3.4 Biological Resources

This chapter discusses the potential for the Proposed Action to affect wetland, riparian, and upland habitats, and the special-status plant, fish, and wildlife species that may utilize these habitats. Specifically, this section: (1) discusses federal, state, and local regulations relevant to vegetation and wildlife resources that may be affected by the Proposed Action; (2) describes the existing environmental setting in the Potentially Affected Area; (3) identifies plant, fish, and wildlife species potentially affected by the Proposed Action; and (4) proposes avoidance, minimization and compensation measures to reduce potentially significant impacts.
The following appendices support this section, unless otherwise specified in the text below:

- **Appendix D**: Supporting Documentation Related to Biological Resources.
- **Appendix F**: Assessment of Potential Effects of the NVRRWP Reductions in Freshwater Discharges into the San Joaquin River on Fisher Habitat and Juvenile Salmon Survival (Hanson 2013).
- **Appendix F:** Draft Sample Frac-out Prevention Plan for HDD

The following sections describe the environmental setting for biological resources in proximity to the project site. Emphasis is placed on biological communities and species that may be affected by construction of the Proposed Action. More general descriptions are provided for areas that would receive recycled water such as agricultural lands and refuges.

For the purposes of this section, the "Study Area" refers to the potential footprint of the Action alternatives including all construction areas, staging areas, access roads, and areas that would be temporarily or permanently disturbed. The Study Area for Alternatives 1 and/or 2 is shown in **Figure 3.4-1,** Sheets 1-17. Note that these figures distinguish preliminary locations where open-cut construction and trenchless construction techniques (e.g., HDD, micro-tunneling) would be employed. In general, trenchless construction techniques would be used in environmentally sensitive areas (e.g., stream crossings, riparian areas) to minimize the potential for disturbance of sensitive resources. The Study Area for Alternative 3 includes the PID intake and the pipeline alignment, which parallels the PID Main Canal and then travels along Bartch and Ward Avenues and is shown in **Figure 3.4-1,** Sheets 18-23.

For the purposes of this section, the "Potentially Affected Area" includes the geographic extent of project actions that may affect biological resources. The Potentially Affected Area includes the Study Area, land within the DPWD's service area, and the CVPIA-designated wildlife refuges that could receive water under the Proposed Action. Because the pipeline alignments cross the DPWD service area, environmental conditions in the agricultural lands that would receive water from NVRRWP are essentially the same as those within the construction footprint.

Figure 3.4-1: Biological Study Area for Alternatives 1 and 2 (1 of 23)

N

0 500 1,000 2,000
Feet

Horizon WATER and ENVIRONMENT

NVRRWP Routes
- North Route
- Turlock-Modesto Link Segment
- South Route (Pomegranate)

Construction Method
- Open-cut Construction
- Trenchless Construction

- Tree
- Photo Location and View Direction

Note
Alternative 1 consists of North Route + Turlock-Modesto Link Segment.
Alternative 2 consists of North Route + South Route.

North Valley Regional Recycled Water Program

Figure 3.4-1
Biological Study Area

Sheet 1 of 17

Figure 3.4-1: Biological Study Area for Alternatives 1 and 2 (2 of 23)

N

0 500 1,000 2,000
Feet

NVRRWP Routes
- North Route
- Turlock-Modesto Link Segment
- South Route (Pomegranate)

Construction Method
- Open-cut Construction
- Trenchless Construction

Tree

Photo Location and View Direction

Note
Alternative 1 consists of North Route + Turlock-Modesto Link Segment.
Alternative 2 consists of North Route + South Route.

Horizon WATER and ENVIRONMENT

North Valley Regional Recycled Water Program

Figure 3.4-1
Biological Study Area

Sheet 2 of 17

Figure 3.4-1: Biological Study Area for Alternatives 1 and 2 (3 of 23)

Figure 3.4-1: Biological Study Area for Alternatives 1 and 2 (4 of 23)

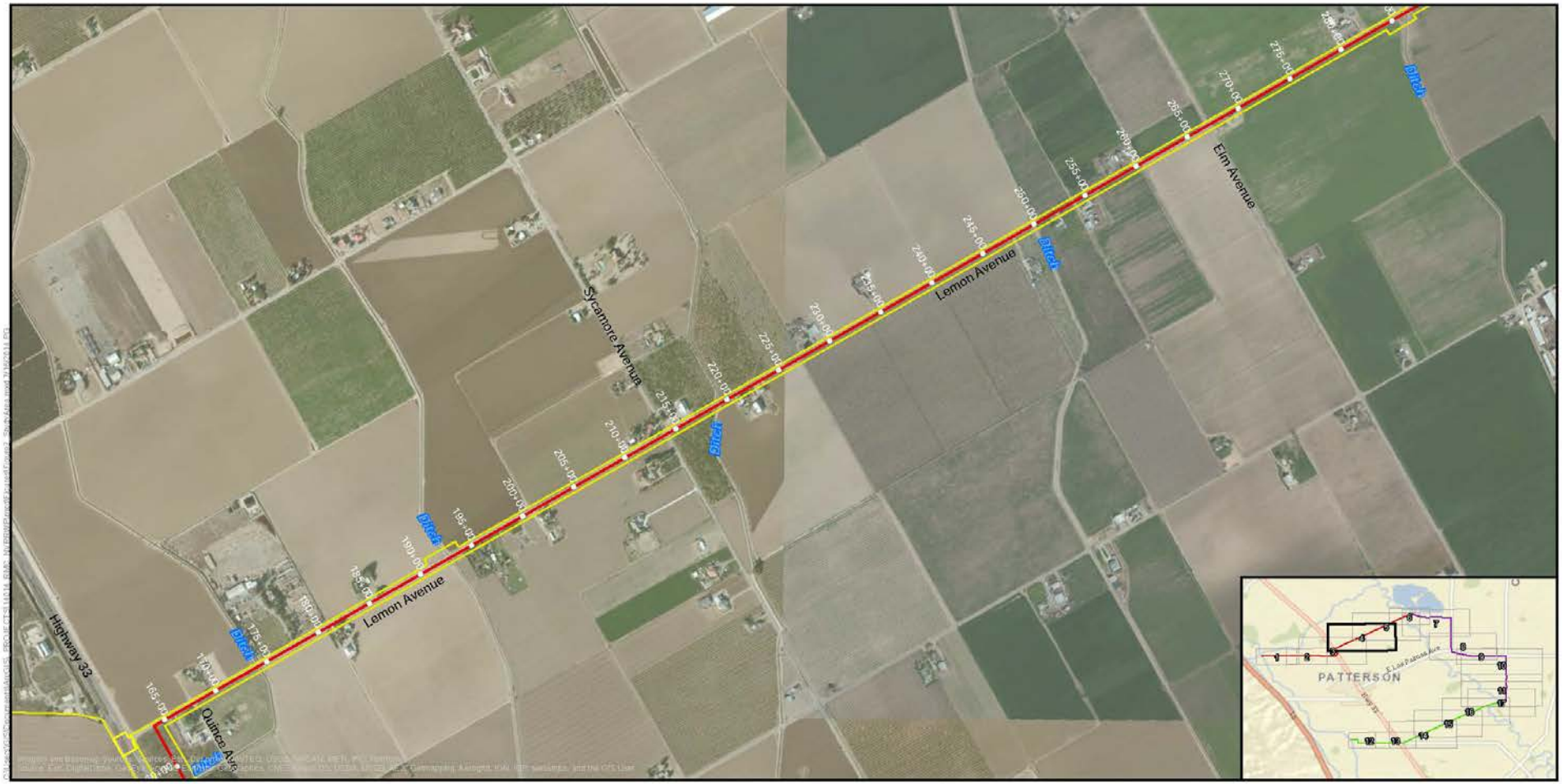


Figure 3.4-1: Biological Study Area for Alternatives 1 and 2 (5 of 23)

Figure 3.4-1: Biological Study Area for Alternatives 1 and 2 (6 of 23)

Figure 3.4-1: Biological Study Area for Alternatives 1 and 2 (7 of 23)

Figure 3.4-1: Biological Study Area for Alternative 1 (8 of 23)

Figure 3.4-1: Biological Study Area for Alternative 1 (9 of 23)

Figure 3.4-1: Biological Study Area for Alternative 1 (10 of 23)

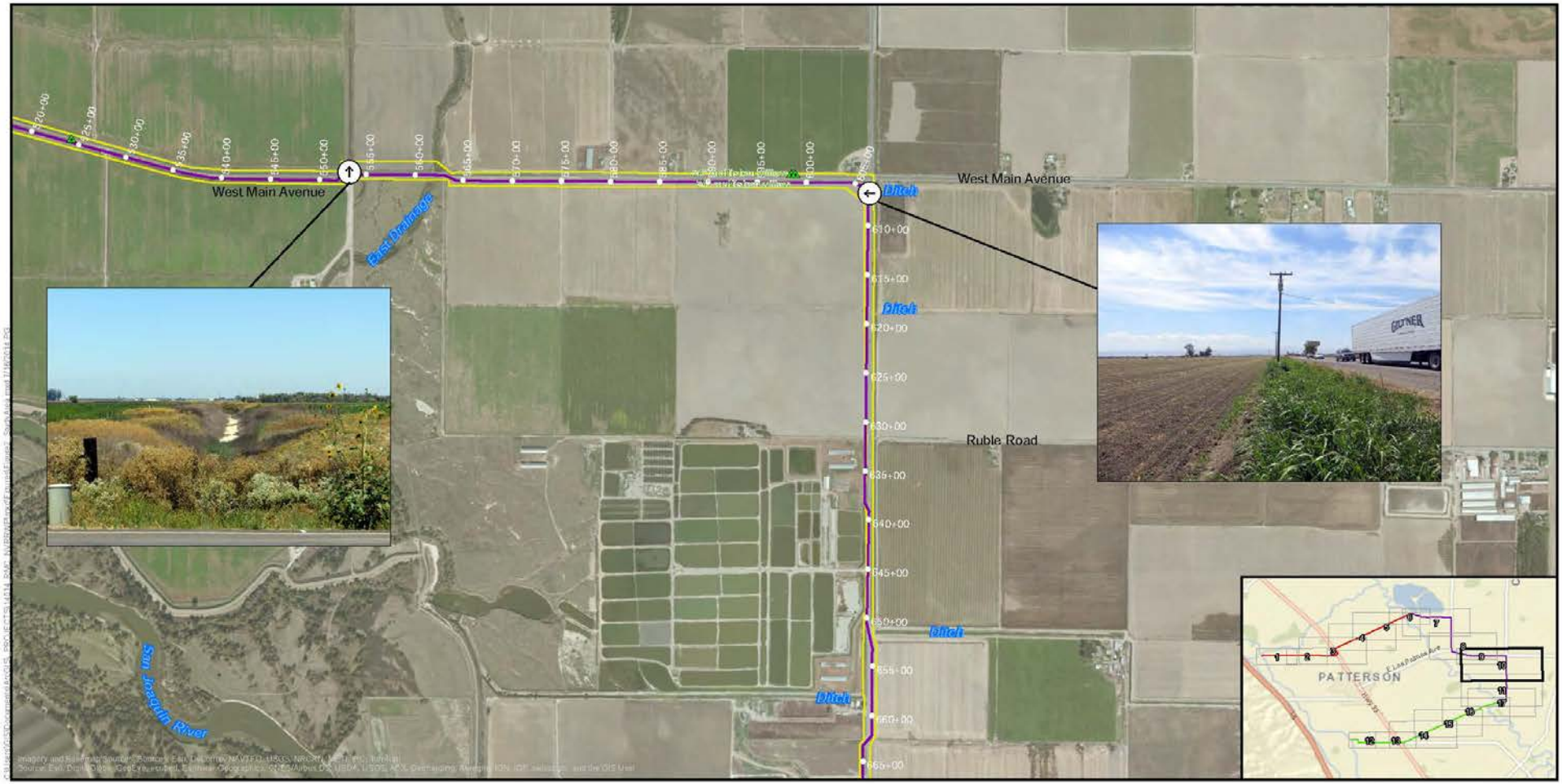


Figure 3.4-1: Biological Study Area for Alternatives 1 and 2 (11 of 23)

Figure 3.4-1: Biological Study Area for Alternative 2 (12 of 23)

Figure 3.4-1: Biological Study Area for Alternative 2 (13 of 23)

Figure 3.4-1: Biological Study Area for Alternative 2 (14 of 23)

N

0 500 1,000 2,000
Feet

Horizon WATER and ENVIRONMENT

NVRRWP Routes
- North Route
- Turlock-Modesto Link Segment
- South Route (Pomegranate)

Construction Method
- Open-cut Construction
- Trenchless Construction

Tree

Photo Location and View Direction

Note
Alternative 1 consists of North Route + Turlock-Modesto Link Segment.
Alternative 2 consists of North Route + South Route.

North Valley Regional Recycled Water Program

Figure 3.4-1
Biological Study Area

Sheet 14 of 17

Figure 3.4-1: Biological Study Area for Alternative 2 (15 of 23)

Figure 3.4-1: Biological Study Area for Alternative 2 (16 of 23)

Figure 3.4-1: Biological Study Area for Alternative 2 (17 of 23)

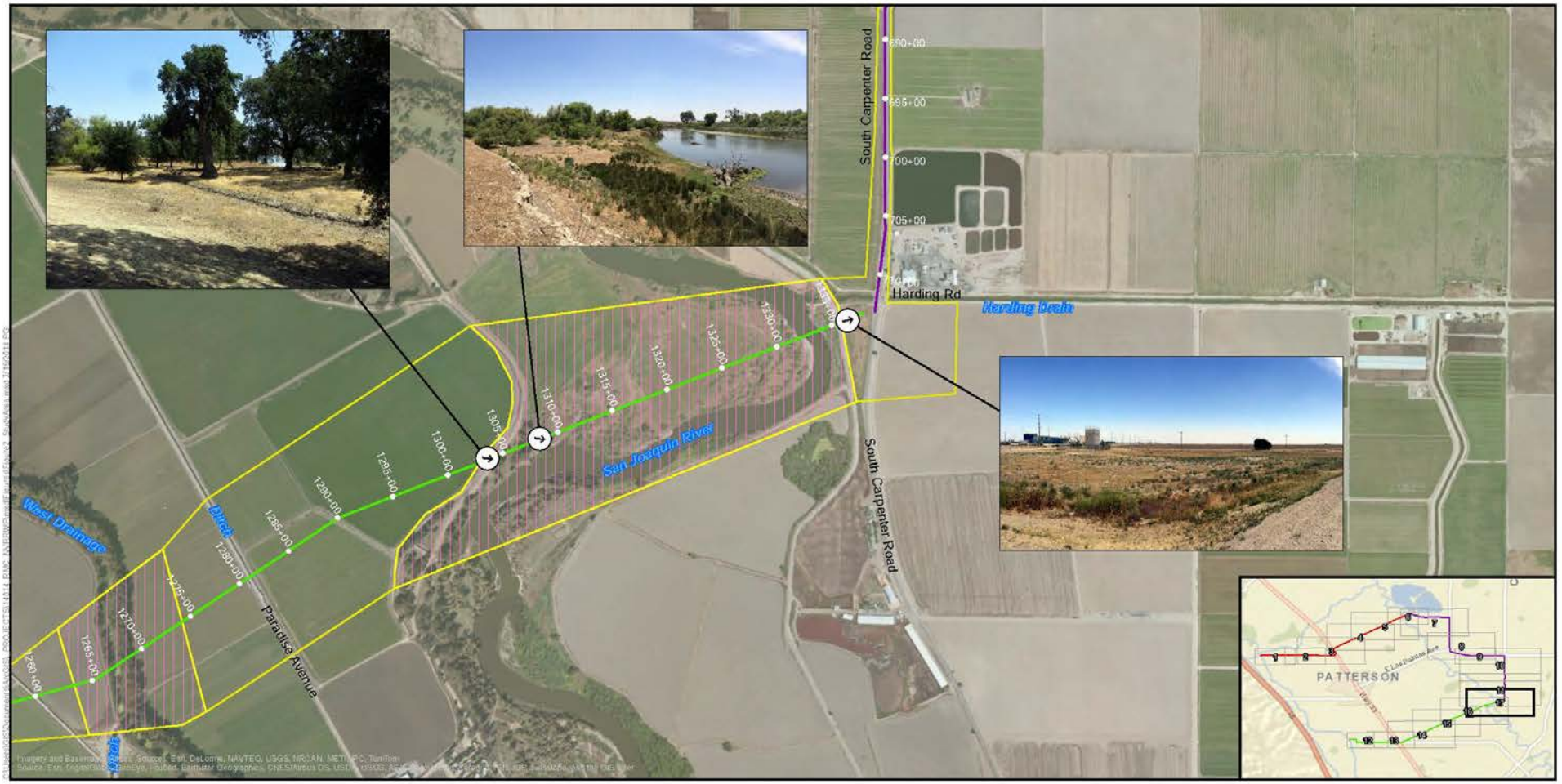


Figure 3.4-1: Biological Study Area for Alternative 3 (18 of 23)

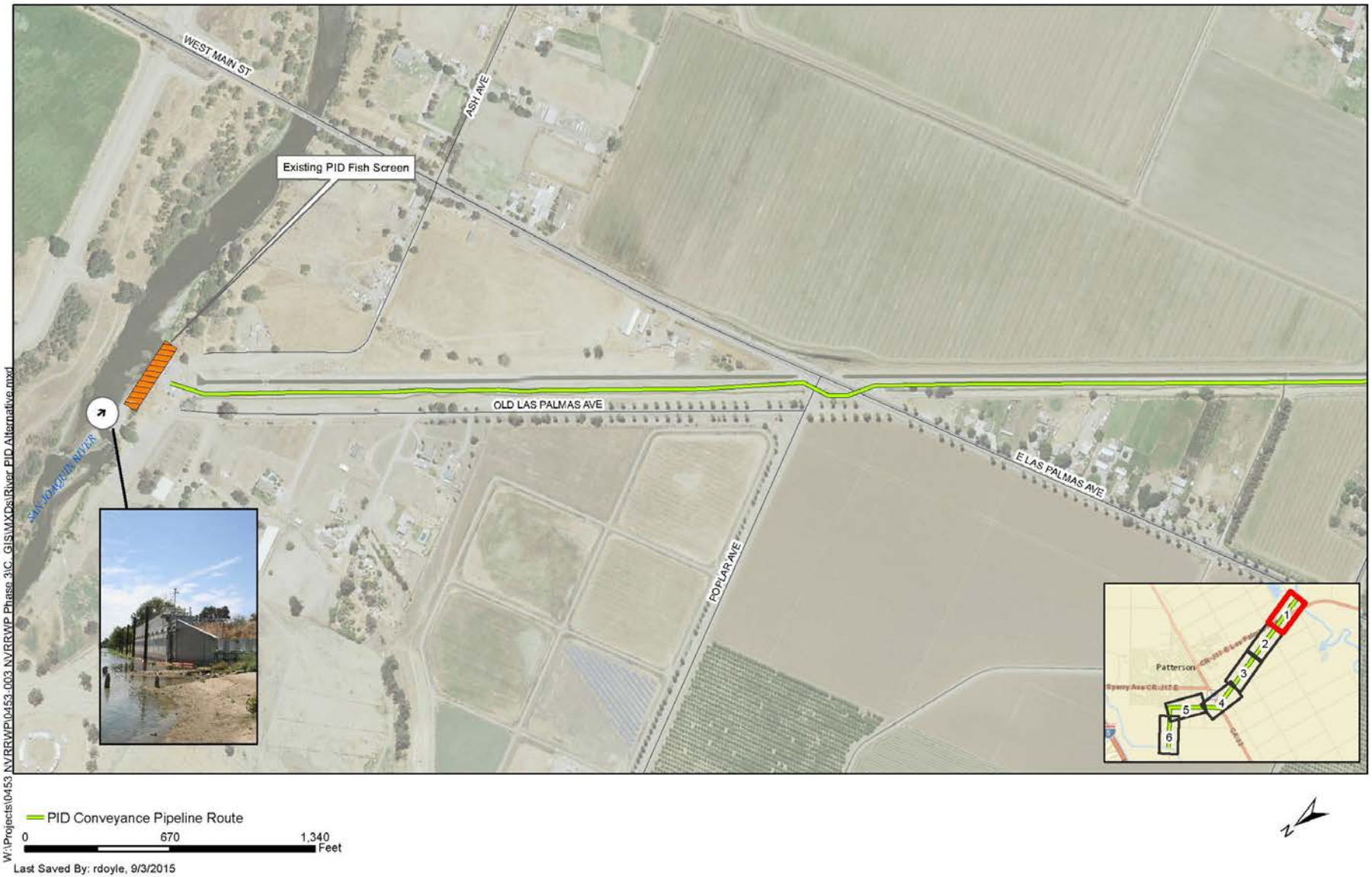


Figure 3.4-1: Biological Study Area for Alternative 3 (19 of 23)

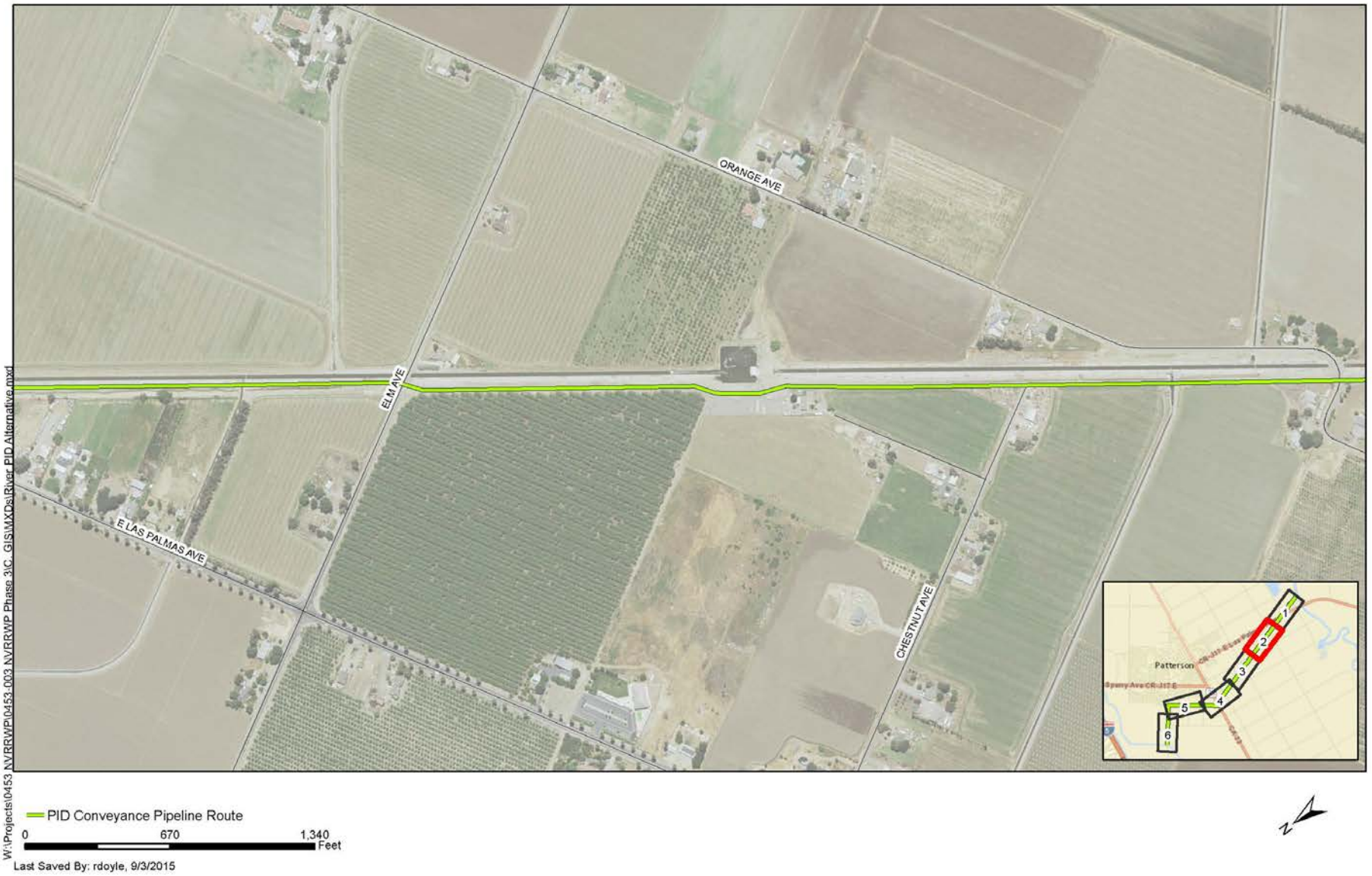


Figure 3.4-1: Biological Study Area for Alternative 3 (20 of 23)

Figure 3.4-1: Biological Study Area for Alternative 3 (21 of 23)

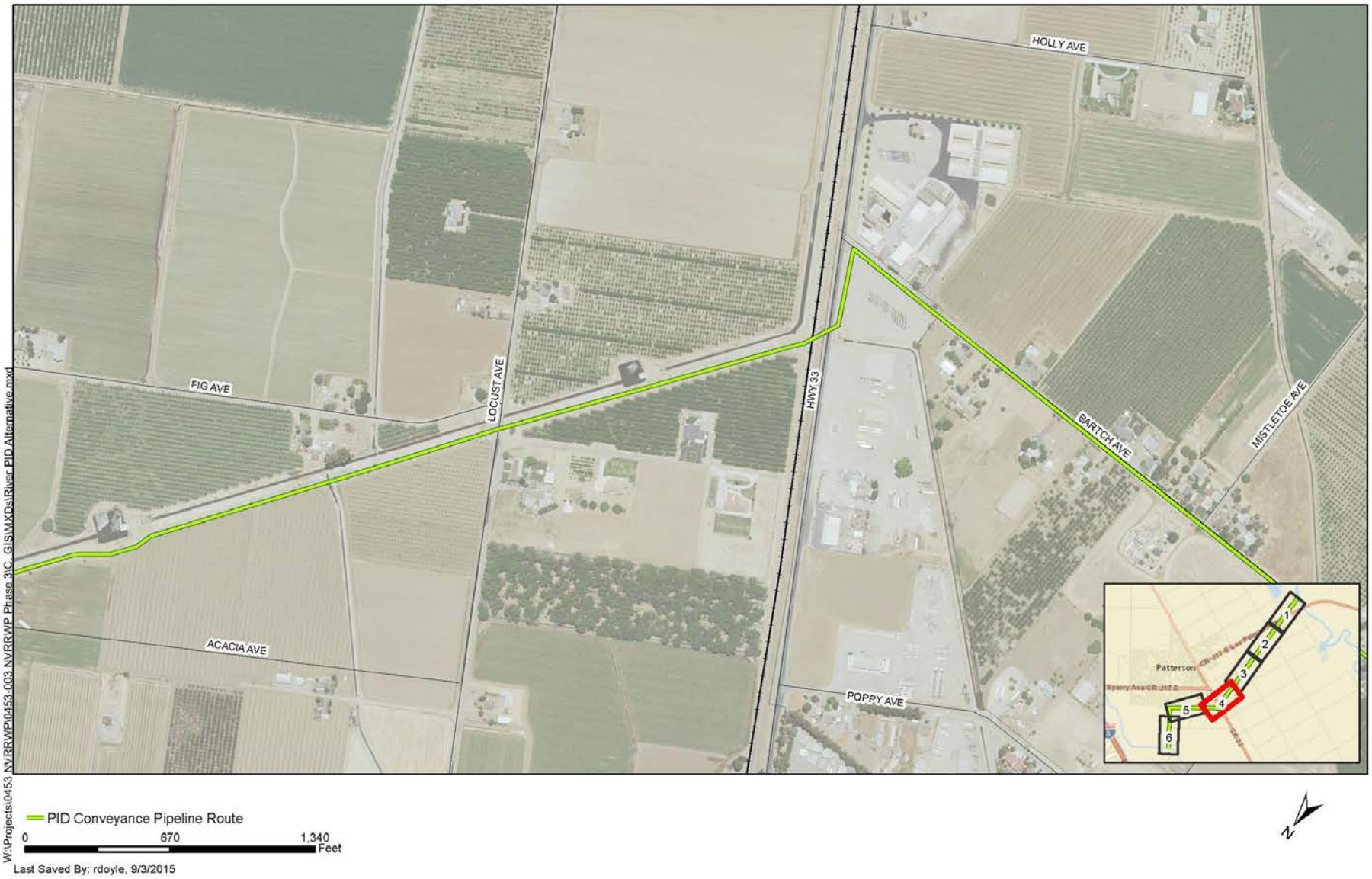


Figure 3.4-1: Biological Study Area for Alternative 3 (22 of 23)

Figure 3.4-1: Biological Study Area for Alternative 3 (23 of 23)

Descriptions of biological resources in the refuges can be found in the environmental document prepared for the refuge water supply program (Reclamation *et al.* 2001). Within the refuges recycled water would only be conveyed to existing habitats that receive water through the refuge water supply program, which includes stream channels, ponds, and wetlands that are seasonally inundated. Water would not be applied to uplands or any isolated wetland areas within those uplands such as vernal pools, which are thus excluded from the Potentially Affected Area.

Regional Setting

The Study Area is situated in the northwestern portion of the San Joaquin Valley and is bisected by the San Joaquin River. The Study Area generally has gently sloping terrain, with elevations around the San Joaquin River approximately 50 to 60 feet above mean sea level (msl), and gradually increases to approximately 180 feet above msl near the DMC.

Historically, land adjacent to the river was characterized by a complex network of sloughs and channels (USGS 1952), which supported a mosaic of habitats including riparian forest and scrub, freshwater wetlands, alkali scrub, and alkali flats (JSA 1998, FWUA and NRDC 2002, CDFW 2014). The completion of Friant Dam near Fresno in 1942 controlled the flow of the San Joaquin River, and within the decades that followed much of the land adjacent to the river was converted to agriculture. The landscape is now dominated by agriculture and agriculture-related business economies. Other land uses in the Study Area include rural residential, wastewater treatment facilities, flood control (levees), transportation, and open space.

The following section provides descriptions of biological communities in the Study Area. The descriptions presented below do not follow one specific classification system (e.g., Holland 1986, Sawyer et al. 2009), rather they draw from several resources to best communicate the characteristics of the resources present in the Study Area. Wildlife typically associated with these biological communities is also described below.

Terrestrial Communities

Agricultural Lands Agricultural lands within and adjacent to the Study Area include flood irrigated pastures, orchards, and row crops. Pastures are typically cultivated in alfalfa (*Medicago sativa*), rescue grass (*Bromus catharticus*), Johnson's grass (*Sorghum halepense*), tall fescue (*Festuca arundinaceae*), and Italian ryegrass (*Festuca perennis*). The primary orchard crops in the vicinity of the Study Area are apricot (*Prunus armeniaca*), English walnut *(Juglans regia*), and almond (*Prunus dulcis*) cultivars (City of Patterson 2010). Row crops include broccoli (*Brassica oleracea*), corn (*Zea mays*), and tomatoes (*Solanum lycopersicum*), among others**.**

Flood irrigated pastures provide food, cover, and nesting grounds for wildlife species; the value of the habitat varies with crop type and agricultural practices. Bird diversity can be high in irrigated pastures (Hartman and Kyle 2010). Species commonly utilizing pasture lands include red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), western meadowlarks (*Sturnella neglecta*), European starling (*Sturnus vulgaris*), house finch (*Carpodacus mexicanus*), killdeer (*Charadrius vociferous*), American crow (*Corvus brachyrhynchos*), and American kestrel (*Falco sparverius*). Some pasture lands and crop fields provide suitable breeding habitat for northern harrier (*Circus cyaneus*). Small mammals in flood

irrigated pasture and row crops provide important prey resources for raptors such as red-tailed hawk (*Buteo jamaicensis*) and Swainson's hawk (*Buteo swainsoni*).

In orchards, the understory vegetation that provides food and cover for wildlife is generally removed, limiting the abundance and diversity of wildlife species. Species such as the side-blotched lizard (*Uta stansburiana*) can occur in this habitat type. American crow and yellow-billed magpies (*Pica nuttalli*), which forage on nut crops, are often present (City of Patterson 2010).

Ruderal Much of the Study Area is situated within access roads and road shoulders that support a ruderal vegetation community. This vegetation type is characterized by early colonizing species of disturbed and degraded areas. Community composition includes non-native annual grasses such as mouse barley (*Hordeum murinum* ssp. *leporinum*), rip-gut brome (*Bromus diandrus*), and red brome (*B. madritensis* ssp. *rubens*). Other species present within this community type include non-native, often invasive thistle species such as spiny sow's thistle (*Sonchus asper*), milk thistle (*Silybum marianum*), star thistles (*Centaurea* spp.) and Italian thistle (*Carduus pycnocephalus*). Although the ruderal plant community is generally limited to herbaceous species, there are several mature, native trees located in this community type along roadways, particularly along Jennings Road and West Main Avenue (**Figure 3.4-1**, Sheets 7 and 8).

Due to sparse vegetative cover and frequent disturbance, ruderal habitats provide limited value to wildlife. Species such as mourning dove (*Zenaida macroura*) and killdeer forage and nest in this community type. The mature trees along the roadways provide perches and nesting habitat for raptors such as red-tailed hawk.

Riparian Woodland

Valley Oak Riparian Forest In the Study Area, valley oak (*Quercus lobata*) riparian forest occurs on the topographically higher portions of the San Joaquin River floodplain (**Figure 3.4-1**, Sheet 17, Station 1310+00) and along the large natural drainage to the west of the San Joaquin River (**Figure 3.4-1**, Sheet 16, Station 1270+00, and Sheet 18, PID Intake). This community type is characterized by large, mature valley oaks in the overstory. The canopy is open to semi-closed. Understory vegetation is generally limited to herbaceous species and vines. Non-native grasses are dominant in the understory along the San Joaquin River. Perennial pepperweed (*Lepidium latifolium*) is dominant in the understory along the channel to the west of the river.

Willow Riparian Woodland Willow (*Salix* spp.) riparian woodland is the dominant community in the San Joaquin River corridor in the Study Area. This vegetation community can best be characterized as Black Willow thicket (Sawyer et al. 2009) or Willow Riparian (Moise and Hendrickson 2002). Black willow (or Gooding's willow, *Salix gooddingii*) composes a minimum of 50 percent of the canopy cover within this vegetation alliance (Sawyer et al. 2009). Fremont's cottonwood (*Populus fremontii*) may be a co-dominant in the overstory canopy. The shrub component of this vegetation type may be composed of willow species (*Salix lasiolepis, S. laevigata* and *S. lucida* ssp. *lasiandra*). Button willow (*Cephalanthus occidentalis*) may dominate along the river banks. Within the Study Area, black willow composes 70 percent or more of the overstory and button willow and young black willow dominate the shrub component;

arroyo willow is also abundant. Various wetland and mesic graminoids (grasses and grass-like plants including rushes and sedges) and forbs are present in the understory depending on the depth to ground water and proximity to the river. Saturated soils and areas with shallow stagnant water are dominated by bulrush (*Schoenoplectus* spp.). River banks and open water support the invasive water hyacinth (*Eichhornia crassipes*) and floating primrose willow (*Ludwigia peploides*). Unsaturated soils located outside the lower floodplain of the river are dominated by mugwort (*Artemisia douglasiana*), stinging nettle (*Urtica dioica*), and poison hemlock (*Conium maculatum*).

Riparian woodlands provide cover, food, and nesting habitat for a variety of wildlife species. Raptor species such as great horned owl (*Bubo virginianus*), red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), Swainson's hawk, white-tailed kite (*Elanus leucurus*), and American kestrel may nest and forage in riparian woodland. Passerine species such as belted kingfisher (*Megaceryle alcyon*), downy woodpecker (*Picoides pubescens*), northern flicker (*Colaptes auratus*), ash-throated flycatcher (*Myiarchus cinerascens*), oak titmouse (*Baeolophus inornatus*), black phoebe (*Sayornis nigricans*), bushtit (*Psaltriparus minimus*), Bewick's wren (*Thryomanes bewickii*), lazuli bunting (*Passerina amoena*), blue grosbeak (*Passerina caerulea*), and species of goldfinches (*Carduelis* spp.) also commonly occur in this habitat. Mammals such as raccoon (*Procyon lotor*), desert cottontail (*Sylvilagus audubonii*), striped skunk (*Mephitis mephitis*), American beaver (*Castor canadensis*), and coyote (*Canis latrans*) are common in riparian woodlands.

Alkali Scrub/Alkali Flat In the Study Area, alkali scrub occurs on the river side of the flood control levee near the Harding Drain (**Figure 3.4-1**, Sheet 17, Station 1335+00). This area is dominated by Australian saltbush (*Atriplex semibaccata*) and big saltbush (*Atriplex lentiformis*). An alkali flat/scrub community occurs adjacent to the Study Area on the south side of West Main Avenue (Figure 3.4-1, Sheet 9, Station 553+00 to 563+00). Dominant species in this area include iodine bush (*Allenrolfea occidentalis*), alkali heath (*Frankenia salina*), saltgrass (*Distichlis spicata*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*) and tumbling saltweed (*Atriplex rosea*). These areas are remnant patches of the expansive alkali habitats that were once present in the San Joaquin Valley.

Alkali habitats support a diversity of wildlife and often rare species, but the alkali habitats in the Study Area are small and disconnected from large tracts of this habitat type. Thus, they are unlikely to support rare species associated with these habitats such as San Joaquin whipsnake (*Masticophis flagellum ruddocki*) and San Joaquin kit fox (*Vulpes macrotis mutica*). More common generalists such as desert cottontail, side-blotched lizard, and various passerine birds are likely to be present.

Aquatic and Wetland Communities

Riverine Riverine habitat in the Study Area includes the main channel of the San Joaquin River. In the Study Area, the river is a low gradient, sand/silt-bed channel with moderate to high sinuosity. Streamflow is perennial. The river is one of the most heavily dammed and diverted rivers in the state. While land use changes and water diversions have substantially reduced the flow and degraded habitat, the river remains an important wildlife corridor in the Central Valley. For example, Chinook salmon (*Oncorhynchus tshawytscha*) and a small number of steelhead

(*O. mykiss*) migrate through this portion of the river to reach spawning habitat in the Merced River (NMFS 2009). White sturgeon (*Acipenser transmontanus*), and possibly green (*Acipenser medirostris*), also occur in this reach of the San Joaquin River (Jackson and Van Eenennaam 2013). Other native fish species that likely occur in this portion of the river include hardhead (*Mylopharodon conocephalus*), Pacific lamprey (*Entosphenus tridentatus*), Kern brook lamprey (*Lampetra hubbsi*), and prickly sculpin (*Cottus asper*). However, reduced flows, high water temperatures in the summer, and degraded water quality have adversely affected the habitat quality for many native fish species, resulting in a greater number of introduced species that are tolerant of these conditions. Introduced species include common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), white catfish (*Ictalurus catus),* fathead minnow (*Pimephales promelas*), red shiner (*Cypriella lutrensis*), and largemouth bass (*Micropteras salmoides*) (San Joaquin River Restoration Program 2012). Herpetofauna that commonly use the river and off-channel aquatic habitats include western pond turtle (*Actinemys marmorata*), Sierran treefrog (*Pseudacris sierra*), and American bullfrog (*Lithobates catesbeianus*).

Sloughs and Natural Drainages As described previously in this section, land adjacent to the river was historically characterized by a complex network of sloughs and side channels. While most of these waterways have been filled, two large drainages that retain "natural" channel characteristics (e.g., sinuosity, non-uniform bed and banks) remain intact in the Study Area: one on the east side of the river, and one on the west. The drainage located east of the river flows adjacent to the City of Modesto Police Department shooting range, alkali habitat south of West Main Avenue, and the Modesto WTP spray fields (**Figure 3.4-1**, Sheets 7 to 10). In general, this drainage has steep banks, which are armored with rip-rap in many locations. Large stands of bulrush are dispersed throughout the drainage. Floating aquatic vegetation such as Ludwigia (*Ludwigia peploides*) is also common.

The drainage to the west of the river (**Figure 3.4-1**, Sheet 16) has the characteristic of a backwater channel or abandoned slough. Flow is likely slow or stagnant throughout most of the year. This channel does not have abundant emergent or aquatic vegetation, but there is a considerable amount of woody debris. Streambanks are gently sloped.

Natural drainages likely support an assemblage of fishes tolerant of warm water and low oxygen conditions such as mosquitofish (*Gambusia affinis*). Ducks and wading birds, such as great blue heron (*Ardea herodias*) and egrets, forage in these drainages. Both drainages provide potentially suitable habitat for western pond turtle, and the drainage on the east side of the river provides potentially suitable habitat for giant garter snake (*Thamnophis gigas*). These drainages are also used by semi-aquatic rodents such as nutria (*Myocastor coypus*) or muskrat (*Ondatra zibethicus*).

Constructed or Modified Drainages The project's proposed alignments cross numerous drainage facilities and irrigation ditches. These water conveyance features vary considerably in scale and character. Some of the larger drainage features, such as the Harding Drain, have channel widths of 10 to 20 feet and support tall emergent vegetation such as cattail (*Typha* spp.) and bulrush. The smaller drain facilities support less vegetation.

Wildlife species that may utilize the larger constructed drainage facilities are similar to those described for the natural drainages above. The large drainage facilities with tall emergent

vegetation support nesting of species such as red-winged blackbird and marsh wren (*Cistothorus palustris*). They provide only marginally suitable habitat for western pond turtle and giant garter snake. The smaller drainage facilities provide more limited wildlife habitat, but some support invertebrate production and avian foraging.

Canals Canals in the Study Area include the DMC and several small concrete-lined and un-lined irrigation canals. The DMC in the Study Area supports limited, if any, aquatic vegetation. Fish species such as striped bass (*Morone saxatilis*) and channel catfish are present in the canal. The DMC embankments support some ruderal vegetation. A small mammal burrow was observed along the embankment near Marshall Road (**Figure 3.4-1**, Sheet 12). No evidence of use by burrowing owls (*Athene cunicularia*) was observed during the reconnaissance survey, but this area is potentially suitable habitat for this species. Small concrete canals in the Study Area provide limited habitat for vegetation or wildlife (Horizon 2014b).

Alkaline Pool/Swale An alkaline pool and a swale exist within the alkali flat/scrub community that occurs adjacent to the Study Area on the south side of West Main Avenue (**Figure 3.4-1**, Sheet 9, Stations 555+00 to 557+00). The pool has been disturbed by grazing and supports limited vegetation (See photo on **Figure 3.4-1**, Sheet 9). The alkali swale is also partially barren, but it supports more vegetation than the pool. Dominant vegetation in the swale consists of iodine bush (*Allenrolfea occidentalis*) and alkali heath (*Frankenia salina*). These wetlands provide potentially suitable habitat for vernal pool branchiopods. While the alkali pool would provide suitable breeding habitat for California tiger salamander (*Ambystoma californiense*), the surrounding landscape lacks suitable upland habitat for this species.

DPWD Service Area

Land within the DPWD service area includes agricultural lands, constructed and modified drainage facilities, and canals. The characteristics of these areas and associated biological resources are similar to the descriptions provided for the Study Area.

South of the Delta CPVIA-designated Wildlife Areas

Multiple NWAs and SWAs, and one privately-managed complex in the Central Valley are designated as CVPIA units/refuges. These areas are generally open spaces containing habitat such as wetlands, native grasslands, riparian forests, and vernal pools that support a variety of fish and wildlife species and are an important part of the Pacific Flyway, a major migration route for migratory birds. A detailed description of the natural resources associated with the refuges is provided in the *San Joaquin River National Wildlife Refuge Final Comprehensive Conservation Plan* (USFWS 2006).

3.4.2 Regulatory Framework

This section describes laws and regulations at the federal, state, and local level that may apply to the Proposed Action.

Federal Policies and Regulations

Clean Water Act The Clean Water Act (CWA) is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands.

Section 401 Section 401 of the CWA allows for evaluation of water quality when a proposed activity requiring a federal license or permit could result in a discharge to waters of the U.S. In California, the SWRCB and its nine Regional Water Quality Control Boards issue water quality certifications. Each Regional Water Quality Control Board is responsible for implementing Section 401 in compliance with the CWA and its water quality control plan (also known as a Basin Plan). Applicants for a federal license or permit to conduct activities that may result in the discharge to waters of the U.S. (including wetlands) must also obtain a Section 401 water quality certification to ensure that any such discharge will comply with the applicable provisions of the CWA. Compliance with Section 401 is required for all projects that have a federal component and may affect state water quality.

Section 404 CWA section 404 regulates the discharge of dredged and fill materials into waters of the U.S., which include all navigable waters, their tributaries, and some isolated waters, as well as some wetlands adjacent to the aforementioned waters (33 CFR § 328.3). Areas typically not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially irrigated areas, artificial lakes or ponds used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water-filled depressions (33 CFR Part 328). Areas meeting the regulatory definition of waters of the U.S. are subject to the jurisdiction of the USACE under provisions of CWA section 404. Construction activities involving placement of fill into jurisdictional waters of the U.S. are regulated by the USACE through permit requirements. No USACE permit is effective in the absence of state water quality certification pursuant to section 401 of the CWA.

Rivers and Harbors Act - Section 10 Section 10 of the Rivers and Harbors Act (33 U.S.C. § 401 et seq.) requires authorization from USACE for construction of any structure over, in, or under navigable waters of the U.S. The navigable length of the San Joaquin River currently includes 236 miles of the river from Sycamore Road (located 7 miles downstream from SR 99 in Fresno County) to San Francisco Bay.

Fish and Wildlife Coordination Act The Fish and Wildlife Coordination Act (FWCA) of 1934, as amended (16 U.S.C. § 661 *et seq*.) is intended to promote conservation of fish and wildlife resources by preventing their loss or damage, and to provide for development and improvement of fish and wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to fully consider recommendations made by USFWS, NMFS, and State wildlife agencies when any waterbody is impounded, diverted, controlled, or modified for any purpose.

Due to the nature of the Proposed Action, Reclamation is coordinating with the USFWS pursuant to FWCA. Compliance with FWCA is being coordinated with Reclamation's Endangered Species Act (ESA) consultation.

Endangered Species Act The ESA of 1973 (16 U.S.C. § 1531–1544) provides protection for animal and plant species that are in danger of extinction (endangered) and those that may become so in the foreseeable future (threatened). The USFWS and NMFS have regulatory authority over projects pursuant to the ESA that may affect the continued existence of a federally listed (threatened or endangered) species. Section 9 of the ESA prohibits the take of federally

listed species. Take is defined under the ESA, in part, as killing, harming, or harassment of such species. Under federal regulations, take is further defined to include habitat modification or degradation where it actually results in death or injury to wildlife by substantially impairing essential behavioral patterns, including breeding, feeding, or sheltering. Several species listed under the ESA occur or have the potential to occur in the Study Area.

Section 7 of the ESA outlines procedures for federal interagency cooperation and participation in the conservation and recovery of federally listed species and designated critical habitat. Section 7(a)(2) requires federal agencies to consult with other federal agencies with regulatory authority to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or to destroy or adversely modify designated critical habitat. Critical habitat identifies specific areas that have the physical and biological features that are essential to the conservation of a listed species, and that may require special management considerations or protection.

Reclamation has been coordinating with USFWS and NMFS on an ongoing basis since early in the planning process to incorporate ESA section 7(a)(2) consultation for potential effects to listed species due to the Proposed Action. Reclamation will not initiate any action related to the NVRRWP without first completing the appropriate consultation(s) with USFWS or NMFS. Documentation of the completion of Section 7 consultation will be included in the Record of Decision issued by Reclamation for the Proposed Action.

Magnuson-Stevens Fishery Conservation and Management Act The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) of 1976 is the primary act governing federal management of fisheries in federal waters, from the 3-nautical-mile state territorial sea limit to the outer limit of the U.S. Exclusive Economic Zone. It establishes exclusive U.S. management authority over all fishing within the Exclusive Economic Zone, all anadromous fish throughout their migratory range except when in a foreign nation's waters, and all fish on the continental shelf. The Magnuson-Stevens Act establishes eight Regional Fishery Management Councils responsible for the preparation of fishery management plans to achieve the optimum yield from U.S. fisheries in their regions. The act also requires federal agencies to consult with NMFS on actions that could damage Essential Fish Habitat (EFH). EFH includes those habitats that support the different life stages of each managed species. A single species may use many different habitats throughout its life to support breeding, spawning, nursery, feeding, and protection functions. EFH can consist of both the water column and the underlying surface (e.g., streambed) of a particular area. The San Joaquin River in the Study Area is designated EFH for Chinook salmon. Reclamation is consulting with NMFS pursuant to the Magnuson-Stevens Act in coordination with its ESA consultation.

Migratory Bird Treaty Act The Migratory Bird Treaty Act (MBTA) (Title 16, U.S.C., Part 703) implements various treaties and conventions between the U.S., Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the MBTA, it is illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations (16 U.S.C. 703). The regulatory definition of *take,* as defined by 50 CFR 10.12, *means to pursue, hunt, shoot, wound, kill, trap,*

capture, or collect, or attempt hunt, shoot, wound, kill, trap, capture, or collect. As such, *take* under the MBTA does not include the concepts of harm and harassment as defined under ESA. The MBTA defines migratory birds broadly; USFWS maintains a list of all covered birds that are considered migratory birds under the MBTA.

The USFWS is responsible for overseeing compliance with the MBTA. On December 8, 2004, the U.S. Congress passed the Migratory Bird Treaty Reform Act (Division E, Title I, Section 143 of the Consolidated Appropriations Act, 2005, PL 108–447), which excludes all migratory birds non-native or human-introduced to the U.S. or its territories. It defines a native migratory bird as a species present within the U.S. and its territories as a result of natural biological or ecological processes. The USFWS published a list of the bird species excluded from the MBTA on March 15, 2005 (70 Federal Register 12710).

Bald and Golden Eagle Protection Act The Bald and Golden Eagle Protection Act prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions (16 U.S.C. 668). Under the Bald and Golden Eagle Protection Act, it is a violation to "…take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest or egg, thereof…". *Take* is defined to include pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, and disturb. *Disturb* is further defined in 50 CFR Part 22.3 as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Public Law 102-575, Title 34, Central Valley Project Improvement Act The CVPIA, a multipurpose water legislation, was signed into law October 30, 1992. Previously referred to as H.R. 429, Public Law 102-575 contains 40 separate titles providing for water resource projects throughout the West. Title 34 of the CVPIA mandates changes in management of the CVP, particularly for the protection, restoration, and enhancement of fish and wildlife.

Ten major water management areas of change include: 800,000 AF of water dedicated to fish and wildlife annually; tiered water pricing applicable to new and renewed contracts; water transfers provision, including sale of water to users outside the CVP service area; special efforts to restore anadromous fish populations by 2002; restoration fund financed by water and power users for habitat restoration and enhancement and water and land acquisitions; no new water contracts until fish and wildlife goals achieved; no contract renewals until completion of a Programmatic EIS; terms of contracts reduced from 40 to 25 years with renewal at the discretion of the Secretary of the Interior; installation of the temperature control device at Shasta Dam; implementation of fish passage measures at Red Bluff Diversion Dam; firm water supplies for Central Valley wildlife refuges; and development of a plan to increase CVP yield (Reclamation 2014).

Public Law 105-57, National Wildlife Refuge System Improvement Act of 1997 USFWS implements the mandates of Public Law 105-57, the National Wildlife Refuge System

Improvement Act of 1997. The Act amends the National Wildlife Refuge System Administration Act of 1966 in a manner that provides an "Organic Act" for the Refuge System. USFWS is responsible for developing comprehensive conservation plans to guide the management and resources of each individual refuge. More than 545 national wildlife refuges and thousands of waterfowl production areas across the U.S. teem with millions of migratory birds, serve as havens for hundreds of endangered species, and host an enormous variety of other plants and animals.

Executive Orders Several Executive Orders (EOs) have been issued providing direction to federal agencies regarding invasive species, floodplain management, and protection of wetlands, as discussed below.

EO 13112: Invasive Species EO 13112 directs all federal agencies to prevent and control introductions of invasive non-native species in a cost-effective and environmentally sound manner to minimize their economic, ecological, and human health impacts. As directed by this EO, a national invasive species management plan guides federal actions to prevent, control, and minimize invasive species and their impacts (NISC 2008).

EO 11990: Protection of Wetlands EO 11990 directs federal agencies to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in implementing civil works.

State Policies and Regulations

California Environmental Quality Act—Sections 15065 and 15380 Title 14, section 15065 of the California Code of Regulations (CEQA Guidelines) requires that a lead agency shall determine whether a project may have a significant effect on the environment and require an EIR to be prepared for the project if there is substantial evidence, in light of the whole record, that the project has the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, and/or substantially reduce the number or restrict the range of an endangered, rare or threatened species.

Title 14, section 15380 of the California Code of Regulations defines the terms "species", "endangered", "rare", and "threatened" as they pertain to CEQA. Section 15380 also provides a greater level of consideration for state-listed or federally-listed species, and for any species that can be shown to meet the criteria for listing, but which has not yet been listed. The criteria for considering a species endangered, rare, or threatened under CEQA are as follows:

- When its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors.
- Although not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens.

- The species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered "threatened" as defined in the ESA.

Species that meet the criteria listed above are often considered “Species of Special Concern” by the CDFW. Species of Special Concern is an administrative designation and carries no formal legal status. Generally, Species of Special Concern should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined in section 15380 of the CEQA Guidelines. However, some older lists of Species of Special Concern were not developed using criteria relevant to CEQA, and the information used in generating those lists is out of date. Therefore, the current circumstances of each unlisted Species of Special Concern must be considered in the context of section 15380 criteria and not automatically assumed to be rare, threatened or endangered. As described in Chapter 1, the City of Modesto is the CEQA lead agency for the NVRWWP and has certified a Final EIR for the project.

California Fish and Game Commission The California Constitution establishes the California Fish and Game Commission (Commission) (California Constitution Article 4, § 20). The Fish and Game Code delegates the power to the Commission to regulate the taking or possession of birds, mammals, fish, amphibian and reptiles (Fish & G. Code, § 200). The Commission has adopted regulations setting forth the manner and method of the take of certain fish and wildlife in the California Code of Regulations, Title 14. Likewise, the Commission has exclusive statutory authority under the Fish and Game Code to designate species as endangered or threatened under the California Endangered Species Act (CESA) (Fish & G. Code, § 2070). Under the Commission’s general regulatory powers function, it establishes seasons, bag limits, and methods of take for game animals and sport fish (i.e., hunting and fishing regulations).

California Fish and Game Code

Section 700 - Species Protection The Fish and Game Code established the CDFW (Fish & G. Code, § 700) and states that the fish and wildlife resources of the state are held in trust for the people of the state by and through the CDFW (Fish & G. Code, § 711.7, subd. (a)). Fish and Game Code section 1802 states that CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. All licenses, permits, tag reservations, and other entitlements for the take of fish and game authorized by the Fish and Game Code are prepared and issued by CDFW (Fish & G. Code, § 1050, subd. (a)). Provisions of the Fish and Game Code establish special protection to certain enumerated species, such as section 5515, which lists fully protected fish species.

Section 1602 – Lake or Streambed Alteration Fish and Game Code section 1602 states that "an entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake" unless CDFW receives written notification regarding the activity and the entity pays the applicable fee. If CDFW determines that the activity may substantially adversely affect an existing fish or wildlife resource, an agreement is issued to the entity that includes reasonable measures necessary to protect the resource.

Section 1900-1913 – Native Plant Protection Act The Native Plant Protection Act (NPPA) of 1977 (Fish & G. Code, §§ 1900-1913) directs CDFW to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this state." The NPPA authorizes the Commission to designate plants as 'endangered' or 'rare' and prohibits 'take' of any such plants, except as authorized in limited circumstances.

CDFW and the California Native Plant Society (CNPS), a non-governmental organization, jointly maintain California Rare Plant Rank lists. These lists include plant species of concern in California. Vascular plants included on these lists are defined as follows:

- List 1: Plants considered extinct or extirpated in California.
- List 1B: Plants that are rare, threatened, or endangered in California and elsewhere.
- List 2: Plants that are rare, threatened, or endangered in California, but more common elsewhere.
- List 3: Plants about which more information is needed - review list.
- List 4: Plants of limited distribution - watch list.

Plants appearing on Lists 1 and 2 are, in general, considered to meet the CEQA Guidelines section 15380(b) criteria and adverse effects to these species may be considered significant. Impacts to plants that are on Lists 3 and 4 are also considered during CEQA review, although because these species are typically not as rare as those on Lists 1 and 2, impacts to them are less frequently considered potentially significant.

Section 2050 et seq. – California Endangered Species Act CESA (Fish & G. Code, § 2050 et seq.) is intended to conserve, protect, restore, and enhance species designated as endangered or threatened, and their habitat (Fish & G. Code, § 2052). The Commission has exclusive statutory authority to designate species as endangered or threatened under CESA (California Constitution, article IV, § 20, subd. (b); Fish & G. Code, § 2070). Animal species designated as endangered or threatened under CESA are listed in California Code of Regulations, Title 14, section 670.5. Plant species designated as endangered or threatened under CESA, or designated as a rare plant species under the California Native Plant Protection Act (Fish & G. Code, § 1900 et seq.), are listed in California Code of Regulations, Title 14, section 670.2.

CESA directs all state agencies, boards, and commissions to seek to conserve endangered and threatened species, and to utilize their authority in furtherance of that policy (Fish & G. Code, § 2055). For purposes of CESA, "conserve," "conserving," and "conservation" mean to implement all methods and procedures necessary to increase the abundance of any endangered or threatened species to levels at which the protections provided by CESA are no longer necessary. These methods and procedures include, but are not limited to, all activities associated with scientific resources management, such as research; census; law enforcement; habitat acquisition; restoration and maintenance; propagation; live trapping; and transplantation; and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking (Fish & G. Code, § 2061). CESA emphasizes that state agencies should not approve projects as proposed that would jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species if there are reasonable and prudent

alternatives available consistent with conserving the species or its habitat that would prevent jeopardy (Fish & G. Code, § 2053).

Species designated as endangered or threatened under CESA, and species designated as candidates for listing or delisting under CESA, are subject to what is commonly known as CESA's "take" prohibition. In general, this prohibition provides that no person shall import into the state, or export out of the state, or take, possess, purchase, or sell within the state (or attempt to do any of those acts), any species, or any part or product thereof, designated by the Commission as protected under CESA, except as otherwise provided by law (Fish & G. Code, §§ 2080, 2085; see also Cal. Code Regs., Tit. 14, § 783.1). "Take" is defined specifically in the Fish and Game Code to mean "hunt, pursue, catch, capture, or kill," or an attempt to do any such act; violations of CESA's take prohibition are criminal misdemeanors under state law (Fish & G. Code, §§ 86, 12000; see also *Department of Fish and Game v. Anderson-Cottonwood Irrigation District* (1992) 8 Cal. App. 4th 1554). Unlike the ESA, CESA applies the take prohibitions to species under petition for listing (candidates) in addition to listed species. Section 2081 of the Fish and Game Code expressly allows CDFW to authorize, by permit, the incidental take of endangered, threatened, and candidate species if all of certain conditions are met. The City of Modesto and the Partner Agencies will be responsible for ensuring compliance with CESA and all other state and local laws and regulations, as applicable.

Other Sections Other sections of the Fish and Game Code describe protection for specific types of wildlife. For example, Fish and Game Code sections 3503, 3513, and 3800 (and other sections and subsections) protect native birds, including their active or inactive nests and eggs, from all forms of take ('take' means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill [Fish & G. Code, § 86]). Raptors (i.e., eagles, falcons, hawks, and owls) and their nests are specifically protected in California under Fish and Game Code section 3503.5, which states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Certain species are designated as fully protected under Fish and Game Code sections 3511 (birds), 5515 (fish), 4700 (mammals), and 5050 (amphibians) and it is illegal to take these species. Non-game mammals are also protected by Fish and Game Code section 4150.

Porter-Cologne Water Quality Act See *Section 3.11, Hydrology and Water Quality.*

National Pollutant Discharge Elimination System (NPDES) Permits See *Section 3.11, Hydrology and Water Quality.*

Local Policies and Regulations

Stanislaus County General Plan Stanislaus County has identified the following goals and policies in the Conservation/Open Space Element of the General Plan (1994) that are relevant to the Proposed Action:

GOAL ONE: Encourage the protection and preservation of natural and scenic areas throughout the County.

Policy One Maintain the natural environment in areas dedicated as parks and open spaces.
Policy Three Areas of sensitive wildlife and plant life (e.g., vernal pools, riparian habitats, flyways and other waterfowl habitats) including habitats and plant species listed in the General Plan Support Document or by state or federal agencies shall be protected from development.
Policy Four Protect and enhance oak woodlands and other native hardwood habitat.

*GOAL TWO***:** Conserve water resources and protect water quality in the County.

Policy Five Protect groundwater aquifers and recharge areas, particularly those critical for the replenishment of reservoirs and aquifers.
Policy Six Preserve vegetation to protect waterways from bank erosion and siltation.

*GOAL TEN***:** Protect fish and wildlife species of the County.

Policy Twenty-Nine Adequate water flows should be maintained in the County's rivers to allow salmon migration.

Implementation Measure 1. The County should continue to lobby the federal government to provide adequate water flow in the County's rivers to allow salmon migration.

Policy Thirty Habitats of rare and endangered fish and wildlife species shall be protected

City of Modesto General Plan The City of Modesto Urban Area General Plan was adopted on October 14, 2008 (City of Modesto 2008). The City of Modesto is currently conducting environmental review on amendments to the 2008 Urban Area General Plan. The Jennings Plant is not within the boundaries of the Urban Area General Plan. The 2008 Urban Area General Plan states that:

"*In the past, the city has relied upon Section 56742 a–b of the Government Code to annex properties noncontiguous to the city, for the purpose of establishing and expanding certain wastewater treatment facilities on Jennings Road, adjacent to the San Joaquin River. Annexation of all of the Wastewater Treatment Plant land is underway at the Jennings Road facilities. Because this site is approximately seven miles from the city limits it is not depicted graphically on the Land Use Diagram. Nevertheless, as long as Section 56742 a–b remains in effect, the city will continue to expand the treatment facilities, and annex the land to the city as appropriate and as needs dictate. The Sphere of Influence should reflect the ability of the City to take this action*."

The 2008 Urban Area General Plan goes on to state that:

"*The City will designate a riparian habitat preserve for the Jennings Road and Sutter Avenue wastewater facilities, where they adjoin the San Joaquin and Tuolumne Rivers,*

respectively, to foster the best conjunctive management of wastewater facilities. The Jennings Road and Sutter Avenue wastewater sites have been incorporated into the Tuolumne River Regional Park (TRRP) Master Plan, and the designation of riparian habitat preserves at these locations is consistent with provisions in the TRRP Master Plan. The designation of riparian preserves at these locations will help preserve open space and protect habitat for threatened and endangered species, including valley elderberry longhorn beetle and Swainson's hawk."

3.4.3 Special-status Species

Definitions and Methods of Assessment

Special-status plant and wildlife species refers to those species that meet one or more of the following criteria:

- Species that are listed as threatened or endangered under ESA (50 CFR 17.12 for listed plants, 50 CFR 17.11 for listed animals).
- Species that are candidates for possible future listing as threatened or endangered under ESA (76 Federal Register 66370).
- Species that are listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5).
- Plants listed as rare under the California Native Plant Protection Act of 1977 (Fish & G. Code, § 1900 et seq).
- California Rare Plant Rank List 1 and 2 species.
- Species that meet the definitions of rare or endangered under CEQA (CEQA Guidelines, § 15380).
- Animals fully protected in California (Fish & G. Code, § 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).

Background information on special-status plant and wildlife species with potential to occur in the Study Area was compiled from numerous sources including, but not limited to, the following:

- USFWS List of Federal Endangered and Threatened Species that Occur in or May Be Affected by Projects in Stanislaus County as well as in the U.S. Geological Survey (USGS) 7.5 minute quadrangles for the Study Area, including Patterson, Westley, Brush Lake, Crow's Landing (USFWS 2014, **Appendix D**).
- California Natural Diversity Database (CNDDB) and CNPS Inventory of Rare and Endangered Plants of California queries for USGS 7.5 minute quadrangles within the Proposed Action Area and quadrangles immediately adjacent to them: Patterson, Westley, Brush Lake, Crow's Landing, Copper Mountain, Solyo, Vernalis, Ripon, Salida, Riverbank, Ceres, Hatch, Gustine, Newman, Orestimba Peak and Wilcox Ridge (**Appendix D**).
- City of Turlock Draft and Final EIR for the Harding Drain Bypass Project (City of Turlock 2004, City of Turlock 2005).
- eBird.org records for the Modesto Wastewater Treatment Plant and spray fields.
- Horizon's field notes and reports from pre-construction surveys and construction monitoring for the Harding Drain Bypass Project (Horizon 2014a).

Reconnaissance level surveys were conducted on April 4, May 9 and 22, July 1, and August 8, 2014. **Tables 3.4-1 and 3.4-2** list the special-status plant and wildlife species known to occur in the vicinity of the Study Area for all three action alternatives, and **Figures 3.4-2** and **3.4.3** show the CNDDB occurrences of special-status plants and animals within a 5-mile radius of the Study Area. The potential for special-status species to occur in the vicinity of the Study Area was evaluated according to the following criteria:

- **None**: indicates that the area contains a complete lack of suitable habitat, the local range for the species is restricted, and/or the species is extirpated in this region.
- **Not Expected**: indicates situations where suitable habitat or key habitat elements may be present but may be of poor quality or isolated from the nearest extant occurrences. Habitat suitability refers to factors such as elevation, soil chemistry and type, vegetation communities, microhabitats, and degraded/significantly altered habitats.
- **Possible**: indicates the presence of suitable habitat or key habitat elements that potentially support the species.
- **Present**: indicates the species was either observed directly or its presence was confirmed by diagnostic signs (i.e. tracks, scat, burrows, carcasses, castings, prey remains) during field investigations or in previous studies in the area.

The Study Area was divided into two areas for the evaluation:

1. Potential for special-status species to occur in areas with open-cut construction.
2. Potential for special-status species to occur within trenchless construction areas or adjacent habitats.

In general, the Proposed Action intends to avoid the use of open-cut construction in areas with potentially sensitive biological or hydrologic resources (i.e. areas without wetlands and/or habitat for special-status species). As described previously, trenchless construction techniques would be used in environmentally sensitive areas. The impact analysis presented in *Section 3.4.4* considers the potential for direct and indirect impacts to special-status species and their habitats. Brief summaries of the life history for special-status species with the potential to be impacted by the Proposed Action are provided in **Appendix D**.

3.4.4 Impact Analysis/Environmental Consequence

Analysis Approach

The Proposed Action may impact biological resources through the direct or indirect disturbance, modification, or destruction of habitat such that it results in death, injury or harassment of individuals or populations of plant or animal species, or impedes or prevents the dispersal of individuals or populations of special-status species. Potential impacts on existing biological resources were evaluated by comparing the quantity and quality of habitats present in the Study Area under the No Action Alternative's baseline conditions to anticipated conditions after implementation of the Proposed Action. Direct and indirect impacts on special-status species were assessed based on the potential for the species or their habitat to be disturbed or enhanced by implementation of the Proposed Action.

In general, once construction is complete, operation and maintenance of the proposed facilities, as described in *Chapter 2, Alternatives and Proposed Action,* would not involve disturbance to biological resources. The Proposed Action would deliver tertiary-treated recycled water to the DMC, where it would blend with the other sources of water in the canal (including other waters of wastewater origin). Irrigation in the DPWD service area would continue to use water from the DMC, and irrigation practices would not change. Continued irrigation is not expected to affect biological resources. Supplemental water would be delivered to refuges via either existing turnouts from the DMC or through other existing private conveyance systems, as appropriate, and in accordance with the refuges' respective annual water delivery schedules. Water delivered to refuges would be managed for wetland and habitat purposes in accordance with the refuges' Reclamation-approved Refuge Water Management Plans. Water would not be applied to uplands or vernal pools and would thus not affect species or habitats in those areas. Unless otherwise stated below, impacts associated with operation and maintenance are considered unlikely or less than significant, and are not discussed further.

Criteria for Determining Significance/Consequence

For the purposes of this analysis, the Proposed Action would result in a significant impact or potential impact to biological resources if it would meet one or more of the following criteria:

- Have a substantial or potential adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW, USFWS, or NMFS.
- Have a substantial or potential adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW, USFWS, or NMFS.
- Have a substantial or potential adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially or potentially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with local policies or ordinances protecting biological resources, or conflict with the provisions of an adopted Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP).

The analysis considers both species and their habitats. A less than significant or unlikely to impact determination generally refers to a situation where there is a measurable impact, but the impact is not likely to result in an adverse outcome for the survival or fitness of a particular species, or a widespread or long-lasting adverse effect on a natural community. Conversely, an impact would be considered potentially significant or adverse if it may substantially decrease the likelihood of survival or fitness of a particular species (e.g., substantial decrease in a local population size or extirpation), or result in widespread or long-lasting adverse effects on a natural community. For impacts found to be "potentially significant", mitigation measures are proposed.

Table 3.4-1: Special-Status Plant Species

Name	Federal listing status	State listing status	Rare Plant Rank	General Habitat	Micro Habitat and Flowering Period	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
red-flowered bird's-foot trefoil *Acmispon rubriflorus*	None	None	1B.1	Cismontane woodland, valley and foothill grassland.	Known from only four disjunct occurrences. The closest occurrence is along Del Puerto Canyon Road, west of Interstate 5 at elevations between 200 - 425 m. Flowers April - June.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
Sharsmith's onion *Allium sharsmithiae*	None	None	1B.3	Cismontane woodland, chaparral.	Rocky, serpentine slopes. 400 - 1200 m. Flowers March - May.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
large-flowered fiddleneck *Amsinckia grandiflora*	FE	SE	1B.1	Cismontane woodland, valley and foothill grassland.	Annual grassland in various soils. 275 - 550 m. Flowers April - May.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
alkali milk-vetch *Astragalus tener* var. *tener*	None	None	1B.2	Alkali playa, valley and foothill grassland, vernal pools.	Low ground, alkali flats, and flooded lands; in annual grassland or in playas or vernal pools. 1-60 m. Flowers March to June.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Species is known to occur in the vicinity of the Project Area along the San Joaquin River for all three Action alternatives. Potential habitat for this species occurs in trenchless construction areas crossing the San Joaquin River and in alkaline flats adjacent to the Alternative 1 Project Area between Stations 553+00 to 563+00. Species was not observed during 2014 reconnaissance surveys (Horizon 2014b).
heartscale *Atriplex cordulata*	None	None	1B.2	Chenopod scrub, valley and foothill grassland, meadows.	Alkaline flats and scalds in the Central Valley, sandy soils. 1- 560 m. Flowers April - October.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species only occurs in alkaline flats adjacent to the Alternative 1 Project Area between Stations 553+00 to 563+00. Species was not observed during 2014 reconnaissance surveys (Horizon 2014b).

Name	Federal listing status	State listing status	Rare Plant Rank	General Habitat	Micro Habitat and Flowering Period	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
brittlescale *Atriplex depressa*	None	None	1B.2	Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland, Vernal pools.	Alkaline clay. Flowers April - October.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species only occurs in alkaline flats adjacent to the Alternative 1 Project Area between Stations 553+00 to 563+00. Species was not observed during 2014 reconnaissance surveys (Horizon 2014b).
lesser saltscale *Atriplex minuscula*	None	None	1B.1	Chenopod scrub, playas, valley and foothill grassland.	In alkali sink and grassland in sandy, alkaline soils. 20-100 m. Flowers May - October.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species only occurs in alkaline flats adjacent to the Alternative 1 Project Area between Stations 553+00 to 563+00. Species was not observed during 2014 reconnaissance surveys (Horizon 2014b).
vernal pool smallscale *Atriplex persistens*	None	None	1B.2	Vernal pools.	Alkaline vernal pools. 10-115 m. Flowers June to October.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species only occurs in alkaline pools/swales adjacent to the Alternative 1 Project Area between Stations 553+00 to 563+00. Species was not observed during 2014 reconnaissance surveys (Horizon 2014b).
big tarplant *Blepharizonia plumosa*	None	None	1B.1	Valley and foothill grassland.	Dry slopes in annual grassland. Clay to clay-loam soils; usually on slopes and often in burned areas. 30-505 m. Flowers July to October.	None. Suitable habitat is not present in Project Area for all three Action alternatives.	None. Suitable habitat is not present in Project Area for all three Action alternatives.
Chinese Camp brodiaea *Brodiaea pallida*	FT	SE	1B.1	Valley and foothill grassland in the North to Central Sierra Foothills.	In flat, rocky, intermittent streambed on serpentine soils. 160–390 m. Flowers May to June.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
round-leaved filaree *California macrophylla*	None	None	1B.1	Cismontane woodland, valley and foothill grassland.	Clay soils. 15-1200 m. Flowers March to May.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Not expected. Marginally suitable habitat is only present in the San Joaquin River crossings and PID Intake areas for all three Action alternatives.

Name	Federal listing status	State listing status	Rare Plant Rank	General Habitat	Micro Habitat and Flowering Period	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
Santa Cruz Mountains pussypaws *Calyptridium parryi* var. *hesseae*	None	None	1B.1	Chaparral, cismontane woodland.	Sandy or gravelly openings. 305-1530 m. Flowers May to August.	None. Suitable habitat is not present. Project Area is not within species known elevation range for all three Action alternatives.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
chaparral harebell *Campanula exigua*	None	None	1B.2	Chaparral.	Rocky sites, usually on serpentine in chaparral. 275-1250 m. Flowers May to June.	None. Suitable habitat is not present. Project Area is not within species known elevation range for all three Action alternatives.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
succulent (=fleshy) owl's-clover *Castilleja campestris* ssp. *succulenta*	FT	SE	1B.2	Vernal pools, valley and foothill grassland.	Moist places, often in acidic soils. 25-750 m.	None. Suitable habitat is not present for all three Action alternatives.	None. Suitable habitat is not present for all three Action alternatives.
Lemmon's jewelflower *Caulanthus lemmonii*	None	None	1B.2	Valley and foothill grassland, chaparral and scrub vegetation. Coast ranges, San Francisco Bay Area and Southwestern San Joaquin Valley.	80-1220 m.Flowers March to May.	None. Suitable habitat is not present. Project Area is not within species known elevation range for all three Action alternatives.	None. Suitable habitat is not present. Project Area is not within species known elevation range.
Hoover's spurge *Chamaesyce hooveri*	FE	ST	1B.2	Vernal pools, valley and foothill grassland.	Vernal pools on volcanic mudflow or clay substrate. 25-130 m. Flowers July to September.	None. Suitable habitat is not present within Project Area for all three Action alternatives.	None. Suitable habitat is not present within Project Area for all three Action alternatives.
hispid bird's-beak *Chloropyron molle* ssp. *hispidum*	None	None	1B.1	Meadows and seeps, playas, valley and foothill grassland.	In damp alkaline soils, especially in alkaline meadows and alkali sinks with Distichlis. 1-155 m. Flowers June to September.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species only occurs in alkaline flats adjacent to the Alternative 1 Project Area between Stations 553+00 to 563+00. Species was not observed during 2014 reconnaissance surveys (Horizon 2014b).
slough thistle *Cirsium crassicaule*	None	None	1B.1	Chenopod scrub, marshes and swamps, riparian scrub.	Sloughs, riverbanks, and marshy areas. Primarily freshwater wetlands. 3-100 m. Flowers May to August.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species includes the San Joaquin River crossings, PID Intake, natural drainages, and alkali scrub.

Name	Federal listing status	State listing status	Rare Plant Rank	General Habitat	Micro Habitat and Flowering Period	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
Hospital Canyon larkspur *Delphinium californicum* ssp. *interius*	None	None	1B.2	Cismontane woodland, chaparral, coastal scrub.	In wet, boggy meadows, openings in chaparral and in canyons. 195-1,095 m. Flowers April to June.	None. Suitable habitat is not present. Project Area is not within species known elevation range for all three Action alternatives.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
Santa Clara Valley dudleya *Dudleya setchelli*	FE	None	1B.2	Valley and foothill grassland, cismontane woodland.	On rocky serpentine outcrops and on rocks within grassland or woodland. 60-455 m. Flowers April to October.	None. Suitable habitat is not present. Project Area is not within species known elevation range for all three Action alternatives.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
Delta button-celery *Eryngium racemosum*	None	SE	1B.1	Riparian scrub.	Seasonally inundated depressions in floodplains on clay soils. 3-30 m. Flowers from June to October.	None. Suitable habitat is not present in the Project Area for all three Action alternatives.	Possible. Potential habitat for this species includes the San Joaquin River crossings for all three Action alternatives; however, clay soil required for species was not observed during 2014 reconnaissance surveys (Horizon 2014b).
spiny-sepaled button-celery *Eryngium spinosepalum*	None	None	1B.2	Vernal pools, valley and foothill grassland.	Vernal pools, within grasslands, at some sites found on clay soil of granitic origin;. 80-1,025 m. Flowers April to May.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
diamond-petaled California poppy *Eschscholzia rhombipetala*	None	None	1B.1	Valley and foothill grassland.	fallow fields and open places on alkaline, clay slopes and flats. 0 - 975 m. Flowers March to April.	Not expected. Minimal habitat is present in the Project Area for all three Action alternatives.	Not expected. Minimal habitat is present in the Project Area for all three Action alternatives.
San Joaquin spearscale *Extriplex joaquinana*	None	None	1B.2	Chenopod scrub, alkali meadow, playas, valley and foothill grassland.	In seasonal alkali wetlands or alkali sink scrub with *Distichlis spicata*, *Frankenia salina*, and other alkali species. 1-835 m. Flowers April to September.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species occurs in alkaline flats adjacent to the Alternative 1 Project Area between Stations 553+00 to 563+00. Species was not observed during 2014 reconnaissance surveys (Horizon 2014b).
Tehama County western flax *Hesperolinon tehamense*	None	None	1B.3	Chaparral, cismontane woodland.	Serpentine barrens in chaparral. 100-1,250 m. Flowers May to June.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.

Name	Federal listing status	State listing status	Rare Plant Rank	General Habitat	Micro Habitat and Flowering Period	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
Mt. Hamilton coreopsis *Leptosyne hamiltonii*	None	None	1B.2	Cismontane woodland.	On steep shale talus with open southwestern exposure. 530-1,300 m. Flowers March to May.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
Hall's bush-mallow *Madia radiata*	None	None	1B.1	Valley and foothill grassland, cismontane woodland, chenopod scrub.	Grassy or open slopes, generally clayey soils or shale. 25-1,125 m. Flowers March to May.	None. Suitable habitat is not present within Project Area for all three Action alternatives.	None. Suitable habitat is not present within Project Area for all three Action alternatives.
showy golden madia *Malacothamnus hallii*	None	None	1B.2	Chaparral.	Some populations on serpentine. 10-550 m. Flowers May to October.	None. Suitable habitat is not present within Project Area for all three Action alternatives.	None. Suitable habitat is not present within Project Area for all three Action alternatives.
prostrate vernal pool navarretia *Navarretia prostrata*	None	None	1B.1	Coastal scrub, valley and foothill grassland, vernal pools.	Alkaline floodplains and vernal pools. 15-700 m. Flowers April to July.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species only occurs in alkaline flats/pool adjacent to the Alternative 1 Project Area between Stations 553+00 to 563+00. Species was not observed during 2014 reconnaissance surveys (Horizon 2014b).
Colusa grass *Neostapfia colusana*	FT	SE	1B.1	Vernal pools.	Usually in large, or deep vernal pool bottoms; adobe soils. 5-125 m. Flowers May to August.	None. Suitable habitat is not present within Project Area for all three Action alternatives.	None. Suitable habitat is not present within Project Area for all three Action alternatives.
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	FT	SE	1B.1	Vernal pools.	10-755m. Flowers April to September.	None. Suitable habitat is not present within Project Area for all three Action alternatives.	None. Suitable habitat is not present within Project Area for all three Action alternatives.
hairy Orcutt grass *Orcuttia pilosa*	FE	SE	1B.1	Vernal pools.	25-125 m. Flowers May to September.	None. Suitable habitat is not present within Project Area for all three Action alternatives.	None. Suitable habitat is not present within Project Area for all three Action alternatives.
Mt. Diablo phacelia *Phacelia phacelioides*	None	None	1B.2	Chaparral, cismontane woodland.	On rock outcrops and talus slopes; sometimes on serpentine. 500-1,370 m. Flowers April to June.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.

Name	Federal listing status	State listing status	Rare Plant Rank	General Habitat	Micro Habitat and Flowering Period	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
Hartweg's golden sunburst *Pseudobahia bahiifolia*	FE	SE	1B.1	Valley and foothill grassland, cismontane woodland.	Clay soils, often acidic. Predominantly on the northern slopes of knolls, but also along shady creeks or near vernal pools. 15-150 m. Flowers March to May.	None. Suitable habitat is not present within Project Area for all three Action alternatives.	None. Suitable habitat is not present within Project Area for all three Action alternatives.
Sanford's arrowhead *Sagittaria sanfordii*	None	None	1B.2	Marshes and swamps.	In standing or slow-moving freshwater ponds, marshes, and ditches. 0-650 m. Flowers May to October.	None. Suitable habitat is not present for all three Action alternatives in open-cut areas.	Possible. Natural drainages and some manmade drainages provide potentially suitable habitat within Project Area for all three Action alternatives.
prairie wedge grass *Sphenopholis obtusata*	None	None	2B.2	Cismontane woodland, meadows and seeps.	Open moist sites, along rivers and springs, alkaline desert seeps. 360-2,325m. Flowers April to July.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.
Suisun Marsh aster *Symphyotrichum lentum*	None	None	1B.2	Marshes and swamps (brackish and freshwater).	Most often seen along sloughs, ponds and ditches with *Phragmites sp.*, *Scirpus sp.*, *Rubus armeniacus, Typha*, etc. 0-3 m. Flowers May to November.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Not expected. Natural and some manmade drainages provide potentially suitable habitat within Project Area for all three Action alternatives, but this species does not typically occur in this portion of the San Joaquin River valley.
Greene's tuctoria *Tuctoria greenei*	FE	Rare	1B.1	Vernal pools, valley and foothill grassland.	Clay bottoms of drying vernal pools and lakes in valley grassland. 5-10 m. Flowers May to September.	None. Suitable habitat is not present within Project Area for all three Action alternatives.	None. Suitable habitat is not present within Project Area for all three Action alternatives.
Red Hills vervain *Verbena californica*	FT	ST	1B.1	Cismontane woodland, valley and foothill grassland.	Mesic sites on serpentine; usually serpentine seeps or creeks. 260-400 m. Flowers May to September.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.	None. Suitable habitat is not present. Project Area for all three Action alternatives is not within species known elevation range.

* List of Abbreviations for Federal and State Species Status follow below:

FE = Federal endangered
FP = State fully protected species
FT = Federal threatened
SE = State endangered
SSC = State species of special concern

ST = State threatened
California Native Plant Society, California Rare Plant Rank:
(1A) Presumed extinct in California
(1B) Rare, threatened, or endangered in California and elsewhere
(2) Rare, threatened, or endangered in California but common elsewhere
1 – Seriously endangered in California
2 – Fairly endangered in California
3 – Not very endangered in California

Table 3.4-2: Special-Status Wildlife Species

Scientific name	Federal listing status	State listing status	General Habitat	Micro Habitat	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
Invertebrates						
Conservancy fairy shrimp *Branchinecta conservatio*	FE	SE	Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools.	Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains, last until June.	None. Suitable habitat is not present in the Project Area for all three Action alternatives.	Possible. Marginally suitable habitat for this species only occurs in the alkaline pool adjacent to the Alternative 1 Project Area at Station 553+00.
longhorn fairy shrimp *Branchinecta longiantenna*	FE	None	Endemic to the eastern margin of the Central Coast mtns in seasonally astatic grassland vernal pools.	Inhabit small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow swales.	None. Suitable habitat is not present in the Project Area for all three Action alternatives.	Possible. Potential habitat for this species only occurs in alkaline pools/swales adjacent to the Alternative 1 Project Area between Stations 553+00 to 557+00.
vernal pool fairy shrimp *Branchinecta lynchi*	FT	None	Endemic to the grasslands of the Central Valley, Central Coast mtns, and South Coast mtns, in astatic rain-filled pools.	Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools. Also known in alkaline pools (Helm 1998).	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species only occurs in alkaline pools/swales adjacent to the Alternative 1 Project Area between Stations 553+00 to 557+00.
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	None	Occurs only in the central valley of California, in association with blue elderberry (*Sambucus mexicana*).	Not specifically defined.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Blue elderberry (host plant) was observed near the Harding Drain outlet at the San Joaquin River (San Joaquin River) and is potentially present in other parts of the Action area at San Joaquin River crossings, PID Intake and along other drainages.
vernal pool tadpole shrimp *Lepidurus packardi*	FE	None	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water.	Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Potential habitat for this species only occurs in alkaline pools/swales adjacent to the Alternative 1 Project Area between Stations 553+00 to 557+00.
Fish						
green sturgeon *Acipenser medirostris*	FT, CH	SSC	These are the most marine species of sturgeon. Abundance increases northward of Point Conception. Spawns in the Sacramento, Klamath, and Trinity Rivers.	Spawns at temps between 8-14 C. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock. Occasionally reported in the San Joaquin River upstream from Stockton (Jackson, Z. J., and J. P. Van Eenennaam. 2013)	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Not expected. There are anecdotal reports of this species in the San Joaquin River downstream of the Project Area for all three Action alternatives (Jackson and Van Eenennaam 2013), but no confirmed accounts. NMFS believes this species would not be present in the Project Area (Pers. Comm. Gutierrez 2014).

Scientific name	Federal listing status	State listing status	General Habitat	Micro Habitat	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
Delta smelt *Hypomesus transpacificus*	FT, CH	SE	Sacramento-San Joaquin Delta. Seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay.	Seldom found at salinities > 10 ppt. Most often at salinities < 2ppt.	None. Project Area is out of range of the species for all three Action alternatives.	None. Project Area is out of range of the species for all three Action alternatives.
San Joaquin roach *Lavinia symmetricus*	None	SSC	Primarily found in small, warm streams but are capable of thriving in larger, colder streams with diverse conditions	Extreme tolerance includes temperatures ranging from 85-95ºF and dissolved oxygen levels as low as 1-2 ppm	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. The San Joaquin River in the Project Area for all three Action alternatives provides potentially suitable habitat.
steelhead (Central Valley DPS) *Oncorhynchus mykiss*	FT, CH	None	Populations spawning in the Sacramento and San Joaquin rivers and their tributaries. Distribution of steelhead in the Central Valley has been significantly reduced in recent years.	Require beds of loose, silt-free, coarse gravel for spawning. Also need cover, cool water and sufficient dissolved oxygen.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Present. Merced River, upstream of the Project Area for all three Action alternatives, supports a small run of steelhead and its designated critical habitat. Species uses San Joaquin River as migratory habitat.
Chinook salmon (Central Valley fall- late fall-run ESU) *Oncorhynchus tshawytscha*	FC	SSC	Populations spawn in the Sacramento and San Joaquin rivers and tributaries.	Require beds of loose, silt-free, coarse gravel for spawning. Also need cover, cool water and high dissolved oxygen.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Present. Merced River, upstream of the Project Area, supports fall-run Chinook. Species uses San Joaquin River as migratory habitat.
Chinook salmon (Central Valley spring-run ESU) *Oncorhynchus tshawytscha*	FT, CH	ST	Populations spawning in Sacramento River tributaries.	Require beds of loose, silt-free, coarse gravel for spawning. Also need cover, cool water and sufficient dissolved oxygen.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Not expected. Naturally spawned spring-run Chinook have been extirpated from the San Joaquin River drainage (Lindley et al. 2004). Strays from populations in the Sacramento River basin may occasionally occur in Project Area for all three Action alternatives.
Chinook salmon (Central Valley spring-run ESU) *Oncorhynchus tshawytscha*	Nonessential experimental population	See FGC 2080.2 to 2080.4.	All spring-run Chinook salmon, including those that have been released or propagated, naturally or artificially, within the experimental population area, which is defined as the San Joaquin River from Friant Dam downstream to its confluence with the Merced River (exclusive)].	Require beds of loose, silt-free, coarse gravel for spawning. Also need cover, cool water and sufficient dissolved oxygen.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Present. A nonessential experimental population has recently been reintroduced to the San Joaquin River within the Project Area for all three Action alternatives (SJRRP 2014).

Scientific name	Federal listing status	State listing status	General Habitat	Micro Habitat	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
Chinook salmon (Sacramento River winter-run ESU) *Oncorhynchus tshawytscha*	FE	SE	Populations spawning in the Sacramento and San Joaquin Rivers and their tributaries.	Require beds of loose, silt-free, coarse gravel for spawning. Also need cover, cool water and sufficient dissolved oxygen.	None. Project Area is outside of species range for all three Action alternatives.	None. Project Area for all three Action alternatives is outside of species range.
hardhead *Mylopharodon conocephalus*	None	SSC	Widely distributed in low to mid-elevation streams in the Sacramento and San Joaquin River tributaries	—	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Species has recently been observed in San Joaquin River near confluence with Stanislaus (Pers. Comm. Merz, 2014).
Sacramento splittail *Pogonichthys macrolepidotus*	None	SSC	Endemic to the lakes and rivers of the Central Valley, but now confined to the Delta, Suisun Bay and associated marshes.	Slow moving river sections, dead end sloughs. Requires flooded vegetation for spawning and foraging for young.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Present. Species distribution fluctuates. During wet years, species has been observed upstream of the Project Area for all three Action alternatives. During dry years, species is not common downstream of the Tuolumne River confluence (Moyle 2002).
Pacific lamprey *Lampetra tridentate*	FSC	None	Found in Pacific Coast streams north of San Luis Obispo Co., however regular runs in Santa Clara River. Size of runs is declining	Swift-current gravel bottomed areas for spawning with water temps between 12-18 C. Ammocoetes need soft sand or mud.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Species has been observed in San Joaquin River upstream and downstream of the Project Area for all three Action alternatives. Various lifestages maybe present year-round. Spawning habitat is not present.
Kern brook lamprey *Entospherus hubbsi*	None	SSC	San Joaquin River system and Kern River	Gravel-bottomed areas for spawning and muddy-bottomed areas where ammocoetes can burrow and feed.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Species has been observed in San Joaquin River upstream and downstream of the Project Area for all three Action alternatives. Various lifestages maybe present year-round. Spawning habitat is not present.
river lamprey *Lampetra ayresii*	None	SSC	San Joaquin River system and Kern River	Adults need clean, gravelly riffles, ammocoetes need sandy backwaters or stream edges, good water quality and temps < 25 C	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Species has been observed in San Joaquin River upstream and downstream of the Project Area. Various lifestages maybe present year-round. Spawning habitat is not present.
Amphibians and Reptiles						
California tiger salamander *Ambystoma californiense*	FT	ST	Central Valley DPS federally listed as threatened. Santa Barbara and Sonoma counties DPS federally listed as endangered.	Need underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding	None. Suitable habitat is not present in the Project Area for all three Action alternatives.	None. The alkaline pool adjacent to the Alternative 1 Project Area at Station 553+00 provides potentially suitable breeding habitat, but the Project Area lacks suitable upland habitat.

Scientific name	Federal listing status	State listing status	General Habitat	Micro Habitat	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
Yosemite toad Bufo canorus	FC	SSC	Vicinity of wet meadows in central High Sierra, 6,400 to 11,300 feet in elevation	Primarily montane wet meadows; also in seasonal ponds associated with lodgepole pine and subalpine conifer forest.	None. Project Area for all three Action alternatives is outside of species range.	None. Project Area for all three Action alternatives is outside of species range.
western pond turtle *Actinemys (=Emys) marmorata*	None	SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation below 6000 ft elevation.	Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Species is likely to occur in San Joaquin River, natural drainages, and some ditches within Project Area for all three Action alternatives.
Blunt-nosed leopard lizard *Gambelia sila*	FE	SE, FP	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	None. Project Area for all three Action alternatives is outside of species current range.	None. Project Area is outside of species current range.
San Joaquin whipsnake *Masticophis flagellum ruddocki*	None	SSC	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.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Saltbush scrub on the inboard side of San Joaquin River levee near Station 1335 (Alternative 2) is potentially suitable habitat. Species was not observed in this location during surveys conducted for the Harding Drain Bypass Project (Horizon 2014a).
Alameda whipsnake *Masticophis lateralis euryxanthus*	FT	ST	Typically found in chaparral and scrub habitats but will also use adjacent grassland, oak savanna and woodland habitats.	Mostly south-facing slopes and ravines, with rock outcrops, deep crevices or abundant rodent burrows, where shrubs form a vegetative mosaic with oak trees and grasses.	None. Project Area for all three Action alternatives is outside of species range.	None. Project Area for all three Action alternatives is outside of species range.
foothill yellow-legged frog *Rana boylii*	None	SSC	Shallow, flowing water in small to moderate-sized streams with at least some cobble-sized substrate	___	None. Suitable habitat is not present in the Project Area for all three Action alternatives.	None. Suitable habitat is not present in the Project Area for all three Action alternatives.
California red-legged frog *Rana draytonii*	FT	SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation.	Requires 11-20 weeks of permanent water for larval development. must have access to estivation habitat.	None. Species has been extirpated from Central Valley floor (USFWS 2002).	None. Species has been extirpated from Central Valley floor (USFWS 2002).

Scientific name	Federal listing status	State listing status	General Habitat	Micro Habitat	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
western spadefoot *Spea hammondii*	None	SSC	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands.	Vernal pools are essential for breeding and egg-laying.	None. Suitable habitat is not present in Project Area for all three Action alternatives.	None. Suitable habitat is not present in Project Area for all three Action alternatives.
giant garter snake *Thamnophis gigas*	FT	ST	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches.	This is the most aquatic of the garter snakes in California.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Natural drainage on east side of San Joaquin River and freshwater wetlands within San Joaquin River provide marginal to potentially suitable habitat for all three Action alternatives. Harding Drain and other large ditches with emergent vegetation provide marginal habitat. Species was not observed during surveys conducted for the Harding Drain Bypass Project (Horizon 2014a). Closest known occurrences is approximately 13 miles south of the Study Area in Merced County near Gustine, CA.
Birds						
tricolored blackbird *Agelaius tricolor*	None	Emergency Protection Status as of 12/3/14 per FGC 2076.5, SSC	Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California.	Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	Possible. Agricultural fields planted with silage or grain provide potential breeding habitat within Project Area for all three Action alternatives.	Present. In 2014, breeding was documented in natural channel in Modesto Jennings Plant spray fields (UC Davis 2014)
burrowing owl *Athene cunicularia*	None	SSC	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.	Possible. Suitable habitat is present within the Project Area for all three Action alternatives. Evidence of species was not observed during reconnaissance surveys (Horizon 2014b). Most recent sighting in the vicinity of the Project Area is from 2003 (CDFW 2014, ebird.org 2014)	Possible. Suitable habitat is present within the Project Area for all three Action alternatives. Evidence of species was not observed during reconnaissance surveys (Horizon 2014b). Most recent sighting in the vicinity of the Project Area is from 2003 (CDFW 2014, ebird.org 2014)
golden eagle *Aquila chrysaetos*	None	FP	Tundra, through grasslands, forested habitat and woodland-brushlands, south to arid deserts.	—	Possible. Species is commonly observed in canyons/foothills to the west of the Project Area for all three Action alternatives (ebird.org 2014). Flyover possible; no suitable nesting habitat.	Possible. Species is commonly observed in canyons/foothills to the west of the Project Area for all three Action alternatives (ebird.org 2014). Flyover possible; marginal foraging and nesting habitat.

Scientific name	Federal listing status	State listing status	General Habitat	Micro Habitat	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
cackling goose *Branta hutchinsii leucopareia*	FD	None	Winters on lakes and inland prairies.	Forages on natural pasture or that cultivated to grain; loafs on lakes, reservoirs, ponds.	Present. Species may forage in agricultural fields throughout the Project Area for all three Action alternatives.	Present. Species is seasonally abundant in Modesto Jennings Plant ponds (ebird.org 2014).
Swainson's hawk *Buteo swainsoni*	None	ST	Breeds in grasslands with with scattered trees, juniper-sage flats, riparian areas, savannahs, and 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.	Present. Species may forage in agricultural fields throughout the Project Area for all three Action alternatives.	Present. Nesting habitat is present in San Joaquin River corridor and the natural drainage to the west of the river for all three Action alternatives.
northern harrier *Circus cyaneus*	None	SSC	Rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland.	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Present. Species has been observed in Modesto Jennings Plant spray fields (ebird.org 2014). Flood irrigated pastures provide potential nesting habitat.	Present. Species has been observed in Modesto Jennings Plant spray fields (ebird.org 2014). Flood irrigated pastures provide potential nesting habitat.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT	SE	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	Nests in riparian jungles of willow, often mixed with cottonwoods, w/ lower story of blackberry, nettles, or wild grape.	None. Project Area for all three Action alternatives is outside of species range.	None. Project Area for all three Action alternatives is outside of species' current breeding territory. Riparian tree/shrub cover is patchy (not dense) and limited in size. It is not typical of the preferred breeding habitat for this species.
yellow warbler *Dendroica petechia*	None	SSC	Riparian plant associations. Prefers willows, cottonwoods, aspens, sycamores, and alders for nesting and foraging.	Also nests in montane shrubbery in open conifer forests.	Possible. Species may forage in agricultural fields adjacent to the San Joaquin River within Project Area for all three Action alternatives.	Possible. Species may nest in San Joaquin River riparian areas within Project Area for all three Action alternatives.
white-tailed kite *Elanus leucurus*	None	FP	Rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland.	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Present. Species has been observed in Modesto Jennings Plant spray fields (ebird.org 2014). Foraging possible; no suitable nesting habitat.	Present. Species has been observed in Modesto Jennings Plant spray fields (ebird.org 2014). Riparian areas in San Joaquin River and isolated mature trees in agricultural areas provide potential nesting habitat.
bald eagle *Haliaeetus luecocephalus*	FD	SE, FP	Permanent resident, and uncommon winter migrant, now restricted to breeding mostly in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity Counties.	Requires large bodies of water, or free flowing rivers with abundant fish, and adjacent snags or other perches.	Possible. Species has been observed in canyons/foothills to the west of the Project Area for all three Action alternatives and at Modesto Jennings Plant (ebird.org 2014). Flyover and foraging possible; no suitable nesting habitat.	Possible. Species has been observed in canyons/foothills to the west of the Project Area for all three Action alternatives and at Modesto Jennings Plant (ebird.org 2014). San Joaquin River provides suitable foraging and roosting habitat; nesting unlikely.

Scientific name	Federal listing status	State listing status	General Habitat	Micro Habitat	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
loggerhead shrike *Lanius ludovicianus*	None	SSC	Broken woodlands, savannah, pinyon-juniper, joshua tree, and riparian woodlands, desert	Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and	Present. Species may forage in agricultural fields throughout the Project Area for all three Action alternatives.	Present. Species may nest in San Joaquin River riparian areas within Project Area for all three Action alternatives.
song sparrow (Modesto population) *Melospiza melodia*	None	SSC	Emergent freshwater marshes, riparian willow thickets. riparian forests, vegetated irrigation canals and levees	Inhabits cattails, tules and other sedges; also known to frequent tangles bordering sloughs.	None. Project Area for all three Action alternatives is outside of species range.	None. Project Area for all three Action alternatives is outside of species range.
California least tern *Sternula antillarum browni*	FE	SE, FP	Shallow estuaries and lagoons.	Nests on beaches or tidal flats.	None. Project Area for all three Action alternatives is outside of species range.	None. Project Area for all three Action alternatives is outside of species range.
least Bell's vireo *Vireo bellii pusillus*	FE	SE	Summer resident of southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft.	Not specifically defined.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Not expected. Species has recently been observed in restored riparian habitat at the San Joaquin River National Wildlife Refuge approximately 10 miles north of the Project Area for all three Action alternatives (Howell et al. 2010). Some riparian areas in the Project Area provide marginal breeding habitat. Due to the species rarity in the Central Valley and habitat quality, it is not expected to breed in the Project Area.
Mammals						
western red bat *Lasiurus blossevillii*	None	SSC	Roosts primarily in trees, 2-40 ft above ground, from sea level up through mixed conifer forests.	Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Possible. Roosting habitat is present in San Joaquin River corridor within Project Area for all three Action alternatives.
pallid bat *Antrozous pallidus*	None	SSC	Grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests	Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Day roosts are in caves, crevices, mines, and occasionally in hollow trees and buildings.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Not expected. Minimal habitat is present within Project Area for all three Action alternatives.
Fresno kangaroo rat *Dipodomys nitratoides exilis*	FE	SE	Alkali sink-open grassland habitats in western Fresno County.	Bare alkaline clay-based soils subject to seasonal inundation, with more friable soil mounds around shrubs and grasses.	None. Project Area for all three Action alternatives is outside of species range.	None. Project Area for all three Action alternatives is outside of species range.

Scientific name	Federal listing status	State listing status	General Habitat	Micro Habitat	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
Riparian woodrat *Neotoma fuscipes riparia*	FE	SSC	Riparian areas along the San Joaquin, Stanislaus and Tuolumne rivers.	Need areas with mix of brush and trees. Need suitable nesting sites in trees, snags or logs.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Not expected. Known populations are limited to San Joaquin River National Wildlife Refuge and Caswell Memorial State Park (USFWS 2012d), which are approximately 9 and 12 miles north of the Project Area for all three Action alternatives, respectively. Habitat in the action area is considered marginally suitable for riparian woodrats due to lack of mature overstory. No woodrat houses were observed during field reconnaissance surveys (Horizon 2014b).
Riparian brush rabbit *Sylvilagus bachmani riparius*	FE	SE	Riparian areas on the San Joaquin River in northern Stanislaus county.	Dense thickets of wild rose, willows, and blackberries.	None. Suitable habitat is not present in open-cut areas for all three Action alternatives.	Not expected. Existing populations are limited to Caswell Memorial State Park and a region in the south Delta near Lathrop (Kelly et al. 2011). Riparian habitat in the Project Area for all three Action alternatives supports willow thickets, but generally lacks other vegetation species (e.g., wild rose, blackberry) commonly found in habitat occupied by riparian brush rabbits. Suitable habitat in the action area is not well connected to occupied habitat at Caswell Memorial State Park, thus potential for dispersal to the action area is uncertain.
American badger *Taxidea taxus*	None	SSC	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.	Not expected. Minimal habitat is present in open-cut areas for all three Action alternatives.	Possible. Drier portions of the San Joaquin River floodplain provide foraging and dispersal habitat within Project Area for all three Action alternatives. Denning is not expected.

Scientific name	Federal listing status	State listing status	General Habitat	Micro Habitat	Potential to Occur in Open-cut Construction Areas	Potential to Occur at PID Intake or in Trenchless Construction Areas or Adjacent Habitats
San Joaquin kit fox *Vulpes macrotis mutica*	FE	ST	Annual grasslands or grassy open stages with scattered shrubby vegetation.	Need loose-textured sandy soils for burrowing, and suitable prey base.	Not expected. Minimal habitat is present in the Project Area for all three Action alternatives. Lands to the west of the Project Area for all three Action alternatives provide linkages for populations to the south and north (USFWS 2009). Kit fox presence in the northern range may be dependent on occasional dispersing animals from populations to the south of Santa Nella (Constable et al. 2009). The closest occurrence is approximately 3 miles west of the Project Area for all three Action alternatives along I-5.	Not expected. Minimal habitat is present in the Project Area for all three Action alternatives. Lands to the west of the Study Area provide linkages for populations to the south and north (USFWS 2009). Kit fox presence in the northern range may be dependent on occasional dispersing animals from populations to the south of Santa Nella (Constable et al. 2009). The closest occurrence is approximately 3 miles west of the Project Area for all three Action alternatives along I-5.

* List of Abbreviations for Federal and State Species Status follow below:

CH = Critical Habitat
FC = Federal candidate for listing
FD = Federal delisted
FE = Federal endangered
FP = State fully protected species
FSC = federal species of concern
FT = Federal threatened
SE = State endangered
ST = State threatened
SSC = State species of special concern

Figure 3.4-2: CNDDB Plant Occurrences

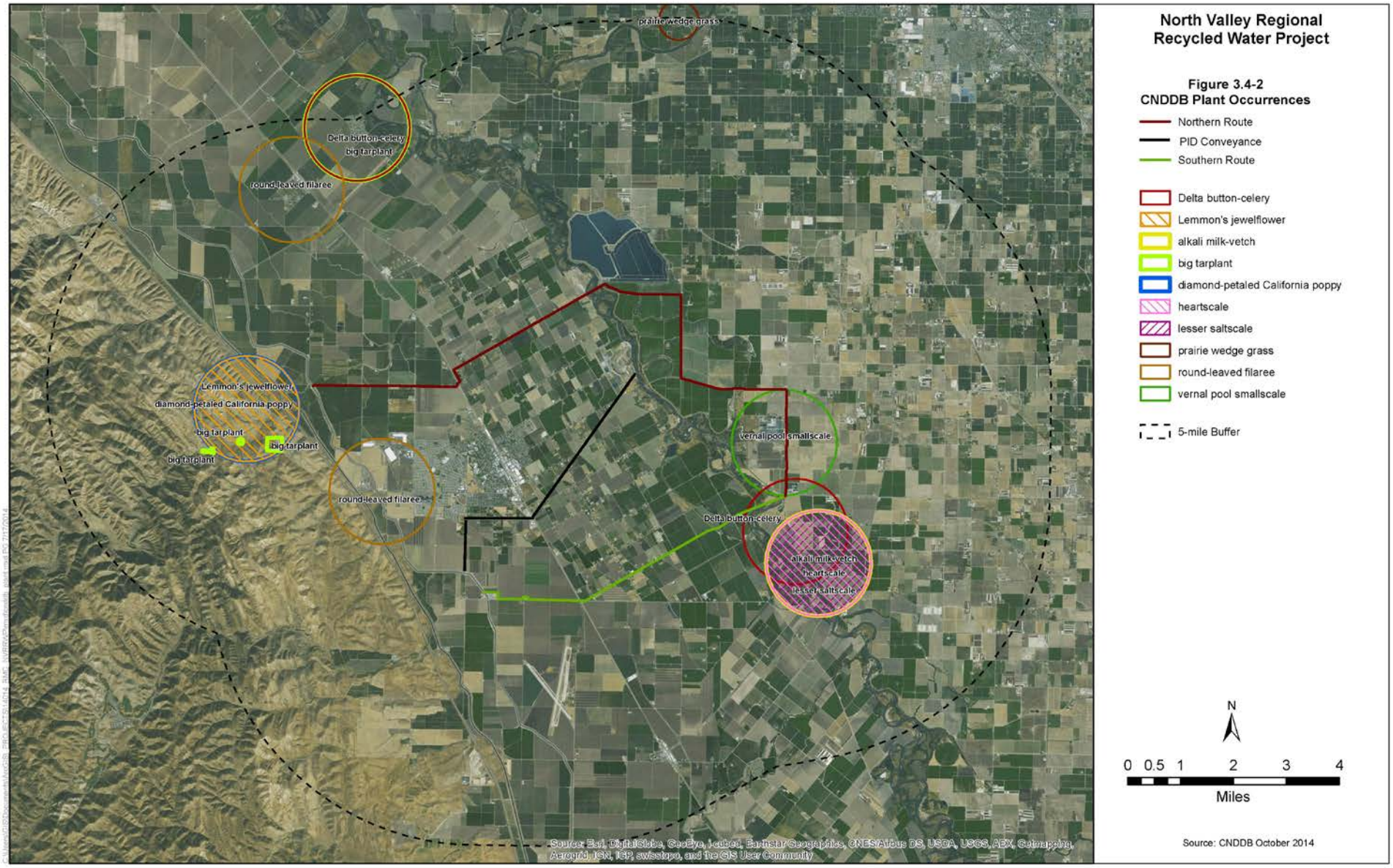
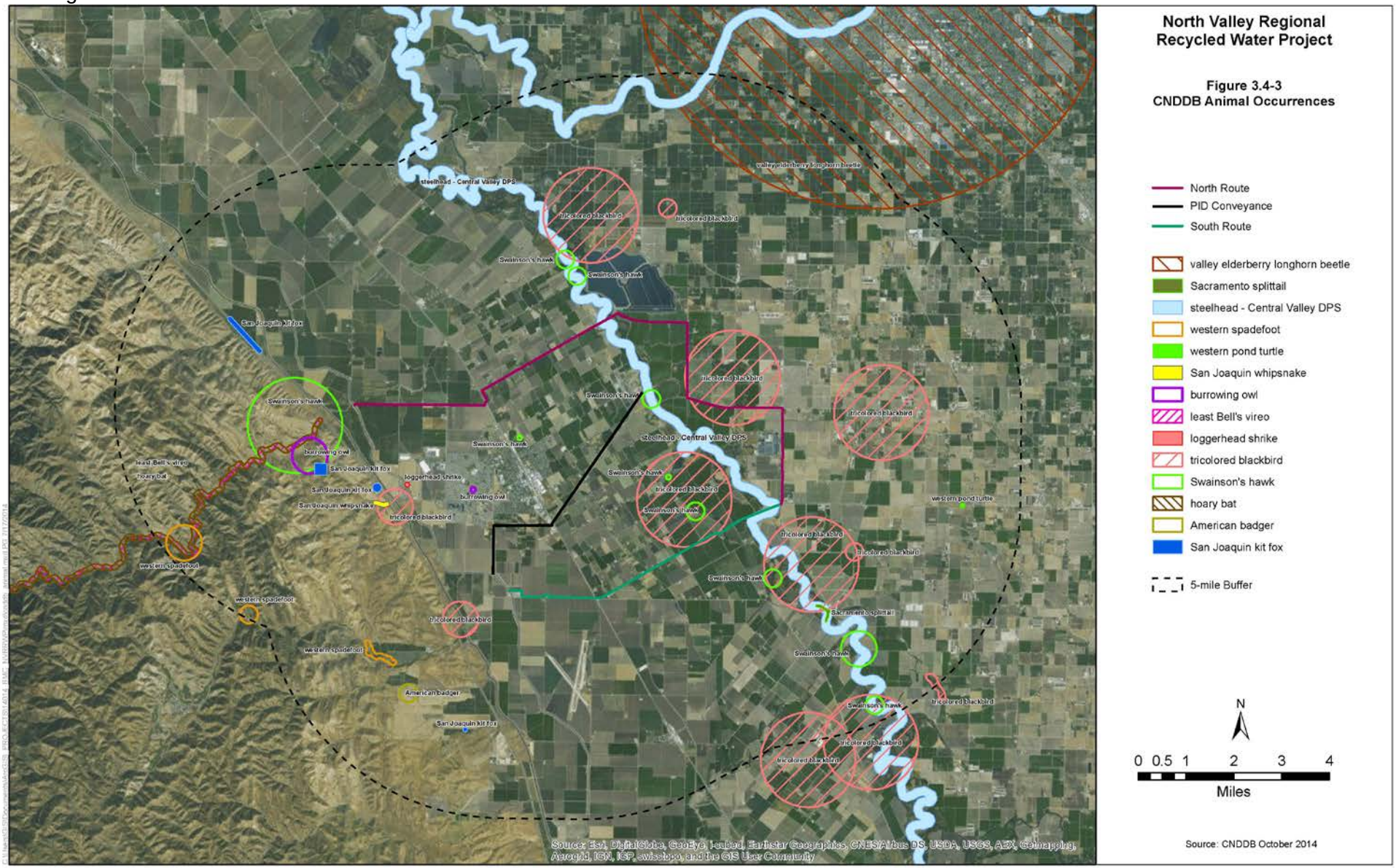


Figure 3.4-3: CNDDB Animal Occurrences



Impacts and Mitigation Measures

Impact BIO-1: Effects on special-status plants **Table 3.4-1** lists the special-status plant species known to occur in the vicinity of the Study Area, and **Figure 3.4-2** shows the CNDDB occurrences of special-status plants within a 5-mile radius of the Study Area. Two CNDDB records of special-status plants are located in the Study Area: one for vernal pool smallscale (*Atriplex persistens*) and one for Delta button celery (*Eryngium racemosum*).

According to the CNDDB (CDFW 2014), the record for vernal pool smallscale along Carpenter Road is from 1965 and the location was mapped as a "best guess" by CNDDB and this occurrence is considered "possibly extirpated". The only potentially suitable habitat for this species in the Study Area is in the alkaline pool/swale adjacent to the Stations 553+00 to 563+00 (**Figure 3.4-1**, Sheet 9). This species was not observed during the 2014 reconnaissance surveys (Horizon 2014b). The occurrence of Delta button celery is from 1968 and is also considered possibly extirpated. Potentially suitable habitat for this species in the Study Area occurs along the San Joaquin River and in refuges, where application of supplemental water is managed to avoid effects on Delta button celery.

Twenty-five of the 39 special-status plant species known to occur in the vicinity of the Study Area are considered to have no potential to occur in the Study Area (**Table 3.4-1**). These species are associated with habitats that are not present in the Study Area, or the Study Area is not within the current range of the species. An additional three special-status plant species are not expected to occur in the Study Area because only marginally suitable habitat is present and/or these species have not been recently observed in the vicinity of the Study Area. Eleven special-status plant species are considered to have the potential to occur in proposed trenchless construction areas or adjacent habitats. No special-status plants are considered to have the potential to occur in areas proposed for open-cut construction (**Table 3.4-1**).

Most of the special-status plants with the potential to occur in trenchless construction areas or adjacent habitats are associated with alkali flat or alkali scrub habitats. These species include: Alkali milk-vetch (*Astragalus tener* var. *tener)*, heartscale (*Atriplex cordulata*), brittlescale (*Atriplex depressa*), lesser saltscale (*Atriplex minuscula*), vernal pool smallscale (*Atriplex persistens*), Hispid bird's beak (*Chloropyron molle* ssp. *hispidum*), San Joaquin spearscale (*Extriplex joaquiniana*), and prostrate vernal pool navarretia (*Navarretia prostrata*). Several *Atriplex* species were observed within the alkali scrub/ alkali flat. One was immature, making identification to the species level impossible at that time. No special-status *Atriplex* species were confirmed.

Special-status plant species associated with riparian habitat or freshwater wetlands with the potential to occur in the Study Area include slough thistle (*Cirsium crassicaule*), Delta button celery (*Eryngium racemosum*), and Sanford's arrowhead (*Sagittaria sanfordii*). Potential habitat for slough thistle occurs in San Joaquin River crossings, natural drainages, and alkali scrub. Potential habitat for Delta button celery is present within the San Joaquin River crossings, however, the microhabitat conditions favored by this species were not observed during the 2014 reconnaissance surveys (Horizon 2014b). Freshwater wetlands within the San Joaquin River

crossings, natural drainages, and some drainage ditches provide potentially suitable habitat for Sanford's arrowhead.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to special-status plants would occur.

Combined Alignment Alternative (Alternative 1) Potential adverse impacts to special-status plants would be minimized by using trenchless construction techniques and avoiding open-cut construction in sensitive habitats. However, potential impacts to special-status plants may result from erosion, sedimentation or alteration in drain patterns within suitable habitat. These impacts would be considered potentially significant. Several mitigation measures are proposed to avoid, reduce, or compensate for potential impacts. **Mitigation Measure BIO-1a** would minimize the area of potential disturbance to habitat for special-status plants. Where disturbance within special-status plant habitat cannot be avoided, **Mitigation Measure BIO-1b** would identify the extent to which special-status plants are present and could be adversely affected by the project. For special-status plants found to be present, **Mitigation Measure BIO-1c** would require monitoring to confirm avoidance of identified special-status plant populations, and compensatory mitigation should special-status plants be adversely affected. Finally, **Mitigation Measure BIO-1d** would be implemented to reduce impacts in the event of a frac-out, and a Draft Sample Frac-out Prevention Plan for HDD is included in **Appendix F**. With implementation of these mitigation measures, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Alternative 2 would have similar impacts to Alternative 1, although there would be no potential impacts to special-status plants that may occur in alkali habitats between Stations 553+00 to 563+00 (**Figure 3.4-1**, Sheet 9) because the route for this alternative does not cross that area. This alternative would have a greater potential to impact special-status plants that may be associated with habitats in the San Joaquin River, such as slough thistle and Delta button celery. There is also a small patch of saltbush scrub on the inboard side of San Joaquin River levee near Station 1335 (**Figure 3.4-1**, Sheet 11) that could potentially support special-status plants.

Potential impacts to special-status plants would be minimized by using trenchless construction techniques and avoiding open-cut construction in sensitive habitats. However, potential impacts to special-status plants may result from erosion, sedimentation or alteration in drain patterns within suitable habitat, similar to Alternative 1. These impacts would be considered potentially significant. **Mitigation Measure BIO-1a, Mitigation Measure BIO-1b, Mitigation Measure BIO-1c,** and **Mitigation Measure BIO-1d** would be implemented as described for Alternative 1. With implementation of these mitigation measures, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Alternative 3 would have similar impacts to Alternative 1, except there would be no potential impacts to special-status plants that may occur in alkali habitats adjacent to West Main Street because the route for this alternative does not cross that area. Unlike Alternatives 1 and 2, this alternative would require construction directly in the bank of the San Joaquin River to expand the existing PID intake. Although the river

provides habitat for special status plants such as slough thistle and Delta button celery, these species were not identified as present at the intake site (PID 2006).

However, Alternative 3 still has the potential to affect special-status plants either directly or from erosion, sedimentation or alteration in drain patterns within suitable habitat. These impacts would be considered potentially significant. **Mitigation Measure BIO-1a, Mitigation Measure BIO-1b,** and **Mitigation Measure BIO-1c** would be implemented as described for Alternatives 1 and 2. With implementation of these mitigation measures, impacts would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measure HYD-1b**, which requires implementation of Best Management Practices (BMPs) to control erosion and sediment during construction, avoiding indirect impacts to plants for erosion or sedimentation during construction.

Mitigation Measure BIO-1a: Avoid or Minimize Impacts to Special-Status Plant Species (Alternatives 1, 2 and 3). To the extent feasible, project-related activities shall avoid habitats with the potential to support special-status plants, including alkali flats, alkali scrub, alkali pools, and freshwater wetlands. To the extent feasible, the Proposed Action shall minimize potential impacts to special-status plants by utilizing trenchless construction techniques within habitats with the potential to support special-status plants**.**

Mitigation Measure BIO-1b: Perform Focused Surveys for Special-Status Plant Species in Suitable Habitats (Alternatives 1, 2 and 3). Within one year prior to commencement of construction activities, a qualified botanist shall perform surveys for special-status plant species within potentially suitable habitat in the vicinity of open-cut construction areas (Survey areas for the Combined and Separate Alignment Alternatives are shown in **Table 3.4-3** and **Figure 3.4-1**; for the PID Conveyance Alternative surveys shall take place at the intake site). Floristic surveys shall be performed according to the *Protocols for Surveying and Evaluating Impacts to Specials Status Native Plant Populations and Natural Communities* (CDFG 2009 or current version). Floristic surveys shall include the use of a reference population, as reasonably feasible, to increase the likelihood of detection, and shall be performed during the appropriate bloom period(s) for each species. If special-status plants are detected within a 100-foot radius or within the microwatershed of an open-cut construction area (including pits that would be used for trenchless construction), **Mitigation Measure BIO-1c** shall be implemented.

Mitigation Measure BIO-1c: Monitor or Compensate for Impacts to Special-Status Plant Species (Alternatives 1, 2 and 3). The locations of special-status plants within the microwatershed or within 100 feet of construction areas shall be marked and the size of the population shall be recorded. Locations of special-status plant populations shall be clearly identified in the field by staking, flagging, or fencing. The plants shall be monitored throughout the duration of construction to determine if the project has resulted in adverse effects (direct or indirect), as determined by a qualified botanist.

If the botanist determines that special-status plants may have been adversely effected, then the Partner Agencies shall implement measures to compensate for the impact. Compensation measures may include transplanting perennial species, seed collection and dispersal for annual species, and other conservation strategies that shall restore and protect the viability of the local population. If minimization measures are implemented, monitoring of plant populations shall be conducted annually for 5 years to assess the mitigation's effectiveness. The performance standard for the mitigation shall be no net reduction in the size or viability of the local population.

Table 3.4-3: Survey Area for Special-Status Species and Sensitive Biological Resources

Mitigation Measure	Species	Location (Station Number)	Timing of Surveys
BIO-1b: Special-Status Plant Species	Alkali milkvetch (*Astragalus tener var. tener*) heartscale (*Atriplex cordulata*) brittlescale (*Atriplex depressa*) lesser saltscale (*Atriplex minuscula*) vernal pool smallscale (*Atriplex persistens*) Hispid bird's beak (*Chloropyron molle* ssp. *hispidum*) slough thistle (*Cirsium crassicaule*) San Joaquin spearscale (*Extriplex joaquiniana*) prostrate vernal pool navarretia (*Navarretia prostrata*)	553+00 to 563+00	Within 1 year prior to construction and during appropriate bloom periods
BIO-1b: Special-Status Plant Species	slough thistle (*Cirsium crassicaule*) Sanford's *arrowhead* (*Sagittaria sanfordii*)	335+00 to 345+00 373+00 to 376+00 436+00 to 438+00 563+00 to 564+00 Harding Drain 1265+00 to 1270+00	
BIO-3b: Minimize or Compensate for Impacts to Valley Elderberry Longhorn Beetle	Elderberry plants/Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus)*	Within 200 feet of all open-cut construction areas	No greater than two years and no less than 120 days prior to construction.
Bio-6: Avoid and Minimize Impacts to Giant Garter Snake	Giant garter snake (*Thamnophis gigas*)	Within 200 feet of: 335+00 to 345+00 373+00 to 376+00 436+00 to 438+00 563+00 to 564+00 Harding Drain	24 hours prior to construction and monitoring during construction within 200 feet of potential aquatic habitat.
Bio-8: Avoid and Minimize Impacts to Western Pond Turtle	Western pond turtle (*Actinemys marmorata*)	335+00 to 345+00 373+00 to 376+00 436+00 to 438+00 563+00 to 564+00 Harding Drain 1265+00 to 1270+00	14 days and 24 hours (survey twice)

Mitigation Measure	Species	Location (Station Number)	Timing of Surveys
Impact Bio-9: Avoid, Minimize, or Compensate for Impacts to Burrowing Owl	Burrowing owl (*Athene cunicularia*)	500-foot radius from all construction areas.	At least 24 hours but no more than 30 days
Impact Bio-10: Avoid and Minimize Impacts to Tricolored Blackbird Nesting Colonies	Tricolored blackbird (*Agelaius tricolor*)	Agricultural fields planted with silage or grain 320+00 to 345+00 373+00 to 376+00 436+00 to 438+00 563+00 to 564+00 Harding Drain 1265+00 to 1270+00	Within 15 days of construction for activities occurring between Feb.1 – Aug. 31
BIO-12: Avoid, Minimize, or Compensate for Impacts to Raptors including Special-status species	Swainson's hawk (*Buteo swainsoni*) White-tailed kite (*Elanus leucurus*)	0.5-mile radius from: San Joaquin River Turlock-Modesto Link Segment 1260+00 to 1275+00	See: *Recommended Timing and Methodology for Swainson's Hawk Nesting Survey's in California's Central Valley*
	Northern harrier (*Circus cyaneus*)	1,000-foot radius from all construction areas	
	Non-listed raptors	0.5-mile radius from all construction areas	
BIO-13: Avoid and Minimize Impacts to Special-status passerine species and other Birds Protected under the MBTA	Special-status passerines including least Bell's vireo (*Vireo bellii pusillus*)	Protocol surveys for least Bell's vireo in San Joaquin River crossing (s), and 500-foot radius from all construction areas.	For least Bell's vireo. see: Least Bell's Vireo Survey Guidelines (USFWS 2011a). At least 24 hours before construction for activities occurring between Feb.1 – Sept. 15 for other passerines
	Non-listed, MBTA protected passerines		
BIO-14: Avoid and Minimize Impacts to San Joaquin kit fox	San Joaquin kit fox (*Vulpes macrotis mutica*)	Within 200 feet of all construction areas	No less than 14 days and no more than 30 days prior to construction

Mitigation Measure BIO-1d: Develop and Implement a Frac-out Contingency Plan for Trenchless Construction (Alternatives 1 and 2 only). Prior to constructing a crossing(s) of the San Joaquin River, a Frac-out Prevention and Contingency Plan shall be developed and submitted by the City of Modesto to the CSLC for review. At minimum, the plan shall prescribe the measures to ensure protection of aquatic resources, a special status plants and wildlife, including:

- Procedures to minimize the potential for a frac-out associated with HDD.
- Procedures for timely detection of frac-outs.

- Procedures for timely response and remediation in the event a frac-out.
- Monitoring of drilling and frac-out response activities by a qualified biologist.

A Draft Sample Frac-out Prevention Plan for HDD is provided in **Appendix F**.

Significance after Mitigation Less than significant for all Action alternatives. No mitigation required for the No Action Alternative.

Impact BIO-2: Effects on vernal pool branchiopods Vernal pool branchiopods with the potential to occur in the Study Area include Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool fairy shrimp (*Branchinecta lynchi*), and vernal pool tadpole shrimp (*Lepidurus packardi*). Potentially suitable habitat for vernal pool branchiopods in the Study Area is limited to the alkali pool and swale on the south side of West Main Avenue adjacent to the project area (**Figure 3.4-1**, Sheet 9, Station 553+00 to 557+00). While vernal pool branchiopods most commonly occur in vernal pools, they may also inhabit other types of seasonal wetlands such as alkali pools and swales (Helm 1998).

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to vernal pool branchiopods would occur.

Combined Alignment Alternative (Alternative 1) The alkali pool and swale with the potential to support vernal pool branchiopods is located on the south side of West Main Avenue. The proposed route for Alternative 1 is on the north side of West Main Avenue (**Figure 3.4-1**, Sheet 9). This would likely avoid potential direct and indirect impacts to vernal pool branchiopods and their habitat because: (1) construction would not occur in the microwatershed of the pool or swale; (2) West Main Avenue functions as a hydraulic barrier for surface flow between the north and south sides of the road; and (3) construction is not likely to affect groundwater conditions on the south side of the road.

However, the precise pipeline alignment and construction methods are not known at this time. If construction occurs in the microwatershed of the alkali pool and swale, this could result in sedimentation, and alteration of hydrology and drainage patterns. These impacts are therefore considered potentially significant. Several mitigation measures are proposed to avoid, minimize, or compensate for potential impacts. **Mitigation Measure BIO-2a** would avoid impacts to suitable habitat for these species to the extent feasible. Where disturbance of habitat is unavoidable, **Mitigation Measure BIO-2b** would require that impacts be minimized through stormwater controls and site restoration, and compensatory mitigation be provided for impacts to the species or suitable habitat. With implementation of these mitigation measures, impacts would be less than significant.

Water deliveries to the DPWD service area and refuges are not anticipated to result in indirect effects to vernal pool branchiopods or their habitat. There are no vernal pools present in DPWD agricultural fields, and supplemental water provided to refuges would not be applied to areas containing vernal pools. There would thus be no effects on vernal pool branchiopods in either of these areas.

Separate Alignment Alternative (Alternative 2) Alternative 2 is not located in proximity to suitable habitat for vernal pool branchiopods species. Therefore, there would be no impacts to these species under this alternative.

PID Conveyance Alternative (Alternative 3) Alternative 3 is not located in proximity to suitable habitat for vernal pool branchiopods species. Vernal pools are not expected to occur at the PID intake site, along the Main Canal ROW, or along Bartch or Ward Avenues. Therefore, there would be no impacts to these species under this alternative.

Significance Determination before Mitigation No impact for the No Action Alternative, Alternative 2, or Alternative 3. Potentially significant for Alternative 1.

Mitigation Measures **Mitigation Measure BIO-2a: Avoid Impacts to Vernal Pool Branchiopods and Their Habitat** (Alternative 1). To the extent feasible, the project-related activities shall avoid impacts to habitat with the potential to support Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp, including alkali pools and swales. Avoidance shall be defined as no direct or indirect effects to suitable habitat. This shall be accomplished by avoiding construction within the microwatershed of suitable habitat for vernal pool branchiopods.

Mitigation Measure BIO-2b: Minimize and Compensate for Impacts to Branchiopods and Their Habitat (Alternative 1). If direct or indirect impacts to habitat with the potential to support vernal pool branchiopods cannot be avoided then the following measures shall be implemented:

- Implement a storm water pollution prevention plan (SWPPP) to reduce the potential for sediments and contaminants to enter pools or depressions where vernal pool branchiopods may occur.
- After construction, restore surface topography and drainage to pre-construction conditions.
- Provide off-site compensation for permanent, temporary, and indirect impacts at ratios determined through consultation with USFWS. The performance standard shall be no net loss in acreage or habitat quality for vernal pool branchiopods, as determined through consultation with USFWS.

Significance after Mitigation Less than significant.

Impact BIO-3: Effects on valley elderberry longhorn beetle Valley elderberry longhorn beetles (VELB) (*Desmocerus californicus dimorphus*) are associated with its host plant elderberry (*Sambucus* spp.). An elderberry shrub was observed near the outlet of the Harding Drain at the San Joaquin River during a reconnaissance survey in 2014 (Horizon 2014b). Elderberry shrubs and VELB have the potential to occur in riparian habitat within the San Joaquin River crossings.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to VELB would occur.

Combined Alignment Alternative (Alternative 1) Potential adverse impacts to VELB would be minimized by using trenchless construction techniques in areas where elderberry shrubs are most likely to occur. However, the precise pipeline alignment, construction methods, and locations of all elderberry shrubs are not known at this time. Impacts to VELB and individual elderberry shrubs may result from removal or damage of elderberry plants, fragmentation of habitat, sedimentation, erosion, or alteration in drainage patterns. These impacts are considered potentially significant. Several mitigation measures are proposed to avoid, minimize, or compensate for potential impacts. **Mitigation Measure BIO-3a** would avoid impacts to the host plant for this species to the extent feasible. If disturbance of the host plant is unavoidable, **Mitigation Measure BIO-3b** would require that impacts be minimized through site restoration and compensatory mitigation for this species. Finally, **Mitigation Measure BIO-1d** would be implemented to reduce impacts in the event of a frac-out. With implementation of these mitigation measures, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts to VELB would be similar to Alternative 1, but there would be a greater chance for impacts in riparian areas because there would be two crossings of the San Joaquin River. These impacts are considered potentially significant. **Mitigation Measure BIO-3a, Mitigation Measure BIO-3b,** and **Mitigation Measure BIO-1d** would be implemented as described for Alternative 1. With implementation of these mitigation measures, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Surveys of the intake site at the San Joaquin River showed that there were no elderberry shrubs in the vicinity of the intake (PID 2006). However, the alignment of the pipeline along the Main Canal has not been surveyed, and it is possible that elderberry bushes have grown at the intake site since surveys were conducted in 2006. Alternative 3 would have similar impacts to Alternatives 1 and 2. **Mitigation Measure BIO-3a** and **Mitigation Measure BIO-3b** would be implemented as described for Alternatives 1 and 2. With implementation of these mitigation measures, impacts would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **See Mitigation Measure BIO-1d** (Alternatives 1 and 2). **Mitigation Measure BIO-3a: Avoid Impacts to Valley Elderberry Longhorn Beetle** (Alternatives 1, 2 and 3). To the extent feasible, the project shall adhere to avoidance measures outlined in USFWS' *Conservation Guidelines for Valley Elderberry Longhorn Beetle* (USFWS 1999). This shall include the following avoidance measures:

- No less than 120 days prior to commencing construction, the locations of elderberry plants within 200 feet of open-cut construction areas shall be identified.
- Fence and flag all areas to be avoided during construction activities including all established elderberry shrubs within 200 feet of open-cut construction that will not be impacted by construction activities.

- No open-cut construction within 100 feet of the dripline of elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level.
- Construction personnel shall participate in a Contractor Environmental Awareness Training (CEAT). The CEAT shall communicate the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements. The CEAT will instruct work crews about the status of the beetle and the need to protect its elderberry host plant.
- Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs will be maintained for the duration of construction.
- No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant would be used within 100 feet of any elderberry plant.

Mitigation Measure BIO-3b: Minimize or Compensate for Impacts to Valley Elderberry Longhorn Beetle (Alternatives 1, 2 and 3). If elderberry plants occur within 100 feet of open-cut construction, their locations shall be reported to the USFWS. In areas where encroachment on the 100-foot buffer has been approved by USFWS, a minimum setback of at least 20 feet from the dripline of each elderberry plant shall be provided, as feasible. For any encroachment into the 100-foot buffer or removal of elderberry plants, the Partner Agencies shall implement measures to compensate for impacts to VELB. Compensation measures shall be consistent with USFWS' *Conservation Guidelines for Valley Elderberry Longhorn Beetle* (USFWS 1999). This shall include establishment of a project-specific VELB Conservation Area or purchase of credits at a USFWS-approved mitigation bank. If the Partner Agencies establish a project-specific Conservation Area, the population of VELBs, the general condition of the Conservation Area, and the condition of the elderberry and associated native plantings in the Conservation Area shall be monitored over a period of 10 years. Monitoring and reporting shall be conducted in accordance with the Conservation Guidelines for VELB (USFWS 1999). A minimum survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants shall be maintained throughout the monitoring period.

Significance after Mitigation Less than significant.

Impact BIO-4: Effects of project construction on special-status fishes In the Study Area, habitat for special-status fish species is generally limited to the San Joaquin River. During high flow events, some special-status fish species may occasionally enter natural drainages or ditches connected to the river. Several special-status fish species may occur in this reach of the San Joaquin River, including: Central Valley fall- and spring-run Chinook salmon, Central Valley steelhead, Sacramento splittail (*Pogonichthys macrolepidotus*), hardhead, San Joaquin roach (*Lavinia symmetricus*), and several species of lamprey (**Table 3.4-2**).

Adult Chinook salmon and steelhead migrate through the Study Area to reach spawning habitat in the Merced River. Juvenile salmonids pass through the Study Area on their way out to the Pacific Ocean. Sacramento splittail may be present in this portion of the river in wet years.

Hardhead have recently been captured downstream near the confluence with the Stanislaus (Pers. Comm. Merz 2014). The status of San Joaquin roach in the Study Area is not well documented, but this species may be present. Lamprey likely migrate through this reach of the river to spawn in upstream tributaries. Ammocetes (lamprey larva) may be dispersed into this reach of the river. There have been anecdotal accounts of green sturgeon in the vicinity of the Study Area (Jackson and Van Eenennaam 2013), but this species is not expected to be present (Pers. Comm. Gutierrez 2014).

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to special-status fish and their habitat would occur.

Combined Alignment Alternative (Alternative 1) Potential construction-related impacts to special-status fish and their habitat would be minimized by using trenchless construction techniques for crossing the San Joaquin River. If HDD is selected as the trenchless construction method, impacts to special-status fish and their habitat may result from a frac-out of drilling fluids. Drilling fluids typically consist of bentonite, which is non-toxic to aquatic life. However, a frac-out may result in a temporary increase in turbidity or sedimentation that can adversely affect aquatic organisms by covering spawning and feeding areas, and clogging fish gills. These impacts are considered potentially significant. **Mitigation Measure BIO-1d** would be implemented to reduce impacts in the event of a frac-out and a Draft Sample Frac-out Prevention Plan for HDD is included in **Appendix F**. With implementation of this mitigation measure, impacts would be less than significant.

Trenchless construction under the San Joaquin River is not expected to result in any noise or vibration impacts on fish in the river. Vibration from the drilling machinery is minimal and because the tunneling operation occurs from 15 to 50 feet below the river, it would be attenuated to an imperceptible level before it reaches the river bottom. No perceptible noise or vibration is expected to translate into the water (Pers. Comm. Glynn 2014). There would be no adverse effects from noise or vibration from drilling machinery.

Construction of launching and receiving pits for trenchless construction would likely require installation of sheet pile cofferdams in upland locations adjacent to the San Joaquin River. Installation of sheet piles may require the use of impact pile driving equipment. Land-based pile driving has the potential to generate underwater noise that could adversely affect special-status fish.

The NMFS Pile Driving Calculator (NMFS 2012) was used to estimate the potential underwater noise-related effects to fish species from construction of launching and receiving pits. The highest values for land-based pile driving activities reported in the *Final Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish Appendix I Compendium of Pile Driving Sound Data* updated October 2012 (ICF Jones & Stokes and Illingworth & Rodkin 2012) were used to iteratively develop thresholds for pile driving that would be protective of fish. **Mitigation Measure BIO-4a** would be implemented to minimize impacts associated with land-based pile driving by limiting the number of strikes that can be

made in a 24-hour period. With implementation of this mitigation measure, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts would be similar to Alternative 1, but there would be a greater chance for impacts to special-status fish and their habitat because there would be two crossings of the San Joaquin River. **Mitigation Measure BIO-1d and Mitigation Measure BIO-4a** would be implemented as described for Alternative 1. With implementation of these mitigation measures, impacts would be less than significant for this alternative.

PID Conveyance Alternative (Alternative 3) Construction would require work within the San Joaquin River to expand the existing PID intake facility and fish screen. This could affect the special status fish species described above. It is expected that construction of the expanded intake would require construction similar to that completed for the existing PID Intake, which began operation in 2011. Construction would require placement and removal of a sheet-pile cofferdam to isolate the work site from the rest of the river. Potential effects of cofferdam installation could include impacts from noise and vibration associated with pile driving in the river. In-river cofferdam construction would also result in a temporary localized disturbance with minor siltation of the water. It is expected that placement of the cofferdam would have to take place between July 1 and September 30 which would minimize effects on fish, especially salmonids, because this is outside of their migratory period for this portion of the San Joaquin River (PID 2006). Length of time required for construction of the expanded intake has not been determined, but it is likely that construction within the cofferdam would not be completed by September 30, which would require that removal of the cofferdam take place the following year in the July 1 to September 30 construction window. It is expected that an Incidental Take Permit from CDFW would be required for construction of this alternative by the Partner Agencies. If this alternative is chosen, Reclamation will complete Section 7 ESA consultation with NMFS. Completion of the Section 7 ESA consultation will be documented in the Record of Decision for the Proposed Action. **Mitigation Measure BIO-4b** would be implemented to reduce impacts of construction work within the San Joaquin River. With implementation of this mitigation measure, impacts would be less than significant for this alternative. Measures to protect water quality, as described in *Section 3.11, Hydrology and Water Quality*, would also be implemented, and would protect special status fish species in the San Joaquin River.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measure BIO-1d** (Alternatives 1 and 2). **Mitigation Measure BIO-4a: Minimize Pile Driving-related Impacts to Special-status Fish** (Alternatives 1 and 2). If impact pile driving activities occur adjacent to the San Joaquin River between October 1 and May 31, the Partner Agencies shall adhere to the restrictions on the number of allowable strikes for a 24 hour period provided in **Table 3.4-4**.

Table 3.4-4: Impact Pile Strike Restrictions for Protection of Special-status Fish

Distance from San Joaquin River (Meters)	Distance from San Joaquin River (Feet)	Maximum Number of Strikes per 24 hours[1]
75	246	130
150	492	365
225	738	672
300	984	1035
375	1230	1447
450	1476	1902
>450	>1476	no limit

[1] Calculations based on NMFS Pile Driving Calculations (NMFS 2012). Assumed peak sound level of 204 decibel (dB) and sound exposure level (SEL) of 175 dB.

Mitigation Measure BIO-4b: Best Management Practices for In-River Intake Construction (Alternative 3). Prior to construction of the expanded intake in the San Joaquin River, the Partner Agencies and PID would develop a program of BMPs for in-river construction in consultation with CDFW and NMFS. At minimum, the plan shall prescribe the measures to ensure protection of aquatic resources and special-status plants, including:

- Project construction and operations shall result in no net loss of wetland resources at the intake site.
- Work within the San Joaquin River shall only take place between July 1 and September 30. Work within the cofferdam will not be considered to be in-river construction.
- All construction contracts shall specify a fish salvage program for all dewatered areas as part of construction. All trapped fish and aquatic species within a dewatered work site will be removed and returned unharmed to the San Joaquin River.

Significance after Mitigation Less than significant.

Impact BIO-5: Effects of project operations on special-status fishes
No Action Alternative. Under the No Action Alternative, no change in operations would occur. Therefore, there would be no new impacts to special-status fish and their habitat**.**

Combined and Separate Alignment Alternatives Currently, water from the Cities' Waste Water Treatment Plants is discharged to the San Joaquin River where it contributes to existing flows and therefore provides potential biological benefits to fishery resources. For example, studies have shown positive relationships between the flow in the San Joaquin River during the spring (e.g., March-May) and the survival of juvenile salmon as well as adult salmon escapement 2.5 years later (Hanson 2013). Under the Proposed Action, the Cities would redirect Waste Water Treatment Plant discharges out of the San Joaquin River, which would result in an incremental reduction in river flows relative to the baseline condition. Average annual flows in the San Joaquin River would be reduced by approximately 0.5 percent, which is considered insignificant

in comparison to the seasonal and annual variations in river flows. Between 1990 and 2014 flows at Vernalis ranged from about 585,000 AFY to 8,900,000 AFY. The percentage reduction varies depending on year type, but in dry years, due to restrictions in their discharge permit, the City of Modesto often cannot discharge to the river at all. Discharge is only allowed when river flows provide a flow ration equal to or greater than 20:1 (river to effluent), so the effect of discharge reductions in dry years is still minimal. For example, in 2014 Modesto only discharged a total of 1,139 AF to the river. Under the No Action Alternative very little water would be discharged during dry years so the discontinuation of this discharge has a minimal effect.

An assessment of the impacts of the reduction of Waste Water Treatment Plant discharges was conducted as part of the feasibility study for the proposed project. Hanson Environmental (Hanson) prepared a report titled *Assessment of Potential Effects of the North Valley Regional Recycled Water Program Reductions in Freshwater Discharges into the San Joaquin River on Fishery Habitat and Juvenile Salmon Survival* (Hanson 2013). This report is provided in **Appendix E**. The analysis focuses on the period from March through May because this is the critical time period when flows in the river can affect sensitive species. Flow reductions at other times in the year would not be expected to be biologically meaningful (see **Appendix E**).

The assessment report utilized Chinook salmon as the indicator species for evaluating the effects of the proposed project (Hanson 2013). Chinook salmon were selected as the indicator species because: (1) quantitative data on the relationships between San Joaquin River flows and habitat quality and availability, survival, and abundance are not available for other fish species inhabiting the river; and (2) Chinook salmon are a species sensitive to changes in instream flows and other environmental factors such as exposure to seasonally elevated water temperature when compared to the greater tolerance of many of the resident and other migratory fish that utilize the San Joaquin River as habitat (Kjelson et al. 1982, Mesick et al. 2007). The two primary conclusions from the assessment were:

- Redirection of discharges from the Modesto and Turlock Waste Water Treatment Plants away from the San Joaquin River would result in an incremental reduction in river flow from the point(s) of the existing discharge downstream. The reduction in San Joaquin River flow would contribute, based on the best scientific information available, to an incremental reduction in juvenile Chinook salmon survival during spring outmigration, a reduction in adult salmon escapement to the San Joaquin River tributaries, and an incremental reduction in habitat quality and availability in the lower river and estuary.
- The magnitude of predicted changes in juvenile salmon survival, adult escapement, and habitat conditions in the lower river and estuary was small (typically less than 1 percent when compared to current baseline conditions) and is well within the natural observed variation in the regression relationships used in these analyses. The magnitude of predicted changes in juvenile salmon survival and adult escapement, habitat quality and availability in the lower San Joaquin River, and the location of the estuarine low salinity zone (X2 location), would not be detectable in field studies and is considered to be less than significant.

Based on results of the assessment, redirection of the discharge of treated wastewater from the Waste Water Treatment Plants at Modesto and Turlock away from the San Joaquin River would not be expected to result in a measureable effect on the population dynamics of Chinook salmon. Since Chinook salmon are among the most sensitive fish species to changes in instream flows and other associated environmental factors (e.g., exposure to seasonally elevated water temperatures: Kjelson et al. 1982, Mesick et al. 2007) the potential effects of the proposed redirection of Waste Water Treatment Plant discharges away from the river would be expected to be less for other resident and migratory fish inhabiting the San Joaquin River (Hanson 2013).

PID Conveyance Alternative (Alternative 3) Similar to Alternatives 1 and 2, this alternative would slightly reduce flows in the San Joaquin River. The only difference is that the instead of discontinuing discharges, both Turlock and Modesto would continue to discharge at their existing discharge locations, and the water would be diverted at the PID intake. This would result in slightly more water in the river for the 3.6 miles between the Turlock discharge location at the Harding Drain Bypass pipeline and the intake, and slightly less water in the river between the PID intake and the existing Modesto discharge location, which is downstream of the intake. Downstream of the Modesto discharge, the amount of water in the river would be the same as for Alternatives 1 and 2. This alternative thus would result in the same incremental reduction in river flows relative to the baseline condition, and would not be expected to result in a measureable effect on the population dynamics of Chinook salmon or other resident and migratory fish inhabiting the San Joaquin River (Hanson 2013).

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Impact BIO-6: Effects on giant garter snake The natural drainage on the east side of San Joaquin River (Figure 3.4-1, Sheets 7-10) and freshwater wetlands within the river provide potentially suitable aquatic habitat for giant garter snake (GGS). The Harding Drain and other large ditches with emergent vegetation also provide marginal aquatic habitat for this species. Uplands adjacent to these aquatic sites provide basking sites and refugia. GGS are also known to occur in the Volta Wildlife Area (USFWS 2012).

GGS were not observed in the Harding Drain or San Joaquin River during pre-construction surveys conducted for the Harding Drain Bypass Project (Horizon 2014a). The closest known occurrence is approximately 13 miles south of the Study Area in Merced County near Gustine, CA (CDFW 2014). The San Joaquin River may function as a dispersal corridor between GGS populations to the south and north.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no direct impacts to GGS would occur. However, under the No Action Alternative GGS habitat could be adversely affected because of a lack of reliable water supply.

Combined Alignment Alternative (Alternative 1) Potential impacts to GGS would be minimized by using trenchless construction techniques in aquatic habitats where GGS may occur. Potential upland habitat adjacent to aquatic habitat in the San Joaquin River would be avoided because

entry and pullback pits for HDD construction would be on the land-side of the river levees and greater than 200 feet from suitable aquatic habitat. To the extent feasible, construction is expected to take place in the active season for GGS, which is from May 1 to October 1. The proposed pipeline alignment would cross the natural drainage on the east side of the San Joaquin River up to three times (**Figure 3.4-1**, Stations 373+00. 436+00, and 562+50). Approximately 54,000 square feet (1.24 acres) of potential GGS upland habitat would be temporarily disturbed during construction. This would temporarily reduce the amount and quality of upland habitat available to GGS. If GGS are present in upland areas during construction, injury or mortality to individuals could result while operating construction equipment for site preparation (i.e., clearing and grubbing). **Mitigation Measure BIO-6** would be implemented to avoid or minimize these potential impacts by avoiding suitable habitat for GGS to the extent feasible. Where disturbance of potentially suitable habitat is unavoidable, **Mitigation Measure BIO-6** would minimize impacts by requiring pre-construction surveys, on-site biological monitoring, restricting the location of certain construction activities, and restoration of impacted areas to pre-construction conditions. With implementation of this mitigation measure, impacts would be less than significant.

Provision of supplemental water to refuges would benefit GGS habitat, but would also increase the amount of water of wastewater origin in the DMC. However, water quality of the DMC is not expected to be adversely affected by discharge of recycled water. Water quality effects are evaluated in detail in *Section 3.11, Hydrology and Water Quality*, and in **Appendix I**, which contains the Antidegradation Analysis performed for the discharge. Water quality would meet Reclamation requirements for discharge of non-project water to the DMC, and modest increases in salinity would not be expected to affect GGS. All constituents would be below applicable aquatic life water quality criteria. GGS are particularly sensitive to selenium but levels of selenium in the DMC are not projected to change under the Proposed Action. Provision of supplemental water to refuges is thus projected to have an overall beneficial impact.

Separate Alignment Alternative (Alternative 2) Potential impacts to GGS would be similar to Alternative 1. There would be a greater chance for impacts to GGS that may occur in wetlands along the San Joaquin River because there would be two crossings of the San Joaquin River. There would be no potential for impacts in the natural drainage on east side of San Joaquin River because this alternative does not cross that drainage. These impacts are considered potentially significant. **Mitigation Measure BIO-6** would be implemented as described for the Alternative 1. With implementation of this mitigation measure, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Potential impacts to GGS would be similar to Alternative 2. There would be a greater chance for impacts to GGS that may occur in wetlands along the San Joaquin River because work would be conducted both within the river and in adjacent upland habitat. Although PID has determined that habitat for GGS at their existing intake site is very limited because of a lack of vegetation and high level of human disturbance (PID 2006), these impacts are still considered potentially significant. **Mitigation Measure BIO-6** would be implemented as described for Alternatives 1 and 2. With implementation of this mitigation measure, impacts would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure BIO-6: Avoid and Minimize Impacts to Giant Garter Snake** (Alternatives 1, 2 and 3). The following measures shall be implemented to avoid or minimize impacts to GGS:

- Trenchless construction techniques shall be used to construct the pipeline crossing in potential aquatic habitat for GGS (applicable to Alternatives 1 and 2 only).
- Construction personnel shall participate in a CEAT. Under this program, workers shall be informed about GGS and habitat, the species life history, conservation goals, identification of the snake, and procedures to follow in the event of a possible sighting.
- Within 24-hours prior to commencement of construction activities, the site shall be inspected by a qualified biologist who is approved by the USFWS. The biologist shall provide the Service with a field report form documenting the monitoring efforts within 24-hours of commencement of construction activities. A qualified biologist shall be on-site during all construction activity within 200 feet of potential habitat for GGS (Survey areas for the Combined and Separate Alignment Alternatives are shown in **Table 3.4-3** and **Figure 3.4-1**; for the PID Conveyance Alternative surveys shall take place at the intake site). If a snake is encountered during construction activities, the biologist shall have the authority to stop construction activities until appropriate corrective measures have been completed or it is determined that the snake would not be harmed.
- Erosion control materials including silt curtains, silt fencing, and erosion control wattles shall be regularly inspected for entanglement or entrapment of the snake. No erosion control devices containing plastic netting (including photo- or biodegradable plastic netting) shall be used.
- Stockpiling of construction materials, portable equipment, vehicles, and supplies shall be restricted to the designated construction staging areas which shall be greater than 200 feet from GGS aquatic habitat.
- Clearing of wetland vegetation, if any, shall be confined to the minimal area necessary to construct the pipeline or intake.

- After completion of construction activities, any temporary fill and construction debris shall be removed. Disturbed areas shall be restored to pre-project conditions. Restoration work shall include replanting native emergent vegetation, where appropriate.

Significance after Mitigation Less than significant.

Impact BIO-7: Effects on San Joaquin whipsnake Potentially suitable habitat for San Joaquin whipsnake occurs in saltbush scrub on the river side of San Joaquin River levee near Station 1335 (**Figure 3.4-1**, Sheet 11). This species was not observed in this location during surveys conducted for the Harding Drain Bypass Project (Horizon 2014a). Lack of burrows or other refuge in alkali flat/scrub between Stations 553+00 to 563+00 make this area unsuitable for San Joaquin whipsnake.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to San Joaquin whipsnake would occur.

Combined Alignment Alternative (Alternative 1) This alternative would not impact San Joaquin whipsnake because it does not cross potentially suitable habitat.

Separate Alignment Alternative (Alternative 2) Potential impacts to San Joaquin whipsnake would be minimized by using trenchless construction techniques in areas where this species may occur (i.e., river side of San Joaquin River levee near Station 1335). The potential for this species to be impacted by a frac-out is considered to be highly unlikely. Impacts are considered less than significant.

PID Conveyance Alternative (Alternative 3) This alternative would not affect San Joaquin whipsnake because it does not cross potentially suitable habitat.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Impact BIO-8: Effects on western pond turtle Potentially suitable habitat for western pond turtle occurs in the San Joaquin River and natural drainages. Irrigation ditches with emergent vegetation provide marginally suitable habitat because they generally lack basking sites, the banks are very steep, and they are not perennially inundated**.**

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to western pond turtle would occur.

Combined Alignment Alternative (Alternative 1) Potential impacts to western pond turtle would be minimized by using trenchless construction techniques in areas where this species is most likely to occur. However, the precise construction methods are not known at this time, and western pond turtle may occur in upland areas. Construction activities that directly impact

western pond turtle or their nests have the potential to result in significant impacts to this species. **Mitigation Measure BIO-8** would avoid impacts to suitable habitat for this species to the extent feasible. Where disturbance of suitable habitat is unavoidable, the mitigation measure would require that impacts be minimized through pre-construction surveys, establishment of buffers, and monitoring. With implementation of this mitigation measure, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts would be similar to Alternative 1, but there would be a greater chance for impacts to western pond turtle because there would be two crossings of the San Joaquin River. **Mitigation Measure BIO-8** would be implemented as described for Alternative 1. With implementation of this mitigation measure, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Potential impacts would be similar to Alternative 1, but there would be a greater chance for impacts to western pond turtle because there would construction within the San Joaquin River, which contains moderate to low quality habitat for western pond turtle within and near the shores of the river. Impacts of construction of the expanded intake facility would be potentially significant. **Mitigation Measure BIO-8** would be implemented as described for Alternatives 1 and 2. With implementation of this mitigation measure, impacts would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure BIO-8: Avoid and Minimize Impacts to Western Pond Turtle** (Alternatives 1, 2 and 3). The following measures shall be implemented to avoid or minimize impacts to western pond turtle:

- To the extent feasible, trenchless construction techniques shall be used where pipelines cross potential aquatic habitat for western pond turtle.
- Construction personnel shall participate in a CEAT. Under this program, workers shall be informed about western pond turtle and their habitat, conservation goals, identification, and procedures to follow in the event of a possible sighting.
- Pre-construction surveys for western pond turtle shall be conducted by a qualified biologist 14 days before and 24 hours before the start of construction activities where suitable habitat exists (Survey areas for the Combined and Separate Alignment Alternatives are shown in **Table 3.4-3** and **Figure 3.4-1**; for the PID Conveyance Alternative surveys shall take place at the intake site). If western pond turtle or their nests are observed during pre-construction surveys, the following measures shall be implemented:
    - A qualified biologist shall be on site to monitor construction in suitable habitat. If a western pond turtle is present within 50 feet of a construction area, no vegetation clearing or ground disturbing activities shall be conducted until the turtle leaves the area on its own volition.
    - If western pond turtle nests are identified in the work area during pre-construction surveys, a 100-foot no-disturbance buffer shall be established

between the nest and any areas of potential disturbance. Buffers shall be clearly marked with temporary fencing. Construction shall not be allowed to commence in the exclusion area until hatchlings have emerged from the nest, or the nest is deemed inactive by a qualified biologist.

Significance after Mitigation Less than significant.

Impact BIO-9: Effects on burrowing owl Potential habitat for burrowing owls occurs in several locations throughout the Study Area, including unvegetated areas adjacent to the DMC and in ruderal and agricultural habitats with burrows. Evidence of this species was not observed during site reconnaissance and few burrows were observed in the Study Area (Horizon 2014b). However, this species may disperse and colonize suitable habitat within the Study Area.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to burrowing owls would occur.

Combined Alignment Alternative (Alternative 1) If present in the vicinity of the Study Area, construction could disturb burrowing owls through noise, visual distraction, or direct impacts to occupied habitat. These impacts would be considered potentially significant. **Mitigation Measure BIO-9** is proposed to avoid impacts to this species, to the extent feasible. Where disturbance is unavoidable, impacts to burrowing owls would be minimized through establishing buffers around active burrows. If active burrows cannot be avoided, passive relocation techniques may be used. If relocation occurs, then compensation would be provided to offset impacts. With implementation of this mitigation measure, impacts would be less than significant.

S*eparate Alignment Alternative (Alternative 2)* Potential impacts would be similar to Alternative 1, but there would be a greater chance for impacts because this alternative crosses a larger area of potentially suitable habitat. **Mitigation Measure BIO-9** would be implemented as described for Alternative 1. With implementation of this mitigation measure, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Potential impacts would be similar to Alternatives 1 and 2, as moderate to low quality habitat for burrowing owl occurs near the PID intake site and along the Main Canal. **Mitigation Measure BIO-9** would be implemented as described for Alternatives 1 and 2. With implementation of this mitigation measure, impacts would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure BIO-9: Avoid, Minimize, or Compensate for Impacts to Burrowing Owl** (Alternatives 1, 2 and 3). Prior to initiating ground-disturbing activities, surveys for burrowing owls shall be conducted in accordance with protocols established in the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012 or current version). If ground-disturbing activities are delayed or suspended for more than 30 days after the pre-construction survey, the site shall be resurveyed. If burrowing owls are detected, disturbance to

burrows shall be avoided during the nesting season (February 1 through August 31). Buffers shall be established around occupied burrows in accordance with guidance provided in the *Staff Report on Burrowing Owl Mitigation*, and at the discretion of a qualified wildlife biologist. Buffers around occupied burrows shall be a minimum of 656 feet (200 meters) during the breeding season, and 160 feet (100 meters) during the non-breeding season. Buffer distances shall be subject to the approval of CDFW.

If occupied burrows cannot be avoided, passive owl relocation techniques may be implemented outside of the nesting season (February 1 through August 31). Owls would be excluded from burrows within 160 feet of construction by installing one-way doors in burrow entrances. The work area shall be monitored daily for 1 week to confirm owl departure from burrows prior to any ground-disturbing activities. Where possible burrows shall be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe shall be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow.

If occupied burrows are relocated, the Partners Agencies shall enhance or create burrows in adjacent habitat at a 1:1 ratio (burrows destroyed to burrows enhanced or created) one week prior to implementation of passive relocation techniques. If burrowing owl habitat enhancement or creation takes place, the Partners Agencies shall develop and implement a monitoring and management plan to assess the effectiveness of the mitigation. The plan shall be subject to the approval of CDFW.

Significance after Mitigation Less than significant.

Impact BIO-10: Effects on tricolored blackbird Potential habitat for tricolored blackbird occurs in the natural drainage on the east side of San Joaquin River (**Figure 3.4-1**, Sheets 7-10), freshwater wetlands within the river, and some agricultural fields planted with silage or grain. The Harding Drain and other large ditches with emergent vegetation provide marginal nesting habitat for this species. A tricolored blackbird breeding colony was documented in 2014 in the natural drainage on the east side of the San Joaquin River (**Figure 3.4-1**, Sheet 7, Station 375) (UC Davis 2014).

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to tricolored blackbirds would occur.

Combined Alignment Alternative (Alternative 1) Potential impacts to tricolored blackbird would be minimized by using trenchless construction techniques in areas that support emergent vegetation. However, this species may nest in agricultural fields and construction could disrupt nesting through noise, visual distraction, or otherwise cause behavioral modifications. While the Proposed Action would not permanently modify nesting habitat for tricolored blackbirds, nest failure would be considered a potentially significant impact. **Mitigation Measure BIO-10** would be implemented to avoid and minimize potential impacts to tricolored blackbird. This mitigation measure includes pre-construction surveys during the nesting season and establishing buffers around active nests. With implementation of this mitigation measure, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts would be similar to the Alternative 1 and are considered potentially significant. However, this alternative would not cross the natural drainage where a breeding colony was observed in 2014. **Mitigation Measure BIO-10** would be implemented as described for Alternative 1. With implementation of this mitigation measure, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Surveys of the PID intake site determined that there was no suitable habitat for tricolored blackbird present at the intake (PID 2006). However, the pipeline alignment could traverse areas adjacent to silage and grain fields, which provide potential habitat for tricolored blackbird. Impacts would be similar to those for Alternatives 1 and 2. **Mitigation Measure BIO-10** would be implemented as described for Alternative 1 and 2. With implementation of this mitigation measure, impacts would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure BIO-10: Avoid and Minimize Impacts to Tricolored Blackbird Nesting Colonies** (Alternatives 1, 2 and 3). The following measures shall be implemented to avoid or minimize impacts to tricolored blackbird:

- To the extent feasible, trenchless construction techniques shall be used in areas that support emergent vegetation.
- During the breeding season (February 1 through August 31), pre-construction surveys for tricolored blackbird shall be conducted in suitable nesting habitat by a qualified biologist no more than 15 days prior to scheduled work. Suitable nesting habitat includes any of the following: (a) dense vegetation near open water; (b) emergent marsh vegetation, especially cattails and bulrush; (c) thickets of willow, blackberry, wild rose, or thistles; or (d) silage and other grain fields such as sorghum.
- If tricolored blackbird breeding is detected, a 500 foot no-disturbance buffer shall be established around the breeding site. The buffer shall be maintained until a qualified biologist has determined that young have fledged and are no longer reliant upon the nest or parental care for survival.

Significance after Mitigation Less than significant.

Impact BIO-11: Effects on golden eagle and bald eagle Golden eagles are commonly observed in the canyons/foothills to the west of the Study Area (ebird.org 2014). The grasslands and oak woodlands of the Diablo Range support a high density of nesting golden eagles. In central California, golden eagles nest primarily in large trees and cliffs within open grasslands and oak savanna, and occasionally in oak woodland and open shrublands (Hunt et al. 1999). The Study Area provides marginal foraging habitat and nesting is unlikely.

Bald eagles have been observed in canyons/foothills to the west of the Study Area and at Modesto WTP (ebird.org 2014). In California, the majority of bald eagles nest in conifer trees near reservoirs (Jackman and Jenkins 2004). Typically, bald eagles forage near open water

(rivers, lakes, reservoirs) where fish or waterfowl are abundant (USFS 2007).The San Joaquin River, and possibly the Jennings Plant, provide potential foraging habitat. Large trees along the San Joaquin River are potential roost sites. Bald eagles are generally winter visitors in the Central Valley; nesting within the vicinity of the Study Area is unlikely. There are no published reports of nest sites on the San Joaquin Valley floor.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to golden and bald eagles would occur.

Combined Alignment Alternative (Alternative 1) Potential impacts to non-breeding golden and bald eagles may include visual distractions, noise, and possibly temporary displacement from suitable foraging areas. Project activities are not likely to reduce fitness, affect breeding, result in "take" of these species, or result in any substantial adverse impacts to eagles. Therefore, potential impacts to golden and bald eagles are considered to be less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts would be similar to Alternative 1. These potential impacts are considered to be less than significant.

PID Conveyance Alternative (Alternative 3) Potential impacts would be similar to Alternatives 1 and 2. These potential impacts are considered to be less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Impact BIO-12: Effects on raptors including special-status species Numerous raptors utilize habitats in the Study Area for nesting and foraging. Non-listed raptors commonly observed in the vicinity of the Study Area include red-tailed hawk, American kestrel, red-shouldered hawk, and merlin, among others. Special-status raptors (excluding bald eagle, golden eagle, and burrowing owls) known to occur in the vicinity of the Study Area include Swainson's hawk, white-tailed kite, and northern harrier (**Table 3.4-2**). These species have been observed in the Study Area and are known to nest locally. Riparian trees along the San Joaquin River and the natural drainage to the west provide potential nesting habitat for Swainson's hawk and white-tailed kite; isolated mature trees in adjacent fields may also be used for nesting. These raptors commonly forage in agricultural fields. Northern harriers nest on the ground in open areas, including some agricultural fields.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to raptors would occur.

Combined Alignment Alternative (Alternative 1) Construction in the vicinity of raptor nest sites could disturb nesting raptors through generation of noise, visual distraction, or direct impacts to occupied nests (e.g., tree removal or ground disturbance). Potential impacts to Swainson's hawk and white-tailed kite would be minimized by using trenchless construction techniques for crossing of the San Joaquin River, where nesting is most likely to occur. However, construction of the San Joaquin River crossing is anticipated to take 8 to 10 months and special-status raptors

could nest in relatively close proximity to trenchless construction operations. Thus, there would be the potential for disturbance of nesting raptors. Impacts that result in nest abandonment, nest failure, or reduced health or vigor of nestlings are considered potentially significant.

Construction in agricultural lands could impact northern harrier nests and would cause temporary loss of suitable foraging habitat for Swainson's hawk and white-tailed kite. Given the amount of available foraging habitat, this is not likely to result in substantial adverse impacts to Swainson's hawk and white-tailed kite. Disturbance of a northern harrier nest is considered a potentially significant impact. Mitigation measures are proposed to avoid, minimize, or compensate for these potential impacts. **Mitigation Measure BIO-12** would avoid or minimize impacts to active nests for these species and require compensatory mitigation for impacts to nesting habitat. With implementation of this mitigation measure, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts would be similar to Alternative 1, but there would be two crossings of the San Joaquin River, and thus a greater chance for distractions, noise, and temporary displacement in higher quality nesting areas. This alternative would also temporarily impact a larger area of suitable foraging habitat for Swainson's hawk and white-tailed kite (although still not considered a substantial adverse impact) and potential nesting habitat for northern harrier. **Mitigation Measure BIO-12** would be implemented as described for Alternative 1. With implementation of this mitigation measure, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Potential impacts would be similar to Alternative 1, but construction would take place within the San Joaquin River. This alternative would also potentially cause temporary impact to suitable foraging habitat for Swainson's hawk and white-tailed kite (although still not considered a substantial adverse impact) and potential nesting habitat for northern harrier. Implementation of **Mitigation Measure BIO-12** would reduce impacts to less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative**.**

Mitigation Measures **Mitigation Measure BIO-12: Avoid, Minimize, or Compensate for Impacts to Raptors including Special-status species** (Alternatives 1, 2 and 3):

- If ground and vegetation disturbing activities occur between February 1 and September 15, a nesting raptor survey, with a focus on Swainson's hawk and white-tailed kite, shall be conducted in accordance with *Recommended Timing and Methodology for Swainson's Hawk Nesting Survey's in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000, or current CDFW guidance). Surveys shall cover a minimum of a 0.5-mile radius around potentially suitable nesting habitat for Swainson's hawk and white-tailed kite (Survey areas for the Combined and Separate Alignment Alternatives are shown in **Table 3.4-3 and Figure 3.4-1**; for the PID Conveyance Alternative surveys shall take place at the intake site). Agricultural lands within 1,000 feet of open-cut construction areas shall be surveyed for northern harrier nests.

- If nesting raptors are detected, a no-disturbance buffer shall be established around the nest. Buffers shall be established by a qualified biologist with consultation with the CDFW and/or USFWS as appropriate. No construction activities shall be initiated within the buffer until fledglings are fully mobile and no longer reliant upon the nest or parental care for survival. Construction must either be started before nests are established, or if nesting birds are already present, construction within the buffer zone would have been delayed until nesting is done for the season.
- If an active Swainson's hawk or white-tailed kite nest is located within a 0.5-mile radius of an active work area, a biologist shall be on site daily to monitor the nest. The biologist shall monitor for behavioral changes that would suggest the birds are stressed by construction activity or the nest may be abandoned. Such behaviors may include excessive vocalization, a startled response coincident with a loud noise or changes in the viewshed, or prolonged absence from the nest by adults. If the biologists determines that nest success may be adversely impacted by construction, then construction shall be discontinued within 0.5 mile of the nest.
- Trees that would need to be removed for construction would be surveyed to determine if they are suitable for raptor nesting.
- If potential raptor nesting trees are to be removed during construction activities, removal shall take place outside of Swainson's hawk nesting season. Suitable nest trees for raptors shall be replaced at a ratio of 3:1 with appropriate species [e.g., valley oak, coast live oak (*Q. agrifolia*)., Fremont cottonwood]. The trees shall be planted within 5 miles of the removal location, in areas appropriate for raptor nesting, and on land owned or managed by one of the Partner Agencies. If replacement planting is implemented, monitoring shall be conducted annually for 5 years to assess the mitigation's effectiveness. The performance standard for the mitigation shall be 65 percent survival of all replacement plantings.

Significance after Mitigation Less than significant.

Impact BIO-13: Effects on special-status passerine species and birds protected under the MBTA Special-status passerines that may nest in the vicinity of the Study Area include tricolored blackbird (see **Impact BIO-9**), loggerhead shrike (*Lanius ludovicianus)*, and yellow warbler (*Dendroica petechia*). Historically, riparian habitat in the vicinity of the Study Area was important breeding habitat for least Bell's vireo (LBV) (*Vireo bellii pusillus*). In June 2005, a LBV nest was founded in a riparian restoration site at the San Joaquin River National Wildlife Refuge, which is approximately 10 mile north of the project area. Prior to 2005, no LBV nests had been confirmed in the Central Valley for over 50 years. There is a historic record of LBV from the late 1920s in Del Puerto Canyon, which is west of the project area. In the Study Area, riparian scrub in the vicinity of Stations 320+00 to 333+00 (**Figure 3.4-1**, Sheet 6) provides potentially suitable breeding habitat for LBV, though vegetation cover may not be quite as dense the species' preferred breeding habitat. Many species of birds protected under the MBTA may also nest in the Study Area.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to special-status passerines or other birds protected under the MBTA would occur.

Combined Alignment Alternative (Alternative 1) Construction could disturb nesting passerines through generation of noise, visual distraction, or direct impacts to occupied nests (e.g., vegetation removal or ground disturbance). Potential impacts would be minimized by using trenchless construction techniques for crossing sensitive habitat (e.g., San Joaquin River), where nesting is most likely to occur. However, the potential for disturbance of nests remains, and nest failure or removal of a nest are considered potentially significant impacts. **Mitigation Measure BIO-13** would minimize potential impacts to passerines by conducting pre-construction surveys during the nesting season and establishing buffers around active nests. With implementation of this mitigation measure, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts would be similar to Alternative 1, but there would be two crossings of the San Joaquin River, and thus a greater chance for distractions, noise, and temporary displacement in higher quality nesting areas. **Mitigation Measure BIO-13** would be implemented as described for Alternative 1. With implementation of this mitigation measure, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Potential impacts would be similar to Alternative 1. Implementation of **Mitigation Measure BIO-13** would reduce impacts to less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure BIO-13: Avoid and Minimize Impacts to Special-status passerine species and other Birds Protected under the MBTA** (Alternatives 1, 2 and 3):

- If ground and vegetation disturbing activities occur between February 1 and September 15, a survey for nesting birds shall be conducted within a 500-foot radius of the construction area. If nests are detected, buffers around nests shall be established. No-disturbance buffers around special-status passerine nests shall be 500 feet and 250 feet for non-listed birds protected under the MBTA and Fish and Game Code sections 3503 and 3513, unless a qualified CDFW and/or USFWS biologist determines that smaller buffers shall be sufficient to minimize impacts to nesting birds. Factors to be considered for determining buffer size shall include: the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers shall be maintained until a qualified biologist has determined that young have fledged and are no longer reliant upon the nest or parental care for survival.
- Prior to commencing a crossing(s) of the San Joaquin River or construction of an expanded intake facility on the river, the Partner Agencies s shall conduct surveys for LBV in accordance with USFWS' Least Bell's Vireo Survey Guidelines (USFWS

2011a). If LBV are detected during the surveys, the Partner Agencies s shall consult with the USFWS to determine appropriate avoidance measures. The performance standard for avoidance shall be no potential impacts to an established LBV nest. This shall be accomplished by establishing a no-disturbance buffer around the active nest. The no-disturbance buffer shall be a minimum of 500 feet, but may be larger depending on site specific conditions and consultation with USFWS.

Significance after Mitigation Less than significant..

Impact BIO-14: Effects on special-status mammals Special-status mammals with the potential to occur in the Study Area include western red bat (*Lasiurus blossevillii*), American badger (*Taxidea taxus*), and San Joaquin kit fox (SJKF).

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to western red bat, American badger, or SJKF would occur.

Combined Alignment Alternative (Alternative 1) Western red bats may roost in trees along the San Joaquin River and large trees along the natural drainages to the west of the river. The drier areas of the San Joaquin River floodplain provide foraging and dispersal habitat for badgers. Habitat for badgers was not observed in open-cut portions of the Study Area. Potential impacts to western red bat and American badger would be minimized by using trenchless construction techniques in the riparian areas where these species may occur. Impacts to badger dens or trees that provide bat roost could result from a frac-out, but this is considered unlikely, and the effects to these species likely would be insubstantial. These impacts are considered to be less than significant.

The vast majority of the Study Area is comprised of roadways surrounded by intensively cultivated lands. These areas may be utilized by SJKF for dispersal and occasional foraging, but are not suitable for extended periods of occupation (USFWS 2010). A small remnant patch of alkali flat/scrub habitat is located on the south side of West Main Avenue (**Figure 3.4-1**, Sheet 9, Station 553+00 to 563+00). While this area is representative of typical habitat occupied by SJKF, it is small and isolated from large tracts of suitable habitat. Furthermore, no burrows were observed in the alkali flat/scrub habitat during 2014 reconnaissance-level surveys (Horizon 2014b), which suggests lack of ground squirrels (a principal prey resource) and den sites. Due to very limited extent of suitable habitat, this species is considered unlikely to occur in the Proposed Action area. However, construction activities could create temporary barriers to movement and dispersal of SJKF. Potential impacts to movement would be minimized by implementation of **Mitigation Measure TR-2**, which requires that trenches be covered at the end of each work day. Potential impacts to SJKF would be further minimized by implementing **Mitigation Measure BIO-14a**, which requires pre-construction surveys for SJKF dens and additional avoidance or minimization measures. Impacts to SJKF are considered unlikely, but would be potentially significant if the species is found in the project area. **Mitigation Measure BIO-14a** would reduce impacts to less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts would be similar to Alternative 1, but there would be a greater chance for impacts to bat roosts and badger dens in riparian areas because there would be two crossings of the San Joaquin River. Potential impacts to western red bat and American badger would be less than significant. **Mitigation Measure BIO-14a** would reduce potential impacts to SJKF to less than significant.

PID Conveyance Alternative (Alternative 3) Similar to Alternatives 1 and 2, **Mitigation Measure BIO-14a** would reduce potential impacts to SJKF to less than significant. Evaluation of the PID intake site determined that the area may be used by special status bats for foraging and night roosts. Bats may use buildings on site or trees, including large-diameter snags (dead trees), in the adjacent riparian area as day roosts (PID 2006). Implementation of **Mitigation Measure BIO-14b** would reduce impacts to bats to less than significant.

Operation and maintenance of any of the Action alternatives would not occur within riparian or alkali scrub habitats, and is thus not expected to adversely impact these species.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure BIO-14a: Avoid and Minimize Impacts to San Joaquin kit fox** (Alternatives 1, 2 and 3):

- Project-related activities will avoid affecting the alkali scrub/flat habitat in the Action area. Avoidance is defined as no direct or indirect effects to habitat.
- A qualified biologist will conduct preconstruction surveys no less than 14 days and no more than 30 days before the commencement of activities to identify potential dens more than 5 inches in diameter within 200 feet of ground disturbing activities. The Partner Agencies will implement USFWS' (2011b) *Standardized Recommendations for Protection of San Joaquin Kit Fox Prior to or During Ground Disturbance*. The Partner Agencies will notify Reclamation and the USFWS in writing of the results of the preconstruction survey within 30 days after these activities are completed prior to the start of construction.
- If potential dens are located within the proposed work area and cannot be avoided during construction activities, a USFWS-approved biologist will determine if the dens are occupied. If occupied dens are present within the proposed work area, their disturbance will be avoided. Exclusion zones will be implemented following the most current USFWS procedures (currently USFWS 2011b). The Partner Agencies will notify Reclamation and the USFWS immediately if a natal or pupping den is found in the survey area, and will present the results of pre-activity den searches within 5 days after these activities are completed and before the start of construction activities in the area.

Mitigation Measure BIO-14b: Avoid and Minimize Impacts to Special-status bats (Alternative 3):

- Construction at the PID intake site shall not take place after sunset or before sunrise.

- Any snags measuring at least 20 inches in diameter shall be inspected by a qualified biologist for potential bat use prior to removal. Should a bat roost be discovered in a snag, CDFW shall be notified to develop appropriate mitigation measures (such as exclusionary nets).

Significance after Mitigation Less than significant.

Impact BIO-15: Effects on riparian habitat and other sensitive natural communities
The majority of the project would be constructed in agricultural lands, road shoulders, or other disturbed and previously developed lands. However, portions of the alternative alignments cross through sensitive natural communities as identified by CDFW (CDFG 2010). Sensitive natural communities in the Study Area include:

- Black willow thickets – *Salix gooddingii* (Alliance code 71.040.05): This is the dominant natural community in the San Joaquin River floodplain.
- Great Valley Valley Oak Riparian Forest - *Quercus lobata*/grass (Alliance code 71.040.05): This community occurs on the high floodplain bench in the vicinity of Station 1310+00 (**Figure 3.4-1**, Sheet 17).
- Alkali heath marsh - F*rankenia salina / Distichlis spicata* (Alliance code 52.500.04): This community occurs on the south side of West Main Avenue (**Figure 3.4-1**, Sheet 9, Station 553+00 to 563+00).
- Valley Sink Scrub - *Allenrolfea occidentalis* (Alliance code 36.120.04): This community occurs on the south side of West Main Avenue (**Figure 3.4-1**, Sheet 9, Station 553+00 to 563+00).

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to sensitive natural communities would occur.

Combined Alignment Alternative (Alternative 1) Potential adverse impacts to riparian areas and sensitive natural communities would be minimized by using trenchless construction techniques in these areas. However, the precise pipeline alignment and construction methods are not known at this time. Impacts to riparian areas and sensitive natural communities may result from sedimentation or alteration in drainage patterns. These impacts are considered potentially significant. Implementation of **Mitigation Measure BIO-1d and Mitigation Measure BIO-2a** would reduce impacts to a level that is less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts to riparian areas and sensitive natural communities would be similar to Alternative 1, but there would be a greater chance for impacts in riparian areas because there would be two crossings of the San Joaquin River. There would be no potential impacts to Alkali health marsh and Valley Sink Scrub habitats between Stations 553+00 to 563+00 (**Figure 3.4-1**, Sheet 9) because the route for this alternative does not cross that area. Implementation of **Mitigation Measure BIO-1d** would reduce impacts to a level that is less than significant.

PID Conveyance Alternative (Alternative 3) Construction of the existing intake, which was completed in 2011, removed riparian habitat at the site, and the area adjacent to the intake now has less riparian vegetation than was present before construction of the new intake. However, there is a potential that expansion of the intake facility, which would require construction in the San Joaquin River channel, would result in loss of some of the remaining riparian vegetation at the site, which would be considered a significant impact. Expansion of the intake could affect riparian forest and mixed willow riparian habitat within this area. **Mitigation Measure BIO-16a** and **Mitigation Measure BIO-16b** would reduce impacts to less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measures BIO-1d** (Alternatives 1 and 2), **BIO-2a** (Alternative 1), **BIO-16a** (Alternatives 1, 2, and 3), and **BIO 16b** (Alternatives 1, 2, and 3).

***S**ignificance after Mitigation* Less than significant.

Impact BIO-16: Effects on federally protected wetlands Aquatic habitats and wetland communities in the Study Area are described in *Section 3.4.1*. Several of these habitats support wetlands and waters that are likely to be regulated by the USACE and the EPA under Section 404 the CWA. The San Joaquin River in the Study Area is considered Traditional Navigable Waters of the U.S. Other wetlands and waters with a "significant nexus" to the San Joaquin River would also be considered jurisdictional waters of the U.S. Drainages excavated wholly in uplands and draining only uplands are not likely to be jurisdictional features. Wetland within the Jennings Plant spray fields, if any, are also not likely to be considered jurisdictional because they are part of a permitted NPDES.

Based on preliminary site reconnaissance, features within and adjacent to the Study Area that are likely to be considered jurisdictional waters of the U.S. include: natural drainages to the east and west of the San Joaquin River, the Harding Drain, and the alkali pool and swale (Horizon2014b). Some large irrigations ditches with a significant nexus to the San Joaquin River may also be considered waters of the U.S. A jurisdictional wetland delineation has been conducted and has been submitted to USACE for verification.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to federally protected wetlands would occur.

Combined Alignment Alternative (Alternative 1) Potential adverse impacts to federally protected wetlands would be minimized by using trenchless construction techniques in these areas. However, the precise pipeline alignment and construction methods are not known at this time. Impacts to federally protected wetlands may result from excavation, placement of fill, frac-out, sedimentation, or alteration in drainage patterns. These impacts are considered potentially significant. Several mitigation measures are proposed to avoid, reduce, or compensate for potential impacts. **Mitigation Measure BIO-16a** would avoid impacts to federally protected wetlands to the extent feasible and where disturbance of wetlands is unavoidable, require a

SWPPP and restoration of impacted areas to pre-construction conditions. **Mitigation Measure BIO-16b** would require compensatory mitigation consistent with the conditions of a CWA Nationwide Permit (NWP) and/or the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (Compensatory Mitigation Rule) (73 CFR 19594). Mitigation applied under the conditions of a NWP and/or the Compensatory Mitigation Rule would provide sufficient compensation for losses of aquatic resources such that impacts would be less than significant. Finally, **Mitigation Measure BIO-1d** would be implemented to reduce impacts in the event of a frac-out. With implementation of these mitigation measures, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts to federally protected wetlands would be similar to Alternative 1, but there would be a greater chance for impacts in riparian areas because there would be two crossings of the San Joaquin River. There would be no potential impacts to alkali pool/swale and the natural drainage on the east side of the river because the route for this alternative does not cross that area. **Mitigation Measure BIO-16a, Mitigation Measure BIO-16b,** and **Mitigation Measure BIO-1d** would be implemented as described for Alternative 1. With implementation of these mitigation measures, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) This alternative would result in permanent fill of riparian habitat and perennial stream habitat in the San Joaquin River. The San Joaquin River is a water of the U.S. and is therefore under the jurisdiction of USACE. The expansion of the intake would require a 404 Permit from the USACE and would require the Partner Agencies to enter in to a Streambed Alteration Agreement with the CDFW as required under Section 1601 of the State Fish and Game Code. Impacts would be significant. **Implementation of Mitigation Measure BIO-16a** and **Mitigation Measure BIO-16b** would reduce impacts to less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measure BIO-1d** (Alternatives 1 and 2).

Mitigation Measure BIO-16a: Avoid and Minimize Impacts to Federally Protect Wetlands (Alternatives 1, 2 and 3). To the extent feasible, project-related activities shall avoid federally protected wetlands. To the extent feasible, the proposed project shall minimize potential impacts to federally protected wetlands by utilizing trenchless construction techniques. A SWPPP shall be implemented to reduce the potential for sediments and contaminants to enter wetlands and waters. After construction, surface topography and drainage shall be restored to pre-construction conditions. Where appropriate, revegetation shall be implemented with site-adapted native species.

Mitigation Measure BIO-16b: Obtain Regulatory Permits for Work Activities Taking Place in Wetlands and Waters of the United States and the State (Alternatives 1, 2 and 3). Work within areas defined as waters of the U.S. that includes placement of fill will require a CWA Section 404 permit and Section 401 Water Quality Certification. All work proposed in

jurisdictional waters of the U.S. shall be authorized under these permits, and the work shall comply with the general and regional conditions of the permits. In areas where disturbance to jurisdictional waters or wetlands occurs, the Partner Agencies shall implement mitigation consistent with the terms of a CWA NWP and/or the Compensatory Mitigation Rule (73 CFR 19594). Compensatory mitigation may include creation, re-establishment, or enhancement of wetlands in the Proposed Action area or at an off-site location. Compensatory mitigation may also include purchase of credits at an approved mitigation bank or contribution to an approved in-lieu fee program.

Significance after Mitigation Less than significant.

Impact BIO-17: Effects on movement of fish and wildlife and use of breeding sites As described in *Section 3.4.1,* several fish and wildlife species utilize the San Joaquin River and adjacent riparian habitat as breeding sites and a migration corridor. The majority of the project would be constructed in agricultural lands, road shoulders, or other disturbed and previously developed lands that do not function as a significant movement corridor for fish and wildlife. However, some wildlife breeding does occur in agricultural lands, natural drainages, and other wetlands.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to breeding or movement of fish and wildlife would occur.

Combined Alignment Alternative (Alternative 1) Potential adverse impacts to breeding or movement of fish and wildlife would be minimized by using trenchless construction techniques for crossing the San Joaquin River. Impacts to breeding wildlife would be minimized by conducting pre-construction surveys during the respective breeding seasons (See **Mitigation Measures BIO-6, 8, 9, 10, 12** and **13**). Open-cut construction would create temporary barriers to wildlife movement in agricultural lands and ruderal habitat. Impacts of open-cuts on wildlife movement would be minimized by implementation of **Mitigation Measure TR-2**, which requires that trenches be covered at the end of each work day. Some mature trees which provide suitable nesting habitat for raptors may be removed during construction, but outside of the raptor nesting season. Impacts of tree removal would be mitigated by replanting trees (See **Mitigation Measures BIO-12)**. This alternative would not create any permanent barriers to wildlife movement or permanently disrupt breeding sites. Thus, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Potential impacts would be similar to Alternative 1, but there would be two crossings of the San Joaquin River, and thus a greater chance for distractions, noise, and temporary displacement in higher quality breeding areas. This alternative would also temporarily impact a larger area of agricultural lands that may be used for movement or nesting. Similar to Alternative 1, impacts to breeding wildlife would be minimized by conducting pre-construction surveys during the respective breeding seasons (See **Mitigation Measures BIO-6, 8, 9, 10, 12** and **13**). Impacts to wildlife movement would be minimized by implementing **Mitigation Measure TR-2**. This alternative would not create any permanent barriers to wildlife movement or permanently disrupt breeding sites. Thus, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Potential impacts would be similar Alternative 1, but there would be construction within the San Joaquin River, and thus a greater chance for distractions, noise, and temporary displacement in higher quality breeding areas, including effects on freshwater fish that use the San Joaquin River as a migratory corridor. Impacts to migratory fish, including salmonids would be minimized by measures to minimize impacts of in-river construction (see **Mitigation Measure BIO-4b**). Impacts to breeding wildlife would be minimized by conducting pre-construction surveys during the respective breeding seasons (See **Mitigation Measures BIO-6, 8, 9, 10, 12** and **13**). Impacts to wildlife movement would be minimized by implementing **Mitigation Measure TR-2**. This alternative would not create any permanent barriers to fish or wildlife movement or permanently disrupt breeding sites. Thus, impacts would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measures BIO-6, 8, 9, 10, 12** and **13**, and **TR-2** (Alternatives 1, 2 and 3); and **Mitigation Measure BIO-4b** (Alternative 3).

Significance after Mitigation Less than significant.

Impact BIO-18: **Conflict with local ordinances or policies protecting biological resources** As discussed in *Section 3.4.2*, the Stanislaus County General Plan establishes several policies to protect sensitive species and habitats such as vernal pools, riparian habitats, and oak woodlands. There is also a policy (Policy Twenty-nine) which indicates the County should continue to lobby the Federal Government to provide adequate water flows in the County's rivers to allow salmon migration.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no conflicts to local ordinances or policies would occur.

Combined Alignment Alternative (Alternative 1) Potential conflicts with County policies that protect sensitive plants, wildlife and habitats would be minimized by using trenchless construction techniques and avoiding open-cut construction in sensitive habitats. However, the precise plan for use of various construction methods is not known and potential impacts to areas

that potentially support sensitive wildlife and plant life may result from sedimentation, or alteration in drainage patterns within suitable habitat. These impacts would be considered potentially significant. Implementation of **Mitigation Measures BIO-1d, BIO-2a,** and **BIO-16a** would reduce impacts to a level that is less than significant.

As discussed above under **Impact BIO-5**, the Proposed Action is not inconsistent with Stanislaus County Policy Twenty-Nine because reductions in discharge would have minimal effects on river flow and would not impair salmon migration in the San Joaquin River. Operational impacts would thus be less than significant.

Separate Alignment Alternative (Alternative 2) Potential conflicts with local ordinances or policies would be similar to Alternative 1, but there would be a greater chance for impacts in riparian areas because there would be two crossings of the San Joaquin River. There would be no potential impacts to sensitive habitats between Stations 553+00 to 563+00 (**Figure 3.4-1**, Sheet 9) because the route for this alternative does not cross that area. Implementation of **Mitigation Measures BIO-1d** and **BIO-16a** would reduce impacts to a level that is less than significant.

PID Conveyance Alternative (Alternative 3) Potential conflicts with local ordinances or policies would be similar to Alternative 1, but there would be a greater chance for impacts in riparian areas because there would be construction within the San Joaquin River. Implementation of **Mitigation Measures BIO-4b** and **BIO-16a** would reduce impacts to a level that is less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **See Mitigation Measures BIO-1d** (Alternatives 1 and 2), **2a** (Alternative 1), **4b** (Alternative 3), and **16a** (Alternatives 1, 2 and 3).

Significance after Mitigation Less than significant with mitigation.

Impact BIO-19: Effects on existing Habitat Conservation Plan (HCP)
No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction and operation would occur. Therefore, no impacts to an HCP would occur.

Combined and Separate Alignment Alternatives, PID Conveyance Alternative (Alternatives 1, 2 and 3) The PG&E San Joaquin Valley Operation & Maintenance HCP (PG&E O&M HCP) (PG&E 2006) covers specific PG&E activities throughout nine counties in the San Joaquin Valley, including Stanislaus County. The PG&E O&M HCP complies with the federal and state ESA and addresses multiple species and critical habitats. The PG&E O&M HCP outlines steps on minimizing, avoiding, and compensating for possible direct, indirect, and cumulative adverse effects on threatened and endangered species that could result from PG&E operation and maintenance activities in the San Joaquin Valley. The Proposed Action lies within the PG&E O&M HCP boundaries; however, the project is not a covered activity under the PG&E O&M HCP.

Plant species covered by the PG&E O&M HCP with the potential to be affected by the Proposed Action include: lesser saltscale, slough thistle Delta button-celery and Hispid bird's-beak. Wildlife covered by the PG&E O&M HCP with the potential to be affected by the Proposed Action include: vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, giant garter snake, Swainson's hawk, white-tailed kite, tricolored blackbird, and western burrowing owl. Because it would have no adverse effect on these species, the Proposed Action alternative would not conflict with the HCP's conservation strategy for these species. There may be some overlap with the Proposed Action and PG&E's San Joaquin Valley O&M activities, but this would mostly occur in developed or disturbed areas. Therefore, impacts are considered to be less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Impact BIO-CUM-1: Effects on terrestrial vegetation, wildlife, and sensitive communities Less than 70 years ago, large portions of the Study Area supported a diverse assemblage of native plants and wildlife. This is inferred from historical topographic maps (USGS 1952), CNDDB records in the Study Area (CDFW 2014), and descriptions of historical habitat conditions along the San Joaquin River corridor (JSA 1998, FWUA and NRDC 2002). Anthropogenic activity, especially conversion to farmland and developed land use, and development of transportation infrastructure such as I-5 has substantially changed wildlife populations and vegetation communities in the Study Area. Additionally, construction and operation of the CVP and SWP, and the introduction of nonnative plant and animal species have resulted in overall significant adverse effects on the extent, species composition, and functioning of wetlands, riparian habitats, and other sensitive natural communities and the distribution and abundance of wildlife species. The threatened and endangered status of numerous plant and animal species, and the dramatic reductions in the extent of wetland and riparian vegetation are evidence of these overall significant cumulative impacts.

Special-status species with the potential to occur in the Study Area are listed in **Tables 3.4-1** and **3.4-2**. The population status and/or viability vary for each of these species. Declines in plant and wildlife populations are largely due to long-term degradation of environmental conditions, as described above. With few exceptions, the declines in the population of a species are the result of the synergistic effects of anthropogenic activities, and not a single causative agent or project. Thus, by definition, it is cumulative impacts that threaten the viability of these species. Non-project related activities that may impact these species either through direct disturbance or habitat alteration include, but are not limited to: agriculture, climate change, and competition with nonnative species, recreational activities, streambed alteration, water resources management, urbanization, and wildfire management.

As mentioned previously, the vast majority of the project would be constructed in agricultural lands, road shoulders, or other disturbed and previously developed lands. In general, these areas do not support rare species. Furthermore, potential adverse impacts to special-status species would be minimized by using trenchless construction techniques and avoiding open-cut construction in sensitive habitats. Mitigation **Measures BIO-1 through BIO-14** would further minimize potential impacts. It is highly unlikely that the Proposed Action alternatives would

contribute substantially to any foreseeable decline of any special-status plant or wildlife species. Therefore, the incremental contribution of the Proposed Action would not be cumulatively considerable, and is considered less than significant.

Similarly, the Proposed Action alternatives would avoid or have only minor impacts to sensitive natural community and federally protected wetlands. **Mitigation Measures BIO-16** would further minimize potential impacts. With implementation of the mitigation measures described above, the Proposed Action is not likely to result in substantial loss or degradation of habitats or have significant adverse effects on vegetation and wildlife. This conclusion is based on field surveys of the Study Area and the known distribution of these organisms and their habitats in relationship to anticipated actions under the Proposed Action alternatives. Thus, the incremental contribution of the Proposed Action would not be cumulatively considerable.

Significance Determination before Mitigation Less than significant for all Action alternatives.

Impact BIO-CUM-2: Effects on fish species and their habitats The fish assemblage and habitats of the San Joaquin River have been severely modified and degraded by upstream impoundments, reductions in instream flows, degradation of spawning and juvenile rearing habitat, increased occurrence of invasive aquatic vegetation and non-native predatory fish, unscreened water diversions, reduction of floodplain, armoring of streambanks, water quality degradation including exposure to elevated spring and summer water temperatures, dissolved oxygen depression in the Stockton Deep Water Shipping Channel, agricultural return flows, among other stressors. Under baseline conditions the impacts are already cumulatively substantial.

The cumulative impacts that have occurred on the San Joaquin River and its tributaries have raised significant concerns with resource management agencies (e.g., NMFS, CDFW, SWRCB). The San Joaquin River supports anadromous steelhead, which are listed as threatened under the ESA. The river is part of the Central Valley recovery plan for salmonids (NMFS 2014), is EFH for Chinook salmon, and the subject of ongoing restoration efforts to reintroduce spring-run and fall-run Chinook salmon downstream of Friant Dam.

The Proposed Action would contribute to a very small increment of reduced flows in the river by removing current discharges by the Cities of Modesto and Turlock. This reduction would further contribute to the already cumulatively substantial impacts that have occurred within the San Joaquin River and could therefore contribute to further degradation of habitat and potentially fish survival. Existing combined discharges from Modesto and Turlock average 25 cfs, and range from a low of 12.9 cfs in June and July when Modesto does not discharge to the river, to a high of 51.4 cfs in February when both cities are discharging (**Appendix E**). As noted in the discussion of **Impact BIO-5** above, the magnitude of predicted changes in juvenile salmon survival, adult escapement, and habitat conditions in the lower river and estuary would be well within the natural observed variation (also see **Appendix E**). Consequently, the redirection of the small amount of discharge of treated wastewater from the Waste Water Treatment Plants at Modesto and Turlock away from the San Joaquin River would not be expected to result in a measureable effect on the population dynamics of Chinook salmon, or on other fish in the San Joaquin River.

Previous studies have shown a relationship between flow in the San Joaquin River in the spring (March to May) and survival of juvenile salmon, as well as adult salmon escapement 2.5 years later (San Joaquin River Group Authority 2007). Effects of the reduction in discharge were thus estimated by evaluating the potential change in flows from March to May (see **Appendix E** for additional details). Reductions in flows were calculated and input into salmon survival models to predict how changes in flows might affect salmon survival and abundance. Reductions in flows would represent an estimated change in water surface ranging from about 0.25 to 1 inch, which represents a change of 0.8 percent or less and is not expected to represent a biologically meaningful reduction in wetted area of the river channel.

Although the project represents a minor reduction in flows, removal of the discharges to the river as proposed under Alternatives 1 and 2 would also remove nutrients and salinity, which would improve water quality, and thereby improve fisheries habitat in the river. Removal of discharges would remove 700 tons of nitrate (as nitrogen) and 9,300 tons of sodium from the river annually (Reclamation 2013). This reduction in nutrient and salt loading would be beneficial to species within the river.

Nevertheless, based on the current poor conditions for fish in the river and the sensitivity to further impacts to salmonids, the contribution of the Proposed Action could potentially be considered cumulatively considerable, even though the incremental change is not expected to be measurable. To address the potential for cumulative effects on salmonids in the San Joaquin River, the Partner Agencies would work with resource agencies, including NMFS, USFWS, and CDFW to assist in implementation of one or more of the recovery actions that have been identified in the Recovery Plan for Central Valley Chinook salmon and steelhead, which have been incorporated in **Mitigation Measure BIO-CUM-1**. This measure would reduce cumulative impacts to less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives.

Mitigation Measures **Mitigation Measure BIO-CUM-1: Assistance with Salmonid Recovery Plan Actions** (Alternatives 1, 2 and 3). The NVRRWP Partner Agencies would work with Reclamation and with resource agencies, including NMFS, USFWS, and CDFW to assist in implementation the following recovery actions from the Recovery Plan for Central Valley Chinook salmon and steelhead.

- *Implement projects that improve wastewater treatment in the San Joaquin River watershed*. The NVRRWP as designed would reduce the input of nutrients and salinity to the San Joaquin River, and as such the Alternatives 1 and 2 of the Proposed Action already address this recovery action.
- *Develop and implement a spawning gravel augmentation plan in the San Joaquin River.* The NVRRWP Partner Agencies would make a cash contribution to an existing restoration program or organization working to augment spawning gravels. The funding could assist in programs being implemented as part of Reclamation's San Joaquin River Restoration Program, the USFWS Anadromous Fish Restoration Program, or other relevant restoration program

Significance after Mitigation Less than significant for all Action alternatives.

3.4.5 References

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3.5 Cultural Resources

This section evaluates the potential impacts on cultural resources associated with implementation of the Proposed Action. The description of the cultural resources setting is based on findings of the Historic Property Survey Report (HPSR) prepared by Basin Research (2014).

3.5.1 Environmental Setting/Affected Environment

This section evaluates the environmental setting for prehistoric, historic, and ethnological resources.

Regional Setting

Prehistoric Cultural resources are traces of human occupation and activity. Native American occupation sites appear to have been selected for accessibility, protection from seasonal flooding, and the availability of resources. Archaeological sites include lithic and ground stone scatters, bedrock milling stations, house pits (abandoned villages sites), cemeteries and village habitations.

The San Joaquin Valley has been characterized as ". . . one of the least-known archaeological areas in California" although the archaeological research to date does "... indicate that populations expanded and settlements proliferated after circa A.D. 1500 in the southern and western portions of the San Joaquin Valley." The lower San Joaquin Valley provided a favorable environment for Native Americans despite the periodic flooding of the bottomlands, intense summer heat, and the ever-present annoyance of mosquitoes. In general, archaeological research has indicated that prehistoric archaeological resources tended to be located on benches and terraced areas adjacent to major drainages and springs with the majority of recorded sites clustering around potable water sources (Basin Research 2014).

Native American occupation and use of the general area appears to extend over 5000-7000 years and may be longer. Archaeological information suggests an increase in the prehistoric population over time due to more efficient resource procurement, storage and increasing political complexity. A tentative chronological sequence of four cultural complexes has been proposed for the general area: the Positas (ca. 3300-2600 B.C.), the Pacheco (ca. 2600 B.C.-A.D. 300), the Gonzaga (ca. A.D. 300-100); and, the Panoche (ca. A.D. 1500-1850) (Basin Research 2014).

Ethnographic The project on the west side of the San Joaquin River was within the territory of the Northern Valley Yokuts. Little is known of the aboriginal inhabitants of the lower or northern San Joaquin Valley as a result of introduced diseases, missionization and displacement by gold seekers. The Yokuts may have been fairly recent arrivals in the San Joaquin Valley. Settlements appear to have focused along the water courses of the San Joaquin Valley. The Yokuts were semi-sedentary and relied heavily on riverine resources and their abundance of fish and waterfowl. The Yokuts first came into contact with Europeans in the late 1700s and were affected by missions. Mission San Jose (present-day Fremont), Mission Santa Clara, and Mission San Juan Bautista appear to have had the most impact on the Yokuts (Basin Research 2014).

Historic The history of the San Joaquin Valley is divided into the Age of Exploration, the Hispanic Period (Spanish Period 1769-1821 and the Mexican Period 1822-1848), and the American Period (1848-onward). During the Hispanic Period, Spanish government policy in northwestern New Spain was directed at the founding of presidios (forts), missions and pueblos (secular towns) with the land held by the Crown whereas later Mexican policy (1822-1848) stressed individual ownership of the land with grants of vast tracts of land to individuals. The American Period focused on development and growth - a pattern that continues into the 21st Century. The American period covered the creation of Stanislaus County, the development of agriculture and transportation in the NVRRWP study area, the colony system, which was responsible for the settling San Joaquin Valley, and the passage of the Wright act in 1887 that permitted groups of farmers to form irrigation districts with the authority to divert river water to dry land for flood control and water conservation.

Project Vicinity

Archaeological Resources Setting For the purpose of evaluating the possible presence of resources that could be affected by the Proposed Action, an Area of Potential Effect (APE) was defined, which encompasses the area that could be disturbed by construction of project facilities. No prehistoric or combined prehistoric/historic era sites have been recorded or reported within or adjacent to the APE based on a review of 25 cultural resource compliance reports on file with the California Historical Resources Information System- Central California Information Center (CHRIS/CCIC)[1]. In addition, no Historic Period archaeological sites have been recorded or reported in or adjacent to the APE. The field inventory confirmed that there is no evidence of the presence of cultural resources in the project area.

Historic Resources Setting No known Hispanic Period expeditions, adobe dwellings, other structures, or features have been reported in or adjacent to the APE.
Four Historic American Period sites have been recorded within the APE or are within 0.25 miles:

- Two recorded linear historic period sites are within the APE along the proposed alignment:
  - P-50-000001/CA-STA-350H - the Southern Pacific Railroad (Tracy Branch) (crossed by Alternatives 1 and 2).
  - P-50-001904, the DMC (at the western terminus of Alternatives 1 and 2).
- Two recorded historic period sites have been recorded within 0.25 miles of the APE:
  - P-50-001882 - a dairy barn and associated milk house located at 2006 Lemon Avenue just east of Elm Avenue is adjacent to the APE (Alternatives 1 and 2).
  - P-50-002043 - former Crows Landing Naval Auxiliary Air Station is recorded to the south of W. Marshall Road (Alternative 2).

Local or state historically or architecturally significant structures, landmarks, or points of interest have been identified within or adjacent to the project as follows:

- The APE ends at the DMC. The DMC has been evaluated individually as eligible for inclusion on the National Register of Historic Places (National Register) under

[1] The compliance reports do not cover the entire proposed APE.

Criterion A (Basom Research 2014). The CVP, DMC (P-50-001904 in Stanislaus County) is listed on the Stanislaus County Historic Properties Directory as code 2S2 (i.e., determined eligible for separate listing by a consensus determination) under criteria A and C.

- The former alignment of the San Pablo and Tulare Extension Railroad Company (now used by the CFNR) with an inferred period of significance of 1887-1889 has been evaluated as not eligible for inclusion on the National Register but appears to be locally significant under National Register Criterion A due to ". . . its association with the settlement and town founding in the west side of the San Joaquin Valley" (Basin Research 2014).

No potentially significant architectural resources were observed during field inventory.

Ethnographic Resources Setting No known ethnographic, traditional or contemporary Native American use areas and/or other features of cultural significance have been identified in or adjacent to the APE based on research and a search of the Native American Heritage Commission (NAHC) Sacred Lands Inventory. Consultation with six Native American individuals/groups recommended by the NAHC did not result in any information about the APE or adjacent areas. No prehistoric or historic period archaeological materials were observed within the APE during field inventory.

Paleontological Resources As described in *Section 3.8, Geology and Soils,* there are three orders of soils represented within the project area, including Alfisols, Inceptisols, and Mollisols. Alfisols are typically found in semiarid to moist areas and are a result of weathering processes that leach clay minerals and other constituents out of the surface layer and into the subsoil. Inceptisols are found in semiarid to humid environments. These soils generally exhibit only moderate degrees of soil weathering and development that display a weak but noticeable soil profile. Mollisols are typically found in temperate grasslands at mid-latitudes. This soil type is characterized by a dark, organic-rich surface horizon. These soils in the San Joaquin Valley have been disturbed through decades of farming, and are not likely to contain paleontological resources. The proposed pipeline alignments would occur mainly through road rights-of-way, which have been disturbed for road construction and utilities installation and as such would not be expected to contain any paleontological resources. The area of the San Joaquin River where the PID intake would need to be expanded has already been disrupted by construction of the existing intake structure

3.5.2 Regulatory Framework

This section describes laws and regulations at the federal, state and local level that may apply to the project.

Federal Policies and Regulations

Federal laws and regulations for cultural resources include but are not limited to:

- National Historic Preservation Act (NHPA) of 1966, as amended: requires Federal agencies to consider the effects of their actions on historic properties.

- Archaeological Resources Protection Act of 1979: requires permitting for the excavation of cultural resources and identifies criminal and civil penalties for collecting and destruction of cultural resources on Federal land.
- Native American Graves Protection and Repatriation Act: addresses the rights on lineal descendants, Indian Tribes, and Native Hawaiian organizations to Native American cultural items, including human remains, funerary objects, sacred objects, and objects of cultural patrimony.
- EO 13007: requires Federal agencies responsible for the management of Federal lands to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites.

State Policies and Regulations

California Register of Historic Resources **"**Historical resource" is a resource listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR). The CRHR includes resources listed in or formally determined eligible for listing in the National Register as well as some California State Landmarks and Points of Historical Interest (Public Resources Code, Section 21084.1 and CEQA Guidelines, Section 15064.5 [a], [b]).

A "Unique Archaeological Resource" means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

(1) Contains information need to answer important scientific research questions and that there is a demonstrable public interest in that information.
(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person. (Public Resources Code, Section 21083.2].

Properties of local significance that have been designated under a local preservation ordinance (e.g., local landmarks or landmark districts) or that have been identified in a local resources inventory may be eligible for listing in the CRHR and are presumed to be "historical resources" for purposes of CEQA (Public Resources Code, Section 5024.1 and California Code of Regulations, Title 14, Section 4850). A Lead Agency should consider a locally significant resource potentially eligible for the CRHR unless it has been demolished, lost substantial integrity, or there is other significant evidence indicating that it is not eligible for listing.

Lead agencies must evaluate any listed or potential cultural resources in accordance with the criteria of the CRHR. The CRHR (Public Resources Code Section 5024.1) is a listing of properties that are to be protected from substantial adverse change, and it includes properties that are listed, or have been formally determined to be eligible for listing in the NRHP, State Historical Landmarks, and eligible Points of Historical Interest. A historical resource may be listed in the CRHR if it meets one or more of the following criteria:

(1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or cultural heritage of California or the U.S.

(2) It is associated with lives of persons important in our past.
(3) It embodies distinctive characteristics of a type, period, or method of construction, or represents the work of a master or possesses high artistic values.
(4) It has yielded or has the potential to yield information important in the prehistory or history of the local area, California, or the nation.

A resource that is not listed in or determined to be eligible for listing in the CRHR, not included in local register or historic resources, or not deemed significant in a historical resource survey may nonetheless be historically significant. This provision is intended to give a Lead Agency discretion to determine that a resource of historic significance exists where none had been identified before and to apply the requirements of Public Resources Code Section 21084.1 to properties that have not previously been formally recognized as historic.

California State Lands Commission Title to all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CLSC. If any cultural resources are discovered on state sovereign lands during construction activities CSLC staff must be consulted.

Local Policies and Regulations

Stanislaus County Stanislaus County has identified the following goals and policies in the Conservation Element of the General Plan (1994):

GOAL EIGHT: Preserve areas of national, state, regional and local historical importance

Policy Twenty-four: The County will support the preservation of Stanislaus County's cultural legacy of historical and archeological resources for future generations.

City of Modesto The following policies in the City of Modesto Urban Area General Plan (City of Modesto 2008) are applicable to the project for the Partner Agencies:

> *Archaeological and Cultural Resources Policies (i):* Any project subject to CEQA that involves substantial earth-disturbing activities, where excavation/construction would occur outside of areas where previous development has occurred, or where excavation/construction would occur at depths greater than existing foundations, roads, and/or trenches in the immediate vicinity, shall require evaluation of the site by a qualified archaeologist retained by the project applicant, which would include at minimum a records search, a Phase I pedestrian survey, and preparation of an archaeological report containing the results of this cultural resources inventory identification effort for submittal to the Central California Information Center.
>
> *Archaeological and Cultural Resources Policies (j):* If Phase II archaeological evaluations are recommended, a report of all such surveys and excavations with recommendations shall be completed prior to project approval.
>
> *Archaeological and Cultural Resources Policies (k):* Any project subject to CEQA that involves substantial earth-disturbing activities shall require consultation by the applicant

for the purposes of determining archaeological and cultural resources impacts and creating appropriate mitigation to address such impacts.

3.5.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This analysis evaluates anticipated changes in the physical environment resulting from the Proposed Action against the thresholds of significance identified below, to determine if direct and indirect changes from existing conditions would constitute potentially significant effects. Project changes are described and potential impacts, if any, are identified under each impact discussion. Where impacts would be considered potentially significant, mitigation measures are identified to reduce impacts to a less-than-significant level.

The inventory of cultural resources was performed by qualified archaeologists and historical resources specialists with Basin Research. Basin Research did an extensive review of background information, starting with a pre-field identification effort that included the following:

- A prehistoric and historic site record and literature search and review. The search included coverage for ¼ mile radius of the study area conducted by the CHRIS-CCIC.
- Review of literature (e.g., selected anthropological and historical publications and other documents) and maps on file at selected libraries and repositories.
- Communication with interested parties including the NAHC and interested Native Americans.
- Review of the shipwreck database search results through the CSLC. The search provides information regarding the presence/absence of shipwrecks around the river crossings.
- A pedestrian survey.

This inventory was used as the basis of the assessment of potential impacts presented below.

Thresholds of Significance

Cultural resource significance is evaluated in terms of eligibility for listing on the National Register.

Consistent with Appendix G of the *CEQA Guidelines* an impact on cultural resources would be considered significant if the project would:

- Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5.
- Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
- Disturb any human remains, including those interred outside of formal cemeteries.

A project with an effect that may cause a substantial adverse change in the significance of a cultural resource is a project that may have a significant effect on the environment. Substantial adverse change in the significance of a cultural resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired (CEQA Guidelines Section 15064.5). The significance of a cultural resource is materially impaired when a project:

- Demolishes or materially alters in an adverse manner those physical characteristics of a cultural resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR.
- Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of cultural resources pursuant to section Public Resources Code 5020.1(k) or its identification in a cultural resources survey meeting the requirements of PRC 5024.1(g), unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant.
- Demolishes or materially alters in an adverse manner those physical characteristics of a cultural resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

Impacts and Mitigation Measures

Impact CUL-1 Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5 or disturb any human remains, including those interred outside of formal cemeteries

No Action Alternative If no action were taken, there would be no cultural resources-related impacts within the study area.

Combined Alignment Alternative (Alternative 1) Based on a review of relevant research and consultation, and the results of a pedestrian survey, it was determined that no prehistoric or combined prehistoric/historic era sites or historic period archaeological sites have been recorded or reported within or adjacent to the APE.

As described above, the archaeology of the San Joaquin Valley is not known as well as other areas of California; however, the potential for significant subsurface prehistoric archaeological resources within the project is considered low based on the review of the archival archaeological data and the development of an archaeological sensitivity map. Nevertheless, excavation and digging associated with construction activities could potentially disturb unknown archaeological sites or result in the inadvertent exposure of buried prehistoric or protohistoric (ethnographic) Native American human remains during construction activities. If encountered, construction activities could inadvertently damage these resources. **Mitigation Measures CUL-1** and **CUL-2** would reduce potential impacts associated with discovery of these resources to less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Based on the information for the overall project area, it is expected that the potential for significant subsurface prehistoric archaeological resources within the project is low. The area of the PID intake has a moderate sensitivity because of its location on the San Joaquin River, but a survey of the site uncovered no archaeological material (PID 2006). Impacts would be similar to Alternatives 1 and 2, and excavation and digging associated with construction activities could potentially disturb unknown archaeological sites or result in the inadvertent exposure of buried prehistoric or protohistoric (ethnographic) Native American human remains during construction activities. If encountered, construction activities could inadvertently damage these resources. **Mitigation Measures CUL-1** and **CUL-2** would reduce potential impacts associated with discovery of these resources to less than significant.

Significance Determination Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure CUL-1: Discovery of previously unknown archaeological resources during construction** (Alternatives 1, 2 and 3). The following measures shall be implemented in the event of unexpected discovery of archaeological resources:

- The project proponent shall note on any construction plans that require ground disturbing excavation that there is a potential for exposing buried cultural resources.
- The project proponent shall retain a Professional Archaeologist to provide a pre-construction briefing to supervisory personnel of any excavation contractor to alert them to the possibility of exposing significant prehistoric archaeological resources within the study area. The briefing shall discuss any archaeological objects that could be exposed, the need to stop excavation at the discovery, and the procedures to follow regarding discovery protection and notification of the project proponent and archaeological team.
- The project proponent shall retain a Professional Archaeologist on an "on-call" basis during ground disturbing construction for the project to review, identify and evaluate cultural resources that may be inadvertently exposed during construction. The archaeologist shall review and evaluate any discoveries to determine if they are historical resource(s) and/or unique archaeological resources under CEQA.
- If cultural resources are encountered during the project, construction personnel shall avoid altering these materials and their context until a Professional Archaeologist has evaluated the situation. Project personnel shall not collect or retain cultural resources. Prehistoric resources include, but are not limited to, chert or obsidian flakes, projectile points, mortars, and pestles; and dark, friable soil containing shell and bone, dietary debris, heat-affected rock, or human burials. Historical resources include stone or adobe foundations or walls, structures and remains with square nails, and refuse deposits, often in old wells and privies.
- If the Professional Archaeologist determines that any cultural resources exposed during construction constitute a historical resource and/or unique archaeological resource, he/she shall notify the Partner Agencies and other appropriate parties of the evaluation and recommended measures to mitigate effects to a less-than significant impact. Mitigation measures may include avoidance, preservation in-place,

recordation, additional archaeological testing and data recovery, among other options. Treatment of any significant cultural resources shall be undertaken with the approval of Reclamation and other lead agencies.

- Any identified cultural resources shall be recorded on forms DPR 422 (archaeological sites) and/or DPR 523 (historic properties) or similar forms by a Professional Archaeologist.

Mitigation Measure CUL-2: Discovery of human burials during construction (Alternatives 1, 2 and 3). The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-disturbing activity within the project shall comply with applicable State and federal laws. This shall include immediate notification of the Stanislaus County Coroner (Stanislaus County Sherriff's Office) and Reclamation.

In the event of the coroner's determination that the human remains are Native American, notification of the NAHC is required. The NAHC shall be notified by phone within 24 hours of the discovery and shall be afforded the opportunity to appoint a Most Likely Descendant (MLD) (Public Resources Code Section 5097.98). The archaeological consultant, project sponsor, and MLD shall make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. California Public Resources Code allows 48 hours to reach agreement on these matters. If the MLD and the other parties do not agree on the reburial method, the project will follow PRC Section 5097.98(b) which states that "the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance."

Significance Determination after Mitigation Less than significant.

Impact CUL-2 Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5

No Action Alternative If no action were taken, there would be no cultural resources related impacts within the study area.

Combined Alignment Alternative (Alternative 1) As described above, two recorded linear historic period sites are within the APE: the Southern Pacific Railroad (Tracy Branch), and the DMC. As described in *Chapter 2, Alternatives and Proposed Action*, the Proposed Action would avoid the Southern Pacific Railroad through tunneling. Alternative 1 would construct a terminal weir at Milepost (MP) 37.32 on the DMC to facilitate discharge of recycled water. The facility would be adjacent to, but outside of the canal, and is not expected to affect the integrity of the DMC. The design of the discharge structure, which is shown in **Figure 2-8**, is intended to allow construction to be completed without any modifications to the canal, but if there are any effects on the canal during consruction the structure would be restored to its existing condition. As such, this alternative would not result in any impacts on historic resources.

Excavation and digging associated with construction activities could potentially expose and disturb previously unknown historical resources. Thus, construction operations could result in the inadvertent exposure of historical resources that could be eligible for inclusion on the CRHR (PRC Section 5024.1). Alteration and modification of historic resources could occur and would be considered potentially significant. **Mitigation Measure CUL-1**, described above, would reduce potential impacts to less than significant.

Separate Alignment Alternative (Alternative 2) Although there would be two new discharge locations under this alternative, installation would be the same for each as for Alternative 1. Consequently, impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Although an APE has not been developed for this alternative, the same two historic resources would be affected by this alternative: the Southern Pacific Railroad and the DMC. Impacts would be the same as Alternatives 1 and 2.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alteranative.

Mitigation Measures See **Mitigation Measure CUL-1** above.

Significance after Mitigation Less than significant.

Impact CUL-3 Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

No Action Alternative If no action were taken, there would be no cultural resources-related impacts within the study area.

Combined Alignment Alternative (Alternative 1) The infrastructure improvements under this alternative would occur in previously disturbed road ROW, or on disturbed land on the Jennings Plant or near the Harding Drain Bypass Pipeline at the southwest corner of the intersection of South Carpenter Avenue and Harding Road. Because these areas have been previously disturbed, soils in these areas are not expected to contain fossils. However, in the unlikely event that fossils are encountered during construction impacts could be potentially significant. **Mitigation Measure CUL-3** would reduce potential impacts associated with discovery of these resources to less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Similar to Alternatives 1 and 2, in the unlikely event that fossils are encountered during construction impacts could be potentially significant. **Mitigation Measure CUL-3** would reduce potential impacts associated with discovery of these resources to less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alteranative.

Mitigation Measures **Mitigation Measure CUL-3: Discovery of paleontological resources during construction** (Alternatives 1, 2 and 3). If paleontological resources are discovered during earthmoving activities, the construction crew would immediately cease work near the find. In accordance with Society of Vertebrate Paleontology guidelines (Society of Vertebrate Paleontology 2010), a qualified paleontologist would assess the nature and importance of the find and recommend appropriate salvage, treatment, and future monitoring and mitigation.

Significance after Mitigation Less than significant.

Cumulative Impact Analysis

The geographic scope of potential cumulative impacts related to cultural resources is the study area. There are three relevant projects within the vicinity of the Proposed Action that may contribute to cumulative impacts:

- Jennings Treatment Plant Phase 2 Upgrades: increase tertiary treatment capacity by 12.6 mgd.
- West Main Improvement Project: widen West Main Ave to 3 lanes from the San Joaquin River to Crows Landing Road (Stanislaus County Department of Public Works 2011).
- StanCOG South Corridor Study: study potential alignments and corridor options for an expressway from the City of Turlock on the east to I-5 on the west (Stanislaus County Department of Public Works 2011).

Construction of the cumulative projects also have the potential to result in the disturbance of previously unknown cultural resources (archaeological and historical) and human burials during excavation activities. However, with the implementation of **Mitigation Measures CUL-1, CUL-2**, and **CUL-3** the project's contribution to these cumulative impacts would not be cumulatively considerable. Thus, the project's contribution to cumulative impacts would not be cumulatively significant.

3.5.4 References

Society of Vertebrate Paleontology. 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.

Stanislaus County. 1994. Stanislaus County General Plan: Chapter 3, Conservation Element. Available at: http://www.stancounty.com/planning/pl/gp/gp-chapter3.pdf.

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3.6 Energy Resources

This section presents the physical and regulatory setting for energy resources surrounding the Proposed Action. The impact analysis determines the potential for construction and operation of the NVRRWP to result in impacts related to wasteful, unnecessary, or inefficient use of energy resources.

3.6.1 Environmental Setting/Affected Environment

This section describes the environmental setting for energy resources within the study area, which includes the entire State of California. The sections below summarize energy resources within the state and regional setting.

California Setting

California generates more than 200,000 gigawatt hours of electricity every year, transporting that electricity over 32,000 miles of transmission lines throughout the state (CEC 2014a). In 2011, California imported just 30 percent of the electricity needed from the Pacific Northwest and the U.S. Southwest. Natural gas provides 53 percent of the in-state electric generation and is the main source for electricity generation within California. In 2010, the California electricity mix included natural gas (53.4 percent), nuclear (15.7 percent), large hydroelectric plants (14.6 percent), and coal (1.7 percent). The remaining 14.6 percent was supplied from renewable resources such as wind, solar, geothermal, biomass, and small hydroelectric facilities (CEC 2011). In-state electricity production at large hydroelectric facilities decreased by nearly 37 percent as compared to 2011, while wind facilities increased output by 31 percent (CEC 2013a).

The California Energy Commission (CEC) estimates that California's energy consumption between 2012 and 2024 will grow between 0.88 and 1.82 percent per year, with peak demand growing between 0.97 and 1.92 percent over the same period (CEC 2013b). Further, additional energy efficiency measures are needed to meet the Assembly Bill (AB) 32 GHG reduction goal of reducing statewide GHG emissions to 1990 levels by 2020. For a discussion on AB 32, please see *Chapter 3.10, Greenhouse Gas Emissions*.

In 2002, California established its Renewable Portfolio Standard program[1] with the goal of increasing the annual percentage of renewable energy in the state's electricity mix by the equivalent of at least 1 percent of sales, with an aggregate total of 20 percent by 2017. The California Public Utilities Commission (CPUC) subsequently accelerated that goal to 2010 for retail sellers of electricity (Public Utilities Code Section 399.15(b)(1)). Governor Schwarzenegger signed EO S-14-08 in 2008, increasing the target to 33 percent renewable energy by 2020.

[1] The Renewable Portfolio Standard is a flexible, market-driven policy to ensure that the public benefits of wind, solar, biomass, and geothermal energy continue to be realized as electricity markets become more competitive. The policy ensures that a minimum amount of renewable energy is included in the portfolio of electricity resources serving a state or country.

Regional Setting

TID provides power to the study area, and would likely supply energy required for project operation. TID has various generating facilities including small and large hydroelectric, natural gas power plants, wind, and solar. TID's Board of Directors adopted a goal of 20 percent renewable energy by 2017. As of 2010, TID's energy portfolio consists of 28 percent renewable (TID 2010a). In summer 2009, TID installed a 70.7 kilowatt solar facility atop their newly renovated parking structure which is expected to generate 132,460 kilowatt-hours per year (TID 2010b). Also, on May 28, 2009, the Tuolumne Wind Project began commercial operation. This project, located in Klickitat County, in Washington state, consists of 62 turbines which generate a total of 136.6 megawatts (TID 2010a). These two projects contributed to TID exceeding their goal 7 years earlier than planned. TID is also the majority owner and operating partner of the Don Pedro Hydroelectric Project, which can generate up to 203 megawatts from its four generators (TID 2010c).

In addition to renewables, TID also has several natural gas power plants. The Almond 2 Power Plant, opened in 2012, added 174 megawatts of output to TID's portfolio (TID 2013). The 250-megwatt Walnut Energy Center is among the cleanest power generating facilities of comparable size in the nation; its emissions are roughly 85 percent lower than similar facilities (TID 2013). The Almond and Walnut Power Plants jointly generated roughly 50 megawatts for distribution to TID's customers (TID 2013).

City of Modesto Urban Area General Plan The City of Modesto Urban Area General Plan serves as a blueprint for future growth within the City. The Plan outlines policies that focus on a community vision (City of Modesto 2008). The following policies in the Urban Area General Plan relating to energy resources would apply to the project:

> *Overall Energy Conservation Policy (e)***:** The City of Modesto shall coordinate with Modesto and Turlock Irrigation District (for electricity) and PG&E (for natural gas) on all new, large-scale, development proposals in the City.
>
> *Overall Energy Conservation Policy (r):* The City shall encourage new residential, commercial, and industrial development to reduce air quality impacts from area sources and from energy consumption.

3.6.2 Regulatory Framework

This section describes laws and regulations that may apply to the Proposed Action.

Federal Policies and Regulations

National Energy Conservation Policy Act The National Energy Conservation Policy Act serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1978, it is regularly updated and amended by subsequent laws and regulations. This act is the foundation of most federal energy requirements.

National Energy Policy Act of 2005 The National Energy Policy Act of 2005 sets equipment energy efficiency standards and seeks to reduce reliance on nonrenewable energy resources and

provide incentives to reduce current demand on these resources. For example, under the Act, consumers and businesses can attain federal tax credits for purchasing fuel-efficient appliances and products, including hybrid vehicles; constructing energy-efficient buildings; and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment. EO 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), signed in 2007, strengthens the key energy management goals for the federal government, and sets more challenging goals than the Energy Policy Act of 2005. The energy reduction and environmental performance requirements of EO 13423 were expanded upon in EO 13514 (Federal Leadership in Environmental, Energy, and Economic Performance) signed in 2009.

State Policies and Regulations

California Energy Action Plan California's Energy Action Plan II is the state's principal energy planning and policy document (CPUC and CEC 2005). The plan describes a coordinated implementation plan for state energy policies and refines and strengthens California's original Energy Action Plan I published in 2003. California Energy Action Plan II identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. It adopts a loading order of preferred energy resources to meet the state's needs and reduce reliance on natural gas and other fossil fuels, also important for achieving GHG emission reductions from the electricity sector.

Energy efficiency and demand response[2] are considered the first ways to meet the energy needs of California's growing population. Renewable energy and distributed generation are considered the best ways on the supply side. To the extent that energy efficiency, demand response, renewable resources, and distributed generation are unable to satisfy increasing energy and capacity needs, CEC supports clean and efficient fossil fuel-fired generation to meet California's energy needs. The 2008 Energy Action Plan Update provides a status update to the 2005 Energy Action Plan II and continues the goals of the original California Energy Action Plan (CPUC and CEC 2008).

State Alternatives Fuel Plan The State Alternatives Fuel Plan (CARB and CEC 2007) presents strategies and steps that California must take to increase the use of alternative fuels without adversely affecting air quality, water quality, or causing negative health effects. The plan recommends alternative fuel targets of 9 percent in 2012, 11 percent in 2017, and 26 percent by 2022. The plan also presents a 2050 Vision that extends the plan outcomes and presents a transportation future that greatly reduces the energy needed for transportation, provides energy through a diverse set of transportation fuels, eliminates over-dependency on oil, and achieves an 80 percent reduction in GHG emissions. With these goals, more than 4 billion gasoline gallon equivalents (20 percent) would be displaced by alternative fuels in 2020. CEC estimates that by 2050, alternative fuels could provide more than half of the energy needed to power California's transportation system.

[2] Demand response is the reduction of customer energy usage during peak periods in order to address system reliability and support the best use of energy infrastructure.

Local Policies and Regulations

Stanislaus County and the City of Modesto do not have any specific policies relating to energy resources that are applicable to the project.

3.6.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action would result in significant impacts related to energy resources. The analysis is based on a review of relevant project documentation.

Thresholds of Significance

For the purposes of this analysis, an impact to energy resources would be significant if the Proposed Action would:

- Result in inefficient, wasteful, or unnecessary consumption of fuels or other energy resources, especially fossil fuels such as coal, natural gas, and oil.

Impacts and Mitigation Measures

Impact ENE-1 Inefficient, Wasteful, or Unnecessary Use of Energy Resources

No Action Alternative If no action were taken, there would be no energy resource impacts within the proposed study area.

Combined Alignment Alternative (Alternative 1) As noted in the project description, operation would require 15,422 megawatt hours per year for pumping. Construction of this alternative would require the use of fuels (primarily gas, diesel, and motor oil) for a variety of construction activities, including excavation, grading, and vehicle travel. During these activities, fuel for construction worker commute trips would be minor in comparison to the fuel used by construction equipment. While the precise amount of construction and operation-related energy consumption is uncertain, use of these fuels would not be wasteful or unnecessary because their use is necessary to contribute to the long-term distribution, use, and reliability of water resources within the study area.

However, excessive idling and other inefficient site operations during construction could result in the inefficient use of fuels. Therefore, impacts related to the inefficient use of fuels during construction would be potentially significant. As discussed in *Chapter 3.3, Air Quality*, mitigation efforts would reduce the impacts related to the inefficient use of construction-related fuels to less than significant. Implementation of **Mitigation Measure AIR-1: Reduce NOx Emissions**, would ensure that equipment is properly tuned and that restrictions on idling are enforced.

Separate Alignment Alternative (Alternative 2) Operation of this alternative would require 17,898 megawatt hours per year for pumping. In addition to the impacts listed under Alternative 1, impacts would also include the energy associated with construction and operation of an additional pump station at the western end of the Harding Drain Bypass Pipeline, which would be required to pump water directly to the DMC. Because the amount of energy consumed during

operation for Alternative 1 and Alternative 2 are very similar, the only net increase in impacts would be as a result of constructing the additional pump station and river crossing. Implementation of **Mitigation Measure AIR-1: Reduce NOx Emissions**, would ensure that equipment is properly tuned and that restrictions on idling are enforced during construction.

PID Conveyance Alternative (Alternative 3) As stated in the project description, operation of the expanded pump facility would require an additional 20,063 megawatt hours per year for pumping. This alternative is expected to require less construction energy because of the shorter length of pipeline. Construction of the expanded intake facility would be a substantial construction effort, but is not expected to require more energy than construction of the two river crossings that are included in Alternative 2. Implementation of **Mitigation Measure AIR-1: Reduce NOx Emissions**, would ensure that equipment is properly tuned and that restrictions on idling are enforced during construction.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **See Mitigation Measure AIR-1: Reduce NOx Emissions (Alternatives 1, 2 and 3),** in *Chapter 3.3 Air Quality*.

Significance Determination after Mitigation Less than significant.

3.6.4 References

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3.7 Environmental Justice

The CEQ's guidance document on environmental justice under NEPA (1997), in referencing EO 12898, states that "each federal agency should analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority populations, low-income populations, and Indian tribes, when such analysis is required by NEPA."

The Proposed Action would be limited to pipelines and appurtenances, including a new pump station, for conveyance of recycled water at locations generally distant from people. The study area is a sparsely populated area of unincorporated Stanislaus County dominated by agricultural fields. Construction-related impacts of the Proposed Action would be temporary, lasting only for the estimated 1.5-year construction period, and would not disproportionately affect any portion of the population. This would be true of all three Action alternatives.

As a result, detailed analysis of environmental effects on minority populations, low-income populations and Indian tribes is not considered necessary, as there is no potential for significant adverse environmental effects. All three Action alternatives would more likely benefit low-income and minority populations by providing a long-term source of water and thereby stabilizing the agricultural labor market. The Proposed Action would also generate short-term employment opportunities during construction.

3.7.1 References

Council on Environmental Quality. 1997. Environmental Justice: Guidance Under the National Environmental Policy Act. Available: http://www.epa.gov/environmentaljustice/resources/policy/ej_guidance_nepa_ceq1297.pdf.

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3.8 Geology and Soils

This section presents the physical and regulatory setting for geology and soils within and surrounding the Proposed Action. The impact analysis evaluates the potential adverse impacts of the NVRRWP related to local geology, existing soil conditions, or seismicity that could result from the implementation of the Proposed Action. The analysis is based on a review of geologic maps and reports including geologic and geotechnical reports and information from state and local agencies.

3.8.1 Environmental Setting/Affected Environment

This section describes the environmental setting for geologic resources and hazards within study area, which includes the project construction footprint and geologic features in the project vicinity that could affect project facilities.

Regional Geology

The proposed project is located within California's San Joaquin Valley, approximately 13 miles west of the City of Turlock and 15 miles southwest of the City of Modesto. The study area falls to the east of I-5 and to the west of California Highway 99 in an area referred to as the Great Valley geomorphic province (California Geologic Survey [CGS] 2002). The Great Valley province is roughly 50 miles wide and 400 miles long and runs down the middle of California. The Sacramento Valley, drained by the Sacramento River, forms the northern part of the province and the San Joaquin Valley, drained by the San Joaquin River, forms the southern portion. The Great Valley region largely consists of Quaternary deposits from the Pleistocene and Holocene epochs. These deposits are largely non-marine consolidated and unconsolidated alluvium, lake, playa, and terrace deposits that have been accumulating over millions of years (CGS 2010).

Known for its rich soils, the region has become California's center for agricultural activities, and includes all three counties served by DPWD. The topography of the region is also very flat, which makes the area further suitable for agriculture and other farming activities (refer to *Chapter 3.2 Agriculture and Forestry Resources*). The land begins to increase in elevation west of the project area and I-5.

Soils

Soil Types The National Resources Conservation Service (NRCS) has a system of soil classification. At the highest level of classification are 12 orders of soil taxonomy (NRCS 2013). Subsequent levels include suborders and great groups. There are three orders represented within the project area, including Alfisols, Inceptisols, and Mollisols. General descriptions of each of these orders are presented below.

Alfisols are typically found in semiarid to moist areas and are a result of weathering processes that leach clay minerals and other constituents out of the surface layer and into the subsoil (NRCS 2013). Thus, this soil type has a high base saturation and an enriched subsoil that supplies nutrients and moisture to plants. These characteristics make this soil type very productive for agricultural activities.

Inceptisols are found in semiarid to humid environments. These soils generally exhibit only moderate degrees of soil weathering and development that display a weak but noticeable soil profile (NRCS 2013). Because of their low degree of development, Inceptisols include a diverse collection of soils. Generally, this soil type occurs in areas that are, from a geomorphic perspective, relatively young. This includes areas such as the Great Valley.

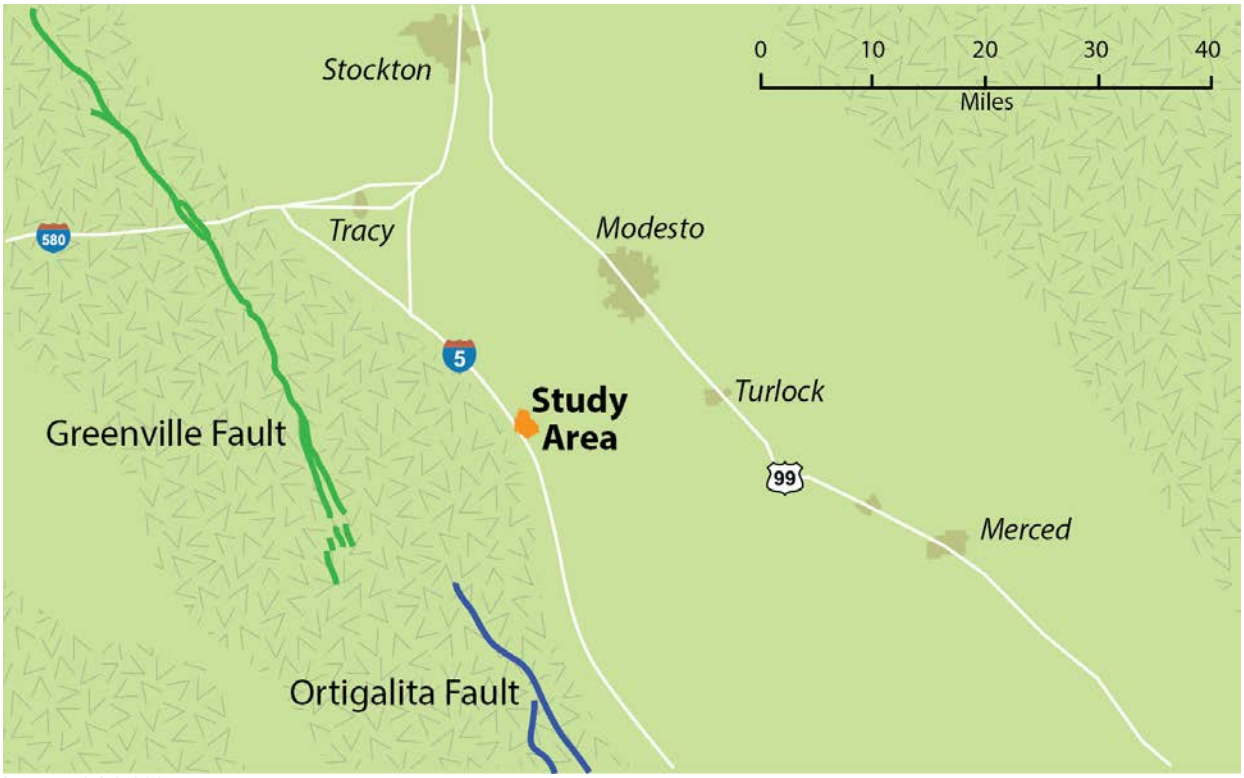
Mollisols are typically found in temperate grasslands at mid-latitudes. This soil type is characterized by a dark, organic-rich surface horizon (NRCS 2013). In relatively dry areas such as the study area, leaching is not a dominant force. As such, there is likely calcium carbonate accumulation, calcium carbonate cementation, or silica cementation, which is evident by a white layer just below the surface layer. The soil profile is generally organic-rich throughout with high base nutrients which makes Mollisols highly productive and suitable for agricultural production.

Potential for Expansive Soils Expansive soils are soils capable of absorbing high amounts of water. As more water is absorbed by the soil, the soil begins to expand, thus potentially damaging structures, including pipelines. Some soil in the project area is characterized as clay with slight to moderate swelling potential (USGS 1989).

Seismicity, Landslides, and Liquefaction

There are several known faults within the region, including the Greenville and Ortigalita faults (see **Figure 3.8-1**). The Greenville fault runs from central Contra Costa County, down through the eastern portion of Alameda County and ends in the northeastern tip of Santa Clara County, next to the border of Santa Clara and Stanislaus Counties. The Greenville fault last ruptured in 1980, resulting in a magnitude 5.6 earthquake (CGS 2007). The Ortigalita fault begins in the southwestern part of Stanislaus County and runs the length of Merced County, ending at the border of Merced and Fresno Counties. There has been no historic surface rupture of the Ortigalita fault (CGS 2007).

Figure 3.8-1: Principal Faults Zoned under Alquist-Priolo Earthquake Fault Zoning Act 1974-2007



Source: CGS 2007

Strong ground motions can worsen existing unstable slope conditions, particularly if coupled with saturated ground conditions. Although numerous types of earthquake-induced landslides have been identified, the most widespread type generally consists of shallow failures involving surface soils and the uppermost weathered bedrock in moderate to steep hillside terrain. Rock falls and rock slides on very steep slopes are also common. While there are areas west of I-5 that are susceptible to landslides, the study area is flat and therefore the risk of landslides is negligible (CGS 2011; CDOC 2007).

Liquefaction typically occurs in loose, saturated sediments consisting primarily of sandy composition in the presence of ground accelerations caused by earthquakes. When liquefaction occurs, the sediments involved have a total or substantial loss of shear strength and behave like a liquid or semi-viscous substance. Three general conditions must be met for liquefaction to occur: (1) strong seismic ground-shaking of relatively long duration; (2) loose, or unconsolidated, recently deposited sediments consisting primarily of silty-sand and sand; and (3) water-saturated sediments within about 50 feet of the surface. While no specific liquefaction hazards have been identified in Stanislaus County, certain locations within the study area may be susceptible to liquefaction due to higher water tables and unconsolidated, granular soils (CDOC 2007). Areas with sandy, saturated soils, such as the areas adjacent to the San Joaquin River, may be at increased risk for liquefaction.

3.8.2 Regulatory Framework

This section describes laws and regulations that may apply to the Proposed Action. There are no federal policies or programs associated with geology and soils that would apply to the Proposed Action.

State Policies and Regulations

Alquist-Priolo Earthquake Fault Zoning Act The Alquist-Priolo Earthquake Fault Zoning Act was adopted in 1972, and is designed to restrict certain development along active faults. The Act requires that the State Geologist delineate earthquake fault zones around the surface traces of active faults and to maintain maps outlining these zones. Active faults are defined as faults that have been active within the last 11,000 years. The purpose of these zones is to prevent the construction of buildings used for human occupancy within an earthquake fault zone. In addition to delineating earthquake fault zones, the Act requires disclosure of properties located within an earthquake fault zone when buying or selling a property. The Act was first designated as the Alquist-Priolo Geologic Hazard Zones Act, but was later changed to the Alquist-Priolo Special Studies Zones Act in 1975 and changed again in 1994 to the Alquist-Priolo Earthquake Fault Zoning Act (CGS 2007). The Proposed Action is not located within a Fault-Rupture Hazard Zone designated by the Alquist-Priolo Earthquake Fault Zoning Act of 1972 and Special Publication 42.

California Building Code The California Building Code (CBC), which is codified in CCR Title 24, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, egress facilities, and general building stability. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/ occupancy, location, and maintenance of all building and structures within its jurisdiction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable.

The CBC is based on the International Building Code. The 2007 CBC is based on the 2006 International Building Code published by the International Code Conference. In addition, the CBC contains necessary California amendments that are based on the American Society of Civil Engineers (ASCE) Minimum Design Standards 7-05. ASCE 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion in building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, all of which are used to determine a Seismic Design Category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to SDC E/F (very high seismic vulnerability and near a major fault). Design specifications are then determined according to the

SDC. Compliance with the CBC would be necessary for the new Harding Drain Bypass Pipeline pump station and possibly for certain grading activities on the project site.

Local Policies and Regulations

Stanislaus County General Plan The Stanislaus County General Plan guides development for the County with a 20-year planning horizon. The following policies outlined in the Agricultural and Safety elements of the County's General Plan would apply to the project:

> *Policy Three Point Six*– The County shall encourage the conservation of soil resources (Agriculture Element).
> *Policy Three*—Development should not be allowed in areas that are particularly susceptible to seismic hazard (Safety Element).

3.8.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action would result in significant impacts related to geology and soils. The analysis is based on a review of geologic maps and reports including geologic and geotechnical reports and information from state and local agencies.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines,* a geology and soils impact would be considered significant if the project would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
    - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42).
    - Strong seismic ground-shaking.
    - Seismic-related ground failure, including liquefaction.
    - Landslides.
- Result in substantial soil erosion or loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.
- Be located on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Rupture of a Known Earthquake Fault* – The Proposed Action is not located within a Fault-Rupture Hazard Zone designated by the Alquist-Priolo Earthquake Fault Zoning Act of 1972 and Special Publication 42. The two nearest active faults are the Greenville and Ortigalita faults, which are located approximately 17 and 15 miles away, respectively (CGS 2007). Since there are no known faults in the project vicinity, there would be no impact associated with the rupture of a known earthquake fault.
- *Landslides* – The study area is located in an agricultural valley, and is relatively flat. As such, the study area is not located on or adjacent to a hillside, exposed rock face, or cliff. According to California Geologic Survey, the study area is in the lowest class for susceptibility to landslides (CGS 2011). The California State Department of Conservation also indicates that the study area is not at risk for landslides (CDOC 2007). Therefore, there would be no impacts related to risk of loss, injury, or death involving landslides as a result of the Proposed Action.
- *Soils Incapable of Adequately Supporting the Use of Septic Tanks or Alternative Wastewater Disposal Systems* – The Proposed Action would not generate wastewater, and would not require the installation of septic tanks or alternative wastewater disposal systems. Therefore, there would be no impacts related to adequate support of septic tanks or alternative wastewater disposal systems.

Impacts and Mitigation Measures

Impact GEO-1 Facility Damage and Exposure of People to Hazards from Strong Seismic Groundshaking and Liquefaction

No Action Alternative If no action were taken, there would be no geology or soils impacts within the study area.

Combined Alignment Alternative (Alternative 1) Most structures, including buildings and pipelines, are subject to damage from earthquakes. The intensity of such an event would depend on which fault the earthquake occurs, the distance of the epicenter from the project site and the duration of shaking. While the Proposed Action is not located within a Fault-Rupture Hazard Zone designated by the Alquist-Priolo Earthquake Fault Zoning Act of 1972 and Special Publication 42, there are two active faults within 20 miles of the study area. The Greenville fault is located approximately 17 miles northwest of the study area and Ortigalita fault is located to the southwest roughly 15 miles away (CGS 2007). These faults could cause groundshaking of an intensity approaching 10 on the Modified Mercalli Scale, which would cause considerable damage to the proposed facilities under this alternative, including the pump station and pipelines, and pose a significant threat to public safety if a pipe were to burst and cause flooding (Stanislaus County 1994).

As mentioned above in *Section 3.8.1*, the study area may be susceptible to liquefaction. The high groundwater table and unconsolidated soils, while good for agriculture, may contribute to the liquefaction risk. Additionally, the sandy, saturated soils adjacent to the San Joaquin River could potentially experience liquefaction. With implementation of **Mitigation Measure GEO-1**, these seismic-related impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as Alternative 1.

PID Conveyance Alternative Impacts would be the same as Alternatives 1 and 2.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure GEO-1: Perform Design-Level Geotechnical Evaluations for Seismic Hazards** (Alternatives 1, 2 and 3). During the design phase for the Proposed Action, perform site-specific, design-level geotechnical evaluations to identify potential secondary ground failure hazards (i.e., seismically-induced settlement) associated with the expected level of seismic ground shaking. A geotechnical memorandum shall be prepared to detail the findings of the evaluations. The geotechnical analysis will provide recommendations to mitigate those hazards in the final design and, if necessary, during construction. The design-level geotechnical evaluations, based on the site conditions, location, and professional opinion of the geotechnical engineer, may include subsurface drilling, soil testing, and analysis of site seismic response to determine appropriate feasible measures to be incorporated into the project design. The performance standard to be used in the geotechnical evaluations will be minimization of the hazards associated with liquefaction and seismic groundshaking. The geotechnical engineer will review the seismic design criteria of facilities to ensure that facilities are designed to withstand the highest expected peak acceleration, set forth by the CBC for each site, and ensure that secondary ground failures, such as liquefaction, are minimized. Recommendations resulting from findings of the geotechnical study will be incorporated into the design and construction of proposed facilities.

Significance Determination after Mitigation Less than significant.

Impact GEO-2 Risk to Property and Life from Expansive Soils
No Action Alternative If no action were taken, there would be no geology or soils impacts within the study area.

Combined Alignment Alternative (Alternative 1) While repurposing the existing Jennings Plant outfall pump station would not increase the risk from expansive soils, the proposed pipelines may be affected by expanding soils. With implementation of **Mitigation Measure GEO-2**, this impact would be less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Impacts would be the same as Alternatives 1 and 2.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure GEO-2: Perform Design-Level Geotechnical Evaluations for Soil Expansion** (Alternatives 1, 2 and 3). During the design phase for all components of the project, a design-level geotechnical evaluation to determine the presence and characteristics of potentially compressible and expansive soils, the engineering properties of the foundation material, and the depth and thickness of soil layers will be completed. The results of the investigations will include measures that would reduce soil expansion to a less-than-significant level. Feasible mitigation measures could include removal and replacement of soil, deep foundations, or deep mixing of compressible or expansive soils with stabilizing agents. All mitigation measures included in the geotechnical evaluation will be incorporated into the project design specifications.

Significance Determination after Mitigation Less than significant.

Impact GEO-3 Result in Substantial Soil Erosion or Loss of Topsoil
No Action Alternative If no action were taken, there would be no geology or soils impacts within the study area.

Combined Alignment Alternative (Alternative 1) Construction activities associated with this alternative are anticipated to disturb more than 1.0 acre of soil. As such, construction of the proposed project would be required to comply with the Construction General Permit (Order No. 2009-0009-DWQ), which is issued by the SWRCB (refer to *Chapter 3.11, Hydrology and Water Quality*).The Construction General Permit requires development of a SWPPP, which outlines BMPs the discharger would use to reduce erosion and topsoil loss from storm water runoff. Compliance with the Construction General Permit would ensure construction of facilities follows mandated BMPs, and therefore would not result in substantial soil erosion or the loss of topsoil. Impacts are considered less than significant and no mitigation is required.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Impacts would be the same as Alternatives 1 and 2.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures No mitigation measures are required.

Cumulative Impacts
The geographic scope of potential cumulative impacts related to geology and soils encompasses the project site and immediate vicinity. There are three relevant projects within the immediate vicinity of the proposed project that may contribute to cumulative impacts:

- Jennings Treatment Plant Phase 2 Upgrades: increase tertiary treatment capacity by 12.6 mgd;

- West Main Improvement Project: widen West Main Ave to 3 lanes from the San Joaquin River to Crows Landing Road (Stanislaus County Department of Public Works 2011);
- StanCOG South Corridor Study: study potential alignments and corridor options for an expressway from the City of Turlock on the east to I-5 on the west (Stanislaus County Department of Public Works 2011).

While potential cumulative impacts related to geology, seismicity, and soils are generally site-specific and depend on local geologic and soil conditions, there may be cumulative impacts associated with the Proposed Action and the projects listed above, particularly related to seismically induced groundshaking and ground failures (expansive soils). However, these impacts would be less than significant with implementation of **Mitigation Measures GEO-1** and **GEO-2**, which require geotechnical evaluations for these seismic hazards.

3.8.4 References

California Department of Conservation (CDOC). 2007. Regulatory Maps: Fault zones, Landslides, and Liquefaction Zones. Accessed on: 18 July 2014. Available at: http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm

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3.9 Greenhouse Gas Emissions

This section evaluates the potential adverse impacts related to GHG emissions that could result from implementation of the Proposed Action. The analysis is based on a review of current GHG conditions, inventory of the proposed project GHG emissions, and information from state and local agencies.

3.9.1 Environmental Setting/Affected Environment

Study Area

Climate change is a global issue and planning surrounding it has been conducted at the state level. Accordingly, the study area for the purposes of GHG emissions considers global GHG emissions in the context of statewide GHG emissions reduction targets that will allow California to do its share in reducing GHG emissions globally.

Global Climate Change Global warming and global climate change are terms that describe changes in the Earth's climate. Global climate change is a broader term, used to describe any worldwide, long-term change in the Earth's climate. This change could be, for example, an increase or decrease in temperatures, the start or end of an ice age, or a shift in precipitation patterns. The term global warming is more specific and refers to a general increase in temperatures across the Earth. Although global warming is characterized by rising temperatures, it can cause other climatic changes, such as a shift in the frequency and intensity of rainfall or hurricanes. Global warming does not necessarily imply that all locations will be warmer. Some specific, unique locations may be cooler even though the Earth, on average, is warmer. All of these changes fit under the umbrella of global climate change.

Because GHGs persist and mix in the atmosphere, they have impacts on a global scale, rather than locally or regionally like most air pollutants. Consequently, GHG emissions that contribute to global climate change result in a worldwide cumulative impact (global warming) rather than a local or regional project-specific impact typically associated with criteria pollutants. Impacts related to GHG emissions are discussed in the context of the Proposed Action's contribution to statewide and global GHG emissions.

Although natural processes can cause global warming, general scientific consensus is that present-day global warming is the result of human activity on the planet (IPCC 2007, 2013). This human-made, or anthropogenic, warming is caused primarily by increased GHG emissions, which keep the Earth's surface warm, known as "the greenhouse effect." The greenhouse effect and the role GHG emissions play in it are described below.

The Greenhouse Effect and Other Climate Change Effects The Earth's atmosphere functions like a greenhouse, allowing sunlight in and trapping some of the heat that reaches the Earth's surface. When solar radiation from the sun enters the Earth's atmosphere, a small portion is reflected back toward space, although a majority of it is absorbed by the Earth's surface. The solar radiation that is absorbed by the Earth's surface then is re-emitted as heat in the form of

low-frequency infrared radiation. Although GHGs in the atmosphere do not absorb solar radiation, they do absorb the lower frequency infrared radiation, thereby trapping it within the Earth's atmosphere and resulting in the warming of the Earth's surface.

The Earth's greenhouse effect has existed far longer than humans have, and it has played a key role in the development of life. Concentrations of major GHGs (discussed in further detail under Greenhouse Gases and their Emissions below) such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and water vapor (H_2O) have been naturally present for millennia at relatively stable levels in the atmosphere, adequate to keep temperatures on the Earth hospitable. Without these GHGs, the Earth's temperature would be too cold for life to exist. However, as human industrial activity has increased, atmospheric concentrations of certain GHGs have grown dramatically. Anthropogenic sources are responsible for GHG emissions in excess of naturally occurring concentrations, thereby intensifying the greenhouse effect and resulting in global climate change.

The Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report: Climate Change 2007 stated that scientific consensus concurs that the global increases in atmospheric concentrations of GHGs since 1750 mainly have resulted from human activities such as fossil fuel use, land use change (e.g., deforestation), and agriculture (IPCC 2007, IPCC 2013). In addition, the report stated that it is likely that these changes in GHG concentrations have contributed to global warming. Confidence levels of claims in this report have increased since 2001, because of the large number of simulations run and the broad range of available climate models (IPCC 2013).

Global climate change is particularly important when discussing water infrastructure and supply. Changes in the climate are expected to cause more severe droughts and changes in annual rainfall and snowpack. Thus, it is important that the water infrastructure and supply be adaptable to meet climate change impacts.

Greenhouse Gases and Their Emissions GHGs includes gases that contribute to the natural greenhouse effect as well as gases that are human-generated and are emitted by modern industrial products, such as perfluorocarbons (PFCs), hydro fluorocarbons, (HFCs), and sulfur hexafluoride (SF_6). These last two families of gases, although not naturally present, have properties that also cause them to trap infrared radiation when they are present in the atmosphere, thus making them GHGs. The effect each of these gases has on global warming is a combination of the volume of their emissions and their global warming potential (GWP). GWP indicates, on a pound for pound basis, how much a gas will contribute to global warming (its potential to trap heat) relative to how much warming would be caused by the same mass of CO_2. **Table 3.9-1** shows the six GHGs and their respective GWPs.

Table 3.9-1: Greenhouse Gas Overview and Global Warming Potential

GHG	GWP 100-year[1]	Brief Description
CO_2	1/1	Released into the atmosphere through burning fossil fuels (coal, natural gas and oil), solid waste, trees and wood products, and also because of certain chemical reactions; removed from the atmosphere when it is absorbed by plants and the ocean; remains in the atmosphere for 50 to more than 100,000 years.
CH_4	28/21	Emitted during production and transport of coal, natural gas, and oil; methane emissions also result from livestock and other agricultural practices and by decay of organic waste in municipal solid waste landfills; remains in the atmosphere for about 10 years.
N_2O	265/310	Emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste; remains in the atmosphere for about 100 years.
HFCs	4-12,400/ 650–11,700	Typically used in refrigeration and air conditioning equipment, as well as in solvents; emissions primarily generated from use in air conditioning systems in buildings and vehicles; remain in the atmosphere from 10 to 270 years.
PFCs	6,630-11,100/ 6,500–9,200	Emitted as by-products of industrial and manufacturing sources; remain in the atmosphere from 800 to 50,000 years.
SF_6	23,500/23,900	Used in electrical transmission and distribution; remain in the atmosphere approximately 3,200 years.

Notes:

1. As scientific understanding of global warming potentials of GHGs improves over time, GWP values are updated in the IPCC scientific assessment reports. However, for regulatory consistency, the Kyoto Protocol fixed the use of GWP values to those published in the IPCC 1996 Second Assessment Report (SAR). The table above shows GWP values for 100 years from both the IPCC 2013 and SAR.

Sources: EPA 2013 and IPCC 2007.

These six gases are the major GHGs that were recognized by the Kyoto Accords. Other GHGs were not recognized by the Kyoto Accords, chiefly because of the smaller role that they play in global climate change or the uncertainties surrounding their effects. One GHG not recognized by the Kyoto Accords is atmospheric H_2O, because an obvious correlation does not exist between H_2O and specific human activities. H_2O appears to act in a feedback manner; higher temperatures lead to higher H_2O concentrations, which in turn cause more global warming (IPCC 2003). A second GHG not recognized in the initial Kyoto Accords but subsequently included by the United Nations Framework Convention on Climate Change and recognized in California as a GHG is nitrogen trifluoride.

The most important GHG in human-induced global warming is CO_2. Although many gases have much higher GWPs than the naturally occurring GHGs, CO_2 is emitted in such vastly higher quantities that it accounts for 85 percent of the GWP of all GHGs emitted by the U.S. (EPA 2006). Fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO_2 emissions over time and, thus, substantial increases in atmospheric CO_2 concentrations. In 2005, atmospheric CO_2 concentrations were about 379 ppm, over 35 percent higher than the pre-industrial concentrations of about 280 ppm (IPCC 2007). In addition to the sheer increase in the volume of its emissions, CO_2 is a major factor in human-induced global warming because of its long lifespan in the atmosphere of 50 to 200 years.

California Climate Impacts Global temperature increases and other climate changes may have a series of substantial negative effects on the health of California residents and California's

economy. These include changing precipitation, snow pack levels, and reduced water supply; reduced air quality; higher risk of infestations by pests and pathogens in agricultural and forest environments; increased wildfire risk; alterations in the coastline and coastal habitats; and increased flood risk (CAT 2006). With respect to compromised air quality, warmer temperatures can cause more ground-level O_3, a pollutant that causes eye irritation and respiratory problems. With regard to water supply, California primarily relies on snowmelt for its drinking water and much of the water used in irrigation during the summer. Global warming could alter, and may already be altering, the seasonal pattern of snow accumulation and snowmelt, and reduce snow pack overall, affecting water supplies.

California GHG Emission Inventory Since 2000, GHG emissions have decreased by 1.6 percent, after reaching a peak in 2004. In 2012, total California GHG emissions were 459 million metric tons of CO_2 equivalent (CO_2e)[1]. This represents a 1.7 percent increase in total GHG emissions from 2011 and the first emissions increase since 2007. This increase was driven primarily by strong economic growth in the state, the unexpected closure of the San Onofre Nuclear Generating Station, and drought conditions that limited in-state hydropower generation. In 2012, the transportation sector was the largest source of emissions, accounting for approximately 37 percent of the total emissions. On-road vehicles accounted for more than 90 percent of emissions in the transportation sector. The industrial sector accounted for approximately 22 percent of the total emissions. Emissions from electricity generation were about 21 percent of total emissions.

Per capita emissions in California have decreased by 12 percent from 2000 to 2012, even though population increased by 11.4 percent during this period. Per capita emissions from in-state electricity generation have declined by 22 percent from 2000 to 2012.

Climate Change Adaptation As described above, global climate change is already affecting ecosystems and society throughout the world. Climate change adaptation refers to the efforts undertaken by ecosystems and society to adjust to and prepare for current and future climate change, thereby reducing vulnerability to those changes. Plant and animal species adapt over time to changing conditions; they migrate or change behaviors in accordance with changing climates, food sources, and predators. Similarly, human adaptation has occurred naturally over history; people move to more suitable living locations, adjust food sources, and more recently, change energy sources.

Many national, as well as state and regional, governments, are implementing adaptive practices to address changes in climate, as well as planning for expected future impacts from climate changes. Some examples of adaptations that already are in practice or under consideration include: conserving water and minimizing runoff with climate-appropriate landscaping, capturing excess rainfall to minimize flooding and maintain a constant water supply through dry spells, protecting valuable resources and infrastructure from flood damage, developing new water supply strategies such as water reuse, aquifer storage and recovery, and desalination, and use of water efficient appliances (EPA 2014).

[1] CO_2e is a metric measure used to compare the emissions from various GHGs based upon their GWP compared to CO_2. The CO_2e for a gas is derived by multiplying the tons of the gas by the associated GWP. For instance using a GWP of 21 for CH_4, 1 ton of CH_4 is equal to 21 tons of CO_2e.

3.9.2 Regulatory Framework

This section describes laws and regulations at the federal, state, and local level that may apply to the project.

Federal Policies and Regulations

U.S. Supreme Court and Endangerment Ruling The U.S. Supreme Court ruled for the first time in 2007 that GHG emissions are air pollutants, covered under the CAA, in *Massachusetts v. The Environmental Protection Agency.* The Court found that the EPA has a mandatory duty to enact rules regulating mobile GHG emissions pursuant to the CAA. The Court held that GHGs fit the definition of an air pollutant causing and contributing to air pollution, which reasonably may be anticipated to endanger public health or welfare. In 2009, the EPA Administrator determined that existing and projected concentrations of GHGs threaten public health and welfare of present-day and future generations, and that combined emissions from motor vehicles contribute to GHG pollution. EPA's endangerment finding covers emissions of six key GHGs: CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6.

Corporate Average Fuel Economy and Greenhouse Gas Emission Standards In 2009, the NHTSA and EPA issued the first joint ruling to establish a national program to regulate model year 2012 through 2016 passenger cars and light trucks, to improve fuel economy and reduce GHG emissions. NHTSA previously had set Corporate Average Fuel Economy standards for vehicle fuel efficiency, but the joint rule was the first coordinated effort between federal programs for fuel economy and GHGs. Since then, NHTSA and EPA have issued new fuel efficiency and GHG emission standards. On August 9, 2011, standards were issued to reduce GHG emissions and improve fuel efficiency for heavy-duty trucks and buses. On October 15, 2012, NHTSA and EPA established a program to reduce GHG emissions and improve fuel economy standards for new cars and light trucks through 2025 (EPA 2012).

Federal Leadership in Environmental, Energy, and Economic Performance On October 5, 2009, EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance,* was signed by CEQ. The EO required federal agencies to set a 2020 GHG emissions reduction target within 90 days, increase energy efficiency, reduce fleet petroleum consumption, conserve water, reduce waste, support sustainable communities, and leverage federal purchasing power to promote environmentally responsible products and technologies.

GHG in NEPA Documents On February 18, 2010, CEQ released draft guidance on the consideration of GHGs in NEPA documents for federal actions. The draft guidelines include a presumptive threshold of 25,000 metric tons of CO_2e emissions from a proposed action to trigger a quantitative analysis. CEQ has not established when GHG emissions are "significant" for NEPA purposes, but rather poses that question to the public (CEQ 2010).

On December 18, 2014, CEQ released revised draft guidance on the consideration of GHG emissions and climate change in NEPA review. This is an update to the guidance previously issued in draft form in February 2010. The Guidance encourages agencies to include a quantitative assessment of GHG emissions for projects expected to have direct GHG emissions of 25,000 metric tons or more on an annual basis. The guidance states that the assessment of

direct and indirect climate change effects should account for upstream and downstream emissions and includes guidance on biogenic sources of GHG emissions from land management actions. The guidance recommends that if a cost-benefit analysis is relevant to the analysis, the Federal social cost of carbon estimates are useful in providing a meaningful NEPA review.

State Policies and Regulations

California Global Warming Solutions Act CARB is the lead agency for implementing AB 32, the California Global Warming Solutions Act, adopted by the State Legislature in 2006. AB 32 set a statewide target to reduce GHG emissions to 1990 levels by 2020. AB 32 also required CARB to prepare a Scoping Plan with the main strategies to be used to achieve reductions in GHG emissions in California.

After receiving public input on their discussion draft of the Proposed Scoping Plan (released in June 2008), CARB issued its Climate Change Proposed Scoping Plan in October 2008, and adopted the plan in December 2008 (CARB 2011b). This plan contains an outline of the proposed State strategies to achieve the 2020 GHG emission limits. Key elements of the Scoping Plan include the following recommendations:

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards.
2. Achieving a statewide renewables energy mix of 33 percent.
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system.
4. Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets.
5. Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel standard.
6. Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

Under the Scoping Plan, approximately 85 percent of the state's emissions are subject to a cap-and-trade program, where covered sectors are placed under a declining emissions cap. Emissions reductions are to be achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations. Emission reductions from this cap-and-trade program are expected to account for a large portion of the reductions required by AB 32.

CARB recently released the First Update of the Climate Change Scoping Plan to reflect progress since 2005, additional reduction measures, and plans for reductions beyond 2020 (CARB 2014). In this update CARB notes the progress toward the 2020 goal to reach 1990 levels established in AB 32. CARB emphasizes the importance of establishing a mid-term target beyond 2020 to reach the goals of executive orders S-03-05 and B-16-2012 to reduce emissions to 80 percent below 1990 levels by 2050 (as described below). This mid-term target will be critical in helping to frame additional policy measures, regulations, planning efforts, and investments in clean

technologies that are needed to continue to reduce emissions. Sector-specific actions that would be needed in order to reach long-term goals are outlined for: energy; transportation, land use, fuels, and infrastructure; agriculture; water; waste; and natural and working lands; short-lived climate pollutants; and green buildings. With respect to water, the Plan encourages development of state policy and regulatory frameworks that allow for effective regional integrated planning and implementation with measures to reduce GHG emissions and maintain water supply reliability during drought periods.

Executive Order S-03-05 and B-16-2012 In 2005, EO S-03-05 was issued, calling for statewide GHG reductions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. The EO also called for the creation of a "Climate Action Team," which was to report to the Governor every 2 years on progress toward meeting the targets and the effects of GHG emissions on the state. The latest of these reports, Climate Action Team Biennial Report, was published in December 2010 (Cal EPA 2010). In March 2012, EO B-16-2012 was issued, affirming the long-range climate goal for California to reduce GHGs to 80 percent below 1990 levels by 2050.

Low Carbon Fuel Standard EO S-1-07, the Low Carbon Fuel Standard (LCFS), was issued in January 2007. The order called for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. The LCFS was approved by CARB in 2009, and it became effective in April 2010. The regulation established annual performance standards for fuel producers and importers, applicable to all fuels used for transportation in California (CARB 2011a).

Assembly Bill 1493 With the passage of AB 1493 in 2002, California launched an innovative and pro-active approach for dealing with GHG emissions and climate change at the State level. AB 1493 required CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards apply to automobiles and light trucks beginning with the 2009 model year. Litigation was filed by automakers, challenging these regulations. EPA initially denied California's related request for a waiver to allow California to regulate vehicle emissions beyond EPA requirements, but a waiver subsequently was granted (CARB 2013).

Renewable Portfolio Standard Established in 2002 under Senate Bill 1078, California's Renewables Portfolio Standard (RPS) was accelerated in 2006 under Senate Bill 107 by requiring that 20 percent of electricity retail sales be served by renewable energy resources by 2010. Subsequent recommendations in California energy policy reports advocated a goal of 33 percent by 2020. Senate Bill X1-2, which implemented the 33 percent by 2020 for electricity sales from renewable energy resources, was signed in April 2011. This new RPS applies to all electricity retailers in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators (local communities that offer procurement service to electric customers within their boundaries). All of these entities must adopt the new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirement being met by the end of 2020.

Senate Bill 1368 Senate Bill 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. Senate Bill 1368 required the CPUC to establish a GHG emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The CEC was required to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards were not to exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further required that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.

Senate Bill 375 Senate Bill 375, the Sustainable Communities and Climate Protection Act of 2008, enhanced California's ability to reach its AB 32 goals, by promoting good land use and transportation planning with the goal of more sustainable communities. Sustainable Communities requires CARB to develop regional GHG emission reduction targets for 2020 and 2035 for each region covered by one of the state's 18 metropolitan planning organizations (MPOs). EO G-11-024 set these targets in 2011. The MPOs were tasked with developing Sustainable Communities Strategies, integrating land use and transportation planning and demonstrating an ability to attain the 2020 and 2035 reduction targets.

Regional Policies and Regulations

SJVAPCD Climate Change Action Plan The SJVAPCD's Climate Change Action Plan, adopted in 2008, directed the District Air Pollution Control Officer to develop guidance to assist lead agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project specific GHG emissions on global climate change (SJVAPCD 2014). On December 17, 2009, the SJVAPCD adopted *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* (Guidance) (SJVAPCD 2009). The Guidance establishes a streamlined process that can be used to evaluate the significance of project-specific GHG emission impacts on global climate change, based on the use of Best Performance Standards (BPS) (SJVAPCD 2009). The SJVAPCD defines BPS as "the most effective achieved-in-practice means of reducing or limiting GHG emissions from a GHG emissions source." Types of BPS include equipment type, equipment design, operational and maintenance practices, measures that improve energy efficiency, and measures that reduce vehicle miles traveled (SJVAPCD 2009).

SJVAPCD Zero Equivalency Policy The SJVAPCD has not developed CEQA significance thresholds for construction-related GHG emissions. However, the SJVAPCD has adopted a Zero Equivalency Policy for GHGs that establishes a level (230 metric tons of CO_2e/year) below which project-specific increases in GHG emissions are considered equivalent to zero for CEQA and District permitting purposes (SJVAPCD 2012b).

Local Policies and Regulations

The City of Modesto and Stanislaus County do not have any specific GHG policies applicable to the Proposed Action. Policies for Merced and San Joaquin Counties are not discussed because no GHG related activities and emissions would occur in these counties.

City of Turlock The City of Turlock General Plan has the following applicable GHG policies:

8.2-a Reduce Greenhouse Gas Emissions. Reduce greenhouse gas emissions to support statewide GHG reduction goals under the California Global Warming Solutions Act (AB 32).
8.2-b Decrease Vehicle-Miles Travelled. Promote a broad range of transportation, land use, and site design measures that result in a decrease in the number of automobile trips and vehicle-miles traveled per capita.
8.2-c Facilitate Energy-Efficient Buildings. Encourage energy efficiency through good urban design and site-planning practices, as well as through building design, maintenance and retrofit.
8.2-d Promote Energy Conservation. Support understanding of the relationship between energy consumption, air quality, and greenhouse gases, and promote energy-saving practices.
8.2-e Reduce Waste. Reduce per capita landfill waste generation by promoting reuse, recycling, and composting.
8.2-f GHG Emissions Reduction Implementation. Within three years of General Plan adoption, prepare a strategic plan for reducing greenhouse gas emissions, focusing on technically and financially feasible implementation measures that can be taken by the City. The Plan will guide the City to lower emissions from its buildings, fleet, and operations.
8.2-n Wastewater and Water System Efficiency. Maximize the efficiency of City-operated wastewater treatment, water treatment, pumping, and distribution equipment. This measure may be part of the GHG Emissions Reduction Plan described in 8.2-f.
8.2-o Outdoor Lighting. Establish outdoor lighting standards to minimize energy use while ensuring appropriate light levels. Standards could include:

- Photocells or astronomical time switches.
- Directional and shielded LED lights.
- Security lights with motion detectors.
- Prohibition against continuous all-night outdoor lighting unless required for security reasons.

8.2-s Require Energy Efficiency for Projects Receiving Public Assistance. Require that projects receiving assistance from the City of Turlock, including but not limited to infrastructure projects and affordable housing, include energy efficiency measures beyond the minimum standards of Title 24.
8.2-t Encourage Solar Power Generation. Encourage the use of passive and active solar devices such as solar collectors, solar cells, and solar heating systems into the design of buildings and parking areas by participating in existing incentive programs and considering new incentives for Turlock property owners.
8.2-u Encourage Other Onsite Renewable Energy Systems. Encourage the installation of other renewable energy systems in new or existing development. Renewable power generation may count toward the Air District's proposed BPS for projects with systems capable of generating at least 2.5 percent of their energy need.
8.2-v Methane Capture. Produce energy through methane capture at the Regional Water Quality Control Facility. Explore opportunities to enhance waste-to-energy generation if feasible.

3.9.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the Proposed Action alternatives would result in significant impacts related to GHG emissions.

As required by SJVAPCD, the CalEEMod version 2013.2.2 was used to quantify GHG emissions from the Proposed Action construction and operation activities. Modeling was completed for Alternatives 1 and 2, but because detailed information about construction is not available for Alternative 3, emissions were evaluated qualitatively. CalEEMod incorporates numerous default assumptions and CARB emission factors for on-road and off-road vehicles (EMFAC 2013 and In-Use Off-Road Equipment Inventory Model 2011). Below is a brief summary of the CalEEMod site-specific inputs used to estimate emissions from the Proposed Action, which are the same as the assumptions used in the analysis of air quality impacts (see *Section 3.3, Air Quality*). Further CalEEMod inputs and outputs are available in **Appendix B**.

The Proposed Action alternatives are assumed to take approximately 1.5 years to construct from summer of 2016 through spring of 2018. Assumptions regarding construction of Alternatives 1 and 2 are shown in **Table 3.3-5** in *Section 3.3, Air Quality,* and in **Appendix C**. In general, it was assumed that five construction crews would work simultaneously.

The equipment anticipated to be employed during each construction phase is shown in **Table 3.3-6 and 3.3-7** in *Section 3.3, Air Quality*. The equipment was mapped to an appropriate CalEEMod equipment type and default horsepower and load factors were applied unless it was mapped to a general equipment category, which used a typical equipment size that may be appropriate for the proposed construction activities.

The number of worker and material hauling trips is shown in **Table 3.3-8** in *Section 3.3, Air Quality*. Worker trips were assumed to be 20 miles one-way and material hauling trips were assumed to be 30 miles one way.

Once the baseline construction emissions associated with the Alternatives 1 and 2 were estimated, mitigation options were evaluated to see if on-site mitigation would be possible to reduce emissions below the significance thresholds. The impact of requiring phased trips for all trucks hauling trench spoil and backfill, such that all trucks importing backfill material to the site would leave with excavated material that needs to be exported, was estimated. This significantly reduces the number of material hauling trips.

With respect to operational emissions, only sporadic vehicle trips would be needed for maintenance and inspection. Since the amount of trips is not known, but likely substantially less than the small project threshold of 1,707 trips per day established by SJVAPCD, no operational emissions from vehicles were estimated. The pumps for all of the action alternatives would be electricity-driven, and electricity was conservatively assumed to be supplied by Modesto Irrigation District. While the NVRRWP may use electricity from TID, using the Modesto Irrigation District is conservative since it has slightly higher GHG emissions per unit of

electricity, and the electricity provider has not yet been determined. No criteria pollutants are associated with electricity use, but the indirect GHG emissions were also estimated using CalEEMod. Alternative 2 may also require an emergency generator at the proposed new pump station located at the Harding Drain Bypass Pipeline. This was not evaluated in CalEEMod since this would be a permitted stationary source and would undergo permitting procedures that are assumed to result in emissions below significance thresholds.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines* a GHG emissions impact would be considered significant if the project would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.

Construction emissions have been considered less than significant if GHG emissions are less than SJVAPCD's zero equivalency threshold of 230 metric tons of CO_2e per year. Construction emissions are typically amortized over the life of the project, which is assumed to be 40 years. For operational emissions, SJVAPCD has adopted a BMP threshold for GHG emissions based on an achievable-in-practice analysis of improvement over a business-as-usual scenario, or 29 percent improvement. However, at this time there is not an approved BMP for this type of project, nor has suitable data to establish a business-as-usual scenario been provided by the SJVAPCD. Therefore, the published California air district mass emissions thresholds were reviewed and considered in developing an appropriate threshold. Both Santa Barbara Air Pollution Control District and the South Coast Air Quality Management District have established a 10,000 metric ton CO_2e per year threshold for industrial sources. This is lower than the CEQ-suggested presumptive 25,000 metric tons of CO_2e emissions from a proposed action to trigger a quantitative analysis in NEPA documents. Thus, a 10,000 metric ton CO_2e per year threshold for operational sources seems appropriate and conservative.

The applicable plans and policies for operational-related emissions were determined to be CARB's Scoping Plan. Specifically, if a project activity does not conflict with CARB's GHG emission reduction policies, it would have a less than significant impact. For construction-related GHG emissions, the applicable significance threshold is compliance with the SJVAPCD's zero equivalency policy, which is considered to be consistent with CARB's Scoping Plan and associated regulations. The zero equivalency policy is used for construction emissions to designate the temporary and low level of emissions that when considered against the total GHG emissions emitted in California is considered *de minimis* and equivalent to no substantial long-term change in the overall amount of emissions.

Impacts and Mitigation Measures

Impact GHG-1 Construction Emissions of GHGs

No Action Alternative Under the No Action Alternative, recycled water would continue to be discharged to the San Joaquin River and or applied to land and there would be no construction required, therefore no construction emissions and no impact on GHG emissions.

Combined Alignment Alternative (Alternative 1) Estimates of construction emissions associated with this alternative were estimated using CalEEMod with assumptions specified above and in **Appendix B**. The total construction emissions are then amortized over a 40-year project life. Under standard equipment assumptions including unphased material hauling trips, the anticipated construction emissions associated with this alternative are shown in **Table 3.9-2**. The amortized construction emissions would be below the SJVAPCD zero equivalency threshold of 230 metric tons of CO_2e per year. Thus, the construction emissions associated with Alternative 1 would have a less than significant impact.

Table 3.9-2: Combined Alignment Alternative GHG Construction Emissions

Scenario	GHG Emissions (metric tons CO2e) – Unphased Truck	GHG Emissions (metric tons CO2e) – Phased Truck
Total Construction Emissions	2,175	1,830
Amortized Emissions	54.4	45.8

Notes:
Emissions are amortized over an assumed 40 year project life.
Source: **Appendix B.**

Table 3.9-2 also shows the construction GHG emissions that would be a result of phased material hauling truck trips since this is an option presented in *Section 3.3, Air Quality*, as a potential mitigation measure for criteria pollutant emissions. Phased truck emissions would result in an overall reduction in GHG emissions compared to unphased truck trips of 15.8 percent. Because this scenario would further reduce emissions below the zero equivalency threshold, impacts under this scenario would also have a less than significant impact.

Separate Alignment Alternative (Alternative 2) Under standard equipment assumptions including unphased material hauling trips, the anticipated construction emissions associated with this alternative are shown in **Table 3.9-3**. The amortized construction emissions would be below the SJVAPCD zero equivalency threshold of 230 metric tons of CO_2e per year. Thus, the construction emissions associated with Alternative 2 would have a less than significant impact.

Table 3.9-3: Separate Alignment Alternative GHG Construction Emissions

Scenario	GHG Emissions (metric tons CO2e) – Unphased Truck	GHG Emissions (metric tons CO2e) – Phased Truck
Total Construction Emissions	3,396	2,869
Amortized Emissions	84.2	71.7

Notes:
Emissions are amortized over an assumed 40 year project life.
Source: **Appendix B.**

Table 3.9-3 also shows the construction GHG emissions that would be a result of phased material hauling truck trips since this is an option presented in *Section 3.3 Air Quality*, as a potential mitigation measure for criteria pollutant emissions. Phased truck emissions would result in an overall reduction in GHG emissions compared to unphased truck trips of 14.8 percent. Because this scenario would further reduce emissions below the zero equivalency threshold, impacts under this scenario would also have a less than significant impact.

PID Conveyance Alternative (Alternative 3) Because this alternative would require somewhat less construction than Alternatives 1 and 2, it is expected that construction emissions would also be below the SJVAPCD zero equivalency threshold of 230 metric tons of CO_2e per year. Thus, the construction emissions associated with this alternative would be less than significant under phased and unphased scenarios.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Impact GHG-2 Operational Emissions of GHGs

No Action Alternative Under the No Action Alternative, recycled water would continue to be discharged to the San Joaquin River or applied to land. There would be no change in operational emissions from current practices and thus no impact on GHG emissions.

Combined Alignment Alternative (Alternative 1) Under this alternative, only occasional trips would be needed for pipeline maintenance and inspection; thus their GHG emissions were not quantified. In addition, GHG emissions associated with periodic testing and maintenance of any emergency generators was not quantified as it was also assumed to be minimal. The main source of GHG emissions during the proposed project operation would be from the electricity used to run the pumps that would transport the water to the DMC. The electricity used by the pumps would result in indirect GHG emissions and was quantified using CalEEMod with the details contained in **Appendix B**.

Based on the estimated pumping requirements to deliver water under this alternative, 15,442 megawatt hours of electricity would be used per year, and the resulting GHG emissions would be 5,855 metric tons of CO_2e per year. This is below the 10,000 metric ton CO_2e per-year threshold for industrial sources, and therefore emissions would be less than significant. Furthermore, this calculation would be an overestimate for future years, since the renewable portfolio standards require emissions associated with electricity to decrease with the incorporation of up to 33 percent renewable energy sources which have zero GHG emissions.

Separate Alignment Alternative (Alternative 2) Based on the calculated total of 17,898 megawatt hours of electricity used per year for the two pump stations needed for this alternative, the resulting GHG emissions would be 6,786 metric tons of CO_2e per year. This is below the 10,000 metric ton CO_2e per year threshold for industrial sources and therefore emissions would be less than significant.

PID Conveyance Alternative (Alternative 3) Based on the calculated energy requirement of 20,063 megawatt hours of electricity used per year, the resulting GHG emissions would be 7,607 metric tons of CO_2e per year. This is below the 10,000 metric ton CO_2e per year threshold for industrial sources and therefore emissions would be less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Impact GHG-3 Consistency with applicable GHG reduction plans

No Action Alternative Under the No Action Alternative, recycled water would continue to discharge to the San Joaquin River. There would be no change in emissions from current practices, which are consistent with CARB's Scoping Plan, and as a result, there would be no impact. However, the No Action Alternative does not move toward ensuring adequate water supplies during droughts, which was identified in the First Scoping Plan Update as a future direction for GHG and climate adaptation policies and regulations.

All Action Alternatives The Proposed Action alternatives would not conflict with any regulations or policies in CARB's Scoping Plan. Furthermore, the Proposed Action would be consistent with CARB's First Scoping Plan Update that suggests the need for future infrastructure planning of water resources to ensure adequate supplies during droughts. One of the main goals of the Proposed Action is to utilize recycled water that is currently discharged to the river to provide irrigation water to areas that are in need of water and to protect wildlife refuges. The GHG emissions would be below significance thresholds, as the project would use electric pumps, with the exception of necessary emergency backup generators. The indirect emissions associated with the use of electricity by the pumps would decrease over time as a result of existing regulations that require the electricity suppliers to increase the percentage of renewable electricity generating sources to 33 percent by 2020.

Significance Determination before Mitigation No impact for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Cumulative Impacts

Because GHG emissions and their contribution to global climate change is a global issue, the criteria above address the cumulative impacts of the project's contributions to GHG emissions. As noted above, the SJVAPCD's Climate Change Action Plan was developed to reduce the

impacts of project specific GHG emissions on global climate change. Because emissions from the Action alternatives would not exceed the applicable SJVAPCD significance thresholds for GHG emissions, the project's GHG emissions are not considered to be cumulatively considerable.

3.9.4 References

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3.10 Hazards and Hazardous Materials

This section presents the physical and regulatory setting for hazards and hazardous materials surrounding the Proposed Action area. The impact analysis considers the potential for the NVRRWP to release hazardous materials into the surrounding environment at levels that would create substantial risk to neighboring areas.

3.10.1 Environmental Setting/Affected Environment

This section describes the environmental setting for current hazards and hazardous materials within the study area, which includes the Proposed Action construction site and adjacent areas.

Known Contamination Sites

Two online databases were searched for known contamination sites within the study area, including EnviroStor (DTSC Hazardous Waste and Substances Site List) and GeoTracker (SWRCB).

The EnviroStor database identifies sites that have known contamination or sites for which there may be reasons for further investigation. Specifically, it lists the following site types: Federal Superfund sites (National Priority List); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. Sites that are in the Hazardous Waste and Substances Site List - Site Cleanup (Cortese List)[1] are also identified.

The GeoTracker is an online tool that provides regulatory data regarding sites that impact groundwater, particularly those that require groundwater cleanup, as well as permitted facilities such as those operating underground storage tanks and land disposal sites (SWRCB 2010).

A search of these two databases shows four known contamination sites within 1,000 feet of the Proposed Action alternative pipeline alignments, and the associated pump station and intake facilities. These sites are detailed below.

PRC Patterson, Inc. (CAD083166728) (T0609900147) The PRC (Petroleum Recycling Corporation) Patterson site is a 10-acre triangular lot located at 13331 North SR 33. The northern pipeline alignment runs west along Lemon Ave where it briefly heads south on SR 33 before turning west again on Zacharias Road. The site is located roughly 0.10 miles northwest of the corner of Lemon Ave and SR 33. The site was home to the Enviropur West Oil Recycling Facility, formerly known as the Petroleum Recycling Corporation Patterson facility, which was an oil recycling facility and hazardous waste generator from the early 1970s until 1996, when the facility was abandoned due to bankruptcy (DTSC 2014a). Prior to the 1970s, the site was used as a pump station for transporting heavy crude oil from Bakersfield to the Bay Area, at which time the site managed an estimated 29 aboveground storage and process tanks. The site is currently owned by the Balock Family Industrial/Commercial Property Trust. Verification monitoring was being conducted in 2003 (SWRCB 2014). Currently, the site is undergoing closure activities, and

[1] Cortese List sites are those that are compiled pursuant to Government Code Section 65962.5.

State Department of Toxic Substances (DTSC) has requested that the owner provide a Corrective Action and a Closure and Post-Closure Plan (DTSC 2014).

AL Castle, Inc. (60001557) The site is located at 1607 W. Marshall Road and is directly adjacent to the southern pipeline alignment as it runs west along W. Marshall Road. An agricultural company, AL Castle, Inc. provided agricultural spraying services for herbicides, pesticides, and fertilizers (DTSC 2014b). The site was used for storage of farm machinery and spraying equipment from the 1950s to the late 1980s. There is potential soil and surface and groundwater contamination from truck washing activities, which would have generated runoff water potentially containing pesticides, herbicides, and fertilizers. This runoff was drained into a ditch that carried the water to an unlined settling pond south of the site. From the settling pond, the water was pumped into the DMC. In 1989, AL Castle's discharge permit was revoked by the Reclamation and the pump was locked (DTSC 2014b). As of June 27, 2012, the site is considered inactive and further evaluation by the DTSC was recommended. Thus, the extent of the contamination is not known.

De Lash Enterprises (T0609939467) This site is located at 16561 SR 33, and is adjacent to the pipeline alignment for the PID Conveyance alternative where it crosses SR 33. The site was formerly a trucking yard that operated a small gas station. Three underground storage tanks were removed from the site, but it was subsequently determined that there was residual contamination of soil and groundwater. The site has been cleaned up and the case has been closed since 2009 (SWRCB 2014).

Campbell Ranch (T0609991946) This site is located at 16521 Ward Avenue, and is adjacent to the portion of the PID Conveyance Alternative pipeline alignment where it runs along Ward Avenue. The site is an open remediation case with known contamination from fuel or other petroleum hydrocarbons affecting groundwater. Although the leak was stopped in 1990, at which time contaminated soils were excavated, the site is still identified as active (SWRCB 2014).

Wildland Fire

The Proposed Action construction footprint is in an area designated for agricultural use by Stanislaus County. Fires within Stanislaus County are generally limited to the foothills in the very eastern and western portions of the County (Stanislaus County 1994). The construction area is located in a Locally Responsible Area (LRA), indicating that neither the state nor the federal government is responsible for fire protection in that area (for more information on fire districts within the region, please see Chapter 3.16, Public Services and Utilities). California Department of Forestry and Fire Protection (CAL FIRE) has developed a Fire Hazard Severity Zone ranking system that predicts the likelihood of an area burning. The model is based on vegetation, topography, weather, crown fire potential, and ember production and movement. Areas identified as LRA in the construction area are mostly designated "LRA Unzoned" with small pockets designated LRA Moderate Fire Hazard Severity Zone, generally south of West Main Avenue and west of South Carpenter Road and around the San Joaquin River in that area (CAL FIRE 2007a).

The area to the west of I-5 is designated as a State Responsibility Area (SRA), indicating that CAL FIRE is responsible for fire management in that area. Within this SRA, the areas west of I-

5, adjacent to the construction footprint are designated as Medium and High Fire Hazard Severity Zones (CAL FIRE 2007b). The closest Very High Fire Hazard Severity Zone is located approximately six miles to the northwest of the northernmost proposed pipeline. While fires have, in the past been as close as 1 mile from the study area, there have been no wildfires reaching the study area (Stanislaus County 2010). The Jennings Plant and Harding Drain Bypass pump stations and the PID intake are all located at least 12 miles away from the nearest Very High Fire Hazard Severity Zone. In addition, past wildfires have not been within 5 miles from any of these facilities.

3.10.2 Regulatory Framework

Hazardous materials and wastes can result in public health hazards if released to soil, groundwater, or air. Hazardous materials as defined in Section 25501(o) of the California Health and Safety Code are materials that, because of their "quantity, concentration, or physical or chemical characteristics, pose a significant present or potential hazard to human health and safety or to the environment if released to the workplace or environment." Hazardous materials have been and are commonly used in commercial, agricultural, and industrial applications, as well as to a limited extent in residential areas.

A waste is any material that is relinquished, recycled, or inherently waste-like. CCR Title 22 Section 66261.1, et seq. contains regulations for the classification of hazardous wastes. Article 3 criteria classify waste as hazardous if it is toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases). Article 4 also lists specific hazardous wastes, while Article 5 identifies specific waste categories, including Resource Conservation and Recovery Act (RCRA) hazardous wastes, non-RCRA hazardous wastes, extremely hazardous wastes, and special wastes. If improperly handled and released to soil, groundwater, or air (in the form of vapors, fumes, or dust), hazardous materials and wastes can result in public health hazards.

This section describes laws and regulations that may apply to the Proposed Action.

Federal Policies and Regulations

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
CERCLA, also referred to as the Superfund law, regulates the potential for liability for cleanup of hazardous substances, provides for defense against liability, identification of contaminated sites, defines hazardous substances, petroleum products, and petroleum exclusions. The Superfund Amendments and Reauthorization Act, includes emergency planning and community right-to-know. Under CERCLA, facilities must report where toxic chemicals are transferred, chemical-specific information, and supplemental information, along with identification information for their facility to the EPA. Hazardous substances must be reported, and releases to the environment accounted for.

Resource Conservation and Recovery Act (RCRA) RCRA regulates potential health and environmental problems associated with solid waste hazards and nonhazardous waste. RCRA defines solid waste as garbage or refuse, sludge from wastewater treatment plant, water supply treatment plant, or air pollution control facility, and other discarded materials. Solid waste can be either hazardous or non-hazardous. Hazardous waste is waste that burns readily, is corrosive, or

reactive, or if it contains certain amounts of toxic chemicals, or has been included on the EPA's list of hazardous wastes. RCRA regulates the disposal of waste and aims to reduce waste generation. It restricts which facilities can receive hazardous wastes and regulates facilities to ensure proper handling of materials.

Emergency Planning and Community Right-To-Know Act (EPCRA) EPCRA was passed in 1986 and requires federal, state, and local governments to create chemical emergency response plans for releases of hazardous substances. It also requires reporting on hazardous and toxic chemicals to increase awareness and access to information on chemical and individual facilities. It requires that facilities report accidental releases of certain chemicals and hazardous substances, and provide such information to the public. Facilities must create and make available Material Safety Data Sheets (MSDS) that describe the chemicals in question and health effects associated with them. Chemical inventories must also be reported if they require an MSDS.

Hazardous Materials Worker Safety Requirements The federal Occupational Safety and Health Administration (OSHA) is the federal agency responsible for ensuring worker safety. The federal regulations for worker safety are contained in CFR Title 29, as authorized in the Occupational Safety and Health Act of 1970; these regulations provide standards for safe workplaces and work practices, including those relating to hazardous materials handling.

Preliminary Remediation Goals EPA has published screening levels, referred to as Regional Screening Levels (RSLs), for the evaluation of chemicals commonly found in soil or groundwater where a release of hazardous materials has occurred (EPA 2014). For an industrial worker, these screening levels are conservative estimates of safe levels of a chemical that a worker could be exposed to in soil and groundwater. If the concentration of a chemical in the soil or groundwater is below the RSL, then it can be assumed that the chemical would not pose a health risk to the worker. Screening levels would generally be lower for industrial workers than construction workers because the industrial worker would be exposed to the hazard over a lifetime while the construction worker would only be exposed for the duration of construction. Therefore, safe levels of chemicals in soil and groundwater would generally be higher for construction workers than industrial workers.

State Policies and Regulations

California Health and Safety Code The California Health and Safety Code contains statewide regulations designed to protect public health and safety. Sections of the state code relevant to the Proposed Action include the Cortese List, which is developed under Section 65962.5 of the California Government Code. The list is compiled and maintained by the DTSC under the Cal-EPA. The Cortese List is a list of all sites identified as having hazardous waste releases.

Facilities that handle, store, use, treat, dispose of, or generate hazardous materials are required to create hazardous-waste management programs under Division 20, Chapter 6.5, section 25100 et seq. Facilities that generate hazardous wastes in excess of 26,400 pounds per year, or extremely hazardous wastes in excess of 26.4 pounds per year, must adhere to California Health and Safety Code Section 25244.12 et seq. This section of the code requires facilities to determine the types and amounts of wastes generated, identify procedures to reduce waste generation, develop written documentation that addresses waste reduction, develop a source-reduction evaluation

review and plan, prepare a plan summary and hazardous waste management report, and a report summary. Hazardous materials handling, reporting requirements, and local agency surveillance programs are regulated under the California Health and Safety Code, Section 25500 et seq.

Local Policies and Regulations

Stanislaus County General Plan The following policy in the Stanislaus County General Plan, Safety Element would apply to the project:

> *Policy Thirteen:* The Department of Environmental Resources shall continue to coordinate efforts to identify locations of hazardous materials and prepare and implement plans for management of spilled hazardous materials as required.

Stanislaus County Hazardous Materials Business Plan As required under the California State Health and Safety Code, businesses that use, handle, or store a hazardous material or an extremely hazardous material are required to submit Hazardous Materials Business Plans to Stanislaus County (Stanislaus County 2014a). Business Plans contain information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed of within the County. The Hazardous Materials Division of the Department of Environmental Resources at Stanislaus County performs routine inspections at businesses required to submit Business Plans to ensure compliance with existing laws and regulations, to identify existing safety hazards, and to suggest preventative measures.

The Hazardous Materials Business Plan must be recertified every year and a copy of the current certification must be kept on the business site (Stanislaus County 2014a). The County also must be notified within 30 days if there is any increase in quantity of a hazardous material at the business, if there is any handling of a previously undisclosed hazardous material, if there is any change in the storage, location or use of hazardous materials, or if there is any change to the business details, including a change in the site map.

City of Modesto Urban Area General Plan The following policy in the Urban Area General Plan relating to hazards and hazardous materials would apply to the project:

> *Hazardous Materials Management Policies (a)*: The City shall comply with all existing federal and state laws that regulate the generation, transportation, storage, and disposal of hazardous materials.
> *Hazardous Materials Management Policies (c)*: In the event that site inspection or construction activities uncover chemical contamination, underground storage tanks, abandoned drums, or other hazardous materials or wastes at a parcel, the inspection report preparer shall so notify the City. The City shall notify the County Health Services Department. Under the direction of these agencies, a site remediation plan shall be prepared by the project applicant.
> The plan would (1) specify measures to be taken to protect workers and the public from exposure to potential site hazards and (2) certify that the proposed remediation measures would clean up the wastes, dispose the wastes, and protect public health in accordance

with federal, state, and local requirements. Permitting or work in the areas of potential hazard shall not proceed until the site remediation plan is on file with the City.
If a parcel is found to be contaminated to a level that prohibits the proposed use, the potential for reduction of the hazard should be evaluated. Site remediation is theoretically capable of removing hazards to levels sufficiently low to allow any use at the site. In practice, both the technical feasibility of the remediation and its cost (financial feasibility) should be evaluated in order to determine the overall feasibility of locating a specific use on a specific site. In some cases, it may require restriction to industrial use or a use that involves complete paving and covering of the parcel.
In accordance with OSHA requirements, any activity performed at a contaminated site shall be preceded by preparation of a separate site health and safety plan (prepared by the project applicant and filed with the City) for the protection of workers and the public. All reports, plans, and other documentation shall be added to the administrative record.
Hazardous Materials Management Policies (d): For each specific project that would generate hazardous waste, the City shall require as a condition of building permit and/or business license approval that the project sponsor prepare a hazardous material transportation program. The transportation program shall identify the location of the new facility or use and designate either (1) specific routes to be used for transport of hazardous materials and wastes to and from the facility, or (2) specific routes to be avoided during transport of hazardous materials and wastes to and from the facility. Routes would be selected to minimize proximity to sensitive receptors to the greatest practical degree. Passage through residential neighborhoods should be minimized, and parking of waste haulers on residential streets should be prohibited. The City Fire Department shall review and approve the applicant's hazardous materials transportation program or, working with the applicant, modify it to the satisfaction of both parties.
Fire Hazard Policies, Peak Load Water Supply: The City shall ensure that adequate water fire-flows are maintained throughout the City and shall regularly monitor fire-flows to ensure adequacy. New development shall comply with the minimum fire-flow rates, as presented in Appendix B of the California Fire Code.
Fire Hazard Policies, Miscellaneous (3): Require all new development to have adequate water to meet the established fire-flow standards.

3.10.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action would result in significant hazards and hazardous materials impacts. Impacts are evaluated based on the known potentially hazardous materials that would be used or stored on site during construction and operation, potential for accidental hazardous substance release, and presence of other health-threatening factors in the Proposed Action vicinity.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines,* a hazard or hazardous materials impact would be considered significant if the project would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Be located on a site which is included on a list of hazardous materials site compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment.
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area.
- For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials* – The Proposed Action would not involve the routine transport, use or disposal of hazardous materials. Thus, the Proposed Action would not create any significant hazards to the public or the environment.
- *Handling and use of hazardous substances within one quarter-mile of an existing or proposed school* – There are no schools or proposed schools located within one quarter-mile of the Proposed Action construction footprint. The closest school, Northmead Elementary School, is located approximately 1.25 miles south of the northern pipeline alignment in the City of Patterson. Patterson High School is located 1.5 miles south of the northern pipeline alignment. Thus, there would be no impact and no further evaluation is required.
- *Be located on a site which is included on a list of hazardous materials site compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment* – The Proposed Action is not located on a site included on a list of hazardous materials site compiled pursuant to Government Code Section 65962.5 (Cortese List). Three Cortese List sites are located within Stanislaus County, and the nearest site to the construction area (Gallo Glass – Sisk Ranch) is located more than 4 miles northeast of the eastern extent of the northern

pipeline alignment. As such, the Proposed Action would not create a significant hazard to the public or the environment.

- *Be located within an airport land use plan or within two miles of a public airport and result in a safety hazard for people residing or working in the project area, or for a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area* – The Proposed Action construction footprint is not located within an airport land use plan, nor is it within two miles of a public airport. The Crows Landing Airport, a private landing facility, is located roughly a mile south of the southern pipeline alignment that runs west along East Marshall Road. This facility was formerly named the Naval Auxiliary Landing Field Crows Landing when it was operated by the U.S. Navy. The parcels undergoing remediation activities are owned by NASA, but property ownership is being transferred to Stanislaus County once cleanup of a parcel is complete (DTSC 2014). Due to the distance of the airstrip from proposed construction areas and the nature of construction within road ROW, project construction would not result in safety hazards for people residing or working in the construction area.

Impacts and Mitigation Measures

Impact HAZ-1 Create a Hazard through Reasonably Foreseeable Upset and Accident Conditions Involving Release of Hazardous Materials into the Environment

No Action Alternative If no action were taken, there would be no hazardous materials impacts within the study area.

Combined Alignment Alternative (Alternative 1) Construction of this alternative could create a hazard to the public or the environment involving the release of hazardous materials used in construction, which include diesel fuel and minor amounts of paints, fuels, solvents and glues. These materials would generally be used in excavation equipment, generators, and other construction equipment and would be contained within vessels engineered for safe storage. These materials would be stored at the construction sites. Where construction activities are adjacent to waterways (i.e., San Joaquin River and the DMC), accidental release of hazardous materials could degrade water quality. Thus, impacts associated with accidental release of hazardous materials are considered potentially significant. **Mitigation Measure HAZ-1a** would reduce the risk of this kind of exposure to less than significant.

The PRC Patterson site is a known hazardous materials site located at 13331 North SR 33, roughly 0.10 miles to the northwest of the proposed pipeline alignment under this alternative at the corner of Lemon Ave and SR 33. Groundwater within the underlying Delta-Mendota sub-basin has historically flowed northwest, but more recent data indicates groundwater flowing to the north and eastward (DWR 2006). Because this flow is away from the construction footprint for this alternative, risks associated with uncovering contaminated soil or contaminated groundwater are not anticipated and the potential for accidental release of hazardous materials into the environment and subsequent exposure to the public is considered less than significant.

Separate Alignment Alternative (Alternative 2) In addition to the impacts listed under Alternative 1, the southern pipeline is located 0.10 miles from the AL Castle, Inc. site. The site is

located on the west side of the DMC, southwest of where this alternative would discharge to the DMC at MP 43.05. Groundwater within the region flows north and eastward (DWR 2006). As such, there is a potential for encountering contaminated groundwater during construction activities if dewatering is needed. Contaminated soil may also be present depending on the extent of past contamination. In such an event, contaminated material would need to be stored for classification prior to transportation and proper disposal. **Mitigation Measure HAZ-1b** would reduce the risk of an accidental release of hazardous materials to less than significant.

PID Conveyance Alternative (Alternative 3) This alternative would have the same potential for release of hazardous materials during construction as described for Alternative 1. **Mitigation Measure HAZ-1a** would reduce the risk of this kind of exposure to less than significant.

According to the Geotracker database (SWRCB 2014), there are two known contamination sites within 1,000 feet of the pipeline alignment for this alternative. De Lash Enterprises, located at 16561 SR 33, was the site of a leaking underground fuel tank, which caused contamination of soil and groundwater. The site has been cleaned up and the case has been closed since 2009. Campbell Ranch, located at 16521 Ward Avenue, is another site of a known leak of fuel or other petroleum hydrocarbons affecting groundwater. This case is still open, and the site is on a parcel that is immediately adjacent to the pipeline alignment. This alternative thus also has the potential for uncovering contaminated soil or groundwater during construction. **Mitigation Measure HAZ-1b** would reduce the risk of an accidental release of hazardous materials to less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure HAZ-1a: Hazardous Materials Management and Spill Prevention Control Plan** (Alternatives 1, 2 and 3). Prior to the start of construction, the construction contractor shall be required to prepare a Hazardous Materials Management Spill Prevention and Control Plan that includes a project-specific contingency plan for hazardous materials and waste operations. The Plan shall be applicable to construction activities, and shall establish policies and procedures according to applicable codes and regulations, including but not limited to the California Building and Fire Codes, and federal and California OSHA regulations. Elements of the Plan shall include, but not be limited to, the following:

- A discussion of hazardous materials management, including delineation of hazardous material storage areas, access and egress routes, waterways, emergency assembly areas, and temporary hazardous waste storage areas.
- Notification and documentation of procedures.
- Spill control and countermeasures, including employee spill prevention/response training.

Mitigation Measure HAZ-1b: Conduct Phase I Study along Pipeline Segments (Alternatives 2 and 3) Prior to the start of construction, a Phase I hazardous waste/hazardous materials study for soil and groundwater contamination shall be completed for Alternative 2 in the area where

the southern pipeline alignment would connect with the DMC, and for Alternative 3, along Bartch and Ward Avenues. The recommendations set forth in the Phase I assessment shall be implemented to the satisfaction of applicable agencies before construction begins. If Phase I assessments indicate the potential for contamination within the construction zone of the pipelines, Phase II studies shall be completed before construction begins. Phase II studies will include soil and groundwater sampling and analysis for anticipated contaminants. The Phase II sampling is intended to identify how to dispose of any potentially harmful material from excavations, and to determine if construction workers need specialized personal protective equipment while constructing the pipeline through that area. If soil or groundwater contaminated by potentially hazardous materials is exposed or encountered during construction that was not identified in the Phase I assessment, the appropriate hazardous materials agencies will be notified.

Significance Determination after Mitigation Less than significant.

Impact HAZ-2 Expose People or Structures to a Significant Risk of Loss, Injury or Death Involving Wildland Fires

No Action Alternative If no action were taken, there would be no wildland fire-related impacts within the study area.

Combined Alignment Alternative (Alternative 1) This alternative is located in an agricultural area and is not considered wildlands. Agricultural areas that have been designated by CAL FIRE within the LRA area exist within the project area in the vicinity of West Main Avenue and South Carpenter Road and along San Joaquin River. Wildlands with Fire Hazard Severity Zone rating of Medium and Very High are located at least 0.5 miles west of the proposed project area, on the west side of I-5. The use of spark-producing construction machinery adjacent to Medium and Fire Hazard Severity Zones could potentially create hazardous fire conditions that could increase the risk of exposing people or structures to a significant risk of loss, injury or death. As such, construction of this alternative would result in a potentially significant impact. **Mitigation Measure HAZ-2** would reduce this potential risk to less than significant.

Once construction is complete, maintenance activities would not be expected to pose a high risk of fire. Pipelines would be buried and would not be exposed to fire and the risk of damage will be less than significant.

Separate Alignment Alternative (Alternative 2 This alternative is also located in an agricultural area and is not considered wildlands. Impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) This alternative is also located in an agricultural area and is not considered wildlands. Impacts would be the same as Alternatives 1 and 2.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure HAZ-2: Prevention of Fire Hazards** (Alternatives 1, 2 and 3). During construction of the proposed project, the construction contractor shall require staging areas, welding areas, or areas slated for construction be cleared of dried vegetation or other materials that could ignite. Construction equipment that includes a spark arrestor shall be maintained in good working order. In addition, construction crews shall have a spotter during welding activities to look out for potentially dangerous situations, such as accidental sparks. Other construction equipment shall be kept in good working order and used only within cleared construction zones. During construction of the proposed project, contractors shall require vehicles and crews working at the project site to have access to functional fire extinguishers.

Significance Determination after Mitigation Less than significant.

Impact HAZ-3 Conflict with Any Adopted Emergency Response Plan or Emergency Evacuation Plan

No Action Alternative If no action were taken, there would be no emergency response plan conflicts.

Combined Alignment Alternative (Alternative 1) This alternative would not conflict with Stanislaus County's Multi-Jurisdictional Hazard Mitigation Plan. Goals of the Plan include: "minimizing the effects of hazardous conditions that might cause loss of life and property; reducing the economic impact of wildfires; promoting a sustainable economy; and increasing public preparedness for disasters." Objectives include ensuring that "future growth shall not exceed the capacity to provide services such as water and public safety" and to "discourage development in areas susceptible to wildfire." With implementation of **Mitigation Measures HAZ-1a, HAZ-1b,** and **HAZ-2**, the Proposed Action would not cause loss of life and property or economic impacts associated with hazardous conditions. As such, impacts are considered less than significant.

Long-term operation of the project would not result in any hazards that would conflict with the Multi Multi-Jurisdictional Hazard Mitigation Plan because this project would only involve conveyance and discharge of recycled water to the DMC.

Refer to *Section 3.19, Transportation*, Impact TR-3, for a discussion of impacts associated with the potential for construction to interfere with the accessibility of roadways to emergency vehicles. **Mitigation Measure TR-1** would reduce impacts associated with interference with emergency access and circulation to less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Impacts would be the same as Alternatives 1 and 2.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measures HAZ-1, HAZ-1a,** and **HAZ-2** above**.**

Significance Determination after Mitigation Less than significant.

Cumulative Impacts

The geographic scope of potential cumulative impacts related to hazards and hazardous materials is the project construction sites and immediate surrounding area. There are three relevant projects within the vicinity of the Proposed Action that may contribute to cumulative impacts:

- Jennings Treatment Plant Phase 2 Upgrades: increase tertiary treatment capacity by 12.6 mgd.
- West Main Improvement Project: widen West Main Ave to 3 lanes from the San Joaquin River to Crows Landing Road (Stanislaus County Department of Public Works 2011).
- StanCOG South Corridor Study: study potential alignments and corridor options for an expressway from the City of Turlock on the east to I-5 on the west (Stanislaus County Department of Public Works 2011).

Cumulative projects would use hazardous materials during construction activities and thus could result in similar impacts associated with the accidental release of chemicals and exposure to public and the environment. In addition, construction could overlap and thus increase the risk of hazards. However, with the implementation of **Mitigation Measures HAZ-1a**, **HAZ-1b** and **HAZ-2,** the project's contribution to these cumulative impacts would not be cumulatively considerable. Thus, the project's contribution to cumulative impacts would be less than cumulatively significant.

3.10.4 References

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3.11 Hydrology and Water Quality

This section presents the physical and regulatory setting for hydrology and water quality for the Proposed Action. The impact analysis considers the potential for the Proposed Action to result in excess surface runoff or flooding, exceed water quality standards, or interfere with groundwater recharge. The following appendix supports this section: **Appendix G**: **Evaluation of NVRRWP Impact on Groundwater**.

3.11.1 Environmental Setting/Affected Environment

The following sections describe the environmental setting for hydrology and water quality in proximity to the project construction sites. For the purposes of this section, the "Study Area" refers to the potential footprint of the Action alternatives including all construction areas, staging areas, access roads, and areas that would be temporarily or permanently disturbed.

Hydrology

The Proposed Action is located in the San Joaquin Valley, which is characterized by cool, wet winters and dry, warm summers. The majority of the annual precipitation occurs from December through April, with approximately 11 inches of rainfall per year.

Surface Water The project area is located within the San Joaquin River Basin (Basin). The Basin covers 15,880 square miles, with its major river systems consisting of the San Joaquin River and its larger tributaries, the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno rivers (RWQCB 2011). The surface water bodies potentially affected by the Proposed Action include the San Joaquin River, the DMC, and the San Luis Reservoir.

San Joaquin River The 366-mile San Joaquin River starts in the high Sierra Nevada, and flows in a mostly northerly direction to the Delta. As discussed in *Chapter 1, Introduction,* Modesto's Jennings Plant and the City of Turlock's RWQCF both discharge treated effluent to the San Joaquin River. Currently, the Turlock RWQCF discharges to the San Joaquin River via the Harding Drain Bypass Pipeline, a single source pipeline owned by the City of Turlock. Discharge via the Harding Drain Bypass Pipeline began on or about October 8, 2014, in accordance with the City of Turlock's NPDES permit requirements.

Figure 3.11-1 below shows a schematic of the San Joaquin River including inflows, outflows and monitoring points. The Vernalis gage and the Newman gage are the most important gages in relation to the Proposed Action. With respect to the Jennings Plant and the City of Turlock RWQCF, the Vernalis gage is downstream and the Newman gage is upstream. The Crows Landing gage is also upstream of both treatment plants but it has a more limited data history than the Newman gage. **Figure 3.11-2** shows monthly flow data for the San Joaquin River as measured at the Vernalis gage.

Figure 3.11-1: Schematic of San Joaquin River Inflows, Outflows and Monitoring Points

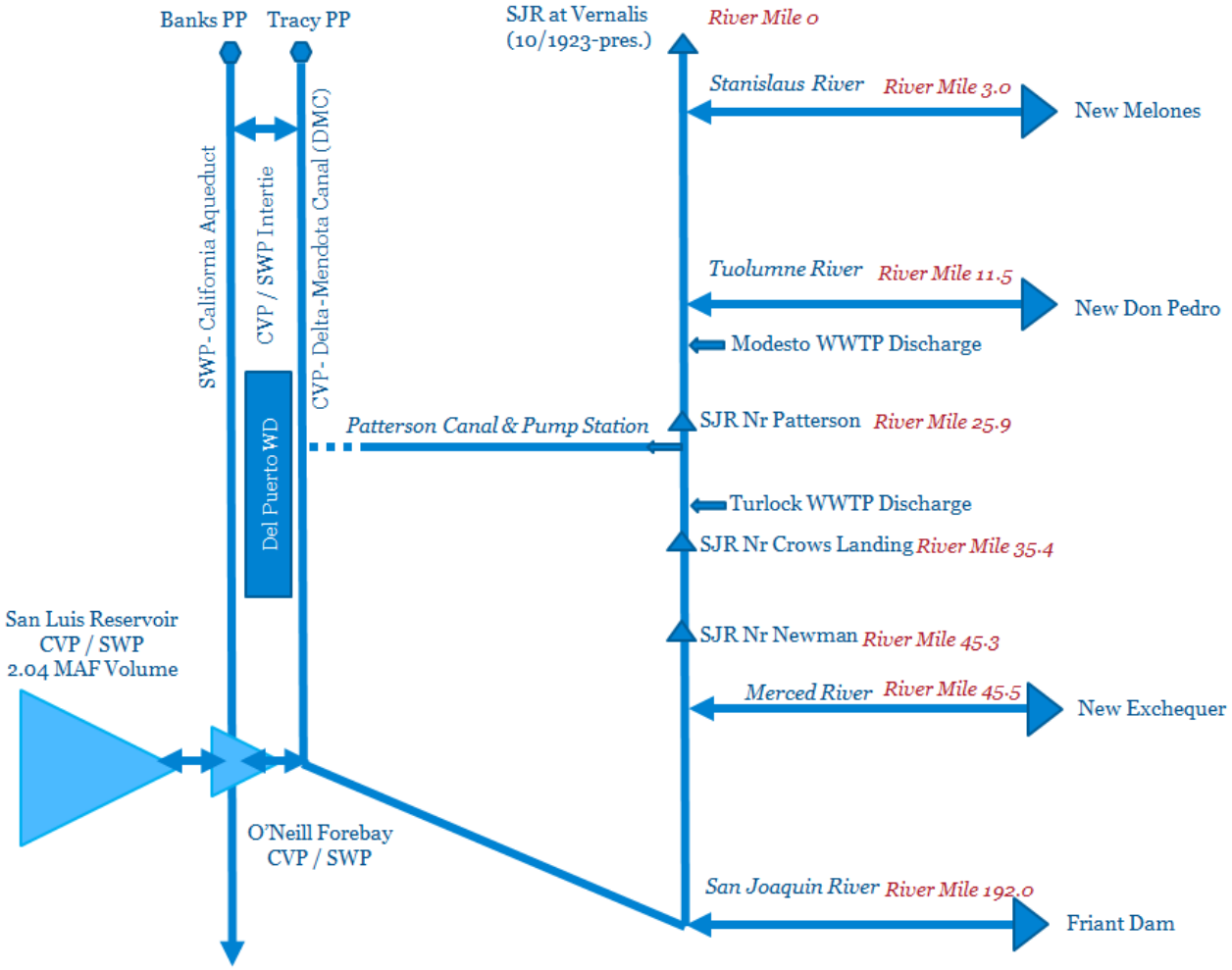
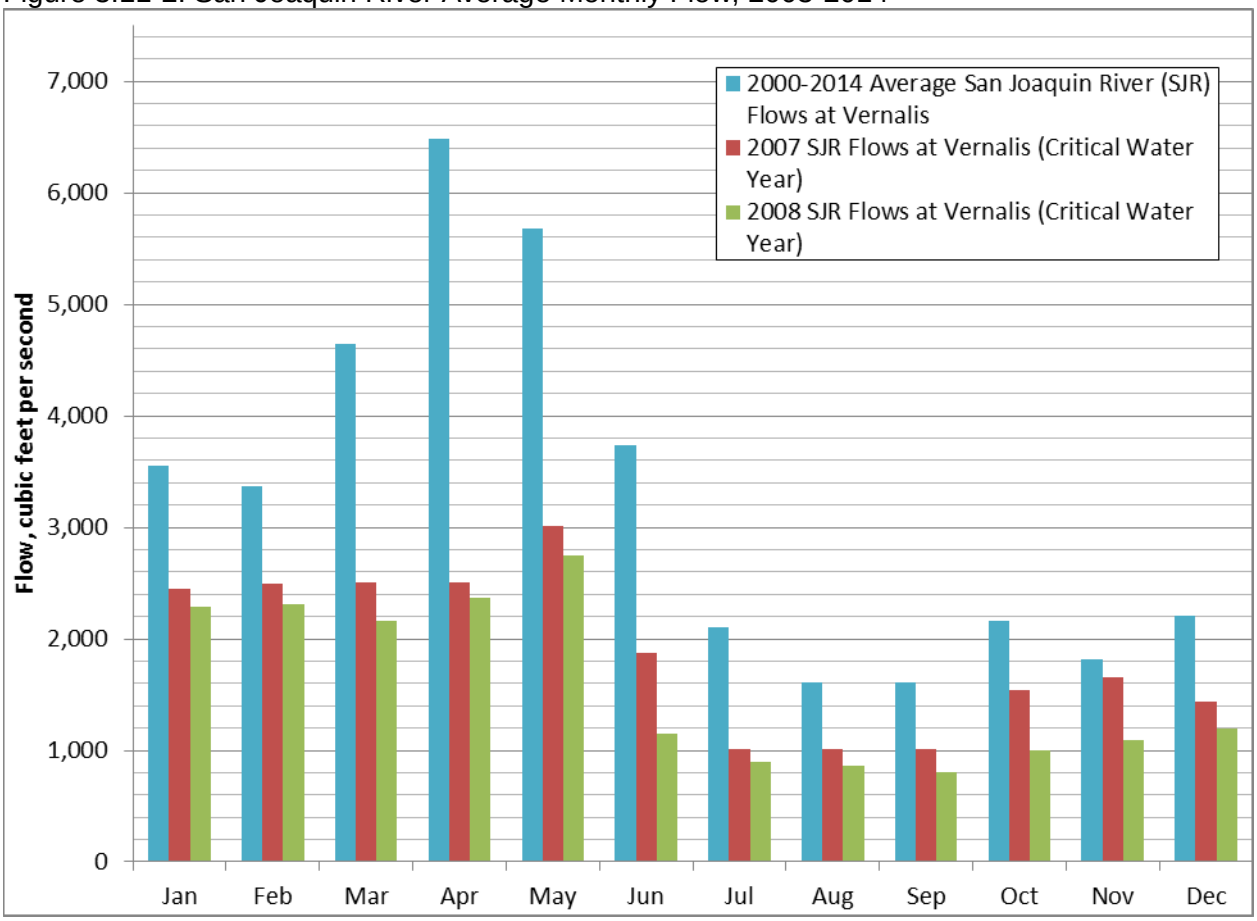


Figure 3.11-2: San Joaquin River Average Monthly Flow, 2003-2014



Reclamation's Long-Term CVP Operational Criteria and Plan (Reclamation 2004) defines flow objectives at the Vernalis gage intended to maintain minimum flows in the San Joaquin River and to maintain a specific salinity balance in the Delta. The flow objectives, shown in Table **3.11-1**, include a higher and lower flow objective; the higher objective is used for more strict Delta salinity requirements.

Table 3.11-1: Base Vernalis Minimum Monthly Average Flow Rate[1]

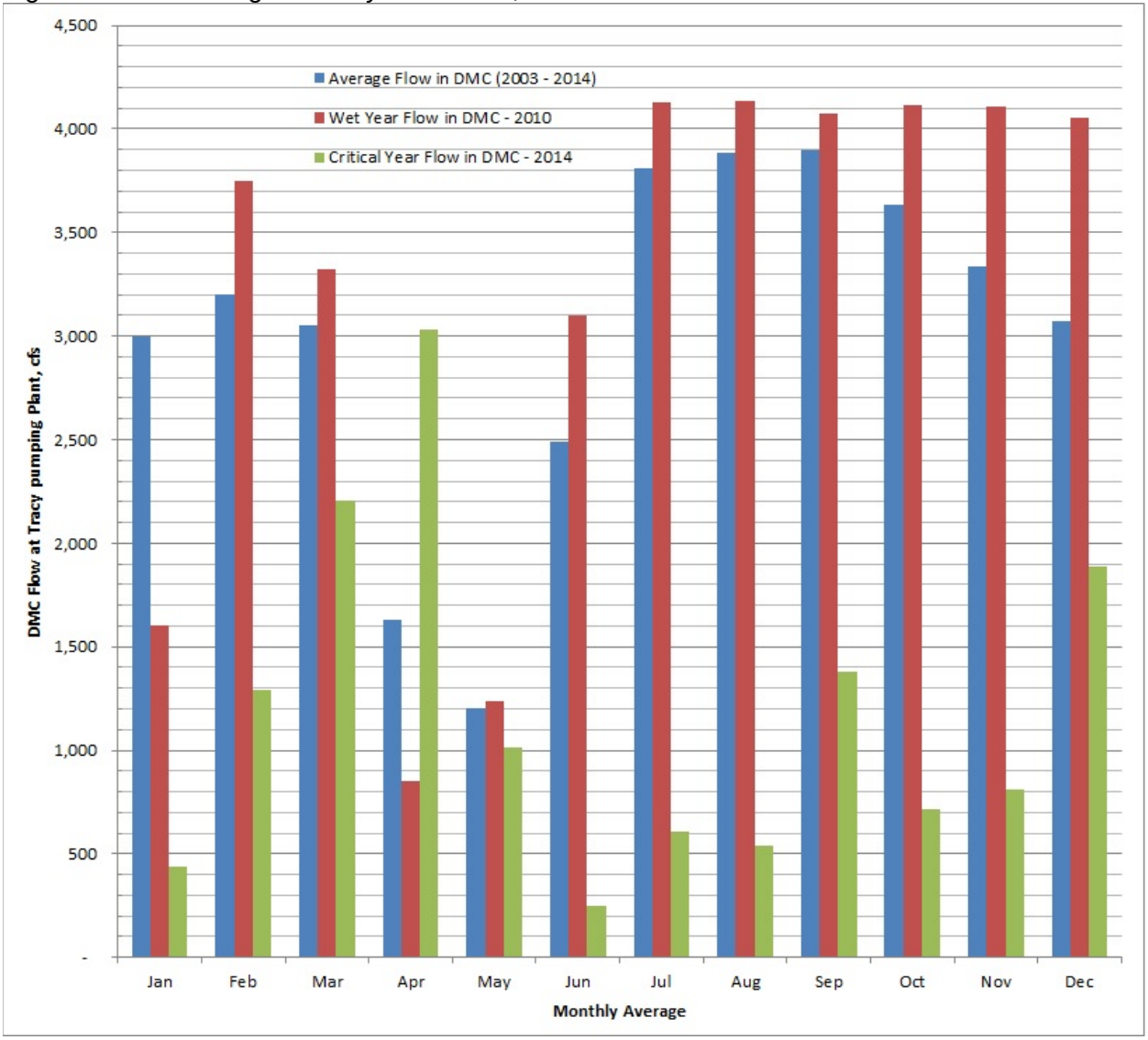
Year Type	All Years	Wet Year	Above Normal Year	Below Normal Year	Dry Year	Critical Year
Flow Standards for Feb – Apr 14 and May 16 - Jun	N/A	2,130 or 3,420 cfs	2,130 or 3,420 cfs	1,420 or 2,280 cfs	1,420 or 2,280 cfs	710 or 1,140 cfs

Source: Reclamation 2004

Delta-Mendota Canal The DMC is a CVP facility operated and maintained by the SLDMWA under contract with Reclamation. The 117 mile concrete-lined canal begins at the Jones Pumping Plant (formerly named the Tracy Pumping Plant), which pumps water from the Delta. The canal runs south along the western edge of the San Joaquin Valley, parallel to the California Aqueduct

for much of its length, but diverges to the east after passing San Luis Reservoir, which receives a portion of its water from the DMC (the remaining portion of water flowing into San Luis Reservoir comes from the California Aqueduct). The water is pumped from the canal into O'Neill Forebay, and then is pumped into San Luis Reservoir by the Gianelli Pumping-Generating Plant. Occasionally, water from O'Neill Forebay is released into the canal. The DMC ends at the Mendota Pool, a small reservoir created by Mendota Dam on the San Joaquin River near the town of Mendota, approximately 30 miles west of Fresno. **Figure 3.11-3** shows average monthly flow in the DMC.

Figure 3.11-3: Average Monthly DMC Flow, 2003-2014



The DMC conveys water for irrigation, wetlands, and municipal/industrial use. The DMC has an inter-connection to the California Aqueduct via an intertie located west of the City of Tracy (Reclamation 2013), and connects with the SWP at O'Neill Forebay.

Reclamation has historically accepted non-Project water in the DMC to supplement the supply of CVP water. This water is primarily from wells located along the canal, as well as surface water pumped from the San Joaquin River. The largest connection to the DMC is a discharge point owned by West Stanislaus Irrigation District located at MP 31.31L.

San Luis Reservoir The DMC is connected to the San Luis Reservoir via O'Neill Forebay midway along the length of the canal. The 2 million AF reservoir is an artificial lake on San Luis Creek in the eastern slopes of the Diablo Range of Merced County that is jointly owned and operated by Reclamation and DWR and is one of California's largest reservoirs (SCVWD 2013). During the summer or dry season, water in San Luis Reservoir is used by CVP contractors (as well as SWP contractors). Under the Action alternatives, recycled water conveyed in the DMC during low-demand periods could be stored in San Luis Reservoir.

San Joaquin River Water Quality The San Joaquin River in the project area carries a high salt load at certain times of year and two river segments downstream of the project area from the Merced River to the Tuolumne River and Tuolumne River to Stanislaus River are listed as impaired water bodies for boron[1], electrical conductivity, mercury, water temperature and several pesticides[2]. Water quality in the lower San Joaquin River near Patterson was evaluated as part of a water supply study that was conducted to determine the feasibility of providing recycled water to refuges (Reclamation 2013). The analysis of available water quality data provided information on a variety of constituents and compared water quality in the San Joaquin River and DMC. **Table 3.11-2** shows representative water quality data for the San Joaquin River and the DMC, and shows expected quality of blended recycled water from the Modesto and Turlock treatment plants.

Groundwater The Proposed Action is within the San Joaquin Valley Groundwater Basin. As shown in **Figure 3.11-4**, the DPWD service area overlies the Tracy and Delta Mendota subbasins of the San Joaquin Valley Groundwater Basin. The Turlock RWQCF is located in the Turlock subbasin and treats water that originates from that subbasin. The Modesto Jennings Plant is located in the Turlock subbasin and treats water that originates from the Modesto and Turlock subbasins. The discharge point for both plants is located in the Turlock subbasin. The pipelines for the Proposed Action alternatives are located within the Delta-Mendota subbasin. In general, groundwater quality throughout the region is suitable for most urban and agricultural uses. However, there are localized areas where groundwater quality is impaired with high chloride, boron, nitrate, iron, and manganese (DWR 2003).

[1] The San Joaquin River from the Merced River to Tuolumne River is listed for boron, but the segment from the Tuolumne River to the Stanislaus River is not.
[2] Segments of the San Joaquin River are listed for chlorpyrifos, DDT (dichloropenyltrichloroethane), DDE, (dichlorodiphenyldichloroethylene), diazinon, alpha–BHC (Benzenehexachloride or alpha-HCH), and group A pesticides.

Table 3.11-2: Average Water Quality of San Joaquin River, DMC and Recycled Water

Constituent	San Joaquin River Near Patterson[1]	DMC[2]	Estimated Recycled Water Quality
Boron (mg/L)	0.59	0.19	0.20
Nitrate (as N) (mg/L)	13.3	3.6	8.4
Selenium (µg/L)	1.9	0.8	1
Arsenic (µg/L)	4	5	3
Sodium (mg/L)	138	51	116
Total Dissolved Solids (mg/L)	679	275	551

Source: Reclamation 2013

1. Water quality data for the San Joaquin River was compiled from the California Environmental Data Exchange Network (CEDEN) stations "SJR @ Patterson" for the period covering 1995-2011, and from station "San Joaquin River @ PID Pumps".
2. DMC water quality data were obtained from the California Data Exchange Center (CDEC28) and the Reclamation Mid-Pacific Region's Environmental Monitoring Database, Water quality data from the DMC are from CDEC at the Tracy Pumping Plant (Station ID: TRP) and DMC Headworks (Station ID: DMC), covering the period 2003-13. Data from the Reclamation Environmental Monitoring Database are from samples collected between 1991 and 2013 at three stations representing the Upper DMC: MP 9.87, the DMC at McCabe near MP 68, and the O'Neill Forebay Inlet Bridge.

3.11.2 Regulatory Framework

This section describes laws and regulations at the federal, state, and local level that may apply to the project.

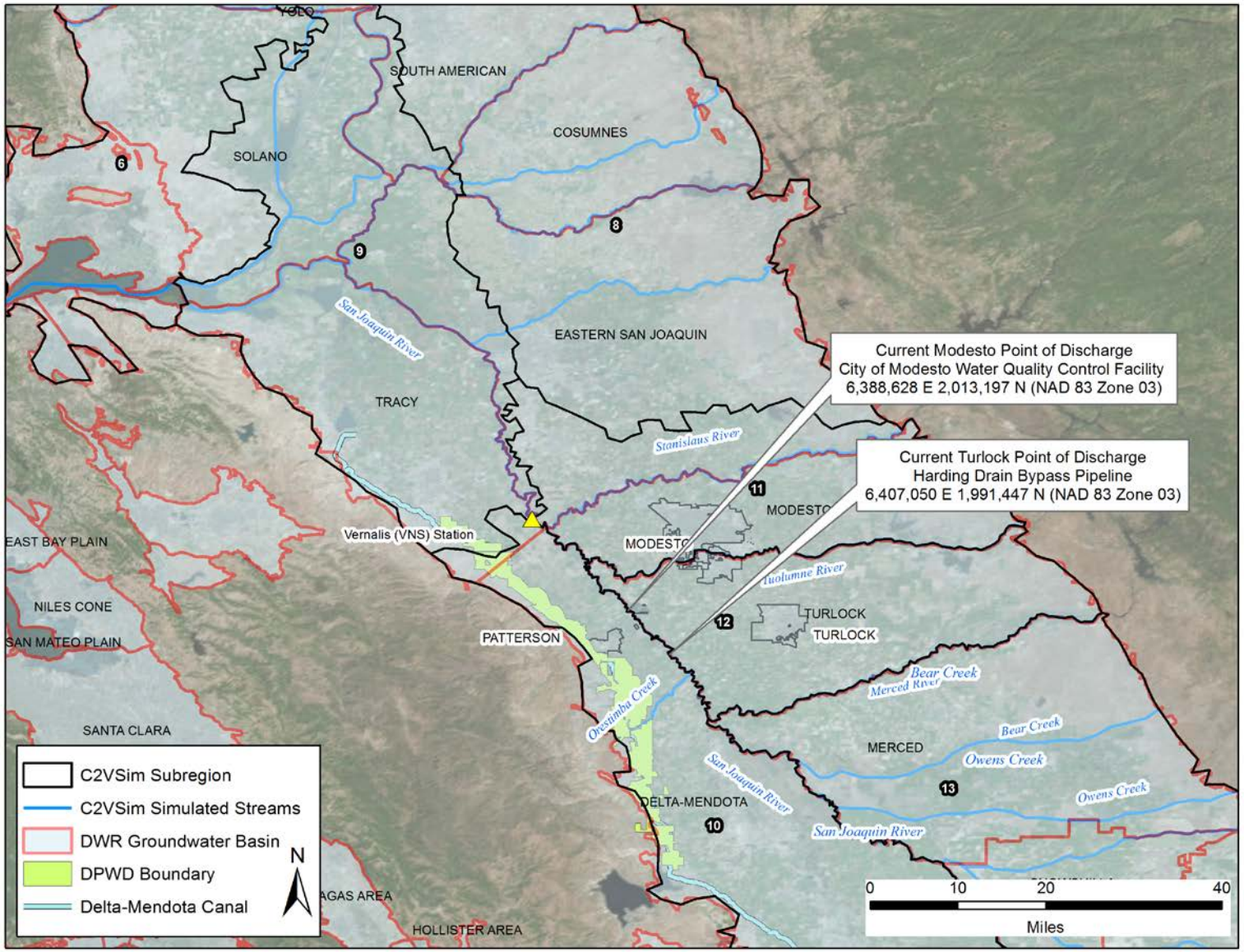
Federal Policies and Regulations

Clean Water Act Originally titled the Federal Water Pollution Control Act of 1972, the CWA is administered by EPA. The CWA allowed the EPA to delegate the NPDES Permit Program to state governments, enabling states to perform many of the permitting, administrative, and enforcement aspects of the NPDES Program. In California, these functions are performed by the SWRCB and the nine Regional Water Quality Control Boards. The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. The CVRWQCB has jurisdiction over the Study Area as well as over the entire lengths of the San Joaquin River and the DMC.

Section 303(d) CWA Section 303(d) requires states to develop lists of water bodies that will not attain water quality standards after implementation of technology-based effluent limitations by point-source dischargers. Section 303(d) further requires states to develop a Total Maximum Daily Load (TMDL) for each of the listed pollutants and water bodies. A TMDL is the amount of pollutant loading that the water body can receive and still meet water quality standards.

In 2011, the EPA gave final approval to a revised list of impaired water bodies (hereinafter referred to as the 303(d) list) prepared by the State. The San Joaquin River is listed for several constituents and TMDLs have been approved for some constituents including specific organic pesticides, salt, and boron (SWRCB 2010). The San Luis Reservoir is listed for mercury but a corresponding TMDL has not yet been developed (SWRCB 2010). The DMC is not on the 303(d) list.

Figure 3.11-4: CV2SIM Subregions and DWR Bulletin 118 Groundwater Basins in the NVRRWP Area



Section 401 Section 401 of the CWA allows for evaluation of water quality when a proposed activity requiring a federal license or permit could result in a discharge to waters of the U.S. Compliance with Section 401 is required for all projects that have a federal component and may affect water quality. See *Chapter 3.4 Biological Resources* for further discussion of CWA Section 401.

Section 402 Section 402 of the CWA specifically required EPA to develop and implement the NPDES program. In California, EPA authorizes the SWRCB to oversee the NPDES program through the Regional Water Quality Control Boards. There are several types of NPDES permits relevant to the Proposed Action.

Individual NPDES Permits (including discharge permits for Publicly-Owned Treatment Works) All point source dischargers to waters of the U.S. not governed by a general permit are required to apply for an individual NPDES permit with the Regional Water Quality Control Board, unless a specific exemption or waiver is provided. The Regional Water Quality Control Board then issues an individual NPDES permit and waste discharge requirements (for any requirements specific to discharges into waters of the State), along with monitoring provisions to ensure compliance. The City of Modesto Jennings Plant and the City of Turlock RWQCF operate under existing individual NPDES permits (CVRWQCB 2010 and CVRWQCB 2012). As noted in *Chapter 1, Introduction,* the Cities of Modesto and Turlock are pursuing revised NPDES permits to allow relocation of their respective discharges from the San Joaquin River to the DMC. The CVRWQCB would address the full range of beneficial uses of the DMC as delineated in the Basin Plan for the Sacramento and San Joaquin River when considering issuance of an NPDES permit. See discussion below of the Porter-Cologne Water Quality Control Act for further information about the Basin Plan.

General Permit for Discharges of Storm Water Associated with Construction Activity In 2009, the SWRCB adopted an amended *General Permit for Discharges of Storm Water Associated with Construction Activity,* NPDES Order No. CAS000002, Order No. 2009-0009-DWQ (Construction General Permit). Effective July 1, 2010, the amended General Construction Permit requires the development and implementation of a SWPPP. The SWPPP must include a site map(s) showing the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the site. The SWPPP must list BMPs the discharger will use to protect stormwater runoff; a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment (Note: The San Joaquin River is not 303(d) listed for sediment). Because the Proposed Action would disturb more than one acre, coverage under the General Construction Permit and development of a SWPPP would be required.

Waste Discharge Requirements for Dewatering and Other Low Threat Discharges to Surface Waters On May 31,2013, the CVRWQCB adopted *Waste Discharge Requirements for Dewatering and Other Low Threat Discharges to Surface Waters,* Order R5-2013-0074 NDPES No. CAG995001 (General Order for Dewatering). Individuals, public agencies, private businesses, and other legal entities discharging relatively pollutant-free wastewaters that pose

little or no threat to the quality of surface waters, for a duration of either 4 months or less in duration or have an average dry weather flow less than 0.25 mgd, may obtain authorization under this General Order to discharge. This General Order covers certain categories of dewatering and other low threat discharges to waters of the U.S., which are either 4 months or less in duration or have a daily average discharge flow that does not exceed 0.25 mgd. As discussed in *Chapter 2, Alternatives and Proposed Action,* dewatering will likely sometimes be employed in the pipeline trenches. It is expected that dewatering would not exceed 0.25 mgd and that the Proposed Action would be eligible for coverage under the General Order. If dewatering were to exceed 0.25 mgd, an alternative NPDES permit would be needed in order to discharge water from dewatering operations. This same permit would be expected to cover discharges that would be required for hydrostatic testing of the pipeline at the completion of construction.

Section 404 CWA section 404 regulates the discharge of dredged and fill materials into waters of the U.S. Areas meeting the regulatory definition of waters of the U.S. are subject to the jurisdiction of the USACE under provisions of CWA section 404. Construction activities involving placement of fill into jurisdictional waters of the U.S. are regulated by the USACE through permit requirements. No USACE permit is in effect in the absence of state water quality certification pursuant to section 401 of the CWA. See *Chapter 3.4 Biological Resources* for further discussion of CWA Section 404.

Rivers and Harbors Act - Section 10 Section 10 of the Rivers and Harbors Act (33 U.S.C. § 401 et seq.) requires authorization from USACE for construction of any structure over, in, or under navigable waters of the U.S. The navigable length of the San Joaquin River currently includes 236 miles of the river from Sycamore Road (located 7 miles downstream from Highway 99 in Fresno County) to the San Francisco Bay. The Proposed Action would need authorization from USACE as two of the alternatives involve installing a pipeline under the navigable portion of the San Joaquin River.

National Flood Insurance Program (NFIP) The NFIP was created to promote flood awareness and reduce flood losses of properties within Special Flood Hazard Areas. Drainage and related flooding hazards are managed in response to requirements established by the National Flood Insurance Act of 1986 and the Flood Disaster Protection Act of 1973, as amended. Requirements of the NFIP are included in the Building Code and through overall City and interagency programs for flood management. In implementing NFIP, the Federal Emergency Management Agency (FEMA) requires that new construction in a flood hazard area meet minimum design standards to place occupied structures above flood hazard areas.

Portions of the Study Area are within the 100-year flood hazard area (generally in areas adjacent to the San Joaquin River), however, no occupied structure would be constructed as part of the Proposed Action. Above-ground facilities would be limited to air valves along the new pipelines (housed in 4 foot by 4 foot steel cages), modifications to the existing Jennings Plant Pump Station, and, in the case of Alternative 2, a small building (building footprint 40 feet by 50 feet) that would house a new pump station at the Harding Drain Bypass Pipeline. Maintenance staff would visit the pump stations periodically but they would not be regularly occupied.

Reclamation Guidelines for Accepting Non-Project Water into the DMC In the *Delta-Mendota Canal Non-Project Surface Water Pump-in Program 2014 Water Quality Monitoring Plan* (Reclamation 2014), Reclamation has established guidelines for accepting non-Project water in the DMC. Specifically, such water must meet water quality standards before introduction to the canal; (i.e. dilution in the canal is not considered in determining whether non-Project water meets water quality standards), and non-Project water must not cause alterations of existing water quality parameters outside of standards established by the then-current guidelines. The current water quality standards for non-Project surface water are based on statewide domestic water quality regulations[3], and are listed in the January 2014 Monitoring Plan. In 2015, these standards will apply to recycled water that may be introduced into the DMC. Similar to the 2014 Monitoring Plan, the 2015 monitoring plan will measure changes in the quality of water in the DMC caused by the introduction of the NVRRWP's non-CVP recyceled water, and confirm that the blended water is suitable for downstream water users. All introductions are required to meet Reclamation's then-current water quality standards prior to introduction into the DMC.

State Policies and Regulations

Porter-Cologne Water Quality Control Act The Porter-Cologne Water Quality Control Act is California's statutory authority for the protection of water quality. Under this act, the State must adopt water quality policies, plans, and objectives that protect the State's waters. The act sets forth the obligations of the SWRCB and Regional Water Quality Control Boards pertaining to the adoption of Basin Plans and establishment of water quality objectives. Unlike the CWA, which regulates only surface water, the Porter-Cologne Act regulates both surface water and groundwater.

The Basin Plan (CVRWQCB 2011) is designed to preserve and enhance water quality and protect the beneficial uses of all regional waters. Specifically, the Basin Plan:

1) Designates beneficial uses for surface and ground waters.
2) Sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy.
3) Describes implementation programs to protect the beneficial uses of all waters in the Region.
4) Describes surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan [California Water Code Sections 13240 thru 13244, Section 13050(j)].

The Basin Plan is used as the regulatory authority for water quality standards established in local NPDES permits and other CVRWQCB decisions. The Basin Plan designates beneficial uses for the San Joaquin River, the DMC, and the San Luis Reservoir.

Title 22 Regulations for Recycled Water Wastewater reclamation or recycling in California is regulated under Title 22, Division 4, of the California Code of Regulations. The intent of these regulations is to ensure protection of public health associated with the use of recycled water. The

[3] California Health and Safety Code (Sections 4010-4037) and Administrative Code (Sections 64401 et sq.). July 2013. Title 22 Domestic Water Quality and Monitoring Regulations.

SWRCB, Division of Drinking Water has jurisdiction over the distribution of recycled wastewater and the enforcement of Title 22 regulations.

Title 22 sets water quality standards based on types of contact expected between the public and the recycled water, outlining applications for which disinfected tertiary treatment is required and also applications for which three levels of secondary treatment would suffice. Disinfected tertiary treated recycled water, such as that to be produced for the proposed project, is suitable for almost all currently allowed uses for recycled water including irrigation of public parks and all food crops and some industrial processes.

Recycled water treatment criteria vary depending on the application of the recycled water and its contact potential with the public. California Title 22 regulations for tertiary recycled water require that the 7-day median concentration of total coliform bacteria measured in the disinfected effluent does not exceed 2.2 most probable number (MPN) per 100 milliliter (mL), 23 MPN/100 mL more than once in any 30-day period, and 240 MPN/100 mL in any single sample.

Policy for Water Quality Control for Recycled Water (Recycled Water Policy) The SWRCB adopted the Recycled Water Policy in May 2009. The purpose of the Recycled Water Policy is to provide direction to the Regional Water Quality Control Boards, proponents of recycled water projects, and the public regarding the appropriate criteria to be used in issuing permits for recycled water projects. The Recycled Water Policy describes permitting criteria that are intended to streamline the permitting of the vast majority of recycled water projects (SWCRB 2013). While the Recycled Water Policy does not explicitly address the main component of the Proposed Action, which is recycled water conveyance, it does, however, strongly encourage the expanded use of recycled water in California. In April 2013, the SWRCB adopted an amendment to the Recycled Water Policy that provided monitoring requirements for Constituents of Emerging Concern (CECs) for groundwater recharge projects using recycled water. Although the Proposed Action is not a groundwater recharge project, the CEC monitoring requirements established by this amendment are to date the most robust regulatory guidance related to CECs and recycled water.

There are eight CECs for which the Recycled Water Policy requires monitoring, at least in the initial assessment phase of projects that include surface application of recycled water for groundwater recharge of a groundwater basin designated for municipal use. For four of these CECs, monitoring trigger levels have been developed (**Table 3.11-3**). The recycled water policy specifies different monitoring scenarios depending on the ratio of the detected levels of the CEC in the recycled water to the monitoring trigger level.

Table 3.11-3: CECs to be included in Baseline Monitoring for Groundwater Recharge Project Including Surface Application of Recycled Water

Constituent	Constituent Group	Relevance/ Indicator Type	Monitoring Trigger Level (µg/L)
17β-estradiol	Steroid hormones	Health	0.009
Caffeine	Stimulant	Health & Performance	0.35
N-Nitrosodimethylamine	Disinfection byproduct	Health	0.01
Triclosan	Antimicrobial	Health	0.35

Local Policies and Regulations

The discussion of existing land use policies and regulations focuses on Stanislaus County, which is the location for all construction of new physical facilities.

Stanislaus County General Plan The following goals/policies in the Stanislaus County General Plan, Conservation/Open Space Element would apply to the project:

GOAL TWO: Conserve water resources and protect water quality in the County.

Policy Five: Protect groundwater aquifers and recharge areas, particularly those critical for the replenishment of reservoirs and aquifers.

Policy Six: Preserve vegetation to protect waterways from bank erosion and siltation.

City of Modesto Urban Area General Plan The City of Modesto Urban Area General Plan outlines policies that focus on a community vision (City of Modesto 2008). There are no policies in the Urban Area General Plan relating to hydrology and water quality that would apply to the project.

3.11.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action would result in significant impacts related to hydrology and water quality. The analysis is based on a review of the hydrology and water quality studies referenced herein that have been developed for the NVRRWP.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines* an impact to hydrology and water quality would be significant if the proposed project would:

- Violate any water quality standards and/or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site.
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality (erosion potential).
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Result in inundation by seiche, tsunami, or mudflow.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site* – The Proposed Action would not alter the course of a stream or river nor increase erosion or siltation. Recycled water would be conveyed to the concrete-lined DMC via a pipeline. See **Impact HYD-1** below for a discussion of erosion and siltation during project construction.
- *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site, or create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff* – The Proposed Action would add very little impervious surface to the landscape as the above-ground facilities are limited to air valves along the proposed pipeline routes (housed in 4 foot by 4 foot steel cages), potential modifications to the existing Jennings Plant Pump Station that would not increase the total footprint of the pump station, potential installation of a small building (building footprint 40 feet by 50 feet) under Alternative 2 that would house a new pump station at the end of the Harding Drain Bypass Pipeline, and potential expansion of the PID intake under Alternative 3. These facilities are too small to have any appreciable impact on surface runoff and flooding.

- *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map* – There is no construction of housing associated with the Proposed Action.
- *Place within a 100-year flood hazard area structures which would impede or redirect flood flows* – Portions of the facilities that would be constructed as part of the Proposed Action would be located within a 100-year flood hazard area. Generally, portions of the Study Area that are within the 100 year flood hazard area are in locations adjacent to the San Joaquin River. The pump station that would be constructed at the end of the Harding Drain Bypass Pipeline as part of Alternative 2 is within the 100 year flood hazard area. The new above-ground facilities that would be constructed at as part of Alternative 1 within the 100-year flood hazard area are limited to air valves along the underground pipeline. The structures are too small to have any appreciable impact on flood flows. The expanded PID intake that is included in Alternative 3 would be located within the 100-year floodplain. However, the intake structure would be submerged and the pump motors would be similar to existing facilities, which are located on an elevated deck grating above the 100-year flood even elevation. Because the expanded intake would have to be designed so as to not impede or redirect flood flows, the impact is considered less-than-significant impact.
- *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam* – The Proposed Action would include very limited above ground structures and would not appreciably impact flood flows or runoff volumes. The Proposed Action would have no impact on any levees or dams and would not increase the risk of failure of any levee or dam. The Proposed Action would redirect the treated effluent of the City of Modesto Jennings Plant and the City of Turlock RWQCF to the DMC either directly (Alternatives 1 and 2) or through the San Joaquin River and PID's intake facilities (Altenative 3). Flows in the DMC are carefully managed and flooding emanating from the DMC due to these additional flows would not occur.
- *Result in inundation by seiche, tsunami, or mudflow* – Tsunamis originating in the Pacific Ocean would dissipate in the San Francisco Bay and pose a negligible hazard to the Study Area. The risk of tsunami in the project area is low enough that California Department of Conservation does not publish a tsunami inundation map for Stanislaus County and all other counties not bordering the Pacific Ocean or the San Francisco Bay. The probability of a seiche occurring in the San Joaquin River is considered minimal as seiches, rare in any circumstance, generally occur only in lakes and enclosed seas.

Impacts and Mitigation Measures

Impact HYD-1 Violation of Water Quality Standards and/or Waste Discharge Requirements (Due to Construction Activities) Activities involving soil disturbance, excavation, cutting/filling, stockpiling, dewatering and grading activities could result in increased erosion and sedimentation to surface waters during construction of the Proposed Action. If precautions are not taken to contain contaminants, construction could produce contaminated stormwater runoff (nonpoint source pollution), a major contributor to the

degradation of water quality. In addition, hazardous materials associated with construction equipment could adversely affect surface and groundwater quality if spilled or stored improperly.

No Action Alternative Under the No Action Alternative, no new pipeline or pump station construction would occur. Therefore, no water quality impacts or erosion/sedimentation associated with construction of these facilities would occur.

Combined Alignment Alternative (Alternative 1) Alternative 1 would consist of two reaches of one pipeline totaling 69,800 linear feet, involve one crossing under the San Joaquin River, and cross under a total of five irrigation canals (along the Lemon Avenue portion of the alignment). In accordance with the Construction General Permit, a SWPPP would be developed for this alternative that would detail BMPs for all project construction activities including excavation, dewatering, and stockpiling.

During construction of this alternative, dewatering would be conducted to remove excess groundwater from excavations created for installation of the. Dewatering operations would be conducted in accordance with the General Order for Dewatering or other appropriate NPDES permit. The discharge from the dewatering operations would be evaluated and made part of the project SWPPP.

Construction of the pipeline crossing the San Joaquin River would be performed using trenchless technology as described in *Chapter 2, Alternatives and Proposed Action*. This type of construction can be accomplished without surface disturbance of the river; however, trenchless construction must be performed carefully to avoid risk of an uncontrolled release of drilling fluids from construction of the pipeline under the river, which is called "frac-out". **Mitigation Measure BIO-1d** would be implemented to protect against frac-out.

Once the pipeline is constructed, hydrostatic testing would be conducted, and water from the testing would also need to be discharged. Water from testing would be discharged in accordance with the General Order for Dewatering or other appropriate NPDES permit.

The Construction General Permit and the General Order for Dewatering are well established regulatory processes that effectively limit threats to water quality from construction activities such as those that would be conducted as part of the Proposed Action, with implementation of **Mitigation Measures HYD-1a**, **HYD-1b**, and **HYD-1c**, potential impacts would be reduced to less than significant.

Separate Alignment Alternative (Alternative 2) Alternative 2 would consist of two pipelines totaling 64,000 linear feet, the construction of a pump station at the end of Harding Drain Bypass Pipeline, involve two crossings under the San Joaquin River, and cross under a total of nine irrigation canals. The extent of ground disturbance and potential for construction-related water quality impacts from pipeline construction under this alternative would be similar to Alternative 1. Additionally, construction of the pump station at the Harding Drain Bypass would also require dewatering that could affect water quality. **Mitigation Measure BIO-1d** would be implemented to protect against frac-out.

Similar to Alternative 1, hydrostatic testing would be conducted once the pipelines are installed. Discharged water from testing would be done in accordance with the General Order for Dewatering or other appropriate NPDES permit as applicable.

The Construction General Permit and the General Order for Dewatering are well established regulatory processes that effectively limit threats to water quality from construction activities such as those that would be conducted as part of the Proposed Action, with implementation of **Mitigation Measures HYD-1a**, **HYD-1b**, and **HYD-1c**, potential impacts would be reduced to less than significant.

PID Conveyance Alternative (Alternative 3) Alternative 3 would consist of one reach of pipeline totaling about 30,100 linear feet, involve construction of a pump station, expansion of PID's intake facility in the San Joaquin River, and would cross under a total of five irrigation canals along the PID Main Canal. The extent of ground disturbance for pipeline construction would be less than Alternative 1 and 2. However, water quality impacts could still occur during construction activities. Similar to Alternatives 1 and 2, implementation of **Mitigation Measures HYD-1a**, **HYD-1b**, and **HYD-1c** would reduce these impact to less than significant**.**

Construction of the expanded PID intake facility would require construction within the San Joaquin River. This would be accomplished by placing a sheet pile cofferdam to isolate the construction activities from the river. During both construction and removal of the cofferdam, there is potential for temporary increases in turbdity and sedimentation downstream of the construction area. These activities would not be expected to contribute any of the 303(d) listed impairments of the San Joaquin River in the project area or downstream of the intake (alpa-BHC, boron, chlorpyrifos, DDT, DDE, diazinon, diuron, *E. coli*, electrical conductivity, Group A pesticides, mercury, toxaphene, temperature, and unknown toxicity) (SWRCB 2010) as they would be required to comply with Sections 401 and 404 of the CWA and would be subject to mitigation described bleow, including preparation of a SWPPP, compliance with General Orders for Dewatering or other appropriate NPDES Permit. With implementation of **Mitigation Measures HYD-1a, HYD-1b,** and **HYD-1c,** potential impacts from expansion of the PID intake facility would be reduced to less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure HYD-1a: Comply with the Construction General Permit** (Alternatives 1, 2 and 3). To minimize the impacts to water quality from construction activities, the proposed project shall implement measures contained in the Construction General Permit including the development of a SWPPP.

Mitigation Measure HYD-1b: Implement BMPs to Control Erosion and Sediment During Construction (Alternatives 1, 2 and 3). The SWPPP shall specify that all construction activities shall implement multiple BMPs to provide effective erosion and sediment control. These BMPs shall be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable. BMPs to be implemented as part of this mitigation measure shall include, but are not limited to, the following measures:

- Temporary erosion control measures, such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover, shall be employed for disturbed areas.
- Dirt and debris shall be swept from paved streets in the construction zone on a regular basis, particularly before predicted rainfall events.
- Grass or other vegetative cover will be re-established on unpaved areas of the construction site as soon as possible after disturbance. In paved areas, any removed paving will be replaced as soon as possible.
- Soil stockpiling sites will be located such that they do not drain directly into the San Joaquin River or irrigation canals.

Multiple BMPs used in combination, properly installed and maintained, can achieve significant sediment removal. BMPs proposed by the project contractor shall be subject to approval by Reclamation and the project proponent, and the project proponent shall require that all parties performing construction under the proposed project incorporate into contract specifications the requirement that the contractor(s) comply with and implement these provisions. The contractor shall also include provisions for monitoring during and after construction activities to verify that these standards are met.

Mitigation Measure HYD-1c: Comply with the General Order for Dewatering or Other Appropriate NPDES Permit (Alternatives 1, 2 and 3). To minimize the impacts to water quality from dewatering activities, the proposed project shall implement measures contained in the General Order for Dewatering or other appropriate NPDES permit or Waste Discharge Requirement. See **Mitigation Measure BIO-1d - Develop and Implement a Frac-out Contingency Plan for Trenchless Construction** regarding potential water quality impacts due to frac-out.

Significance after Mitigation Less than significant.

Impact HYD-2 Violation of Water Quality Standards and/or Waste Discharge Requirements (at Project Implementation)

No Action Alternative Under the No Action Alternative, recycled water from Modesto and Turlock would not be discharged to the DMC. Therefore, no changes in DMC water quality would occur. Discharges to the San Joaquin River would continue. As discharges by both cities

under this alternative would be required to meet existing and future water quality requirements pursuant to NPDES permits, impacts would be less than significant.

Combined Alignment Alternative (Alternative 1) Alternative 1, does not include any changes to the treatment processes at either treatment plant and the two plants have good compliance histories with their current treatment processes. As described previously, the CVRWQCB would consider the change in discharge location in the re-issuance of the NPDES permits for both treatment plants. Like all wastewater treatment plant NPDES permits, the NPDES permits for the Jennings Plant and the City of Turlock RWQCF include monitoring requirements for water quality parameters and a wide range of chemical constituents to ensure that the permitted effluent limitations are met and that the discharge does not degrade the water quality of receiving waters. Future re-issuances of these NPDES permits will consider the results of recent effluent data (data collected over approximately the last five years) in establishing future effluent limitations and monitoring requirements. Discharge into the DMC would require issuance of an NPDES permit, which would establish allowable water quality for discharge and define monitoring requirements for the recycled water.

In addition, Reclamation's current water quality criteria and monitoring plan (Reclamation 2014) includes two sets of water quality criteria – criteria for the quality of the "pumped-in" non-Project water (Reclamation 2014, Table 5) and a more limited set of criteria, which the water in the DMC must meet after the addition of non-Project water (Reclamation 2014, Table 8). Any introductions under this alternative would have to meet Reclamation's then-current water quality criteria before introduction into the DMC.

Reclamation's 2013 Refuge Recycled Water Supply Study calculated flow-weighted average concentrations of constituents of interest for the combined recycled water from the Jennings Plant and the City of Turlock RWQCF based on available water quality data from both treatment plants. This study also calculated estimated water quality parameters in the DMC after the addition of the recycled water. Complete blending/mixing was assumed. **Table 3.11-4** shows the estimated quality of the recycled water as compared to the water quality standards for acceptance of non-Project water.

Table 3.11-4: Estimated Recycled Water Quality Compared to Reclamation Standards for Acceptance of Non-Project Water

Constituent[1]	Estimated Recycled Water Quality[2]	Water Quality Standard for Acceptance of Non-Project Water into the DMC[3]
Primary		
Aluminum (mg/L)	0.09	1
Antimony (mg/L)	0.0006	0.006
Arsenic (mg/L)	0.003	0.01
Barium (mg/L)	0.08	1
Beryllium (mg/L)	0.00002	0.004
Boron (mg/L)	0.20	0.70
Cadmium (mg/L)	0.00004	0.0005
Chromium (mg/L)	0.001	0.05
Lead (mg/L)	0.0002	0.02
Mercury (mg/L)	2E-6	0.002
Nickel (mg/L)	0.002	0.1
Nitrate (as N) (mg/L)	8.4	10
Nitrate + Nitrite (sum as N) (mg/L)	8.6	10
Nitrite (mg/L)	0.2	1
Selenium (mg/L)	0.0007	0.002
Thallium (mg/L)	0.0005	0.002
Secondary		
Chloride (mg/L)	152	250
Copper (mg/L)	0.003	1
Iron (mg/L)	0.1	0.3
Manganese (mg/L)	0.02	0.05
Molybdenum (mg/L)	0.01	0.01
Silver (mg/L)	0.001	0.1
Sodium (mg/L)	**116**	**69**
Specific Conductance (µS/cm)	945	2,200
Sulfate (mg/L)	61	250
Total Dissolved Solids (mg/L)	551	1,500
Zinc (mg/L)	0.05	5
Organic Chemicals		
Chlordane (µg/L)	Not Detected	0.1
Chlorpyrifos (µg/L)	Not Detected	0.025
Diazinon (µg/L)	Not Detected	0.16

1. Constituents listed are those for which recycled water quality data is available.
2. Reclamation 2013
3. Reclamation 2014, Table 5

Existing quality of water in the DMC, estimated water quality in the DMC after discharge of recycled water, and the standards for the change that the addition of the non-Project water is allowed to cause (based on Table 8 of Reclamation's 2014 Monitoring Plan [Reclamation 2014]) are shown in **Table 3.11-5.**

As shown in **Table 3.11-4**, sodium is the only constituent within the recycled water expected to exceed Reclamation's standards for acceptance of non-Project water into the DMC, however the standards for this constituent are met when measured as a part of total dissolved solids or specific conductance (**Table 3.11-4)**. When recycled water is blended with water in the DMC, the sodium level is expected to be 57 milligram per liter (mg/L) (Reclamation 2013), which is below the standards of 69 mg/L. Futhermore, as shown in **Table 3.11-5,** the addition of the recycled water to the DMC would not increase any of the water quality parameters beyond the amount specified in Table 8 of Reclamation's 2014 Monitoring Plan (Reclamation 2014).

Table 3.11-5: Estimated Water Quality in the DMC after Addition of Recycled Water

Constituent	Estimated Recycled Water Quality	Average DMC Water Quality	Estimated Quality of Recycled Water Blended with DMC	Increase After Blending	Maximum Increase Allowed After Blending
Specific Conductance (µS/cm)	945[(1)]	419[(1)]	463[(1)]	44	50[(4)]
Turbidity (NTU)	1.1[(2)]	16.9[(3)]	15.6	-1.3	5[(4)]
Selenium (µg/L)	0.7[(1)]	0.8[(1)]	0.8[(1)]	0.0	1[(4)]

NTU = Nephelometric Turbidity Units

1. Refuge Recycled Water Supply Study (Reclamation 2013). Calculation of blended water quality assumed recycled water flow of 82 cfs and DMC flow of 900 cfs, which roughly corresponds to the 10th percentile flow rate for the Tracy Pumping Plant. This is conservatively large amount of recycled water (9 percent) as a percentage of the total DMC flow.
2. The existing NPDES permit for the City of Turlock RWQCF specifies that the turbidity of the teritiary effluent (recycled water) shall not exceed 2 NTU within any 24 hour period (CVRWQCB, 2010). The existing NPDES permit for the Jennings Plant specifies that the turbidity of the tertiary effluent shall not exceed 0.2 NTU as a daily average (CVRWQCB, 2012).
3. Reclamation Mid-Pacific Environmental Monitoring Branch, DMC @ McCabe Road (5/2001 – 11/2014)
4. Reclamation 2014, Table 8

Selenium, a constituent of concern for recycled water use at wildlife refuges, is present in NVRRWP recycled water. However, as shown in **Table 3.11-4** and **3.11-5**, estimated selenium concentrations are less than those of existing DMC water quality (0.8 µg/L). The same is true for boron and arsenic (Reclamation 2013). Introduction of the recycled water would be blended with DMC water prior to delivery to the refuges and is not expected to exceed water quality standards for these consituents.

The recycled water from the Jennings Plant and the City of Turlock RWQCF must comply with effluent limitations for BOD as per the NPDES permits for those facilities (CVRWQCB 2010, CVRWQCB 2012). For both treatment facilities, the BOD effluent limitations are 10 mg/L average monthly, 15 mg/L average weekly, and 20 mg/L maximum daily for tertiary effluent. Because of the low BOD effluent concentrations, the discharge of recycled water to the DMC would not significantly impact dissolved oxygen concentrations in the DMC. Reclamation has not developed dissolved oxygen water quality standards for the DMC because the DMC, as a concrete-lined water supply channel, does not provide habitat for fish or other species. Generally,

an open channel such as the DMC will not have low dissolved oxygen unless there is a significant source of BOD.

As operation of the project under this alternative is required to meet existing and future water quality requirements pursuant to NPDES permits and Reclamation's then-current water quality criteria and monitoring plan, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Impacts under this alterantive would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Under this alternative, recycled water would be discharged into the San Joaquin River and then diverted through the PID expanded intake facility before being conveyed through PID's conveyance facilities for discharge into the DMC. Discharge of recycled water to the river would be pursuant to NPDES permits and is not expected to violate water quality standards as both the City of Modesto Jennings Plant and the City of Turlock RWQCF have good histories of compliance with their NPDES Permits, and both cities would discharge tertiary treated recycled water to the river. As with Alternatives 1 and 2, introduction of this water into the DMC would be required to meet Reclamation's then-current water quality standards both prior to and during introduction periods. As operation of the project under this alternative is required to meet existing and future water quality requirements pursuant to NPDES permits and Reclamation's then-current water quality criteria and monitoring plan, impacts would be less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. Less than significant for No Action Alternative.

Mitigation Measures No mitigation measures are required.

Impact HYD-3 Substantial Depletion of Groundwater Supplies or Substantial Interference with Groundwater Recharge

No Action Alternative Under the No Action Alternative, recycled water from the Cities of Modesto and Turlock would not be directed to the DMC. While the Cities of Modesto and Turlock currently discharge to the San Joaquin River, they could pursue other options for use of the recycled water that would reduce stream flows in the San Joaquin River similar to what would occur under under the Proposed Action.

Under the No Action Alternative, DPWD would not have an additional water supply and would continue to be reliant on the CVP as its primary water supply. To offset reductions in CVP allocations, the District would continue to execute water transfers /exchanges and to pump groundwater from private wells as available. Additional groundwater pumping would adversely impact already depleted groundwater levels beneath DPWD even though extraction of groundwater would be conducted within the bounds of existing regulations, including recently passed legislation, specifically Senate Bill 1168, Assembly Bill 1739, and Senate Bill 1319, which together enacted the Sustainable Groundwater Management Act providing a framework for improved management of groundwater supplies by local authorities.

Combined Alignment Alternative (Alternative 1) Under this alternative, both cities would retain permits to discharge to the river; however, the discharges would only occur under unusual or extreme circumstances such as when the DMC was not available due to capacity constraints or some type of failure, thus the proposed project would result in a slight reduction of stream flows in the San Joaquin River as the current discharges from the Cities of Modesto and Turlock to the San Joaquin River no longer would occur on a regular basis. The average annual flow of the San Joaquin River between 1924 and 2011 was 3.3 million AF/year (**Appendix G**). As a result of the proposed project under this alternative, the average annual stream flows at Vernalis station would be reduced by approximately 18,000 AF/year, or approximately 0.5 percent of the average annual flows (**Appendix G**).

As documented in **Appendix G**, **Evaluation of NVRRWP Impact on Groundwater**, the impact of the proposed project's reductions in the San Joaquin River stream flows on groundwater storage was analyzed using the C2VSim groundwater simulation model developed and maintained by DWR. The analysis considered groundwater in the vicinity of the San Joaquin River from the project construction area to the Delta, including areas downstream of the Vernalis station (located approximately 25 miles downstream from the Harding Drain Bypass Pipeline). This entire area is within the San Joaquin River groundwater basin and includes the subbasins shown in **Table 3.11-6** below. The simulation period for this version of C2VSim-FG is 88 years incorporating historical hydrology from 1922 to 2009.

The model showed that the reduction of stream flows would increase stream gains (reduce groundwater storage) from the aquifer when the stream is a gaining stream (i.e. groundwater levels are higher than stream levels). Correspondingly, the model showed that reduction of stream flows would reduce stream losses to the aquifer (increase groundwater storage) when the stream is a losing stream (i.e. groundwater levels are lower than stream levels) (see **Figure 3.11-5**). Because the river is a gaining stream from September to March groundwater storage would be reduced during this period (when irrigation demands are low); however, groundwater storage would increase from April to August when the river is a losing stream (and when irrigation demand are high).

The estimated changes in groundwater storage over the 88 years of simulation along with the cumulative change in groundwater storage are shown in **Figure 3.11-5** and **Figure 3.11-6**. The change in groundwater storage varies from approximately -280 AF/year to approximately 150 AF/year (**Figure 3.11-6**) and results in an estimated 2,420 AF less groundwater in storage over the 88 year simulation period. This equates to an average annual reduction in groundwater storage of 27 AF/year (**Table 3.11-6)**, which represents approximately 0.15 percent - 0.2 percent of the annual stream/groundwater interaction. This is within the potential margin of error of the groundwater simulation model, and the impact is considered less than significant.

Figure 3.11-5: Average Monthly Change in Groundwater Storage for Groundwater Basin C2VSim Subregions 8 to 12

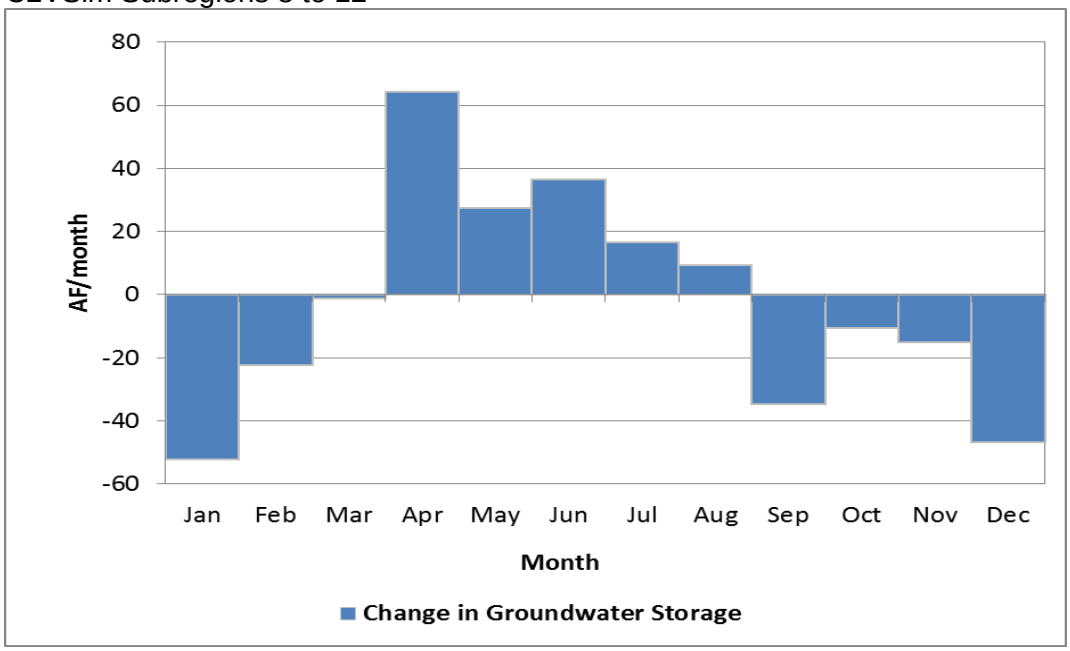


Figure 3.11-6: Estimated Cumulative Change in Groundwater Storage C2VSim Subregions 8 to 12

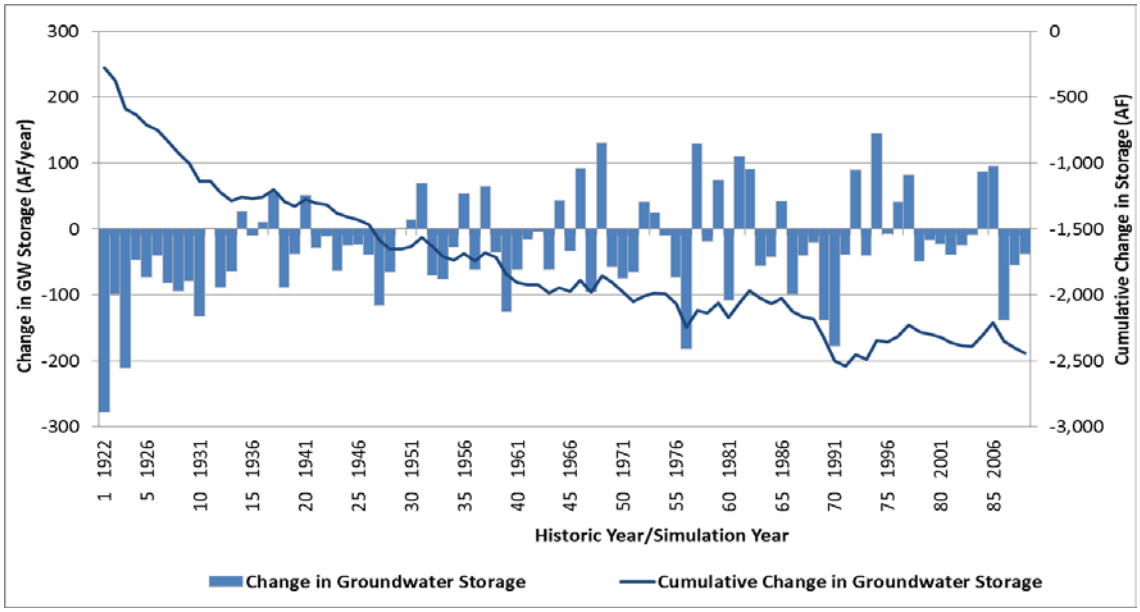


Table 3.11-6: Change in Groundwater Storage for Groundwater Subregions Downstream of the City of Modesto WPCF and the City of Turlock

C2VSim Subregion	DWR Bulletin 118 Groundwater Basin	Change in Groundwater Storage	
		Average Annual (AF/year)	Cumulative (AF)
8	Eastern San Joaquin, Cosumnes, South American	-7	-630
9	Tracy, Solano, Eastern San Joaquin, South American	-10	-900
10	Delta-Mendota	-5	-450
11	Modesto, Eastern San Joaquin	-3	-230
12	Turlock	-2	-210
Total		**-27**	**-2,420**

Separate Alignment Alternative (Alternative 2) Impacts under this alternative would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Under this alternative, recycled water would still be discharged to the river, but then diverted at the expanded PID intake facility. Recycled water from the City of Turlock would thus be in the river for 3.6 miles before being diverted. A volume of water matching the amount discharged by the City of Modesto would also be diverted at the PID intake, but this would occur upstream of the Modesto discharge location. Thus there would be slightly more water in the river between the Turlock discharge and the PID intake, and slightly less water in the river between the PID intake and the Modesto discharge location. The net impact on amount of groundwater recharge would not be expected to be measurably different than the estimates presented above for Alternatives 1 and 2, because downstream of the Modesto discharge location the volume of water in the river would be the same for all three Action alternatives. Because impacts would be essentially the same as those for Alternatives 1 and 2, which have a minimal effect on groundwater, impacts would be considered less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. Potentially significant for the No Action Alternative.

Mitigation Measures No mitigation measures are required for the Action alternatives. No mitigation is possible for the No Action Alternative.

Impact HYD-4 Otherwise substantially degrade water quality (Constituents of Emerging Concern)

No Action Alternative Under the No Action Alternative, recycled water from Modesto and Turlock would not be discharged to the DMC. Therefore, no changes in DMC water quality would occur, and thus there would be no impact.

Combined Alignment Alternative (Alternative 1) One common concern with the use of recycled water involves CECs, which include classes of chemicals such as pharmaceuticals, current use pesticides, and industrial chemicals. Many CECs are potentially present in recycled water, surface waters, and groundwater, but the ability to detect many of these chemicals at low concentrations is so recent that a robust framework for interpreting their potential human or

ecosystem health effects is unavailable. Although there is currently no applicable regulatory guidance regarding CECs in recycled water used as part of a project such as the NVRRWP, in California, the most well-established regulations and policies related to CECs in recycled water are associated with the Recycled Water Policy (SWRCB 2013). The SWRCB adopted the Recycled Water Policy in May 2009 and in April 2013 adopted an amendment to the Recycled Water Policy that provided CEC monitoring requirements for surface application of recycled water for groundwater recharge of a groundwater basin designated for municipal use.

Reclamation's 2013 Refuge Water Quality Supply Study (Reclamation 2013) included analysis for CECs in samples collected from City of Turlock RWQCF tertiary effluent, the City of Modesto Jennings Plant secondary effluent (the tertiary treatment facility was not operational at the time), the DMC, PID Main Canal, and a delivery point for DMC water to the refuges (the China Island Delivery Point). Analytical results for the CECs for which the Recycled Water Policy specifies monitoring trigger levels are shown in **Table 3.11-7** below:

Table 3.11-7: 2013 Refuge Recycled Water Supply Study Analytical Results for CECs in Recycled Water Policy for Jennings Plant and Turlock RWQCF

Constituent	Monitoring Trigger Level	Modesto Jennings Plant Effluent (µg/L)	Turlock RWQCF Effluent (µg/L)	
17β-estradiol	0.009	<0.004	<0.004	<0.004
Caffeine	0.35	0.073	**0.920**	**0.700**
N-Nitrosodimethylamine (NDMA)	0.01	<0.002	0.0024	0.0025
Triclosan	0.35	<0.01	<0.01	<0.01

While the samples of City of Turlock RWQCF effluent contained levels of caffeine above the monitoring trigger level, it should be noted that:

- The CEC monitoring trigger levels in the Recycled Water Policy were developed for groundwater recharge projects for which the end use of the recharged water included municipal use (drinking water use). The proposed project is not a groundwater recharge project.
- The ratios of the detected levels of caffeine in the City of Turlock RWQCF to the monitoring trigger levels are 2.6 and 2.0. At these ratios, the Recycled Water Policy specifies only continued monitoring for CECs.

Caffeine and other CECs were also detected in the China Island, DMC and PID main canal samples (Reclamation 2013). The detection of CECs in the China Island, DMC and PID Main Canal samples was to be expected as other wastewater treatment plants also discharge to the source waters for each. The source water in the DMC is drawn from the Delta and multiple wastewater treatment plants discharge treated effluent to the Delta or to waterways that flow to the Delta. The SWP Watershed Sanitary Survey 2011 Update (State Water Project 2012) estimated that the discharge from the Sacramento, Stockton, and Manteca wastewater treatment plants (three of the largest wastewater dischargers to Delta tributaries) can comprise up to approximately 3 percent of the flow at the Jones Pumping Plant (Delta intake for the DMC).

Similarly, the water pumped into the PID Main Canal is sourced from the San Joaquin River. Upstream of the PID diversion, there are a number of wastewater treatment plants that discharge into the San Joaquin River, including the City of Turlock.

Because the proposed project under this alternative would not significantly change the extent of CECs in the DMC, this impact is considered less than significant.

Separate Alignment Alternative (Alternative 2) Impacts under this alternative would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) This alternative would discharge recycled water into the San Joaquin River where it would be diverted through PID's expanded intake and conveyed through PID's existing system prior to discharge into the DMC. As described above, CECs are already present in the San Joaquin River and Delta from existing approved wastewater treatment dischages, including those currently being done by the Cities pursuant to their NPDES permits. As discharge of the recyceled water would not change what is already being done in the river, and diversion would include CECs that are already present in the river, the impacts of this alternative would be similar to Alternatives 1 and 2, and would be less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. Less than significant for the No Action Alternative.

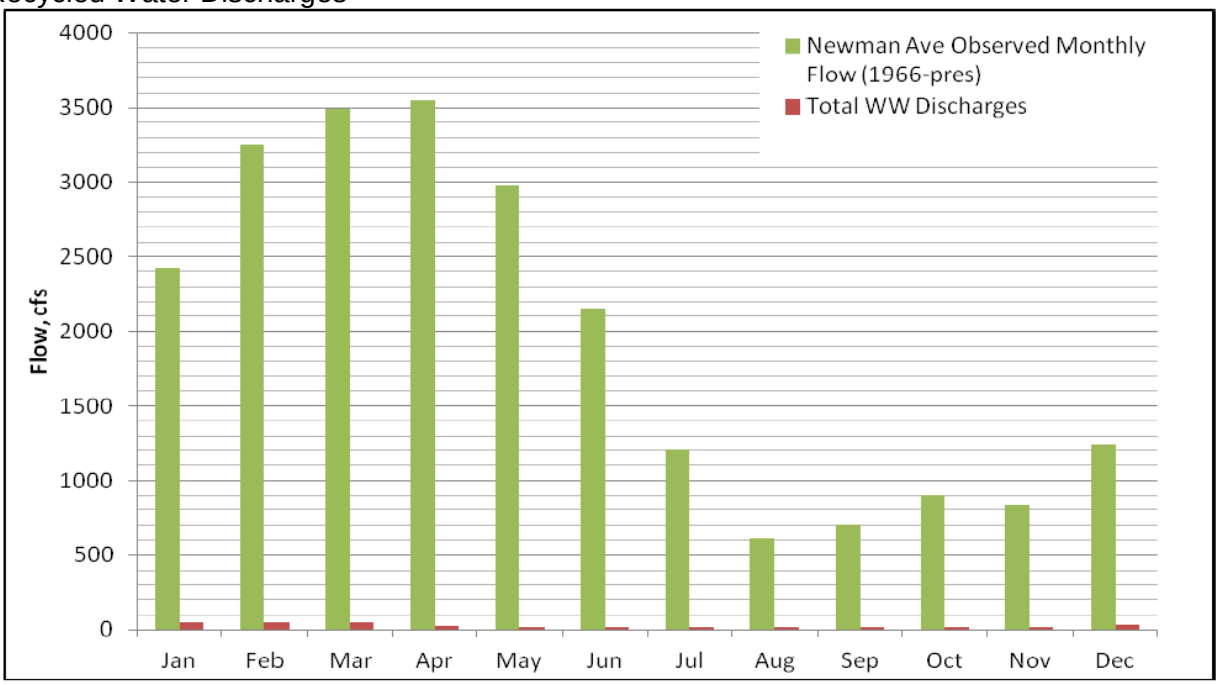
Mitigation Measures No mitigation measures are required.

Impact HYD-5 Reduction of Flows in San Joaquin River

No Action Alternative Under the No Action Alternative, recycled water from Modesto and Turlock would not be discharged to the DMC. While the Cities of Modesto and Turlock currently discharge their recycled water to the San Joaquin River, they could pursue other options for use of the recycled water that would also reduce stream flows in the San Joaquin River. If other uses for recycled water are found that reduce flows in the river, impacts would still be considered less than significant, because the change in flows would be minor (see discussion below under Alternatives 1 and 2).

Combined Alignment Alternative and Separate Alignment Alternative (Alternative 1 and Alternative 2) Under both Alternatives 1 & 2, current discharge to the San Joaquin River would be discontinued and flows from the two treatment plants would be redirected to the DMC. The discharge from the two treatment plants represents a small portion of the total flow in the San Joaquin River (RMC 2013). **Figure 3.11-7** below shows the current recycled water discharge compared to the monthly average flows at the Newman Gage. The Newman Gage is located upstream of the Cities of Modesto and Turlock's wastewater discharges (approximately 10 miles upstream of the Turlock discharge) and is the closest upstream river gage with a long history of river flow data.

Figure 3.11-7: Comparison of San Joaquin River Monthly Average Flows at Newman Gage and Recycled Water Discharges



Source: RMC 2013

The C2Vsim model discussed under **Impact HYD-3** and in **Appendix G**, **Evaluation of NVRRWP Impact on Groundwater** was used to simulate the impact of removing the current recycled water discharges from the San Joaquin River on downstream river flows at the Vernalis station, which measures the San Joaquin River's contribution to Delta outflows. The Vernalis station is approximately 20 miles downstream of the Modesto discharge point and is also downstream of the points at which the Merced and Tuolumne Rivers enter the San Joaquin River. The model simulation showed that the average annual stream flows at Vernalis station would be reduced by approximately 18,000 AF/year (**Appendix G**). The average flow of the San Joaquin River at Vernalis between 1924 and 2011 was 3.3 million AF/year **(Appendix G)**. The reduction in San Joaquin River stream flows at Vernalis due to NVRRWP is approximately 0.5 percent of the average annual flows. This is considered to be a less than significant impact on Delta outflows (**Appendix G**).

The reduction in river stage height (a reflection of water depth in the river) associated with curtailment of the recycled water discharges is estimated to range from approximately 0.25 inches to 1 inch (Hanson 2013). This is considered to be a less than significant impact.

Additionally, removing recycled water flows from the San Joaquin River would beneficially reduce the loading of salt into the river because the salts present in the recycled water would no longer be added to the river (RMC 2013).

PID Conveyance Alternative (Alternative 3) Alternative 3 would have essentially the same impact to flows in the San Joaquin River as Alternatives 1 and 2 as the flows for all three Action alternatives would be identical downstream of the Modesto discharge location. There would be

very minor differences in flows for the few miles between the Turlock and Modesto discharge sites under this alternative, with slightly more water remaining in the river between the Turlock discharge and the PID intake, and slightly less water in the river from the PID intake to the Modesto discharge site. Similar to Alternatives 1 and 2, impacts downstream of Modesto would be less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. Less than significant for No Action Alternative.

Mitigation Measures No mitigation measures are required.

Impact HYD-6 Effect on Delta Exports at Banks and Tracy Pumping Plants

No Action Alternative Under the No Action Alternative, recycled water from Modesto and Turlock would continue to be discharged to the river. However, as noted above, the Cities of Modesto and Turlock and could pursue other options for use of the recycled water that would also reduce stream flows in the San Joaquin River. Impacts would be less than significant.

All Action Alternatives As noted above in **Impact HYD-5**, the change in San Joaquin River stream flows at Vernalis due to the NVRRWP is less than significant. In addition to the evaluation of flows, the potential effect on Delta exports was analyzed using the CalSim II model developed by DWR. The CalSim II model was configured to run with and without discharges of recycled water by the Cities of Modesto and Turlock to the San Joaquin River. The two Calsim II model scenarios were compared to evaluate the impact of NVRRWP on Delta exports at the Banks and Jones pumping plants.

Per the Calsim II modelling (RMC 2014), the changes in San Joaquin River stream flows at Vernalis due to the NVRRWP would result in minimal changes to water available in the Delta for exports at the Banks and Jones pumping plants. A comparison of results of CalSim scenarios with and without the NVRRWP shows no changes at the two pumping plants, thus there would be a minimal change in flows at Vernalis due to the Proposed Action. The projected flow changes at Vernalis would have a less than significant impact on the amount of water available for pumping at the Jones and Banks pumping plants and is considered (RMC 2014).

Significance Determination before Mitigation Less than significant for all Action alternatives. Less than significant for the No Action Alternative.

Mitigation Measures No mitigation measures are required.

Cumulative Impacts

Cumulative Impacts to Groundwater Storage As discussed under **Impact HYD-3**, cumulative or long-term impacts of reduced San Joaquin River flows on groundwater storage due to changes in the stream-aquifer interaction would be less than significant. None of the cumulative projects identified in the Proposed Action area would have any effect on the stream-aquifer interaction, and thus there is no cumulative impact to which the Proposed Action contributes. The NVRRWP would not result in increased groundwater pumping in the Turlock, Modesto, or Delta-Mendota subbasins, and thus does not have the potential to combine with

other projects to result in a significant impact. In fact, the NVRRWP could reduce the impacts of groundwater pumping in the Delta-Mendota subbasin, by providing a reliable alternative source of irrigation water to DPWD. There are pre-existing, long-term groundwater problems in the Turlock subbasin, which are part of the baseline conditions, but these conditions are located in the eastern portion of the basin and would occur regardless of whether the Proposed Action is implemented. There is also the possibility that groundwater pumping for both municipal and agricultural uses in the Turlock subbasin could occur in the future, and this is a potentially significant impact. However, the very minor changes in groundwater storage in the western portion of the basin that are associated with reduced San Joaquin River flows are not expected to combine with pumping in the eastern portion of the basin to result in an incremental effect that would be cumulatively considerable.

Cumulative Impacts to San Joaquin River Flows As discussed under **Impact HYD-6**, the reduction in San Joaquin River stream flows at Vernalis due to NVRRWP is approximately 0.5 percent of the average annual flows **(Appendix G).** This is considered to be a less than significant cumulative impact. The C2Vsim model that was used to estimate changes in San Joaquin River flows considers cumulative impacts of multiple environmental factors. C2VSim simulates water movement through the interconnected land surface, surface water and groundwater flow systems in the 20,000 square miles of the alluvial Central Valley aquifer. C2VSim dynamically calculates groundwater conditions based on urban and crop water demands, long-term hydrologic and meteorologic records, land use, cropping patterns, and other inputs.

Cumulative Impacts in the DMC The DMC is often used to convey non-Project water from various approved sources. The quality of non-Project water being introduced is tested prior to and during introductions in order to limit the potential for degradation of CVP water supplies. All non-Project waters introduced and conveyed within federal facilities must meet Reclamation's water quality standards. If, through monitoring, non-Project water fails to meet the criteria for discharging into federal facilities, the water would not be introduced until subsequent testing has demonstrated that the water quality has been met by the criteria as outlined in Reclamation's then current water quality standards. This testing program is anticipated to adequately protect the quality of water in the DMC from the cumulative effects of introduction of non-Project water from the Proposed Action as well as other projects. In addition, as noted under **Impact HYD-2**, discharge of the recycled water to the DMC would require issuance of an NPDES permit, which would establish additional monitoring requirements for the recycled water.

Although capacity in the DMC is limited, SLDMWA and Reclamation actively operate the canal in order to maximize conveyance capacity at all times. Non-Project water would only be allowed to enter the DMC for conveyance and storage within federal facilities if excess capacity is available. As such, the Proposed Action would not limit the ability of other users to make use of the DMC. In addition, the use of the California Aqueduct-DMC Intertie can help to alleviate DMC capacity issues. For these reasons, the Proposed Action is not anticipated to cause conflicts or other cumulative impacts to DMC operations.

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3.12 Indian Trust Assets

This section presents the physical and regulatory setting related to Indian Trust Assets in the vicinity of the proposed NVRRWP project. The impact analysis considers whether the Proposed Action would have potential impacts to Indian Trust Assets.

3.12.1 Environmental Setting/Affected Environment

The study area for the analysis is Stanislaus County. This section describes the environmental setting for Indian Trust Assets within the study area.

There are no Indian Trust Assets in the study area. The nearest Indian Trust Asset is the Chicken Ranch Rancheria, approximately 44 miles northeast of the project area.

3.12.2 Regulatory Framework

This section describes laws and regulations that may apply to the Proposed Action.

Federal Policies and Regulations

Indian Trust Assets are legal interests in assets that are held in trust by the U.S. Government for federally recognized Indian tribes or individuals. The trust relationship usually stems from a treaty, EO, or act of Congress. The Secretary of the Interior is the trustee for the U.S. on behalf of federally recognized Indian tribes. "Assets" are anything owned that holds monetary value. "Legal interests" are defined as a property interest for which there is a legal remedy, such as compensation or injunction, if there is improper interference. Assets can be real property, physical assets, or intangible property rights, such as a lease, or right to use something. Indian Trust Assets cannot be sold, leased or otherwise alienated without U.S. approval. Trust assets may include lands, minerals, and natural resources, as well as hunting, fishing, and water rights. Indian reservations, rancherias, and public domain allotments are examples of lands that are often considered trust assets. In some cases, Indian Trust Assets may be located off trust land. Reclamation shares Indian trust responsibility with all other agencies of the Executive Branch to protect and maintain Indian Trust assets reserved by or granted to Indian tribes, or Indian individuals by treaty, statute, or EO.

3.12.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

Potential impacts on Indian Trust Assets are analyzed based on the potential for the proposed project to affect such assets.

Thresholds of Significance

An impact to Indian Trust Assets would be considered significant if the project would:

- Adversely affect (modify or alter) an Indian Trust Asset.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Affect Indian Trust Assets* – The Proposed Action does not have a potential to affect Indian Trust Assets as there are none in the project area.

3.12.4 References

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3.13 Land Use and Planning

This section presents the physical and regulatory setting for land use and planning surrounding the Proposed Action. The impact analysis considers the potential for the NVRRWP to physically divide the community or conflict with adopted land use plans or policies. The analysis is based on a review of local land use plans and policies and aerial imagery.

3.13.1 Environmental Setting/Affected Environment

This section describes the environmental setting for current land use within the study area, which includes the proposed Action alternative's construction sites and adjacent land uses. Direct land use impacts are focused in Stanislaus County, where all proposed project facilities would be located; however, project water supply would benefit agricultural land uses in the entire DPWD service area. Additionally, information is provided regarding land uses for the refuges that could receive water supply from the project.

Regional Land Use

The proposed study area is located within California's San Joaquin Valley, approximately 13 miles west of the City of Turlock and 15 miles southwest of the City of Modesto. The study area falls to the east of I-5 and to the west of SR 33. Land use within and adjacent to the proposed study area is characteristic of rural portions of the central San Joaquin Valley and unincorporated portions of Stanislaus County. From an aerial perspective, the landscape is dominated by large square plots with sparse structural development. Irrigated pasture, orchards, row crops, various agricultural structures, dairies, and scattered rural residences dominate the land use pattern for virtually all of the study area.

The project would serve recycled water to agricultural uses within the DPWD service area in San Joaquin, Stanislaus, and Merced counties. More information on agriculture within the region is presented in *Chapter 3.2, Agriculture and Forestry Resources.* More developed and urban land uses are situated to the east of the proposed study area in the Cities of Turlock and Modesto.

The Proposed Action would also make recycled water available to the SOD CVPIA-designated refuges to meet CVPIA requirements. Descriptions of the refuges that could be served by the Proposed Action are provided below, and are based on information presented in Reclamation's Recycled Water Refuge Study (Reclamation 2013).

San Luis National Wildlife Refuge Complex The San Luis NWR Complex, managed by USFWS, is located approximately 10 miles north of Los Banos, California. It encompasses over 26,800 acres of wetlands, riparian forests, native grasslands, and vernal pools. The NWR Complex supports populations of endemic tule elk and is host to assemblages of birds, mammals, reptiles, amphibians, fish, insects, and plants; some of which are endangered species. The NWR is a major wintering ground and migratory stopover point for large concentrations of waterfowl, shorebirds, and other water birds. The San Luis NWR includes the East Bear Creek Unit, West Bear Creek Unit, Freitas Unit, Kesterson Unit, and San Luis Unit (Reclamation 2013).

Kern National Wildlife Refuge Kern NWR, managed by USFWS, is located approximately 20 miles west of the City of Delano. The refuge consists of 11,249 acres of natural desert uplands, a relict riparian corridor, and developed marsh; it is situated on what was once the largest freshwater wetland complex in the western U.S. The Kern NWR provides optimum wintering habitat for migratory birds with an emphasis on waterfowl and water birds. Through restoration and maintenance of native habitat diversity, the refuge also provides suitable habitat for several endangered species as well as preserving a remnant example of the historic valley uplands in the San Joaquin Desert (Reclamation 2013).

State Wildlife Areas Volta SWA, managed by CDFW, is located approximately 0.75 mile north of Volta. Volta SWA consists of 2,891 acres of managed marsh and valley alkali scrub, which support 150 species of birds, including large numbers of waterfowl and shorebirds (Reclamation 2013).

Mendota SWA, managed by CDFW, is located approximately three miles south of Mendota near Whites Bridge. It consists of 11,802 acres with flatlands and floodplain (Reclamation 2013).

Los Banos SWA, managed by CDFW, is located approximately four miles northeast of Los Banos, and includes the Mud Slough Unit. Los Banos SWA was the first of a series of waterfowl refuges established throughout the state to manage habitat for wintering waterfowl and consists of more than 6,217 acres of wetland habitat which includes lakes, sloughs and managed marsh. The refuge supports over 200 species of birds (Reclamation 2013).

The North Grasslands SWA, managed by CDFW, is located approximately six miles north of Los Banos. It consists of 7,069 acres of wetlands, riparian habitat and uplands, which support Swainson's hawk and sandhill crane. The North Grasslands SWA includes the China Island Unit, Galdwall Unit and Salt Slough Unit (Reclamation 2013).

Other Units The Grasslands Resource Conservation District (GRCD) comprises approximately 60,000 acres of habitat land and is composed of privately-owned hunting clubs and other privately-owned wetland areas, as well as all or portions of several SWAs (such as Volta SWA, Los Banos SWA, and the Mud Slough, Gadwall, and Salt Slough units of the North Grassland SWA) and federal wildlife refuges (such as San Luis NWR).

Lands within the GRCD are primarily managed for waterfowl habitat. The GWD has a Water Management Plan, but no overall habitat management plan exists for the GRCD because of the large number of individual property owners. The management objectives of the GRCD include an active program to encourage natural food plant and habitat protection. Land uses include seasonally flooded wetlands, moist soil impoundments, permanent wetland, irrigated pasture, and croplands.

The GRCD contains most of the 51,530 acre GWD. The GWD is a legal entity that was established under section 34000 of the California Water Code to receive and distribute CVP water. The GWD delivers CVP water to the wetland areas within its boundaries. The GWD contains approximately 165 separate ownerships, most of which are duck clubs. Perpetual easements have been purchased by the USFWS to help preserve wetland-dependent migratory

bird habitat on approximately 31,000 acres serviced by the GWD. These easements authorize the USFWS to restrict land uses that would diminish wetland habitat values.

Existing Land Uses

Direct impacts of project construction would be confined to Stanislaus County. The Land Use element of Stanislaus County's General Plan designates the proposed study area for all three Action alternatives as Agriculture (Stanislaus County 1994). The sections below provide more detail as to the type of agriculture found along the three proposed alternative pipeline alignments.

Alternative 1 – Combined Alignment Alternative The pipeline from the Harding Drain Bypass Pipeline to the Jennings Plant Pump Station would begin at the corner of South Carpenter Road and West Harding Road and travel north along South Carpenter Road. Turning west onto West Main Street, the pipeline would continue along West Main Street and then run north onto Jennings Road. The pipeline would then traverse an agricultural field access road to reach the southeastern edge of the Modesto's Jennings Plant. Row crops dominate the agricultural land uses along these stretches of the pipeline.

The Jennings Plant Pump Station is located within the Modesto Jennings Plant, which is bounded to the west by the San Joaquin River, to the east by the Modesto Compost Facility, and to the north and south by agricultural plots. The pipeline would leave the Jennings Plant at the southwestern edge and travel west across a riparian area and under the San Joaquin River, and through an agricultural access road to Lemon Avenue. Lemon Avenue crosses areas planted predominantly in row crops and orchards with some agricultural structures and rural residences. The pipeline turns south along SR 33, which is adjacent to orchards. Turning west onto Zacharias Road, the pipeline runs along Zacharias Road to the DMC. The agriculture along Zacharias Road is predominately orchards with some row crops and agricultural structures and rural residences. For most of this alignment, the pipeline would be constructed on County ROW.

Alternative 2 – Separate Alignment Alternative Existing land use characteristics of Alternative 2 are similar to Alternative 1; land use along the portion of the pipeline from the Modesto Jennings Plant to the DMC is described above under Alternative 1. The new pump station would be located at the southwest corner of South Carpenter Road and West Harding Road. From there, the pipeline alignment traverses a riparian area, under the San Joaquin River, and through several row crop plots before meeting with Pomegranate Avenue. Pomegranate Avenue is dominated by row crops, agricultural structures, and rural residences. The pipeline then turns north up Locust Avenue, west along an agricultural access road before turning south along SR 33. This stretch of the pipeline is adjacent to orchards and has agricultural structures and a number of rural residences. From SR 33, the pipeline runs west along West Marshall Road before turning north on an agricultural access road and then west alongside an electrical substation.

Alternative 3 – PID Conveyance Alternative Land use characteristics of Alternative 3 are similar to Alternatives 1 and 2. The pipeline would begin at the PID intake, which is an existing public use. The pipeline would be constructed within PID ROW, paralleling the PID Main Canal, and then run along Bartch Avenue to Ward Avenue. Land use along the PID Main Canal, Bartch Avenue and Ward Avenue is agricultural, with scattered rural residences.

Sensitive Receptors

Land uses such as residential, schools, day care centers, hospitals, and convalescent homes are considered to be more sensitive than the general public to certain environmental effects, and thus are collectively known as sensitive receptors. There are no schools, day care centers, hospitals, or convalescent homes within 1 mile of the proposed study area. While the proposed study area is not designated as residential in the Stanislaus County General Plan, there are rural residential homes scattered along the three proposed alternatives' pipeline alignments.

3.13.2 Regulatory Framework

This section describes laws and regulations that may apply to the Proposed Action. There are no federal or state policies or programs regulating land use that would apply to the Proposed Action.

Local Policies and Regulations

The discussion of existing land use policies and regulations focuses on Stanislaus County, which is the location for all proposed construction.

Stanislaus County General Plan The Stanislaus County General Plan guides development for the County within a 20-year planning horizon. The Land Use element of the County's General Plan designates the proposed study area as Agriculture (Stanislaus County 1994). This classification is intended to "recognize the value and importance of agriculture by acting to preclude incompatible urban development within agricultural areas. It is intended for areas of land which are presently or potentially desirable for agricultural usage. These are typically areas which possess characteristics with respect to location, topography, parcel size, soil classification, water availability, and adjacent usage which, in proper combination, provide a favorable agricultural environment." The following policies in the Stanislaus County General Plan, Land Use Element would apply to the project:

> *Policy Two*: Land designated Agriculture shall be restricted to uses that are compatible with agricultural practices, including natural resources management, open space, outdoor recreation and enjoyment of scenic beauty.
> *Policy Fourteen*: Uses shall not be permitted to intrude into or be located adjacent to an agricultural area if they are detrimental to continued agricultural usage of the surrounding area.
> *Policy Sixteen*: Agriculture, as the primary industry of the County, shall be promoted and protected.
> *Policy Twenty-Two*: Future growth shall not exceed the capabilities/capacity of the provider of services such as sewer, public safety, solid waste management, road systems schools, health care facilities, etc.

Stanislaus County Zoning Code The Stanislaus County Zoning Code is designed to promote and protect the public health, safety, peace, morals, comfort, convenience, and general welfare of those living and working within Stanislaus County. The Zoning Code provides a general plan of development for the county, and serves to guide, control and regulate the future growth of the county in accordance with the county General Plan. The study area is zoned as A-2, that is, the study area is designed to support and enhance agriculture as the predominant land use. Uses and

policies regarding the A-2 zone are intended to protect open space lands, and ensure that all land uses are compatible with agriculture and open space, including natural resources management.

City of Modesto Urban Area General Plan The City of Modesto Urban Area General Plan serves as a blueprint for future growth within the City. The Plan outlines policies that focus on a community vision (City of Modesto 2008). The following policy in the Urban Area General Plan relating to land use and planning would apply to the project:

> *Overall Land Use Policy***:** Establish and maintain an orderly and compatible land use pattern. Evaluate land use compatibility, design compatibility, and the compatibility of lot size and configuration where new development is proposed within or adjacent to established neighborhoods, as well as noise, traffic, and environmental hazards when making land use decisions.

3.13.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action would result in significant impacts related to land use. The analysis is based on a review of relevant local plans and aerial photography.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines,* a land use and planning impact would be considered significant if the project would:

- Physically divide an established community or result in land use conflicts.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
- Conflict with any applicable HCP or natural community conservation plan.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to activities associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Conflict with any applicable HCP or natural community conservation plan* – There is no adopted HCP or natural community conservation plan for the study area. Therefore, there would be no impact.

Impacts and Mitigation Measures

Impact LU-1 Physically Divide an Established Community or Result in Land Use Conflicts

No Action Alternative If no action were taken, there would be no land use impacts within the study area.

Combined Alignment Alternative (Alternative 1) Alternative 1would not physically divide an established neighborhood or community because it would not occur within an urban or residential area and would not include construction of a roadway, wall, barrier, or other obstruction that would physically divide existing land uses. In addition, this alternative would not permanently interfere with vehicular circulation of the neighborhood or community. The proposed pipeline would generally follow along existing roadways and would be buried underground once constructed. The pipeline may include aboveground air valves which would be housed on a concrete slab in a protective steel cage (approximately 4 feet by 4 feet in dimension) on the shoulder of the road. The repurposing of the Jennings Plant Pump Station would also not physically divide the community as the plant is already constructed and all repurposing activities would occur on pump station property owned by the City of Modesto.

All pipeline installation would occur within public roadways, private agricultural lands, and public open space areas. An easement from Caltrans would be required to construct the pipeline under SR 33. An access agreement may be required for the railroad crossing. A land use authorization from Reclamation would be required for installation of the new discharge crossing within Reclamation ROW. Project construction could temporarily impact roadway ROWs, but these impacts would cease upon completion of construction and would not be anticipated to affect interaction within a neighborhood or community. As such, there would be no impacts to land use under this alternative as no land uses would be changed or impacted.

Separate Alignment Alternative (Alternative 2) Impacts of Alternative 2 would be similar to Alternative 1. However, Alternative 2 includes an additional pipeline alignment that would require two crossings of SR 33 and the CNFR railroad as well as two discharge locations on the DMC. All three of these would require authorization as described under Alternative 1. Additional impacts under this alternative would also include the construction of an new pump station at the western end of the Harding Drain Bypass Pipeline. The City of Turlock owns this parcel, so no easements or other land acquisition would be needed. Construction of the additional pump station would not physically divide an established neighborhood or community because it would not include construction of a wall, barrier, or other obstruction that would physically divide existing land uses. There would be no impacts to land use under this alternative as no land uses would be changed or impacted.

PID Conveyance Alternative (Alternative 3) Impacts of pipeline construction would be similar to Alternatives 1 and 2. This alternative would not physically divide a community or result in land use conflicts. Construction of the expanded PID intake and pump station would take place at the existing intake facility and would not physically divide an established neighborhood or community because it would not include construction of a wall, barrier, or other obstruction that would physically divide existing land uses. There would be no impacts to land use under this alternative as no land uses would be changed or impacted.

Significance Determination before Mitigation No impact for all Action alternatives. No impact from the No Action Alternative.

Mitigation Measures No mitigation measures are required.

Impact LU-2 Conflict with Any Applicable Land Use Plan, Policy, or Regulation

No Action Alternative If no action were taken, there would be no direct land use impacts within the study area. However, it is not unlikely that a lack of reliable water supply could result in a conversion of agricultural land to non-agriculture use in DPWD. This would be a significant, and because mitigation would not be possible, potentially unavoidable adverse effect of the No Action Alternative.

Combined Alignment Alternative (Alternative 1) This alternative would be consistent with the Land Use element of the Stanislaus County General Plan. The General Plan states that "agriculture, as the primary industry of the County, shall be promoted and protected." The project would secure a reliable water source alternative to CVP water for agriculture use within the County in DPWD's service area. With this new water source, farmers in DPWD could slow the rate of groundwater overdraft and preserve water within the region for later use. See Chapter 3.2 Agriculture and Forestry Resources for more information on agricultural impacts. Land uses along the construction corridor would be affected temporarily during construction, but because the area would be restored to existing conditions once construction is complete the impact would be considered less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be similar to Alternative 1. In addition, as described in Chapter 2, Alternatives and Proposed Action, this alternative would require construction of an additional pump station to be located at the corner of W. Harding Road and S. Carpenter Road. Land in this area is zoned A-2, indicating that public buildings or other facilities operated by political subdivisions are a Tier 3 use, which would require a use permit and approval from the Stanislaus County Planning Commission prior to development. Tier 3 uses are consistent with the A-2 Zone if (1) the use will not be substantially detrimental or in conflict with the agricultural use of other property in the vicinity and (2) the parcel on which the use is requested is not located in one of the County's most productive agricultural areas as defined in Stanislaus County's General Plan (Stanislaus County 1994). Once constructed, the proposed pump station would not interfere with agricultural uses within the vicinity. Similarly, because the pump station is located on less than 1 acre of land and helps to serve water to agricultural communities within Stanislaus County, it would be consistent with the A-2 zone. As such, the proposed project would not conflict with any local land use plan, and similar to Alternative 1 any temporary land use impacts during construction would be less than significant.

PID Conveyance Alternative (Alternative 3) Impacts would be similar to Alternatives 1 and 2. Under this alternative, the pipeline would be constructed in roads or in existing PID ROW. In addition, the expansion of the PID intake and construction of new pump would take place at PID's existing intake site. Thus, this alternative would not conflict with any local land use plan, and any temporary land use impacts during construction would be less than significant.

Significance Determination before Mitigation Less than significant for Alternatives 1, 2, and 3. Potentially significant and unavoidable for the No Action Alternative.

Mitigation Measures No mitigation measures are required for Alternatives 1, 2, and 3. No mitigation is possible for the No Action Alternative.

Cumulative Impacts

The geographic scope of potential cumulative impacts related to land use and planning is the study area. There are three relevant projects within the vicinity of the Proposed Action that may contribute to cumulative impacts:

- Jennings Treatment Plant Phase 2 Upgrades: increase tertiary treatment capacity by 12.6 mgd.
- West Main Improvement Project: widen West Main Ave to 3 lanes from the San Joaquin River to Crows Landing Road (Stanislaus County Department of Public Works 2011).
- StanCOG South Corridor Study: study potential alignments and corridor options for an expressway from the City of Turlock on the east to I-5 on the west (Stanislaus County Department of Public Works 2011).

Implementation of the Proposed Action, in conjunction with the projects listed above, would not create cumulative land use conflicts. The Proposed Action alternatives are consistent with all land use plans and would thus not have a cumulative impact related to land use planning conflicts. Facilities and infrastructure associated with the Proposed Action would either be buried underground or would be constructed in areas adjacent to other public infrastructure, and as such, would not create long-term cumulative impacts associated with dividing an established community.

3.13.4 References

Bureau of Reclamation (Reclamation). 2013. Refuge Recycled Water Supply Study, Volume I – Project Report. June.

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Stanislaus County. 1994. Stanislaus County General Plan. Available at: http://www.stancounty.com/ planning/pl/general-plan.shtm

Stanislaus County Department of Public Works. 2011. Road to Success – Bridges to the Future, Fall 2011. Available at: http://www.stancounty.com/publicworks/pdf/cip-project-flyer.pdf

3.14 Noise

This section addresses future noise impacts resulting from the implementation of the Proposed Action. Noise regulations for each jurisdiction are identified and summarized as they relate to specific components of the Proposed Action alternatives. This analysis assumes typical construction equipment noise levels to estimate corresponding noise levels at sensitive receptor locations and determines project significance based on local noise regulations.

3.14.1 Environmental Setting/Affected Environment

Study Area

The study area for this section is the area surrounding the construction work areas for the three Action alternatives. In general this is a rural area with few sensitive receptors. The pipeline alignments are mainly located along roadways, in rural agricultural or undeveloped areas, or within existing developed areas such as the Jennings Treatment Plant and the PID intake structure, to which public access is limited.

Noise Principles and Descriptors

Noise Background Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz) which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power or volume). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of each measured Hz and corresponding sound power level. The audible sound spectrum consists of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum (20 to 20,000 Hz). As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A weighting follows an international standard method of frequency de-emphasis and is typically applied to community noise measurements. In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Table 3.14-1**. All of the noise levels reported herein are A-weighted unless otherwise stated.

Table 3.14-1: Typical A-Weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: Caltrans 1998.

Noise Exposure and Community Noise An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in **Table 3.14-1** are representative of measured noise at a given instant in time, however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources such as aircraft flyovers, vehicle pass-bys, and sirens, which are readily identifiable to the individual. These successive additions of sound to the community noise environment vary the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).
L_{max}: the instantaneous maximum noise level for a specified period of time.
L_{dn}: 24-hour day and night A-weighed noise exposure level which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises.) Noise between 10:00 P.M. and 7:00 A.M. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noise.

Effects of Noise on People The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, learning.
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. No completely satisfactory method exists to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans 1998):

- Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dBA.
- Outside of such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise.
- It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA.
- A change in level of 5 dBA is a readily perceptible increase in noise level.
- A 10 dBA change is recognized as twice as loud as the original source.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. Sound level is measured in decibels. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple linear fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 to 9 dBA per doubling of distance from the

source, depending on environmental conditions (i.e., atmospheric conditions and noise barriers, either vegetative or manufactured). Widely distributed noises, such as a large industrial facility spread over many acres or a street with moving vehicles (a "line" source), would typically attenuate at a lower rate, approximately 4 to 6 dBA per doubling of distance.

Vibration Background Groundborne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be composed of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in Hz. Most environmental vibrations consist of a composite, or "spectrum" of many frequencies. The normal frequency range of most groundborne vibrations that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz. Vibration information for this analysis has been described in terms of the peak particle velocity (PPV), measured in inches per second, or vibration level measured with respect to Root Mean Square (RMS) vibration velocity in decibels (VdB), with a reference quantity of 1 micro inch per second.

Vibration energy dissipates as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. High-frequency vibrations reduce much more rapidly than do low frequencies, so that in the far-field zone distant from a source, the low frequencies tend to dominate. Soil properties also affect the propagation of vibration. When groundborne vibration interacts with a building, usually a ground-to-foundation coupling loss occurs, but the vibration also can be amplified by the structural resonances of the walls and floors. Vibration in buildings typically is perceived as rattling of windows, shaking of loose items, or the motion of building surfaces. In some cases, the vibration of building surfaces also can be radiated as sound and heard as a low-frequency rumbling noise, known as groundborne noise.

Groundborne vibration generally is limited to areas within a few hundred feet of certain types of industrial operations and construction/demolition activities, such as pile driving. Road vehicles rarely create enough groundborne vibration amplitude to be perceptible to humans unless the receiver is in immediate proximity to the source or the road surface is poorly maintained and has potholes or bumps. Human sensitivity to vibration varies by frequency and by receiver. Generally, people are more sensitive to low-frequency vibration. Human annoyance also is related to the number and duration of events; the more events that occur or the greater the duration, the more annoying it becomes.

Existing Noise Environment The existing noise environment in the project area is attributed to various stationary and mobile sources. These include noise originating from local vehicular and truck traffic and the operation of stationary sources (e.g., an existing tallow factory at the northeast corner of Harding Road and Carpenter Road) and mobile noise sources associated with local agricultural activities. Other, less prevalent, sources of noise that contribute to the existing noise environment in the project construction areas include landscaping activities (e.g., leaf blowing, lawn mowing) and regional roadway traffic.

Sensitive Receptors Some land uses are considered more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation

from noise) and the types of activities typically involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas generally are more sensitive to noise than are commercial and industrial land uses. Sensitive receptors in the vicinity of the Action alternative's pipeline alignments and pump stations include several rural residences. Installation of the pipelines would occur almost entirely within County road and drainage and irrigation canal ROW. In some instances, the pipeline could be installed within 50 feet of an existing residence; all three alternative pipeline alignments have residences within 50 feet.

3.14.2 Regulatory Framework

Federal Policies and Regulations

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

State Policies and Regulations

The State of California establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dBA. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of L_{dn} 45 dBA in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than L_{dn} 60 dBA. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Local Policies and Regulations

Local regulation of noise involves implementation of General Plan policies and Noise Ordinance standards. Local General Plans identify general principles intended to guide and influence development plans, and Noise Ordinances set forth the specific standards and procedures for addressing particular noise sources and activities. General Plans recognize that different types of land uses have different sensitivities toward their noise environment; residential areas are generally considered to be the land use most sensitive to noise and industrial/commercial areas are generally considered to be the least sensitive. Local noise ordinances typically set forth standards related to construction activities, nuisance-type noise sources, and industrial property line noise levels. Noise regulations and standards that apply to the land uses within the unincorporated portions Stanislaus County are provided below.

Stanislaus County Noise Ordinance The Stanislaus County Noise Ordinance (Title 10 Chapter 10.46 Noise Control) establishes exterior noise level standards shown in **Table 3.14-2**. While these generally apply to operations, there is an exemption for construction or maintenance activities performed by or at the direction of any public entity or public utility. The noise ordinance also has limits for construction equipment during the hours of 7 P.M. to 7 A.M. which requires noise levels to be below 75 dBA during these hours.

Table 3.14-2: Exterior Noise Level Standards

Designated Noise Zone	Maximum A-weighted Sound Level (L_{max})	
	7:00 A.M. to 9:59 P.M.	10:00 P.M. to 6:59 A.M.
Noise Sensitive	45	45
Residential	50	45
Commercial	60	55
Industrial	75	75

Stanislaus County vibration ordinance prohibits operation of any device that creates vibration that is above the vibration perception threshold, which is defined to be a measured motion velocity of 0.01 inch persecond over the range of one to one hundred Hz. While these generally apply to operational vibration, there is an exemption for construction or maintenance activities performed by or at the direction of any public entity or public utility.

City of Modesto General Plan The Modesto General Plan does not include any noise policies relevant to the Proposed Action.

City of Modesto's Municipal Code Section 4.9-103 (Enumerations) of the City of Modesto's municipal code states that use of heavy equipment (e.g., bulldozers, road graders, backhoes, etc.), construction, demolition or other activities that result in loud and raucous operations before 7:00 A.M. or after 9:00 P.M. are declared as public nuisances. However, per Section 4-9.104 (Exemptions) of the City's municipal code, activities on or in publicly owned property are exempt from the City of Modesto's noise requirement. Because the Jennings Plant outfall pump station is on publicly owned property, proposed activities at this location would be exempt from Section 4.9-103.

3.14.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

Noise Construction noise sources would include a variety of heavy equipment and other machinery. The Federal Transit Administration (FTA) has established guidance on noise and vibration impact assessments for construction equipment (FTA 2006). The FTA recommends that for a rough estimate of construction noise levels that the noisiest two pieces of equipment be used to analyze the anticipated noise levels at sensitive receptors assuming the following:

- Full power operation for a full one hour is assumed.
- There are no obstructions to the noise travel paths.
- Typical noise levels from construction equipment are used.

- All pieces of equipment are assumed to operate at the center of the proposed project area.

Using these simplifying assumptions, the noise levels at specific distances can be obtained using the equations provided in the FTA guidance (FTA 2006).

The estimated noise levels are compared to the noise emission limits established by Stanislaus County. While the above calculations apply to construction equipment, truck traffic to and from the construction sites could also have the potential to create additional noise for residences and commercial establishments located along haul routes.

Vibration Construction activity associated with the operation of heavy equipment and vibratory pile driving may generate localized groundborne vibration and noise. However, vibration from ground-disturbing construction activity is typically below the threshold of perception when the activity is more than 50 feet from the receiver. The impact of vibratory pile driving can potentially impact nearby buildings and sensitive receptors. Based on methods and equations described by FTA (FTA 2006), the vibration levels in terms of peak particle velocity at specific distances can be obtained.

Using the most sensitive building types and land use categories the peak PPV would have to exceed 0.12 inches per second and L_{eq} would have to exceed 65 VdB in order to result in any building damage or vibrational disturbances. For industrial buildings the PPV would have to exceed 0.5 inches per second in order to result in any building damage or vibrational disturbances (Caltrans 2013).

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines*, a noise impact would be considered significant if the project would cause:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels.
- For a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the project are identified below along with supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Aircraft noise* - Because the project is not located near an airport or airstrip, people working in the project area would not be exposed to noise from airports and airstrips.

Impacts and Mitigation Measures

Impact NOISE-1 Temporary Construction-Related Noise Increases

No Action Alternative Under the No Action Alternative, no construction would occur and there would be no noise impacts.

Combined Alignment Alternative (Alternative 1) Under Alternative 1, construction activities would occur in several phases with different construction equipment lists and in multiple locations. For calculation of noise impacts, construction activities were grouped as applicable to the following locations: Weir Structure, Pump Station, Pipeline (except San Joaquin River crossing), and San Joaquin River Crossing. The construction phase at each of these locations that had the two noisiest pieces of equipment was used to estimate the A-weighted noise impacts shown in **Table 3.14-3**.

Table 3.14-3: Construction Noise Levels

Construction Location	Equipment Type	Typical Noise Level 50 feet from Source (dBA)	Distance to Meet Daytime Exterior Noise Standard (Feet)			
			Sensitive (45 dBA)	Residential (50 dBA)	Commercial (60 dBA)	Industrial (75 dBA)
Weir Structure	Concrete Saws	90	10,200	5,736	1,813	323
	Tractors/Loaders/ Backhoes	85				
Pump Station	Excavator	85	7,071	3,976	1,257	224
	Bulldozer	85				
Pipeline	Rubber Tired Dozers	85	7,071	3,976	1,257	224
	Tractors/Loaders/ Backhoes	85				
San Joaquin River Crossing	Vibratory or Impact Pile Driver	95[1]	16,583	9,325	2,949	524
	Bulldozer	85				

[1]See *Section 4, Biological Resources*, for analysis of noise effects on fish and wildlife. Source: FHWA 2006; FTA 2006, Appendix C

According to **Table 3.14-3** the exterior noise threshold of 50 dBA would be achieved for residential receptors located 3,976 to 9,325 feet or further from the construction area depending on the specific construction phase. For the pump station there is a residence located to the east of the pump station that is 3,760 feet from the Modesto pump station and may experience some

noise above 50 dBA, but no sources would be above 75 dBA. Three residences would experience levels above 50 dBA from construction of the Modesto Weir. Numerous residences are adjacent to the pipeline alignment and would experience levels above 50 dBA for the short time when pipeline construction activity is being conducted near a particular residence before moving further along the pipeline alignment. Numerous residences would also be affected during the San Joaquin River Crossing phase due largely to the pile driving activity, which is scheduled to occur for 2 months, with noise levels decreasing for construction of the trenchless crossings using HDD or microtunneling during the remainder of the construction phase.

While the Stanislaus County Noise Ordinance exempts public entities and utilities, the noise levels at residences near the construction activity could result in annoyance and thus noise generated by project construction could be potentially significant.

In order to address noise annoyance that sensitive receptors and residents may experience, **Mitigation Measure NOISE-1** will be implemented. While not all of the mitigation measure components are measureable, this mitigation measure will result in some reduction in noise levels. For instance, the use of mufflers typically can reduce levels by 5 to 10 dBA (EPA 1971) and additional reductions would occur with the use of any sound barriers or obstructions. Since the County Noise Ordinance exempts this type of construction activity from the noise threshold and appropriate measures have been implemented to reduce levels, the noise levels after mitigation would be less than significant.

Separate Alignment Alternative (Alternative 2) Similar to Alternative 1, construction activities were grouped for calculation of noise impacts as applicable to the following locations: Weir Structure, Pump Station, Pipeline (except San Joaquin River crossing), and San Joaquin River Crossing. The construction phase at each of these locations that had the two noisiest pieces of equipment was used to estimate the A-weighted noise impacts shown in **Table 3.14-3**. Since similar types of equipment are used in Alternatives 1 and 2, the two noisiest pieces of equipment are the same for a given construction phase type and only the location of sensitive receptors near the construction site has changed.

According to **Table 3.14-3** the exterior noise threshold of 50 dBA would be achieved for residential receptors located 3,976 to 9,325 feet or further from the construction area depending on the specific construction phase. A residence is located 3,760 feet from the Modesto pump station and may experience some noise above 50dBA. Several residences are located closer than 3,976 feet from the Turlock pump station site that would experience construction noise levels above 50 dBA, but no sources would be above 75dBA. Three residences would experience levels above 50 dBA from construction of the Modesto Weir and about 12 residences would experience levels above 50 dBA from construction of the Turlock Weir. Numerous residences are adjacent to the pipeline alignment and would experience levels above 50 dBA for the short time when pipeline construction activity is being conducted near a particular residence before moving further along the pipeline alignment. Numerous residences would be affected during the two San Joaquin River Crossings due largely to the pile driving activity, which is scheduled to occur for 2 months with noise levels decreasing for the remainder of the construction phase.

While the Stanislaus County Noise Ordinance exempts public entities and utilities, the noise levels at residences near the construction activity could result in annoyances and thus noise generated by project construction could be potentially significant.

In order to address some of the noise annoyance that sensitive receptors and residents may experience, **Mitigation Measure NOISE-1** will be implemented. While not all of the mitigation measure components are measureable, this mitigation measure will result in some reduction in noise levels. For instance the use of mufflers typically can reduce levels by 5 to 10 dBA (EPA 1971) and additional reductions would occur with the use of any sound barriers or obstructions. Since the County Noise Ordinance exempts this type of construction activity from the noise threshold and appropriate measures have been implemented to reduce levels, the noise levels after mitigation would be less than significant.

PID Conveyance Alternative (Alternative 3) Noise impacts for construction of the weir structure, pump station, and pipeline would be expected to be the same as for Alternatives 1 and 2, and are shown in **Table 3.14-3**. There are several rural residences located along the pipeline alignment, both along the PID Main Canal, and along Bartch and Ward Avenues, but pipeline construction would only affect any individual residence for a short period of time. There is a residence about ½ mile from the weir structure on the DMC, which would experience noise levels above 50 dBA.

In addition, Alternative 3 would require expansion of the existing PID intake facility. Noise impacts of construction would be similar to the impacts of constructing the existing diversion and fish screen. The noisiest construction activity for the intake would be pile driving for construction of the cofferdam, which is estimated to be 95 dBA at a distance of 50 feet. The nearest residence is located about 500 feet southwest of the intake, and could experience noise levels of 74 dBA during pile driving (PID 2006). As stated above, the Stanislaus County Noise Ordinance exempts public entities and utilities, but the noise levels at residences near the construction activity could result in annoyances and thus noise generated by project construction could be potentially significant.

In order to address some of the noise annoyance that sensitive receptors and residents may experience, **Mitigation Measure NOISE-1** will be implemented. Because the County Noise Ordinance exempts this type of construction activity from the noise threshold and appropriate measures have been implemented to reduce levels, the noise levels after mitigation would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure NOISE-1: Noise Reduction Measures** (Alternatives 1, 2, and 3). To reduce the impact of noise from construction activities the following measures shall be implemented to the extent feasible:

- Construction activities shall be limited to the hours of 7:00 A.M. to 7:00 P.M., Monday to Friday.

- Construction staging areas shall be as far as possible from existing residences.
- Construction equipment noise shall be minimized during project construction by muffling and shielding intakes and exhaust on construction equipment per the manufacturers' specifications and by shrouding or shielding impact tools. All equipment shall have sound-control devices no less effective than those provided by the manufacturer.
- All stationary noise generating construction equipment shall be placed as far away as possible from sensitive receptors on in an orientation minimizing noise impacts (e.g. behind barriers or storage piles).

Significance Determination after Mitigation Less than significant for all Action alternatives.

Impact NOISE-2 Temporary Disturbance from Construction-Related Vibration
No Action Alternative There would be no construction and therefore no vibration impacts would occur.

Combined Alignment Alternative (Alternative 1) Vibrational impacts from construction could mainly occur from the vibratory pile drivers used at the San Joaquin River crossing. Vibrations from the rest of the construction equipment would typically be below the PPV threshold of 0.01 inches per second at 182 feet. The estimated PPV for the San Joaquin River crossing pile driving activities is based on a reference PPV for vibratory pile drivers at 25 feet of 0.65 inches per second (Caltrans 2013). This was used to estimate the minimum distance a structure would have to be from the pile driving activity to experience 0.01 inch per second threshold. Any structures or sensitive receptors closer than 1,112 feet to the San Joaquin river crossing would experience vibrations greater than the threshold. There are no sensitive receptors or structures located within a 1,112-foot radius of the Modesto crossing and thus the impact from vibrations would be less than significant.

Separate Alignment Alternative (Alternative 2) Impacts for the Modesto crossing would be as described above for Alternative 1.

For the Turlock crossing, an industrial area with several buildings located nearby may experience vibrations above the threshold, which may cause annoyance for workers at this location. However, vibration levels would be less than 0.5 inches per second (Caltrans 2013), which is the threshold to cause damage to industrial buildings. These vibration levels would not cause any building damage and would cause only temporary annoyance for people working near the activities. In addition, the County of Stanislaus vibration ordinance exempts this type of temporary construction activity from lower annoyance thresholds. Therefore, the impact from vibrations would be less than significant.

PID Conveyance Alternative (Alternative 3) Vibration impacts from construction would mainly be associated with pile driving that would be needed for expansion of the PID intake facility. There is a residence located about 500 feet from the intake site that could experience vibrations above the threshold, which may cause annoyance for residents at this location. However, vibration levels would not be expected to be greater than those experienced during construction of the existing intake, which was not expected to damage nearby structures (PID 2006).

Vibration levels are not expected to cause damage, and would cause only temporary annoyance for nearby receptors. In addition, the County of Stanislaus vibration ordinance exempts this type of temporary construction activity from the 0.01 inches per second threshold. Therefore, the impact from vibrations would be less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Impact NOISE-3 Increase in Ambient Noise Due to Operational Noise and Vibration
No Action Alternative Under the No Action Alternative, no construction would occur and there would be no additional operational noises or vibration. Therefore there would be no noise impacts.

Combined Alignment Alternative (Alternative 1) Operation of the modified pump station would result in the generation of noise from pump machinery. Land use surrounding the proposed site of the pump station beyond the wastewater treatment plant is agricultural with some residences located 3,760 feet from the proposed site. The pump station would use 500-horsepower pumps. Given that the pump station would be housed within an enclosed structure, and considering the distance to the nearest sensitive receptors, noise generated by the pump station would generally correspond to existing noise levels, especially since it already has an existing pump station that would be repurposed. Therefore, the impact is less than significant.

Separate Alignment Alternative (Alternative 2) Operation of the pump stations would result in the generation of noise from pump machinery. Land use surrounding the proposed sites of the pump stations include the Jennings Plant, agricultural uses, and some residences located 3,760 and 1,660 feet from the proposed site for the Modesto and Harding Drain Pump Stations, respectively. At build-out, the pump stations would consist of 300 and 250 horsepower pumps for the Modesto and Harding Drain Pump Stations, respectively. Given that the pump stations would be housed within enclosed structures in conjunction with the distances to the nearest sensitive receptors, noise generated by the pump stations would generally correspond with existing noise levels. Therefore, the impact is less than significant.

PID Conveyance Alternative (Alternative 3) Operation of the new pump station at the PID intake would result in the generation of noise from pump machinery. Land use surrounding the proposed site of the pump station at the PID intake is agricultural with one rural residence located about 500 feet from the existing intake site. Noise generated by the pump station, which would be housed within an enclosed structure, would generally correspond to existing noise levels, especially since there is already an existing pump station at the site. Therefore, the impact is less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Impact NOISE-4 Cumulative Noise and Vibration Impacts

No Action Alternative Under the No Action Alternative there would be no additional operational noises or vibration. Therefore, there would be no cumulatively considerable impact.

All Action Alternatives (Alternatives 1, 2, and 3) Temporary increases in ambient noise and vibration levels during installation of the proposed facilities for all Action alternatives would not be cumulatively considerable given the short-term nature of the impacts. Over the long term, the noise impact from the proposed project would be negligible and not cumulatively considerable, given that it would include operation of pumps in enclosed structures and very infrequent motor vehicle trips associated with maintenance activities.

Significance Determination before Mitigation Not cumulatively considerable and therefore less than significant for all Action alternatives.

Mitigation Measures No mitigation required.

3.14.4 References

California Department of Transportation (Caltrans). 1998. Technical Noise Supplement – A Technical Supplement to the Traffic Noise Analysis Protocol, October 1998.

California Department of Transportation (Caltrans). 2013. Transportation and Construction Vibration Guidance Manual. September.

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3.15 Population and Housing

This section describes the population and housing of the study area, and the relevant regulatory setting. This section also evaluates the potential for the Proposed Action alternatives to affect population and housing.

3.15.1 Environmental Setting/Affected Environment

Population

The DPWD service area encompasses lands within Stanislaus County, San Joaquin County, and Merced County, in the San Joaquin Valley. Proposed facilities will be located entirely within Stanislaus County, and recycled water would be used within DPWD's service area in all three counties. According to the Housing Element of the Stanislaus County General the Plan, the population of the unincorporated limits of Stanislaus County rose from 95,756 in 1990 to 106,741 in 2000, an increase of 11.3 percent from 1990. The overall growth rate from 1990 to present has remained below 1.5 percent. The 2012 population was 114,712, which represents a percent change of approximately 0.4 during that time period (County of Stanislaus 2012). The population of the unincorporated and incorporated areas has risen from 510,694 in July 2008 to 525,491, an approximately 2.8 percent increase since 2008 (County of Stanislaus 2012 and U.S. Census Bureau 2014a). According to the Housing Element, most of the future residential growth in Stanislaus County is projected to occur within the limits of the incorporated cities as historically experienced. Any concentrated growth in unincorporated Stanislaus County is anticipated to take place in communities of Denair, Diablo Grande, Keyes and Salida, which are guided by community plans and are served by special districts that provide sewer and water systems necessary to accommodate development (County of Stanislaus 2012).

The population of San Joaquin County grew from 563,598 to 686,660 residents from 2000 to 2008. The annual average population growth rate during that period was equivalent to 2.7 percent, with the incorporated population occurring at a higher rate (3.1 percent) than the unincorporated area (1.4 percent) (County of San Joaquin 2011). According to the U.S. Census, the 2013 estimated population for 2010 and 2013 are 685,308 and 704,379, respectively, or a population change of approximately 2.8 percent between 2010 and 2013 (U.S. Census Bureau 2014b).

The population of Merced County increased from 210,554 in 2000 to 255,793 in 2010, , a growth rate of approximately 22 percent during that period. According to the U.S. Census, the estimated population in 2013 is 263,228, which represents a population change of approximately 2.9 percent between 2010 and 2013 (U.S. Census Bureau 2014c).

Housing

According to the Stanislaus County Housing Element, household growth between 1990 and 2000 increased at a greater rate throughout the County as a whole than it did in the unincorporated areas. The households in 1990 and 2000 in unincorporated areas are 30,961 and 32,646, an annual percent change of 0.5 percent compared to 1.2 percent Countywide. This was attributed to greater occurrence of multi-family rental units within the incorporated cities where services and

infrastructure are more readily available (County of Stanislaus 2012). Housing units in 2013 were 179,683 (U.S. Census Bureau 2014b).

From 2000 to 2008, San Joaquin County experienced historically high rates of housing growth, with incorporated areas growing slightly faster than unincorporated areas (2.67 percent compared to 1.25 percent). Growth within the cities is possibly related to the trend that has occurred over the last several decades of an influx of Bay Area workers seeking more affordable housing in San Joaquin County. In 2013, there were 235,943 housing units (U.S. Census Bureau 2014b).

In Merced County, the average household growth rate from 2000 to 2006 was 18.5 percent, with the number of household units growing from 68,373 in 2000 to 81,058 in 2006 (U.S. Census Bureau 2000; 2006). The growth rate slowed to 3.1 percent from 2006 to 2012, with the number of household units totaling 83,571 in 2012 (U.S. Census Bureau 2012). In 2013, there were 83,840 housing units (U.S. Census Bureau 2014c).

3.15.2 Regulatory Framework

This section describes laws and regulations that may apply to the Proposed Action.

Federal Policies and Regulations

There are no federal regulations associated with population and housing that are relevant to the Proposed Action.

State Policies and Regulations

There are no state regulations associated with population and housing that are relevant to the Proposed Action.

Local Policies and Regulations

Stanislaus County General Plan The Land Use Element of the Stanislaus County General Plan provides guidance on the County's growth (County of Stanislaus No Date).

GOAL THREE: Foster stable economic growth through appropriate land use policies.

> *Policy Twenty-two*: Future growth shall not exceed the capabilities/capacity of the provider of services such as sewer, water, public safety, solid waste management, road systems, schools, health care facilities, etc.

San Joaquin County General Plan The San Joaquin County General Plan provides guidance on the County's growth (County of San Joaquin General Plan 2010).

> *Objective 1:* To ensure that there is an adequate amount of land planned for urban development to accommodate the projected population growth in areas where the appropriate level of services are or can be made available.
> *Objective 7:* To provide public facilities and services to meet needs in an efficient and cost-effective manner.

Merced County General Plan The Merced County General Plan provides guidance on the County's growth and development (County of Merced 2013).

Policy LU-1.1. Countywide Development. Direct urban development to areas within urban boundaries of cities, Urban Communities, and Highway Interchange Centers in order to preserve productive agriculture, limit urban sprawl, and protect natural resources.
Policy LU-1.2. Rural Centers. Limit the amount of new growth within existing Rural Centers by allowing only agriculture-supporting residential and commercial uses.
Policy LU-1.3. Rural Residential Centers. Limit the amount of new growth within existing Rural Centers by allowing only residential uses, limiting public services, and prohibiting commercial uses.
Policy LU-1.5. New Urban Communities. Consider the establishment of new Urban Communities in areas off of productive agricultural land which satisfy the policy requirements under Goal LU-5.F, in order to accommodate projected future growth.
Policy LU-1.10. Orderly Community Growth. Require the orderly, well planned, and balanced growth of the incorporated communities consistent with the limits imposed by local infrastructure, services, public facilities, and their ability to assimilate growth.

City of Modesto Urban Area General Plan The City of Modesto Urban Area General Plan serves as a blueprint for future growth within the City. The Plan outlines policies that focus on a community vision (City of Modesto 2008). The following policy in the Housing Element of the Urban Area General Plan relating to population and housing would apply to the project:

Policy 6.1: Promote coordination between infrastructure master plans, service area boundaries, and housing plans to ensure that adequate services are available to serve expected housing growth. Direct housing to areas where infrastructure and utilities can be provided commensurate with housing population.

3.15.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action alternatives would result in significant impacts related to population and housing.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines,* an impact on population and housing would be considered significant if the project would:

- Displace substantial numbers of housing units, necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to activities associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Displace substantial numbers of housing units* – The Proposed Action alternatives would be confined primarily to land owned by the Cities of Modesto and Turlock and to existing roadways and adjacent ROW and would not require the demolition of existing residential houses. As a result, the Proposed Action would not displace existing housing.
- *Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere* – The Proposed Action alternatives construction activities would be confined to land owned by the Cities of Modesto and Turlock and to existing roadways and adjacent ROW and would not remove any housing. As a result, the Proposed Action would not displace people.

3.15.4 References

County of Merced. 2013. Merced County General Plan. Land Use Element. December 2013. Available at: http://www.co.merced.ca.us/documents/28/42/2030%20General%20Pl_1.PDF

County of San Joaquin. 2010. San Joaquin County General Plan – Housing Element. January 12. Available at: http://www.sjgov.org/commdev/cgi-bin/cdyn.exe/handouts-neighpresv_HousingElement?grp=handouts-neighpresv&obj=HousingElement

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U.S. Census Bureau. 2014a. State and County Quick Facts – Stanislaus County, California. Last amended July 8. Available at: http://quickfacts.census.gov /qfd/states/06/06099.html

U.S. Census Bureau. 2014b. State and County Quick Facts – San Joaquin County, California. Last amended July 8. Available at: http://quickfacts.census.gov/qfd/states/06/06077.html

U.S. Census Bureau. 2014c. State and County Quick Facts – Merced County, California. Last amended July 8. Available at: http://quickfacts.census.gov/qfd/states/06/06047.html

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3.16 Public Services and Utilities

This section presents the physical and regulatory setting for public services and utilities surrounding the Proposed Action. The impact analysis considers the potential for the Proposed Action to exceed the existing capacities for public services (i.e., police, fire, schools, and parks) and utilities (i.e., water, wastewater, storm drainage, solid waste, and electrical services). The analysis is based on a review of local land use plans and policies and aerial imagery.

3.16.1 Environmental Setting/Affected Environment

The study area for the analysis is Stanislaus County, which provides public services to the area in which the Proposed Action alternatives facilities would be constructed. This section describes the environmental setting for current public services and utilities within the construction study area. From the DMC, the Proposed Action would also supply water to users in Merced and San Joaquin Counties, but because there are no facilities there, no effects on services or utilities in those areas are expected.

Police Services

The Stanislaus County Sheriff's Department provides police services for the study area. The Department has a Sheriff, an Undersheriff, 2 Captains, 4 Chiefs, 2 Sergeants, and 10 Lieutenants, as well as a number of officers (Stanislaus County Sheriff's Department 2014a). Patrol Services is responsible for responding to citizen calls and is expected to investigate crime, make arrests, provide preventative patrol, and render assistance as needed. Patrol Services includes specialty units including the K-9 Unit, the Mounted Unit, and SWAT. The Investigations Division is responsible for the follow-up of major crimes that are reported to the Department. The Sheriff's Department provides contractual law enforcement services to the cities of Riverbank, Patterson, Waterford, and Hughson (Stanislaus County Sheriff's Department 2014b).

Fire Services

Fire protection services within the study area are provided by the West Stanislaus County Fire Protection District (WSCFPD), the Westport Fire Protection District (WFPD), and the Mountain View Fire Protection District (MVFPD).

The WSCFD serves roughly 625 square miles west of the San Joaquin River in Stanislaus County, excluding the cities of Patterson and Newman. The WSCFD serves the portions of both Alternative 1 and Alternative 2 that are west of the San Joaquin River, and all of the area crossed by Alternative 3. There are five stations, two of which are jointly shared with the cities of Newman and Patterson. District Headquarters are located at 244 West Las Palmas Avenue in Patterson. The District has eight staff and 85 volunteers and provides fire, emergency medical services (EMS), and rescue services (West Stanislaus County Fire Protection District 2014). Apparatus includes 8 engines, 4 water tenders, 3 rescue vehicles, 1 electric unit, 1 air unit, 4 command vehicles, and 1 truck (West Stanislaus County Fire Protection District 2014). In 2010, the District responded to 120 fires, 280 rescue/medical calls, and 236 other incidents (West Stanislaus County Fire Protection District 2014).

The WFPD serves 45 square miles, including a small portion of the eastern edge of Alternative 1. There is one station located at 5160 South Carpenter Road in Modesto. There are 17 volunteers on staff with access to 2 engines, 1 water tender, and 1 rescue vehicle (Stanislaus LAFCO 2007). Services include fire, EMS, and rescue. Roughly 300 incidents were reported in 2005 (Stanislaus LAFCO 2007).

The MVFPD serves 53 square miles, including a portion of Alternative 2 east of the San Joaquin River. The MVFPD has two stations and is headquartered at 9633 Crows Landing Road in Crows Landing. The MVFPD has 18 volunteer staff with 3 engines and 1 water tender; services include fire, EMS, and rescue (Stanislaus LAFCO 2007). In 2005, MVFPD reported less than 200 incidents (Stanislaus LAFCO 2007).

Other Emergency Services

The Stanislaus County Emergency Medical Services Committee is tasked with coordinating and regulating local emergency service for Stanislaus County (Mountain Valley Emergency Medical Services Agency 2013). Committee members are appointed by the Stanislaus County Board of Supervisors and serve three year terms. The Committee is responsible for recommending optimal EMS dispatch and EMS first response configurations for the County, evaluating the need for policy development, recommending optimal emergency ambulance service areas, recommending guidelines for an EMS disaster plan, and evaluating EMS education levels.

Water Supply

West Stanislaus Irrigation District (WSID) serves the mid-portion of Alternative 1 which runs east-west from I-5 to SR 33. WSID provides water for irrigation purposes to its customers. The district operates and maintains an intake canal along the San Joaquin River for its diversions. WSID also has a contract for CVP water delivered from the DMC.

TID serves the southeastern portion of Alternative 2, including the proposed pump station located at the corner of S. Carpenter Road and W. Harding Road (Stanislaus LAFCO 2009/2011). TID provides irrigation water to more than 5,800 growers in a 307 square mile service area with 149,500 acres of farmland. TID water is stored in Don Pedro Reservoir, and is conveyed by gravity to its service area.

PID serves the portion of Alternative 1 that run from west of the San Joaquin River to SR 33. PID also serves the portion of Alternative 2 that runs along Pomegranate Ave. south of the City of Patterson to SR 33, and almost all of the Alternative 3 alignment. Serving nearly 13,500 acres of farmland and ranches with irrigation water, PID diverts water from the San Joaquin River and has a contract for CVP water delivered from the DMC.

DPWD serves the remainder of the Proposed Action area, including between Rogers Road along Zacharias Avenue to where Alternative 1 connects with the DMC, between SR 33 and along Marshall Road to where Alternative 2 connects with the DMC, and the southern end of the Alternative 3 alignment between Elfers Road and the DMC. Serving agricultural irrigation water to roughly 45,000 acres of farmland, DPWD's primary source of water is from the CVP.

Wastewater

The majority of unincorporated Stanislaus County, including the study area, is not provided sewer services by a wastewater entity, as rural residences rely on septic systems.

Solid Waste

The Environmental Resources Department of Stanislaus County provides solid waste management services to the study area (Stanislaus County 2013). These services include administering the Refuse Control Ordinance, preparing educational outreach materials, promoting beverage container and waste motor oil recycling, and administering the four refuse collection agreements for the unincorporated areas of Stanislaus County. Bertolotti Disposal Company is the contracted entity that collects solid waste within the study area.

Collected waste and recyclables are transported to the Bertolotti Disposal and Transfer Station at 231 Flamingo Drive in Ceres. From the Transfer Station, all non-recycled waste items are transported to the Fink Road Sanitary Landfill located at 4000 Fink Road in Crows Landing. Opened in 1973, the Fink Road Landfill is owned by Stanislaus County and operated by the Environmental Resources Department (Stanislaus County 2014). It provides landfill services to the cities of Ceres, Hughson, Modesto, Newman, Oakdale, Patterson, Riverbank, Turlock, Waterford, and the unincorporated areas of Stanislaus County.

3.16.2 Regulatory Framework

This section describes laws and regulations that may apply to the Proposed Action.

Federal Policies and Regulations

Uniform Crime Reporting Program (UCR) The Federal Bureau of Investigation currently collects information on over 14,000 law enforcement agencies across the nation through the UCR. The UCR defines law enforcement officers as individuals who ordinarily carry a firearm and a badge, have full arrest powers, and are paid from governmental funds set aside specifically for sworn law enforcement representatives. While the UCR records number of law enforcement officers per 1,000 inhabitants, there are currently neither national requirements nor recommendations for staffing level ratios. The national average of sworn officers per 1,000 inhabitants was 2.4 in 2011, with the highest in cities with fewer than 10,000 residents.

Federal Safe Drinking Water Act (SDWA) The SDWA ensures the quality of drinking water and is administered by the EPA. The EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. The Act authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water and cause harm to the public.

State Policies and Regulations

California Drinking Water Program (DWP) The DWP regulates public water systems, oversees water recycling projects, permits water treatment devices, certifies drinking water treatment and distribution operators, and supports and promotes water system security.

Local Policies and Regulations

Stanislaus County General Plan The Stanislaus County General Plan guides development for the County with a 20-year planning horizon.

The following policies in the Stanislaus County General Plan, Safety Element would apply to the project (Stanislaus County 1994):

> *Policy Seven* – Adequate fire and sheriff protection shall be provided.

City of Modesto The City of Modesto Urban Area General Plan serves as a blueprint for future growth within the City. The Plan outlines policies that focus on a community vision (City of Modesto 2008). The following policy in the Urban Area General Plan relating to public services and utilities would apply to the project:

> *General Water Goal*: Ensure a consistent, reliable, high-quality water supply for the City of Modesto and its customers.
> *Water Policies- Baseline Developed Area (i)*: The City of Modesto should continue to pursue additional potential water supply alternatives available to the City to accommodate growth and meet future demand in both normal and dry years.
> *General Wastewater Goal*: The objective of the City's wastewater system is to meet increasingly strict wastewater regulations in a cost-effective manner. As demand for water increases in California, reclaiming wastewater could create opportunities to optimize the region's water resources. Similar opportunities exist for the beneficial reuse of biosolids and digester gas, and other residuals of wastewater treatment.
> *Wastewater Policies- Baseline Developed Area (b)*: The City shall support the near-term expansion of the wastewater treatment and disposal capacity of the Jennings Road Secondary Treatment Plant.
> *Wastewater Policies- Baseline Developed Area (f)*: The City shall continue to support, develop, and research future water reclamation opportunities as a water resource.
> *Wastewater Policies- Baseline Developed Area (m)*: The City will encourage the regional beneficial reuse of reclaimed water. The City is committed to development of a full reclamation program in the long term. The City will comply with Title 22 standards for use of reclaimed water and criteria contained in the California Department of Public Health (CDPH) "Purple Book."
> *Fire Protection Policies- Baseline Developed Area and Planned Urbanizing Area (b)*: The City of Modesto shall ensure adequate ingress and egress to all structures for firefighting and rescue purposes independent of privately owned and maintained driveways.
> *Fire Protection Policies- Baseline Developed Area and Planned Urbanizing Area (k)*: The City of Modesto shall protect life and property by requiring engineered fire protection systems and fire resistive roof systems as part of all new construction; in situations where access is limited, fire sprinkler shall be required for new construction.

3.16.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

Potential impacts on public services and utilities are analyzed based on the potential for the Proposed Action alternatives to affect the services described above.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines* a public service or utility impact would be considered significant if the project would:

- Result in substantial adverse impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection, police protection, schools, parks, or other public facilities.
- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects or result in the determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Have insufficient water supplies available to serve the project from existing entitlements and resources, and thus require new or expanded entitlements.
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
- Be served by a landfill without sufficient permitted capacity to accommodate the project's solid waste disposal needs or violate federal, state, and local statutes and regulations related to solid waste.
- Comply with federal, state, and local statues and regulations related to solid waste.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to activities associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects* – The Proposed Action alternatives entail the construction of

new facilities to augment DPWD's water supply with recycled water. The environmental effects of the proposed facilities are evaluated throughout this document. The Proposed Action would not require or result in the construction of new water or wastewater treatment facilities beyond those being analyzed within this environmental document.

- *Require or results in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects* – The Proposed Action alternatives would not generate a substantial increase in the amount of stormwater runoff as nearly all proposed construction elements would either be buried underground or would be constructed on presently impervious land. The Proposed Action would thus not generate a need for new stormwater drainage facilities or the expansion of existing facilities.
- *Have insufficient water supplies available to serve the project from existing entitlements and resources, and thus require new or expanded entitlements* – The Proposed Action alternatives are designed to provide a supplemental water supply to DPWD's service area and SOD CVPIA refuges, and would not create a new demand for water supply. The Proposed Action would not require any additional entitlements, beyond those that are included and evaluated throughout this document.
- *Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments* – The Proposed Action is a water supply project, using recycled water as a source of non-potable water for beneficial use. The Proposed Action would not generate any additional demand for wastewater treatment, beyond that proposed as part of the Proposed Action. Thus, no further evaluation is required.

Impacts and Mitigation Measures

Impact PUB-1 Impacts Associated with New or Altered Governmental Facilities to Maintain Acceptable Levels of Performance

No Action Alternative If no action were taken, there would be no public service impacts within the study area.

All Action Alternatives (Alternative 1, 2, and 3) The Action alternatives include construction of pipelines and pump stations to convey recycled water to potential customers in DPWD and does not include residential or commercial development that would directly induce population growth and require new or expanded fire and police protection, schools, parks, or other public facilities (see *Chapter 4*). In addition, implementation of the project under any of the alternatives would not indirectly induce unplanned population growth that would place new demands on local public service providers, as the resulting water would be provided to existing customers. Thus, the project would not result, directly or indirectly, in substantial adverse impacts associated with the provision of new or physically altered governmental facilities. The project does not generate a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts. The project is not expected to affect the ability of local providers to maintain acceptable service ratios, response times or other performance objectives for fire protection, police protection, schools, parks, or other public facilities. Similarly, the

operation and maintenance of the Proposed Action would not substantially increase the need for new staff from the public service entities.

During construction, accidents could occur in the work area. These accidents would temporarily increase demand for emergency services, which would occur on an as-needed and emergency basis. This short-term increase could be accommodated by the service providers in the study area. Because the Proposed Action alternatives would not require additional public services, this impact is considered less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures No mitigation measures are required.

Impact PUB-2 Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board

No Action Alternative If no action were taken, treated wastewater would continue to be discharged to the San Joaquin River, pursuant to existing NPDES permits for the Cities of Modesto and Turlock.

Combined Alignment Alternative (Alternative 1) Recycled water, blended with DMC water, would be delivered to farms within DPWD and the refuge's service area. Discharge of recycled water to the DMC would be subject to an NPDES Permit issued by the CVRWQCB and Reclamation's then current water quality requirements. The project would be designed to meet all water quality requirements specified by the CVRWQCB and Reclamation. Refer to *Section 3.11, Hydrology and Water Quality* for additional discussion of water quality.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Recycled water would be blended with San Joaquin River water prior to being introduced into the DMC for delivery to farms within DPWD's service area. Discharge of recycled water to the San Joaquin River would continue to be subject to NPDES permits held by the Cities of Turlock and Modesto, which have been issued by the CVRWQCB. The project would have to meet all water quality requirements specified by the CVRWQCB for discharge, including both existing requirements and potential future requirements, which are becoming increasingly stringent as well as Reclamation's water quality requirements for introduction and conveyance in federal facilities. With continued discharge to the river it is expected that both treatment plants would have to be upgraded in the future to meet more stringent requirements for salt and nutrient removal. It is likely that both plants would have to provide partial treatment via reverse osmosis for salinity removal, which would then require brine disposal for the salts that are removed during treatment. The Modesto Jennings Plant currently provides removal of nitrates/nitrite, but the Turlock facility only removes ammonia. It is likely that Turlock would have to upgrade their treatment process to include nitrogen removal and UV disinfection. The possibility that the existing Turlock and Modesto treatment plants would not meet future treatment requirements is considered a potentially significant impact.

With implementation of **Mitigation Measure PUB-1,** potential impacts would be reduced to less than significant.

Significance Determination before Mitigation Less than significant for Alternatives 1 and 2; potentially significant for Alternative 3.

Mitigation Measures **Mitigation Measure PUB-2: Treatment Plant Upgrades** (Alternative 3). The Cities of Modesto and Turlock would upgrade treatment facilities as needed to meet future requirements for salinity and nutrient removal, plus other future treatment requirements established by the CVRWQCB.

Significance Determination after Mitigation Less than significant.

Impact PUB-3 Served By a Landfill without Sufficient Permitted Capacity or Violate Regulations Related to Solid Waste

No Action Alternative If no action were taken, there would be no solid waste impacts within the study area.

Combined Alignment Alternative (Alternative 1) During construction of this alternative, there would be minimal solid waste generated that would require disposal at a landfill. Spoil, including soil and rock, that would be excavated during construction of the project would either be reused on site for backfilling or disposed of properly. Spoil unable to be reused would be temporarily stored at staging areas until characterized, and then hauled away to the proper disposal site. Additional solid waste would be generated by construction crews within the study area, which would need to be hauled off site to be disposed. Operation of the buried pipeline and re-purposed pump station would not generate any additional solid waste that would require disposal at a landfill.

Solid waste generated during construction, including spoil that cannot be reused, would likely be delivered to the Fink Road Sanitary Landfill. This landfill is currently sized to satisfy all county landfill disposal needs through 2076 (Stanislaus County 2002). As such, impacts to landfill resources would be less than significant. The proposed project would comply with all federal, state, and local statues and regulations related to solid waste.

Separate Alignment Alternative (Alternative 2) Impacts for this alternative would include all of those mentioned above for Alternative 1 as well as impacts resulting from the construction of the new pump station near the western end of the Harding Drain Bypass Pipeline. This impact would include additional spoil material and other trash and solid waste generated by crews during construction which would also be within the capacity of the Fink Road Sanitary Landfill. Similar to Alternative 1, impacts to landfill resources would be less than significant and the proposed project would comply with all federal, state, and local statues and regulations related to solid waste.

PID Conveyance Alternative (Alternative 3) Impacts would be similar to Alternatives 1 and 2, and would also be less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures No mitigation measures are required.

Impact PUB-4 Temporary Disruption of Utilities Due to Construction-Related Activities
No Action Alternative If no action were taken, there would be no utility or public service impacts within the study area.

Combined Alignment Alternative (Alternative 1) Alternative 1 includes the construction of a pipeline within and alongside roads, where other utilities are commonly found. Construction of the proposed project could potentially conflict with existing utilities located along the roadways and near the pump station, particularly underground utilities and/or overhead lines. If these utilities are not clearly identified prior to construction, damage and temporary disruption to those lines, and interruption of the associated services could result. Potential damage to major utility lines could result in significant impacts to the service area, unless appropriate coordination and notification of other service providers is conducted during project planning, design, and construction. Temporary disruption of utility services (i.e., electricity and water) is possible and must be mitigated to ensure that existing construction of the proposed project is not impacted. **Mitigation Measure PUB-4** would reduce this potential impact to less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Impacts would be the similar to Alternatives 1 and 2, though the potential for disruption of utilities in roadways would be slightly less because less pipeline construction in roadways would be needed. However, this alternative would require conveyance through PID facilities, and would require substantial expansion of those facilities. There is thus a possibility for interruption of water deliveries to PID customers during construction.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure PUB-4: Coordinate Relocation and Interruptions of Service with Utility Providers during Construction** (Alternatives 1, 2 and 3). The construction contractor shall be required to verify the nature and location of underground utilities before the start of any construction that would require excavation. The contractor shall be required to notify and coordinate with public and private utility providers at least 48 hours before the commencement of work adjacent to any utility. The contractor shall be required to notify the service provider in advance of service interruptions to allow the service provider sufficient time to notify customers. The contractor shall be required to coordinate timing of interruptions with the service providers to minimize the frequency and duration of interruptions.

Significance Determination after Mitigation Less than significant.

Impact PUB-5 Could Require Construction of New Wastewater Treatment Facilities that Would Cause Significant Environmental Effects

No Action Alternative Under the No Action Alternative, it may be necessary for the Cities of Modesto and Turlock to construct treatment plant upgrades if discharge to the river continues if the CVRWQCB imposes additional requirements for removal of salinity and nutrients. It is likely that treatment facilities could be constructed within the existing treatment plant sites, so it is projected that siting of facilities would not result in significant impacts to sensitive cultural or biological resources or to residents in the project area. However, if reverse osmosis treatment is needed to remove salinity, the treatment process would produce brine (highly saline water containing the salts that are removed by the reverse osmosis process). Brine disposal in an inland area is typically difficult because ocean disposal options are not available. Given the uncertainties regarding brine disposal, it is possible that brine disposal could require construction of facilities that would have a significant impact on the environment.

Combined Alignment and Separate Alignment Alternatives (Alternatives 1 and 2) These alternatives include construction of new facilities to augment water supply with recycled water. The environmental effects of the proposed facilities are evaluated throughout this document. These alternatives would not require or result in the construction of new water or wastewater treatment facilities beyond those being analyzed within this environmental document. There would be no impact.

PID Conveyance Alternative (Alternative 3) Similar to the No Action Alternative, this alternative would continue discharges to the San Joaquin River which could require future treatment plant upgrades if the CVRWQCB imposes additional requirements for removal of salinity and nutrients. Construction of new facilities, including brine disposal, could have a significant impact on the environment.

Significance Determination before Mitigation No impact for Alternatives 1 and 2. Significant and potentially unavoidable impacts for Alternative 3 and the No Action Alternative.

Mitigation Measures Although mitigation of impacts may be possible, due to the high level of uncertainty regarding brine disposal it is not possible to define specific mitigation and this impact is considered to be potentially significant and unavoidable.

Significance Determination after Mitigation No impact for Alternatives 1 and 2. Significant and potentially unavoidable impacts for Alternative 3 and the No Action Alternative.

Cumulative Impacts

The geographic scope of potential cumulative impacts related to public services and utilities includes the study area, Stanislaus County, and the service areas of each of the agencies listed in *Section 13.16.1* above. There are three relevant projects within the vicinity of the proposed project that may contribute to cumulative impacts:

- Jennings Treatment Plant Phase 2 Upgrades: increase tertiary treatment capacity by 12.6 mgd.

- West Main Improvement Project: widen West Main Ave to 3 lanes from the San Joaquin River to Crows Landing Road (Stanislaus County Department of Public Works 2011).
- StanCOG South Corridor Study: study potential alignments and corridor options for an expressway from the City of Turlock on the east to I-5 on the west (Stanislaus County Department of Public Works 2011).

Cumulative projects could result in increases in the generation of solid waste, damage to utilities, and disruption to utility service. Because the Proposed Action alternatives are not expected to generate substantial amounts of solid waste and there is sufficient capacity at the landfill through 2076, the alternatives would not contribute to cumulatively considerable impacts. With respect to utility impacts during construction, the implementation of **Mitigation Measure PUB-4** would reduce the proposed alternative's contribution to cumulative effects. As such, they would not contribute to cumulatively considerable impacts.

However, Alternative 3, similar to the No Action Alternative, may require future treatment plant upgrades, which could result in cumulatively considerable impacts. Also, if discharge standards for salts and nutrients become more stringent, it's likely that other dischargers to the San Joaquin River would also have to upgrade treatment facilities. Timing of the upgrades is uncertain, and would not likely overlap with construction of the Jennings Treatment Plant Phase 2 Upgrades, which should be completed in 2016. However, due to the uncertainties regarding brine disposal, there is a possibility of cumulatively significant impacts.

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3.17 Recreation

This section evaluates the potential impacts related to recreational uses that could result from implementation of the Proposed Action. Recreational resources (e.g., parks, bikeways, fishing access, etc.) within the project area are described, along with related County General Plan polices. The impact analysis presents the standards used to evaluate impacts to recreational resources and addresses potential effects of the Proposed Action on such resources. Also assessed are the potential effects that could result from delivery of this water to SOD CVPIA-designated refuges.

3.17.1 Environmental Setting/Affected Environment

The following sections describe the environmental setting for recreational uses and facilities in the construction site vicinity.

Project Site Vicinity

The Proposed Action construction area is generally located in the central portion of Stanislaus County and includes areas that are north, west, and south of the City of Patterson. Area residents have access to recreational opportunities and facilities including several park and fishing areas, bikeways, and recreational centers. The park system that exists today reflects the historical growth patterns of the project area and the trends for certain types of recreational facilities that have been popular as the local park system has developed.

Alternatives 1 and 2 would require one or more crossing of the San Joaquin River, SR 33, the CFNR railroad tracks, and irrigation canals. Alternative 3 would require crossing of SR 33, the CFNR railroad tracks, and irrigation canals. Land uses adjacent to these alignments and other new/constructed facilities consist of agriculture and rural residences. The DMC is used informally for recreation, including fishing, though there is no formally designated fishing access. Further discussion of recreational opportunities in the vicinity of the alternatives follows.

Jennings Plant Pump Station The City of Modesto Wastewater Division maintains a secondary treatment and tertiary facility on Jennings Road northeast of the City of Patterson. The effluent ponds of the Jennings Plant Pump Station form the largest wetland in Stanislaus County and attract a large number of migratory birds. Public access to the area is restricted; the Stanislaus Audubon Society organizes bird watching tours at the facility (City of Modesto 2014; Stanislaus Audubon Society 2014).

Local Bikeways A review of available maps indicates that no designated bikeways traverse the project area. For further discussion of bikeways, please see *Section 3.19, Transportation and Traffic.*

Fishing Access In the project vicinity, there is one access point for fishing in the San Joaquin River. Las Palmas Fishing Access is located adjacent to the existing PID intake on the San Joaquin River east of Patterson off of route J17 (Las Palmas/West Main Street). The three-acre

park has one mile of river frontage with a parking lot, restrooms, concrete boat ramp, barbecues, picnic tables and handicapped access.

South of the Delta CPVIA-designated Wildlife Areas

As discussed in *Chapter 2, Alternative and Proposed Action*, in addition to providing water to the DPWD service area, the proposed project would make recycled water available to certain SOD refuges. Multiple NWRs, SWAs, and one privately managed complex in the Central Valley are designated as CVPIA units/refuges. These areas are generally open spaces containing habitat such as wetlands, native grasslands, riparian forests, and vernal pools that support a variety of fish and wildlife species and are an important part of the Pacific Flyway, a major migration root for migratory birds. Most of them are open to the public. They provide opportunities for birdwatching, wildlife viewing, hiking, biking, boating, waterfowl hunting, camping and fishing. **Table 3.17-1** lists the CPVIA units/refuges located SOD that could potentially be served by the proposed project.

Table 3.17-1: South of Delta CVPIA Wildlife Areas

Facility Name	Location	Activities Available	Acres (approx.)
San Luis NWR (USFWS)[1] • East Bear Creek Unit • Freitas Unit • Kesterson Unit • San Luis Unit • West Bear Creek Unit	Merced County: Approximately 10 miles north of Los Banos	Exhibit hall with interactive educational exhibits, auto/trail routes, bird watching, waterfowl hunting, fishing, and Tule Elk viewing	26,800
Kern NWR (USFWS)[1]	Kern County: 20 miles west of the City of Delano	Auto route, waterfowl hunting, fishing, wildlife viewing	11,249
Volta SWA(CDFW)[2]	Merced County: 0.75 mile north of Volta	Waterfowl hunting, nature trails, wildlife viewing	2,891
Mendota SWA (CDFW)[2]	Fresno County: 3 miles south of Mendota near Whites Bridge	Camping during waterfowl season, hunting, fishing, wildlife viewing.	11,802
Los Banos SWA (CDFW)[2]	Merced County: 4 miles northeast of Los Banos on Henry Miller Avenue	Hunting, hiking, biking, bird watching, boat launch, fishing, kayaking, walking and bicycling on undesignated trails	6,217
North Grasslands SWA (CDFW)[2] • Salt Slough Unit • China Island Unit	Merced and Stanislaus Counties: Generally 6 miles north of Los Banos	Camping during waterfowl season, hunting, boat launch, fishing, boating, wildlife viewing.	7,069
Grasslands Wildlife Management Area (USFWS) [1;3]	Merced County: Santa Fe Grade Rd, several miles east of Los Banos	Closed to public use; wildlife viewing is accessible from adjacent roads, primarily Sante Fe Grade Road, which bisects the north and south Grasslands in a NW/SE direction, north and south of Los Banos	60,000

Sources:
1. USFWS
2. CDFW 2014
3. Recreation.gov 2014

San Luis Reservoir State Recreation Area

Nestled in the grassy hills of the western San Joaquin Valley near historic Pacheco Pass, San Luis Reservoir State Recreation Area is noted for boating, board sailing, fishing, camping, and picnicking. The San Luis State Recreation Area is owned by Reclamation and managed by the California Department of Parks and Recreation. San Luis Reservoir was constructed as a storage reservoir for the CVP and the SWP. It stores water pumped from the Delta pursuant to Reclamation's and DWR's water rights permits. The water arrives through the California Aqueduct and the DMC, and is pumped from the O'Neill Forebay into the main reservoir whenever system demands are below the export capacity of the combined pumping plants. As described in *Chapter 2, Alternatives and Proposed Action*, recycled water conveyed in the DMC as part of the Proposed Action during low-demand periods could be stored in San Luis Reservoir when capacity is available.

A visitor center at the Romero Overlook provides full information on the reservoir and the water projects through audio-visual and printed materials. Telescopes are also available for viewing the area. The Romero Visitor Center is administered by DWR.

San Luis Reservoir State Recreation Area has four campgrounds: Basalt, San Luis Creek, Medeiros, and Los Banos Creek. All campgrounds are open year round. North and South Beach day-use areas have about 200 picnic sites with shade ramadas, tables, and BBQ grills. Both day-use areas have plenty of shade and grass. North Beach is the only designated swim area within San Luis Reservoir State Recreation Area. San Luis Reservoir State Recreation Area consists of three water bodies: San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir, all of which are accessible to boaters, although Los Banos Creek is subject to winter closure because of water release from the reservoir (State Parks 2014).

3.17.2 Regulatory Framework

This section describes laws and regulations at the federal, state, and local level that may apply to the Proposed Action.

Federal Policies and Regulations

Public Law 102-575, Title 34, Central Valley Project Improvement Act (CVPIA) See *Section 3.4.2, Biological Resources, Regulatory Framework.*

Public Law 105-57, National Wildlife Refuge System Improvement Act of 1997 See *Section 3.4.2, Biological Resources, Regulatory Framework.*

San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan The San Joaquin River NWR is 9 miles west of the city of Modesto and straddles western Stanislaus and Southern San Joaquin Counties. This NWR was established in 1987 primarily to protect wintering habitat for Aleutian Canadian goose (*Branta canadensis leucopareia*), then a federally-listed endangered species. The refuge also serves to protect other threatened and endangered species that depend on wetlands and riparian floodplain habitat. The refuge played a pivotal role in the removal of the Aleutian Canada goose from the federal Threatened and Endangered Species List in 2001.

The San Joaquin River NWR Comprehensive Conservation Plan (CCP) (USFWS 2006) was developed to guide the management of the San Joaquin River NWR for the next 15 years. The San Joaquin River NWR provides protection for both wetland- and upland-dependent wildlife species of California's Central Valley. The goals of the San Joaquin River NWR CCP include providing opportunities for environmental education about native California habitats and wildlife and their conservation and restoration, providing the public with wildlife viewing and photographic opportunities, and providing other recreational activities such as waterfowl hunting and fishing.

State Policies and Regulations

Public Trust Doctrine The Public Trust Doctrine espouses the notion that title to lands under navigable waters up to the high water mark is held by the state in trust for the people (California State Lands Commission n.d.). The Submerged Lands Act grants states sovereignty over their tide and submerged lands, and the Supreme Court established the states' duty to protect (in perpetuity) the public's interest in these areas.[1] The California Supreme Court has interpreted the range of public interest values in these waterways to include general recreation activities such as swimming and boating, as well as preservation of lands in their natural state as open space, as wildlife habitat, and for scientific study.[2,3] The Public Trust Doctrine applies to the San Joaquin River in the vicinity of the Proposed Action.

Local Policies and Regulations

Stanislaus County General Plan Stanislaus County has identified the following goals and policies in the Conservation Element of the General Plan (1994) that are relevant to the Proposed Action:

GOAL 1: Encourage the protection and preservation of natural and scenic areas throughout the County.

Policy 1: Maintain the natural environment in areas dedicated as parks and open spaces.

Policy 2: Assure compatibility between natural areas and development.

*GOAL 4***:** Provide for the open-space recreational needs of the residents of the County.

Policy 14: Provide for diverse recreational opportunities such as horseback riding trails, hiking trails, and bikeways.

Policy 15: Coordinate the provision of recreation needs with the other providers such as the USACE, the State Resources Agency, school districts, river rafters, horse stable operators, and private organizations such as the Sierra Club and Audubon Society.

Stanislaus County Parks Master Plan The Stanislaus County Parks Master Plan (1998) provides a comprehensive overview to guide the Board of Supervisors, Parks Recreation

[1] *Illinois Central Railroad v. Illinois*, 1892. 146 U.S. 387. The Public Trust Doctrine has yet to be applied to federal lands and waters through statutes or case law.

[2] Marks v. Whitney. 1971. 6 Cal.3d 251; National Audubon Society v. Superior Court. 1983. 33 Cal.3d 419; People v. California Fish Co. 1913. 166 Cal. 576.

[3] Frank, R. M. 1983. "Forever Free: Navigability, Inland Waterways, and the Expanding Public Interest." *University of California, Davis Law Review:*16:579. California case law also establishes a link between navigation and recreation, and verges on treating the two as interchangeable public interests.

Commission and the Parks Department in meeting a variety of goals for park lands and users over the next twenty years. In 1994, Stanislaus County updated its General Plan and charged the Parks Department and Parks Commission with accomplishing the development of a Parks Master Plan. Development of this long range plan has included a needs assessment, specific park plans, future planning, development of design standards, and economic and fiscal planning.

The Stanislaus County Parks Master Plan prioritizes simple inexpensive activities, outdoor activities involving the natural environment, and park amenities that include bathroom facilities, children's play areas, barbeques, lighted areas, bike paths, and sports fields. The plan recognizes the importance of fishing access along the county's waterways.

Merced County General Plan Merced County contains approximately 114,000 acres of county, state, and federal parks and recreation areas and public open space areas. Merced County is in the process of updating its General Plan. The 2030 Merced County General Plan Planning Commission Review Draft (Merced County 2011) Recreation and Cultural Resources Element recognizes that recreational resources provide economic, health, and open space benefits. The majority of the NWRs and SWAs that could receive water flows from the Proposed Action are located in Merced County. The following goals and policies in the Recreation and Cultural Resources Element are relevant to the Proposed Action:

GOAL RCR-1: Preserve, enhance, expand, and manage Merced County's diverse system of regional parks, trails, recreation areas, and natural resources for the enjoyment of present and future residents and park visitors.

> Policy RCR-1.1: Encourage the continuation and expansion of existing public recreation land uses, including, but not limited to, public beaches, parks, recreation areas, wildlife areas, and trails.

San Joaquin County General Plan The Public Facilities chapter of the San Joaquin County General Plan (2010) describes the health, economic, and natural resource benefits of recreation and the necessity of providing recreational opportunities for all of the County's residents. Water-based activities such as fishing, boating, swimming, and water skiing, are the most popular recreational activities in San Joaquin County. There are about 400 miles of waterways in the County, including the California Delta, Mokelumne River, Stanislaus River, Calaveras River, and several canals, aqueducts, and borrow sites. The DMC passes through the County, however, there are no legal recreational access points on the canal within San Joaquin County (San Joaquin County 2010).

City of Modesto One of the goals of the City of Modesto's Urban General Plan is to preserve the natural river corridors in Modesto for recreational and open space opportunities. However, the Urban General Plan does not include any specific policies relevant to recreational resources in the project area (City of Modesto 2008).

3.17.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action alternatives would result in significant impacts related to recreational resources. The analysis is based on the project's preliminary design information, including construction methods and procedures, and project design and management, when weighed against the baseline environmental conditions of recreational facilities in the project area.

The evaluation addresses direct effects on recreational facilities, as well as indirect effects, such as changes in recreational opportunities that could affect the use of the related recreational facility or another facility elsewhere. For example, the evaluation considers whether a reduction in recreational opportunities at a given location could displace users to a different location, resulting in an increase in use and potential for deterioration of the facilities at that other location.

Water from the Proposed Action that may be stored in San Luis Reservoir would not be anticipated to measurably affect recreational facilities because Reclamation would manage introduction of water in the DMC so as to not exceed capacity of the canal and reservoir. Water levels are thus not expected to change in a way that would adversely affect recreation, so impacts in these locations are not considered further.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines* an impact on recreational resources would be considered significant if the project would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial deterioration of the facility would occur or be accelerated.
- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to activities associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no impact determination is appropriate.

- *Inclusion of Recreational Facilities or Require Construction or Expansion of Recreational Facilities* – The Proposed Action alternatives do not include recreational facilities nor would they include construction or expansion of recreational facilities. Therefore, there would be no impacts on the environment related to construction of new or expanded recreational facilities.

Impacts and Mitigation Measures

Impact REC-1. Substantial Impairment of the Use of Existing Parks or Other Recreational Facilities

No Action Alternative Under the No Action Alternative, no-construction would occur. Therefore, no impacts on recreational facilities would occur.

Combined Alignment Alternative (Alternative 1) As described previously, land uses adjacent to Alternative 1 consist of agriculture and rural residences. Pump station construction and operation would occur at the existing Jennings Plant. Public access to the Jennings Plant is restricted, although tours are granted to bird watching groups (see *Section 3.17.1, Environmental Setting/Affected Environment*, above, for more information). The proposed project under this alternative would not change the amount of water available for storage in the effluent ponds. A 54-inch-diameter pipe would deliver recycled water to the DMC near Zacharias Road. However, because formal fishing access at the DMC is not available, access to the canal would not be impacted, so this impact is considered less than significant. Once constructed, the discharge site would not interfere with potential access to the DMC. No other public recreational facilities are located within or adjacent to this alternative's pipeline alignment; therefore, there would be no potential for impact to existing parks or other recreational facilities. Overall impacts are considered less than significant.

Separate Alignment Alternative (Alternative 2) Land uses adjacent to Alternative 2 are similar to those of Alternative 1. The existing pump station at Jennings Plant would also be modified and a new pump station would be constructed at the Harding Drain Bypass Pipeline, located near South Carpenter Road. Currently, the latter site is vacant and consists of open space and agricultural land uses. Under Alternative 2, one 42-inch-diameter pipeline would introduce supply to the DMC at the terminus of Zacharias Road, and another 42-inch-diameter pipe would discharge north of West Marshall Road. Once constructed neither introduction points would interfere with potential access to the DMC. No other public recreational facilities are located within or adjacent to the project alignment; therefore, there would be no impact to existing parks or other recreational facilities from Alternative 2. Overall impacts are considered less than significant.

PID Conveyance Alternative (Alternative 3) Land uses adjacent to the pipeline alignment for this alternative are similar to those of Alternatives 1 and 2, and pipeline construction would not impair recreational uses. The existing PID intake facility is immediately south of an existing recreation area and boat ramp on the San Joaquin River. Construction at the intake site would not affect the boat ramp facility (PID 2006). As with Alternatives 1 and 2, a discharge structure would need to be constructed at the DMC. Once constructed, the discharge site would not interfere with potential access to the DMC. No other public recreational facilities are located within or adjacent to the project alignment; therefore, impacts to existing parks or other recreational facilities from Alternative 3 would be less than significant.

Significance Determination Less than significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures None.

Impact REC-2 Increase in Water Flow to the National Wildlife Refuges Such that Substantial Increase in Birdwatching and Other Recreational Opportunities Would Occur
No Action Alternative Under the No Action Alternative, there would be no change to the water supply to SOD CVPIA-designated refuges, and as such no change in recreational opportunities or use of recreational facilities at these locations. There would be no impact.

All Action Alternatives (Alternative 1, 2, and 3) The Proposed Action alternatives would make some recycled water available to certain SOD CVPIA-designated refuges to meet CVPIA requirements. These refuges contain habitat that supports a variety of fish and wildlife species, and are an important part of the Pacific Flyway, a major migration route for migratory birds. An increase in water supply would most likely lead to an increase in habitat for these species. While this conceivably could have a beneficial effect on recreational viewing opportunities at the refuges that receive water from the Proposed Action, causing an increase in recreational use, no determination has yet been made on the amount of water or which of the refuges would be served by the NVRRWP.

Significance Determination Potentially beneficial impact for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures None.

Cumulative Impact Analysis

The Proposed Action alternatives may have limited short-term impacts on recreation as described above. However, there are no cumulative projects that would affect recreation on the DMC or San Joaquin River that would create cumulative adverse impacts to recreation from any of the Action alternatives.

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3.18 Socioeconomics

This section describes the socioeconomic conditions in the study area, and discusses the effect on the economy that could be expected to result from implementing the Proposed Action.

3.18.1 Environmental Setting/Affected Environment

The following sections present socioeconomic data for San Joaquin, Stanislaus and Merced Counties.

Population and Employment

Table 3.18-1 shows the estimated population in San Joaquin, Stanislaus and Merced Counties and the numbers of individuals employed in various industries in each county.

Table 3.18-1: Population and Employment by Industry Sector - 2013

Category	San Joaquin County	Stanislaus County	Merced County
Total Population	685,306	514,453	255,793
Employed Population	269,943	202,047	96,057
INDUSTRY			
Agriculture, forestry, fishing, hunting, mining	13,782	11,124	13,576
Construction	18,092	12,162	6,567
Wholesale trade	26,382	26,592	12,064
Retail trade	9,879	7,084	2,804
Transportation, warehousing, utilities	36,930	28,422	10,097
Information	15,945	9,012	4,854
Finance, insurance and real estate	5,729	1,540	1,614
Professional, scientific, management, administrative, waste management services	12,298	8,856	3,767
Education, health care	27,759	19,374	5,978
Arts, entertainment, recreation, accommodation, food services	58,147	43,340	21,272
Other services (not public)	20,462	15,688	5,440
Public administration	12,770	10,804	4,245
Median income (dollars)	$56,652	$50,686	$49,870
Per capita income (dollars)	$21,652	$20,608	$17,838

Source: U.S. Census 2013

After rising steadily through 2011, overall unemployment rates in the three counties served by DPWD have decreased in the last several years. **Table 3.18-2** shows unemployment rates in San Joaquin, Stanislaus and Merced Counties from 2008 through 2014.

Table 3.18-2: Annual Average Unemployment Rates

Year	San Joaquin County	Stanislaus County	Merced County
2008	10.4	11.0	12.5
2009	15.3	15.8	16.9
2010	17.3	17.2	18.7
2011	16.8	16.7	18.2
2012	15.0	15.1	16.9
2013	12.8	13.0	14.7
2014	10.6	11.2	12.8

Source: California EDD 2015

Agricultural Water Use and Production

DPWD has a contract with Reclamation for delivery of up to 140,210 AF of CVP water annually for irrigation of approximately 45,000 acres of highly productive farmland with a production value of over $130 million gross farm dollars annually (RMC 2013). Prior to the implementation of the CVPIA, and other legal and regulatory delivery constraints, DPWD typically received its full water allocation every year. When the full water allocation was available, normal agricultural fallowing in the DPWD service area averaged 3,349 acres per year (RMC 2013).

As shown in **Table 3.18-3**, Reclamation was only able to provide full CVP contract deliveries to DPWD in only three water years out of the last twenty four. On-going shortages and lack of water supply reliability have created a severe hardship on DPWD and its growers as they have been required to increase fallowing and/or purchase more costly water supplies on the open market to support ongoing agriculture. Crop reports for 2014 indicate that fallowed acreage has increased by almost 4,000 acres over the prior year's total of 7,239 acres, resulting in a significant loss of both farm income and agricultural related jobs. The effect of these shortages on the agriculturally-based economies of the communities on the west side of the San Joaquin Valley has had severe economic repercussions and will exhibit continuing negative economic impacts as these losses ripple through the local and regional economies.

Uncertainties regarding water supply have ongoing effects on the local economy. Over the years from 2001 to 2013 growers in the DPWD service area increased acreage planted to higher value permanent crops, such as almonds, but in the face of uncertain water deliveries, growers may defer land conversion investments and leave lands fallow. However, this is not an option for lands already planted in permanent crops. Drought conditions and pumping restrictions have thus had major economic impacts on San Joaquin Valley counties (Michael and Hewitt et al. 2010).

Table 3.18-3: Historic Annual CVP Allocation

Year	Allocation (AFY)	Percent of Full Allocation
1990-91	70,105	50
1991-92	35,053	25
1992-93	35,053	25
1993-94	70,105	50
1994-95	58,888	42
1995-96	140,210	100
1997-98	126,189	90
1998-99	140,210	100
1999-2000	98,147	70
2000-01	91,137	65
2001-02	63,095	45
2002-03	98,147	70
2003-04	105,158	75
2004-05	98,147	70
2005-06	119,179	85
2006-07	140,210	100
2007-08	70,105	50
2008-09	56,084	40
2009-10	14,021	10
2010-11	63,095	45
2011-12	112,168	80
2012-13	56,084	40
2013-14	28,042	20
2014-15	0	0

3.18.2 Regulatory Framework

There are no federal or state regulations regarding socioeconomics that would apply to the Proposed Action. This section describes laws and regulations at the local level that may apply to the project.

Local Policies and Regulations

Stanislaus County General Plan The following goal is relevant to socioeconomics.

- Agriculture Goal One: Strengthen the agricultural sector of our economy.

San Joaquin County General Plan The following objective is relevant to socioeconomics.

- Water Resources Objective 1: To ensure adequate quantity and quality of water resources for municipal and industrial uses, agriculture, recreation, and fish and wildlife.

Merced County General Plan The following goal is relevant to socioeconomics.

*GOAL AG-1***:** Maintain the financial viability of the agricultural sector by encouraging expansion of commercial agriculture, attracting new agricultural support and value added industries, and promoting locally-grown commodity.

3.18.3 Impact Analysis/Environmental Consequences

CEQ's NEPA regulations (40 CFR 1508.8[b]) list economic and social factors among the effects that should be analyzed in an EIS. Specifically, economic and social effects should be discussed when they are interrelated with natural or physical effects (40 CFR 1508.14).

Methodology for Analysis

Potential economic benefits of the Proposee Action were analyzed using a regional input-output model that was calibrated to existing local economic data. IMPLAN Version 3 software was used to derive the model. The analysis was focused on quantifying the income and employment benefits associated with additional water supply and did not take into account the short-term benefits of construction employment or ongoing operations and maintenance of the proposed water conveyance facilities. Analysis was based on the potential agricultural cropping impacts from new recycled water supplies as direct, indirect and induced income and employment (Michael and Pogue 2010).

Impacts

Economic Benefits of Proposed Action

No Action Alternative The No Action Alternative would not result in any of the potential economic benefits of the project, and the agricultural economy in the DPWD service area would continue to be subject to the uncertainties of water supply availability. Additional years in which DPWD does not receive a full allocation of CVP water would result in ongoing adverse effects on the agricultural economy due to fallowing and loss of agricultural related jobs.

Combined Alignment and Separate Alignment Alternatives (Alternatives 1 and 2) The potential economic benefits of Alternatives 1 and 2 would be the same as each alternative would be able to deliver much needed additional water supplies to DPWD and certain SOD refuges. Although not expected until full build out of the Cities (a 40 year period), the potential annual delivery of up to 59,000 AF would provide additional water supplies to supplement DPWD's CVP water supplies ensuring continued agricultural viability in the district. Based on the analysis conducted by Michael and Pogue (2010), at full buildout, the NVRRWP under these alternatives could result in 572 additional jobs, with $29,030,055 in total income and $67,537,627[1] in total output each year.

[1] Income and output were calculated in 2010 dollars. Values in 2014 dollars, accounting for inflation using the Consumer Price Index, would be $31,665,665 in total income and $73,669,302 in total output each year.

PID Conveyance Alternative (Alternative 3) Under Alternative 3, the delivery of additional water supplies to DPWD would have similar socioeconomic benefits as Alternatives 1 and 2. However, there might be some short-term disruption of service to growers served by the PID Main Canal during construction of the portions of the pipeline that cross existing laterals. This could have a minor economic impact, but due to the short-term nature of the disruption the effects are expected to be fairly small.

3.18.4 References

Bureau of Reclamation (Reclamation). 2014. Central Valley Operations, Water Deliveries for Delta-Mendota Canal accessed online on July 16, 2014, available at: http://www.usbr.gov/mp/cvo/11deliv.html

Bureau of Reclamation (Reclamation). 2014. Summary of Water Supply Allocations, accessed online July 16, 2014, available at: http://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf

California Employment Development Department (EDD). 2015. Labor Market Information, Local Area Profiles. Data accessed online on August 5, 2015, available at: http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localareaproqsselection.asp?menuchoice=localareapro

Michael, Jeffrey, Richard Howitt, Josué Medellín-Azuara, and Duncan MacEwan. 2010. *A Retrospective Estimate of the Economic Impacts of Reduced Water Supplies to the San Joaquin Valley in 2009*, September 28, 2010.

Michael, Jeffrey and Thomas Pogue. 2010. *North Valley Regional Recycled Water Project: Impact on Regional Income, Employment and Output*, December 16, 2010

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3.19 Transportation and Traffic

This section evaluates the potential impacts related to transportation and traffic that could result from implementation of the Proposed Action. The analysis is based on a review of traffic facilities in the project vicinity and local transportation plans.

3.19.1 Environmental Setting/Affected Environment

The following sections describe the environmental setting for transportation and traffic within the study area.

Regional Setting and Project Vicinity

The Proposed Action construction area is generally located in the central portion of Stanislaus County and includes areas that are north, east, and south of the City of Patterson. The Combined Alignment Alternative (Alternative 1) includes installation of a recycled water pipeline that would run approximately 69,800 feet beginning at Turlock's Harding Drain Bypass Pipeline, continuing north along South Carpenter Road, west on West Main Street, north on Jennings Road to Modesto's Jennings Plant, and then continues west beneath the San Joaquin River, and then along Lemon Avenue and Zacharias Road to the DMC. **Figure 2-2** shows the planned pipeline route for Alternative 1 and names of the affected roads.

The Separate Alignment Alternative (Alternative 2) includes independent pipeline segments from Turlock and Modesto's treatment facilities to the DMC. The northern segment of the pipeline follows the same route as the pipeline planned for Alternative 1 from the Jennings Plant outfall pump station to the DMC, beginning at Modesto's Jennings Plant and continuing west beneath the San Joaquin River, and then along Lemon Avenue and Zacharias Road to the DMC. The southern segment would begin from a new pump station located adjacent to the Harding Drain Bypass Pipeline, continue west underneath the San Joaquin River, across open space and along Pomegranate Avenue and a private road between Locust Avenue and SR 33, continue along West Marshall Road, jog around a substation to the north of West Marshall Road, and end at the DMC. **Figure 2-3** shows the planned pipeline route for Alternative 2 and names of the affected roads.

The PID Conveyance Alternative (Alternative 3) would primarily be constructed paralleling the PID Main Canal, with short segments on Bartch Avenue and Ward Avenue. **Figure 2-4** shows the planned pipeline route for Alternative 3 and names of the affected roads.

Regional Transportation Network Stanislaus County is served by several major highways including I-5, Highway 99, SR 132, SR 165, and County Road J17 (West Main Street). SR 33 is a two-lane and four-lane (within city limits only), north-south route that runs parallel to I-5 between Santa Nella and Vernalis. SR 108 has an east-west alignment from Riverbank and SR 219 to the county line. Within the county, SR 108 connects to SR 120. SR 120 is a major east-west, two- and four-lane state highway in northern Stanislaus County that is the continuation of the primary route to Yosemite National Park. SR 120 also connects Oakdale to San Joaquin County.

SR 132 travels throughout the county in an east-west two-lane configuration, through the center of Modesto. This highway is known as Maze Boulevard west of Highway 99 and as Yosemite Boulevard east of Highway 99. SR 165 is a north-south facility located in the southern portion of the county, between the Merced County line and Highway 99 in Turlock. SR 219 is a two- and four- lane, east-west highway that connects with Highway 99 near Salida and SR 108 in Modesto.

The proposed project would be located along several stretches of roadway that have been identified by the Stanislaus Council of Governments (StanCOG) as possible future expressways in the 2010 StanCOG Regional Expressway Study (StanCOG 2010). The following possible alignments are located within the Proposed Action construction area (StanCOG 2014a and StanCOG 2014c):

1. County Road J17 (West Main Street) may serve as the main artery of the planned South County Corridor, which is a planned multilane lane expressway that will connect the cities of Patterson and Turlock. Construction required to widen West Main Street will occur in phases along segments of West Main Street; construction to widen West Main Street to three lanes from the San Joaquin River west to Carpenter Road is scheduled to begin in 2020 (StanCOG 2014b).
2. As part of the planned South County Corridor expressway, a Patterson Bypass is a planned expressway with an unspecified number of lanes that will route drivers around the City of Patterson and will serve to link I-5 with the City of Turlock. The Patterson Bypass may use existing Zacharias Road and construction would involve widening the road and realigning the intersection of Zacharias Road and SR 33, but according to the City of Patterson 2010 General Plan EIR, the Patterson Bypass does not have any funding forecasted, although the City has identified it as a need (City of Patterson 2010) and it is still under study (StanCOG 2010). Additionally, the intersection at Carpenter Road and West Main Street will be improved (StanCOG 2014a).
3. SR 33 is planned to be an expressway outside of the City of Patterson. It is currently a two lane road but StanCOG 2010 states there are plans to widen it to a four-lane expressway (StanCOG 2010). The City of Patterson General Plan EIR also states that SR 33 will be widened from downtown Patterson to the San Joaquin County line (but does not specify the number of lanes), and recommends widening the road to four lanes from the intersection of SR 33 and Sperry Road in downtown Patterson north to the intersection of Rogers Road and SR 33 (City of Patterson 2010).

Designated Truck Routes SRs 132, 108, and 120 are the east-west arteries running through the County. The primary north-south arteries are Highway 99 and I-5. All county roads, unless otherwise signed, are designated truck routes.

Transit Service Stanislaus Regional Transit (STaRT) offers transportation between cities within Stanislaus County and to the City of Merced via seven bus routes. Route 10 provides service between Modesto and Turlock during weekdays, and operates seventeen round trips between 5:05 a.m. and 10:35 p.m. Route 15 also provides service between Modesto and Turlock

during weekdays, and combines with the Modesto/Riverbank/Oakdale route to provide Saturday service. Route 40 offers service to Modesto, Grayson, Westley, and Patterson, Monday through Saturday. Route 45 West offers service to Patterson, Crows Landing, Newman, and Gustine, Monday through Saturday, and Route 45 East offers Monday through Saturday service between Turlock and Patterson. Route 60 offers weekday service between Modesto and Oakdale, as well as Saturday service to Riverbank. Route 70 offers service to Modesto, Turlock, and Merced Monday through Saturday. STaRT offers curb-to-curb shuttle services between Modesto/ Oakdale/ Riverbank, Turlock/Modesto/Ceres/Keyes, and Waterford/Modesto/Hughson/Empire. STaRT also offers Dial-A-Ride services in Newman, Oakdale, Patterson, Riverbank, and Waterford (STaRT 2014).

Turlock Transit Lines, operated by the City of Turlock, provides public transportation services via both the Bus Line Service of Turlock (BLAST) and Dial-A-Ride of Turlock (DART). BLAST service operates Monday through Friday, from 6:40 A.M. through 5:30 P.M. and from 9:25 A.M. through 4:00 P.M. on Saturday. BLAST serves virtually all major focal points in Turlock and Denair. DART provides curb-to-curb service to senior and disabled passengers in the greater Turlock and Denair areas. In Turlock, DART service is offered Monday through Friday, from 6:40 A.M. to 5:30 P.M., and on Saturday, from 9:25 A.M. to 4:00 P.M. In Denair, DART service is offered Monday through Friday, from 9:00 A.M. to 4:00 P.M., and on Saturday, from 9:30 A.M. to 3:30 P.M. (City of Turlock 2014).

Bikeways/Pedestrian Circulation The regional network of bicycle facilities includes a variety of Class I, II, and III bikeways within the cities and communities of Stanislaus County. Class I bicycle facilities are also known as bike paths. Class II facilities are more commonly known as bike lanes, and are designated by striping in paved roads or street ROW. Bicyclists using these facilities share the roadway with cars. The bike lanes are clearly marked and distinguished as guideways for bicycles. Class III facilities are bike routes that share ROW with other vehicles but have no striping or recognizable designation other than signage. No designated bicycle facilities exist within the study area (StanCOG 2014a), but West Main Street is a planned Class III bikeway (Stanislaus County 2011).

Railroads The CFNR maintains railroad tracks that are located adjacent and parallel to SR 33 within the designated study area.

Existing Traffic Volumes Daily traffic volumes in Stanislaus County range from more than 138,000 average daily trips (ADT) on Highway 99 to more than 16,000 ADT on arterials such as West Main Street to less than 2,000 ADT on local streets (StanCOG 2010). **Table 3.19-1** shows ADT values for road segments near the study area.

Table 3.19-1: Existing Daily Traffic Volumes on Roadways In and Around the Project Area

Roadway	Location	Daily Traffic (ADT)
Sperry Road	SR 33 to Ward Avenue	7,150
SR 33	Ward Ave to Westley, CA	5,042
SR 33	Crows Landing Road to Poppy Ave	3,650

Level of service (LOS) is a measure of the performance of transportation facilities. TStanCOG defines roadway LOS as one of six LOS designations: A, B, C, D, E, or F (StanCOG 2011). LOS A and B represent free flow or reasonably free flow operations, and LOS E and F represent high levels of congestion and unstable traffic flow. **Table 3.19-2** provides descriptions of each LOS category.

The LOS for the roadways that could be directly affected by the Action alternatives was not available during preparation of the Draft EIR/EIS or this Final EIS; however, the Stanislaus County General Plan (County of Stanislaus 1994) identifies a target LOS of C or better. The local roadways are not typically congested, and so this LOS is likely being met under baseline conditions.

Table 3.19-2: LOS Definitions/Characteristics

LOS	Description
A	Represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.
B	Stable flow, but the presence of others in the traffic stream begins to be noticeable.
C	Stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interaction with others in the traffic stream.
D	Represents high density, but stable flow.
E	Represents operating conditions at or near the capacity level.
F	Represents forced traffic flow or a breakdown in traffic flow.

Parking Unless otherwise indicated, parking is available to vehicles along the shoulders of County highways within the County ROW, per the Stanislaus County Code.

3.19.2 Regulatory Framework

This section describes laws and regulations at the federal, state, and local level that may apply to the Proposed Action.

Federal Highway Administration Manual on Uniform Traffic Control Devices

The Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) is a compilation of national standards for all traffic control devices, including road markings, highway signs, and traffic signals. This document, which has been administered by FHWA since 1971, is updated periodically to accommodate the nation's evolving transportation needs and addresses new safety technologies, traffic control tools and traffic management techniques. The most current version of the MUTCD is dated 2009 and was published in the Federal Register on June 13, 2012 (FHWA 2014).

Caltrans Transportation Management Plan Guidelines

Caltrans Transportation Management Plan Guidelines (2009) outlines strategies and guidelines that are needed to minimize traffic congestion during road work activities that are planned along existing Caltrans facilities. The guidelines established in this document identify processes, roles, and responsibilities for all planned construction, maintenance, and permit activities.

Incorporation of these strategies in project construction documents and implementation of the strategies are expected to help reduce congestion and manage traffic impacts near work areas.

Stanislaus County General Plan

The Circulation Element of the Stanislaus County General Plan (County of Stanislaus 1994) contains the following relevant policies and implementation measures:

GOAL ONE: Encourage the protection and preservation of natural and scenic areas throughout the County.

> *Policy Two:* Circulation systems shall be designed and maintained to promote safety and minimize traffic congestion.
>
> *Implementation Measure 1:* The County shall maintain LOS C or better for all County roadways and intersections, except, within the sphere of influence of a city that has adopted a lower level of service standard, the City standard shall apply.
>
> *Implementation Measure 7:* Within the spheres of influence of any city, roadway improvements, dedications, building setbacks, and road reservations shall meet the development standards of the city consistent with the Spheres of Influence Policy in the Land Use Element of the General Plan, except in those areas subject to an individual city/county agreement.
>
> *Implementation Measure 10:* Traffic control devices (e.g., traffic signals), traffic calming, and other transportation system management techniques shall be utilized to control the flow of traffic, improve traffic safety, and minimize delays.
>
> Policy Five: Transportation requirements of commercial and industrial development shall be considered in all planning, design, construction, and improvements.

GOAL TWO: Provide a safe, comprehensive, and coordinated transportation system that includes a broad range of transportation modes.

> *Policy Seven:* Bikeways and pedestrian facilities shall be designed to provide reasonable access from residential areas to major bicycle and pedestrian traffic destinations such as schools, recreation and transportation facilities, centers of employment, and shopping areas.
>
> *Implementation Measure 7:* Whenever a roadway is resurfaced or restored, adequate pavement shoulder and/or striping will be considered to safely accommodate bicycle travel in accordance with the County Standards and Specifications, the Caltrans Highway Design Manual, or other nationally recognized standard, where adequate right-of-way exists.
>
> *Policy Eight:* Promote public transit as a viable transportation choice.

GOAL THREE: Maintain a balanced and efficient transportation system that facilitates inter-city and interregional travel and goods movement.

> *Policy Nine:* The County shall promote the development of inter-city and interregional transportation facilities that more efficiently moves goods and freight within and through the region.

Modesto Urban Area General Plan

There are no transporation policies relevant to the Proposed Action. Operation of facilities under the Action alternatives would not generate more than 100 peak-hour trips, so a traffic study is not

required. Other policies pertain to development of the transportation network within the Modesto urban area and are not applicable to the Proposed Action.

3.19.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action could result in significant impacts related to local transportation and traffic. The analysis is based on a review of various plans, policies, and reports, as well as evaluations of aerial imagery and visits to the study area.

Operational effects would be minimal; pipelines would be buried and vehicle traffic generated by the project under the three Action alternatives would be limited to a very small number of infrequent vehicle trips for pipeline inspection and maintenance. For this reason, this impact analysis focuses on construction-related impacts.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines*, a traffic impact would be considered significant if the Proposed Action would:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of a circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersection, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roadways or highways.
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- Substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.
- Conflict with adopted policies regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to activities associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks* – Activities related to construction and operation of the Proposed Action alternatives would not interfere

with air traffic; they would neither require an alteration of air traffic patterns nor result in an increase in air traffic levels.

Impacts and Mitigation Measures

Impact TR-1 Temporary Lane and Road Closures and Potential for LOS Degradation

No Action Alternative Under the No Action Alternative, neither pipeline construction nor operation would occur. There would be no impacts to transportation and traffic under the No Action Alternative.

Combined Alignment Alternative (Alternative 1) All pipeline construction would occur within public roadways and other public ROW, private and municipal agricultural lands, and public open space areas. Construction of the pipeline alignment under this alternative would consist of open-cut construction, except at specific crossings (e.g., river, highway, railroad, and irrigation canals), where trenchless construction techniques would be employed. Equipment, material and vehicle staging would be accommodated either at the construction zones, or at selected off-site locations (e.g., open lots) owned by the Cities of Modesto and Turlock. To accommodate construction equipment and work area, the entire construction corridor (active work area including the trench) would be approximately 45 feet wide.

Lemon Avenue and Zacharias Road are narrow, two-lane rural roads that are approximately 20 feet wide with varying widths of shoulders surrounded by agricultural lands. Overhead electrical utility lines are located along a large portion of these roadways.Residences and other farm-related structures are scattered on parcels along these alignments.

If access can be provided along the roadway shoulders and adjacent property, only partial road closures with appropriate traffic control would be required. The potential exists for pipeline construction along West Main Street, Jennings Road and South Carpenter Road to create lane/road closures requiring detours and other traffic control. Road closures are also anticipated along Lemon Avenue during construction, which would necessitate detours. One segment of trenchless pipe would be required to cross both SR 33 and the CFNR.

Partial or complete closures of roadways could cause a degradation of LOS below acceptable standards, cause roadway congestion, and potentially create roadway hazards. This impact is considered to be potentially significant. Implementation of **Mitigation Measure TR-1** would reduce impacts to a level that is less than significant

Separate Alignment Alternative (Alternative 2) The impacts caused by the installation of the northern reach of the pipeline would be the same as those described for Alternative 1. Impacts along the southern reach of the pipeline would be similar. In particular, Pomegranate Avenue is a narrow, two-lane rural road that is approximately 20 feet wide with varying widths of shoulders surrounded by agricultural lands. Overhead electrical utility lines are located along a large portion of this roadway. Residences and other farm-related structures are scattered on parcels along the alignment. Installation of the southern reach of the pipeline would result in the closure of Pomegranate Avenue during construction, requiring detours. As in the case of the northern reach, one segment of trenchless pipe would be required to cross both SR 33 and the CFNR.

Impacts under this alternative would be similar to Alternative 1 and would be considered potentially significant. Implementation of **Mitigation Measure TR-1** would reduce impacts to a level that is less than significant.

PID Conveyance Alternative (Alternative 3) This alternative has a shorter length of pipeline than Alternatives 1 and 2, and the majority of the pipeline would be constructed in existing PID ROW along the Main Canal. Construction in roadways would be limited to about 1.3 miles of pipeline in Bartch Avenue and about 1 mile of pipeline in Ward Avenue. Impacts of construction in these roadways would be similar to those described for Alternative 1. As with the other alternatives, one segment of trenchless pipe would be required to cross both SR 33 and CFNR. Temporary lane and road closures would be considered potentially significant. Implementation of **Mitigation Measure TR-1** would reduce impacts to a level that is less than significant

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure TR-1: Implement a Construction Management Plan to Minimize Interference with Traffic and Emergency Response Hazards** (Alternatives 1, 2 and 3). The Partner Agencies or the construction contractor, in consultation with the County, will prepare and implement a Traffic Management Plan (TMP). The Partner Agencies will be responsible for ensuring that the plan is adequately developed and implemented. The Partner Agencies will provide the TMP to the Stanislaus County Department of Public Works and Caltrans. The TMP will include recommended traffic-control and traffic-reduction measures as identified in the Transportation Management Plan Guidelines issued by the Division of Traffic Operations Office of System Management Operations (Caltrans 2009). The Partner Agencies will require all traffic-control or traffic-reduction measures described in the TMP to be implemented. In addition, to the extent feasible, construction-related traffic and any temporary road closures shall be scheduled during non-peak traffic periods.

The measures included in the TMP shall be consistent with any applicable guidelines outlined in the Standard Specifications for Public Works Construction, the U.S. Department of Transportation's Manual on Uniform Traffic Control Devices, and the Work Area Traffic Control Handbook. The plan will include the following items:

- Definition of location and timing of any temporary lane or roadway closures.
- Identification and provision for circumstances requiring the use of temporary traffic control measures, such as flag persons, warning signs, lights, barricades, and cones to provide safe work areas in the vicinity of the project site or along the haul routes, including for narrow roadway segments, and to warn, control, protect, and expedite vehicular, bicycle, and pedestrian traffic and access by emergency responders.
- Implementation of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak-hour traffic, placement of detour signs (if required), lane closure procedures (if required), flaggers (if required), placement of cones for drivers, and designated construction access routes and access points.
- Notification to adjacent property owners, transit agencies and public safety personnel regarding when major deliveries, detours, and lane closures will occur.

- Measures to address the potential for construction-related traffic to impede emergency response vehicles and a specific training and information program for construction workers to ensure awareness of emergency procedures for project-related accidents.
- Identification of haul routes for movement of construction vehicles that will minimize impacts on vehicular and pedestrian traffic and circulation and safety, and provision for monitoring surface streets used for haul routes so that any damage and debris attributable to the haul trucks can be identified and corrected by the Partner Agencies in coordination with the construction contractor.
- Consideration of other projects in the vicinity that could also affect the same roadways as the project.
- Development of a process for responding to and tracking complaints pertaining to construction activity, including identification of an onsite complaint manager.
- Documentation of road pavement conditions for all routes that would be used by construction vehicles both before and after project construction. Roads damaged by construction vehicles will be repaired to the level at which they existed before project construction.

Significance after Mitigation Less than significant.

Impact TR-2. Potential Impacts on Public Transit, Bicycle, and Pedestrian Uses of Affected Roadways

No Action Alternative Under the No Action Alternative, no pipeline construction would occur. There would be no impacts to transportation and traffic under the No Action Alternative.

Combined Alignment Alternative (Alternative 1) Traffic impacts during construction of Alternative 1 may include disruption of alternative modes of transportation, such as blocking bicycle or pedestrian access on the shoulders of area roadways. The potentially affected roadways do not have sidewalks or specifically delineated bike lanes. Impacts on transportation and traffic would be temporary in nature but could significantly conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation. STaRT Route 45 West travels along West Main Street Monday through Saturday of each week, and could be affected by lane or road closures of West Main Street or the surrounding roads that may be affected by the construction of this alternative. Additionally, the shoulders of the roads that may be affected may be used by pedestrians and cyclists, who could in turn be affected by lane or road closures. This impact is considered potentially significant. Implementation of **Mitigation Measure TR-1** would reduce potential impacts on transit, bicycle, and pedestrian uses of potentially affected roadways during the construction phase, and would ensure that impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be similar to those of Alternative 1, and are considered potentially significant. Implementation of **Mitigation Measure TR-1** would reduce potential impacts on transit, bicycle, and pedestrian uses of potentially affected roadways during the construction phase, and would ensure that impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) The pipeline alignment for this alternative would not affect any public transit routes, but could affect bicycle or pedestrian access along Bartch and Ward Avenues. Impacts would be similar to those of Alternative 1, and are considered potentially significant. Implementation of **Mitigation Measure TR-1** would reduce potential impacts on bicycle, and pedestrian uses of potentially affected roadways during the construction phase, and would ensure that impacts would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measure TR-1.**

Significance after Mitigation Less than significant.

Impact TR-3 Interference with Emergency Access and Circulation
No Action Alternative Under the No Action Alternative, neither pipeline construction nor operation would occur. There would be no impacts to the access and circulation of emergency vehicles under the No Action Alternative.

Combined Alignment Alternative Construction of this alternative could interfere with the accessibility of roadways to emergency vehicles. Lane closures or full road closures, particularly along limited-width roads such as Lemon Avenue, Zacharias Road, Pomegranate Avenue, and Jennings Road could affect the response time necessary for emergency vehicles responding to emergencies in the area or traveling through the area. Impacts on emergency access and circulation would be temporary in nature but could significantly conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system. This impact is considered potentially significant. Implementation of **Mitigation Measure TR-1** would address the potential to interference with emergency access and circulation, reducing this impact to a level that would be less than significant.

Separate Alignment Alternative (Alternative 2) Impacts under this alternative would be similar to those of Alternative 1. Road closures could result in delays to emergency vehicles using roads that may be affected by construction. This impact is considered potentially significant. Implementation of **Mitigation Measure TR-1** would reduce this impact to a level that would be less than significant.

PID Conveyance Alternative (Alternative 3) Impacts under this alternative would be similar Alternative 1, though fewer roads would be affected. Road closures could result in delays to emergency vehicles using roads that may be affected by construction. This impact is considered potentially significant. Implementation of **Mitigation Measure TR-1** would reduce this impact to a level that would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measure TR-1**.

Significance after Mitigation Less than significant.

Impact TR-4 Impacts to Traffic and Circulation from Trip Generation
No Action Alternative Under the No Action Alternative, neither pipeline construction would occur. There would be no trip generation under the No Action Alternative.

Combined Alignment Alternative Construction of this alternative would generate vehicle trips for deliveries of equipment and materials and disposal of spoil, and workers would be expected to commute via car from their homes to the work areas. This could result in impacts to traffic and circulation along potentially affected roadways.

Under this alternative, hauling trips could range from zero (for locations not requiring haul of spoil, such as for reconstruction of the pump station), to 83 round trips per day (for pipeline trenching). Worker vehicle trips are estimated to range from 8 to 28 round trips per day. In addition, a maximum of 25 truck trips per day would be required for delivery of imported backfill, pipe, equipment and other materials. This would introduce considerable additional traffic volume to existing roadways, many of which are small, rural, and do not have substantial capacity. While the existing traffic volumes on these roadways are generally low, and impacts would be short-term in any particular location, the traffic generated by the project could reduce LOS below acceptable levels and impair traffic circulation. This impact is considered potentially significant. **Mitigation Measure TR-1** would address these impacts by developing a construction TMP, which would identify haul routes, timing, and other factors to reduce impacts. With implementation of this mitigation measure, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Impacts of this alternative would be similar to those of Alternative 1. Hauling trips could range from zero (for locations not requiring haul of spoil, such as for reconstruction of the pump station), to 71 round trips per day (for pipeline trenching). Worker vehicle trips are estimated to range from 8 to 28 round trips per day. In addition, a maximum of 25 truck trips per day would be required for delivery of imported backfill, pipe, equipment and other materials. This impact is considered potentially significant. **Mitigation Measure TR-1** would address these impacts by developing a construction TMP, which would identify haul routes, timing, and other factors to reduce impacts. With implementation of this mitigation measure, impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Impacts of this alternative would be similar to those of Alternatives 1 and 2, though there would be fewer hauling trips because of the shorter length of pipeline. **Mitigation Measure TR-1** would address these impacts by developing a construction TMP, which would identify haul routes, timing, and other factors to reduce impacts. With implementation of this mitigation measure, impacts would be less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measure TR-1**.

Significance after Mitigation Less than significant.

Impact TR-5 Damage to Driveways from Open Trench Excavation
No Action Alternative Under the No Action Alternative, neither pipeline construction nor operation would occur. There would be no impacts to driveways along the above listed roadways under the No Action Alternative.

Combined Alignment Alternative (Alternative 1) Residences and facilities located along South Carpenter Road, West Main Street, Jennings Road, Lemon Avenue, and Zacharias Road that use driveways to access their respective roadways could be affected by open-trenching activities that would occur along these roadways. This is considered to be a potentially significant impact. **Mitigation Measure TR-2** would reduce this impact by providing access to driveways outside of construction work hours. Together with **Mitigation Measure TR-1**, which would include notification of adjacent property owners of planned construction activities, impacts due to interference with driveway access because of open trenching activities would be reduced to less than significant.

Separate Alignment Alternative (Alternative 2) Residences and facilities located along Lemon Avenue, Zacharias Road, and Pomegranate Avenue that use driveways to access their respective roadways could be affected by open-trenching activities that would occur along these roadways.This is considered to be a potentially significant impact. **Mitigation Measure TR-2** would reduce this impact by providing access to driveways outside of construction work hours. Together with **Mitigation Measure TR-1**, which would include notification of adjacent property owners of planned construction activities, impacts due to interference with driveway access because of open trenching activities would be reduced to less than significant.

PID Conveyance Alternative (Alternative 3) Residences and facilities located along Bartch Avenue and Ward Avenue that use driveways to access their respective roadways could be affected by open-trenching activities that would occur along these roadways. This is considered to be a potentially significant impact. **Mitigation Measure TR-2** would reduce this impact by providing access to driveways outside of construction work hours. Together with **Mitigation Measure TR-1**, which would include notification of adjacent property owners of planned construction activities, impacts due to interference with driveway access because of open trenching activities would be reduced to less than significant.

Significance Determination before Mitigation Potentially significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures See **Mitigation Measure TR-1**.

Mitigation Measure TR-2: Install Temporary Trench Plates over Open Trenches
(Alternatives 1, 2 and 3). During construction of the pipeline, temporary trench plates will be installed over open trenches at the end of each work day.

Significance after Mitigation Less than significant.

Impact TR-6 Impacts to State Route 33 and California Northern Railroad Company Railroad Tracks

No Action Alternative Under the No Action Alternative, there would be no impacts to SR 33 and CFNR railroad tracks, as construction of the pipeline would not take place.

All Action Alternatives (Alternative 1, 2, and 3) Pipeline crossings of SR 33 and CFNR railroad tracks could result in impediments to highway and rail traffic, respectively. However, trenchless construction methods (HDD or jack and bore construction) would be used for crossings of SR 33 and CFNR tracks, which would avoid traffic and circulation impediments to these transportation corridors. By using trenchless technology, the Action alternatives would avoid impacts to SR 33, CFNR tracks, and related roadway and rail traffic; there would be no impact.

Significance Determination before Mitigation No impact.

Mitigation Measures No mitigation measures are necessary.

Impact TR-7 Impacts to Roadway Surfaces as a Result of Construction Activities

No Action Alternative There would be no impacts to roadway surfaces if the No Action Alternative is implemented as no construction would occur.

Combined Alignment Alternative (Alternative 1) Implementation of this alternative would involve open trench construction along roadways and roadway shoulders, which would involve cutting into the roadway surface in various locations. Damage to the roadway would be temporary; upon completion of the pipeline installation, affected roadways would be repaved per the requirements of Stanislaus County (Stanislaus County 2014). Because damage to roadways would be temporary and roadway surfaces would be restored after construction, impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as under Alternative 1, and would be less than significant.

PID Conveyance Alternative (Alternative 3) Impacts would be the same as under Alternative 1, though there would be less construction in roadways; impacts would be less than significant.

Significance Determination before Mitigation Less than significant for all Action alternatives. No impact for the No Action Alternative.

Mitigation Measures No mitigation measures are necessary.

Cumulative Impact Analysis

The geographic scope of cumulative impacts related to transportation and traffic includes the construction footprint and surrounding roadways. The Proposed Action, as well as other projects listed in **Table 3.0-1**, would result in significant cumulative impacts if they collectively adversely affect the same roadways or other transportation infrastructure. Projects listed in **Table 3.0-1** that are relevant to the Proposed Action are the South County Corridor Study and the West Main Street Highway Improvement project. Although none of the roads that would be affected

by the proposed Action alternatives would be directly affected by roadway improvements during the Proposed Action's construction phase, it is possible that the intersection of South Carpenter Road and West Main Street will undergo construction starting in 2016, as the roadway widening of the segment of West Main Street from Carpenter Road to Crows Landing Road is scheduled to begin in 2016 (StanCOG 2014c). Roadway widening and associated improvements to the intersection of West Main Street and South Carpenter Road, combined with construction activities required to implement the Proposed Action, could result in potentially significant cumulative impacts by resulting in lane closures, roadway closures, and construction-related traffic at the same time, increasing congestion on local roadways. The Proposed Action's contribution would be considerable, and this would be a potentially significant impact.

Mitigation Measure TR-1 would involve preparation of a construction management plan for traffic, which would include consideration of other projects in the development of measures to reduce the traffic impacts of the Proposed Action. With implementation of this mitigation measure, the contribution of the project to this cumulative impact would be reduced to a level where it would no longer be considerable.

Significance Determination before Mitigation Potentially significant for all Action alternatives.

Mitigation Measures See **Mitigation Measure TR-1.**

Significance after Mitigation Less than significant.

3.19.4 References

California Department of Transportation (Caltrans). June 2009. Transportation Management Plan Guidelines. Division of Traffic Operations, Office of System Management Operations. Available: http://www.dot.ca.gov/hq/traffops/systemops/tmp_lcs/files/TMP_Guidelines.pdf. Accessed July 14, 2014.

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Chapter 4 Other NEPA Considerations

4.1 Significant and Unavoidable Impacts

As described in *Chapter 3, Affected Environment/Environmental Setting, Environmental Consequences/Impacts and Mitigation Measures,* there would be no significant and unavoidable impacts from Alternatives 1 and 2. Alternative 3 could result in a significant unavoidable impact associated with the need for additional treatment of wastewater prior to discharge to the San Joaquin River due to future requirements and the resultant need for brine disposal.

The No Action Alternative does have the potential to result in significant impacts associated with the lack of a reliable water supply. There is a potential for increased groundwater pumping, which could result in further depletion of the groundwater basin. It is also likely that a lack of water supply could lead to the conversion of agricultural land to non-agricultural uses. This would be a significant unavoidable impact. In addition, the No Action Alternative could result in a significant unavoidable impact associated with the need for additional treatment of the wastewater prior to discharge to the San Joaquin River due to future requirements and the resultant need for brine disposal.

4.2 Irreversible and Irretrievable Commitments of Resources

Implementation of the Proposed Action would require irreversible commitment of natural resources including construction materials; labor; and energy required for construction, operation, and maintenance. Commitment of non-renewable natural resources used in construction would include gravel, petroleum products, steel, and others. Commitment of energy resources for construction would include fuel oil, natural gas, and gasoline for heavy machinery. Operation of the Proposed Action would result in further commitment of energy resources. However, the consumption of energy for construction and operation would not be inefficient, wasteful or unnecessary. The Proposed Action would support the reuse of recycled water for irrigation in the region, which would otherwise be discharged into the San Joaquin River.

4.3 Growth Inducing Impacts

Projects are considered to have growth-inducing implications when economic, housing, or population growth occur either directly or indirectly. Local land use plans (e.g., general plans) provide for development patterns and growth policies that allow for the planned and orderly expansion of urban development (i.e., residential, commercial and industrial uses) supported by adequate urban public services (e.g., water supply, wastewater treatment, solid waste service disposal capacity, police and fire services). A project that would induce unplanned growth (i.e., conflict with local land use plans) could indirectly cause adverse environmental impacts not

previously envisioned. Thus, to assess whether a project has the potential to induce growth and result in adverse secondary effects beyond what is anticipated by the local jurisdiction, it is important to assess the degree to which the growth associated with a project would or would not be consistent with applicable land use plan.

Construction of the Proposed Action alternatives would not directly induce population growth, as no new residential or commercial development projects would be served by the project (see *Section 3.16, Population and Housing*). The Proposed Action would deliver recycled water to existing growers in the DPWD Service area (within Stanislaus, San Joaquin and Merced Counties) for agricultural irrigation purposes only. Growers in this region rely heavily on CVP supplies[1] (Reclamation 2011), augmented by groundwater pumping and surface water transfers, which vary depending on Delta pumping restrictions, drought conditions, and climate change and associated allocations by Reclamation. The proposed Action alternatives would also not indirectly induce growth (by removing or reducing the barriers to growth) because recycled water would not offset potable supplies in the cities of Turlock or Modesto where the recycled water is derived, or in any of the counties where recycled water would be delivered. Recycled water would be used beneficially for irrigation purposes for existing growers who have unreliable water supply, in lieu of being discharged into the San Joaquin River and being exported out of the region. Recycled water would also supplement supplies to refuges. Delivering non-potable water supply to refuges and to potential users within the DPWD service area would not increase existing potable water supplies and thus would not indirectly accommodate additional development within the cities or counties. Thus, impacts of growth inducement are less than significant for all three Action alternatives.

4.4 Environmentally Preferable Alternative

Reclamation and the Partner Agencies have identified Alternative 1 – Combined Alignment Alternative, as the Preferred Alternative.

Reclamation is required to identify the Preferred Alternative in a Final EIS (unless prohibited by law) (40 CFR 1502.14(e) and 43 CFR 46.425). It should be noted that CEQ regulations do not require identification of a Preferred Alternative in a Draft EIS if none has been determined. The Preferred Alternative should be an alternative that completes the action and that best meets the purpose and need for the action, as defined in an EIS. Defining the Preferred Alternative does not define the Federal lead agency's final decision. It is not necessary to provide a separate discussion in an EIS on the rationale for selecting of a Preferred Alternative. That specific discussion is most appropriate for the Record of Decision. The intention is to inform the public what the Federal lead agency considers best, based on available information. Public comments or other considerations may result in a change in the Preferred Alternative and may even result in the final decision (recorded in the Record of Decision) not being the Preferred Alternative identified in a Final EIS.

[1] DPWD has also secured alternate water supplies through temporary water transfers from other agencies or the use of groundwater from privately owned wells.

If an alternative exists that has the consensus of the affected community and is reasonable and practicable, meets the purpose and need for action, and is within Reclamation's statutory authority to implement, Reclamation should designate that alterative as the Preferred Alternative or explicitly explain why it was not so designated (43 CFR 46.110). No such consensus-based alternative has yet to be proposed by any party.

4.5 References

Bureau of Reclamation (Reclamation). 2014. Reclamation Announces Initial 2014 Central Valley Project Water Supply Allocation. February 21. Available at: http://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=46045

Bureau of Reclamation (Reclamation). 2011. Del Puerto Water District Water Management Plan. 2008 Criteria. July 5. Available at: http://www.water.ca.gov/wateruseefficiency/sb7/docs/2014/plans/Del%20Puerto%20WD%20PLAN_DOCUMENT.pdf

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Chapter 5 Consultation, Coordination and Compliance

This chapter summarizes the activities undertaken by Reclamation and the Partner Agencies to satisfy NEPA, CEQA, and other regulatory requirements, as well as activities undertaken for public and agency involvement. As described in Chapter 1, Reclamation and the City of Modesto jointly prepared a Draft EIR/EIS for the proposed NVRRWP, but due to timing constraints the City of Modesto prepared a standalone Final EIR (SCH# 2014042068) pursuant to CEQA requirements which was released on June 19, 2015 and certified by the City on July 7, 2015. This Final EIS has been prepared by Reclamation to satisfy NEPA requirements.

5.1 Scoping

The CEQA Notice of Preparation (NOP) and NEPA NOI for the Draft EIR/EIS were released on April 22, 2014, and distributed to 27 agencies. Postcards with information on where the NOP could be viewed and notification of the scoping meeting were also sent to 32 organizations and 84 property owners. The release of the NOP and NOI, along with postings of these notices in the local newspapers and on the websites of Reclamation and the Partner Agencies, began the 30-day scoping period for the project which ended on May 22, 2014. A joint public scoping meeting for the Draft EIR/EIS was held at on May 13, 2014 at the City of Modesto (2nd Floor Conference Room 2001 at 1010 Tenth Street). The Scoping Report is included in **Appendix A** of this Final EIS.

5.2 Draft EIR/EIS Distribution

As described previously, the Draft EIS/EIR was distributed for a 60 day public review and comment period beginning on January 8, 2015. A public meeting was held on Wednesday, February 11, 2015 at Modesto City Hall, 1010 Tenth Street, Modesto. During the public review period, Reclamation and the City of Modesto received 15 comment letters. The City of Modesto also received correspondence from the State Clearinghouse documenting the completion of the public review period for the Draft EIR. There were no verbal comments made at the public meeting. The comment letters and Reclamation's response to comments are included in *Chapter 8* of this Final EIS.

During the public review period, the Draft EIR/EIS was available for review on Reclamation's website (http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=17241), the Partner Agencies website (http://www.nvr-recycledwater.org/documents.asp), and at the following locations:

Bureau of Reclamation
1243 "N" Street
Fresno, CA 93721

City of Modesto, Utilities Department
1010 Tenth Street, 4th Floor
Modesto, CA 95354

City of Turlock
156 S. Broadway
Turlock, CA 95380

Del Puerto Water District
17840 Ward Ave
Patterson, CA 95363

The distribution list for the Draft EIR/EIS is included as **Appendix H**.

5.3 Compliance with Federal Statutes and Regulations

This section describes the status of compliance with relevant federal laws, executive orders, and policies.

5.3.1 Federal Endangered Species Act

Section 7 of the ESA (16 U.S.C. § 1531 *et seq.*) requires federal agencies, in consultation with and with the assistance of the Secretary of the Interior and or Commerce, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species. The USFWS and NMFS have regulatory authority over projects pursuant to the ESA that may affect the continued existence of a federally listed (threatened or endangered) species. Section 9 of the ESA prohibits the take of federally listed species. Take is defined under the ESA, in part, as killing, harming, or harassment of such species. Under federal regulations, take is further defined to include habitat modification or degradation where it actually results in death or injury to wildlife by substantially impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Section 7 of the ESA outlines procedures for federal interagency cooperation and participation in the conservation and recovery of federally listed species and designated critical habitat. Section 7(a)(2) requires federal agencies to consult with other federal agencies with regulatory authority to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or to destroy or adversely modify designated critical habitat. Critical habitat identifies specific areas that have the physical and biological features that are essential to the conservation of a listed species, and that may require special management considerations or protection.

Chapter 3.4, Biological Resources, describes the sensitive species that have the potential to occur in the area, and potential effects to federal endangered and threatened species. Impacts to species will be avoided through the implementation of Mitigation Measures, or through measures established in consultation with the USFWS and NMFS.

Reclamation has been coordinating with USFWS and NMFS on an ongoing basis since early in the planning process to incorporate ESA section 7(a)(2) consultation for potential effects to listed species due to the Proposed Action. Reclamation will not initiate any action related to the NVRRWP without first completing the appropriate consultation(s) with USFWS or NMFS. Documentation of the completion of Section 7 consultation will be included in the Record of Decision issued by Reclamation for the Proposed Action.

5.3.2 Fish and Wildlife Coordination Act

FWCA of 1934, as amended (16 U.S.C. § 661 *et seq*.) is intended to promote conservation of fish and wildlife resources by preventing their loss or damage, and to provide for development and improvement of fish and wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to fully consider recommendations made by USFWS, NMFS, and State wildlife agencies when any waterbody is impounded, diverted, controlled, or modified for any purpose.

FWCA requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. Reclamation has initiated consultation with the USFWS pursuant to FWCA. Documentation of the completion of FWCA consultation will be included in the Record of Decision issued by Reclamation for the Proposed Action.

5.3.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Act of 1976 as amended (16 U.S.C. § 1801 *et seq*.), is the primary act governing federal management of fisheries in federal waters, from the 3-nautical-mile state territorial sea limit to the outer limit of the U.S. Exclusive Economic Zone. It establishes exclusive U.S. management authority over all fishing within the Exclusive Economic Zone, all anadromous fish throughout their migratory range except when in a foreign nation's waters, and all fish on the continental shelf. The Magnuson-Stevens Act establishes eight Regional Fishery Management Councils responsible for the preparation of fishery management plans to achieve the optimum yield from U.S. fisheries in their regions. The act also requires federal agencies to consult with NMFS on actions that could damage EFH. EFH, as defined in the 1996 Sustainable Fisheries Act (Public Law 104-297). EFH includes those habitats that support the different life stages of each managed species. A single species may use many different habitats throughout its life to support breeding, spawning, nursery, feeding, and protection functions. EFH can consist of both the water column and the underlying surface (e.g., streambed) of a particular area. The San Joaquin River in the Study Area is designated EFH for Chinook salmon. As described in *Section 3.4, Biological Resources,* the project is not expected to have adverse effect on fish habitat in the San Joaquin River. Reclamation is consulting with NMFS pursuant to the Magnuson-Stevens Act in coordination with its ESA consultation.

5.3.4 National Historic Preservation Act, Section 106

The purpose of NHPA (16 U.S. Code § 470) is to protect, preserve, rehabilitate, or restore significant historical, archeological, and cultural resources. Section 106 of the act requires Federal agencies to take into account effects on historic properties. Once an undertaking has been established, the Section 106 review involves a step-by-step procedure described in detail in the implementing regulations (36 CFR Part 800). Reclamation initiated consultation with the SHPO on May 27, 2015 requesting concurrence with a finding of no adverse effects to historic properties affected for the Proposed Action. SHPO concurred with Reclamation's determination on July, 2, 2015.

5.3.5 Clean Air Act

The U.S. Congress adopted general conformity requirements as part of the CAA Amendments in 1990 and the EPA implemented those requirements in 1993 (Sec. 176 of the CAA (42 U.S.C. § 7506) and 40 CFR Part 93, Subpart B). General conformity requires that all federal actions "conform" with the SIP as approved or promulgated by EPA. The purpose of the general conformity program is to ensure that actions taken by the federal government do not undermine state or local efforts to achieve and maintain the national ambient air quality standards. Before a federal action is taken, it must be evaluated for conformity with the SIP. All "reasonably foreseeable" emissions predicted to result from the action are taken into consideration. These include direct and indirect emissions, and must be identified as to location and quantity. If it is found that the action would create emissions above *de minimis* threshold levels specified in EPA regulations (40 CFR § 93.153(b)), or if the activity is considered "regionally significant" because its emissions exceed 10 percent of an area's total emissions, the action cannot proceed unless mitigation measures are specified that would bring the Proposed Action into conformance. As described in *Section 3.3, Air Quality*, the study area lies within the San Joaquin Valley Air Basin. The results of the air quality modeling showed that NO_x emissions could exceed Federal General Conformity significance thresholds. With implementation of **Mitigation Measure AIR-1** (reduce NO_x emissions), impacts would be reduced to less than significant. Thus, the project is in compliance with this Act.

5.3.6 Farmland Protection Policy Act

FPPA (7 U.S.C. § 4201 *et seq.*) requires a federal agency to consider the effects of its actions and programs on the nation's farmlands. The FPPA is intended to minimize the impact of federal programs with respect to the conversion of farmland to nonagricultural uses. It assures that, to the extent possible, federal programs are administered to be compatible with state, local, and private programs and policies to protect farmland. As described in *Section 3.1, Agriculture and Forestry Resources*, no long term conversion of farmland to non-agricultural use would occur. There could be temporary impacts to soil resources during construction where activities would occur within agricultural land, but such effects would be mitigated to less-than-significant levels with implementation of **Mitigation Measure AG-1**. Thus, the project would be in compliance with this Act.

5.3.7 Executive Order 11988 – Floodplain Management

EO 11988 requires federal agencies to recognize the values of floodplains and to consider the public benefits from restoring and preserving floodplains. Because pipelines would need to cross

under the San Joaquin River, there would be facilities located within the floodplain, but the buried pipelines and associated small appurtenances such as air release valves, would not increase flood hazards or interfere with floodplain management. Reclamation and the Partner Agencies have considered EO 11988 in their development of the NVRRWP alternatives and have complied with this order.

5.3.8 Federal Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and Executive Order 13168

The MBTA (16 U.S.C. §§ 703-712) and the Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668c) prohibit the take of migratory birds (or any part, nest, or eggs of any such bird) and the take and commerce of eagles. EO 13168 requires that any project with federal involvement address impacts of federal actions on migratory birds. As described in *Section 3.4, Biological Resources*, the Proposed Action could have potential to impact burrowing owls and tricolored blackbirds. However, with **Mitigation Measures BIO-9** and **BIO-10**, impacts would be reduced to less than significant. *Section 3.4* also evaluated the impacts on golden eagle and bald eagle and determined that potential impacts on these species would be less than significant. Thus, the lead agency would be in compliance with this EO and the Acts.

5.3.9 Executive Order 13112: Invasive Species

EO 13112 directs all federal agencies to prevent and control introductions of invasive non-native species in a cost-effective and environmentally sound manner to minimize their economic, ecological, and human health impacts. As directed by this EO, a national invasive species management plan guides federal actions to prevent, control, and minimize invasive species and their impacts (NISC 2008). No invasive species that warrant removal have been identified in the study area. In areas where revegetation is required, use of native species will be required so as to insure that invasive non-native plant species are not introduced to the area. Discharge of recycled water would not entail any risk of introducing invasive aquatic species to the DMC. The Proposed Action would thus be in compliance with this EO.

5.3.10 Executive Order 11990 – Protection of Wetlands

Under EO 11990, federal agencies must avoid affecting wetlands unless it is determined that no practicable alternative is available. The EO directs federal agencies to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in implementing civil works. As described in *Section 3.4, Biological Resources*, wetlands likely occur in the study area. A jurisdictional wetland delineation has been submitted to USACE for verification. Mitigation measures have been identified to reduce potentially significant impacts to less than significant levels. These include avoidance of federally protected wetlands to the extent possible through alignment adjustments and use of trenchless construction techniques, compensatory mitigation for losses of aquatic resources, and measures to reduce impacts of a frac-out. Thus, the Proposed Action will be in compliance with EO 11990.

5.4 Cooperating Agencies

Under NEPA cooperating agencies are agencies other than the lead agency that have jurisdiction by law or special expertise with respect to the environmental impacts expected to result from a proposed project. For the NVRRWP, the following agencies have been designated as Cooperating Agencies pursuant to NEPA in preparation of the Draft EIR/EIS and the Final EIS:

- City of Modesto, the lead agency for CEQA and one of the partners in the NVRRWP
- DPWD, a partner in the NVRRWP
- USFWS, responsible for biological consultation regarding effects on terrestrial and freshwater aquatic species
- NMFS, responsible for biological consultation regarding effects on anadromous fish
- City of Turlock, a partner in the NVRRWP

In addition, Reclamation is consulting with the USACE regarding necessary permits under Section 404 of the CWA. The USACE has designated Reclamation as the NEPA lead for permitting under both Section 7 of the ESA and Section 106 of the NHPA.

5.5 References

United States Environmental Protection Agency (EPA). 2014. Pacific Southwest, Region 9. 2014. Ground Water – Sole Source Aquifer. Last updated September 25, 2013. Available at: http://epa.gov/Region9/water/groundwater/ssa.html

Chapter 6 EIS Preparers

A list of persons who prepared or reviewed various sections of the Final EIS, prepared significant background materials, or participated substantially in preparing the Final EIS is presented below.

6.1 EIS Preparation Team

Table 6-1: List of Preparers

Name	Qualifications	Project Role
	Bureau of Reclamation, NEPA Lead Agency	
Scott Taylor, Repayment Specialist	M.S. Economics, 6 years experience	Project Manager
Ben Lawrence, Natural Resource Specialist	B.S. Chemical Engineering, 16 years experience	NEPA Review- South-Central California Area Office
Rain Emerson, Supervisory Natural Resource Specialist	M.S. Biology - Evolutionary and Ecology Option, 6 years experience	NEPA Review- South-Central California Area Office
Doug Kleinsmith, Natural Resources Specialist		NEPA Review- Mid-Pacific Regional Office
Liz Vasquez, Natural Resource Specialist	M.S. Environmental Science and Management, 10 years experience	NEPA Review- Mid-Pacific Regional Office
Jennifer Lewis, Wildlife Biologist	B.A. Biology, Ph.D. Entomology, 5 years experience	Review: Biology
Mark Carper, Archaeologist	M.A. Archaeology, 15 years experience	Review: Cultural Resources
Mary Johannis, Deputy Regional Planning Officer	B.S. Civil Engineering, Professional Engineer, 20 years experience	Review: Energy
Lisa Rainger, Geologist	B.S. Geology, 27 years experience	Review: Geology
Michael Mosley, Physical Scientist	B.S. Geological and Environmental Science, 6 years experience	Review: Water Quality
Tim Rust, Fish and Wildlife Program Manager	B.S Biology, M.S. Environmental Engineering, 34 years experience	Review: Refuges and Water
Chris Eacock, Project Manager/Soil Scientist		Review: Water Quality
Patricia Rivera, Native American Affairs Program Manager	B.A. Social Work, Anthropology, and Sociology; M.S. Public Policy and Administration; J.D., 8 years experience	Review: Indian Trust Assets

Andrea Meier, Natural Resource Specialist	B.S. Environmental Toxicology, M.S. Public Policy and Administration, 12 years experience	Review: Project Description
David Woolley, Land Resource Specialist		Review: Recreation
	RMC Water and Environment	
Robin Cort	B.S. Biology, Ph.D. Ecology; over 30 years experience in water resources planning, environmental documentation and permitting	Manager of EIR/EIS preparation
Lyndel Melton	M.S. Environmental Engineering, B.S., Civil Engineering: Over 36 years experience in civil, environmental and water resources planning and design and environmental compliance	Project Manager and Technical Reviewer
Carrie Del Boccio	M.S. Environmental Engineering, B.S., Civil Engineering, Education Abroad; Over 9 years experience in water planning and treatment design, pipeline design	Project Engineer
Sue Chau	B.A. Environmental Science; over 15 years experience in water resources including water/wastewater treatment, storage, conveyance, and water supply, CEQA and NEPA compliance and water planning	Population and Housing; Growth Inducement
Katie Cole	M.S. Environmental Science and Management, B.S. Sociology and Environmental Studies; 1 year experience in water resources planning	Land Use, Energy, Geology and Soils, Public Services and Utilities, Hazards and Hazardous Materials,
Phoebe Grow	M.S. Environmental Management, B.S. and B.A.; Over 10 years experience in environmental engineering in water resources planning, regulatory compliance, environmental permitting, stormwater management, and regional watershed planning	Hydrology and Water Quality
Reza Namvar	Ph.D. Civil Engineering, M.S., B.S.; Over 19 years experience in environmental and water resources planning, management and engineering, development and application of groundwater flow and contaminant transport models	Groundwater analysis
Ryan Doyle	B.S. Civil and Environmental Engineering; Over 1 year experience water resources planning and design to groundwater modeling and remediation	GIS
Lindsey Wilcox	B.S. Environmental Resources and Forest Engineering; Over 8 years experience in water resource planning and permitting	Document preparation
	Basin Research	
Colin Busby	Ph.D. Anthropology, 38 years cultural resources management experience	Cultural Resources, Historic Property Survey Report
Donna Garaventa	Ph.D. Anthropology, 35 years experience in cultural resources assessment	Cultural Resources, Historic Property Survey Report
	Horizon Water and Environment	
Michael Stevenson	M.S., Environmental Science, 17 years experience in environmental compliance	Technical oversight, QA/QC
Kevin Fisher	M.S., Ecology, 14 years experience in biological assessments	Biological Resources
Jen Schulte	Ph.D., Chemical Engineering, 8 years experience in air and noise impact assessment	Air Quality, Global Climate Change/GHGs, Noise
Allison Chan	M.S., Environmental Management, 7 years experience in environmental analysis	Aesthetics
Jacob Finkle	B.S., Environmental Sciences, 3 years experience in environmental analysis	Traffic/Transportation
Patrick Donaldson	M.S., Environmental Management, 3 years experience in environmental analysis	Environmental Justice, Agriculture and Forestry Resources
Pam Rittlemeyer	M.A., Geography, 6 years experience in environmental analysis	Recreation

Catherine Schnurrenberger	M.S. Ecology, 24 years experience in environmental analysis	Biological Resources
Brian Piontek	M.S., Environmental Management, 3 years experience in environmental analysis	Biological Resources
Corrina Lu	M.A., Geography, 13 years experience in environmental analysis	Biological Resources
Paul Glendening	B.A., Geography, 13 years experience in environmental analysis	GIS
Scott Walls	MLA, 6 years experience in environmental analysis	Biological Resources

6.2 North Valley Regional Recycled Water Program Partner Agencies Reviewers

City of Modesto, CEQA Lead Agency

William Wong, P.E.	Engineering Division Manager, Utilities Department
Larry Parlin, P.E.	Director of Utilities
Richard Ulm, P.E.	Former Director Utility and Planning Projects

City of Turlock

Michael Cooke	Municipal Services Director
Dan Madden	Former Municipal Services Director
Garner Reynolds, P.E.	Regulatory Affairs Manager

Del Puerto Water District

Anthea Hansen	General Manager

City of Ceres

Michael Brinton, P.E.	Deputy Director of Public Works

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