Final Initial Study/ Negative Declaration

For The

Knights Landing Outfall Gates Rehabilitation Project

Prepared by:

Division of Flood Management
Flood Maintenance Office
3310 El Camino Avenue, Suite 140
Sacramento, California 95821

Contact person:

Bonnie Green Ross
bross@water.ca.gov
(916) 574-0372

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Introduction

The Department of Water Resources (DWR) proposes the Knights Landing Outfall Gates Rehabilitation Project (Project) to replace ten gates on each side of the outfall structure at the project site. DWR maintains certain specified features of the Sacramento River Flood Control Project, including many miles of levees and all weirs and flood relief structures as required under Water Code section 8361. This project is located in the channel of the Colusa Drain at the town of Knights Landing in Yolo County (Figure 1). The structure relieves low lying lands in the Colusa Drain of excess water (permitting planting and harvesting) and provides irrigation water via the Ridge Cut by controlling water levels at the bottom end of Colusa Drain during the irrigation season. During the flood season when stages in the Sacramento River are high, the gates prevent Sacramento River water from flowing into the Colusa Drain. The gate structure will remain in operation during construction activities by limiting the number of gates that can be taken out of service at a particular time.

Background

The Federal Rivers and Harbors Act of 1896 and 1902 started the federal-state partnership in the construction, operation and maintenance of flood protection facilities. In 1911, the State of California approved a master plan for flood control in the Central Valley and created The Reclamation Board (currently called the Central Valley Flood Protection Board (CVFPB)) to carry out the plan. In 1917, Congress authorized the Sacramento River Flood Control Project (SRFCP), and construction started in 1918. In 1927, the California State Legislature specified the portions of the SRFCP that would be operated and maintained by the State of California. Over the years, three other federally-authorized, state-supported flood protection projects have developed from the basic SRFCP authorization. They are the Sacramento River and Major and Minor tributaries, Sacramento River; Chico Landing to Red Bluff and Sacramento River Bank Protection Projects. After 91 years, the federal, State, and local roles in flood protection activities in the Central Valley of California essentially are: (1) the U.S. Army Corps of Engineers (USACE) constructs flood protection works; (2) The CVFPB provides assurance of proper operation and maintenance and the state share of required nonfederal funding; (3) DWR (a) operates and maintains legislatively specified project works and project channels (Section 8361 Water Code), and (b) inspects the project works that are operated and maintained by local districts and public agencies; and (4) local districts and public agencies assure the CVFPB that they will properly operate and maintain those projects works within their jurisdiction.

The purpose of this project is to rehabilitate the Knights Landing Outfall Gates (Figure 2). Rehabilitation includes; replacement of gates, valves, seals, actuators, related appurtenances, sheet pile protection for the working pad, and the existing electrical and communication system. Additional work includes limited site work, providing required clearances and obtaining permanent access rights along an existing road, replacing an existing trash barrier system, providing new stop logs, replacing an existing stop log storage box, installing: a new trash rack system, a limited number of sheet piles, new handrails, trolley hoist system, and a generator at

the Sacramento Maintenance Yard. The Sacramento Maintenance Yard performs regular maintenance of the gates; however, due to the age of the structure, many elements of the gates need substantial rehabilitation. The gates are operated by DWR in accordance with Water Code Section 8361 to convey drainage from Colusa Drain into the Yolo Bypass via Knights Landing Ridge Cut (KLRC) during the flood season, preventing excess Sacramento River floodwater from flooding the Colusa Drain. The Water Code requires DWR to operate and maintain units of the Sacramento River Flood Control Project. The Knights Landing Ridge Cut flowage area and the Knights Landing Outfall Gates are part of the flood control facilities constructed in the Colusa Basin watershed (Figure 1). The gates also allow DWR to meet the State's irrigation water supply obligations. This project will carry out the construction of the new gates and ancillary equipment necessary to ensure proper operation of the outfall structure.

Preceding the winter runoff, the riverside slide gates are closed and discharges are not permitted until water in the Sacramento River is below flood stage. The USACE Operations and Maintenance Manual specifies that the gates be closed when water elevation in the Sacramento River reaches or exceeds U.S. Engineering Datum (USED) of 37 feet. During flood season, these gates are normally closed when the surface water elevation in the Sacramento River is much lower, typically at 25 feet USED. During irrigation season, a pool elevation of approximately 25 feet USED is maintained on the Colusa Drainage side for irrigation purposes. Excess water is released through the gates into the Sacramento River.

This structure is a critical barrier in preventing the Sacramento River floodwater from flooding the Colusa Drain. The Colusa Basin watershed covers approximately one million acres in three counties (Glenn, Colusa, and Northern Yolo) in California's upper Sacramento Valley along the Sacramento River. Land within the Basin is devoted primarily to agriculture production including irrigated crops, orchards, and vineyards in the valley lands (Figure 4). During the flood season, the lower portion of the Colusa Drain behaves similar to a reservoir with the Knights Landing Outfall Gates and the Knights Landing Ridge Cut controlling the water surface elevation in the Drain. If backwater from the Sacramento River were not controlled, widespread flooding would ensue throughout the lower Colusa Drain. On average, estimated damage caused by wintertime flooding total $1.2 million in the lower Colusa Drain basin (based on U.S. Department of Interior, Bureau of Reclamation 1998 Environmental Impact Statement/Environmental Impact Report). This analysis period covers 25 years from 1965 through 1990. The damages estimate covers the flooding effects up to 100,000 acres of primary agriculture land within the Colusa Basin from Willows to Knights Landing and along Willow Creek. Damages are largely attributed to farming, private property, public infrastructure, and levee repairs as part of federal assistance through PL 84-99.

Although rare, extreme rain-induced flooding can cause damage of disastrous proportions. Devastating floods have repeatedly struck the Colusa Basin resulting in costly damages to public and private property and loss of life. In 1995, the three counties suffered an estimated $100 million in damages, with public infrastructure (public buildings, infrastructure, and roads) damages accounting for 65 percent of the loss with the remainder associated to private property and farming (crop, livestock, and nursery losses) damages. In particular, the flooding inundated portions of State Highways 113 and 45, and Interstate 5.

The construction of the Knights Landing Outfall Gates occurred during three different periods. The structure was originally built by local interests in 1914 or 1915 and consisted of a concrete slab floor 84 feet wide with abutments at either side, 30 feet high. The space between the abutments was closed by two gate swing gate leaves that were constructed of timber held together with straps and bolts. During 1929 and 1930, the swinging gate leaves were replaced with a permanent concrete buttress to support steel flap gates. In 1949, new control gates replaced the steel flap gates. Eight manually operated slide gates on the Colusa Basin Drain side were replaced in1985 with automated actuators that maintain a set water surface elevation on the Colusa Drain side of the structure. Currently flow is controlled by eight motorized 66-inch and two manually operated 42-inch screw-operated slide gates on the Colusa Drain side, and by eight manually operated 66-inch and two 42-inch combination flap and slide gates on the Sacramento River side. This arrangement allows control of flow in both directions and at different elevations. The eight motorized screw gates allow the outfall from the Colusa Drain during low water stages in the Sacramento River, or inflow into the Colusa Drain from the Sacramento River. There are three catwalks with handrails, one on the top of the structure and the others just above the gates on both sides of the structure. The Central Valley Flood Protection Board (formerly Reclamation Board) (CVFPB) officially accepted responsibility for operation and maintenance of the gates on September 12, 1944.

The Knights Landing Outfall Structure currently consists of a concrete slab foundation having a center section 84 feet wide with concrete abutments and concrete wing walls on each side. Flow is controlled by eight motorized 66-inch and two manually operated 42-inch screw-operated slide gates on the Colusa Drain side, and by eight manually operated 66-inch and two 42-inch combination flap and slide gates on the Sacramento River side. This arrangement allows control of flow in both directions and at different elevations. The eight motorized screw gates allow the outfall from the Colusa Drain during low water stages in the Sacramento River, or inflow into the Colusa Drain from the Sacramento River. There are three catwalks with handrails, one on the top of the structure and the others just above the gates on both sides of the structure.

Project Location

Portions of this project, located in Yolo County, California, are at the Sacramento Maintenance Yard (Yard) and at the Knights Landing Outfall Gates (KLOG). The Yard is located at 1450 Riverbank Road, West Sacramento, California 95605-2028. The township, range, and section are; T.9.N; R.4.E; Section 28. The KLOG is located on the Colusa Drain Channel in the town of Knights Landing approximately .25 miles on Road 108 west of Highway 45. The township, range, and section are; T.11.N; R.2.E; Section 14.

Existing Conditions

The existing gates are deteriorated and require replacement. At least two of the gates are completely disabled and unusable.

In 2007, during routine maintenance operations, Sacramento Maintenance Yard personnel recorded a small hole in the concrete wing wall structure of the gates below the normally maintained pool elevation. Water has been observed flowing through the structure. Visual inspection indicates that this leak can be repaired; however, if left unabated this could lead to substantial structural damage.

The lack of a debris removal system in the original Knights Landing Outfall Gates design contributed to the deterioration of the gates. Currently, debris from Colusa Drain is kept away from the gates by a trash barrier (Figure 3) constructed from large wooden logs held in place by a steel cable. The composition of this debris includes rice cuttings, stumps, tree branches, old tires, household appliances (such as full sized refrigerators), and car bodies. In the past, the debris caused significant damage to the structure and gate when the trash barrier system has failed.

The catwalk on the Colusa Drain side has also sustained major damage in the past from debris that collected around it after existing trash barrier washed downstream during a major storm event. The catwalk was recently replaced by DWR staff to allow for regular maintenance of the gates.

Due to the age of the equipment and the outdated control technology, the gates require increasing staff time to operate and maintain. Although eight out of the ten gates on the Colusa Drain side can be operated automatically, many of their control functions are no longer working as designed. Communications rely on a telephone modem line that transmits information using dial tones. The signal provides limited information on the status of the gate settings, and DWR personnel are often dispatched to verify gate settings, especially during inclement weather. The actuators also now require increased maintenance due to their age. In addition, the water level sensors for the actuators are antiquated necessitating staff visits to the structure to verify water levels and adjust gate settings.

The current reliance on communication via telephone lines for monitoring the actuators poses risks to system operations. Most recently, the telephone lines were severed during installation of fencing by an adjacent landowner. The communications equipment is also susceptible to damage and/or disruptions as a result of major storm events and power outages. The Sacramento Maintenance Yard indicates that the telephone line suffers from communications disruption a minimum of once per year.

Electrical power to the site is also susceptible to frequent power outages common to the area. During the January 2007 storm event, the power outage lasted over a day and DWR personnel were required to operate the gates manually. The lack of reliable and stable backup power and effective communications during the January 2007 storm event highlights the vulnerability of the current flood control system and DWR's ability to mount an effective response. The need to dispatch DWR personnel for manual operation of the gates negates the benefits of the existing automated motor controllers. Personnel and resources that could be utilized to address other flood control system operation and maintenance concerns are dispatched to the Knight Landing Outfall Gates to verify water levels and operate the gates manually.

Scope of Work/How Work Will Proceed

The objectives of the project are to rehabilitate the structure and to upgrade its control mechanism by correcting existing deficiencies at the Knights Landing Outfall Gates and returning it to its designed operating parameters.

A. Structural Rehabilitation. There are 20 flow control devices: eight 66-inch and two 42-inch screw-operated slide gates on the Colusa Drain side, and eight 66-inch and two 42-inch combination flap and slide gates on the Sacramento River side. The project will replace all gate flaps, seals, and assemblies. Each gate is flanked by concrete wing walls, which when blocked with stop-logs on either side of the structure, can be dewatered. The gate assembly on both sides of the structure will be removed and replaced while facilitating continuous operation of the outfall gates during construction. The 42" gate at bay number 1 of the structure does not have a wing wall on both sides. This will need to have a cofferdam constructed on the downstream side for dewatering. The project will also repair a crack in the concrete where the abutment and outfall structure meet at bay number 1 on the Sacramento River side of the structure. The crack repair will be contained within the cofferdam at bay number 1. A new metal stop-log will be fabricated to replace an outdated wooden one. This new stop-log would be taller to allow dewatering at a higher stage. The overhead track that supports the winch that places and removes the stop-logs will also be replaced.

B. Working Pad. A working pad for Operations and Maintenance equipment is needed for the south bank on the Colusa Drain side of the channel. An excavator is used to remove debris from the channel. The south bank, which the excavator operates on, cannot support the weight of the equipment close to the water's edge thus limiting the reach of the excavator. Sheet-piles will be installed to support the weight of the equipment and stabilize the sloughing bank.

C. Gate Actuators, Motor Controllers, and Water Level Sensors. The project will remove and replace the eight worn actuators and install two additional actuators for the two 42-inch screw-operated slide gates on the Colusa Drain side. The outdated motor controllers and nonfunctional water level sensors will also be replaced. Together, the new control system and other existing water level sensors along the Sacramento River will allow greater flexibility in the operation of the gates to protect Colusa Drain from the backwater effect of the Sacramento River, and maintain the necessary water pool elevation on the Colusa Drain side for irrigation. The new control system will then post the information collected to the California Data Exchange Center (CDEC) to provide for a more accurate assessment of the conditions of the State's flood control system.

D. Emergency Power. The project will provide two emergency backup power sources, one for the outfall gates and one for the Sacramento Maintenance Yard. The project will provide for an Uninterruptable Power Supply (UPS) battery backup of the communications system from the outfall gates control room to the Sacramento Maintenance Yard and a trailer mounted generator to provide power to operate the gates, controllers, and wireless communication. The battery backup at the outfall gates will only provide power for the wireless communication until the trailer mounted generator can be towed to the site. Similarly, a permanently installed emergency backup generator at the Sacramento

Maintenance Yard will operate essential equipments necessary in the event of an electrical power outage during flood fighting. The UPS will be sized based upon the response time for Sacramento Maintenance Yard personnel to respond to a power outage at the outfall gates and bring the trailer mount generator online. It will be stored at the maintenance yard. The emergency backup power generators will be sized to the power requirements of each site to provide three days of uninterrupted power in case of a power failure. This will ensure that essential functions are not disrupted.

E. Communications Upgrade. The project will install wireless communication links will allow transfer of data and alerts between the Sacramento Maintenance Yard and the Knights Landing Outfall Gates' motor controllers. Data on the gates' status and operational parameters, as well as water surface elevations can be uploaded to CDEC through wireless communication transmissions. The wireless communication equipment will replace the existing telephone conduits to ensure dependable transfer of information and instructions, especially during floods.

F. Trash Barrier System. The existing lumber trash barrier will be renovated with new logs and connections. The connections between the logs and the anchors will be strengthened to withstand greater force.

G. Staging Area. The proposed equipment staging areas are located adjacent to the outfall gates on the north and south bank of the Sycamore Slough side of the structure. (See Figure 3)

H. Project Timing. Construction on the upstream section will begin May, 2012 (State budget constrains may delay the project by several years.) Downstream construction will not begin until July 1, 2012. All work is scheduled for completion by October 31, 2012.

Equipment Staging

An already existing staging area located on the southeast bank of the Colusa Drain just upstream of the outfall gates (Figure 3) will be used for the storage of construction equipment and materials. The staging area will be approximately 0.23 acres (10,000 square feet [sf]). A second staging area located on the northwest side of the Colusa Drain is approximately 0.03 acres (1,300 sf), will be used for parking worker's vehicles and other small equipment.

Access

Access to the project site will be from State Route 45 along the east levee crown (Figure 4). Near the southeast end of the structure, earthwork will be required to provide a safer turning radius allowing maintenance staff enough area to turn their vehicles around and return along the same road. Up to 0.5 acres of levee road will receive a fresh application of aggregate base.

Post-Project Maintenance

Routine maintenance of the facility primarily involves debris removal. After significant storms, debris accumulates behind the floating stop log barrier. From the working pad an excavator is used to pull the material to shore where it is piled and burned. The trash racks in front of each of the ten gates will need to be cleared of debris that was not caught by the floating stop log barrier.

II. Environmental Setting

Existing Conditions

The project is located near the confluence of the Sacramento River with the Colusa Basin Drainage Canal (CBDC), Sycamore Slough, and the KLRC (Figure 1) in the Colusa Basin Watershed (CBW). The entire CBW lies within the Great Valley geologic province and includes the Sacramento Valley and surrounding Coast Range, Klamath, Cascade, and Sierra Nevada mountain ranges and the surrounding foothills underlain by older sedimentary bedrock (Harvey and Associates 2008). The Basin itself is overlain by floodplain deposits, slough channels, and frequently flooded basins that arose from modern fluvial processes taking place on the aggrading floodplain of the Sacramento River (Harvey and Associates 2008). Sycamore Slough is a good example of this active geology.

The project is west of the small town of Knights Landing. Just upstream of the Knights Landing Outfall Gates, the Colusa Drainage Canal passes the cutoff to the Outfall Gates and meets the Knights Landing Ridge cut. The Sacramento River is just Downstream of the Outfall Gates (Figure 1).

Most of the land use in the CBW is rural and principally supports farming and rangeland agricultural practices (Figure 5). According to Harvey and Associates (2008) in their Colusa Basin Watershed Assessment document, less than 1% of the watershed, which comprises three counties (Yolo, Colusa, and Glenn), is urbanized. The majority of lands in the CBW are mapped as "Important Farmland" by the State of California Department of Conservation (DOC) and by the U.S. Department of Agriculture (U.S.D.O.A). In the CBW, 34% or 144,711 acres of the prime soils are under Williamson Act Contract; 14% or 58,952 acres are in the Farmland Security Zone contract program.

The project lies within the Great Valley geologic province that comprises the Sacramento Valley and surrounding Coast Range, Klamath, Cascade, and Sierra Nevada mountains with their surrounding foothills which are underlain by older sedimentary bedrock (Harvey and Associates 2008). Alluvial deposits from the surrounding foothills grade into the valley floor of the basin. The basin soils are comprised of a complex of loamy floodplain deposits (Appendix 2).

The area draining into the Colusa Basin Drain at the Highway 20 gage is 973 square miles (~623,000 acres) or about 60% of the area comprising the CBW. The mean annual precipitation ranges between 17 and 27 inches. For the period of record, the average annual runoff at the Highway 20 gage is 496,000 acre-feet per year (Harvey & Associates 2008). This

storm water runoff volume is high due to winter runoff from foothill streams and rice field irrigation water in the summer.

The Colusa Basin is a resting stop for millions of migrating waterfowl along the Pacific Flyway (Navigant 2000). The Sutter National Wildlife Refuge is just north-northeast of the project. The Refuge contains 2,591 acres comprised of seasonal marsh, permanent ponds, and uplands. Other habitat types in the general vicinity of the project include cultivated, annual grasslands including ruderal areas, riparian, open water, and developed/urban. The majority of the land surrounding the project consists of rice lands (Figure 5) that together with the refuge typically support wintering populations of more than 175,000 ducks and 50,000 geese (U.S.F.W.S. 2011). More than 300 species of birds and mammals, both resident and migratory, use the refuges. These same species can be found in the land and waterways surrounding the project. The marshes and rice lands support fish, frogs, and invertebrates, which are used by wintering grebes, white pelicans, white-faced ibis, egrets, herons, and bitterns as a food resource (Navigant 2000).

Fish

Fish species listed for protection under the California and/or Federal Endangered Species Acts found in the Sacramento River in the vicinity of Yolo County (across the Sacramento River from the KLRC) include winter-run Chinook salmon (*Oncorhynchus tshawytscha*), spring-run Chinook salmon (*O. tshawytscha*), steelhead (*Salmo gairdneri*) (Yolo County 2005), and green sturgeon (*Acipenser medirostris*) Southern Distinct Population Segment (DPS).

Brown and Kimmerer (2002) prepared a report for the CALFED Science Program estimating, among other things, the numbers of juvenile winter-run Chinook salmon migrating past Knights Landing representing progeny from brood years 1995 through 2001. Brood year 1998-1999 had the highest count of Winter-run at 136,452. Brood year 1999-2000 had the lowest number at 27,725.

In 2010, the Delta Operations for Salmonids and Sturgeon (DOSS) group began a fish monitoring effort throughout the State. Knights Landing was one of the fish monitoring sites. The Team carried out weekly surveys which they published. See Table 1 for DOSS 2010 survey results. The data shows that at least three salmonid runs and one steelhead run were found in the vicinity of the Knights Landing Outfall Gates during 2010.

The green sturgeon (DPS) is uncommon on the Sacramento River (Moyle 2002) which is the southern- most spawning habitat for this population segment. Green sturgeons spend the majority of their lives in the ocean and spawn in the Sacramento River between March and July although peak spawning occurs between mid-April and mid-June. They spawn in the deep, fast water of the Sacramento River when the temperatures are between 8-14°C (Moyle 2002). Green sturgeons are known to occur in the area of Knights Landing.

The U.S.G.S. (1998) carried out fish and invertebrate studies in the CBDC downstream of Highway 20. Table 2 lists fish species that were identified in the CBDC in July of 1996. Nine species of fish, including only one native, the Sacramento sucker (*Catostomus occidentalis*), were collected. No other fisheries studies in the CBDC were found.

Acoustical Effects on Fish

Introduction

Public and resource agencies, of late, have increasing concerns about the potential injury or death of fish related to underwater pile driving, especially, its effects on listed fish species (ICF J&S et.al. 2009). Percussive pile driving produces a range of effects that can potentially alter fish behavior or cause physical injury or death depending on the intensity and characteristics of the sound, distance and location of the fish in the water column relative to the sound source, and the size and mass of the fish.

Underwater Sound Generation and Acoustic Energy Produced

Sound levels, expressed in decibels (dB) are used to describe or calculate the magnitude of the sound pressure expressed in sound pressure level (SPL), the root mean square (RMS) which relates to the amplitude of the pressure of the sound wave, and the sound exposure level (SEL). SEL is used to represent acoustic energy and can be used as one measure to characterize physical injury (Buehler 2010). Buehler also reported while addressing typical underwater sound levels that an unattenuated pile strike at 200-300 meters from the source produces an SEL of 180 dB RMS while an unattenuated pile strike at 100 meters from the source generates 200 dB Another study undertaken by the California Department of Transportation, ICF Jones & Stokes, and Illingworth and Rodkin, Inc. (ICF J&S et.al. 2009) found that a Steel H-type impact generated 190 dB (peak pressure) and 175/171 RMS sound pressure measured at 10 meters from the source. While presenting at the Transportation Research Board Annual Meeting in 2010 Buehler presented interim impact criteria for fish as being,

- 208 dB-peak,
- 187 dB-$SEL_{cumulative}$ sound exposure level, and
- 183 dB-$SEL_{cumulative}$ for fish less than 2 grams.

There are obviously some differences of opinion between various studies as seen above. Nonetheless, interim criteria presented by Buehler are currently being used on projects in California and other west coast states.

Potential Treatments for Reducing Underwater Sound Generation

There are two general categories used to reduce underwater sound generated by pile driving: treatments that reduce sound transmission through the water and treatments that reduce sound generated by the pile driving (Caltrans, et.al. 2009). The former includes various types of air bubble curtains and cofferdams. The latter includes alternative hammer types, such as vibratory, oscillating, rotating, or press-in systems. Caltrans, et.al. (2009) research found that vibratory hammers, in general, are much quieter than impact hammers in terms of sound amplitudes. The NCE Report (2007) adds that the use of vibratory methods has been measured by several authors and is reported to be significantly quieter than other impact methods. It goes on to say that rise times and peak over and under pressures are significantly

reduced by using this method. The current project design includes the use of a vibrating hammer.

Underwater sound propagation in shallow water can take various paths from the source to the receiver: a direct path, a surface reflection path, a bottom reflection path, a ground path, and a re-radiated path off of the bed of the channel (ICF J&S et.al. 2009). There is, therefore, the potential for sound energy to be re-radiated from the surface of the water, the channel bed, or other paths. ICF J&S et.al. (2009), in their technical guidance document, reports that, "Normally, the ground-radiated noise is dominated by low frequencies, which cannot propagate efficiently through shallow water." Furthermore, the Guidance mentions that obstructions such as structures, channel width and the bank slope can modify how sound propagates in water. The outfall gates which bisect the channel can be considered a significant obstruction to sound movement underwater just as a solid object would attenuate sound vibrations in air. The NCE Report (2007) describing treatments for reducing underwater sounds refers to an approach for reducing pile driving noise by using a physical barrier . The Report also discusses reducing noise by removing water from a solid casing essentially creating a cofferdam. This will completely decouple the water from the direct radiation path of the pile (Reyff 2004 in NCE Report 07-001). Reyff reported that decoupling the water from inside the barrier could reduce peak levels by 15 dB and overall RMS levels by 5-35 dB. While the construction is underway, water within the outfall structure, between the gates, will be removed essentially creating a dewatered cofferdam. In addition, cofferdams will be installed upstream and downstream while the gates are being replaced. This approach has been found effective in reducing noise levels (NCE 2007) as discussed above. In fact, the NCE Report states that, "Vibratory methods have been measured by several authors to be significantly quieter than impact methods."

Using pile caps will result in peak level noise reductions of 1-8 dB (NCE 2007). The construction designers are considering using pile capes for installation of the wall.

Conclusions: Mitigation for the project includes:

- Installing cofferdams on the outfall bays to repair the gates will also function to avoid harm to fish on the downstream (Sacramento) side of the structure. The Colusa Drain side will also have cofferdams.
- Use of the NMFS standard window for in water construction (July 1 – October 1).
- Water quality impacts will be avoided downstream by installing silt fencing to trap any soil or rocks that may be dislodged while pile driving.
- Monitors will be on site during cofferdam installation to ensure no fish impacts occur.
- The use of vibratory hammers to reduce noise and vibration impacts to fish. If impact hammers must replace vibrating hammers, pile caps will be used to reduce noise and vibration impacts.

The information listed (above) provides adequate arguments in favor of the conclusion that pile driving activity during the Knights Landing Outfall Gates replacement will not cause significant damage to listed fish species downstream of the project site.

TABLE 1: 2010 THE DELTA OPERATIONS FOR SALMONIDS AND STURGEON (DOSS) GROUP DATA SHOWS THAT AT LEAST 3 SALMONID RUNS AND 1 STEELHEAD RUN WERE FOUND IN THE VICINITY OF THE KNIGHTS LANDING OUTFALL GATES DURING 2010.

Date	Species	Catch	
12/14/09	LF	1	
12/17/09	2 WR, 1 LF	3	
12/19/09	WR	1	
1/04/10 – 01/05/10		0	
1/06/10	2WR, 1 LF	3	
1/07/10	6 FR, 2 LF	8	
1/09/10	3 FR	3	
1/11/10	1 FR	1	
3/08/10 – 3/15/10	1 LF	1	Total=13
3/15/10 – 3/22/10	62 FR, 3 SR	65	Total=65
4/19/10 – 4/26/10	795 FR, 61 SR, 3 LF*, 1 SH**	859	Total=859

FR = Fall run, LF = Late fall run, SR = Spring run, WR = Winter run, SH = Steelhead (for 4/19-4/26) LF* = 178 were adipose clipped, SH** = adipose clipped

Other sensitive vertebrate species known to occur in the project area and listed on the California Natural Diversity Data Base (CNDDB) include Swainson's hawk (*Buteo swainsoni*), Western red bat (Lasiurus blossevillii), hoary bat (*Lasiurus cinereus*), and Sacramento splittail (*Pogonichthys macrolepidotus*), (Table 3 and Figure 9, below).

TABLE 2: FISH ELECTROSHOCKING IN THE COLUSA BASIN DRAINAGE CANAL AT KNIGHTS LANDING, CALIFORNIA, JULY 10, 1996

Site:	**Colusa Basin Drain at Road 99E near Knights Landing, California**
Site Number:	**11390890**
Collection Date:	**Jul. 10th 1996**
Type of Data:	**Fish Data**
Collection Methods:	**Boat and Backpack Electrofishing**
Common Name	**Scientific Name**
BLUEGILL	*Lepomis macrochirus*
CHANNEL CATFISH	*Ictalurus punctatus*
COMMON CARP	*Cyprinus carpio*
INLAND SILVERSIDE	*Menidia beryllina*
LARGEMOUTH BASS	*Micropterus salmoides*
SACRAMENTO SUCKER	*Catostomus occidentalis*
THREADFIN SHAD	*Dorosoma petenense*
THREADFIN SHAD	*Dorosoma petenense*
WARMOUTH	*Lepomis gulosus*
WESTERN MOSQUITOFISH	*Gambusia affinis*
WHITE CATFISH	*Ictalurus catus*
WHITE CRAPPIE	*Pomoxis annularis*

*A similar study was carried out on 8/25/98 and 8 different species were found to occur:

- *O. tshawytscha*
- *Cottus asper*
- *Hysterocarpus traski*
- *Nylopharodon conocephalus*
- *Pogonichthys cicoides*
- *Macropterus dolomieui*
- *Lavinia exilicauda*
- *Percina macrolepida*

Table 3: California Diversity Data Base Printout or Knights Landing 7.5' Topographic Map.

COMMON NAME	FEDERAL STATUS	CALIFORNIA STATUS	DFG STATUS	CNPS LIST	HABITAT	EFFECTS DETERMINATION
Swainson's hawk	None	Threatened	SSC	N/A	Riparian systems adjacent to suitable foraging habitats (native grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row croplands). May nest in mature riparian forest, lone trees or groves of oaks, other trees in agricultural fields, and mature roadside trees.	SWHA are unlikely to be nesting near the project. Nesting trees in immediate vicinity are adjacent to the outfall gates and provide year-round access to fisherman. More suitable habitat exists up & downstream. Truck crops, field, crops and rice provide poor foraging. No CNDDB occurrences within 1/2 mi. MAY AFFECT BUT NOT LIKELY TO ADVERSELY AFFECT.
hoary bat	None	None	SSC	N/A	Prefers open habitats or habitat mosaics; roosting in dense foliage of medium to large trees near water.	Found within a half mile of the project along the Sacramento River. Adequate (roosting) habitat is not available in the vicinity of the project. NOT LIKELY TO ADVERSELY AFFECT.
western red bat	None	None	SSC	N/A	Found in riparian habitats, particularly mature stands of cottonwood/sycamore and fruit orchards.	Found within a half mile of the project along the Sacramento River. Adequate (roosting) habitat is not available in the vicinity of the project. NOT LIKELY TO ADVERSELY AFFECT.
Sacramento splittail	Listing was remanded in 2003.	None	SSC	N/A	Native populations now restricted to San Francisco Bay Delta and lower Sacramento River. Spawn on seasonally inundated vegetation. Offspring rear in food-rich floodplain habitat.	Spawning and rearing habitat not present. NOT LIKELY TO ADVERSELY AFFECT.

Greenhouse Gas Emissions

Environmental Setting

Warming of the climate system is now considered to be unequivocal (IPCC, 2007). Global average surface temperature has increased approximately 1.33 °F over the last one hundred years, with the most severe warming occurring in the most recent decades. Eleven of the twelve years from 1995 to 2006, rank among the twelve warmest years in the instrumental record of global average surface temperature (going back to 1850). Continued warming is projected to increase global average temperature between 2 and 11 °F over the next one hundred years (IPCC, 2007).

The causes of this warming have been identified as both natural processes and as the result of human actions. Increases in greenhouse gas (GHG) concentrations in the Earth's atmosphere are thought to be the main cause of human induced climate change. GHGs naturally trap heat by impeding the exit of solar radiation that has hit the Earth and is reflected back into space. The six principal GHGs of concern are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons, and perfluorocarbons.

Scope

The California Environmental Quality Act (CEQA) requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects they are considering for approval. CEQA requires that the cumulative impacts of GHG, even additions that are relatively small on a global basis, need to be considered.

Impact Assessment

It is unlikely that any single project by itself could have a significant impact on the environment. However, the cumulative effect of human activities has been clearly linked to quantifiable changes in the composition of the atmosphere, which in turn have been shown to be the main cause of global climate change (IPCC, 2007). Therefore, the analysis of the environmental effects of GHG emissions from this project will be addressed as a cumulative impact analysis. The Department of Water Resources has not established a quantitative significance threshold for GHG emissions; instead each project is evaluated on a case by case basis using the most up to date calculation and analysis methods. The proposed project could result in a significant impact if it would generate GHG emissions:

- either directly or indirectly, that may have a significant cumulative impact on the environment;
- that would conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases, including the state goal of reducing greenhouse gas emissions in California to 1990 levels by 2020, as set forth by the timetable established in AB 32, California Global Warming Solutions Act of 2006. (See Natural Resources Agency draft CEQA Guidelines, Appendix G.)

Note, however, that Appendix G is considered a set of sample questions. Thus additional factors, to be considered on a case by case basis, taking into consideration the project setting, may warrant looking beyond these questions.[1]

Based on the size, scope, and purpose of this project the following significance criteria will be used to determine the significance of GHG emissions from this project:

A. Whether the proposed project has the potential to conflict with or is consistent with plans to reduce or mitigate greenhouse gases. Including:

- The California Global Warming Solutions Act of 2006 (AB32) established the first applicable plan for the reduction of GHG emissions in California;
- regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions; or
- whether the proposed project is part of a plan that includes overall reductions in greenhouse gas emissions.

B. Whether the relative amounts of greenhouse gas emissions over the life of the proposed project are small in comparison to the amount of greenhouse gas emissions for major facilities that are required to report greenhouse gas emissions under AB32 and the federal Mandatory Greenhouse Gas Reporting Rule (25,000 metric tons of CO_2 Equivalent or MTCO2e /year); and

C. Whether the proposed project has the potential to contribute to a lower carbon future, such as:

- whether the design of the proposed project is inherently energy efficient;
- whether all applicable best management practices that would reduce greenhouse gas emissions are incorporated into the proposed project design;
- whether the proposed project implements or funds its fair share of a mitigation strategy designed to alleviate climate change?
- whether there are process improvements or efficiencies gained by implementing the proposed project?

Construction Impact

Construction of the project would generate some GHG emissions. The major sources of GHG emissions include operation of diesel-powered construction equipment for earthwork, dewatering, and gate removal/installation. Another source of GHG emissions is operation of gasoline-powered vehicles for on-road trips such as construction worker commuting and diesel-powered vehicles for on-road trips such as construction material hauling. The primary form of GHG would be Carbon Dioxide (CO_2) from exhaust of diesel-powered off-road construction equipment, gasoline-powered on-road vehicles, and diesel-powered on-road

[1] Reliance on AB 32 or other regulatory standards can serve as proxies for significance only to the extent that they accurately reflect the level at which an impact can be said to be less than significant. *See, e.g., Protect the Historic Amador Waterways v. Amador Water Agency*, (2004).116 Cal. App. 4th 1099, 1109.

vehicles. Construction activities will be short term and phased over a period of approximately six months. The number and type of construction equipment required to complete each project phase will be limited due to the size of the project area and scope of activities. GHG from construction activities were estimated and show that project construction would generate a total of approximately 454 $MTCO_2e$ (Appendix 3).

Operation Impact

There will be direct GHG emissions at the Sacramento Maintenance Yard site due to intermittent operation of the diesel engine generator and indirect GHG emissions at the Knights Landing site due to operation of the gate actuators and control system during project operation. Operation of the gates and control systems at Knights Landing would consume electricity, which would indirectly result in GHG emissions at the power plants where the electricity is generated. The electricity demands at Knights Landing were estimated by the power demand of the gate actuators and control system. The annual electricity demand for operating the Knights Landing Outfall Gates is approximately 17,000 kW-h. Annual GHG emissions as a result of energy consumption were also estimated and the results show that energy and diesel fuel consumption from project operations would generate an annual GHG emission of approximately 6 $MTCO_2e$ (Appendix 3).

DWR would adopt all feasible strategies to reduce emissions, including but not limited to using clean fuel, and tuning and maintaining equipment in compliance with manufacture's specifications. These strategies will be implemented to minimize the emissions from this project.

Impact Assessment

Construction GHG emissions were amortized over a 30-year project useful life, and then combined with the annual operational GHG emissions. The GHG emissions over the project useful life would be approximately 21 $MTCO_2e$ per year.

No state or federal agency has yet established significance criteria (thresholds of significance) for GHG or other impacts to global climate change. However, some statewide standards have been established that provide information about the order of magnitude of emissions that might be considered significant. Pursuant to AB 32, the California Air Resources Board (CARB) mandates that only "large" facilities (i.e., stationary, continuous sources of GHG emissions) that generate greater than 25,000 metric tons of CO2 equivalents (CO2e) per year report their GHG emissions. In addition, CARB has released a preliminary draft staff proposal that recommends 7,000 metric tons of CO2e per year be used as the baseline threshold for impacts. It is not the intention of the lead agency to adopt a 25,000 or 7,000 $MTCO_2e$ threshold of significance, but only to provide context to the scale of the emissions from the proposed project. The emissions from the proposed project are three and two orders of magnitude lower than CARB's current reporting level and proposed significance threshold, respectively.

Based on the review discussed above, this project does not conflict with any statewide or local goals with regard to reduction of GHG. The discharge of GHG to the atmosphere during and after construction is believed to be less than significant, and no significant negative impact to climate change is expected.

CEQA Environmental Checklist

PROJECT DESCRIPTION AND BACKGROUND

Project Title:	Knights Landing Outfall Gates Rehabilitation
Lead agency name and address:	Department of Water Resources Division of Flood Management Flood Maintenance Office 3310 El Camino Avenue, Ste. 140 Sacramento, CA 95821
Contact person and phone number:	Bonnie Green Ross (916) 574-0372
Project Location:	Knights Landing, Yolo Co, CA
Project sponsor's name and address:	Same as Lead Agency
General plan description:	
Zoning:	
Description of project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation.)	The project will replace the twenty outfall gates DWR maintains in Knights Landing.
Surrounding land uses and setting; briefly describe the project's surroundings:	The land use surrounding the project is mostly agriculture, open space and new residential.
Other public agencies whose approval is required (e.g. permits, financial approval, or participation agreements):	U.S.A.C.E., R.W.Q.C.B., DFG, (coord w/) NMFS & U.S.F.W.S., C.V.F.P.B.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project. Please see the checklist beginning on page 3 for additional information.

☐	Aesthetics	☐	Agriculture and Forestry	x	Air Quality
x	Biological Resources	☐	Cultural Resources	☐	Geology/Soils
x	Greenhouse Gas Emissions	☐	Hazards and Hazardous Materials	☐	Hydrology/Water Quality
☐	Land Use/Planning	☐	Mineral Resources	x	Noise
☐	Population/Housing	☐	Public Services	☐	Recreation
☐	Transportation/Traffic	☐	Utilities/Service Systems	☐	Mandatory Findings of Significance

DETERMINATION:

On the basis of this initial evaluation:

☐	I find that the proposed project COULD NOT have a significant effect on the environment, and a Negative Declaration will be prepared.
X	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A Mitigated Negative Declaration will be prepared.
☐	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
☐	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An Environmental Impact Report is required, but it must analyze only the effects that remain to be addressed.
☐	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in a Negative Declaration pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to the Native Declaration, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature: Keith E. Swanson	**Date:** 5/12/16
Printed Name: Keith E. Swanson	**For:**

CEQA Environmental Checklist

This checklist identifies physical, biological, social and economic factors that might be affected by the proposed project. In many cases, background studies performed in connection with the projects indicate no impacts. A NO IMPACT answer in the last column reflects this determination. Where there is a need for clarifying discussion, the discussion is included either following the applicable section of the checklist or is within the body of the environmental document itself. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts. The questions in this form are intended to encourage the thoughtful assessment of impacts and do not represent thresholds of significance.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
I. AESTHETICS: Would the project:				
a) Have a substantial adverse effect on a scenic vista	☐	☐	☐	X
The project will not affect a scenic vista.				
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway	☐	☐	☐	X
Will not substantially damage scenic resources or historic buildings. The project activities are limited to the outfall gates and staging area.				
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	X
The project will not substantially degrade the existing visual character or quality of the site and its surroundings? No change will occur.				
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	X

Work will take place during daylight hours thus no additional light or glare will be generated.

There will be no effect on the aesthetic character of the area surrounding the Outfall Gates. The construction replaces existing structures for similar use within the existing footprint. No habitat, aesthetic or historical features will be affected.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
II. AGRICULTURE AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and the forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	X
No prime, unique, or farmland of state importance will be impacted.				
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	X
No zoning or Williamson Act Contract lands will be affected.				

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	X

No conflicts with existing zoning; no attempts to rezone or affect timber or timberland production

d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	X

No conversion of forest land.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	X

No conversion of farmland or timber land to any other uses.

No other changes in the existing environment.

Project activities are limited to the Outfall Gates structure, the access road, and the staging area. The gates will be replaced and the structure will be re-furbished. A staging area already exists and access to the site will be from Hwy 45 and on to the right levee. Project traffic will not come near and agricultural fields or nearby riparian areas.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
III. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	X	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non- attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	X
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	X
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	X

The project will occur between April and November 1, 2012. Very few construction vehicles will be on site. A crane to lift gates to and from the structure, pile driving equipment, and earthwork and compaction equipment will be on site and workers will commute using their own vehicles. When the project is complete, the backup generator at the Sacramento Maintenance Yard will be exercised monthly. The use of a small generator during power outages and the remote sensing of gates from Sacramento Yard will reduce substantial GHG output associated with the project in the future.

IV. BIOLOGICAL RESOURCES: Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial 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 California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	X	☐

No substantial adverse affect on listed species; likely no effect at all.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	X

No effect on any riparian habitat or other sensitive natural community.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	X

No effect on any federally protected wetlands. No effect on wetlands at all.

d) Interfere substantially 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?	☐	☐	X	

Less than significant effect on native resident or migratory fish or wildlife species or wildlife nursery site. See discussion on Acoustical Effects on Fish in Initial Study pg.11.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	X

No effect on any local policies or ordinances protecting biological resources.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	X

No effect on any local, regional or state HCP or NCCP.

Western red bat (Lasiurus blossevillii) and hoary bat (L. cinereus) have been recorded in one location just within one-half mile of the project site (Table 3). Both bats are listed as Species of Special Concern (SSC) by the California Department of Fish and Game (DFG). Both are also listed as a SSC in Arizona and Utah. Western red bats and hoary bats are solitary, foliage-roosting bats that sometimes use the same roosts. Roosting preferences include: dense vegetation above and unobstructed space below with no potential perches for predators below. They also prefer enough surrounding vegetation to protect them from wind and to retain heat.

Although there are dense patches of riparian habitat up and downstream from the project, the riparian patches just downstream and immediately adjacent to the Outfall Gates contain crowns that are open with branches and other perches for potential predators below the crown. The open branching of these trees reduces heat retention and exposes these bats to predation. Because of these habitat features it is unlikely that these bat species perch or otherwise use the adjacent riparian patches.

There are two small patches of riparian trees; one each on the left and right banks downstream of the structure that receive almost constant human traffic related to fishing. This activity no doubt discourages raptors, including Swainson's hawks, as no raptor nests have been noted in this sparse habitat. Further, no Swainson's nesting sites have been identified within one-half mile of the outfall gates (Table 3).

The project will avoid water quality issues and possible impacts to listed fish species because the area around each of the gates will have cofferdams constructed and the area dewatered. With cofferdams, any listed fish species will be isolated from the construction. Most of the construction will take place outside of the Chinook winter-run, and Central Valley steelhead upstream migrations. Out-migrating salmonid juveniles usually are active during nighttime hours. Poor quality shaded riverine habit (SRA) is just downstream of the work site where fishermen congregate. There is better SRA habitat further downstream around Sycamore Slough and closer to the confluence with the Sacramento River. Splittail should not be affected as construction will take place outside of the spawning window and splittail spawning habitat is not present.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES: Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	X
No change to historical resources.				
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	X
No change in the significance of an archaeological resource.				
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	X
No destruction, either directly or indirectly, of a unique paleontological resource or site or geologic feature.				
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	X
No disturbance of any human remains.				

The gates have been modified several times since they were installed. A small control building on the left bank and levee will have new equipment installed inside the structure but will otherwise not be altered. The staging area has been used for years and will be provided a safer, more stable surface for construction equipment and vehicles.

In the process of the cultural resource study for the Knights Landing Outfall Gates (KLOG) Rehabilitation Project, a significant archaeological site was identified within the area of potential effects (APE). The resource is in the northeastern portion of the APE adjacent to State Route (SR) 45 (see Figure A). In this location, it was proposed that the access road to the east side of the Colusa Basin Channel be widened to allow for construction traffic which would require the removal of a single oak tree, vegetation, and a minimum depth of 6 inches of soil along the road alignment. During a field visit on April 5, 2011, DWR archaeologist Rebecca H. Gilbert and Tiffany A. Schmid attempted to relocate the resource through observation of the ground surface, but heavy vegetation coverage hindered visibility.

The resource, archaeological site CA-YOL-7, was first recorded in 1934 with subsequent records being completed in 2000 and 2008. Both of the latter site records indicate that artifacts were still present both on the surface and subsurface at the site on both sides of SR 45. Based on its location, CA-YOL-7 is presumed to be the ethnographic River Patwin village of Yodoi, and artifacts identified at the site include obsidian and basalt flakes, shell, modified bone, and human remains. The presence of human remains at the site makes it eligible for the National Register of Historic Places under Section 106 of the National Historic Preservation Act. This eligibility dictates that any construction activities (including grading) that have the potential to disturb surface and/or subsurface components of CA-YOL-7 cannot proceed without additional attention. Disturbance of the site has the potential to be an adverse effect under the Section 106 guidelines. In addition, under CEQA and the California Public Resources Code, impacts to the site have the potential to be considered significant.

Due to the sensitive nature of CA-YOL-7, the cultural resource staff for DWR proposed two options on how to proceed with the project:

1. The most desirable option would be to avoid the area where CA-YOL-7 is located entirely. This would require not widening the east access road as originally proposed to avoid disturbing the ground in the vicinity of CA-YOL-7. The area of the site adjacent to the access road would still need to be flagged and or fenced to ensure that errant construction vehicles do not enter CA-YOL-7.

2. If option #1 cannot be implemented, testing for the presence of cultural material and the site boundary would need to be undertaken. DWR cultural staff would need to consult with the Native American Heritage Commission (NAHC) and the State Historic Preservation Officer (SHPO) as to the best way to proceed with testing for surface and/or subsurface deposits related to CA-YOL-7. The first option would be to conduct minimal test excavation. Due to the known presence of human remains at the site, the NAHC will then contact the Most Likely Descendant (MLD). Monitoring by Native American tribes/ individuals will most likely be requested by the tribes because of the sensitive nature of the archaeological deposits.

If site deposits are found in the area of impact, mitigation and data recovery will need to take place. DWR facilities and cultural staff do not possess the capacity to perform these activities and therefore would be required to contract with a consultant for this phase of the work. Consultants will be required to submit proposals to DWR with their time and cost estimates for mitigation and data recovery at KLOG. The time and cost estimates will vary between consultants and DWR will chose the one best suited for the project. (See Appendix 4 for the entire report.)

DWR is following the recommendations of its Cultural Resource Staff. The access road will not be widened, thus no tree trimming will be required. Instead, traffic control will be used for the entry of large construction vehicles onto the site. CA-YOL-7 will be flagged or forced to stop entry into the area and monitors may be used to ensure the area is protected.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
VI. GEOLOGY AND SOILS: Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	X
i) 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?	☐	☐	☐	X
ii) Strong seismic ground shaking?	☐	☐	☐	X
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	X
iv) Landslides?	☐	☐	☐	X

The project will not expose people to the rupture of an earthquake fault or other seismic ground shaking as there are no faults running through or at the project site (U.S.G.S. 2011).

b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	X

No soil erosion because best management practices will be used during all soil disturbing activities and permanent erosion control methods will include soil stabilization of access road with aggregate base.

c) 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?	☐	X	☐	☐

Pile driving operations may have an impact on the saturated soil. Should soil instability occur, pile driving will cease until the soil has been stabilized and NMFS will be contacted to assess if any negative effects could occur to listed fish species.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	X

No digging or earth moving will potentially disturb human remains.

The project, for the most part, will not have an effect on the geology and soils within the project area. There are basically three parts to this project: (1) the replacement of the outfall gates and the trash boom in the canal and (2) placement of sheet piles on the right bank upstream of the outfall gates, and (3) the permanent access road work. The new gates will be manufactured off site and placed in the same location as the existing gates from the staging area roadway on the east side of the outfall structure (Figure 3). A crane will be used to place each new gate into the outfall structure. The crane will operate from the road access on the east side of the outfall structure. The waterside of the staging area will have a sheet pile wall installed at the water line to stabilize the bank. Pile driving operations for sheet pile installation could potentially cause soil instability. The contractor will monitor this and pile driving will be discontinued until soil has been stabilized.

Compacted fill will be placed behind the sheet pile to level the working pad and make maintenance of the trash barrier system safer and more efficient.

The U.S. Geological Survey produces fault maps. The California-Nevada Fault Map showed no faults in the project area. The closest fault is in Woodland. Construction equipment is at a minimum and will not create vibrations large enough to result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

A cofferdam or stop logs will be installed while each gate is replaced. The gates sit on a concrete apron that is virtually scoured of sediment by water passing through. When the cofferdams are removed and the gates are allowed to pass water, no sediment will be present to create water quality impacts.

VII. GREENHOUSE GAS EMISSIONS: Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	X	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	X	☐

See Appendix 3 for greenhouse gas calculations and page 16 for greenhouse gas discussion.

VIII. HAZARDS AND HAZARDOUS MATERIALS: Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	X
b) 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?	☐	☐	☐	X
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	X
e) 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, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	X

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
h) 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?	☐	☐	☐	X

The staging area will be used for material storage and parking construction vehicles. The contractor is required to prepare an environmental plan to deal will hazardous materials, water quality impacts from sedimentation, spills, fire and other unforeseen mishaps.

IX. HYDROLOGY AND WATER QUALITY: Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	X	☐	☐

No water quality standards or waste discharge requirements will be violated during pile driving activities. To avoid potential impacts, best management practices such as silt fencing will be used, so effects are expected to be less than significant.

b) 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)?	☐	☐	☐	X

The project will not deplete groundwater, interfere with recharge or lower the local groundwater table.

c) 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?	☐	☐	☐	X

Existing drainage patterns will not be altered.

d) 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?	☐	☐	☐	X

The course of a waterway will not be changed.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
e) 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?	☐	☐	☐	X
Runoff will not be increased.				
f) Otherwise substantially degrade water quality?	☐	☐	☐	X
Water quality will not be degraded.				
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood HHazard Boundary or Flood Insurance Rate MMap or other flood hazard delineation mmap?	☐	☐	☐	X
The project will not affect or otherwise encourage development				
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	X
No new structures will be placed within the 100-year flood hazard area.				
i) 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?	☐	☐	☐	X
J) Inundation by seiche, tsunami, or mudflow.	☐	☐	☐	X

It is unlikely that the project will violate any water quality standards or waste discharge requirements. The gates sit on a concrete apron and are flushed clean by the force of the outfall water. The outfall gate structure will be in operation the entire time the project is undergoing renovation. The gates that are being replaced will have a cofferdam to allow for dry working conditions. DWR is not expecting that water quality will be impaired from construction activities.

The staging area will be used for material storage and parking construction vehicles. The contractor is required to prepare an environmental plan to deal will hazardous materials, water quality impacts from sedimentation, spills, fire and other unforeseen mishaps.

X. LAND USE AND PLANNING: Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	X
b)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?	☐	☐	☐	X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	X

The project is simply upgrading the existing gate structure and protecting and enhancing the existing staging area and permanent access road. There will be no impacts to existing land uses or land use policies.

XI. MINERAL RESOURCES: Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	X

There is no mineral mining in the project area nor is there any mining in Yolo County. The project will not have any impacts related to mineral resource recovery.

	Potentially Significant Imp.	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
XII. NOISE: Would the project result in:				
a) 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.	☐	☐	X	☐

Construction activities have potential for resulting in localized, short-term noise impacts. The contractor is required to implement an approved Noise Abatement Plan.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			X	

Sheet-piles will be installed to support the weight of the equipment and stabilize the working pad for operation and maintenance staff. Installation should take one to three days, thus excessive noise and groundborne vibration issuing from the piling installation will be short-term and is a less than significant impact.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X

There will <u>not be</u> any substantial, <u>permanent</u> increases in ambient noise levels.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.			X	

During installation of the sheet pile wall for the working pad, area, short-term excessive noise levels may occur. The pile driving activity is expected to last no more than one to three days. Because of the short-term nature of this work, the impacts are not considered substantial.

e) 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, would the project expose people residing or working in the project area to excessive noise levels?				X

The project is not located near any airport.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X

There is no private airstrip within the vicinity of the project.

The Yolo County General Plan was adopted June 10, 2009 (Yolo County 2009). At that time the Noise element was updated and discussed the predominantly agricultural character of the county. The document also made clear that Yolo County's primary concern with noise generation in the vicinity of residential subdivisions, among other uses. A new residential development was recently constructed on the landside of the right levee.

In California, sound levels are evaluated using the A-weighted sound level or dBA. Freeway traffic has an A-weighted sound level of 60 dBA. Typical noise levels for farming activities range from 78dBA to as much as 106 dBA_{max} with and an average of about 84 dBA L_{max}. Sensitivity to noise increases during the evening and at night (Yolo County 2009).

When sound propagates over a distance, changes in the level and frequency of the sound occur. Generally as noise spreads (geometric spreading) it becomes attenuated and this reduction in noise depends on whether the noise comes from a point source or occurs over a distance such as with highway noise (Yolo County 2009). The project, for the most part, will be localized. Noise attenuation can also occur with ground absorption. This occurs when the path of the noise is close to the ground. Soft surfaces such as dirt, grass, or low vegetation absorb sound. Barriers between the noise source and the receiver can substantially lower noise levels received (Yolo County 2009).

Projects that impair the line of sight between the source and the receiver typically result in a decrease of at least 5 dBs. A taller barrier, such as the levee, could provide as much as a 20 dB decrease in noise received (Yolo County 2009). The majority of project activity will take place below the toe of the levee.

The Project is located below a constructed barrier; the levee. A majority of the construction will take place below the levee toe and thus the line of sight to the houses approximately 100 feet away. The Yolo County General Plan reports that work carried out below the line of sight can decrease the noise generated between 5 dBs and 20 dBs depending on how tall the barrier is.

Ambient noise in the vicinity surrounding the project area is generated principally by automobile and truck traffic on State Route 113 and State Route 45, generating as much ambient noise as 60 dBA. As already mentioned farming activities generate an average of about 84 dBA. So the background noise in the project area is considered between "normally acceptable" and "clearly unacceptable" according to the 2003 General Plan Guidelines developed by the Governor's Office of Planning and Research.

Very little additional traffic will be generated by project activities. Minor truck and automobile traffic will be generated during the morning and afternoon commutes. A few specialized trucks will be utilized during the project time including a crane to place the gates, a cement truck to repair the wing wall at Gate #1, a water truck, and other construction equipment. Most equipment is stationary. Appendix 2 contains a table listing the type of equipment, the expected total operation in days, and the total operation in hours.
Two types of equipment will create noise that is considered clearly unacceptable. Pile drivers produce sound levels between 81-96 dBA at 50 feet (Bolt et. al., 1987). The closest dwelling is 150 feet distant and between the work site and the dwelling is the levee which both deflects noise upward and absorbs it.

Pile driving at the water's edge of the staging area is expected to last one day between the hours of 7:00 a.m. and 6:00 p.m. but may extend a maximum of three days. Because the work will be carried out during daylight hours and because of the minimum number of days that noise will be generated, this noise impact is not considered significant.

There may be some grinding due to onsite metal fabrication. The noise generated by the grinders will be intermittent but may last most of the construction timeline. Maintaining the established work hours should keep the impact less than significant.

XIII. POPULATION AND HOUSING: Would the project:	Potentially Significant Imp.	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	X

There will be no change to population growth, displacement or removal of homes, or displacement of any home owners as a result of this project.

XIV. PUBLIC SERVICES:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Would the project result in substantial adverse physical 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 any of the public services:				
Police protection?	☐	☐	☐	X
Fire protection?	☐	☐	☐	X
Schools?	☐	☐	☐	X
Parks?	☐	☐	☐	X
Other public Facilities?	☐	☐	☐	X

The project will have no effect on any public facilities or special districts.

The project will not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities There is no 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 any of the public services. This includes police and fire departments, schools, parks, and other public facilities.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
XV. RECREATION:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	X

a) and (b) The project is upstream of the only recreational facility in Knights Landing. The project would not increase the use or otherwise affect the boat launching facility.

A new housing development has recently been constructed just east of the staging area on the landside of the east levee. Thus a recreation access is not available through this private property. There is a recreational facility, the Knights Landing Boat Launch, on Highway 45 just downstream of the project. The facility provides access to the Sacramento River for boating, water skiing, and fishing with signage on the west bank downstream of and not affected by the project.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
XVI. TRANSPORTATION/TRAFFIC: Would the project:				
a) 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 including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	X
b) 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 roads or highways?	☐	☐	☐	X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?	☐	☐	☐	X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	X
e) Result in inadequate emergency access?	☐	☐	☐	X
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	X

(a-f) The only transportation plan in the area is the "Transportation Corridor Concept Report State Route (SR) 113, approved on 12/21/2009 by Caltrans District 3. In the area of the project SR 113 passes through rural agricultural land (current level of service-D). The report states that, "No significant growth or development is anticipated in the rural areas served by SR 113 (Caltrans 2009) for the next 20 years. The segment of SR 113 running near the project is expected to remain at LOS D for the next 20 years with the Peak Hour Traffic changing from 629 to 815 over that 20-year period. So the addition of a minor number of trucks to deliver gravel, one that conducts the pile driving for a day, another to carry the boom to lift the gates in and worker commuting vehicles, the project should not significantly affect traffic patterns, noise, or air quality.

XVII. UTILITIES AND SERVICE SYSTEMS: Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	X

The project will not exceed wastewater treatment requirements. It is unlikely that the project will affect water quality at all.

b) 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?	☐	☐	☐	X

The project will not require the construction or expansion of any new water or wastewater treatment facilities.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	X

The project will not require the construction or expansion of new facilities.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	X

The project will have sufficient water entitlements to carry out the required construction.

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	X

The existing wastewater treatment provider has adequate capacity to serve the project's needs although the project is not expected to have any effects on water quality.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
	☐	☐	☐	X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	X

The project will not have any solid waste disposal needs.

Thus the project is expected to have little or no effect on existing utilities or service systems.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, 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, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	X
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	X
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	X

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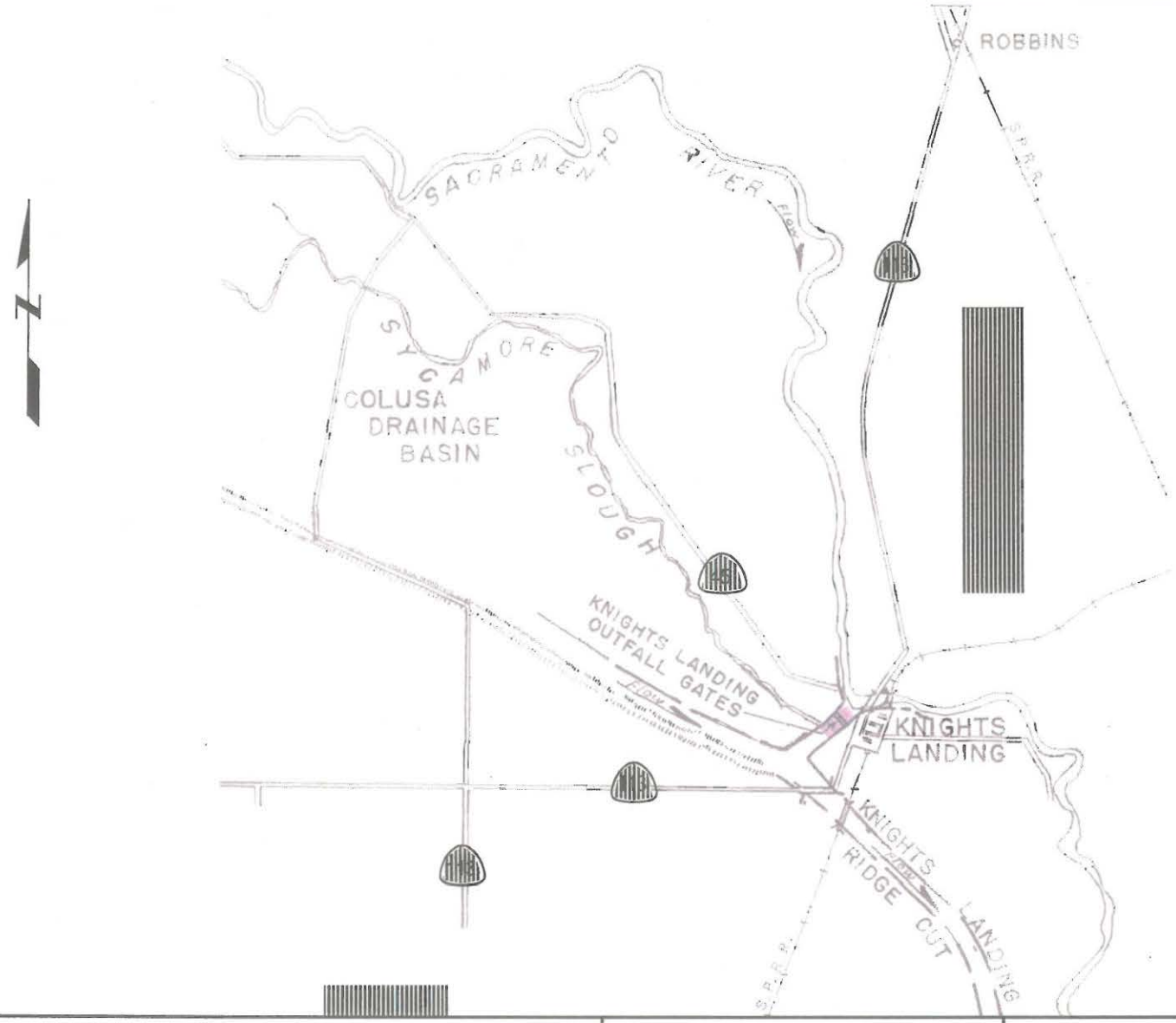
FIGURES

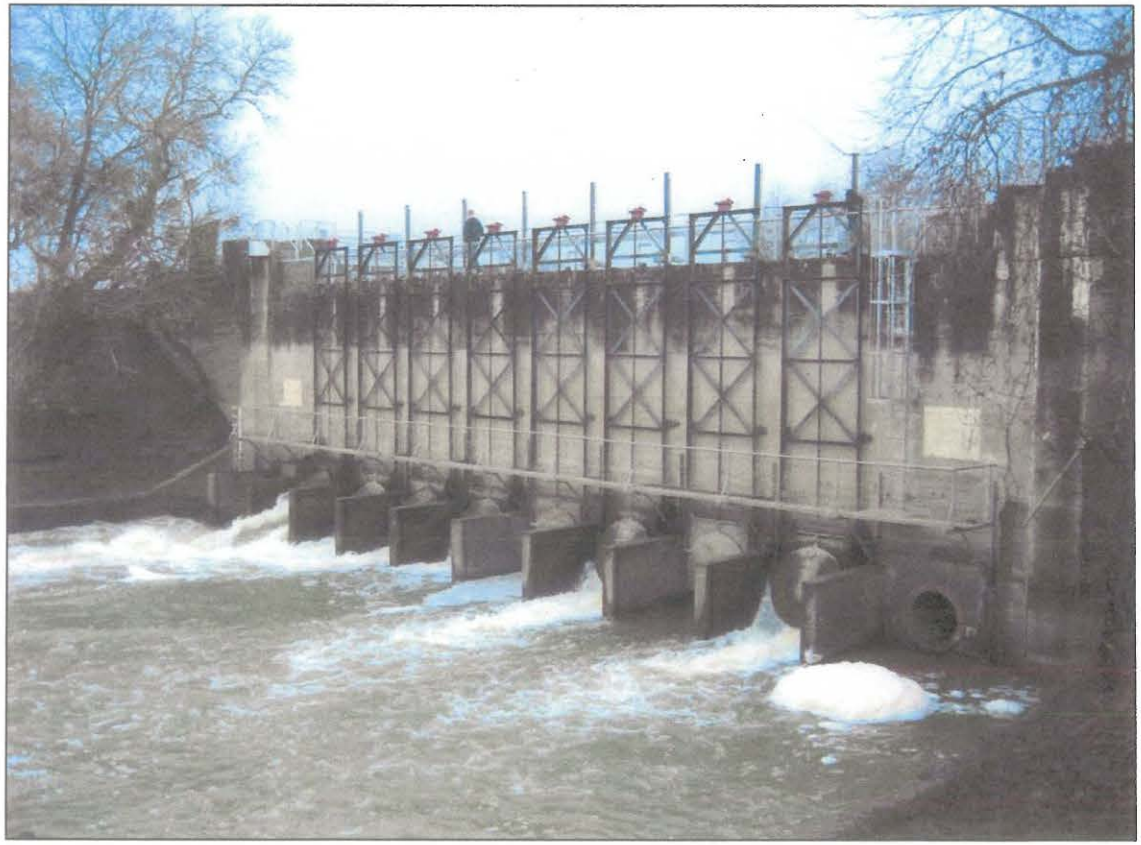


STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT

KNIGHTS LANDING OUT FALL GATES

VICINITY MAP

FIGURE
1

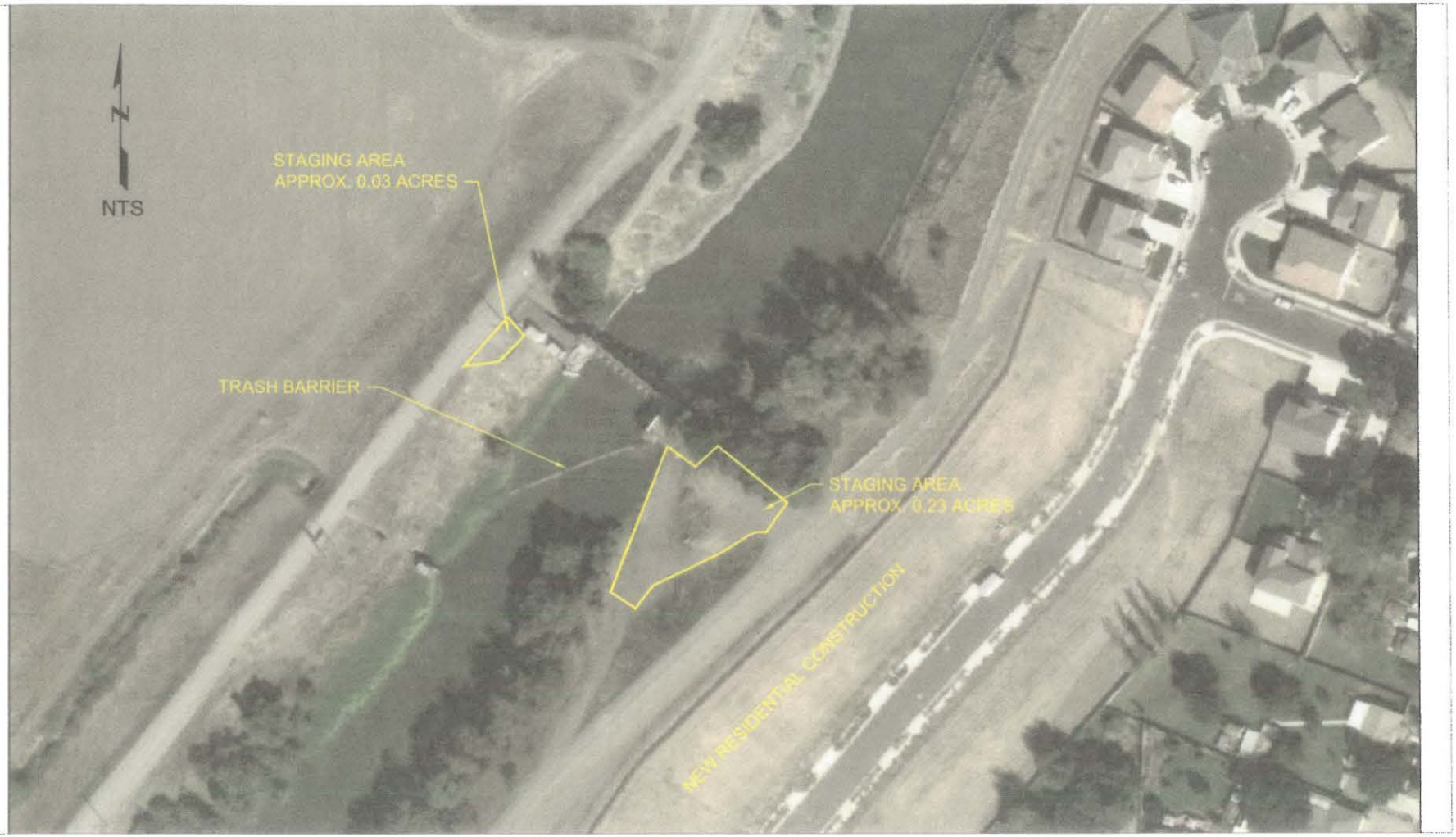


View of Knights Landing Outfall Structure from the downstream Sacramento River side of the structure.

Department of Water Resources
Flood Maintenace Office
Maintenance Support Branch
System Integrity C

KNIGHTS LANDING OUTFALL GATES REHABILITATION PROJECT

Date: FEB. 2011	PHOTO	Figure: 2



Department of Water Resources
Flood Maintenace Office
Maintenance Support Branch
System Integrity C

KNIGHTS LANDING OUTFALL GATES
REHABILITATION PROJECT

Date: FEB. 2011	STAGING AREA PLAN	Figure: 3

N

NTS

Access through gated driveway off of State Route 45.

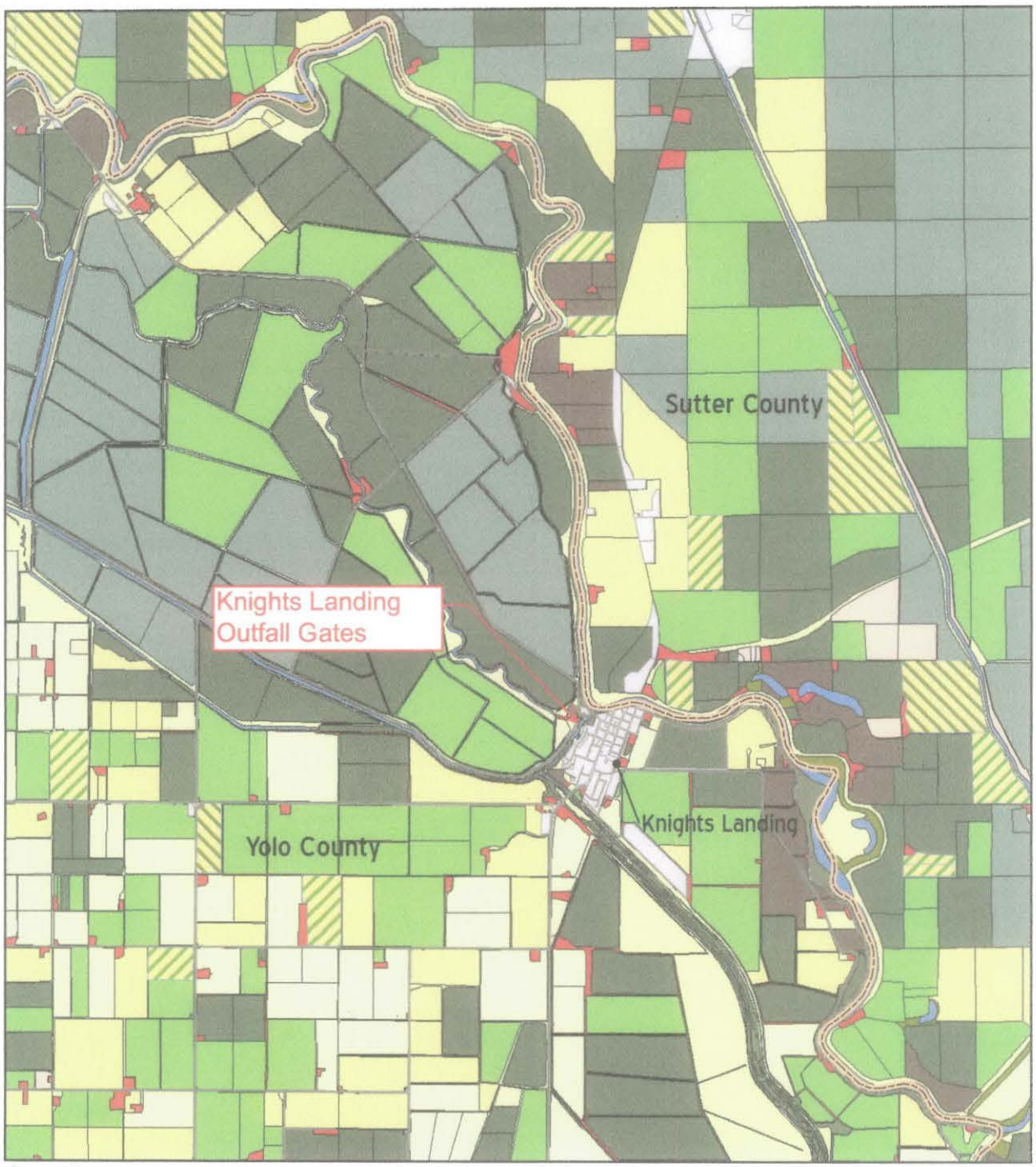
N

NTS

Department of Water Resources
Flood Maintenace Office
Maintenance Support Branch
System Integrity C

KNIGHTS LANDING OUTFALL GATES REHABILITATION PROJECT

Date: FEB. 2011	CONSTRUCTION ACCESS	Figure: 4



Legend

- County Boundary
- Fallow
- Urban Land
- Double Cropped Grain and Field Crops
- Double Cropped Grain and Truck Crops
- Deciduous Fruits and Nuts
- Field Crops
- Grain and Hay
- Idle Land
- Alfalfa or Pasture
- Rice
- Truck Crops
- Native Riparian
- Native Vegetation
- Water Surface
- Semiagricultural and Incidental to Agriculture

Figure 5
Land Use Near Knights Landing

Sutter County -- mapped in 2004
Yolo County -- mapped in 2008

N
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APPENDICES

Appendix 1

Project Design/Plans

STATE OF CALIFORNIA

CALIFORNIA NATURAL RESOURCES AGENCY

DEPARTMENT OF WATER RESOURCES

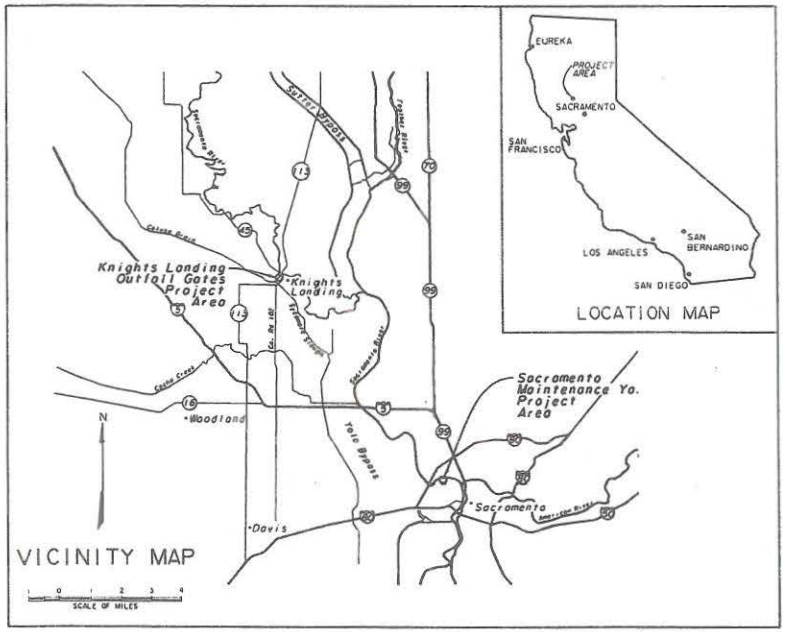
DIVISION OF ENGINEERING

DIVISION OF FLOOD MANAGEMENT

YOLO COUNTY - COLUSA DRAIN

OUTFALL GATES REHABILITATION

SPEC. NO. 10-XX



REV.	DATE	DESCRIPTION	SUB.	APP'D

THINK SAFETY - ACT SAFELY

APPROVED: DATE:

CHIEF, DIVISION OF ENGINEERING
REG. C.E. No. 37148

SPEC. No.	10-XX
DRAWING No.	
REV.	SHEET No. 1

3/15/2011

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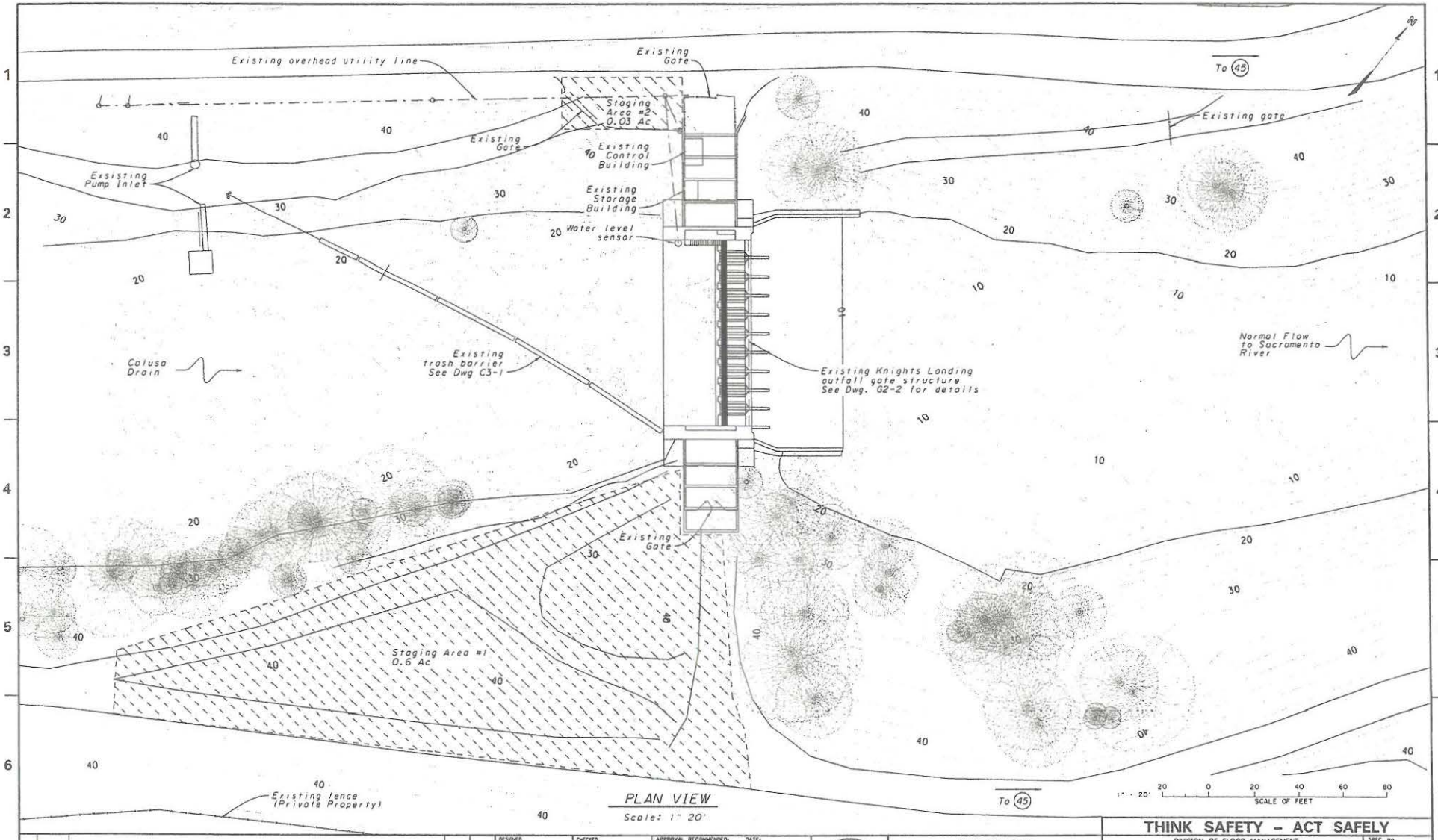


THINK SAFETY – ACT SAFELY

REV.	DATE	DESCRIPTION	SUB.	APP'D

DESIGNED P. Calquhoun REG. C.E. No. 77563
CHECKED F. Dubar REG. C.E. No. 13687
DRAWN M. Calquhoun REG. C.E. No. 77563
REVIEWED F. Seddick REG. C.E. No. 37136
SUBMITTED P. LaCaca REG. C.E. No. 68336

APPROVAL RECOMMENDED: DATE:
CHIEF, DAMS AND CANALS SEC., REG. C.E. No. 52754
APPROVAL RECOMMENDED: DATE:
CHIEF, CONSTRUCTION OFFICE
APPROVED: DATE:
CHIEF, GEOTECH. & STRUCT. BRANCH, REG. C.E. No. 52771

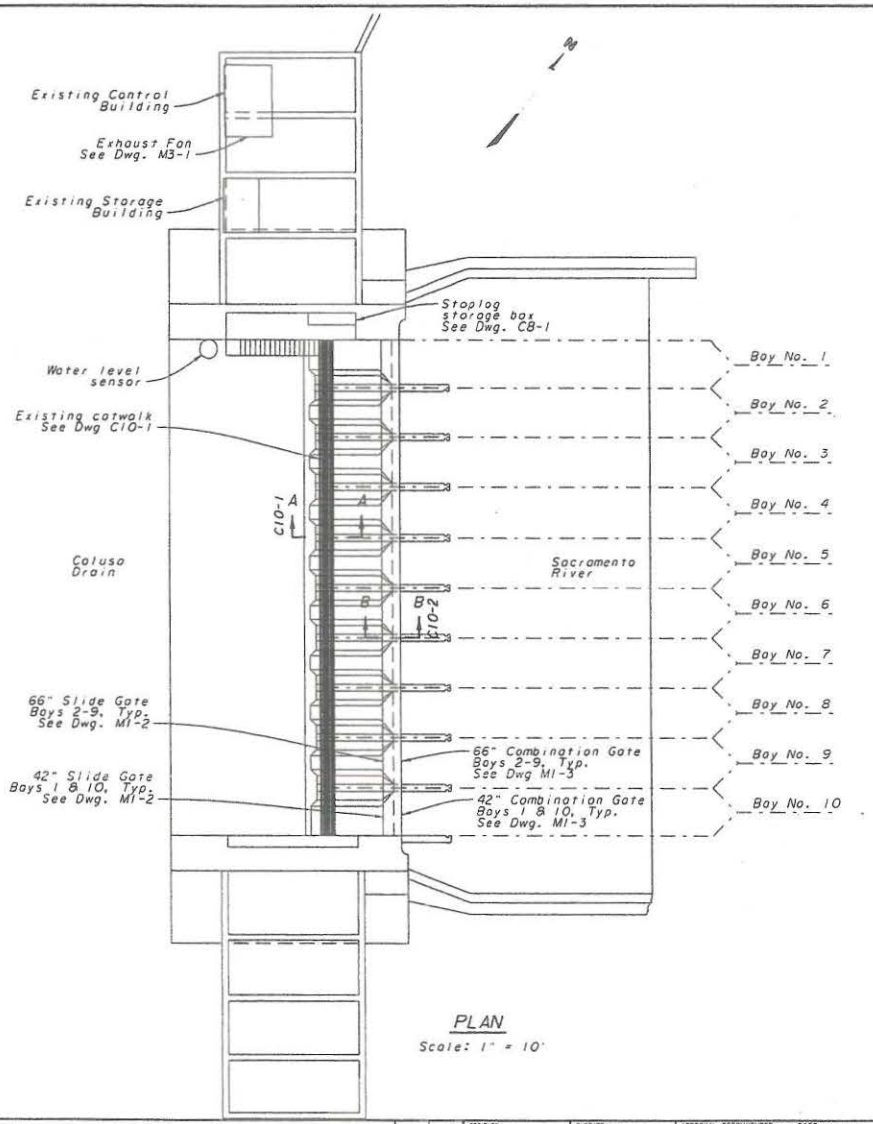
STATE OF CALIFORNIA
CALIFORNIA NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING
STATE WATER FACILITIES

DIVISION OF FLOOD MANAGEMENT
YOLO COUNTY – COLUSA DRAIN

OUTFALL GATES REHABILITATION
EXISTING SITE PLAN

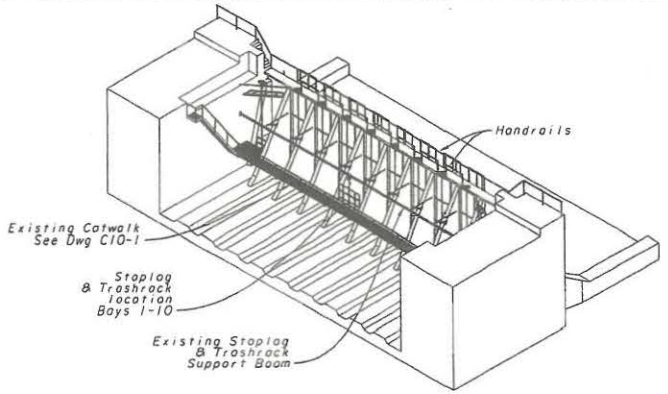
SPEC. No. 10-XX
DRAWING No.
REV. SHEET No. 2

3/15/2011



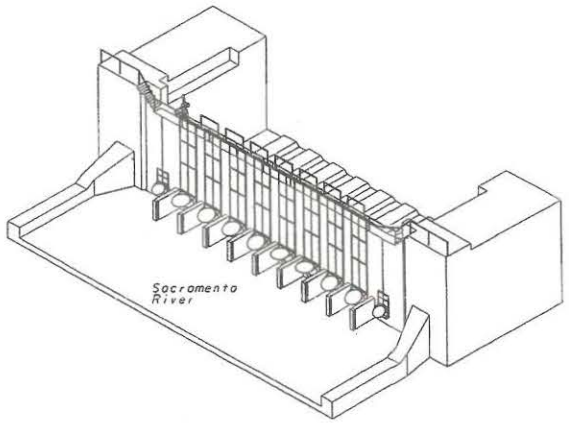
PLAN

Scale: 1" = 10'



COLUSA DRAIN SIDE

Not to Scale



SACRAMENTO RIVER SIDE

Not to Scale

1" = 10' SCALE OF FEET 10 0 10 20 30 40

REV.	DATE	DESCRIPTION	SUB.	APP'D

DESIGNED R. Calquhoun REG. C.E. No. 77663
DRAWN R. Calquhoun REG. C.E. No. 77663
SUBMITTED P. LaCaca REG. C.E. No. 58336
CHECKED F. Dubar REG. C.E. No. 13587
REVIEWED F. Seldick REG. C.E. No. 37136
APPROVAL RECOMMENDED: DATE:
CHIEF, DAMS AND CANALS SEC., REG. C.E. No. 52756
APPROVAL RECOMMENDED: DATE:
CHIEF, CONSTRUCTION OFFICE
APPROVED: DATE:
CHIEF, DESIGN & SPECT. BRANCH, REG. C.E. No. 52771

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DIVISION OF ENGINEERING
STATE WATER FACILITIES

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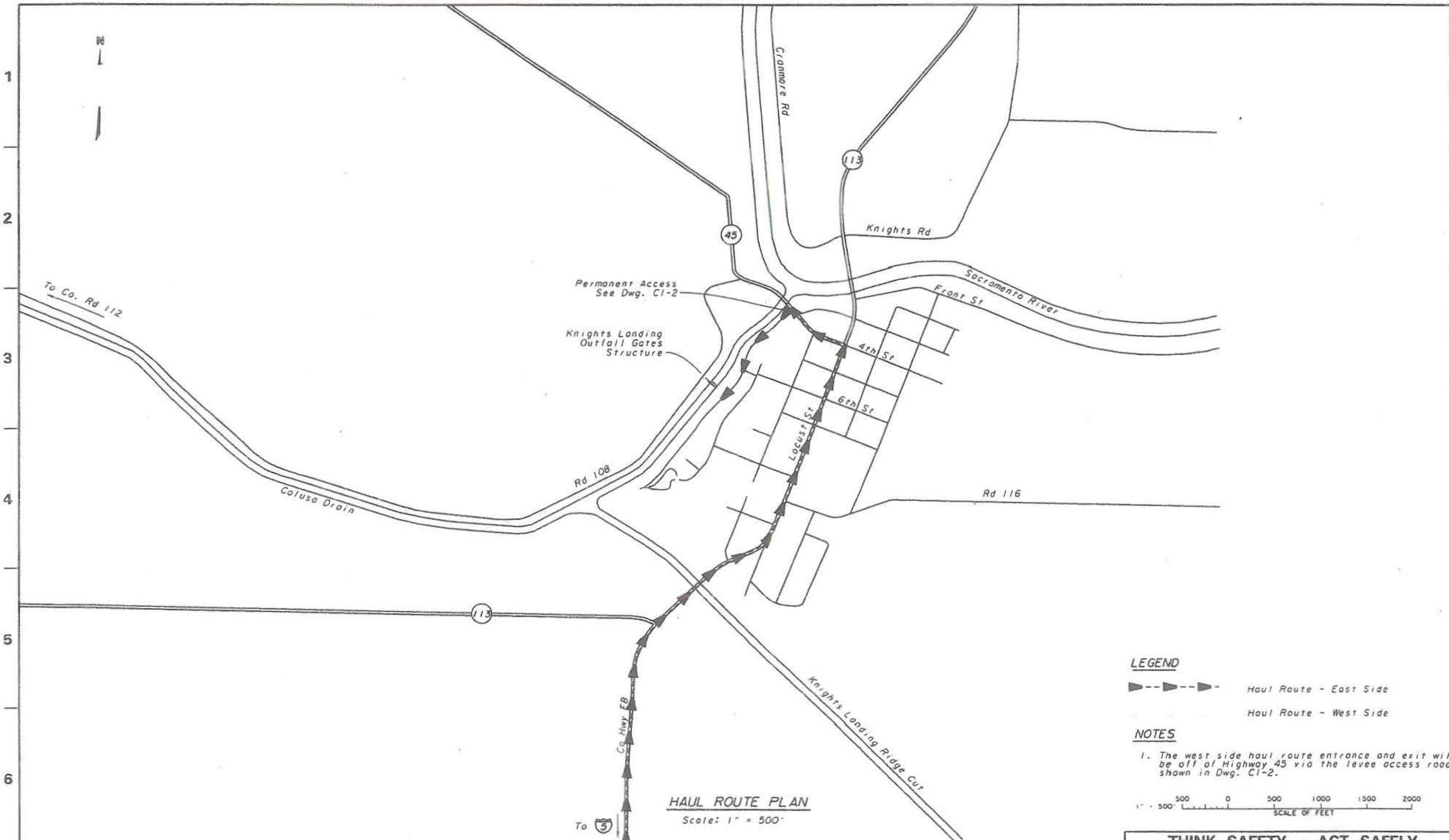
DIVISION OF FLOOD MANAGEMENT
YOLO COUNTY - COLUSA DRAIN

OUTFALL GATES REHABILITATION
PLAN AND ISOMETRIC VIEWS

SPEC. No. 10-XX
DRAWING No.
REV. SHEET No. 3

3/15/2011

A B C D E F G



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REV.	DATE	DESCRIPTION	SUB.	APP'D

DESIGNED: R. Colquhoun, REG. C.E. No. 77683
CHECKED: F. Dubar, REG. C.E. No. 13687
DRAWN: R. Colquhoun, REG. C.E. No. 77683
REVIEWED: F. Seldick, REG. C.E. No. 31136
SUBMITTED: P. LeCocq, REG. C.E. No. 48336

APPROVAL RECOMMENDED: DATE:
CHIEF, DAMS AND CANALS SEC., REG. C.E. No. 52754
APPROVAL RECOMMENDED: DATE:
CHIEF, CONSTRUCTION OFFICE
APPROVED: DATE:
CHIEF, DESIGN & STRUCT. BRANCH, REG. C.E. No. 52771

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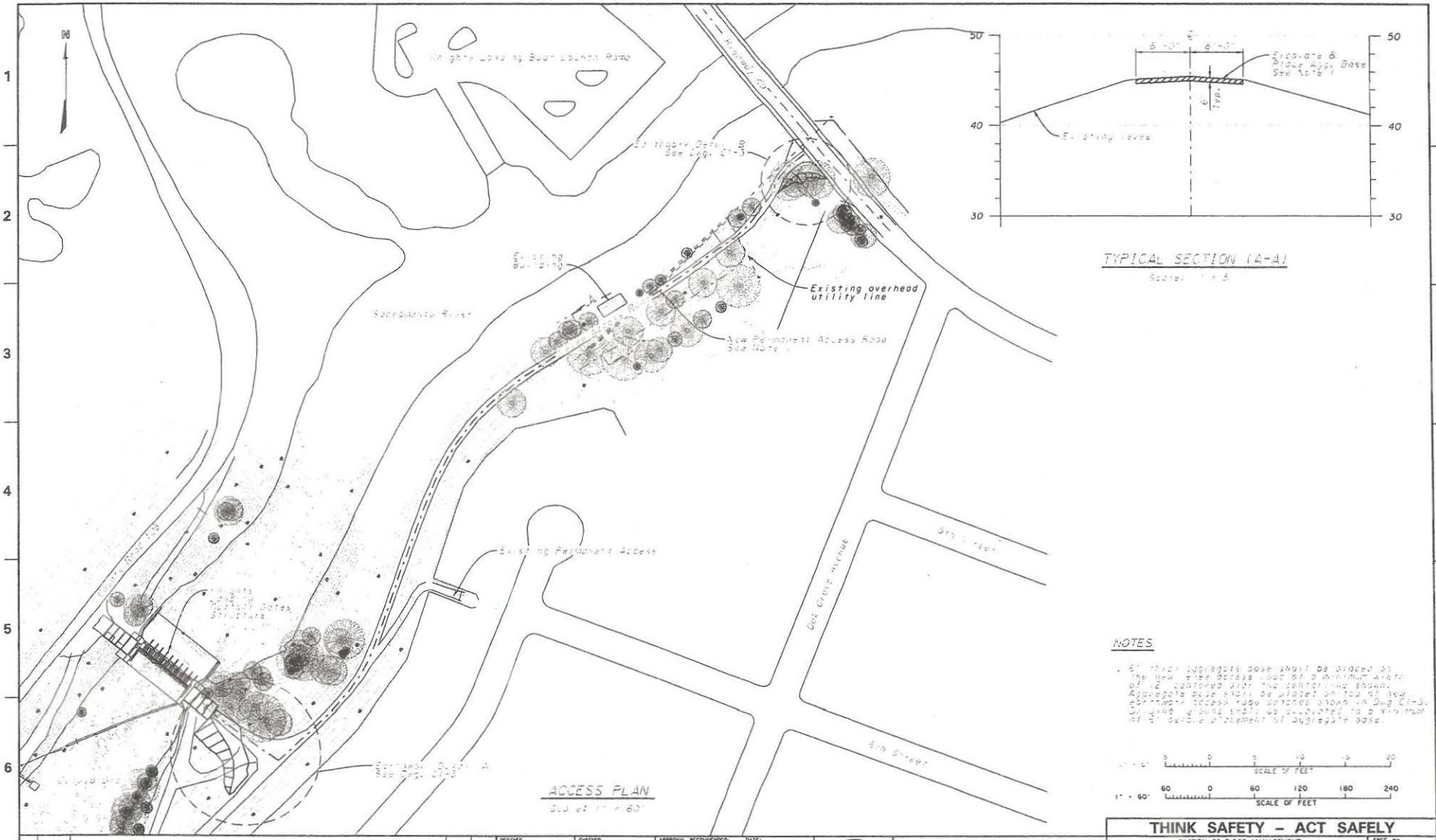
DIVISION OF ENGINEERING
STATE WATER FACILITIES

DIVISION OF FLOOD MANAGEMENT
YOLO COUNTY – COLUSA DRAIN

OUTFALL GATES REHABILITATION
HAUL ROUTES

SPEC. No. 10-XX
DRAWING No.
REV.
SHEET No. 4

3/15/2011



REV.	DATE	DESCRIPTION	SUB.	APP'D

DESIGNED R. Colquhoun REG. C.E. No. 77683	CHECKED F. Dubar REG. C.E. No. 13687	APPROVAL RECOMMENDED: DATE: CHIEF, BANK AND CANALS SEC., REG. C.E. No. 52754
DRAWN R. Colquhoun REG. C.E. No. 77683	REVIEWED F. Seidick REG. C.E. No. 37136	APPROVAL RECOMMENDED: DATE: CHIEF, CONSTRUCTION OFFICE
SUBMITTED: P. LaCoco REG. C.E. No. 58336		APPROVED: DATE: CHIEF, GEOTECH. & STRUCT. BRANCH, REG. C.E. No. 52771

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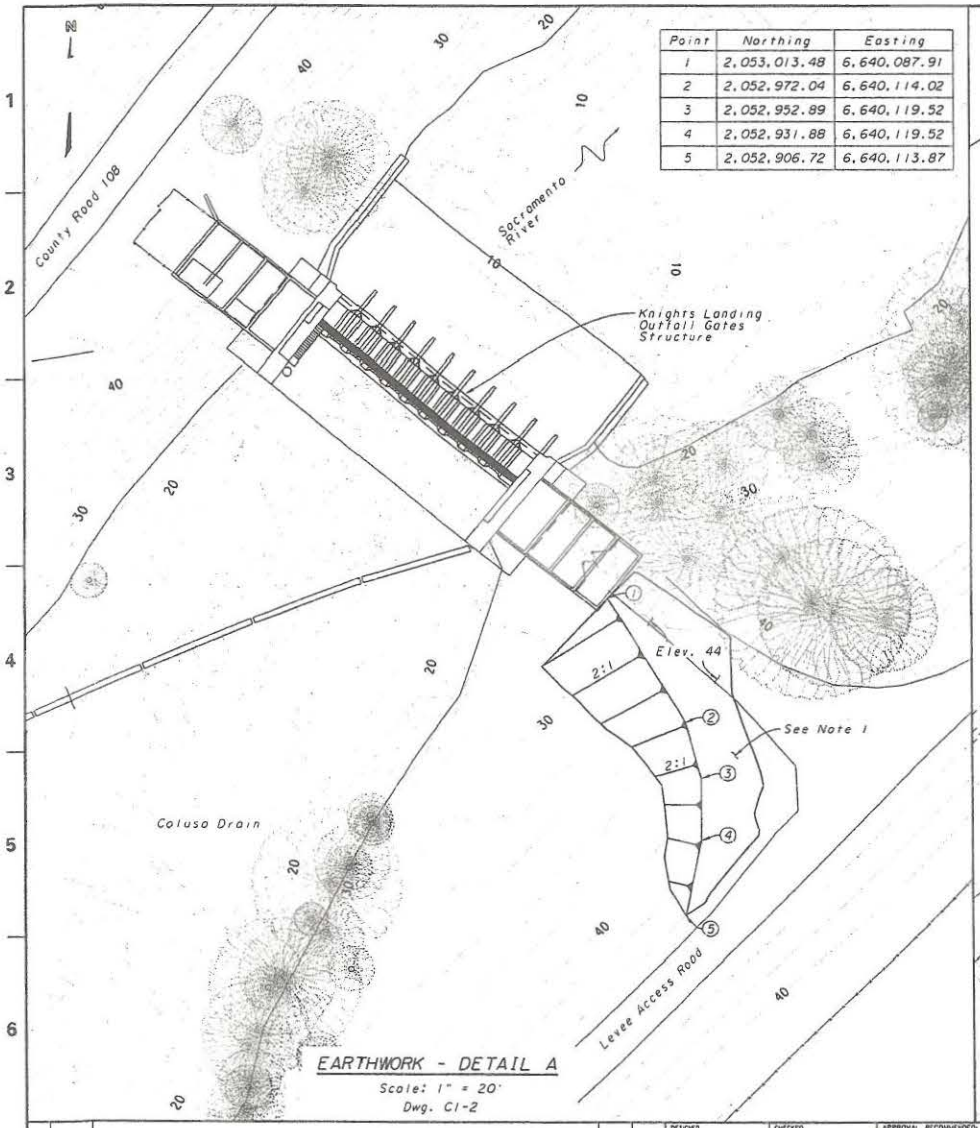
DIVISION OF FLOOD MANAGEMENT
YOLO COUNTY – COLUSA DRAIN

OUTFALL GATES REHABILITATION PERMANENT ACCESS

SPEC. No. 10–XX
DRAWING No.
REV. SHEET No. 5

3/15/2011

Point	Northing	Easting
1	2,053,013.48	6,640,087.91
2	2,052,972.04	6,640,114.02
3	2,052,952.89	6,640,119.52
4	2,052,931.88	6,640,119.52
5	2,052,906.72	6,640,113.87

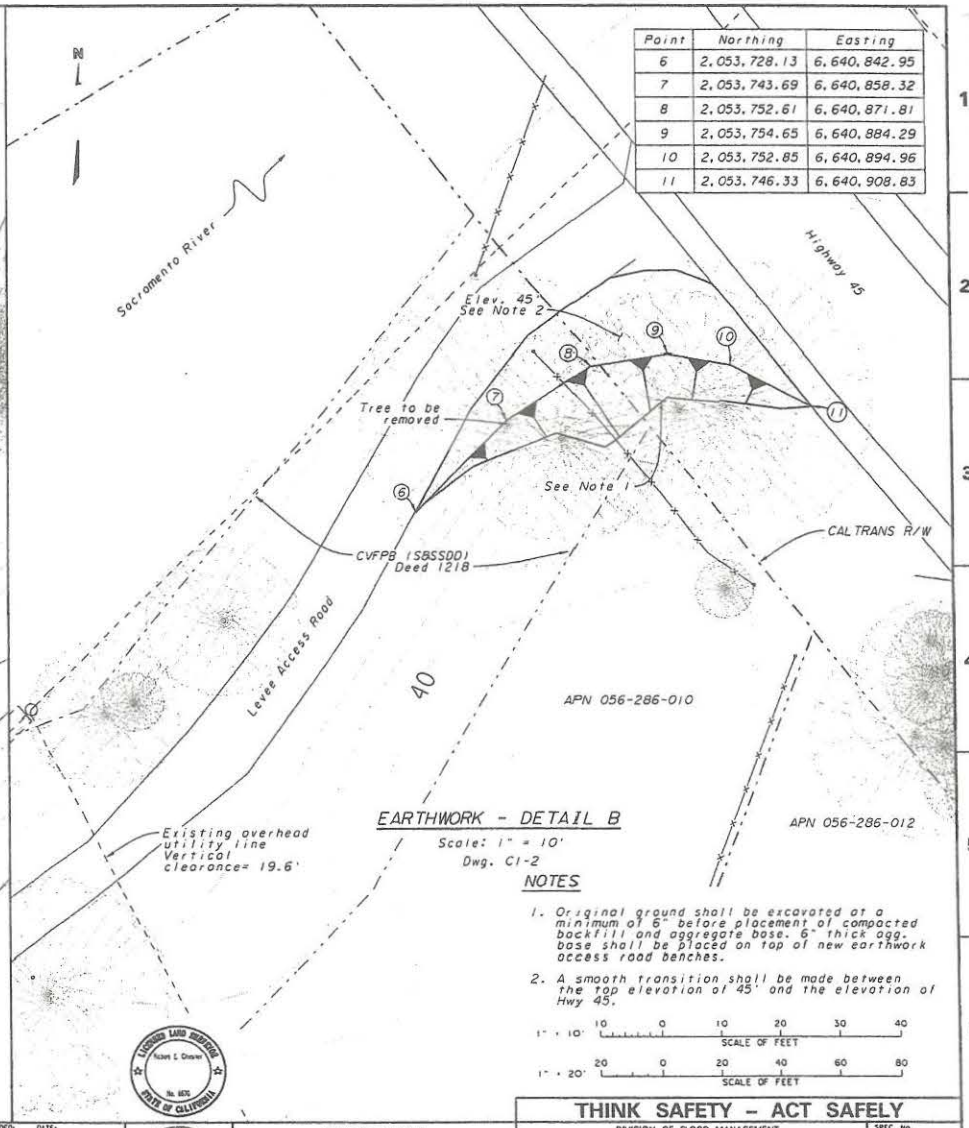


EARTHWORK - DETAIL A

Scale: 1" = 20'

Dwg. C1-2

Point	Northing	Easting
6	2,053,728.13	6,640,842.95
7	2,053,743.69	6,640,858.32
8	2,053,752.61	6,640,871.81
9	2,053,754.65	6,640,884.29
10	2,053,752.85	6,640,894.96
11	2,053,746.33	6,640,908.83



EARTHWORK - DETAIL B

Scale: 1" = 10'

Dwg. C1-2

NOTES

1. Original ground shall be excavated at a minimum of 6" before placement of compacted backfill and aggregate base. 6" thick agg. base shall be placed on top of new earthwork access road benches.
2. A smooth transition shall be made between the top elevation of 45' and the elevation of Hwy 45.

1" = 10' SCALE OF FEET (10 0 10 20 30 40)

1" = 20' SCALE OF FEET (20 0 20 40 60 80)

LICENSED LAND SURVEYOR — Robert E. Chrisman — No. 6676 — STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — PHILIP C. LeCocq — No. 58336 — Civil — STATE OF CALIFORNIA

THINK SAFETY - ACT SAFELY

REV.	DATE	DESCRIPTION	SUB.	APP'D

DESIGNED: R. Calquhoun, REG. C.E. No. 77663
DRAWN: R. Calquhoun, REG. C.E. No. 77663
SUBMITTED: P. LeCocq, REG. C.E. No. 58336
CHECKED: F. Dubar, REG. C.E. No. 13687
REVIEWED: F. Seldick, REG. C.E. No. 37136

APPROVAL RECOMMENDED: DATE:
CHIEF, DAMS AND CANALS SEC., REG. C.E. No. 52754
APPROVAL RECOMMENDED: DATE:
CHIEF, CONSTRUCTION OFFICE
APPROVED: DATE:
CHIEF, GEOTECH. & STRUCT. BRANCH, REG. C.E. No. 52771

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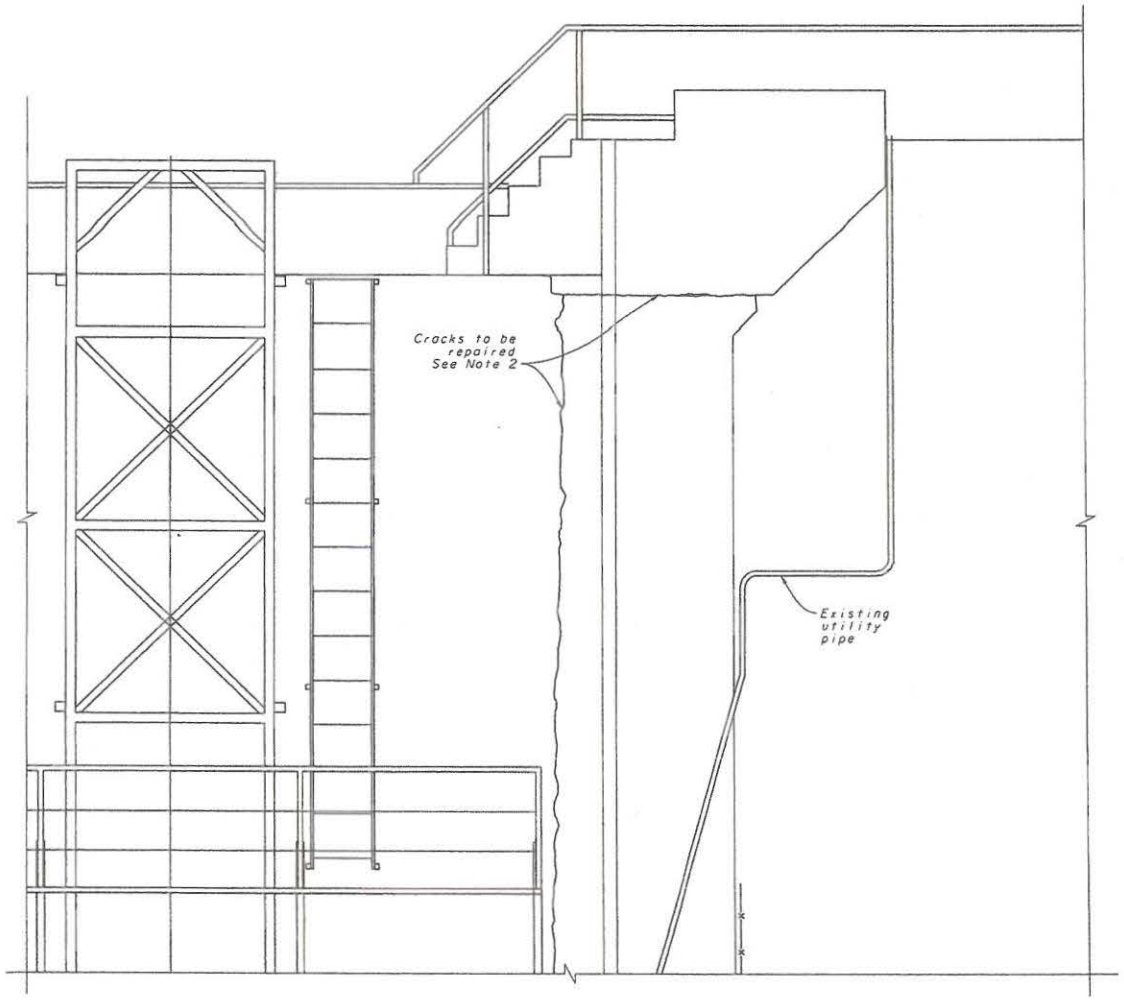
OUTFALL GATES REHABILITATION
EARTHWORK

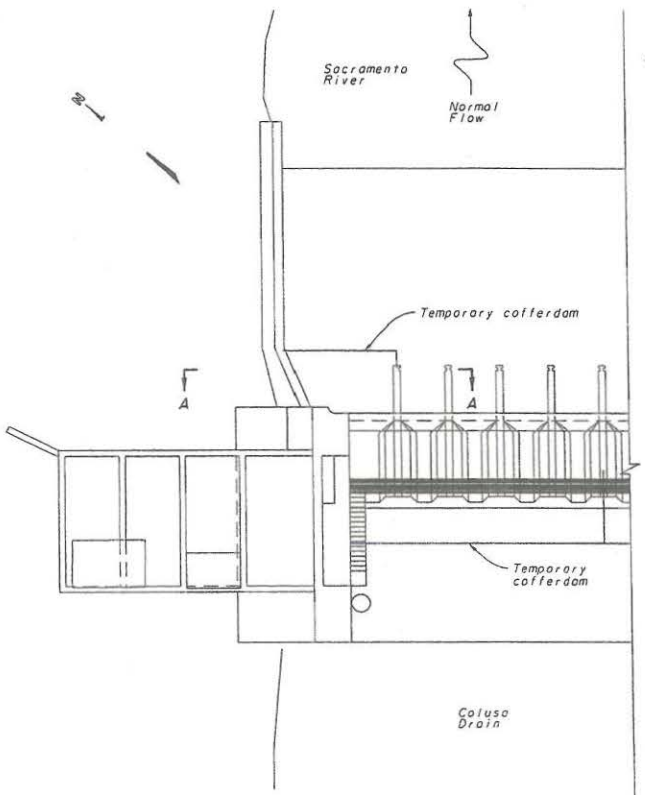
SPEC. No. 10-XX
DRAWING No.
REV. | SHEET No. 6

3/15/2011



SECTION A-A

Scale: 1/2" = 1'



PLAN VIEW

Scale: 1" = 10'

NOTES

1. Locations and dimensions of roads and structures are approximate.
2. Cracks shall be clean and dry before placement of epoxy or grout per specification 03932 - Crack Repair. Crack and spawling continues beneath normal water surface elevation and shall be included in repairs.

1" = 10' SCALE OF FEET (10 0 10 20 30 40)

½" = 1' SCALE OF FEET (1 0 1 2 3 4 5 6 7 8 9)

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REV.	DATE	DESCRIPTION	SUB.	APP'D

DESIGNED R. Colquhoun REG. C.E. No. 77683
CHECKED F. Dabar REG. C.E. No. 13687
DRAWN R. Colquhoun REG. C.E. No. 77683
REVIEWED F. Sedevcr REG. C.E. No. 37170
SUBMITTED: P. LaCava REG. C.E. No. 58336

APPROVAL RECOMMENDED: DATE:
CHIEF, DAMS AND CANALS SEC., REG. C.E. No. 52754
APPROVAL RECOMMENDED: DATE:
CHIEF, CONSTRUCTION OFFICE
APPROVED: DATE:
CHIEF, GEOTECH. & STRUCT. BRANCH, REG. C.E. No. 52771

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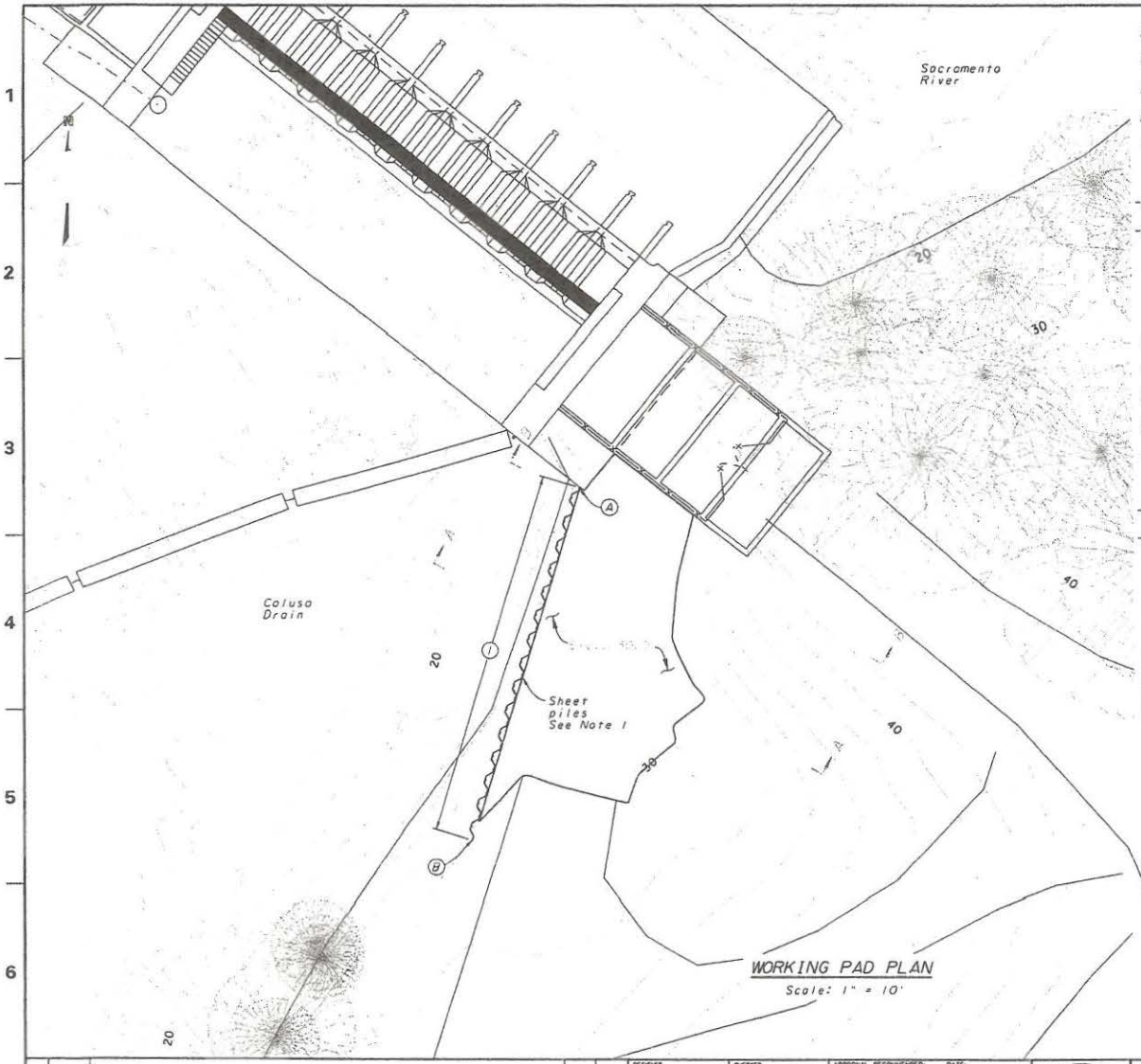
YOLO COUNTY – COLUSA DRAIN

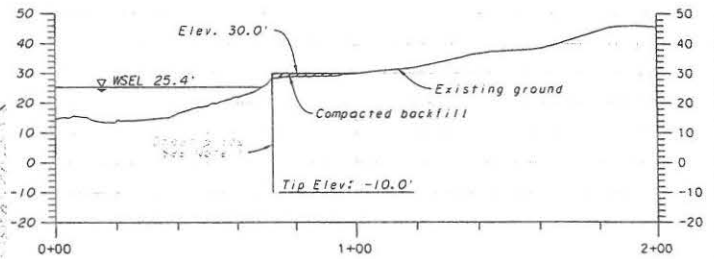
OUTFALL GATES REHABILITATION
CONCRETE REPAIR
SACRAMENTO RIVER SIDE

SPEC. No. 10-XX
DRAWING No.
REV.
SHEET No. 7

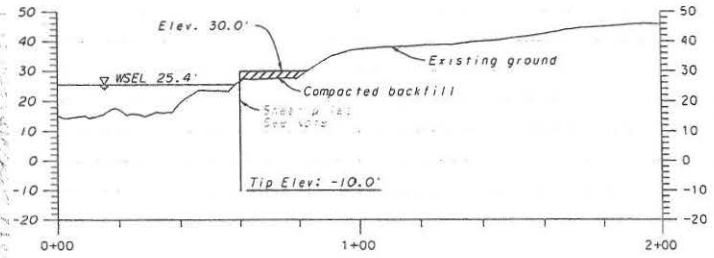
3/15/2011



WORKING PAD PLAN
Scale: 1" = 10'



SECTION A-A
Scale: 1" = 20'



SECTION B-B
Scale: 1" = 20'

Point	Northing	Easting
A	2,053,021.78	6,640,055.66
B	2,052,958.58	6,640,036.63

Section	Length (ft)	Pile Height (ft)	Crest Elevation (ft)	Tip Elevation (ft)
1	66	40	30.0	-10.0

NOTES

1. Sheet pile wall sections shall be a hot rolled Z-shaped section with a minimum modulus of elasticity of 20 in³/ft and have a minimum web thickness of 0.375 in.

1" = 10' 10 0 10 20 30 40 SCALE OF FEET

1" = 20' 20 0 20 40 60 80 SCALE OF FEET

THINK SAFETY – ACT SAFELY

REV.	DATE	DESCRIPTION	SUB.	APP'D

DESIGNED R. Colquhoun REG. C.E. No. 17663
DRAWN R. Colquhoun REG. C.E. No. 17663
SUBMITTED P. LeCocq REG. C.E. No. 60336
CHECKED F. Dudar REG. C.E. No. 13681
REVIEWED F. Sedaick REG. C.E. No. 37136

APPROVAL RECOMMENDED: DATE:
CHIEF, DAMS AND CANALS SEC., REG. C.E. No. 52756
APPROVAL RECOMMENDED: DATE:
CHIEF, CONSTRUCTION OFFICE
APPROVED: DATE:
CHIEF, GEOTECH. & STRUCT. BRANCH, REG. C.E. No. 52771

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DIVISION OF ENGINEERING
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YOLO COUNTY – COLUSA DRAIN
OUTFALL GATES REHABILITATION
WORKING PAD

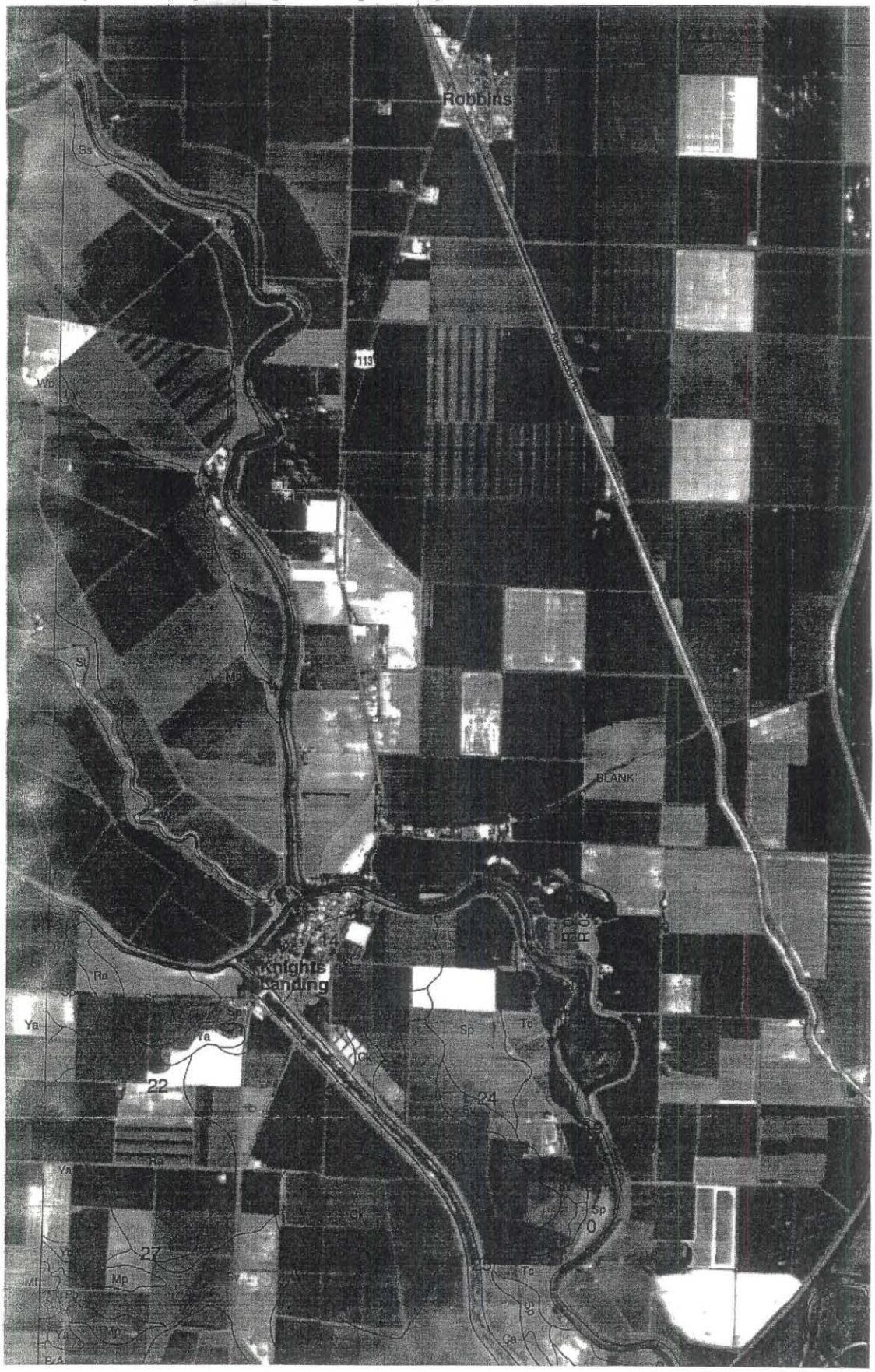
SPEC. No. 10-XX
DRAWING No.
REV. SHEET No. 8

3/15/2011

Appendix 2

Soil Characteristics

Soil Survey of Yolo County, CA - Knights Landing Quadrangle



Guide to Mapping Units

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. In referring to a range site, or a wildlife group, read the introduction to the section it is in for general information about its management. Blank cells in the range site column mean that the particular mapping unit is not used for range.

Map Symbol		Range Site	Vegetative Group	Wildlife Group
AaA	Arbuckle gravelly loam, 0 to 2 percent slopes		A	1
AaB	Arbuckle gravelly loam, 2 to 5 percent slopes		A	1
BaD3	Balcom silty clay loam, 5 to 15 percent slopes, severely eroded	Fine Loamy	G	8
BaE2	Balcom silty clay loam, 15 to 30 percent slopes, eroded	Fine Loamy	G	7
BaF2	Balcom silty clay loam, 30 to 50 percent slopes, eroded	Fine Loamy	G	7
BaG3	Balcom silty clay loam, 50 to 75 percent slopes, severely eroded	Fine Loamy	J	8
BdF2	Balcom-Dibble complex, 30 to 50 percent slopes, eroded		G	7
BrA	Brentwood silty clay loam, 0 to 2 percent slopes		A	1
Ca	Capay silty Clay		C	3
Cb	Capay silty clay, flooded		E	4
Cc	Capay soils, flooded		E	4
Ch	Clear Lake silty clay loam		C	3
Ck	Clear Lake clay		C	3
Cn	Clear Lake soils, flooded		E	4
CrE2	Climara clay, 2 to 30 percent slopes, eroded	Clayey	C	7
CtD2	Corning gravelly loam, 2 to 15 percent slopes, eroded	Claypan	D	6
CtE2	Corning gravelly loam, IS to 30 percent slopes, eroded	Claypan	D	6
DaF2	Dibble clay loam, 30 to 50 percent slopes, eroded	Fine Loamy	G	7
DaG2	Dibble clay loam, SO to 75 percent slopes, eroded	Fine Loamy	J	7
DbE2	Dibble-Millsholm complex, 9 to 30	Fine	G	7

Sp	Sycamore silt loam, drained		A	1
Sr	Sycamore silt loam, flooded		E	1
Ss	Sycamore silty clay loam		E	1
St	Sycamore silty clay loam, drained		A	1
Su	Sycamore complex		E	4
Sv	Sycamore complex, drained		C	3
Sw	Sycamore complex, flooded		E	4
TaA	Tehama loam, 0 to 2 percent slopes		A	3
TaB	Tehama loam, 2 to 5 percent slopes		A	3
Tb	Tyndall very fine sandy loam		E	1
Tc	Tyndall very fine sandy loam, drained		A	1
Td	Tyndall very fine sandy loam, flooded		E	1
Te	Tyndall very fine sandy loam, deep		E	1
Tf	Tyndall silty clay loam		E	1
Va	Valdez silt loam		E	1
Vb	Valdez silt loam, deep		E	4
Vc	Valdez complex, flooded		E	4
Wa	Willows silty clay loam		E	4
Wb	Willows clay		E	4
Wc	Willows clay, alkali		F	5
Wd	Willows clay, alkali, drained		F	5
Wf	Willows clay, alkali, flooded		F	5
Wg	Willows soils, flooded		E	4
Wm	Willows clay, marly variant		E	4
Wn	Willows clay, marly variant, saline alkali		F	5
Ya	Yolo silt loam		A	1
Yb	Yolo silty clay loam		A	1
Za	Zamora loam		A	1

Pb	Pescadero silty clay, saline alkali		E	5
Pc	Pescadero soils, flooded		E	5
PfE2	Positas gravelly loam, 15 to 30 percent slopes, eroded	Clay Pan	D	6
PfF2	Positas gravelly loam, 30 to 50 percent slopes, eroded	Clay Pan	J	6
PfF3	Positas gravelly loam, 30 to SO percent slopes, severely eroded	Clay Pan	J	8
Ra	Reiff very fine sandy loam		A	1
Rb	Reiff gravelly loam		A	1
Rg	Rincon silty clay loam		A	3
Rh	Riverwash		J	9
Rk	Riz loam		D	3
Rn	Riz loam, flooded		E	4
RoG	Rock land		J	9
Sa	Sacramento silty clay loam		E	4
Sb	Sacramento silty clay loam, drained		C	3
Sc	Sacramento clay		E	4
Sd	Sacramento clay, drained		C	3
Se	Sacramento clay, flooded		E	4
Sf	Sacramento clay, deep		E	4
Sg	Sacramento soils, flooded		E	4
Sh	San Ysidro loam		D	3
SkD	Sehorn clay, 2 to 15 percent slopes	Clayey	C	7
SkE2	Sehorn clay, 15 to 30 percent slopes, eroded	Clayey	C	7
SkF2	Sehorn clay, 30 to 50 percent slopes, eroded	Clayey	C	7
S1D	Sehorn cobbly clay, 2 to 15 percent slopes	Clayey	C	7
SmD	Sehorn Balcom complex, 2 to 15 percent slopes	Clayey	C, G	7
SmE2	Sehorn Balcom complex, IS to 30 percent slopes, eroded	Clayey	C, G	7
SmF2	Sehorn Balcom complex, 30 to 50 percent slopes, eroded	Clayey	C, G	7
Sn	Soboba gravelly sandy loam		B	2
So	Sycamore silt loam		E	1

	percent slopes, eroded	Loamy		
DbF2	Dibble-Millsholm complex, 30 to 50 percent slopes, eroded	Shallow Loamy	G, J	7
DbG2	Dibble-Millsholm complex, 50 to 75 percent slopes, eroded	Shallow Loamy	J	7
HcA	Hillgate loam, 0 to 2 percent slopes		D	3
HcC2	Hillgate loam, 2 to 9 percent slopes, eroded		D	3
HdA	Hillgate loam, moderately deep, 0 to 2 percent slopes		D	3
HdC	Hillgate loam, moderately deep, 2 to 9 percent slopes		D	6
La	Lang sandy loam		E	2
Lb	Lang sandy loam, deep		E	2
Lc	Lang sandy loam, deep, flooded		E	2
Ld	Lang silt loam		E	2
Lg	Laugenour very fine sandy loam		A	1
Lh	Laugenour very fine sandy loam, flooded		E	1
Lk	Laugenour very fine sandy loam, deep, flooded		E	1
Lm	Loamy alluvial land		B	2
Ma	Made land		C	3
Mb	Maria silt loam		A	1
Mc	Maria silt loam, flooded		E	1
Md	Maria silt loam, deep		A	3
Mf	Marvin silty clay loam		A	3
Mk	Merritt silty clay loam		E	1
Mn	Merritt silty clay loam, deep		E	4
Mo	Merritt silty clay loam, deep, drained		A	3
Mp	Merritt complex, saline alkali		F	5
MrG2	Millsholm rocky loam, 15 to 75 percent slopes, eroded	Shallow Loamy	J	8
Ms	Myers clay		C	3
Oa	Omni silty clay loam		E	4
Ob	Omni silty clay		E	4
Pa	Pescadero silty clay		E	4

Appendix 3

1 GREENHOUSE GAS EMISSIONS

1.1 Environmental Setting

Warming of the climate system is now considered to be unequivocal (IPCC, 2007). Global average surface temperature has increased approximately 1.33 °F over the last one hundred years, with the most severe warming occurring in the most recent decades. Eleven of the twelve years from 1995 to 2006, rank among the twelve warmest years in the instrumental record of global average surface temperature (going back to 1850). Continued warming is projected to increase global average temperature between 2 and 11 °F over the next one hundred years (IPCC, 2007).

The causes of this warming have been identified as both natural processes and as the result of human actions. Increases in greenhouse gas (GHG) concentrations in the Earth's atmosphere are thought to be the main cause of human induced climate change. GHGs naturally trap heat by impeding the exit of solar radiation that has hit the Earth and is reflected back into space. The six principal GHGs of concern are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons, and perfluorocarbons.

1.2 Scope

The California Environmental Quality Act (CEQA) requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects they are considering for approval. CEQA requires that the cumulative impacts of GHG, even additions that are relatively small on a global basis, need to be considered.

1.3 Impact Assessment

It is unlikely that any single project by itself could have a significant impact on the environment. However, the cumulative effect of human activities has been clearly linked to quantifiable changes in the composition of the atmosphere, which in turn have been shown to be the main cause of global climate change (IPCC, 2007). Therefore, the analysis of the environmental effects of GHG emissions from this project will be addressed as a cumulative impact analysis.

The Department of Water Resources has not established a quantitative significance threshold for GHG emissions; instead each project is evaluated on a case by case basis using the most up to date calculation and analysis methods. The proposed project could result in a significant impact if it would generate GHG emissions:

- either directly or indirectly, that may have a significant cumulative impact on the environment;
- that would conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases, including the state goal of reducing greenhouse gas emissions in California to 1990 levels by 2020, as set forth by the timetable established in AB 32, California Global Warming Solutions Act of 2006.

(See July 3, 2009 Natural Resources Agency draft CEQA Guidelines, Appendix G.)

Note, however, that Appendix G is considered a set of sample questions. Thus additional factors, to be considered on a case by case basis, taking into consideration the project setting, may warrant looking beyond these questions.[1]

Based on the size, scope, and purpose of this project the following significance criteria will be used to determine the significance of GHG emissions from this project:

A. Whether the proposed project has the potential to conflict with or is consistent with plans to reduce or mitigate greenhouse gases. Including:

    - The California Global Warming Solutions Act of 2006 (AB32) established the first applicable plan for the reduction of GHG emissions in California;
    - regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions; or
    - whether the proposed project is part of a plan that includes overall reductions in greenhouse gas emissions.

B. Whether the relative amounts of greenhouse gas emissions over the life of the proposed project are small in comparison to the amount of greenhouse gas emissions for major facilities that are required to report greenhouse gas emissions under AB32 and the federal Mandatory Greenhouse Gas Reporting Rule (25,000 metric tons of CO_2 Equivalent or MTCO2e /year); and

C. Whether the proposed project has the potential to contribute to a lower carbon future, such as:
    - whether the design of the proposed project is inherently energy efficient;
    - whether all applicable best management practices that would reduce greenhouse gas emissions are incorporated into the proposed project design;
    - whether the proposed project implements or funds its fair share of a mitigation strategy designed to alleviate climate change?
    - whether there are process improvements or efficiencies gained by implementing the proposed project?

Construction Impact- The project would result in a significant GHG emission impact if construction emissions from the project exceed any of the significance thresholds set forth above.

Operations Impact- The project would result in a significant GHG emissions impact if net ongoing GHG emissions from the project exceed any of the significance thresholds set forth above.

---

[1] Reliance on AB 32 or other regulatory standards can serve as proxies for significance only to the extent that they accurately reflect the level at which an impact can be said to be less than significant. *See, e.g., Protect the Historic Amador Waterways v. Amador Water Agency*, (2004).116 Cal. App. 4th 1099, 1109.

1.4 Construction Impact

Construction of the project would generate some GHG emissions. The major sources of GHG emissions include operation of diesel-powered construction equipment for earthwork, dewatering, and gate removal/installation. Another source of GHG emissions is operation of gasoline-powered vehicles for on-road trips such as construction worker commuting and diesel-powered vehicles for on-road trips such as construction material hauling. The primary form of GHG would be CO2 from exhaust of diesel-powered off-road construction equipment, gasoline-powered on-road vehicles, and diesel-powered on-road vehicles. Construction activities will be short termed and phased over a period of approximately six months. The number and type of construction equipment required to complete each project phase will be limited due to the size of the project area and scope of activities. GHG from construction activities were estimated by using the template spreadsheet provided by DWR CEQA Climate Change Committees (Appendix X). The result shows project construction would generate a total of approximately 454 $MTCO_2e$.

1.5 Operation Impact

There will be direct GHG emissions at the Sacramento Maintenance Yard site due to intermittent operation of the diesel engine generator and indirect GHG emissions at the Knights Landing site due to operation of the gate actuators and control system during project operation. Operation of the gates and control systems at Knights Landing would consume electricity, which would indirectly result in GHG emissions at the power plants where the electricity is generated. The electricity demands at Knights Landing were estimated by the power demand of the gate actuators and control system. The annual electricity demand for operating the Knights Landing Outfall Gates is approximately 17,000 kW-h. Annual GHG emissions as a result of energy consumption were also estimated by using the template spreadsheet provided by DWR CEQA Climate Change Committees (Appendix X). The results show that energy and diesel fuel consumption from project operations would generate an annual GHG emission of approximately 6 $MTCO_2e$.

DWR would adopt all feasible strategies to reduce emissions, including but not limited to using clean fuel, and tuning and maintaining equipment in compliance with manufacture's specifications. These strategies will be implemented to minimize the emissions from this project.

1.6 Impact Assessment

Construction GHG emissions were amortized over a 30-year project useful life, and then combined with the annual operational GHG emissions. The GHG emissions over the project useful life would be approximately 21 $MTCO_2e$ per year.

No state or federal agency has yet established significance criteria (thresholds of significance) for GHG or other impacts to global climate change. However, some statewide standards have been established that provide information about the order of magnitude of emissions that might be considered significant. Pursuant to AB 32, the California Air Resources Board (CARB) mandates that only "large" facilities (i.e., stationary, continuous sources of GHG emissions) that generate greater than 25,000

metric tons of CO2 equivalents (CO2e) per year report their GHG emissions. In addition, CARB has released a preliminary draft staff proposal that recommends 7,000 metric tons of CO2e per year be used as the baseline threshold for impacts. It is not the intention of the lead agency to adopt a 25,000 or 7,000 $MTCO_2e$ threshold of significance, but only to provide context to the scale of the emissions from the proposed project. The emissions from the proposed project are three and two orders of magnitude lower than CARB's current reporting level and proposed significance threshold, respectively.

Based on the review discussed above, this project does not conflict with any statewide or local goals with regard to reduction of GHG.

The discharge of GHG to the atmosphere during and after construction is believed to be less than significant, and no significant negative impact to climate change is expected

VII. GREENHOUSE GAS EMISSIONS – Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Appendix 3. Sample Greenhouse Gas Emissions Inventory

KLOG - Greenhouse Gas Emissions Inventory and Calculation

Construction Equipment Emissions

Line	Type of Equipment	Maximum Number per Day	Total Operation Days	Total Operation Hours[1]	Fuel Consumption Per Hour[2,4,5]	Total Fuel Consumption (gal. diesel)	CO_2e/gal Diesel[3]	Total CO_2 Equivalent Emissions (Metric Tons)
1	Generator (dewatering)	1	100	2400	2	4,800	0.010391	49.88
2	Generator	1	90	720	2	1,440	0.010391	14.96
3	Water Truck	1	10	40	6	240	0.010391	2.49
4	Water Pump	1	100	2400	2	4,800	0.010391	49.88
5	Backhoe	1	5	40	3	120	0.010391	1.25
6	Bobcats	1	10	80	2	160	0.010391	1.66
7	Excavator	1	5	40	9	360	0.010391	3.74
8	Bulldozer	1	10	80	13	1,040	0.010391	10.81
9	Compactor	1	5	40	18	720	0.010391	7.48
10	Walk-behind Compactor	1	5	40	4	160	0.010391	1.66
11	Crane	1	110	880	10	8,800	0.010391	91.44
12	Forklift	1	80	640	3	1,920	0.010391	19.95
13	Tree Trimming Truck	1	2	16	8	128	0.010391	1.33
14	Concrete Pump	1	3	24	2	48	0.010391	0.50
15	Supervisor Truck	1	120	320	3	960	0.010391	9.98
16	Service Truck	1	80	213	3	640	0.010391	6.65
17	TOTAL					26,336		273.67

18 [1] Hours per work day == >> 8

19 [2] Caterpillar Performance Handbook, Edition 40

20 [3] World Resources Institute-Mobile combustion CO2 emissions tool. June 2003 Version 1.2

21 [4] Kubota Engine Generator Specifications. 2010.

22 [5] Based on historical final construction reports compiled by the Construction Office.

Construction Workforce Transportation Emissions

24	Average Number of Workers per Day	Total Number of Workdays	Average Distance Travelled (round trip)	Total Miles Travelled	Average Passenger Vehicle Fuel Efficiency[6]	Total Fuel Consumption (gal. gasoline)	CO_2e/gal Gasoline[3]	Total CO_2 Equivalent Emissions (metric tons)
25	10	120	60	72000	20.8	3461.5	0.00901	31.2
26	TOTAL							31.2

27 [6] United States Environmental Protection Agency. 2008. Light-Duty Automotive

28

Construction Materials Transportation Emissions

30	Trip Type	Total Number of Trips	Average Trip Distance (round trip)	Total Miles Travelled	Average Semi-truck Fuel Efficiency	Total Fuel Consumption (gal. diesel)	CO_2e/gal Diesel[3]	Total CO_2 Equivalent Emissions (metric tons)
31	Mobilize Demob	26	60	1560	6	260.00	0.010391	2.70
32	Delivery	100	55	5500	6	916.67	0.010391	9.53
33	Temporary Structure (Cofferdam)	6	60	360	6	60.00	0.010391	0.62
34	Spoils	20	40	800	6	133.33	0.010391	1.39
35	TOTAL							14.24

36

Appendix 3. Sample Greenhouse Gas Emissions Inventory

Operational Emissions

	MWH of electricity per year	MT $CO2_e$/MWH[7]	CO_2 e emissions per year	
Average Annual Electricity Needed	17	0.33	5.61	Electricity consumed by gate actuators and control system

Greenhouse Gas	Average Annual Production Emissions (MT)	Global Warming Potential.[8]	CO_2 e emissions per year	Average Annual Miles
CO2	0.31	1	0.31	180
CH4		23	0.00	Inspection
N2O		296	0.00	vehicles
SF6		22000	0.00	only
Others as necessary			0	
TOTAL			5.92	

[7] eGRID2007 Version 1.1, December 2008 (Year 2005 data) *CAMX-WECC sub-region* .

[8] IPCC Third Assessment Report (2001)

Construction Equipment Emissions	273.7	(from line	17 above)
Workforce Transportation Emissions	31.2	(from line	26 above)
Construction Materials Emissions	14.24	(from line	35 above)
Operational Emissions	5.92	(from line	47 above)
Total Greenhouse Gas Emissions	**325.0**	**MT CO_2 equivalents**	
Estimated Project Useful life	30	Years	
Average Annual Total GHG Emissions[9]	16.6	**MT CO_2 equivalents**	

[9] short-term construction emissions amortized over life of project

Appendix 3. Sample Greenhouse Gas Emissions Inventory

Sac Yard - Greenhouse Gas Emissions Inventory and Calculation

Construction Equipment Emissions

Line	Type of Equipment	Maximum Number per Day	Total Operation Days	Total Operation Hours[1]	Fuel Consumption Per Hour[2,4,5]	Total Fuel Consumption (gal. diesel)	CO_2e/gal Diesel[3]	Total CO_2 Equivalent Emissions (Metric Tons)
1	Generator	1	20	160	2	320	0.010391	3.33
2	Backhoe	1	2	16	3	48	0.010391	0.50
3	Bobcats	1	5	40	2	80	0.010391	0.83
4	Walk-behind Compactor	1	2	16	4	64	0.010391	0.67
5	Crane	1	2	16	10	160	0.010391	1.66
6	Forklift	1	5	40	3	120	0.010391	1.25
7	Concrete Pump	1	2	16	2	32	0.010391	0.33
8	Supervisor Truck	1	30	80	3	240	0.010391	2.49
9	Service Truck	1	20	53	3	160	0.010391	1.66
10	TOTAL					1,224		12.72

11 [1] Hours per work day == >> 8

12 [2] Caterpillar Performance Handbook, Edition 40

13 [3] World Resources Institute-Mobile combustion CO2 emissions tool. June 2003 Version 1.2

14 [4] Kubota Engine Generator Specifications. 2010.

15 [5] Based on historical final construction reports compiled by the Construction Office.

16 **Construction Workforce Transportation Emissions**

17	Average Number of Workers per Day	Total Number of Workdays	Average Distance Travelled (round trip)	Total Miles Travelled	Average Passenger Vehicle Fuel Efficiency[6]	Total Fuel Consumption (gal. gasoline)	CO_2e/gal Gasoline[3]	Total CO_2 Equivalent Emissions (metric tons)
18	5	30	20	3000	20.8	144.2	0.00901	1.3
19	TOTAL							1.3

20 [6] United States Environmental Protection Agency. 2008. Light-Duty Automotive Technology

21

22 **Construction Materials Transportation Emissions**

23	Trip Type	Total Number of Trips	Average Trip Distance (round trip)	Total Miles Travelled	Average Semi-truck Fuel Efficiency	Total Fuel Consumption (gal. diesel)	CO_2e/gal Diesel[3]	Total CO_2 Equivalent Emissions (metric tons)
24	Mobilize Demob	14	30	420	6	70.00	0.010391	0.73
25	Delivery	5	23	115	6	19.17	0.010391	0.20
26	Spoils	1	60	60	6	10.00	0.010391	0.10
27	TOTAL							1.03

28

Appendix 3. Sample Greenhouse Gas Emissions Inventory

Operational Emissions

	Total Operation Hours Per Year	Fuel Consumption Per Hour	Total Fuel Consumption Per Year (gal. diesel)	CO_2e/gal Diesel [3]	Total CO_2 Equivalent Emissions (Metric Tons)
Generator Fuel Consumption (Diesel)	30	8.3	249	0.010391376	2.59

Greenhouse Gas	Average Annual Production Emissions (MT)	Global Warming Potential[8]	CO_2 e emissions per year	Average Annual Miles
CO2	0.10	1	0.10	60
CH4		23	0.00	Inspection
N2O		296	0.00	vehicles
SF6		22000	0.00	only
Others as necessary			0	
TOTAL			2.69	

[7] eGRID2007 Version 1.1, December 2008 (Year 2005 data) *CAMX-WECC sub-region* .

[8] IPCC Third Assessment Report (2001)

Construction Equipment Emissions	12.7	(from line	10 above)
Workforce Transportation Emissions	1.3	(from line	19 above)
Construction Materials Emissions	1.03	(from line	27 above)
Operational Emissions	2.69	(from line	39 above)
Total Greenhouse Gas Emissions	**17.7**	**MT CO_2 equivalents**	
Estimated Project Useful life	30	Years	
Average Annual Total GHG Emissions[9]	3.2	**MT CO_2 equivalents**	

[9] short-term construction emissions amortized over life of project

Appendix 3. Sample Greenhouse Gas Emissions Inventory

KLOG - Greenhouse Gas Emissions Inventory and Calculation

Knights Landing Construction Equipment Emissions

Line	Type of Equipment	Maximum Number per Day	Total Operation Days	Total Operation Hours[1]	Fuel Consumption Per Hour[2,4,5]	Total Fuel Consumption (gal. diesel)	CO_2e/gal Diesel[3]	Total CO_2 Equivalent Emissions (Metric Tons)
1	Generator (dewatering)	1	100	2400	2	4,800	0.010391	49.88
2	Generator	1	90	720	2	1,440	0.010391	14.96
3	Water Truck	1	10	40	6	240	0.010391	2.49
4	Water Pump	1	100	2400	2	4,800	0.010391	49.88
5	Backhoe	1	5	40	3	120	0.010391	1.25
6	Bobcats	1	10	80	2	160	0.010391	1.66
7	Excavator	1	5	40	9	360	0.010391	3.74
8	Bulldozer	1	10	80	13	1,040	0.010391	10.81
9	Compactor	1	5	40	18	720	0.010391	7.48
10	Walk-behind Compactor	1	5	40	4	160	0.010391	1.66
11	Crane	1	110	880	10	8,800	0.010391	91.44
12	Forklift	1	80	640	3	1,920	0.010391	19.95
13	Tree Trimming Truck	1	2	16	8	128	0.010391	1.33
14	Concrete Pump	1	3	24	2	48	0.010391	0.50
15	Supervisor Truck	1	120	320	3	960	0.010391	9.98
16	Service Truck	1	80	213	3	640	0.010391	6.65
17	TOTAL					26,336		273.67
18	[1] Hours per work day == >> 8							
19	[2] Caterpillar Performance Handbook, Edition 40							
20	[3] World Resources Institute-Mobile combustion CO2 emissions tool. June 2003 Version 1.2							
21	[4]Kubota Engine Generator Specifications. 2010.							
22	[5]Based on historical construction reports compiled by the Construction Office.							

Knights Landing Construction Workforce Transportation Emissions

24	Average Number of Workers per Day	Total Number of Workdays	Average Distance Travelled (round trip)	Total Miles Travelled	Average Passenger Vehicle Fuel Efficiency[6]	Total Fuel Consumption (gal. gasoline)	CO_2e/gal Gasoline[3]	Total CO_2 Equivalent Emissions (metric tons)
25	10	120	60	72000	20.8	3461.5	0.00901	31.2
26	TOTAL							31.2
27	[6] United States Environmental Protection Agency. 2008. Light-Duty Automotive							
28								

Knights Landing Construction Materials Transportation Emissions

30	Trip Type	Total Number of Trips	Average Trip Distance (round trip)	Total Miles Travelled	Average Semi-truck Fuel Efficiency	Total Fuel Consumption (gal. diesel)	CO_2e/gal Diesel[3]	Total CO_2 Equivalent Emissions (metric tons)
31	Mobilize Demob	26	60	1560	6	260.00	0.010391	2.70
32	Delivery	100	55	5500	6	916.67	0.010391	9.53
33	Temporary Structure (Cofferdam)	6	60	360	6	60.00	0.010391	0.62
34	Spoils	20	40	800	6	133.33	0.010391	1.39
35	TOTAL							14.24
36								

Appendix 3. Sample Greenhouse Gas Emissions Inventory

Knights Landing Operational Emissions

	MWH of electricity per year	MT $CO2_e$/MWH[7]	CO_2 e emissions per year	
Average Annual Electricity Needed	17	0.33	5.61	Electricity consumed by gate actuators and control system

Greenhouse Gas	Average Annual Production Emissions (MT)	Global Warming Potential[8]	CO_2 e emissions per year	Average Annual Miles
CO2	0.31	1	0.31	180
CH4		23	0.00	Inspection
N2O		296	0.00	vehicles
SF6		22000	0.00	only
Others as necessary			0	
TOTAL			5.92	

[7] eGRID2007 Version 1.1, December 2008 (Year 2005 data) *CAMX-WECC sub-region* .

[8] IPCC Third Assessment Report (2001)

Sacramento Maintenance Yard Construction Equipment Emissions

Type of Equipment	Maximum Number per Day	Total Operation Days	Total Operation Hours[1]	Fuel Consumption Per Hour[2,4,5]	Total Fuel Consumption (gal. diesel)	CO_2e/gal Diesel[3]	Total CO_2 Equivalent Emissions (Metric Tons)
Generator	1	20	160	2	320	0.010391	3.33
Backhoe	1	2	16	3	48	0.010391	0.50
Bobcats	1	5	40	2	80	0.010391	0.83
Walk-behind Compactor	1	2	16	4	64	0.010391	0.67
Crane	1	2	16	10	160	0.010391	1.66
Forklift	1	5	40	3	120	0.010391	1.25
Concrete Pump	1	2	16	2	32	0.010391	0.33
Supervisor Truck	1	30	80	3	240	0.010391	2.49
Service Truck	1	20	53	3	160	0.010391	1.66
TOTAL					1,224		12.72

[1] Hours per work day == >> 8

[2] Caterpillar Performance Handbook, Edition 40

[3] World Resources Institute-Mobile combustion CO2 emissions tool. June 2003 Version 1.2

[4] Kubota Engine Generator Specifications. 2010.

[5] Based on historical construction reports compiled by the Construction Office.

Sacramento Maintenance Yard Construction Workforce Transportation Emissions

Average Number of Workers per Day	Total Number of Workdays	Average Distance Travelled (round trip)	Total Miles Travelled	Average Passenger Vehicle Fuel Efficiency[6]	Total Fuel Consumption (gal. gasoline)	CO_2e/gal Gasoline[3]	Total CO_2 Equivalent Emissions (metric tons)
5	30	20	3000	20.8	144.2	0.00901	1.3

Appendix 3. Sample Greenhouse Gas Emissions Inventory

72	TOTAL							1.3
73	[6] United States Environmental Protection Agency. 2008. Light-Duty Automotive							
74								
75	**Sacramento Maintenance Yard Construction Materials Transportation Emissions**							
76	**Trip Type**	**Total Number of Trips**	**Average Trip Distance (round trip)**	**Total Miles Travelled**	**Average Semi-truck Fuel Efficiency**	**Total Fuel Consumption (gal. diesel)**	**CO_2e/gal Diesel [3]**	**Total CO_2 Equivalent Emissions (metric tons)**
77	Mobilize Demob	14	30	420	6	70.00	0.010391	0.73
78	Delivery	5	23	115	6	19.17	0.010391	0.20
79	Spoils	1	60	60	6	10.00	0.010391	0.10
80	TOTAL							1.03
81								
82	**Sacramento Maintenance Yard Operational Emissions**							
83		**Total Operation Hours Per Year**	**Fuel Consumption Per Hour**	**Total Fuel Consumption Per Year (gal. diesel)**	**CO_2e/gal Diesel [3]**	**Total CO_2 Equivalent Emissions (Metric Tons)**		
84	Generator Fuel Consumption (Diesel)	30	8.3	249	0.010391376	2.59		
85								
86	**Greenhouse Gas**	**Average Annual Production Emissions (MT)**	**Global Warming Potential [8]**	**CO_2 e emissions per year**	**Average Annual Miles**			
87	CO2	0.10	1	0.10	60			
88	CH4		23	0.00	Inspection			
89	N2O		296	0.00	vehicles			
90	SF6		22000	0.00	only			
91	*Others as necessary*			0				
92	TOTAL			2.69				
93	[7] eGRID2007 Version 1.1, December 2008 (Year 2005 data) *CAMX-WECC sub-region* .							
94	[8] IPCC Third Assessment Report (2001)							
95								
96	**KLOG Total Emissions**							
97	Construction Equipment Emissions	286.4	(from lines	17	63 above)			
98	Workforce Transportation Emissions	32.5	(from lines	26	72 above)			
99	Construction Materials Emissions	15.27	(from lines	35	80 above)			
100	Operational Emissions	8.61	(from lines	47	92 above)			
101	**Total Greenhouse Gas Emissions**	342.8	MT CO_2 equivalents					
102	**Estimated Project Useful life**	30	Years					
103	**Average Annual Total GHG Emissions [9]**	19.7	MT CO_2 equivalents					
104	[9] short-term construction emissions amortized over life of project							