

## **Appendix D**

---

### **Description of Conveyance Facilities and Waterways**

## **Conveyance Facilities and Waterways**

### **Jones Pumping Plant and Banks Pumping Plant**

Located in the Sacramento-San Joaquin Delta, Banks lifts water 244 feet from the Clifton Court Forebay into the beginning of the Aqueduct. DWR has a priority system for pumping SWP and CVP water supplies at Banks. CVP water supplies have a lower priority compared to SWP uses. Prior to pumping CVP supplies at Banks (Joint Point of Diversion [JPOD]) there are environmental and water quality plans that must be submitted and approved and criteria that must be met. Under certain conditions, DWR does not have an opportunity to pump and convey the annual allocation of water supplies to the CV contractors or pumping and conveyance may occur at a time that is outside of the growing season.

Jones consists of an inlet channel, pumping plant, and discharge pipes. Water in the Delta is lifted 197 feet into the DMC. Each of the six pumps at Tracy is powered by a 22,500 horsepower motor and is capable of pumping 767 cfs. Power to run the huge pumps is supplied by CVP powerplants. The water is pumped through three 15-foot-diameter discharge pipes and carried about 1 mile up to the DMC. The intake canal includes the Jones Fish Screen, which was built to intercept downstream migrant fish so they may be returned to the main channel to resume their journey to the ocean. Although CV contractor supplies are predominantly pumped at Banks, infrequently, if pumping capacity exists after all other CVP needs have been met (typically in the spring), CV contractor water supplies have been pumped at Jones and moved over the SWP at O'Neill Forebay for conveyance to the CVC.

### **Delta-Mendota Canal**

The DMC carries water southeasterly from the Jones along the west side of the SJV for irrigation supply, for use in the San Luis Unit, and to replace San Joaquin River water stored at Friant Dam and used in the Friant-Kern and Madera systems. The canal is about 117 miles long and terminates at the Mendota Pool, about 30 miles west of Fresno. The initial diversion capacity is 4,600 cfs, which is gradually decreased to 3,211 cfs at the terminus. It also connects with O'Neill Forebay near San Luis Reservoir where water can be pumped from the DMC into either San Luis Joint Use Facilities a part of which is a shared canal named the San Luis Canal for the CVP and the Aqueduct for the SWP.

### **O'Neill Forebay**

These joint Federal/State facilities are located on San Luis Creek, 2.5 miles downstream from San Luis Dam. O'Neill Dam, completed in 1967, is a zoned earthfill structure with a height of 87 feet and a crest length of 14,300 feet. The forebay, with a capacity of 56,400 AF, is used as a hydraulic junction point for Federal and State waters. The top 20,000 AF acts to re-regulate storage necessary to permit off-peak pumping and on-peak generation by the main San Luis Pumping-Generating Plant. The O'Neill Forebay Inlet Channel extends 2,200 feet from the DMC to deliver water to the O'Neill Forebay. Six pumping units of the O'Neill Pumping-Generating Plant lift water 45 to 53 feet into the forebay.

### **Friant-Kern Canal**

The FKC carries water over 151.8 miles in a southerly direction from Friant Dam to its terminus at the Kern River, four miles west of Bakersfield. The FKC has an initial capacity of 5,000 cfs that gradually decreases to 2,000 cfs at its terminus in the Kern River (Reclamation, 2009). The water conveyed in the FKC is from the San Joaquin River and is considered to be of good quality because it originates from snow melt from the Sierra Nevada. The water is used for municipal and industrial, and agricultural purposes in Fresno, Tulare, and Kern Counties. The FKC is a part of the CVP, which annually delivers about seven million AF of water for agricultural, urban, and wildlife use.

### **California Aqueduct**

The State of California constructed the Aqueduct as part of the SWP. Waters from the Aqueduct flow out of the Delta near the City of Tracy to San Bernadino and Riverside into Lake Perris. SWP contractors take delivery from the CVC and/or direct diversion from the Aqueduct. The SWP typically delivers approximately 1.36 million AF to the SJV per year. Contracts executed in the early 1960s established the maximum annual water amount (supply) that each SWP long-term contractor may request from the SWP.

Recovered groundwater that is discharged into the Aqueduct, can be delivered to water districts or exchanged with the DWR. Exchanges with the DWR can be simultaneous, or delayed exchanges. In a simultaneous exchange water delivered from the Aqueduct to an upstream district at the same time the recovered groundwater is transported to the Aqueduct. With a delayed exchange, water might be delivered by the DWR to the receiving district from storage before or after the recovered groundwater is received.

### **Joint-Use Facility – San Luis Canal/California Aqueduct**

The SLC is the Federally-built and operated section of the California Aqueduct and extends 102.5 miles from O'Neill Forebay, near Los Banos, in a southeasterly direction to a point west of Kettleman City. The SLC is a part of the CVP, while the California Aqueduct is a part of the State Water Project (operated by the DWR). The principle purpose of the CVP portion of the facility is to furnish approximately 1.25 million AF of water as a supplemental irrigation supply to roughly 600,000 acres located in the western portion of Fresno, Kings, and Merced counties. Beyond Kettleman City, the State Water Project delivers water to southern California mainly for M&I purposes. This is almost half of the water supply for the Los Angeles region. The SLC/California Aqueduct is a concrete-lined canal with a capacity ranging from 8,350 to 13,100 cfs.

### **Cross Valley Canal**

The CVC is a locally-financed facility completed in 1975 and operated by the Kern County Water Agency (KCWA). The canal extends from the California Aqueduct near Tupakan to Bakersfield. It consists of 6 pumping lifts, with a capacity of 1,400 cubic-feet per second (cfs) from the Aqueduct to Arvin-Edison Water Storage District's Intake Canal (also near the FKC terminus and Kern River). The CVC "extension", an unlined canal, continues past the AEWS D Intake Canal, which is rated 342 cfs and has an additional 2 pumping lifts. The CVC is a joint-use facility owned by various participants, including Cross Valley Contractors and AEWS D. The CVC can convey water from the Aqueduct to the Kern Water Bank, the City of Bakersfield

groundwater recharge facility, the Berrenda Mesa Property, the Pioneer Banking Project, the Kern River channel, to AEWSD's Intake Canal, or to various member units of KCWA and other districts who have access to the CVC. When needed, the CVC is also capable of conveying 500 cfs, in reverse flow-gravity mode, to the Aqueduct. In 2008, as part of the CVC expansion project, an additional 500 cfs turnout was constructed from the FKC that can deliver water by gravity into either the AEWSD Intake Canal or the CVC.

### **Kern River/Alejandro/Outlet Canals**

Water from the FKC, the CVC, or from the Kern River can be conveyed in the Kern River channel or in the Kern River Canal to the Pioneer Banking project or other recharge areas. Conveyance of water in the Kern River Canal requires an agreement with the City of Bakersfield. Conveyance of water in the Alejandro Canal requires an agreement with the Buena Vista Water Storage District. It should be noted that depending on groundwater pumping operations, water in the Buena Vista Aquatic Lake may contain high concentrations of arsenic. These high concentrations are caused when groundwater from nearby wells is pumped into the Buena Vista Aquatic lakes for agricultural use and to make up evaporation losses.

The Kern River is about 165 miles long and is the southernmost river in the San Joaquin Valley. The river originates from the Sierra Nevada mountains on the eastern side of Tulare County and terminates on the west side of Kern County where it is mainly diverted for local water supplies. When the Kern River enters Kern County, it deposits into Lake Isabella created as a result of Isabella Dam. Below the dam, the river is highly diverted through a series of canals to irrigate farms in the southern San Joaquin Valley and provide municipal water supplies to the City of Bakersfield and surrounding areas. The Kern River is one of the few rivers in the Central Valley which does not contribute water to the CVP; however, the FKC joins the river approximately four miles west of downtown Bakersfield. Kern River water quality is generally similar to that in the FKC since its origin is also from snow melt in the Sierra Nevada. The Kern River Canal can also be used to convey water from the Kern River to the California Aqueduct directly via the Alejandro Canal, the Buena Vista Aquatic Lakes and Outlet Canal and a pumping plant, or indirectly via an exchange.

### **Kern Water Bank Canal**

The Kern Water Bank Canal is a bi-directional canal constructed by the Kern Water Bank Authority. The canal has a single pumping plant for delivering water for recharge. The forward flow capacity is 950 cfs. Reverse flow capacity is approximately 650 cfs. The canal is used to convey SWP water and other waters from the Aqueduct to the local banking projects for groundwater recharge. The canal is also used to convey pumped groundwater during a surface water short year, back to the Aqueduct, either directly or by exchange, to water districts for a supplemental water supply.

### **Kings River**

The Corps is the operator of Pine Flat Dam and releases water for flood control. During the irrigation season, (normally June through August) water is released from behind Pine Flat Dam and the Kings River is controlled by the Kings River Water Association. In wet years the Kings River may flow to the Tulare Lake Basin. Only in very wet seasons does the Kings River flow north into Fresno Slough and into the San Joaquin River. The average annual runoff for the

Kings River is approximately 1.7 million AF. The Kings River is managed similarly to a canal system providing water for irrigation and to meet flow requirements for fish and wildlife purposes.

### **Kaweah and St. Johns Rivers**

The Corps also operates Terminus Dam on the Kaweah River for flood control and water supply. Downstream of Terminus Dam, the St. Johns River and Lower Kaweah River divides from the Kaweah River at McKay Point. The St. Johns River becomes Cross Creek north of Goshen. A few tributaries such as Dry Creek and Yokohl Creek, flow into the Kaweah and St. Johns Rivers. The Kaweah River ceases to be an identifiable stream south of Highway 245, and the river branches into Mill Creek and other major and minor streams creating a delta. During the irrigation season (June through August) the Kaweah Delta Water Conservation District manages the Kaweah River irrigation flows similarly to a canal facility to meet demands and on behalf of the watermaster for the Kaweah and St. Johns Rivers Association. The average annual runoff of the Kaweah River is 430,000 AF, and does not include various smaller creeks. The St. Johns River was permanently established during the fresher of 1861-62 and branches off the Kaweah River. The Lower Kaweah River, St. Johns River and smaller creeks are used for conveyance of irrigation water to ditch companies and water districts.

### **Tule River**

The Tule River watershed above Success Dam is a fan shaped area containing 245,000 acres, ranging in elevation of 550 feet at Success Dam to a maximum of 10,000 feet, with less than 10 percent of the watershed above elevation 7,500 feet. The Tule River above Success Reservoir is composed of three channels, the North Fork and the Middle Fork that join just above the community of Springville, and the South Fork that passes through the Tule River Indian Reservation before entering Success Reservoir at State Route 190. The main channel of the Tule River below Success Dam traverses about 50 miles to the pocket of the Tulare Lake Basin where the river joins the terminus of the South Fork of the Kings River. The Tule River bifurcates at Road 192 and a South Fork channel traverses 12 miles along with a third Middle Fork channel of 3 miles, all northerly of the community of Woodville.

Success Dam, a Corps project currently has a storage capacity of 82,300 AF, of which 75,000 AF is reserved for flood control and irrigation water storage. The remaining storage, 7,300 AF, was set aside for a silt and recreation pool. The Tule River runoff at Success Reservoir is extremely variable subject to precipitation in the watershed. Records of the Tule River runoff for the past 101 years are available from water year 1904 through water year 2004. The average annual runoff of the Tule River is 141,630 AF. Of the past 101 years, 1977 was the driest year with a runoff of 15,810 AF, and 1983 was the wettest year with 615,090 AF.

The Tule River Association, made up of all water rights holders at and below Success Reservoir, administers the water and storage rights at and below Success Dam. The Corps controls storage in Success Reservoir through a Flood Control Diagram that limits irrigation storage during the period November 15th to May 1st of the following year. Irrigation water storage operations during the remainder of the year are controlled by the Tule River Association Watermaster.

The Tule River gross service area below Success Dam covers about 320,000 acres, of which 140,000 acres are within Tulare County, and 180,000 acres are within the Tulare Lake Basin of Kings County. Of the gross service area, approximately 240,000 acres are developed in irrigated agriculture with the remainder in urban and non-agriculture uses.

**Dos Amigos Pumping Plant**

This joint Federal/State facility, 17 miles south of O'Neill Forebay, is a relift plant in the San Luis Canal. The plant contains six pumping units, each capable of delivering 2,200 cfs at 125 feet of head.