

Imperial Dam to Be Hollow Concrete Weir Weighted With Ballast

Interesting Details of Unique Structure Bids Being Taken on Dam and Desilting Works

Imperial dam and desilting works of the All-American Canal System, for which bids will be received by the Bureau of Reclamation at Yuma, up to 10 a.m., mountain standard time, November 21, is one of the most interesting and unique construction jobs planned in the west. The dam will be built across the Colorado river for the purpose of diverting water into the canal on the California side of the stream and ultimately into the Gila Valley on the Arizona side. It will be a concrete structure about 2990 ft. long, exclusive of a rock fill dike at the Arizona end which will be about 470 ft. in length.

The main or central portion of the dam will be an overflow weir of the hollow concrete "floating" type of construction supported on a silt or sand foundation and partially filled with sand and gravel ballast for added weight. This weir will be about 1200 ft. long with the crest 31 ft. above the foundation. A reinforced concrete apron 8 ft. thick will extend about 65 ft. downstream from the toe of the overflow weir, and heavy rip-rap will be placed for an additional 150 ft. downstream from the concrete apron.

A sluiceway about 240 ft. wide, controlled by radial gates, will be constructed on the California side of the river between the overflow weir and the headworks for the All-American canal. A sluiceway channel, into which the silt removed by the desilting works will also be discharged, will extend about 3000 ft. downstream from the sluice gates, with rock-fill training dikes on each side of the channel.

The headworks of the All-American canal will be located at the California end of the dam. Diversion into the canal will be controlled by four roller gates each 75 ft. long and 12 ft. high, which will be operated by machinery installed in houses constructed on two piers between the gates. A bridge structure of steel girders supporting a reinforced concrete deck will be built across the sluiceway, connecting with a reinforced concrete ramp leading down to a road on the embankment on the river side. The main channel leading to the desilting works. A trash rack structure consisting of structural steel frame supported on a concrete foundation will extend upstream from the river side of the headwork structure to the end of a rock-fill training dike extending upstream about 500 ft. from the other side of the headwork structure.

The diversion into the proposed Gila Valley canal on the Arizona side of the river will be through three gate structures for desilting basins separated by short sections of non-overflow dam. Diversion to each desilting basin will be controlled by nine radial gates installed in the gate structure to be built under the present plans and specifications.

Reinforced concrete bearing piles will support the non-overflow sections of the dam except at the abutments where the foundation will be on rock. Reinforced concrete paving will be constructed upstream from

the dam and will extend to the rock abutments on both sides of the river and about 212 ft. upstream from the axis of the dam.

Three lines of sheet piling will be driven across the river upstream from the dam, one under the upstream edge of the concrete paving, one under the middle of the paving and one near the downstream edge of the concrete paving. A line of steel sheet piling will be driven downstream from the dam, on a line with the edge of the downstream edge of the reinforced concrete apron.

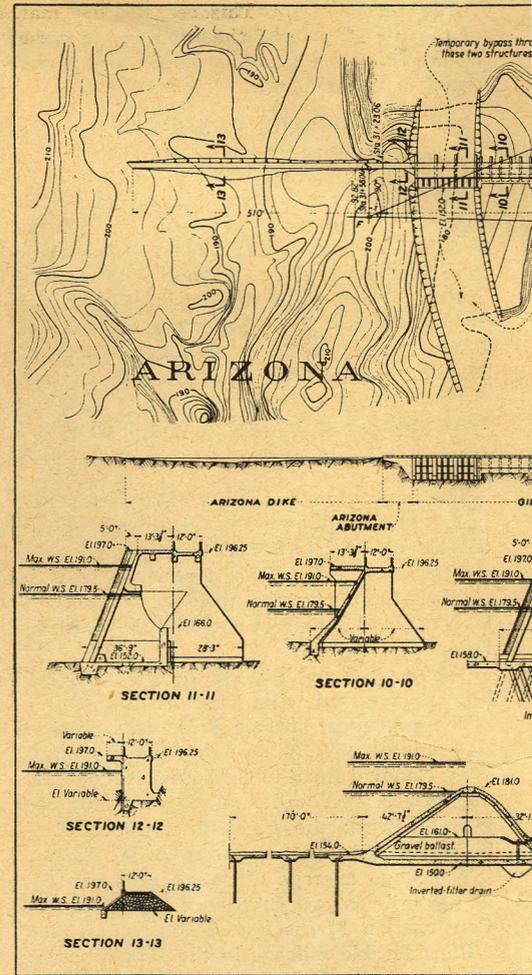
A gravel filled drainage trench will be constructed under and for the full length of the portion of the dam built on silt and sand foundations. Seepage will be removed from the trench by means of riser pipes leading to the interior of the overflow section of the dam and objectors. A road will be constructed from the California end of the dam to connect with a roadway on the top of the upper bank of the All-American canal.

A description and plan of the desilting works was published in Southwest Builder and Contractor, issue of July 5, 1935. The main channel leading from the headworks will be divided into four separate channels by timber sheet piling walls, each of which, except the one nearest to the river will lead from one of the roller gates to an influent channel, and a combination effluent and bypass channel at the downstream end of the desilting works. Six settling basins, each about 269 ft. wide and 769 ft. long, arranged in pairs will be provided. Each pair of basins will handle a flow of 2000 second feet and will be fed by an influent channel between the basins. Radial gates will control the flow in each influent channel and each combination effluent and bypass channel. Seventy-two rotary type scrapers, each 125 ft. in diameter, operated by individual motors, will force the deposited silt into collecting trenches from which it will be flushed into a system of sludge disposal pipes and thence into the sluiceway channel through which it will be carried into the river below the dam.

The effluent weirs on the sides of each pair of the settling basins will be compacted earth fills with longitudinal core walls of wood sheet piling. The crests of the weirs will be capped with reinforced concrete encasing the top of the piling and extending part way down the slopes, the balance of which, and the bottoms of the channels, will be covered with dry-rock paving. All other embankments will be earth fills with dry-rock paving on slopes exposed to water.

Included in the present contract will be a section of the All-American canal about 1500 ft. in length connecting the desilting works with the end of a portion of the canal to be constructed under another contract.

Diversion of the river during construction of the dam will be the problem of the contractor. This may be accomplished, if desired, by using the two most easterly intake structures for the canal on the Arizona side of the river. These have been designed to

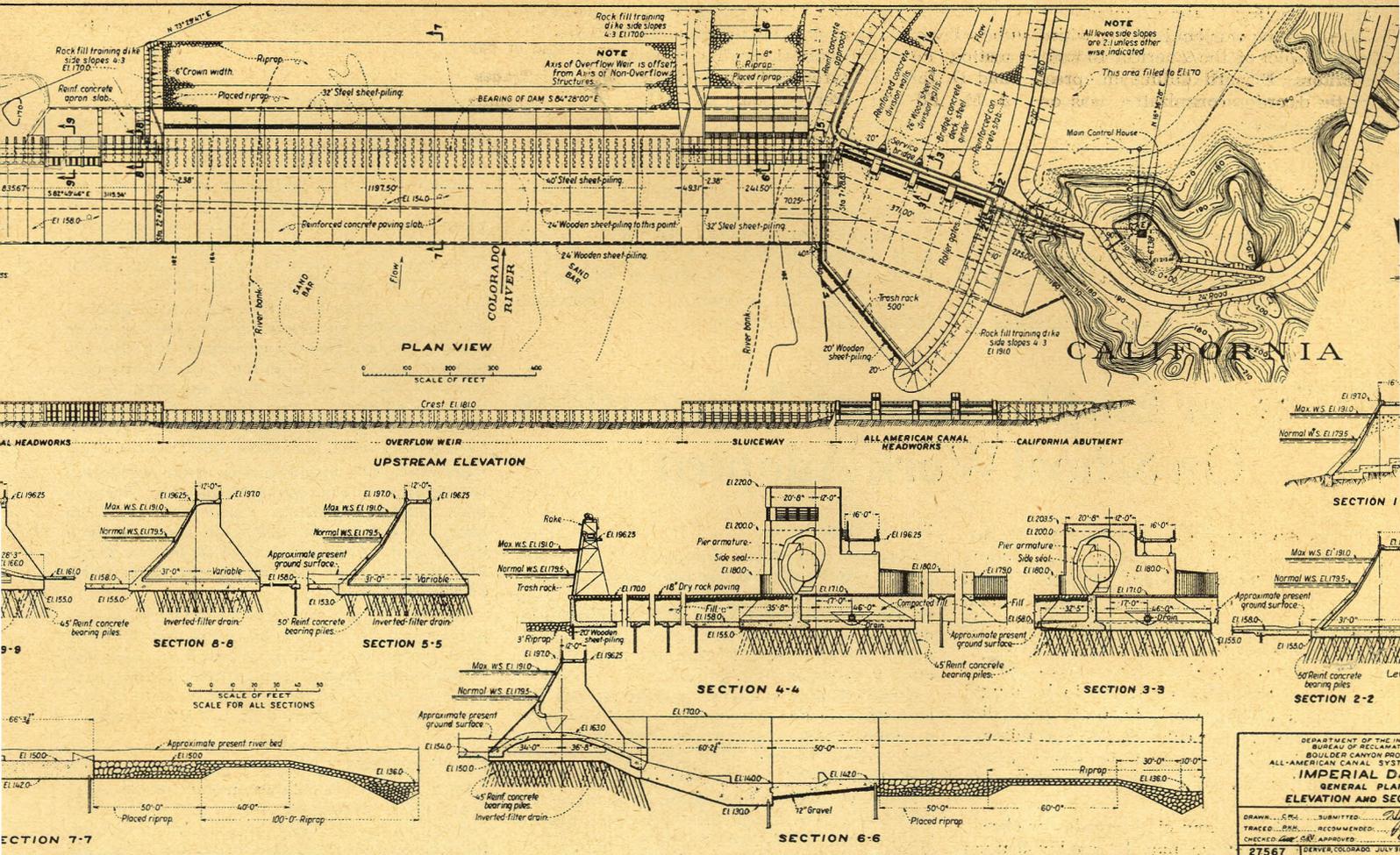


provide additional diversion capacity up to 60,000 cu. ft. per second. However, their use for this purpose is optional with the contractor, and in event some other plan is adopted the design of the structures will be changed to meet only the requirements for diversion into the Gila Valley canal, and the contractor will be entitled to no additional allowances above unit prices in the bid schedule. The contractor will submit a lump sum bid on diversion and care of the river during construction and unwatering foundations, covering whatever plan he elects to use.

Practically all materials except those not permanently incorporated into the work will be furnished by the government. However, the contractor will be required to furnish all rock for dry-rock paving, rip-rap, placed rip-rap and for rock fills on canal embankments. The government will also furnish all gates, valves, machinery and operating equipment. Sand and broken rock and gravel for concrete, gravel for drainage trench under the dam, and for backfilling in sheet-piling trenches will be delivered to the contractor in stock piles just below the dam site. All other materials will be delivered f.o.b. cars at Potholes on the Southern Pacific railroad at Laguna dam.

The time allowed for completion of the work is 800 calendar days from the date the contractor receives notice to proceed. Liquidated damages to the amount of \$500 per day will be assessed for each day the work is delayed beyond the time limit.

Approximate quantities in the bid schedule comprise 98 separate items. The total estimated excavation in rock is 32 cu. yds. of which amount 57,000 cu. yds. are for the dam and 246,000 cu. yds. are for desilting works. Common excavation



● This drawing shows the general plan and type of construction of Imperial dam which will divert water from the Colorado river into the All-American canal, and for which bids are now being taken by the U. S. Bureau of Reclamation, Dr. Elwood Mead, commissioner. This dam is an overflow weir of the hollow concrete "floating" type of construction on a silt or sand foundation and partially filled with sand and gravel for ballast. Details of construction are shown in the above drawing. All the non-overflow section of the dam will rest on precast reinforced concrete piles driven at an angle upstream and downstream for tension and compression.

approximately 2,203,450 cu. yds. of which 330,000 cu. yds. will be for the dam and 374,000 cu. yds. for channels and basins of the desilting works. This total also includes 1,000,000 cu. yds. of excavation from borrow pits for embankments to be hauled to the site.

Approximately 1,065,000 cu. yds. of material will be compacted in embankments and fills, this work constituting a separate item. The material will be placed in 6 in. layers, watered and rolled. Rollers with ball or sheeps foot tampers, which can be weighted by water in the cylinders, are specified. These embankments form the walls of the desilting basins and channels and the connecting section of the All-American canal. The material to be used is sand gravel and initial test embankments of not less than 1000 cu. yds. each will be constructed before the work is started.

Approximately 113,400 lin. ft. of precast reinforced concrete piles will be made by the contractor and driven at an angle upstream and downstream, half to be under compression and half under tension. Tops of the latter will be hooked into the base of the structure above by short lengths of reinforcing steel welded to the bars in the pile. These piles will have a hexagonal section with tapered ends, in two sizes, 18 in. and 20 in., and will vary from about 30 to 50 ft. in length. A two inch jet pipe will be cast in each pile.

Wood sheet piling will comprise about 1,710,000 board feet to be fabricated and driven under the upstream reinforced concrete paving slab in the bed of the river and 950,000 board feet of creosoted sheet piling to form

the division walls between the channels in the headworks. The former will be fabricated by the contractor and will consist each of three pieces, 3x12 in., spiked together to form tongue and grooved edges. Treated piles will be furnished to the contractor already fabricated.

Among other items there will be 181,700 sq. yds. dry rock paving 18 in. thick; 47,300 cu. yds. rock fills on the outside slopes of embankments; and 24,300 cu. yds. rip-rap.

Approximately 5,203,000 lbs. of steel sheet piling arch weighing 36 lbs. per lin. ft., will be driven in the cutoff walls at the downstream edge of the concrete paving above the dam and at the downstream edge of the concrete apron below the dam. Where rock is encountered at a depth of 24 ft. or less below the surface a trench will be cut in the rock and the piles will be embedded in concrete in the trench. The amount to be so placed is estimated at 182,000 lbs. in addition to the quantity mentioned above.

The total yardage of concrete is not so important as the fact that it will be practically all heavily reinforced. Of the approximately 165,310 cu. yds. of concrete, 65,200 cu. yds. will be in the dam, 54,800 cu. yds. in the upstream paving and apron below the dam, 34,700 cu. yds. in the desilting works and 10,000 cu. yds. in the precast piles. A total of 18,255,000 lbs. of reinforcing steel is to be placed.

Metal work to be installed by the contractor aggregates about 7,175,000 lbs., comprising roller gates and hoists, radial gates, trash racks and frames; metal linings and slots in influent channels, revolving scrapers

and drives and metal pipe and fittings and valves in desilting works. There will also be 379,000 lbs. of structural steel to be erected in a service bridge and in a maintenance bridge. Other items include the plating of 71,300 lin. ft. metal electrical conduit, construction of 7700 lin. ft. 4-way and 5800 lin. ft. 6-way clay multiple duct conduit and plating of 60,000 lbs. electrical apparatus.

R. F. Walter is the chief engineer of the Reclamation Bureau; J. L. Savage, chief designing engineer; L. N. McClellan, chief electrical engineer; C. M. Day, mechanical engineer; H. R. McBirney, senior engineer, canals; E. B. Debler, hydraulic engineer; R. B. Williams, construction engineer on All-American canal.

Officers Are Nominated for Architects Chapter

Nomination of officers and directors for 1936 featured the regular monthly meeting of Southern California Chapter, The American Institute of Architects, held at the Pasadena Athletic Club on November 12.

Report of the nominating committee, submitted by Earl Heitschmidt in the absence of Chairman Donald Parkinson, follows: Ralph C. Flewelling, president; Eugene Weston, Jr., vice-president; George J. Adams, secretary, and Samuel E. Lunden, treasurer. S. M. Marston was nominated director for the three-year term. Henry Carlton Newton and Reginald D. Johnson are the hold-over directors. The election will be held at the De-

DEPARTMENT OF THE INTERIOR	RECLAMATION BUREAU
BOLDED CANYON PROJECT	ALL-AMERICAN CANAL SYSTEM
IMPERIAL DAM	GENERAL PLAN
ELEVATION AND SECTIONS	
DRAWN BY: C.M.A.	SUBMITTED BY: J.W.
TRACED BY: R.H.	RECOMMENDED BY: J.W.
CHECKED BY: S.H.	APPROVED BY: J.W.
27567	DENVER, COLORADO, JULY 1935