

TECHNICAL MEMORANDUM



MWH

Subject: Ranney Well Collector Power Cost

Workshop #3 **February 16 – 18, 2005**

BACKGROUND AND PURPOSE

Conveyance facilities are needed to carry the water from the Ranney Wells to the intake (wet well) of the existing pumping plant that diverts water from the Sacramento River. The cost estimate that was done for the Ranney Wells included the pumps and motors for lifting the water from the caissons into a conveyance pipe. The conveyance extended out 50 feet from the Ranney Wells.

In this memo we estimated the cost of constructing the pipeline to convey the water from each Ranney well to the wet well at the pumping plant. We didn't add for the connections and also facilities for discharging the water into the wet well. This would require two tees and two 90-degree bends to make the connections. Two facilities would be required to discharge the water into the wet well. An estimate of the power costs was made on varying levels of pumping. The energy cost used was 20 cents per KW-h.

The Ranney Well Alternative discussed in the memorandum provides a construction cost estimate for the Ranney Well conveyance system as well as the operating cost of the Vertical Turbine Pumps located in the each Ranney Well. The conceptual design, assumptions and construction estimate is discussed below.

CONCEPTUAL DESIGN

Four Ranney Well locations, one well located north of the existing M & T wet well with the remaining three wells located south of the existing wet well were evaluated. Each well will have a water production rate of 35 cubic feet per second (cfs). The vertical turbine pumps in each well shall be sized to deliver water at a minimum velocity of 5 feet per second (fps) at a total dynamic head (TDS) of 100 feet. Matt Reed with Ranney Well recommended a minimum of 1000 feet between each well for maximum efficiency. The Table below lists the construction cost and yearly operating cost for the Ranney Well Alternative.

Material	Unit Price (\$)	Quantity	Total Cost (\$)
24" RCP	\$84	1800 LF	\$151,200
26" RCP	\$87	1000 LF	\$87,000
32" RCP	\$92	600 LF	\$55,200
Caisson Pumping Energy	\$0.2/KW-hr.	4 pumps	\$576,660

per Year (20,000 ac-ft)			
Caisson Pumping Energy per Year (30,000 ac-ft)	\$0.2/KW-hr.	4 pumps	\$864,990
Caisson Pumping Energy per Year (40,000 ac-ft)	\$0.2/KW-hr.	4 pumps	\$1,153,320

At 20,000 ac-ft of production a year the pumps need to only operate a total of 5 hours a day (total for all 4 pumps). Similarly with 30,000 ac-ft a year of production the pumps will operate for 7.5 hours and at 40,000 ac-ft operating for a total of 10 hours.

The pipeline construction estimates are based on an average 3 feet of cover with open cut and no construction restraints.