

Calaveras Dam replacement to begin amid retrofit

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The days are numbered for the old tower and decorative arches at Calaveras Dam, which holds back the reservoir that is San Francisco's largest local source of drinking water.

Workers for the San Francisco Public Utilities Commission will begin shoveling dirt today as part of a \$416 million project to replace the 210-foot-high earthen barrier that has collected water from Alameda Creek for 86 years.

The dam, built in 1925 on top of an earthquake fault, was deemed seismically unsafe a decade ago, and the reservoir has been operating 51 feet below capacity as a precaution. The plan is to build a new 220-foot-high dam immediately downstream in the same remote canyon surrounded by oak-dotted hills and grasslands northeast of Milpitas.

The Calaveras Reservoir, which is on the Alameda-Santa Clara county line, drains 100 square miles of watershed, including much of the southern sections of the East Bay and the southern slopes of Mount Diablo, but since 2001 the utility has been using less than half the amount of water it was designed to hold.

"This project is important to get this source of water back online," said Daniel Wade, Sunol regional project manager for the San Francisco PUC's water system improvement program.

The dam replacement is the largest of 81 projects in the PUC's \$4.6 billion program to retrofit the entire San Francisco water-delivery system.

The new Calaveras Dam, scheduled for completion in 2015, will sit close to the old dam, and all but a small section of the old dam will be covered with water when the reservoir is filled. The capacity will remain the same.

Restoring capacity

The plan is to build it using mostly materials found on-site, but Wade said modern compacting techniques will be used. He said cement grout will be injected 150 feet below the base of the dam to minimize leaking and improve stability. The idea is to eliminate the structural problems that plagued the current dam and restore the reservoir to its historic capacity of 96,850 acre-feet, or 31 billion gallons, Wade said.

"A concrete dam would not be appropriate for the site because of the earthquake danger," Wade said. "What we are building is called a zoned earth-and-rock-fill dam, which is not brittle like concrete and will move and adjust with the earth's movements."

Workers will begin digging out the canyon below the current dam within the next two weeks. In all, 7 million cubic yards will be excavated, the equivalent of two Great Pyramids. The amount of dirt and rock removed would bury 1,200 football fields in one yard of dirt.

Hundreds of oak trees will have to be removed. About 3.5 million cubic yards of the excavated material will be used in the structure. Excess dirt and rock will be dumped at four disposal sites that will be graded and seeded to blend in with the topography. Workers are under strict orders to control the dust from the naturally occurring asbestos in the serpentine rock at the site.

"It's a major earthmoving project," said Steve Ritchie, the San Francisco PUC's assistant general manager for water. "The old dam will serve as a way to keep the site dry while we're building the dam."

San Francisco has owned water rights to Alameda Creek since the 1880s. Calaveras Dam was built by the Spring Valley Water Co., which was known for its ornate architecture and, thanks to this particular dam project, structural issues. Spring Valley was touting the project in 1918 as the largest earth-and-rock structure in the world until it collapsed under its own weight while still under construction.

The rebuilt dam blocked the historic coho salmon and steelhead trout migrations in Alameda Creek and, as it turned out, was not even a primary source of water for San Francisco, which purchased the entire Spring Valley system soon after the dam was completed.

Hetch Hetchy main supplier

The Hetch Hetchy Reservoir, on the Tuolumne River in Yosemite National Park, now provides 85 percent of the water used by 2.5 million residents in San Francisco, on the Peninsula and in the East Bay. Calaveras Dam is used as a secondary source. Still, the city diverts 85 percent of the stream flow from the upper creek.

In 2001, California dam regulators ordered the PUC to drain the reservoir to about one-third of its capacity in an attempt to avoid a collapse during an earthquake.

The commission drew up plans for a new dam just downstream, but the proposal ran into opposition from environmentalists, who demanded limits on diversions and guarantees that creek flows would be suitable for the migration and spawning of steelhead trout.

The 45-mile-long Alameda Creek is the third-largest tributary of San Francisco Bay behind the Sacramento and San Joaquin rivers. It has been the focus of intensive restoration efforts since 1997, when [Central Coast](#) steelhead were listed as threatened under the Endangered Species Act.

The rainbow trout in the reservoir are believed to be landlocked steelhead that are descendants of the indigenous fish population, biologists say. Conservationists hope to use those fish as a potential gene pool for restoring the original native steelhead runs.

Resurrecting habitat

San Francisco won approval for the new dam after officials agreed to year-round releases and guaranteed cold-water flows from the new reservoir. The utility also agreed to build a fish ladder and put fish screens on pipes at a diversion dam downstream from the Calaveras Reservoir.

"We're a lot happier with the project now than when it was first proposed," said Jeff Miller, director of the Alameda Creek Alliance and conservation advocate with the Center for Biological Diversity. "The cold-water releases and new flow schedules from Calaveras Reservoir, combined with the changed operations of the diversion dam, will resurrect habitat for steelhead in Alameda Creek and potentially open up the creek for fish all the way to its headwaters."

The ornate tower that has been the dam's signature for the better part of a century will be taken out along with most of the old structure over the next few years. In a nod toward history, officials said, a duplicate tower will be built over the new dam's intake valves.