

ESP UPDATE



Summer 2006 Edition



The Emergency Storage Project is a system of reservoirs, interconnected pipelines, and pumping stations designed to make water available to the San Diego region in the event of an interruption in imported water deliveries.

The Emergency Storage Project is part of the San Diego County Water Authority's Capital Improvement Program to enhance and increase the operational flexibility of its water delivery system.

This newsletter is one way the San Diego County Water Authority is keeping communities like yours informed about the project's progress.

For more information, please call toll free (877) 426-2010 or visit our website at www.sdcwa.org.

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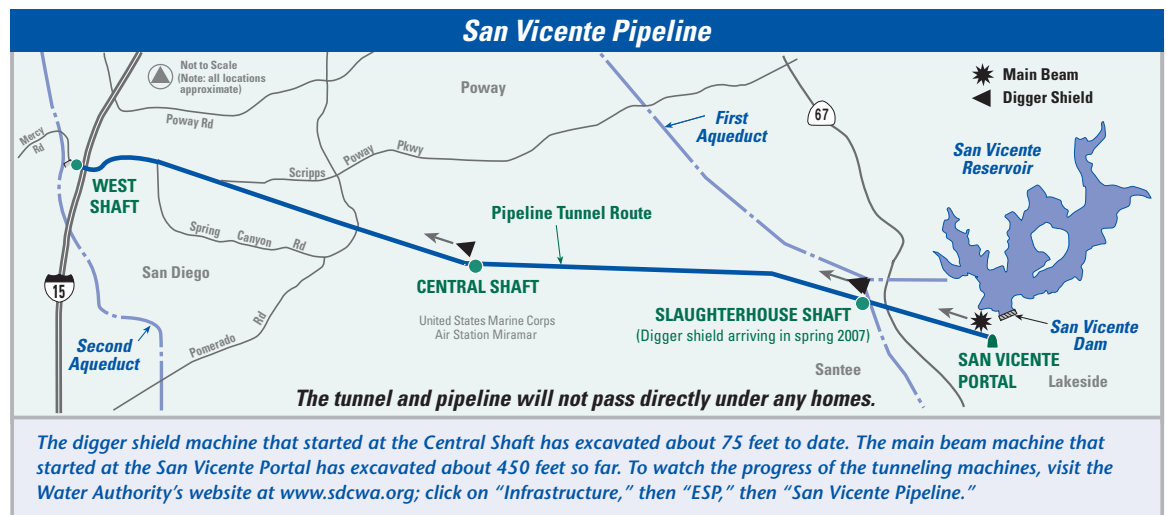
San Vicente Pipeline Tunneling Machines Have Arrived

After traveling thousands of miles by truck from Washington state and Ohio, two tunneling machines reached Lakeside and San Diego safe and sound. The San Vicente Pipeline construction team breathed a big sigh of relief, as these machines will be doing the hard labor to excavate the majority of the pipeline tunnel.

The two tunneling machines arrived in May and June in many loads. A digger shield machine was delivered to the Central Shaft. It will use a digging arm equipped with a pick and scraper to excavate the soft ground westward from the Central Shaft toward the West Shaft. Another digger shield machine is scheduled to arrive at the Slaughterhouse Shaft in spring 2007. It will dig west to the Central Shaft.



The 12-foot-tall, 400-foot-long main beam machine was delivered to the San Vicente Portal in June.



A different kind of machine was delivered to the San Vicente Portal — a main beam tunnel boring machine. Instead of a digging arm, it has a rotating cutter head and 28 rolling steel disks to break up hard rock. The main beam machine will push against the face of the tunnel while the head rotates and the 17-inch disks roll against the rock, breaking it into small pieces. The machine will tunnel west from the San Vicente Portal to the Slaughterhouse Shaft. It will then be removed and reinstalled at the West Shaft, where it will tunnel eastward.

See **TUNNELING MACHINES** on page 2

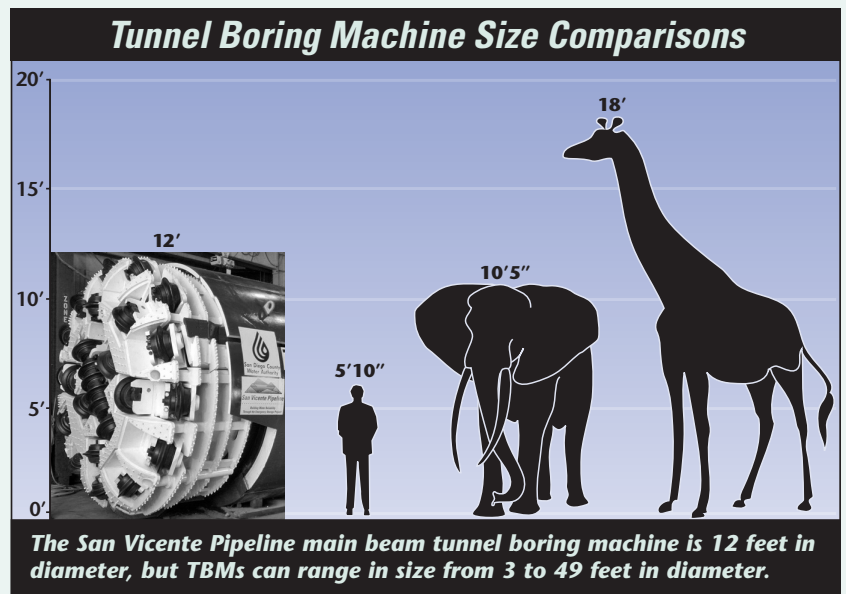


San Diego County Water Authority

Capital Improvement Program

Fun Facts about Tunnel Boring Machines:

- Tunnel boring machines (TBMs) are used to excavate tunnels as an alternative to drill-and-blast methods.
- Varying types of TBMs can move through different geologies ranging from soft clay to hard rock.
- Contractors can avoid disturbing surrounding soil and produce a smooth tunnel wall by using TBMs.
- Tunnel diameters created by TBMs can range from 3.28 feet to 49 feet. The San Vicente Pipeline tunnel will be approximately 12 feet in diameter.
- There are approximately 120 of these machines currently working around the world.



TUNNELING MACHINES *continued from page 1*

Each machine measures 300 to 400 feet in length, including a long conveyor belt system that carries the rock and dirt excavated from the tunnel to small train cars. The cars run on rails installed in the tunnel to carry the dirt and rock to the access points where it is removed from the tunnel.



The tunnel boring machines have a long conveyor belt system to remove the dirt and rock from the tunnel.

After tunneling is complete at the end of 2007, the next major phase of construction will begin. Steel pipe segments will be delivered to the access points and the contractor will begin installing the pipeline. The entire project is expected to be complete at the end of 2008. 💧

Famous TBMs Around the World

Tunnel boring machines are used all over the world. Perhaps the most famous tunnel created by tunnel boring machines is the Chunnel. Linking England and France below the English Channel, the Chunnel is 31 miles long, including 24 miles under water. The three-year excavation was completed in 1994 at a cost of \$21 billion. The American Society of Civil Engineers declared the Chunnel to be one of the Seven Wonders of the Modern World.

One of the world's largest tunnel boring machines was used to excavate a five-mile-long portion of the Queens Tunnel Project. The TBM was 23 feet in diameter and weighed 580 tons. Completed in 1999, the tunnel's purpose was to improve water distribution to a major section of Queens in New York City.

The South Bay Ocean Outfall project, constructed by the San Diego Metropolitan Wastewater Department, used a 330-foot-long, 186-ton boring machine with similar technology to the TBM used in the Chunnel project. Completed in 1999, the TBM created a 3.6-mile tunnel under the ocean floor to help address the decades-long problem of untreated Mexican sewage contaminating local beaches.

The last time the Water Authority used a tunnel boring machine was for the Pipeline 4 Extension Cowles Mountain Tunnel project in 1992. This project used a TBM, nicknamed "Guaca-mole," to dig an 11-foot-diameter tunnel through extremely hard rock. It took seven months to dig a 6,800-foot-long tunnel under Cowles Mountain. The pipeline now delivers treated water to the Water Authority's member agencies south of Mission Gorge Road. 💧

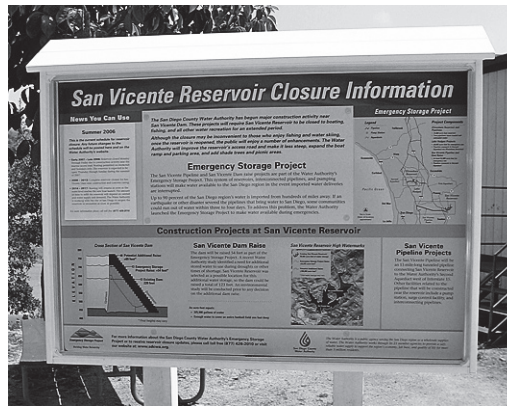


Lake Hodges Pump Station Construction Begins

Construction began in May 2006 on the Lake Hodges pump station and inlet-outlet structure, which will move water between Lake Hodges and Olivenhain Reservoir. A 120-foot-deep hole is now being excavated to house the pump station turbines. The pump station building will be mostly below ground with an above-ground structure measuring 30 feet wide, 50 feet long, and 18 feet high.

During excavation of the pump station, a temporary barrier, called a cofferdam, will be constructed in a small area of the lake. The cofferdam will hold back water while an inlet-outlet structure is built to connect the lake to the pump station. Lake Hodges will not be lowered at any time during construction of the pump station.

During the planning phases of the Lake Hodges Projects, the Water Authority recognized the opportunity to generate electricity due to the 770-foot elevation difference between Olivenhain



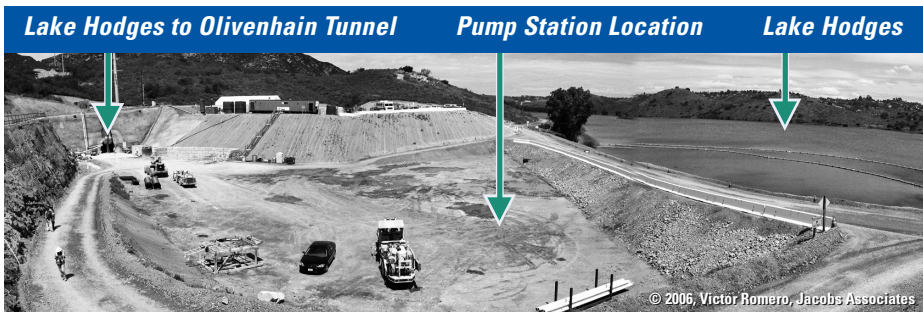
The kiosk will be updated with the most current closure schedule available.

Keeping Recreational Users Updated on the San Vicente Reservoir Closure Schedule

A kiosk installed in front of the San Vicente Reservoir concession stand provides users with updated information about the future closure of the reservoir. The reservoir must be closed for the San Vicente Dam raise and other Emergency Storage Project construction jobs.

The current timeline for reservoir closure is as follows, and may change as the project schedules are finalized:

- **Early 2007 — mid-2008:** Reservoir closed Monday through Friday due to construction activity near the marina access road. Boating permitted on weekends and holidays only. Exception: From May through September 2007, the reservoir is expected to return to its regular Thursday-through-Sunday schedule.



Two contractors are working on the Lake Hodges site: Kiewit Pacific is constructing the tunnel and pipeline and Archer Western is constructing the pump station.

Reservoir and Lake Hodges. Water pumped uphill from Lake Hodges to Olivenhain will travel back downhill by gravity into reversible motor-generator/pump turbines. The energy captured will be placed on the power grid for regional use. 💧

Tunnel from Lake Hodges to Olivenhain Nearly Complete

About 5,600 feet of the 5,800-foot-long tunnel has been excavated for the Lake Hodges to Olivenhain Reservoir tunnel and pipeline project. Tunneling began in September 2005 and is on schedule to be complete in late summer 2006. Pipeline sections are expected to begin arriving to the site in early September 2006, and the pipeline is scheduled to be complete by spring 2007. 💧

- **Early to mid-2008 — 2013:** Complete reservoir closure for San Vicente Dam raise construction and concrete curing.
- **2014 — 2017:** Boating will resume as soon as the water level reaches the new boat launch. The length of time needed to refill the reservoir will depend on rainfall and water supply and demand. The Water Authority is working with the city of San Diego to reopen the reservoir as soon as possible. 💧

EIR for Dam Raise Under Way Soon

This fall, the Water Authority will begin preparing an environmental study to address the potential impacts from raising the San Vicente Dam an additional 63 feet beyond the 54 feet planned for the Emergency Storage Project. The study will be called the Carryover Storage and San Vicente Dam Raise Project Environmental Impact Report and Environmental Impact Statement (EIR/EIS).

Notifications about the upcoming environmental review will be mailed to those on the San Vicente Dam raise mailing list. To be added to the list, please call the project information line at **(877) 426-2010**. To sign up for email notifications, go to the Water Authority's website at www.sdcwa.org, click on "Infrastructure," then "ESP." 💧



San Vicente Pipeline Coloring Contest Winners

In April, the San Vicente Pipeline project team invited kids ages 5 through 12 who live along the pipeline route to participate in a contest to color a picture of a tunnel boring machine. The Water Authority received 121 contest submissions and the judging committee chose four grand prize winners: **Ashley Velarde: 5-year-old age group, Nikhil Penugonda: 6-year-old age group, Neh Shah: 7- to 8-year-old age group, and Hannah Galleher: 9- to 12-year-old age group.**



Coloring contest winners (from left to right) Ashley Velarde, Neh Shah, Nikhil Penugonda, and Hannah Galleher were recognized at the June 22 board meeting.

Each contest participant received a certificate of recognition and prizes. The four grand prize winners were recognized by the Water Authority's board of directors at the June 22 board meeting. Their artwork was made into a decal that was placed on the San Vicente Portal tunneling machine.

Congratulations to the winners and thank you to everyone who participated in the contest! 

For more
information

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**about the San Diego County Water Authority's
Emergency Storage Project,
please call toll free (877) 426-2010
or visit our website at: www.sdcwa.org.**

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San Diego County
Water Authority

4677 Overland Ave.
San Diego, CA 92123

The San Diego County Water Authority is a public agency serving the San Diego region as a wholesale supplier of water. The Water Authority works through its 23 member agencies to provide a safe, reliable water supply to support the region's \$150 billion economy, job base, and the quality of life for more than 3 million residents.

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