

TAMING THE

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Pictured: Plastic lining helps keep water out of the tunnels during construction.



Devil's Slide

**It's mesmerizing and majestic.
It's breathtaking—
and it was temperamental.**

Taming the Devil

After decades-long debates between citizens, environmental groups, and government, the new Devil's Slide tunnels and bridges fix a coastal route notorious for rockslide closures.

Located in San Mateo County, on California's coastal State Route 1, *Devil's Slide* winds across California's coast between Pacifica and Montara, carved out of the steep cliff sides. Route 1 hugged the coastline across the aptly named Devil's Slide region, a steep, unstable section of highway with a long history of closures due to rockslides and land slippage.

With the Devil's Slide project, Caltrans created a safe, reliable route along California's unpredictable coastal Bay Area.

The Devil's History

It took two years for the California Division of Highways, Caltrans' predecessor, to complete the original section of State Route 1 at Devil's Slide, opening the famed stretch in 1937.

That same year, California Division of Public Works District Construction Engineer E. G. Poss boasted that before his new road, "the highway along the cliff face required men with the agility of mountain goats, courage, experience, and complete lack of nerves. One false step meant a tumble into the breakers."

But just one year later, State Route 1 at Devil's Slide experienced the first of many slide-related closures; significant slides would happen each decade thereafter.

Tunnel Project Means Safer Drive

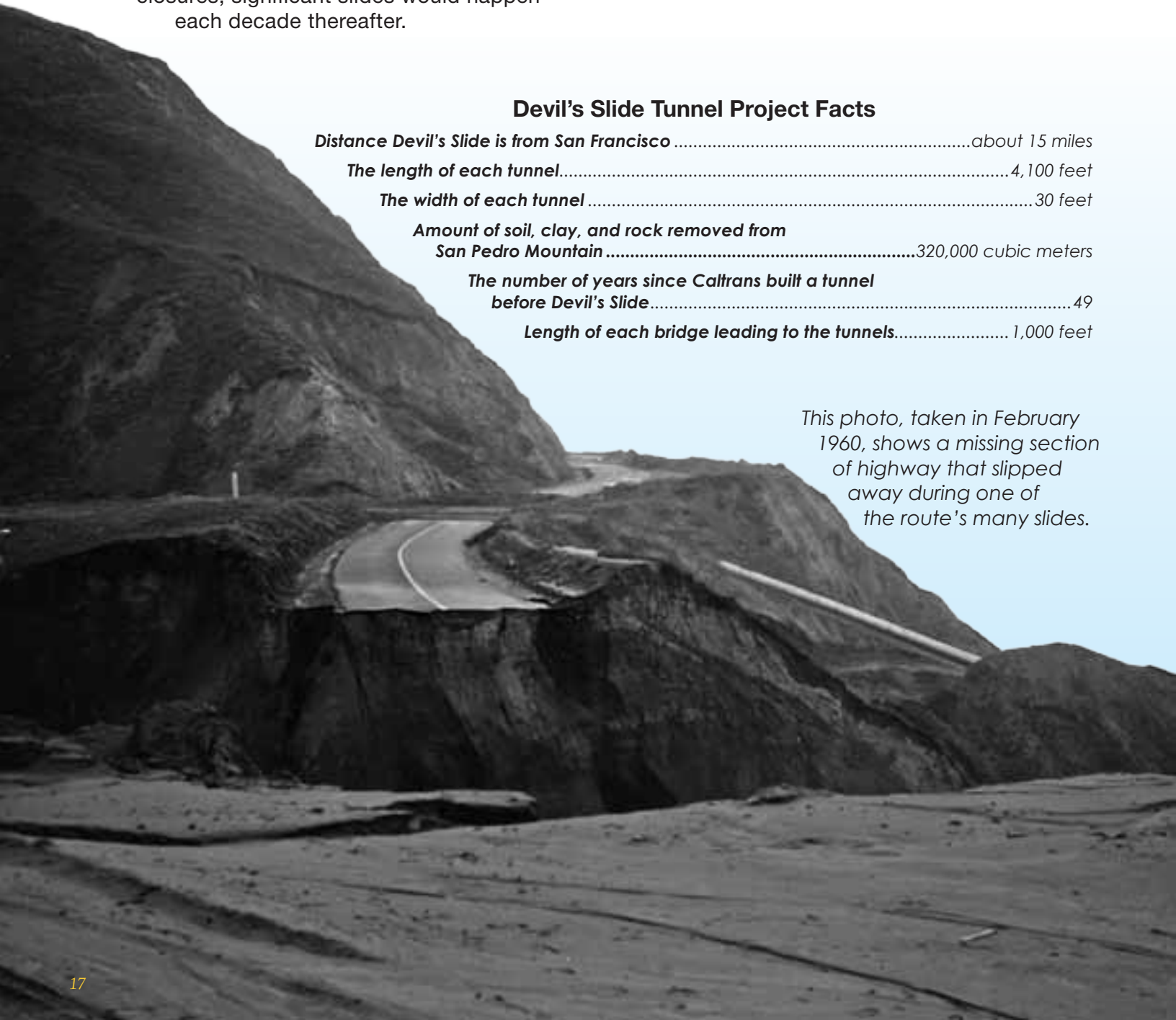
Caltrans' No. 1 goal is safety, and the new Devil's Slide project helps the department achieve that goal.

The previous route through Devil's Slide was a two-lane divided highway with no median and many short-radius curves, typical of a mountainous route. The new route eliminates the tight-radius curves and divides the highway with twin tunnels and bridges for opposing traffic, eliminating the potential for cross over. It gives drivers a smooth, safe route, and the bridges, which go over the Shamrock Ranch below, have guardrails to help keep drivers from crashing, thus enhancing safety.

Devil's Slide Tunnel Project Facts

<i>Distance Devil's Slide is from San Francisco</i>	<i>about 15 miles</i>
<i>The length of each tunnel</i>	<i>4,100 feet</i>
<i>The width of each tunnel</i>	<i>30 feet</i>
<i>Amount of soil, clay, and rock removed from San Pedro Mountain</i>	<i>320,000 cubic meters</i>
<i>The number of years since Caltrans built a tunnel before Devil's Slide</i>	<i>49</i>
<i>Length of each bridge leading to the tunnels</i>	<i>1,000 feet</i>

This photo, taken in February 1960, shows a missing section of highway that slipped away during one of the route's many slides.



A Continuing Battle

In 1958, the search for a permanent solution to the area's landslide problems began. The Division of Highways proposed an overland bypass, but advocacy groups concerned about the effects of constructing a highway over the mountain area opposed the project. This would be the beginning of a series of battles. Environmental lawsuits would follow, with Caltrans proposing projects and local residents insisting on maintaining the area's scenic beauty and considering the ecological effects of a proposed project.

The first plan to tame the area came in 1960. The Devil's Slide Bypass, a six-lane freeway would run for about seven miles from Half Moon Bay, over Montara Mountain, to Pacifica. Developers hoping to bring buildings and people to the area supported the project, but residents weren't enthusiastic about turning their rural area into an urban one.

Environmental awareness increased in the 1960s, and on January 1, 1970, President Nixon signed into law the National Environmental Policy Act (NEPA) of 1969. The California Environmental Quality Act

(CEQA) also became law in 1970, with both laws requiring more in-depth environmental impact studies for projects, which would drastically change the process for building transportation projects.

The bypass idea reemerged in the early 1970s when developers sought greater freeway access. Once again, residents opposed a bypass. Then, in 1972, California voters passed legislation limiting coastal development. That same year, the San Mateo Board of Supervisors approved plans for a new freeway, but citizens and environmental groups filed a multiplaintiff lawsuit to stop the freeway based on NEPA and CEQA requirements. Later that year, a U.S. district court judge ruled in favor of the environmentalists. The bypass plan was abandoned due to the new environmental requirements and the costs involved.

A tunnel was first proposed in 1973, but Caltrans initially dismissed the idea as too costly. In the early 1980s, the department decided to look at new ways to fix the problem highway while also adhering to environmental requirements. The Marine Disposal



The video above shows the progress of the new tunnels from the damaged highway, to the groundbreaking, and through the opening ceremony.

Alternative proposed to scrape the unstable part of the mountain, dump it into the ocean, and replace it with a new road on the new ledge. Federal officials refused to endorse it, and this alternative was also dismissed as too costly. Then, in 1983, the Devil was sliding again—this time closing State Route 1 for 84 days.

Another slide in 1995 closed the road for about five months, making life nightmarish for residents and costing more than \$3 million to repair.

Desperate for a solution, a panel of local engineers and geologists, with the approval of county supervisors, recommended a tunnel as a permanent fix and in November 1996, San Mateo County



Jet fans clear smoke from the tunnel in the event of a fire.

voters—74 percent of them—approved Measure T, the Devil’s Slide Tunnel Initiative. Caltrans again reviewed the tunnel proposal and this time found that it would cost about the same as a bypass.

The final design not only put an end to the ongoing road closures at Devil’s Slide, but also met public approval, preserved the environment, and complemented the natural surroundings. Tapered piers and curved struts give a graceful shallow arch look to the two bridges that connect the north portal of each tunnel to Highway 1. An open-design tubular steel pedestrian/bicycle guardrail preserves spectacular views from both bridges. The community was heavily involved in the process from the beginning, and the project was designed based on community and stakeholder input. Caltrans gave regular project tours and engaged the media, creating excitement for a long-awaited project.

Tunneling is Challenging

The new Devil’s Slide tunnels are Caltrans’ first completed tunnel project in nearly 50 years. To prepare for the tunnel work, crews took core samples from the mountain so they could choose the best equipment to dig the tunnels. The samples showed both soft rock and hard rock; however, work got really tricky in the last third of the tunnels when crews met with rapidly-changing rock formations. As crews met with a rock change, they had to swap out some of the equipment—even the ventilation system. This meant more time and money. As if that wasn’t enough, at one point, the tunnel began to shift, requiring increased reinforcement of the structure.

In order to deal with the unforeseen changes in the rock formations, the project’s schedule was increased from five to six and one-half years, and the cost was raised from \$263 million to \$439 million. Federal emergency relief funds were allocated to cover the additional cost.

Protecting the Environment

The Devil’s Slide project has two bridges that pass over a valley at the Shamrock Ranch, which contains a pond and wetlands. The wetland was fenced off to protect the environmentally sensitive area, home to many species, including pelagic cormorants, white-crowned sparrows, western scrub jay, California newts, peregrine falcons, and several endangered species such as the California red-legged frog, the San Francisco dusky-footed woodrat, the mission blue butterfly, and San Mateo County’s only known remaining population of Hickman’s potentilla. To make sure that the best care was taken of these sensitive populations, all project engineers went through endangered species identification training.

An offsite mitigation project, required by Caltrans’ regulatory partners, restored additional habitat. Biologists cultivated plants and monitored native species with drought-tolerant characteristics, while removing other invasive and noninvasive varieties. Biologists also monitored all migratory nesting birds on site.

To preserve the natural beauty of the area, an earthen berm was built to surround the operations and maintenance center. The building has a vegetation-covered roof, and is located about 1,000 feet south of the south portal. These elements help the facility blend into its natural

surroundings and shield it from the highway view. A small maintenance crew ensures safe operation of the tunnel and carries out routine maintenance tasks.

So What is the Public Getting?

The total cost of the Devil's Slide project was \$439 million. U.S. Senator Barbara Boxer helped get additional emergency funding for the stretch of highway in addition to the original \$50 million secured by Congressman Tom Lantos in 1983. The project received 100 percent of its funding from federal emergency relief.

The project was split into six contracts: one each for tunnels, bridges, south rock cut, and three for mitigation: one onsite and two offsite. The largest contract, the tunnel contract, constructed twin tunnels, approach roads, an operations center, and public access features. The project includes a separated two-lane road, one lane in each direction. The new road passes through twin tunnels, over twin bridges, and connects with an existing nonseparated two-lane road at each end. The new road is approximately 6,500 feet long, made of roughly 4,000-foot twin tunnels, and a 1,500-foot north approach road, which includes the 1,000-foot parallel bridges, and the 1,000-foot south approach road, with the tunnels running through a portion of the San Pedro Mountain. The new tunnels are the longest in the state.

The tunnels have 10 emergency cross passages, three equipment chambers, three underground

equipment rooms and 16 fans in each tunnel for ventilation. The tunnels also feature a day and night lighting system with brightness transition at each end and state-of-the-art detection systems for fire suppression, carbon monoxide, nitrogen oxide, and over-height vehicles.

Electronic message signs displaying safety/advisory information, closed-circuit television monitoring, and emergency and call box telephone systems allow Caltrans to watch and communicate tunnel activity. The tunnels are designed to withstand the largest expected earthquake for the area, and each tunnel is accessible to bicyclists.

Motorists can now enjoy the new stretch of highway on State Route 1, but the old scenic route isn't a complete thing of the past. Caltrans relinquished the old stretch of highway at Devil's Slide to San Mateo County to convert it into a public facility for hiking and bicycling. People drawn to the devilishly beautiful area will still be able to enjoy it, but instead of driving it, they can walk or bike and breathe in the beauty the area has to offer.

While the area has long been known as Devil's Slide, California Senate Concurrent Resolution 71 (2008), authored by State Senator Leland Yee, officially named the tunnels the "Tom Lantos Tunnels at Devil's Slide," in honor of the congressman who worked to get the first funding for the project.

You can learn more about the Devil's Slide tunnels and bridge project at the [Caltrans District 4 website](#).

Antique cars were the first to drive through the Devil's Slide tunnels during the opening celebration.

