

## I-680 Toll Plaza Approach

A HOCHTIEF Company

### Owner

California Department of Transportation

### Location

Martinez, CA

### Value

\$39,200,000

### Market

Highways & Interchanges

### Start - Completion Dates

9/2002 - 5/2006

- 1,194-foot eight-span bridge
- Engineered rock fill for temporary support over marshland
- 17-lane toll plaza approach
- Value engineering solution to reduce risks associated with unstable soil and ground conditions

## Project Description

Flatiron constructed the approach for a new toll plaza along Interstate 680 about 30 miles northeast of the San Francisco Bay. Flatiron's project was part of a larger plan to construct a new northbound I-680 toll bridge over the Carquinez Straits. Flatiron built two main structures for the approach—the Mococo On-Ramp Bridge and the Mococo Overhead Bridge, a 1,194-foot-long eight-span bridge that begins with five lanes and flares to 17 lanes at the new toll plaza.

This project presented major challenges, namely those caused by unstable soil conditions. Brackish marshlands—situated between the Tessoro and Shell Oil Refineries and the Rhodia Chemical Plant—constituted most of the project site. In order to work over the contaminated marsh, the owner's design called for Flatiron to fill the area with an engineered rock fill. The final fill design consisted of two layers of Tensar Geogrid fabric and three feet of drain rock topped with one foot of aggregate base. This fill supported heavy crane loads during installation of the 55-foot-long piles and other operations. Since the marsh had to be restored upon completion, this entire fill was placed on a layer of filter fabric to allow for clean removal of the rock.

Additionally, because the land was unable to support heavy loads, Caltrans specified use of lightweight concrete for the embankment. Flatiron replaced much of the soil with a lightweight foam concrete much lighter than regular concrete. Flatiron placed layers of lightweight expanded polystyrene (EPS) blocks (up to 20-feet-thick) on top of the lightweight concrete to shape the actual approach. Roughly 2,000 EPS blocks formed the lightweight fill material for the new freeway approaches. This combination of lightweight materials significantly reduced the overburden pressures on the underground and will reduce further settlement.

Originally, the design called for heavy precast segments for part of the superstructure. Recognizing the risks associated with placing heavy precast units on unstable soil, Flatiron proposed a new design for the bridge's superstructure that called for casting part of the superstructure in place. Flatiron's proposal required minimal crane support and involved much less risk than the original design.

### Company Role

Flatiron was the prime contractor for this project.

