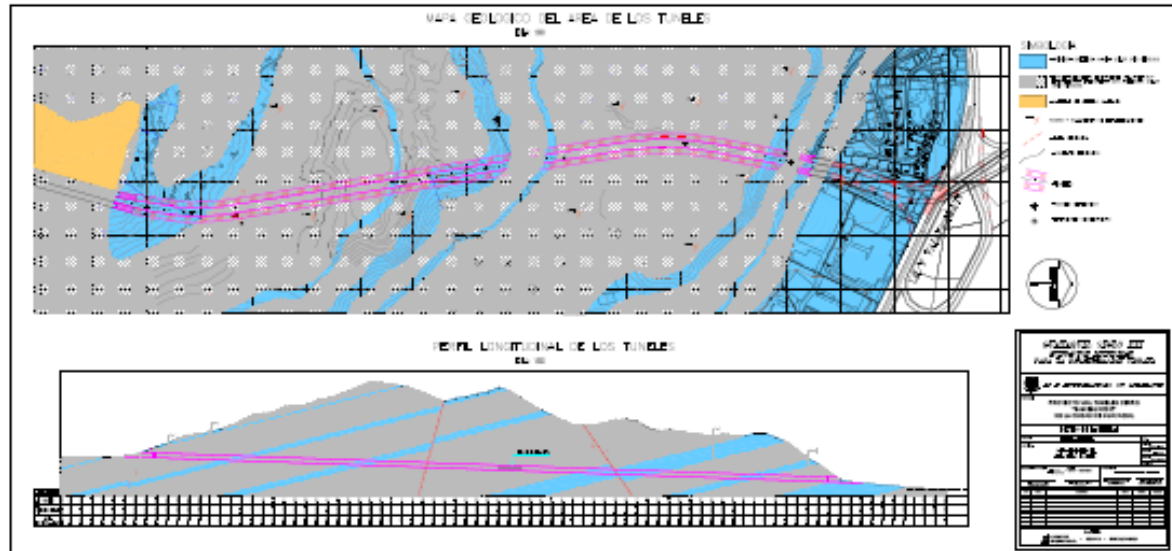


## Tunnels

# San Eduardo Tunnel Guayaquil Ecuador



The Fundamental Road Network Scheme of the City of Guayaquil foreseen for the year 2010, includes the upgrading of the Avenida del Bombero.

At km 4.5 of the Av. del Bombero is a interchange of two main roads located, that connect the residential areas in the south-west of Guayaquil with the industrial sector in the north of the city.

This interchange is a site of permanent traffic congestion that entails travel times of up to one hour for a route of max. 8.0 km, an occurrence that represents economic losses, in addition to the environmental damages caused by the emissions.

In view of this problem the municipality of Guayaquil has decided to investigate a new direct road link between the Av. Barcelona in the south of the city and the before mentioned interchange.

The project consists of 3.74 km of 3 lane dual carriage-way road including two parallel tunnels of 1,320 m crossing the mountain San Eduardo, the reconstruction of interchange at km 4.5 and a new interchange to connect the new road link with the Av. Barcelona.

The two parallel tunnels will have a regular distance of approx. 15 m, 3 lanes for unidirectional traffic and be connected by three cross passages for the case of emergency.

The intention of this project is to improve the conditions of traffic substantially, reducing the operative costs of the users, the indices of congestion, traffic accidents and also to improve the environmental conditions.

### Client:

Guayaquil Siglo XXI, Fundación Municipal para la Regeneración Urbana (Foundation "Guayaquil Siglo XXI" for Urban Regeneration)

### Technical Data:

Length of project	3.74 km
No. of lanes	2 * 3
No. of Interchanges	3
Length of tunnel	2 * 1,320 m
Excavated cross-section	approx. 102 m <sup>2</sup>
Emergency stations	3 per tunnel
Cross passages	3

### Duration of Services:

2003

### Services: \*

#### Study at feasibility level:

- Survey
- Traffic Study
- Road Design with Alternatives
- Hydrology, Drainage Concept
- Geological and Geotechnical Investigations
- Tunnel Design
- Tunnel Installations
- Environmental Impact
- Economic Evaluation

\* in joint venture



**Túnel cerro El Carmen, Guayaquil (Ecuador)**



**Túnel cerro Santa Ana, Guayaquil (Ecuador)**