



SIKA AT WORK

CENTRAL SUBWAY TUNNEL, SAN FRANCISCO, USA

BUILDING TRUST



CENTRAL SUBWAY TUNNEL SAN FRANCISCO

PROJECT DESCRIPTION

The Central Subway Tunnel in San Francisco, California is a \$233 million US project being constructed between March 2012 and March 2015. The double tube tunnel is 1.7 miles (2.7 km) long and 20 feet (6 meters) in diameter. It represents the backbone of the extension of muni's third line and will provide a significant decrease in travel times between 4th and King Street and Chinatown. Full operation is scheduled for 2019. It will be a crucial travel artery, reducing current travel times of more than 20 minutes down to just 8 minutes, for a distance of 1.7 miles (2.7 km).

PROJECT REQUIREMENTS

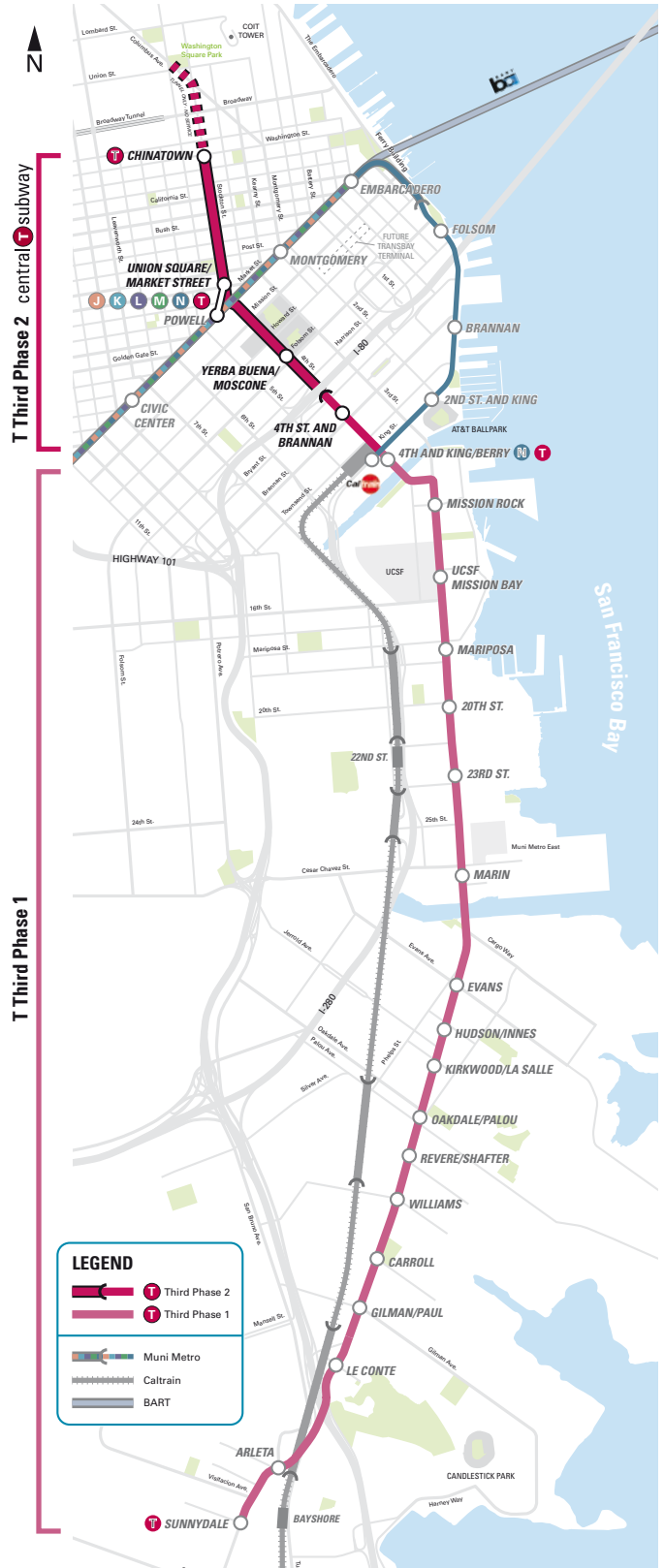
Tunnel construction was executed by using two Tunneling Boring Machines (TBMs) with a boring speed of 40 feet (12 meters) per day and required a constant supply of concrete tunnel segments. To accomplish this, the production of 21,258 segments representing approx. 36,600 yd³ (28,000 m³) of concrete was required. In order to produce such a large amount of tunnel segments in a short period of time, 60 segments per day had to be produced. This production rate could only be accomplished by using a high early strength concrete, gaining a minimum stripping strength of 17 MPa (2,500 psi) at the age of 14 hours.



SIKA SOLUTION

Sika admixtures Plastocrete® 161, Sika® ViscoCrete® 2100, SikaCrete® 950 DP, Sika® Fiber HP, as well as SikaSet® NC (when set acceleration and faster strength gain was necessary) ensured the trouble free production of the high quality tunnel segments. This admixture combination guaranteed a required 30 minute slump life to place conventional concrete with a slump of 6-7 inches (150 - 175 mm) into concrete forms and to perform all finishing operations. The use of SikaSet® NC, a non-chloride accelerating admixture, during the colder weather assured early strength development without any additional concrete heating.

Last but not least, the concrete plasticity at the time of consolidation had to be such that it provided an excellent bughole free surface needed to fulfill stringent requirements for vacuum lifting.



SIKA ADMIXTURES FOR PRECAST



SIKA PRODUCTS

- | | |
|----------------------------|-----------------------|
| ■ Plastocrete® 161 | Water Reducer |
| ■ Sika® ViscoCrete®-2100 | Superplasticizer |
| ■ SikaSet® NC | Set Accelerator |
| ■ Sikacrete® 950 DP | Microsilica |
| ■ Sika® Fiber HP (2lbs/yd) | Micro Synthetic Fiber |

PROJECT PARTICIPANTS

- Client: San Francisco Municipal Transportation Authority
- Preliminary Engineering Firms: Parsons Brinckerhoff's San Francisco and Cleveland, along with San Francisco-based PGH Wong Engineering, Inc.
- Final Design: PB Telamon (joint venture of the San Francisco office of Parsons Brinckerhoff and San Francisco-based Telamon Engineering Consultants, Inc.)
- Segment Producer: Precast Management Corporation
- Contractor: Barnard Impregilo Healy joint venture

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Please consult the Data Sheet prior to any use and processing.



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