

History of Doyle Drive Freeway Structure at Presidio

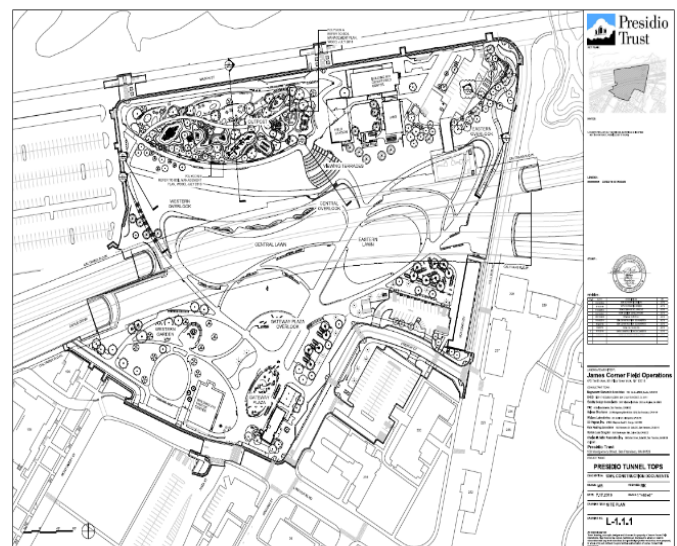
In the 1930's, Doyle Drive was constructed by the Army based on a design that intentionally prevented public physical or visual access to their facilities, discouraging rather than encouraging access to Presidio. The Army departed the Presidio in 1994 and by 1996 Congress created the Presidio Trust which partners with the National Park Service. After reaching its useful life (more than 75 years of service), the route had become structurally and seismically deficient with a safety rating of 2 out of 100. The route had safety issues such as lack of median barrier, no shoulders and exit ramp geometry with extremely tight turning radii.



Existing Doyle Drive

Challenges	Solutions
<ul style="list-style-type: none"> • Create a major arterial interconnected with communities to blend into a parkway. • Work with numerous public agencies (state and federal) to agree on a concept to design. Create an experience for motorists to feel like they are driving through a park. • Construct a tunnel-at-grade and park on top of the structure with complex soil conditions. 	<ul style="list-style-type: none"> • Innovative idea to create a tunnel-at-grade structure and construct a park on top of the structure to create a public space. Designed a complex geometric alignment and offset roadway grades and landscape features to create views of the park and San Francisco Bay. • Maintained close coordination with all participating public agencies and created a partnership on the final design. • Implemented unique foundation design, used lightweight fill and geofoam fill.

During the PAED Process, the parkway concept rather than typical freeway design was developed. Although it carries 8 lanes of traffic, a design with elements accentuating the parkway idea was advanced, enabling the roadway to be more fully compatible with its National Park setting. Multiple entities, including Caltrans, the San Francisco County Transportation Authority (SFCTA), San Francisco Metropolitan Transit Agency (SFMTA), San Francisco Department of Public Works (SFPD), San Francisco Public Utilities Commission (SFPUC), Presidio Trust, National Park Service (NPS), San Francisco Planning Department and the Golden Gate Bridge and Highway Transportation District and their consultants developed the alternatives and environmental documents. Caltrans worked with over 25 citizen advisory groups throughout the process to concur with the new parkway concepts.



Plan view of Tunnel Tops Park Design

With Caltrans vision to create a parkway, one of the most important consultants was Michael Painter. Painter, a Mill Valley landscape architect, envisioned a roadway that would replace the Doyle Drive viaduct and construct twin sets of tunnels at the Main Post and Battery areas. This provided the opportunity to create more than 20 acres of new parkland in areas previously devoted only to high-speed automobile traffic. Views along the new parkway were preserved and additional views created, in particular along the new Highway Viaduct, but also by placing the north and southbound traffic lanes at different elevations, in some places separated by wide landscaped medians. This meant that views toward the San Francisco Bay, the Golden Gate Bridge, and other landmarks were maximized and unobstructed by traffic to the extent possible. The Main Post was the original army base and today serves as the Presidio Trust's primary base of operations, with the Parade Grounds providing an expansive public gathering place with exceptional views of the Bay and beyond.



Conceptual Design of Tunnel Tops Planting



Aerial view of Tunnel Tops Park



Main Post Tunnel looking East



View of Tunnel Tops Park with Golden Gate Bridge

Challenges with Construction

At the Main Post and Battery areas, Michael Painter's vision of tunnels built on-grade and then buried allowed for the creation of Tunnel Tops Park and the less highly developed parkland atop the Battery Tunnels. This innovation expanded the publicly accessible parkland by more than 20 acres. Caltrans construction began in 2009 and the tunnels were completed in 2016, at which time traffic was diverted from the parallel roadway to the Parkway's permanent new alignment.



Doyle Drive detour

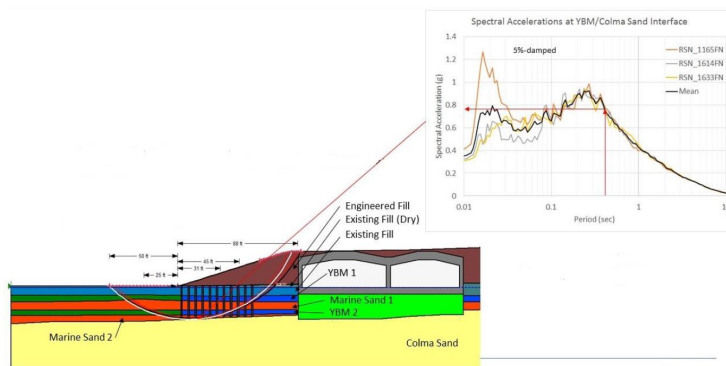


Demolition of Doyle Drive

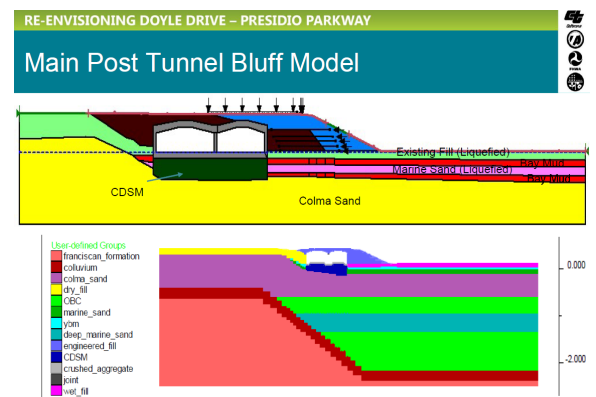


Demolition of Doyle Drive

Design and construction of the Main Post Tunnels (MPT) were facing unsuitable foundation soil conditions consisted of very soft clay Bay mud and very loose sand layers with high groundwater and artesian levels. Staging construction of MPT required a detour supported by a retaining wall system filled with light weight cellular concrete to minimize settlement and impact on utilities beneath. Furthermore, the project site is located in a seismically active zone of northern California with many faults producing earthquakes and causing strong ground shaking to liquefy very loose sand. Therefore, foundation soils were treated by cement deep soil mixing in grid pattern to support these tunnels on mat foundations and maintain groundwater flow path in the Bay direction.



Soil Cross Sections Analysis



Soil Cross Section

Along with limited load on the top of tunnel by using light weight fill geofoam of unit weight less than 3 lb/cu ft, lateral spread of MPT bluff due to liquefaction was considered and prevented by stone columns.



Installation of geofoam and lightweight fill

With the infrastructure Park Presidio completed in 2017, the remaining work include many of the featured landscape for the Presidio.



Aerial view of completed Main Post Tunnel



Aerial view of construction of the Tunnel Tops Park

Tunnel Tops Park

Inland parts of the Presidio now have direct pedestrian and connectivity to Crissy March, Crissy Beach, and the rest of San Francisco's northern waterfront. Features include, multiple seating and picnic areas, a firepit for group gatherings, and the Outpost playground, intended to foster exploration and creative play. Cypress trees removed for roadway construction were used to build some of the Outpost's play structures as well as the long-sculpted benches, designed to mimic the form of the Marin headlines.

Heavily planted landscapes were designed and installed at numerous locations from near the Golden Gate Bridge toll plaza to the Palace of Fine Arts and on SR 1 near the Parkway, a total of more than 30 acres. Seed was collected within the Presidio from locally native plants and grown in Park nurseries, providing tens of thousands of plants with genetics native to the Presidio. These plants were used throughout the project area, enhancing the habitat for numerous species of native animals. Thousands of other plants were also used, focusing on the species historically used in the Presidio. Large specimen trees were located where root systems would not intrude on the tunnel structures, a safety measure furthered by use of extensive root barriers.



Aerial view of Main Post Tunnel with completed Tunnel Tops Park



Aerial view of completed Tunnel Tops Park

Caltrans Youtube Video Placeholder

Tunnel Tops Video

30second – 1 minute video
proposed to be added for Caltrans
video footage of Tunnel Tops Parks
and add team interviews.