



LEAGUE
OF CALIFORNIA
CITIESSM

Save California Streets
Coalition's

OUTSTANDING LOCAL
STREETS AND ROADS
AWARDS PROGRAM

PREPARED BY:

Michael Baker

INTERNATIONAL

PROJECT DESCRIPTION

THE FIRM'S ROLE IN THE PROJECT:

Michael Baker International was the lead designer.

ROLE OF OTHER FIRMS IN THE PROJECT:

Michael Baker's subconsultants included WMH, AECOM, URS, ARWS, Earth Mechanics and Haygood& Associates.

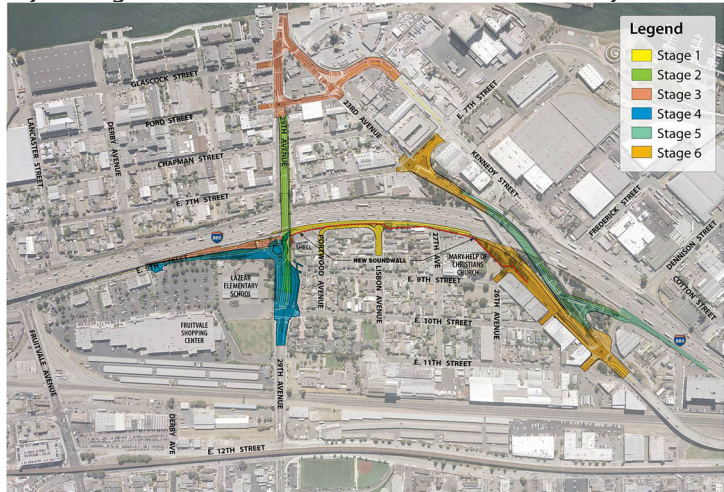
THE CIVIL ENGINEER for the project was Diablo Engineering Group.

THE GENERAL CONTRACTOR was Palm Engineering.

DESCRIPTION OF THE FIRM'S CONTRIBUTION TO THE PROJECT:

I-880 is a major commuter route and the most heavily used goods movement corridor in California's Bay Area region, connecting the Port of Oakland with Silicon Valley. Average traffic volumes on I-880 exceed 220,000 vehicles per day. High traffic volumes, nonstandard geometry, nonstandard interchange spacing and short weaving all contributed to the deficient flow of traffic and high accident rates in the vicinity of the 23rd Avenue and 29th Avenue interchanges.

Major project stakeholders included the California Department of Transportation and Alameda County Transportation Commission, along with the City of Oakland. To improve safety and operations at the interchanges, a five-stage plan was executed that included:



- Phase 1
 - Safety improvements to the northbound on-ramp
 - Safety improvements to the freeway mainline
 - Soundwall installation in the northbound direction between 29th and 23rd Avenues
 - Modification of local streets
 - Landscape enhancement
- Phase 2: Reconstruction of the 29th Avenue overcrossing
- Phase 3: Construction of the northbound I-880 off-ramp to 29th Avenue
- Phase 4: Reconstruction of the 23rd Avenue overcrossing
- Phase 5: Reconstruction of the northbound I-880 off-ramp to 23rd Avenue

The finished project includes ramp and intersection modifications and reconstruction, overcrossing structure replacements and construction of a new soundwall, and re-directs regional traffic out of the neighborhood. The final structures better connect the cities of Alameda and Oakland and can now be used by school children within the Jingtletown neighborhood, motorists, pedestrians and bicyclists.



ORIGINAL OR INNOVATIVE APPLICATION OF NEW OR EXISTING TECHNIQUES

The project notably included the first roundabout at an onramp in the Bay Area. This innovation was initiated as a solution to requests from the community. The residents wanted to retain internal access to the neighborhood, school and local shopping center without having to get on the freeway, which had been an issue with the previous configuration. The roundabout met this request in a safe and convenient manner. Studies show that roundabouts are often safer, more efficient, less costly and more aesthetically appealing than the conventional stop or signal-controlled intersections. The low-speed environment created by the horizontal roadway geometry forces all vehicles to slow down to navigate the intersection. The elimination of crossing vehicle paths reduces vehicle conflict points and the potential for crashes, thereby saving substantial travel time for motorists and costs for damages and emergency services.

Another innovation was the use of Expanded Polystyrene blocks as fill in the abutment structures, a strong lightweight solution that allowed construction to proceed without having to wait for settlement. This saved months in the project timeline.

The connection of the offramp structure to the overcrossing above the roundabout was complicated. The team used precast materials for the 29th Avenue overcrossing to expedite construction and then cast the offramp in place. A floating slab detail was used to tie the two together to meet seismic requirements and the column locations were finely adjusted to meet the temporary traffic control and final roundabout configuration.

A creative solution was employed to raise the overcrossings, which needed to provide for clearances for trucks as well as ADA accessibility where there had not been before. A major challenge to this was the large elevation change between the crossing intersections. To allow for these clearances and safe accessibility, intricate balancing and innovative special ADA ramping were utilized.



FUTURE VALUE TO THE ENGINEERING PROFESSION & PUBLIC PERCEPTION

As the first roundabout at an onramp in the Bay Area, the project has opened new possibilities and proven that the roundabout option is viable. Future projects will draw upon the key learnings and continue to provide value to the engineering profession.

Throughout the entire project, the team remained engaged with the neighboring community and school to ensure a product that would positively impact the area. The final structures better connect the cities of Alameda and Oakland and can now be used by school children within the Jingtowntown neighborhood, motorists, pedestrians and bicyclists. 4,000 feet of pedestrian and bike safety improvements were incorporated into this project.

COMPLEXITY

There was not adequate financing for the soundwall and ramp realignment, so the team creatively pursued Trade Corridor Improvement Funding because the 23rd Avenue and 29th Avenue bridges were the last in the corridor that didn't meet vertical clearance requirements.

Design challenges included the critical bottleneck because of the close proximity between the 23rd and 29th Avenue interchanges, resulting in short acceleration and weaving distances. The project was an engineering accomplishment, particularly with the convergence of three overcrossings into two within this constrained area. Because two of the onramps at 23rd Avenue were closely spaced and creating conflicts on I-880, the team consolidated them into one, while keeping eastbound traffic over 23rd Avenue open at all times by incorporating night and weekend work.

Low vertical clearances of overcrossings and non-standard design of existing ramps contributed to the need for safety and operational improvements. The spans at the end of their useful lives were replaced and the new overcrossings were 14 inches taller than their predecessors.

The team dealt with poor soil conditions, employing the innovative use of Expanded Polystyrene blocks as fill in the abutment structures, a strong lightweight solution that allowed construction to proceed without having to wait for settlement, as well as wick drains, which accelerate consolidation of soil. Both solutions saved 12 months in the schedule.

Utilities were challenging as the area hadn't experienced major construction in many years and the utility companies did not have comprehensive records. The team coordinated with various utility companies by compiling documentation, holding dedicated utility meetings and completing extensive potholing during the design phase. During construction, field and coordination meetings were strategically held to keep ahead of the contractor's schedule.



EXCEEDING OWNER/CLIENT NEEDS

The project was executed exceptionally well, with all major stakeholders - the California Department of Transportation and Alameda County Transportation Commission, along with the City of Oakland - considering it a success. The project was extremely complicated, so there were contingencies in place, with the project budget coming in within the parameters set forth. This was a notable achievement as other projects along the corridor had been over-budget.

The team dealt with several delays but remained committed to a high-quality final product. Although these delays threatened to push the project by nearly a year, the Michael Baker and Diablo Engineering Group team were able to bring the project closer to alignment with the schedule by incorporating innovations and creative staging. In addition, the team faced a challenge in that the soundwall was located on piles, which had to be drilled per strict protocols. Even with the challenge of construction occurring during a rough winter, the soundwall was completed per the protocols and procedures in place.



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