COUNTY OF FRESNO

2023 LS&R ANNUAL AWARDS

BRIDGE: EFFICIENT AND SUSTAINABLE BRIDGE MAINTENANCE, CONSTRUCTION AND RECONSTRUCTION PROJECTS

JAMES BYPASS OVERFLOW BRIDGES ON MANNING AVE

PROJECT DESCRIPTION

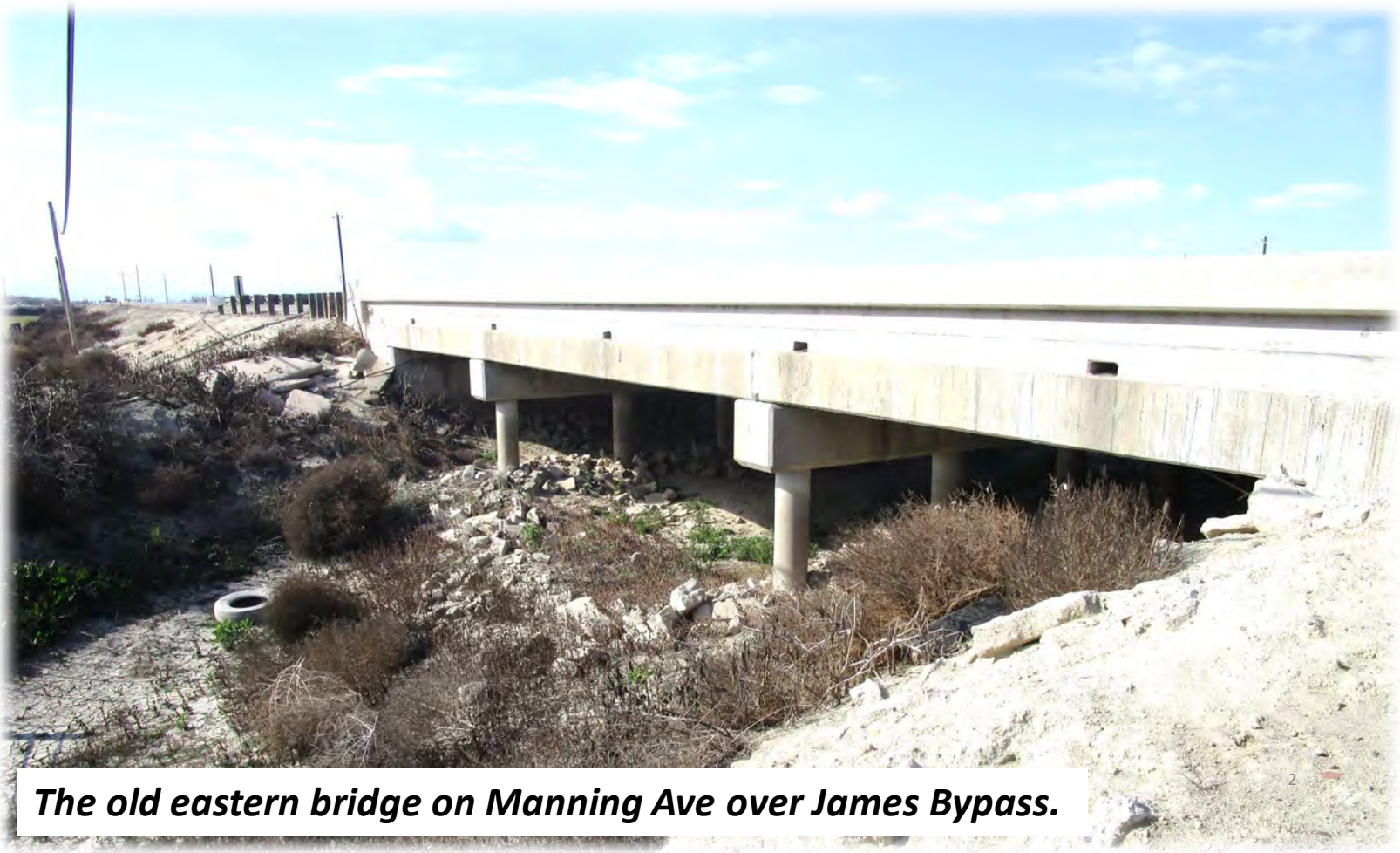
The James Bypass Overflow Bridges Project replaced two deficient bridges on Manning Avenue west of SR 99; East James Bypass Overflow Bridge, 3.8 miles west of State Route 145 (Bridge No. 42C0066) and West James Bypass Overflow Bridge, 3.2 miles east of Colorado Avenue (Bridge No. 42C0067), east of the community of San Joaquin (See Exhibit X). The bridge replacement was executed using accelerated bridge construction (ABC) methods in order to keep Manning Avenue open to trucks and traffic for as much of the project duration as possible. Foundations for the two new bridges were constructed underneath the existing bridges to keep the road open to traffic for as long as possible. Precast was used for the bridge girders to allow off-site construction to occur and rapid setting concrete materials were incorporated to minimize the duration of activities that could only occur after demolishing the existing bridges. Utilizing these ABC methods, Manning Avenue was only closed down to traffic for a total of 5 weeks.

The old western bridge on Manning Ave over James Bypass.

BRIDGE DESIGN & CONSTRUCTION

The James Bypass on Manning Avenue was a multiple bridge replacement project executed using accelerated bridge construction methods in order to keep Manning open to trucks and traffic for as much of the project duration as possible. Recognizing the large amount of traffic utilizing Manning Avenue at this location, this project was conceived from the beginning to end as an accelerated bridge construction project and incorporated elements throughout to achieve that goal. With the roadway closed down for only 5 weeks total to demolish the old bridges, construct the new bridges, and repave a quarter mile of roadway, that goal was successfully achieved.

In order to allow traffic to stay on the existing bridges during construction of the new bridge foundations, the foundations for the new bridges were constructed approximately 1 foot below the soffit (underside) of the existing bridges. Due to low headroom below the bridges for construction of deep foundation (piles), each bridge support was founded on outboard large diameter piles constructed on each side of the roadway to form an outrigger bent at each support.



The old eastern bridge on Manning Ave over James Bypass.

The new bridge girders consist of precast/prestressed voided slabs approximately matching the depth of the previous non-prestressed bridge to avoid impacting freeboard over the Central Valley Flood Board regulated floodway. In order to make up the elevation difference between the new foundations and the proposed soffit, a secondary rapid strength concrete pour was utilized after demolishing the existing bridges to precisely set the girder elevation.

The adjustability in the secondary pour was a critical part of setting the finished roadway to maintain the nearly flat 0.37% slope required to smoothly transition the bridge deck and approach roadway onto an existing canal bridge located 100 feet from the westernmost bridge on this project. Further complicating that smooth transition was the camber of the multiple precast voided slab spans and the 45-degree skew of the bridge. In order to reconcile the various geometric constraints, a polyester concrete overlay with a minimum thickness of 0.75 inches and a maximum thickness of 6 inches was used. In combination with the secondary pour, the polyester concrete overlay provided the adjustability to account for the various geometric challenges posed by the site. Through close collaboration between the County, their consultant team, and the contractor, the secondary pour and polyester concrete overlay elevations were set such that the finished deck did not require grinding to achieve a smooth roadway transition and adequate drainage of the bridge deck.

West bridge girder erection.

OBSTACLES OVERCOME

Additional challenges overcome during construction were the varying environmental and regulatory restrictions placed upon the project. Due to the early arrival of nesting swallows, construction of the project was delayed by several months to meet regulatory requirement. This delay pushed the construction of the foundations beyond the in-channel period typically allowed by the Central Valley Flood Protection Board and required biweekly variances as well as the design of falsework to withstand potential flood flows. The Contractor and the County successfully navigated these challenges, and the project was substantially completed in June of 2022.

Funding for the project was provided by the federal Highway Bridge Program, with RMRA providing the local match. The original bid amount for the project was $5,260,535, and the project was completed under budget at $5,036,122.

View of bridges near completion from the east.

The completed east bridge looking southeast.

The completed west bridge looking southeast.

The County of Fresno wishes to thank all of the agencies which helped make this a successful project.

2022 ASCE Outstanding Structural Project for both the Fresno Branch and San Francisco Section Awards.

2022 APWA Project of the Year $5-25 million (Bridges)

PROJECT FUNDING

Caltrans

SB1

U.S. Department of Transportation
Federal Highway Administration

PROJECT DESIGN

CORNERSTONE structural engineering group

GEOTECHNICAL ENGINEERING

Krazan

BRIDGE CONSTRUCTION

VIKING CONSTRUCTION

ADDITIONAL PARTENERSHIPS

STATE OF CALIFORNIA – SAN DIEGO REGION – REGIONAL WATER QUALITY CONTROL BOARD

JAMES IRRIGATION DISTRICT – ORGANIZED FEBRUARY 16, 1920 – SAN JOAQUIN, CA

US Army Corps of Engineers.