

## **1. Introduction**

### **1.1 Structure Selection Report**

This Structure Selection Report summarizes preliminary bridge engineering and provides documentation for structure selection of an overall bridge layout and structure type for the new 4<sup>th</sup> St. Bridge in Pueblo, Colorado. Preliminary Engineering and FIR plans development for this project are being completed for the Colorado Department of Transportation, Region 2, by Figg Bridge Engineers, Inc. and a subconsultant team comprised of firms specializing in roadway and civil design, hydraulics and drainage, geotechnical and geologic investigation, hazardous waste, railroad coordination, surveying, lighting, and urban design.

This report includes a description of the project including goals and critical issues, an overview of the condition of the existing 4<sup>th</sup> St. Bridge, and preliminary engineering with cost estimates for each bridge alternate and structure type studied. Each bridge alternate is evaluated against a comprehensive set of criteria reflecting the goals and critical issues of the project, and a structure type recommended. With CDOT concurrence, the recommended structure documented in this report will be advanced into the final design phase of the project.

This Structure Selection Report is intended to complement the Structure Concept Report completed for the project by Figg Bridge Engineers in December 2001. Bridge alternates and structure types studied during the preliminary design phase are those that were recommended for further study in the Structure Concept Report after evaluation against project criteria. Both the Structure Concept Report and the construction alternates study performed for the historical clearance process recommended replacement of the existing bridge rather than re-use and/or rehabilitation. A detailed discussion of the construction alternates study is contained in the March 2002 report titled, "Structural Considerations and Cost Analysis of Construction Alternates Supporting the Historical Bridge Evaluation Section 106 and 4(f) Process," prepared by Figg Bridge Engineers.

### **1.2 Project Description**

Fourth Street is a major east west route through Pueblo connecting I-25, downtown, and western residential neighborhoods. The 4<sup>th</sup> St. Bridge carries State Highway 96A (SH96A) across a small city street, the Union Pacific (UPRR) and Burlington Northern Santa Fe (BNSF) railroad yards (Pueblo Yard), a floodwall, and the Arkansas River. The Pueblo Yard is a major railroad system component with approximately 30 tracks at the bridge location, including one BNSF and two UPRR mainlines. The yard is currently running at or above capacity. The Arkansas River in this area is relatively narrow and shallow with flow controlled by the Pueblo Reservoir. The City of Pueblo is currently teamed with the United States Corps of Engineers for an Arkansas River restoration

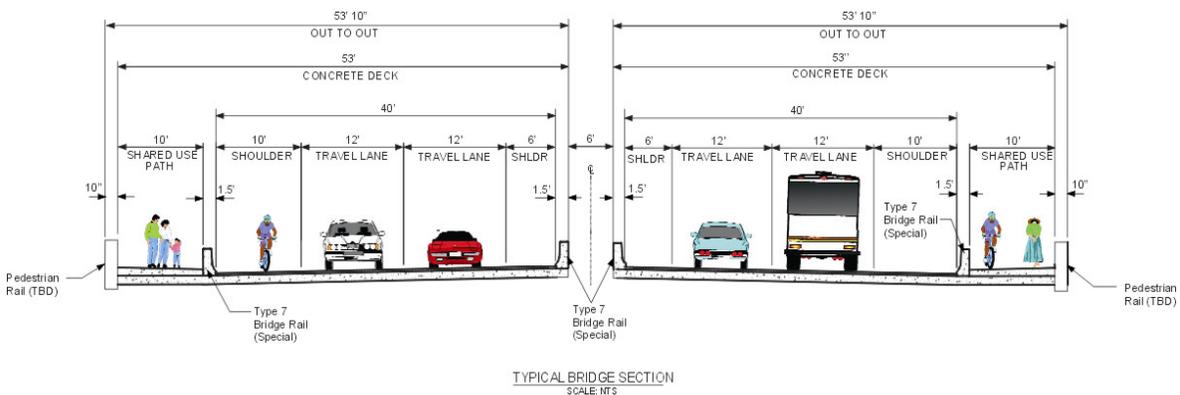


project (Legacy Project) aimed at reestablishing the riverine environment and encouraging recreational use of the river in this area.

The existing 4<sup>th</sup> St. Bridge, structure number K-18-Z, has a Sufficiency Rating of 24 out of 100 and has become structurally deficient and functionally obsolete. Improvements will be made to enhance safety for motorists and pedestrians through new bridge construction and approach roadway modifications. Roadway alignment and profile improvements, structure replacement, drainage design, lighting, and urban design are part of the final overall strategy.

The existing bridge cross section consists of two substandard 11-foot traffic lanes, two 2-foot shoulders, and a 4-foot sidewalk in each direction. A concrete barrier separates the sidewalks from the travel lanes and a 4-foot wide median with a double-sided W-Rail barrier separates traffic directions. The heavily traveled 4-foot wide sidewalks on each side of the bridge are narrow and do not provide adequate passing width for both pedestrians and bicyclists

The bridge and roadway cross-section will be improved to accommodate current and future traffic demands on the 4<sup>th</sup> St. corridor. The new cross-section includes two 12-foot travel lanes, a 6-foot inside shoulder, a 10-foot outside shoulder, and a 10-foot wide multi-use sidewalk in each direction. The 10-foot wide outside shoulders will provide breakdown lanes on the bridge as well as accommodate high-speed bicyclists. The 6-foot wide inside shoulders will provide an overall width capable of accommodating an additional lane in each direction if needed for future demand. The overall width also allows for efficient traffic phasing during construction as discussed in Section 5. The wide multi-use sidewalks on each side provide adequate facilities for pedestrians and casual bicyclists without the need for crossing heavily traveled 4<sup>th</sup> Street (See Figure 1.1).



**Figure 1.1 Proposed Bridge Cross Section**

### 1.3 **Project Location**

Figure 1.1 shows the project location and existing 4<sup>th</sup> St. Bridge. The bridge is located in Pueblo, Colorado on 4<sup>th</sup> St. (SH96A) west of I-25 and downtown Pueblo between Midtown Circle Drive and Elmhurst Place. The bridge crosses a local city street connecting 4<sup>th</sup> St. to Midtown Center, the UPRR and BNSF railroad yard, the Arkansas River, and the Arkansas River Floodwall. Residential and commercial properties are located west of the bridge towards Abriendo Avenue. A handicapped fishing pier, trail system, and parking facility are also located on the west end of the bridge, along the river and on the western bluff. East of the bridge are primarily commercial and industrial properties. Railroad and power generation facilities are nearby and the Midtown Center mall is just north of the bridge at the east end. Downtown Pueblo is further to the east between Elizabeth Street and I-25. The project study limits are Elizabeth St. on the east and Abriendo Avenue on the west. It is anticipated that construction activities will be limited to the region between Midtown Circle Drive and W. Corona Avenue.

### 1.4 **Project Goals and Critical Issues**

Goals of the 4<sup>th</sup> St. Bridge Project include improving safety to motorists, pedestrians, and bicyclists on the bridge, increasing capacity, providing a higher functioning level of service, improving railroad clearances, and increasing load carrying capacity. Community and agency involvement in decision making related to project elements such as bridge, roadway, aesthetics, and urban design is key to the successful project. Critical project issues include:

- Railroad Safety Requirements (UPRR and BNSF)
- Access and Right of Way Restrictions
- Environmental Assessment and Mitigation
- Historical Assessment and Mitigation
- CDOT Schedule and Budget Constraints
- Aesthetics and Urban Design
- Community and Agency Involvement
- Maintenance of Traffic During Construction (4-lanes at all times)
- Alignment and Profile Improvements
- Access to Midtown Shopping Center
- Arkansas River Floodwall Considerations
- Coordination with Other Pueblo Projects  
(I-25 Reconstruction, Historic Arkansas Riverwalk Project (HARP),  
Downtown Access Study, Legacy Project)



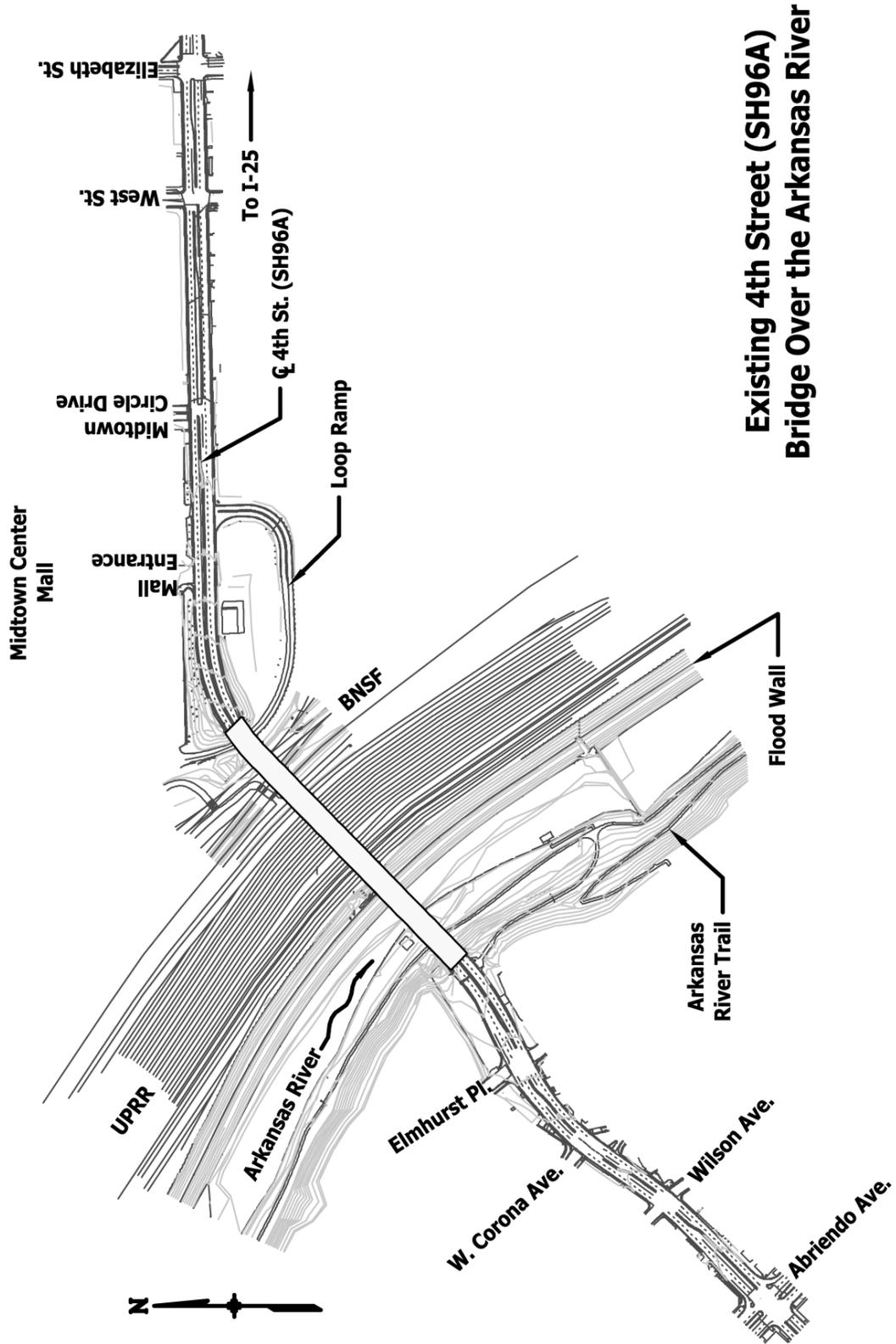


Figure 1.2 Existing Structure Site Location Map