1.0 PURPOSE AND NEED

This Environmental Assessment (EA) for the State Highway (SH) 82 Grand Avenue Bridge in Glenwood Springs, Colorado, describes the alternatives being considered for improvements within the study area, including the Proposed Action identified by the Federal Highway Administration (FHWA) and the Colorado Department of Transportation (CDOT). It also identifies potential impacts of the Proposed Action and mitigation for those impacts. This EA has been prepared in accordance with National Environmental Policy Act (NEPA) provisions and applicable regulations. As the lead agency for this Proposed Action, the FHWA is responsible for supervising the NEPA analysis. CDOT, as the project sponsor and co-lead agency, prepared the EA and documentation. The City of Glenwood Springs is a cooperating agency.

1.1 Project Context and Background

The SH 82/Grand Avenue Bridge is the gateway to Glenwood Springs, Glenwood Canyon, the Roaring Fork Valley, and Colorado's western slope communities. It serves local and regional travelers, the Glenwood Springs community, emergency responders, bicyclists, and pedestrians.

The SH 82 Grand Avenue Bridge is a vital regional and local link.

Plans to replace or rehabilitate the aging Grand Avenue Bridge extend back to the early 1990s. CDOT then initiated the project, but later deferred it due to lack of local support. In 2010, the City of Glenwood Springs (City), CDOT, Garfield County, and the Roaring Fork Transportation Authority (RFTA) completed the *SH 82 Corridor Optimization Plan* (COP) (City of Glenwood Springs et al, 2010), which describes potential strategies for improving mobility in the SH 82 corridor. The strategies included the widening of the Grand Avenue Bridge and improvements to the local street network and the I-70 interchange.

The replacement of Grand Avenue Bridge also is included in the *Glenwood Springs Comprehensive Plan* (City of Glenwood Springs, 2011). A transportation strategy in the plan states that the City should, "work with CDOT on the replacement of the Grand Avenue Bridge," and recognized that the bridge would need to accommodate four lanes of traffic.

The Grand Avenue Bridge is rated as "poor" and is considered functionally obsolete.

In 2009, the Colorado state legislature passed a bill to address the state's poorly-rated bridges. Funding Advancements for Surface Transportation and Economic Recovery (FASTER), or Senate Bill 108, created the Colorado Bridge Enterprise, a business entity within CDOT, with the purpose to finance, repair, reconstruct, and replace bridges designated as structurally deficient or functionally obsolete, and rated "poor" by CDOT. Bridges with a sufficiency rating less than 50 are considered structurally deficient and/or functionally obsolete and rated "poor." The Grand Avenue Bridge has a sufficiency rating of 43.2 because it has several structural deficiencies and is functionally obsolete. Revenue from vehicle registration fees allows Colorado Bridge Enterprise to replace or repair poor-rated bridges statewide, before they reach a stage where they have to be restricted or closed.

1.2 Project Scoping and Visioning

CDOT used the Context Sensitive Solutions (CSS) process established as part of CDOT's I-70 Mountain Corridor program to prepare the Grand Avenue Bridge EA. The guidelines provided a framework to consider the total context of the proposed project – not just the study's physical boundaries.

As part of the CSS process, a scoping and visioning process established the project Context Statement, project Purpose and Need, and project Critical Success Factors. The study team held an agency scoping meeting, a public scoping open house, and a visioning session to set the framework for developing the project's Purpose and Need. These meetings are described further in Chapter 5.0 *Agency Coordination/Public Involvement.*

The Project Leadership Team developed this Context Statement:

> *The Grand Avenue Bridge over the Colorado River, Interstate 70 and the railroad tracks, connects north and south Glenwood Springs, I-70 and State Highway 82, and the historic districts of downtown and the Glenwood Hot Springs.*
>
> *The bridge stands as a gateway to the city of Glenwood Springs, Glenwood Canyon, the Roaring Fork Valley, and Colorado's western slope communities. It serves local, regional and state travel, local commuters, emergency response, bicyclists and pedestrians.*
>
> *The soaring walls of Glenwood Canyon; the rich history of Glenwood Springs, built at the confluence of the Colorado and Roaring Fork Rivers; mining; tourism and recreation define a splendid and vivid context for the Grand Avenue bridge.*

The Project Leadership Team also developed Critical Success Factors that were reviewed throughout the visioning and scoping process. These were characteristics of the proposed project that were considered important to the stakeholders. A complete list of these Critical Success Factors is included in Appendix A.

Based on the project scoping and visioning, and the Context Statement and Critical Success Factors, the project Purpose and Need were established.

1.3 Project Purpose

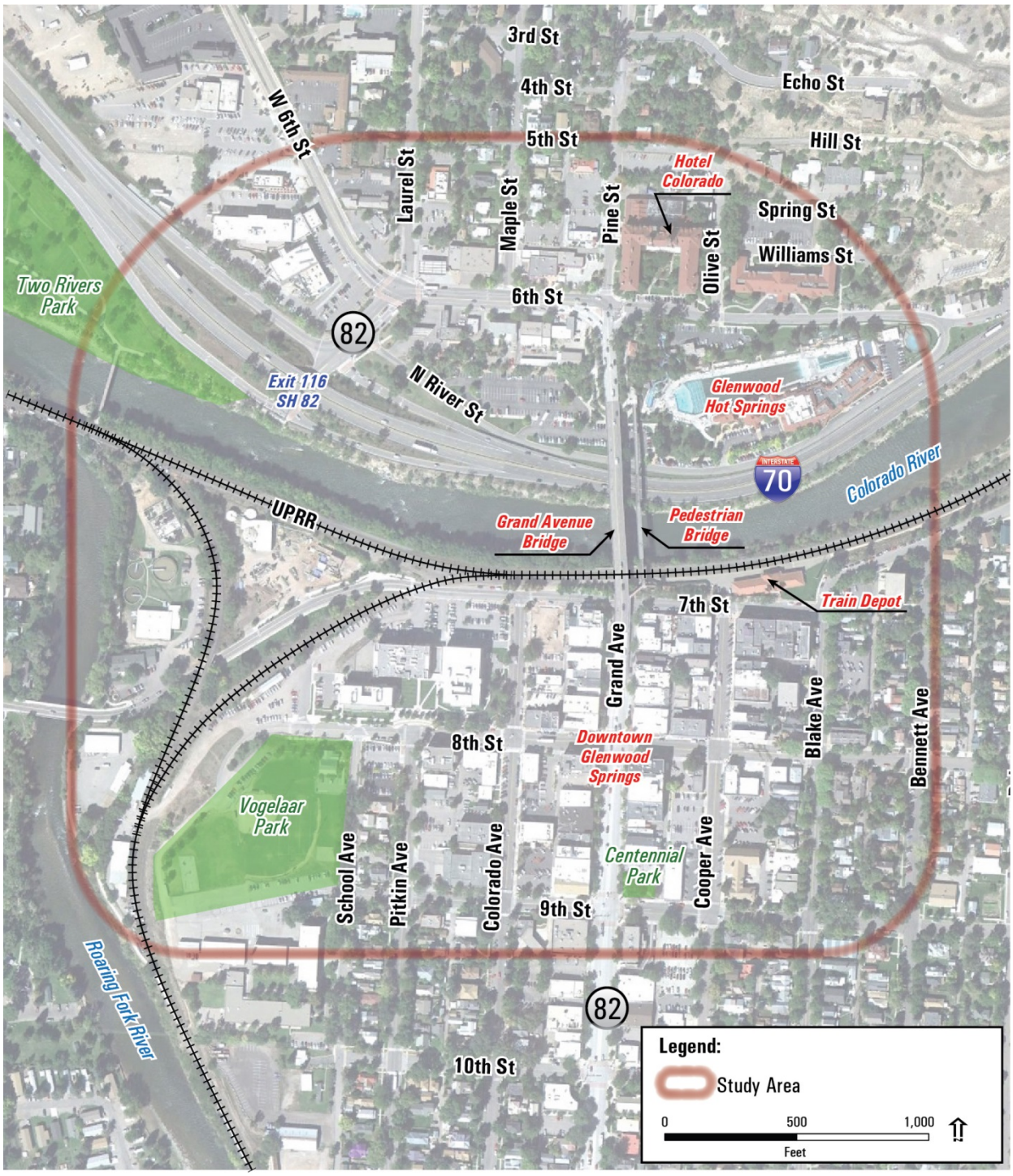
The Grand Avenue Bridge serves as a vital link of SH 82 across the Colorado River, I-70, and the Union Pacific Railroad (UPRR), connecting downtown Glenwood Springs and the Roaring Fork Valley with the historic Glenwood Hot Springs, Hotel Colorado, and I-70. The purpose of the project is to provide a safe, secure, and effective multimodal connection from downtown Glenwood Springs across the Colorado River and I-70 to the historic Glenwood Hot Springs area. The study area is presented in Figure 1-1, and the regional context is presented in Figure 1-2.

1.4 Project Needs

The importance of the bridge to the local and regional transportation network underscores the following two project needs:

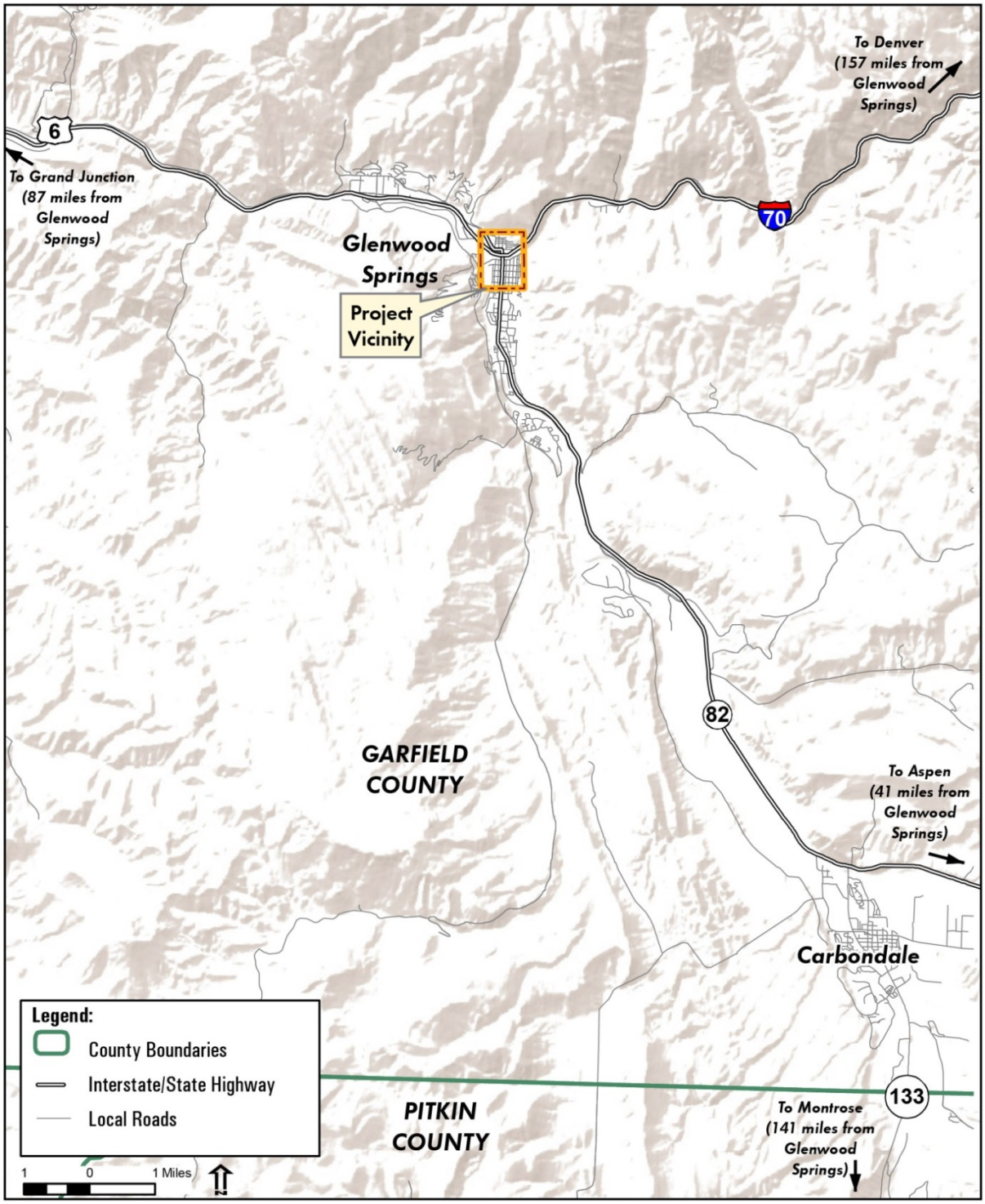
- Improve multimodal connectivity between downtown Glenwood Springs and the Roaring Fork Valley with the historic Glenwood Hot Springs pool area and I-70.
- Address the functional and structural deficiencies of the bridge.

FIGURE 1-1. STUDY AREA



Source: Jacobs, 2014.

FIGURE 1-2. REGIONAL CONTEXT

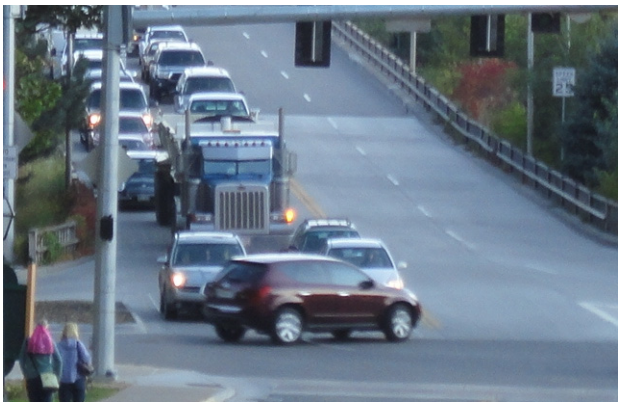


Source: Jacobs, 2014.

1.4.1 Improve Multimodal Connectivity

NEED: Improve multimodal connectivity between downtown Glenwood Springs and the Roaring Fork Valley with the historic Hot Springs pool area and I-70.

Multimodal connectivity describes the extent to which transportation infrastructure permits (or restricts) movement of people and vehicles in different directions. The Grand Avenue Bridge and the pedestrian bridge connect the Glenwood Hot Springs and Hotel Colorado area to the core downtown commercial corridor located south of the bridge along Grand Avenue. However, the condition of the bridges discussed below impairs this connection for a variety of transportation users.


A truck taking up both lanes on the bridge worsens traffic congestion.

The lack of sufficient alternate routes underscores the need to improve the Grand Avenue Bridge multimodal connection between downtown, the Hot Springs pool area, and I-70. The closest alternate routes across the river and I-70 are Devereux Road and Midland Avenue (Exit 114). Devereux Road does not cross the UPRR tracks, and Midland Avenue is more than 2.3 miles west of the Grand Avenue Bridge. Midland Avenue does not directly connect the downtown core area with the Glenwood Hot Springs area. No other alternate routes are currently planned or under construction.

Narrow Lanes

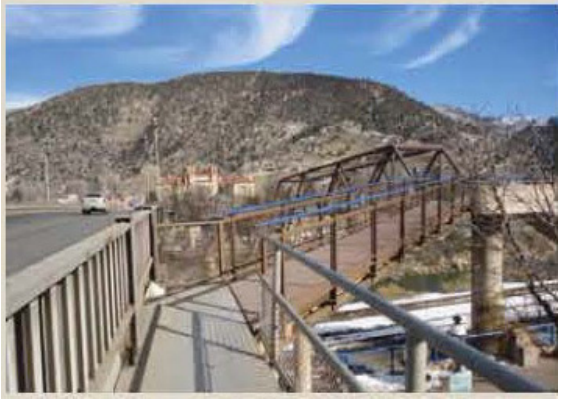
On the bridge, the lanes are a substandard width (9 feet 4 inches instead of the standard 12 feet) and there are no shoulders. These conditions impair the ability of the bridge to provide connectivity. Vehicle safety and mobility are impaired because they:

- Force larger vehicles (transit buses, emergency service vehicles, oversized passenger vehicles, etc.) to cross over into the second lane, occupying two full lanes of traffic.
- Create an unnerving environment for drivers.
- Limit drivers' ability to make emergency maneuvers.
- Hinder the response time of emergency service vehicles. The narrow lanes make it difficult for emergency response vehicles to pass other vehicles on the bridge without entering into oncoming traffic. Narrow lanes also delay emergency response times because there is limited space for vehicles to pull to the side of the bridge and yield.

Inadequate Pedestrian/Bicycle Facilities

Existing conditions limit pedestrian and bicyclist connectivity. When it was built in 1953, the Grand Avenue Bridge had sidewalks on both sides. After the bridge was converted from two travel lanes to four lanes and the sidewalks were removed, the City constructed a pedestrian bridge next to the Grand Avenue Bridge for pedestrians.

The pedestrian bridge was completed in the mid-1980s, and was not built to be accessible according to current Americans with Disabilities Act (ADA) standards. A 250-foot-long ramp is the only non-stair access to the pedestrian bridge, which is located to the east of the roadway bridge. The width of the ramp is generally 4 feet except where light posts narrow the width to 3.5 feet in several locations, the slope exceeds 5 percent for more than half of the bridge length, and there are no landings.



The existing pedestrian bridge does not meet the requirements of the Americans with Disabilities Act.

CDOT is a multimodal transportation agency, and part of its mission is to consider the needs of all users during facilities planning, design, and operation. CDOT Policy Directive 1602.0 (CDOT, 2009) states, "It is the policy of the Colorado Transportation Commission to provide transportation infrastructure that accommodates bicycle and pedestrian use of the highways in a manner that is safe and reliable for all highway users. The needs of bicyclists and pedestrians shall be included in the planning, design, and operation of transportation facilities, as a matter of routine."

Traffic Congestion

Future traffic increases will worsen the Grand Avenue Bridge's ability to provide connectivity. In 2006 and 2007, CDOT and the City produced 2030 travel demand forecasts for the *SH 82 Corridor Optimization Study* (City of Glenwood Springs, 2007) and in 2010 for the *SH 82 Corridor Optimization Plan* (City of Glenwood Springs et al, 2010). As a result of the coordination and input at that time, a 2 percent annual growth rate was agreed upon for evaluating future travel demand and improvements on the SH 82 corridor. (The growth rate in traffic from 1988 to 2006 was actually closer to 4 percent per year.) Traffic growth of 2 percent per year would result in increased congestion on the bridge and its connecting streets.

Traffic growth of 2 percent per year would result in increased congestion on the bridge and its connecting streets.

The forecasts developed for the *SH 82 Corridor Optimization Plan* were used in this EA's traffic analyses because the study team determined that they now represent a reasonable estimate of 2035 traffic forecasts, considering the recent economic downturn and corresponding reduction in traffic along SH 82 through Glenwood Springs. Section 3.2 *Transportation* provides more detail on the transportation forecasts and analysis performed for this EA.

1.4.2 Address Functional and Structural Deficiencies of the Bridge

NEED: Address the functional and structural deficiencies of the bridge to improve public safety, including emergency service response, and reliability as a critical transportation route.

The existing Grand Avenue Bridge was constructed in 1953 as a two-lane bridge with a sidewalk on each side of the bridge. In 1969, the sidewalks were removed to add two additional lanes. Originally designed for a 50-year lifespan, the 61-year-old bridge has been identified with numerous problems that require either major rehabilitation or replacement.

Functional Deficiencies

Based on a bridge inspection and report prepared in 2013 (CDOT, 2013), CDOT classified the bridge as "functionally obsolete." This classification is the result of geometric deficiencies, all of which must be corrected for the bridge not to be considered functionally obsolete.

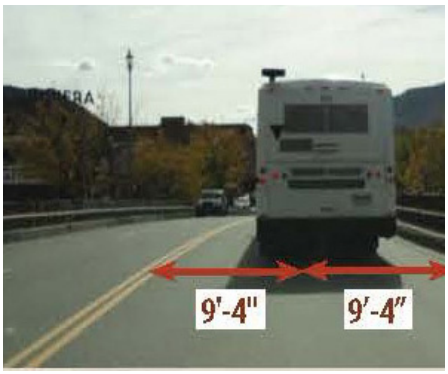
- Bridge width is too narrow to accommodate four standard lane widths.
- Vertical clearances are substandard at 7th Street and the UPRR tracks.
- Horizontal clearances are substandard because of the location of bridge piers related to I-70 travel lanes.

What is a "functionally obsolete" bridge?

A functionally obsolete bridge is one that was built to standards that are not used today. These bridges are not automatically rated as structurally deficient, nor are they inherently unsafe. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand or to meet the current geometric standards.

- The bridge is "scour critical," which means the bridge foundations have been determined to be unstable under certain scour (erosion) conditions. Specifically, erosion has been observed below the concrete footing that supports the piers in the river. Hydraulic analysis has determined the bridge to be unstable at flow rates below a 500-year flood event.

Bridge Width. When the bridge was converted to four lanes, the lane widths had to be narrowed. The existing lane widths are 9 feet 4 inches that narrow down from 11-foot-wide approach lanes at the south end of the bridge. Standard state highway lane widths are 12 feet. In addition, there are no shoulders on the bridge. The bridge inspection rating for bridge width is 2 out of 9.

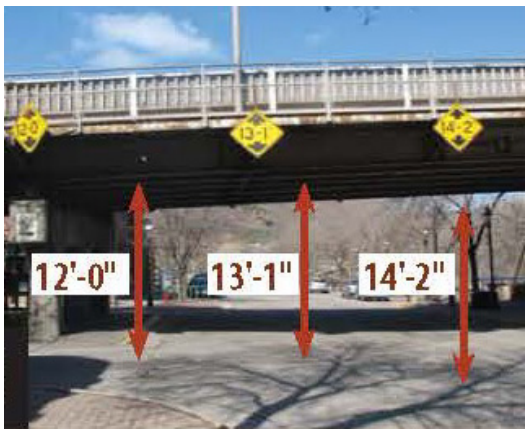


Converting the bridge to four lanes narrowed the lanes to a substandard width.

Vertical Clearances at the UPRR and 7th Street. The existing bridge crosses over the UPRR with a vertical clearance of 22 feet 6 inches. While some crossings exist and operate acceptably with less vertical clearance, the minimum vertical clearance for a grade-separated crossing of a railroad, per federal regulations, is 23 feet 0 inch. The existing vertical clearance over the UPRR is 6 inches less than required, which makes it substandard according to both the federal and American Railway Engineering and Maintenance of Way Association (AREMA) requirements, along with being 10 inches less than the UPRR minimum guidelines. The existing impaired clearance restricts the movement of specific railcar types and high-wide loads, and impacts railroad maintenance activities.

The existing bridge's vertical clearance from 7th Street to the bottom of the bridge girders varies from 12 feet to 14 feet 2 inches. Current standards require a bridge to have a clearance of 14 feet 6 inches over local streets. The combined rating for the two bridge vertical clearances is 3 out of 9.

UPRR standards and federal regulations require an additional 10 inches in vertical clearance over railroad tracks.



The bridge girders have been damaged by tall vehicles on 7th Street passing under the low bridge.

Pier Locations Related to I-70 Travel Lanes. The Grand Avenue Bridge piers are located less than 6 feet from the I-70 travel lanes. Also, the on ramp to eastbound I-70 and the westbound I-70 deceleration lane are too short and cause issues for merging and diverging traffic. The location of the bridge piers constrains these lanes and the ability to address these issues. These deficiencies resulted in an appraisal rating of 3 out of 9.

I-70 eastbound.

I-70 westbound.

Risk of bridge closure. There is potential that further deterioration of the bridge or damage to the bridge as a result of a collision could result in emergency closures for repairs. An emergency short- or long-term closure of the bridge would result in substantial travel impacts for local and regional SH 82 users, and could impact I-70 traffic. Depending on the types of repairs, traffic could be delayed intermittently or detoured completely. A full closure of I-70 would mean a 141-mile detour through Craig and Meeker via SH 13, US 40, and SH 131.

As mentioned in Section 1.4.1 *Improve Multimodal Connectivity*, the closest alternate SH 82 routes across the river and I-70 are Devereux Road and Midland Avenue (Exit 114). Neither of these routes has the capacity to adequately accommodate traffic volumes.

In addition, a bridge closure would delay emergency response to the residents and commercial entities located north of the Colorado River from the emergency service providers and facilities located south of river (Glenwood Springs Police Department, Glenwood Springs Fire Department, Garfield County Sheriff's Office, and Valley View Hospital).

Merging distance onto I-70 eastbound. The piers next to the eastbound I-70 shoulder limit the length of the on ramp and the merge/taper area, creating a short distance to merge onto I-70 eastbound. The current distance from the end of the ramp to the bridge piers is approximately 300 feet, making the acceleration/merge area less than 150 feet. This is about half of the current standard, which is a minimum of 300 feet of acceleration distance for a design speed of 50 mph.

Bridge Piers and Footings Susceptible to Scour. The predicted scour depth for a 100-year flood event for the pier in the river is over three feet below the footing. A recent hydraulic assessment found the bridge to be "scour critical," meaning that the bridge foundations have been determined to be unstable for assessed, calculated, or observed scour conditions (AMEC, 2014). Specifically, erosion has been observed below the concrete footing that supports the piers in the river. The bridge needs to be monitored closely during and after a high water event or closed if monitoring is not feasible. In addition, the hydraulic analysis determined that the bridge is unstable at flow rates below a 500-year flood event. CDOT's 2013 bridge inspection report (CDOT, 2013) rated the bridge's piers and abutments a 6 out of 9 because the piers were showing deterioration, corrosion, and exposed reinforcing steel. Figure 1-3 illustrates the existing bridge pier scour.

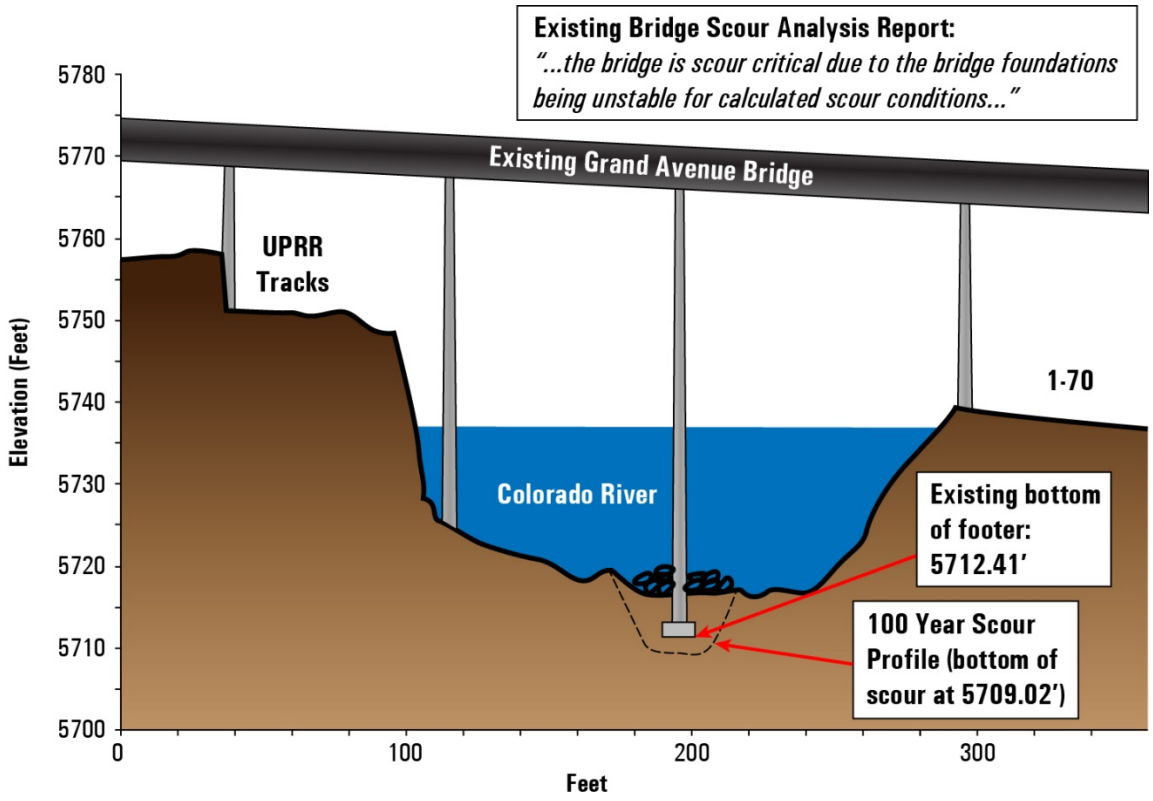
The bed material that supports the pier footings erodes, particularly in years of high water flows, compromising the piers over time.

Structural Deficiencies

Load Carrying Capacity. The existing bridge load carrying capacity is 55 percent of new bridge design standards. The bridge was designed in 1953 for two lanes of traffic using standards at the time. Current standards for a four-lane bridge require significantly more capacity. The bridge load capacity is substandard, but not low enough to require limiting loads or use by legal roadway traffic. The noted load carrying capacity of 55 percent of new bridge design standards is relative to frequent common loads that a bridge experiences. The bridge is capable of carrying higher loads on an infrequent basis, but this bridge frequently carries loads higher than intended for its original design, particularly because it serves as the main route for heavy vehicles.

The existing bridge load carrying capacity is 55 percent of new bridge design standards.

FIGURE 1-3. EXISTING BRIDGE PIER SCOUR



Source: AMEC, 2014.

Other Structural Issues. The 2013 bridge inspection reported other issues with the bridge's condition, including:

- Substandard bridge rail.
- Deterioration of the concrete curbs and piers, exposing reinforcing steel in places.
- Corrosion on the railing, girders, and bridge supports.