



# US 50 Blue Mesa Bridges ER Project





# Introduction

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CDOT - Region 3 Transportation Director  
24 years with CDOT

**Jess Hastings, PE**

Benesch - Colorado Division Manager  
18 Years w/ Benesch





# FHWA Action

## T1 Steel Butt Weld Investigation and Testing

On December 31, 2021 FHWA issued the Action: To inventory, test all welds, and mitigate any rejectable indications of All Non-Destructive Testing of Fracture Critical Members Fabricated from AASHTO M244 Grade 100 (ASTM A514/A517) Steel (T1 Steel).

FHWA Deadline for state compliance: March 31, 2024.



May 11, 2021 a fracture was discovered in one of the main span tension ties at the location of a butt weld in the I-40 Hernando de Soto Bridge, Arkansas/Tennessee.



# Blue Mesa Bridges - General Information



**K-07-A**

- US 50 over the Lake Fork at mile marker 132.69
- 6 Span, Continuous Composite Welded Girder bridge. 993ft, 300ft max span
- Spans 3, 4, and 5 are Non-redundant Steel Tension Members (NSTM).
- 2 total lanes, 1 lane each direction
- Built 1963, FAIR Condition



**Built 1963**



**K-07-B**

- US 50 over the Blue Mesa Reservoir at mile marker 136.16
- 10 Span, Continuous Composite Welded Girder bridge. 1,532ft, max span 360ft
- Spans 5, 6, and 7 are Non-redundant Steel Tension Members (NSTM).
- 2 total lanes, 1 lane each direction
- Built 1963, FAIR Condition



# Blue Mesa Bridges - Existing Structure

- The bridges are composed of 100 ksi T1 Steel built-Up (welded) members and is a NSTM (Non-Redundant Steel Tension Member) bridge



Two Girder Line System



Pin and Hanger



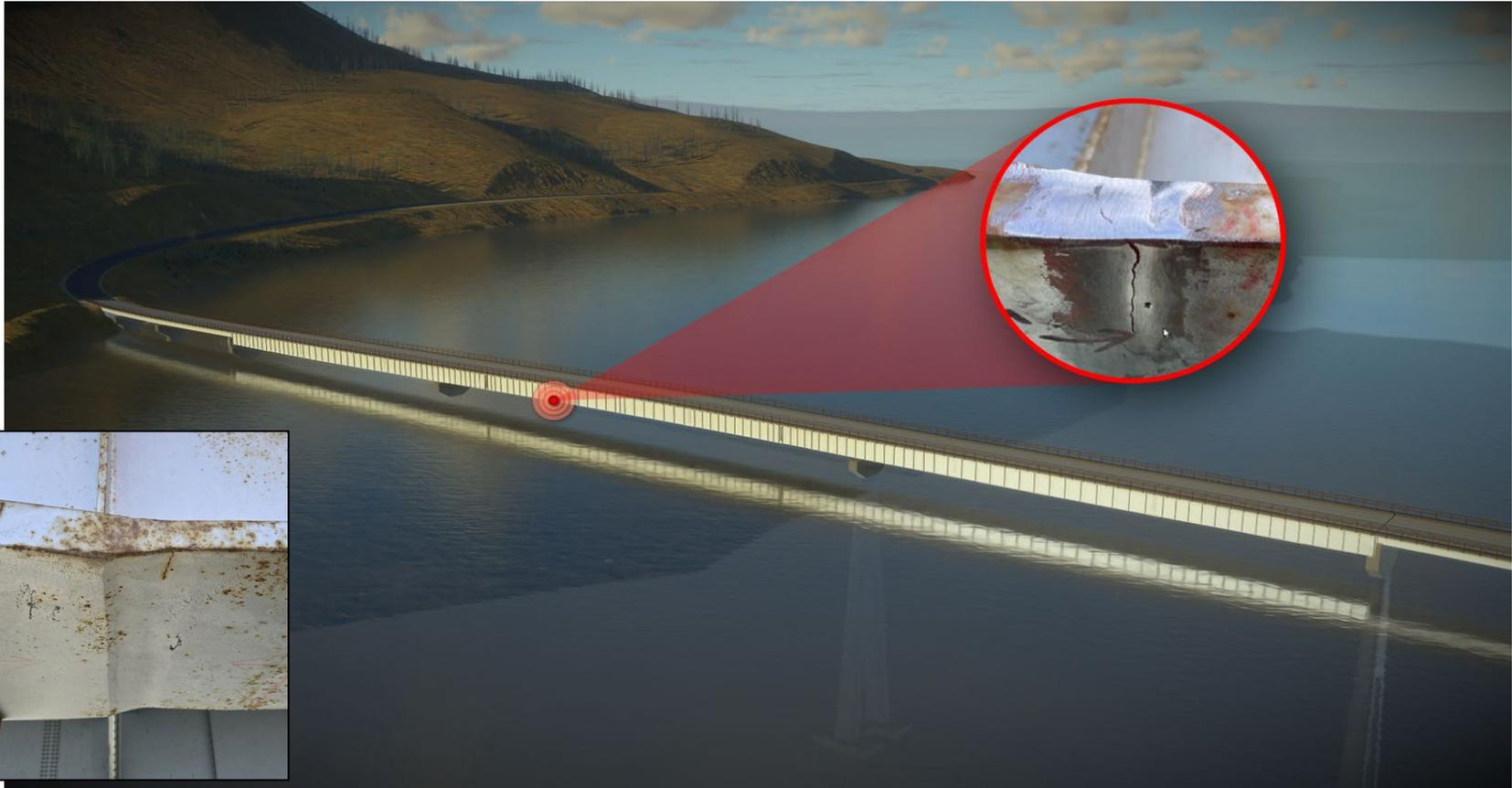
Span 5 = 270'

Span 6 = 360'

Span 7 = 270'



# Bridge K-07-B (Middle Bridge) 1st Determined Crack Span 6



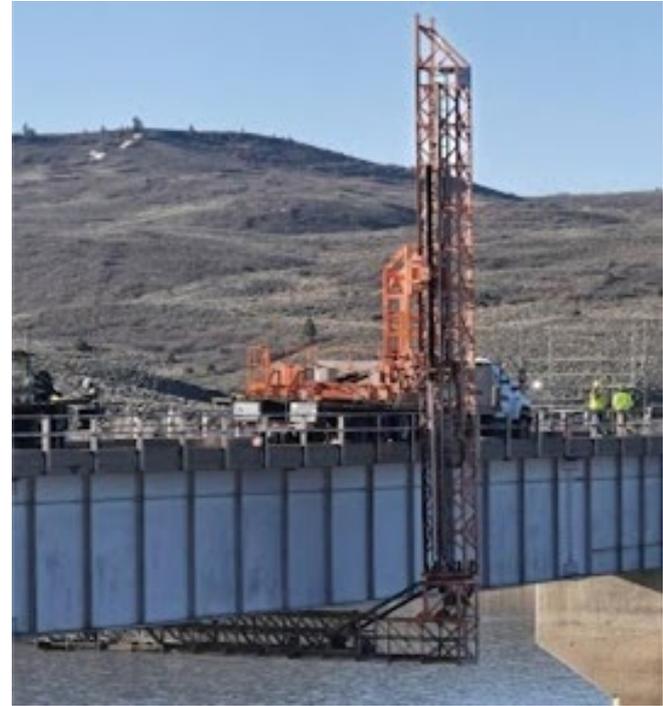


# Middle Bridge Span 6 - Ropework Inspection



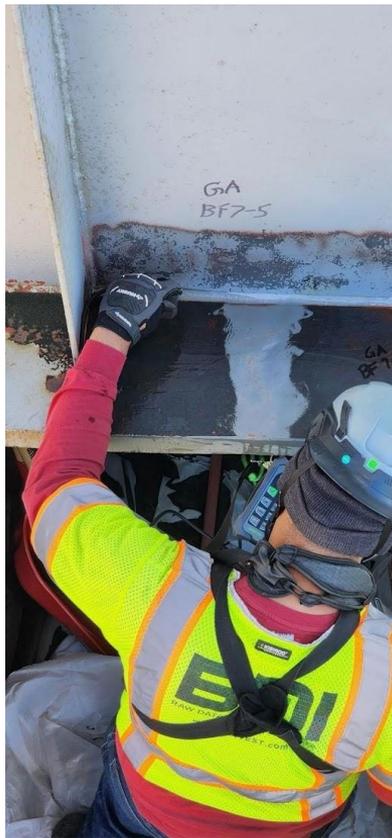


# Middle Bridge Spans 5 & 7 - Truck Access





# Middle Bridge Ultrasonic Testing (UT)





# Weather Conditions & Safety Aspects

US 50 @ Blue Mesa Reservoir				
	Hi Temp	Low Temp	Winds	Precipitation
Wednesday, May 1	63	29	14	50% chance of precipitation
Thursday, May 2	57	27	18	6% chance of precipitation
Friday, May 3	62	28	20	1% chance of precipitation
Saturday, May 4	65	32	10	24% chance of precipitation
Sunday, May 5	67	30	18	23% chance of precipitation
Monday, May 6	49	30	23	24% chance of precipitation
Tuesday, May 7	57	29	22	22% chance of precipitation

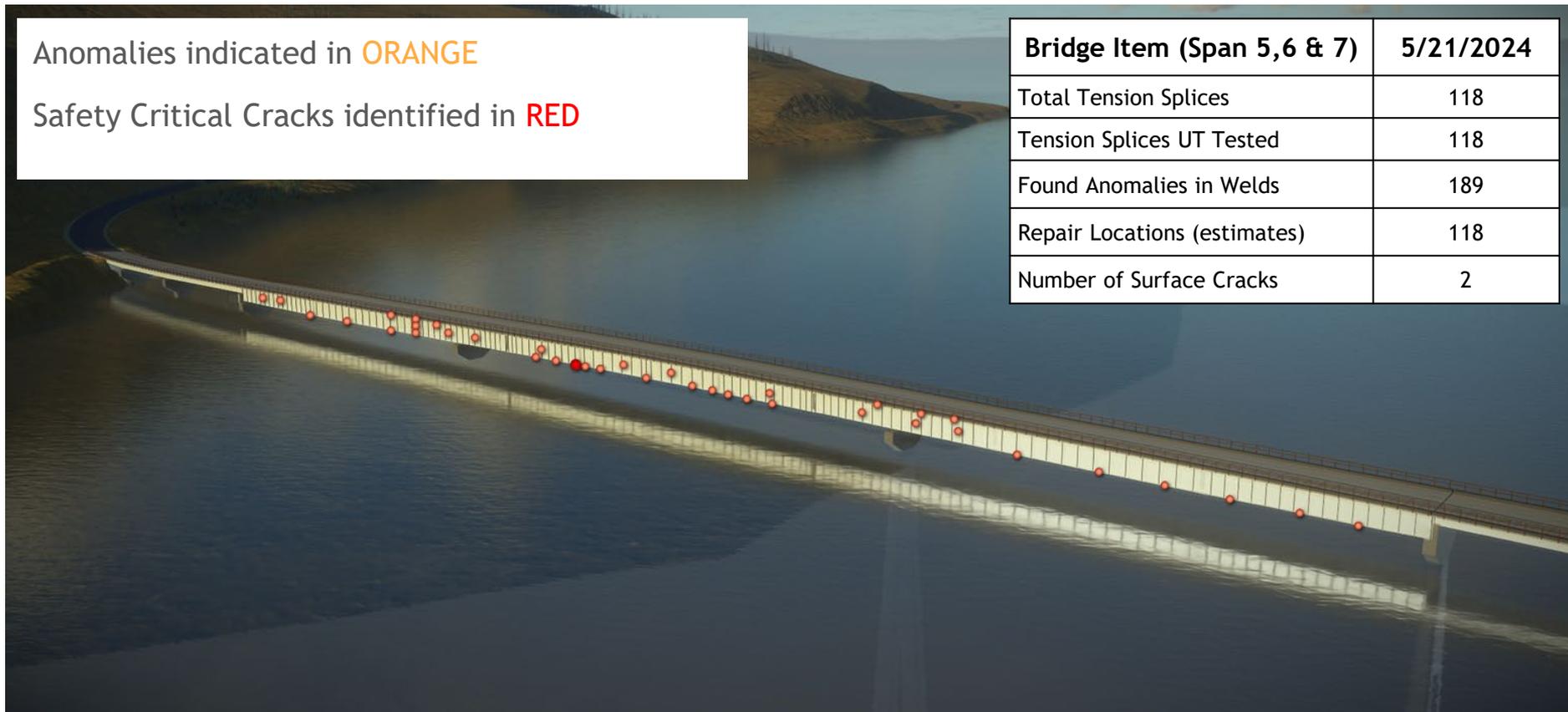


# Blue Mesa Middle Bridge Defects

Anomalies indicated in **ORANGE**

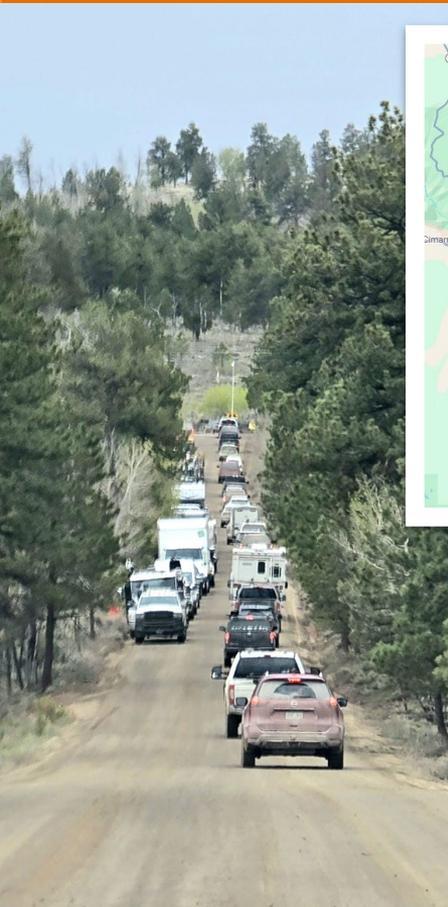
Safety Critical Cracks identified in **RED**

Bridge Item (Span 5,6 & 7)	5/21/2024
Total Tension Splices	118
Tension Splices UT Tested	118
Found Anomalies in Welds	189
Repair Locations (estimates)	118
Number of Surface Cracks	2

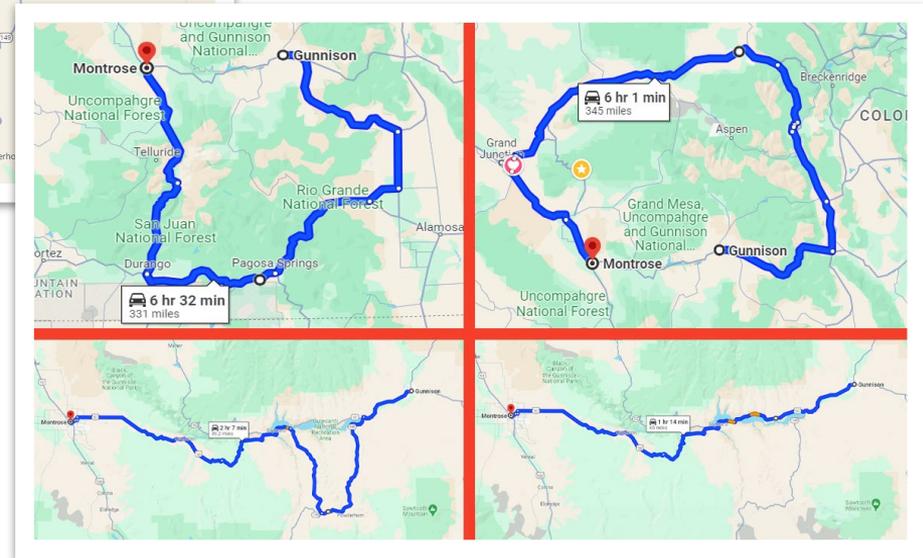




# Impact to Community



Shut Down Bridge  
Blue Mesa Cutoff – CR 25  
Lake City Cutoff – CR 26  
Both County Roads connect US50  
to SH149





# Response Goals

- Overall Goal: Safety
  - Site safety (workers, weather, communications)
  - Public safety
- Short-Term Goal
  - Facilitate emergency ambulance service on bridge
- Mid-Term Goal
  - Facilitate local traffic on a small interval basis
- Long-Term Goal
  - Structural integrity of structure for legal loads



# Evaluated Repair Options

Options	Descriptions	Sketches	Risks or unknowns	Schedule <sup>1,2</sup>	Relative cost <sup>1</sup>
Local Plating	<ul style="list-style-type: none"> <li>Using localized splice plates in the area of indications on the exterior of bottom flange to splice over the indication</li> <li>Least Quantity of Material Required</li> </ul>		<ul style="list-style-type: none"> <li>Increases complexity if additional defects are later found.</li> <li>Relative costs increase with the number of defects found.</li> </ul>	1 – 3 Months	\$ - \$\$\$
Suspended Span Bottom Flange Only	<ul style="list-style-type: none"> <li>Adding cover plate(s) to the bottom face of the bottom flange for the entire length of the suspended span</li> </ul>		<ul style="list-style-type: none"> <li>Material availability</li> <li>Does not address any additional finds outside of suspended span.</li> <li>Effect of weight on pin and hanger and cantilever</li> </ul>	2-4 Months	\$\$-\$\$\$
Global Plating All high strength tension flanges including negative moment region	<ul style="list-style-type: none"> <li>Plates are added to the tension side of span 5-7 on the top flange and bottom flange</li> <li>Local Plating of web welds (as Required)</li> <li>Would require partial deck removal in areas of top flange plating</li> <li>Provides redundancy for girders</li> </ul>		<ul style="list-style-type: none"> <li>Material availability</li> <li>Sequence of construction</li> <li>Negative effects of additional weight</li> <li>Schedule risk due to design complexity</li> </ul>	4-7 Months	\$\$\$
Superstructure Replacement	<ul style="list-style-type: none"> <li>Replace spans 5-7 with a new superstructure on existing piers</li> <li>Removes Non-Redundant Structure from the Bridge Inventory</li> </ul>		<ul style="list-style-type: none"> <li>Long material lead times</li> <li>Strength and condition of existing piers and foundations.</li> </ul>	6-12 Months	\$\$\$\$
Full Bridge Replacement	<ul style="list-style-type: none"> <li>Replace two girder bridge spans 5-7 and foundations with new Continuous multi girder (4) Bridge.</li> </ul>		<ul style="list-style-type: none"> <li>Environmental, geotechnical, and other considerations</li> </ul>	>12Mo	\$\$\$\$\$

1. Schedule and cost are relative estimates, should be evaluated by Contractor.

2. Schedules are dependent on inspection findings, material availability, and weather.





# Blue Mesa Middle Bridge Global Repairs



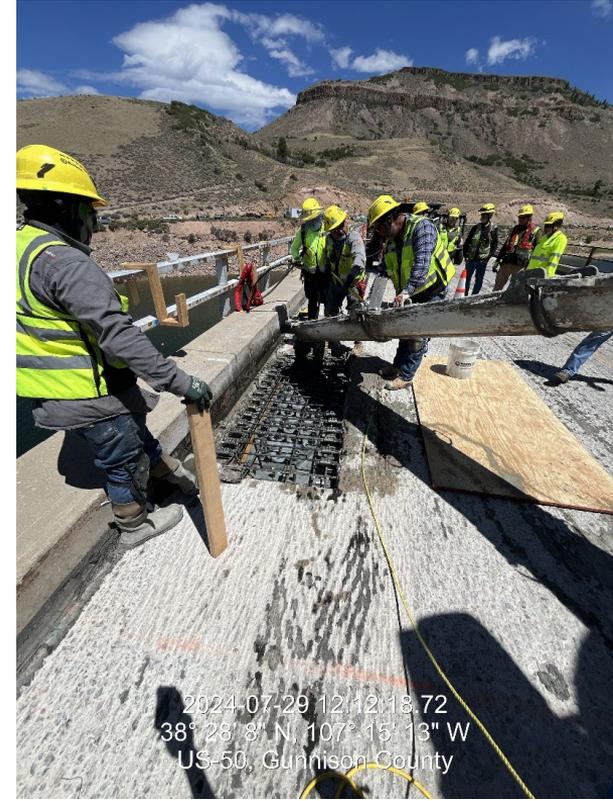
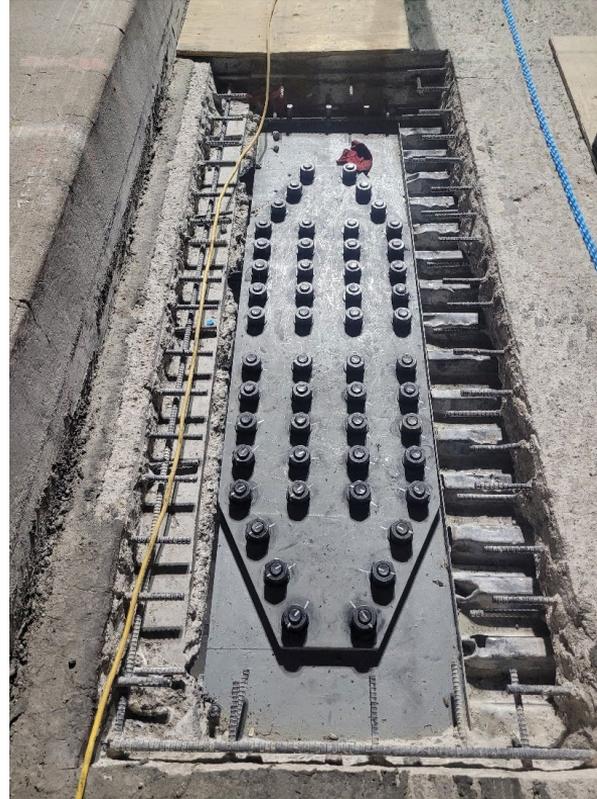


# Blue Mesa Middle Bridge Global Repairs





# Blue Mesa Middle Bridge Top Flange Repairs



2024-07-29 12:12:18.72  
38° 28' 8" N, 107° 15' 13" W  
US-50, Gunnison County



# Milling, expansion devices, poly overlay



- Reduce weight
- Waterproof deck



# Key Milestone Dates/Timeline

April 8, 2024	Inspection of Middle Bridge
April 11, 2024	Finding was reported on Middle Bridge from inspectors
April 18, 2024	In-depth Inspection using Ultrasonic Testing (UT) of the butt weld resulted in <b>full closure of Middle bridge to all traffic (FHWA &amp; CDOT)</b>
April 22, 2024	County Road 26 was opened for limited traffic crossings
April 23, 2024	Governor issued a Disaster Emergency Declaration
July 3, 2024	Middle Bridge open to limited traffic (Emergency and passenger vehicles)
July 25, 2024	County Road 25 improvements completed
July 29, 2024	Began mitigation work on Lake Fork Bridge
October 16, 2024	Middle Bridge open to all traffic without traffic control
* December 2024	Lake Fork Bridge Open without traffic control



# Emergency Declaration

- **Governor Issued a State Disaster Emergency Declaration on April 23, 2024.**
  - It allows State agencies to quickly respond to needs of citizens, reassign personnel, and deploy vehicles, trucks, and equipment to respond to the incident.
- A Federal Disaster Emergency Declaration was never issued
  - Not a natural disaster
  - Work was classified as asset repair since the structure remained standing
- CDOT Chief Engineer Stefanik approved Emergency Contracting Procedures
  - This allowed a quick/streamlined process to bring on a contractor not using the typical low bid system



# Financial

- No Federal Participation to date though state is actively pursuing retroactive grants
- CDOT had to develop a financial plan to make the necessary improvements/repairs to the structures
  - \$30M from Transportation Commission Reserve Funding
  - \$96M Bridge and Tunnel Enterprise (BTE)
  - **Approximate Total Cost \$126M**
- USDOT signed letter of No Prejudice under the Bridge Investment Program (BIP) dated effective July 30, 2024
  - This allowed CDOT to apply for Federal BIP Grant for work that is completed after the effective date.
  - CDOT is applying for \$100M of BIP Grant funding



# Keys to success

- Communication, Communication, Communication!
- Commitment to the goals and success of the project
- Knowledgeable and experienced team of experts
- Cooperation with Key Stakeholders (Other agencies, etc.)
- Partnership with Gunnison County



# Facts & Acknowledgements



## Project Team

- CDOT Region 3 & Staff Bridge
- Kiewit Infrastructure Co.
- Michael Baker International
- Benesch
- BDI
- Stantec

- 410 tons of added plate steel
- 51,504 bolts