BUILDING STRONGER CDI together COMMUNITIES

BRIDGE OVER FRENE CREEK

HERMANN, MO

Dennis Heckman, PE

MoDOT

PURPOSE & NEED

- 92 year old bridge

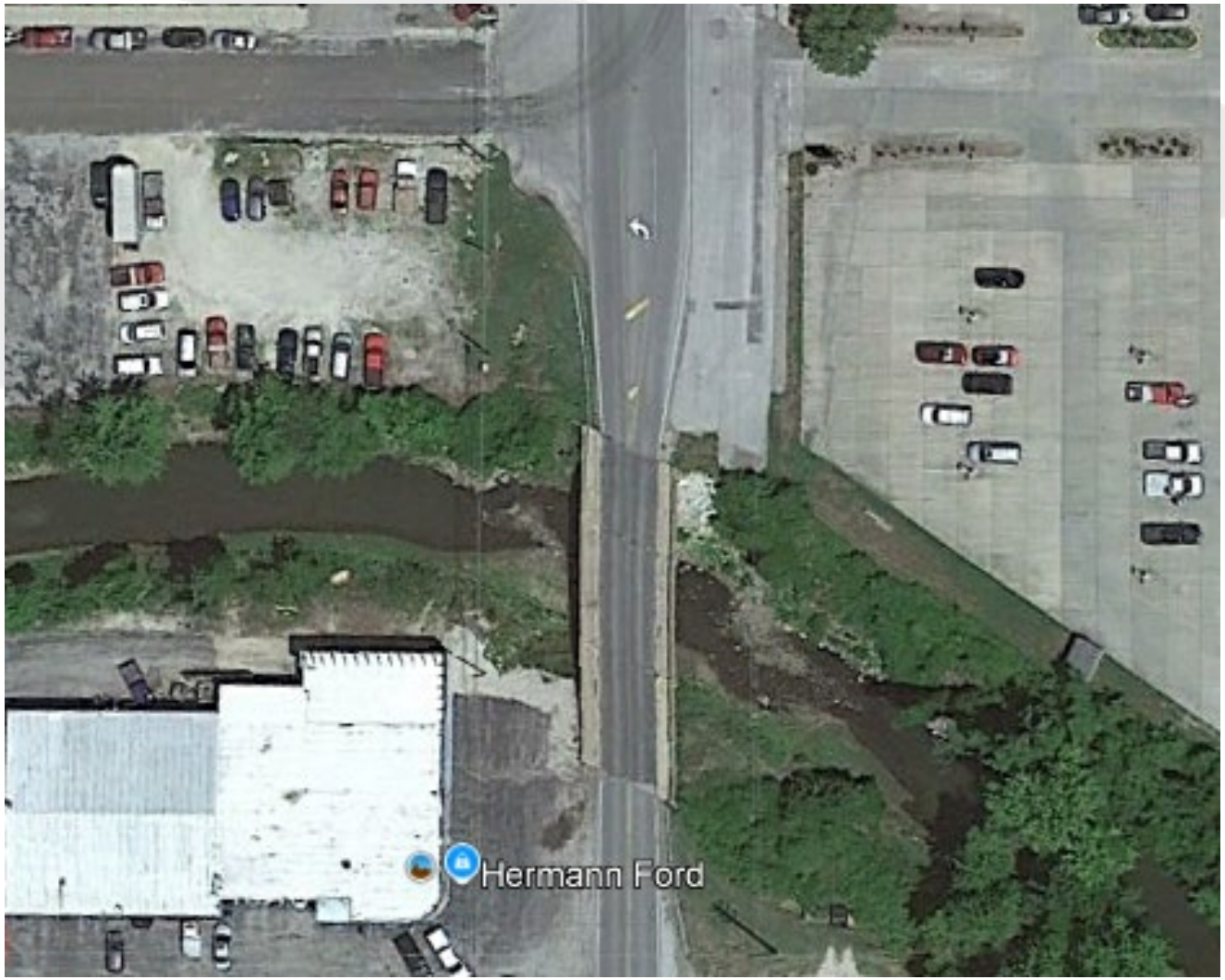
PURPOSE & NEED

- 20’ Roadway Width
- Non-compliant sidewalks
- Very Rough Condition

PURPOSE & NEED

Roadway Width

- 100’ North of Bridge
- 20’ on the Bridge
- 24’ South of Bridge



OPTIONS CONSIDERED

1

Reconfigure or Rehab

2

Superstructure Replacement

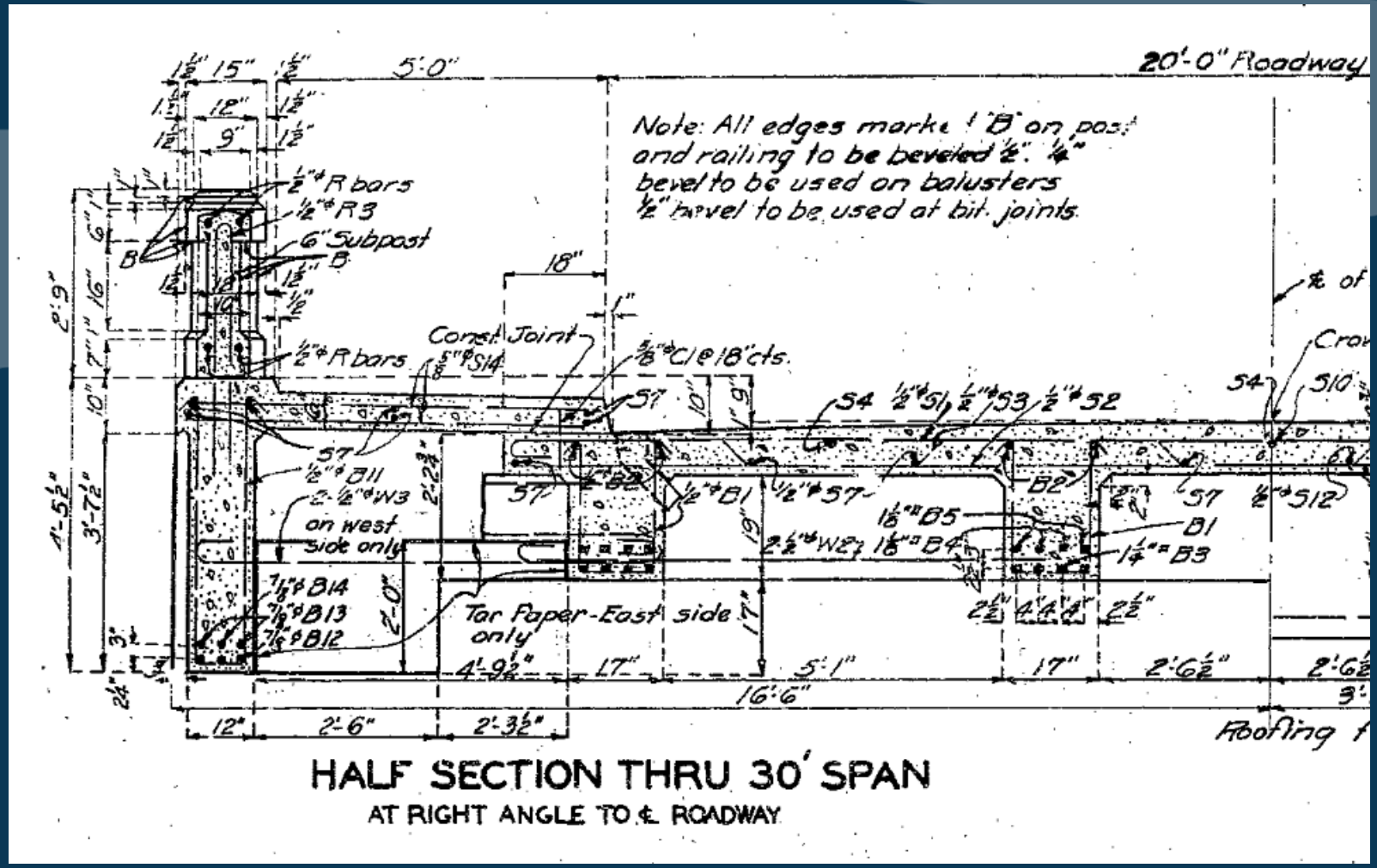
- Two or three spans

3

New Bridge

- Single or three spans

RECONFIGURE OR REHAB



SUPERSTRUCTURE REPLACEMENT

General items

- Substructure in good condition.
- No load posting.
- New steel superstructure would be lighter than existing.

Number of Spans

- Three Spans would be most straight forward.
- Two spans was considered to improve hydraulics; however, it would increase load too much on one existing intermediate bent.

Types of Girders

- Prestressed Concrete was ruled out due to desire to reduce dead loads.
- Steel Wide Flange and Press Brake Tub Girders.

NEW BRIDGE

General items

- Would provide longest service life.
- Would require environmental and geotechnical investigations.
- Would not address overtopping of roadway and bridge without a very large investment.

New Three Span Bridge

- Would be hard to miss existing substructure piling.
- Would not improve hydraulics much.

New Single Span Bridge

- Would improve hydraulics.
- Would require even more of a raise in grade.

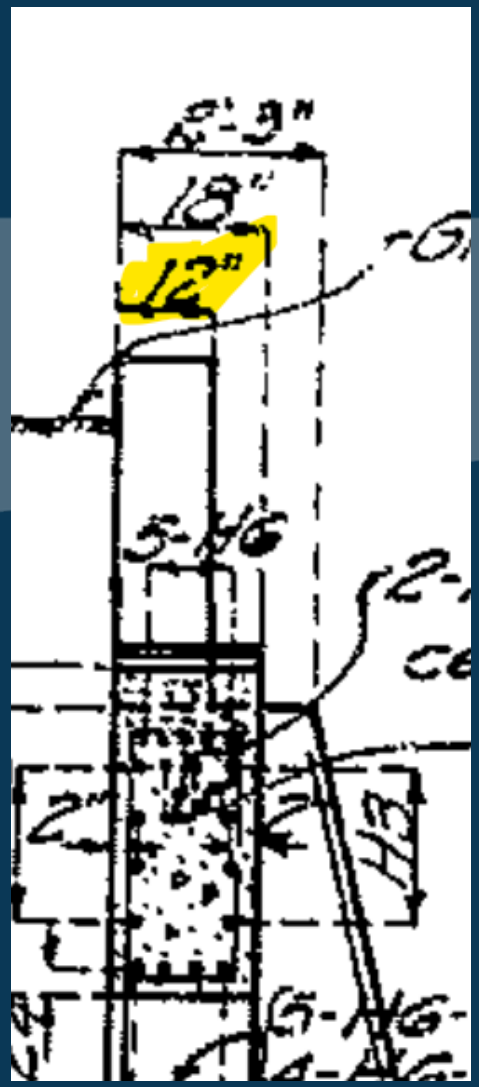
OPTION CHOSEN

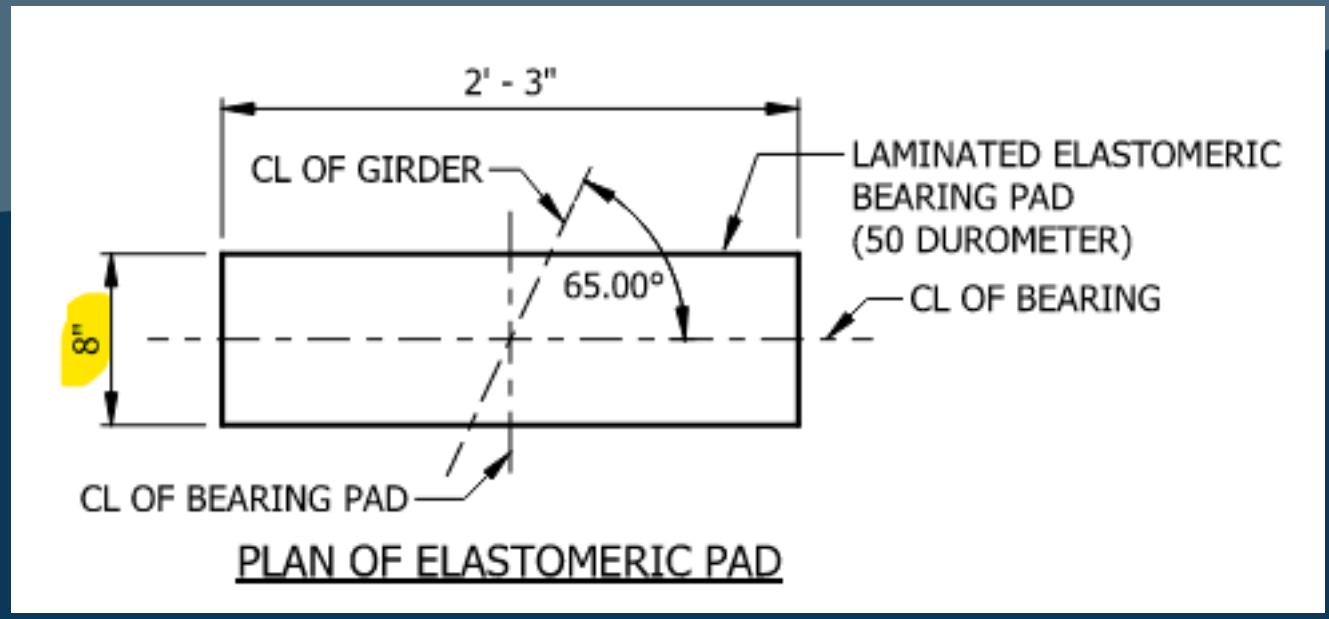
- Core Team's Ideal Choice was a New Single Span Bridge
  - MoDOT Geotech was asked to determine spill slopes.
  - Even without new borings, it became apparent that spill slopes would be flatter than existing.
  - This would lead to an unacceptable raise in grade.
  - It would also not address the flooding concerns without raising the grade several feet, which would heavily impact local businesses and be very expensive.

- First Real Choice was a Three Span Superstructure Replacement – Practical Design.

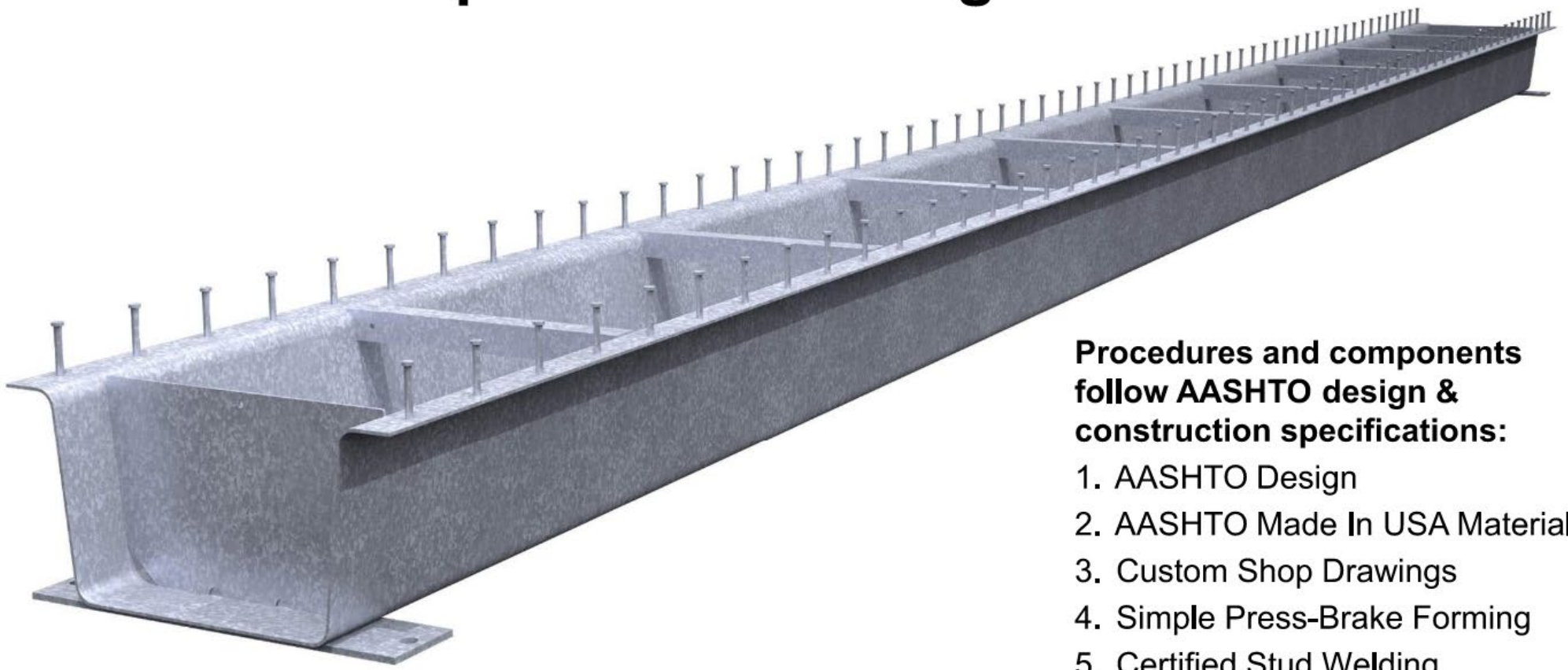
- Steel Press Brake Tub Girders Were Chosen for the Following Reasons
  - MoDOT would receive an additional 5% in federal reimbursement for innovation.
  - More of the existing end bents could be utilized due to the shorter bearing pads.
  - Already galvanized. WF girders must use a separate facility to add galvanizing which adds lead time and cost risk.
  - MoDOT is a lead state for the AASHTO Innovation Initiative Focus Technology for PBTG. They wanted to use these girders on their system to evaluate and monitor.

OPTION CHOSEN





What is a steel press brake tub girder?



Procedures and components follow AASHTO design & construction specifications:

1. AASHTO Design
2. AASHTO Made In USA Material
3. Custom Shop Drawings
4. Simple Press-Brake Forming
5. Certified Stud Welding
6. Hot-Dipped Galvanized Coating

SIMPLIFIED MATERIAL HANDLING

Lighter Weight, Easy to Unload

- Unload with light equipment, utilize a small excavator or a SkyTrak
- Stockpile multiple beams in a small area for tight site conditions
- Easy delivery access to any site

DESIGN RESPONSIBILITIES

Surveying
Hydraulics
Deck Design
Substructure Design
Roadway Design
Contract Plans
Aesthetics
Utility Coordination

Superstructure Design
Plan Sheets for Girders/Bearings

HYDRAULICS

- Shallower Girders allowed slightly more freeboard without raising the grade.

- Backwater from the Missouri River will still flood this road/bridge occasionally.

STAGED CONSTRUCTION?

- Avoids a lengthy detour
- Higher cost
- Longer time frame

CLOSE THE ROAD?

- Detour on local roads is short; however, not suitable for trucks
- Lower cost
- Shorter time frame
- More likely to avoid peak tourist seasons

CLOSE THE ROAD!

- Road must be open in May, October and December
- 250,000 tourists per year

MAIFEST

OKTOBERFEST

CHRISTMAS

CLOSE THE ROAD!

- October Bid Letting
- January Notice-to-Proceed
- Contractor was given 75 calendar days
- Pick a window between June 1 and December 1

MAIFEST

OKTOBERFEST

CHRISTMAS

WATER AND SEWER LINES

WATER AND SEWER LINES

- Existing water and sewer lines attached to bridge
- Water line turned out to be abandoned
- Plan was to replace sewer line in kind with bypass pumping
- Just prior to bidding, city decided to reroute sewer off of bridge

BID LETTING

- October 2023 letting
- Can’t close the road until summer 2024

	STATE FISCAL YEAR PROJECT BUDGETING					
	Prior	7/2023	7/2024	7/2025	7/2026	7/2027
	Prog	6/2024	6/2025	6/2026	6/2027	6/2028
Engineering:	37	319				
R/W:	1	0				
Construction:	0	1,223				

Bidder Name	Address	Published	Bid Amount
Don Schnieders Excavating Company, Inc.	1307 Fairgrounds Road Jefferson City MO 65109	Yes	$1,259,505.35
E & C Bridge, LLC	PO Box 48 California MO 65018	Yes	$1,297,383.35
Emery Sapp & Sons, Inc.	2301 I-70 Drive NW Columbia MO 65202	Yes	$1,328,533.29
K.J.U., Inc. dba K.J. Unnerstall Construction Co.	4923 South Point Road Washington MO 63090	Yes	$1,392,700.00
Capital Paving & Construction, LLC	PO Box 104960 Jefferson City MO 65110-4747	Yes	$1,516,332.15
S & A Equipment & Builders, LLC	PO Box 937 Fulton MO 65251	Yes	$1,688,792.12

VALUE ENGINEERING

- One conceptual VE was submitted by the contractor
- It would have used WF beams in a simple for dead – continuous for live (SDCL) configuration
- Same superstructure depth and still galvanized
- Ended up being cost neutral for MoDOT because they could lose the extra 5% reimbursement for innovation

CONSTRUCTION

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RESULTS

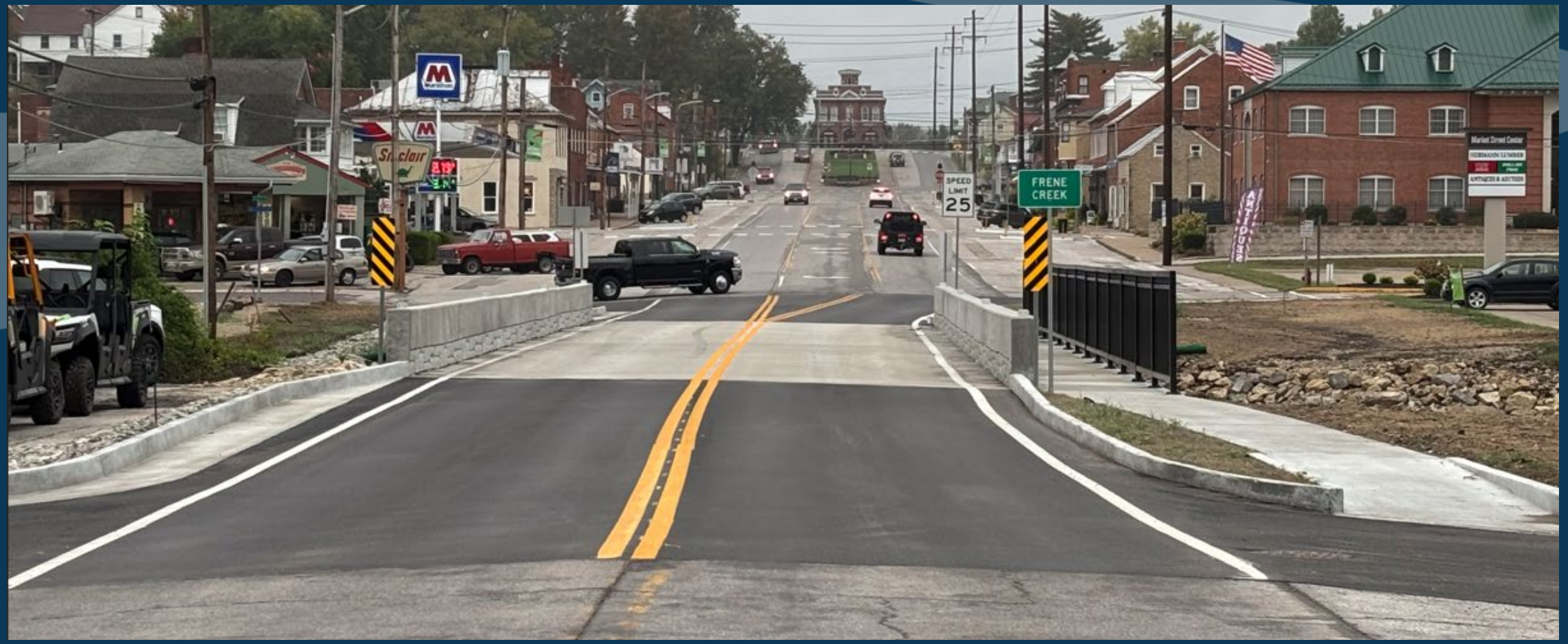
AESTHETICS BY CITY OF HERMANN

ADA AND ROADWAY DRAINAGE

ADA AND ROADWAY DRAINAGE

RESULTS

RESULTS



REFLECTIONS

- The use of Press Brake Tub Girders went smoothly.
- They are a good tool for projects that benefit from light, shallow girders.
- Engage fabricators early in the design process.
- MoDOT is also exploring SDCL (simple for dead, continuous for live) wide flange girders for similar situations.
- Push the utilities harder to make decisions earlier in the design process.

Patrick Hake, PE – Transportation PM

Joe Alderson, PE – Structural Liaison Eng.

James Hake – Sr. Construction Inspector

Dennis Heckman, PE – PM

Kim Streicher, PE – Structural Lead

Alison Graves, PE – Roadway Lead

Kaitlin Ford, PE - Hydraulics

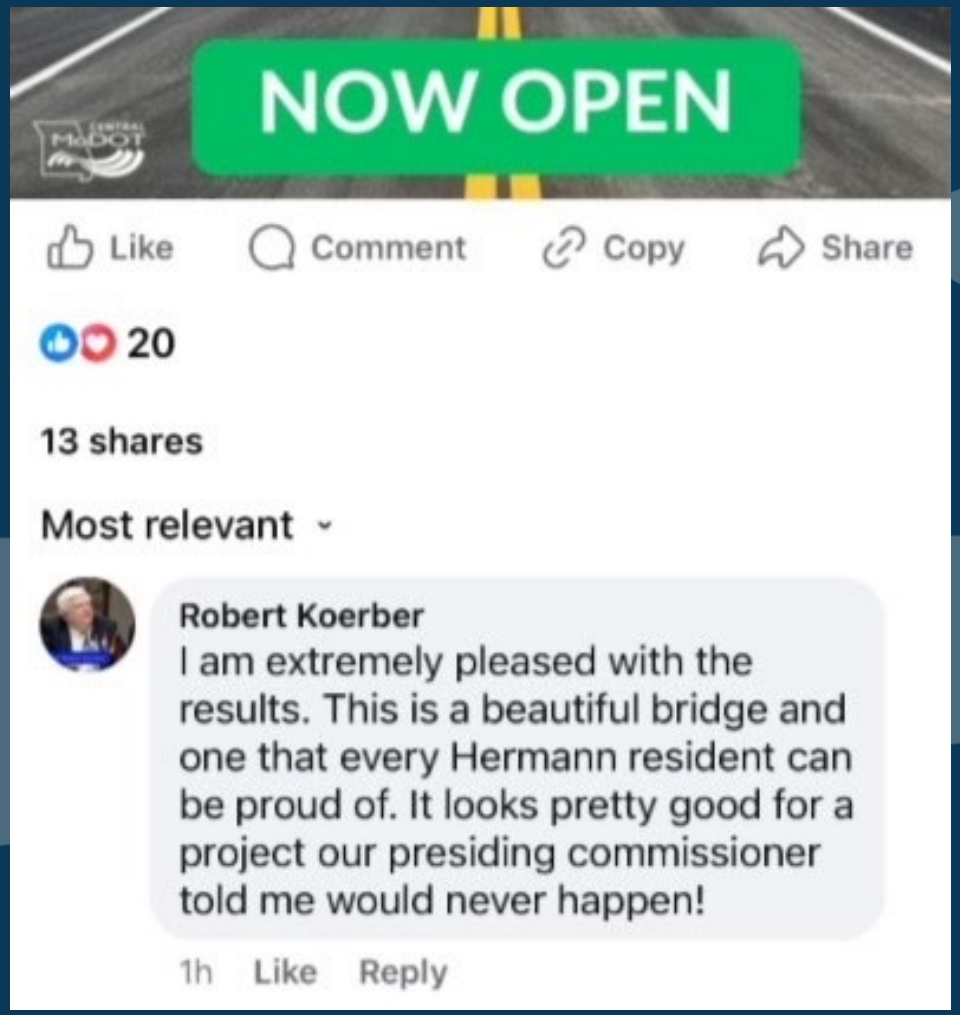
Guy Nelson, PE and Rob Rieger

Ozan Ridvanoglu, PE

Darren Rector and Patricia Heaney

Travis Hernandez, PE

Don Rhea, PE and Doug Holtmeyer



BUILDING STRONGER COMMUNITIES CDI together

QUESTIONS?

Dennis Heckman, PE
dheckman@civildesigninc.com