

Project Abstract

The City of Conway will replace the bridge at Salem Road over Tucker Creek. The road is a major corridor in Conway and lacks capacity for traffic volume, as well as, causes a serious safety concern for pedestrians using the section of greenway that runs parallel to Tucker Creek and crosses at Salem Road. The road is 2-lane and is supported by an insufficient bridge structure. Existing structure does not allow for the widening of said bridge, so the City of Conway secured Fisher Arnold to conduct a preliminary engineering study to propose the best replacement techniques, as well as, estimate probable cost to construct – estimated at \$2.3 million. Proposed innovations include using components from multiple EDC initiatives, where most appropriate, including accelerated bridge construction, geo-synthetic reinforced soil integrated bridge system, pre-fabricated bridge elements and systems, ultra-high-performance concrete connections, and safe transportation for every pedestrian. The City of Conway is requesting 64.7% reimbursement from eligible innovations through the AID program. The City is collaborating with the Arkansas Department of Transportation and the project is complete and is not part of a larger project. Project goals are reduced environmental impacts, decreased construction time, increased pedestrian safety, and improved user satisfaction. Requested funds will be used for the construction phase of said project.

Project Description

The recommended replacement bridge structure is a single, 75-foot span superstructure supported by GRS-IBS abutments. The bridge will carry four traffic lanes, with 8-foot pedestrian sidewalks on each side. The proposed superstructure is a side-by-side prestressed concrete box beam bridge, which qualifies as UHPC, PBES and ABS technologies. As an alternate to the prestressed concrete box beam superstructure, consideration is made for pre-fabricated and pre-topped deck steel beams, also meeting the qualifications for UHPC, PBES and ABS, but likely is costlier. Final bridge replacement designs, including traffic control and phasing, must accommodate the following functions:

1. Relocation of utilities and existing drainage structures,
2. Abbreviated road closure window of up to 90 days to allow contractor access for replacement bridge construction,
3. Demolition of the existing four-barrel box bridge structure,
4. Construction of the new GRS-IBS bridge abutments,
5. Re-alignment of the Tucker Creek Walking/Bike Trail to pass underneath proposed bridge structure; including removal of signalized pedestrian crosswalk; and creek-side retaining wall along trail,
6. Installation of the new superstructure, and
7. Paving and roadway approach improvements.

The existing bridge carrying Salem Road over Tucker creek is a 2-lane, 4 span structure constructed with a steel pan supported concrete deck cast atop masonry block walls. The masonry abutment and intermediate walls are supported on a cast-in-place concrete slab.



(downstream view)



(upstream view)

There are no sidewalks on the existing bridge. Railings are constructed from steel pipe and are attached to the superstructure at the masonry piers. Plans for the existing structure and/or bridge inspection reports were not provided to FA for preparation of this study. Reinforcement and structural details for the masonry abutments, piers, foundation, and wingwalls are unknown.

At the subject bridge site, Tucker Creek flows from the northeast toward the southwest. The existing 4-span structure, although different in construction, is like a 4-barrel box culvert with a concrete floor slab which interrupts the natural stream bed upstream and downstream of the existing bridge. On the downstream side of the structure, the streambed is approximately 12-18" below the elevation of the concrete floor slab. The 4-barrel structure is oriented generally parallel with the flowline of Tucker Creek, thus forming an approximate 60 degree skew angle with Salem Road.

The Tucker Creek Walking/Bike Trail generally parallels the north bank of Tucker Creek in the area of the bridge site. Approximately 25 feet north of the existing bridge structure, the trail crosses Salem Road, at-grade, at a signalized pedestrian crosswalk. Trail pedestrians,



both walkers and bikers, must currently cross Salem Road at grade. In contrast, at the nearest downstream intersection of the Tucker Creek Trail and S. Country Club Rd., the trail passes underneath S. Country Club Rd., thus eliminating traffic delays and safety hazards of an at-grade crossing. Additionally, pedestrians traveling along Salem Road do not have access to continuous sidewalks, as the two-lane bridge structure does not provide for such.

Drainage structures are located near the wingwalls at all four corners of the bridge. Storm drains empty into Tucker Creek thru concrete pipe (NE, NW, & SW) or concrete drainage flume (SE). The concrete flume presents a challenge for pedestrians traveling north on Salem Road, as they must leave the sidewalk and walk along the roadway shoulder to keep from accidentally stepping down into the flume.



Innovation Performance

Designs for the bridge replacement will undergo constructability review by the City of Conway, ArDOT, and interested qualified contractors. These stakeholders will be invited to attend a project level preliminary design review and constructability session following the 30% design completion. An additional session will be held following the 60% design completion milestone. Meeting minutes and written comments from these sessions will be captured for use later in a published Project Success Study.

The City of Conway will allow for public involvement prior to design completion and throughout construction. All community stakeholders will be afforded the opportunity to provide comments. The City of Conway will collect community input to use in the Project Success Study. The City of Conway and their Design Consultant will prepare and publish a Project Success Study to highlight the use and effectiveness of the EDC innovations incorporated into this bridge replacement project. Additionally, a project open house and possibly a one-day workshop will be hosted at the project site and advertised to interested parties through coordination with ArDOT and the FHWA.

Accelerated Bridge Construction (EDC innovations) success will be measured by evaluating community stakeholder experiences (experience rating factors), comparing project construction timeline (proposed vs. actual comparison), comparing project costs (engineer's estimate vs. actual completed cost), and identifying project specific challenges or obstacles which surfaced in either the design or construction phase. Findings from the project evaluation will be published in

the Project Success Study and shared with stakeholders and municipalities. The goal for the published study, the open house, and the one-day workshop is to share the lessons learned with other municipalities considering bridge replacement projects.

Applicant Information and Coordination with other entities

Arkansas Department of Transportation will serve as project applicant and the City of Conway, AR will serve as the sub-recipient. City of Conway, AR engineers and city administrators have been in regular correspondence and planning with ArDOT engineers and project coordinators, as well as, FHWA regional coordinators regarding the replacement of this bridge to increase mobility, safety, and long-term sustainability. Outside consultation from an experienced engineering firm was sought from the City of Conway, AR for project planning and cost estimates.

Finley Vinson, City Engineer, is the point of contact for this project. His contact information is finley.vinson@cityofconway.org or by phone is (501) 513.3565.

Eligibility and Selection Criteria

The City of Conway is eligible to apply for funding, and to date, has not received AID funding. The project is ready to initiate within 12 months of applying for AID demonstration funding. The innovation does align with TIDP goals. According to FHWA, this innovation is proven in real-world application and has documented benefits, as demonstrated in the application. The proposed innovation has never been used by the City of Conway; however, positive results will support future use of this innovation.

The applicant is willing to participate in monitoring and assessment activities regarding the effectiveness of the innovation and subsequent technology transfer and information dissemination activities associated with the project; the City further accepts FHWA oversight of the project; and additionally, the City will conduct a pre- and post-determination for evaluation of customer satisfaction with the bridge replacement.

Funding Request

The total estimated cost of the project is \$2,372,779.48. The City of Conway is requesting 64.7% of eligible innovation costs including the use of ultra-high-performance concrete and safety transportation for every pedestrian, up to \$1,000,000. The City of Conway has approved funding the remaining costs associated with the bridge replacement. The City of Conway, Arkansas City Council fully supports this project and the amount will be included in the 2020 fiscal year budget. The budget on the following page displays the engineer's opinion of probable costs associated with this project.

Engineer's Opinion of Probable Cost To Construct *

Agency:	City of Conway, AR		
Project:	Salem Road over Tucker Creek		
Description:	Bridge Replacement		
Location:			
State:	Arkansas		
County:	Faulkner	(Rev 2/15/2019 to Incl. UHPC)	
Date:	3/12/2019 (Rev 3/12/2019 to Federal Portion NTE \$1.0MM)		

* This evaluation is *not* based on any completed design work for this project, only preliminary assessments.

DESCRIPTION % of Construction Items	LOCAL 35.30%	STATE 0%	FEDERAL 64.70%	TOTAL
Construction Items				
Pavement Removal	\$ 1,553.20	\$ -	\$ 2,846.80	\$ 4,400.00
Asphalt Paving	\$ 32,165.64	\$ -	\$ 58,955.16	\$ 91,120.80
Concrete Paving	\$ 8,366.10	\$ -	\$ 15,333.90	\$ 23,700.00
Drainage	\$ 26,203.19	\$ -	\$ 48,026.81	\$ 74,230.00
Appurtenances	\$ 9,547.47	\$ -	\$ 17,499.19	\$ 27,046.67
Structures	\$ 363,549.80	\$ -	\$ 666,336.31	\$ 1,029,886.11
Fencing	\$ 13,237.50	\$ -	\$ 24,262.50	\$ 37,500.00
Earthwork	\$ 45,748.80	\$ -	\$ 83,851.20	\$ 129,600.00
Clearing & Grubbing	\$ 1,588.50	\$ -	\$ 2,911.50	\$ 4,500.00
Seeding & Sodding	\$ 11,913.75	\$ -	\$ 21,836.25	\$ 33,750.00
Rip-Rap or Slope Protection	\$ 18,303.70	\$ -	\$ 33,548.15	\$ 51,851.85
Guardrail	\$ 8,482.59	\$ -	\$ 15,547.41	\$ 24,030.00
Signing	\$ 882.50	\$ -	\$ 1,617.50	\$ 2,500.00
Pavement Markings	\$ 234.00	\$ -	\$ 428.88	\$ 662.88
Maintenance of Traffic	\$ 3,530.00	\$ -	\$ 6,470.00	\$ 10,000.00
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
Mobilization (8% construction cost)	\$ -	\$ -	\$ -	\$ 123,582.26
Other Items = 10%	\$ -	\$ -	\$ -	\$ 154,477.83
Construction Contingency = 10%	\$ -	\$ -	\$ -	\$ 154,477.83
Construction Items Subtotal	\$ 545,306.74		\$ 999,471.57	\$ 1,977,316.23

Right-of-Way & Utilities				
ROW		\$ -	\$ -	\$ -
Utilities		\$ -	\$ -	\$ -

Engineering & Construction Administration				
Engineering Design	10.0%			\$ 197,731.62
CEI	10.0%			\$ 197,731.62
Engineering & Construction Administration Subtotal				\$ 395,463.25

TOTAL PROJECT COST	\$ 2,372,779.48
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