

Transportation Investment Generating Economic Recovery Discretionary Grant Program Fiscal Year 2012

Project Name: Highway 92 Bridge Improvement Project

Project Type: Bridge

Project Location: Conway and Van Buren Counties, Arkansas

Area Type: Rural

Grant Amount Requested: See Below

		Percentage of Total Project Cost
Bridge		
Preliminary Engineering	\$97,000	5%
Right of Way and Utilities	\$77,000	4%
Construction Engineering	\$289,000	15%
Roadway and Bridge Construction	\$1,467,000	76%
Total	\$1,930,000	100%
TOTAL FUNDS REQUESTED:	\$1,544,000	
TOTAL STATE CONTRIBUTION:	\$386,000	
TOTAL PROJECT COST:	\$1,930,000	

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PROJECT DESCRIPTION:

This project will replace two load posted bridges and improve the bridge approaches on Highway 92 in Conway and Van Buren Counties to stimulate rural economic growth by allowing timber products to be transported to processing plants in the area.

An electronic copy of this application may be found at www.arkansashighways.com/TIGER/T4/92.aspx



Application Outline:

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Project Benefits:

- i. State of Good Repair:
 - Replacement of two load posted bridges (72 and 47 years old) at the end of their service life, will reduce the long-term operations and maintenance costs.
 - The project will strengthen the economic growth and transportation network efficiency by improving mobility of goods and access to services.
- ii. Economic Competitiveness:
 - Will provide reliable access and regional mobility for local traffics.
 - Will improve the transportation network and provide increased opportunities for rural residents.
 - Will sustain the long-term growth of the region.
 - Will connect the natural resources of the local economy to larger national markets.
 - Not replacing these two bridges will adversely affect the ability of local businesses to transport timber and farm products.
- iii. Livability:
 - Will reduce indirection and extra travel resulting in lower motor fuel consumption, leading to a potential increase in family income.
 - Will improve safety for pedestrian and bike traffic in Conway along Highway 64.
- iv. Environmental Sustainability:
 - Reduction in the total vehicle miles traveled will result in reduced vehicle emissions in the region.
 - Reduced consumption works toward decreasing the dependence on possible fuels.
- v. Safety:
 - Will decrease crash potential by providing more access routes to truck traffic (without passing through the pedestrian intense area of Conway).
 - Will provide improved safety for pedestrians and bicycle users along the detour route in Conway.
- vi. Benefit/Cost:
 - Total benefit of \$29,902,123
 - Total costs of \$1,756,000
 - Benefit/Cost ratio of 19.57

I. Project Description

The Arkansas State Highway and Transportation Department (AHTD) is requesting funding to replace two weight-restricted bridges and widen the lanes and shoulders of the bridge approaches on Highway 92 in rural Conway and Van Buren Counties in north central Arkansas to stimulate rural economic growth. The total cost of the project is \$1.93 million. This application requests \$1.544 million (80 percent of the project cost). The project location is shown in Figure 1. The project schedule is shown in Table 1.

Figure 1: Project Location

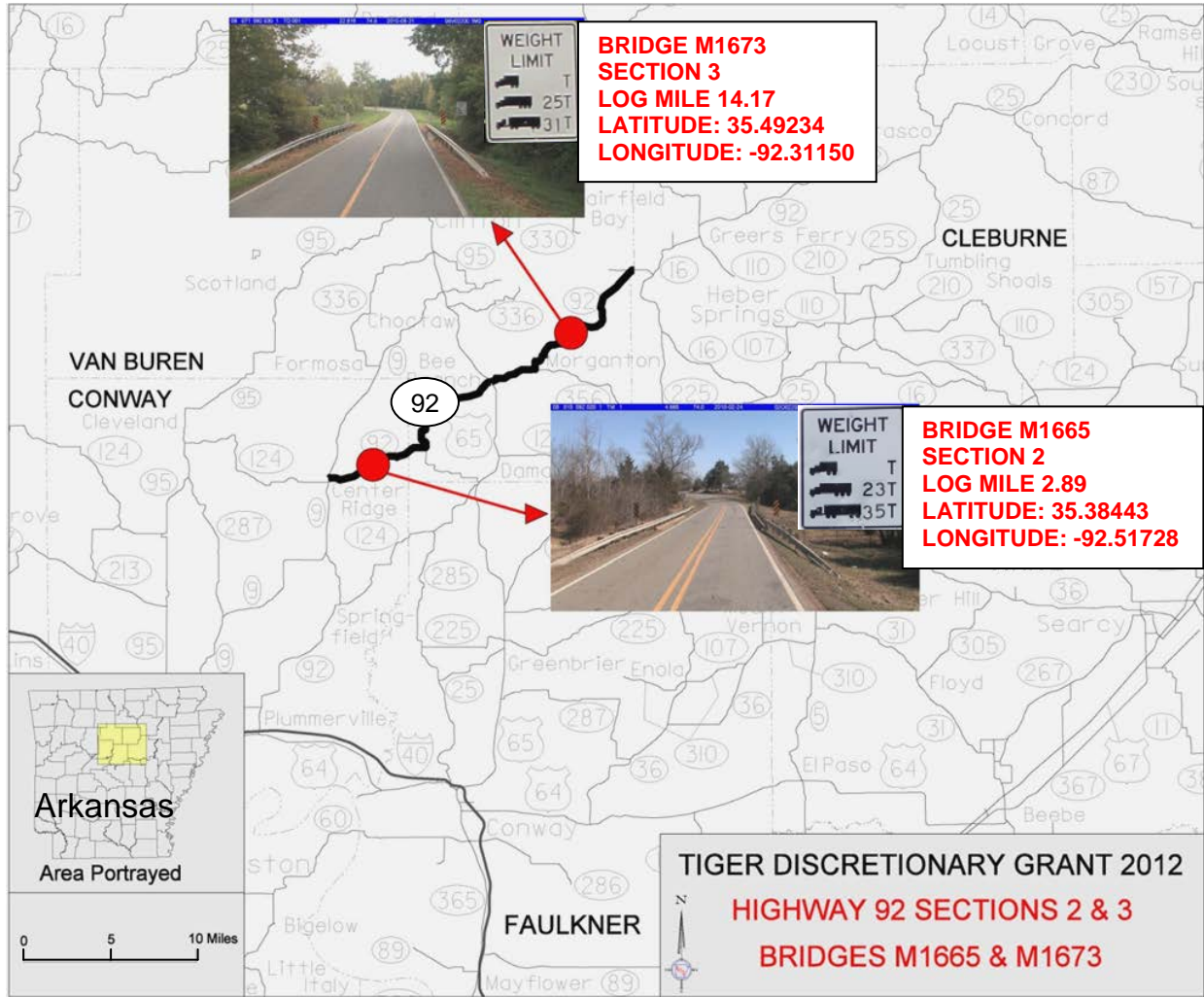


Table 1 – Project Schedule

Task	Completion Date
Awarded to Contract	May, 2013
Mobilization of Project	June, 2013
Project Substantially Complete	September, 2014
Open to Traffic	September, 2014

Bridge M1665 (located at Section 2, Log Mile 2.89) was constructed in 1965. Originally, the superstructure was constructed of timber beams and the bridge had a concrete deck. The deck now has an asphalt overlay with a timber and w-beam guardrail. The substructure consists of masonry and concrete bents with an unknown foundation. The structure has a sufficiency rating of 44.7. The curb-to-curb width is 24 feet with a 10-foot lane and 2-foot shoulder in each direction on the structure.

Bridge M1673 (located at Section 3, Log Mile 14.17) was constructed in 1940. The original superstructure was constructed of steel beams with a concrete deck. The deck now has an asphalt overlay with timber and w-beam guardrail. The substructure consists of masonry and concrete bents with an unknown foundation. The sufficiency rating for this structure is 63.0. The curb-to-curb width is 26 feet with a 10-foot lane and 3-foot shoulder in each direction on the structure.

Since 2006, Bridge M1665's deck and substructure condition has decreased by 14 percent. The condition of the bridge superstructure has decreased 29 percent in the same time period. More importantly, the bridge sufficiency rating was 70 in 2006. It was 44.7 in 2011. That is a 36 percent deterioration of the bridge rating, coincident with the natural gas exploration activities. For this reason, the bridge has been weight restricted. Even though Bridge M1673 has not shown as significant reduction in its bridge sufficiency rating as has Bridge M1665, it is showing similar signs of deterioration. The deck and superstructure condition have decreased 14 percent since 2006. If traffic along Highway 92 continues to increase, as it has been for the past five years, the bridge sufficiency rating of Bridge M1673 will likely decrease in a manner similar to bridge M1665. The rate of deterioration experienced by these two bridges makes them suitable candidates for timely replacement.

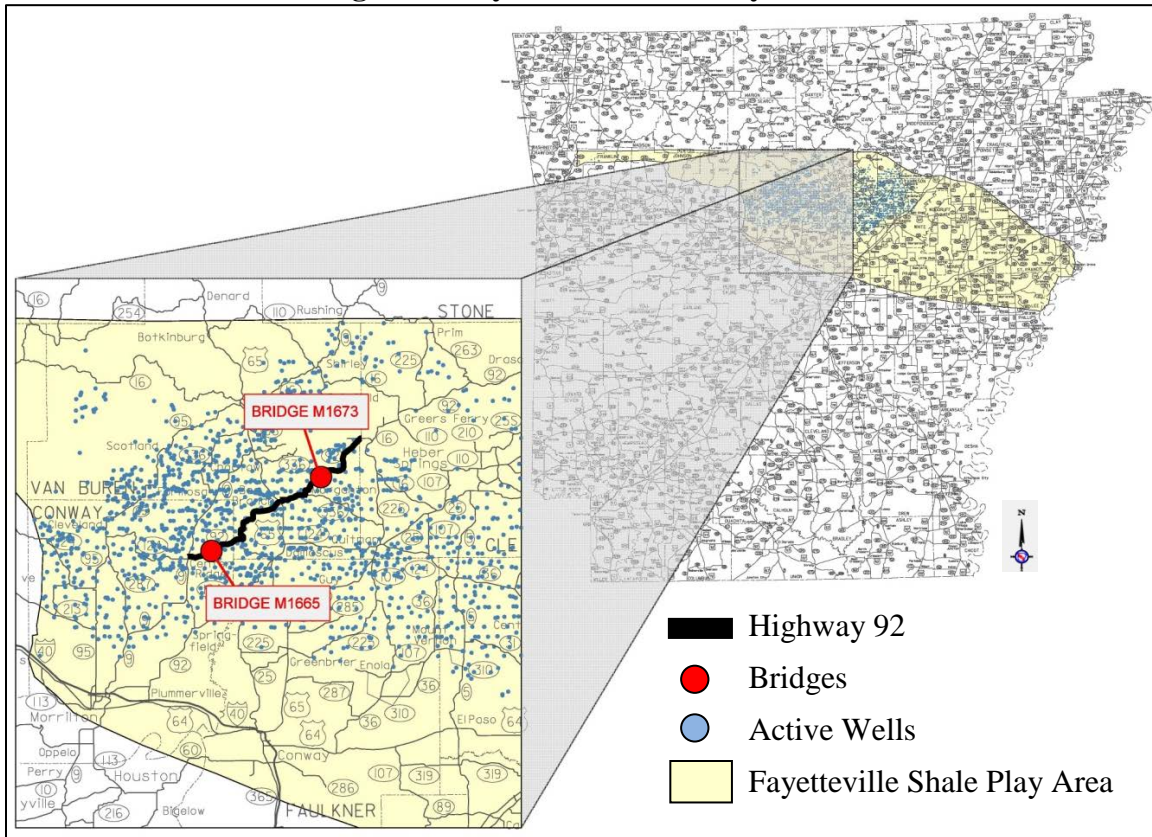
The proposed bridge cross-section for both structures includes a curb-to-curb width of 40 feet. This will allow two 12-foot lanes and 8-foot shoulders. The bridges are designed for future traffic growth and to support 80,000 lb trucks.

Starting in 2007, there has been a natural gas exploration boom in the north central region of Arkansas, an area geologically known as the Fayetteville Shale area (See Figure 2). Drilling activities have led to the region being known as the Fayetteville Shale Play (FSP). These activities have led to the rapid development of over 4,000 new natural gas wells. Each well requires over 1,000 truck trips and 2,400 equivalent single axle loads (ESALs). The public roads and bridges in this area have been subjected to a tremendous amount of heavy traffic loadings for which they were not designed.

More than 800 miles of highways and 1,000 bridges in Arkansas have been adversely affected by the increased traffic loadings in the FSP area. Acceleration of pavement and structural deterioration has led to the need for improved transportation infrastructure to ensure continued rural economic development. Figure 2 shows active gas well drilling sites surrounding the two bridges on Highway 92 in the FSP area. This yellow region includes 7,439 square miles and 1,759 miles of the State Highway System. This is 14% of the total land mass of Arkansas and over 10% of the State Highway System. Accelerated deterioration of the highways and

bridges creates a tremendous challenge for AHTD to maintain the serviceability of these facilities that are vital to the economy of the region.

Figure 2: Fayetteville Shale Play Area



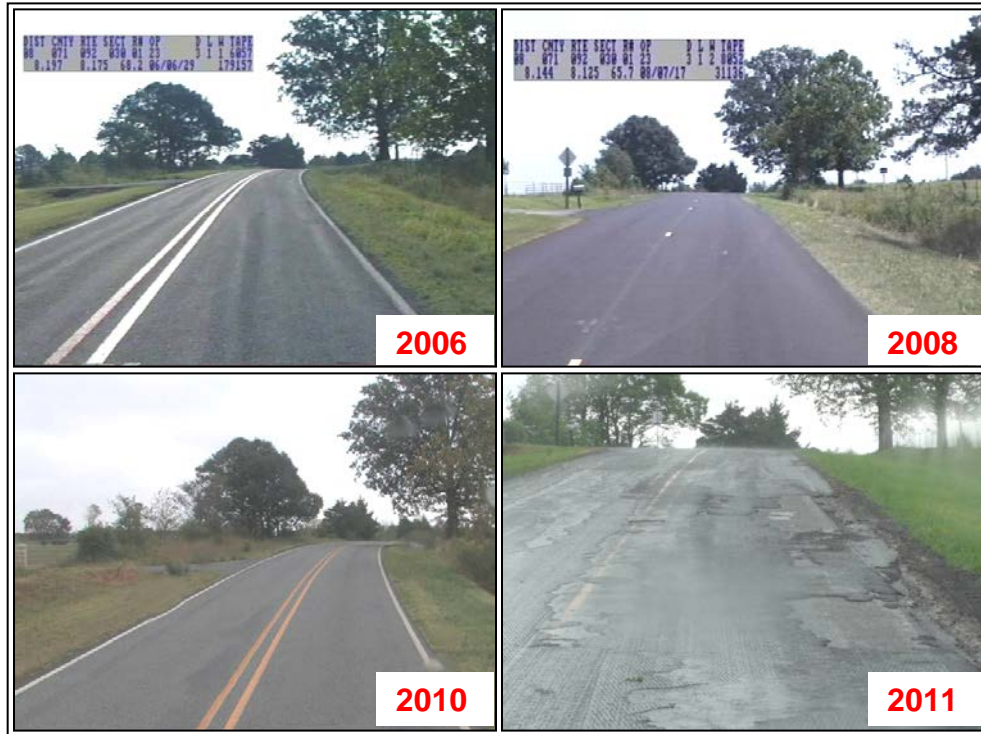
In response to the rapid infrastructure deterioration in the FSP area, several routes were recommended to be weight restricted in an effort to extend the life of the pavement. When these weight restricted routes were proposed, State legislators in the affected area became concerned about the economic impacts. In response to their concerns, the Arkansas State Highway Commission met with the local State legislators to gather more information.

AHTD was directed to hold public meetings to discover how weight restricting some of the routes could impact the area's industries, in particular timber and poultry. Because of the concerns expressed at these meetings, AHTD decided not to weight restrict Highway 92 from 80,000 lb to 64,000 lb. Instead, AHTD resurfaced Highway 92 to strengthen the roadway. However, it was found that two bridges on Highway 92 could not support these heavy loads and needed to be weight restricted. Bridge M1665 was restricted to vehicles less than 35 tons (70,000 lb), and Bridge M1673 was restricted to vehicles less than 31 tons (62,000 lb). This has adversely impacted the ability to transport timber and farm products.

The images in Figure 3 highlight the progression of deterioration on a typical route within the FSP area. In 2006, there was no noticeable damage to the roadway or shoulders. The 2008 image shows the recent overlay. By 2010, rutting, bleeding, and cracking began to affect the

roadway and surface. The image from 2011 shows the current condition of this facility with rutting, cracking, raveling, and deterioration of the pavement edge.

Figure 3: Deterioration of a Typical Facility in the Fayetteville Shale Play Area



These images are of the roadway conditions, but the bridges along the routes are also subject to similar stresses leading to deterioration of the deck and substructure. Many highways and bridges in the FSP area are now weight-restricted due to excessive loadings and rapid deterioration. This has impaired the mobility of the local community, as well as Arkansas as a whole.

Before the natural gas exploration began in 2007, the north central region of Arkansas already had many established industries and businesses. One large economic driver in Arkansas, especially in Conway and Van Buren Counties, is the forest production industry. Arkansas is the fourth largest timber-producing state in the country and the largest timber-producing state in the south, as reported by the [Arkansas Forest Research Center](#). Over 50 percent of Conway and Van Buren Counties' land area is timberland. Figure 4 shows the percentage of each county covered in timber.

Figure 5 illustrates the location of Highway 92 and the two bridges for which funding is requested. Highway 92 (highlighted in black in Figure 5) has experienced significant growth in traffic. At Bridge M1665, traffic has grown from 790 vehicles per day (vpd) in 2006, to 2,000 vpd in 2011 due to the recent natural gas drilling exploration activities in the area. At Bridge M1673, traffic has increased from 2,200 vpd in 2006 to 3,900 vpd in 2011. This represents an annual growth of 20.4 percent and 12.1 percent respectively, while the average annual statewide

growth rate is 2 percent. Since 2007, it is estimated that there have been over 335,000 ESALs on Sections 2 and 3 of Highway 92 that was originally designed for 115,540 ESALs.

Figure 4: Percent of County in Timberland

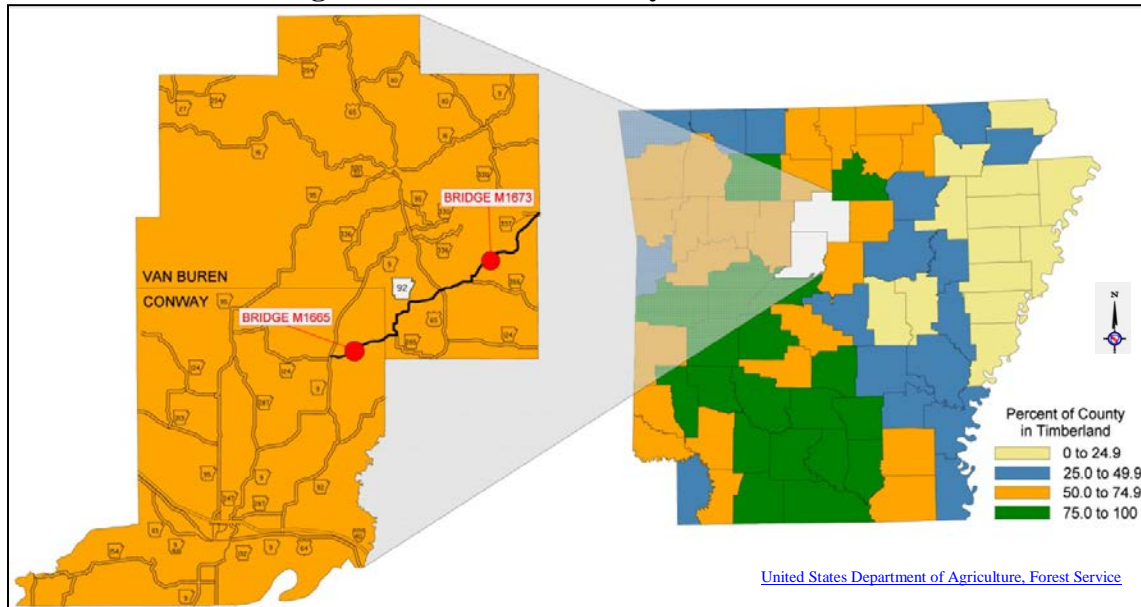
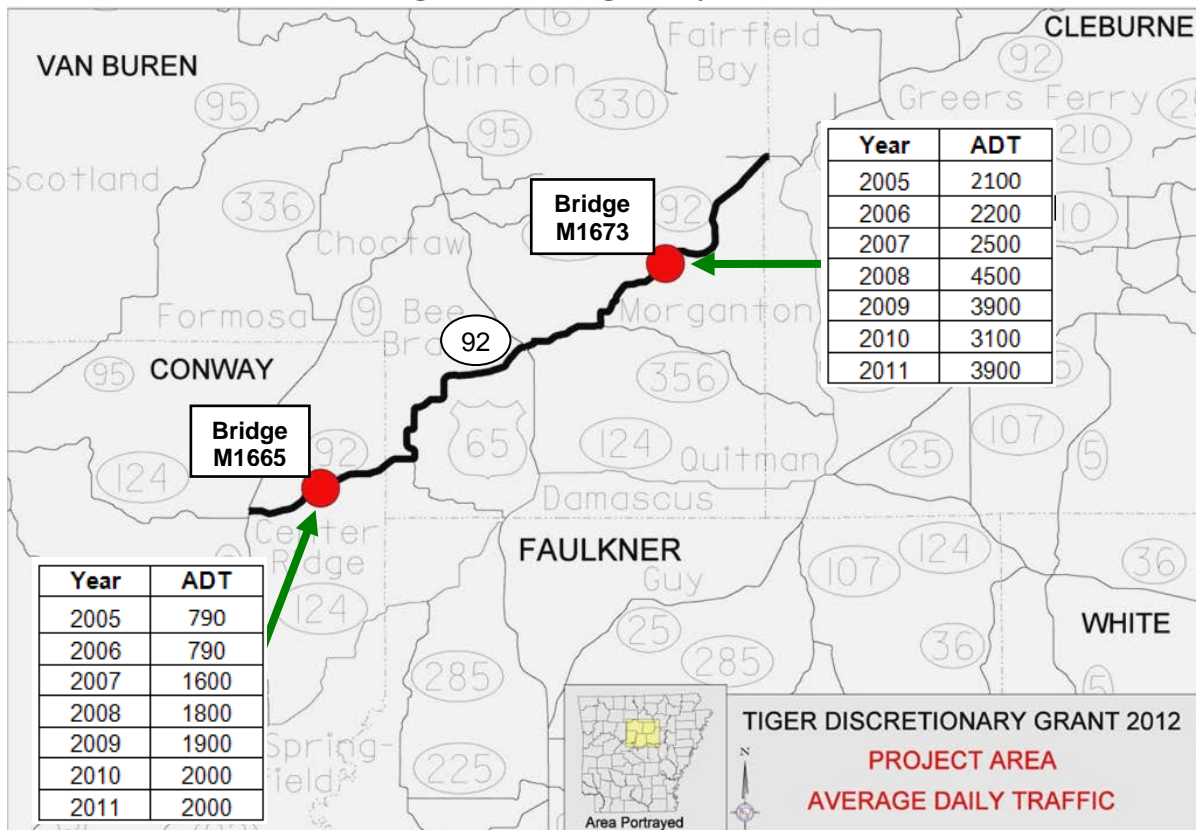


Figure 5: Average Daily Traffic



II. Project Parties

In 1913, the 39th Arkansas General Assembly appointed the first State Highway Commission, under Act 302, to address the transportation needs of the State. Amendment 42 of the Constitution of Arkansas, passed by a vote of the people in November 1952, established the present five-member State Highway Commission that is appointed by the Governor. Under Amendment 42, the State Highway Commission was vested with the power of administering Arkansas' State Highway System. In 1977, Act 192 created the Arkansas State Highway and Transportation Department by adding the responsibility for coordination of public and private transportation activities and the implementation of a safe and efficient intermodal transportation system. AHTD is the sole applicant for of this project.

III. Grant Funds and Sources/Uses of Project Funds

The proposed project is located on the Arkansas State Highway System. This system is the 12th largest State Highway System in the country. However, AHTD is actually 43rd in the nation in terms of highway user revenues. This places AHTD in the position of continually having to do more with less. Nowhere is this more obvious than in the comparison of administrative costs per mile. AHTD has repeatedly achieved one of the lowest administrative costs per mile in the country when compared to other state highway agencies. This has been accomplished through conscientious stewardship of the limited state and federal funds available for use.

The Arkansas State Highway System carries 77% of the total traffic and 95% of all heavy truck traffic that uses the public road system in Arkansas. AHTD is responsible for the maintenance and improvement of 16,416 miles of roadway and 7,233 bridges. Funds for improvements must be secured from all possible sources.

Figure 6 highlights the issues related to construction projects. In 1977, 143 miles could be widened for \$100 million. In 1994, 33 miles could be widened. In 2011, only 15 miles could be widened with the same amount of funding. Due to this reduction in buying power, fewer miles can be improved each year.

Figure 6: Arkansas' Shrinking Highway Dollar (Widening)

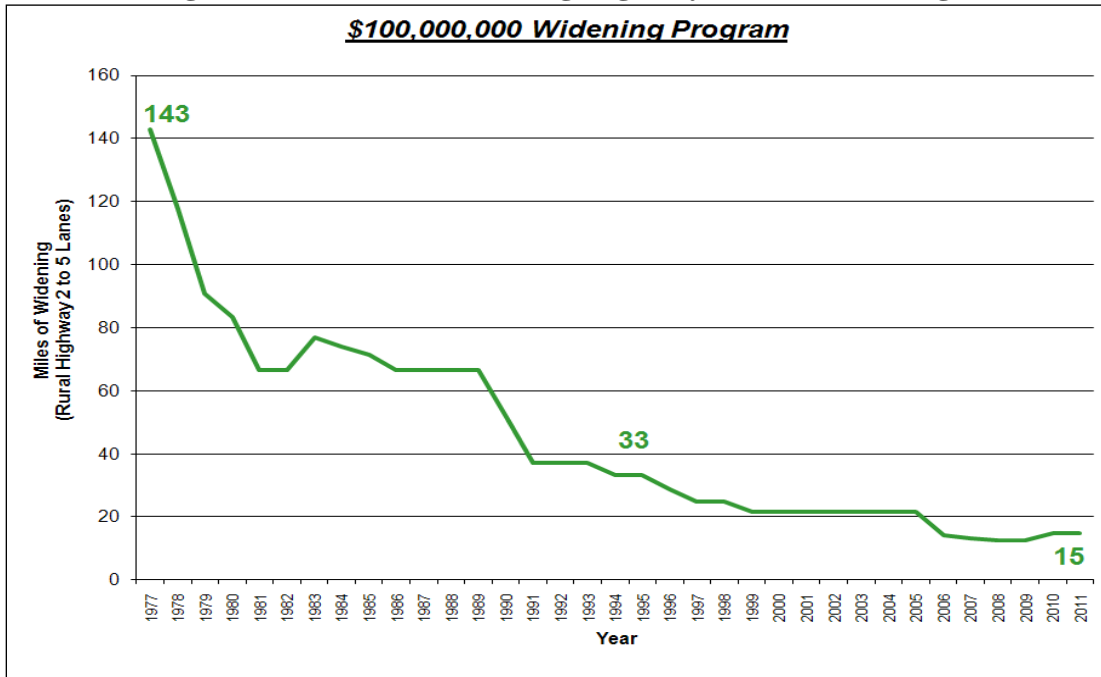
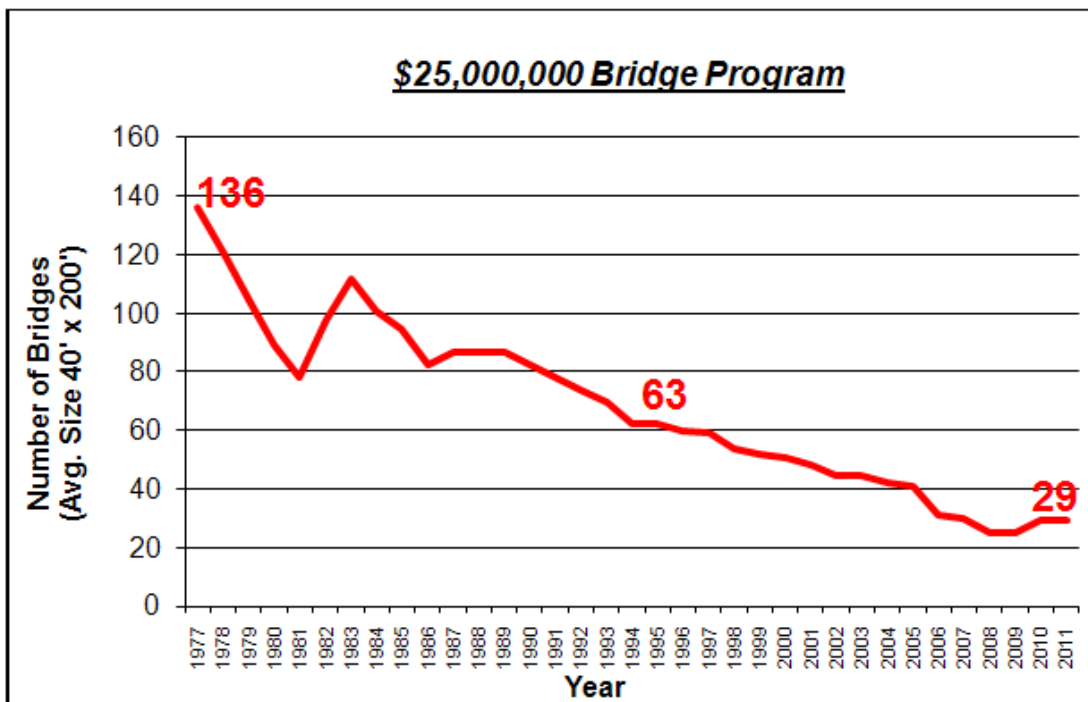


Figure 7 shows the result of shrinking dollars on bridge construction. In 1977, 136 bridges could be constructed with \$25 million. In 1994, 63 bridges could be constructed. In 2011, only 29 bridges could be constructed with the same amount of funding. Due to this reduction in buying power, fewer bridges can be replaced or rehabilitated each year.

Figure 7: Arkansas' Shrinking Highway Dollar (Bridge)



In the most recent State Highway Needs Study, there are nearly \$23.6 billion in outstanding needs statewide over the next ten years. At the same time, under current funding assumptions, AHTD is set to receive only about \$4.1 billion in the next ten years. This results in an anticipated shortfall of nearly \$20 billion over the next ten years.

The bottom line is the use of any additional funds is a welcome option for AHTD to address highway congestion, pavement or bridge conditions, system maintenance, or administration and operations. Additional funds would allow AHTD to expedite the improvement of these bridges. Presently, 1,063 out of 7,233 state owned highway bridges need rehabilitation or replacement. Of these bridges, 322 are weight-restricted to ensure public safety. Currently, all available funding has been committed to other high priority bridge needs through 2016.

AHTD has long been committed to the improvement of highways in the FSP area. Natural gas exploration began in the area in 2007. Since 2010, AHTD has expended more than \$46.25 million on 43 projects in the region. The recent development of intense activities in the FSP area has led to a funding challenge to AHTD. The accelerated deterioration rate of bridges has led to difficulty maintaining the serviceability of these two bridges. For this reason, the TIGER Grant funds are appropriate to fund the reconstruction of the two bridges in the FSP area.

AHTD requests \$1.544 million to fund the project. The total cost of the project is \$1.93 million; the grant amount requested represents 80% of the total project cost. The remainder of the project cost, \$0.386 million, will be funded using state construction funds. The use of project funds is given in Table 2. This project is not suitable for the Transportation Infrastructure Finance and Innovation Act funding because the total cost is less than \$50 million.

Table 2: Use of Project Funds

Task	Funds Requested (Federal)	State Match	Total
Preliminary Engineering	\$77,600	\$19,400	\$97,000
Right of Way Acquisition	\$61,600	\$15,400	\$77,000
Construction Engineering	\$231,200	\$57,800	\$289,000
Construction	\$1,173,600	\$293,400	\$1,467,000
TOTAL	\$1,544,000	\$386,000	\$1,930,000

IV. Selection Criteria

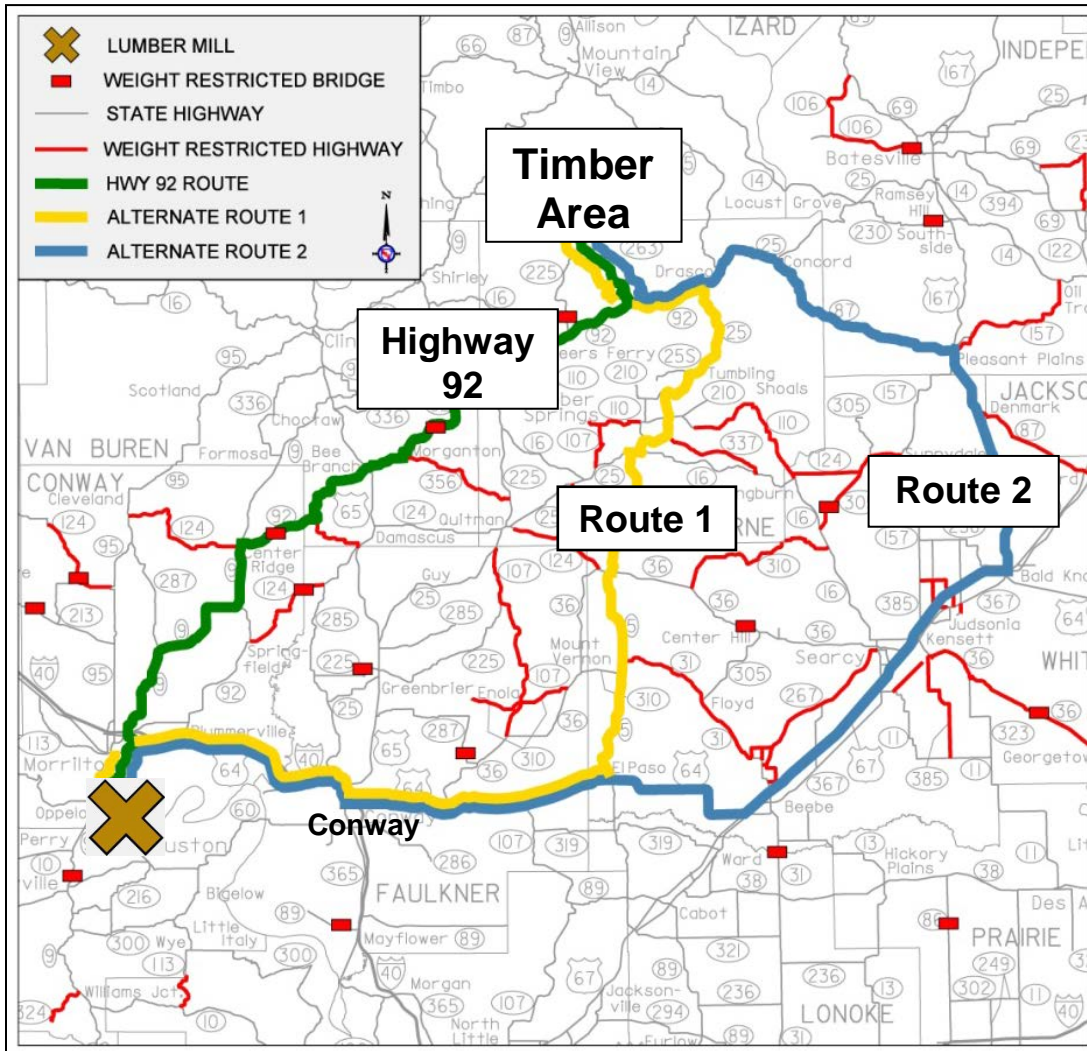
A. Long-Term Outcomes

i. State of Good Repair

Existing routes in this region are sometimes circuitous due to the natural terrain. The following map, Figure 8, shows typical alternate routes that are currently being used by the local timber industry to accommodate the weight restriction of these two bridges on Highway 92. Also shown on this figure is a representative location of the timber mill where the timber is being

transported. This location is the largest mill in the area and it is used to calculate detour distances and travel times. The highways and bridges highlighted in red are weight restricted due to the increased traffic loading related to the natural gas exploration activities. Replacement of the two bridges on Highway 92 will provide a more direct route between the timber area and the mill.

Figure 8: Alternate Routes



The approximate mileage between the north central Arkansas timber area and the mill along Alternate Route 1 is 105 miles. The approximate mileage along Alternate Route 2 is 132 miles. However, the mileage can be reduced drastically to 76 miles if the two bridges on Highway 92 are replaced. The replacement of the two bridges will decrease the mileage traveled along Route 1 and Route 2 by 28 percent and 42 percent, respectively. It should be noted that Alternate Routes 1 and 2 both go through the City of Conway in Faulkner County. Issues resulting from this are discussed in detail in Safety Criteria Section. If the current timber tonnage continues to be legally transported along Highway 92, the individual loads must be smaller to comply with the weight restriction, thus increasing the number of trips along Highway

92. If all 100 trips remain on Highway 92, the total number of trips will increase to 130 (or 260 round trip).

For air quality and road user cost analysis purposes the following assumes are made. Of the 100 original timber trucks, 50 percent will remain on Highway 92, 35 percent will use Alternate Route 1, and 15 percent will use Alternate Route 2.

The need to improve the transportation network in the FSP area is not a new or recent development. With the onset of the increase in commercial vehicle traffic in this area, the roadway and bridge network began to exhibit accelerated deterioration. In 2007, AHTD began working to address issues such as public safety with the weight-restriction on certain routes and structures until repairs, rehabilitation, or replacements could be made. The Table 3 displays the history of projects since 2010 that have been completed in the FSP area, currently under construction, and currently programmed for construction.

Table 3: Fayetteville Shale Play Area Projects (2010 – Present)

Status (number of projects)	Amount Expended or Committed	Length (miles)
Complete (37)	\$37,825,004	232
Under Construction (6)	\$8,420,230	45
Programmed (14)	\$16,891,840	95

Since 2008, AHTD has collected Roadway Maintenance Assessment fees from the natural gas exploration companies to offset the damage to the State Highway System. The fees are calculated based on pavement deflection analyses. These fees range from \$18,000 to \$50,000 per well on a weight restricted route. The total amount of fees collected from 2008 to 2011 is \$6.6 million. These funds are used for maintenance activities and are assigned to the specific route where the well is located. Since Highway 92 is currently not weight restricted, except for the bridges, it is not eligible to use funds from the Roadway Maintenance Assessment Fees. Therefore, excessive loadings have continued along this route, causing additional deterioration. It is estimated that allowing this route to remain open to the free flow of all traffic has forced AHTD to spend several million dollars a year in additional maintenance activities with no compensation.

ii. Economic Competitiveness

The bridges on Highway 92 are weight-restricted, which is preventing the region from reaching its full economic potential. There is not an extensive transportation network in this region with pavement conditions that allow for the free movement of commercial vehicles transporting products in and out of the FSP area. Rural industries will thrive with the improved access in this area and the increased availability of transportation services throughout the region.

Replacement of the two bridges on Highway 92 will improve the transportation network and provide more opportunity for these rural communities. This project will not only improve the competitiveness of the region, but it will improve the competitiveness of the United States by connecting the natural resources of the local economy to larger national markets.

According to members of the logging industry, there are approximately 100 truck trips per day between the timber area and the local mill. Improvements to the Highway 92 structures will allow these commercial vehicles to travel the shorter route and will decrease the travel in the region between 2,900 and 5,600 vehicle-miles travel per day. For these 100 truck trips, this represents a daily reduction of diesel fuel between 645 and 1,245 gallons. This is based on average fuel efficiency for a forestry truck of 4.5 miles per gallon. Decreasing the dependency of the driving public on fossil fuel not only reduces the cost of transporting goods, but it also produces long-term economic benefits.

As part of the efforts to solicit input from the local residents and business owners regarding the weight-restriction of facilities in the region, AHTD sponsored a series of three public meetings in the Spring of 2011.

The purpose of the meetings was to share information regarding AHTD's plans in the area as well as to receive feedback from the public. Over 285 people attended the six hours of public meetings. Countless comments were submitted to AHTD regarding the weight-restricted roadways and bridges in the region. Members of the public expressed very strong opinions regarding the importance of Highway 92 for the region's economic well-being. One meeting attendee was quoted saying, "Not being able to transport goods on Highway 92 can put some of these industries and businesses on the razor's edge between profit and loss." Other attendees reported:

"We are trying to balance the needs of people to have a nice place to live and raise their family also with the industry that is here"

"You are interrupting too much of their lives"

"Timber and farming is a big industry in Arkansas."

"It's the timber industry. It's the farm industry. And you put these guys out of business"

"You're fixing to put [people] out of business because [they] can't get poultry feed"

"I hope you are not going to be the one responsible for shutting down business in this area."

"A guy with a \$1.2 million facility located on that road just can't pick it up and move it somewhere and ya'll were saying he can't even get in and out of his own driveway; so that just doesn't make sense..."

"And for us, Highway 92 is the major thing that would impact us. When we haul, we haul down [Highway] 92 to Morrilton."

“If we leave out our trucks coming to Batesville, what they will do is travel down [Highway] 167, cross [Highway] 64 right down here in the middle of [the City of] Conway. And I don’t know if any of you have been through [the City of] Conway lately, but it’s a nightmare for all big trucks. So that’s the way all of our trucks will have to go. If they take a different route to be able to carry the weight. So far as safety, I think there’s going to be a lot more people walking down the sidewalks in [the City of] Conway. I didn’t see too many people walking down the road on [Highway] 92. So I think that’s a major safety issue right there.”

“I think the most people would be impacted are the farm people [and] poultry people.”

“Highway 92 has been a main thoroughfare for years, not only for me, but for all the logging industry, and everybody else. If you drop that there, it’s going to have a big bearing on a lot of people.”

“I’ll have to drive all the way to Beebe from across [Highway] 64 over to [the Cities of] Conway or Morrilton and come back up to get to the job site, and, at \$4 a gallon diesel fuel, that’s going to be a huge cost.”

“I adjudicate Highway 92 and you want to raise/lower the weight restriction on that, but if I go through a lot of these towns, which I see is really congested with people and cars. Like [the City of] Conway, you have the college there, you have kids. It really concerns me going through there because one of them kids or a car pulls out in front of you. You know a life ain’t worth a whole lot but it’s worth a lot to their families and the people to safety. Safety is the most important thing to me. [Highway] 92 is the simplest way and shortest route for me to get down south.”

“For us, we are a timber business and [Highway] 92 is a major thoroughfare for us. It has been for many, many years. As the gentleman awhile ago said; for us, if we are not going down [Highway] 92 to get to Morrilton and Cadron Creek and those other mills then that puts us going down [Highway] 167 off of [Highway] 64 right through the middle of Conway. Like he said that is a major public safety issue right there.”

Complete transcripts of the three meetings can be found in Appendix A and under www.arkansahighways.com/TIGER/T4/92.aspx.

iii. Livability

By allowing traffic to travel on the bridges, it will decrease travel for shippers as much as 56 miles. Likewise, it will lower motor fuel consumption, resulting in a potential increase in family income. The reduction in the trip length will also lower the length of time for each round-trip traveled, thus allowing each hauler to transport more loads in a day. Many of the timber haulers are independent contractors. Each loaded trip that can travel on the shorter route will help decrease the financial burden for these contractors. Additionally, if independent contractors

are able to maintain their chosen rural lifestyle, more communities will remain intact with enhanced economic opportunities.

Van Buren County currently has an unemployment rate of 9.9 percent, which is above the national unemployment rate of 9.5 percent. Even though the unemployment rate in Conway County of 7.9 percent is below the national average, it is still higher than the State unemployment rate of 7.8 percent. The per capita income in Van Buren County is \$27,281, which is more than 30 percent below the national average of \$39,635. The per capita income in Conway County is \$31,679. This is 20 percent below the national average. The unemployment rates and low per capita incomes are noted by in Table 4.

Table 4: Unemployment Rates and Median Incomes (as of December 2011)

County	Median Income	Unemployment
Conway	\$31,679	8.1%
Van Buren	\$27,281	9.7%
Arkansas	\$32,315	7.9%
United States	\$39,635	9.3%

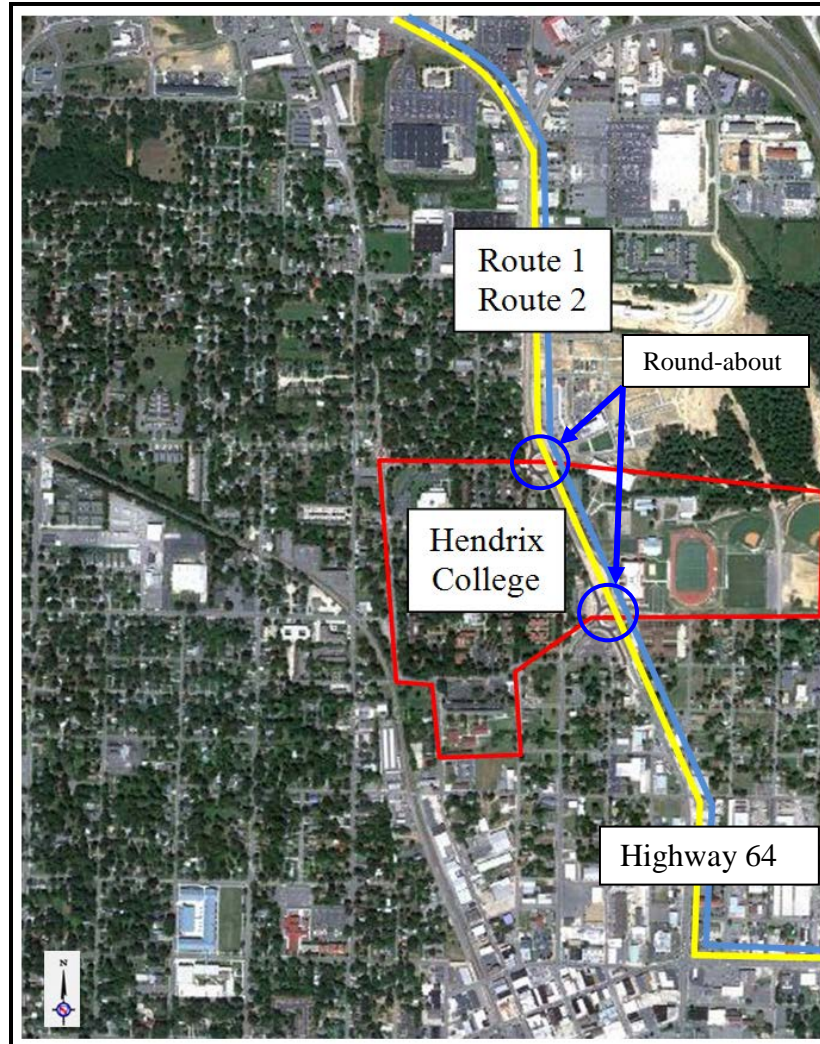
Source: [42 USC 38 Subchapter III, Section 3161](#)
[Arkansas Department of Workforce Services](#)

The most commonly used detour routes (Alternate Routes 1 and 2), that avoid weight-restricted facilities are longer and more congested. In addition to the challenges of steep grades, drivers are often faced with conditions of urban congestion in the cities of Searcy and Conway. Both cities are regional hubs for commercial businesses, medical services, and educational institutions. Industry representatives have provided information regarding the most common detour routes along Highway 5 (Alternate Route 1) or Highway 87 (Alternate Route 2), with both routes accessing Highway 64 east of the City of Conway.

In the City of Conway, there is robust commercial development along Highway 64. The timber trucks are forced to make maneuvers with tight turning radii. Additionally, Highway 64 is located through the middle of the Hendrix College campus. There are high numbers of pedestrians in the area. Recent safety and mobility improvements in the City of Conway have led to the construction of two roundabouts in the vicinity of Hendrix College. When the logging trucks use the alternate route along Highway 64, they are forced to navigate these roundabouts while paying special attention to the pedestrian population. Figure 9 displays the alternate routes through the City of Conway as well as the limits of Hendrix College and the location of the two round-about intersections.

The project will increase the livability of the City of Conway, especially in the Hendrix College area by decreasing truck traffic in the area, encouraging more pedestrian and biker use as an alternate way to commute to work and school. Having an alternate route for the truck traffic will also improve the access for non-drivers and persons with disabilities in the Conway community.

Figure 9: Alternate Routes Through the City of Conway Along Highway 64



iv. Environmental Sustainability

Unlike other regions of the United States, Arkansas climate allows timber to grow relatively quickly. This has led to Arkansas being the fourth largest timber-producing state in the country and the largest timber-producing state in the south, as reported by the [Arkansas Forest Research Center](#). The percentage of timber land in Arkansas is shown in Figure 4. The favorable climate combined with modern sustainable logging and foresting practices has led to an industry that will remain viable in this region for the foreseeable future. Improvement to these two structures along Highway 92 will help ensure the continuation of the timber industry in the region with efficient routes between the forests, sawmills, factories, and other industry-related facilities in the area.

Table 5, shows that by reconstructing the two weight restricted bridges on Highway 92 will reduce the yearly vehicle miles traveled by 1,015,363. It will also reduce the yearly fuel consumption by 225,636 gallons. More importantly, this project will also help reduce the

amount of greenhouse gases released into the atmosphere. Using the standard emission rates from MOBILE 6.2 for the calculations of volatile organic compounds (VOC) and nitrous oxides (NO_x), there will be a 21 percent reduction in VOCs and a 21 percent reduction in NO_x.

Table 5: Cost Saving and Emission Reduction

	VMT (Year)	Fuel (Gallon/Year)	Cost	Time (Hr)	VOC (Tons/Year)	NO _x (Tons/Year)
No Bridge Replacement	4,815,363	1,070,081	\$4,066,306	112,102	7.522	7.945
With Bridge Replacement	3,800,000	844,444	\$3,208,889	90,833	5.936	6.270
Difference	(1,015,363)	(225,636)	(\$857,418)	(21,269)	(1.586)	(1.675)

Note: Cost of fuel \$3.80 per gallon (diesel).
 Emission rates are from EPA, MOBILE 6, 2009
 Fuel efficiency is 4.5 miles per gallon for trucks.
 Yearly calculation assumes five working days a week and 50 working weeks a year.

v. *Safety*

With the highways and bridges deteriorating in the FSP region, it is critical that work continue to provide a safe and sound roadway network for the public. Commercial vehicles in excess of the posted limits on the regional roadways present both a maintenance and safety hazard. If these vehicles continue to use these restricted facilities, there is a risk of roadway or bridge failure.

Improvement to the Highway 92 structures will have a positive impact on the safety of the road users along Highway 92 as well as the safety along Highway 64 in Conway and all other routes currently carrying detoured traffic. By reconstructing the two structures on Highway 92, timber industry vehicles are provided additional alternatives for travel between the timber area and the mill. Truck traffic will no longer need to go through the busy commercial and high pedestrian area in the City of Conway.

The crash rate along Highway 64 through Hendrix College is 9.39 crashes per million vehicles miles (mvm) traveled. The statewide average crash rate for similar types of facilities is 4.59 crashes per mvm traveled. The crash rate on Highway 64 is more than double the statewide average. The presence of these commercial vehicles in the high pedestrian area increases the exposure and possibility of crashes along the detour route. Construction of the bridges along Highway 92 will reduce the opportunities for truck crashes near Hendrix College as well as along the outer congested detour routes.

Both Bridge M1665 and M1673's substructure consists of masonry and concrete bents with an unknown foundation. Safety will be increased by replacing the unknown foundation with a foundation that is designed for current and future needs.

Currently Bridge M1665 has a lane width of 10 feet and a shoulder width of 2 feet. According to the Highway Safety Manual, this represents a Crash Modification Factor (CMF) of 1.30 for the lane width and 1.30 for the shoulders. Bridge M1673 currently has 10-foot lanes and 3-foot shoulders. The CMF of the lane width is 1.30 and 1.15 for the shoulders. With the

proposed replacement bridges having 12-foot lanes and 8-foot shoulders, the CMFs for both structures will be reduced to 1.00 and 0.87, respectively for lane and shoulder widths. This represents an anticipated crash rate reduction of 48 percent for Bridge 1665 and 10.5 percent for Bridge 1673.

B. Job Creation and Near-Term Economic Activity

With the construction of this project, one immediate benefit will be the creation of jobs during construction of the facility. Based on research conducted by the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO), this project is expected to directly or indirectly support 56 full time equivalent work-quarter jobs in this economically distressed region of the State. According to AASHTO, for every \$1 million spent on a project there are 27.5 jobs created. A breakdown of when jobs are expected is provided in Table 6.

Table 6: Full Time Equivalent Work-Quarter Jobs Supported by TIGER Investment

Quarter/Calendar Year	Construction Jobs	Supporting Industry Jobs	Non-Construction Jobs	TOTAL Employment
2012 Q3	2	1	3	5
2012 Q4	2	1	3	5
2013 Q1	2	1	3	5
2013 Q2	3	1	4	8
2013 Q3	3	1	4	8
2013 Q4	3	1	4	8
2014 Q1	3	1	4	8
PROJECT TOTAL	24	7	25	56

As mentioned previously, allowing the free flow of commercial traffic on Highway 92 is essential to the region. Replacement of the bridges will reduce the need for detour routes and will, in turn, reduce the current operating expenses of the timber industry. As a result, companies can hire more employees and independent timber haulers can continue to work.

C. Innovation

To decrease the impact on traffic as much as possible, the new bridges will be built adjacent the existing bridges. By doing this, the roadway will not have to be closed while the new bridges are being constructed.

D. Partnership

Due to the location of this facility in north central Arkansas and the fact that it is a State Highway, AHTD is the sole applicant for this project.

V. Results of Benefit-Cost Analysis

The Benefit Cost Analysis (BCA) [see www.arkansashighways.com/TIGER/T4/92.aspx], was performed in accordance with the ARRA guidance provided in the Federal Register. These benefits and costs were quantified in accordance with the Federal Register Volume 77, Number

The purpose of the BCA is to systemically compare the benefits and costs of replacing two structures along Highway 92 in Conway and Van Buren Counties, Arkansas. The BCA compared the cost of replacing the two structures to the cost of not doing anything outside of routine maintenance. The analysis considers a 20-year project life (2013 through 2033) for purposes of the BCA.

The analysis considered typical roadway construction and maintenance costs in Arkansas. Table 7 summarizes the findings of the BCA analysis. Road User Benefits that were considered include the value of travel time savings provided by the improved facility, vehicle operating cost benefits, and the value to society of enhancing the safety within the improved highway network.

Table 7: Benefit Cost Analysis Results (3 Percent Discount)

Year	Activity	Construction and Maintenance Costs		Travel Time Benefit		Vehicle Operation Cost Benefit		Safety Benefits		Emissions (non Carbon Dioxide)	
		Non-Disc.	Discounted 3%	Non-Disc.	Discounted 3%	Non-Disc.	Discounted 3%	Non-Disc.	Discounted 3%	Non-Disc.	Discounted 3%
2013		\$1,916,000	\$1,916,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2014	(Construction	-\$8,320	-\$8,078	\$418,226	\$406,044	\$1,132,868	\$1,099,872	\$188,135	\$182,655	\$12,794	\$12,421
2015		-\$8,653	-\$8,156	\$430,772	\$406,044	\$1,166,854	\$1,099,872	\$193,779	\$182,655	\$13,178	\$12,421
2016		-\$8,999	-\$8,235	\$443,696	\$406,044	\$1,201,859	\$1,099,872	\$199,592	\$182,655	\$13,573	\$12,421
2017		-\$9,359	-\$8,315	\$457,006	\$406,044	\$1,237,915	\$1,099,872	\$205,580	\$182,655	\$13,980	\$12,421
2018		-\$9,733	-\$8,396	\$470,717	\$406,044	\$1,275,053	\$1,099,872	\$211,747	\$182,655	\$14,400	\$12,421
2019		-\$10,123	-\$8,477	\$484,838	\$406,044	\$1,313,304	\$1,099,872	\$218,100	\$182,655	\$14,832	\$12,421
2020		-\$10,527	-\$8,560	\$499,383	\$406,044	\$1,352,703	\$1,099,872	\$224,643	\$182,655	\$15,277	\$12,421
2021		-\$10,949	-\$8,643	\$514,365	\$406,044	\$1,393,284	\$1,099,872	\$231,382	\$182,655	\$15,735	\$12,421
2022		-\$11,386	-\$8,727	\$529,796	\$406,044	\$1,435,083	\$1,099,872	\$238,323	\$182,655	\$16,207	\$12,421
2023		-\$11,842	-\$8,812	\$545,690	\$406,044	\$1,478,136	\$1,099,872	\$245,473	\$182,655	\$16,693	\$12,421
2024		-\$12,316	-\$8,897	\$562,060	\$406,044	\$1,522,480	\$1,099,872	\$252,837	\$182,655	\$17,194	\$12,421
2025		-\$12,808	-\$8,983	\$578,922	\$406,044	\$1,568,154	\$1,099,872	\$260,422	\$182,655	\$17,710	\$12,421
2026		-\$13,321	-\$9,071	\$596,290	\$406,044	\$1,615,199	\$1,099,872	\$268,235	\$182,655	\$18,241	\$12,421
2027		-\$13,853	-\$9,159	\$614,178	\$406,044	\$1,663,655	\$1,099,872	\$276,282	\$182,655	\$18,788	\$12,421
2028		-\$14,408	-\$9,248	\$632,604	\$406,044	\$1,713,564	\$1,099,872	\$284,570	\$182,655	\$19,352	\$12,421
2029		-\$14,984	-\$9,337	\$651,582	\$406,044	\$1,764,971	\$1,099,872	\$293,108	\$182,655	\$19,932	\$12,421
2030		-\$15,583	-\$9,428	\$671,129	\$406,044	\$1,817,920	\$1,099,872	\$301,901	\$182,655	\$20,530	\$12,421
2031		-\$16,207	-\$9,520	\$691,263	\$406,044	\$1,872,458	\$1,099,872	\$310,958	\$182,655	\$21,146	\$12,421
2032		-\$16,855	-\$9,612	\$712,001	\$406,044	\$1,928,632	\$1,099,872	\$320,287	\$182,655	\$21,781	\$12,421
2033		-\$17,529	-\$9,705	\$733,361	\$406,044	\$1,986,491	\$1,099,872	\$329,895	\$182,655	\$22,434	\$12,421
TOTAL			\$1,738,641		\$8,120,885		\$21,997,433		\$3,653,099		\$248,424
			3% Discount								
			\$34,019,841	Discounted Benefit							
			\$1,738,641	Discounted Costs							
			19.57	Overall B/C							

Benefits of this project do not easily lend themselves to simple quantification. The economic benefits of connecting timber rich areas of north central Arkansas to the mills and other secondary industries as well as providing a safe and efficient transportation network for the region cannot be easily quantified beyond the impacts of construction activities and travel time savings. Providing an improved transportation network in the region does make an impact in terms of improving the per capita income in areas of the country that are below the national average which is a goal of the TIGER Discretionary Grant program.

The BCA was calculated using the following key factors for evaluation:

- Construction Costs
- Operation and Maintenance Costs
- Forecasted Traffic
- Travel Speeds and Congestion
- Historic Crash Data
- Vehicles Miles Traveled
- Traffic Distribution by Vehicle Type
- Value of Time

The construction cost estimate for the improvement of the two structures along Highway 92 is \$1.93 million. These costs reflect basic construction costs that would be incurred if the project were built using traditional construction methods and schedules. A 3% inflation rate was applied to calculate future benefits and a 4% construction cost inflation rate was used to calculate future construction and maintenance costs. Additionally, a 3% discount rate was used to bring future benefits and costs to present value.

Maintenance costs are also reported in this section. The two scenarios (replacing the bridges versus leaving the weight-restricted bridge in place) are different in the future maintenance needs and the road user costs. Without the bridge replacement, trucks used in the timber industries will face a significant detour to avoid steep grades and the weight-restricted routes and bridges. The costs of bridge maintenance have been taken into account and brought to present value. Costs associated with bridge construction and maintenance activities are reported in Attachment 1 of Appendix B.

The BCA value of time analysis quantifies the road user impacts that the Highway 92 bridge improvements would have in terms of travel time savings by first determining the amount of travel time saved and then assigning a dollar value for this time. This includes differentiating time valuations by trip type, assuming passenger vehicle trips will not be impacted by the replacement of the structures since they are not subject to the detours caused by the weight-restrictions. The value of time for commercial vehicles was calculated as 100% of the total compensation. A vehicle occupancy rate of 1.0 person per commercial vehicle was used. Detailed worksheets showing factors considered for the Value of Time are included in Attachment 2 of Appendix B.

The impacts of the vehicle operating costs account for the actual cost to operate the vehicle, aside from the travel time costs. Again, it should be noted that only commercial vehicles are considered in this calculation because passenger vehicles are not subject to the detour of the weight-restricted bridges. The detailed worksheets for this calculation are shown in Attachment 3 of Appendix B.

The value of safety improvements considers cost savings that can be attributed to the reduction in travel distance by commercial vehicles, that will no longer have to detour through very congested conditions with a high volume of pedestrian movements. Crash rate reductions were estimated by determining the miles traveled along different facility types both under the

detour route and using an improved Highway 92. Detailed worksheets illustrating this analysis are included in Attachment 4 of Appendix B.

When examined as a single segment of improvements made within this corridor, the proposed bridge replacements along Highway 92 exhibits a net positive economic impact of 19.57.

VI. Project Readiness and NEPA

Due to the scope of the project, a Tier II Categorical Exclusion is expected without any significant environmental issues. It is anticipated that environmental clearance can be obtained within 180 days. Pending full funding of this grant application, Federal Highway Administration authorization to begin construction can be obtained within nine months.

VII. Federal Wage Rate Certification

The Federal Wage Rate Certification statement is located at www.arkansashighways.com/TIGER/T4/FWR.aspx.

VIII. Changes to the Pre-Application

There are no changes from the Pre-Application to the current final application.