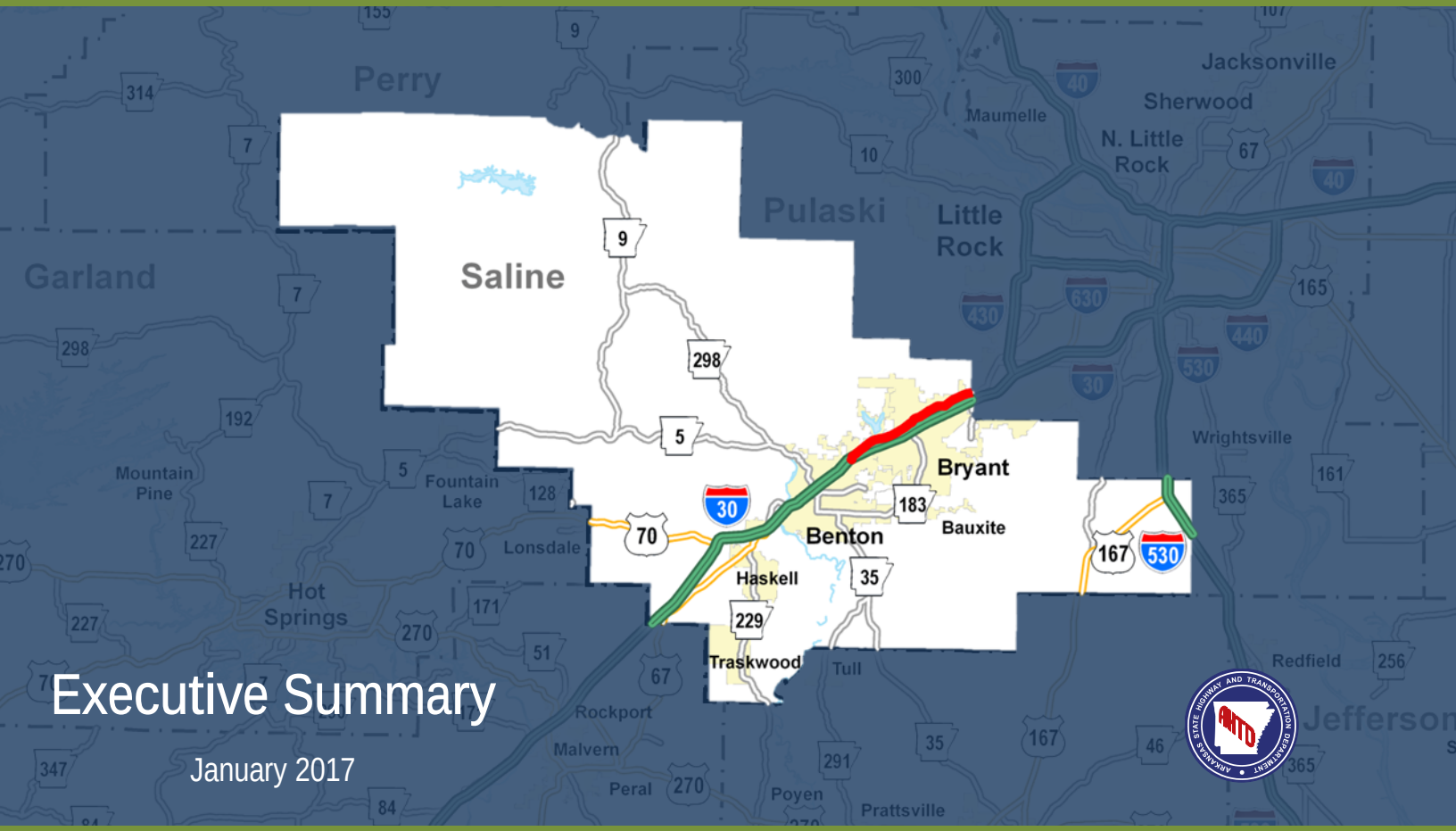
HIGHWAY 5 CORRIDOR IMPROVEMENT STUDY

BENTON (INTERSTATE 30) - PULASKI COUNTY LINE

SALINE COUNTY



Executive Summary

January 2017

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EXECUTIVE SUMMARY

Prepared by the Transportation Planning and Policy Division
Arkansas State Highway and Transportation Department
In cooperation with the Federal Highway Administration

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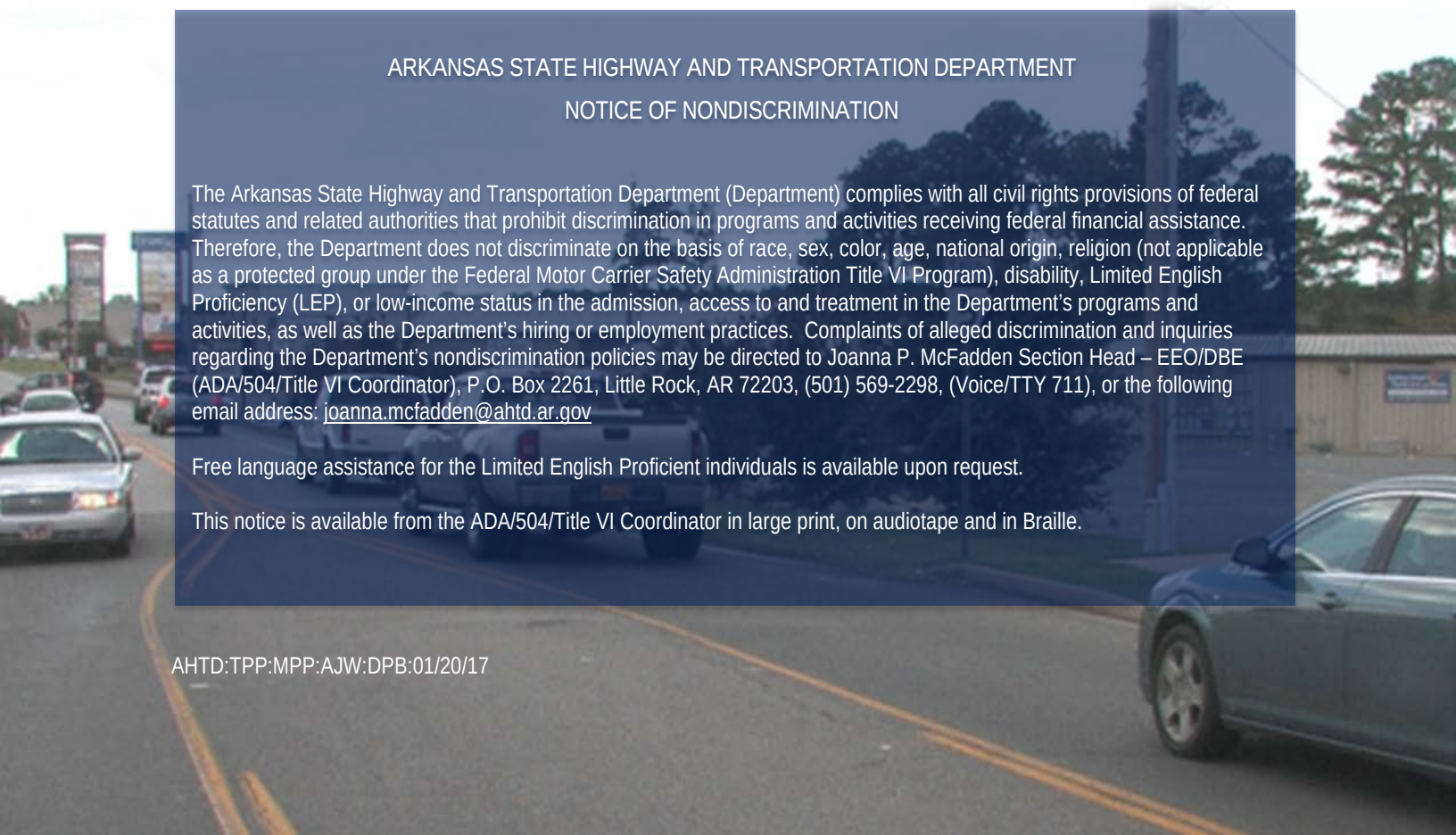

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

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INTRODUCTION

At the request of local officials, the Arkansas State Highway Commission passed Minute Order 2009-120, which authorized a study of needed improvements to approximately seven miles of Highway 5. The study limits are between Interstate 30 in Benton to the Pulaski/Saline County Line at Alexander Road in the City of Bryant, as shown in Figure ES-1.

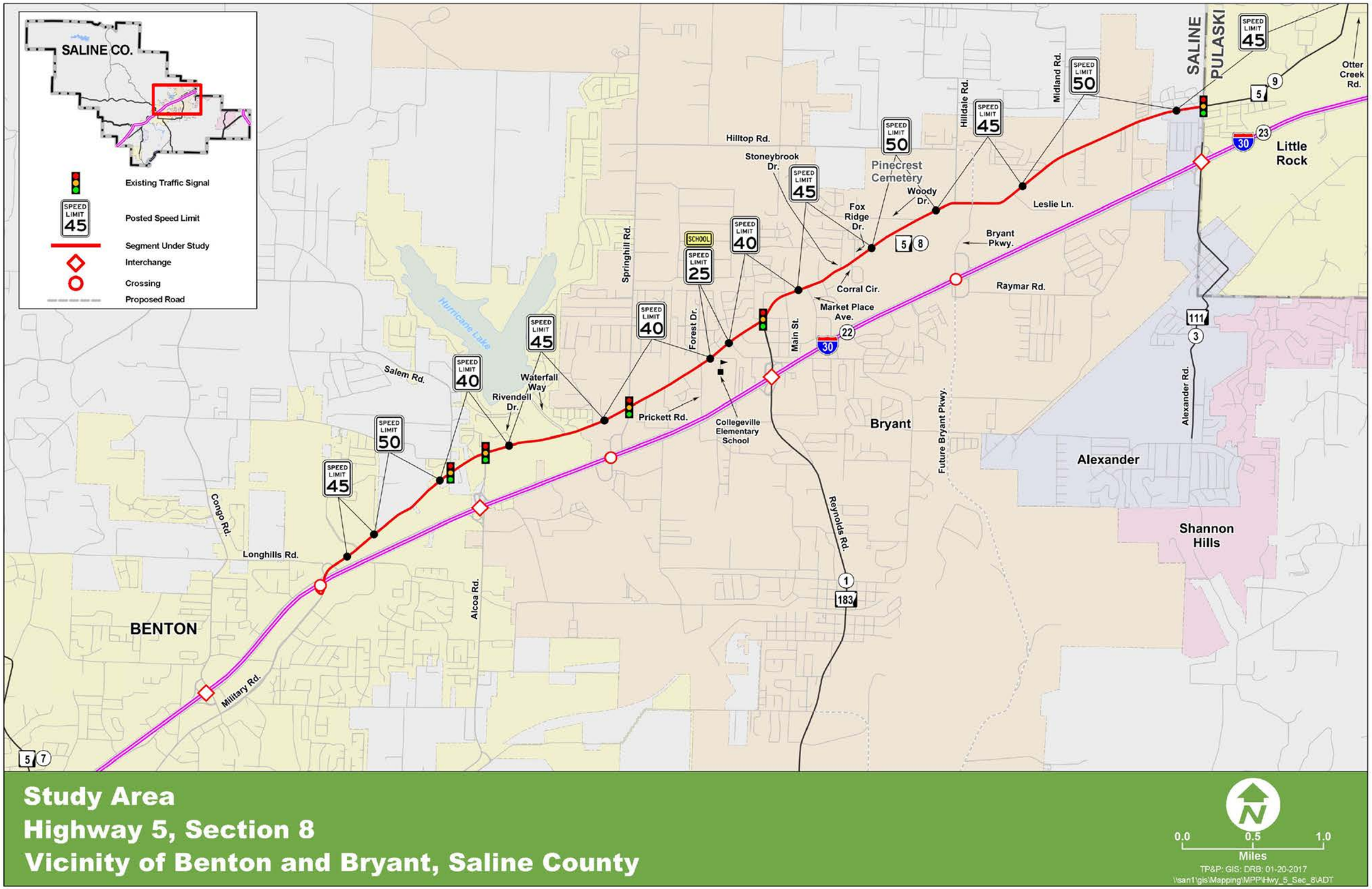
PURPOSE AND NEED

The purpose of this study is to identify needed improvements to Highway 5 to relieve traffic congestion and enhance safety for all roadway users. The study also considers typical roadway cross-sections and construction phasing for developing future improvement projects in the corridor.

EXISTING CONDITIONS

Highway 5 is a parallel arterial to Interstate 30. Highway 5 provides access to employment and commerce in Saline County, Pulaski County, and the greater central Arkansas region. It also serves as an alternate route for Interstate 30 during periods of congestion. Highway 5 consists of two 10-foot travel lanes with 4-foot paved shoulders between Interstate 30 and Springhill Road, and two 11-foot travel lanes with 4-foot paved shoulders between Springhill Road and Alexander Road. The signalized intersections along the corridor include left-turn lanes.

Figure ES-1 – Corridor Study Limits



TRAFFIC ANALYSIS

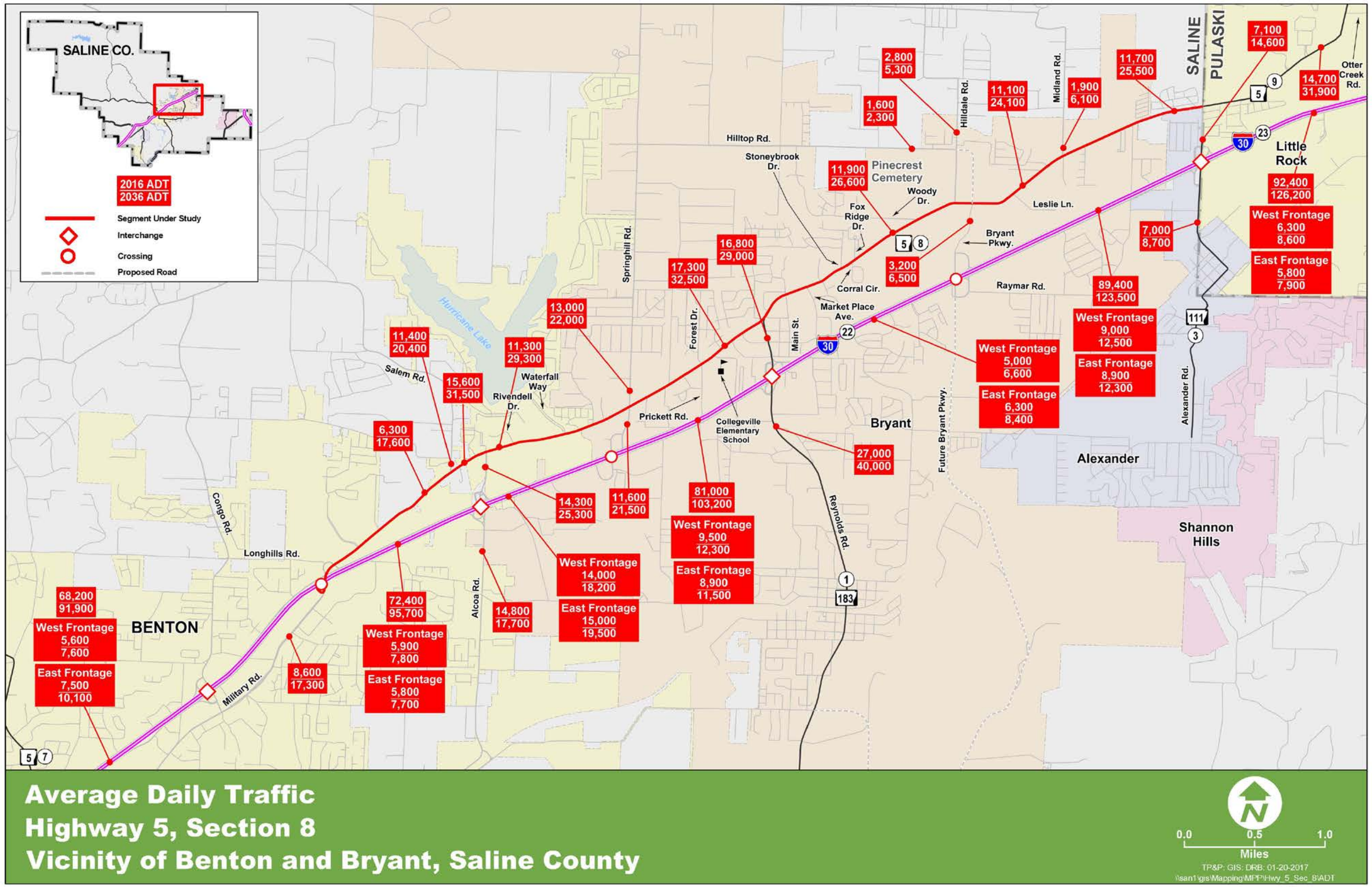
The current average daily traffic (ADT) along Highway 5 ranges from 6,300 vehicles per day (vpd) southwest of Salem Road to 17,300 vpd near Highway 183. Traffic volumes were projected to the year 2036 using historic growth trends and the Central Arkansas Regional Transportation Study (CARTS) Regional Travel Demand Model. Figure ES-2 shows the existing and forecast daily traffic volumes along Highway 5 and other roadways in the study area. The portion of Highway 5 that has the highest ADT is between Springhill Road and Highway 183. The growth trend is expected to continue for some time into the future due to the abundant desirable land for development and the reasonable commuting distance to major employment centers.

Traffic operations along Highway 5 were analyzed at major intersections through the corridor using a traffic analysis software package - Synchro (Version 8). The results of this analysis during both the morning and afternoon peaks are documented in Table ES-1. For future year analyses, signals at select major intersections were assumed.

Table ES-1 – Levels of Service at Signalized Intersections (No-Build)

Intersection	2016		2036	
	AM	PM	AM	PM
Salem Road	C	B	F	D
Alcoa Road	B	D	D	F
Waterfall Way	N/A	N/A	B	C
Springhill Road	D	E	E	F
Prickett Road/Forest Drive	N/A	N/A	A	F
Highway 183	C	F	F	F
Bryant Parkway	N/A	N/A	C	F
Midland Road	N/A	N/A	B	F
Alexander Road	B	B	B	C

Figure ES-2 – Estimated Average Daily Traffic (ADT)



The analysis indicated that unacceptable traffic operations will occur at most signalized intersections on Highway 5 during the afternoon peak, as well as at three signalized intersections during the morning peak. Traffic flow between signalized intersections would worsen as volumes exceed capacity and driveway densities in currently underdeveloped areas increase. The segments between Salem Road and Alcoa Road and between Highway 183 and Bryant Parkway are especially susceptible to service degradation if access is not managed in a reasonable manner.

SAFETY ANALYSIS

The corridor was divided into three distinct sections for the safety analysis. These sections were as follows:

1. Interstate 30 to west of Springhill Road
2. West of Springhill Road to Main Street (Bryant)
3. Main Street (Bryant) to Alexander Road (County Line)

Crash data for 2010 through 2014 were used to calculate crash rates as shown in Table ES-2. Crash rates are computed as the number of crashes per million vehicle miles (mvm) traveled for total crashes and per 100 mvm for fatal (K) and serious injury (A) crashes. The average KA crash rate for all sections between 2010 and 2014 exceeded the statewide average.

Most crashes of all severities were rear-end or angle crashes, which is common under congested traffic conditions. This is particularly common when a median or a two-way left-turn lane is not provided. Figure ES-3 shows all crashes during the 2010-2014 study period. Crash clustering is evident around the intersections and in the Springhill Road to Highway 183 section, which is the portion of the corridor with the highest traffic volumes.

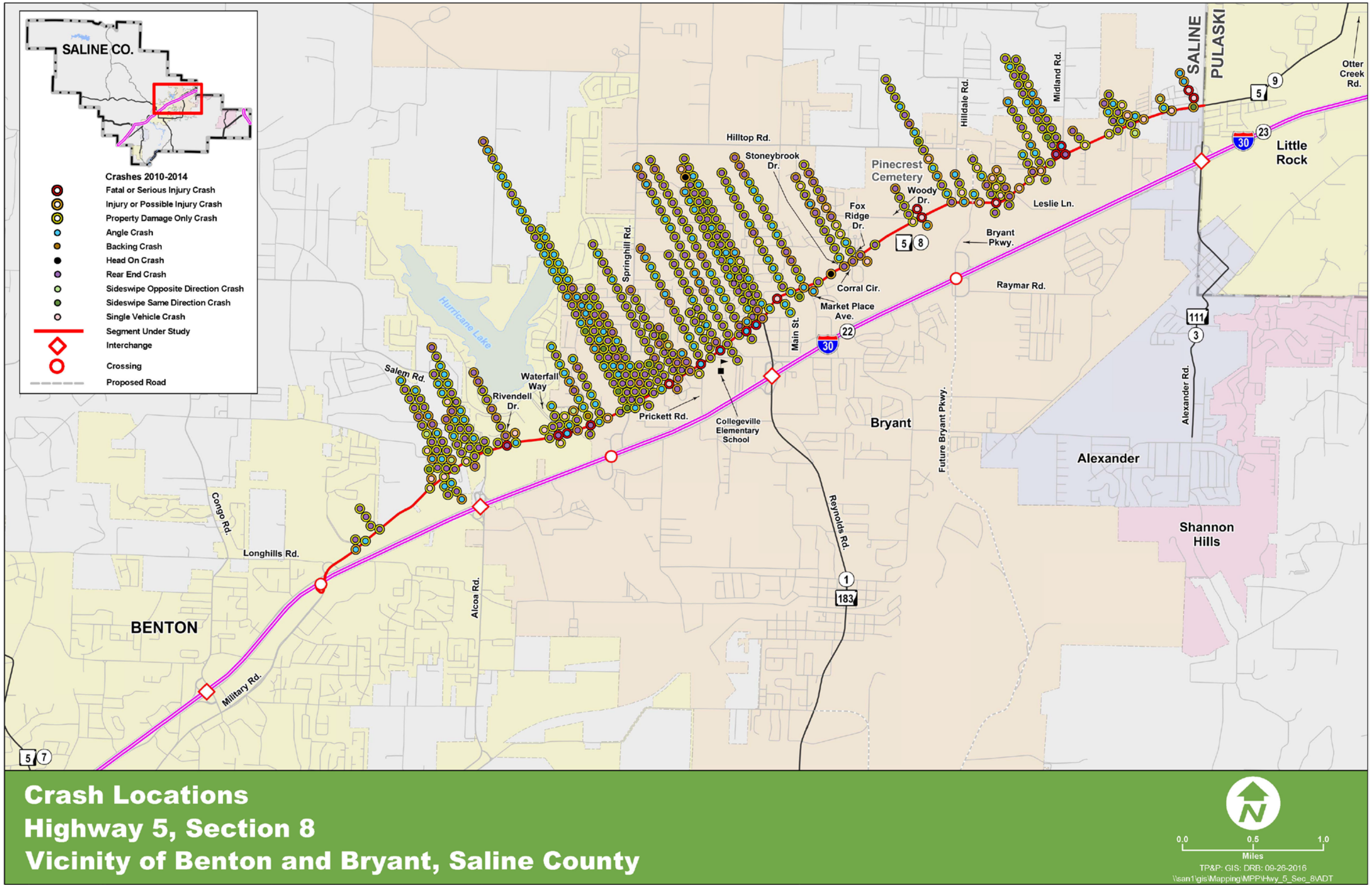
There are several locations along Highway 5 where sight distance is less than optimal due to roadway geometry, making it difficult for turning vehicles to judge appropriate gaps. Such locations include the curvature near Hilldale Road and Stoneybrook Drive.

Table ES-2 – Crash Rates (2010-2014)

Segment	Route/ Section/ Log Mile	Type of Roadway (Length)	Year	Weighted ADT	Number of Crashes(KA)	Crash Rate* (KA)**	Statewide Average Crash Rate*(KA)**
Interstate 30 to West of Springhill Road	Highway 5 Section 8 LM 0.42-2.54	Urban Two-Lane Undivided (2.12 Miles)	2010	8,800	22(0)	3.23(0.00)	2.90(8.93)
			2011	8,600	26(3)	3.91(45.08)	2.81(9.94)
			2012	8,700	26(0)	3.86(0.00)	2.78(11.43)
			2013	8,600	19(0)	2.86(0.00)	2.34(12.47)
			2014	9,500	24(1)	3.26(13.60)	2.37(11.53)
			Avg.	8,800	23.40(0.80)	3.42(11.74)	2.64(10.86)
West of Springhill Road to Main Street (Bryant)	Highway 5 Section 8 LM 2.54-4.13	Urban Two-Lane Undivided (1.59 Miles)	2010	12,800	46(1)	6.19(13.46)	2.90(8.93)
			2011	13,500	51(1)	6.51(12.76)	2.81(9.94)
			2012	14,300	69(1)	8.31(12.05)	2.78(11.43)
			2013	12,800	69(2)	9.29(26.92)	2.34(12.47)
			2014	13,700	46(1)	5.79(12.58)	2.37(11.53)
			Avg.	13,400	56.20(1.20)	7.22(15.56)	2.64(10.86)
Main Street (Bryant) to Alexander Road (County Line)	Highway 5 Section 8 LM 4.13-7.45	Urban Two-Lane Undivided (3.32 Miles)	2010	10,100	20(0)	1.63(0.00)	2.90(8.93)
			2011	10,300	27(0)	2.16(0.00)	2.81(9.94)
			2012	10,300	43(2)	3.45(16.02)	2.78(11.43)
			2013	10,000	31(2)	2.56(16.50)	2.34(12.47)
			2014	10,200	35(4)	2.83(32.36)	2.37(11.53)
			Avg.	10,200	31.20(1.60)	2.53(12.98)	2.64(10.86)

* Crash rates are expressed in per million vehicle miles traveled (MVM).
** KA crash rates are expressed in per 100 MVM.

Figure ES-3 – Highway 5 Study Corridor Crashes (2010-2014)



OTHER CONSIDERATIONS

Metropolitan Transportation Plan

The 2040 Metropolitan Transportation Plan (MTP) - Imagine Central Arkansas, was adopted in December 2014 by Metroplan, the designated metropolitan planning organization (MPO) responsible for long-range transportation planning for central Arkansas. Highway 5 is on the Regional Arterial Network, and improvements to the segment between Alcoa Road and Highway 183 are on the Financially Constrained Project List.

Regional Arterial Network

Metroplan has identified the Regional Arterial Network (RAN) since 1999 as a set of regionally significant non-freeway roads that emphasized connectivity and mobility. Highway 5 was identified as one of the RAN corridors to connect communities like Benton, Bryant, and Little Rock with an emphasis on higher mobility. In addition to serving local traffic, this route serves as an alternate route when Interstate 30 is disrupted due to congestion, incidents, weather, or other causes.

Bicycles and Pedestrians

The Central Arkansas Regional Transportation Study Regional Bikeways and Bike Plans map has designated Highway 5 as a Regional Bicycle Connector, providing a connection between the local bicycle trails in Little Rock, Bryant and Benton. Therefore, according to the Department's Bike and Pedestrian Policy, cyclist and pedestrian accommodations on this corridor will be constructed.

ENVIRONMENTAL CONSIDERATIONS

A cursory environmental review was conducted to identify any environmental constraints or conditions that warrant consideration in the planning or design process. The preliminary analysis indicated that there are cemeteries, National Register of Historic Places, wetlands, streams, and underground storage tanks that should be avoided during design.

DESCRIPTION OF ALTERNATIVES

Much of the Highway 5 corridor is semi-rural with homes and businesses generally set back from the highway, thus limiting potential widening conflicts. However, there are segments that are commercialized with numerous buildings relatively close to the highway. The segment of Highway 5 through Bryant, particularly between Springhill Road and Highway 183, is highly developed and will present widening challenges. The highway between Salem Road and Alcoa Road, primarily in Benton, is also developed with businesses close to the existing highway.

NO-BUILD ALTERNATIVE

This alternative would retain the existing two through lanes on Highway 5 from Interstate 30 in Benton to Pulaski County. As traffic volumes increase, excessive queueing and near gridlock conditions would occur as a result. Additionally, Highway 5 would serve poorly as an alternate route when travel on Interstate 30 is disrupted.

ALTERNATIVE 1 - FOUR LANES WITH A RAISED MEDIAN

Alternative 1 would widen the existing highway to four 11-foot through lanes with a 15-foot raised median. A 5-foot sidewalk with a 3-foot setback and a 4-foot bicycle lane on each side would be provided. This alternative would also provide periodic median breaks designed to accommodate U-turn movements. Combined with proper access management, this alternative would enhance mobility, safety, and proper land development along the corridor.

ALTERNATIVE 2 - FOUR LANES WITH A FLUSH MEDIAN (CONTINUOUS, TWO-WAY, LEFT TURN LANE)

Alternative 2 would widen the existing highway to four 11-foot through lanes with a 12-foot continuous, two-way, left turn lane. Similar to Alternative 1, a 5-foot sidewalk with a 3-foot setback and a 4-foot bicycle lane on each side would be provided. A four-lane highway with a flushed median allows direct left-turn access to adjacent land while removing left-turn vehicles from the travel lane.

INTERSECTION IMPROVEMENTS

In addition to widening Highway 5, Table ES-3 shows the intersection improvements for Alternative 1 and Alternative 2.

Table ES-3 – Intersection Improvements

Intersection	Improvements
Salem Road*	Two-lane left turn bay for southbound (SB) Salem Road to northbound (NB) Highway 5 movement
Alcoa Road	Two-lane right turn bay for NB Highway 5 to SB Alcoa Road movement
Springhill Road	Four lanes on Springhill Road; two-lane left turn bays for NB Springhill Road to SB Highway 5 and SB Springhill Road to NB Highway 5 movements; designated right turn bay for SB Highway 5 to NB Springhill Road movement
Highway 183	Two-lane left turn bays for NB Highway 183 to SB Highway 5 and SB Highway 5 to SB Highway 183 movements
*Proposed improvements should be reinvestigated if direct connection between Salem Road and the Interstate 30 frontage road is constructed.	

The Highway 183 intersection would benefit with a designated right turn bay for the northbound Highway 5 to southbound Highway 183 movement. However, physical constraints may prevent the necessary future expansion.

ACCESS MANAGEMENT

An access management plan should be strongly considered in conjunction with any improvements. Bryant has identified Highway 5 as one of four arterials in the area that the Bryant Planning Commission deemed appropriate for consideration of access management plans. The *Benton Master Street Plan* authorizes the City to adopt and implement individual access management plans for arterial roadways in conjunction with roadway improvements.

COST ESTIMATE

The total estimated cost for Alternative 1 is $55.2 million (in 2016 dollars), of which $41.8 million is the construction cost. The total estimated cost for Alternative 2 is $57.4 million (in 2016 dollars), of which $43.5 million is the construction cost. The total estimated costs include preliminary and construction engineering, right of way, and utilities.

ANALYSIS OF ALTERNATIVES

Traffic operations at intersections along the Highway 5 corridor under the build alternatives (Alternatives 1 and 2) and the No-Build Alternative were evaluated. The results of this analysis are shown in Table ES-4. At the planning level, the two build alternatives will operate very similarly, and both alternatives have superior operations compared to the No-Build alternative. Both build alternatives would provide a safer corridor for pedestrians and cyclists than the existing highway, which generally has no sidewalks and narrow shoulders.

Table ES-4 – Levels of Service at Signalized Intersections (Build)

Intersection	No-Build Alternative				Build (Alternatives 1 and 2)			
	2016		2036		2016		2036	
	AM	PM	AM	PM	AM	PM	AM	PM
Salem Road	C	B	F	D	B	B	C	D
Alcoa Road	B	D	D	F	B	C	D	D
Waterfall Way	N/A	N/A	B	C	N/A	N/A	B	B
Springhill Road	D	E	E	F	B	C	C	D
Prickett Road/Forest Drive	N/A	N/A	A	F	N/A	N/A	B	B
Highway 183	C	F	F	F	B	C	C	D
Bryant Parkway	N/A	N/A	C	F	N/A	N/A	C	D
Midland Road	N/A	N/A	B	F	N/A	N/A	B	C
Alexander Road	B	B	B	C	B	B	B	C

CONCLUSIONS

Highway 5 is an important arterial in Saline and Pulaski Counties. In addition to serving local traffic, Highway 5 also functions as an important alternate route for Interstate 30. Highway 5 has also been designated as a future regional bicycle connector. This study was conducted to identify needed improvements to Highway 5 between Benton and Bryant that would relieve traffic congestion and enhance safety for all users.

An analysis of traffic operations indicated that two signalized intersections (Springhill Road and Highway 183) currently operate at an unacceptable level of service during peak hours. Anticipated traffic growth will result in additional congestion in the future. Frequent turns from through travel lanes result in stop-and-go conditions. A safety analysis identified the fatal and serious injury crash rates for all segments of the study area exceeded the statewide average. This analysis also indicated reduced sight distance due to poor geometry in the vicinity of Hilldale Road and Stoneybrook Drive.

The No-Build Alternative would not meet the needs of the study area and would not address existing and worsening congestion and safety issues throughout the corridor. Either build alternative would provide acceptable operations on typical days, improve safety performance, and improve the functionality of Highway 5 to serve as a relief route for Interstate 30. Both build alternatives would also provide improved accommodations for pedestrians and cyclists. According to the Transportation Research Board's Access Management Manual (2nd Edition), the implementation of raised medians and access control produces a safer corridor. Regardless of the alternative chosen, a long term access management plan for the corridor should be considered.

CONSTRUCTION PHASING

Due to the limited funding available for the many transportation needs statewide, corridor improvements should be prioritized and then scheduled based on available funding. The most pressing need is the commercialized portion of the corridor in Bryant. The 2016-2020 Statewide Transportation Improvement Program (STIP) provides $12.6 million in funding to improve the segment between Alcoa Road and Highway 183. The STIP also provides $5.3 million in funding to improve Highway 5 between Interstate 30 and Alcoa Road. Other capacity improvements (with geometric improvements where applicable) between Highway 183 and Bryant Parkway and between Bryant Parkway and Alexander Road should be scheduled

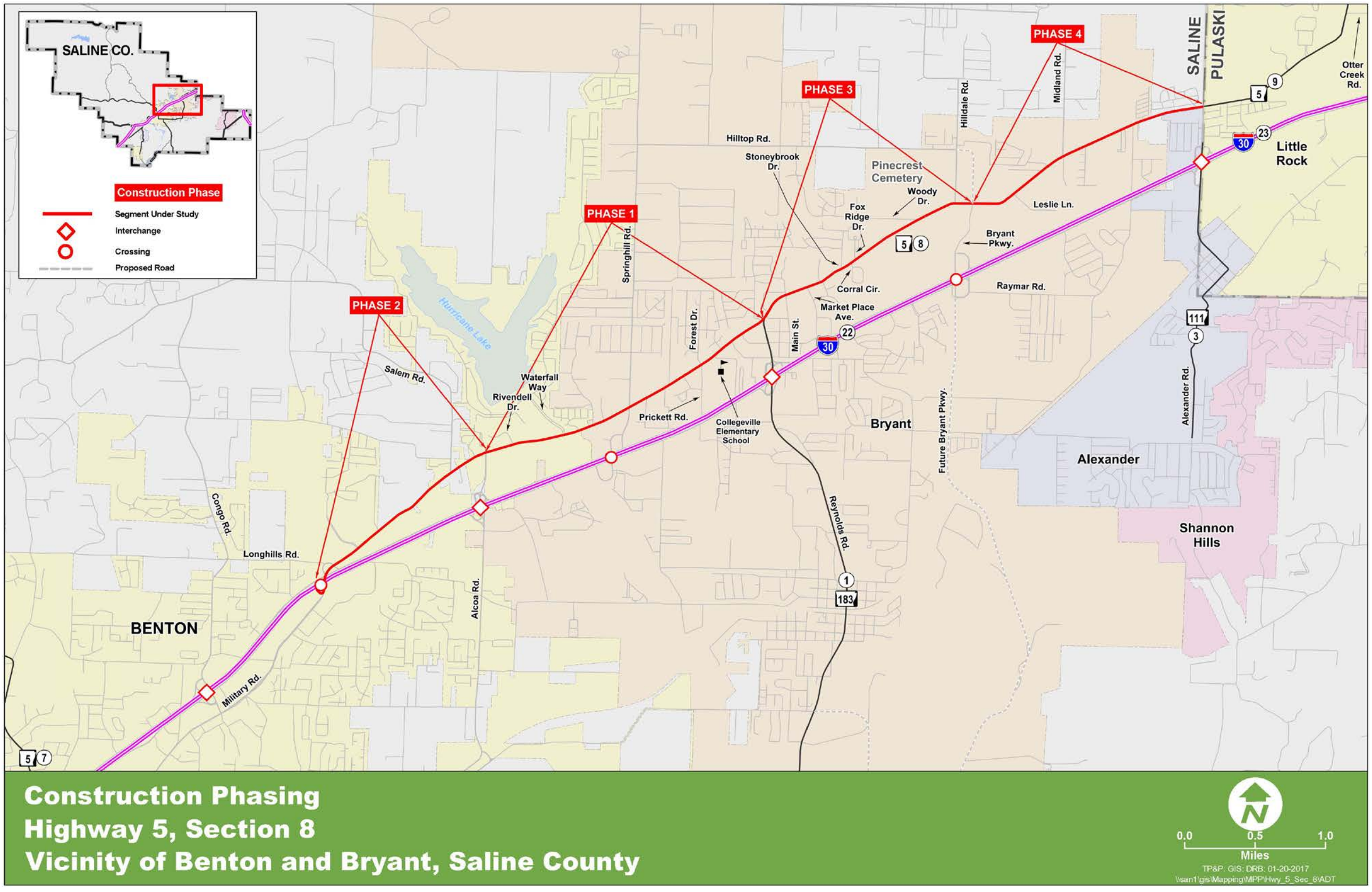
as priorities warrant and funds become available. Table ES-5 summarizes the costs for each phase in 2016 dollars. Figure ES-4 illustrates the phase locations.

Table ES-5 – Phasing Cost Summary

Phase	Job	Termini	Length (miles)	Construction Cost* (millions)	Total Cost* (millions)
1	061335	Alcoa Road - Highway 183	2.22	$14.9	$19.7
2	061508	Interstate 30 - Alcoa Road	1.25	$7.7	$10.1
3	-	Highway 183 - Bryant Parkway	1.76	$10.7	$14.1
4	-	Bryant Parkway - Alexander Road	1.82	$10.2	$13.5
*All costs are based on Alternative 2.					

Due to the high cost associated with widening, cost sharing arrangements with local jurisdictions should be explored. At a minimum, possible removal of highways from the State Highway System should be considered.

Figure ES-4 – Recommended Phasing



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