ARDOT Job 090069

NORTHWEST ARKANSAS NATIONAL AIRPORT ACCESS

Environmental Assessment



January 2021



U.S. Department of Transportation Federal Highway Administration





NORTHWEST ARKANSAS NATIONAL AIRPORT ACCESS

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Environmental Assessment

Submitted pursuant to:

The National Environmental Policy Act 42 U.S.C. §4322(2)(c) and 23 C.F.R. §771

Submitted by:

FEDERAL HIGHWAY ADMINISTRATION

and

ARKANSAS DEPARTMENT OF TRANSPORTATION

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In compliance with the National Environmental Policy Act, this Environmental Assessment describes the proposed project to provide a roadway that would connect the Northwest Arkansas National Airport (XNA) to Hwy. 612 (Springdale Northern Bypass) in Benton County, AR. The analysis did not identify any significant adverse environmental impacts and identifies the New Location Alternative as the Preferred Alternative.

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This Environmental Assessment is also available for review online at: http://www.arkansashighways.com/

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January 21, 2021

Date of Approval



U.S. Department of Transportation

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Chapter 1 – Purpose and Need

Chapter 1 describes current transportation problems, explains how the proposed project could resolve these problems, and outlines the project's lead agency roles.

1.1 What is the proposed project?

The Federal Highway Administration (FHWA), in cooperation with the Arkansas Department of Transportation (ARDOT) and the Northwest Arkansas National Airport (XNA), are proposing an improved connection between XNA and the Springdale Northern Bypass (SNB). The SNB is also known as Highway (Hwy.) 612. The project area is shown on **Figure 1**.

1.2 What is the history of the proposed project?

The Northwest Arkansas Regional Airport Authority was formed to evaluate, plan, and develop a new commercial airport to serve the air trade area of Northwest Arkansas. To accomplish this, the Authority prepared a feasibility study, site selection study, master plan, and an Environmental Impact Statement (EIS) to aid in a location for the new airport. The airport began operations at its current location in 1998.

In 1999, an EIS was initiated to identify a better access road from Interstate 49 (I-49) to the airport. Work on this EIS continued through 2019. Over the course of the EIS study (19 years), the project area, population, property development, and area roadways changed substantially. Because of these changes, especially the completion of the SNB from I-49 to Hwy. 112, the scope of the project was reduced and, in 2019, the EIS was terminated, an Environmental Assessment (EA) was initiated, and the airport changed its named to the Northwest Arkansas National Airport. **Figure 2** presents a summary and timeline of the activities related to the proposed access road.

1.3 What are the existing conditions in the project area?

Population Characteristics

The project area is located in Northwest Arkansas in Benton County. Benton County, and adjacent Washington County, have experienced substantial population growth since 2000 (**Table 1**: Population Growth). The larger cities within these counties include Rogers, Fayetteville, Springdale, and Bentonville. The smaller towns include Highfill, Elm Springs, and Caves Springs. According to the U.S. Census Bureau, Northwest Arkansas experienced a considerable population growth from 2000 to 2019. Project area cities and towns experienced between 51% and 378% growth in population as compared to an average growth for the state of 13%. The Fayetteville-Springdale-Rogers area was the 14th fastest growing metro area in the United States in 2017 (Holtmeyer, 2018).



Figure 1: General Project Location

Figure 2: History of XNA Access Road



Location	2000	2019*	Change	% Change
State of Arkansas	2,673,400	3,017,804	344,404	13%
Benton County	153,406	279,141	125,735	82%
Cave Springs	1,103	5,276	4173	378%
Highfill	379	635	256	68%
Rogers	38,829	68,669	29,840	77%
Bentonville	19,730	54,909	35,179	178%
Washington County	157,715	239,187	81,472	52%
Elm Springs	1,004	2,472	1468	146%
Fayetteville	58,047	87,590	29,543	51%
Springdale	45,798	81,125	35,327	77%

Table 1: Population Growth

*Annual Estimates of the Resident Population for Incorporated Places and Counties in Arkansas: April 1, 2010 to July 1, 2019. Retrieved August 20, 2020.

According to the website Talk Business and Politics (2016), the growth in Northwest Arkansas has been related to an influx of higher paying jobs that resulted in continued investment in local cities and businesses. The presence of several growth oriented business makes this area an attractive place for people to live and work. A growth oriented business has the potential to generate significant revenue within one or more trading sector industries. Employers that have influenced growth in Northwest Arkansas include Walmart Stores in Bentonville, Tyson Foods in Springdale, the University of Arkansas in Fayetteville, and J.B. Hunt Transport Services, Inc. in Lowell. Other major employers within Benton and Washington Counties include Ozark Mountain Poultry, Inc., Simmons Foods, PAM Transportation Services, Inc., and Harps Food Stores.

The region has witnessed massive quality-of-life investments over the past decade that spurred consistent population growth. The investments include the construction of Arvest Ballpark, the Razorback Regional Greenway, the Walmart AMP, the Scott Family Amazeum, and a major renovation to Walton Arts Center. Additional community enhancements include the Crystal Bridges Museum of American Art, Brightwater, Theatre Squared, Bike NWA, and Downtown Bentonville, Inc. Outdoor recreation ammenities such as walking, biking, and running trails have also increased.

Existing Transportation Network

Figure 3 shows the highway system that surrounds XNA. I-49 is located about five miles east of the project area and is the primary interstate highway that provides access to Northwest Arkansas from Missouri to the north and I-40 to the south. From I-49, the most direct routes to XNA are provided by Hwy. 264, Hwy. 112, Hwy. 12, and the SNB.

Hwy. 264 is a two-lane east-west road that provides a connection between the south entrance of XNA and the towns of Highfill, Healing Springs, Cave Springs, and I-49. Hwy. 264 along this section does not have shoulders and has two 90-degree curves requiring very slow speeds.

Hwy. 112 is a two-lane north-south highway that passes through Cave Springs and connects to the SNB in the project area and to Bentonville to the north and Elm Springs to the south. Hwy. 112 will serve as the backbone of future growth west of I-49, but runs directly through downtown Cave Springs with reduced speeds and congestion.

Hwy. 12/SW Regional Airport Boulevard (Blvd.) provides access to the north entrance of XNA from Bentonville and northern Highfill. Hwy. 12 is a two-lane roadway that provides a connection to I-49 from Hwy. 71B (SE Walton Blvd.) in Bentonville and to Centerton via Hwy. 279.

The SNB (Hwy. 612 on Figure 3) is a four-lane highway located about 2.5 miles south of Cave Springs that has fully-controlled access and provides a direct connection between Hwy. 112 and I-49. The SNB would eventually tie into Hwy. 412 to the south of the project area.

Airport Blvd. and Regional Avenue (Ave.) are located on the east side of XNA. Airport Blvd. connects Hwy. 264 to Regional Ave. on the south side of the airport. Regional Ave. provides a connection between Airport Blvd. and Hwy. 12 at the north entrance of XNA.

Northwest Arkansas has been an area of growth for over 20 years which has resulted in transportation improvements to local, state, and interstate roadways. **Figure 4** shows some of the important roadway improvement projects within or near the project area. These projects include the SNB, Hwy. 112 corridor improvements, and the Hwy. 264 bridge over Little Osage Creek. The SNB project would construct the remainder of the western half of the SNB to Hwy. 412 and is considered as an essential east-west bypass corridor improvement. The Hwy. 112 corridor improvements projects would widen approximately 20 miles of Hwy. 112 from Fayetteville to Bentonville. The Little Osage Creek project consists of the replacement of the Hwy. 264 bridge over Little Osage Creek. Major projects near the project and under construction include the Hwy. 71B interchange and construction of Hwy. 549, the Bella Vista Bypass.



Figure 3: Existing Transportation Network



Figure 4: Planned Transportation Projects

Enplanement Growth

The population growth in Northwest Arkansas, as described above, has resulted in the increased demand for air travel. In 2019, XNA saw a 17% increase in passengers, representing substantial growth for a small-hub

An **enplanement** is one person boarding an airplane.

airport. The number of passengers using XNA in 2019 was 64% higher than in 2011, and the airport has experienced eight consecutive years of passenger growth. A study conducted by Mead and Hunt (2020) predicts enplanements at XNA will double by 2033 and more than triple by the end of the 20-year planning period to approximately 2.9 million annually. As passenger volumes and airport-related employment have increased, so has the volume of traffic to and from the airport and on the local roadway network.

1.4 Why are improvements needed?

Existing and Future Traffic Conditions

Access to XNA is provided by Hwy. 264 to the south and Hwy. 12 to the north. Both roads are winding, narrow, mostly two-lane highways. Due to poor connectivity between I-49 and the XNA, motorists must use local roads to and from I-49 to get to the airport resulting in misdirection, longer travel times, and delay.

Connectivity

Connectivity refers to the number of links in a transportation network and how directly travelers can reach their destinations. As connectivity increases, travel distances decrease and route options increase. The concept of connectivity primarily relates to developed areas, where the design of local street networks can have a significant impact not only on trip lengths, but also on overall network performance. In addition, connectivity improvements can have a significant impact on local travel patterns. Due to a lack of connectivity between Interstate 49 and XNA, motorists traveling between these points must use local roads, resulting in misdirection and longer travel times.

Both access roads to XNA, Hwy. 264 and Hwy. 12, are minor arterials with deficient horizontal geometry in the vicinity of XNA. To the south, Hwy. 264 has a posted speed limit of 55 mph, though 0.5 mile east of the airport entrance, drivers encounter sharp 90-degree reverse curves with a posted advisory speed of 20 mph. Approaching from the south or east, Hwy. 264 provides an indirect route to the airport by forcing traffic through downtown Cave Springs.

Approaching from the north via Hwy. 71B (Walton Blvd.), drivers encounter an urbanizing corridor with traffic signals, varying lane configurations, and a series of sharp 90-degree curves. Walmart Distribution Centers are located along Hwy. 12, providing an additional source of heavy truck traffic. North of XNA, Hwy. 12 is posted for 55 mph but has a sharp curve just north of the airport property with an advisory speed of 25 mph.

Resiliency

FHWA Order 5520 establishes FHWA policy on preparedness and resilience to climate change and extreme weather events and for integrating resilience into long-range transportation planning. The policy encourages state departments of transportation to develop, implement, and evaluate riskedbased and cost-effective strategies to minimize climate and extreme weather risks and improve resiliency to protect critical infrastructure using the best available science, technology, and information.

For this study, resiliency was evaluated by identifying failure critical infrastructure along the corridor and determining if failures at these locations would result in a significant increase in travel distance. Locations which tend

Resiliency is defined as the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruption (FHWA 2014) and to focus on the ability to prepare for and recover from disasters and disruptive events (Dix et al. 2018).

to flood were also noted. Hwy. 112 has notable flooding tendencies, particularly on the segment just north of the SNB, which provides access to XNA. Hwy. 264 also has several locations which are prone to flooding, necessitating road closures on both the east and west sides of the south airport entrance. Hwy. 264 flooded twice in 2019, resulting in temporary road closures and causing delays for people traveling to or from XNA.

Congestion

While the primary study area for this project is bounded by Hwy. 12 to the west and the SNB to the east and encompasses the area south of XNA, including Hwy. 264, the entire network system was considered in the congestion evaluation.

In 2018, much of the extended study area corridors operate at fair or better than fair condition, except for a few notable areas along I-49, Hwy. 71B, Hwy. 102, and Hwy. 112. With the exception of Hwy. 112 which will be widened from two lanes to four lanes in a future separate project, the 2040 No-Action traffic conditions are anticipated to worsen along the above corridors as well and other areas in the extended study area. **Table 2** identifies the areas with unacceptable congestion levels. The Traffic Study is provided in **Appendix A**.

Route	Segment	2018 Congestion Levels	2040 Congestion Levels
	Washington County Line to Hwy. 264	Poor	Very Poor
I-49	Hwy. 264 to Hwy. 71B	Fair	Very Poor
	Hwy. 71B to Hwy. 102	Good or Better	Very Poor
I-49 Hwy. 12 Hwy. 62 Hwy. 71B Hwy 102	Regional Ave. to West of Mill Dam Rd.	Good or Better	Fair
	West of Mill Dam Rd. to SW Shell Rd.	Fair	Poor
пwy. 12	SW Shell Rd. to SW I St.	Good or Better	Very Poor
	SW I St. to Hwy. 71B	Very Poor	Very Poor
Hwy. 62	I-49 SB Ramp to I-49 NB Ramp	Very Poor	Very Poor
	Hwy. 72 to SE 18th St.	Very Poor	Very Poor
	SE 18th St. to SE 28 th St./Airport Rd.	Fair	Poor
Hwy. 71B	SE 28 th St./Airport Rd. to I-49	Very Poor	Very Poor
	I-49 to 46th St.	Fair	Very Poor
	Dixieland Rd. to N 8th St.	Fair	Fair
	N Vaughn Rd. to Hwy 102 Spur/S Fish Hatchery Rd.	Fair	Poor
	SW Elm Tree Rd. to SW I St.	Fair	Very Poor
Luny 102	SW I St. to Hwy. 71B	Poor	Very Poor
riwy 102	Hwy. 71B to SE J St.	Very Poor	Very Poor
	SE J St. to SE Moberly Ln.	Poor	Very Poor
	SE Moberly Ln. to I-49	Very Poor	Very Poor
Hwy. 112	Washington County Line to Hwy. 12	Poor	Good or Better
	Airport Blvd. to Bush Arbor Rd.	Fair	Poor
	Bush Arbor Rd. to Hwy. 112	Good or Better	Fair
Hwy. 264	Hwy. 112 to Rainbow Rd.	Good or Better	Fair
	Rainbow Rd. to West of Goad Springs Rd.	Good or Better	Poor
	West of Goad Springs Rd. to Hwy. 71B	Very Poor	Very Poor
Airport Blvd.	Airport Entrance to Hwy. 264	Good or Better	Very Poor
SW I St.	Hwy. 12 to Hwy. 71B	Fair	Very Poor

 Table 2: Congestion Levels

Source: Garver 2020

1.5 What is the purpose of this project?

As the population grows in Northwest Arkansas and activity at XNA also grows with increasing enplanements and movement of goods, the purpose of the proposed project is to provide an improved connection between XNA and the SNB that reduces congestion and increases reliability.

1.6 Who is the lead agency for this project?

The FHWA is the lead agency and has the primary responsibility for the content and accuracy of this EA in accordance with the National Environmental Policy Act (NEPA).

1.7 What is the purpose of this Environmental Assessment?

This EA is being prepared to:

- Explain the purpose and need of the project.
- Describe the alternatives considered for implementing the project.
- Evaluate the social, economic, and environmental effects of the alternatives.
- Inform and receive feedback from the public and local officials about the potential impacts of the proposed project.
- Determine whether effects are significant and require an Environmental Impact Statement or if the project effects can be sufficiently documented through this EA and a Finding of No Significant Impacts (FONSI).

What are **significant** impacts?

NEPA regulations do not provide specific thresholds to determine if project impacts are considered significant, but they do discuss the process that should be used to evaluate impacts.

Consideration is given both to context of the setting, and intensity, which is the severity of the impacts. A Finding of No Significant Impact (FONSI) presents the reasons why an action will not have significant environmental effects and therefore does not require preparing an Environmental Impact Statement. Based on analyses and project feedback received to date, the ARDOT anticipates preparing a FONSI for this project.

Chapter 2 – Alternatives Development

Chapter 2 identifies the project limits, explains how project alternatives were developed, describes the public involvement process, and details the alternatives evaluated in this EA.

2.1 What are the project limits and why were they chosen?

The project limits include the south entrance to XNA at Hwy. 264 as the northern terminus and the SNB as the southern terminus. These project limits were selected to provide the closest direct connection from XNA to a major regional highway system.

2.2 What alternatives are evaluated in this EA?

Four alternatives are evaluated in this EA: No Action Alternative, New Location Alternative, Partial New Location Alternative, and Improve Existing Highways Alternative. A discussion of the planned Hwy. 112 improvements project is included below and in Chapter 3 but it is not an alternative in this study. A map of the action alternatives is provided in **Figure 5**.

No Action Alternative

The No Action Alternative would involve maintenance activities and planned improvements to area roadways that currently provide access to the XNA airport. Selection of the No Action Alternative would avoid a major state and federal expenditure and impacts to the economic, natural, and social environments directly related to this project.

NEPA requires including a "**No Action**" alternative in environmental analysis. Although it is unlikely to meet the project's purpose and need, the "No Action" alternative provides a baseline against which the other alternatives can be compared.



Figure 5: Alternative Alignment Locations

New Location Alternative

The New Location Alternative shown on Figure 6 would be a fully-controlled access highway facility approximately 4.6 miles long with a new grade separated trumpet-type interchange at the SNB. A layout of the proposed trumpet interchange is provided on Figure 7. This interchange would be designed to connect to the future location of the SNB between Hwy. 112 and Hwy. 412. The SNB would need to be extended west approximately one mile from its current terminus at Hwy. 112 to meet the New Location Alternative interchange. This future interchange location was identified based on interchange spacing requirements by FHWA and consideration of environmental impacts. This alternative would then extend north and west from the SNB on a new alignment to an at-grade intersection at Hwy. 264 east of the existing entrance road to XNA. The typical section would consist of a four-lane divided highway with a 60-foot-wide depressed grass median, six-foot-wide inner shoulders, and 10-foot-wide outer shoulders. The design speed would be 70 mph. Overpasses would be located at three local roads: Holmes Rd., Haden Rd., and Wager Dr. Bridges would also be constructed over Little Osage Creek and Osage Creek. The estimated cost for right of way (ROW) acquisition and construction of this alternative is approximately \$85.6 million. The typical section of the New Location Alternative is shown on Figure 8.

A **fully-controlled access highway** is one where vehicles can only enter or exit the roadway via ramps at interchanges. These facilities are designed for higher speeds with a preference to through traffic.

A partially-controlled access highway is one where vehicles may enter or exit the roadway via ramps at interchanges, but also at-grade at selected major public intersections. These types of facilities also limit the number of private driveway connections.

Partial New Location Alternative

The Partial New Location Alternative would be approximately 4.3 miles long with 2.7 miles on new location paralleling Colonel Myers Rd. to the east with full access control and 1.6 miles of improvements to Hwy. 112 and Hwy. 264 with partial access control. A roundabout is proposed at Colonel Meyers Rd. and Hwy. 264. The two consecutive 90-degree curves near Brush Harbor Rd. would be replaced with a straighter and safer alignment. The typical section for both full and partial control sections would consist of four lanes with a 15-foot-wide raised grass median, curb and gutter, and a 45 mph design speed (Figure 8). This alternative would have at-grade intersections at Hwy. 112 and Hwy. 264. Overpasses would be located at Farrar Rd. and Kelly Rd. Bridges would be constructed over Little Osage Creek and Osage Creek. The estimated cost for ROW and construction of this alternative is approximately \$66.4 million. The Partial New Location Alternative is shown on **Figure 9**.



Figure 6: New Location Alternative



Figure 7: Trumpet Interchange - South end of New Location Alternative



Figure 8: Typical Sections



Typical Improvement Sections NORTHWEST ARKANSAS NATIONAL AIRPORT ACCESS ALTERNATIVES

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Figure 9: Partial New Location Alternative

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would be approximately 6.6 miles long and begin at the SNB and Hwy. 112 interchange. The improvements would follow existing Hwy. 112 towards Cave Springs. A bypass west of Cave Springs, beginning 400 feet south of East Ave. to 260 feet west of N. Allen Street (St.), would minimize substantial impacts to the homes, businesses, parks, and historic structures along Hwy. 112 in Cave Springs. After the bypass intersects Hwy. 264, the improvements follow Hwy. 264 west to the south entrance of XNA. The consecutive 90-degree curves on Hwy. 264 would be replaced with a straighter and safer alignment. The typical section would consist of four travel lanes, a 15-foot-wide raised grass median, curb and gutter, partial access control, and a 45 mph design speed (Figure 8). No overpasses would be provided. Bridges would be provided at Spring Creek, Osage Creek, and Little Osage Creek. The estimated cost for ROW and construction of this alternative is approximately \$57.1 million. **Figure 10** shows the Improve the Existing Highways Alternative.

Highway 112

At the request of the Northwest Arkansas Regional Planning Commission (NWARPC), the Metropolitan Planning Organization (MPO) for the Northwest Arkansas metro area, the Arkansas State Highway Commission authorized the study of 20 miles of Hwy. 112 from Fayetteville to Bentonville to determine the feasibility of improvements to address capacity and safety needs that would improve reliability, reduce congestion, reduce serious and fatal crashes, and develop an urban arterial that addresses all modes of transportation (NWARPC, 2018). The study was completed in 2015 and identified a preliminary Improvement Alternative that would widen Hwy. 112 from two to four lanes along the entire 20 miles. Project design is underway for two segments of Hwy. 112: Hwy. 412 to the SNB and the SNB to Hwy. 12.

Although improvements to only Hwy. 112 are not an alternative for this project, the future Hwy. 112 improvements that overlap with this study are already programmed and in development, and scheduled to be constructed within the near future. The overlap with the Hwy. 112 improvements projects for the Improve the Existing Highways Alternative is from the SNB to Hwy. 264. The overlap for the Partial New Location Alternative is from the SNB to Wagon Wheel Rd. There is no overlap with the New Location Alternative. An outline of the Hwy. 112 impacts is provided in Chapter 3 to identify impacts that would likely occur in the future regardless of which project, the XNA connector or the Hwy. 112 improvements, is funded first.

The project details have not been finalized for the separate Hwy. 112 projects, but the improvements and typical section are expected to be similar to those for Hwy. 112 from the SNB to Hwy. 264 as described above for the Improve the Existing Highways Alternative.



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Figure 10: Improve the Existing Highways Alternative and Hwy. 112 Improvements

2.3 How has the public been involved?

On December 5, 2019, a local officials' meeting and an open forum public involvement meeting were held at Trinity Grace Church in Rogers, Arkansas. A total of 196 people, 27 of which were local officials, attended the meetings. Maps showing the proposed alignments for the action alternatives were presented for review and comment. Eighty-three comment forms/emails and five letters were received. The complete public involvement meeting synopsis is included in **Appendix B**.

Additional communication with the public included a project website (https://xnaaccess. azurewebsites.net/) published in October 2019 to provide study information and updates. The website includes a project overview, frequently asked questions, information presented at the December 2019 public meeting, and project contact information.

2.4 How have government agencies been involved?

In December 2019, input from local officials was solicited regarding the proposed project. Additionally, federal and state resource agencies were provided maps and project information and asked to review the proposed study area and provide information or identify concerns they may have about the project impacts.

In addition, Section 163 of the Federal Aviation Administration Reauthorization Act of 2018, which concerns actions on or around an airport, was considered in the development of the action alternatives. If the project impacts the runway protection zone (RPZ) or any other component of the Airport Layout Plan (ALP), the project would require FAA review. Based on information provided by XNA through their coordination with FAA, participation in the EA process would not be required. Agency coordination is provided in **Appendix C**.

2.5 How have tribal governments been involved?

Section 106 of the National Historic Preservation Act requires federal agencies to consult with tribes where projects may affect tribal areas with historical or cultural significance. The FHWA initiated coordination with tribes having an active cultural interest in the area. The Tribal Historic Preservation Officers were given the opportunity to comment on the proposed project. The Osage Nation provided avoidance areas that contain significant historic properties for the Osage Nation. No other comments were received. A copy of the cultural resources report completed for the project would be provided to any tribes that request it. Tribal correspondence is provided in Appendix C.

Chapter 3 – Environmental Impacts & Mitigation

This chapter summarizes potential project impacts on people and the environment.

3.1 How were potential impacts evaluated?

Studies were conducted to determine how the proposed project would potentially impact the natural, cultural, and social environments. Results of studies and analyses that are not fully discussed in the following EA text are incorporated by reference or included in the appendices. Resources not impacted by the project are not discussed in detail. Potential impacts are changes or effects that may occur as a result of a proposed project. The impacts may be social or cultural, economic, or ecological. The terms "impact" and "effect" can be used interchangeably.

The analyses considered both the intensity of the effects and their duration (e.g., short-term during construction, or long term, remaining after

construction). The effects discussed in this chapter are presumed to be long-term unless otherwise noted and generally described as positive or negative. The analyses in this chapter are based on preliminary design of the three action alternatives. The anticipated Hwy. 112 impacts as a result of the proposed corridor improvements that overlap with the Improve the Existing Highways Alternative and Partial New Location Alternative are also included for informational purposes, to identify impacts that would likely occur in the future regardless of which project is funded first: XNA or the Hwy. 112 corridor improvements.

3.2 How would the project affect local traffic conditions?

From a connectivity standpoint, each of the action alternatives would reduce the overall trip duration for regional movements and from I-49 to XNA via the SNB. Additionally, the New Location Alternative and the Partial New Location Alternative would substantially reduce the travel distance from the SNB to XNA, as well as remove some of the XNA traffic from roads that serve local traffic, which improves safety and efficiency for all road users.

Travel Times

The travel times were all derived from the Northwest Arkansas Travel Demand Model. All values are measured from Airport Blvd. at Hwy. 264 to the Westbound ramp at the Hwy. 112/SNB interchange. **Table 3** below shows the results for each Alternative and the comparison with the 2040 No Action Alternative. All three action alternatives perform better than the No Action Alternative with regard to travel times with the New Location Alternative having the shortest travel time.

Alternative	Length (miles)	Average ADT	AM Travel Time (Min)	PM Travel Time (Min)
2040 No Action	6.63	13,246	8.19	8.80
2040 New Location Alternative	4.60	18,814	4.99	5.04
2040 Partial New Location Alternative	4.34	14,960	5.76	5.97
2040 Improve Existing Alternative	6.63	13,883	7.47	7.66

Table 3: Travel Time Comparison

Traffic Congestion

The percent change in Average Daily Traffic volumes from the 2040 No Action Alternative for each of the action alternatives was minimal outside the study area; therefore, congestion analyses of the action alternatives outside the study area were not performed. As shown in **Table 4**, the action alternatives operate better than the No Action Alternative in 2040.

Route	Segment	2018 Congestion Levels	2040 No Action Alt. Congestion Levels	2040 New Location Alt. Congestion Levels	2040 Partial New Location Alt. Congestion Levels	2040 Improve Existing Alt. Congestion Levels
Hwy. 12	Regional Ave. to West of Mill Dam Rd.	Good or Better	Fair	Fair	Fair	Fair
Hwy. 112	Washington Co. Line to Hwy. 12	Poor	Good or Better	Good or Better	Good or Better	Good or Better
	Airport Blvd. to Bush Arbor Rd.	Fair	Poor	Fair	Good or Better	Good or Better
Hwy. 264	Bush Arbor Rd. to Mill Dam Rd.	Good or Better	Fair	Fair	Good or Better	Good or Better
	Mill Dam Rd. to Hwy. 112	Good or Better	Fair	Fair	Fair	Good or Better
Airport Blvd.	Airport Entrance to Hwy. 264	Good or Better	Very Poor	Good or Better	Good or Better	Good or Better
Regional Ave.	Hwy. 12 to Airport Blvd.	Good or Better	Good or Better	Good or Better	Good or Better	Good or Better
New	Hwy. 264 to Hwy. 612 (New Location Alt.)	n/a	n/a	Good or Better	n/a	n/a
Connector	Hwy. 264 to Hwy. 112 (Partial New Location Alt.)	n/a	n/a	n/a	Good or Better	n/a

Table 4: Congestion Level Comparison

New Location Alternative

Overall, the New Location Alternative provides the most direct connection and the shortest travel times between XNA and the SNB. Congestion in the study area would be reduced when compared to the No Action Alternative.

Local travel patterns are not anticipated to be disrupted long-term by the construction of this alternative since it is on new location. After construction is complete, residents would still be able to travel the local roadway network between Hwy. 264 and Robbins Rd. and between Hwy. 112 and Hendrix Rd. on overpasses at Holmes Rd., Haden Rd., and Wager Dr.

Partial New Location

The Partial New Location Alternative would result in slightly longer travel times when compared to the New Location Alternative. Congestion in the study area would be reduced when compared to the No Action Alternative.

Local travel patterns would be temporarily disrupted by the construction of this alternative. After construction, overpasses at Farrar Rd. and Kelly Rd. would provide continued access for residents along Colonel Myers Rd., Wager Dr., and Robbins Rd., so local long-term travel patterns would not be substantially impacted.

Improve the Existing Highways Alternative

Although the Improve the Existing Highways Alternative has the longest expected travel time when compared to the other action alternatives, it would reduce congestion in the study area and slightly improve travel times when compared to the No Action Alternative. Local travel patterns would remain very similar to current patterns although the number of vehicles using Hwy. 112 is expected to increase.

Highway 112

Because the Hwy. 112 improvements would only improve part of the route from the SNB to XNA, it would not substantially improve travel times or connectivity over the existing condition.

3.3 Would the project affect land use?

The U.S. Geological Survey (USGS) 2016 National Land Cover Dataset was used to identify land use/land cover types along the alternative alignments as shown on **Figure 11**. The construction of the proposed project would result in the direct conversion of land from its present use to a transportation use. The majority of land cover along the action alternatives consists of pastureland, deciduous forest cover, developed open space, a mixture of light residential development south of Hwy. 264 and XNA, and isolated small business development along Hwy. 264 and along Hwy. 112 south of downtown Cave Springs. The dominant land use types identified by alternative are shown in **Table 5**. The additional ROW required for each alternative that would be converted to transportation use is summarized in **Table 6**. A discussion of induced development is provided in **Section 3.15**.



Figure 11: Land Use

	Acres of each Land Use Type				
Alternative	Hay/Pasture	Deciduous Forest	Herbaceous	Developed Open Space*	Acres
No Action	0	0	0	0	0
New Location	140.3	91.4	3.3	4.9	240.0
Partial New Location	60.6	24.6	0.9	31	117.1
Improve Existing Hwys.	40.4	13.6	0.1	61	115.1

Table 5: Land Use Types

*Developed open space includes the existing highway footprint, which is why the total acreage is larger than the proposed ROW acquisition in Table 6

	ROW	Number of Relocations			
Alternative	Required	Residential	Business	Landlord	TOTAL
No Action	0 acres	0	0	0	0
New Location	241.8 acres	2	3	0	5
Partial New Location	100.6 acres	11	1	4	16
Improve Existing Hwys.	74.7 acres	17	2	5	24

Table 6: Right of Way Impacts and Relocations

No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed and not affect land use patterns within the project area. Land use changes would likely continue along the current trend of increasing development and urban sprawl seen throughout Northwest Arkansas in recent years.

New Location Alternative

The New Location Alternative would require the acquisition of approximately 241.8 acres of right of way. This would predominantly include the conversion of forested and pastureland with scattered low-density residential development. The New Location Alternative would not directly impact any planned developments and is consistent with the comprehensive land use plans for the area.

Partial New Location Alternative

The Partial New Location Alternative would require the acquisition of approximately 100.6 acres of right of way. This would predominantly include the conversion of forested and pastureland, scattered low-density residential development, and developed open space.

The Partial New Location Alternative would not directly impact any planned developments and is consistent with the comprehensive land plans for the area. Access to existing residential development and business enterprises not displaced by the project would not be impacted by the construction of the project.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would require the acquisition of approximately 74.7 acres of right of way. Land use adjacent to this alternative is likely to follow the same trends of development as the past 20 years that have concentrated on residential development northward toward Bentonville along Hwy. 112 and eastward along Hwy. 264 toward the community of Lowell at I-49.

Highway 112

Hwy. 112 impacts associated with the Improve the Existing Highway Alternative include 20.4 acres of hay/pasture, 3.2 acres of deciduous forest, and 25.5 acres of developed open space, for a total footprint of 49.1 acres and 35.6 acres of ROW required. Hwy. 112 impacts associated with the Partial New Location Alternative include 5.8 acres of hay/pasture, 1.2 acre deciduous forest, and 9.8 acres of developed open space for a total footprint of 16.8 acres and 10.0 acres of ROW required.

3.4 Would there be any relocations?

Described below are the types and number of relocations associated with each alternative. When avoidance is not possible, relocation assistance would be provided in accordance with Public Law 91-646, Uniform Relocation Assistance Act of 1970. Construction of the project would not begin until decent, safe, and sanitary replacement housing is in place for all residential occupants. Table 6 above summarizes the number and type of relocations required for each alternative.

Acquisition and relocation assistance would be provided to displaced

persons in accordance with the Uniform Relocation Assistance and Real Properties Acquisitions Policies Act of 1970. A Conceptual Stage Relocation Statement (CSRS) was completed to identify comparable replacement residential and commercial properties within a six-mile radius of the displacement and is included in **Appendix D**.

No Action Alternative

The No Action Alternative would not require any relocations.

New Location Alternative

The New Location Alternative is anticipated to involve two residential relocations and three business relocations. One of the impacted properties is a farmhouse associated with a farming business and is counted as both a business and a residential relocation.

Relocations occur when a residence, business, or nonprofit organization is impacted severely enough that they cannot continue to live or do business at their current location. This usually occurs when proposed ROW acquisition requires removing a structure, taking most of a business's parking, or severing access to a property.

Partial New Location Alternative

The Partial New Location Alternative is anticipated to involve 11 residential relocations (four of these are residential tenants that also have landlord business impacts) and one business relocation.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative is anticipated to involve 17 residential relocations (nine of these are residential tenants involving five landlord business impacts) and two business relocations.

Highway 112

The Hwy. 112 impacts associated with the Improve the Existing Highways Alternative would include 13 residential relocations (eight of these are residential tenants involving four landlord business impacts) and two business relocations. Hwy. 112 impacts associated with the Partial New Location Alternative include one residential and one business relocation.

3.5 How would the project affect views?

The viewshed for the proposed project includes views of the surrounding landscape from the alternatives and views of proposed alternatives from the surrounding landscape. The landscape within the project area consists mostly of scattered residential development and large areas of pasture or other undeveloped lands. Older homes are typically more isolated and surrounded by pastures that support cattle grazing or hay meadows. Newer residential developments are

A **viewshed** is the area that is visible from a specific location. The viewshed may be from the point of view from a traveler or a neighbor. Project viewers such as **travelers** include drivers, bicyclists, and pedestrians that have views *from* the road.

typically associated with more open space or little forest cover between the home and the roadway.

Construction of all action alternatives and the Hwy. 112 improvements would result in the short-term presence of construction vehicles and equipment, temporarily altering the area's visual character. Vegetation impacts in temporary construction easements would be minor and short-term until new vegetation becomes established. Overall, construction activities would have minor short-term impacts on views in the project area. Adverse impacts to the overall viewshed are not expected as a result of the project for any alternative.

No Action Alternative

The No Action Alternative would not result in a change to the viewshed or to the existing visual character or quality of the project area.

New Location Alternative

This alignment largely passes through undeveloped pasture and woodland (**Photos 1-2**) and would primarily be viewed at local roadway crossings and scattered homes near the proposed alignment. Construction of a new roadway and removal of several acres of trees and other vegetation would alter the viewshed along the project corridor. The







new bridges over Osage Creek and Little Osage Creek would be elevated and increase the visibility of the roadway to nearby residences and expand travelers' views of the surrounding rural landscape. Overall visual quality impacts are likely to be beneficial for travelers but may be negative for adjacent residents for whom views of the roadway would become more prominent.

Compared with the other action alternatives, the New Location Alternative would provide the least visible changes in the viewshed due to crossing the most rural, undeveloped portion of the project area.

Partial New Location Alternative

Views along this alignment mostly consist of existing roadways (Hwys. 112 and 264), pastureland, and scattered homes (**Photos 3-4**). Most views along Hwy. 264 are restricted because Hwy. 264 is at a lower or equal elevation than the surrounding landscape. On Hwy. 112, the roadway is not visible to most of the homes on the east side of the highway. Under the Partial New Location Alternative, proposed improvements along the existing highways would not be out of character with the existing

highways views as are already incorporated into the visual character of their locations and are compatible with surrounding land development. However, proposed improvements would involve a grass center median which would improve the visual character. Additional alterations to the viewshed include the proposed interchange at Hwy. 264 and Colonel Myers Rd.



Photo 4. West view from Hwy. 264



Similar to the New Location Alternative, the section of the Partial New Location Alternative that occurs along new location would alter visual resources by introducing new roadway infrastructure and removing existing vegetation. Construction of the proposed bridge over Osage Creek, which would be higher than the surrounding area, would increase the visibility of the roadway to nearby residences and expand travelers' views of the surrounding rural landscape. For the approximately one-mile section on new location located parallel to Colonel Meyers Rd. (**Photo 5**), existing homes along, and travelers on, Colonel Meyers Rd. would have a more prominent view of the proposed roadway. As roadways are already incorporated into the visual character of this section of the project corridor, the proposed improvements would not be out of character with the existing views. Between Wager Dr. and Hwy. 112, adjacent landowners' views of the new roadway would mostly be blocked because of the dense forested vegetation lying between the homes and the proposed road.

Photo 5. South view from Colonel Meyers Rd.



Overall viewshed impacts are likely to be beneficial or neutral for travelers

and may be negative for adjacent residents for whom views of the roadway would become more prominent.

Improve the Existing Highways Alternative

Views along this alignment mostly consist of roadways, pastureland, narrow forests, and scattered

commercial and residential development

(**Photos 6-9**). Because this alternative primarily follows existing Hwys. 112 and 264, views to and from the roadway would change very little except the roadway width would increase and include a grass median that may be planted to improve the visual character. Increased roadway widths would alter the appearance of the existing roadway for travelers and

adjacent landowners and would result in existing residences and commercial buildings being in closer proximity to the roadway. However, proposed improvements would not be out of character with the existing views, as highways are already incorporated into the viewshed and are compatible with surrounding land development. Photo 6. East view from Hwy. 264 Photo 7. South view from Hwy. 264



Photo 8. North view from Hwy. 112



Photo 9. South view from Hwy. 264, west of bypass





The most notable alteration to the viewshed under this alternative is the construction of a bypass of Hwy. 112 to the west of downtown Cave Springs on new location. The homes located immediately east of this approximately 0.7-mile long bypass section would have a view of a new four-lane roadway where there was once primarily only open space and scattered trees (Photo 9).

Compared with the other action alternatives, the Improve the Existing Highways Alternative would provide the most visible changes in the viewshed due to crossing the most populated portions of the
project. Overall viewshed impacts are likely to be beneficial or neutral for travelers and may be negative for adjacent landowners for whom views of the roadway would become more prominent. Impacts may also be beneficial for adjacent businesses, who may benefit from increased visibility to travelers.

Highway 112

Views to and from the proposed Hwy. 112 improvements would be similar to those of the Improve the Existing Highways Alternative and the Hwy. 112 section of the Partial New Location Alternative.

3.6 Would there be highway-related noise impacts?

A traffic noise analysis is required for proposed Federal-aid highway projects that would construct a highway on new location, substantially alter an existing highway, or increase the number of through-traffic lanes. A screening-level traffic noise study was completed for the proposed project to assess potential noise impacts as a result of proposed improvements. A screening analysis typically represents a worst-case scenario with higher sound levels than would be expected in detailed modeling and may be used to determine if there is a need for a detailed analysis. For screening analysis purposes, the

ARDOT *Policy on Highway Traffic Noise Abatement* requires determining noise levels within 4 dBA of the Noise Abatement Criteria (NAC) values. This analysis identified Activity Category B and C noise

sensitive receptors within the project corridors, which represent land uses such as residential areas, parks, and churches. Receptors located within the noise screening analysis threshold of 63 dBA will be identified. The screening analysis threshold for a receptor to be impacted is 66 dBA for NAC Categories B and C, or a substantial increase, which occurs when a design year noise level is predicted to increase 10 or more dBA above the existing noise levels. What is noise?

Sound is anything we hear, while noise is unwanted or undesirable sound. Traffic noise is a combination of the noises produced by vehicle engines, exhaust, and tires.

A-weighted decibels, abbreviated **dBA**, are an expression of the relative loudness of sounds in air as perceived by the human ear.

The FHWA Traffic Noise Model (TNM) Version 2.5 software program is used to predict existing and future traffic noise levels. The TNM straight line model uses roadway information and the existing and design year traffic. Receptors (discrete points modeled in the TNM program) are incrementally placed away from the existing and proposed roadway centerlines to determine the distance to which impacts extend. The model assumes that the roadway and receptors were located at the same elevation with no intervening barriers such as topography or dense vegetation. The screening-level noise assessment and maps are provided in **Appendix E**.

No Action Alternative

The No Action Alternative was analyzed in the screening level study. A total of 124 receptors would be impacted within the 66 dBA buffer, which includes 59 residential receptors, 61 recreational vehicle pads at The Creeks Golf & RV Resort, one food stand with exterior seating, one park (T.R. Wallis), the Cave Springs Community Building with exterior people activity areas, and one place of worship with exterior

people activity areas. **Table 7** shows noise impacts per alternative. The table also shows the number of receptors within the 63 dBA Noise Boundary Zone (NBZ). This is the area of land away from the centerline of the roadway between where the 66 dBA and the 63 dBA sound level can be heard.

Alternatives	Receptors (63 NBZ)	NAC Impacts (66 NBZ)	Substantial Increase (SI) Impacts	Total Impacts (NAC + SI)
No Action	8	124	N/A	124
New Location	3	0	7	7
Partial New Location	3	8	6	14
Improve Existing Hwys.	32	20	3	23

Table 7:	Receptors	Identified in	Screening-Lev	el Noise Analysi
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Note1: NBZ – Noise Buffer Zone

Note2: N/A - Not Applicable. Impacts are not counted for a No Action Alternative

New Location Alternative

Seven receptors were identified in the noise buffer zone under future build conditions, three are within the 63 dBA buffer all of which are substantial increase impacts. None of these impacted receptors are within the existing 66 dBA contour distance that approaches the NAC criteria. There are approximately four noise-sensitive properties located within the current proposed ROW which are not included in the total number of impacts because they would likely be relocated.

Partial New Location Alternative

Seventeen receptors were identified in the noise buffer zone under future build conditions, 8 receptors are impacted within the 66 dBA buffer, three are within the 63 dBA buffer, and six are substantial increase impacts. One of these impacted receptors is within the existing 66 dBA contour distance that approaches the NAC criteria. There are approximately nine noise sensitive properties located within the current proposed ROW that are not included in the total number of impacts because they would likely be relocated.

Improve the Existing Highways Alternative

Thirty-two receptors were identified in the noise buffer zone under future build conditions. Twenty-three of these receptors are predicted to experience noise impacts under future action conditions, 20 are NAC 66 dBA impacts, and three are substantial increase impacts. There are approximately nine noise sensitive properties located within the current proposed ROW which are not included in the total number of impacts because they would likely be relocated.

Highway 112

Within the Hwy. 112 section of the Improve the Existing Highways Alternative, 32 receptors were predicted to experience noise levels within the 63 dBA NBZ, 11 receptors are NAC 66dBA impacts,

and four are substantial increase. Within the Hwy. 112 section associated with the Partial New Location Alternative, one receptor is predicted to be impacted within the 66 dBA buffer and two noise receptors are predicted to experience noise levels within the 63 dBA NBZ.

3.7 Would any historic or archeological resources be affected by the project?

Section 106 of the National Historic Preservation Act requires agencies to consider the effects of federal actions to historic properties. In compliance with Section 106 requirements, the FHWA is conducting ongoing consultation with the appropriate Native American tribes.

Prior to alternative alignment development, records were checked to determine if previously documented cultural resources were known in the

Historic properties are those that are listed, or eligible for inclusion, in the National Register of Historic Places (NRHP), as defined in (36 CFR §800.16(I)).

project area. This included a record review of the Automated Management of Archeological Site Data in Arkansas (AMASDA) database maintained by the Arkansas Archeological Survey for previously recorded archeological sites immediately proximal to the action alternatives. A historic properties records check was also conducted of the Arkansas Historic Preservation Program (AHPP)'s structure database. In addition, a historic structures survey assessed 72 structures and one cemetery for inclusion to the National Register of Historic Places (NRHP). An Architectural Resources Survey was submitted to AHPP requesting concurrence on eligibility determination. AHPP concurred that eleven historic properties were eligible for inclusion in the NRHP. Section 106 related documentation is provided in **Appendix F**.

Once a Preferred Alternative is identified, a Phase I cultural resources survey that includes shovel tests would be conducted. The report documenting the results of the survey, quantifying impacts to historic properties, and stating recommendations would be prepared and submitted to the State Historic Preservation Officer (SHPO) for review. If prehistoric or historic sites are identified, the sites would be evaluated to determine if Phase II testing is necessary. Should any of the undetermined sites be impacted and avoidance is not possible, then site-specific data recovery plans would be prepared, and data recovery would be carried out at the earliest practicable time.

The following identifies the number of archeological sites and historic structures within or near each alternative. All undetermined sites are considered potentially eligible for inclusion in the NRHP until proven otherwise.

New Location Alternative

Seven previously recorded undetermined archeological sites were identified proximal to the New Location Alternative. No archeological sites on the NRHP were identified. One structure is considered eligible to the NRHP.

Partial New Location Alternative

Four previously recorded undetermined archeological sites were identified proximal to this alternative. No archeological sites on the NRHP were identified. Three structures are considered eligible to the NRHP.

Improve the Existing Highways Alternative

Five previously recorded undetermined archeological sites were identified proximal to this alternative. No archeological sites on the NRHP were identified. Nine structures are considered eligible to the NRHP.

Highway 112

Hwy. 112 impacts associated with the Partial New Location Alternative would include one previously recorded undetermined archeological site. No structures eligible to the NRHP would be associated with the Partial New Location Alternative portion of Hwy. 112. Hwy. 112 impacts associated with the Improve the Existing Highways Alternative would include two previously undetermined archeological sites and four structures eligible to the NRHP.

3.8 Would any karst areas be impacted?

Karst can be defined as an area of land underlain by soluble rocks, primarily limestone and dolomites, where surface water and groundwater have slowly dissolved bedrock at the surface and in the subsurface. This process forms a unique set of surface features that can include sinkholes, springs, and sinking streams and subsurface features such as caves. The project area is located in an area underlain by the Mississippian Boone Formation, a host for these karst features, which consists of very fine to coarse-grained limestone with interbedded chert. The presence of the chert in the Mississippian Boone Formation masks the traditional karst landforms at the surface (Brahana, 2018). In Arkansas, the Mississippian Boone Formation varies in thickness from 200 to 500 feet and exclusively represents the Springfield Plateau Aquifer (Hays et al., 2016). Caves are well known to have formed within the Mississippian Boone Formation.

The project area is located in an area of karst. **Figure 12** represents a conceptual model of the karst terrain and the underlying karst aquifer and can be considered representative of the Mississippian Boone Formation.

Precipitation that falls on the karst landscape that



Figure 12: Conceptual Model of The Karst Terrain and the Underlying Karst Aquifer

replenishes groundwater supplies is known as recharge. Two common types of recharge in karst areas include diffuse recharge and concentrated recharge. **Diffuse recharge** slowly seeps through the soil and into the underlying bedrock. **Concentrated recharge** enters the subsurface through larger dissolved out openings in the bedrock. Water that enters the subsurface through areas of concentrated recharge, such as sink holes, moves through the subsurface more quickly due to the larger channels/conduits in the bedrock. Any contamination at the surface can travel through areas of concentrated recharge relatively quickly to reach the underlying aquifer and effect groundwater quality.

Good groundwater quality is essential in maintaining stream, spring, and karst cave environments that support healthy ecosystems and endangered species habitat. About 75% of the water which ultimately reaches rivers and lakes in the area passes through groundwater systems for some distance and most of the groundwater recharge enters through sinking streams as opposed to sinkholes or water infiltrating through soil (Aley and Moss, 2001). A losing stream is a surface stream that loses considerable volumes of water to the subsurface in localized areas. In addition, karst groundwater systems can be affected by changes in recharge to the groundwater flow system caused by changes in land cover and changes in drainage. A decrease to surface water quality of recharge water would likely affect the quality of groundwater resources. Areas identified as open groundwater systems provide ineffective natural cleansing and are especially vulnerable to contaminated inputs associated with runoff and spills.

Four mapped spring recharge areas were identified near the project area and include the Cave Springs Recharge Area, Hewlitt Springs Recharge Area, Elm Springs Recharge Area, and Logan Springs Recharge Area. These spring recharge areas were delineated and mapped by the Ozark Underground Laboratory (OUL) and are shown on **Figure 13**. None of the action alternatives would impact these mapped recharge areas. None of the project area streams that flow into or through the alternative alignments flow into known mapped recharge areas. The dye tracing conducted by OUL identified threatened and endangered species habitat slightly to the north, east, west, and south of the project area. The potential exists for similar habitat to be found along the action alternatives.

Garver learned during a field review in September 2020 with USFWS that an Ozark Cavefish (a federally-protected species) was observed at a spring between the New Location Alternative and the Partial New Location Alternative. This would indicate there is an open groundwater system in the project area with openings large enough for movement of the cavefish and the transport of food for the cavefish.

A Karst Assessment was conducted along the action alternatives to identify any surface karst features, subsurface karst features, and any exposures of the Boone Formation to identify any outcrops that may be receiving water or discharging water. Additionally, a review of USGS topographic mapping of the project area was conducted to identify any sinkholes, ponds, and springs. The project area is located on four USGS maps that include the Springdale, Centerton, Robinson, and Bentonville quadrangle maps. Topographic mapping shows relatively flat-lying upland areas dissected by valleys and tributaries to Little Osage Creek, Osage Creek, and Spring Creek. Land within the study area represents a masked or mantled karst terrain.



Figure 13: Recharge Areas

Coordination with the Arkansas Geological Survey indicated that a farm pond may indicate the presence of a sinkhole. All farm ponds were visually assessed as to their landscape position, signs indicative of sinkholes, and construction method. All ponds were determined to have been created by constructing a berm on the downstream side for capturing stormwater runoff. These ponds were not considered to be karst features.

Additionally, topographic mapping shows numerous springs can be found within the valley areas, which is typical of karst topography. Springs within the project area respond rapidly to precipitation events which indicates that concentrated or focused recharge is a major component of total recharge to springs (Aley and Moss, 2001). Karst springs can serve as habitat for federally listed species including the Ozark Cavefish and the Benton County Cave Crayfish. An assessment for threatened and endangered species habitat and an assessment to identify karst features were conducted in the winter of 2020 (details in **Section 3.12**). There are no mapped recharge areas or caves along the action alternatives.

No Action Alternative

The No Action Alternative would not impact karst or associated habitats in the project area.

New Location Alternative

The New Location Alternative would require impacts to the most area of karst terrain (242 acres) and would directly impact two springs and three ponds. Osage Creek and Little Osage Creek may be temporarily impacted by construction activities associated with the proposed project.

Partial New Location Alternative

The Partial New Location Alternative would impact 121 acres of karst terrain and would directly impact three springs and one pond. Osage Creek and Little Osage Creek may be temporarily impacted by construction activities associated with the proposed project.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would require 128 acres of karst terrain and would directly impact two springs and five ponds. Osage Creek, Little Osage Creek, and Spring Creek may be temporarily impacted by construction activities associated with the proposed project.

Highway 112

Hwy. 112 impacts associated with the Improve the Existing Highways Alternative would cross through 56 acres of karst terrain and impact two ponds and one spring. Temporary impacts to Spring Creek are anticipated with regard to construction activities. Hwy. 112 impacts associated with the Partial New Location Alternative would cross 17 acres of karst terrain and would not impact any springs or ponds. Temporary impacts to Spring Creek are anticipated during construction activities.

Karst Best Management Practices

During construction, there is the potential to encounter voids or caves and their inhabitants; therefore, precautionary measures must be taken during construction in sensitive areas, such as karst regions, to avoid impacts to groundwater and the aquatic habitat of sensitive species. The construction of highways and associated activities can introduce pollutant contamination into the groundwater because of minimal filtration and rapid introduction of the surface water into the groundwater flow system. Introduction of contaminants such as petroleum products would be detrimental to water quality in wells, springs, caves, and any organisms that may inhabit the caves.

Erosion and sediment control would follow ARDOT's best management practices (BMPs) to minimize sedimentation and avoid impacts to groundwater and sensitive or endangered species.

In the event cave discovery is made during construction, the USFWS and ARDOT Environmental Division would be contacted for a determination of the proper procedures to be followed as is outlined in the Cave Discovery Special Provision that will be added to the project contract.

3.9 How would water resources, wetlands, and streams be affected?

Coordination with the Arkansas Department of Health (ADH) revealed that no surface water intakes, public water supply wells, or wellhead protection areas are present within the project area. No public water supply systems would be impacted by any of the action alternatives.

Topographic review identified that two perennial streams, Little Osage Creek and Osage Creek, several unnamed intermittent and ephemeral tributaries, and numerous ponds and springs are located within the project area. Both perennial streams receive flow from the adjacent uplands. Little Osage Creek is designated as an Ecologically Sensitive Waterbody (ESW) under the Arkansas Division of Environmental Quality (ADEQ) Rule 2 and generally flows through the central portion of the project area. Osage Creek crosses the entire project area, extending from just west of Cave Springs to the western project area boundary. The Healing Springs Stream Mitigation site is located adjacent and north of Hwy. 264 between Cave Springs and XNA. Several springs, considered difficult-to-replace resources by the U.S. Army Corps of Engineers (USACE), are located in the region.

The proposed corridors of all action alternatives were evaluated to identify wetlands, streams, springs, and ponds. Wetlands were preliminarily identified and classified by qualified biologists based on Cowardin et al. (1979). The majority of wetland determinations were made using vegetation, hydrology, and soils in accordance with the routine approach described in the USACE Wetland Delineation Manual (1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). None of the streams flowing into or through the corridors associated with all three action alternatives flow

What are wetlands?

Wetlands are areas typically inundated or saturated by surface or groundwater to the extent that they can support vegetation adapted for life in wet soil conditions. Wetlands are protected under Section 404 of the Clean Water Act because they provide flood control, aid in water quality, and provide wildlife habitat. into known delineated recharge areas.

Figure 14 shows the location of preliminary identified wetlands, streams, and springs along each alternative and **Table 8** summarizes anticipated impacts to those aquatic features. An aquatic resources assessment is provided in **Appendix G**.

No Action Alternative

The No Action Alternative would not impact any wetlands, streams, or springs. No groundwater resources would be affected.

New Location Alternative

The New Location Alternative would have direct impacts to wetlands and streams as summarized in Table 8. Direct impacts to wetlands and streams would occur as a result of direct fill, temporary clearing, grading, culvert installation, and channel improvements. This alternative would impact the most wetlands (3.2 acres) of the three action alternatives, one acre of which is considered open water. Although this alternative would impact approximately 6,509 linear feet (LF) of stream (comprised of 18 streams), an estimated 97% of the impacted streams are considered ephemeral, meaning they only flow after rain events. Additionally, this alternative impacts the least amount of perennial and intermittent streams, which retain increased aquatic life value. None of the streams flowing into or through this alternative's corridor flow into known groundwater recharge zones. This alternative would impact two springs, which is less than the Partial New Location Alternative, and equal to the Improve the Existing Highways Alternative. Direct impacts to springs may occur due to heavy equipment usage in close proximity that may compact surrounding soils and installation of spring boxes, which would allow for continued issuance of the springs to downstream areas. Three ponds (totaling 1.0 acre) with wetland fringes along their edges would also be impacted by this alternative.

Partial New Location Alternative

The Partial Location Alternative would impact the least amount of wetlands (0.8 acre) and streams (6,705 LF), as compared to the other action alternatives; however, stream impacts would be greater to intermittent and perennial streams than those impacts determined for the New Location Alternative. Direct impacts to wetlands and streams would occur as a result of direct fill, temporary clearing, grading, culvert installation, and channel improvements. None of the streams flowing into or through this alternative's corridor flow into known groundwater recharge zones. This alternative would impact three springs, which is more springs than the other action alternatives, and one pond with a wetland fringe around it. Direct impacts to springs may occur due to heavy equipment usage in close proximity that may compact surrounding soils and installation of spring boxes, which would allow for continued issuance of the springs to downstream areas. The Hwy. 112 impacts falling within this section of the Partial New Location Alternative would impact one spring.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would impact an estimated 1.5 acres of wetlands. Due

to the location and orientation of the streams along the existing roadways, this alternative would impact the most streams (20 streams comprising 14,849 LF). The greater amount of impacts is attributed to the parallel nature of many of the streams within and adjacent to the proposed ROW, of which approximately 7,500 LF are from a single parallel stream located immediately south of Hwy. 264. Direct impacts to wetlands and streams would occur as a result of direct fill, temporary clearing, grading, culvert installation, and channel improvements. This alternative would impact five ponds totaling 0.5 acre and two springs. Direct impacts to springs may occur due to heavy equipment usage in close proximity that may compact surrounding soils and installation of spring boxes, which would allow for continued issuance of the springs to downstream areas.

The Healing Springs Mitigation Site is located adjacent to the existing Hwy. 264 ROW; however, this site and the spring run associated with the property would be avoided by this alternative.

Highway 112

Hwy. 112 impacts associated with the Partial New Location Alternative include approximately 916 LF of streams. There are no wetland or pond impacts associated with the Partial New Location Alternative.

The Hwy. 112 impacts associated with the Improve the Existing Highways Alternative include one spring, approximately 1,621 LF of streams, 0.9 acre of wetlands, and two ponds.

Alternative	Wetlands (acres)*			Streams (linear feet)**				Omrinana	
	PEM	PFO	PUB	Total	Per	Int	Eph	Total	Springs
No Action	0	0	0	0	0	0	0	0	0
New Location	0.1	2.1	1.0	3.2	0	196	6,313	6,509	2
Partial New Location	0.3	0.4	0.1	0.8	2,046	3,903	756	6,705	3
Improve Existing Hwys.	0.5	0.5	0.5	1.5	4,991	9,067	791	14,849	2

			_	_	
Table 8 [.]	Approxima	te Wetland	Stream	and Sn	ring Impacts
		to Wothania	, ou cum,	und op	mig mipuoto

* PEM - Emergent Wetland; PFO - Forested Wetland; PUB - Pond or Open Water Wetland

** Per - Perennial; Int - Intermittent; Eph - Ephemeral



Figure 14: Aquatic Features Overview

Best Management Practices

During construction activities for any action alternative, streams would be subject to a temporary influx of sediment laden surface runoff associated with construction activities such as clearing and grubbing and bridge installation. Construction activities would comply with requirements of the Clean Water Act (CWA) as required by the USACE Section 404 permit program. Additionally, as required by Section 402 of the CWA, all action alternatives would obtain coverage under the National Pollutant Discharge Elimination System (NPDES) general permit for Construction Activities. The provisions of this permit include preparation of a Stormwater Pollution Prevention Plan (SWPPP), which contains a selection of BMPs to be implemented to effectively reduce or prevent the discharge of pollutants into receiving waters during construction activities. Stormwater runoff would be controlled and monitored according to applicable federal regulations. Water quality regulations required by the ADEQ State Water Quality Certification (Section 401 of the CWA) also would be implemented.

As described in **Section 3.8**, all action alternatives would cross areas of land underlain by the Boone Aquifer. Groundwater may be temporarily impacted by surface runoff due to disturbance from land clearing, culvert construction, and operating construction equipment and vehicles. As mentioned above, BMPs would be implemented to minimize sediment leaving the construction site. The action alternatives have been evaluated at the surface for the presence of karst features that provide a direct connection to the groundwater flow system. As stated previously, none of the project area streams that flow into or through the action alternatives flow into known mapped recharge areas. The dye tracing conducted by OUL identified threatened and endangered species habitat slightly to the north, east, west, and south of the project area. The potential exists for similar habitat to be found along the action alternatives.

Based on observation information provided by the USFWS regarding a spring located between the Partial New Location Alternative and New Location Alternative, the potential for an open groundwater system in the project area exists.

3.10 Would floodplains be impacted by the project?

The project was evaluated to determine if any encroachment into special flood hazard areas, identified through the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, would occur within the action alternatives. As shown in **Figure 15**, special flood hazard areas, also known as the 100-year floodplain, associated with Osage Creek, Little Osage Creek, and Spring Creek are present within the project area.

What is the Clean Water Act (CWA)?

The CWA is a federal regulation governing activities that may have a harmful effect on the quality of the nation's water bodies. Section 404 of the CWA governs discharge of material into water bodies. Section 402 of the CWA governs the discharge of pollutants into water bodies. Section 401 of the CWA gives the states the authority to regulate the discharges that may affect water quality.

What is a floodplain?

Floodplains are land areas that become covered by water in a flood event. 100-year floodplains are areas that would be covered by a flood event that has a 1% chance of occurring (or being exceeded) each year, also known as a 100-year flood. This is the floodplain commonly used for insurance and regulatory purposes. The final project design would be reviewed to confirm that the design is adequate and that the potential risk to life and property are minimized. Adjacent properties should not be impacted nor have a greater flood risk than existed before construction of the project. For any of the action alternatives, associated floodplain impacts would result in a no net rise of the floodplain elevation or affect water surface elevations.

No Action Alternative

The No Action Alternative would not affect any floodplains.

New Location Alternative

The New Location Alternative would cross 15.6 acres of floodplain associated with Osage Creek and Little Osage Creek. The floodplains for Osage Creek and Little Osage Creek would be bridged, which would result in only minor impacts to the floodplains. The bridge crossings of the floodplains would be constructed in a manner to cause zero rise in the 100-year flood elevations.

Partial New Location Alternative

The Partial New Location Alternative would cross 11.0 acres of floodplain associated with Osage Creek and Little Osage Creek. A new bridge would be built on the new location segment over Osage Creek and the existing bridge on Hwy. 264 over Little Osage Creek would be widened. Only minor impacts to the floodplain would occur at these crossings.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would cross 24.4 acres of floodplain associated with Osage Creek, Little Osage Creek, and Spring Creek. All of these floodplains are already bridged with structures that would be widened to accommodate the widened highway. Only minor impacts to the floodplain would occur at these crossings.

Highway 112

Hwy. 112 improvements would cross 14.0 acres of floodplains associated with Osage Creek and Spring Creek similar to the Improve the Existing Highways Alternative. Only minor impacts to the floodplain would occur at these crossings. No floodplains would be impacted along the Partial New Location Alternative segment of the Hwy. 112 improvements.



Figure 15: Floodplains

3.11 Are impacts to wildlife or their habitat expected from the project?

The project area has varied topography and contains diverse vegetation types. The project area is primarily located in the Springfield Plateau Ecoregion with a small portion of the New Location Alternative located within the Dissected Springfield Plateau-Elk River Hills of the Ozark Highlands Ecoregion (Level IV Ecoregions 39a and 39b; Woods et al., 2005). This ecoregion is underlain by highly soluble and fractured limestone and dolomite, is highly dissected, partly forested, and is rich in karst features. According to Woods et al. (2005), potential natural vegetation consists of oak-hickory forest and some oak-hickory-pine forest; native uplands consist of mixed deciduous forest containing black oak (*Quercus velutina*), white oak (*Q. alba*), blackjack oak (*Q. marilandica*), post oak (*Q. stellate*), and hickories (*Carya* spp.) with some mixed deciduous-shortleaf pine (*Pinus* spp.) forest; and floodplains with low terraces commonly containing willows (*Salix* spp.), maples (*Acer* spp.), hickories, birch (*Betula nigra*), American elm (*Ulmus americana*), and American sycamore (*Platanus occidentalis*). Based on the 2016 NLCD prepared by the USGS, as shown in Figure 11, the majority of the land cover identified along and adjacent to the action alternatives consists of pastureland and woodland.

Common edge plant species in the project area include blackberries (*Rubus* spp.), honeysuckles (*Lonicera* spp.) and other vine species, American beauty berry (*Calicarpa americana*), and young trees. It should be noted that storm damage from a spring 2020 tornado has left the area with numerous mature trees uprooted and laying on the ground, which provide additional habitat for ground dwelling wildlife such as rabbits, foxes, and smaller rodents.

The study area has forested, edge, and open field habitats present for many of the common wildlife species and species of concern. Most wildlife species found in the project area are habitat generalists and are not restricted to a particular habitat type. The species of wildlife expected to use or be present within the proposed project area include white-tailed deer (*Odocoileus*)

virginianus), fox squirrel (*Sciurus niger*), cottontail rabbit (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), mink (*Mustela vison*), opossum (*Didelphis virginiana*), skunk (*Mephitis mephitis*), muskrat (*Ondatra zibethicus*), and beaver (*Castor canadensis*). Various avian species (comprised of raptors, waterfowl, songbirds, neo-tropical migrants), as well as a variety of reptiles and amphibians including timber rattlesnakes (*Crotalus horridus*), copperheads (*Agkistrodon contortrix*), cottonmouths (*A. piscivorus*), water snakes (*Nerodia* spp.), salamanders, lizards, skinks, tortoises, and turtles are present in and/or migrate through the general area.

Natural Diversity Database occurrence data obtained from the Arkansas Natural Heritage Commission (ANHC) indicates there are ten state-identified species of concern and several sensitive streams within the study area. The species' detailed habitat descriptions, state status, global and state rank data have been provided by ANHC and are included in **Appendix H**.

The area where two habitat types meet, such as woodlands and pastures, is called edge habitat. Edges provide greater plant diversity, cover, nesting areas, and travel corridors for wildlife (McPeake, University of Arkansas Cooperative Extension Service).

What are edge species?

No Action Alternative

The No Action Alternative would have no effect on wildlife or wildlife habitat.

New Location Alternative

The New Location Alternative corridor contains a dominance of pastureland grazed by livestock. The large tracts of open pasture are fragmented with hardwood forested areas that are interconnected along drainage features and hillsides. These forested areas contain young to mature trees with a species composition consisting predominantly of white and red oak species (*Quercus* spp.), hackberry (*Celtis* spp.), hickory, cherry (*Prunus* spp.), elm, and Sycamore.

The New Location Alternative would cross three ANHC identified sensitive streams (Osage Creek, Little Osage Creek, and an unnamed tributary to Little Osage Creek) and would impact areas known to have swamp milkweed (*Asclepias incarnata ssp. Incarnata*), and habitat for the Arkansas darter (*Etheostoma cragini*), midget crayfish (*Faxonius nana*), Meek's short pointed crayfish (*Faxonius meeki brevis*), least darter (*Etheostoma microperca*), sunburst darter (*Etheostoma mihileze*), and redspot chub (*Nocomis asper*). Little Osage Creek is also considered an ESW by ADEQ. Two Arkansas darter and one midget crayfish occurrences are documented in close proximity to this alternative. Approximately 2,236 LF of preferred habitat for the Meek's short pointed crayfish, midget crayfish, Arkansas darter, least darter, sunburst darter, and redspot chub would be impacted directly and/or indirectly by construction activities, primarily increased turbidity and sedimentation. BMPs would include installing and maintaining appropriate sediment control features and protecting natural buffers.

Conversion of forested, edge, and stream bank habitat types to a roadway would reduce the available habitat for the swamp milkweed (*Asclepias incarnata ssp. incarnata*), Palmer's hawthorn (*Crataegus palmeri*), and Ozark trillium (*Trillium ozarkanum*); however, the same habitat types remain in the immediate vicinity. Approximately 75 acres of upland forested habitat would be lost. Details on forested impacts associated with federally listed bat species are provided in **Section 3.12** and karst habitat impacts are covered in **Section 3.8**.

Unimpeded wildlife movement through the area would be reduced by the new four-lane roadway and restricted primarily to bridge crossings at Osage Creek and Little Osage Creek.

Partial New Location Alternative

The general wildlife habitat associated with the Partial New Location Alternative is similar in species composition and abundance to the New Location Alternative for the section between Hwy. 112 and Hwy. 264 that is on new location. The wildlife habitat along the Hwy. 112 and Hwy. 264 segments of this alternative are primarily associated with the creek drainages.

The Partial New Location Alternative would cross five ANHC identified sensitive streams (Osage Creek, Little Osage Creek, and tributaries to Little Osage Creek) and would impact areas known to have ringed salamander (*Ambystoma annulatum*), midget crayfish, and least darter species, as identified by ANHC. Approximately 2,489 LF of preferred habitat for the midget crayfish, Arkansas darter, least darter,

sunburst darter, and redspot chub would be impacted either directly, by culvert installation or channel improvements, and indirectly by sedimentation. An estimated 2,043 LF of Meek's short pointed crayfish habitat would also be impacted by this alternative. The portion of these state listed aquatic species' habitat impacts associated with improving Hwy. 112 is 320 LF. Several other species occurrences are documented in close proximity to this alternative, most of which are upgradient relative to the alternative. Additionally, other habitat generalist species occur within this alternative's corridor. BMPs would include installing and maintaining appropriate sediment control features and protecting natural buffers.

Approximately 26 acres of suitable forested habitat for the Palmer's Hawthorn and Ozark trillium would be impacted directly by clearing and grubbing. Direct forest conversion impacts would include clearing and grubbing activities that would remove forest habitat within the project footprint. Indirect impacts due to sedimentation from these construction activities may also occur. Details on forested impacts associated with federally listed bat species are provided in **Section 3.12** and karst habitat impacts are covered in **Section 3.8**.

Unimpeded wildlife movement through the area would be reduced by the new four-lane roadway on new location between Hwys. 112 and 264. There is already a two-lane roadway (Colonel Myers Rd.) impacting wildlife movement along this section of the project. The footprint of Hwys. 112 and 264 would be enlarged, making crossing for wildlife more dangerous.

Improve the Existing Highways Alternative

Wildlife habitat along existing Hwys. 112 and 264 is very fragmented with significantly more development adjacent to both roadways. The landscape within the existing ROW is regularly maintained in unforested areas. This alternative would have the least amount of impacts to undisturbed wildlife habitat.

The Improve the Existing Highways Alternative would cross six ANHC identified sensitive streams (Osage Creek, Little Osage Creek, tributaries to Little Osage Creek, and Spring Creek) and would impact areas known to have ringed salamander, midget crayfish, Arkansas darter, and least darter species, as identified by ANHC. Approximately 5,668 LF of preferred habitat for the midget crayfish, Arkansas darter, least darter, sunburst darter, and redspot chub would be impacted in the same ways previously described in the Partial New Location Alternative section. An estimated 4,790 LF of Meek's short pointed crayfish habitat would also be impacted by this alternative. Additionally, one of the sensitive streams would be upstream of these species' locations. Several other species occurrences are also documented in close proximity and downgradient relevant to this alternative. Other habitat generalist species occur within this alternative's corridor. BMPs would include installing and maintaining appropriate sediment control features and protecting natural buffers.

Wildlife movement is already restricted by the existing roadway and other developments such as houses and businesses. Adding additional lanes would increase the distance for wildlife crossing these roadways, making it more dangerous.

Highway 112

The Hwy. 112 impacts associated with the Partial New Location Alternative include 3.53 acres of forested area and 165 LF of stream that would be considered habitat for state-listed species.

Hwy. 112 impacts associated with the Improve the Existing Highways Alternative include forested area impacts of 5.0 acres and 1,032 LF of stream associated with preferred habitat for the Meek's short pointed crayfish, midget crayfish, Arkansas darter, least darter, sunburst darter, and redspot chub. Habitat associated with these species is located downgradient relative to the highway, which may increase the potential for sedimentation impacts. The other habitat generalist species also occur within this alternative's corridor.

Hwy. 112 impacts associated with the Improve Existing Highways Alternative would include crossing one ANHC identified sensitive stream (Spring Creek) and would impact areas known to have ringed salamander and midget crayfish species.

Wildlife movement is already restricted by the existing roadway and other developments such as houses and businesses. Adding additional lanes would increase the distance for wildlife crossing Hwy. 112, making it more dangerous.

3.12 Are impacts to federally-protected species expected from the project?

In accordance with the Endangered Species Act of 1973, federally-listed threatened and endangered species were identified for the proposed project area using the USFWS online Information, Planning, and Conservation decision support system (USFWS, April 2020). A total of ten threatened or endangered species are on the USFWS Official Species List for the proposed project area and have the potential to be present in or migrate through Benton County. The listed species include the Northern Long-eared Bat (*Myotis septentrionalis*), Indiana Bat (*Myotis sodalis*), Gray Bat (*Myotis grisescens*), Ozark Big-eared Bat (*Corynorhinus townsendii ingens*), Piping Plover (*Charadrius melodus*), Red Knot (*Calidris canutus rufa*), Ozark Cavefish (*Amblyopsis rosae*), Benton County Cave Crayfish (*Cambarus aculabrum*),

An **endangered species** is one that is in danger of extinction throughout all or a substantial portion of its range. Endangered species receive the highest level of protection.

A **threatened species** is one that is likely to become endangered in the near future.

and the Missouri Bladderpod (*Physaria filiformis*). Additionally, the Eastern Black Rail (*Laterallus jamaicensis ssp. jamaicensis*) is included on the Official Species List as proposed threatened. **Table 9** details the status and closest known occurrences of these federally listed species that have a potential to be impacted.

Species/Status	Closest Known Occurrence
Northern Long-eared Bat (Threatened)	Osage Creek (Redman, 2015), within 5 miles (ANHC, 2020)
Gray Bat (Endangered)	Cave Springs Cave, within 1 mile (ANHC, 2020)
Indiana Bat (Endangered)	Within 1 mile (ANHC, 2020)
Ozark Big-eared Bat (Endangered)	Currently Unknown
Eastern Black Rail (Proposed Threatened)	Currently Unknown
Ozark Cavefish (Threatened)	Cave Springs Cave, within 1 mile (ANHC, 2020)
Benton County Cave Crayfish (Endangered)	Cave Springs Cave, within 5 miles (ANHC, 2020)

Table 9: Federally Listed Species, Status and Known Occurrences

No critical habitats are present within the proposed project area. A habitat assessment for the federallyprotected species was conducted for all three action alternatives. Based on habitat observed in the study area (see **Figure 16** and Appendix H), suitable forested foraging and roosting habitat is present for the listed bat species, potential karst features for the cave obligate species, and wetlands for the Eastern Black Rail. Based on coordination with USFWS and ANHC, review of the Northern Long-eared Bat Consultation Area map and Final 4(D) Rule Guidance document, no known occupied bat maternity roost trees were identified within 150 feet of the action alternatives; however, potential roost trees are present. ANHC data did not reveal records of any listed bat species as occurring within the action alternatives but did have occurrence records of Gray Bats at Cave Springs Cave. Suitable habitats for the Red Knot, Piping Plover, and Missouri Bladderpod were not identified within the study area of any of the alternatives.

Consultation with USFWS began early and has been ongoing throughout the NEPA process. A summary of the habitat assessment is provided in the request for technical assistance that was submitted to USFWS in April 2020 (see Appendix H). A subsequent field review of the three action alternatives was completed with the USFWS in September 2020. A summary of the field review can be found in Appendix H and includes the following:

- All three alternatives would impact springs and likely to require blasting
- The USFWS does not have occurrence records for the listed species within any of the three alternatives
- The entire area is surrounded by Ozark Cavefish and Benton County Cave Crayfish occurrence records
- Other projects in the area are currently being reviewed by the USFWS and the recommendation was to overlap projects as much as possible
- Recommendation was made to follow karst BMPs
- Strong possibility that highway development would impact the cave obligate species

The USFWS responded in October 2020 (see Appendix C) and recommended following the BMPs developed for the Cave Springs Cave Recharge area. These BMPs are described in the *Cave Springs Area Karst Resource Conservation Regulations*. Section 7 consultation will continue upon selection of

the Preferred Alternative. Avoidance and mitigation measures will be determined upon completion of Section 7 consultation.





All action alternatives exhibited suitable habitat for the Indiana, Northern Long-eared, Gray, and Ozark Big-eared bats, Ozark Cavefish, Benton County Cave Crayfish, and Eastern Black Rail. According to the USFWS, Gray bats roost almost exclusively in caves throughout the year and are rarely found roosting in structures. However, the USFWS Arkansas Ecological Services Field Office has indicated reports of Gray bats occasionally roosting in storm sewers, mines, and buildings (USFWS, 2018). Additionally, none of the action alternatives would have direct effects on the Cave Springs Cave or its water quality. Suitable habitat and impacts within the respective alternative corridors for each species is presented in **Table 10**. Avoidance and minimization measures (AMM) would be implemented through ARDOT Special Provisions (SP) for tree clearing in karst areas, water quality, and cave discovery SPs, the USFWS's *Community Growth Best Management Practices for Conservation of Karst Recharge Zones*, and *Cave Springs Area Karst Resource Conservation Regulations*.

Bald Eagles (*Haliaeetus leucocephalus*) are protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act. Suitable nesting trees and foraging areas for the Bald Eagle were observed within all action alternatives' corridors; however, no Bald Eagles or nests were observed during the site reconnaissance. Impacts to suitable nesting trees would include tree clearing associated with road construction. Implementation of the following BMPs would minimize potential unforeseen impacts to Bald Eagles:

- Suitable nesting trees and foraging areas are present within the proposed project area for the Bald Eagle. Prior to construction, the project area would be surveyed to ensure no nesting eagles are present or would be negatively impacted by the project.
- Maintain a 330-foot buffer between an identified nest and the project area.
- Restrict all clearing within 660 feet of a nest to outside of the nesting season of late May to late September.
- Maintain natural landscape buffers that screen construction activities from an identified nest.

Protected migratory birds include Cliff Swallows (*Petrochelidon pyrrhonota*) and Barn Swallows (*Hirundo rustica*). Barn Swallows use man-made structures for nesting and live in close association with humans. Both swallow species commonly use bridges and culverts for nesting. Other migratory birds can also nest on transportation structures. Implementation of the following mitigation measures for all action alternatives would ensure that the proposed project would avoid or minimize potential adverse effects to migratory birds, other birds of prey protected under the MBTA, and federally protected species:

• Suitable nesting habitat is present within the proposed project area for migratory birds. Construction activities with the potential to affect migratory birds are encouraged to occur between August 15 and March 31 to avoid the nesting season. Suitable habitat for nonmigratory ground nesting birds is also present and construction is encouraged to occur during the same timeframe. Provided construction can be conducted within the non-nesting season, no adverse effects are anticipated to migratory birds. The ARDOT migratory bird SP would be implemented as part of the project.

	Quitable	Alternatives				
Species/Status	Habitat	No Action	New Location	Partial New Location	Improve the Existing Hwys.	
Northern Long-eared Bat	Forested Acreage	0	75.5	26.4	18.9	
(<i>Myotis septentrionalis</i>) Threatened	Roosting Structures	0	11	15	12	
Gray Bat	Forested Acreage	0	75.5	26.4	18.9	
Endangered	Roosting Structures	0	11	15	12	
Indiana Bat (<i>Myotis sodalis</i>) Endangered	Forested Acreage	0	75.5	26.4	18.9	
	Roosting Structures	0	11	15	12	
Ozark Big-eared Bat (Corynorhinus townsendii ingens) Endangered	Acres of Summer Foraging Habitat	0	75.5	26.4	18.9	
Eastern Black Rail (<i>Laterallus jamaicensis</i> <i>ssp. jamaicensis</i>) Proposed Threatened	Wetland Acreage	0	0	0.07	0.08	
Ozark Cavefish (<i>Amblyopsis rosae</i>) Threatened	No. of Springs Impacted	0	2	3	2	
Benton County Cave Crayfish (Cambarus aculabrum) Endangered	No. of Springs Impacted	0	2	3	2	

Table 10: Federally Listed Species Preliminary Habitat Impacts

No Action Alternative

The No Action Alternative would have no effect on federally-protected species.

New Location Alternative

The New Location Alternative would impact the greatest amount of suitable foraging habitat for all four listed bat species with an estimated 75.5 acres of forested area impacted. Direct impacts would include

tree clearing and grubbing by heavy equipment and indirect impacts would include potential sedimentation as a result of ground disturbing activities. An estimated 11 building or barn structures suitable for summer roosting for the Indiana, Gray, and Northern Long-eared bats were observed. A known Gray bat maternity colony is located within Cave Springs Cave that is 2.75 miles northeast of this alternative. A 2014 presence/absence bat survey conducted in close proximity to the New Location Alternative documented occurrences of Northern Long-eared bats and Gray bats along Osage Creek (Redman, 2014).

Suitable habitat associated with springs along Osage Creek and Little Osage Creek was observed for the Ozark Cavefish and the Benton County Cave Crayfish. Springs are considered direct conduits to groundwater resources (CTA, 2015), which may provide suitable habitat for the Ozark Cavefish and the Benton County Cave Crayfish. The Partial New Location Alternative impacts three springs while the New Location Alternative and the Improve the Existing Highways Alternative each impact two springs. Direct impacts to springs may occur due to heavy equipment usage in close proximity that may compact surrounding soils and installation of spring boxes, which would allow for continued issuance of the springs to downstream areas. The introduction of sediment and degraded water quality into these systems from both construction and post-construction paved roadway surfaces may also indirectly impact these two species, which are known to be vulnerable to chemicals in the groundwater (USFWS, 2019).

The New Location Alternative would impact several structures potentially suitable for barn swallow nesting, including one box culvert that would potentially be suitable for swallows. Bridges constructed as part of this alternative could provide future additional suitable nesting habitat.

Partial New Location Alternative

The Partial New Location Alternative would impact 26.4 acres of suitable foraging habitat for all four listed bat species. An estimated 13 building or barn structures and two existing bridges suitable for summer roosting for the Indiana, Gray, and Northern Long-eared bats would be impacted. Direct impacts would include tree clearing and grubbing, and bridge demolition by heavy equipment and indirect impacts would include potential sedimentation as a result of ground disturbing activities. The known Gray bat maternity colony located within Cave Springs Cave is 1.6 miles northeast of this alternative. Suitable habitat associated with springs along Osage Creek and Little Osage Creek was observed for the Ozark Cavefish and the Benton County Cave Crayfish. Three springs would be impacted by the Partial New Location Alternative, which is one more than the Improve the Existing Highways Alternative, and the same as those impacted by the New Location Alternative. The direct and indirect impacts to springs located in the Partial New Location Alternative would be similar to those identified in the New Location Alternative.

Suitable habitat in the form of emergent wetlands was observed for the Eastern Black Rail. This alternative would impact 0.07 acre of emergent wetlands containing dense vegetation cover. Direct impacts of filling of the wetlands and indirect impacts of downstream sedimentation would occur. The

same BMPs to control off-site sedimentation as identified for the New Alignment Alternative would be implemented to ensure off-site wetlands would not be impacted.

Suitable migratory bird habitat within the Partial New Location Alternative would be impacted by removal of several structures potentially suitable for barn swallow nesting and two bridge structures potentially suitable for swallows and other migratory birds. Bridges constructed as part of this alternative would provide future suitable nesting habitat. The ARDOT migratory bird SP would be implemented as part of the project. Implementation of the same mitigation measures identified for the New Location Alternative would be utilized for this alternative.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would impact 18.9 acres of suitable foraging habitat for all four listed bat species, which is the least amount of forested area impacted compared to the other two action alternatives. An estimated nine building or barn structures and three bridges suitable for summer roosting for the Indiana, Gray, and Northern Long-eared bats would be impacted. Direct impacts would include tree clearing and grubbing, and bridge demolition by heavy equipment and indirect impacts would include potential sedimentation as a result of ground disturbing activities. The known Gray bat maternity roost located within Cave Springs Cave is 2,000 feet east of this alternative. Implementation of the same mitigation measures identified for the New Location Alternative would be utilized for this alternative.

Suitable habitat associated with springs along the existing highways was observed for the Ozark Cavefish and the Benton County Cave Crayfish. Two springs would be impacted by the Improve the Existing Highways Alternative. The direct and indirect impacts to springs located in the Improve the Existing Highways Alternative would be similar to those identified in the New Location Alternative.

Suitable habitat in the form of emergent wetlands was observed for the Eastern Black Rail. This alternative would impact 0.08 acre of emergent wetlands containing dense vegetation cover. Direct impacts of filling of the wetlands and indirect impacts of downstream sedimentation would occur. The same BMPs to control off-site sedimentation as identified for the New Alignment Alternative would be implemented to ensure off-site wetlands would not be impacted.

Suitable migratory bird habitat within the Improve the Existing Highways Alternative would be impacted by removal of several structures potentially suitable for barn swallow nesting and three bridge structures potentially suitable for swallows and other migratory birds. Bridges constructed as part of this alternative would provide future suitable nesting habitat. The ARDOT migratory bird SP would be implemented as part of the project. Implementation of the same mitigation measures identified for the New Location Alternative would be utilized for this alternative.

Highway 112

The Hwy. 112 impacts associated with the Partial New Location Alternative include 3.53 acres of suitable summer foraging habitat for all four listed bat species. There are no suitable roosting structures, springs, wetlands, or ponds associated with the Partial New Location Alternative section on Hwy. 112.

Hwy. 112 impacts associated with the Improve the Existing Highways Alternative would include 5.0 acres of suitable foraging habitat for all four listed bat species, one suitable summer roosting structure, one spring, 0.08 acre of emergent wetlands, and one structure (Spring Creek bridge) suitable for migratory bird nesting. One structure suitable for summer roosting for the Indiana and Northern Long-eared Bats, and possibly the Gray Bat (Spring Creek bridge) was identified. The known Gray bat maternity roost located within Cave Springs Cave is also 2,000 feet east of this alternative. Bridge improvements would provide future suitable nesting habitat. The ARDOT migratory bird SP would be implemented as part of the project.

Direct impacts would include tree clearing and grubbing, and bridge demolition by heavy equipment and indirect impacts would include potential sedimentation as a result of ground disturbing activities. Implementation of the same mitigation measures identified for the New Location Alternative would be utilized for this alternative.

The Hwy. 112 impacts associated with the Improve the Existing Highways Alternative and the Partial New Location Alternative would have no direct effects on the Cave Springs Cave or its water quality.

3.13 Are there any hazardous materials located in the project area?

A site reconnaissance and a review of public government databases were used to determine if any hazardous materials were present in the project area. The site reconnaissance identified approximately seven small trash dumps, two sites with aboveground storage tanks (ASTs), and one site with an Industrial Storm Water Pollution Prevention Plan. Potential impacts are

Hazardous materials are any materials which if encountered may cause a potential health risk to the public.

summarized below for each alternative. The locations of these sites are provided in Figure 17.

If hazardous materials are identified, observed, or accidentally uncovered during construction, work would be halted, and the appropriate entities would be notified. Prior to resuming construction, the type of contaminant and extent of contamination would be identified. If necessary, a remediation and disposal plan would be developed. All remediation work would be conducted in conformance with the ADEQ, Environmental Protection Agency (EPA), and Occupational Safety and Health Administration (OSHA) regulations.

Additionally, an asbestos survey by a certified asbestos inspector would be conducted on each building identified for demolition. If the survey detects the presence of any asbestos-containing materials, plans would be developed for the safe removal of these materials prior to demolition. All asbestos abatement work would be conducted in accordance with ADEQ, EPA, and OSHA asbestos abatement regulations.



Figure 17: Hazardous Materials

No Action Alternative

The No Action Alternative would not impact any hazardous materials. None of the identified trash/dump sites would be remediated under the No Action Alternative.

New Location Alternative

Five trash/debris dump sites were observed within the footprint of the New Location Alternative. All of these sites would have to be remediated prior to construction. The site located at Northwest Pallet Woodworks had soil staining and petroleum odors observed near an overturned, partially full, 55-gallon drum containing an unknown substance. This facility possesses an Industrial SWPPP that allows the facility to discharge stormwater associated with industrial activity and likely contains hazardous materials, including petroleum products. Northwest Pallet Woodworks is one of the relocations associated with the New Location Alternative. This alternative would also require the removal of an AST near the south end of the alignment.

Partial New Location Alternative

Two trash/debris dump sites were observed within the footprint of the Partial New Location Alternative. Due to grading limits, only the northernmost site would have to be remediated prior to construction. Additionally, one registered AST is located near the alignment but would not be impacted by the Partial New Location Alternative.

Improve the Existing Highways Alternative

One registered AST is located near the Improve the Existing Highways Alternative but would not be impacted by this alternative.

Highway 112

No hazardous materials were identified along Hwy. 112.

3.14 Would any prime farmlands be impacted by the project?

The Natural Resource Conservation Service (NRCS) administers the Farmland Protection Policy Act (FPPA) of 1981 to ensure that federal programs minimize unnecessary and irreversible conversion of prime farmland or farmland of statewide importance to non-agricultural uses. The NRCS Web Soil Survey was accessed to identify the presence of any prime farmland in the project area.

No Action Alternative

No prime farmland would be converted under the No Action Alternative.

Prime farmland is defined by the U.S. Department of Agriculture as land that has the best combination of physical and chemical characteristics for producing crops. In some areas, land that does not meet the criteria for prime or unique farmland is considered to be **farmland of statewide importance** and may include lands that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

Action Alternatives

The New Location Alternative, Partial New Location Alternative, and the Improve the Existing Highways Alternative would disturb 11.0, 5.1, and 0.0 acres, respectively, of prime farmland. The prime farmland worksheet, form CPA-106, was sent to the NRCS for their review and completion. Each action alternative received a total site assessment score of less than 160 points on the worksheet; therefore, the provisions of the FPPA do not apply.

Highway 112

No prime farmland would be impacted by Hwy. 112 improvements.

3.15 Does the project have any indirect effects?

Council of Environmental Quality (CEQ) and FHWA regulations require that potential indirect effects be considered during the NEPA process. Indirect effects are reasonably foreseeable effects that may be caused by the project but would occur in the future or outside of the project area.

Encroachment-Alteration Effects

Encroachment-alteration effects are physical, chemical, or biological changes in the environment that occur as a result of the project but are removed in time or distance from the direct effects. Impacts to water quality that occur as a result of the project but are then distributed off-site as water moves downstream beyond the project area, are the primary encroachment-alteration effect for this project.

No Action Alternative

For the No Action Alternative, no improvements would be constructed; therefore, no short-term or long-term indirect effects (of any type) are anticipated to occur.

Action Alternatives

For each action alternative, construction is anticipated to cause temporary encroachment-alteration effects to water quality that may impact streams, karst features (e.g. springs), and cave-obligate species. The action alternatives would directly impact streams (including Little Osage Creek and Osage Creek) due to vegetation removal and earth moving activities during construction. These activities may indirectly affect receiving drainages by causing a temporary increase in sedimentation, which decreases water quality, to the local watershed from stormwater runoff. These temporary impacts would likely include increased turbidity in some areas or even sources of petroleum or other pollutants from construction vehicles.

Based on the amount of new land disturbance, the New Location Alternative would appear to have the greater likelihood of indirectly impacting water quality. All action alternatives would also directly impact

Indirect effects are defined as impacts that are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" according to the CEQ (40 Code of Federal Regulations [CFR] 1508.8) and may "include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems".

springs (i.e., karst features) and may, therefore, indirectly impact other springs and other connected, subterranean karst features, through the introduction of degraded water quality associated with construction and/or stormwater runoff. While stormwater has an immediate effect on surface waters, some of these contaminants may also reach an aquifer, which in turn indirectly affects springs. Decreased water quality is a known threat to karst systems (including springs). Therefore, karst features and/or springs may also be temporarily degraded if construction results in a direct connection between the surface and the groundwater system that allows pollution from septic tanks, urban runoff, and waste from livestock/poultry to impact groundwater. Moreover, because springs are linked to suitable habitat for aquatic cave species such as the Ozark Cavefish and the Benton County Cave Crayfish, the introduction of degraded water quality may also indirectly impact these two species, which are known to be vulnerable to chemicals in the groundwater (USFWS, 2019).

Based on the number of direct impacts to springs, the Partial New Location Alternative would presumably have the greatest risk of indirectly impacting springs and cave-obligate species. Based on proximity to Cave Springs Cave and the number of adjacent recharge areas, the Improve the Existing Highways Alternative and the Hwy. 112 improvements would appear to have the overall greater risk to karst features and/or cave-obligate species. However, without additional studies, the true potential for karst, spring, and groundwater impacts is not known. Regardless, BMP measures would be implemented as part of the design and construction of the project to avoid and/or reduce encroachment-alteration effects to surrounding resources resulting from stormwater runoff. These construction BMPs would help minimize water quality degradation. Additionally, the project would have provisions relating to karst features (including springs) in place that would reduce impacts if cave or surface openings are encountered during construction.

As mentioned in **Section 3.8**, four karst recharge areas are located near the proposed project area: Logan Cave to the west, Hewlett Springs to the north, Elm Springs to the south, and Cave Springs Cave to the east. Based on ADEQ flowline data, none of the streams within the project area flow (either directly or indirectly) into any of the four karst recharge areas. Therefore, encroachment-alteration effects to these surrounding recharge areas are not anticipated.

Induced-Growth Effects

Changes in the pattern of land use, growth patterns, population density, or growth rate due to the construction of a highway project also may occur, and the resulting induced development can impact sensitive resources. This is another type of indirect effect that is categorized as induced-growth effects. An assessment of induced-growth effects is summarized below and provided in **Appendix I**.

Increased accessibility due to the proposed project is anticipated by some city planners to increase the rate of future development within the project vicinity. The increased rate of development for residential, commercial, and mixed-use purposes in the three induced-growth areas described below (one for the New Location Alternative and two for the Partial New Location Alternative) would potentially impact sensitive biological resources. However, for each action alternative, measures such as general

construction BMPs, permitting guidelines, and regulatory requirements would minimize potential adverse induced-growth impacts for sensitive resources.

No Action Alternative

With the No Action Alternative, no improvements would be constructed, and increased accessibility and induced growth would not occur as a result. However, there are several planned projects in the vicinity (such as the SNB extension, widening of Hwy. 112, and future development within the surrounding communities) that would be constructed regardless of the proposed project; these projects are addressed in **Section 3.16**.

New Location Alternative

The New Location Alternative would have only two points of exit and entry, one at each end. Increased accessibility is not expected to occur in the area immediately surrounding the proposed alignment's connection to the SNB extension as both the proposed roadway and the SNB are fully-controlled access facilities. The north end would connect to Hwy. 264 approximately 0.2 mile east of the intersection of Hwy. 264 and Airport Blvd. Induced growth is expected to occur surrounding this intersection and it is likely that facilities such as fuel stations or travel-related services would be developed here. Induced-growth related development in this area may impact up to approximately 6 acres of potentially suitable roosting habitat for federally-protected bat species, up to 1,200 LF of a stream, and up to 0.4 acre of ponds. These stream impacts may also result in a temporary decrease in water quality on and off-site during development. No floodplains, known springs, habitat for aquatic cave-obligate species or other threatened/endangered species, and other sensitive resources were identified within the induced growth area. However, because the project occurs within a karst region, aquatic resources may be connected underground or off-site to karst features; therefore, the likelihood exists that impacts to karst features and/or growth in this area.

The New Location Alternative would result in changes in traffic and mobility that would increase the likelihood of land use changes. City and regional planners anticipate the project would increase the rate and intensity of development in their jurisdictional areas, particularly around intersections (i.e., around the proposed road's intersection with Hwy. 264 and with the SNB interchange) where land use would be expected to change from rural/undeveloped to commercial or even industrial. Few, if any, land use changes would be anticipated along the existing Hwy. 112 or Hwy. 264 as traffic growth rates (compared to the No Action Alternative) would be reduced in these areas as a result of the project.

Sensitive noise receptors in the project vicinity would be directly impacted by noise caused from the proposed project. Additionally, traffic patterns would change as a result of the project and these changes may result in increased traffic noise levels in some areas. However, induced-growth effects are not anticipated to result in substantial traffic noise.

Partial New Location Alternative

The Partial New Location Alternative is fully controlled only on the new alignment section between Hwy. 264 and Hwy. 112. Multiple exit and entry points already exist along the existing highways. While widening would occur along the route on the existing highway and this action may increase mobility, improvements along the existing highways are not expected to substantially increase the overall accessibility of these areas as these routes are already accessible. Only the proposed alignment's connections to Hwy. 264 and Hwy. 112 are anticipated to result in increased accessibility.

Induced growth is expected to occur within portions of these two areas and it is likely that facilities such as fuel stations or travel-related services would be developed around these intersections. Inducedgrowth related development in this area may impact up to approximately 14 acres of potentially suitable roosting habitat for federally-protected bat species, 2,800 LF of streams, and 2.3 acres of ponds and wetlands. These stream impacts may also result in a temporary decrease in water quality during development. While present within an area identified as having increased accessibility, Little Osage Creek is not considered an area likely for induced growth to occur given the significant regulatory requirements for impacting such a large water resource. Floodplains, however, are still considered areas where induced-growth would potentially occur despite the regulatory constraints associated with floodplain development. If both of the induced-growth areas were entirely developed, a total of approximately 33.6 acres of floodplains would be impacted. No other sensitive resources (e.g., observed springs, historic properties, or habitat for federally-protected species) are known to occur within the induced growth areas identified for this alternative. However, because the project occurs within a karst region, aquatic resources may be connected below ground or off-site to karst features and, therefore, the likelihood exists that impacts to karst features and/or groundwater would occur as a result of induced growth in this area.

Feedback from city planners primarily indicated regional growth would occur regardless of the proposed project, yet they also indicated they expected an increase in the rate and intensity of development in the area. This increase in the rate of development coupled with the project's changes in increased mobility suggests land use changes along the Partial New Location Alternative would be expected. In addition to the areas of increased accessibility described below, land use changes would be likely along the sections of the Partial New Location Alternative utilizing the existing highway. The Partial New Location Alternative increases the likelihood of redevelopment along the existing highway and zoning is predicted by some planners to change from rural/undeveloped to commercial or industrial. The greatest likelihood of land use changes would be expected around the proposed roadway's interchanges with Hwy. 112 and Hwy. 264.

Similar to the New Location Alternative, some areas of the project would have increased noise levels because of traffic pattern changes caused by the proposed project. However, induced-growth effects are not anticipated to result in substantial traffic noise.

Improve the Existing Highways Alternative

The Improve Existing Highways Alternative includes widening of existing highway along the entire proposed route and this action may increase mobility, however these widening improvements are not anticipated to cause a substantial increase in the overall accessibility of the area. Therefore, there are no areas identified as having a potential for induced growth along this alignment.

This alternative has the potential to cause land use changes resulting from increased mobility due to road widening. Anticipated land use changes primarily include an increase in the rate/intensity of development and redevelopment along the existing highway, which may include more service-based businesses such as dining and lodging.

Highway 112

Induced-growth effects for these planned improvements are very similar to those described above for the Improve the Existing Highways Alternative and the Partial New Location Alternatives.

3.16 Does the project have any cumulative impacts?

Cumulative impacts result from the total effects of a proposed project when added to other past, present, and reasonably foreseeable future projects or actions. Cumulative impacts include the direct and indirect impacts of a project together with the reasonably foreseeable future actions of others. The cumulative impacts that result from an action may be undetectable but can add to other disturbances and eventually lead to a measurable environmental change. For any given resource, a cumulative impact would only potentially exist if the resource were also directly or indirectly impacted by the proposed project.

Cumulative impacts are defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action (CFR 40 §1508.7).

No Action Alternative

The No Action Alternative would not result in any cumulative effects.

Action Alternatives

For the action alternatives, cumulative impacts to water resources, federally-protected species habitat, land use, and noise were evaluated. Cumulative analyses considered other past, present, and reasonably foreseeable future projects identified primarily through assessment of aerial imagery and the Statewide Transportation Improvement Plan (STIP). Interviews with city and regional planners were also conducted, though very few planners provided information regarding foreseeable projects within their jurisdictions. Other actions evaluated include the past and future sections of the SNB, proposed Hwy. 112 widening (including construction of a bypass around Cave Springs), construction of a wastewater line from Cave Springs to the Northwest Arkansas Conservation Authority (NACA), current/future residential and commercial development, and other reasonably foreseeable transportation projects. Due to the minor or negligible direct impacts to communities, air quality, and

historic properties from the proposed project, the potential for cumulative impacts to these resources is considered low and detailed analyses were not conducted. The detailed cumulative impacts assessment, which was conducted individually by resource, is provided in Appendix I and is summarized below.

Water Resources

The proposed action alternatives would directly impact surface water sources and may indirectly affect receiving drainages associated with a temporary increase in sedimentation to the local watershed from stormwater runoff. Additionally, some induced growth impacts may occur as described in Section 3.15. The combined impacts resulting from direct, indirect, and those other actions where impacts were able to be estimated would produce a cumulative impact of 23,420 LF for streams and 6.9 acres for wetlands within the study area investigated for this resource, which is the project's 98,327-acre HUC12 watershed. However, this likely only represents a subset of the impacts resulting from other actions as not all future projects appeared to have been clearly identified during the interview process. Therefore, cumulative impacts were also conservatively calculated based on historical trends with resulting estimates indicating a total loss of approximately 213 acres (8.1%) of wetlands throughout the entire resource study area. The true cumulative impact to the acreages of water resources would be somewhere between these two values (i.e., between 7 and 213 acres). With the use of BMPs for the proposed action alternatives and assuming appropriate implementation of BMPs for other actions, stormwater runoff resulting from the project combined with impacts of other actions are anticipated to be minimized or prevented and not influence other areas of the watershed. Additionally, given the relatively minor percentage of wetland reduction for the entire resource study area, the proposed project is not expected to contribute substantial cumulative impacts to waters and wetlands in the project vicinity. Cumulative impacts to floodplains related to other past and reasonably foreseeable future actions combined with the proposed project are possible. However, both Benton and Washington Counties participate in FEMA's National Flood Insurance Program and Benton County (which is where the proposed project and most of the other actions are located) participates in the Community Rating System. Participation in the Community Rating System program mitigates home and business damage by flooding.

Federally-Protected Species Wildlife Habitat

As detailed in **Section 3.12**, the proposed project has the potential to impact seven federally-listed species: the Gray Bat, Indiana Bat, Northern Long-eared Bat, Ozark Big-eared Bat, Eastern Black Rail, Ozark Cavefish, and the Benton County Cave Crayfish. Resources associated with these species include wooded habitat and riparian corridors (for bat roosting/foraging), caves (for bat roosting), emergent wetlands (for the rail), and cave streams or springs (for the Ozark Cavefish and the Benton County Cave Crayfish). The combined impacts resulting from direct, indirect, and those other actions where impacts were able to be estimated would produce a cumulative impact of 503 acres of tree clearing within the study area investigated for this resource. Cumulative impacts conservatively calculated based on historical trends indicating a total loss of approximately 1,431 acres (11.7%) of

woodlands throughout the entire resource study area. However, not all of these wooded areas may be suitable bat habitat. Likely the true cumulative impact for the acreages of tree removal would be somewhere between these two values (i.e., between 503 and 1,431 acres).

For the proposed action alternatives, general minimization and mitigation measures such as erosion and sedimentation BMPs as a part of the SWPPP would be applied to help protect water quality within this important karst region and as a result, also help protect stream and/or spring habitats potentially utilized by threatened and endangered species. Additionally, BMPs identified by USFWS (2007) would be used for the proposed action alternatives as a guide to ensure that any sedimentation is kept to a minimum and to avoid impacts to groundwater and sensitive or endangered species. USFWS specifically recommended in their October 8, 2020 letter that the proposed project follow karst BMPs consistent with those previously developed for the Cave Springs Cave Recharge area. For some of the residential developments identified as other actions, compliance with the Cave Springs Area Karst Resource Conservation Regulations would be required. This conservation initiative was proposed to mitigate for any potentially adverse effects to sensitive resources resulting from possible secondary and cumulative development and applies to any project within the Cave Springs Direct Recharge Area in the city limits of Rogers, Cave Springs, Lowell, and Springdale. Additionally, for any other actions involving federal funds or permits, coordination with, and project clearance from, the USFWS would be required prior to construction. However, for other actions that do not involve a federal nexus, project clearance from USFWS would likely not be required.

Given the quantity of available bat habitat in the project vicinity and the conservation measures in place for those federally funded/permitted projects, the proposed project is not expected to contribute to substantial cumulative impacts to bat habitat. Precise impacts to aquatic cave-obligate species is unknown given the subterranean and indirect nature of these potential impacts. However, given the proposed project, the Hwy. 112 widening project (including the Cave Springs Bypass), and the Cave Spring's wastewater improvements project will all cross through areas identified by USFWS as having karst features (e.g., springs, caves, and losing streams), cumulative effects of these developments and the supporting infrastructure is a concern for conservation and protection of at-risk species. Therefore, the USFWS recommends that in order to minimize impacts to listed species, ARDOT should coordinate the paths of the Cave Springs Bypass, widening of Hwy. 112, and construction of the XNA connector road to overlap as much as possible and follow alignments being proposed for other actions, such as the NACA. Moreover, because the project occurs within a karst region, aquatic resources may be connected below ground or off-site to karst features and, therefore, the possibility exists that impacting particular aquatic resources may affect habitat for cave-obligate species. However, given that the proposed action alternatives and most of the identifiable other actions do not appear to directly impact any recharge zones in the area or known cave systems, cumulative impacts are not anticipated to be substantial. Cumulative impacts to Eastern Black Rail habitat (i.e. emergent wetlands) are not considered substantial given the very minimal impacts anticipated from direct, indirect, and other project actions.

Land Use

As detailed in **Sections 3.3** and **3.15**, the proposed project has the potential to impact land use. The direct and indirect acreages of rural/undeveloped lands converted to maintained ROW, combined with the conversion of 347 acres of undeveloped land to developed land use by other actions, results in a cumulative impact of 676 acres of converted lands. This cumulative value of converted land would represent approximately 6% of the undeveloped land within the study area investigated for this resource. Figure 11 shows the direct land use impacts in relation to the 2016 NLCD.

Based on the 2040 Metropolitan Transportation Plan developed for the project area, minimization and mitigation for some land use impacts may occur through the work on the Northwest Arkansas Regional Open Space Plan. However, this Open Space Plan appears to offer little direct mitigation for cumulative impacts to land use with regards to the proposed action alternatives and foreseeable other actions in the resource study area. While direct impacts to land use from the action alternatives are large in quantity, the cumulative reduction in percent of undeveloped land is relatively minor and not likely to contribute substantial cumulative impacts to land use in the project vicinity.

Traffic Noise

Sensitive noise receptors in the project vicinity are directly impacted by noise caused from the proposed action alternatives (**Section 3.6**), while induced-growth effects are not anticipated to result in substantial traffic noise. As detailed in Appendix I, traffic patterns would change as a result of the action alternatives. These changes may result in increased traffic noise levels in some areas. Other considerations include noise associated with the XNA, which is expected to increase in the future as the airport is more heavily utilized by aircraft. However, based on a recent noise analysis conducted for a separate project at XNA, these future aircraft noise impacts are not projected to expand beyond airport property. Thus, substantial cumulative impacts related to traffic noise are not anticipated to occur as a result of the proposed action alternatives.

3.17 What resources are either not present or not affected?

Air Quality

Benton County is in attainment for all National Ambient Air Quality Standards; therefore, the project is not subject to transportation conformity requirements. An air quality analysis was prepared for corridor 4AB and corridor 5AB for the Northwest Arkansas Regional EIS in September 2012. Corridor 4AB and Corridor 5AB are located in the same general location as the New Location and Partial New Location Alternatives. Local air quality air impacts were assessed by comparing future carbon monoxide (CO) levels with state and federal standards. The analysis indicted that the highest existing 1-hour CO concentration was 6.1 parts per million (ppm) and the highest future for that no action analysis was 6.9 ppm, both well below the 1-hour standard of 35 ppm.

For each action alternative in this EA, the amount of mobile source air toxics (MSAT) emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are

the same for each alternative. The VMT for the New Location Alternative and the Partial New Location Alternative are lower than that of the No Action Alternative, while the VMT for the Improve the Existing Highways Alternative is slightly higher due to the additional traffic attracted to the improved route. However, Vehicle Hours Traveled (VHT), which can also be correlated to MSAT, are lower for all three action alternatives than that of the No Action Alternative due to overall improved travel efficiency.

Because the VMT and VHT estimated for the No Action Alternative are near to or higher than the levels for any of the action alternatives, significantly higher levels of MSAT are not expected from any of the action alternatives compared to the No Action Alternative. Refer to **Table 11**.

Alternative	Length (miles)	Average ADT	VMT	VHT
No Action	6.63	13,246	87,818	1,835
New Location	4.60	18,814	86,544	1,248
Partial New Location	4.34	14,960	64,926	1,392
Improve Existing Hwys.	6.63	13,883	92,042	1,750

Table 11: VMT and VHT Comparison for Design Year 2040

In addition, because the estimated VMT under each of the action alternatives are nearly the same, varying by less than five percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of the EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent from 2010 to 2050 (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, October 12, 2016). Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

In sum, under all action alternatives in the design year, it is expected there would be reduced MSAT emissions in the immediate area of the project relative to the No Action Alternative, due to the reduced VMT and VHT associated with more direct routing, reduced delay, higher travel speeds, and due to EPA's MSAT reduction programs.

Energy

There are no energy impacts associated with the proposed project.
Environmental Justice

Review of census data indicated that none of the census tracts or census block groups within the project area had median household incomes below the poverty guidelines or minority populations greater than 50%. No impacts to environmental justice populations are anticipated.

Wild and Scenic Rivers

No Wild and Scenic Rivers would be impacted by the proposed project.

Section 4(f) and Section 6(f) Resources

No Section 4(f) or Section 6(f) resources have been identified within the proposed project area.

Chapter 4 – Results and Recommendations

This chapter summarizes environmental analysis results and recommendations.

4.1 What are the results of this EA?

 Table 12 summarizes impacts of the action alternatives for comparison purposes.

Resource Categories	No Action Alternative	New Location Alternative	Partial New Location Alternative	Improve Existing Hwys. Alternative		
ENGINEERING						
Length	6.6 miles	4.6 miles	4.3 miles	6.6 miles		
ROW Required	0 acres	241.8 acres	100.6 acres	74.7 acres		
Construction Cost*	\$0	\$79,773,225	\$61,944,051	\$50,511,233		
ROW Cost*	\$0	\$5,830,000	\$4,815,000	\$6,625,000		
Total Cost*	\$0	\$85,603,225	\$66,759,051	\$57,136,233		
		NATURAL RESC	DURCES			
Wetlands	0 acres	3.3 acres	0.8 acre	1.5 acres		
100-Year	0 acres	15.6 acres	11 acres	24.4 acres		
Floodplains	crossed	crossed	crossed			
Streams	0 LF	6,509 LF	6,705 LF	14,849 LF		
Karst Springs	0	2	3	2		
Suitable Habitat; Ozark Cavefish	0	2 springs	3 springs	2 springs		
Suitable Habitat; Benton County Crayfish	0	2 springs	3 springs	2 springs		
Suitable Habitat; Bats	0	75.5 acres	26.4 acres	18.9 acres		
Suitable Roosting Structures	0	11	15	12		

Table 12: Alternatives Comparison Table

Resource Categories	No Action Alternative	New Location Alternative	Partial New Location Alternative	Improve Existing Hwys. Alternative		
	RELOCATIONS					
Residences	nces 0 2 11 17					
Landlord Businesses	0	0	4	5		
Businesses	0	3	1	2		
OTHER RESOURCES						
NRHP Eligible Sites 0 1 3 9						
Hazardous Materials Sites	0	6	2	0		
Noise Impacts	123	7	14	24		
Prime Farmland (acres)	0	11	5.1	0		
Visual Quality	0	Least Noticeable Changes	Moderately Noticeable Changes	Greatest Noticeable Changes		

* Costs are based on preliminary design and do not include utility relocations.

4.2 What is the Preferred Alternative?

The New Location Alternative has been identified as the Preferred Alternative because it provides the most direct and reliable route to the airport with environmental and social impacts comparable to the other build alternatives. The New Location Alternative best reduces the likelihood of congestion, accidents, or extreme weather events interfering with airport access by providing a completely new route to the airport, allowing for the existing highways and the new access road to serve as redundant routes in the case of such events.

Table 13 identifies the major impacts associated with the Preferred Alternative.

Table 13:	Impacts	Associated	with the	Preferred	Alternative
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Resource Categories	No Action	Preferred Alternative
Relocations Required	0	5
Visual Quality	None	Least Noticeable Changes
ROW Required	0 acres	241.8 acres

Resource Categories	No Action	Preferred Alternative
Known NRHP Sites	0	1
Stream Impacts	0 LF	6,509 LF
Wetland Impacts	0 acres	3.2 acres
Floodplain Impacts	0 acres	0 acres
Hazardous Materials Sites	None	6 sites
Farmland Impacts	0 acres	11 acres
Karst Springs	0	2
Suitable Bat Habitat	0	75.5 acres
Roosting Structures	0	11

4.1 What commitments have been made?

ARDOT's standard commitments regarding relocation procedures, hazardous waste abatement, cultural resources discovery, water quality impact controls, and revegetation have been made for this project. The commitments are as follows:

- Residents and businesses displaced as a direct result of acquisition for the project will be eligible for relocation assistance in accordance with Public Law 91-646, Uniform Relocation Assistance Act of 1970.
- An asbestos survey will be conducted by a certified asbestos inspector on each building slated for acquisition and demolition. All detected asbestos-containing materials will be removed prior to demolition in accordance with ADEQ, EPA, and OSHA regulations.
- In the event of cave discovery during construction, work will immediately be discontinued in the area, access shall be denied, and the opening secured to prevent unauthorized entry. The USFWS will be contacted for the proper procedures to be followed and to examine the cave to determine usage by any listed species.
- A detailed hydrology and hydraulics study will be performed during the final design to demonstrate that the project would not result in any increase in flood level due to construction that would violate applicable floodplain regulations or ordinances.
- If hazardous materials, unknown illegal dumps, or USTs are identified or accidentally uncovered during construction, the type and extent of the contamination will be determined according to the ARDOT response protocol. In cooperation with the ADEQ, appropriate remediation and disposal methods will be determined.

- Project construction will be in compliance with all applicable CWA regulations, as required. This
 includes obtaining the following: Section 401 Water Quality Certification, Section 402 NPDES,
 and Section 404 Permit for Dredged or Fill Material.
- Stream and wetland mitigation will be offered at an approved mitigation site at a ratio approved during the Section 404 permitting process.
- An intensive cultural resources survey will be conducted for the Preferred Alternative. If sites are
 affected, a report documenting the survey results and stating the ARDOT's recommendations
 will be prepared and submitted for SHPO review. If prehistoric sites are impacted, FHWA-led
 consultation with the appropriate Native American Tribe will be conducted and the site(s)
 evaluated to determine if Phase II testing is necessary. Should any of the sites be determined
 as eligible or potentially eligible for NRHP nomination and avoidance is not possible, site-specific
 treatment plans will be prepared and data recovery conducted at the earliest practicable time.
 All borrow pits, waste areas, and work roads will be surveyed for cultural resources when
 locations become available.
- Water Pollution Control and Nesting Sites of Migratory Birds Special Provisions will be incorporated into the construction contract to minimize potential impacts to water quality and migratory birds.
- Appropriate action will be taken to mitigate any permanent impacts to private drinking water sources should they occur due to this project.
- Water quality best management practices will follow the Cave Spring Area Karst Resource Conservation Regulations as recommended by the USFWS. Section 7 consultation with the USFWS will continue upon the selection of the Preferred Alternative. USFWS concurrence/clearance will be obtained for the Preferred Alternative prior to final NEPA approval.
- A wildflower seed mix will be included in the permanent seeding for the project.

4.2 Is the NEPA process finished?

After this EA is approved by the FHWA for public dissemination, a Location Public Hearing will be held.

After a review of comments received from citizens, public officials, and public agencies, if it is determined that there are not significant impacts associated with the Preferred Alternative, a FONSI document will be prepared and submitted to the FHWA. If significant, immitigable impacts are identified, an EIS would be initiated. If FHWA issues a FONSI, it will identify the Selected Alternative. The issuance of a FONSI concludes the NEPA process.

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<u>Acronyms</u>

AAS	Arkansas Archeological Survey
ADEQ	Arkansas Division of Environmental Quality
ADH	Arkansas Department of Health
ADT	Average Daily Traffic
ALP	Airport Layout Plan
AMASDA	Automated Management of Archeological Site Data in Arkansas
AMM	Avoidance and Minimization Measures
ArDOT	Arkansas Department of Transportation
AST	Aboveground Storage Tanks
BMP	Best Management Practice
CEQ	Council of Environmental Quality
CMF	Crash Modification Factor
CO	Carbon Monoxide
CSRS	Conceptual Stage Relocation Statement
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
ESW	Ecologically Sensitive Waterbody
FEMA	Federal Emergency Management Agency
FHWA	Federal Hwy. Administration
FONSI	Finding of No Significant Impact

FPPA	Farmland Protection Policy Act
IPaC	Information, Planning, and Conservation
LF	Linear Feet
MBTA	Migratory Bird Treaty Act
MPH	Miles Per Hour
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NACA	Northwest Arkansas Conservation Authority
NBZ	Noise Boundary Zone
NEPA	National Environmental Policy Act
NLCD	National Land Cover Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWARPC	Northwest Arkansas Regional Planning Commission
OSHA	Occupational Safety and Health Administration
OUL	Ozark Underground Laboratory
PPM	Parts Per Million
ROW	Right of Way
RPZ	Runway Protection Zone
SHPO	State Historic Preservation Office
SI	Substantial Increase
SNB	Springdale Northern Bypass
SP	Special Provision
STIP	Statewide Transportation Improvement Plan
SWPPP	Stormwater Pollution Prevention Plan
TNM	Traffic Noise Model
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Travelled
XNA	Northwest Arkansas National Airport

Appendix A – Traffic Study

TRAFFIC AND SAFETY NEEDS

Before any traffic and safety improvements can be planned, the need for such improvements must be established. The following sections of this report examine the existing transportation system within the study area to identify any deficiencies stemming from traffic and safety operations and to evaluate existing and future needs.

The identified needs, which were established based on an evaluation of existing and future traffic operations, historical crashes, and other considerations, will lay the foundation for the development of solutions that are in line with the study goals and the overarching goals established in the Arkansas Long Range Intermodal Transportation Plan (LRITP).

TRAFFIC AND SAFETY BACKGROUND

The Northwest Arkansas National (XNA) Airport generates significant traffic, and access to this hub is provided by Highway 264 to the south and Highway 12 to the north. Both corridors are classified as minor arterials and are winding, narrow, mostly two-lane highways. Due to a lack of connectivity between Interstate 49 and the XNA Airport, motorists traveling along these routes use local roads to ultimately travel north or south along Interstate 49 resulting in misdirection, longer travel times, and delay.

The primary study area for the new connector road, shown in **Figure 1**, is bounded by Highway 12 to the west and Springdale Northern Bypass to the east and encompasses the area south of XNA Airport, including Highway 264.



Figure 1: Primary Study Area

The impact of a new connector road will affect the traffic and safety operations for a much larger area which extends up to Bentonville, as shown in **Figure 2**. For that reason, the following corridors within the area were identified for analysis:

- Interstate 49 from the Washington County Line to Highway 72
- Highway 12 from Highway 264 to Highway 71B (SE Walton Boulevard)
- **Highway 62** from Interstate 49 to Highway 94
- Highway 71B (W Walnut Street) from N 8th Street to Interstate 49
- Highway 71B (Walton Boulevard) from Interstate 49 to NW A Street
- Highway 102 from Pleasant Valley Road to Interstate 49
- Highway 112 from Washington County Line to Highway 12 (SW Regional Airport Boulevard)
- **Highway 264** from Bloomington Street to Highway 12
- Highway 279 from SW Regional Airport Boulevard to Highway 102 (W Centerton Boulevard)
- Highway 612 Section 2 from Log Mile 0.00-4.47
- Airport Boulevard from the Airport Entrance to Highway 264
- **SW I Street** from Highway 71B (SE Walton Boulevard) to Highway 12 (SW Regional Airport Boulevard)
- **Regional Avenue** from Highway 12 to Airport Boulevard

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Figure 2: Extended Study Area



SAFETY AND SECURITY

SAFETY

In order to evaluate safety performance, the historical crashes occurring within the extended study area were collected for the five most recent complete years of available data (2013-2017). Generally, crash patterns on these corridor are typical of State highways in Arkansas: in urban areas, where traffic volumes are high, the frequency of rear-end crashes tends to increase due to proliferation of access points; and in the more rural areas, there is a higher incidence of single-vehicle (run-off-road) crashes.

Crash rates for total crashes and KA crashes were calculated for contiguous segments with similar

KA Crashes are defined as either fatal or serious injury crashes.

geometric, developmental, and other characteristics along the study routes and compared to the statewide averages for similar facilities. Crash rates were calculated as follows:

Crash Rate (R) = (C * 10⁶)/(V*365*N*L)

- R = Roadway crash rate expressed as crashes per Million Vehicle-Miles (MVM) of travel
- C = Total number of roadway crashes in the study period
- V = Traffic volumes using Average Annual Daily Traffic volumes
- N = Number of years of data
- L = Length of the roadway segment in miles

Similarly, the formula for KA Crash Rate is $(C * 10^8)/(V*365*N*L)$ resulting in the KA crash rate expressed as crashes per 100 MVM of travel.

Where possible, individual segments were grouped together to eliminate having one crash result in a poor crash rate ratio. This ratio of crash rates to statewide average crash rates was calculated as follows:

Crash Rate Ratio = R/Arkansas Statewide Crash Rate

• R = Roadway crash rate expressed as crashes per MVM of travel or 100 MVM of travel for KA

Figures 3 and 4 present crash rate ratios for all crash severities as well as KA crashes only along the corridors. Locations highlighted in red or orange have higher historical crash rates than statewide averages for similar facilities, whereas locations highlighted in yellow or green have similar or lower historical crash rates than statewide average for similar facilities. As shown, the highest crash rate ratios were observed along Highway 102 followed by Highway 71B. It should be noted that no crash data was available for Highway 612. **Appendix A – Safety Analysis** provides additional information on the crash rates and crash rate ratios.

Over 170 KA crashes were recorded along the study corridor from 2013-2017. Of those crashes, the majority were either single vehicle or rear end crashes. KA crash locations by crash manner are shown in **Figure 5**.

Figure 3: Crash Rate Ratios for All Severity Crashes



Figure 4: Crash Rate Ratios for KA Crashes



Figure 5: Crash Manner for KA Crashes



Contributing factors resulting in various crash types include:

- Single Vehicle Crashes Generally caused by distracted driving (e.g., texting while driving), inclement weather, speeding, mechanical error, avoiding a vehicle, object, or animal, intoxicated driving, and/or sun glare.
- Rear End Crashes Generally caused by driving in heavy traffic conditions, distracted driving, and other similar conditions to those causing single vehicle crashes.
- Angle Crashes Generally caused by left-turn conflicts at intersections or driveways or cross-street traffic not yielding to the main lane traffic.
- Head-On Crashes Generally caused by drivers crossing the centerline, ignoring traffic signs and signals, and other similar conditions to those causing single vehicle crashes.
- Sideswipe Crashes Generally caused by drivers failing to check blind spots before changing lanes, drivers drifting into other lanes while distracted, intoxicated drivers weaving in and out of lanes, and drivers reacting to a road hazard by overcorrecting their steering wheel.

SECURITY

Enhance resiliency is a study goal related to ensuring security of the transportation system. Resilience is the ability of the transportation system to recover and regain functionality after a major disruption or disaster. For this study, resiliency was evaluated by identifying failure critical infrastructure along the corridor and determining if failures at these locations would result in a significant increase in travel distance. Locations which tend to flood were also noted. Highway 112 has notable flooding tendencies, particularly on the segment just north of the Springdale Northern Bypass which provides access to

XNA Airport. Highway 264 also has several locations which are prone to flooding, necessitating road closures on both the east and west sides of the south airport entrance.

MOBILITY AND SYSTEM RELIABILITY

CONNECTIVITY

Connectivity refers to the number of links in a transportation network and how directly travelers can reach their destinations. As connectivity increases, travel distances decrease and route options increase.

The concept of connectivity primarily relates to developed areas, where the design of local street networks can have a significant impact not only on trip lengths, but also on overall network performance. In addition, connectivity improvements can have a significant impact on local travel patterns.

The proposed XNA Connector should reduce the overall trip length/duration for regional movements as well as remove XNA traffic from streets that serve local traffic, which improves safety and efficiency for all road users.

RECURRING DELAY

In order to quantify the recurring delay of each corridor segment or intersection, the *Highway* Capacity Manual (HCM) methodology was utilized. qualitatively The НСМ describes operating conditions within a traffic stream or at an intersection using a concept known as Level of Service (LOS). LOS is typically designated into six categories. These range from LOS A indicating free-flow, low density, or nearly negligible delay conditions to LOS F where demand exceeds capacity and large queues are experienced. A graphical representation of LOS is presented in Figure 6.



Volume Development

The volume and classification count data collected annually shown in **Figure 7** were used to develop the design hourly volumes used in the operational analysis of the corridors. For the intersection analysis, existing turning movement counts from ARDOT, XNA, and the City of Bentonville were utilized. For the 2040 analysis, the traffic volumes were projected using the annual growth rates (AGR) noted in **Appendix B – Traffic Forecast**. Growth rates along each corridor are shown in **Figure 8**.

Figure 7: 2018 and 2040 No-Action ADT



Figure 8: Annual Growth Rates



LOS Methodology

For the initial screening process, a generalized LOS tool was used. For the final evaluation, the corridors were analyzed using the *Highway Capacity Software (HCS7)* for all locations except where signalized intersections were spaced so closely that the corridor no longer operated as uninterrupted flow. For the areas with several major intersections, *Synchro* software was utilized to model the network and determine corridor LOS. The results are summarized by corridor in the following subsections. Detailed reports from the *HCS* and *Synchro* analyses are provided in **Appendix C – Traffic Analysis**.

For freeway, highway, and ramp segments, LOS is based on density which is measured in passenger cars per mile per lane (pc/mi/ln). For Class II two-lane highways, the LOS is based on percent time spent following (PTSF). For Class III highways, the LOS is based on percent of free flow speed (PFFS). **Table 1** depicts the LOS thresholds for these segment types as stated in the *HCM 6th Edition*, pp. 12-19 and 15-8.

Level of	Description	Freeway or Multilane Highway	Class II Two-Lane Highway	Class III Two-Lane Highway
Service		Density (pc/mi/ln)	PTSF (%)	PFFS (&)
А	Free flow	0 to 11	0 to 40	> 91.7
В	Slight restriction of free flow	> 11 to 18	> 40 to 55	> 83.3 to 91.7
С	Restriction to free flow	> 18 to 26	> 55 to 70	> 75.0 to 83.3
D	Noticeable restriction, declining speeds	> 26 to 35	> 70 to 85	> 67.7 top 75.0
E	No gaps in traffic, volatile speeds	> 35 to 45	> 85	<u><</u> 66.7
F	Breakdown, large queues, recurring congestion	> 45 or Demand > Capacity	Demand > Capacity	Demand > Capacity

Table 1: LOS Thresholds from HCM

In order to quantify the operational conditions of intersections within the study corridors, *Synchro 10* software along with its companion *SimTraffic* software were used to analyze

the expected delays and LOS based on the *HCM* methodology and *SimTraffic* microsimulation methodology. **Table 2** describes the LOS thresholds for signalized intersections (*HCM 6*th *Edition*, pg. 19-16) and unsignalized intersections (pp. 20-6, 21-8, and 22-9).

Level of	Description	Control Delay Rnage (sec/veh)		
Service	Description	Signalized	Unsignalized	
А	Usually no conflicting traffic	0 to 10	0 to 10	
В	Occasionally some delay due to conflicting traffic	> 10 to 20	> 10 to 15	
С	Dleay noticeable, but not inconveniencing	> 20 to 35	> 15 to 25	
D	Delay noticeable and irratating, increased likelihood of risk-taking	> 35 to 55	> 25 to 35	
E	Delay approaches tolerance leve, risk-taking behavior likely	> 55 to 80	> 35 to 50	
F	Delay exceeds tolerance level, high likelihood of risk-taking	> 80	> 50	

Table 2: Intersection Level of Service Thresholds

LOS Analysis Results

The extended study area passes through both rural and urbanized areas. The threshold for acceptable traffic conditions in rural areas is LOS C, and for urban areas is LOS D. **Figures 9 and 10** present LOS graphically for both the years 2018 and 2040. In 2018, much of the extended study area corridors operate at LOS C or better except for a few notable areas identified below.

- Interstate 49
 - Washington County Line to Highway 264 LOS E
 - Highway 264 to Highway 71B LOS D
- Highway 12
 - o Mill Dam Road to CR 576– LOS D
 - Highway 112/SW I Street to Highway 71B (SE Walton Boulevard)– LOS F
- Highway 62
 - I-49 SB Ramp to I-49 NB Ramp LOS F

- Highway 71B
 - 46th Street to I-49 LOS D
 - I-49 Ramps to Airport Road/SE 28th Street LOS F
 - Airport Road/SE 28th Street to SW Commerce Drive LOS D
 - SW Commerce Drive to Highway 72 (W Central Avenue) LOS F
- Highway 102
 - N Vaughn Road to Highway 102Spur/S Fish Hatchery Road LOS D
 - SW Elm Tree Road to SW "I Street LOS D
 - SW I Street to Highway 71B (Walton Boulevard) LOS E
 - Highway 71B (Walton Boulevard) to SE J Street LOS F
 - SE J Street to SE Moberly Lane LOS E
 - SE Moberly Lane to I-49 SB Ramp LOS F
- Highway 112
 - Washington County Line to Highway 12 (SW Regional Airport Boulevard) –
 LOS E
- Highway 264
 - Bloomington Street to Belview LOS F
 - Mill Dam Road to Airport Boulevard LOS D
- SW I Street
 - Highway 71B to Highway 12 (SW Regional Airport Boulevard) LOS D

In 2040, traffic conditions are anticipated to worsen at these and other areas along the study corridor. The exception to this worsening is along Highway 112 which will be widened from two lanes to four lanes.

- Interstate 49
 - Washington County Line to Highway 102/Highway 62 LOS F

- Highway 12
 - Regional Avenue to Mill Dam Road LOS D
 - Mill Dam Road to CR 576– LOS E
 - County Road 576 to Highway 71B (SE Walton Boulevard) LOS F
- Highway 62
 - I-49 SB Ramp to I-49 NB Ramp LOS F
- Highway 71B
 - N 8th Street to Dixieland Road LOS D
 - 46th Street to Airport Road/SE 28th Street LOS F
 - Airport Road/SE 28th Street to SW Commerce Drive LOS E
 - SW Commerce Drive to Highway 72 (W Central Avenue) LOS F
- Highway 102
 - N Vaughn Road to Highway 102Spur/S Fish Hatchery Road LOS E
 - SW Elm Tree Road to I-49 SB Ramp LOS F
- Highway 112
 - Washington County Line to Highway 12 (SW Regional Airport Boulevard) -

LOS B

- Highway 264
 - Bloomington Street to Belview LOS F
 - Belview Road to S Rainbow Road LOS E
 - S Rainbow Road to Mill Dam Road LOS D
 - Mill Dam Road to Airport Boulevard LOS E
- Airport Boulevard
 - $\circ~$ Airport Entrance to Highway 264 LOS F
- SW I Street
 - Highway 71B to Highway 12 (SW Regional Airport Boulevard) LOS F

Figure 9: 2018 Level of Service



Figure 10: 2040 Level of Service



NON-RECURRING DELAY

Reliability refers to the dependability of travel times. Even if a highway performs well on a typical day, unpredictable events such as weather and crashes may occasionally affect performance. Travel time reliability is an increasing concern of commuters, shippers, and other travelers who depend on predictable service for timely arrival or delivery.

Reliability was reviewed for the extended study area corridors using one year of data from the 2018 National Performance Management Research Data Set (NPMRDS) and typical day data from Google Maps. The 2018 NPMRDS was used to estimate peak-hour travel speeds for the corridors on the National Highway System. **Figures 11 and 12** show the results of the NPMRDS data. Travel speeds 20 mph or more below posted speeds were detected at the following locations:

- I-49 Pleasant Grove Road to Hwy 71B (Northbound)
- I-49 Hwy 71B to New Hope Road (Southbound)
- Highway 62 I-49 Southbound Ramps to Highway 94
- Highway 71B N 8th Street (Rogers) to Hwy 72 (Bentonville)

Non-National Highway System routes that were flagged as having delay from the Google Maps are identified below:

- Highway 102 Highway 279 to I-49 Southbound Ramps
- Highway 12 SW Windmill Road to SW Runway Drive
- Highway 12 County Road 576 to Highway 71B
- Highway 112 Brown Road to Highway 264 (Healing Springs Road)
- Highway 112 Wallis Road to Chapell
- Highway 112 SW H Street/Elk Road to Highway 12

- Highway 264 (W Monroe Avenue) Bloomington Street (Lowell) to Center Corner Drive
- Highway 264 (Healing Springs Road) Highway 112 to Farrar Road
- Highway 612 Westbound Exit Ramp to Highway 112

Figure 11: AM Peak Travel Speed



Figure 12: AM Peak Travel Speed



ACCESS MANAGEMENT

Access management refers to methods that promote the safe and efficient movement of people and goods by reducing roadway conflicts at street intersections and driveways. Effective access management preserves the functional needs of the roadway while providing reasonable access to property.

Efforts to manage access in the study area include the following:

• The June 2015 *Highway 112 Corridor Study, Benton and Washington Counties* recommended widening Highway 112 to four lanes and access management strategies such as raised medians, better driveway spacing, and deceleration lanes.

As new projects occur in the extended study area, more access management projects are anticipated. Given the intended function of the proposed XNA connector, a relatively high degree of control of access is desirable.

TRAFFIC AND SAFETY ANALYSIS

The *Purpose and Need* identified the transportation issues within the study area. Based on stakeholder/public input and the information in the *Purpose and Need*, the study team developed three alternatives to address the transportation issues in the study area. The traffic and safety performance of each of these Alternatives compared to the 2040 No-Action Alternative is discussed throughout the following sections.

ALTERNATIVES

NEW LOCATION ALTERNATIVE

This alternative would consist of a four-lane divided highway and would be constructed on new alignment from Highway 264 to Highway 612 (Springdale Northern Bypass). The New Location Alternative is shown in green in **Figure 1**.

PARTIAL NEW LOCATION ALTERNATIVE

This alternative would follow existing Highway 264 from Airport Boulevard to Mill Dam Road/Colonel Meyers Road and then continue south on new alignment to Highway 112 at the Wagon Wheel Road intersection. The typical section would consist of a four-lane divided highway with a raised median. **Figure 1** displays this corridor in purple.

IMPROVE EXISTING ALTERNATIVE

This alternative would follow existing Highway 264 to Highway 112 and continue south to Highway 612 (Springdale Northern Bypass). The typical section would consist of 4 lanes divided with a raised median This alternative is shown in orange in **Figure 1**.


Figure 1: Alternative Alignments

SAFETY

The safety impacts of each Alternative were evaluated qualitatively by comparing the relative values of applicable Crash Modification Factors (CMFs) of each to the No-Action Alternative. It should be noted that this is a simplified method and only provides the potential percent change in crashes and not the change in the number of crashes. A detailed evaluation would require a more rigorous method.

The Crash Modification Factors Clearinghouse was used as the resource to search and determine applicable CMFs. After comparing the design features of the Action and No-Action Alternatives including the number of lanes, lane widths, shoulder widths, median widths, and type of access, the following applicable CMFs were considered:

- Convert two-lane roadway to four-lane divided roadway (CMF ID 7566)
- Convert median width from 10 feet to 60 feet (CMF ID 4548)
- Convert median width from 10 feet to 70 feet (CMF ID 5292)
- Increase lane width (CMF ID 3936)
- Change right shoulder width from x to y (CMF ID 3012)
- Change driveway density from x to y driveway per mile (CMF ID 2459)

Multiple CMFs were combined to represent the overall safety impact of each alternative. **Table 1** displays the safety impact of the Action Alternatives compared to the No-Action Alternative and the estimated percent change in crashes. As shown, the New Location Alternative provides the highest reduction in crashes when compared to the No-Action Alternative.

Alternatives	Location	Total Length	Safety Impac No-A	ct Relative to ction
		(miles)	CMF	Reduction
New Location	New connector - Hwy 264 to Hwy 612	4.60	0 121	97 00%
Alternative	Hwy 612 - New connector to Hwy 112	4.00	0.121	07.90%
Partial New	Hwy 264 -Mill Dam Rd to Airport Blvd			
Location	New connector - Hwy 264 to Hwy 112	4.34	0.238	76.16%
Alternative	Hwy 112 (S Main St) - Hwy 612 to Wagon Wheel Road			
	Hwy 264 (Healing Springs Rd) - Hwy 112 (Main St) to Mill Dam Rd			
Improve Existing	Hwy 264 -Mill Dam Rd to Airport Blvd	6.62	0.246	75 150/
Alternative	Hwy 112 (S Main St) - Hwy 612 to Hwy 264 (E Lowell Ave)	0.03	0.240	75.45%
	Hwy 112 (S Main St) - Hwy 264 (E Lowell Ave) to Hwy 264 (Healing Spirngs Rd)			
	Hwy 264 (Healing Springs Rd) - Hwy 112 (Main St) to Mill Dam Rd			
No-Action	Hwy 264 -Mill Dam Rd to Airport Blvd	6.62	1.0	0.00/
Alternative	Hwy 112 (S Main St) - Hwy 612 to Hwy 264 (E Lowell Ave)	0.03	1.0	0.0%
	Hwy 112 (S Main St) - Hwy 264 (E Lowell Ave) to Hwy 264 (Healing Spirngs Rd)			

Table 1: Relative Comparison of Design Alternatives using CMFs

MOBILITY AND SYSTEM RELIABILITY

CONNECTIVITY

From a connectivity standpoint, each of the Action Alternatives will reduce the overall trip duration for regional movements. Additionally, the New Location Alternative and the Partial New Location Alternative will reduce the travel length as well as remove some of the XNA traffic from streets that serve local traffic, which improves safety and efficiency for all road users.

The vehicle miles travelled (VMT), vehicle hours traveled (VHT) and travel time were all derived from the NARTS TDM. All values are measured from Airport Boulevard at Highway 264 to the Westbound ramp at the Highway 112/Highway 612 interchange. **Table 2** below shows the results for each Alternative and the comparison with the 2040 No-Action Alternative. Although the VMT is lowest for the 2040 Partial New Location Alternative due to the length of the route, the VHT and travel times are lowest for the 2040 New Location Alternative. All three Action Alternatives perform better than the No-Action Alternative with regards to travel times.

Table 2: Travel Comparison

Alternative	Length (miles)	∨мт	VHT	AM Travel Time (Min)	PM Travel Time (Min)
2040 No-Action	6.63	87,818	1,835	8.19	8.80
2040 New Location Alternative	4.60	86,544	1,248	4.99	5.04
2040 Partial New Location Alternative	4.34	64,926	1,392	5.76	5.97
2040 Improve Existing Alternative	6.63	92,042	1,750	7.47	7.66

VOLUME DEVELOPMENT

The volume development for the Alternatives is described in **Appendix B** – **Traffic Forecast. Figures 2-9** on the following pages show the AM and PM Peak Hour volumes in the primary study area as well as the ADT in the Extended study area.



Figure 2: Existing Peak Hour Traffic Volumes (Primary Study Area)



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Figure 4: 2040 New Alilgnment Alternative Peak Hour Traffic Volumes (Primary Study Area)

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Figure 5: 2040 Partial New Alignment Alternative Peak Hour Traffic Volumes (Primary Study Area)



Figure 6: 2040 Improve Existing Alternative Peak Hour Traffic Volumes (Primary Study Area)



Figure 7: ADT – 2040 No-Action vs. New Location Alternative (Extended Study Area)



Figure 8: ADT – 2040 No-Action vs. Partial New Location Alternative (Extended Study Area)



Figure 9: ADT – 2040 No-Action vs. Improve Existing Alternative (Extended Study Area)

Northwest Arkansas National Airport Access Study (F) Alternatives Analysis Report

RECURRING DELAY

The recurring delay of each corridor segment or intersection in each Action Alternative was quantified in the same manner as the Existing and 2040 No-Action.

LOS Analysis Results

For the Extended Study Area, the percent change in ADT from the 2040 No-Action for each of the Alternatives was minimal. Therefore, analyses of the Action Alternatives outside the Primary Study Area were not performed. More detail on the traffic operations for the primary study area as well as the extended study area is provided in **Appendix C** – **Traffic Analysis**.

As shown in **Figure 10**, the Action Alternatives in the Primary Study Area corridors (Highway 12, Highway 112, Highway 264, and Highway 612) operate at or better than the No-Action Alternative except for Highway 264 east of Highway 112. For the Partial New Alignment Alternative and the Improve Existing Alternative, this segment of Highway 264 operates at LOS E compared to LOS D in the No-Action scenario.

At the Primary Study Area intersections (Highway 264 at Airport Boulevard and at Mill Dam Road/Colonel Myers Road, and Highway 112 at Highway 264 (Healing Springs Road), Highway 264 (Lowell Avenue), Wagon Wheel Road, Highway 612 WB Ramp, and Highway 612 EB Ramp) signalization was added where needed in all 2040 Alternatives. The results indicate that the intersections will operate at the same or better LOS for each Action Alternative when compared to the No-Action Alternative except for the Highway 112 at Wagon Wheel Road intersection where volumes for all but the Partial New Alignment Alternative likely would not warrant a signal in the future.

Figure 10: Level of Service



ACCESS MANAGEMENT

Access management refers to methods that promote the safe and efficient movement of people and goods by reducing roadway conflicts at street intersections and driveways. Effective access management preserves the functional needs of the roadway while providing reasonable access to property.

Efforts to manage access in the study area include the following:

• The June 2015 *Highway 112 Corridor Study, Benton and Washington Counties* recommended widening Highway 112 to four lanes and access management strategies such as raised medians, better driveway spacing, and deceleration lanes.

Given the intended function of the proposed XNA connector, a relatively high degree of control of access is desirable. As shown in **Figure 11**, the typical section for the New Location Alternative would be a divided highway and the typical sections for the Partial New Location Alternative and the Improve Existing Alternative will include a curb and gutter section with a raised median.





Northwest Arkansas National Airport Access Study (F) BENTON COUNTY

APPENDIX A – SAFETY ANALYSIS



Prepared by Garver for the Arkansas Department of Transportation and the Northwest Arkansas National Airport In cooperation with the Federal Highway Administration

This report was funded in part by the Federal Highway Administration, U.S. Department of Transportation. The views and opinions of the authors expressed herein do not necessarily state or reflect those of the U.S. Department of Transportation.

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CRASH RATES

Rates for total crashes and KA crashes were computed for the corridor segments within the study area and compared to the statewide average for similar facilities. Locations highlighted in red or orange have higher historical crash rates than Statewide averages for similar facilities, whereas locations highlighted in yellow or green have similar or lower historical crash rates than statewide average for similar facilities. The results are shown in the following subsections. Note that no crash data was available for Highway 612.

INTERSTATE 49 – WASHINGTON COUNTY LINE TO HIGHWAY 72

As shown in **Table A-1**, no significantly elevated crash rates or KA crash rates were noted along Interstate 49.

					Total C	rashes			KA Cr	ashes	
Route	Section	Log Miles	Weighted ADT	Number of Crashes	Crash Rate (per MVM) ¹	Statewide Average (per MVM) ¹	Crash Rate Ratio ²	Number of Crashes	Crash Rate (per 100 MVM) ¹	Statewide Average (per 100 MVM) ¹	Crash Rate Ratio ²
					I-49)					
1-49	29	74.16 - 75.21	92,000	355	2.01	1.20	1.67	5	2.83	3.94	0.72
1-49	29	75.21 - 77.93	79,000	381	0.97	1.20	0.81	16	4.09	3.94	1.04
1-49	29	77.93 - 80.05	79,000	358	1.17	1.20	0.97	14	4.57	3.94	1.16
1-49	29	80.05 - 82.00	79,205	333	1.18	1.20	0.98	13	4.61	3.94	1.17
1-49	29	82.00 - 83.16	82,000	215	1.24	1.20	1.03	11	6.34	3.94	1.61
1-49	29	83.16 - 84.29	82,000	153	0.91	1.20	0.76	6	3.56	3.94	0.90
1-49	29	84.29 - 85.85	69,358	164	0.83	1.20	0.69	10	5.05	3.94	1.28
1-49	29	85.74 - 88.08	50,721	167	0.77	0.81	0.95	2	0.92	3.16	0.29

Table A-1: Interstate 49 Crash Rate Ratios

HIGHWAY 12 – HIGHWAY 264 TO HIGHWAY 71B

As shown in **Table A-2**, no elevated crash rates or KA crash rates were noted along Highway 12.

					Total C	rashes			KA Cr	ashes	
Route	Section	Log Miles	Weighted ADT	Number of Crashes	Crash Rate (per MVM) ¹	Statewide Average (per MVM) ¹	Crash Rate Ratio ²	Number of Crashes	Crash Rate (per 100 MVM) ¹	Statewide Average (per 100 MVM) ¹	Crash Rate Ratio ²
					Hwy	12					
Hwy 12	2	7.94 - 12.77	3,742	33	1.00	2.48	0.40	0	0.00	9.55	0.00
Hwy 12	2	12.77 - 13.93	7,600	16	0.99	2.48	0.40	1	6.22	9.55	0.65
Hwy 12	2	13.93 - 17.81	10,335	50	0.68	2.48	0.28	1	1.37	9.55	0.14
Hwy 12	2	17.81 - 20.50	26,947	709	5.35	3.98	1.35	2	1.51	7.88	0.19

Table A-2: Highway 12 Crash Rate Ratios

HIGHWAY 62 – INTERSTATE 49 SB RAMP TO HIGHWAY 94

As shown in **Table A-3**, the crash rate along Highway 62 is similar to the statewide average crash rate, and the KA crash rate is lower than the statewide average KA crash rate for similar highway facilities.

					Total C	rashes					
Route	Section	Log Miles	Weighted ADT	Number of Crashes	Crash Rate (per MVM) ¹	Statewide Average (per MVM) ¹	Crash Rate Ratio ²	Number of Crashes	Crash Rate (per 100 MVM) ¹	Statewide Average (per 100 MVM) ¹	Crash Rate Ratio ²
Hwy 62											
Hwv 62	2	0.00 - 3.09	28.628	746	4.63	3.98	1.16	11	6.82	7.88	0.87

Table A-3: Highway 62 Crash Rate Ratios

HIGHWAY 71B – N 8TH STREET TO NW A STREET

As shown in **Table A-4**, the segment of Highway 71B from Interstate 49 to Highway 12/ SW Regional Airport Boulevard (LM 0.00-1.48) has a crash rate ratio more than double the statewide average. Highway 71B is a multilane highway with a two-way left turn lane (TWLTL), numerous intersections both signalized and unsignalized, and driveways. Congestion, signal timing issues, and lack of access management are possible contributing factors to the high crash rates within this segment.

					Total C	rashes			KA Cr	ashes	
Route	Section	Log Miles	Weighted ADT	Number of Crashes	Crash Rate (per MVM) ¹	Statewide Average (per MVM) ¹	Crash Rate Ratio ²	Number of Crashes	Crash Rate (per 100 MVM) ¹	Statewide Average (per 100 MVM) ¹	Crash Rate Ratio ²
					Hwy 7	71B					
Hwy 71B	18B	8.58 - 11.80	27,920	1000	6.09	3.98	1.53	11	6.70	7.88	0.85
Hwy 71B	19B	0.00 - 1.48	38,391	998	9.62	3.98	2.42	8	7.71	7.88	0.98
Hwy 71B	19B	1.48 - 4.20	26,569	946	7.22	3.98	1.82	5	3.82	7.88	0.48

Table A-4: Highway 71B Crash Rate Ratios

HIGHWAY 102 - HIGHWAY 279 TO INTERSTATE 49 SB RAMP

As shown in **Table A-5**, the segment of Highway 102 from Highway 71B/ Walton Boulevard to Interstate 49 Southbound Ramps (LM 4.00-5.88) has double the statewide average crash rate for similar highway facilities. This segment is a multilane highway with a TWLTL, several intersections, and several driveways. Congestion, signal timing issues, and lack of access management are possible contributing factors to the high crash rates within this segment.

Table A-5:	Highway	102 Crash	Rate Ratios
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					Total C	rashes	-	KA Crashes			
Route	Section	Log Miles	Weighted ADT	Number of Crashes	Crash Rate (per MVM) ¹	Statewide Average (per MVM) ¹	Crash Rate Ratio ²	Number of Crashes	Crash Rate (per 100 MVM) ¹	Statewide Average (per 100 MVM) ¹	Crash Rate Ratio ²
					Hwy ′	102					
Hwy 102	2	9.04 - 11.36	9,750	153	3.70	2.48	1.49	7	16.93	9.55	1.77
Hwy 102	3	0.00 - 2.02	26,223	343	3.55	3.98	0.89	5	5.17	7.88	0.66
Hwy 102	3	2.02 - 4.00	32,057	396	3.43	3.98	0.86	7	6.06	7.88	0.77
Hwy 102	3	4.00 - 5.88	31,169	858	8.01	3.98	2.01	7	6.53	7.88	0.83

HIGHWAY 112 – WASHINGTON COUNTY LINE TO HIGHWAY 12

As shown in **Table A-6**, no significantly elevated crash rates or KA crash rates were noted along Highway 112.

					Total C	rashes			KA Cr	ashes	
Route	Section	Log Miles	Weighted ADT	Number of Crashes	Crash Rate (per MVM) ¹	Statewide Average (per MVM) ¹	Crash Rate Ratio ²	Number of Crashes	Crash Rate (per 100 MVM) ¹	Statewide Average (per 100 MVM) ¹	Crash Rate Ratio ²
Hwy 112											
Hwy 112	2	0.00 - 3.49	10,149	108	1.67	2.48	0.67	6	9.29	9.55	0.97
Hwy 112	2	3.49 - 3.85	14,000	19	2.07	2.48	0.83	0	0.00	9.55	0.00
Hwy 112	2	3.85 - 6.42	9,466	39	0.88	2.48	0.35	1	2.25	9.55	0.24
Hwy 112	2	6.42 - 8.75	8,244	96	2.74	2.48	1.10	2	5.72	9.55	0.60
Hwy 112	2	8.75 - 9.22	8,100	17	2.36	4.35	0.54	0	0.00	4.84	0.00

Table A-6: Highway 112 Crash Rate Ratios

HIGHWAY 264 – BLOOMINGTON STREET TO HIGHWAY 12

As shown in **Table A-7**, the crash rate for the segment of Highway 264 between Interstate 49 and Goad Springs Road (LM 0.74-1.01) is over twice the statewide average for similar highways. Congestion and signal timing issues may be contributing factors to this elevated crash rate.

Table A-7: Highway 264 Crash Rate Ratios

					Total C	rashes			KA Cra	ashes	
Route	Section	Log Miles	Weighted ADT	Number of Crashes	Crash Rate (per MVM) ¹	Statewide Average (per MVM) ¹	Crash Rate Ratio ²	Number of Crashes	Crash Rate (per 100 MVM) ¹	Statewide Average (per 100 MVM) ¹	Crash Rate Ratio ²
					Hwy 2	264					
Hwy 264	2	0.00 - 0.74	25,252	198	5.85	3.98	1.47	2	5.90	7.88	0.75
Hwy 264	2	0.74 - 1.01	26,000	75	5.75	2.48	2.31	1	7.66	9.55	0.80
Hwy 264	2	1.01 - 7.35	7,132	257	1.67	2.48	0.67	17	11.04	9.55	1.16

HIGHWAY 279 – SW REGIONAL AIRPORT BOULEVARD TO HIGHWAY 102

As shown in **Table A-8**, no elevated crash rates were noted along Highway 279 from SW Regional Airport Boulevard to Highway 102.

				Total Crashes				KA Crashes			
Route	Section	Log Miles	Weighted ADT	Number of Crashes	Crash Rate (per MVM) ¹	Statewide Average (per MVM) ¹	Crash Rate Ratio ²	Number of Crashes	Crash Rate (per 100 MVM) ¹	Statewide Average (per 100 MVM) ¹	Crash Rate Ratio ²
Hwy 279											
Hwy 279	0	0.00 - 3.02	4,100	19	0.84	2.48	0.34	0	0.00	9.55	0.00

 Table A-8: Highway 279 Crash Rate Ratios

NON-HIGHWAY CRASHES

Segments of Airport Boulevard, SW I Street, and Regional Avenue were evaluated as shown in **Table A-9**, and no significantly elevated crash rates were noted along these routes.

					Total C	rashes		KA Crashes			
Route	Section	Log Miles	Weighted ADT	Number of Crashes	Crash Rate (per MVM) ¹	Statewide Average (per MVM) ¹	Crash Rate Ratio ²	Number of Crashes	Crash Rate (per 100 MVM) ¹	Statewide Average (per 100 MVM) ¹	Crash Rate Ratio ²
Airport Blvd											
Airport Blvd	1	0.00 - 0.68	3,400	0	0.00	2.48	0.00	0	0.00	9.55	0.00
					SW I	St					
SW I St	1	0.00 - 0.70	12,000	70	4.57	2.48	1.84	0	0.00	9.55	0.00
SW I St	1	0.70 - 2.19	14,000	53	1.39	3.98	0.35	0	0.00	7.88	0.00
					Regiona	l Ave					
Regional Ave	2&3	0.00 - 0.60	4,400	6	0.29	2.48	0.12	0	0.00	9.55	0.00

Table A-9: Non-Highway Crash Rate Ratios

Northwest Arkansas National Airport Access Study (F) BENTON COUNTY

APPENDIX B – TRAFFIC FORECAST



Prepared by Garver for the Arkansas Department of Transportation and the Northwest Arkansas National Airport In cooperation with the Federal Highway Administration

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TRAFFIC FORECAST METHODOLOGY

The Arkansas Department of Transportation (ARDOT) proposes to perform an Environmental Assessment (EA) for a connector road from the Springdale Northern Bypass (SNB) to the Northwest Arkansas National Airport (XNA) in Benton County. Alliance Transportation Group, Inc. (ATG) assisted Garver, LLC (Garver) in forecasting the 2040 No Action traffic volumes and the Action Alternative traffic volumes as part of the Environmental Assessment.

This report describes the methods used for the traffic forecast and the results of the forecast. The first method utilized to project 2040 No-Action traffic volumes was the trend function in *Excel*. This method utilizes historic data and is based on the equation y=mx+b, where y represents the traffic volume and x represents the year. For these calculations, the true "b" value was selected.

The Northwest Arkansas Travel Demand Model (NWA TDM) was the other tool used to develop the traffic forecast for 2040 No-Action volumes as well as the three Action Alternative volumes. The NWA TDM was thoroughly reviewed and updated to ensure the forecasting reliability for the XNA connector alternatives. A 2010 scenario, a 2040 No-Action scenario, and three Action Alternative scenarios were performed using the NWA TDM. The modeled volumes were used in the development of the growth rates between 2010 and 2040 for study corridors.

EXISTING VOLUMES

The existing volumes were determined based on Average Daily Traffic (ADT) volumes available on the ARDOT website and turning movement count data provided by XNA, ARDOT, and the City of Bentonville. **Tables B-1** through **B-11** show the historical data available on the study corridors. Several stations had intermittent time frames of missing data. In instances where one or two years of data was missing, the average of the year before and the year after was used to fill in the missing data point. Filled in data points are shown in red.

Approach	Washington County Line to Wagon Wheel Rd	Wagon Wheel Rd and Hwy 264 (at Hwy 612)	Hwy 264 to Pleasant Grove Rd	Pleasant Grove Rd to Promenade Blvd	Promenade Blvd to New Hope Rd to Hwy 12	New Hope Rd to Hwy 71B	Hwy 71B to Hwy 102/Hwy 62	Hwy 102/Hwy 62 to Hwy 72
Station	041935	040509	040090	040530	040086	040070	040432	040251
1998	37,000	35,000	36,000		32,000	37,000	27,000	20,000
1999	42,000	42,000	39,000		36,000	39,000	37,000	25,000
2000	43,000	53,000	41,000		47,000	40,000	35,000	28,000
2001	51,000	49,000	43,000		48,000	46,000	41,000	28,000
2002	55,000	50,000	47,000		49,000	48,000	37,000	30,000
2003	56,000	53,000	50,000		51,000	55,000	44,000	31,000
2004	63,300	52,100	63,200		50,900	58,800	46,400	35,800
2005	66,100	63,700	64,800		60,800	58,500	50,300	39,700
2006	66,300	64,700	62,400		58,400	61,500	48,300	34,300
2007	65,500	63,900	66,000	62,500	60,700	66,000	52,800	38,500
2008	63,000	62,000	64,000	63,000	63,000	66,000	54,000	39,000
2009	64,000	63,000	65,000	64,000	63,000	67,000	55,000	39,000
2010	69,000	69,000	69,000	69,000	69,000	70,000	58,000	42,000
2011	72,000	71,000	71,000	71,000	71,000	72,000	60,000	42,000
2012	71,000	71,000	71,000	72,000	73,000	73,000	60,000	44,000
2013	77,000	74,500	74,500	75,500	76,500	76,500	56,000	44,000
2014	74,000	78,000	78,000	79,000	80,000	80,000	60,000	49,000
2015	76,000	75,000	74,000	76,000	76,000	77,000	64,000	47,000
2016	76,000	78,000	77,000	78,000	80,000	80,000	64,000	48,000
2017	78,000	78,000	77,000	78,000	80,000	80,000	64,000	51,000
2018	92,000	79,000	79,000	79,000	82,000	82,000	69,000	51,000

Table B-1: Historical ADT on Interstate 49

Approach	Hwy. 264 to NW Corner of XNA	NW Corner of XNA to Regional Ave	Regional Ave to SW Regional Airport Blvd	Vaughn Rd to Mill Dam Rd	Mill Dam Rd to CR 576	CR 576 to SW Bright Rd	SW Bright Rd to Hwy 112/SW I St	Hwy 112/SW I St to SW Rainbow Ln	SW Rainbow Ln to Hwy 71B (SE Walton Blvd)
Station	040009	040159	040114	040115	040116	040117	040010	040011	040012
1998	1,600						3,600		5,400
1999	1,600						5,300	7,400	7,200
2000	1,900						6,800	8,800	6,800
2001	1,800						8,000	9,400	9,500
2002	2,100						8,000	600	10,000
2003	2,200						9,300	10,000	11,000
2004	2,400						11,500	10,900	11,800
2005	2,600						13,200	14,900	14,300
2006	3,300		6,000	5,600	7,900	12,100	15,500	19,400	16,800
2007	2,700		5,700	5,600	8,000	11,700	15,600	20,100	19,400
2008	2,600	2,800	5,300	5,200	7,900	13,000	16,000	21,000	20,000
2009	2,700	3,300	6,000	6,400	9,100	15,000	20,000	21,000	19,000
2010	2,700	2,700	5,700	6,200	8,400	13,000	18,000	22,000	20,000
2011	2,400	2,800	5,600	5,600	8,300	12,000	18,000	2,000	16,000
2012	2,800	2,900	5,700	6,200	8,800	14,000	20,000	21,000	19,000
2013	300	3,200	5,900	6,700	9,200	14,000	22,000	17,000	18,000
2014	3,100	1,800	6,500	6,200	9,200	14,000	22,000	21,000	18,000
2015	3,200	3,400	6,400	7,000	10,000	14,000	23,000	23,000	20,000
2016	3,500	3,200	6,900	6,800	9,900	15,000	23,000	25,000	21,000
2017	3,900	4,000	7,100	7,700	11,000	18,000	28,000	28,000	23,000
2018	3,700	3,900	7,600	8,100	13,000	23,000	32,000	29,000	24,000

Table B-2: Historical ADT on Highway 12

Approach	I-49 SB Ramp to west of I-49 NB Ramp	I-49 NB Ramp to east of Dixieland Road	East of Dixieland Road to Hwy. 94
Station	040136	040422	040423
1998		23,000	20,000
1999		20,000	20,000
2000		24,000	18,000
2001		24,000	19,000
2002		27,000	21,000
2003		27,000	20,000
2004		29,500	22,400
2005		31,900	24,600
2006		33,800	25,700
2007		31,000	24,000
2008	38,000	30,000	22,000
2009	39,000	31,000	24,000
2010	39,000	29,000	23,000
2011	37,000	28,000	23,000
2012	40,000	30,000	23,000
2013	38,000	31,000	24,000
2014	35,000	29,000	22,000
2015	35,000	28,000	23,000
2016	37,000	26,000	22,000
2017	38,000	28,000	23,000
2018	37,000	30,000	25,000

Table B-3: Historical ADT on Highway 62

Approach	N 8th St to Dixieland Rd	Dixieland Rd to N 34th St	N 34th St to N 46th St	N 46th St to I-49	I-49 to SE Dodson Rd/SE J St	E Dodson Rd/SE J St to Hwy 12 (SW Regional Airport Blvd)	Hwy 12 (SW Regional Airport Blvd) to SW Rainbow Ln	SW Rainbow Ln to Airport Rd/SE 28th St	Airport Rd/SE 28th St to SW Commerce Dr	SW Commerce Dr to Hwy 102 (SW 14th St)	SW 8th St to SW I St
Station	040413	040137	040414	040139	040200	040201	040202	040203	040204	040205	040206
1998			22,000		21,000	14,000	14,000	15,000	16,000	14,000	19,000
1999	17,000		23,500		22,000	17,000	13,000	15,000	17,000	15,000	20,000
2000	18,000		23,500		18,000	18,000	12,000	15,000	18,000	16,000	20,000
2001	21,000		25,000		23,000	18,500	18,000	15,000	19,000	18,000	21,000
2002	23,000		26,000		23,000	19,000	13,000	15,000	21,000	20,000	21,000
2003	25,000		26,000		24,000	20,000	13,000	15,000	20,000	20,000	21,000
2004	23,400		28,400		24,500	21,300	12,400	16,000	18,400	22,700	24,500
2005	23,200		26,500		29,000	25,600	15,350	18,750	22,850	20,400	25,800
2006	27,200		29,600		33,500	29,900	18,300	21,500	27,300	25,700	29,800
2007	24,900		30,000		35,250	31,300	19,900	23,600	28,100	26,700	32,800
2008	23,000	27,000	30,000	32,000	35,250	34,000	21,000	24,000	29,000	27,000	30,900
2009	24,000	27,000	30,000	31,000	37,000	32,000	19,000	23,000	28,000	26,000	29,000
2010	24,000	27,000	28,000	31,000	38,000	34,000	21,000	24,000	30,000	28,000	27,000
2011	22,000	26,000	28,000	30,000	37,000	33,000	21,000	24,000	29,000	26,000	28,000
2012	23,000	27,000	29,000	30,000	37,000	35,000	21,000	24,000	30,000	27,000	28,000
2013	23,000	28,000	27,000	32,000	35,000	36,000	20,000	23,000	29,000	27,000	26,000
2014	23,000	29,000	28,000	34,000	38,000	32,000	19,000	22,000	27,000	26,000	27,000
2015	24,000	27,000	31,000	31,000	37,000	35,000	22,000	25,000	31,000	29,000	27,000
2016	24,000	27,000	31,000	30,000	37,000	36,000	20,000	25,000	29,000	29,000	27,000
2017	25,000	28,000	32,000	32,000	39,000	37,000	21,000	23,000	28,000	26,000	24,000
2018	24,000	29,000	30,000	34,000	40,000	38,000	21,000	24,000	29,000	27,000	26,000

Table B-4: Historical ADT on Highway 71B

Approach	Hwy. 279 to N Vaughn Rd.	N Vaughn Rd to Hwy. 102 Spur/S Fish Hatchery Rd.	Hwy. 102 Spur/S Fish Hatchery Rd. to SW Tater Black Rd	SW Tater Black Rd. to SW Elm Tree Rd.	SW Elm Tree Rd. to SW I St.	SW I St. to Hwy. 71B (Walton Blvd.)	Hwy. 71B (Walton Blvd. to SW A St.)	SW A St. to SE J St.	SE J St. to SE Moberly Ln.	SE Moberly Ln to I-49 SB Ramp
Station	040056	040057	040127	040128	040215	040132	040214	040216	040217	040174
1998	5,600	6,900			9,200		9,400			
1999	6,200	7,900			11,000		13,000	15,000	21,000	
2000	6,300	7,600			13,000		13,000	18,000	21,000	
2001	6,000	7,800			15,000		15,000	19,000	22,000	
2002	6,200	8,000			15,000		18,000	21,000	25,000	
2003	5,000	8,300			16,000		19,000	22,000	26,000	
2004	6,900	8,800			19,900		19,600	26,900	29,600	
2005	7,700	9,300			20,200		22,400	25,900	31,700	
2006	8,700	10,500			22,300		24,900	28,500	33,000	
2007	6,800	8,100			21,100		22,000	25,600	29,900	
2008	6,400	8,500	15,000	18,000	22,000	19,000	21,000	26,000	30,000	36,000
2009	6,600	8,800	15,000	16,000	25,000	17,000	26,000	26,000	31,000	37,000
2010	7,200	9,300	16,000	18,000	25,000	18,000	22,000	27,000	32,000	37,000
2011	7,100	9,600	18,000	20,000	28,000	27,000	24,000	27,000	30,000	34,000
2012	6,200	9,200	18,000	23,000	28,000	27,000	24,000	29,000	32,000	37,000
2013	7,300	9,100	18,000	20,000	26,000	25,000	26,000	28,000	31,000	33,000
2014	7,300	11,000	21,000	25,000	32,000	31,000	25,000	27,000	29,000	34,000
2015	8,200	11,000	23,000	29,000	34,000	31,000	28,000	30,000	31,000	35,000
2016	8,000	11,000	25,000	29,000	35,000	30,000	27,000	29,000	32,000	35,000
2017	7,900	11,000	24,000	29,000	32,000	29,000	27,000	29,000	30,000	35,000
2018	8,400	12,000	25,000	30,000	33,000	29,000	28,000	30,000	32,000	35,000

Table B-5: Historical ADT on Highway 102

	Approach	Washington County Line to Marchant Rd/Carrie Smith Rd	Marchant Rd/Carrie Smith Rd to Hwy 264 (E Lowell Ave)	Hwy 264 (E Lowell Ave) to Hwy 264 (Healing Spirngs Rd)	Hwy 264 (Healing Spirngs Rd) to Sands Rd	Sands Rd to CR 46 (W Haxton Rd)	CR 46 (W Haxton Rd) to Chattin Cir	Ch 12
ĺ	Station	041681	040160	040059	040060	040061	040171	r -
	1998	3,300		4,800	2,300	2,400		
	1999	3,000		5,800	2,600	2,500		
	2000	3,300		6,100	2,500	2,500		
	2001	3,450		5,800	2,900	2,500		
	2002	3,450		5,800	2,700	2,400		
	2003	3,600		6,000	2,700	2,400		
	2004	5,800		6,400	4,700	3,100		
	2005	5,700		7,900	4,300	4,200		
	2006	6,100		8,900	4,400	4,800		
	2007	6,400		8,200	4,400	4,700		
	2008	6,000	4,300	8,000	4,400	4,300	3,600	
	2009	6,000	5,000	9,100	4,500	5,000	3,800	
	2010	6,000	4,500	7,900	4,100	4,600	4,200	
	2011	5,800	4,600	7,700	5,000	4,800	4,400	
	2012	6,400	5,500	8,700	5,700	5,700	5,100	
	2013	6,900	5,900	6,700	6,650	6,600	5,600	
	2014	8,200	6,900	11,000	7,600	7,500	6,700	
	2015	9,300	8,300	12,000	8,700	7,900	7,900	
	2016	10,000	9,400	15,000	11,000	9,500	10,000	
	2017	10,000	9,100	14,000	11,000	9,800	10,000	
	2018	11,000	10,000	14,000	10,000	9,500	8,800	

Table B-6: Historical ADT on Highway 112

ttin Cir to Hwy (SW Regional irport Blvd)
040062
2,400
2,450
2,500
2,500
2,400
2,400
2,500
3,800
4,300
4,400
4,000
4,800
4,100
4,300
5,000
5,800
6,600
7,400
8,500
8,600
8,100

Approach	Bloomington St to I-49	l-49 to Goad Springs Rd	Goad Springs Rd to Belview Rd	Belview Rd to S Rainbow Rd	S Rainbow Rd to Hwy 112	Hwy 112 (Main St) to Mill Dam Rd	Mill Dam Rd to Airport Blvd	Airport Blvd to Hwy 12
Station	040103	040155	040104	040154	040072	040172	040073	040156
1998	18,000		4,200		2,800		2,100	
1999	18,000		5,400		4,000		3,500	
2000	20,000		4,900		4,100		3,700	
2001	19,000		6,600		3,900		3,700	
2002	20,000		6,500		3,800		3,500	
2003	21,000		7,200		4,200		3,500	
2004	21,800		7,000		4,200		4,200	
2005	22,400		7,900		5,400		4,600	
2006	23,000		8,400		6,200		4,700	
2007	20,900		8,300		5,300		4,600	
2008	20,000	23,000	8,200	5,400	5,000	5,400	4,300	2,000
2009	22,000	24,000	10,000	6,700	6,000	6,500	4,600	2,500
2010	21,000	23,000	8,900	5,800	5,200	5,400	5,000	2,100
2011	19,000	20,000	9,700	6,400	5,300	4,800	4,500	1,800
2012	21,000	23,000	11,000	6,900	6,100	5,800	4,700	2,200
2013	20,000	21,000	10,000	7,100	6,850	6,000	5,100	2,500
2014	22,000	24,000	11,000	8,800	7,600	6,800	5,800	2,300
2015	22,000	22,000	13,000	9,600	8,100	7,100	5,800	2,600
2016	24,000	25,000	13,000	11,000	8,800	8,500	6,900	2,800
2017	25,000	25,000	13,000	10,000	8,800	7,700	6,600	3,000
2018	25,000	26,000	13,000	9,500	7,400	8,000	7,400	3,300

Table B-7: Historical ADT on Highway 264
Table B-8: Historical ADT on Highway 279

Approach	SW Regional Airport Blvd to Hubber Rd/Holloway Rd	Hubber Rd/Holloway Rd to Hwy 102 (W Centerton Blvd)
Station	040075	040076
1998	1,300	1,400
1999	1,300	1,400
2000	1,900	2,000
2001	2,000	2,300
2002	1,700	2,100
2003	2,100	1,800
2004	2,400	2,800
2005	3,000	3,100
2006	2,900	3,000
2007	2,600	2,900
2008	2,400	2,400
2009	2,500	2,600
2010	2,700	2,800
2011	2,700	2,600
2012	2,600	2,600
2013	2,700	2,700
2014	2,900	3,100
2015	3,500	3,500
2016	3,600	3,600
2017	3,850	3,850
2018	4,100	4,100

Table B-9: Historical ADT on Airport Boulevard

Approach	Airport Entrance to Hwy 264
Station	040181
1998	
1999	
2000	
2001	
2002	
2003	
2004	
2005	
2006	
2007	
2008	3,600
2009	3,200
2010	3,400
2011	3,500
2012	3,600
2013	3,500
2014	4,200
2015	3,700
2016	3,800
2017	3,000
2018	3,400

Approach	Hwy 71B (Walton Blvd) to Hwy 102 (SW 14th St)	Hwy 102 (SW 14th St) to Hwy 12 (SW Regional Airport Blvd)
Station	040237	040238
1998	4,100	1,100
1999	4,300	1,400
2000	4,200	1,200
2001	4,000	1,600
2002	4,500	1,800
2003	4,600	1,700
2004	5,100	2,000
2005	3,000	3,500
2006	8,700	4,600
2007	9,250	3,700
2008	9,800	4,100
2009	9,000	3,700
2010	8,200	3,900
2011	9,400	5,150
2012	11,000	6,400
2013	11,000	9,600
2014	12,000	11,000
2015	12,000	12,000
2016	11,000	12,000
2017	11,000	12,000
2018	12.000	14.000

Table B-10: Historical ADT on SW I Street

Table B-11: Historical ADT on Regional Avenue

Approach	Regional Ave from Hwy. 12 to Airport Blvd
Station	040173
1998	
1999	
2000	
2001	
2002	
2003	
2004	
2005	
2006	
2007	
2008	3,200
2009	2,900
2010	3,200
2011	3,100
2012	3,200
2013	3,500
2014	3,500
2015	3,800
2016	4,000
2017	3,700
2018	4,400

TRAVEL DEMAND MODEL

Travel Demand Models (TDMs) are tools used to help understand how changes to a transportation system, combined with population growth and land use changes over time, might affect travel patterns in a given area in a specified future year. The NWA TDM was used as the tool for forecasting traffic of the XNA Connector alternatives.

The most up-to-date NWA TDM was obtained from the Northwest Arkansas Regional Planning Commission (NWARPC). The NWA TDM is a four-step model covering Benton County, Washington County, and a small portion of MacDonald County with a base year of 2010 and a forecast year of 2040. The 2040 NWA model network reflects the roadway projects included in the NWARPC 2040 Metropolitan Transportation Plan (MTP).

The NWA TDM includes three time periods, as shown in **Table B-12**. The NWA TDM has passenger and truck components that allow the forecasting of both passenger and truck volumes on roadways.

Time Period	Count Station ID
AM Peak	6:00am – 9:00am
PM Peak	3:00pm – 6:00pm
	12:00am – 6:00am,
Off Peak	9:00am – 3:00pm,
	6:00pm – 12:00am

Table B-12: NWA TDM Time Periods

The NWA TDM was used to run a 2010 (base year) scenario, a 2040 No-Action scenario, and three 2040 Build alternative scenarios. These scenarios were used to develop growth

rates from 2010 to 2040 on Highway 264 and Highway 112 and to guide the development of 2040 traffic volumes on the new alternative roadway segments.

The NWA TDM's inputs were thoroughly reviewed to ensure that the model accurately represents the 2010 land use and roadway conditions within the project area, and that the model reasonably forecasts land use and roadway traffic in 2040. The NWA TDM's base year validation was reviewed and improved to increase the model's forecasting reliability. Input revisions were carried through to all modeled scenarios to ensure consistency.

The following sections describe how the NWA TDM was reviewed and updated to forecast traffic for the XNA Connector alternatives.

NWA TDM REVIEW AND UPDATES

The basic building blocks of a TDM are two geographic layers: the transportation system network layer and the traffic analysis zone (TAZ) layer. The network layer represents the transportation system, including different categories of roads (such as freeways, arterials, collectors, ramps, etc.) in a region. The TAZ layer stores land use information of a region. A TAZ is a basic geographical unit that links land uses with the transportation system.

This section describes the review and updates of the two geographic layers, the land use inputs, and the validation improvement for the NWA TDM. This section also lists the assumptions for coding the three alignment alternatives in the NWA TDM's network.

GEOGRAPHIC LAYERS

The NWA TDM's TAZ structure was reviewed and found to be adequate for the desired level of detail along the XNA Connector alternatives. No changes were made to the existing TAZ structure.

The NWA TDM adopts a multi-year master roadway network that includes roadways for both 2010 and 2040. For any scenario run using the NWA TDM, the master network is used to create a separate network for the scenario. The master network was reviewed and updated to ensure revisions were applied to the networks for all scenarios. Roadway alignments and attributes (such as number of lanes and functional class) near XNA were reviewed. Minor coding errors including link connectivity, two missing intersections, and the directionality of a ramp were fixed. The north entrance to XNA from Regional Avenue that was not previously coded was added to the master network. The centroid connectors of TAZs near XNA were also adjusted to better reflect zonal traffic loading to the network.

The NWA TDM master roadway network reflects the roadway projects included in the NWARPC 2040 MTP. Two projects that directly impact the XNA Connector analysis are: 1) Springdale Northern Bypass (SNB) extension from Highway 112 to Highway 412 and 2) widening Highway 112 from one lane per direction to two lanes per direction from Regional Airport Boulevard in the City of Bentonville to Howard Nickell Road in the City of Fayetteville. Being fiscal constraint projects, these two projects are included in the 2040 No-Action and all three alternatives scenarios.

LAND USE INPUT

Land use inputs, or population and employment, of the TAZs in a TDM decide the magnitude and locations of travel demand generated in a region. As part of the base year validation review, the 2010 zonal population and employment near XNA were reviewed based on the 2010 Census data and Google Earth aerial images. The 2010 Census data

and Google Earth aerial images confirmed the NWA TDM's inputs reasonably represent the 2010 land use conditions.

The 2040 land use inputs of the NWA TDM were reviewed to ensure the model incorporated a reasonable 2040 land use forecast for the XNA Connector analysis. For the purpose of summarizing statistics, an XNA project area was defined by the limits of Highway 102 in the north, US 412 in the south, IH49 in the east, and a line about four miles west of the XNA airport.

Table B-13 presents the 2010 and 2040 population and employment along with the corresponding 2010 to 2040 compound annual growth rates (CAGR) for the model area, Benton County, and the XNA project area.

Variables	NWA Region	Benton County	XNA Project Area
2010 Population	436,166	223,400	37,754
2040 Population	841,332	425,863	139,143
2010-2040 Population CAGR	2.2%	2.2%	4.4%
2010 Employment	187,116	91,638	17,619
2040 Employment	339,285	204,137	40,796
2010-2040 Employment CAGR	2.0%	2.7%	2.8%

Table B-13: NWA TDM Population and Employment Overview

The NWA TDM forecasts that the entire NWA region and Benton County have a 2% population growth rate between 2010 and 2040. This trend is consistent with the population projection for the NWA region and Benton County by the Arkansas Economic Development Institute (AEDI)¹. The NWA TDM forecasts that the NWA region has a 2% employment growth rate and Benton County has a 3% employment growth rate between 2010 and 2040. This trend is reasonable based on the historical growth between 2002 and 2012 calculated using the Economic Census data provided by the Arkansas State Data

¹ The AEDI population projection data was downloaded from <u>https://aedi.ualr.edu/index.php?id=939</u>.

Center². The NWA TDM's forecast shows that the XNA project area has a higher population growth than the other regions.

The available recent local land use plans from cities near XNA³ were downloaded and reviewed to evaluate the future land use input near XNA in the NWA TDM. The NWARPC staff was also consulted regarding the development near XNA. The review of the local land use plans and the information obtained from the NWARPC staff confirmed the NWA TDM reasonably reflected the future land use plan near XNA. **Figure B-1** and **Figure B-2** present the TAZ population and employment changes near XNA between 2010 and 2040, respectively.

 ² The Economic Census data was downloaded from <u>http://arstatedatacenter.youraedi.com/economic-census/</u>.
 ³ Only City of Bentonville and City of Rogers have recently updated land use plans. The 2018 City of Bentonville Community Plan was downloaded from <u>http://www.bentonvillear.com/258/City-Plans</u>. The 2019 City of Rogers Comprehensive Growth Plan was downloaded from <u>https://rogersar.gov/1165/Plans-Manuals-Ordinances</u>.







Figure B-2: 2010 to 2040 NWA TDM Employment Change by TAZ

The NWA TDM includes the XNA airport as a special generator with average daily flights as the input variable. The special generator input used for 2010 was 50 average daily flights. The 2010 special generator value and the trip rate were confirmed to be reasonable based on the 2010 annual enplanement data and comparisons between traffic counts and modeled volumes near XNA. The special generator input used for 2040 was 73 average daily flights, which indicated a 1.3% CAGR. To evaluate this forecasted airport growth, historical XNA annual enplanement data and the XNA master construction plan were obtained from XNA staff. Historical annual enplanement and planned 2034 enplanement are presented in **Table B-14**.

Years	Annual Enplanement	Data Source
2000	367,157	
2010	570,625	XNA Airport Enplanement Data
2018	788,261	
2034	1,300,000	XNA Master Construction Plan

Table B-14: XNA Annual Enplanement

For the past 18 years, the XNA enplanement increased by a 4.3% CAGR. The airport is planning that the enplanement will increase with a 3.2% CAGR between 2018 and 2034. Based on this information, the 1.3% CAGR of average daily flights used by the NWA TDM is believed to be relatively low and was, therefore, adjusted to 3%. This adjustment changed the 2040 airport special generator input from 73 to 120 daily flights. With this adjustment, the NWA TDM produced around 10,000 daily vehicle trips in the airport TAZ, which was a reasonable result compared to the planned 2034 enplanement.

VALIDATION IMPROVEMENT

As described in the NWA TDM Validation Memo⁴, the published NWA TDM was previously validated for each of the model steps. The total modeled volume for the NWA TDM shows a 93% comparison to the total traffic counts. The total modeled volume for the XNA project area shows a comparison of 99% to the total traffic counts, with a 26% RMSE. Count comparisons for nine available 2010 count locations near the XNA airport on Regional Avenue, Airport Boulevard, and between XNA and SNB on Highway 264 and Highway 112 are provided in this report to demonstrate the NWA TDM's performance for modeling roadway volumes near the XNA airport. **Figure B-3** shows these nine count locations, and **Table B-15** presents the count comparisons before and after the network corrections and adjustments.

⁴ The NWA TDM Validation Memo was included in the model package provided by NWARPC.



Figure B-3: Count Comparison Locations

Count	Count Logotion	2010	Model Results Before Adjustment		Model Results After Adjustment	
Station ID		AADT⁵	Volumes	% of Count	Volumes	% of Count
040181	Airport Blvd.	3,400	3,871	114%	3,089	91%
040173	Regional Ave.	3,200	3,466	108%	3,253	102%
040156	Hwy 264 W. of Airport Blvd.	2,100	2,784	133%	2,389	114%
040073	Hwy 264 E. of Airport Blvd.	5,000	6,257	125%	6,031	120%
040172	Hwy 264 W. of Hwy 112	5,400	2,496	46%	4,545	84%
040059	Hwy 112 S. of Hwy 264	7,900	6,545	83%	6,733	85%
040160	Hwy 112 N. of SNB	4,500	7,048	157%	5,371	119%
041681	Hwy 112 S. of SNB	6,000	9,210	156%	6,036	101%
040060	Hwy 112 N. of Hwy 264	4,100	8,597	210%	6,285	153%

Table B-15:Count Comparison near XNA

The comparison in **Table B-15** shows that the network corrections and centroid connector adjustments significantly improved the NWA TDM's performance for modeling roadway volumes near XNA. The modeled volumes are within 10% of the counts on Airport Boulevard (count station 040181) and Regional Avenue (count station 040173), which indicates that the NWA TDM accurately represents traffic entering/leaving the airport.

ALTERNATIVE CODING ASSUMPTIONS

The three Action Alternatives were coded in the master roadway network. Coding alternatives in the master roadway network ensures the XNA Connector is the only difference between the alternative scenarios. **Table** B-16 **B-16** describes the coding assumptions of the three alternatives.

⁵ The 2010 AADT data was downloaded from ARDOT Traffic Count Website: <u>https://www.arkansashiqhways.com/System Info and Research/traffic info/traffic map.aspx</u>

Alternatives	Functional Class (FHWA Definition)	Number of Lanes	Posted Speed	Lane Width	Right Shoulder Width⁵	Divided/ Undivided	Access Point/Intersections
New Alignment	Rural Principal Arterial	2 lanes per direction	70 mph	12 feet	10 feet	Divided	1) New alignment, 2) Ramp access to Highway 264, and 3) Ramp access to Springdale Northern Bypass.
Partial New Alignment	Urban Principal Arterial	2 lanes per direction	45 mph	12 feet	1.5-foot cub and gutter (no shoulder)	Divided	 New alignment between XNA and Brush Arbor Road, 2) Existing alignment (with improvement) of Highway 264 between Brush Arbor Road and Colonel Meyers Road, 3) New alignment between Highway 264 and Highway 112, and 4) At-grade intersections at Highway 112.
Improve Existing	Rural Principal Arterial	2 lanes per direction	50 mph	12 feet	6 feet	Divided	Widen Highway 264 and Highway 112.

Table B-16: NWA TDM Coding Assumptions for the Three Alternatives

The NWARPC 2040 MTP includes two projects that directly impact the XNA Connector analysis: the SNB extension from Highway 112 to Highway 412, and the widening of Highway 112 from one lane per direction to two lanes per direction from Regional Airport Boulevard to Howard Nickell are included in the 2040 No-Action and all the three Action Alternative scenarios.

⁶ The NWA TDM requires right shoulder width as an input for capacity estimation.

NWA TDM TRAFFIC FORECAST

The NWA TDM modeled volumes were used to develop the growth rates between 2010 and 2040 for Highway 112 and Highway 246 and to guide the development of forecast traffic volumes for the new alternative roadway segments. As listed in **Table B-12**, the AM peak period is three hours, stretching from 6:00 am to 9:00 am. Likewise, the PM peak period includes the hours between 3:00 pm and 6:00 pm. Modeled volumes reported in this section are all rounded to the nearest hundred.

Note that the modeled results are provided for planning purposes and to assist in visualizing conceptual outcomes of proposed improvements in the corridor and should not be used for design work or investment decisions on specific project improvements.

2040 NO-ACTION ALTERNATIVE

The 2040 No-Action Alternative includes roadway projects from the NWARPC 2040 MTP and excludes the XNA connector improvements on the existing facilities and new alignment alternatives. It should be noted that Highway 112 is coded as a 2-lane per direction facility as part of the 2040 MTP projects.

Table B-17 presents the 2010 to 2040 CAGR on Highway 264 and Highway 112 from theNo-Action scenario.

Count Station	Count Location	24-Hour CAGR	AM Period CAGR	PM Period CAGR	24-Hour Truck CAGR
040073	Hwy 264 E. of Airport Blvd.	2.4%	2.0%	1.8%	1.8%
040172	Hwy 264 W. of Hwy 112	2.8%	2.9%	2.8%	0.8%
040059	Hwy 112 S. of Hwy 264	3.3%	2.9%	2.6%	3.3%
040160	Hwy 112 N. of SNB	4.8%	4.3%	3.6%	5.3%

Table B-17: 2010-2040 CAGR on Hwy. 264 and Hwy. 112 (2040 No-Action Alt.)

2040 NEW ALIGNMENT ALTERNATIVE

The 2040 New Alignment Alternative was coded as a rural principal arterial with fully controlled access.

Figure B-4 shows New Alignment Alternative as coded in the NWA TDM 2040 network. **Table B-18** presents the 2010 to 2040 CAGR on Highway 264 and Highway 112 with the XNA Connector New Alignment Alternative in place. **Table B-19** presents the 2040 modeled volumes on the main section of the New Alignment Alternative.

Table B-18: 2010-2040 CAGR on Hwy. 264 and Hwy. 112 (2040 New Alignment Alt.)

Count Station	Count Location	24-Hour CAGR	AM Period CAGR	PM Period CAGR	24-Hour Truck CAGR
040073	Hwy 264 E. of Airport Blvd.	-0.1%	-0.3%	-0.4%	-2.9%
040172	Hwy 264 W. of Hwy 112	2.3%	2.6%	2.6%	-1.2%
040059	Hwy 112 S. of Hwy 264	2.9%	2.5%	2.2%	2.7%
040160	Hwy 112 N. of SNB	3.9%	3.3%	2.8%	3.9%

Table B-19: 2040 Modeled Volumes on New Alignment Alternative Main Section

Direction	24-Hour Volume	AM Period Volume	PM Period Volume	24-Hour Truck Volume
Northbound	7,000	1,700	1,900	1,500
Southbound	7,400	1,300	2,300	1,600

The modeled volumes for New Alignment Alternative ramps at Highway 264 and SNB are shown in **Figure B-5** through **Figure B-10**.



Figure B-4: XNA Connector New Alignment Alternative in the 2040 Roadway Network



Figure B-5: 2040 New Alignment Alternative Daily Ramp Volumes (at Highway 264)



Figure B-6: 2040 New Alignment Alternative AM Period Ramp Volumes (at Highway 264)



Figure B-7: 2040 New Alignment Alternative PM Period Ramp Volumes (at Highway 264)



Figure B-8: 2040 New Alignment Alternative Daily Ramp Volumes (at SNB)



Figure B-9: 2040 New Alignment Alternative AM Period Ramp Volumes (at SNB)



Figure B-10: 2040 New Alignment Alternative PM Period Ramp Volumes (at SNB)

2040 PARTIAL NEW ALIGNMENT ALTERNATIVE

The 2040 Partial New Alignment Alternative was coded as an urban principal arterial with partially controlled access. Partial New Alignment Alternative includes improvement to a portion of Highway 264 and construction of a new roadway with alignment between Highway 264 and Highway 112. **Figure B-11** shows Partial New Alignment Alternative as coded in the NWA TDM 2040 network. **Table B-20** presents the 2010 to 2040 CAGR on Highway 264 and Highway 112 with the XNA Connector Partial New Alignment Alternative in place. **Table B-21** presents the 2040 modeled volumes on the new alignment of the Partial New Alignment Alternative.

able B-20: 2010-2040 CAGR on Hw չ	. 264 and Hwy. 112 (20)40 Partial New Alignment Alt.)
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Count Station	Count Location	24-Hour CAGR	AM Period CAGR	PM Period CAGR	24-Hour Truck CAGR
040073	Hwy 264 E. of Airport Blvd.	2.8%	2.4%	2.2%	3.0%
040172	Hwy 264 W. of Hwy 112	2.4%	2.5%	2.6%	-0.2%
040059	Hwy 112 S. of Hwy 264	2.9%	2.6%	2.1%	2.8%
040160	Hwy 112 N. of SNB	5.3%	4.5%	4.1%	6.3%

Table B-21: 2040 Modeled Volumes on Partial New Alignment Alternative New Alignment

Direction	24-Hour Volume	AM Period Volume	PM Period Volume	24-Hour Truck Volume
Northbound	4,800	1,200	1,500	1,100
Southbound	5,300	900	1,800	1,200



Figure B-11: XNA Connector Partial New Alignment Alternative in the 2040 Roadway Network

2040 IMPROVE EXISTING ALTERNATIVE

Improve Existing Alternative widens the existing Highway 112 and Highway 264 roadways. **Table B-22** presents the 2010 to 2040 CAGR on Highway 264 and Highway 112 with the improvement to the two roadways.

Count Station	Count Location	24-Hour CAGR	AM Period CAGR	PM Period CAGR	24-Hour Truck CAGR
040073	Hwy 264 E. of Airport Blvd.	2.5%	2.1%	2.0%	1.9%
040172	Hwy 264 W. of Hwy 112	2.7%	2.7%	2.5%	0.8%
040059	Hwy 112 S. of Hwy 264	3.7%	3.4%	3.0%	3.6%
040160	Hwy 112 N. of SNB	5.0%	4.5%	3.8%	5.5%

2040 TRAFFIC FORECAST RESULTS

NO-ACTION ALTERNATIVES

For the final annual growth rates (AGR) along the corridors, an average of the two methods for each individual segment was calculated. At locations where a negative growth rate was calculated from either the Trend function or the TDM, a 0.00% AGR was assumed prior to averaging. Once theses averages were calculated, the individual segments were grouped into logical segments and weighted averages based on volumes were then determined. **Tables B-23** through **B-33** reflect the results of the 2040 forecasts. Table locations where a 0.00% AGR was assumed in place of negative growth rates are highlighted in yellow.

Method	Trend	NARTS	Average	Used	Method	Trend	NARTS	Average	Used	
Washington County Line to Wagon Wheel Rd						Promenade Blv	d to New Hope	e Rd to Hwy 12		
2018	18 92,000						82,	000		
AGR (%)	1.60%	0.54%	1.07%	1.05%	AGR (%)	2.38%	1.15%	1.77%	1.75%	
2040	130,474	103,488	116,000	116,000	2040	137,556	105,494	121,000	120,000	
	Wagon Wheel	Rd and Hwy 26	4 (at Hwy 612)			New I	lope Rd to Hw	y 71B		
2018		79,0	000		2018		82,	Back to Hwy 71B 82,000 1.04% 1.70% 1.70% 100.062 140.000 140.000		
AGR (%)	2.16%	0.52%	1.34%	1.35%	AGR (%)	2.36%	1.04%	1.70%	1.70%	
2040	126,538	88,471	106,000	106,000	2040	137,082	102,982	119,000	119,000	
	Hwy 264 to Pleasant Grove Rd					Hwy 71	B to Hwy 102/I	Hwy 62		
2018		79,	000		2018		69,000			
AGR (%)	2.32%	1.03%	1.68%	1.70%	AGR (%)	2.06%	1.34%	1.70%	1.70%	
2040	130,939	98,942	114,000	114,000	2040	108,044	92,390	100,000	100,000	
	Pleasant Gr	ove Rd to Prom	enade Blvd			Hwy 1	02/Hwy 62 to H	lwy 72		
2018	79,000				2018	51,000				
AGR (%)	1.85%	0.89%	1.37%	1.35%	AGR (%)	2.23%	1.84%	2.04%	2.05%	
2040	118,115	96,050	107,000	106,000	2040	82,929	76,214	79,500	79,500	

Table B-23: 204) Traffic Forecast on	Interstate 49
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Method	Trend	NARTS	Average	Used	Method	Trend	NARTS	Average	Used	
	Hwy. 26	4 to NW Corner	r of XNA			CR S	R 576 to SW Bright Rd			
2018		3,7	00		2018		23,000			
AGR (%)	1.42%	1.99%	1.71%	1.70%	AGR (%)	1.34%	3.81%	2.58%	2.40%	
2040	5,047	5,712	5,400	5,400	2040	30,815	52,392	40,000	39,000	
	NW Corne	er of XNA to Reg	gional Ave			SW Brigh	nt Rd to Hwy 11	2/SW I St		
2018		3,9	00		2018		32,	000		
AGR (%)	1.59%	3.35%	2.47%	2.40%	AGR (%)	2.47%	3.32%	2.89%	3.00%	
2040	5,521	8,052	6,700	6,600	2040	54,708	65,614	60,000	61,500	
	Regional Ave	to SW Regiona	I Airport Blvd		Hwy 112/SW I St to SW Rainbow			ainbow Ln		
2018		7,6	00		2018		29,000			
AGR (%)	1.35%	2.58%	1.96%	2.40%	AGR (%)	2.48%	3.48%	2.98%	3.00%	
2040	10,200	13,302	11,500	13,000	2040	49,716	61,500	55,500	55,500	
	Vaugl	hn Rd to Mill Da	am Rd			SW Rainbow Li	n to Hwy 71B (SE Walton Blvd)	
2018		8,1	00		2018		24,	000		
AGR (%)	1.71%	3.14%	2.42%	2.40%	AGR (%)	2.60%	3.61%	3.11%	3.00%	
2040	11,762	15,987	13,500	13,500	2040	42,246	52,327	47,000	46,000	
	Mill	Dam Rd to CR	576							
2018		13,	000							
AGR (%)	1.57%	3.14%	2.36%	2.40%						
2040	18,331	15,987	21,500	22,000						

Table B-24: 2040 Traffic Forecast on Highway 12

Table B-25: 2040 Traffic Forecast on Highway 62

Method	Trend	NARTS	Average	Used	Method	Trend	NARTS	Average	Used	
	I-49 SB Ram	np to west of I-4	9 NB Ramp			East of D	ixieland Road t	o Hwy. 94		
2018	37,000						25,	25,000 1 75% 0 87% 1 15%		
AGR (%)	-0.71%	-0.44%	0.00%	0.05%	AGR (%)	-0.03%	1.75%	0.87%	1.15%	
2040	31,655	33,604	37,000	37,500	2040	24,809	36,595	30,500	32,000	
I-49 NB Ramp to east of Dixieland Road										
2018		30,	000							
AGR (%)	0.88%	1.83%	1.36%	1.15%						
2040	36,410	44,743	40,500	38,500						

Note: The AGR% used for I-49 SB Ramp to the west of I-49 NB Ramp was based on the adjacent Highway 102 segment

Method	Trend	NARTS	Average	Used	Method	Trend	NARTS	Average	Used
	N 8tl	h St to Dixielan	d Rd		Hwy	12 (SW Region	al Airport Blvd) to SW Rainbo	w Ln
2018		24,0	000		2018		21,	000	
AGR (%)	0.88%	1.54%	1.21%	1.10%	AGR (%)	2.05%	-0.65%	0.70%	1.10%
2040	29,132	33,572	31,500	30,500	2040	32,851	18,189	24,500	26,500
	Dixie	land Rd to N 34	th St			SW Rainbow	Ln to Airport F	Rd/SE 28th St	
2018		29,0	000		2018		24,	000	
AGR (%)	0.43%	1.51%	0.97%	1.10%	AGR (%)	2.24%	0.07%	1.15%	1.10%
2040	31,873	40,329	36,000	37,000	2040	39,058	24,380	31,000	30,500
	N 3	4th St to N 46th	n St			Airport Rd/SE	28th St to SW	Commerce Dr	
2018		30,	000		2018		29,	000	
AGR (%)	1.25%	1.42%	1.34%	1.10%	AGR (%)	2.32%	0.34%	1.33%	1.10%
2040	39,436	40,939	40,000	38,000	2040	48,025	31,255	39,000	37,000
		N 46th St to I-49)			SW Commerce	e Dr to Hwy 10	2 (SW 14th St)	ł
2018		34,0	000		2018	2018 27,000			
AGR (%)	0.22%	1.62%	0.92%	1.10%	AGR (%)	2.37%	0.27%	1.32%	1.10%
2040	35,718	48,378	41,500	43,500	2040	45,208	28,620	36,000	34,500
	I-49 to \$	SE Dodson Rd/	SE J St			SV	8th St to SW	St	ł
2018		40,0	000		2018		26,	000	
AGR (%)	2.29%	0.78%	1.53%	1.65%	AGR (%)	1.61%	0.21%	0.91%	1.10%
2040	65,787	47,469	56,000	57,500	2040	36,945	27,238	31,500	33,000
E Dods	on Rd/SE J St	to Hwy 12 (SW	Regional Airpo	ort Blvd)					
2018		38,	000						
AGR (%)	2.60%	0.87%	1.73%	1.65%					
2040	66,785	46,015	55,500	54,500					

Table B-26: 2040 Traffic Forecast on Highway 71B

Table B-27: 2040 Traffic Forecast on Highway 102

Method	Trend	NARTS	Average	Used	Method	Trend	NARTS	Average	Used	
	Hwy.	279 to N Vaugh	ın Rd.			SW I St. to	Hwy. 71B (Wa	alton Blvd.)		
2018		8,4	.00		2018		29,000			
AGR (%)	0.97%	0.52%	0.74%	1.05%	AGR (%)	3.48%	2.06%	2.77%	2.45%	
2040	10,385	9,405	9,900	10,500	2040	61,564	45,435	53,000	49,500	
N V	aughn Rd to H	wy. 102 Spur/S	Fish Hatchery	Rd.	Hwy. 71B (Walton Blvd. to SW A St.)					
2018		12,0	000		2018		28,	000		
AGR (%)	1.17%	1.39%	1.28%	1.05%	AGR (%)	2.39%	1.04%	1.72%	1.30%	
2040	15,512	16,253	16,000	15,000	2040	47,092	35,191	40,500	37,000	
Hwy. 102 Spur/S Fish Hatchery Rd. to SW Tater Black Rd				ack Rd		SN	A St. to SE J	St.		
2018		25,	000		2018	30,000				
AGR (%)	3.27%	0.97%	2.12%	2.45%	AGR (%)	1.86%	0.65%	1.25%	1.30%	
2040	50,745	30,922	39,500	42,500	2040	44,971	34,576	39,500	40,000	
	SW Tater Bla	ack Rd. to SW E	Elm Tree Rd.			SE J S	St. to SE Mobe	rly Ln.		
2018		30,	000		2018		32,	000		
AGR (%)	3.49%	1.14%	2.32%	2.45%	AGR (%)	1.45%	0.64%	1.04%	1.30%	
2040	63,864	38,468	49,500	51,000	2040	43,881	36,846	40,000	42,500	
	SW El	m Tree Rd. to S	WISt.			SE Mobe	rly Ln to I-49 S	SB Ramp		
2018		33,	000		2018		35,	000		
AGR (%)	2.95%	1.99%	2.47%	2.45%	AGR (%)	-0.64%	0.08%	0.04%	0.05%	
2040	62,595	50,879	56,500	56,000	2040	30,364	35,635	35,500	35,500	

Method	Trend	NARTS	Average	Used	Method	Trend	NARTS	Average	Used	
Washington County Line to Marchant Rd/Carrie Smith Rd				Sands Rd	l to CR 46 (W H	axton Rd)				
2018		11,0	000		2018		9,5	500		
AGR (%)	2.23%	4.30%	3.27%	3.50%	AGR (%)	2.76%	3.91%	3.34%	3.50%	
2040	17,881	27,758	22,500	23,500	2040	17,307	22,082	19,500	20,000	
March	ant Rd/Carrie	Smith Rd to Hw	y 264 (E Lowe	ll Ave)	CR 46 (W Haxton Rd) to Chattin Cir					
2018		10,0	000		2018		8,8	800		
AGR (%)	3.95%	4.83%	4.39%	3.50%	AGR (%)	4.90%	3.86%	4.38%	3.50%	
2040	23,471	28,199	25,500	21,500	2040	25,224	20,259	22,500	19,000	
Hwy 2	64 (E Lowell A	ve) to Hwy 264	(Healing Spirn	gs Rd)	Chattin Cir to Hwy 12 (SW Regional Airport Blvd)					
2018		14,0	000		2018		8,100			
AGR (%)	2.07%	3.29%	2.68%	3.50%	AGR (%)	2.82%	4.47%	3.65%	3.50%	
2040	21,969	28,544	25,000	30,000	2040	14,933	21,203	18,000	17,500	
	Hwy 264 (Hea	ling Spirngs Ro	d) to Sands Rd							
2018	10,000									
AGR (%)	2.83%	3.80%	3.32%	3.50%						
2040	18,471	22,728	20,500	21,500						

Table B-28: 2040 Traffic Forecast on Highway 112

Table B-29: 2040 Traffic Forecast on Highway 264

Method	Trend	NARTS	Average	Used	Method	Trend	NARTS	Average	Used		
	Bloo	omington St to	I-49		S Rainbow Rd to Hwy 112						
2018		25,	000		2018	7,400					
AGR (%)	0.60%	2.17%	1.39%	1.45%	AGR (%)	%) 2.91% 2.25% 2.58%		2.58%	2.50%		
2040	28,539	40,134	34,000	34,500	2040	13,908	12,064	13,000	12,500		
	I-49 t	o Goad Spring	s Rd			Hwy 112	(Main St) to Mi	ll Dam Rd			
2018		26,	000		2018	8,000					
AGR (%)	0.75%	2.36%	1.55%	1.45%	AGR (%)	2.76%	2.80%	2.78%	2.50%		
2040	30,636	43,391	36,500	35,500	2040	14,572	14,683	14,500	14,000		
	Goad Sp	rings Rd to Be	lview Rd		Mill Dam Rd to Airport Blvd						
2018		13,0	000		2018	7,400					
AGR (%)	2.56%	3.63%	3.10%	3.40%	AGR (%)	1.71%	2.42%	2.07%	2.50%		
2040	22,674	28,509	25,500	27,000	2040	10,743	12,527	11,500	12,500		
Belview Rd to S Rainbow Rd					Airport Blvd to Hwy 12						
2018	9,500				2018	3,300					
AGR (%)	3.90%	3.65%	3.78%	3.40%	AGR (%)	2.33%	3.10%	2.72%	2.50%		
2040	22,065	20,903	21,500	20,000	2040	5,483	6,462	6,000	5,700		

Table B-30: 2040 Traffic Forecast on Highway 279

Method	Trend	NARTS	Average	Used	Method	Trend	NARTS	Average	Used	
SW	Regional Airpo	rt Blvd to Hubb	er Rd/Holloway	y Rd	Hubber Rd/Holloway Rd to Hwy 102 (W Centerton Blvd)					
2018		4,1	00		2018	4,100				
AGR (%)	1.84%	2.14%	1.99%	2.00%	AGR (%)	1.69%	2.34%	2.01%	2.00%	
2040	6,125	6,530	6,300	6,300	2040	5,929	6,816	6,400	6,300	

Table B-31: 2040 Traffic Forecast on Airport Boulevard

Method	Trend	NARTS	Average	Used	Method	Trend	Calculated	NARTS	Average	Used
	t Entrance to H									
2018		3,4	100							
AGR (%)	0.30%	3.08%	1.69%	3.10%						
2040	3,635	6,626	4,900	6,700						

Method	Trend	NARTS	Average	Used	Method	Trend	NARTS	Average	Used		
Н	wy 71B (Waltor	n Blvd) to Hwy	102 (SW 14th S	t)	Hwy 102 (SW 14th St) to Hwy 12 (SW Regional Airport Blvd)						
2018		12,	000		2018	14,000					
AGR (%)	3.06%	2.49%	2.78%	2.90%	AGR (%)	2.91%	3.02%	2.96%	2.90%		
2040	23.311	20.596	22.000	22,500	2040	26.302	26.917	26,500	26,500		

Table B-32: 2040 Traffic Forecast on SW I Street

Table B-33: 2040 Traffic Forecast on Regional Avenue

Method	Trend	NARTS	Average	Used	Method	Trend	Calculated	NARTS	Average	Used
Regional Ave from Hwy. 12 to Airport Blvd										
2018		4,4	400							
AGR (%)	1.97%	2.91%	2.45%	2.45%						
2040	6,765	4,428	7,500	7,500						

ACTION ALTERNATIVES

For the Action Alternatives, the 2040 No-Action volumes were multiplied by the percent change in volume based on the NARTS TDM and are shown in **Table B-34**.

		2040 No- Action	2040 New Altern	Location ative	2040 Partial New Location Alternative		2040 Improve Existing Alternative	
Corridor	Location	ADT	% Change from No- Action	ADT	% Change from No- Action	ADT	% Change from No- Action	ADT
I-49	Wagon Wheel Rd and Hwy 264 (at Hwy 612)	106,000	98.98%	105,000	100.00%	106,000	100.00%	106,000
I-49	Hwy 264 to Pleasant Grove Rd	114,000	99.31%	113,000	99.77%	114,000	99.66%	114,000
I-49	Hwy 71B to Hwy 102/Hwy 62	100,000	99.63%	99,500	99.88%	100,000	99.88%	100,000
I-49	Hwy 102/Hwy 62 to Hwy 72	79,500	99.69%	79,500	100.00%	79,500	99.85%	79,500
Hwy 12	NW Comer of XNA to Regional Ave	6,600	105.81%	7,000	101.16%	6,700	100.00%	6,600
Hwy 12	Regional Ave to SW Regional Airport Blvd	13,000	116.95%	15,000	101.69%	13,000	99.15%	13,000
Hwy 12	Vaughn Rd to Mill Dam Rd	13,500	101.44%	13,500	100.00%	13,500	100.00%	13,500
Hwy 12	Mill Dam Rd to CR 576	22,000	95.08%	21,000	100.82%	22,000	100.00%	22,000
Hwy 12	CR 576 to SW Bright Rd	38,000	96.95%	37,000	98.31%	37,500	100.00%	38,000
Hwy 12	SW Bright Rd to Hwy 112/SW I St	52,500	99.50%	52,000	99.75%	52,500	100.00%	52,500
Hwy 12	Hwy 112/SW I St to SW Rainbow Ln	55,500	99.72%	55,500	99.44%	55,000	100.28%	55,500
Hwy 12	SW Rainbow Ln to Hwy 71B (SE Walton Blvd)	51,000	100.00%	51,000	100.00%	51,000	100.00%	51,000
Hwy 71B	I-49 to SE Dodson Rd/SE J St	57,500	99.18%	57,000	100.00%	57,500	99.84%	57,500
Hwy 71B	E Dodson Rd/SE J St to Hwy 12 (SW Regional Airport Blvd)	54,500	99.31%	54,000	100.17%	54,500	100.00%	54,500
Hwy 71B	Hwy 12 (SW Regional Airport Blvd) to SW Rainbow Ln	26,500	98.28%	26,000	100.34%	26,500	100.00%	26,500
Hwy 71B	SW Rainbow Ln to Airport Rd/SE 28th St	30,500	98.67%	30,000	100.27%	30,500	100.53%	30,500
Hwy 71B	Airport Rd/SE 28th St to SW Commerce Dr	37,000	100.97%	37,500	100.00%	37,000	100.24%	37,000
Hwy 71B	SW Commerce Dr to Hwy 102 (SW 14th St)	34,500	100.48%	34,500	99.76%	34,500	99.76%	34,500
Hwy 71B	B (S Walton Blvd) - Hwy 102 (SW 14th St) to Hwy 72 (W Centr	33,000	100.15%	33,000	100.15%	33,000	100.00%	33,000
Hwy 102	SW Tater Black Rd. to SW Elm Tree Rd.	51,000	97.44%	49,500	99.04%	50,500	100.00%	51,000
Hwy 102	SW Elm Tree Rd. to SW I St.	56,000	99.23%	55,500	100.00%	56,000	100.00%	56,000
Hwy 102	SW I St. to Hwy. 71B (Walton Blvd.)	49,500	98.53%	49,000	100.37%	49,500	100.00%	49,500
Hwy 102	Hwy. 71B (Walton Blvd. to SW A St.)	37,000	98.01%	36,500	100.28%	37,000	100.00%	37,000
Hwy 102	SW A St. to SE J St.	40,000	97.87%	39,000	100.53%	40,000	100.00%	40,000
Hwy 102	SE J St. to SE Moberly Ln.	42,500	100.47%	42,500	100.47%	42,500	100.00%	42,500
Hwy 102	SE Moberly Ln to I-49 SB Ramp	35,500	100.73%	36,000	100.48%	35,500	100.00%	35,500
Hwy 62	I-49 SB Ramp to west of I-49 NB Ramp	37,500	100.90%	38,000	100.30%	37,500	100.30%	37,500
Hwy 62	I-49 NB Ramp to east of Dixieland Road	38,500	100.00%	38,500	100.00%	38,500	100.00%	38,500
Hwy 112	Washington County Line to Marchant Rd/Carrie Smith Rd	23,500	116.98%	27,500	109.43%	25,500	101.89%	24,000
Hwy 112	Marchant Rd/Carrie Smith Rd to Hwy 264 (E Lowell Ave)	21,500	76.13%	16,500	112.16%	24,000	104.95%	22,500
Hwy 112	Hwy 264 (E Lowell Ave) to Hwy 264 (Healing Spirngs Rd)	30,000	90.40%	27,000	89.27%	27,000	112.43%	33,500
Hwy 112	Hwy 264 (Healing Spirngs Rd) to Sands Rd	21.500	95.85%	20.500	93.78%	20.000	96.89%	21.000
Hwy 112	Sands Rd to CR 46 (W Haxton Rd)	20,000	96.48%	19,500	94.97%	19,000	101.01%	20,000
Hwy 112	CR 46 (W Haxton Rd) to Chattin Cir	19.000	96.23%	18.500	94.34%	18.000	102.52%	19.500
Hwy 112	Chattin Cir to Hwy 12 (SW Regional Airport Blvd)	17,500	100.00%	17,500	96.15%	17,000	102.52%	18,000
Hwy 264	Bloomington St to I-49	34,500	99.49%	34,500	100.00%	34,500	100.00%	34,500
Hwy 264	I-49 to Goad Springs Rd	35,500	99.48%	35,500	99.83%	35,500	100.17%	35,500
Hwy 264	Goad Springs Rd to Belview Rd	27,000	94.84%	25,500	98.59%	26,500	100.47%	27,000
Hwy 264	Belview Rd to S Rainbow Rd	20,000	88.24%	17,500	96.47%	19,500	103.53%	20,500
Hwy 264	S Rainbow Rd to Hwy 112	12.500	86.49%	11.000	95.95%	12.000	108.11%	13.500
Hwy 264	Hwy 112 (Main St) to Mill Dam Rd	14,000	87.38%	12,000	88.35%	12,500	98.06%	13,500
Hwy 264	Mill Dam Rd to Airport Blvd	12.500	65.00%	8.100	113.01%	14.000	101.63%	12,500
Hwy 264	Airport Blvd to Hwy 12	5,700	128.33%	7,300	116.67%	6,700	100.00%	5,700
Hwy 612	Highway 612 - Interstate 49 to Highway 112	20,000	109.55%	22,000	101.01%	20,000	98.99%	19,500
Hwy 612	Highway 612 - Highway 112 to Proposed XNA Connector	20,000	159.60%	31,500	100.51%	20,000	101.01%	20,000
Hwy 612	Highway 612 - roposed XNA Connector to the West	20,000	106.06%	21,000	100.51%	20,000	101.01%	20,000
Airport Blvd	Airport Entrance to Hwy 264	6,700	110.39%	7,400	100.00%	6,700	100.00%	6,700
SW I St	Hwy 71B (Walton Blyd) to Hwy 102 (SW 14th St)	22,500	100.00%	22,500	99,65%	22,500	100,35%	22,500
SW I St	Hwy 102 (SW 14th St) to Hwy 12 (SW Regional Airport Blvd)	26,500	98.56%	26,000	98.56%	26,000	100.72%	26,500
Regional Ave	Regional Ave from Hwy. 12 to Airport Blvd	7,500	110.39%	8,300	100.00%	7,500	100.00%	7,500

PEAK HOUR VOLUMES

Unique to this project is the shift in directional volumes that occur during the AM and PM peak periods. Currently, the primary direction of travel in the AM is toward the south and in the PM toward the north. Due to a higher growth rate of employment generators north of the project compared to south of the project, the 2040 volumes show the primary direction of travel in the AM is toward the north and in the PM toward the south. Because of this change in direction, 2040 peak hour volumes in the primary study area included the anticipated growth rates and the directional change.
Northwest Arkansas National Airport Access Study (F) BENTON COUNTY

APPENDIX C – TRAFFIC ANALYSIS



Prepared by Garver for the Arkansas Department of Transportation and the Northwest Arkansas National Airport In cooperation with the Federal Highway Administration

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LEVEL OF SERVICE (LOS)

For the evaluation of the study corridors, a generalized LOS tool developed by ARDOT using the methods in the latest edition of the *Highway Capacity Manual 6th Edition (HCM)* was utilized to perform

Acceptability ratios, or volume/LOS thresholds, are used to determine the acceptability of operations. A ratio less than 1 is acceptable. A ratio greater than 1 is unacceptable.

an initial screening of the corridors for current and projected traffic conditions. After the screening process, more detailed LOS analyses were performed using either *Highway Capacity Software (HCS)* or *Synchro* software. The results of the *HCS/Synchro* analyses were then compared to the results of the ARDOT LOS screening tool and any conflicting results were reconciled. The results are described by route in the following subsections.

Operational analyses of the Primary Study Area intersections were conducted using *Synchro* and its companion software *SimTraffic* software according to the *HCM* methodology and *SimTraffic* microsimulation methodology. Microsimulation allows the user to analyze intersection operations both individually and in context of the entire study network. Additionally, microsimulation gives the user a powerful visualization tool to trace any sources of vehicle delay and queuing as well as the opportunity to perform multiple simulation runs with varying traffic loading within the peak hour to account for the expected variability within a system. This variation also accounts for the various types of drivers (aggressiveness, gap acceptance tolerance) and vehicles (performance on grades, general acceleration /deceleration). Finally, micro-simulation provides the best means to demonstrate the impacts of queues on nearby intersections.

INTERSTATE 49 – WASHINGTON COUNTY LINE TO HIGHWAY 72

The initial screening indicated LOS C or better for most of the corridor except for the first segment from the Washington County Line to Wagon Wheel Road which showed LOS D with an acceptability ratio greater than 0.90. Additionally, the segments between Promenade Boulevard and Highway 71B also showed LOS D for existing conditions. For the 2040 No-Action initial screening, the entire route showed LOS E/F with acceptability ratios greater than 1.00.

For a more detailed analysis of Interstate 49 (I-49) corridor, the freeway facility module of *HCS* was used to determine the LOS along the corridor. As shown in **Table C-1**, the two southern most segments of I-49 are currently operating below an acceptable LOS with LOS E occurring from the Washington County Line to Highway 264. By the year 2040, the corridor is expected to deteriorate to LOS F from the Washington County Line to Highway 102/Highway 62 with only the northernmost segment from Highway 102/Highway 62 to Highway 72 operating at an acceptable LOS.

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
Washington County Line to Wagon Wheel Rd	74.16	75.21	92,000	E	1.05%	116,000	F
Wagon Wheel Rd and Hwy 264 (at Hwy 612)	75.21	77.93	79,000	E	1.35%	106,000	F
Hwy 264 to Pleasant Grove Rd	77.93	80.05	79,000	D	1.70%	114,000	F
Pleasant Grove Rd to Promenade Blvd	80.05	82.00	79,000	D	1.35%	106,000	F
Promenade Blvd to New Hope Rd to Hwy 12	82.00	83.16	82,000	D	1.75%	120,000	F
New Hope Rd to Hwy 71B	83.16	84.29	82,000	D	1.70%	119,000	F
Hwy 71B to Hwy 102/Hwy 62	84.29	85.85	69,000	В	1.70%	100,000	F
Hwy 102/Hwy 62 to Hwy 72	85.74	88.08	51,000	С	2.05%	79,500	С

Table C-1: Existing and 2040 No-Action LOS Results on the Interstate 49 Corridor

Table C-2 summarizes the corridor LOS results for the Action Alternatives. As shown, the 2040 Action Alternatives will not have an impact on the traffic operation of I-49 when compared to the 2040 No-Action Alternative.

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
Washington County Line to Wagon Wheel Rd	99.46%	115,000	F	100.00%	116,000	F	99.73%	116,000	F
Wagon Wheel Rd and Hwy 264 (at Hwy 612)	98.98%	105,000	F	100.00%	106,000	F	100.00%	106,000	F
Hwy 264 to Pleasant Grove Rd	99.31%	113,000	F	99.77%	114,000	F	99.66%	114,000	F
Pleasant Grove Rd to Promenade Blvd	99.10%	105,000	F	99.74%	106,000	F	99.61%	106,000	F
Promenade Blvd to New Hope Rd to Hwy 12	98.91%	119,000	F	99.76%	120,000	F	99.76%	120,000	F
New Hope Rd to Hwy 71B	99.19%	118,000	F	99.88%	119,000	F	99.88%	119,000	F
Hwy 71B to Hwy 102/Hwy 62	99.63%	99,500	F	99.88%	100,000	F	99.88%	100,000	F
Hwy 102/Hwy 62 to Hwy 72	99.69%	79,500	С	100.00%	79,500	С	99.85%	79,500	С

Table C-2: 2040 Action Alternatives LOS Results on the Interstate 49 Corridor

HIGHWAY 12 – HIGHWAY 264 TO HIGHWAY 71B

The LOS Tool indicated possible performance issues from Mill Dam Road to Highway 71B (SE Walton Boulevard) with LOS D in the rural arterial portion from Mill Dam Road to County Road 576 with an acceptability ratio greater than 1.00 and LOS D, E, and F in the urban arterial portion from SW Bright Road to Highway 71B (Walton Boulevard). By 2040, the LOS D, E, and F results extend from Regional Avenue to Highway 71B (Walton Boulevard) with acceptability ratios above 1.00.

For the detailed analysis, the sections of Highway 12 from Highway 264 to County Road 576 were analyzed using the two-lane highway module of *HCS*. The sections of Highway 12 from County Road 576 to Highway 71B (Walton Boulevard) were analyzed using *Synchro*. These results demonstrate barely adequate LOS D conditions from Mill Dam Road to County Road 576 and failing LOS from Highway 112/SW I Street to Highway 71B (Walton Boulevard) in 2018. As traffic demands grow, these facilities will fail to provide adequate service with LOS D, E, and F from Regional Avenue to Highway 71B. **Table C-3** shows the results of the existing 2018 and future 2040 LOS.

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
Hwy. 264 to NW Corner of XNA	7.94	11.76	3,700	А	1.70%	5,400	В
NW Corner of XNA to Regional Ave	11.76	12.77	3,900	А	2.40%	6,600	В
Regional Ave to SW Regional Airport Blvd	12.77	13.93	7,600	С	2.40%	13,000	D
Vaughn Rd to Mill Dam Rd	13.93	15.64	8,100	С	2.40%	13,500	D
Mill Dam Rd to CR 576	15.64	17.81	13,000	D	2.40%	22,000	E
CR 576 to SW Bright Rd	17.81	18.28	22,500	С	2.40%	38,000	F
SW Bright Rd to Hwy 112/SW I St	18.28	19.79	27,500	С	3.00%	52,500	F
Hwy 112/SW I St to SW Rainbow Ln	19.79	20.42	29,000	F	3.00%	55,500	F
SW Rainbow Ln to Hwy 71B (SE Walton Blvd)	20.42	20.50	26,500	F	3.00%	51,000	F

Table C-3: Existing and 2040 No-Action LOS Results on the Highway 12 Corridor

Table C-4 shows the *HCS* LOS results for the Action Alternatives for Highway 12 from Highway 264 to County Road 576. These segments show no change from the 2040 No-Action Alternative. The segments of Highway 12 from County Road 576 to Highway 71B (Walton Boulevard) were analyzed using *Synchro* for the 2040 No-Action and were not reevaluated based on the minimal difference in volumes from the 2040 No-Action scenario.

Table C-4: 2040 Action Alternatives LOS Results on the Highway 12 Corridor

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
Hwy. 264 to NW Corner of XNA	91.49%	4,900	В	95.74%	5,200	В	97.87%	5,300	В
NW Corner of XNA to Regional Ave	105.81%	7,000	В	101.16%	6,700	В	100.00%	6,600	В
Regional Ave to SW Regional Airport Blvd	116.95%	15,000	D	101.69%	13,000	D	99.15%	13,000	D
Vaughn Rd to Mill Dam Rd	101.44%	13,500	D	100.00%	13,500	D	100.00%	13,500	D
Mill Dam Rd to CR 576	95.08%	21,000	E	100.82%	22,000	E	100.00%	22,000	E
CR 576 to SW Bright Rd	96.95%	37,000		98.31%	37,500		100.00%	38,000	
SW Bright Rd to Hwy 112/SW I St	99.50%	52,000	F based on	99.75%	52,500	F based on	100.00%	52,500	F based on
Hwy 112/SW I St to SW Rainbow Ln	99.72%	55,500	No-Action	99.44%	55,000	No-Action	100.28%	55,500	No-Action
SW Rainbow Ln to Hwy 71B (SE Walton Blvd)	100.00%	51,000		100.00%	51,000		100.00%	51,000	

HIGHWAY 62 – INTERSTATE 49 SB RAMP TO HIGHWAY 94

The LOS Tool showed inadequate LOS F with an acceptability ratio of greater than 1.00 for the westernmost portion of Highway 62 through the I-49 interchange area. By 2040,

the LOS F results extend to Dixieland Road, and the segment from east of Dixieland Road to Highway 94 shows LOS D.

For the detailed analysis, the segment of Highway 62 from the I-49 Southbound Ramps to west of the I-49 Northbound ramps was analyzed using *Synchro*. The results show LOS F for this segment. Due to the lack of turning movement volumes, the multilane highway module of *HCS* was used to analyze Highway 62 from the I-49 Northbound ramps through Highway 94. The results for this portion of Highway 62 show adequate performance through 2040. These results are shown in **Table C-5**.

 Table C-5: Existing and 2040 No-Action LOS Results on Highway 62

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
I-49 SB Ramp to west of I-49 NB Ramp	0.00	0.11	37,000	F	0.00%	37,000	F
I-49 NB Ramp to east of Dixieland Road	0.11	3.07	30,000	В	1.15%	38,500	С
East of Dixieland Road to Hwy. 94	3.07	3.09	25,000	В	1.15%	32,000	В

Table C-6 summarizes the corridor *HCS* LOS results for the 2040 Action Alternatives. As shown, the LOS for the Action Alternatives are the same as for the No-Action Alternative. The Action Alternatives will have an insignificant impact on the traffic volumes (less than 1% variation) when compared to the 2040 No-Action Alternative. Thus, the interchange segment was not re-evaluated using *Synchro* for the Action Alternatives.

Table C-6: 2040 Action Alternative	s LOS Results on Highway 62
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Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
I-49 SB Ramp to west of I-49 NB Ramp	100.90%	38,000	F No-Action	100.30%	37,500	F No-Action	100.30%	37,500	F No-Action
I-49 NB Ramp to east of Dixieland Road	100.00%	38,500	С	100.00%	38,500	С	100.00%	38,500	С
East of Dixieland Road to Hwy. 94	100.00%	32,000	В	100.00%	32,000	В	100.00%	32,000	В

HIGHWAY 71B – N 8TH STREET TO HIGHWAY 72

The LOS Tool indicated possible performance issues with LOS D for a few segments of Highway 71B between N 46th Street and SE Dodson Road/SE J Street and between Airport Road/SE 28th Street and Highway 102/SW 14th Street. By 2040, the LOS Tool indicated LOS D, E, and F conditions from Dixieland Road through Highway 72/W Central Avenue except for the segment from Highway 12/SW Regional Airport Boulevard to SW Rainbow Lane. Most of these segments also showed an acceptability ratio greater than 1.00.

For the more detailed analysis, the multilane highway module of *HCS* was used to analyze Highway 71B from N 8th Street through N 46th Street. *Synchro* was used to analyze Highway 71B from I-49 through Highway 72/W Central Avenue. The LOS Tool was used for the segment from N 46th Street to I-49 due to lack of data for modeling this segment. The results show LOS D and F conditions from N 46th Street through Highway 72/W Central Avenue in 2018 and LOS E and F conditions in 2040. By 2040, the segment from N 8th Street to Dixieland Road also deteriorates to LOS D. These results are shown in **Table C-7**.

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
N 8th St to Dixieland Rd	8.58	9.59	24,000	С	1.10%	30,500	D
Dixieland Rd to N 34th St	9.59	10.87	29,000	В	1.10%	37,000	С
N 34th St to N 46th St	10.87	11.75	30,000	В	1.10%	38,000	С
N 46th St to I-49	11.75	11.80	34,000	D	1.10%	43,500	F
I-49 to SE Dodson Rd/SE J St	0.00	0.80	40,000	F	1.65%	57,500	F
E Dodson Rd/SE J St to Hwy 12 (SW Regional Airport Blvd)	0.80	1.48	38,000	F	1.65%	54,500	F
Hwy 12 (SW Regional Airport Blvd) to SW Rainbow Ln	1.48	1.62	21,000	F	1.10%	26,500	F
SW Rainbow Ln to Airport Rd/SE 28th St	1.64	2.00	24,000	F	1.10%	30,500	F
Airport Rd/SE 28th St to SW Commerce Dr	2.00	2.68	29,000	D	1.10%	37,000	E
SW Commerce Dr to Hwy 102 (SW 14th St)	2.68	2.99	27,000	F	1.10%	34,500	F
B (S Walton Blvd) - Hwy 102 (SW 14th St) to Hwy 72 (W Centr	2.99	4.20	26,000	F	1.10%	33,000	F

Table C-7: Existing and 2040 No-Action LOS Results on Highway 71B

Table C-8 shows the *HCS* LOS results for the Action Alternatives for Highway 71B from N 8th Street through N 46th Street. The LOS for the Action Alternatives are the same as for the No-Action Alternative. The segments of Highway 71B from I-49 through Highway 72/W Central Avenue were analyzed using *Synchro* for the Future No-Action and were not re-evaluated based on the minimal difference in volumes from the 2040 No-Action scenario. The segment from N 46th Street to I-49 utilized the LOS Tool to determine the results.

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
N 8th St to Dixieland Rd	99.75%	30,500	D	99.75%	30,500	D	99.75%	30,500	D
Dixieland Rd to N 34th St	100.16%	37,000	С	100.32%	37,000	С	100.48%	37,000	С
N 34th St to N 46th St	99.80%	38,000	С	100.00%	38,000	С	100.00%	38,000	С
N 46th St to I-49	100.29%	43,500	F	100.29%	43,500	F	100.15%	43,500	F
I-49 to SE Dodson Rd/SE J St	99.18%	57,000		100.00%	57,500		99.84%	57,500	
E Dodson Rd/SE J St to Hwy 12 (SW Regional Airport Blvd)	99.31%	54,000	F based on	100.17%	54,500	F based on	100.00%	54,500	F based on
Hwy 12 (SW Regional Airport Blvd) to SW Rainbow Ln	98.28%	26,000	No-Action	100.34%	26,500	No-Action	100.00%	26,500	No-Action
SW Rainbow Ln to Airport Rd/SE 28th St	98.67%	30,000		100.27%	30,500		100.53%	30,500	
Airport Rd/SE 28th St to SW Commerce Dr	100.97%	37,500	E No-Action	100.00%	37,000	E No-Action	100.24%	37,000	E No-Action
SW Commerce Dr to Hwy 102 (SW 14th St)	100.48%	34,500	F based on	99.76%	34,500	F based on	99.76%	34,500	F based on
B (S Walton Blvd) - Hwy 102 (SW 14th St) to Hwy 72 (W Centi	100.15%	33,000	No-Action	100.15%	33,000	No-Action	100.00%	33,000	No-Action

Table C-8: 2040 Action Alternatives LOS Results on Highway 71B

HIGHWAY 102 – HIGHWAY 279 TO INTERSTATE 49 SB RAMP

The LOS Tool showed possible performance issues from SW Tater Black Road through SW I Street and from SW A Street through the I-49 Southbound Ramps with LOS D and E conditions. The Section from SE Moberly Lane to the I-49 Southbound Ramps has an acceptability ratio greater than 1.00. By 2040, the LOS Tool showed performance issues throughout most of the Highway 102 study area with LOS E or F and acceptability ratios over 1.00 from Highway 102 Spur/S Fish Hatchery Road to the I-49 Southbound Ramps.

The two-lane highway module of *HCS* was used to analyze Highway 102 from Highway 279 to Main Street, the multilane highway module of *HCS* was used to analyze from Main

Street to SW Tater Black Road, and *Synchro* was used to analyze from SW Tater Black Road to I-49 Southbound Ramps. The results of this analysis, shown in **Table C-9**, reveal unacceptable LOS E/F conditions from SW I Street through I-49 Southbound Ramps, and additional areas with LOS D conditions. By 2040, LOS F conditions prevail from SW Tater Black Road through I-49 Southbound Ramps, and LOS D/E conditions occur from N Vaughn Road to Highway 102 Spur/S Fish Hatchery Road.

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
Hwy. 279 to N Vaughn Rd.	9.04	10.37	8,400	В	1.06%	10,500	С
N Vaughn Rd to Hwy. 102 Spur/S Fish Hatchery Rd.	10.37	11.30	12,000	С	1.05%	15,000	D
	11.30	11.36	12,000	D	1.05%	15,000	E
Hwy. 102 Spur/S Fish Hatchery Rd. to SW Tater Black Rd	0.00	1.64	25,000	В	2.45%	42,500	С
SW Tater Black Rd. to SW Elm Tree Rd.	1.64	2.02	30,000	С	2.45%	51,000	F
SW Elm Tree Rd. to SW I St.	2.02	3.53	33,000	D	2.45%	56,000	F
SW I St. to Hwy. 71B (Walton Blvd.)	3.53	4.00	29,000	E	2.45%	49,500	F
Hwy. 71B (Walton Blvd. to SW A St.)	4.00	4.17	28,000	F	1.30%	37,000	F
SW A St. to SE J St.	4.17	4.92	30,000	F	1.30%	40,000	F
SE J St. to SE Moberly Ln.	4.92	5.82	32,000	E	1.30%	42,500	F
SE Moberly Ln to I-49 SB Ramp	5.82	5.88	35,000	F	0.05%	35,500	F

Table C-9: Existing and 2040 No-Action LOS Results on Highway 102

Table C-10 summarizes the corridor *HCS* LOS results for the 2040 Action Alternatives. These results demonstrate no change in LOS for the Action Alternatives when compared to the No-Action Alternative. As shown, the Alternatives will not have a significant impact on the traffic volumes (less than 1% variation for the Partial New Alignment and Improve Existing Alternatives and less than 3% for the New Alignment Alternative) when compared to the 2040 No-Action Alternative. Thus, the segments from SW Tater Black Road to the I-49 SB Ramp were not re-evaluated using *Synchro* for the Action Alternatives.

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
Hwy. 279 to N Vaughn Rd.	103.57%	11,000	С	100.71%	10,500	С	100.00%	10,500	С
N Vouche Dd to Huw, 102 Sour/S Eich Hotoboo, Dd	102.73%	15,500	D	100.00%	15,000	D	100.00%	15,000	D
N vaugini ku to nwy. 102 Spui/S Fish hatchery ku.	102.73%	15,500	E	100.00%	15,000	E	100.00%	15,000	E
Hwy. 102 Spur/S Fish Hatchery Rd. to SW Tater Black Rd	100.09%	42,500	С	99.52%	42,500	С	100.00%	42,500	С
SW Tater Black Rd. to SW Elm Tree Rd.	97.44%	49,500		99.04%	50,500		100.00%	51,000	
SW Elm Tree Rd. to SW I St.	99.23%	55,500		100.00%	56,000		100.00%	56,000	
SW I St. to Hwy. 71B (Walton Blvd.)	98.53%	49,000		100.37%	49,500		100.00%	49,500	
Hwy. 71B (Walton Blvd. to SW A St.)	98.01%	36,500	F based on No-Action	100.28%	37,000	F based on No-Action	100.00%	37,000	F based on No-Action
SW A St. to SE J St.	97.87%	39,000	NO / IOUOII	100.53%	40,000		100.00%	40,000	NO ROLON
SE J St. to SE Moberly Ln.	100.47%	42,500		100.47%	42,500		100.00%	42,500	
SE Moberly Ln to I-49 SB Ramp	100.73%	36,000		100.48%	35,500		100.00%	35,500	

Table C-10: 2040 Action Alternatives LOS Results on Highway 102

HIGHWAY 112 – WASHINGTON COUNTY LINE TO HIGHWAY 12

The LOS Tool showed inadequate performance for all but the northern-most 0.48 miles of this corridor in 2018. Widening from a two-lane highway to a four-lane highway is planned for this corridor. With widening, the LOS Tool showed LOS F conditions and an acceptability ratio greater than 1.00 from Highway 264 (E Lowell Avenue) to Highway 264 (Healing Springs Road) and LOS D conditions from Washington County Line to Marchant Road/Carrie Smith Road.

For the detailed analysis of 2018 existing conditions, the two-lane highway module of *HCS* was used. The results, shown in **Table C-11**, showed LOS E conditions throughout the entire study area. For the detailed analysis of 2040 No-Action conditions, the multilane highway module of *HCS* was used. The results showed acceptable performance throughout the corridor in 2040 with widening.

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
Washington County Line to Marchant Rd/Carrie Smith Rd	0.00	0.52	11,000	E	3.50%	23,500	В
Marchant Rd/Carrie Smith Rd to Hwy 264 (E Lowell Ave)	0.52	3.49	10,000	E	3.50%	21,500	В
Hwy 264 (E Lowell Ave) to Hwy 264 (Healing Spirngs Rd)	3.49	3.85	14,000	E	3.50%	30,000	С
Hwy 264 (Healing Spirngs Rd) to Sands Rd	3.85	5.63	10,000	E	3.50%	21,500	В
Sands Rd to CR 46 (W Haxton Rd)	5.63	5.68	9,500	E	3.50%	20,000	В
CR 46 (W Haxton Rd) to Chattin Cir	5.68	6.42	8,800	E	3.50%	19,000	В
Chattin Cir to Huw 12 (SM/ Pagional Airport Blud)	6.42	8.75	8,100	E	3.50%	17,500	В
	8.75	9.22	8,100	E	3.50%	17,500	В

Table C-11: Existing and 2040 No-Action LOS Results on Highway 112

Table C-12 summarizes the Highway 112 corridor LOS results for the Action Alternatives. As shown, the LOS for the 2040 Action Alternatives is the same or better than the LOS for the 2040 No-Action Alternative.

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
Washington County Line to Marchant Rd/Carrie Smith Rd	116.98%	27,500	В	109.43%	25,500	В	101.89%	24,000	В
Marchant Rd/Carrie Smith Rd to Hwy 264 (E Lowell Ave)	76.13%	16,500	А	112.16%	24,000	В	104.95%	22,500	В
Hwy 264 (E Lowell Ave) to Hwy 264 (Healing Spirngs Rd)	90.40%	27,000	В	89.27%	27,000	В	112.43%	33,500	С
Hwy 264 (Healing Spirngs Rd) to Sands Rd	95.85%	20,500	В	93.78%	20,000	В	96.89%	21,000	В
Sands Rd to CR 46 (W Haxton Rd)	96.48%	19,500	В	94.97%	19,000	В	101.01%	20,000	В
CR 46 (W Haxton Rd) to Chattin Cir	96.23%	18,500	В	94.34%	18,000	А	102.52%	19,500	В
Chattin Cista Llux 12 (CM Designal Airport Dhut)	100.00%	17,500	В	96.15%	17,000	В	102.52%	18,000	В
Chattin Cir to Hwy 12 (SW Regional Airport Bivd)	100.00%	17,500	В	96.15%	17,000	В	102.31%	18,000	В

Table C-12: 2040 Action Alternatives LOS Results on Highway 112

Tables C-13 through **C-26** illustrate the Primary Study Area intersection LOS on Highway 112 based upon the *Synchro* results using *HCM* methodology and *SimTraffic* methodology. As part of the 2040 analysis (No-Action and Action Alternatives), signalization was added where needed except at the Wagon Wheel Road intersection where volumes for all but the Partial New Alignment Alternative likely would not warrant a signal in the future. All Action Alternative intersections are shown to meet or exceed the LOS provided in the 2040 No-Action Alternative except for Highway 112 at Wagon Wheel Road (Improve Existing Alternative) and Highway 612 WB Ramp at Highway 112 (New Location Alternative and Partial New Location Alternative).

					Hwy 11	2 at Hwy 2	64 (Healing	Springs Ro	(k						
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
		Delay	9.2		-	-			143.7	-	23.8	-	-	-	15.4
Existing - AM Peak	Stop	v/c	0.148	n/a²	-	-	n/	′a²	0.981	-	0.66	-	-	-	0.981
	Step	LOS	А		-	-			F	-	D	-	-	-	С
		Delay	10.6		-	-			354.1	-	17.8	-	-	-	14.4
Existing - PM Peak	Stop	v/c	0.36	n/a²	-	-	n/	a ²	1.232	-	0.429	-	-	-	1.232
		LOS	В		-	-			F	-	С	-	-	-	В
2040 No. Action AM		Delay	49.6	11	L.8	26.6	46	5.4	47.8	34	.5		55.8		31.2
2040 NO-ACTOR AM Peak	Signal	v/c	0.95	0.	69	0.06	0.	91	0.66	0.0	01		0.34		0.95
. com		LOS	D	1	3	С	[C	D	Þ	1		E		С
2040 No. Action DM		Delay	96.4	8	.5	19.0	48	3.3	47.7	42	.1		57.1		42.2
2040 NO-ACTOR PIN Peak	Signal	v/c	1.08	0.	52	0.03	0.	96	0.36	0.0	06		0.43		1.08
		LOS	F	1	٩	В	[כ	D	ŀ	1		E		D
NowLocation		Delay	31.3	13	3.5	22.5	24	1.6	27.8	11	.1		33.1		20.0
Alternative AM Peak	Signal	v/c	0.8	0.	79	0.06	0.	84	0.52	0.	1		0.11		0.84
/		LOS	С	1	3	С	(C	С	Þ	1		С		В
Nowlocation		Delay	38.0	5	.9	12.6	23	3.1	34.1	17	.2		37.1		19.2
Alternative PM Peak	Signal	v/c	0.84	0.	51	0.03	0.	87	0.31	0.:	19		0.17		0.87
		LOS	D	1	4	В	(C	С	Þ	1		D		В
Partial Now Location		Delay	31.0	12	2.8	21.4	2	5	27.8	11	.1		34.4		19.9
Alternative AM Peak	Signal	v/c	0.8	0.	77	0.05	0.	84	0.52	0.:	15		0.27		0.84
/		LOS	С	I	3	С	(C	С	ŀ	1		С		В
Partial Now Location		Delay	38.2	6	.2	13.1	23	3.7	33.3	16	.7		38.0		19.8
Alternative PM Peak	Signal	v/c	0.84	0.	51	0.03	0.	87	0.29	0.:	19		0.35		0.87
		LOS	D	1	4	В	(C	С	Þ	1		D		В
Improvo Existing		Delay	11.0	7	.4	15.3	16	5.8	14.0	9.	5		15.8		11.1
Alternative AM Peak	Signal	v/c	0.38	0.	35	0.43	0.	59	0.18	0.0	07		0.18		0.59
/		LOS	В	1	٩	В	I	3	В	A	1		В		В
Improvo Existing		Delay	10.3	6	.4	6.4	15	5.7	14.1	10	.1		15.5		10.9
Alternative PM Peak	Signal	v/c	0.36	0.	26	0.49	0.	63	0.07	0.0	09		0.2		0.63
		LOS	В	1	4	А	1	3	В	A	1		В		В
¹ Overall v/c ratio used is the n	naximum value o	of all movem	ents												

Table C-13: Hwy 112 at Hwy 264 (Healing Spring Rd) LOS – HCM Methodology

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					Hwy 112	2 at Hwy 26	4 (Healing	Springs Rd)						
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Existing ANA Dook	Two-Way	Delay	9.0	1.8	1.0	6.5	3.1	2.0	224.7	19.6	59.5	48.8	46.0	17.8	27.9
Existing - Aivi Peak	Stop	LOS	А	А	А	А	А	А	F	С	F	E	E	С	D
Existing - DM Deak	Two-Way	Delay	17.2	2.1	1.6	7.0	7.0	4.4	505.4	65.9	120.3	188.3	232.3	146.4	36.3
Existing - Fivi Feak	Stop	LOS	С	А	А	А	А	А	F	F	F	F	F	F	E
2040 No-Action AM	Signal	Delay	35.8	11.5	10.8	37.8	37.4	23.3	54.1	4.9	9.1	35.0	53.7	18.9	24.5
Peak	Signal	LOS	D	В	В	D	D	С	D	А	А	С	D	В	С
2040 No-Action PM	Signal	Delay	47.0	7.6	5.7	19.6	77.8	70.6	54.6	14.7	36.6	51.6	43.2	16.8	46.6
Peak	Jighai	LOS	D	А	А	В	E	E	D	В	D	D	D	В	D
New Location	Signal	Delay	33.0	11.6	9.3	37.3	23.3	13.8	34.7	3.2	10.2	32.7	34.7	16.7	18.3
Alternative AM Peak	Jigilai	LOS	С	В	А	D	С	В	С	А	В	С	С	В	В
New Location	Signal	Delay	47.5	7.5	6.0	34.5	29.3	23.4	39.1	9.0	16.9	28.8	42.7	14.9	22.8
Alternative PM Peak	Signal	LOS	D	А	А	С	С	С	D	А	В	С	D	В	С
Partial New Location	Signal	Delay	36.7	11.5	9.1	36.4	24.2	11.1	34.5	2.9	10.6	37.7	33.5	18.0	19.3
Alternative AM Peak	Signal	LOS	D	В	А	D	С	В	С	А	В	D	С	В	В
Partial New Location	Signal	Delay	53.1	8.5	6.5	44.1	34.4	29.9	35.3	8.7	18.4	44.6	49.2	17.9	26.5
Alternative PM Peak	Jighai	LOS	D	А	А	D	С	С	D	А	В	D	D	В	С
Improve Existing	Signal	Delay	11.1	7.2	5.2	21.0	13.2	1.5	14.3	8.7	8.0	9.1	12.9	5.2	9.8
Alternative AM Peak	Jiglidi	LOS	В	А	А	С	В	А	В	А	А	А	В	А	А
Improve Existing	Signal	Delay	11.4	6.6	3.8	15.6	14.0	3.3	13.6	10.2	11.0	10.1	12.3	5.2	10.2
Alternative PM Peak	JIGHA	LOS	В	А	А	В	В	А	В	В	В	В	В	А	В

Table C-14: Hwy 112 at Hwy 264 (Healing Spring Rd) LOS – SimTraffic Methodology

				H۱	wy 112 By	pass at Hw	y 264 (Hea	ling Spring	s Rd)						
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
lucran Cristian	xisting Signal v/a 0.8 0.5		.1	29.6	31	.1	24.2	20.9	19.4		18.1		20.9		
Improve Existing Alternative AM Peak	Signal	v/c	0.8	0.5	58	0.7	0.	77	0.39	0.38	0.28		0.2		0.8
		LOS	С	В	5	С	C	2	С	С	В		В		С
		Delay	29.1	11	.5	28.3	30	.5	23.4	23.4	22.8		21.8		22.4
Alternative PM Peak	Signal	v/c	0.84	0.4	13	0.75	0.8	31	0.33	0.35	0.31		0.25		0.84
		LOS	С	В	5	С	C	2	С	С	С		С		С

Table C-15: Hwy 112 Bypass at Hwy 264 (Healing Springs Rd) LOS – HCM Methodology

Table C-16: Hwy 112 Bypass at Hwy 264 (Healing Springs Rd) LOS – SimTraffic Methodology

				H	wy 112 Byj	oass at Hw	y 264 (Hea	ling Spring	s Rd)						
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Improve Existing	Signal	Delay	29.6	13.2	8.8	34.4	25.8	9.0	33.4	26.5	8.8	27.3	20.7	14.3	20.2
Alternative AM Peak	Signal	LOS	С	В	А	С	С	А	С	С	А	С	С	В	С
Improve Existing	Signal	Delay	41.5	12.8	9.2	30.0	24.9	14.8	30.8	27.7	15.6	31.0	26.7	16.8	22.2
Alternative PM Peak	Signal	LOS	D	В	А	С	С	В	С	С	В	С	С	В	С

					-	-	-	-							
					Hwy 112	2 Bypass at	Hwy 264 (Lowell Ave	e)						
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Income Cuinting		Delay	-	26	.3	25.4	16.8	-	-	-	-	29.3	-		21.3
Improve Existing Alternative AM Peak	Signal	v/c	-	0.8	34	0.89	0.26	-	-	-	-	0.41	-	n/a²	0.89
Improve Existing Alternative AM Peak		LOS	-	С		С	В	-	-	-	-	С	-		С
lucina Evistina		Delay	-	28	.0	18.4	11.8	-	-	-	-	18.9	-		19.0
Alternative PM Peak	Signal	v/c	-	0.8	31	0.74	0.57	-	-	-	-	0.25	-	n/a²	0.81
, atemative i wir cur		LOS	-	С		В	В	-	-	-	-	В	-		В

Table C-17: Hwy 112 Bypass at Hwy 264 (Lowell Ave) LOS – HCM Methodology

Table C-18: Hwy 112 Bypass at Hwy 264 (Lowell Ave) LOS – SimTraffic Methodology

					Hwy 112	Bypass at	Hwy 264 (Lowell Ave	2)						
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Improve Existing	Signal	Delay	-	31.9	27.4	25.4	6.6	-	-	-	-	31.7	-	7.3	22.8
Alternative AM Peak	Signal	LOS	-	С	С	С	А	-	-	-	-	С	-	А	С
Improve Existing	Cignal	Delay	-	31.4	24.8	22.0	11.6	-	-	-	-	21.8	-	8.6	19.0
Alternative PM Peak	Signal	LOS	-	С	С	С	В	-	-	-	-	С	-	А	В

					Hwy	/ 112 at Hw	ry 264 (Low	vell Ave)							
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
		Delay	-	13	.0	9.2	2.9	-	-	-	-	24.8	-		9.4
Existing - AM Peak	Signal	v/c	-	0.7	76	0.74	0.41	-	-	-	-	0.63	-	n/a²	0.76
		LOS	-	B	3	А	А	-	-	-	-	С	-		А
		Delay	-	11	.4	7.5	3.7	-	-	-	-	22.5	-		8.9
Existing - PM Peak	Signal	v/c	-	0.7	74	0.48	0.47	-	-	-	-	0.74	-	n/a²	0.74
		LOS	-	B	3	А	А	-	-	-	-	С	-		А
		Delay	-	144	1.9	231.7	16.7	-	-	-	-	239.0	-		150.9
2040 NO-ACTION AM Peak	Signal	v/c	-	1.2	22	1.4	0.46	-	-	-	-	1.42	-	n/a²	1.42
r cuk		LOS	-	F		F	В	-	-	-	-	F	-		E E
2040 No. Action BM		Delay	-	41	.3	129.8	34.5	-	-	-	-	325.4	-		124.8
Peak	Signal	v/c	-	0.8	35	1.19	0.9	-	-	-	-	1.6	-	n/a²	1.6
		LOS	-	C)	F	С	-	-	-	-	F	-		F
Newlocation		Delay	-	21	.6	48.4	3.6	-	-	-	-	44.0	-		23.6
Alternative AM Peak	Signal	v/c	-	0.8	32	0.89	0.3	-	-	-	-	0.85	-	n/a²	0.89
		LOS	-	C	2	D	А	-	-	-	-	D	-		С
Newlocation		Delay	-	14	.6	25.0	5.7	-	-	-	-	27.2	-		13.1
Alternative PM Peak	Signal	v/c	-	0.6	56	0.8	0.59	-	-	-	-	0.83	-	n/a²	0.83
		LOS	-	B	3	С	А	-	-	-	-	С	-		В
Partial New Location		Delay	-	66	.2	64.6	2.7	-	-	-	-	65.6	-		54.4
Alternative AM Peak	Signal	v/c	-	1.0	03	0.97	0.23	-	-	-	-	0.86	-	n/a²	1.03
		LOS	-	E		E	А	-	-	-	-	E	-		D
Partial New Location		Delay	-	12	.8	8.6	6.1	-	-	-	-	24.2	-		10.0
Alternative PM Peak	Signal	v/c	-	0.6	53	0.53	0.61	-	-	-	-	0.82	-	n/a²	0.82
		LOS	-	B	3	А	А	-	-	-	-	С	-		А
Improve Evicting		Delay	31.4	34	.7	23.5	13	8.6	30.5	37	7.0		25.9		26.3
Alternative AM Peak	Signal	v/c	0.69	0.7	77	0.67	0.	19	0.18	0.	75		0.75		0.77
/ iternative / ivi r cak		LOS	С	C	2	С	E	3	С		C		С		С
Improvo Evisting		Delay	27.7	28	.6	19.6	14	l.0	25.6	30).7		20.0		20.7
Alternative PM Peak	Signal	v/c	0.58	0.6	65	0.58	0.	35	0.18	0.	71		0.67		0.71
		LOS	С	C	2	В	E	3	С		С		В		С
¹ Overall v/c ratio used is the n	naximum value	of all movem	ents												

Table C-19: Hwy 112 at Hwy 264 (Lowell Ave) LOS – HCM Methodology

² Free movement

					Hwy	112 at Hw	y 264 (Low	ell Ave)							
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Existing ANA Dook	Signal	Delay	-	15.2	8.1	16.2	3.4	-	-	-	-	29	-	4.3	11.3
Existing - Aivi Peak	Signal	LOS	-	В	А	В	А	-	-	-	-	С	-	А	В
Existing - DM Dook	Signal	Delay	-	13.7	7	12.9	3.5	-	-	-	-	41.1	-	16.9	12.7
Existing - Fivi Feak	Signal	LOS	-	В	А	В	А	-	-	-	-	D	-	В	В
2040 No-Action AM	Signal	Delay	-	16.5	4.5	32.4	4	-	-	-	-	799.5	-	797.6	164.8
Peak	Jigilai	LOS	-	В	А	С	А	-	-	-	-	F	-	F	F
2040 No-Action PM	Signal	Delay	-	13.5	4	18.3	5.2	-	-	-	-	475.5	-	442.5	97.7
Peak		LOS	-	В	А	В	А	-	-	-	-	F	-	F	F
New Location	Signal	Delay	-	20.5	15.2	46.3	5.4	-	-	-	-	52.8	-	14.4	21.9
Alternative AM Peak	Jigilai	LOS	-	С	В	D	А	-	-	-	-	D	-	В	С
New Location	Signal	Delay	-	16.5	10.9	36.7	6.9	-	-	-	-	46.8	-	14.9	17
Alternative PM Peak	Jigilai	LOS	-	В	В	D	А	-	-	-	-	D	-	В	В
Partial New Location	Signal	Delay	-	31.1	11.1	42	3.2	-	-	-	-	58.7	-	5.2	29.1
Alternative AM Peak	Jighai	LOS	-	С	В	D	А	-	-	-	-	E	-	А	С
Partial New Location	Signal	Delay	-	14	3.7	17.1	6.7	-	-	-	-	40.3	-	12.4	12.8
Alternative PM Peak	Jighai	LOS	-	В	А	В	А	-	-	-	-	D	-	В	В
Improve Existing	Signal	Delay	30.0	29.4	3.4	28.7	13.3	7.4	31.5	32.5	23.9	32.6	19.3	7.2	22.8
Alternative AM Peak	Jigilai	LOS	С	С	А	С	В	А	С	С	С	С	В	А	С
Improve Existing	Signal	Delay	34.6	29.6	3.7	24.2	15.5	12.3	30.1	29.0	19.2	30.5	19.9	8.4	20.2
Alternative PM Peak	JIBLIA	LOS	С	С	А	С	В	В	С	С	В	С	В	А	С

Table C-20: Hwy 112 at Hwy 264 (Lowell Ave) LOS – SimTraffic Methodology

					Hw	y 112 at W	Wagon W	heel Rd							
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
	T	Delay	-			8.7		-	-	-	-	21.4	-		0.8
Existing - AM Peak	Stop	v/c	-	n/a	a²	0.02	n/a²	-	-	-	-	0.14	-	n/a²	0.14
	otop	LOS	-			А		-	-	-	-	D	-		А
		Delay	-			9.3		-	-	-	-	22.1	-		0.7
Existing - PM Peak	Stop	v/c	-	n/:	a ²	0.03	n/a²	-	-	-	-	0.11	-	n/a²	0.11
	otop	LOS	-			А		-	-	-	-	D	-		А
2040 No. Action ANA	Two Mov	Delay	-			13.6		-	-	-	-	353.5	-		12.2
2040 NO-ACTION AIM Peak	Stop	v/c	-	n/:	a ²	0.08	n/a²	-	-	-	-	1.36	-	n/a²	1.36
. cun	otop	LOS	-			В		-	-	-	-	F	-		В
2040 No. Action DM		Delay	-			12.9		-	-	-	-	732.2	-		20.1
2040 NO-ACTION PIVI Peak	Stop	v/c	-	n/:	a²	0.1	n/a²	-	-	-	-	2.05	-	n/a²	2.05
		LOS	-			В		-	-	-	-	F	-		D
Newlection		Delay	-			11.2		-	-	-	-	52.5	-		2.0
Alternative AM Peak	Stop	v/c	-	n/:	a ²	0.05	n/a²	-	-	-	-	0.45	-	n/a²	0.45
,	otop	LOS	-			В		-	-	-	-	F	-		А
Newleastion	Two Mov	Delay	-			10.6		-	-	-	-	44.0	-		1.7
Alternative PM Peak	Stop	v/c	-	n/:	a²	0.06	n/a²	-	-	-	-	0.39	-	n/a²	0.39
	otop	LOS	-			В		-	-	-	-	E	-		А
Partial New Location		Delay	13.9	11	7	22.5	18	3.2	23.5	18.0	18.6		29.8		15.4
Alternative AM Peak	Signal	v/c	0.63	0.	8	0.19	0.	72	0.28	0.03	0.13		0.40		0.8
		LOS	В	E	3	С	E	3	С	В	В		С		С
Dartial Now Lagatian		Delay	46.1	7.	4	13.7	25	5.4	45.4	35.6	38.7		53.0		24.5
Alternative PM Peak	Signal	v/c	0.91	0.4	49	0.15	0.	86	0.58	0.05	0.37		0.48		0.91
,		LOS	D	Д	4	В	(2	D	D	D		D		D
Improve Evicting	Two Mov	Delay	-			14.5		-	-	-	-	570.0	-		19.6
Alternative AM Peak	Stop	v/c	-	n/:	a²	0.1	n/a²	-	-	-	-	1.81	-	n/a¹	1.81
,	otop	LOS	-			В		-	-	-	-	F	-		С
Improvo Evisting		Delay	-			13.6		-	-	-	-	1964.2	-		54.5
Alternative PM Peak	Stop	v/c	-	n/a	a²	0.1	n/a²	-	-	-	-	4.4	-	n/a ¹	4.4
	0.00	LOS	-			В		-	-	-	-	F	-		F
¹ Overall v/c ratio used is the	maximum value o	of all movem	ents												

Table C-21: Hwy 112 at Wagon Wheel Rd LOS – HCM Methodology

² Free movement

					Hw	y 112 at W	Wagon W	heel Rd							
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Existing AM Dook	Two-Way	Delay	-	2.7	2.4	4.3	0.8	-	-	-	-	16.0	-	7.9	2.2
Existing - Aivi Feak	Stop	LOS	-	А	А	А	А	-	-	-	-	С	-	А	А
Existing DM Dook	Two-Way	Delay	-	3.8	2.9	5.7	1.7	-	-	-	-	22.6	-	10.4	3.3
Existing - Fivi Feak	Stop	LOS	-	А	А	А	А	-	-	-	-	D	-	В	А
2040 No-Action AM	Two-Way	Delay	-	11.8	11.1	53.3	3.8	-	-	-	-	574.5	-	519.4	27.6
Peak	Stop	LOS	-	В	В	F	А	-	-	-	-	F	-	F	D
2040 No-Action PM	Two-Way	Delay	-	3.3	3.1	15.1	2.2	-	-	-	-	83.8	-	63.7	4.9
Peak	Stop	LOS	-	А	А	С	А	-	-	-	-	F	-	F	А
New Location	Two-Way	Delay	-	2.0	2.8	8.7	1.0	-	-	-	-	27.7	-	14.5	8.7
Alternative AM Peak	Stop	LOS	-	А	А	А	А	-	-	-	-	D	-	В	А
New Location	Two-Way	Delay	-	2.1	2.9	5.8	1.1	-	-	-	-	32.0	-	14.4	2.2
Alternative PM Peak	Stop	LOS	-	А	А	А	А	-	-	-	-	D	-	В	А
Partial New Location	Signal	Delay	27.3	14.9	11.4	63.0	19.2	6.8	31.9	29.0	13.6	30.9	37.5	22.9	18.2
Alternative AM Peak	Signal	LOS	С	В	В	E	В	А	С	С	В	С	D	С	В
Partial New Location	Signal	Delay	81.6	30.4	24.9	49.1	25.5	15.9	127.8	45.3	33.3	71.6	68.5	48.9	42.3
Alternative PM Peak	Signal	LOS	F	С	С	D	С	В	F	D	С	E	E	D	D
Improve Existing	Two-Way	Delay	-	3.4	4.2	18.5	1.9	-	-	-	-	122.4	-	139.4	7.2
Alternative AM Peak	Stop	LOS	-	А	А	С	А	-	-	-	-	F	-	F	А
Improve Existing	Two-Way	Delay	-	3.9	3.9	18.1	3.1	-	-	-	-	244.1	-	160.0	8.9
Alternative PM Peak	Stop	LOS	-	А	А	С	А	-	-	-	-	F	-	F	А

Table C-22: Hwy 112 at Wagon Wheel Rd LOS – SimTraffic Methodology

				Hwy 11	2 at Hwy 6	12 (Springo	ale North	ern Bypass) WB Ramp	s					
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
	True Mary	Delay	-		-	-		-	-	-	-	31.0	-	11.8	4.3
Existing - AM Peak	Ston	v/c	-	n/a²	-	-	n/a²	-	-	-	-	0.48	-	0.21	0.48
	Stop	LOS	-		-	-		-	-	-	-	D	-	В	А
		Delay	-		-	-		-	-	-	-	102.4	-	16.1	21.0
Existing - PM Peak	Ston	v/c	-	n/a²	-	-	n/a²	-	-	-	-	1.02	-	0.48	1.02
	Stop	LOS	-		-	-		-	-	-	-	F	-	С	D
		Delay	4.3	1.7	-	-	5.5	3.8	-	-	-	67.8	-		4.8
2040 NO-Action Alvi Peak	Signal	v/c	0.56	0.44	-	-	0.45	0.13	-	-	-	0.34	-	n/a²	0.83
i cuit		LOS	А	А	-	-	А	А	-	-	-	E	-		А
2040 No. Action DNA		Delay	21.4	0.6	-	-	20.9	12.2	-	-	-	51.3	-		16.5
2040 NO-Action PIVI Peak	Signal	v/c	0.79	0.5	-	-	0.77	0.21	-	-	-	0.9	-	n/a²	0.9
		LOS	С	А	-	-	С	В	-	-	-	D	-		С
Nowleastica		Delay	6.3	2.5	-	-	10.7	8.8	-	-	-	34.6	-		6.3
Alternative AM Peak	Signal	v/c	0.57	0.44	-	-	0.58	0.15	-	-	-	0.67	-	n/a²	0.67
, accordance , and a card		LOS	А	А	-	-	В	А	-	-	-	С	-		А
Neurise		Delay	24.2	8.2	-	-	29.4	22.9	-	-	-	35.4	-		22.4
Alternative PM Peak	Signal	v/c	0.9	0.4	-	-	0.81	0.37	-	-	-	0.89	-	n/a²	0.9
, aternative i mi eau		LOS	С	А	-	-	С	С	-	-	-	D	-		С
Deutiel Neur Leastiere		Delay	8.2	3.1	-	-	9.2	5.9	-	-	-	41.1	-		6.6
Alternative AM Peak	Signal	v/c	0.56	0.61	-	-	0.69	0.08	-	-	-	0.8	-	n/a²	0.8
, accordance , and a card		LOS	А	А	-	-	А	А	-	-	-	D	-		А
Deutiel Neur Leastiere		Delay	27.3	33.4	-	-	39.2	22.2	-	-	-	52.8	-		38.4
Alternative PM Peak	Signal	v/c	0.48	0.91	-	-	0.89	0.23	-	-	-	0.96	-	n/a²	0.96
Allemative First eak		LOS	С	С	-	-	D	С	-	-	-	D	-		D
Income Fristing		Delay	7.4	3.2	-	-	9.2	6.1	-	-	-	42.4	-		6.9
Alternative AM Peak	Signal	v/c	0.51	0.58	-	-	0.68	0.08	-	-	-	0.85	-	n/a²	0.85
, accordance , and a card		LOS	А	А	-	-	А	А	-	-	-	D	-		А
Income District		Delay	20.4	9.5	-	-	21.9	11.9	-	-	-	42.8	-		19.2
Alternative PM Peak	Signal	v/c	0.7	0.61	-	-	0.85	0.12	-	-	-	0.9	-	n/a²	0.9
Alternative Five Peak		LOS	С	А	-	-	С	В	-	-	-	D	-		В
¹ Overall v/c ratio used is the $\frac{2}{5}$	maximum value o	of all movem	ents												

Table C-23: Hwy 112 at Hwy 612 WB (Springdale Northern Bypass) Ramps LOS – HCM Methodology

Northwest Arkansas National Airport Access Study (F) Appendix C – Traffic Analysis

				Hwy 11	2 at Hwy 61	L2 (Springd	lale Northe	rn Bypass)	WB Ramp	s					
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Evisting ANA Dook	Two-Way	Delay	-	2.6	-	-	1.1	-	-	-	-	21.4	-	2.7	3.6
Existing - Aivi Feak	Stop	LOS	-	А	-	-	А	-	-	-	-	D	-	А	А
Existing DM Dook	Two-Way	Delay	-	2.7	-	-	1.5	-	-	-	-	89.2	-	4.0	17.6
Existing - Fivi Feak	Stop	LOS	-	А	-	-	А	-	-	-	-	F	-	А	С
2040 No-Action AM	Signal	Delay	19.8	9.6	-	-	6.7	3.3	-	-	-	47.8	-	3.1	9.6
Peak	Signal	LOS	В	А	-	-	А	А	-	-	-	D	-	А	А
2040 No-Action PM	Signal	Delay	27.7	15.2	-	-	19.2	6.5	-	-	-	37.5	-	4.2	14.8
Peak	Signal	LOS	С	В	-	-	В	А	-	-	-	D	-	А	В
New Location	Signal	Delay	17.4	6.8	-	-	9.1	7.8	-	-	-	25.2	-	2.4	9.5
Alternative AM Peak	Signal	LOS	В	А	-	-	А	А	-	-	-	С	-	А	А
New Location	Signal	Delay	33.8	12.8	-	-	28.8	14.1	-	-	-	35.8	-	3.9	22.1
Alternative PM Peak	Signal	LOS	С	В	-	-	С	В	-	-	-	D	-	А	С
Partial New Location	Signal	Delay	19.0	10.5	-	-	7.8	3.5	-	-	-	25.8	-	2.8	9.9
Alternative AM Peak	Signal	LOS	В	В	-	-	А	А	-	-	-	С	-	А	А
Partial New Location	Signal	Delay	40.6	28.6	-	-	27.6	10.7	-	-	-	40.3	-	4.4	28.3
Alternative PM Peak	Signal	LOS	D	С	-	-	С	В	-	-	-	D	-	А	С
Improve Existing	Signal	Delay	21.4	10.6	-	-	8.1	3.7	-	-	-	27.1	-	3.2	10.3
Alternative AM Peak	Signal	LOS	С	В	-	-	А	А	-	-	-	С	-	А	В
Improve Existing	Signal	Delay	41.7	14.4	-	-	19.8	7.1	-	-	-	35.6	-	4.3	18.7
Alternative PM Peak	Sigliai	LOS	D	В	-	-	В	А	-	-	-	D	-	А	В

Table C-24: Hwy 112 at Hwy 612 WB (Springdale Northern Bypass) Ramps LOS – SimTraffic Methodology

				Hwy 11	.2 at Hwy 6	12 (Spring	dale North	ern Bypass	s) EB Ramp	s					
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
	T	Delay	-			11.0		-	-	-	-	-	-	-	2.1
Existing - AM Peak	Ston	v/c	-	n/	a ²	0.32	n/a²	-	-	-	-	-	-	-	0.32
	Stop	LOS	-			В		-	-	-	-	-	-	-	А
	T	Delay	-			9.5		-	-	-	-	-	-	-	1.0
Existing - PM Peak	Two-way Ston	v/c	-	n/	a ²	0.16	n/a²	-	-	-	-	-	-	-	0.16
	5100	LOS	-			А		-	-	-	-	-	-	-	А
2040 No. 4 - 11 414		Delay	-	26.0		43.7	5.2	-	37.3	-	53.0	-	-	-	25.4
2040 NO-Action AM Peak	Signal	v/c	-	0.83	n/a²	0.92	0.32	-	0.65	-	0.86	-	-	-	0.92
I Cuk		LOS	-	С		D	А	-	D	-	D	-	-	-	С
		Delay	-	12.0		8.1	0.5	-	46.0	-	38.2	-	-	-	10.7
2040 NO-ACTION PIVI Peak	Signal	v/c	-	0.56	n/a²	0.41	0.63	-	0.84	-	0.7	-	-	-	0.84
T Cuk		LOS	-	В		А	А	-	D	-	D	-	-	-	В
		Delay	-	27.6		24.4	7.9	-	36.8	-	21.4	-	-	-	26.0
New Location	Signal	v/c	-	0.84	n/a²	0.85	0.16	-	0.89	-	0.33	-	-	-	0.89
Alternative Aim reak		LOS	-	С		С	А	-	D	-	С	-	-	-	С
		Delay	-	19.8		14.1	11.3	-	23.2	-	14.9	-	-	-	26.0
New Location	Signal	v/c	-	0.76	n/a²	0.47	0.57	-	0.87	-	0.25	-	-	-	0.87
Alternative Fivi Feak		LOS	-	В		В	В	-	С	-	В	-	-	-	С
		Delay	-	29.2		48.9	3.7	-	60.1	-	37.4	-	-	-	27.0
Alternative AM Peak	Signal	v/c	-	0.92	n/a²	0.92	0.33	-	0.85	-	0.35	-	-	-	0.92
Alternative Aim reak		LOS	-	С		D	А	-	E	-	D	-	-	-	С
		Delay	-	13.4		11.7	9.0	-	30.6	-	23.1	-	-	-	12.8
Partial New Location	Signal	v/c	-	0.74	n/a²	0.43	0.79	-	0.81	-	0.24	-	-	-	0.81
Alternative Fivi Feak		LOS	-	В		В	А	-	С	-	С	-	-	-	В
		Delay	-	21.8		33.5	3.9	-	43.3	-	31.8	-	-	-	20.4
Improve Existing	Signal	v/c	-	0.87	n/a²	0.9	0.32	-	0.82	-	0.34	-	-	-	0.9
Alternative Alvi Feak		LOS	-	С		С	А	-	D	-	С	-	-	-	С
		Delay	-	13.5		10.9	8.5	-	26.4	-	19.5	-	-	-	12.2
Alternative PM Poak	Signal	v/c	-	0.76	n/a²	0.4	0.76	-	0.8	-	0.2	-	-	-	0.8
		LOS	-	В		В	А	-	С	-	В	-	-	-	В
¹ Overall v/c ratio used is the	maximum value o	f all moveme	ents												

Table C-25: Hwy 112 at Hwy 612 EB (Springdale Northern Bypass) Ramps LOS – HCM Methodology

² Free movement

				Hwy 11	2 at Hwy 6	12 (Springe	ale Northe	ern Bypass) EB Ramps	5					
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Existing AM Dook	Two-Way	Delay	-	5.3	2.9	15.1	3.2	-	-	-	-	-	-	-	6.1
Existing - Aivi Feak	Stop	LOS	-	А	А	С	А	-	-	-	-	-	-	-	А
Existing DM Dook	Two-Way	Delay	-	4.2	2.2	10.6	2.2	-	-	-	-	-	-	-	3.8
Existing - Fivi Feak	Stop	LOS	-	А	А	В	А	-	-	-	-	-	-	-	А
2040 No-Action AM	Signal	Delay	-	30.6	14.6	31.5	12.3	-	32.4	-	7.1	-	-	-	23.1
Peak	Signal	LOS	-	С	В	С	В	-	С	-	А	-	-	-	С
2040 No-Action PM	Signal	Delay	-	16.0	5.1	23.3	16.4	-	29.6	-	13.4	-	-	-	16.7
Peak	Signal	LOS	-	В	А	С	В	-	С	-	В	-	-	-	В
New Location	Signal	Delay	-	33.4	9.4	31.1	12.0	-	31.3	-	30.7	-	-	-	26.8
Alternative AM Peak	Signal	LOS	-	С	А	С	В	-	С	-	С	-	-	-	С
New Location	Signal	Delay	-	24.9	4.7	23.5	17.1	-	22.5	-	20	-	-	-	20.0
Alternative PM Peak	Signal	LOS	-	С	А	С	В	-	С	-	В	-	-	-	В
Partial New Location	Signal	Delay	-	28.0	14.4	32.4	7.4	-	51.1	-	58	-	-	-	25.7
Alternative AM Peak	Signal	LOS	-	С	В	С	А	-	D	-	E	-	-	-	С
Partial New Location	Signal	Delay	-	17.7	6.8	23.6	13.9	-	30.5	-	27.5	-	-	-	17.3
Alternative PM Peak	Signal	LOS	-	В	А	С	В	-	С	-	С	-	-	-	В
Improve Existing	Signal	Delay	-	24.6	9.4	37.7	8.6	-	39.5	-	9.3	-	-	-	20.4
Alternative AM Peak	Signal	LOS	-	С	А	D	А	-	D	-	А	-	-	-	С
Improve Existing	Signal	Delay	-	14.1	3.5	25.9	14.8	-	26.9	-	14.9	-	-	-	15.5
Alternative PM Peak	Signar	LOS	-	В	А	С	В	-	С	-	В	-	-	-	В

Table C-26: Hwy 112 at Hwy 612 EB (Springdale Northern Bypass) Ramps LOS – SimTraffic Methodology

HIGHWAY 264 – BLOOMINGTON STREET TO HIGHWAY

The LOS Tool showed LOS D and F conditions from Bloomington Street through Belview Road with acceptability ratios greater than 1.00 from I-49 to Belview Road in 2018. By 2040, the LOS Tool showed LOS D and F conditions with acceptability ratios greater than 1.00 from Bloomington Street to Airport Boulevard.

For the detailed analysis, *Synchro* was used to analyze the Highway 264 corridor from Bloomington Street to Belview Road, and the two-lane highway module of *HCS* was used to analyze from Belview Road to Highway 12. The results, shown in **Table C-27**, demonstrate unacceptable LOS F conditions from Bloomington Street to Belview Road and LOS D conditions from Mill Dam Road to Airport Boulevard in 2018. By 2040, LOS D, E, and F conditions exist from Bloomington Street to Airport Boulevard.

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
Bloomington St to I-49	0.00	0.55	25,000	F	1.45%	34,500	F
149 to Good Springs Pd	0.55	0.74	26,000	F	1.45%	35,500	F
1-49 to Goad Spinigs Nu	0.74	1.01	26,000	F	1.45%	35,500	F
Goad Springs Rd to Belview Rd	1.01	1.22	13,000	F	3.40%	27,000	F
Belview Rd to S Rainbow Rd	1.22	3.71	9,500	С	3.40%	20,000	E
S Rainbow Rd to Hwy 112	3.71	5.50	7,400	С	2.50%	12,500	D
Hwy 112 (Main St) to Mill Dam Rd	0.00	3.18	8,000	С	2.50%	14,000	D
Mill Dam Rd to Airport Blvd	3.18	3.80	7,400	D	2.50%	12,500	E
Airport Blvd to Hwy 12	3.80	7.35	3,300	А	2.50%	5,700	В

Table C-27: Existing and 2040 No-Action LOS Results on Highway 264

Table C-28 shows the *HCS* LOS results for the Action Alternatives for Highway 264 from Belview Road to Highway 12. All Action Alternatives result in improved LOS for the segment from Mill Dam Road to Airport Boulevard (from LOS E under No-Action to LOS D under the New Alignment Alternative and LOS A under the Partial New Alignment and the Improve Existing Alternatives). Two of the Action Alternatives (Partial New Alignment and Improve Existing) also result in improved LOS from Airport Boulevard to Highway 12. The segments of Highway 264 from Bloomington Street to Belview Road were analyzed using *Synchro* for the Future No-Action and were not re-evaluated from the 2040 No-Action scenario.

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
Bloomington St to I-49	99.49%	34,500		100.00%	34,500		100.00%	34,500	
I-49 to Goad Springs Rd	99.48%	35,500	F based on	99.83%	35,500	F based on	100.17%	35,500	F based on No-Action
Goad Springs Rd to Belview Rd	94.84%	25,500		98.59%	26,500		100.47%	27,000	NO / IOIOII
Belview Rd to S Rainbow Rd	88.24%	17,500	E	96.47%	19,500	E	103.53%	20,500	E
S Rainbow Rd to Hwy 112	86.49%	11,000	D	95.95%	12,000	E	108.11%	13,500	E
Hwy 112 (Main St) to Mill Dam Rd	87.38%	12,000	D	88.35%	12,500	D	98.06%	13,500	А
Mill Dam Rd to Airport Blvd	65.00%	8,100	D	113.01%	14,000	А	101.63%	12,500	А
Airport Blvd to Hwy 12	128.33%	7,300	С	116.67%	6,700	А	100.00%	5,700	А

Table C-28: 2040 Action Alternatives LOS Results on Highway 264

Tables C-29 through **C-32** illustrate the Primary Study Area intersection LOS on Highway 264 based upon the *Synchro* results using *HCM* methodology and *SimTraffic* methodology. As part of the 2040 analysis (No-Action and Action Alternatives), signalization was added where needed. All Action Alternative intersections are shown to operate similar to or better than the 2040 No-Action Alternatives.

					Hwy 264	at Mill Da	m Rd/Colo	nel Myers I	Rd						
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
		Delay		15.3			14.1								1.1
Existing - AM Peak	Stop	v/c		0.1			0.1			n/a²			n/a²		0.062
		LOS		С			В								А
		Delay		16.5			14.9								1.0
Existing - PM Peak	Stop	v/c		0.1			0.0			n/a²			n/a²		0.068
		LOS		С			В								А
2040 No. Action AM		Delay		36.6			23.6								3.2
Peak	Stop	v/c		0.4			0.2			n/a²			n/a²		0.4
		LOS		E			D								А
2040 No. Action PM		Delay		51.9			38.1								3.3
Peak	Stop	v/c		0.5			0.2			n/a²			n/a²		0.45
		LOS		F			E								А
Newlocation	Two-W/av	Delay		17.0			14.5								1.9
Alternative AM Peak	Stop	v/c		0.2			0.1			n/a²			n/a²		0.16
		LOS		С			В								А
Newlocation		Delay		18.8			17.7								1.4
Alternative PM Peak	Stop	v/c		0.1			0.1			n/a²			n/a²		0.12
		LOS		С			С								А
Partial New Location	Round-	Delay		8.4			5.8			5.3			7.4		7.2
Alternative AM Peak	about	v/c		0.5			0.3			0.0			0.4		0.48
		LOS		А			А			А			А		А
Partial New Location	Pound	Delay		6.6			6.8			7.2			7.0		6.8
Alternative PM Peak	about	v/c		0.3			0.4			0.1			0.4		0.43
		LOS		А			А			А			А		А
Improvo Existing		Delay		25.6			20.5								2.4
Alternative AM Peak	Stop	v/c		0.3			0.2			n/a²			n/a²		0.31
		LOS		D			D								А
Improvo Existing		Delay		37.3			27.3								2.4
Alternative PM Peak	Stop	v/c		0.4			0.2			n/a²			n/a²		0.36
		LOS		E			D								А
¹ Overall v/c ratio used is the	maximum value o	of all movem	ents												

Table C-29: Hwy 264 at Mill Dam Rd/Colonel Myers Rd LOS – HCM Methodology

Northwest Arkansas National Airport Access Study (F) Appendix C – Traffic Analysis

					Hwy 264	at Mill Dan	n Rd/Color	nel Myers F	۲d						
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Evicting ANA Dook	Two-Way	Delay	9.1	0.9	4.7	6.4	9.1	3.2	6.0	4.1	3.0	2.6	2.6	2.5	3.7
Existing - Aivi Feak	Stop	LOS	А	А	А	А	А	А	А	А	А	А	А	А	А
Existing DM Dook	Two-Way	Delay	9.8	6.4	5.4	8.1	10.7	3.7	6.3	2.8	2.4	7.5	4.2	3.3	4.1
Existing - Pivi Peak	Stop	LOS	А	А	А	А	В	А	А	А	А	А	А	А	А
2040 No-Action AM	Two-Way	Delay	13.2	18.0	7.9	14.1	11.6	6.5	8.4	4.6	3.6	6.3	4.4	3.7	5.3
Peak	Stop	LOS	В	С	А	В	В	А	А	А	А	А	А	А	А
2040 No-Action PM	Two-Way	Delay	18.2	16.7	7.9	16.5	20.0	6.5	8.3	5.2	4.6	9.2	4.5	4.0	5.8
Peak	Stop	LOS	С	С	А	С	С	А	А	А	А	А	А	А	А
New Location	Two-Way	Delay	9.0	9.4	3.7	6.7	9.9	3.4	4.9	2.1	2.1	3.1	3.0	1.6	3.1
Alternative AM Peak	Stop	LOS	А	А	А	А	А	А	А	А	А	А	А	А	А
New Location	Two-Way	Delay	10.2	11.0	5.3	8.9	12.6	5.2	6.1	2.6	2.4	4.1	3.0	1.3	3.2
Alternative PM Peak	Stop	LOS	В	В	А	А	В	А	А	А	А	А	А	А	А
Partial New Location	Round-	Delay	10.8	4.1	4.1	5.2	0.6	3.3	3.3	5.4	3.2	4.9	4.5	3.2	5.8
Alternative AM Peak	about	LOS	В	А	А	А	А	А	А	А	А	А	А	А	А
Partial New Location	Round-	Delay	8.0	0.9	3.7	4.7	0.9	4.7	3.8	7.6	4.1	4.3	4.5	3.5	4.7
Alternative PM Peak	about	LOS	А	А	А	А	А	А	А	А	А	А	А	А	А
Improve Existing	Two-Way	Delay	11.9	14.4	5.7	11.7	14.0	6.5	5.9	1.9	1.4	1.2	2.3	1.3	3.0
Alternative AM Peak	Stop	LOS	В	В	А	В	В	А	А	А	А	А	А	А	А
Improve Existing	Two-Way	Delay	14.0	18.4	6.1	11.5	14.6	5.5	6.0	2.5	1.9	4.2	2.2	1.2	3.0
Alternative PM Peak	Stop	LOS	В	С	А	В	В	А	А	А	А	А	А	А	А

Table C-30: Hwy 264 at Mill Dam Rd/Colonel Myers Rd LOS – SimTraffic Methodology

						Hwy 264 ai	nd Airport	Blvd							
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
		Delay	-	-	-	13.8	-	8.8	7.5		-	-			5.5
Existing - AM Peak	Stop	v/c	-	-	-	0.336	-	0.016	0.012	n/a²	-	-	n/	′a²	0.336
	otop	LOS	-	-	-	В	-	А	А		-	-			А
		Delay	-	-	-	12.6	-	9.7	7.8		-	-			4.0
Existing - PM Peak	Stop	v/c	-	-	-	0.226	-	0.023	0.01	n/a²	-	-	n/	′a²	0.226
	otop	LOS	-	-	-	В	-	А	А		-	-			А
2040 No. Action AM		Delay	-	-	-	16.4	-		7.6	5.5	-	-	12.4		11.7
Peak	Signal	v/c	-	-	-	0.842	-	n/a²	0.024	0.024	-	-	0.91	n/a²	0.91
		LOS	-	-	-	В	-		А	А	-	-	В		В
2040 No. Action BM		Delay	-	-	-	14.6	-		10.0	9.3	-	-	15.2		13.1
Peak	Signal	v/c	-	-	-	0.83	-	n/a²	0.05	0.48	-	-	0.67	n/a²	0.83
		LOS	-	-	-	В	-		А	А	-	-	В		В
Newlocation		Delay	-	-	-	11.0	-		6.7	6.5	-	-	6.6		7.8
Alternative AM Peak	Signal	v/c	-	-	-	0.74	-	n/a²	0.31	0.33	-	-	0.43	n/a²	0.74
		LOS	-	-	-	В	-		А	А	-	-	А		А
Newlocation		Delay	-	-	-	10.5	-		9.3	9.9	-	-	8.6		9.7
Alternative PM Peak	Signal	v/c	-	-	-	0.79	-	n/a²	0.4	0.5	-	-	0.32	n/a²	0.79
		LOS	-	-	-	В	-		А	А	-	-	А		А
Partial New Location		Delay	-	-	-	14.8	-		8.5	5.4	-	-	10.7		10.4
Alternative AM Peak	Signal	v/c	-	-	-	0.77	-	n/a²	0.11	0.19	-	-	0.49	n/a²	0.77
		LOS	-	-	-	В	-		А	А	-	-	В		В
Partial New Location		Delay	-	-	-	13.2	-		11.5	8.7	-	-	13.6		11.9
Alternative PM Peak	Signal	v/c	-	-	-	0.82	-	n/a²	0.05	0.31	-	-	0.49	n/a²	0.82
		LOS	-	-	-	В	-		В	А	-	-	В		В
Improvo Existing		Delay	-	-	-	14.2	-		8.5	5.2	-	-	10.5		10.2
Alternative AM Peak	Signal	v/c	-	-	-	0.76	-	n/a²	0.1	0.17	-	-	0.46	n/a²	0.76
		LOS	-	-	-	В	-		А	А	-	-	В		В
Improve Existing		Delay	-	-	-	12.6	-		11.2	8.3	-	-	13.1		11.4
Alternative PM Peak	Signal	v/c	-	-	-	0.81	-	n/a²	0.05	0.29	-	-	0.46	n/a²	0.81
		LOS	-	-	-	В	-		В	А	-	-	В		В
¹ Overall v/c ratio used is the	maximum value o	of all movem	ents												

Table C-31: Hwy 264 at Airport Blvd LOS – HCM Methodology

² Free movement

					ŀ	lwy 264 an	d Airport B	Blvd							
Alternative	Stop Control	Metric	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall ¹
Existing AM Book	Two-Way	Delay	-	-	-	15.5	-	2.8	2.8	2.8	-	-	9.0	5.8	7.6
Existing - Aivi Feak	Stop	LOS	-	-	-	С	-	А	А	А	-	-	А	А	А
Existing DM Book	Two-Way	Delay	-	-	-	20.6	-	2.6	13.0	2.8	-	-	12.1	7.6	10.5
Existing - Fivi Feak	Stop	LOS	-	-	-	D	-	А	В	А	-	-	В	А	В
2040 No-Action AM	Signal	Delay	-	-	-	13.5	-	2.6	12.8	7.4	-	-	22.3	8.9	13.0
Peak	Jighai	LOS	-	-	-	В	-	А	В	А	-	-	С	А	В
2040 No-Action PM	Signal	Delay	-	-	-	13.2	-	2.9	13.8	10.7	-	-	22.8	7.9	12.7
Peak	Signal	LOS	-	-	-	В	-	А	В	В	-	-	С	А	В
New Location	Signal	Delay	-	-	-	13.2	-	3.0	13.5	6.9	-	-	8.5	5.1	8.6
Alternative AM Peak	Signal	LOS	-	-	-	В	-	А	В	А	-	-	А	А	А
New Location	Signal	Delay	-	-	-	12.4	-	3.8	14.0	10.1	-	-	9.4	4.6	9.2
Alternative PM Peak	Signal	LOS	-	-	-	В	-	А	В	В	-	-	А	А	А
Partial New Location	Signal	Delay	-	-	-	11.9	-	2.5	9.8	5.8	-	-	10.1	5.4	8.2
Alternative AM Peak	Signal	LOS	-	-	-	В	-	А	А	А	-	-	В	А	А
Partial New Location	Signal	Delay	-	-	-	12.4	-	3.2	13.6	9.5	-	-	12.9	5.2	10.0
Alternative PM Peak	Signal	LOS	-	-	-	В	-	А	В	А	-	-	В	А	А
Improve Existing	Signal	Delay	-	-	-	12.5	-	2.8	9.9	5.8	-	-	10.4	5.8	8.6
Alternative AM Peak	Signar	LOS	-	-	-	В	-	А	А	А	-	-	В	А	А
Improve Existing	Signal	Delay	-	-	-	12.4	-	3.2	12.0	8.8	-	-	12.1	5.3	9.6
Alternative PM Peak	Signar	LOS	-	-	-	В	-	А	В	А	-	-	В	А	А

Table C-32: Hwy 264 at Airport Blvd LOS – SimTraffic Methodology

HIGHWAY 279 – SW REGIONAL AIRPORT BOULEVARD TO HIGHWAY 102

The LOS Tool showed LOS C conditions throughout the Highway 279 corridor for both 2018 and 2040. For the detailed analysis, the two-lane highway module of *HCS* was utilized. The results, shown in **Table C-33**, demonstrate acceptable LOS throughout the study area both in 2018 and in 2040.

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
SW Regional Airport Blvd to Hubber Rd/Holloway Rd	0.00	1.63	4,100	А	2.00%	6,300	В
Hubber Rd/Holloway Rd to Hwy 102 (W Centerton Blvd)	1.63	3.02	4,100	А	2.00%	6,300	В

Table C-33: Existing and 2040 No-Action LOS Results on Highway 279

Table C-34 shows the *HCS* LOS results for the Action Alternatives for Highway 279. All Action Alternatives show the same LOS B conditions throughout the corridor as for the No-Action Alternative.

 Table C-34: 2040 Action Alternatives LOS Results on Highway 279

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
SW Regional Airport Blvd to Hubber Rd/Holloway Rd	120.48%	7,600	В	103.61%	6,500	В	100.00%	6,300	В
Hubber Rd/Holloway Rd to Hwy 102 (W Centerton Blvd)	119.32%	7,500	В	102.27%	6,400	В	90.91%	5,700	В

HIGHWAY 612 – INTERSTATE 49 TO HIGHWAY 112

The LOS Tool showed LOS A conditions throughout the Highway 612 corridor both for 2018 and for 2040. For the detailed analysis, the freeway facilities module of *HCS* was utilized. The results, shown in **Table C-35**, reveal acceptable LOS A and LOS B conditions throughout the study area. It should be noted that the segment of Highway 612 from

Highway 112 to west of the Proposed XNA Connector was only analyzed for 2040 because this stretch of Highway 612 has not been constructed.

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
Highway 612 - Interstate 49 to Highway 112		0.69	7,100	А	4.80%	20,000	В
Highway 612 - Highway 112 to Proposed XNA Connector	4.86	6.00		-	-	20,000	В
Highway 612 - Proposed XNA Connector to the West	6.00	8.00	-	-	-	20,000	В

Table C-35: Existing and 2040 No-Action LOS Results on Highway 612

Table C-36 shows the *HCS* LOS results for the Action Alternatives for Highway 612. All Action Alternatives show the same LOS B conditions throughout the corridor as for the No-Action Alternative.

Table C-36: 2040 Action Alternatives LOS Results on Highway 612

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
Highway 612 - Interstate 49 to Highway 112	109.55%	22,000	В	101.01%	20,000	В	98.99%	20,000	В
Highway 612 - Highway 112 to Proposed XNA Connector	159.60%	32,000	В	100.51%	20,000	В	101.01%	20,000	В
Highway 612 - Proposed XNA Connector to the West	106.06%	21,000	В	100.51%	20,000	В	101.01%	20,000	В

AIRPORT BOULEVARD FROM AIRPORT ENTRANCE TO HIGHWAY 264

The LOS Tool showed LOS B/C conditions along Airport Boulevard in 2018 and LOS C conditions in 2040. *Synchro* was used for the detailed analysis. As shown in **Table C-37**, LOS B conditions occur in 2018, but unacceptable LOS F conditions occur in 2040.

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
Airport Entrance to Hwy 264	0.00	0.68	3,400	В	3.10%	6,700	F

Table C-37: Existing and 2040 No-Action LOS Results on Airport Boulevard

Table C-38 shows the HCS LOS results for the Action Alternatives for Airport Boulevard.All Action Alternatives show notable improvements in LOS over the No-Action Alternative(LOS B compared to LOS F).

Table C-38: 2040 Action Alternatives LOS Results on Airport Boulevard

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
Airport Entrance to Hwy 264	110.39%	7,400	В	100.00%	6,700	В	100.00%	6,700	В

SW I STREET – HIGHWAY 71B TO HIGHWAY 12

The LOS Tool showed LOS E/F conditions and acceptability ratios over 1.00 throughout the entire study area in 2018 and in 2040. *Synchro* was utilized for the detailed analysis of this corridor. As shown in **Table C-39**, marginally acceptable LOS D conditions exist in 2018, and unacceptable LOS F conditions exist in 2040 throughout the entire study area.

Table C-39: Existing and 2040 No-Action LOS Results on SW I Street

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
Hwy 71B (Walton Blvd) to Hwy 102 (SW 14th St)	0.00	0.70	12,000	D	2.90%	22,500	F
Hwy 102 (SW 14th St) to Hwy 12 (SW Regional Airport Blvd)	0.70	2.19	14,000	D	2.90%	26,500	F

Table C-40 shows the *HCS* LOS results for the Action Alternatives for SW I Street. Due to the minimal difference in volumes from the 2040 No-Action scenario to the Action Alternatives, the SW I Street corridor was analyzed using the *Synchro* model for the Future No-Action scenario and was not re-evaluated for the Action Alternatives.

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
Hwy 71B (Walton Blvd) to Hwy 102 (SW 14th St)	100.00%	22,500	F No-Action	99.65%	22,500	F No-Action	100.35%	22,500	F No-Action
Hwy 102 (SW 14th St) to Hwy 12 (SW Regional Airport Blvd)	98.56%	26,000	F No-Action	98.56%	26,000	F No-Action	100.72%	26,500	F No-Action

Table C-40: 2040 Action Alternatives LOS Results on SW I Street

REGIONAL AVENUE FROM HIGHWAY 12 TO AIRPORT BOULEVARD

The LOS Tool showed LOS B conditions along Regional Avenue in 2018. In 2040, the LOS Tool showed LOS D and an acceptability ratio over 1.00. The two-lane highway module of *HCS* was utilized for the detailed analysis of Regional Avenue. The results, shown in **Table C-41**, demonstrate acceptable LOS B and LOS C in 2018 and in 2040, respectively.

Table C-41: Existing and 2040 No-Action LOS Results on Regional Avenue

Location	Begin LM	End LM	2018 ADT	2018 LOS	AGR %	2040 No-Action ADT	2040 No-Action LOS
Regional Ave from Hwy. 12 to Airport Blvd	0.00	2.02	4,400	В	2.45%	7,500	С

Table C-42 shows the HCS LOS results for the Action Alternatives for Regional Avenue. AllAction Alternatives show LOS C which is the same as the No-Action scenario.

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
Regional Ave from Hwy. 12 to Airport Blvd	110.39%	8,300	С	100.00%	7,500	С	100.00%	7,500	С

Table C-42: 2040 Action Alternatives LOS Results on Regional Avenue

NEW/PARTIAL NEW ALIGNMENT

The LOS Tool showed LOS A along the New Alignment and LOS B along the Partial New Alignment in 2040. Because this corridor is not yet built, 2018 conditions were not evaluated. The freeway facility module of *HCS* was utilized for the detailed analysis of the
New Alignment, and the multilane highway module of *HCS* was utilized for the analysis of the Partial New Alignment. The results, shown in **Table C-43**, demonstrate acceptable LOS A conditions for both Alignment Alternatives in 2040.

Table C-43: 2040 Action Alternatives LOS Results on New/Partial New Alignment

Location	% Change from No- Action	2040 New Alignment ADT	2040 New Alignment LOS	% Change from No- Action	2040 Partial New Alignment ADT	2040 Partial New Alignment LOS	% Change from No- Action	2040 Improve Existing ADT	2040 Improve Existing LOS
New Alignment (Hwy 264 to Hwy 612)	-	14,500	А	-	-	-	-	-	-
Partial New Alignment (Hwy 264 to Hwy 112)	-	-	-	-	10,100	А	-	-	-

Appendix B – Public Involvement Synopsis

Public Involvement Synopsis

Job Number 090069 Northwest Arkansas Regional Airport (XNA) Access Benton County Thursday, December 5, 2019

An open-forum Public Involvement Meeting for the proposed project was held at Trinity Grace Church, 5845 S. Bellview Road in Rogers, from 4:00 – 7:00 p.m. on Thursday, December 5, 2019. In addition, a Public Officials Meeting was held at 3:00 p.m. at the same location. Special efforts to involve minorities and the public in the meeting included the following:

- Display advertisement placed in the *Northwest Arkansas Democrat Gazette* newspaper on Sunday, November 17, 2019 and Sunday, December 1, 2019. Display advertisement also placed in the *La Prensa Libre* newspaper on Thursday, November 21, 2019 and Thursday, December 5, 2019.
- Outreach letters mailed to Elected Officials, Property Owners and Churches.
- Outreach documents emailed to XNA Board.
- Email invitation sent to Community Stakeholders.
- Northwest Arkansas Regional Planning Commission sent notice to Technical Advisory Committee & Transportation Policy Committee
- Public Meeting Notice Flyer posted to ARDOT website, XNA Project website and social media websites such as XNA Facebook and XNA Twitter.
- ARDOT News Release published on Thursday, November 21, 2019.
- XNA Media release sent to media list.

The following information was available for inspection and comment:

- Displays including 4 identical copies of aerial photograph roll plots at a scale of 1-inch equals 528 feet.
- Exhibit board displaying the history of the project.

Handouts for the public included a summary sheet, comment form, online comment form flyer and a small-scale map illustrating the project location, which was identical to the aerial photograph display. Copies of the handouts are attached.

Table 1 describes the results of the public participation at the meeting.

Table 1	
Public Participation	Totals
Attendance at Public Officials Meeting (including staff)	27
Attendance at Public Involvement Meeting (including staff)	169
Comment forms / emails received	83
Letters received	5

Updated: Tuesday, January 7, 2020



Garver staff reviewed all comments received and evaluated their contents. The summary of comments listed below reflects the personal perception or opinion of the person or organization make the statement. The sequencing of the comments is random and is not intended to reflect importance or numerical values. Some of the comments were combined and/or paraphrased to simplify the synopsis process.

An analysis of the responses received as a result of the public survey is shown in Table 2.

Table 2				
Survey Results	Totals			
Supports improved connectivity	73			
Does not support improved connectivity	6			

Improvements will impact property/community	59
Improvements will not impact property/community	18

Prefers New Location Alternative	61
Prefers to Improve Existing Alternative	13
Prefers Partial New Location Alternative	9
Prefers No Build Alternative	2

Suggested improvements to proposed project/alternatives	30
Knew of environmental issues in immediate proposed alternative areas	18
Made additional comments	36

The following is a general listing of comments associated with this project:

Reasons for supporting improved connectivity:

- Current route (Highway 112.) always subject to traffic congestion (14)
- Improved connection will be more direct to XNA (10)
- Current route to XNA is dangerous (7)
- Current route to XNA is too slow and difficult (4)
- Current route (612 to 112 to 264) to XNA can be confusing to visitors due to many twists and turns.
- Growing population of Northwest Arkansas requires improvements of area to reduce congestion.
- Southern entrance to XNA subject to flooding.

Updated: Tuesday, January 7, 2020



Public Involvement Synopsis Public Meeting

Suggestions for improving proposed project/alternatives:

- Expand Highway 112 (8)
- Implement four-lane divided highway (5)
- Move new location north of Harden Road and Holmes Road intersection (3)
- Create exchange between future bypass and Robbins Road (3)
- Pave Wager Road leading to Snavely/ Hendrix (2)
- Do not implement stop signs/stop lights but reduce speed limit to 65mph (2)
- Connect new road to Bella Vista Bypass
- Implement lights at intersections

Environmental Issues in immediate area of any proposed alternatives:

- Run-off will flood Spring on Holmes Road (6)
- Original route subject to blind cavefish (3)
- Small cemetery on Colonel Meyers Road and Wager Road (3)
- "Improve Existing" route passes through Cave Springs (3)
- Eagles, blue herons and buzzards reside along Osage Creek (2)
- Wildlife sanctuary located at intersection of New Location and Little Osage (2)
- New 612 bypass will cause drainage and flooding issues

General Concerns:

- Widening road will cause more construction at intersection of New Location
- Traffic
- Accidents due to speeding and construction

Attachments:

- Public handouts, including blank comment form
- Small-scale display copy



Northwest Arkansas Regional Airport (XNA) Access Study



Job 090069

Background

The Arkansas Department of Transportation (Department) has contracted with Garver to perform an Environmental Assessment for a connector road to the Northwest Arkansas Regional Airport (XNA). The scope of work also includes roadway and bridge design plans for the alignment, which will be determined through the Environmental Assessment process.

The purpose of the proposed project is to provide a highway connection for the reliable and efficient movement of air transportation passengers and property between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612). The project is estimated to be approximately 4 miles long.

Alternatives

The following alignment alternatives will be considered and evaluated.

- No build
- One alternative on new location
- One alternative on partial new location
- One alternative that improves existing Highways 112 and 264

Public Meeting Purpose

The project team has developed various alternatives to connect the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612). We would like your input on which alternative would provide the best connectivity for the area.

We appreciate your involvement in this study and any comments or questions you provide on the materials and information presented at this public meeting. Comments may be submitted through Friday, December 20, 2019. There is also an online comment form available at XNAAccess.TransportationPlanRoom.com.

ARKANSAS DEPARTMENT OF TRANSPORTATION (ARDOT) CITIZEN COMMENT FORM

ARDOT JOB NUMBER 090069 NORTHWEST ARKANSAS REGIONAL AIRPORT (XNA) ACCESS BENTON COUNTY

LOCATION: Trinity Grace Church 5845 S. Bellview Road Rogers, AR 4:00 – 7:00 p.m. Thursday, December 5, 2019

Please provide your comments on this form and leave it with ARDOT or Garver personnel at the meeting or mail it by <u>Friday, December 20, 2019</u> to: Nicolette Russell, Garver, 4701 Northshore Drive, North Little Rock, AR 72118. Alternatively, you can send in the form via e-mail to <u>PublicInvolvement@GarverUSA.com</u> or submit an online comment at XNAAccess.TransportationPlanRoom.com.

Yes	No	Do you feel there is a need for improved connectivity between Hwy. 612 (Springdale Northern Bypass) and the Northwest Arkansas Regional Airport?
Yes	No □	Do you feel the proposed improvements will impact your property or community?
Which	alternat	tive do you prefer?
		No Build
		New location
		Partial new location
		Improve existing

Do you have any suggestions to improve the proposed project or any of the alternatives shown at this meeting?

Do you know of any environmental issues in the immediate area of any of the proposed alternatives that should be considered as the project is developed? (Examples: cemeteries, springs, caves, endangered species, hazardous materials sites, existing or former landfills, or parks/public lands?

Please make any additional comments here.

It is often necessary for the ARDOT to contact property owners along potential routes. If you are a property owner along or adjacent to the route under consideration, or if you would like to be notified of future public meetings related to this study, please provide information below. Thank you.

Name (<i>Please Print</i>):	
Address:	Phone: ()
	_
E-mail:	_

Thank you for taking the time to participate. For additional information, please visit <u>www.ardot.gov</u> or XNAAccess.TransportationPlanRoom.com.

Appendix B: Public Involvement Synopsis - Page 7 of 8



XNAAccess.TransportationPlanRoom.com

Submit Your Comments **Online!**



XNAAccess.TransportationPlanRoom.com

Submit your public meeting comments online by *Friday, December 20, 2019*.

A printed comment form is also available in your meeting handouts and may be returned in the comment box, via email, or by mail.





XNAAccess.TransportationPlanRoom.com



Submit your public meeting comments online by *Friday, December 20, 2019*.

A printed comment form is also available in your meeting handouts and may be returned in the comment box, via email, or by mail.





Appendix C – Agency and Tribal Coordination

Agency Consultation

Agency consultation letters and exhibits were sent to the following agencies for project coordination. Agency response dates are noted.

Arkansas Department of Health (ADH)

• Response received March 3, 2020

Arkansas Department of Parks, Heritage, and Tourism (ADPHT)

• No response received to date

Arkansas Energy and Environment, Division of Environmental Quality

• Response received June 18, 2020 (from the Arkansas Geological Survey)

Arkansas Game and Fish Commission (AGFC)

• No response received to date

Arkansas Historic Preservation Program (AHPP)

• Response received March 5, 2020

Arkansas Natural Heritage Commission (ANHC)

• Response received May 26, 2020

Federal Emergency Management Agency

- Response received February 19, 2020
- U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)
 - Response received March 23, 2020
- U.S. Army Corps of Engineers (USACE)
 - No response received to date
- U.S. Fish and Wildlife Service (USFWS)
 - Updated Official Species List obtained from IPaC on April 3, 2020 (this is provided in Appendix H)
 - Response received May 4, 2020
 - Response received October 8, 2020
- U.S. Geological Survey (USGS)
 - Response received June 15, 2020





June 18, 2020

Mr. Bill McAbee Environmental Project Manager Garver. LLc. 4701 Northshore Drive North Little Rock, Arkansas 72118

Dear Mr. McAbee:

This is letter is in response to your request for comments on the proposed construction of the Northwest Arkansas National Airport Access road ARDOT No. 090069 & FAP No. NHPP-0004(80). The following comments pertain to the geology of the area of this proposed project.

The entire area is underlain by the Mississippian age Boone Formation. This formation is composed mostly of the carbonate rock limestone with varying amounts of chert. Because limestone is very prone to dissolution by acidic rain water this formation produces what is called karst topography. This includes the formation of numerous sinkholes (which many are visible on the 7.5 topographic maps of the area as small ponds) numerous caves and springs. Also the depth to bedrock can vary by tens of feet over a short horizontal distance.

Because of these potential subsurface issues I would strongly recommend that GPR (Ground Penetrating Radar) be used for potential routes to be able to locate these subsurface geo-hazards and either avoid them or mitigate them before final construction.

If you have any questions please feel free to contact me at 501-683-0117 or by email bill.prior@arkansas.gov.

Sincerely,

William Lee Prior Geology Supervisor 3815 West Roosevelt Road, Little Rock, Arkansas 72204





March 5, 2020

Mr. Bill McAbee Environmental Project Manager Garver, LLC 4701 Northshore Drive North Little Rock, AR 72118

Re: Benton County – General Environmental Assessment Technical Assistance – FHWA Proposed Undertaking – XNA Connector Road Project ARDOT Job Number 090069 AHPP Tracking Number 55434.01

Dear Mr. McAbee:

The staff of the Arkansas Historic Preservation Program (AHPP) reviewed the records for previous investigations and significant archaeological, architectural, and historic resources within or proximal to the proposed study area demarcated on the provided maps. According to our research, there are several archeological and structural resources within the study area that are determined eligible for the National Register of Historic Places (NRHP) or unevaluated for NRHP eligibility. Additionally, the records show few previous cultural resources investigations within the study area.

We look forward to commenting on the recommendations or effect finding from the Federal Highway Administration when that information is available.

Tribes that have expressed an interest in the area include the Cherokee Nation (Ms. Elizabeth Toombs), the Osage Nation (Dr. Andrea Hunter), the Shawnee Tribe (Ms. Tonya Tipton), and the United Keetoowah Band of Cherokee Indians (Ms. Erin Thompson and Charlotte Wolfe). We recommend consultation in accordance with 36 CFR § 800.2(c)(2).

Thank you for the opportunity to review the study area. If you have any questions, please contact Eric Mills of my staff at (501) 324-9784 or eric.mills@arkansas.gov. Please refer to the AHPP Tracking Number above in any correspondence.

Sincerely,

Scott Kaufman Director, AHPP

cc: Dr. Ann Early, Arkansas Archeological Survey

Arkansas Historic Preservation Program 1100 North Street • Little Rock, AR 72201 • 501.324.9880 ArkansasPreservation.com





Asa Hutchinson Governor Stacy Hurst Secretary

Date: May 26, 2020 Subject: Elements of Special Concern XNA Connector Road Project Benton County, AR ANHC No.: P-CF..-20-037

Mr. Ryan Mountain Garver 2049 East Joyce Boulevard Suite 400 Fayetteville, AR 72703

Dear Mr. Mountain:

Staff members of the Arkansas Natural Heritage Commission (ANHC) have reviewed our files for records indicating the occurrence of rare plants and animals, outstanding natural communities, natural or scenic rivers, or other elements of special concern within the XNA Connector Road Project Area. The results of this review have been provided as Geographic Information System (GIS) shapefiles. Documentation is provided to help you interpret the information contained in these files.

Our records indicate the occurrence of ten species of conservation concern within the project area. A list of these elements, with habitat information is attached for your reference. The study site falls within a Karst region of the state characterized by caves, springs, and sinkholes. These habitats support a variety of rare species. Most notable in this area are species associated with streams, springs and spring runs. Four fish and two crayfish species listed in the State's Wildlife Action Plan as species of "Greatest Conservation Concern" have been recorded from the main channels, tributaries and spring runs of Osage Creek, Spring Creek, and Little Osage Creek,

Etheostoma cragini, Arkansas Darter Etheostoma microperca, Least Darter Etheostoma mihileze, Sunburst Darter Nocomis asper, Redspot Chub Orconectes meeki brevis, Meek's Short Pointed Crayfish Orconectes nana, Midget Crayfish

Arkansas darter and least darter are limited to very specific habitat in Benton and Washington Counties. Recent information suggests one or both may represent undescribed species. The Arkansas Highway and Transportation Department (ARDOT) has recently purchased property for mitigation within the Healing Springs complex which supports many of these species. This agency is partnering with ARDOT in the management and protection of the Healing Springs site. Placement and construction of a connector road should seek to minimize impact to the sensitive aquatic habitats in this area.

A list of elements of conservation concern recorded within a five-mile radius of the project area is enclosed for your reference. Represented on this list are elements for which we have records in our database. The list has been annotated to indicate those elements known to occur within a one-mile radius of the project site. A legend is enclosed to help you interpret the codes used on this list.

Please keep in mind that the project area may contain important natural features of which we are unaware. Staff members of the Arkansas Natural Heritage Commission have not conducted a field survey of the study site. Our review is based on data available to the program at the time of the request. It should not be regarded as a final statement on the elements or areas under consideration. Because our files are updated constantly, you may want to check with us again at a later time.

Thank you for consulting us. It has been a pleasure to work with you on this study.

Sincerely,

Cindy Osborne

Cindy Osborne Data Manager/Environmental Review Coordinator

Enclosures: GIS shapefiles

Documentation Project Area Element list with Habitat Information Element List Legend Data Sharing Agreement Invoice

U. S. Department of Homeland Security FEMA Region 6 800 North Loop 288 Denton, TX 76209-3698



FEDERAL EMERGENCY MANAGEMENT AGENCY REGION 6 MITIGATION DIVISION

RE: XNA Connector Access Road, ARDOT Job Number 090069 & FAP No. NHPP-0004(80), Benton County, Arkansas

NOTICE REVIEW/ENVIRONMENTAL CONSULTATION

 \boxtimes

We have no comments to offer.

We offer the following comments:

WE WOULD REQUEST THAT THE COMMUNITY FLOODPLAIN ADMINISTRATOR BE CONTACTED FOR THE REVIEW AND POSSIBLE PERMIT REQUIREMENTS FOR THIS PROJECT. IF FEDERALLY FUNDED, WE WOULD REQUEST PROJECT TO BE IN COMPLIANCE WITH E011988 & E0 11990.

Kevin Gambrill, FPA Planning Department 905 Northwest Eighth Street Bentonville, AR 72712-4566 (479) 271-1003

REVIEWER:

 \square

Colleen Sciano Floodplain Management and Insurance Branch Mitigation Division (940) 383-7257

DATE: February 19, 2020



United States Department of Agriculture

March 23, 2020

Bill McAbee Environmental Project Manager Garver 2049 E. Joyce Blvd. Suite 400 Fayetteville, AR 72703

Dear Mr. McAbee,

This letter is in response to your request for information related to Prime Farmland and Farmland of Statewide Importance for the proposed XNA Connector Road alternatives located in Benton County, Arkansas. Please find enclosed form NRS-CPA-106 listing each of the alternatives. A map showing the location of areas of Prime Farmland is also enclosed.

Should you have any questions or need additional information, please call me at (501) 301-3163 or email at edgar.mersiovsky@usda.gov.

Sincerely,

Edgar P. Mersiovsky State Soil Scientist

Enclosure





Farmland Classification of Soils Coordination - Page 8 of 18 XNA Connector Road Benton County, Arkansas



0.5	5	0.2	75	0	0.	55 1.1	1.65	2.2
E						-		Miles

U.S. DEPARTMENT OF AGRICULTURE Natural Resources Conservation Service

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

NRCS-CPA-106

(Rev. 1-91)

PART I (To be completed by Federal Agency)			3. Date of Land Evaluation Request 4. Sheet 1 of						
1. Name of Project			5. Federal Agency Involved						
2. Type of Project			6. County and State						
PART II (To be completed by NR	CS)		1. Date	1. Date Request Received by NRCS 2. Person Completing Form					
 Does the corridor contain prime, unio (If no, the FPPA does not apply - Do 	que statewide or local ir not complete additiona	nportant farmland	1? m).	YES NO		4. Acres	Irrigated	Average F	arm Size
5 Major Crop(s)		6. Farmable La	nd in Gover	nment Jurisdiction		7. Amoun	nt of Farn	nland As De	fined in FPPA
		Acres:		%		Acres	5:		%
8. Name Of Land Evaluation System U	sed	9. Name of Loc	al Site Asse	ssment System		10. Date	Land Eva	aluation Ret	urned by NRCS
PART III (To be completed by Fe	deral Agency)			Alternativ	/e Corric	lor For S	Segmen	t	
TART III (TO be completed by Te	derai Agency)			New Location A	Partia	I New A	Improv	e Existing	Corridor D
A. Total Acres To Be Converted Dire	ctly								
B. Total Acres To Be Converted Indir	ectly, Or To Receive	Services							
C. Total Acres In Corridor									
PART IV (To be completed by N	RCS) Land Evaluati	ion Informatio	n						
A. Total Acres Prime And Unique Fa	ırmland								
B. Total Acres Statewide And Local	Important Farmland								
C. Percentage Of Farmland in Coun	ity Or Local Govt. Uni	t To Be Converte	ed						
D. Percentage Of Farmland in Govt.	Jurisdiction With Same	e Or Higher Rela	tive Value						
PART V (To be completed by NRCS) Land Evaluation Info	ormation Criterio	n Relative						
value of Farmland to Be Serviced of	or Converted (Scale o	of 0 - 100 Points)						
PART VI (To be completed by Fed	eral Agency) Corrido	or CER 658 5(c))	Maximum						
	a are explained in 7	CI IX 050.5(C))	Foints						
Area In Nonurban Use			15						
2. Perimeter in Nonurban Use	mod		20						
3. Percent Of Control Being Far		4	20						
4. Protection Provided By State 7			20						
5. Size of Present Farm Unit Cor	ripared to Average		10						
6. Creation Of Nonfarmable Farm			25						
7. Availability Of Farm Support S	Services		5						
8. On-Farm Investments			20						
9. Effects Of Conversion On Fari	n Support Services		25						
10. Compatibility With Existing Ag			10						
			160						
PART VII (To be completed by Fe	deral Agency)								
Relative Value Of Farmland (From Part V)			100						
Total Corridor Assessment (From Part VI above or a local site assessment)			160						
TOTAL POINTS (Total of above	2 lines)		260						
1. Corridor Selected:	 Total Acres of Farr Converted by Project 	nlands to be ect:	3. Date Of	Selection:	4. Was /	A Local Si	te Asses	sment Used	?
						YES	NC) Ll	

5. Reason For Selection:

DATE

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?
 More than 90 percent - 15 points
 90 to 20 percent - 14 to 1 point(s)
 Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?
More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?

More than 90 percent - 20 points 90 to 20 percent - 19 to 1 point(s) Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland? Site is protected - 20 points

Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with \$1,000 or more in sales.) As large or larger - 10 points

Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?

Acreage equal to more than 25 percent of acres directly converted by the project - 25 points Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s) Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?
 All required services are available - 5 points
 Some required services are available - 4 to 1 point(s)
 No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures? High amount of on-farm investment - 20 points Moderate amount of on-farm investment - 19 to 1 point(s) No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area? Substantial reduction in demand for support services if the site is converted - 25 points Some reduction in demand for support services if the site is converted - 1 to 24 point(s) No significant reduction in demand for support services if the site is converted - 0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use? Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s) Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points

Mountain, Ryan C.

From: Sent: To: Subject:	Lewis, Lindsey <lindsey_lewis@fws.gov> Monday, May 4, 2020 3:05 PM Mountain, Ryan C. Re: [EXTERNAL] Project: XNA Access - NEPA - File Transfer - XNA Connector Rd ARDOT No. 090069 - Request for Technical Assistance</lindsey_lewis@fws.gov>
Follow Up Flag:	Follow up
Flag Status:	Flagged

Ryan,

The Service has reviewed the information you provided in consideration of your request for technical assistance received on Friday, April 24, 2020. We offer the following for your consideration.

We would like to conduct a site visit prior to the finalizing of any determinations in accordance with Section 7 of the Endangered Species Act, so that they Service may adequately assess both the alternatives and any potential mitigation needs related to federally listed species. Our preliminary thoughts, based off the alternative descriptions and aerial/topographic maps, is that option 2, utilizing a mostly existing alignment and having a minimal footprint and effects to listed species, would be preferred. It is likely that cavefish occur within the karst under all three proposed routes. We recommend that all springs and any conduits that are encountered before or during construction be surveyed. The Service offers our assistance with conducting these surveys as soon as we are able to resume field work following the Covid-19 shutdown. If there is a more immediate need to survey these sites and complete the assessment, please let us know and we will make every effort to either participate or coordinate with you on completing the necessary surveys.

Thank you for the opportunity to review this action and provide you with assistance early in the consultation process. Please let me know if you have any questions or if we can be of any further assistance.

Thanks,

Lindsey Lewis Biologist

US Fish & Wildlife Service Arkansas Field Office 110 South Amity Rd., Suite 300 Conway, Arkansas 72032

(501) 513-4489 - voice (501) 513-4480 - fax Lindsey_Lewis@fws.gov http://www.fws.gov/arkansas-es/

NOTE: This email correspondence and any attachments to and from this sender is subject to the Freedom of Information Act (FOLA) and may be disclosed to third parties.

From: Ryan Mountain <RCMountain@GarverUSA.com>
Sent: Friday, April 24, 2020 3:40 PM
To: Lewis, Lindsey <lindsey_lewis@fws.gov>
Subject: [EXTERNAL] Project: XNA Access - NEPA - File Transfer - XNA Connector Rd. - ARDOT No. 090069 - Request for
Technical Assistance

IMPORTANT: Click a link below to access files associated with this transmittal that came in through the Garver Info Exchange web site.

Download all associated files

Additional links: Reply to All

Project Name:	XNA Access - NEPA
Project Number:	17017600
From:	Ryan Mountain (Garver)
То:	Lindsey Lewis (US Fish and Wildlife Service)
CC:	Kayti.Ewing@ardot.gov; Bill McAbee (Garver)
Subject:	XNA Connector Rd ARDOT No. 090069 - Request for Technical Assistance
Purpose:	For your review and comment
Sent via:	Info Exchange
Expiration Date:	6/23/2020
Remarks:	Lindsey,
	Attached is the Request for Technical Assistance for this XNA Connector Road project. Please let us know if you have any questions or need additional information. Maybe when things get back to normal we can meet you out there.
	Have a good weekend.
	Thanks! Ryan

Transferred Files

NAME	ТҮРЕ	DATE	TIME	SIZE
Transmittal - 00003.pdf	PDF File	4/24/2020	/24/2020 3:39	
			PM	
XNA Connector Rd USFWS	PDF File	4/24/2020	1:24	24,727
2020-4-24 RTA.pdf			PM	КВ



Appendix C: Agency & Tribal Coordination - Page 13 of

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Arkansas Ecological Service Field Office 110 South Amity Road, Suite 300 Conway, Arkansas 72032

October 8, 2020

Consultation Code: 04ER1000-2020-SLI-0029

Ryan Mountain Senior Environmental Scientist Garver, LLC 2049 E. Joyce Blvd. Suite 400 Fayetteville, Arkansas 72703

Dear Mr. Mountain,

The U.S. Fish and Wildlife Service (Service) is responding to your request for technical assistance dated April 24, 2020, regarding the Environmental Assessment (EA) for the XNA Connector Road project located near Cave Springs, Benton County, Arkansas. The project was described and assessed as follows (abbreviated):

The Federal Highway Administration (FHWA), in cooperation with the Arkansas Department of Transportation (ARDOT), are proposing to prepare an environmental Assessment (EA) for approximately four miles of new highway for a connector road from the Springdale Northern Bypass to the Northwest Arkansas National Airport (XNA). The project is currently in the planning stages of its development and ARDOT has retained Garver to conduct a habitat assessment and complete environmental documentation. This report summarizes our findings.

Site investigations of the study corridors for three alternatives being evaluated in the EA were conducted between late January and early February 2020. All areas where construction and/or physical disturbance may occur for each alternative are included in the study corridors (i.e., within the proposed right-of-way) as shown in Figures 1-3. The corridors were visually inspected for the New Location Alternative and Partial New Alternative. The corridor associated with the Improve the Existing Highways Alternative was evaluated from existing public right-of-way. This habitat assessment did not include official surveys for federally listed species; however, two occurrences of threatened and endangered species adjacent to the existing alignment of State Highway 264 has been documented in the Cave Springs Area Karst Resources Conservation Initiative. Several springs and seeps were identified during the field investigation. Additionally, losing streams have been documented in Benton County. The official species list indicates that no critical habitat is located within the study area.



Mr. Ryan Mountain

The U.S. Fish and Wildlife Service (Service) has reviewed the EA and performed an on-site assessment of the proposed alignments. Based on the information you provided and our assessment, we believe that all three of the alternatives have the potential to impact federally listed species and karst habitats. Each of the proposed alignments will cross through areas having karst features, such as springs, caves, and losing streams. We have no records of listed species presence on any of the three proposed routes; however, these areas are surrounded on all sides by Ozark Cavefish (*Amblyopsis rosae*) populations and we have Benton County Cave Crayfish (*Cambarus aculabrum*) records to the southeast. Therefore, the best option for minimizing the effects and avoiding species would be to follow an existing alignment to the greatest extent possible where previous habitat modifications and on-going disturbances have already occurred and currently exist.

Further, this region has been experiencing rapid growth and development and it is expected to only increase into the near future. In addition to the proposed XNA connector road, we have received proposals for widening Highway 112, construction of a bypass around Cave Springs, and building a wastewater line from the city of Cave Springs to the Northwest Arkansas Conservation Authority (NACA). The cumulative effects of these developments and the supporting infrastructure is a concern for conservation and protection of at-risk species. Therefore, considering the potential effects of all three alignments, the Service recommends that in order to minimize impacts to listed species, ARDOT should coordinate the paths of the Cave Springs Bypass, widening of Highway 112, and construction of the XNA connector road to overlap as much as possible and follow alignments being proposed for other actions, such as NACA. In addition, we recommend following karst best management practices consistent with those previously developed for the Cave Springs Cave Recharge area.

The Service appreciates the opportunity to provide early comments on this proposed action and looks forward to assisting you further as the project development and environmental review progresses. For further assistance or if you have any questions, please contact Lindsey Lewis at (501) 513-4489 or lindsey lewis@fws.gov.

Sincerely,

Melvin L. Tobin Field Supervisor

cc: Project File Read File

Filename: C:\Users\lilewis\Documents\PROJECTS\FY2021\ARDOT\XNA\AFO Letter - XNA EA - Comments.docx



United States Department of the Interior U.S. GEOLOGICAL SURVEY Lower Mississippi Gulf Water Science Center Fayetteville Office 700 West Research Center Blvd. Fayetteville, Arkanas 72701

Date:15 June 2020

Phillip D. Hays, Ph.D. Hydrologist, U.S. Geological Survey 216 Gearhart Hall University of Arkansas Fayetteville, AR 72701

Mr. Bill McAbee Environmental Project Manager Garver LLC 4701 Northshore Drive North Little Rock, Arkansas 72118

Dear Mr. McAbee:

We tender this letter in response to your request for comments on the proposed construction of the Northwest Arkansas National Airport Access road ARDOT No. 090069 & FAP No. NHPP-0004(80). Our comments relate to the hydrogeology of the proposed project area.

The U.S. Geological Survey is a science agency and has no policy or regulatory responsibility or authority in NEPA or other determinations. As such, USGS has no position on activities such as road construction but can collect and provide data to inform and aid planning of policy, resource-protection, management, and development approaches and can provide science-based interpretations on potential environmental/hydrologic effects as requested. As our partner agency, the Arkansas Geological Survey, has commented, the area of interest is an area of karst terrane. Karst terrane is defined by the presence of soluble bedrock, in this case limestone, in which water flowing along pre-existing porous zones presented by bedding planes, faults, fractures, and other features has enhanced porosity to create a groundwater hydrologic system that includes an important component of focused, conduit flow. Karst groundwater flow is distinct from typical, diffuse-flow groundwater systems in that karst groundwater flow velocities can be orders of magnitude greater, often exceeding hundreds to thousands of feet per day. Groundwater in karst terrane is in close connection with surface water, with abundant exchange back and forth between the surface-water and groundwater regimes (Hays and others, 2016). Karst development exerts important controls over patterns of groundwater and ultimately surface-water flow. The karst terrane of the area of interest defines the nature of potential environmental concerns.

Numerous studies and data-collection efforts near the potential highway alignments have focused on Benton and Washington Counties and recharge areas of some springs delineated by dye tracing, including studies specifically driven by construction and development efforts. Thomas Aley has conducted many of these investigations, including studies relating to the Northwest Arkansas Regional Airport (Aley (1992); six alternative highway corridors connecting the airport to nearby cities (Aley and others, 2001); recharge area delineation of Cave Spring and Civil War Cave (Aley and others, 2014); and Centerton Fish Hatchery Spring recharge area delineation (Aley and Aley, 2014). Dr. Van Brahana has conducted and supervised research in the wider area including karst inventories and recharge delineations (Brahana, 1995; Brahana, 1997; Brahana and others, 1999; Brahana and others, 2000; Peterson and others, 2002). Borehole geophysical data were presented by Stanton (1999). Arkansas Water Resources Center conducts periodic water-quality monitoring in the area on Osage and Spring Creeks (see Haggard, 2010; https://arkansas-water-center.uark.edu/research/nwa-monitoring.php) and Cave Springs Lake (https://arkansas-water-center.uark.edu/research/cave-springs.php). Unpublished University of Arkansas graduate research theses (Williams, 1991; Gillip, 2007) contain relevant karst recharge characteristics and groundwatersurface water interaction data, as do USGS published reports by Gillip and others (2009), Freiwald (1987) and Moix and others (2003). These reports document the well-developed karst nature of the area, although comprehensive data are not available for the complete area defined by the current proposed highway alignments. Groundwater for human use is of secondary importance in the area of interest; public water supply from Beaver Lake addresses most all domestic and commercial water-use needs there. Groundwater is used on a relatively minor scale for agricultural and home-garden type applications. Groundwater in the area of interest is very important from an environmental and ecosystem-service standpoint, although this has not been economically quantified. Good groundwater quality is essential in maintaining stream, spring, and karst cave environments that support healthy ecosystems, endangered species, recreational, and esthetic values.

Karst groundwater systems are susceptible to changes in recharge caused by changes in land-surface cover and changes in drainage; these systems are also susceptible to surface-derived contamination because focused flow paths—including karst features such as sinkholes, losing-stream segments, and vug and cave conduits—rapidly transmit surface water to groundwater aquifers (Adamski and others, 1997; Knierim and others; 2015; Hays and others, 2016).

Environmental concerns focus on two areas: 1) potential physical hydrologic effects on recharge, groundwater levels, and associated down-gradient impacts on maintenance of stream flow and spring discharge; and 2) potential water-quality effects. Regarding effects on physical hydrologic characteristics and groundwater recharge, reductions of recharge could result from construction of impermeable surfaces and drainage structures, changes in areal distribution or elevations of recharge, and changes in land use and land cover. Such changes can alter groundwater flow or change the proportion of groundwater moving by diffuse flow pathways versus focused-flow pathwaysaltering the fundamental karst hydrologic budget, reduce groundwater levels in cave and conduit systems, reduce spring flows, increase stream flow during high-flow and flood events, reduce stream flow during dry season, and reduce maintenance of stream temperatures year-round. Such effects can be brought about not only directly by road construction, but by land development that can follow construction of a new road—particularly if numerous exits or full access are available. Engineering practices are available that minimize impacts to groundwater recharge. Although not complete, the ASTM Draft D18.90 Karst Standards--Geotechnical Characterization of Karst for Construction Activities may offer guidance for these approaches after these standards are finalized. Regarding potential water-quality impacts, the denudation and modification of land associated with construction and development, alteration of karst land cover and surfaces, exposure of plugged sinkholes and covered fractures, the introduction of new potential contamination sources and roadway spills, can greatly impact groundwater and connected surface-water quality, and karst environments. Sediment is a major karst subsurface and stream contaminant. Gillip (2007) observed deposition of up to 8 ft of sediment during individual storm events through large sections of Civil War Cave during periods of active construction and development and road building in the recharge area. Nutrient, organic, and trace-metal contaminants can also be of concern during and after construction. These contaminants may impact the karst hydrologic system on a chronic time scale as contaminants are added over time to ultimately overcome the system's natural holding and processing capacity such is often the case for nutrients or trace metals, or contaminants can be introduced on an acute scale such is the case for many roadway spills. The physical alterations that change flow characteristics of the karst system can exacerbate the already high susceptibility to water-quality impacts.

A final set of concerns may be considered proximate rather than direct and are related to the availability of knowledge needed to best understand impacts. In general concern exists regarding the lack of existing data for the specific area of the potential alignments area. Questions that should be addressed prior to construction: Will a focused karst inventory be conducted? Has a comprehensive assimilation of available data been conducted? Will a data-gap analysis be conducted?

Thank you for the opportunity to interact with you during the process and provide comment on potential environmental effects. We would be glad to provide additional detail if needed. Please feel free to contact me at 479-236-1166 or <u>pdhays@usgs.gov</u>.

Best regards,

Phillip D. Hays, Ph.D.

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Tribal Consultation

Tribal consultation letters and exhibits were sent to the following tribes for the project. Tribal response dates are noted.

Caddo Nation

• No response received to date

Osage Nation

• Response received January 11, 2020. Letter not included due to sensitive historic property information.

Shawnee Tribe

• No response received to date

United Keetoowah Band of Cherokee Indians in Oklahoma

• No response received to date

Appendix D – Conceptual Stage Relocation Statement

CONCEPTUAL STAGE RELOCATION STATEMENT

Job 090069 Northwest Arkansas National Airport Access Benton County

September 17, 2020

GENERAL STATEMENT OF RELOCATION PROCEDURE

Persons displaced as a direct result of acquisition for the proposed project will be eligible for relocation assistance in accordance with Public Law 91-646, the Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970, as amended (The Uniform Act). The Relocation Program provides advisory assistance and payments to minimize the adverse impact and hardship of displacement upon such persons. No lawful occupant shall be required to move without receiving a minimum of 90 days advance written notice. All displaced persons; residential, business, farm, nonprofit organization, and personal property relocatees are eligible for reimbursement for actual reasonable moving costs.

It is the Department's Policy that adequate replacement housing will be made available, built if necessary, before any person is required to move from their dwelling. All replacement housing must be fair housing and offered to all affected persons regardless of race, color, religion, sex or national origin. Construction of the project will not begin until decent, safe and sanitary replacement housing is in place and offered to all affected persons.

There are two basic types of residential relocation payments: (1) Replacement Housing payments and (2) Moving Expense payments. Replacement Housing payments are made to qualified owners and tenants. An owner may receive a payment of up to \$31,000.00 for the increased cost of a comparable replacement dwelling. The amount of this payment is determined by a study of the housing market. Owners may also be eligible for payments to compensate them for the increased interest cost for a new mortgage and the incidental expenses incurred in connection with the purchase of a replacement dwelling. A tenant may receive a rental subsidy payment of up to \$7,200.00. Tenants may elect to receive a down payment rather than a rental subsidy to enable them to purchase a replacement dwelling. Replacement Housing payments are made in addition to Moving Expense payments.

Businesses, farms, and nonprofit organizations are eligible for reestablishment payments, not to exceed \$25,000.00. Reestablishment expense payments are made in addition to moving expense payments. A business, farm, or nonprofit organization may be eligible for a fixed payment in lieu of the moving costs and reestablishment costs if relocation cannot be accomplished without a substantial loss of existing patronage. The fixed payment will be computed in accordance with the Uniform Relocation Act and cannot exceed \$40,000.00.

If the displacee is not satisfied with the amounts offered as relocation payments, they will be provided a form to assist in filing a formal appeal. A hearing will be arranged at a time and place convenient for the displacee, and the facts of the case will be promptly and carefully reviewed.

Relocation services will be provided until all persons are relocated or their relocation eligibility expires. The Relocation Office will have listings of available replacement housing and commercial

properties. Information is also maintained concerning other Federal and State Programs offering assistance to displaced persons.

PROJECT SPECIFIC DISPLACEMENTS

The purpose of the proposed project is to provide an improved connection/roadway between the Northwest Arkansas National Airport (XNA) and Highway 612 that reduces congestion, increases reliability, and improves safety.

Based on preliminary right of way plans and aerial photographs, it is estimated that the alternatives under consideration for the subject project could cause the following displacements and costs:

New Location Alternative:							
2	Residential Owners	\$	80,000.00				
3	Businesses	\$	123,000.00				
	Total	\$	203,000.00				
Partial New Location Alternative:							
7	Residential Owners	\$	240,000.00				
4	Residential Tenants	\$	48,000.00				
4	Landlord Businesses	\$	100,000.00				
1	Business	\$	40,000.00				
15	Personal Property	\$	3,000.00				
	Total	\$	431,000.00				
Improve the Existing Highways Alternative:							
8	Residential Owners	\$	280,000.00				
5	Residential Tenants	\$	96,000.00				
5	Landlord Businesses	\$	100,000.00				
2	Businesses	\$	80,000.00				
15	Personal Property	\$	3,000.00				
	Total	¢	559 000 00				

The general characteristics of the displacees to be relocated are listed on the Conceptual Stage Relocation Inventory forms in the back of this report.

An available housing inventory has been compiled and it indicates there are at least 188 comparable (i.e., those listed up to \$400,000) replacement dwellings available for sale and 63 comparable (i.e., those listed up to \$3,000) replacement dwellings available for rent within a reasonable proximity of the project area. At least 25 developed commercial properties are currently for sale within a reasonable proximity of the project area. However, of these 25, only one site is within the price range comparable to the property value of the displacements. At least 107 vacant land commercial properties are currently for sale within a reasonable proximity of the project area. One of these vacant land commercial sites includes 3 acres of industrial land with a listed price of \$399,000. The business relocation for Northwest Pallet Inc may also find this industrial site suitable. Additionally, one of these vacant land commercial sites includes 35 acres of agricultural land available for sale with a listed price of \$1,890,000. At least 204 commercial properties are available for lease at the time of this report. Twenty-six of these commercial properties for lease are industrial sites with monthly rental rates ranging from \$4,050 to \$54,167. Of these 26 properties, three provide buildings with square

footages similar to that of Northwest Pallet Inc and their rental rates range from \$11,250-\$21,705 per month. A breakdown of the available properties is as follows:

Residential (For Sale) \$ 0 - 50,000 50,001 - 100,000 100,001 - 200,000 200,001 - 300,000 300,001 - 400,000 400,001 and up Total	Number of Units 0 1 44 68 75 109 297
Residential (Monthly Rent) \$ 0 - 500 501 - 1,000 1,001 - 2,000 2,001 - 3,000 3,001 and up Total	0 18 36 9 2 65
Commercial Properties (For Sale) \$ 0 - 200,000 200,001 - 400,000 400,001 - 600,000 600,001 - 800,000 801,000 and up Total	0 1 0 24 25
Commercial Land (For Sale) \$ 0 - 200,000 200,001 - 400,000 400,001 - 600,000 600,001 - 800,000 801,000 and up Total	4 21 14 6 <u>62</u> 107
Commercial Properties (For Lease) \$ 0 - 1,000 1,001 - 2,000 2,001 - 3,000 3,001 - 5,000 5,001 and up Total	6 16 26 46 110 204

This is a new location roadway project in Arkadelphia, AR. The dwellings and number of dwellings are comparable and adequate to provide replacement housing for the families displaced on the project. The housing market should not be detrimentally affected and there should be no problems with insufficient housing at this time. In the event housing cannot be found or can be found but not within the displacees' economic means at the time of displacement, Section 206 of Public Law 91-646 (Housing of Last Resort) will be utilized to its fullest and practical extent.

The replacement property inventory was compiled from data obtained from real estate companies and web sites for the subject area. The dwellings contained in the inventory have been determined to be comparable and decent, safe, and sanitary. The locations of the comparable dwellings are not less desirable in regard to public utilities and public and commercial facilities, are reasonably accessible to the displacees' places of employment, adequate to accommodate the displacees, and in neighborhoods which are not subject to unreasonable adverse environmental factors. It has also been determined that the available housing is within the financial means of the displacees and is fair housing open to all persons regardless of race, color, sex, religion or national origin consistent with the requirements of 49 CFR, Subpart A, Section 24.2 and Title VIII of the Civil Rights Act of 1968.

A commercial property inventory indicates there are at least 25 developed properties for sale, 204 developed properties for lease, and 107 vacant lots available in the subject area at this time. The businesses displaced on the project may not be able to relocate in the immediate area of their displacement resulting in termination of the operation. However, in order to assist the displaced businesses and nonprofit organizations in relocating, the State will explore all possible sources of funding or other resources that may be available to businesses and nonprofit organizations. Sources that will be considered include: State and Local entities, the Department of Housing and Urban Development, the Economic Development Administration, the Small Business Administration, and other Federal Agencies. Emphasis will be given in providing relocation advisory services to the businesses and nonprofit organizations. Appropriate measures will be taken to ensure that each entity displaced is fully aware of their benefits, entitlements, courses of action that are open to it, and any special provisions designed to encourage businesses and nonprofit organizations to relocate within the same community.

All displacees will be offered relocation assistance under provisions in the applicable FHWA regulations. At the time of displacement another inventory of available housing in the subject area will be obtained and an analysis of the market made to ensure that there are dwellings adequate to meet the needs of all displacees. Also, special relocation advisory services and assistance will be administered commensurate with displacees' needs, when necessary. Examples of these include, but are not limited to, Housing of Last Resort as previously mentioned and consultation with local officials, social and federal agencies, and community groups.

There are no other identified unusual conditions involved with this project.

CONCEPTUAL STAGE RELOCATION INVENTORY

Job No.: 090069

Job Name: Northwest Arkansas National Airport Access

Date of Inventory: September 17, 2020

Relo. #	Relocation Type ¹	Business or Owner Name	Street Name	Square Feet	Value Estimate ²	Rental Estimate ³	# of Employees	Occ. Length⁴		
	New Location Alternative									
1	BUS + R/O	Wildcat Creek Farms, LLC	10614 Wager Rd.	2,788	\$179,750		Unk	Unk		
2	R/O	Home (Trimble)	13628 Trails End Ranch Rd.	1,216	\$37,400					
3*	BUS	Marchant Hills Arena	4083 Robbins Rd.	37,500	\$470,250		3	23		
4*	BUS	Northwest Pallet Inc	10450 Marchant Rd.	32,700	\$723,550		24	47		
		Par	tial New Location Alterna	tive						
1	LLBUS + R/T	Home (Miller)	11187 W. Hwy. 264	1,800	\$78,000	\$850				
2	R/O	Home (Hunt)	12219 Colonel Myers Rd.	1,446	\$118,750					
3	LLBUS + R/T	Home (McGarrah)	12204 Colonel Myers Rd.	768	\$131,300	\$600				
4	R/O	Home (Lastovica Living Trust)	12036 Mill Dam Rd.	1,608	\$70,350					
5	R/O	Home (Cook)	12122 Mill Dam Rd.	1,183	\$135,800					
6	LLBUS + R/T	Home (Nelson)	12677 Colonel Myers Rd.	1,064	\$18,400	\$900				
7	R/O	Home (Holt)	12822 Colonel Myers Rd.	1,640	\$91,250					
8	LLBUS + R/T	Home (Curry)	12991 Kelly Rd.	1,152	\$185,550	\$1,200				
9	R/O	Home (Yanez)	12973 Kelly Rd.	1,568	\$71,900					
10	BUS + PP	Ridgeview Group Home	12958 Hwy. 112	4,060	\$398,150		15	15		
11	R/O	Home (Holt)	8984 Crest Lane	2,886	\$361,650					
12	R/O	Envirotekonline LLC (part time business potentially operated in home)	8985 Crest Lane	2,776	\$316,200					
Improve Existing Highways Alternative										
1	LLBUS + R/T	Home (Miller)	11187 W. Hwy. 264	1,800	\$78,000	\$850				

Relo. #	Relocation Type ¹	Business or Owner Name	Street Name	Square Feet	Value Estimate ²	Rental Estimate ³	# of Employees	Occ. Length⁴
2	R/O	Home (Hunt)	12219 Colonel Myers Rd.	1,446	\$118,750			
3	R/O	Home (Samuelson)	10410 W Hwy. 264	1,488	\$80,250			
4	R/O	Home (Vite)	9821 W Hwy. 264	1,456	\$37,450			
5	R/O	Home (Hamilton Revocable Trust)	271 Healing Springs Rd.	1,376	\$65,850			
6-10	LLBUS + R/T	Hash Properties LLC with 5 dwelling units	202 Sand Bar Lane A-E	1,276 - 1,950	\$113,000 - \$153,250	\$1,250		
11	R/O	Home (Buttry)	257 Healing Springs Rd.	1,898	\$154,100			
12	LLBUS + R/T	Town & Country Fine Living LLC	534 S Main Street	900	\$55,050	\$800		
13	R/O	Home (Fite)	101 Pebble Beach Drive	2,220	\$232,300			
14	LLBUS + R/T	Home (Hash)	1359 Duffers Ct	2,537	\$469,100	\$2,700		
15	LLBUS + R/T	Home (Fourie)	1363 Duffers CT	3,461	\$494,200	\$2,800		
16	BUS	Creeks Golf Course LLC	12881 Hwy. 112	768	\$65,900		Unk	10
17	BUS + PP	Ridgeview Group Home	12958 Hwy. 112	4,060	\$398,150		15	15
18	R/O	Home (Holt)	8984 Crest Lane	2,886	\$361,650			
19	R/O	Envirotekonline LLC (part time business potentially operated in home)	8985 Crest Lane	2,776	\$316,200			

¹Relo. Type:

R/OResidential OwnerR/TResidential TenantLL BUSLandlord BusinessBUSBusinessPPPersonal Property

² Based the total appraised value of land and improvements as identified through use of the Benton County Assessor's website at <u>https://bentoncountyar.gov/assessor/</u> ³ Monthly rental cost based on estimates from websites such as Zillow or Trulia, or from comparable properties

⁴ Occupancy in years

*Relocation costs associated with these two businesses may be covered by the Highway 412 - XNA Connector (Springdale Bypass) (Western Leg) (ROW) project, which is programed in the 2019-2022 Transportation Improvement Program (TIP).
New Location Alternative

Relocation Type	Number	Property Values or Residential Rental Rates	Employees Affected (Range)
Residential Owners	2	\$37,400.00 - \$179,750.00	N/A
Residential Tenants	0	N/A	N/A
Landlord Businesses	0	N/A	N/A
Businesses	3	\$179,750.00 - \$723,550.00	3 - 24
Totals	4	N/A	3 - 24

Partial New Location Alternative

Relocation Type	Number	Property Values or Residential Rental Rates	Employees Affected (Range)
Residential Owners	7	\$70,350.00 - \$361,650.00	N/A
Residential Tenants	4	\$600.00 - \$1,200.00	N/A
Landlord Businesses	4	\$18,400.00 - \$185,550.00	N/A
Businesses	1	\$398,150.00	15
Totals	12	N/A	15

Improve Existing Highways Alternative

Relocation Type	Number	Property Values or Residential Rental Rates	Employees Affected (Range)
Residential Owners	8	\$37,450.00 - \$361,650.00	N/A
Residential Tenants	5	\$800.00 - \$2,800.00	N/A
Landlord Businesses	5	\$55,050.00 - \$494,200.00	N/A
Businesses	2	\$65,900.00 - \$398,150.00	0 - 15
Totals	19	N/A	0 - 15

Appendix E – Noise Assessment

NOISE ASSESSMENT REPORT SCREENING LEVEL NOISE ANALYSIS ARDOT JOB NUMBER 090069 NORTHWEST ARKANSAS NATIONAL AIRPORT ACCESS (F)

Fundamentals of Sound and Noise

Noise is defined as unwanted or undesirable sound. The three basic parameters of how noise affects people are summarized below.

Intensity is determined by the level of sound expressed in units of decibels (dB). A 3 dB change in sound level is barely perceptible to most people in a common outdoor setting. However, a 5 dB increase presents a noticeable change and a 10 dB sound level increase is perceived to be twice as loud. Outdoor conversation at normal levels at a distance of 3 feet becomes difficult when the sound level exceeds the mid-60 dBA range.

Frequency is related to the tone or pitch of the sound. The amplification or attenuation of different frequencies of sound to correspond to the way the human ear "hears" these frequencies is referred to as "A-weighting." The A-weighted sound level in decibels is expressed as dBA.

Variation with time occurs because noise fluctuates from moment to moment. A single level called the equivalent sound level (Leq) is used to compensate for this fluctuation. The Leq is a steady sound level containing the same amount of sound energy as the actual time-varying sound evaluated over the same time period. The Leq averages the louder and quieter moments but gives more weight to the louder moments.

For highway noise assessment purposes, Leq is typically evaluated over the worst 1hour period and written as Leq(h). The Leq(h) commonly describes sound levels at locations of outdoor human use and activity and reflects the conditions that will typically produce the worst traffic noise (e.g., the highest traffic volumes traveling at the highest possible speeds).

Noise Impact and Abatement Criteria

Traffic noise impacts are determined by comparing design year Leq(h) values to: (1) a set of Noise Abatement Criteria (NAC) for different land use categories; and (2) existing Leq(h) values. A noise impact occurs when design year (future build) levels approach or exceed the NAC value or a substantial increase in noise occurs. An approach is considered to be 1 dBA less than the NAC value. A substantial increase is defined as 10 dBA or greater than existing noise levels.

A *noise sensitive receptor* (receptor) is defined as a representative location of a noise sensitive area for various land uses. Most receptors associated with highway traffic noise analysis are categorized as NAC Activity Category B (residential) and C (e.g., parks, hospitals, schools, places of worship). Since the NAC value for Activity Categories B and C is 67 dBA, noise impacts would occur at 66 dBA or greater.

Noise Assessment ARDOT Job 090069 Page 2 of 9

Consideration of noise abatement measures is required when the NAC value is approached or exceeded, or when a substantial increase is predicted. Noise barriers (e.g., walls or berms) are the most common noise abatement measures.

Screening Level Noise Analysis

A screening level noise analysis (screening analysis) may typically be performed for projects that are unlikely to cause noise impacts and/or where noise abatement measures are likely to be unfeasible for acoustical or engineering reasons. Factors common to these types of projects include low traffic volumes, slower speeds, the presence of few or no receptors, and the need for roadway access points (e.g., driveways, roadway intersections, etc.). For screening analysis purposes, the ARDOT noise policy requires determining noise levels within 4 dBA of the NAC value. The screening analysis threshold would therefore be 63 dBA for Activity Categories B and C.

According to the ARDOT noise screening policy (p.18), "1) The model should use the existing and the future "build" condition traffic information, posted speeds, and project receiver distances from the roadway to determine ARDOT noise abatement approach criteria impacts in the future "build" condition. The existing condition is compared to the "build" condition to determine whether impacts due to sound level increases are expected. Traffic data, including existing and design year traffic volume information for certain vehicle classes, can be obtained through the ARDOT's Transportation Planning and Policy Division." For this screening analysis, ARDOT has requested that performing an analysis to determine the number of noise receptors predicted to approach, equal or exceed the NAC criteria for the future year No-Action alternative be conducted.

Screening analysis results represent a worst-case scenario with higher sound levels than would be expected in detailed modeling. The results may be used to determine the need for detailed analysis if noise impacts are likely and the placement of noise barriers is feasible. It may also be used for projects that lack receptors in order to assess impacts on undeveloped land.

The FHWA Traffic Noise Model Version 2.5 (TNM) software program is used to predict existing and future Leq(h) traffic noise levels. The TNM straight line model uses the existing year and design year traffic and roadway information. Receivers (discrete points modeled in the TNM program) are incrementally placed away from the roadway centerline to determine the distance to which impacts extend. The model assumes that the roadway and receivers were located at the same elevation with no intervening barriers such as topography or dense vegetation.

Project Evaluation and Screening Analysis Results

Activity Category B and C receptors were identified in the project corridors. A screening analysis was performed to determine potential impacts for three proposed Build Alternatives and the No-Action Alternative in an effort to reduce the number of alternatives and/or select a preferred alternative. Once a preferred alternative is

Noise Assessment ARDOT Job 090069 Page 3 of 9

selected, this analysis will be revisited and an informed decision will be made on requiring a detailed analysis, similar to ones performed for other previous EA alternative analyses. Many impacted receptors have direct driveway access and the remainder are in sparse low-density areas. A detailed analysis is still likely needed as there are new alignment sections without direct driveway access, plus there are some potentially impacted receptors whose backyards abut the road and may be eligible for noise abatement measures.

TNM modeling was completed using the existing year 2018 and design year 2040 (future build and no-action) traffic and roadway information. Due to the difference in design speeds and typical sections, both the improve existing and partial/new alignment alternative segments of the project corridor were modeled. Receivers were identified from the centerline of proposed alternatives to distances correlating to approximately 66 dBA for existing and future build conditions, 63 dBA for future build conditions, 63 dBA for future build conditions, 63 dBA for possible substantial increase impacts for the Partial New Location Alternative (53+10 dBA, based on averaged field measurements) and 61 dBA for possible substantial increase impacts for rounding the decibel levels (e.g., 62.8 dBA is reported as 63 dBA). The model calculation tables, input data and figures showing the predicted noise impact contours (distance buffers) and receptors are attached.

Short-term noise measurements at each location shown below were conducted by making three consecutive 15-minute measurements in one-minute intervals. Background noises (i.e., local traffic, neighborhood activities, pedestrian activities, sirens, etc., as applicable) were noted during these measurements, and the corresponding one-minute periods were eliminated from the calculation of the measured noise level, as necessary. As indicated in **Table 1**, the existing noise levels at the exterior measurement locations were between approximately 42 and 57 dBA in the less developed areas 1, 2, and 4, and between approximately 62 and 69 dBA in the more developed areas 3, 5, and 6. All of the measurement locations were first-row residences with direct exposure to the proposed Northwest Arkansas National Airport Access (F) Road.

Location	Area	Date	Time	Measured L _{eq} (dBA)
			11:17-11:32	42.3
Holmes Road	8	10/14/19	11:33-11:48	53.4
			11:48-12:03	51.5
Wager Bood	0	10/12/10	16:36-16:51	49.7
wayer Road	0	10/13/19	16:52-17:07	52.3

 Table 1. Existing Noise Levels at Measurement Locations

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			17:07-17:22	57.0
			8:10-8:25	66.2
Healing Springs Road (Hwy 264)	5	10/14/19	8:26-8:41	69.0
110000 (1111 y 201)			8:42-8:57	67.5
			9:35-9:50	52.2
Colonel Myers Road	8	10/14/19	9:51-10:06	53.7
			10:08-10:23	55.1
			13:29-13:44	65.5
Healing Springs Road (Hwy 264)	4	10/13/19	13:48-14:03	62.9
			14:05-14:20	64.4
			15:07-15:22	68.7
South Main Street (Hwy 112)	1	10/13/19	15:22-15:37	68.3
(,			15:38-15:53	67.6

No-Action Alternative Results: A total of 59 residential receptors, 61 Recreational Vehicle pads at The Creeks Golf & RV Resort, one food stand with exterior seating, one park (T.R. Wallis), the Cave Springs Community Building with exterior people activity areas and one place of worship with exterior people activity areas were predicted to experience noise impacts within distances of 150, 150, 145, 150 and 140 feet under future no-action conditions for NSA's 1-5 respectively, 73 (including 32 RV pads) of which were predicted to experience noise impacts within distances of 115, 80, 85 and 75 feet under existing conditions for NSA's 2-5, respectively. NSA 1 did not have existing NAC impacts

Eight receptors were predicted to experience noise levels within the 63 dBA screening analysis threshold at distances of 200, 200, 185 and 175 feet (NSAs 1, 2, 4, and 5 respectively), under future no-action conditions. The predicted noise impact and screening analysis threshold distances and receptors are shown on the attached Figures in the Appendix.

Improve the Existing Highways Alternative Results: A total of 23 receptors were predicted to experience noise impacts of 66 dBA within distances of 150, 150, 100, 100 and 135 feet under future build conditions for NSA's 1, 2, 4, 5, and 6 respectively, nine of which were predicted to experience noise impacts within distances of 115, 85 and 75 feet under existing conditions for NSAs 2, 4 and 5. NSA 1 did not have existing NAC impacts and NSA 6 is new alignment (Cave Springs Bypass) with no existing 66 dBA sound level impacts except for one residence immediately at the southern border with NSA 2.

Thirty-two receptors were predicted to experience noise levels within the 63 dBA screening analysis threshold at distances of 190 and 190 feet (NSAs 1 and 2 respectively), under future build conditions. This total includes 29 Recreational Vehicle

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pads at The Creeks Golf & RV Resort in NSA 2. Ten of these impacted receptors are within the existing 66 dBA contour distance that approaches the NAC criteria. The predicted noise impact and screening analysis threshold distances and receptors are shown on the attached Figures. Please note that there are noise-sensitive properties (including multi-family apartment buildings) and the first row of Recreational Vehicle pads at The Creeks Golf & RV Resort located within the current proposed right-of-way. None of these properties are included in the total number of noise impacts, as they would likely be considered relocations.

Highway 112

A total of 14 receptors are predicted to experience noise impacts under future build conditions for this section. Three (3) of these 14 receptors are substantial increases (≥ 10 dBA) that were predicted in the Cave Springs Bypass section. The remaining impacted receptors are predicted to be NAC criteria impacts (66 dBA).

Thirty-two (32) receptors are predicted to experience noise levels within the 63 dBA screening analysis threshold under future build conditions. This total includes 29 Recreational Vehicle pads at The Creeks Golf & RV Resort. The remainder are residential.

Please note that there are noise-sensitive properties (including one multi-family apartment) and the first row of Recreational Vehicle pads at The Creeks Golf & RV Resort located within the current proposed right-of-way. None of these properties are included in the total number of noise impacts, as they would likely be right-of-way acquisitions.

Partial New Location Alternative Results: Seventeen receptors were identified in the noise buffer zone under future build conditions, 8 receptors are impacted within the 66 dBA buffer and six are substantial increase impacts. A total of 17 receptors were predicted to experience noise impacts within distances of 85, 100 and 150 feet under future build conditions for NSA's 8, 5 and 1, respectively, one of which was predicted to experience noise impacts within a distance of 75 feet under existing conditions for NSA 5. NSA 1 did not have existing NAC impacts and NSA 8 is new alignment with no existing 66 dBA sound levels. Three receptors were predicted to experience noise levels within the 63 dBA screening analysis threshold at distances of 135, 150 and 190 feet (NSAs 8, 5, 1 respectively), under future build conditions. The predicted noise impact and screening analysis distances and receptors are shown on the attached figures. Please note that there are approximately nine noise-sensitive properties located within the current proposed right-of-way. None of these properties are included in the total number of noise impacts.

New Location Alternative Results: Seven receptors were identified in the noise buffer zone under future build conditions, all of which are substantial increase impacts. None of these impacted receptors are within an existing 66 dBA contour distance that approaches the NAC criteria since NSA 9 is new alignment with no existing 66 dBA sound levels. The predicted noise impact and screening analysis distances and

Noise Assessment ARDOT Job 090069 Page 6 of 9

receptors are shown on the attached figures. Please note that there are approximately four noise-sensitive properties located within the current proposed right-of-way. None of these properties are included in the total number of noise impacts.

As mentioned, there are six substantial increases (\geq 10 dBA) predicted for the Partial New Location Alternative and four predicted for the New Location Alternative. The predicted distance from centerline for the Partial New Location Alternative was 135 feet and was 350 feet for the New Location Alternative. The New Location Alternative distance was greater because of the 70 mph design speed and the larger typical section/cross-section footprint.

As previously noted, this screening analysis was performed to determine potential impacts for three proposed Build Alternatives in an effort to possibly reduce the number of alternatives. A detailed noise analysis will most likely be required when a selected alternative is identified.

Professional judgment indicates that no potentially impacted locations will have both feasible and reasonable mitigation from either one or both of the following reasons:

Feasibility - many impacted sites will have direct driveway access or may be located on the corner of an intersecting cross-street. Both of these conditions preclude a barrier being placed across either of these, leaving gaps in an analyzed barrier and not being able to achieve a minimum decibel reduction. Additionally, the barriers would have to be offset from the driveway or cross-street to allow for line-of-sight safety triangles.

Additionally, it is expected that three of the Osage Vista townhomes may be relocated. These are the western buildings of the six total buildings located near the intersection of the proposed highway bypass and Highway 264. Nonetheless, even though the substantial increase impact criteria contour goes through the remaining three eastern buildings, the only noise receptors at these townhouse units are the patios on the east side of the units. These receptors are shielded from the proposed highway by the buildings themselves. As a result, these receptors are not even likely to be impacted and no mitigation analyses will be needed.

Reasonableness - for other areas that do not have direct access or cross-streets, the density of noise-sensitive receptors is very sparse. Therefore, the cost per benefited receptor criteria likely will be exceeded.

Project construction operations typically increase noise levels. These increases would be temporary and have minimal to minor adverse effects on land uses and activities in the project area. Local ordinances may prohibit construction activities or restrict noise levels or high noise levels between certain time periods (e.g., nighttime and/or weekend work). Temporary construction noise reduction measures such as nighttime and/or weekend work restrictions may also be considered. Noise Assessment ARDOT Job 090069 Page 7 of 9

Planning Information for Local Officials

The ARDOT encourages local communities and developers to practice noise compatibility planning. As presented in **Table 2**, noise level prediction results for future build conditions are shown. Sound level calculations were made at incremental distances between 25-500 feet from various existing and proposed roadway centerlines. The detailed incremental distance results are included in the Noise Assessment Report Attachments Appendix.

There are nine distinct traffic volume, typical cross-section and/or speed areas in the project corridors with Activity Category B and C exterior receptors, as listed below.

- Area 1 Highway 112; Highway 612 to Wagon Wheel
- Area 2 Highway 112; Wagon Wheel to Highway 264 South
- Area 3 Highway 112; Highway 264 South to Highway 264 North*
- Area 4 Highway 264; Highway 112 to Mill Dam
- Area 5 Highway 264; Mill Dam to Airport Blvd.
- Area 6 Highway 112 Bypass; South of Highway 264 (proposed)
- Area 7 Highway 112 Bypass; North of Highway 264 (proposed)**
- Area 8 Partial New Location Alternative (proposed)
- Area 9 New Location Alternative (proposed)

*Area 3 is bypassed by Area 6 in Cave Springs and is no longer part of the Improve The Existing Highways Alternative.

**Since the initial submission, Area 7 has been removed. Nonetheless, the Areas have not been renumbered so as to maintain continuity with the original draft analysis.

Table 2 shows the specific distances of the 66 dBA, 63 dBA (ARDOT Policy), 63 dBA for Areas 6 and 8 substantial increase criteria and 61 dBA for Area 9 substantial increase criteria contours that may capture noise-sensitive impacts as a result of constructing the proposed improvements in the nine areas. Existing 66 dBA contours are also presented for informational purposes.

These predictions do not represent noise levels at every location at a particular distance back from the roadway. Noise levels will vary with changes in terrain and other site conditions.

	Existing Condition									
Area	Dista	ance (ft)*	Leq(h), dBA**							
1		115	66							
2		115	66							
3		80		66						
4		85		66						
5		75		66						
		No-Action	Alternative							
Area	Distance (ft)*	Distance (ft)* Leq(h), dBA** Distance (ft)* Leq(h), dBA**								
1	150	66	200	63						
2	150	66	200	63						
3	145	66	180	63						
4	150	66	185	63						
5	140	66	175 63							
	Improve th	e Existing Highwa	ys Alternative							
Area	Distance (ft)*	Leq(h), dBA**	Distance (ft)*	Leq(h), dBA**						
1	150	66	190	63						
2	150	66	190 63							
4	100	66	145	63						
5	100	66	140	63						
6 (New alignment)	135	66	175	63 (Substantial Inc.)						
	Partia	al New Location Alt	ternative							
Area	Distance (ft)*	Leq(h), dBA**	Distance (ft)*	Leq(h), dBA**						
1	150	66	190	63						
5	100	66	150	63						
8 (New alignment)	85	66	135	63 (Screening)						
	00	00	135	63 (Substantial Inc.)						
	New Location Alternative									
Area	Distance (ft)*	Leq(h), dBA**	Distance (ft)*	Leq(h), dBA**						
9 (New alignment)	240	66	300 63 (Screenin							
	210		350	61 (Substantial Inc.)						

Table 2. Noise Levels for Compatibility Planning

Perpendicular to centerline of Area "X" Roadway

** Rounded to tenth value

Table 3 presents the NAC. This information is included to inform local officials and planners of anticipated noise levels so that future development will be compatible. In compliance with federal guidelines, a copy of this screening analysis will be transmitted to the local agencies for land use planning purposes.

Activity Category	L _{eq(h)} dBA	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B*	67	Exterior	Residential properties.
C*	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structure, radio stations, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structure, radio studios, recording studios, schools, and television studios.
E*	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D, or F.
F			Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G			Undeveloped lands that are not permitted.

Table 3. Noise Abatement Criteria

* Includes undeveloped lands permitted for this activity category.

NOISE ASSESSMENT REPORT ATTACHMENTS SCREENING LEVEL NOISE ANALYSIS ARDOT JOB NUMBER 090069 NORTHWEST ARKANSAS NATIONAL AIRPORT ACCESS (F)

APPENDIX

NOISE DATA WORKSHEETS (WITH TRAFFIC VOLUMES AND SOUND LEVELS)

TNM SOUND LEVEL MODEL OUTPUTS

FIGURES:

PROJECT LOCATION MAP (ALL BUILD ALTERNATIVES)

• PROJECT LOCATION

NO-ACTION ALTERNATIVE (AREAS 1-5)

NEW LOCATION ALTERNATIVE: AREA 9

- PROJECT LOCATION
- NEW LOCATION ALTERNATIVE: AREA 9 (RIGHT-OF-WAY, IMPACTS, CONTOURS)

PARTIAL NEW LOCATION ALTERNATIVE: AREA 8

- PROJECT LOCATION
- PARTIAL NEW LOCATION ALTERNATIVE: AREA 8 (RIGHT-OF-WAY, IMPACTS, CONTOURS)

IMPROVE THE EXISTING HIGHWAYS ALTERNATIVE: AREAS 1-6 (AREA 7 DELETED FROM STUDY)

- PROJECT LOCATION
- IMPROVE THE EXISTING HIGHWAYS ALTERNATIVE: AREAS 1-6 (RIGHT-OF-WAY, IMPACTS, CONTOURS)
 - O AREA 1 HIGHWAY 112; HIGHWAY 612 TO WAGON WHEEL
 - AREA 2 HIGHWAY 112; WAGON WHEEL TO HIGHWAY 264 SOUTH
 - AREA 3 HIGHWAY 112; HIGHWAY 264 SOUTH TO HIGHWAY 264 NORTH (BYPASSED BY AREA 6 IN CAVE SPRINGS)
 - O AREA 4 HIGHWAY 264; HIGHWAY 112 TO MILL DAM
 - AREA 5 HIGHWAY 264; MILL DAM TO AIRPORT
 - AREA 6 HIGHWAY 112 BYPASS; SOUTH OF HIGHWAY 264 (CAVE SPRINGS BYPASS)

NOISE DATA WORKSHEETS (WITH TRAFFIC VOLUMES AND SOUND LEVELS)

					NOISE	DATA WORKS	SHEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Nati	onal Airpo	rt Access	(F)								
Roadway Re	eference:	Area 1											
County:	Benton]										
Design Year	:	2040											
Year(s) To E	Be Modeled:	2018											
		_											
Roadway Cr	oss-Sections	:	2 12'	lanes; 24	4' shoulders	total 32' wide	1	Note:	DHV = (A	DT)(K)	K - Percent	of ADT in	design hou
			2018	EXISTIN	G	Area	1		DDHV = (PEAK = A	ADT)(K)(D) M/PM Peak	D - Direction hour, which	nal Distrib ever is gre	ution eater
Operating S	peed:				50]						
Traffic Data				VEAR		%TRUCK	DEVK	CARS	МТ	нт	CARS/2	MT/2	HT/2
Traine Data.						,, index	- LAN		3.6%	1.7%		1011/2	111/2
				2018			1180	1117	42	20	559	21	10

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loh No:	000060	-											
JUD NO.	090003												
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County:	Benton												
Design Year	r:	2040											
			_										
Year(s) To I	Be Modeled:	2018											
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Roadwav C	ross-Sections	;	2 12'	lanes: 24	1' shoulders	total 32' wide		Note:	DHV = (A	DT)(K)	K - Percent	of ADT in	1 desian hou
								_	DDHV = (ADT)(K)(D)	D - Directior	nal Distrib	oution
			2018	EXISTING	G	Area	2		PEAK = A	M/PM Peak	< hour, whiche	ever is gro	eater
Operating S	Speed:				50]						
Traffic Data						% TRUCK	DEVK	CARS	мт	μт	CAPS/2	MT/2	⊔т/2
Traine Data	•				FINIFLAN	/01KOCK	FLAN	CAILS	3.6%	1.7%	CANO/2	11/2	111/2
				2018		-	1153	1092	42	20	546	21	10
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Job Name:	Northwest Arl	kansas Nati	onal Airpo	rt Access	(F)								
Roadway R	eference:	Area 3											
County:	Benton												
Design Year	r:	2040]										
Year(s) To I	Be Modeled:	2018											
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									DDHV = (ADT)(K)(D)	D - Direction	nal Distrib	oution
			2018	EXISTIN	G	Area	3		PEAK = A	M/PM Peak	thour, whiche	ever is gro	eater
Operating S	Speed:		1		40								
Traffic Data	:			YEAR	PM PEAK	%TRUCK	PEAK	CARS	MT	НТ	CARS/2	MT/2	HT/2
									3.6%	1.7%			
				2018			1577	1493	57	27	747	28	13

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Job No:	090069]											
Job Name:	Northwest Ar	kansas Nati	onal Airpo	rt Access ((F)]						
Roadway R	eference:	Area 4											
County:	Benton												
Design Year	r:	2040											
Year(s) To E	Be Modeled:	2018											
Roadway C	ross-Sections	:	2 12'	lanes; 2 4	1' shoulders	total 32' wide		Note:	DHV = (A	DT)(K)	K - Percent	of ADT in	ı design hou
			2018	EXISTIN	G	Area	4		DDHV = (PEAK = A	ADT)(K)(D) M/PM Peak	D - Direction	nal Distrib ∋ver is gr∉	ution eater
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									2%	1%			
				2018			725	703	15	7	352	7	4

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Roadway R	eference:	Area 5											
County:	Benton												
Design Yea	r:	2040											
Year(s) To I	Be Modeled:	2018											
Roadway C	ross-Sections		4 12'	lanes; 2	4' shoulders	total 32' wide	1	Note:	DHV = (A	DT)(K)	K - Percent	of ADT i	n design hour
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County:	Benton	i İ]										
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Roadway C	ross-Sections	:	2 12'	lanes; 2	4' shoulders	total 32' wide		Note:	DHV = (AI)	DT)(K)	K - Percent	of ADT in	design hou
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amo Butu	-			10.00		,inteen	1	0, 110	3.6%	1.7%	5/110/2		
				2040			2557	2422	91	44	1211	46	22
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Job Name:	Northwest Ar	kansas Nat	tional Airpo	ort Acces	s (F)								
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ROAUWAY R	elerence.	Alea Z											
County:	Benton	1]										
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Roadway C	ross-Sections	:	2 12'	lanes; 2	4' shoulders	total 32' wide		Note:	DHV = (AI	DT)(K)	K - Percent	of ADT in	design hou
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Tame Data						, intoon		UNIC	3.6%	1.7%	0410/2	11/2	111/2
	1			2040			2470	2340	88	42	1170	44	21

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Job No:	090069												
Job Name:	Northwest Ar	kansas Na	tional Airp	ort Acces	s (F)								
Roadway R	eference:	Area 3											
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Designited	· ·	2040											
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Roadway C	ross-Sections	:	2 12'	lanes; 2	4' shoulders	total 32' wide		Note:	DHV = (AI	DT)(K)	K - Percent	of ADT in	design hou
									DDHV = (I	ADT)(K)(D)	D - Direction	al Distrib	ution
			2040	No-Actio	on	Area	3		PEAK = A	M/PM Pea	k hour, which	ever is gr	eater
Operating S	Speed:				40								
Troffic Data				VEAD		%TRUCK	DEAK	CARE	мт	ит	CARS/2	MT/2	UT/2
				TEAR		MIRUCK	FEAN	CARS	3.6%	1.7%	CAR3/2	11/2	<u> </u>
				2040			3358	3181	120	57	1591	60	29

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Job No:	090069												
Job Name:	Northwest Ar	kansas Nat	tional Airp	ort Acces	s (F)	<u> </u>							
Roadway R	eference:	Area 4											
County:	Benton												
Design Year	:	2040											
Year(s) To E	e Modeled:	2040											
Roadway C	ross-Sections	: 	2 12	lanes; 2	4' shoulders	total 32' wide		Note:			K - Percent	of AD I in al Distrib	design hou
			2040	No-Actio	on	Area	4		PFAK = A	M/PM Peal	k hour which	everis or	reater
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Operating S	peed:		1		55								
Traffic Data	:			YEAR	PM PEAK	%TRUCK	PEAK	CARS	мт	нт	CARS/2	MT/2	HT/2
						,	/ut	0.00	3.6%	1.7%			/=
				2040			1463	1386	52	25	693	26	12

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County:	Benton												
Design Yea	r:	2040											
Year(s) To E	Be Modeled:	2040											
				_									
				_									
				_									
				_									
				_									
				_									
Roadway C	ross-Sections		4 12'	lanes; 2	4' shoulders	total 32' wide		Note:	DHV = (Al	DT)(K)	K - Percent	of ADT in	n design hour
									DDHV = (A)	ADT)(K)(D)	D - Direction	al Distrib	ution
			2040	No-Actio	on	Area	5		PEAK = A	M/PM Pea	k hour, which	ever is gr	eater
	<u> </u>						1						
Operating S	speea:				55								
Traffic Data	:			YEAR	PM PEAK	%TRUCK	PEAK	CARS	МТ	НТ	CARS/2	MT/2	HT/2
									3.6%	1.7%			
				2040			1261	1194	45	22	597	23	11

					NOISE DA	ATA WORKS	HEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Nati	onal Airpo	rt Access	(F)								
Roadway Re	eference:	Area 1		· · · · · ·									
	-												
County:	Benton	1]										
Design Year	••	2040	1										
Design real		20-10											
Year(s) To E	Be Modeled:	2040											
Poadway Cr	ross-Soctions	, ·		37	5' each side of center	Total 75'							
Roadway Ci	USS-Sections	.	4-11	' lanes 2	4' Inner & Outer Shid	rs 15' Grass M	edian	Note:		א)(דר	K - Percent	ADT in d	esian hour
				ianoo, 2			Galari	11010.	DDHV = 0		D - Direction	nal Distrib	oution
			2040	Improve	Existing Alt	Area	1		PEAK = A	M/PM Peak	hour, whiche	ever is an	eater
Operating S	peed:		45	6 (Propose	ed Design Speed)		-	_				j.	
Traffic Data:	:			YEAR	PM PEAK	%TRUCK	PEAK	CARS	MT	HT	CARS/2	MT/2	HT/2
									3.6%	1.7%			
				2040			2654	2513	96	45	1257	48	23

					NOISE DA	ATA WORKS	SHEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Nati	onal Airpo	rt Access	(F)								
Roadway Re	eference:	Area 2]							
			_										
County:	Benton												
Design Year	:	2040											
Vear(c) To F	Po Modolod:	2040											
real(s) TO E	se modeled.	2040											
Deschuser O				07	<u>Flanck side of conten</u>	T-4-1 751							
Roadway Cr	ross-Sections	5:	4.44	37.	5 each side of center	, Total 75	la all'an	Nistau			K Dana ant		
			4-11	lanes, z-	4 Inner & Outer Snich	IS, ID GIASS IV	eulan	Note.			R - Percent	ADT III u	esign nour
			2040	Improve	Fristing Alt	Area	2		PEAK = A	M/PM Peak	bour which	ver is an	aater
Operating S	peed:		45	6 (Propose	ed Design Speed)	A.ca	-		1 L/ X - A				
operating e	, , , , , , , , , , , , , , , , , , ,				ou Boolgir opeou)								
Traffic Data:	:			YEAR	PM PEAK	%TRUCK	PEAK	CARS	MT	HT	CARS/2	MT/2	HT/2
									3.6%	1.7%			
				2040			2544	2409	92	43	1205	46	22

					NOISE DA	ATA WORKS	SHEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Nati	onal Airpo	rt Access	(F)								
Roadway Ro	eference:	Area 4											
	-												
County:	Benton	1]										
Design Year	•	2040	1										
Decigit real		20-10											
Year(s) To E	Be Modeled:	2040											
Roadway C	ross-Sections	2.		37	5' each side of center	Total 75'		1					
Roadway O	033-000000		4-11	' lanes 2-	4' Inner & Outer Shidi	rs 15' Grass M	ledian	Note:	DHV = (AI)		K - Percent	ADT in de	esian hour
				141100, 2					DDHV = 0	ADT)(K)(D)	D - Direction	nal Distrib	oution
			2040	Improve	Existing Alt	Area	4	1	PEAK = A	M/PM Peak	hour, which	ever is are	eater
Operating S	peed:		45	(Propose	ed Design Speed)							Ĵ	
Traffic Data	:			YEAR	PM PEAK	%TRUCK	PEAK	CARS	MT	HT	CARS/2	MT/2	HT/2
									2%	1%			
				2040			1435	1392	29	14	696	14	7

					NOISE DA	ATA WORKS	SHEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Nati	onal Airpo	rt Access	(F)								
Roadway Re	eference:	Area 5											
County:	Benton												
Design Year	:	2040											
				_									
Year(s) To E	Be Modeled:	2040											
Roadway Cr	ross-Sections	2.		37	5' each side of center	Total 75'							
riouunuy or			4-11	' lanes 2-	4' Inner & Outer Shidi	rs 15' Grass M	edian	Note:	DHV = (AI))T)(K)	K - Percent	ADT in de	esian hour
				101100, L					DDHV = 0	ADT)(K)(D)	D - Direction	nal Distrib	oution
			2040	Improve	Existing Alt	Area	5		PEAK = A	M/PM Peak	hour, whiche	ever is ar	eater
Operating S	peed:		45	5 (Propose	ed Design Speed)							Ĵ	
Traffic Data:	:			YEAR	PM PEAK	%TRUCK	PEAK	CARS	MT	HT	CARS/2	MT/2	HT/2
									2%	1%			
				2040			1269	1231	25	13	615	13	6

					NOISE D	ATA WORKS	SHEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Nati	onal Airpo	ort Access	(F)	ï							
	-												
Roadway Re	eference:	Area 6	1										
County:	Benton												
Design Year	:	2040											
Year(s) To E	Be Modeled:	2040											
Roadway Cr	oss-Sections	:		37.	5' each side of cente	er, Total 75'							
			4-1	1' lanes, 2-	4' Inner & Outer Shk	drs, 15' Grass M	ledian	Note:	DHV = (A	DT)(K)	K - Percent	ADT in d	esign hour
							-		DDHV = (ADT)(K)(D)	D - Direction	nal Distrib	oution
On enetin a O			2040	Improve	Existing Alt	Area	6		PEAK = A	M/PM Peak	hour, whiche	ever is gro	eater
Operating 5	peea:		4	5 (Propose	ea Design Speea)	1							
Traffic Data:				YEAR	PM PEAK	%TRUCK	PEAK	CARS	мт	нт	CARS/2	MT/2	HT/2
								1	3.6%	1.7%			
				2040			671	635	24	11	318	12	6

					NOISE DA	ATA WORKS	SHEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Nati	onal Airpo	rt Access	(F)								
Roadway Re	eference:	Area 1											
County:	Benton												
Design Year	:	2040											
Year(s) To E	Be Modeled:	2040											
Roadway Cr	oss-Sections	5:		37.	5' each side of center	, Total 75'							
			4-11	' lanes, 2-	4' Inner & Outer Shld	rs, 15' Grass M	edian	Note:	DHV = (Al	DT)(K)	K - Percent	ADT in de	esign hour
									DDHV = (A)	ADT)(K)(D)	D - Direction	nal Distrib	oution
			2040	Partial N	New Location	Area	1	_	PEAK = A	M/PM Peak	hour, whiche	ever is gro	eater
Operating S	peed:		4	o (Propose	ed Design Speed)]						
Traffic Data:				YEAR	PM PEAK	%TRUCK	PEAK	CARS	МТ	НТ	CARS/2	MT/2	HT/2
						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			3.6%	1.7%			····-
	1			2040			2654	2513	96	45	1257	48	23

					NOISE DA	TA WORKS	SHEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Nati	onal Airpo	rt Access	(F)	1							
	-												
Roadway Re	eterence:	Area 5		1	1								
O assessments as	Deuteur		-										
County:	Benion	1											
Design Year	•	2040	1										
200.g.1 104.	-												
Year(s) To E	Be Modeled:	2040											
Boodwoy Cr	and Santiana			27	5' analysida of contar	Total 75'							
Roauway Ci	055-Sections		1_11	37. ' Janes 2	1' Inner & Outer Shidi	, Total 75	odian	Note:		דר)(א)	K Percent		esian hour
			4-11	iai 165, 2-		13, 13 Glass W	eulan	Note.	DHV = (A)	או)(דר) 1001)(או)	D - Direction	al Distrib	ution
			2040	Partial N	lew Location	Δrea	5	1	PEAK = A	M/PM Peak	bour which	ver is an	eater
Operating S	peed:		45	6 (Propose	ed Design Speed)			_					
operating e	pood				su Boolgii opoou)								
Traffic Data:				YEAR	PM PEAK	%TRUCK	PEAK	CARS	MT	HT	CARS/2	MT/2	HT/2
									2%	1%			
				2040			1269	1231	25	13	615	13	6

					NOISE DA	ATA WORKS	SHEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Natio	onal Airpo	rt Access	(F)								
Roadway R	eference:	Area 8											
County:	Benton												
Design Year	•	2040]										
Year(s) To E	Be Modeled:	2040			New Alignment - Ex	risting dBA =							
					52.2. 53.7. 55.1 (sho	ort term							
					readings along Cold	onel Myers							
					Rd) Average is 53.6								
					increase is 63.6.	,							
37.5' each side of c Roadway Cross-Sections: 4-11' lanes, 2-4' Inner & Outer						, Total 75'							
Roadway C	ross-Sections	:	4-11	lanes, 2	-4' Inner & Outer Shldi	rs, 15' Grass M	edian	Note:	DHV = (A	DT)(K)	K - Percent	ADT in de	esign hour
									DDHV = (ADT)(K)(D)	D - Direction	nal Distrib	oution
			2040	Partial I	New Location	Area	8		PEAK = A	M/PM Peak	hour, which	ever is gro	eater
Operating S	peed:		4	5 (Propos	ed Design Speed)	1							
Traffic Data	:			YEAR	PM PEAK	%TRUCK	PEAK	CARS	МТ	НТ	CARS/2	MT/2	HT/2
									3.6%	1.7%			
				2040			1120	1061	40	19	530	20	10

					NOISE DA	TA WORKS	SHEET						
Job No:	090069												
Job Name:	Northwest Ar	kansas Nati	onal Airpo	rt Access	(F)								
Roadway R	eference:	Area 9											
County:	Benton	·											
			1										
Design Year	r:	2040											
Veer(e) Te l	Be Medeled:	2040			Now Alignment Ex	iating dDA -							
rear(s) 101	42.3. 53.4. 51.5. 49.7. 52.3												
					42.3, 53.4, 51.5, 49.7								
					Short term reading	S along Boode)							
					Average is 51.0 co								
					Average is 51.0, 50	IU UBA							
					increase is or.								
				42	oneh side of conter	Total 120'							
Boodwov C	roce Sections		1 1	42 2' lance 6	(10' Innor/Outor Shidr	10tal 120	odion	Noto:			K Porcont		ocian hour
Roauway C	1055-300000		4-14			5, 40 GIASS IV	Sulan	Note.			D Direction	ADT III ui	ution
			2040	Now Ali	anmont Altornativo	Aroa	0			M/DM Dool	D - Direction	vorie ar	aator
Operating S	Spood:		2040	(Propos	ed Design Speed)	Alea	9		FEAR - A			evenis gr	ealei
Operating a	speeu.				eu Design Speeu)								
Traffic Data	:			YEAR	PM PEAK	%TRUCK	PEAK	CARS	MT	HT	CARS/2	MT/2	HT/2
									3.6%	1.7%			
				2040			1760	1667	63	30	833	32	15

TNM SOUND LEVEL MODEL OUTPUTS

ARDOT APK/MBI

RESULTS: SOUND LEVELS

11 March 2020 **TNM 2.5** Calculated with TNM 2.5

PROJECT/CONTRACT: 090069 RUN: Ex Area 1 SR112; SR612-Wagon BARRIER DESIGN: INPUT HEIGHTS Average pavement type shall be used unless a State highway agency substantiates the use ATMOSPHERICS: 68 deg F, 50% RH of a different type with approval of FHWA. Receiver Name No. #DUs Existing No Barrier With Barrier LAeq1h LAeq1h Increase over existing Type Calculated Noise Reduction Calculated Crit'n Calculated Crit'n Impact LAeq1h Calculated Goal Calculated Sub'l Inc minus Goal dBA dBA dBA dB dB dBA dB dB dB 25' from centerline 0.0 73.3 66 73.3 10 Snd Lvl 73.3 0.0 8 -8.0) 1 1 50 2 0.0 69.9 66 69.9 10 Snd Lvl 69.9 0.0 8 -8.0) 75 0.0 67.9 66 67.9 10 Snd Lvl 67.9 0.0 8 -8.0) ¹⁰⁰ Say 115' 66.5 10 Snd Lvl 66.5 0.0 -8.0) 0.0 66.5 66 8 4 1 125 5 0.0 65.3 66 65.3 10 65.3 0.0 -8.0) 8 1 150 0.0 63.3 66 63.3 10 63.3 0.0 8 -8.0) 6 175 7 0.0 61.5 66 61.5 10 _ 61.5 0.0 8 -8.0) 1 200 8 0.0 59.9 66 59.9 10 59.9 0.0 8 -8.01 1 ____ 225 10 0.0 58.5 66 58.5 10 58.5 0.0 8 -8.01 1 250 11 0.0 57.3 66 57.3 10 57.3 0.0 -8.01 1 ____ 8 ____ 275 12 1 0.0 56.2 66 56.2 10 56.2 0.0 8 -8.01 300 13 1 0.0 55.2 66 55.2 10 _ 55.2 0.0 8 -8.01 325 14 1 0.0 54.3 66 54.3 10 _ 54.3 0.0 8 -8.01 350 15 1 0.0 53.5 66 53.5 10 _ 53.5 0.0 8 -8.0) 375 16 0.0 52.7 66 52.7 10 52.7 0.0 8 -8.0) 400 17 0.0 52.0 66 52.0 10 52.0 0.0 8 -8.0) 1 425 18 0.0 51.4 66 51.4 10 _ 51.4 0.0 8 -8.0) 450 19 0.0 50.8 66 50.8 10 50.8 0.0 8 -8.0) 475 21 0.0 50.2 66 50.2 10 50.2 0.0 -8.0) 8 500 22 49.6 49.6 49.6 -8.0) 0.0 66 10 0.0 8 Dwelling Units #DUs Noise Reduction Min A∨g Max dB dB dB All Selected 20 0.0 0.0 0.0 All Impacted 4 0.0 0.0 0.0 All that meet NR Goal 0 0.0 0.0 0.0

ARDOT APK/NBI

T BI 11 March 2020 TNM 2.5 Calculated with TNM 2.5

 RESULTS: SOUND LEVELS

 PROJECT/CONTRACT:
 090069

 RUN:
 E× Area 2 SR112; Wagon-SR264

 BARRIER DESIGN:
 INPUT HEIGHTS

 ATMOSPHERICS:
 68 deg F, 50% RH

 Receiver
 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Name	No.	#DUs	Existing LAeq1h	No Barrier With Barrier											
				LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction				
	-			Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal			
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB			
25' from centerline	1	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0			
50	2	! 1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0			
75	3	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0			
100 Con 115	4	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0			
125 Say 115	5	i 1	0.0	65.2	66	65.2	10	—	65.2	0.0	8	-8.0			
150	6	1	0.0	63.2	66	63.2	10	—	63.2	0.0	8	-8.0			
175	7	' 1	0.0	61.4	66	61.4	10	-	61.4	0.0	8	-8.0			
200	8	1	0.0	59.8	66	59.8	10	—	59.8	0.0	8	-8.0			
225	10	1	0.0	58.4	66	58.4	10	—	58.4	0.0	8	-8.0			
250	11	1	0.0	57.2	66	57.2	10	—	57.2	0.0	8	-8.0			
275	12	! 1	0.0	56.1	66	56.1	10	—	56.1	0.0	8	-8.0			
300	13	1	0.0	55.1	66	55.1	10	_	55.1	0.0	8	-8.0			
325	14	1	0.0	54.2	66	54.2	10	—	54.2	0.0	8	-8.0			
350	15	i 1	0.0	53.4	66	53.4	10	-	53.4	0.0	8	-8.0			
375	16	i 1	0.0	52.6	66	52.6	10	_	52.6	0.0	8	-8.0			
400	17	' 1	0.0	51.9	66	51.9	10	—	51.9	0.0	8	-8.0			
425	18	1	0.0	51.3	66	51.3	10	—	51.3	0.0	8	-8.0			
450	19	1	0.0	50.7	66	50.7	10	—	50.7	0.0	8	-8.0			
475	21	1	0.0	50.1	66	50.1	10	-	50.1	0.0	8	-8.0			
500	22	: 1	0.0	49.6	66	49.6	10	—	49.6	0.0	8	-8.0			
Dwelling Units		# DUs	Noise Re	duction											
			Min	A∨g	Max										
			dB	dB	dB										

		dB	dB	dB
All Selected	20	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0

11 March 2020

Calculated with TNM 2.5

TNM 2.5

ARDOT APK/MBI

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN:

BARRIER DESIGN:

ATMOSPHERICS:

090069 Ex Area 3 SR112; SR264-SR264 INPUT HEIGHTS

68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Name	No	#DHe	Evicting	No Barrier					With Barrie			
Name	NU.	#005	LAIsung					Tuna	Coloulated	Notes Dedu		
			LACTI	Calculated	Crit'n	Calculated	r existing Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
25' from centerline	1	1	0.0	71.8	66	71.8	10	Snd Lvl	71.8	0.0	1	3 -8.0
50	2	1	0.0	N 83	66	68.4	10	Snd Lvl	68.4	0.0	1	3 -8.0
75 0 001	3	1	0.0	66.5	66	66.5	10	Snd Lyl	66.5	0.0		3 -8.0
100 Say 80	4	1	0.0	65.0	66	65.0	10	_	65.0	0.0		3 -8.0
105	- 5	•	0.0	00.0	66	63.8	10	_	63.8	0.0		3 -8.0
150	6	1	0.0	61.9	66	61.9	10	_	61.9	0.0	1	3 -8.0
175	7	1	0.0	60.1	66	60.1	10	_	60.1	0.0	1	3 -8.0
200	8	1	0.0	58.6	66	58.6	10	_	58.6	0.0	1	3 -8.0
225	10	1	0.0	57.3	66	57.3	10	-	57.3	0.0	1	3 -8.0
250	11	1	0.0	56.1	66	56.1	10	_	56.1	0.0	1	3 -8.0
275	12	1	0.0	55.1	66	55.1	10	_	55.1	0.0	1	3 -8.0
300	13	1	0.0	54.1	66	54.1	10	_	54.1	0.0	1	3 -8.0
325	14	1	0.0	53.3	66	53.3	10	_	53.3	0.0	1	3 -8.0
350	15	1	0.0	52.5	66	52.5	10	—	52.5	0.0		3 -8.0
375	16	1	0.0	51.8	66	51.8	10	_	51.8	0.0		3 -8.0
400	17	1	0.0	51.2	66	51.2	10	_	51.2	0.0		3 -8.0
425	18	1	0.0	50.6	66	50.6	10	_	50.6	0.0	1	3 -8.0
450	19	1	0.0	50.0	66	50.0	10	-	50.0	0.0	1	3 -8.0
475	21	1	0.0	49.5	66	49.5	10	_	49.5	0.0		3 -8.0
500	22	1	0.0	49.0	66	49.0	10	—	49.0	0.0	1	3 -8.0
Dwelling Units		# DUs	Noise Re	duction								
			Min	A∨g	Max							
			dB	dB	dB							
All Selected		20	0.0	0.0	0.0							
All Impacted		3	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

ARDOT APK/MBI

TNM 2.5 Calculated with TNM 2.5

18 March 2020

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

ATMOSPHERICS:

Ex Area 4 SR264; SR112-Mill INPUT HEIGHTS

68 deg F, 50% RH

090069

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Name	No.	#DUs	Existing LAeq1h	No Barrier With Barrier											
				LAeg1h	LAeg1h		r existing	Туре	Calculated	Noise Redu	ction				
25' from centerline 50 75 Say 85' 100 125 150 175 200 225 250 275 300 325 350 375 400				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal			
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB			
25' from centerline	1	1	0.0	72.0	66	72.0	10	Snd Lyl	72.0	0.0	8	- 8.0			
50	2	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0			
75 Sav 85'	3	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0			
100	4	1	0.0	65.2	66	65.2	10	_	65.2	0.0	8	-8.0			
125	5	1	0.0	64.0	66	64.0	10	—	64.0	0.0	8	-8.0			
150	6	1	0.0	62.0	66	62.0	10	—	62.0	0.0	8	-8.0			
175	7	1	0.0	60.1	66	60.1	10	—	60.1	0.0	8	-8.0			
200	8	1	0.0	58.5	66	58.5	10	-	58.5	0.0	8	-8.0			
225	10	1	0.0	57.1	66	57.1	10	—	57.1	0.0	8	-8.0			
250	11	1	0.0	55.8	66	55.8	10	—	55.8	0.0	8	-8.0			
275	12	1	0.0	54.7	66	54.7	10	-	54.7	0.0	8	-8.0			
300	13	1	0.0	53.6	66	53.6	10	_	53.6	0.0	8	-8.0			
325	14	1	0.0	52.7	66	52.7	10	—	52.7	0.0	8	-8.0			
350	15	1	0.0	51.8	66	51.8	10	—	51.8	0.0	8	-8.0			
375	16	1	0.0	51.0	66	51.0	10	_	51.0	0.0	8	-8.0			
400	17	1	0.0	50.3	66	50.3	10	_	50.3	0.0	8	-8.0			
425	18	1	0.0	49.6	66	49.6	10	—	49.6	0.0	8	-8.0			
450	19	1	0.0	49.0	66	49.0	10	—	49.0	0.0	8	-8.0			
475	21	1	0.0	48.4	66	48.4	10	_	48.4	0.0	8	-8.0			
500	22	1	0.0	47.8	66	47.8	10	_	47.8	0.0	8	-8.0			

ARDOT APK/MBI							18 March TNM 2.5 Calculate	2020 d with TNI	vi 2.5			
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		090069)									
RUN:		Ex Are:	a 5 SR264	; Mill-Airport								
BARRIER DESIGN:		INPUT	HEIGHTS					A∨erage a State hi	pavement typ ighway agen	pe shall be u cy substantia	sed unles ites the us	s se
ATMOSPHERICS:		68 deg	g F, 50% R	Н				of a diffe	rent type with	approval of	FHWA.	
Receiver												
Name	No. #DUs		Existing	No Barrier	No Barrier					r		
			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
25' from centerline	1	1	0.0	71.7	66	71.7	10	Snd Lvl	71.7	0.0	8	-8.0
50	2	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
75	3	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
100	4	1	0.0	65.0	66	65.0	10	—	65.0	0.0	8	-8.0
125	5	1	0.0	63.8	66	63.8	10	_	63.8	0.0	8	-8.0
150	6	1	0.0	61.8	66	61.8	10	—	61.8	0.0	8	-8.0
175	7	1	0.0	59.9	66	59.9	10	—	59.9	0.0	8	-8.0
200	8	1	0.0	58.3	66	58.3	10	_	58.3	0.0	8	-8.0
225	10	1	0.0	56.8	66	56.8	10	-	56.8	0.0	8	-8.0
250	11	1	0.0	55.6	66	55.6	10	_	55.6	0.0	8	-8.0
275	12	1	0.0	54.4	66	54.4	10	—	54.4	0.0	8	-8.0
300	13	1	0.0	53.4	66	53.4	10	—	53.4	0.0	8	-8.0
325	14	1	0.0	52.4	66	52.4	10	-	52.4	0.0	8	-8.0
350	15	1	0.0	51.6	66	51.6	10	_	51.6	0.0	8	
375	16	1	0.0	50.8	66	50.8	10	_	50.8	0.0	8	-8.0
400	17	1	0.0	50.0	66	50.0	10	-	50.0	0.0	8	-8.0
425	18	1	0.0	49.4	66	49.4	10	_	49.4	0.0	8	-8.0
450	19	1	0.0	48.7	66	48.7	10	_	48.7	0.0	8	-8.0
475	21	1	0.0	48.1	66	48.1	10	_	48.1	0.0	8	-8.0
500	22	1	0.0	47.6	66	47.6	10	_	47.6	0.0	8	8.0
Dwelling Units		# DUs	Noise Re	duction								
			Min	Ava	Max							
21 September 2020

Calculated with TNM 2.5

TNM 2.5

ARDOT APK/MBI

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

ATMOSPHERICS:

090069 No-Act Area 1 SR112; SR612-Wagon INPUT HEIGHTS

68 deg F, 50% RH

Receiver												
Name	No. #DUs Existin								With Barrier	r		
			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
25' from centerline	1	1	0.0	76.6	66	76.6	10	Snd Lvl	76.6	0.0	8	-8.0
50	2	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0
75	3	1	0.0	71.3	66	71.3	10	Snd Lvl	71.3	0.0	8	-8.0
100	4	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
125	Б	1	0.0	68.7	<u>aa</u>	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
¹⁵⁰ Sov 160'	6	1	0.0	66.7	66	66.7	10	Snd Lyl	66.7	0.0	8	-8.0
175 Say 100	7	1	0.0	64.8	66	64.8	10		64.8	0.0	8	-8.0
200	8		0.0	სქ.ქ	bb	63.3	10	-	63.3	0.0	8	-8.0
225	10	1	0.0	61.9	66	61.9	10	-	61.9	0.0	8	-8.0
250	11	1	0.0	60.7	66	60.7	10	—	60.7	0.0	8	-8.0
275	12	1	0.0	59.6	66	59.6	10	-	59.6	0.0	8	-8.0
300	13	1	0.0	58.6	66	58.6	10	-	58.6	0.0	8	-8.0
325	14	1	0.0	57.7	66	57.7	10	-	57.7	0.0	8	-8.0
350	15	1	0.0	56.8	66	56.8	10		56.8	0.0	8	-8.0
375	16	1	0.0	56.1	66	56.1	10	-	56.1	0.0	8	-8.0
400	17	1	0.0	55.4	66	55.4	10		55.4	0.0	8	-8.0
425	18	1	0.0	54.7	66	54.7	10	—	54.7	0.0	8	-8.0
450	19	1	0.0	54.1	66	54.1	10	_	54.1	0.0	8	-8.0
475	21	1	0.0	53.6	66	53.6	10		53.6	0.0	8	-8.0
500	22	1	0.0	53.0	66	53.0	10	-	53.0	0.0	8	-8.0

21 September 2020

Calculated with TNM 2.5

TNM 2.5

ARDOT APK/NBI

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

ATMOSPHERICS:

090069 No-Act Area 2 SR112; Wagon-SR264 INPUT HEIGHTS

68 deg F, 50% RH

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrie			
]			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
25' from centerline	1	1	0.0	76.5	66	76.5	10	Snd Lvl	76.5	0.0	8	-8.0
50	2	1	0.0	73.1	66	73.1	10	Snd Lvl	73.1	0.0	8	-8.0
75	3	1	0.0	71.1	66	71.1	10	Snd Lvl	71.1	0.0	8	-8.0
100	4	1	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
125	Б	1	0.0	68.5	<u> </u>	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
¹⁵⁰ Sov 160'	6	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
175 Say 100	7	1	0.0	64.7	66	64.7	10	—	64.7	0.0	8	-8.0
200	ð	I	0.0	b3.I	bb	63.1	10	—	63.1	0.0	8	-8.0
225	10	1	0.0	61.7	66	61.7	10	—	61.7	0.0	8	-8.0
250	11	1	0.0	60.5	66	60.5	10		60.5	0.0	8	; -8.0
275	12	1	0.0	59.4	66	59.4	10	—	59.4	0.0	8	-8.0
300	13	1	0.0	58.4	66	58.4	10		58.4	0.0	8	-8.0
325	14	1	0.0	57.5	66	57.5	10	—	57.5	0.0	8	-8.0
350	15	1	0.0	56.7	66	56.7	10		56.7	0.0	8	-8.0
375	16	1	0.0	55.9	66	55.9	10	—	55.9	0.0	8	-8.0
400	17	1	0.0	55.2	66	55.2	10	—	55.2	0.0	8	-8.0
425	18	1	0.0	54.6	66	54.6	10		54.6	0.0	8	-8.0
450	19	1	0.0	54.0	66	54.0	10		54.0	0.0	8	-8.0
475	21	1	0.0	53.4	66	53.4	10	—	53.4	0.0	6	-8.0
500	22	1	0.0	52.9	66	52.9	10	_	52.9	0.0	8	-8.0

21 September 2020 TNM 2.5 Calculated with TNM 2.5

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

ATMOSPHERICS:

090069 No-Act Area 3 SR112; SR264-SR264 INPUT HEIGHTS

68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	#DUs Existing No Barrier With Barrier									
			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
25' from centerline	1	1	0.0	75.1	66	75.1	10	Snd Lvl	75.1	0.0	8	-8.0
50	2	1	0.0	71.7	66	71.7	10	Snd Lvl	71.7	0.0	8	-8.0
75	3	1	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
100		1	0.0	68 3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
125 Cov 4 4	C1 5	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
<u>150</u> Say 14	-O	1	0.0	65.2	66	65.2	10	—	65.2	0.0	8	-8.0
175	1		0.0	b3.4	66	63.4	10	_	63.4	0.0	8	-8.0
200	8	1	0.0	61.9	66	61.9	10	—	61.9	0.0	8	-8.0
225	10	1	0.0	60.6	66	60.6	10	—	60.6	0.0	8	-8.0
250	11	1	0.0	59.4	66	59.4	10	—	59.4	0.0	8	-8.0
275	12	1	0.0	58.3	66	58.3	10	_	58.3	0.0	8	-8.0
300	13	1	0.0	57.4	66	57.4	10	—	57.4	0.0	8	-8.0
325	14	1	0.0	56.6	66	56.6	10	—	56.6	0.0	8	-8.0
350	15	1	0.0	55.8	66	55.8	10	—	55.8	0.0	8	-8.0
375	16	1	0.0	55.1	66	55.1	10	_	55.1	0.0	8	-8.0
400	17	1	0.0	54.4	66	54.4	10	—	54.4	0.0	8	-8.0
425	18	1	0.0	53.8	66	53.8	10	—	53.8	0.0	8	-8.0
450	19	1	0.0	53.3	66	53.3	10		53.3	0.0	8	-8.0
475	21	1	0.0	52.8	66	52.8	10	_	52.8	0.0	8	-8.0
500	22	1	0.0	52.3	66	52.3	10	-	52.3	0.0	8	-8.0

ARDOT APK/MBI

21 September 2020 TNM 2.5 Calculated with TNM 2.5

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

ATMOSPHERICS:

090069 No Act Area 4 SR264; SR112-Mill INPUT HEIGHTS

68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrie	r		
			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
25' from centerline	1	1	0.0	75.4	66	75.4	10	Snd Lvl	75.4	0.0	8	-8.0
50	2	: 1	0.0	72.1	66	72.1	10	Snd Lyl	72.1	0.0	8	-8.0
75	3	1	0.0	70.1	66	70.1	10	Snd Lyl	70.1	0.0	8	-8.0
100	4	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
125	5	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
150	6	1	0.0	65.5	66	65.5	10	—	65.5	0.0	8	-8.0
175	- ,	-	0.0	0.0	00	0 <i>3</i> .b	10	_	63.6	0.0	8	-8.0
200	8	1	0.0	62.0	66	62.0	10	_	62.0	0.0	8	-8.0
225	10	1	0.0	60.6	66	60.6	10	_	60.6	0.0	8	-8.0
250	11	1	0.0	59.4	66	59.4	10	_	59.4	0.0	8	-8.0
275	12	: 1	0.0	58.2	66	58.2	10	—	58.2	0.0	8	-8.0
300	13	1	0.0	57.2	66	57.2	10		57.2	0.0	8	-8.0
325	14	1	0.0	56.3	66	56.3	10	—	56.3	0.0	8	-8.0
350	15	i 1	0.0	55.4	66	55.4	10	_	55.4	0.0	8	-8.0
375	16	i 1	0.0	54.7	66	54.7	10	—	54.7	0.0	8	-8.0
400	17	1	0.0	53.9	66	53.9	10	_	53.9	0.0	8	-8.0
425	18	1	0.0	53.3	66	53.3	10	—	53.3	0.0	8	-8.0
450	19	1	0.0	52.7	66	52.7	10	—	52.7	0.0	8	-8.0
475	21	1	0.0	52.1	66	52.1	10	_	52.1	0.0	8	-8.0
500	22	1	0.0	51.5	66	51.5	10	_	51.5	0.0	8	-8.0

ARDOT APK/MBI

21 September 2020 TNM 2.5 Calculated with TNM 2.5

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

ATMOSPHERICS:

090069 No-Act Area 5 SR264; Mill-Airport INPUT HEIGHTS

68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrie			
			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
25' from centerline	1	1	0.0	74.8	66	74.8	10	Snd Lvl	74.8	0.0	8	-8.0
50	2	1	0.0	71.4	66	71.4	10	Snd Lvl	71.4	0.0	8	-8.0
75	3	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
1 <u>00</u>		1	0.0	68.0	66	<u>68.0</u>	10	Snd Lvl	68.0	0.0	8	-8.0
125 Sov 140'	5	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
150 Say 140	6	1	0.0	64.8	66	64.8	10		64.8	0.0	8	-8.0
175	,	1	0.0	03.0	00	63.0	10	—	63.0	0.0	8	-8.0
200	8	1	0.0	61.4	66	61.4	10	—	61.4	0.0	8	-8.0
225	10	1	0.0	60.0	66	60.0	10	—	60.0	0.0	8	-8.0
250	11	1	0.0	58.7	66	58.7	10	_	58.7	0.0	8	-8.0
275	12	1	0.0	57.6	66	57.6	10		57.6	0.0	8	-8.0
300	13	1	0.0	56.6	66	56.6	10	_	56.6	0.0	8	-8.0
325	14	1	0.0	55.7	66	55.7	10		55.7	0.0	8	-8.0
350	15	1	0.0	54.8	66	54.8	10		54.8	0.0	8	-8.0
375	16	1	0.0	54.0	66	54.0	10	_	54.0	0.0	8	-8.0
400	17	1	0.0	53.3	66	53.3	10	_	53.3	0.0	8	-8.0
425	18	1	0.0	52.7	66	52.7	10	_	52.7	0.0	8	-8.0
450	19	1	0.0	52.0	66	52.0	10	_	52.0	0.0	8	-8.0
475	21	1	0.0	51.5	66	51.5	10	_	51.5	0.0	8	-8.0
500	22	1	0.0	50.9	66	50.9	10	—	50.9	0.0	8	-8.0

ARDOT APK/MBI

11 March 2020 TNM 2.5 Calculated with TNM 2.5

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RESULTS: SOUND LEVELS PROJECT/CONTRACT: 090069 RUN: BARRIER DESIGN: IEA Area 1 INPUT HEIGHTS Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA. ATMOSPHERICS: 68 deg F, 50% RH

ARDOT

APK/MBI

Receiver

Name	No.	#DUs	Existing	No Barrier					With Barrie	ſ		
			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
	1						Sub'l Inc					minus
	i i											Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
50	3	1	0.0	73.3	66	73.3	10	Snd Lvl	73.3	0.0	8	-8.0
75	4	1	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
100	5	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
125	6	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
150	7	1	0.0	65.7	66	65.7	10	—	65.7	0.0	8	-8.0
175 Sov 100'	8	1	0.0	63.8	66	63.8	10	_	63.8	0.0	8	-8.0
200 Say 190	10	1	0.0	62.2	66	62.2	10		62.2	0.0	8	-8.0
225	11	1	0.0	60.9	66	60.9	10		60.9	0.0	8	-8.0
250	12	1	0.0	60.0	66	60.0	10	-	60.0	0.0	8	-8.0
275	13	1	0.0	59.3	66	59.3	10	-	59.3	0.0	8	-8.0
300	14	1	0.0	58.7	66	58.7	10	-	58.7	0.0	8	-8.0
325	15	1	0.0	58.1	66	58.1	10	-	58.1	0.0	8	-8.0
350	16	1	0.0	57.6	66	57.6	10	-	57.6	0.0	8	-8.0
375	17	1	0.0	57.2	66	57.2	10	-	57.2	0.0	8	-8.0
400	18	1	0.0	56.8	66	56.8	10	-	56.8	0.0	8	-8.0
425	19	1	0.0	56.4	66	56.4	10	-	56.4	0.0	8	-8.0
450	21	1	0.0	56.1	66	56.1	10	-	56.1	0.0	8	-8.0
475	22	1	0.0	55.5	66	55.5	10	-	55.5	0.0	8	-8.0
500	24	1	0.0	54.9	66	54.9	10		54.9	0.0	8	-8.0
Dwelling Units		# DUs	Noise Re	duction								
			Min	A∨g	Max							
			dB	dB	dB							
All Selected		19	0.0	0.0	0.0							
All Impacted		4	0.0	0.0	0.0							
All that meet NB Goal		n	N.N	N.N	N.N							

11 March 2020 TNM 2.5 Calculated with TNM 2.5

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Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

090069 IEA Area 2 INPUT HEIGHTS

ATMOSPHERICS:		68 deç	j F, 50% R	0% RH of a different type with approval of FHWA.								
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrie	r		
			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
50	3	1	0.0	73.1	66	73.1	10	Snd Lvl	73.1	0.0	8	-8.0
75	4	1	0.0	70.4	66	70.4	10	Snd Lvl	70.4	0.0	8	-8.0
100	5	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
125	6	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
150	7	1	0.0	65.5	66	65.5	10		65.5	0.0	8	-8.0
175 Say 100'	8	1	0.0	63.6	66	63.6	10	_	63.6	0.0	8	-8.0
200 Say 190	10	1	0.0	62.0	66	62.0	10	_	62.0	0.0	8	-8.0
225	11	1	0.0	60.7	66	60.7	10	_	60.7	0.0	8	-8.0
250	12	1	0.0	59.8	66	59.8	10	_	59.8	0.0	8	-8.0
275	13	1	0.0	59.1	66	59.1	10	_	59.1	0.0	8	-8.0
300	14	1	0.0	58.5	66	58.5	10		58.5	0.0	8	-8.0
325	15	1	0.0	57.9	66	57.9	10		57.9	0.0	8	-8.0
350	16	1	0.0	57.4	66	57.4	10	_	57.4	0.0	8	-8.0
375	17	1	0.0	57.0	66	57.0	10	_	57.0	0.0	8	-8.0
400	18	1	0.0	56.6	66	56.6	10	_	56.6	0.0	8	-8.0
425	19	1	0.0	56.2	66	56.2	10	_	56.2	0.0	8	-8.0
450	21	1	0.0	55.9	66	55.9	10	_	55.9	0.0	8	-8.0
475	22	1	0.0	55.3	66	55.3	10	_	55.3	0.0	8	-8.0
500	24	1	0.0	54.7	66	54.7	10	—	54.7	0.0	8	-8.0
Dwelling Units		# DUs	Noise Re	eduction								
-			Min	Avg	Max							
			10	10	10							

		Min	Avg	Max
		dB	dB	dB
All Selected	19	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	Λ	0.0	N.N	N.N

RESULTS: SOUND LEVELS PROJECT/CONTRACT:

ATMOSPHERICS:

RUN: BARRIER DESIGN: 090069 IEA Area 4 INPUT HEIGHTS 68 deg F, 50% RH

11 March 2020 TNM 2.5 Calculated with TNM 2.5

> Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Name	No.	#DUs	Existing	No Barrier					With Barrie	r		
			LAeg1h	LAeg1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
50	3	1	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0		8 -8.0
75	4	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0		8 -8.0
100	5	1	0.0	65.8	66	65.8	10	—	65.8	0.0		8 -8.0
125 Sav 145'	b	I	U.U	64. I	60	64.1	10		64.1	0.0	I	8 -8.0
150 Cay 145	7	1	0.0	62.5	66	62.5	10		62.5	0.0	I	8 -8.0
175	8	1	U.U	60.5	66	60.5	10		60.5	0.0	I	8 -8.0
200	10	1	0.0	58.9	66	58.9	10		58.9	0.0	I	8 -8.0
225	11	1	0.0	57.6	66	57.6	10		57.6	0.0	I	8 -8.0
250	12	1	0.0	56.7	66	56.7	10	-	56.7	0.0		8 -8.0
275	13	1	0.0	56.0	66	56.0	10		56.0	0.0	I	8 -8.0
300	14	1	0.0	55.3	66	55.3	10		55.3	0.0		8 -8.0
325	15	1	0.0	54.8	66	54.8	10		54.8	0.0		8 -8.0
350	16	1	0.0	54.3	66	54.3	10		54.3	0.0		8 -8.0
375	17	1	0.0	53.9	66	53.9	10		53.9	0.0		8 -8.0
400	18	1	0.0	53.5	66	53.5	10		53.5	0.0		8 -8.0
425	19	1	0.0	53.1	66	53.1	10		53.1	0.0		8 -8.0
450	21	1	0.0	52.8	66	52.8	10		52.8	0.0		8 -8.0
475	22	1	0.0	52.2	66	52.2	10		52.2	0.0		8 -8.0
500	24	1	0.0	51.6	66	51.6	10		51.6	0.0		8 -8.0
Dwelling Units		# DUs	Noise Re	duction								
			Min	A∨g	Max							
			dB	dB	dB							
All Selected		19	0.0	0.0	0.0							
All Impacted		2	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

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54.3

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53.3

52.9

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52.2 51.7

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ARDOT APK/MBI

Say 140'

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175

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225

250

275 300

325

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11 March 2020 TNM 2.5

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							Calculate	d with TNM	12.5			
RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN: ATMOSPHERICS:		090069 IEA Are INPUT 68 deg	9 :a 5 ' HEIGHTS g F, 50% R	H				Average a State hi of a differ	avement typ ghway agen ent type with	e shall be u cy substantia approval of	sed unles ates the us FHWA.	6 3 C
Receiver Name	No	#DUo	Eviating	No Parrier					With Parrie			
Name	NU.	#DUS	Existing	NU Daniel				-	With Dame		-	1
			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
50	3	1	0.0	69.6	66	69.6	10	Snd Lvl	69.6	0.0	8	-8.0
76		1	0.0	CC 0	CC	CC 0	10	Codia	CC 0	0.0	8	-8.0
100	5	1	0.0	65.2	66	65.2	10	—	65.2	0.0	8	-8.0
125 Say 140'	6	1	U.U	63.6	66	63.6	10		63.6	0.0	8	-8.0

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61.9

60.0

58.4

57.1

56.2

55.4

54.8

54.3

53.8

53.3

52.9

100	10		0.0	52.5		
425	19	1	0.0	52.6	61	6
450	21	1	0.0	52.2	61	6
475	22	1	0.0	51.7	61	6
500	24	1	0.0	51.0	61	6
Dwelling Units		# DUs	Noise Re	duction		
			Min	A∨g	Max	
			dB	dB	dB	
All Selected		19	dB 0.0	dB 0.0	dB 0.0	D
All Selected All Impacted		19 2	dB 0.0 0.0	dB 0.0 0.0	dB 0.0	D D

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ARDOT APK/MBI

ATMOSPHERICS:

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

090069 IEA Area 6-SR112 Byp South of SR264 INPUT HEIGHTS

68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

11 March 2020 TNM 2.5 Calculated with TNM 2.5

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrie	r		
			LAeq1h	LAeq1h		Increase ove	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
50	3	1	0.0	72.6	66	72.6	10	Snd Lvl	72.6	0.0	8	-8.01
75	4	1	0.0	70.0	66	70.0	10	Snd Lvl	70.0	0.0	8	-8.0)
100	5	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.01
125	6	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0)
150	7	1	0.0	65.0	66	65.0	10	—	65.0	0.0	8	-8.01
175	8	1	0.0	63.2	66	63.2	10	—	63.2	0.0	8	-8.0)
200	10	1	0.0	61.7	66	61.7	10	—	61.7	0.0	8	-8.01
225	11	1	0.0	60.4	66	60.4	10	—	60.4	0.0	8	-8.0)
250 53 is existing	12	1	0.0	59.6	66	59.6	10	—	59.6	0.0	8	-8.01
275 condition. 63 dBA is	13	1	0.0	58.8	66	58.8	10	—	58.8	0.0	8	-8.01
300 substantial impact	14	1	0.0	58.2	66	58.2	10	—	58.2	0.0	8	-8.01
³²⁵ criteria	15	1	0.0	57.7	66	57.7	10	—	57.7	0.0	8	-8.01
350 CHIENA.	16	1	0.0	57.2	66	57.2	10	—	57.2	0.0	8	-8.01
375	17	1	0.0	56.7	66	56.7	10	—	56.7	0.0	8	-8.01
400	18	1	0.0	56.3	66	56.3	10	—	56.3	0.0	8	-8.01
425	19	1	0.0	56.0	66	56.0	10	—	56.0	0.0	8	-8.01
450	21	1	0.0	55.6	66	55.6	10	—	55.6	0.0	8	-8.01
475	22	1	0.0	55.1	66	55.1	10	—	55.1	0.0	8	-8.01
500	24	1	0.0	54.5	66	54.5	10	-	54.5	0.0	8	-8.01
Dwelling Units		# DUs	Noise Re	duction								
			Min	A∨g	Max							
			dB	dB	dB							
All Selected		19	0.0	0.0	0.0							
All Impacted		4	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN:

BARRIER DESIGN:

ATMOSPHERICS:

090069 Partial New Location Area 1 INPUT HEIGHTS

68 deg F, 50% RH

11 March 2020 TNM 2.5 Calculated with TNM 2.5

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier With Barrier								
				LAeq1h		Increase over existing		Туре	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
75	4	1	0.0	70.6	66	70.6	10	Snd Lyl	70.6	0.0	6	-8.0
100	5	1	0.0	68.9	66	68.9	10	Snd Lyl	68.9	0.0	8	-8.0
125	6	1	0.0	67.3	66	67.3	10	Snd Lyl	67.3	0.0	8	-8.0
150	7	1	0.0	65.7	66	65.7	10		65.7	0.0	8	-8.0
175 Say 100'	8	1	0.0	63.8	66	63.8	10		63.8	0.0	8	-8.0
200 Say 190	10	1	0.0	62.2	66	62.2	10		62.2	0.0	8	-8.0
225	11	1	0.0	60.9	66	60.9	10	<u> </u>	60.9	0.0	8	-8.0
250	12	1	0.0	60.0	66	60.0	10	<u> </u>	60.0	0.0	8	-8.0
275	13	1	0.0	59.3	66	59.3	10	<u> </u>	59.3	0.0	8	-8.0
300	14	1	0.0	58.7	66	58.7	10	<u> </u>	58.7	0.0	8	-8.0
325	15	1	0.0	58.1	66	58.1	10	·	58.1	0.0	8	-8.0
350	16	1	0.0	57.6	66	57.6	10		57.6	0.0	8	-8.0
375	17	1	0.0	57.2	66	57.2	10		57.2	0.0	8	-8.0
400	18	1	0.0	56.8	66	56.8	10	-	56.8	0.0	8	-8.0
425	19	1	0.0	56.4	66	56.4	10	-	56.4	0.0	8	-8.0
450	21	1	0.0	56.1	66	56.1	10		56.1	0.0	8	-8.0
475	22	1	0.0	55.5	66	55.5	10		55.5	0.0	8	-8.0
500	24	1	0.0	54.9	66	54.9	10	<u> </u>	54.9	0.0	8	-8.0
Dwelling Units		#DUs	Noise Re	duction								
			Min	A∨g	Max							
			dB	dB	dB							
All Selected		18	0.0	0.0	0.0							
All Impacted		3	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

11 March 2020

Calculated with TNM 2.5

TNM 2.5

ARDOT APK/MBI

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

090069 Partial New Location Area 5 INPUT HEIGHTS

68 deg F, 50% RH

ATMOSPHERICS: Receiver

Name	No.	#DUs	Existing LAeq1h	No Barrier				With Barrier				
				LAeq1h		Increase over existing		Туре	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
75	4	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
100	5	1	0.0	66.3	66	66.3	10	Snd Lyl	66.3	0.0	8	-8.0
125	6	1	0.0	64.9	66	64.9	10	I —	64.9	0.0	8	-8.0
150	7	1	0.0	63.3	66	63.3	10	· —	63.3	0.0	8	-8.0
175	8	1	0.0	61.3	66	61.3	10	I —	61.3	0.0	8	-8.0
200	10	1	0.0	59.5	66	59.5	10	I —	59.5	0.0	8	-8.0
225	11	1	0.0	57.9	66	57.9	10	I —	57.9	0.0	8	-8.0
250	12	1	0.0	56.6	66	56.6	10	· —	56.6	0.0	8	-8.0
275	13	1	0.0	55.4	66	55.4	10	· —	55.4	0.0	8	-8.0
300	14	1	0.0	54.3	66	54.3	10	· —	54.3	0.0	8	-8.0
325	15	1	0.0	53.4	66	53.4	10	· —	53.4	0.0	8	-8.0
350	16	1	0.0	52.5	66	52.5	10	· —	52.5	0.0	8	-8.0
375	17	1	0.0	51.7	66	51.7	10	· —	51.7	0.0	8	-8.0
400	18	1	0.0	50.9	66	50.9	10	· —	50.9	0.0	8	-8.0
425	19	1	0.0	50.3	66	50.3	10	· —	50.3	0.0	8	-8.0
450	21	1	0.0	49.7	66	49.7	10	· —	49.7	0.0	8	-8.0
475	22	1	0.0	49.1	66	49.1	10	· —	49.1	0.0	8	-8.0
500	24	1	0.0	48.5	66	48.5	10	<u> </u>	48.5	0.0	8	-8.0
Dwelling Units		#DUs	Noise Re	duction								
			Min	A∨g	Max							
			dB	dB	dB							
All Selected		18	0.0	0.0	0.0							
All Impacted		2	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

11 March 2020 TNM 2.5 Calculated with TNM 2.5 | |

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH Receiver #DUs Existing No Barrier No. With Barrier Name LAeq1h LAeq1h Increase over existing Type Calculated Noise Reduction Calculated Crit'n Calculated Crit'n Impact LAeq1h Calculated Goal Calculated Sub'l Inc minus Goal dBA dBA dBA dB dB dBA dB dB dB 75 4 0.0 66.9 66 66.9 10 Snd Lvl 66.9 0.0 8 -8.0 100 5 0.0 65.2 66 65.2 10 65.2 0.0 8 -8.0 125 66 6 0.0 63.5 63.5 10 63.5 0.0 8 -8.0 1 Say 135' 150 61.9 10 _ 61.9 -8.0 7 0.0 61.9 66 0.0 8 1 60.0 60.0 10 60.0 -8.0 175 8 0.0 66 _ 0.0 8 53 dBA is existing 200 10 58.4 58.4 0.0 58.4 66 10 0.0 -8.0 1 8 condition. 63 dBA is 225 57.2 11 1 0.0 57.2 66 57.2 10 ____ 0.0 8 -8.0 substantial increase _ 250 12 0.0 56.3 66 56.3 10 56.3 0.0 8 -8.0 1 ____ criteria. 275 13 1 0.0 55.6 66 55.6 10 55.6 0.0 8 -8.0 300 14 1 0.0 54.9 66 54.9 10 54.9 0.0 8 -8.0 325 15 0.0 54.4 54.4 10 54.4 0.0 8 -8.0 1 66 350 16 0.0 53.9 66 53.9 10 _____ 53.9 0.0 8 -8.0 1 375 17 0.0 53.5 66 53.5 53.5 8 -8.0 10 0.0 1 400 53.1 18 0.0 53.1 66 53.1 0.0 -8.0 1 10 8 425 19 0.0 52.7 66 52.7 10 52.7 0.0 -8.0 8 _ 450 52.3 21 0.0 52.3 66 52.3 10 0.0 8 -8.0 1 475 22 0.0 51.8 66 51.8 10 51.8 0.0 8 -8.0 1 _ 500 24 0.0 51.2 66 51.2 10 51.2 0.0 8 -8.0 1 **Dwelling Units** # DUs Noise Reduction Min A∨g Max dB dB dB 0.0 All Selected 18 0.0 0.0 All Impacted 0.0 0.0 0.0 1 All that meet NR Goal 0 0.0 0.0 0.0

ARDOT

APK/MBI

RUN:

RESULTS: SOUND LEVELS PROJECT/CONTRACT:

BARRIER DESIGN:

090069

Partial New Loc Area 8

INPUT HEIGHTS

RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: BARRIER DESIGN:

090069 New Location Area 9 INPUT HEIGHTS

68 deg F, 50% RH

11 March 2020 TNM 2.5 Calculated with TNM 2.5

> Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver

ATMOSPHERICS:

Name		No.	#DUs	Existing LAeq1h	No Barrier				With Barrier				
					LAeq1h		Increase over existing		Туре	Calculated	Noise Reduction		
					Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
								Sub'l Inc					minus
													Goal
				dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
75		4	1	0.0	76.2	66	76.2	10	Snd Lvl	76.2	0.0	8	-8.0
100		5	1	0.0	73.8	66	73.8	10	Snd Lvl	73.8	0.0	8	-8.0
125		6	1	0.0	72.2	66	72.2	10	Snd Lvl	72.2	0.0	8	-8.0
150		7	1	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0
175		8	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
200	51 dBA is existing	10	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
225	condition. 61 dBA is	11	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
250	substantial increase	12	1	0.0	65.3	66	65.3	10	-	65.3	0.0	8	-8.0
275	criteria	13	1	0.0	64.0	66	64.0	10	-	64.0	0.0	8	-8.0
300	ontonia	14	1	0.0	62.8	66	62.8	10	-	62.8	0.0	8	-8.0
325		15	1	0.0	61.7	66	61.7	10	-	61.7	0.0	8	-8.0
350		16	1	0.0	60.7	66	60.7	10	-	60.7	0.0	8	-8.0
375		17	1	0.0	59.7	66	59.7	10		59.7	0.0	8	-8.0
400		18	1	0.0	58.9	66	58.9	10	-	58.9	0.0	8	-8.0
425		19	1	0.0	58.1	66	58.1	10		58.1	0.0	8	-8.0
450		21	1	0.0	57.4	66	57.4	10		57.4	0.0	8	-8.0
475		22	1	0.0	56.7	66	56.7	10		56.7	0.0	8	-8.0
500		24	1	0.0	56.4	66	56.4	10		56.4	0.0	8	-8.0
Dwelling Units			#DUs	Noise Re	duction								

		Min	A∨g	Max
		dB	dB	dB
All Selected	18	0.0	0.0	0.0
All Impacted	7	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix E: Noise Assessment - Page 49 of 71 **PROJECT LOCATION MAP (ALL BUILD ALTERNATIVES)**



NO-ACTION ALTERNATIVE (AREAS 1-5)

- PROJECT LOCATION
- NO ACTION ALTERNATIVE: AREAS 1-5 (SITES APPROACHING, EQUALLING OR EXCEEDING THE NAC CRITERIA, CONTOURS)
 - AREA 1 HIGHWAY 112; HIGHWAY 612 TO WAGON WHEEL
 - AREA 2 HIGHWAY 112; WAGON WHEEL TO HIGHWAY 264 SOUTH
 - AREA 3 HIGHWAY 112; HIGHWAY 264 SOUTH TO HIGHWAY 264 NORTH (AREA 3 IS BYPASSED BY AREA 6 IN CAVE SPRINGS - NOT ANALYZED).
 - AREA 4 HIGHWAY 264; HIGHWAY 112 TO MILL DAM
 - O AREA 5 HIGHWAY 264; MILL DAM TO AIRPORT















NEW LOCATION ALTERNATIVE; AREA 9

- **PROJECT LOCATION**
- NEW LOCATION ALTERNATIVE: AREA 9 (RIGHT-OF-WAY, IMPACTS, CONTOURS)





PARTIAL NEW LOCATION ALTERNATIVE; AREAS 1, 5, 8

- **PROJECT LOCATION**
- PARTIAL NEW LOCATION ALTERNATIVE: AREAS 1, 5, 8 (RIGHT-OF-WAY, IMPACTS, CONTOURS)









IMPROVE THE EXISTING HIGHWAYS ALTERNATIVE; AREAS 1-6 (AREA 7 DELETED FROM STUDY)

- **PROJECT LOCATION**
- IMPROVE THE EXISTING HIGHWAYSALTERNATIVE: AREAS 1-6 (RIGHT-OF-WAY, IMPACTS, CONTOURS)
 - AREA 1 HIGHWAY 112; HIGHWAY 612 TO WAGON WHEEL
 - AREA 2 HIGHWAY 112; WAGON WHEEL TO HIGHWAY 264 SOUTH
 - AREA 3 HIGHWAY 112; HIGHWAY 264 SOUTH TO HIGHWAY 264 NORTH (AREA 3 IS BYPASSED BY AREA 6 IN CAVE SPRINGS - NOT ANALYZED).
 - AREA 4 HIGHWAY 264; HIGHWAY 112 TO MILL DAM
 - O AREA 5 HIGHWAY 264; MILL DAM TO AIRPORT
 - AREA 6 HIGHWAY 112 BYPASS; SOUTH OF HIGHWAY 264 (PROPOSED) (CAVE SPRINGS BYPASS)












Appendix F – Cultural Resources





March 5, 2020

Mr. Bill McAbee Environmental Project Manager Garver, LLC 4701 Northshore Drive North Little Rock, AR 72118

Re: Benton County – General Environmental Assessment Technical Assistance – FHWA Proposed Undertaking – XNA Connector Road Project ARDOT Job Number 090069 AHPP Tracking Number 55434.01

Dear Mr. McAbee:

The staff of the Arkansas Historic Preservation Program (AHPP) reviewed the records for previous investigations and significant archaeological, architectural, and historic resources within or proximal to the proposed study area demarcated on the provided maps. According to our research, there are several archeological and structural resources within the study area that are determined eligible for the National Register of Historic Places (NRHP) or unevaluated for NRHP eligibility. Additionally, the records show few previous cultural resources investigations within the study area.

We look forward to commenting on the recommendations or effect finding from the Federal Highway Administration when that information is available.

Tribes that have expressed an interest in the area include the Cherokee Nation (Ms. Elizabeth Toombs), the Osage Nation (Dr. Andrea Hunter), the Shawnee Tribe (Ms. Tonya Tipton), and the United Keetoowah Band of Cherokee Indians (Ms. Erin Thompson and Charlotte Wolfe). We recommend consultation in accordance with 36 CFR § 800.2(c)(2).

Thank you for the opportunity to review the study area. If you have any questions, please contact Eric Mills of my staff at (501) 324-9784 or eric.mills@arkansas.gov. Please refer to the AHPP Tracking Number above in any correspondence.

Sincerely,

Scott Kaufman Director, AHPP

cc: Dr. Ann Early, Arkansas Archeological Survey

Arkansas Historic Preservation Program 1100 North Street • Little Rock, AR 72201 • 501.324.9880 ArkansasPreservation.com Appendix G – Aquatic Resources Assessment



2049 E. Joyce Blvd. Suite 400 Fayetteville, AR 72703 TEL 479.527.9100 FAX 479.527.9101

www.GarverUSA.com

MEMORANDUM

- Date: August 27, 2020
- Prepared By: Colby Marshall, Environmental Scientist Garver
 - RE: Aquatic Features Arkansas Department of Transportation (ARDOT) – XNA Connector Road ARDOT Job No. 090069 Cave Springs, Benton County, Arkansas

The Federal Highway Administration (FHWA), in cooperation with the Arkansas Department of Transportation (ARDOT), is preparing an Environmental Assessment (EA) for approximately four miles of new highway for a connector road from the future Springdale Northern Bypass connection at US Highway 612 to the Northwest Arkansas National Airport (XNA). Three build alternative corridors, as described in detail in the EA, were evaluated to identify wetlands, streams, springs, and ponds. This memo was prepared to document overall potential impacts to these aquatic features, which are summarized in the below table.

Wetlands were preliminarily identified and classified within the proposed alternative corridors based on Cowardin, et al. (1979). The majority of wetland determinations were made using observable vegetation, hydrology, and soils in accordance with the routine approach described in the USACE Wetland Delineation Manual (1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). Aquatic features along existing alignments in the Partial New Location Alternative and the Improve Existing Highways Alternatives were visually identified from public right-of-way (except for new locations along the Partial New Location Alternative). These identifications were made using field observations and desktop data (Natural Resources Conservation Service; NRCS) soils data, aerial photographs, and U.S. Geologic Survey (USGS) topographic maps.

New Location Alternative

This alternative contains 18 streams that include Osage Creek and Little Osage Creek. Five wetlands were delineated which includes three forested wetlands (PFO) and two emergent wetlands (PEM). Additionally, seven ponds and two springheads were identified.

Partial New Location Alternative

This alternative contains 13 streams and also includes Osage Creek and Little Osage Creek. Nine wetlands were delineated which includes three PFO and six PEM wetlands. Additionally, two ponds and three springheads were identified.

Improve the Existing Condition Alternative

This alternative contains 18 streams that include Osage Creek and Spring Creek. Several streams are parallel to this alternative alignment. Two PFO, seven PEM, and four unconsolidated bottom (PUB) wetlands were identified within this corridor for a total of 13 wetlands. Additionally, three ponds and two springheads were identified.

Estimated impacts to these aquatic features are identified for each alternative in the below table. Impacts were determined based on the conceptually proposed right-of-way.



	Impacted Aquatic Features								
	Wetlands				Streams				Springs
Alternative	PEM (ac)	PFO (ac)	PUB* (ac)	Total (ac)	PER (LF)	INT (LF)	EPH (LF)	Total (LF)	Count
New Location	0.14	2.12	1.05	3.2	109	196	6,313	6,618	2
Partial New Location	0.28	0.42	0.11	0.80	2,046	3,903	756	6,705	3
Improve the Existing Condition	0.47	0.53	0.46	1.46	4,991	9,067	791	14,849	2

Table 1: Impacted Aquatic Features for each Alternative

*Pond impacts are included as unconsolidated bottom wetalnds



Northwest Arkansas National Airport Access Road Benton County, Arkansas





Pond

Perennial Channel
Improve Existing Alternative
Intermittent Channel
Partial New Alternative
Ephmeral with OHWM
All New Alternative
PEM Wetland
FEMA Effective Zone A
PUB Wetland

Figure 3 Aquatic Features

























Appendix G: Aquatic Resources Assessment - Page 15 of 17







Appendix H – Protected Species



2049 E. Joyce Blvd. Suite 400 Fayetteville, AR 72703 TEL 479.527.9100 FAX 479.527.9101 www.GarverUSA.com

April 24, 2020

Lindsey Lewis, ARDOT Liaison U.S. Fish and Wildlife Service 110 South Amity Road, Ste. 300 Conway, AR 72032 #501-513-4489; Lindsey_Lewis@fws.gov

 Re: Arkansas Department of Transportation (ARDOT) – XNA Connector Road ARDOT No. 090069
Request for Technical Assistance
Cave Springs, Benton County, Arkansas

Dear Mr. Lewis:

This letter serves to provide information on the occurrence of suitable habitat for the federally-protected threatened or endangered species listed on the official species list provided by the IPaC project planning tool (attached) for the XNA Connector Road project located near Cave Springs, Benton County, Arkansas (See **Figure 1**).

The Federal Highway Administration (FHWA), in cooperation with the Arkansas Department of Transportation (ARDOT), are proposing to prepare an Environmental Assessment (EA) for approximately four miles of new highway for a connector road from the Springdale Northern Bypass to the Northwest Arkansas National Airport (XNA). The project is currently in the planning stages of its development and ARDOT has retained Garver to conduct a habitat assessment and complete environmental documentation. This report summarizes our findings.

Site investigations of the study corridors for three alternatives being evaluated in the EA were conducted between late January and early February 2020. All areas where construction and/or physical disturbance may occur for each alternative are included in the study corridors (i.e., within the proposed right-of-way) as shown in **Figures 1-3**. The corridors were visually inspected for the New Location Alternative and Partial New Alternative. The corridor associated with the Improve the Existing Highways Alternative was evaluated from existing public right-of-way. This habitat assessment did not include official surveys for federally listed species; however, two occurrences of threatened and endangered species adjacent to the existing alignment of State Highway 264 has been documented in the *Cave Springs Area Karst Resources Conservation Initiative*. Several springs and seeps were identified during the field investigation. Additionally, losing streams have been documented in Benton County. The official species list indicates that no critical habitat is located within the study area. The three alternatives being evaluated in the EA are described below:

1. New Location Alternative

The new location alternative is approximately four miles long and would extend southward on new location from an at-grade intersection at Highway 264 approximately 1,100 feet east of the

Mr. Lewis April 24, 2020 Page 2 of 11

existing entrance road to XNA airport. The alignment then continues south approximately one mile where it then veers to the southeast on new alignment to connect to the future section of Highway 612 with a trumpet interchange. Highway 612 would need to be extended approximately 1¼ mile from its current terminus at Highway 112 to meet the new location alternative interchange. The typical section would consist of a four-lane divided highway with a 60-foot depressed grass median and full control of access. The design speed limit would be 70 miles per hour. The alignment would cross four local roads with over or underpasses and have bridges at Little Osage Creek and Osage Creek.

2. Partial New Location Alternative

This alternative would begin by improving Highway 264 to the east of the southern entrance road to the XNA airport. The improvements would follow Highway 264 for approximately 1,700 feet east, then diverge southeast on new location to remove the consecutive 90-degree curves, rejoin with existing Highway 264 for approximately 4,200 feet before diverging south near Colonel Myers Road. An at-grade intersection will connect improved Highway 264 from the northwest, existing Highway 264 to the northeast, Colonel Myers Road to the southeast, and a new alignment section paralleling Colonel Myers Road on the east side. The new alignment will cross over Osage Creek, then turns to the east to connect with Highway 112 where it follows Highway 112 south to connect with the existing Highway 612 interchange. The total distance for this alternative would be approximately 4.4 miles, with the 2.7 miles of new alignment having full control of access, and 1.7 miles of improved Highway 264 and Highway 112 having partial control of access. The typical section consists of four lanes divided with a 15-foot raised grass median and a design speed of 45 miles per hour. This alternative will have at-grade intersections at Highway 264 and Highway 112.

3. Improve the Existing Highways Alternative

This study alternative would begin at the southern entrance of the XNA airport and follow existing Highway 264 to Cave Springs, including the elimination of the consecutive 90-degree curves as in the Partial New Location Alternative. At Cave Springs, the alignment would turn south and follow Highway 112 through downtown Cave Springs, or will follow a future Highway 112 bypass around the west side of Cave Springs, to tie into Highway 112 south of town. South of town, this alternative would improve existing Highway 112 southward to the Highway 612 interchange. The total distance for this alternative would be approximately 6.4 miles. The typical section would consist of four lanes divided with a 15-foot raised grass median with partial control and a design speed of 45 miles per hour.

Refer to **Table 1** for the species, habitat requirements, and effects determinations identified for this project. **Figure 2** depicts the listed species' suitable or preferred habitat within the study corridors for each alternative and **Figure 3** shows the aquatic features within the project vicinity.

Mr. Lewis April 24, 2020 Page 3 of 11

Species/Status	Habitat Requirements	Suitable Habitat within Proposed ROW A. All New Alt. B. Partial New Alt. C. Improve Existing Alt.		
Gray Bat (<i>Myotis grisescens</i>) Endangered	The gray bat occurs in limestone karst areas and primarily uses caves throughout the year, although they move from one cave to another seasonally. Smaller colonies also occasionally roost under bridge structures.	Forested summer foraging habitat A. 75.5 ac B. 26.4 ac C. 20.9 ac	Suitable roosting structures* A. 0 B. 2 C. 2	
Indiana Bat (<i>Myotis sodalis</i>) Endangered	diana Bat otis sodalis) idangered The Indiana bat hibernates in cool caves and mines in the winter and wooded areas in the spring and summer. During summer, colonies are found behind slabs of exfoliating bark of dead trees, often in bottomland or floodplain habitats, but also in upland situations.		Suitable roosting structures* A. 11 B. 15 C. 12	
Northern Long- eared Bat (<i>Myotis</i> <i>septentrionalis</i>) Threatened	In winter, northern long-eared bats use caves, mine portals, abandoned tunnels, protected sites along cliff lines and similar situations that afford protection from cold. During the summer they roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees.	Forested foraging and roosting habitat A. 75.5 ac B. 26.4 ac C. 20.9 ac	Suitable roosting structures* A. 11 B. 15 C. 12	
Ozark Big-eared Bat (Corynorhinus townsendii ingens) Endangered	The Ozark big-eared bat inhabits caves year-round, typically located in oak-hickory hardwood forests.	Summer foraging habitat A. 75.5 ac B. 26.4 ac C. 20.9 ac		
Piping Plover (<i>Charadrius</i> <i>melodus</i>) Threatened	Piping plovers are usually found along sandbars of major rivers, salt flats, and mudflats of reservoirs.	No sandbars, salt flats or mudflats are located within or adjacent to the study corridors.		
Benton County Cave Crayfish (Cambaras aculabrum) Endangered	The Benton County cave crayfish occurs in clean cave springs, near walls of pools, or in stream edges in chert/limestone cave streams.	Karst region has documented caves in Benton County. Springs within the study corridors: A. 2 springs B. 5 springs, 3 wells C. 2 springs		
Ozark Cavefish (<i>Amblyopsis rosae</i>) Threatened	The Ozark cavefish occurs in dark cave waters, primarily clear upwelling streams with chert or rubble substrate, and occasionally in pools over silt and sand. They have also been found in wells, springs, and sinkholes.	Karst region has documented caves in Benton County. Springs within the study corridors: A. 2 springs B. 5 springs, 3 wells C. 2 springs		

Table 1: T&E Listed Species and Habitat Requirements

Mr. Lewis April 24, 2020 Page 4 of 11

Species/Status	Habitat Requirements	Suitable Habitat within Proposed ROW A. All New Alt. B. Partial New Alt. C. Improve Existing Alt.		
Missouri Bladderpod (<i>Physaria filiformis</i>) Threatened	Missouri bladderpods are usually found in open limestone glades, barrens, and outcrops within unglaciated prairie areas. Glades are naturally dry, treeless areas with shallow, loose soil and areas of exposed rock. They are occasionally in dolomitic glades and are often associated with grazed pastures. Cedar invasion of glade sites is common. Sometimes the bladderpod is found on highway right-of-way and pastures where mowing and grazing have kept the area open. Occasionally it is found in open rocky woods.	No dry limestone or dolomitic glades or barrens occur within the study corridors for any of the alternatives.		
Eastern Black Rail (<i>Laterallus</i> <i>jamaicensis</i>) - Proposed Threatened	Eastern black rails occupy wetlands and marshes in areas of moist soil or shallow flooding. They require dense vegetative cover that allows movement underneath the canopy, such as rushes, sedges, and grasses.	Wetland habitat with dense vegetation. A. 0 ac B. 0.07 ac C. 0.08 ac		

*Suitable structure habitat includes barns, abandoned buildings, and bridges.

The photographs below show the typical habitat observed within the study corridors associated with each listed species.

Mr. Lewis April 24, 2020 Page 5 of 11



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Mr. Lewis April 24, 2020 Page 9 of 11



Mr. Lewis April 24, 2020 Page 10 of 11



Mr. Lewis April 24, 2020 Page 11 of 11



We respectfully request technical assistance from USFWS regarding threatened and endangered species. Thank you for your assistance and please call me (479-903-2041) or email (rcmountain@GarverUSA.com) if you have any questions or need any additional information.

Sincerely, GARVER, LLC

Pagan Mountan

Ryan Mountain, PWS Senior Environmental Scientist

- Copies To: Bill McAbee Garver
- Enclosures: Figure 1 Site Location Map Figure 2 - Habitat Overview Map Figure 3 - Aquatic Features IPaC Official Species List



United States Department of the Interior

FISH AND WILDLIFE SERVICE Arkansas Ecological Services Field Office 110 South Amity Suite 300 Conway, AR 72032-8975 Phone: (501) 513-4470 Fax: (501) 513-4480 http://www.fws.gov/arkansas-es



In Reply Refer To: Consultation Code: 04ER1000-2020-SLI-0029 Event Code: 04ER1000-2020-E-01775 Project Name: XNA Connector Road Project April 03, 2020

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies endangered, threatened, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). This letter only provides an official species list and technical assistance; if you determine that listed species and/or designated critical habitat may be affected in any way by the proposed project, even if the effect is wholly beneficial, consultation with the Service will be necessary.

If you determine that this project will have no effect on listed species and their habitat in any way, then you have completed Section 7 consultation with the Service and may use this letter in your project file or application.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found on our website.

<u>Please visit our website at http://www.fws.gov/arkansas-es/IPaC/home.html for species-specific guidance to avoid and minimize adverse effects to federally endangered,</u>

threatened, proposed, and candidate species. Our web site also contains additional information on species life history and habitat requirements that may be useful in project planning.

If your project involves in-stream construction activities, oil and natural gas infrastructure, road construction, transmission lines, or communication towers, please review our project specific guidance at <u>http://www.fws.gov/arkansas-es/IPaC/ProjSpec.html</u>.

The karst region of Arkansas is a unique region that covers the **northern third of Arkansas** and we have specific guidance to conserve sensitive cave-obligate and bat species. **Please visit** <u>http://www.fws.gov/arkansas-es/IPaC/Karst.html</u> to determine if your project occurs in the karst region and to view karst specific-guidance. Proper implementation and maintenance of best management practices specified in these guidance documents is necessary to avoid adverse effects to federally protected species and often avoids the more lengthy formal consultation process.

If your species list includes any mussels, Northern Long-eared Bat, Indiana Bat, Yellowcheek Darter, Red-cockaded Woodpecker, or American Burying Beetle, your project may require a presence/absence and/or habitat survey prior to commencing project activities. Please check the appropriate species-specific guidance on our website to determine if your project requires a survey. We strongly recommend that you contact the appropriate staff species lead biologist (see office directory or species page) prior to conducting presence/absence surveys to ensure the appropriate level of effort and methodology.

Under the ESA, it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with the Service further. Similarly, it is the responsibility of the Federal action agency or project proponent, not the Service, to make "no effect" determinations. If you determine that your proposed action will have "no effect" on threatened or endangered species or their respective critical habitat, you do not need to seek concurrence with the Service. Nevertheless, it is a violation of Federal law to harm or harass any federally-listed threatened or endangered fish or wildlife species without the appropriate permit.

Through the consultation process, we will analyze information contained in a biological assessment that you provide. If your proposed action is associated with Federal funding or permitting, consultation will occur with the Federal agency under section 7(a)(2) of the ESA. Otherwise, an incidental take permit pursuant to section 10(a)(1)(B) of the ESA (also known as a habitat conservation plan) is necessary to harm or harass federally listed threatened or endangered fish or wildlife species. In either case, there is no mechanism for authorizing incidental take "after-the-fact." For more information regarding formal consultation and HCPs, please see the Service's Consultation Handbook and Habitat Conservation Plans at www.fws.gov/ endangered/esa-library/index.html#consultations.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to

federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, **the accuracy of this species list should be verified after 90 days.** This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. **Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.**

Attachment(s):

Official Species List
Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arkansas Ecological Services Field Office

110 South Amity Suite 300 Conway, AR 72032-8975 (501) 513-4470

Project Summary

Consultation Code:	04ER1000-2020-SLI-0029
Event Code:	04ER1000-2020-E-01775
Project Name:	XNA Connector Road Project
Project Type:	TRANSPORTATION
Project Description:	The XNA Connector Road Project is located in Benton County, Arkansas and is approximately 4 miles in length. The purpose of the proposed action is to provide a reliable and efficient connection from the Northwest Arkansas Regional Airport in Bentonville to the Springdale Northern Bypass (Highway 612) . The project will evaluate two alternatives on new location and one alternative that improves existing Highway 112 and Highway 264.

Project Location:

Approximate location of the project can be viewed in Google Maps: <u>https://www.google.com/maps/place/36.23661580516328N94.26508978650236W</u>



Counties: Benton, AR | Washington, AR

Endangered Species Act Species

There is a total of 10 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. <u>NOAA Fisheries</u>, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat Myotis grisescens	Endangered
No critical habitat has been designated for this species.	0
Species profile: https://ecos.fws.gov/ecp/species/6329	
Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. Your location is outside the critical habitat.	Endangered
Species profile: <u>https://ecos.fws.gov/ecp/species/5949</u>	
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species.	Threatened
Species profile: <u>https://ecos.fws.gov/ecp/species/9045</u>	
Ozark Big-eared Bat Corynorhinus (=Plecotus) townsendii ingens	Endangered
No critical habitat has been designated for this species.	
Species prome: https://ecos.tws.gov/ecp/species//245	

Birds

NAME	STATUS
Eastern Black Rail <i>Laterallus jamaicensis ssp. jamaicensis</i> No critical habitat has been designated for this species. Species profile: <u>https://ecos.fws.gov/ecp/species/10477</u>	Proposed Threatened
 Piping Plover Charadrius melodus Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: <u>https://ecos.fws.gov/ecp/species/6039</u> 	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: <u>https://ecos.fws.gov/ecp/species/1864</u>	Threatened
Fishes	
NAME	STATUS
Ozark Cavefish <i>Amblyopsis rosae</i> No critical habitat has been designated for this species. Species profile: <u>https://ecos.fws.gov/ecp/species/6490</u>	Threatened
Crustaceans	
NAME	STATUS
Benton County Cave Crayfish <i>Cambarus aculabrum</i> No critical habitat has been designated for this species. Species profile: <u>https://ecos.fws.gov/ecp/species/5011</u>	Endangered
Flowering Plants	
NAME	STATUS
Missouri Bladderpod <i>Physaria filiformis</i> No critical habitat has been designated for this species. Species profile: <u>https://ecos.fws.gov/ecp/species/5361</u>	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.





Northwest Arkansas National Airport Access Road Benton County, Arkansas





Suitable Foraging / Roosting Forest Habitat

- Potential Bat Habitat Structures
- Springs

• Wells Note: Cave Springs Cave and Recharge Area not in project area. Data outside of project areas shown is not included in impacts. Figure 2 Habitat Overview Map





Northwest Arkansas National Airport Access Road Benton County, Arkansas





Intermittent Channel

—··- Ephmeral with OHWM 🔲

Z PEM Wetland

- Ketland PFO Wetland
- /// PUB Wetland

Pond

- Improve Existing Alternative
 Partial New Alternative
 - Partial New Alternative
 - All New Alternative

FEMA Effective Zone

Figure 3 Aquatic Features







Asa Hutchinson Governor Stacy Hurst Secretary

Date: May 26, 2020 Subject: Elements of Special Concern XNA Connector Road Project Benton County, AR ANHC No.: P-CF..-20-037

Mr. Ryan Mountain Garver 2049 East Joyce Boulevard Suite 400 Fayetteville, AR 72703

Dear Mr. Mountain:

Staff members of the Arkansas Natural Heritage Commission (ANHC) have reviewed our files for records indicating the occurrence of rare plants and animals, outstanding natural communities, natural or scenic rivers, or other elements of special concern within the XNA Connector Road Project Area. The results of this review have been provided as Geographic Information System (GIS) shapefiles. Documentation is provided to help you interpret the information contained in these files.

Our records indicate the occurrence of ten species of conservation concern within the project area. A list of these elements, with habitat information is attached for your reference. The study site falls within a Karst region of the state characterized by caves, springs, and sinkholes. These habitats support a variety of rare species. Most notable in this area are species associated with streams, springs and spring runs. Four fish and two crayfish species listed in the State's Wildlife Action Plan as species of "Greatest Conservation Concern" have been recorded from the main channels, tributaries and spring runs of Osage Creek, Spring Creek, and Little Osage Creek,

Etheostoma cragini, Arkansas Darter Etheostoma microperca, Least Darter Etheostoma mihileze, Sunburst Darter Nocomis asper, Redspot Chub Orconectes meeki brevis, Meek's Short Pointed Crayfish Orconectes nana, Midget Crayfish

Arkansas darter and least darter are limited to very specific habitat in Benton and Washington Counties. Recent information suggests one or both may represent undescribed species. The Arkansas Highway and Transportation Department (ARDOT) has recently purchased property for mitigation within the Healing Springs complex which supports many of these species. This agency is partnering with ARDOT in the management and protection of the Healing Springs site. Placement and construction of a connector road should seek to minimize impact to the sensitive aquatic habitats in this area.

A list of elements of conservation concern recorded within a five-mile radius of the project area is enclosed for your reference. Represented on this list are elements for which we have records in our database. The list has been annotated to indicate those elements known to occur within a one-mile radius of the project site. A legend is enclosed to help you interpret the codes used on this list.

Please keep in mind that the project area may contain important natural features of which we are unaware. Staff members of the Arkansas Natural Heritage Commission have not conducted a field survey of the study site. Our review is based on data available to the program at the time of the request. It should not be regarded as a final statement on the elements or areas under consideration. Because our files are updated constantly, you may want to check with us again at a later time.

Thank you for consulting us. It has been a pleasure to work with you on this study.

Sincerely,

Cindy Osborne

Cindy Osborne Data Manager/Environmental Review Coordinator

Enclosures: GIS shapefiles

Documentation Project Area Element list with Habitat Information Element List Legend Data Sharing Agreement Invoice

ANHCDATA Shapefile

Tags

Rare species, thretened species, endangered species, XNA Connector Road.

Summary

This shapefile was created in response to an information request from the Garver, LLC. The data will be used to evaluate potential impacts to sensitive elements for the proposed XNA Connector Road Project in Benton County, Arkansas.

Description

Description of Data:

Occurrence data entered into the Natural Diversity Database represent known locations of elements, which the Arkansas Natural Heritage Commission (ANHC) currently tracks. These elements include species considered either endangered, threatened, rare, peripheral or status undetermined as well as outstanding examples of natural communities (terrestrial, palustrine and aquatic), geologic features, and colonial bird nesting sites. Generally speaking, the basic requirement for entering an occurrence into the natural diversity database is that the place marked as an occurrence must contribute to the survival of the element. The specific criterion used for each type of element depends on the basic biology of the element. Data has been "summarized" into 20-acre hexagons.

Contact Information:

Cindy Osborne, Data Manager

Arkansas Natural Heritage Commission

1100 North Street

Little Rock, AR 72201

Phone: 501-324-9762

Fax: 501-324-9618

e-mail: Cindy.Osborne@Arkansas.gov

Source of Data:

Data entered into the database have been collected from literature sources, herbaria, museums, Universities and field surveys by staff biologists.

Mapping Information:

All mappable occurrence data entered into the natural diversity database are mapped on 7.5' Topographic quadrangles (1:24,000) and are assigned a township, range and section as well as latitude and longitude coordinates. In some cases the actual mapped location represents a "best guess" based on the information available. The accuracy of mapped locations can vary from approximately one hundred feet to roughly five miles (the level of a 7.5' quadrangle). Close attention should be given to the Precision Code. This code indicates the accuracy of the mapped location. Precision codes are described in greater detail below. A hexagon shape may include multiple observations of a given species within the area covered by the hexagon. Details for the most recent record fallling within the hexagon are included in the attribute table of the shapefile. This includes the latitude/longitude location for the most recent record.

Descriptions of Fields in Data Table

ELCODE

Element Code. This is a code identifying the species.

SNAME

Scientific Name.

SCOMNAME

Common Name.

GRANK

Global Rank. This is a conservation rank used by State Heritage Programs and The Nature Conservancy. The rank indicates the relative rarity of an element throughout its range. The following codes are used:

G1 = Critically imperiled globally. At a very high risk of extinction due to extreme rarity, very steep declines, very severe threats or other factors.

G2 = Imperiled globally. At high risk of extinction due to very restricted range, very few populations, steep declines, or other factors.

G3 = Vulnerable globally. At moderate risk of extinction due to a restricted range, relatively few populations, recent and widespread declines, or other factors.

G4 = Apparently secure globallyAt fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

G5 = Secure globally. At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

GH = Of historical occurrence, possibly extinct globally. Missing; known from only historical occurrences, but still some hope of rediscovery.

GU = Unrankable. Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

GX = Presumed extinct globally. Not located despite intensive searches and virtually no likelihood of rediscovery.

GNR = Unranked. The global rank not yet assessed.

GNA = Not Applicable. A conservation status rank is not applicable.

T-RANKS= T subranks are given to global ranks when a subspecies, variety, or race is considered at the state level. The subrank is made up of a "T" plus a number or letter (1, 2, 3, 4, 5, H, U, X) with the same ranking rules as a full species.

Q = A "Q" in the global rank indicates the element's taxonomic classification as a species is a matter of conjecture among scientists.

RANGES = Ranges are used temporarily until a final rank decision can be made.

? = A question mark is used temporarily when there is some indecision regarding the rank assignment or when an element has not been ranked.

B = Breeding status

N = Non-breeding status

SRANK

State Rank. This is a conservation rank used by State Heritage Programs and The Nature Conservancy. The rank indicates the relative rarity of an element throughout Arkansas. The following codes are used:

S1 = Critically imperiled in the state. At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

S2 = Imperiled in the state. At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

S3 = Vulnerable in the state. At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

S4 = Apparently secure in the state. At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

S5 = Secure in the state. At very low or no risk of extirpation in the jurisdiction due to a very

extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

SH = Of historical occurrence, with some possibility of rediscovery. Its presence may not have been verified in the past 20-40 years. A species may be assigned this rank without the 20-40 year delay if the only known occurrences were destroyed or if it had been extensively and unsuccessfully sought.

SU = Unrankable. Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SX = Presumed extirpated from the state. Not located despite intensive searches and virtually no likelihood of rediscovery.

SNR = Unranked. The state rank not yet assessed.

SNA = Not Applicable. A conservation status rank is not applicable.

USESA

U.S. Endangered Species Act status. This field provides information on whether the species is listed as Endangered or Threatened by the U.S. Fish and Wildlife Service. A blank indicates the element has no federal listing. The following codes are used:

C = Candidate species. The U.S. Fish and Wildlife Service has enough scientific information to warrant proposing these species for listing as endangered or threatened under the Endangered Species Act.

LE = Listed Endangered; the U.S. Fish and Wildlife Service has listed these species as endangered under the Endangered Species Act.

LT = Listed Threatened; the U.S. Fish and Wildlife Service has listed these species as threatened under the Endangered Species Act.

PE = Proposed Endangered; the U.S. Fish and Wildlife Service has proposed these species for listing as endangered.

PT = Proposed Threatened; the U.S. Fish and Wildlife Service has proposed these species for listing as threatened.

T/SA = Threatened (or Endangered) because of similarity of appearance.

E/SA

STATESTAT

State Status Code. At present, Arkansas does not have a law providing special state protection to species considered endangered or threatened in Arkansas. However, lists of species of special concern have been developed by this program in cooperation with other government agencies, and professionals. Species appearing on these lists are believed to be rare in the

state and are presently being inventoried by this agency. The following codes have been used in this field:

INV = Inventory Element; The Arkansas Natural Heritage Commission is currently conducting active inventory work on these elements. Available data suggests these elements are of conservation concern. These elements may include outstanding examples of Natural Communities, colonial bird nesting sites, outstanding scenic and geologic features as well as plants and animals which, according to current information, may be rare, peripheral, or of an undetermined status in the state. The ANHC is gathering detailed location information on these elements.

SE = State Endangered; this term is applied differently for plants and animals

Animals - These species are afforded protection under Arkansas Game and Fish Commission (AGFC) Regulation. The AGFC states that it is unlawful to import, transport, sell, purchase,hunt, harrass or possess any threatend or endangered species of wildlife or parts. The AGFC lists as endangered any wildlife species or subspecies endangered or threatened with extinction, listed or proposed as a candidate for listing by the U.S. Fish and Wildlife Service or any native species or subspecies listed as endangered by the Commission.

Plants - These species have been recognized by the Arkansas Natural Heritage Commission as being in danger of being extirpated from the state. This is an administrative designation with no regulatory authority.

ST = State Threatened; These species have been recognized by the Arkansas Natural Heritage Commission as being likely to become endangered in Arkansas in the foreseeable future, based on current inventory information. This is an administrative designation with no regulatory authority.

LASTOBS

Last Observed Date. The most recent date that the occurrence was last observed and recorded as extant within the hexagon shape.

FIRSTOBS

First Observed Date. The date of the earliest observation record falling within the hexagon shape.

CNT_of_OBS

Count of Observations. This is a count of the number of observation records falling within the hexagon shape.

COUNTYCODE

County Code. A four digit code for the county(s) in which the occurrence falls. The code is in the following format:

1st 4 letters of county name

Example: GARL = Garland County

SITE

Site Name. This is a short site name for the area in which the occurrence falls. Not all records will have a site name associated with them. This is listed for quick reference.

PRECISION

Precision of mapped location. All mappable occurrence data entered into the natural diversity database are mapped on topographic quadrangles and are assigned a township, range and section as well as latitude and longitude coordinates. In some cases the actual mapped location represents a "best guess" based on the information available. Careful attention should be paid to the precision code assignments to distinguish these "best guesses" from confirmed locations. The location given represents the centrum of the occurrence. The following codes are used:

S = Element is specifically mapped (within a three second radius, ~ 100 feet).

M = Element mapped to within one minute radius (1.5 mile).

G = Element is mapped to a general region identified by a geographic name on a U.S.G.S. quadrangle.

TBA = This is a new "observation" record for which a precision code has not been assigned.

QUADNAME

Quadrangle Name. The name of the 7.5' topographic quadrangle(s) on which the occurrence falls.

TRS

The Township/Range/Section of the record of the most recent record within the hexagon shape.

DIRECTIONS

Directions to the most recent record within the hexagon shape

GENDESC

General Description of the location/habitat of the most recent record within the hexagon shape.

EODATA

Element Occurrence Data (size, number of individuals, vigor, etc...) for the most recent record within the hexagon shape.

BESTSOURCE

Best Source of information used for the most recent record in the hexagon shape.

EOCODE

Element Occurrence Code. A unique identifier for the occurrence. This number identifies the

most recent occurrence of a given species within the hexagon shape.

LATNUM

Latitude. The latitude of the centrum of the occurrence in decimal degrees.

LONGNUM

Longitude. The longitude of the centrum of the occurrence in decimal degrees.

SHAPE_ID

A unique identifier for the element within the shape. This number should be used when requesting or supplying data on an occurrence to the Arkansas Natural Heritage Commission.

SHAPECODE

An arbitrary number assigned to the shape.

Credits

This data was compiled by the Arkanas Natural Heritage Commission, Division of Arkansas Heritage, Arkansas Department of Parks, Heritage and Tourism, Little Rock, AR.

Use limitations

Reproduction and/or distribution of the complete electronic data set or subsets thereof to any parties other than Garver, LLC is strictly prohibited.



Tags streams, rare speices, endangered species, threatened species

Summary

This shapefile was developed to help identify those streams supporting species of conservation concern.

Description

Description of Data:

Using the USGS Streams shapefile, Arkansas Natural Heritage Commission Staff has developed a layer of streams in the state that are known to support rare species. Listing in this shapefile does not imply any legal designation or regulatory authority. The file was developed for information purposes only. A "sister" table has been provided with the shapefile (Species.dbf). This table lists the species recorded in the riparian zone or within a given stream and provides rank and status information for the species. The "sister" table may be linked to the shapefile using the stream name field (STREAM).

Contact Information:

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Source of Data:

Streams were selected using the Arkansas Natural Heritage Commission's sensitive species database. Those streams supporting species of conservation concern were included.

Mapping Information:

The streams were derived using the USGS Streams Layer. Each stream segment was united

into a single feature.

Descriptions of Fields in Attribute Table for Sensitive_Streams shapefile

Stream

Stream Name – The name applied to the stream. This field serves as a link to a sister table (SPECIES.dbf) that allows users to know what species have been recorded from each stream.

Descriptions of Fields in data table for Stream Species File (SPECIES.DBF)

ELCODE

Element Code. This is a unique code identifying the element.

STREAM

Name of the Stream.

SNAME

Scientific Name for the Element

SCOMNAME

Common Name for the Element

GRANK

Global Rank. This is a conservation rank used by State Heritage Programs and NatureServe. The rank indicates the relative rarity of an element throughout its range. The following codes are used:

G1 = Critically Imperiled Globally - At very high risk of extinction or elimination due to veryrestricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.

G2 = Imperiled Globally - At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

G3 = Vulnerable Globally - At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

G4 = Apparently Secure Globally - At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

G5 = Secure Globally - At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

GH = Possibly Extinct Globally - Known from only historical occurrences but still some hope of rediscovery.

G = Unrankable. Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

GX = Presumed extinct globally. Not located despite intensive searches and virtually no likelihood of rediscovery.

GNR = Unranked. The global rank not yet assessed.

GNA = Not Applicable. A conservation status rank is not applicable.

T-RANKS = T subranks are given to global ranks when a subspecies, variety, or race is considered at the state level. The subrank is made up of a "T" plus a number or letter (1, 2, 3, 4, 5, H, U, X) with the same ranking rules as a full species.

Q = A "Q" in the global rank indicates the element's taxonomic classification as a species is a matter of conjecture among scientists.

RANGES = Ranges are used to indicate uncertainty about the exact status of a taxon. Ranges cannot skip more than two ranks.

? = Denotes inexact numeric rank.

B = Breeding status

N = Non-breeding status

M = Migrant - Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the nation or state/province.

SRANK

State Rank. This is a conservation rank used by State Heritage Programs and NatureServe. The rank indicates the relative rarity of an element throughout Arkansas. The following codes are used:

S1 = Critically Imperiled - At very high risk of extirpation in the jurisdiction due to very

restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

S2 = Imperiled - At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

S3 = Vulnerable - At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

S4 = Apparently Secure - At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

S5 = Secure - At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

SH = Possibly Extirpated – Known from only historical records but still some hope of rediscovery.

SU = Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SX = Presumed Extirpated - Species is believed to be extirpated from the jurisdiction. Not located despite intensive searches of historical sites and other appropriate habitat, and

virtually no likelihood that it will be rediscovered.

SNR = Unranked. The state rank not yet assessed.

SNA = Not Applicable. A conservation status rank is not applicable.

FEDSTAT

Federal Status under the U.S. Endangered Species Act. The following codes are used. A blank indicates the element has no federal listing:

C = Candidate species. The U.S. Fish and Wildlife Service has enough scientific information to warrant proposing these species for listing as endangered or threatened under the Endangered Species Act.

LE = Listed Endangered; the U.S. Fish and Wildlife Service has listed these species as endangered under the Endangered Species Act.

LT = Listed Threatened; the U.S. Fish and Wildlife Service has listed these species as threatened under the Endangered Species Act.

PE = Proposed Endangered; the U.S. Fish and Wildlife Service has proposed these species for listing as endangered.

PT = Proposed Threatened; the U.S. Fish and Wildlife Service has proposed these species for listing as threatened.

T/SA or E/SA = Threatened (or Endangered) because of similarity of appearance.

Credits

This shapefile was developed by the Arkanas Natural Heritage Commission, an agency of the Department of Arkansas Heritage.

Use limitations

This file should not be redistributed without prior written permission from the Arkansas Natural Heritage Commission

Arkansas Natural Heritage Commission Division of Arkansas Heritage Arkansas Department of Parks, Heritage and Tourism Elements of Special Concern Within a Five-mile Radius XNA Connector Road Project Study Area

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
Animals-Invertebrates					
* Caecidotea stiladactyla	an isopod	-	INV	G3G4	S3
Cambarus aculabrum	Benton County cave crayfish	LE	SE	G1	S1
* Faxonius meeki brevis	Meek's short pointed crayfish	-	INV	G4T3	S2
* Faxonius nana	midget crayfish	-	INV	G3	S3
* Ligidium elrodii	an isopod	-	INV	G4G5	S2
* Stygobromus onondagaensis	an amphipod	-	INV	G3	S1?
* Stygobromus ozarkensis	Ozark cave amphipod	-	INV	G4	S2
Animals-Vertebrates					
* Ambystoma annulatum	Ringed Salamander	-	INV	G4	S3
Ambystoma tigrinum	Eastern Tiger Salamander	-	INV	G5	S3
* Etheostoma cragini	Arkansas darter	-	INV	G3G4	S1
* Etheostoma microperca	least darter	-	INV	G5	S1
* Etheostoma mihileze	sunburst darter	-	INV	G4	S3
* Eurycea spelaea	Grotto Salamander	-	INV	G4	S3
* Myotis grisescens	gray bat	LE	SE	G4	S2S3
* Myotis sodalis	Indiana bat	LE	SE	G2	S1
* Nocomis asper	redspot chub	-	INV	G4	S3
* Troglichthys rosae	Ozark cavefish	LT	SE	G3	S1
Plants-Vascular					
* Asclepias incarnata ssp. incarnata	swamp milkweed	-	INV	G5T5	S2
* Carex aggregata	cluster sedge	-	INV	G5	S1
 Carex sparganioides 	bur-reed sedge	-	INV	G5	S3
* Crataegus palmeri	Palmer's hawthorn	-	INV	GNR	SNR
* Koeleria macrantha	prairie June grass	-	INV	G5	S2
* Trillium ozarkanum	Ozark trillium	-	INV	G3	S3
Special Elements-Natural Cor	nmunities				
* Cave Stream		-	INV	GNR	SNR
* Spring-Ozark Mountains		-	INV	GNR	SNR
Special Elements-Other					
Colonial nesting site, water birds		-	INV	GNR	SNR

* - These elements have been recorded within a one-mile radius of the XNA Connector Road Study Area.

Arkansas Natural Heritage Commission Division of Arkansas Heritage Arkansas Department of Parks, Heritage and Tourism Elements of Special Concern

Sensitive Elements, XNA Connector Road Project, Benton County, AR

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank	Habitat	NatureServe Link
Animals-Invertet	orates						
Faxonius meeki brevis	Meek's short pointed crayfish	-	INV	G4T3	S2	Small, clear streams with bedrock, rubble, or gravel substrate	http://explorer.natureserve.org/servlet/NatureServe?searchName=Orconectes+meeki+brevis
Faxonius nana	midget crayfish	-	INV	G3	S3	Clear, flowing permanent streams with substrates of limestone gravel and cobbles. Usually found in riffles.	http://explorer.natureserve.org/servlet/NatureServe?searchName=Orconectes+nana
Animals-Vertebr	ates						
Ambystoma annulatum	Ringed Salamander	-	INV	G4	S3	Ponds, lakes, and water holes, mesic hardwood forest, riparian, pine-oak forest, woodland, sinkhole and depression ponds	http://explorer.natureserve.org/servlet/NatureServe?searchName=Ambystoma+annulatum
Etheostoma cragini	Arkansas darter	-	INV	G3G4	S1	Small permanent-flow springs and spring run creeks often less than three feet wide and one foot deep, always found in association with aquatic vegetation over a substrate of gravel, sand, and silt.	http://explorer.natureserve.org/servlet/NatureServe?searchName=Etheostoma+cragini
Etheostoma microperca	least darter	-	INV	G5	S1	Small clear springs and quiet pools of spring creeks having permanent flow and gravel bottoms, often with accumulations of detritus and thich growths of water cress and filamentous algae	http://explorer.natureserve.org/servlet/NatureServe?searchName=Etheostoma+microperca
Etheostoma mihileze	sunburst darter	-	INV	G4	S3	Small, clear, cool, permanently flowing streams and creeks with a clean gravel and/or cobble substrate. Particularly found in pools.	http://explorer.natureserve.org/servlet/NatureServe?searchName=Etheostoma+mihileze
Nocomis asper	redspot chub	-	INV	G4	S3	Upland, clear spring-fed streams with gravel bottoms	http://explorer.natureserve.org/servlet/NatureServe?searchName=Nocomis+asper
Plants-Vascular							
Asclepias incarnata ssp. incarnata	swamp milkweed	-	INV	G5T5	S2	Moist to wet prairie, stream banks, pond and lake margins, and ditches	http://explorer.natureserve.org/servlet/NatureServe?searchName=Asclepias+incarnata+ssp.+incarnata

Scientific Name	Common Name	Federal	State	Global	State	Habitat	NatureServe Link
		Status	Status	Rank	Rank		
Crataegus palmeri	Palmer's hawthorn	-	INV	GNR	SNR	Dry to mesic forest or woodland, occasionally upland prairie, seasonally moist depressions in prairies, often on chert or novaculite substrates.	
Trillium ozarkanum	Ozark trillium	-	INV	G3	S3	Dry to mesic forest or woodland, occasionally upland prairie, often on chert or novaculite substrates	http://explorer.natureserve.org/servlet/NatureServe?searchName=Trillium+pusillum+var.+ozarkanum

LEGEND

STATUS CODES

FEDERAL STATUS CODES

С	=	Candidate species. The U.S. Fish and Wildlife Service has enough scientific information to warrant proposing this species for listing as endangered or threatened under the Endangered Species Act.
LE	=	Listed Endangered; the U.S. Fish and Wildlife Service has listed this species as endangered under the Endangered Species Act.
LT	=	Listed Threatened; the U.S. Fish and Wildlife Service has listed this species as threatened under the Endangered Species Act.
-PD	=	Proposed for Delisting; the U.S. Fish and Wildlife Service has proposed that this species be removed from the list of Endangered or Threatened Species.
PE	=	Proposed Endangered; the U.S. Fish and Wildlife Service has proposed this species for listing as endangered.
PT	=	Proposed Threatened; the U.S. Fish and Wildlife Service has proposed this species for listing as threatened.
T/SA	=	Threatened (or Endangered) because of similarity of appearance.

E/SA

STATE STATUS CODES

- INV = Inventory Element The Arkansas Natural Heritage Commission is currently conducting active inventory work on these elements. Available data suggests these elements are of conservation concern. These elements may include outstanding examples of Natural Communities or animal assemblages as well as plants and animals, which, according to current information, may be rare, peripheral, or of an undetermined status in the state. The ANHC is gathering detailed location information on these elements.
- WAT = Watch List Species; The Arkansas Natural Heritage Commission is not conducting active inventory work on these species, however, available information suggests they may be of conservation concern. The ANHC is gathering general information on status and trends of these elements. An "*" indicates the status of the species will be changed to "INV" if the species is verified as occurring in the state (this typically means the agency has received a verified breeding record for the species).
- MON = Monitored Species; The Arkansas Natural Heritage Commission is currently monitoring information on these species. These species do not have conservation concerns at present. They may be new species to the state, or species on which additional information is needed. The ANHC is gathering detailed location information on these elements
- SE = State Endangered; this term is applied differently for plants and animals.

Animals – These species are afforded protection under Arkansas Game and Fish Commission (AGFC) Regulation. The AGFC states that it is unlawful to import, transport, sell, purchase, hunt, harass or possess any threatened or endangered species of wildlife or parts. The AGFC lists as endangered any wildlife species or subspecies endangered or threatened with extinction, listed or proposed as a candidate for listing by the U.S. Fish and Wildlife Service or any native species or subspecies listed as endangered by the Commission.

Plants – These species have been recognized by the Arkansas Natural Heritage Commission as being in danger of being extirpated from the state. This is an administrative designation with no regulatory authority.

ST = State Threatened; These plant species have been recognized by the Arkansas Natural Heritage Commission as being likely to become endangered in Arkansas in the foreseeable future, based on current inventory information. This is an administrative designation with no regulatory authority.

DEFINITION OF RANKS Global Ranks

- G1 = Critically imperiled globally. At a very high risk of extinction due to extreme rarity, very steep declines, very severe threats or other factors.
- G2 = Imperiled globally. At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats or other factors.
- G3 = Vulnerable globally. At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
- G4 = Apparently secure globally At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

- G5 = Secure globally. At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
- GH = Of historical occurrence, possibly extinct globally. Known from only historical occurrences but still some hope of rediscovery.
- GU = Unrankable. Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- GX = Presumed extinct globally. Not located despite intensive searches and virtually no likelihood of rediscovery.
- GNR = Unranked. The global rank not yet assessed.
- GNA = Not Applicable. A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities.
- T-RANKS= Infraspecific Taxon (trinomial) The status of infraspecific taxa (subspecies or varieties) are indicated by a "Trank" following the species' global rank. Rules for assigning T-ranks follow the same principles as those for GRANKS.

State Ranks

- S1 = Critically imperiled in the state. At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
- S2 = Imperiled in the state. At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
- S3 = Vulnerable in the state. At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
- S4 = Apparently secure in the state. At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
- S5 = Secure in the state. At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.
- SH = Of historical occurrence in the state. Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.
- SU = Unrankable in the state. Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- SX = Presumed extirpated from the state. Species or ecosystem not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
- SNR = Unranked. The state rank not yet assessed.
- SNA = Not Applicable. A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities.

General Ranking Notes

- Q = A "Q" in the global rank indicates the element's taxonomic classification as a species is a matter of conjecture among scientists.
- RANGES= Ranges are used to indicate a range of uncertainty about the status of the element.
- ? = A question mark is used to denote an inexact numeric rank.
- B = Refers to the breeding population of a species in the state.
- N = Refers to the non-breeding population of a species in the state.

Appendix I – Induced-Growth Effects and Cumulative

Impact Assessments

Induced-Growth Effects

The Council of Environmental Quality (CEQ) and the Federal Highway Administration (FHWA) regulations require that potential indirect effects be considered during the National Environmental Policy Act (NEPA) process. Indirect effects are defined as impacts that are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" according to the CEQ (40 Code of Federal Regulations (C.F.R.) 1508.8) and may "include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." Indirect effects would occur outside of the existing or proposed right of way (ROW). As to the cause and effect relationship between the proposed improvements and the indirect effect, CEQ states that indirect effects may include induced changes to land use resulting in resource impacts (40 C.F.R. § 1508.8). This assessment focuses on indirect effects related to induced growth.

FHWA, in cooperation with the Arkansas Department of Transportation (ARDOT) and the Northwest Arkansas National Airport (XNA), are proposing to construct an approximately 4-mile long roadway that would connect XNA to Highway (Hwy) 612, which is also called the Springdale Northern Bypass (SNB). In compliance with FHWA regulations, this document has been prepared to assess the growth-related indirect effects of the proposed Northwest Arkansas National Airport Access project, which is hereafter simply referred to as the Project.

The time frame of the induced-growth effects analysis extends to 2040, the design year of the proposed project. A study area, or Area of Influence (AOI), was determined and used for the induced-growth analysis. The AOI was determined using major roadways, existing development areas, and natural features to ensure that potential developments and areas with a potential for indirect effects were encompassed within the AOI. Interviews with city and regional planners allowed for input on the resulting AOI boundary and provided feedback on the Project's anticipated indirect effects. The indirect effects AOI, which is located in northwest Arkansas, is shown in **Figure 1**.

The four alternatives evaluated in this technical report are the No Action Alternative, New Location Alternative, Partial New Location Alternative, and the Improve the Existing Highways Alternative. These alternatives are described in detail in the Environmental Assessment prepared for the proposed project. Alternatives are discussed further in the following sections which are organized by the four-step approach¹ to evaluate induced-growth impacts for the Project. This analysis assumes the presence of the extension of the SNB/Hwy 612 to the west from Hwy 112 to US 412 (shown in **Figure 1**). The SNB extension is not currently constructed but is an independently planned project that will

¹ The four-step approach is taken from the American Association of State Highway and Transportation Officials' *Practitioner's Handbook 12: Assessing Indirect Effects and Cumulative Impacts Under NEPA*.



Figure 1: Indirect Effects Area of Influence (AOI) for the Project

connect the existing terminal end of Hwy 612 to US 412 to the southwest. The New Location Alternative has been designed to directly connect to the SNB extension. For each alternative, the below assessments of the potential for increased accessibility, induced growth, and impacts on sensitive resources all assume the presence of the future SNB extension/Hwy 612 improvements.

Assess the Potential for Increased Accessibility

Table 1 summarizes the access points and general assumptions determined for each build alternative. A discussion on the accessibility potential for each alternative is provided following the table.

Alternatives	Functional Class (FHWA Definition)	Number of Lanes	Posted Speed	Lane Width	Right Shoulder Width	Divided/ Undivided	Access Point/Intersections
New Location	Rural Principal Arterial	2 lanes per direction	70 mph	12 feet	10 feet	Divided	1) New alignment, 2) Ramp access to Highway 264, and 3) Ramp access to Springdale Northern Bypass.
Partial New Location	Urban Principal Arterial	2 lanes per direction	45 mph	12 feet	1.5-foot cub and gutter (no shoulder)	Divided	 New alignment between XNA and Brush Arbor Road, 2) Existing alignment (with improvement) of Highway 264 between Brush Arbor Road and Colonel Meyers Road, 3) New alignment between Highway 264 and Highway 112, and 4) At-grade intersections at Highway 112.
Improve Existing	Rural Principal	2 lanes per direction	50 mph	12 feet	6 feet	Divided	Widen Highway 264 and Highway 112.

	Table 1: Assumptions and Access Points for the Three Build Alter	natives (Source: Project Team, March)
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No Action Alternative

For the No Action Alternative, no improvements would be constructed; therefore, increased accessibility would not occur as a result of this alternative. However, there are several planned projects in the vicinity (such as the SNB extension, widening of Hwy 112, and future development within the surrounding communities) that would be constructed regardless of the proposed project.

New Location Alternative

This alternative, which is a fully controlled facility, will have only two points of egress/ingress, one at each of its terminal ends. The north access point is the proposed alignment's connection to Hwy 264, which occurs approximately 0.2 mile east of the intersection of Hwy 264 and Airport Blvd. Increased accessibility to this specific geographic area will occur but is expected to be limited to the north by Airport-owned property (**Figure 2**). The south access point is the proposed alignment's connection to Hwy 612. Increased accessibility is not expected to occur in the area immediately surrounding this interchange as both the proposed roadway



Figure 2: Areas of Increased Accessibility (shown by hatching) for the New Location Alternative

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and the SNB are fully controlled facilities and no exits to surrounding properties are proposed. Travelers currently utilizing Hwy 612 to reach the Airport will experience increased Airport accessibility and travel time savings through this alternative as it essentially provides a direct highway route from the I-49/Hwy 612 interchange to the Airport.

Partial New Location Alternative

Unlike the New Location Alternative, this alternative is only a fully controlled facility on the new alignment section between Hwy 264 and Hwy 112. Multiple points of egress/ingress already exist along the existing roadways (Hwy 264 and Hwy 112) and these would remain unchanged. While widening will occur along the portion of the route on existing highways and this action may increase mobility, improvements along the existing roadways do not substantially increase the overall accessibility of the areas along the existing highways as these routes are currently accessible to existing travelers and no additional access points are anticipated to be provided. However, the proposed alignment's connection to Hwy 264, which occurs at the intersection of Hwy 264 and Colonel Myers Rd, will result in increased accessibility to this specific geographic area as it provides a new access point from Hwy 112 to Hwy 264 and surrounding roadways (Figure 3). The proposed alignment's connection to Hwy 112 will also result in increased accessibility to the area immediately surrounding this intersection as it provides a new access point to Hwy 112 from Hwy 264 (Figure 3). Travelers currently utilizing Hwy 612 to reach the Airport are anticipated to experience some increased Airport accessibility and travel time savings through this alternative, but not as much time savings as the New Location Alternative provides.

Changes in traffic, access, and mobility can result in changes in land use by influencing the rate and/or type of development in an area. Land use changes along the Partial New Location Alternative would be expected at the areas of increased accessibility described above as well as along the existing highways. These land use changes are described more in the next section.

Improve the Existing Highways Alternative

As this alternative is almost entirely along existing highways and these routes are currently accessible by existing travelers, there is minimal potential to further increase accessibility along the existing roadways. There is one 0.69-mile long segment southwest of the intersection of Hwy 112 and Hwy 264 that will occur on a new alignment to avoid downtown Cave Springs. This segment will be a fully controlled facility with no on/off ramps and is, therefore, not anticipated to result in increased accessibility. While widening of existing highways will occur along the entire proposed route and this action may increase mobility, these widening improvements are not considered to cause a substantial increase in the overall accessibility of the area. However, as described in the next section, this alternative will cause changes in traffic and mobility along its existing highways that are expected to result in changes in land use by influencing the rate and/or type of development in the Project area.



Figure 3: Areas of Increased Accessibility (shown by hatching) for the Partial New Location Alternative

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Highway 112 Improvements

As this alternative is entirely along existing Hwy. 112 and this route is currently accessible by existing travelers, there is minimal potential to further increase accessibility along this existing roadway. While widening of the existing highway will occur along the entire proposed route (from Hwy. 612 to Hwy. 264) and this action may increase mobility, these widening improvements are not considered to cause a substantial increase in the overall accessibility of the area. However, as described in the next section, this alternative will cause changes in traffic and mobility along its length that are expected to result in changes in land use by influencing the rate and/or type of development in the Project area.

Assess the Potential for Induced Growth

According to U.S. Census Bureau population data shown in **Table 2**, the cities within and surrounding the AOI are experiencing an increasing growth trend. The AOI is primarily located in Benton County but also includes a portion of Washington County. Benton and Washington Counties have shown substantial population growth in the last 20 years. This has resulted in an increase in traffic on the local highway system that provides access to XNA. According to a 2018 article published in the Northwest Arkansas Democrat Gazette, the Fayetteville-Springdale-Rogers area was the 14th fastest growing metropolitan area in the United States in 2017.

Location	2000	2010	Change	% Change
Arkansas	2,673,400	2,915,918	+242,518	9
Benton County	153,406	221,339	+67,933	44
Cave Springs	1,103	1,729	+626	56
Highfill	379	583	+204	54
Rogers	38,829	55,964	+17,135	44
Bentonville	19,730	35,301	+15,571	79
Washington County	157,715	203,065	+45,350	29
Elm Springs	1,004	1,535	+531	53
Fayetteville	58,047	73,580	+15,533	27
Springdale	45,798	69,797	+23,999	52

 Table 2: Population Growth within Project Area (Source: Project Team, March 2020)

The AOI primarily consist of undeveloped land. Undeveloped areas represent approximately 75% of the entire AOI; however, approximately 13% of the undeveloped areas are within natural features such as floodplains, parks, and wetlands. These areas are less likely to be developed due to these regulated features.

No Action Alternative

No improvements would be constructed under the No Action Alternative; therefore, induced growth and land use changes would not occur as a result of this alternative. As shown in **Table 3**, the 24-hour compound annual growth rate (CAGR) for the existing highways within the AOI will increase by 2.4% to 4.8% under the No Action Alternative. The count locations referenced in **Table 3** are shown in **Figure 4**.

Table 3: 2010-2040 Compound Annual Growth Rate (CAGR) on Hwy 264 and Hwy 112 (2040 NoBuild) (Source: Project Team, March 2020)

Count Station	Count Location	24-Hour CAGR	AM Period CAGR	PM Period CAGR	24-Hour Truck CAGR
040073	Hwy 264 E. of Airport Blvd.	2.4%	2.0%	1.8%	1.8%
040172	Hwy 264 W. of Hwy 112	2.8%	2.9%	2.8%	0.8%
040059	Hwy 112 S. of Hwy 264	3.3%	2.9%	2.6%	3.3%
040160	Hwy 112 N. of SNB	4.8%	4.3%	3.6%	5.3%

New Location Alternative

The New Location Alternative is expected to influence travel patterns by providing an alternate route to/from XNA and reducing traffic volumes on existing highways (as shown in **Tables 4** and **5**). The New Location Alternative, which is expected to have a future 24-hour traffic volume of approximately 7,200 (average of north and southbound) vehicles, will reduce the projected 24-hour CAGR on existing highways by 0.4% to 2.5% (as seen by comparing **Tables 3** and **5**).

Table 4: 2040 Modeled Volumes on the New Location Alternative (Source: Project Team, March 2020)

Direction	24-Hour Volume	AM Period Volume	PM Period Volume	24-Hour Truck Volume
Northbound	7,000	1,700	1,900	1,500
Southbound	7,400	1,300	2,300	1,600

Table 5: 2010-2040 CAGR on Hwy 264 and Hwy 112 for the 2040 New Location Alternative (Source:Project Team, March 2020)

Count Station	Count Location	24-Hour CAGR	AM Period CAGR	PM Period CAGR	24-Hour Truck CAGR
040073	Hwy 264 E. of Airport Blvd.	-0.1%	-0.3%	-0.4%	-2.9%
040172	Hwy 264 W. of Hwy 112	2.3%	2.6%	2.6%	-1.2%
040059	Hwy 112 S. of Hwy 264	2.9%	2.5%	2.2%	2.7%
040160	Hwy 112 N. of SNB	3.9%	3.3%	2.8%	3.9%



Figure 4: Count Comparison Locations (Source: Project Team, March 2020)

As population growth is already occurring within the AOI, it is likely that the current growth trends will continue regardless of whether the Project is implemented. According to feedback from most city planners of Bentonville, Cave Springs, Elm Springs, Lowell, and Rogers (copies of their responses are attached to this assessment), future developments within the surrounding communities are not believed to be induced/affected by the Project. Other planners, including the Airport, felt development in their jurisdiction would occur independent of the proposed project, but that the Project may affect the rate and intensity of development in the Springdale area, including redevelopment around the intersection of the proposed roadway with the SNB (Hwy 612), as well as the access road to the airport. Springdale also felt the Project would increase the likelihood of commercial development in and around intersections and affect the rate and intensity of these development in the Highfill area, including possible land rezoning from rural residential to industrial along the path of the Project.

Thus, the New Location Alternative will result in changes in traffic and mobility that will increase the likelihood of land use changes. As detailed above, planners anticipate the Project will increase the rate and intensity of development in the area, particularly around intersections (i.e., around the proposed road's intersection with Hwy 264 and with the SNB interchange) where land use would be expected to change from rural/undeveloped to commercial or even industrial. Few, if any, land use changes would be anticipated along the existing Highways 112 or 264 as traffic rates will be reduced in these areas as a result of the Project.

For the area of increased accessibility at the proposed alignment's connection to Hwy 264, the majority of this area is currently undeveloped and, with one area of exception, has no apparent constraints that prohibit the probability of development in this immediate area assuming private landowners are willing to sell/develop their property. The only constrained area is the airport-owned property located in the northwest quadrant of this area (see **Figure 5**). Development on airport property is still likely to occur but will be controlled by XNA and regulated by FAA. Thus, as shown in **Figure 5**, the entire area of increased accessibility has a high potential for induced growth, and it is likely that facilities such as gasoline stations or travel-related services will be developed around the Hwy 264/Project intersection. The rest of the proposed corridor for the New Location Alternative has a very low potential for induced growth due to lack of access, lack of existing infrastructure, and development restrictions such as floodplains.


Figure 5: Induced Growth Areas within the New Location Alternative

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Partial New Location Alternative

The Partial New Location Alternative is expected to have some influence on travel patterns (as shown in **Tables 6** and **7**), by providing an alternate route to/from XNA. The Partial New Location Alternative, which is expected to have a future 24-hour traffic volume of approximately 5,500 (average of north and southbound) vehicles, will both reduce and increase the projected 24-hour CAGR on some segments of the existing highways (as seen by comparing **Tables 3** and **7**). Traffic models suggest a decrease in CAGR of 0.4% on existing highway near the Hwy 112/Hwy 264 intersection in Cave Springs, but an increase (0.4% to 0.5%) near the proposed route's terminal ends.

Table 6: 2040 Modeled Volumes on the Partial New Location Alternative (Source: Project Team, March 2020)

Direction	24-Hour Volume	AM Period Volume	PM Period Volume	24-Hour Truck Volume
Northbound	4,800	1,200	1,500	1,100
Southbound	5,300	900	1,800	1,200

Table 7: 2010-2040 CAGR on Hwy 264 and Hwy 112 (2040 Partial New Location Alternative) (Source:Project Team, March 2020)

Count Station	Count Location	24-Hour CAGR	AM Period CAGR	PM Period CAGR	24-Hour Truck CAGR
040073	Hwy 264 E. of Airport Blvd.	2.8%	2.4%	2.2%	3.0%
040172	Hwy 264 W. of Hwy 112	2.4%	2.5%	2.6%	-0.2%
040059	Hwy 112 S. of Hwy 264	2.9%	2.6%	2.1%	2.8%
040160	Hwy 112 N. of SNB	5.3%	4.5%	4.1%	6.3%

Based on census data trends, population growth within the AOI is likely to continue regardless of whether the Project is implemented. Feedback from city planners primarily indicated regional growth will occur regardless of the proposed project (see attached city planner interviews). However, planners also specifically indicated the Project will increase the rate and intensity of development in the area. This increase in the rate of development coupled with the project's changes in increased mobility suggests land use changes along the Partial New Location Alternative would be expected. In addition to the areas of increased accessibility described below, land use changes are likely along the existing highways. The Partial New Location Alternative increases the likelihood of redevelopment along the existing highways and land use would be expected to change from rural/undeveloped to commercial or even industrial. The greatest likelihood of land use changes would be expected along Hwy 112 and Hwy 264 of the proposed roadway.

For the area of increased accessibility at the proposed alignment's connection to Hwy 264, much of this area is currently undeveloped. However, the area immediately west of

Colonel Myers Road is within a floodplain as Little Osage Creek runs parallel to this road. The floodplain and associated Little Osage Creek are significant constraints that decrease the probability of development immediately west of Colonel Myers Rd. However, the floodplain is still considered an area of induced growth (albeit a low likelihood compared to the other areas), while Little Osage Creek is not considered an area likely for induced growth to occur given the significant regulatory requirements for impacting such a large water resource. For the area east of Colonel Myers Road, some existing residential properties are present. A large (greater than 0.5 acre) wetland is present south of Hwy 264 within the increased accessibility area. Initial development within this wetland would be less likely due to permitting requirements. For the remaining undeveloped land, if landowners are willing to sell their property, this area (shown in Figure 6) has a moderate potential for induced growth, and it is likely that facilities such as gasoline stations or travel-related services will be developed around the Hwy 264/Project intersection. For the area of increased accessibility at the proposed alignment's connection to Hwy 112, some existing residential properties are present but much of this area is currently undeveloped. If landowners are willing to sell their property, this area (shown in Figure 7) has a moderate potential for induced growth, and it is likely that facilities such as gasoline stations or travel-related services will be developed around the Hwy 112/Project intersection. The potential for growth in this area may be constrained to the north by a large pond, further north by a floodplain, and to the west and northwest by existing residential development. The remainder of the proposed corridor has a much lower potential for induced growth due to lack of access, lack of existing infrastructure, and/or development restrictions such as floodplains.

Improve the Existing Highways Alternative

Besides the increase in anticipated traffic volumes, no substantial differences in the quantity or locations of the 24-hour CAGR is expected between the Improve the Existing Highways Alternative compared to the No Action Alternative. Thus, no changes in user's travel patterns are anticipated as this is likely the route already utilized to reach XNA.

Feedback from city planners primarily indicated regional growth will occur regardless of the proposed project (see attached city planner interviews). However, planners also specifically indicated the Project will increase the rate and intensity of development in the area. This increase in the intensity of development coupled with the project's changes in increased mobility due to road widening suggests a likelihood of land use changes along the Improve the Existing Highways Alternative. Expected land use changes primarily include redevelopment along the existing highways and may include more service-based businesses such as dining and lodging.

As there are no areas along this alignment expected to have a substantial increase in new accessibility, there are no areas anticipated to have induced growth as a result of the project.



Figure 6: Induced Growth Areas within the Partial New Location Alternative

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Figure 7: Induced Growth Areas within the Partial New Location Alternative

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Highway 112 Improvements

The potential for induced growth for these planned improvements are identical to those described above for the Improve the Existing Highways Alternative.

Assess the Potential for Impacts on Sensitive Resources

No Action Alternative

No improvements would be constructed under the No Action Alternative; thus, no potential for impacts on sensitive resources from this alternative are anticipated.

New Location Alternative

Few sensitive resources are present within the induced-growth area surrounding the intersection of the proposed alternative's connection to Hwy 264. Some mature trees are present that could function as suitable habitat for the federally-listed northern long-eared bat (NLEB) and Indiana bat (IBat). Most of the wooded habitat within the induced-growth area are fragmented from existing development and roadways and no substantial riparian corridors are present. Induced growth in this area may affect (through removal) approximately 6 acres of potentially suitable roosting habitat for the NLEB and IBat. Additionally, this area contains one barn and one shed (both abandoned) that could function as NLEB summer roosting habitat. Any future tree clearing that may occur could comply with the 4(d) Rule established for the NLEB, and seasonal tree clearing restrictions would minimize impacts the NLEB and IBat. No potential habitat of other federally-protected species was observed within the induced-growth area for this alternative.

One stream (approximately 1,200 LF) and three ponds (totaling approximately 0.4 acre) are present within the induced-growth area associated with this alternative and could be impacted by induced growth through fill or culverting. The stream would likely be considered functionally impaired as approximately half of it is channelized and concrete-lined. The ponds are in fair to poor condition due to cattle disturbance. Any impacts to potentially jurisdictional waters and wetlands would require compliance with Section 404 of the Clean Water Act (CWA). These regulatory restrictions may discourage impacts to these resources. If any historic properties are determined to be present within the induced-growth area surrounding the intersection of the New Location Alternative's connection to Hwy 264, Section 106 consultation and clearance from the State Historic Preservation Office (SHPO) will have to occur prior to disturbing the resource.

Because the project occurs with a karst region, aquatic resources (including ponds) may be connected belowground or off-site to karst features and, therefore, the likelihood exists that impacts to karst features and/or groundwater could occur as a result of induced growth in this area. For example, the stream in this area converges with an unnamed tributary to Little Osage Creek that has been identified as a potential losing stream.

As detailed in the EA, sensitive noise receptors in the project vicinity are directly impacted by noise caused from the proposed action. Additionally, traffic patterns will change as a result of the proposed action and these changes could result in increased traffic noise levels in some areas. However, induced-growth effects are not anticipated to result in substantial traffic noise. Other considerations include noise associated with the Airport, which is expected to increase in the future as the airport is more heavily utilized by aircraft. However, based on a recent noise analysis conducted for a separate project at XNA, these future aircraft noise impacts are not projected to expand beyond airport property. Thus, substantial induced-growth impacts related to traffic noise are not anticipated to occur as a result of the proposed action.

Partial New Location Alternative

Some sensitive resources are present within the induced-growth areas surrounding the intersections of the proposed alternative's connections to Hwy 264 and to Hwy 112. Several mature trees are present that could function as suitable habitat for the federallylisted NLEB and IBat. Most of the wooded habitat within the two induced-growth areas are fragmented from existing development and roadways and lack riparian corridors. Induced growth in these two areas may affect (through removal) a total of approximately 14 acres of potentially suitable roosting habitat for the NLEB and IBat. Additionally, this area appears to contain some barns/sheds that may be abandoned and could function as NLEB summer roosting habitat. Depending on the amount of required tree clearing that may occur, future projects could comply with the 4(d) Rule established for the NLEB, and seasonal tree clearing restrictions would minimize impacts the NLEB and IBat. Although both of these two induced-growth areas are outside of the Cave Springs Recharge Area boundary and have no know springs, the eastern portion of the area around the Hwy 264 intersection is within a moderate vulnerability zone of the Cave Springs Karst Region and the entire area around the Hwy 112 intersection is within either a moderate, high, or extremely high vulnerability zone of the Cave Springs Karst Region. The vulnerable regions coupled with the presence of streams increases the likelihood that these areas may contain suitable habitat for the Ozark Cavefish or the Benton County Cave Crayfish. Potential habitat of other federally-protected species was not observed within the induced-growth areas for this alternative.

Three streams (totaling approximately 2,800 LF), five wetlands (totaling approximately 0.9 acre), and two ponds (totaling approximately 1.4 acres) are present within the induced-growth area associated with this alternative and could be impacted by induced growth through fill or culverting. The streams would likely be considered functionally impaired as most of their reaches are immediately adjacent to the existing highways and numerous segments have been placed in culverts below driveway. The three wetlands adjacent to Hwy 264 are in poor condition due to construction and other human disturbance. The remaining two wetlands appear fully functional. Ponds appear to be in good condition based on aerial imagery but likely have some degree of disturbance due to livestock as they appear to function as stock ponds. As is the case for the New Location Alternative, CWA regulatory restrictions may discourage impacts to wetlands and streams, and Section 106 requirements may provide protections to cultural resources if historic properties are determined to be present.

Because the project occurs with a karst region, aquatic resources (including ponds) may be connected belowground or off-site to karst features and, therefore, the likelihood exists that impacts to karst features could occur as a result of induced growth in this area.

Although the floodplains located in the two areas of increased accessibility are considered constraints to development, they are still considered areas where induced-growth could occur. If both of the induced-growth areas were entirely developed, a total of approximately 33.6 acres of floodplains would be impacted. At this time (without hydraulic modeling or knowledge of what developments may occur), specific impacts to the region's flood storage capacity are unknown.

Similar to the New Location Alternative, some areas of the project could have increased noise levels because of traffic pattern changes caused by the proposed action. However, induced-growth effects are not anticipated to result in substantial traffic noise.

Improve the Existing Highways Alternative

There are no areas identified as having a potential for induced growth along this alignment.

Highway 112 Improvements

There are no areas identified as having a potential for induced growth along this alignment.

Assess Potential Minimization and Mitigation Measures

For each of the build alternatives, general minimization and mitigation measures such as erosion and sedimentation best management practices (BMPs) as a part of the Stormwater Pollution Prevention Plan (SWPPP) would be required for developments and would be implemented by the developer or the contractor. These BMPs would help protect water quality within this important karst region and as a result, also help protect stream and/or spring habitats potentially utilized by threatened and endangered species. The Arkansas Department of Environmental Quality (ADEQ) is the agency responsible with authorizing General Construction Stormwater permits and their associated SWPPPs.

Rogers, Lowell, Springdale, and Cave Springs (cities within the AOI) have adopted the Cave Springs Area Karst Resource Conservation Regulations drafted in 2015. Although the AOI is almost entirely outside of the Cave Springs Direct and Indirect Recharge Area Boundary and there are no areas of anticipated induced-growth in the recharge area, other future impacts to the region may still be examined closely by regulatory or partner agencies. Many cities have implemented mitigation measures to protect karst regions in their drainage criteria manual. Minimization and mitigation measures protecting karst features will help protect both water quality and wildlife habitat for areas within the direct Cave Springs recharge zone. If required by USFWS, BMPs to protect karst features will be implemented for direct impacts of the proposed project.

Furthermore, development projects within the AOI will be required to comply with the Clean Water Act (CWA). Section 404 of the CWA is regulated by the US Army Corps of

Engineers (USACE) and protects Waters of the United States, such as streams and wetlands. For any project requiring a Section 404 permit, Section 401 of the CWA will also be required, as will Section 7 of the Endangered Species Act (ESA) if federal funding is utilized. Section 401 requires water quality certification and is regulated by ADEQ. Section 7 of the ESA requires an assessment of impacts to federally-listed species and consultation with USFWS. Federally-funded project, or those with a federal nexus, also require Section 106 consultation with the State Historic Preservation Office with regards to impacts to cultural resources.

For threatened and endangered species specifically, minimized could be implemented by simply avoiding impacts to protected-species habitat. For potential loss of habitat and species potentially affected from increased magnitude of growth, BMPs could be implemented to minimize impacts to these resources. Local entities and developers could be responsible for incorporating BMPs for potential development activities. Examples of BMPs would be requirements for contractors to avoid harming species if encountered, seeding, replanting, and landscaping with specifications that would minimize soil disturbance where possible. Unfortunately, unless specifically required by federal or state regulations, developments often only utilize the minimum BMPs required. For the NLEB and IBat, seasonal tree clearing restrictions could be followed as one available mitigation measure.

Land use planning and regulatory guidelines would help manage any indirect impacts within the AOI, including impacts related to an accelerated rate of development and/or redevelopment. Examples of regulatory guidelines and planning techniques include subdivision regulations, zoning ordinances, land development regulations, and ordinances. However, it does not appear that any of the previously listed management strategies are currently in place within, or would be applicable for, the induced-growth areas. The responsibility of transportation providers, such as ARDOT, local and regional transit agencies, and local municipalities, would be to implement a transportation system to complement land use or development management techniques currently in place.

Summary and Conclusion

In conclusion, the improved mobility and accessibility within the project limits could indirectly alter traffic operations and growth patterns on existing highways. Increased accessibility in the three specific areas described above is anticipated by some city planners to increase the rate of future development within the AOI. These anticipated induced growth effects are expected to occur at three locations: the New Location Alternative's connections to Hwy 264 (**Figure 6**), and the Partial New Location Alternative's connections to Hwy 112 (**Figure 7**). Although no specific projects have been identified and no "reasonably foreseeable" projects are planned at these locations, the increased rate of development for residential, commercial, and mixed-use purposes in these three areas could potentially impact sensitive biological resources. However, measures such as BMPs, permitting guidelines, agency coordination, and regulatory requirements in

cooperation with appropriate stakeholders and entities would help to mitigate or minimize some potential adverse induced-growth impacts for these sensitive resources. The increased rate of development resulting from the proposed project could also result in positive economic impacts due to increased property taxes and sales tax revenues.

Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations (40 CFR § 1508.7) defines cumulative impacts (i.e., effects) as "the impact on the environment which results from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions." The purpose of a cumulative impacts analysis is to assess the direct and indirect impacts of the proposed project within the larger context of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future. This approach evaluates the incremental impacts of the proposed project in respect to the overall health and abundance of selected resources.

FHWA, in cooperation with the Arkansas Department of Transportation (ARDOT) and the Northwest Arkansas National Airport (XNA), are proposing to construct an approximately 4-mile long roadway that would connect XNA to Highway (Hwy) 612, which is also called the Springdale Northern Bypass (SNB). In compliance with FHWA regulations, this document has been prepared to assess the cumulative impacts of the proposed Northwest Arkansas National Airport Access project.

Four alternatives are described in detail in the Environmental Assessment prepared for the proposed project: the No Action Alternative, New Location Alternative, Partial New Location Alternative, and the Improve the Existing Highways Alternative. For the No Action Alternative, no improvements would be constructed; therefore, cumulative impacts would not result from this alternative. Cumulative impacts associated with the three action alternatives are discussed further in the following sections.

The following five-step approach¹ was utilized to assess the potential cumulative impacts of the past, present, and reasonably foreseeable actions to the resources in the study area:

- 1. Resource Study Area, Conditions, and Trends;
- 2. Direct and Indirect Effects on Each Resource from the Proposed Project;
- 3. Other Actions Past, Present, and Reasonably Foreseeable and their Effect on Each Resource;
- 4. The Overall Effects of the Proposed Project Combined with Other Actions; and
- 5. Mitigation of Cumulative Impacts.

Cumulative impacts are analyzed in terms of the specific resource being affected. The key resources of the analysis are identified using resources discussed in the Environmental Assessment. FHWA's Guidance states: "If a project will not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on that resource." CEQ guidance recommends focusing on key resource issues of national, regional, or local significance. To identify potential issues, the resource is considered whether it is protected by legislation or resource management plans; ecologically important; culturally important; economically important; or important to the well-being of a

¹ The five-step approach is based on American Association of State Highway and Transportation Officials' *Practitioner's Handbook 12: Assessing Indirect Effects and Cumulative Impacts Under NEPA*.

human community.

Applying the above criteria, the resources or environmental issues considered for the cumulative impacts analysis are listed in **Table 1**. As recommended by CEQ guidance, specific indicators of each resource's condition are identified and shown. The use of indicators of a resource's health, abundance, and/or integrity are helpful tools in formulating quantitative or qualitative metrics for characterizing overall impacts to resources. These indicators are also key aspects of each resource that have already been evaluated in terms of the project's direct and indirect impacts and facilitate greater consistency and objectivity in the analysis of cumulative impacts.

Resource	Are there Substantial Adverse Direct or Indirect Impacts?	ls Resource/ Issue at Risk or in Poor or Declining Health?	Is Resource/ Issue Included in Cumulative Impacts Analysis?	Reason for Including or Excluding Key Issues for Cumulative Impacts Analysis
Water Resources	Yes	Yes. The total area/quantity of water resources is in decline or at risk from development.	Yes	The potential direct and indirect impacts to water resources (i.e., wetlands, springs, streams, and floodplains) would warrant a cumulative impacts analysis.
Ecological Resources	Yes	Yes. The populations of certain federally-listed species and their habitats are in decline or at risk.	Yes	The direct and indirect impacts to some federally-listed species would warrant a cumulative impacts analysis.
Land Resources and Uses	Yes	Yes. While undeveloped land is not in short supply within the project area, it is a resource in decline.	Yes	Since both direct and indirect land use impacts are anticipated, and undeveloped land would be considered a declining resource, a cumulative impacts analysis is warranted.
Community Resources	No	No. Most neighborhoods are currently stable but could experience conflict from development. No parks or recreation areas are present in the project area.	No	No direct or indirect impacts are anticipated from the proposed project. Resources not directly or indirectly affected are not included in the cumulative impacts analysis.
Air Quality	No	No. The area is in attainment for air quality standards under the Clean Air Act.	No	No direct or indirect impacts are anticipated from the proposed project. Resources not directly or indirectly affected are not included in the cumulative impacts analysis.

Resource	Are there Substantial Adverse Direct or Indirect Impacts?	ls Resource/ Issue at Risk or in Poor or Declining Health?	Is Resource/ Issue Included in Cumulative Impacts Analysis?	Reason for Including or Excluding Key Issues for Cumulative Impacts Analysis
Traffic Noise	Potentially	No. Traffic noise is not considered a declining or at-risk resource. However, sensitive noise receptors are present and are directly impacted by noise caused from the proposed action.	No full analysis conducted.	Traffic patterns will change as a result of the proposed action and could result in increased traffic noise levels in some areas. Induced-growth effects are not anticipated to result in substantial traffic noise. Noise associated with the Airport is expected to increase in the future as the airport is more heavily utilized by aircraft. However, these impacts are not projected to expand beyond airport property. A full cumulative analysis of traffic noise is not conducted as substantial cumulative impacts related to traffic noise are not anticipated to occur as a result of the proposed action.
Historic Resources	No	No NRHP listed or eligible for listing sites are at risk and may be present within the project area.	No	While historic properties are considered a declining resource and may be impacted by the proposed project, impacts are not expected to be significant and will, therefore, not be included in the cumulative impacts analysis. Furthermore, no induced growth effects to these resources are anticipated.

Source: Project Team, May 2020.

Resources eligible for a cumulative impacts analysis are water resources, habitat for some federally-listed species, and land use. Traffic noise is assessed in the EA document. Each of the following sections discuss these eligible resources using the five-step approach applied for the cumulative impacts analysis.

Water Resources

1. Resource Study Area, Conditions, and Trends

The resource study area (RSA) for the cumulative analysis for water resources was delineated using the HUC12 watershed units (**Figure 1**). This watershed is used as the boundary for the RSA because it is the watershed in which the proposed project is located and encompasses water resources that would be potentially affected by the proposed project. The temporal study period is from 1998 to 2040. The temporal start date of 1998 was selected to follow the year when the construction of XNA was completed and open to the public. The ending temporal boundary of 2040 is selected to correlate with the design year of the proposed project.

The RSA, which encompasses approximately 154 square miles (98,327 acres), includes numerous streams including Spring Branch, Spring Creek, Brush Creek, Little Osage Creek, and Osage Creek, the latter two occurring within the immediate project vicinity. None of the watercourses within the RSA are classified as impaired or have established Total Maximum Daily Loads (TMDLs). Water resources identified within the RSA are shown in Figures 2 and 3. These aquatic features within the RSA were identified using a variety of methods, including field identification, reviews of aerial imagery, topographic maps, the National Hydrology Dataset, and the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps, and Federal Emergency Management Agency (FEMA) flood hazard zone data. With the exception of field identification, none of the above-listed resources are field verified due to the size of the RSA. However, these data sources showed similar attributes in relation to water features and the NWI data was specifically used to determine the approximate acreage of wetland and riparian/stream features within the RSA. Using the NWI data, approximately 2,617 acres of water features are within the RSA. This constitutes approximately 3% of the entire RSA. Based on Federal Emergency Management Agency (FEMA) data, the RSA contains approximately 3,908 acres of Zone A floodplain and 3,556 acres of Zone AE floodplain. These areas constitute approximately 8% of the entire RSA. The majority of the floodplains are located in the southwest quadrant of the RSA as they are associated with the major watercourses draining to the southwest. All floodplains within the proposed action areas are Zone A floodplain.

Based on field data collected in the immediate vicinity of the proposed alignments, approximately 25 wetlands (totalling roughly 6 acres), 10 springs, and 50 streams (totalling roughly 61,000 linear feet [LF]) are present within the alternative corridors. The majority of the wetlands are emergent and the majority of the streams are ephemeral. Existing wetlands and streams appeared to range from good to fair condition, with condition relative to the feature's proximity to existing development. Those aquatic features near existing highways (such as along Hwy 264 and Hwy 112) or homesteads often appeared in poorer condition than those features isolated from existing development. This was especially true along Hwy 264 where on-going construction is occurring, including the replacement of the existing bridge over Little Osage Creek. Osage Creek and Little Osage Creek are both perennial watercourses classified as



Figure 1: Resource Study Area (RSA) for Water Resources



Figure 2: Water, Wetland, and Spring Features Within the RSA



Figure 3: Floodplains Within the Water Resource RSA

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Ecologically Sensitive Waterbodies by ADEQ due to the habitat they provide to protected species. Additionally, four of the springs within the project area were located in the same vicinity and all appeared in fair condition due to their immediate proximity to existing development. Two of the four were in a gravel road (Farrar Rd), one was adjacent to a residential property with the resulting stream channelized, and the fourth flowed through a field heavily disturbed by cattle. Floodplain health is not known but based on the historical trend of continued development in the floodplain (based on comparing 1989 and 2017 aerial imagery), additional floodplain develop is an anticipated trend. However, both Benton and Washington Counties participate in FEMA's National Flood Insurance Program and require floodplain development permits.

Data is not available from previous to current conditions to quantify changes in floodplain, acreage of wetlands or lengths of undisturbed streams; however, it is likely to assume that the amount of wetland acreage and lengths of undisturbed streams has steadily decreased over time due to increased development and changes in land use. Similarly, development within the floodplain has increased when comparing available 1989 imagery and 2017 imagery. According to U.S. Census Bureau population data, the cities within and surrounding the project vicinity are experiencing an increasing growth trend. Historical trends include additional infrastructure, additional subdivisions, and land clearing for cattle or hay production. However, the ecological importance of the area and the benefits of this karst region is becoming more apparent as more and more regulations to protect these features have been established within the past couple years (e.g., the Cave Springs Karst Regulations which has been adopted by several cities). Future trends in development within the Cave Springs Direct Recharge Area will be less impactful on natural resources than were historical developments. However, for developments outside the Direct Recharge Area, slow minor declines in water resources, including floodplains, are anticipated.

2. Direct and Indirect Effects on Each Resource from the Proposed Project

Permanent fill impacts to wetlands from the proposed project (direct effects) are approximately 3.3 acres for the New Location Alternative, 0.8 acre for the Partial New Location Alternative, and 1.5 acres for the Improve Existing Highways Alternative. Fill material would be placed in the wetlands for the construction of items such as roads, embankments, bridge abutments, and bridge columns. Depending on the grading necessary for construction, impacts to some forested wetlands (such as at bridge crossings) would be permanently altered with the removal of trees, but these areas may return as herbaceous wetlands. Other areas would be filled and would result in a complete loss of wetland areas.

Two springs near the New Location Alternative would be directly impacted by construction. Impacts to on-site springs are currently anticipated for three springs along the Partial New Location Alternative and two springs along the Improve Existing Highways Alternative. Cave Springs Cave and the recharge zone will not be impacted by the project.

Permanent fill impacts to streams from the proposed project are approximately 6,618 LF

of streams for the New Location Alternative, 6,705 LF for the Partial New Location Alternative, and 14,849 LF for the Improve Existing Highways Alternative. Fill material would be placed in streams for the construction of items such as culvert extensions, bridge columns, and roadway widening.

The stream and wetland impacts would require Section 404 permitting through the U.S. Army Corps of Engineers (USACE). Mitigation would be required for the impacts and it is possible that a permanent loss of function and services associated with the aquatic features within the proposed project limits may occur. Additional coordination with USACE and the USFWS will occur prior to construction.

Direct impacts to floodplain are not currently known, but the amount of floodplains in the proposed ROW is reported. The New Location Alternative would cross 15.6 acres of floodplain while the Partial New Location Alternative would impact 11.0 acres. The Improve the Existing Highways Alternative would cross 24.4 acres of floodplain. Floodplain impacts would require that a Floodplain Development permit from Benton County be obtained.

Minimal indirect impacts were determined from the proposed project. Three areas with the potential for induced growth were identified in the indirect effects analysis: the intersection of the New Location Alternative with Hwy 264, the intersection of the Partial New Location Alternative with Hwy 264, and the intersection of the Partial New Location Alternative with Hwy 112. Based on input from city planners, it is possible that developments within these areas may occur independent of the proposed project; however, the proposed project would likely affect the rate of the development. For the New Location Alternative, one stream (approximately 1,200 LF) and three ponds (totaling approximately 0.4 acre) would be impacted through fill or culverting by induced growth in the developable area. For the Partial New Location Alternative, three streams (totaling approximately 2,800 LF), five wetlands (totaling approximately 0.9 acre), two ponds (totaling approximately 1.4 acres), and 33.6 acres of floodplains could be impacted through fill or culverting by induced growth areas.

3. Other Actions – Past, Present, and Reasonably Foreseeable – and their Effect on Each Resource

Numerous past actions have occurred in the immediate project vicinity within the past 22 years, few of which have been significant in scale. The most notable past development is the construction of the SNB which connected I-49 and Hwy 112. Currently, only a portion of this project has been built. However, the full project will extend from Hwy 412 in Tontitown to Hwy 412 east of Sonora. Based on the Final Environmental Impact Statement (FEIS) prepared for the project, the preferred alignment for the entire project will impacted 2,600 LF of Special Flood Hazard Area (SFHA), 600 LF of floodway, one spring, and a total of 21 stream crossings. Other past actions include construction of low-density residential properties near the south end of the New Location Alternative (impacts unknown), construction of a subdivision along the east side of Hwy 112 (few apparent impacts), construction of several low-density residential properties located northwest of

the intersection of Wager Drive and Hwy 112 (nearly all of these properties are in the floodplain and may have also result in wetland impacts), construction of an RV park and an additional subdivision along the west side of Hwy 112 (a portion of the subdivision is in the floodplain and also appears to have impacted a stream and wetlands), replacement of the bridge on Hwy 264 over Osage Creek (temporarily stream impacts likely), construction of several low-density residential properties along Hwy 264 and associated sideroads (stream and wetland impacts possible), and construction of a subdivision along the south side of Hwy 264 (few apparent impacts). Past actions within the RSA beyond the immediate project vicinity have been much more sizable and include the development (primarily residential but includes commercial as well as a large quarry) of very large areas. Areas developed since 1998 occur primarily east of Hwy 112 as the larger cities of Springdale, Lowell, Rogers and Bentonville expand their boundaries. Historical data was not available to determine specific areas of potentially affected wetlands and streams from past actions. However, based on aerial imagery and topographic maps, some developments may have filled existing wetlands or culverted/filled existing streams. For the replacement of the bridge on Hwy 264 over Osage Creek, the bridge was constructed on an offset alignment to the south and water quality impacts were presumably primarily temporary.

Present actions identified in the immediate project vicinity include the replacement of the existing Hwy 264 bridge over Little Osage Creek on an offset alignment to the north. Construction appears to have impacted approximately 1,200 LF of one unnamed tributary that flows east along the north side of Hwy 264 as well as approximately 0.2 acre of one wetland-stream complex located northeast of the intersection of Colonel Myers Road and Hwy 264. Other construction impacts in the immediate area (associated with an unknow project) are present along the south side of Hwy 264 approximately 0.2 mile west of the Hwy 264/Haden Road intersection and include what appears to be visible disturbance of approximately 300 LF of the stream and roughly 0.2 acre of a wetland.

Other present and future actions include the developments or expansions of several subdivisions within Cave Springs and Lowell as well as roadway improvement projects. Some of these projects were described by City Planners and copies of their responses are located within this appendix. However, many of the city planners failed to provide specific details regarding proposed development. Of those projects with specific enough details to locate the project, a total estimated 3,230 LF of stream impacts and 0.4 acre of wetland impacts may have occurred as a result of the site grading conducted. No apparent floodplain impacts resulted from the site grading associated with the locatable city projects. During the interview process, the Airport indicated that a future industrial park was planned adjacent to the airport though the specific location was not provided. Based on available planning documents, this development did not appear reasonable foreseeable or financially constrained. Additionally, based on recent aerial imagery, three large areas appear to have been recently disturbed, one of which is for residential development and the other two appear to be for surface mining and/or commercial developments. These three areas collectively appear to have impacted approximately 1,950 LF of streams and 0.4 acre of wetlands. One of these areas is within a floodplain but no currently structures or roadways appear to have been constructed.

The City of Cave Springs plans to build a wastewater line from Cave Springs to the Northwest Arkansas Conservation Authority (NACA). The proposed improvements to the city's wastewater treatment and disposal system currently have three alternatives under consideration. Implementation of this project would incur wetland and/or stream impacts but the quantity of these impacts would depend on which alternative was chosen. Further development of this project is required before quantitative impact analysis can occur with regards to its cumulative effects on the Northwest Arkansas National Airport Access project with regard to wetlands and streams.

As a result of the rapid population growth in northwest Arkansas, many new transportation infrastructure projects have been proposed in the region to keep pace with the residential and commercial developments. Some of these transportation projects are reasonably foreseeable actions and are shown in Figure 3 of the EA document. Based on the 2019-2022 Statewide Transportation Improvement Plan (STIP) and interviews with the Northwest Arkansas Regional Planning Commission (NWARPC), five foreseeable projects are planned within the RSA. The first project is the Hwy 112 Corridor Improvements project which plans construction to be completed in 2022. NWARPC mentioned in a phone interview that while there is money in the STIP for the Hwy 112 improvements, the entire section identified for improvements will not necessarily get built. Hwy 112 traverses through or near several environmentally sensitive areas, including the Cave Springs Recharge Area. It is the only continuous North-South route west of I-49, serving local and regional traffic between Fayetteville and Bentonville, making it crucial for regional mobility. The proposed improvements will widen 17.9 miles of the highway (beginning at the Benton/Washington County line extending north) from two to four travel lanes, improve geometry, and provide access management. Strategies to manage access such as adequate driveway spacing, a raised median, and deceleration lanes will be necessary to maximize operations and safety through this corridor. Hwy 112 crosses an estimated 17 streams (impacting an estimated 1,891 LF within the project area) and numerous floodplains. Widening of this facility will likely impact these resources. Additionally, an estimated 0.3 acres of wetlands may be associated with some of those streams and/or floodplains. However, these impacts will be smaller in scale than a newalignment project as improvements would presumably stay within existing right of way. The second foreseeable project is the approximately six-mile extension of the SNB (Hwy 612) for which construction is planned to be completed in 2021. This project is considered an essential east-west corridor improvement to the highway system in the metropolitan area and will continue to improve reliability and safety for freight and commuters by providing a four-lane fully controlled access freeway through the urbanized area and relieving traffic congestion and improving safety on the existing US 412 through Springdale. Water resource impacts associated with this project (both past and future work) were previously described and are anticipated to be greater in quantity compared to other projects since the SNB will be constructed on entirely new alignment. The third project is an intersection improvement project in Lowell at Hwy 264 and Bellview Street. Minimal to no water resource impacts are anticipated. The fourth project is a capacity project in Rogers on Hwy 12 just west of 8th Street. Water resource impacts are anticipated to be minimal as the area is in a highly developed area. The fifth project is a capital project in Centerton on Hwy 102 just east of Hwy 279. Water resource impacts

may include two stream impacts as well as floodplain impacts. According to an interview with NWARPC, other identified projects in the vicinity of the proposed improvements (notably the Hwy 279 Corridor, Hwy 264 west of I-49, and Hwy 264 within Cave Springs) are environmentally constrained by sensitive areas and not likely to occur in the foreseeable future.

Delineation of past and future impacts to water resources are difficult to quantify for the above-described actions and especially so for those city projects that were not locatable. However, types of impacts could include stream or wetland fill, culvert extensions, bridge widening and/or development within the floodplain. For those other projects that wetland and stream impacts are able to be estimated, a total of 4,730 LF of stream impacts and 2.8 acres of wetland impacts could be anticipated in total. With all future projects, analysis of impacts to water resources would be individually evaluated during project implementation.

To conservatively estimate "worst case" impacts from future actions, trends from USFWS studies² were used to calculate the potential areas of wetlands that would be present by 2040. Using the five-year 2004-2009 study from USFWS, a two percent decline was determined for that time period. If this trend continues, the amount of wetlands would decline by approximately eight percent. Although this percentage does not seem staggering, if applied to the amount of water and wetland features within the RSA, this eight percent represents approximately 209 acres which can be a substantial amount of habitat loss for species that depend on these areas. The cumulative effects of losses in freshwater systems can have consequences for hydrologic and ecosystem connectivity. Substantial reductions in wetland extent can result in habitat loss and fragmentation, and may limit the ability to reconstruct and repair wetlands (Dahl 2011). However, this wetland reduction is again, simply a worst case scenario of wetland decline within the entire RSA.

4. The Overall Effects of the Proposed Project Combined with Other Actions

As stated in the previous section, cumulative effects of freshwater system reductions can have hydrologic and ecological consequences. The direct impacts of up to 3.3 acres of wetland impacts and up to 14,849 LF of stream impacts is a relatively small reduction of total acreage for water resources found within the RSA. The indirect impacts of up to 2.3 acres of wetland impacts and up to 2,800 LF of stream impacts is also a relatively small reduction of water resources. The direct and indirect impacts to wetlands equate to approximately 0.1 percent of the total acreage for water resources (approximately 2,617 acres) found within the RSA. This reduction combined with the other actions where impacts are able to be estimated would produce a cumulative impact of 23,420 LF for streams and 7.3 acres for wetlands. However, this only represents a subset of the impacts resulting from other actions. Therefore, the cumulative impacts resulting from the worst case scenario are also considered and these total to an 8.1 percent reduction in aquatic resources, which would mean a loss of approximately 213 acres of aquatic resources throughout the entire RSA. Likely the true cumulative impact to the acreages of wetlands

² Dahl, T.E. 2011. Status and Trends of Wetlands in the Conterminous United States 2004 to 2009. U.S. Department of the Interior; Fish and Wildlife Service, Washington, D.C. 108 pp.

and streams will be somewhere between these two values (i.e, between 7 and 213 acres). Overall, given the relatively minor percentage of wetland reduction, the proposed project is not expected to contribute substantial cumulative impacts to water resources in the project vicinity. Cumulative impacts to floodplains related to other past and reasonably foreseeable future actions combined with the proposed project are also possible. However, as with the proposed project, floodplain impacts will be minimized on other projects through location and design considerations.

5. Mitigation of Cumulative Impacts

For the proposed action, several standards and regulations are in place to mitigate for water resource impacts. General minimization and mitigation measures such as erosion and sedimentation best management practices (BMPs) as a part of the Stormwater Pollution Prevention Plan (SWPPP) would be required for roadway construction and would be implemented by the Developer or the Contractor. These BMPs would help protect water quality within this important karst region and as a result, also help protect stream and/or spring habitats potentially utilized by threatened and endangered species. The Arkansas Department of Environmental Quality (ADEQ) is the agency responsible with authorizing General Construction Stormwater permits and their associated SWPPPs. Additionally, BMPs identified by USFSW (2007)³ will be used for the proposed action as a guide to ensure that any sedimentation is kept to a minimum and to avoid impacts to groundwater and sensitive or endangered species. BMP measures employed can include the use of filter fences, straw bales, interceptor dikes and swales, sediment traps, detention basis, seeding and revegetation where appropriate. Additionally, the Cities of Rogers, Cave Springs, Lowell, and Springdale have adopted the Cave Springs Area Karst Resource Conservation Regulations drafted in 2015. Although the proposed action is outside of the Cave Springs Direct Recharge Area, impacts of other actions within the direct recharge area in these cities will be closely examined. These cities have implemented specific mitigation measures to protect karst regions in their drainage criteria manual or in their city ordinances and any other actions will be required to abide by these standards. Impacts from the proposed action will also be required to comply with the Clean Water Act (CWA). Section 404 of the CWA is regulated by the US Army Corps of Engineers (USACE) and protects Waters of the United States (i.e., streams and wetlands). The proposed action will also require water quality certification for stream impacts as it will be subject to Section 401 of the CWA. For floodplains, a Floodplain Development permit from Benton County will be obtained and per the permit requirements, the Flood Damage Prevention Ordinance will be applied to minimize flood damages to the proposed development and to adjacent properties as well. As for other actions, both Benton and Washington Counties participate in FEMA's National Flood Insurance Program and Benton County (which is where the proposed action occurs and most of the RSA is located) participates in the Community Rating System. Participation in the Community Rating System program mitigates home and business damage by flooding.

³ United States Fish and Wildlife Service, 2007. Community Growth Best Management Practices for Conservation of Karst Recharge Areas, 14 pp.

Minimization and mitigation for impacts of other future actions (assuming they are federally funded or involve federal permitting) should require the same standards and adhere to the same regulations as described above for the proposed action. Efforts should be taken through local, state, and federal regulations to avoid and minimize any adverse effects from development or future activities. Any impacts associated with future developments would be the responsibility of developers in coordination with the local municipalities and local agencies.

Federally-Listed Species Habitat

1. Resource Study Area, Conditions, and Trends

The proposed project has the potential for a "may affect not likely to adversely affect" determination for seven federally-listed species: the gray bat, Indiana bat (IBat), northern long-eared bat (NLEB), Ozark big-eared bat, eastern black rail, Ozark cavefish, and the Benton County cave crayfish. Resources associated with these species include wooded habitat and riparian corridors (for bat roosting/foraging), caves (for bat roosting), emergent wetlands (for the rail), and cave streams and springs caves (for the Ozark cavefish and the Benton County cave crayfish). The RSA for the cumulative analysis of federally-listed species habitat was delineated using a combination of natural speciesbased boundaries for bats and the mapped vulnerability areas of the Cave Springs Recharge Area with regards to the two karst species (the Ozark cavefish and the Benton County cave cravfish). First, a 2.5 buffer was placed around the project extents. This distance is based on a reasonable bat foraging distance of 2.5 miles⁴. Next, any area identified as a vulnerability zone was included in the RSA, which is labelled as the T&E RSA in **Figure 4**. By design and as shown in **Figure 4**, the resulting RSA includes both the direct and indirect Cave Springs recharge areas and encompasses a total of approximately 66,474 acres. The same temporal limits (1998 to 2040) used for the cumulative analysis on water resources is applied for this analysis for the same reasons as discussed in the water resources section. The boundary of the direct and indirect recharge areas can be seen in Appendix F of the EA document. Exhibits showing mapped wooded areas (representing bat habitat) and identified emergent wetlands (representing rail habitat) are provided in Appendix H and G, respectively, of the EA document.

Karst features including caves, sinkholes, and solution valleys are known to occur in the ecological region encompassing the RSA. Springs are common and contribute substantially to streamflow in the summer and fall. Losing streams can be direct conduits to groundwater resources and in this specific area are those that allow discrete recharge into the Cave Springs Recharge Area. The region is noted to be mostly cleared for pastureland, hay land, or expanding residential development.

Northwest Arkansas is an area of the state that has experienced unprecedented periods of growth over the last decade, most notably from 2003 to 2007. As a result, the Northwest Arkansas Regional Planning Commission funded a study to identify efforts that would help prevent future adverse effects to threatened and endangered species, and their habitats within the sensitive karst landscapes of northwest Arkansas⁵. Recommendations from the study included endangered species surveys and recharge delineation studies for caves associated with endangered and threatened species and avoiding water quality degradation, among many others. The study concluded that without such efforts, it was

⁴ USFWS. 2019. Section 7 Technical Assistance, Summary of Indiana Bat Ecology. Available at:

https://www.fws.gov/midwest/endangered/section7/s7process/mammals/inba/INBAEcologySummary.html

⁵ Aley, T. and C. Aley. 1979. Prevention of adverse impacts on endangered, threatened, and rare animal species in Benton and Washington Counties, Arkansas. Northwest Arkansas Regional Planning Commission, Springdale, Arkansas. 35p.



Figure 4: Federally-Listed Species Habitat RSA Map and Select Features within the RSA for Listed Species

likely that adverse effects to groundwater and other ecologically important resources could occur over time.

The RSA contains approximately 12,231 acres of forested habitat and riparian corridors (suitable for bat roosting/foraging; based on the 2016 National Land Cover Database; NLCD), 1,218 acres of presumptive habitat for the Ozark cavefish (as identified by the Cave Springs Area Karst Resource Conservation Study), and 479 miles of streams mapped by the National Hydrology Databases (potentially connected to suitable habitat for cavefish and cravfish), and less than 1 acre of emergent wetland habitat (suitable rail habitat; based on the 2016 NLCD). Osage Creek and Little Osage Creek are both perennial watercourses classified as Ecologically Sensitive Waterbodies (ESW) by ADEQ. ESAs are known to provide habitat within the existing range of threatened, endemic species aquatic or semi-aquatic endangered or of life forms (https://www.adeg.state.ar.us/water/resources/definitions.aspx). Of the stream habitats, approximately 43,137 LF are identified by the Cave Springs Area Karst Resource Conservation Study as being losing streams. As previously described, losing streams are karst features that can be direct conduits to groundwater resources and in this specific area are those that allow discrete recharge into the Cave Springs Recharge Area. Much of the wooded habitats within the RSW are fragmented from existing development and roadways. However, large sections of woodlands and riparian corridors are still present along streams, particularly in the southwest guadrant of the RSA.

Precise data is not available previous to current conditions to quantify historical trends in habitat quality/quantify for these federally-protected species. However, based on historically aerial photography, the overall amount of forested habitat has steadily decreased over time due to increased development and changes in land use. Given current aforementioned water quality trends for Cave Springs Cave and the rapidly changing use and development of the area, the condition of threatened and endangered species in the area remains uncertain. Historical trends include additional infrastructure, additional subdivisions, and land clearing for cattle or hay production. However, the ecological importance of the area and the benefits of this karst region is becoming more apparent as more and more regulations to protect these features have been established within the past couple years (e.g., the Cave Springs Karst Regulations which has been adopted by several cities). Thus, it is believed that future trends in development will be less impactful on natural resources than was historical development.

2. Direct and Indirect Effects on Each Resource from the Proposed Project

Clearing and grading activities within the proposed right of way (ROW) will directly impact approximately 75.5 acres of forested habitat by the New Location Alternative, 26.4 acres by the Partial New Location Alternative, and 18.9 acres by the Improve Existing Highways Alternative. Removal of these trees could permanently convert potentially suitable bat habitat to maintained ROW.

Clearing and grading activities within the proposed right of way (ROW) will also directly impact approximately 0.7 acre of emergent wetlands within the Partial New Location

Alternative and 0.08 acre of emergent wetlands within the Improve Existing Highways Alternative. No emergent wetlands will be directly impacted by the New Location Alternative. Removal of these emergent wetlands could permanently convert potentially suitable rail habitat to maintained ROW.

While none of the proposed alternatives directly impact presumptive habitat (as identified by the Cave Springs Area Karst Study) for the Ozark Cavefish or occur within the delineated recharge zone, the proposed project does occur within several vulnerability zones. Of the 242 acres of proposed ROW for the New Location Alternative, approximately 123 acres (51 percent) occurs within vulnerability zones 1, 2, or 3. Of the 101 acres of proposed ROW for the Partial New Location Alternative, approximately 86 acres (85 percent) occurs within vulnerability zones 1, 2, or 3. Of the 75 acres of proposed ROW for the Improve Existing Highways Alternative, approximately 49 acres (65 percent) occurs within vulnerability zones 1, 2, or 3. Construction activities in these areas will result in land disturbance and increased rates of erosion and sedimentation. Additionally, as discussed in the water resources section, each alternative will directly impact (through grading and/or fill) springs identified during the wetland delineation. Two springs near the New Location Alternative would be directly impacted by construction, three springs would be impacted by the Partial New Location Alternative, and two springs would be impacted by the Improve Existing Highways Alternative. Moreover, because the project occurs with a karst region, aquatic resources (including ponds) may be connected belowground or off-site to karst features and, therefore, the likelihood exists that impacts to karst features and/or habitat for cave-obligate species could occur as a result of direct or indirect impacts.

Portions of Osage Creek and Little Osage Creek, which are classified as ESWs by ADEQ due to the important habitat they provide to wildlife including federally-protected species, are present in the project extents. The New Location Alternative will construct two span bridges, one over each of the two creeks and substantial direct impacts to these watercourse will be avoided. Further north, a portion of Little Osage Creek will be impacted along Hwy 264 by the proposed crossing of both the Partial New Location Alternative and the Improve Existing Highways Alternative. Impacts to these streams or to any adjoining wetlands would require Section 404 permitting through the USACE. Mitigation would be required for any impacts and it is likely that a permanent loss of all function and services associated with the aquatic features can be avoided through minimization and mitigation measures. Additional coordination with the USFWS will occur prior to construction.

Minimal indirect impacts were determined from the proposed project. Three areas with the potential for induced growth were identified in the indirect effects analysis: the intersection of the New Location Alternative with Hwy 264, the intersection of the Partial New Location Alternative with Hwy 264, and the intersection of the Partial New Location Alternative with Hwy 112. Based on input from city planners, it is possible that developments within these areas may occur independent of the proposed project; however, the proposed project would likely affect the rate of the development. For the New Location Alternative, induced growth in this area may affect (through removal) 6

acres of potentially suitable roosting habitat for the NLEB and IBat. Additionally, this area contains one barn and one shed (both abandoned) that could function as NLEB summer roosting habitat. Any future tree clearing that may occur could comply with the 4(d) rule established for the NLEB, and seasonal tree clearing restrictions would minimize impacts the NLEB and IBat.

For the Partial New Location Alternative, induced growth in these two areas may affect (through removal) a total of 14 acres of potentially suitable roosting habitat for the NLEB and IBat and approximately 0.7 acre of potentially suitable emergent wetland habitat for the rail. Additionally, this area appears to contain some barns/sheds that may be abandoned and could function as NLEB summer roosting habitat. Depending on the amount of required tree clearing that may occur, future projects could comply with the 4(d) rule established for the NLEB, and seasonal tree clearing restrictions would minimize impacts the NLEB and IBat. Although both of these two developable areas are outside of the Cave Springs Recharge Area boundary, the eastern portion of the area around the Hwy 264 intersection is within a moderate vulnerability zone of the Cave Springs Karst Region and the entire area around the Hwy 112 intersection is within either a moderate, high, or extremely high vulnerability zone of streams increases the likelihood that these areas may contain suitable habitat for the Ozark Cavefish or the Benton County Cave Crayfish, resulting in a may affect determination for the species.

No areas of induced growth were identified for the Improve the Existing Highways Alternative.

3. Other Actions – Past, Present, and Reasonably Foreseeable – and their Effect on Each Resource

As documented in the water resources section, numerous past, present, and reasonably foreseeable actions have occurred in the water resource RSA. The RSA established for federally-listed species habitat is slightly smaller and almost entirely contained within the RSA established for water resources. No additional "other actions" were documented within the T&E RSA. However, two of the five reasonably foreseeable transportation projects listed for the waters RSA occur outside of the habitat RSA. The two future projects beyond the habitat/T&E RSA that are not evaluated for this resource are the capacity project in Rogers on Hwy 12 just west of 8th Street and the capital project in Centerton on Hwy 102 just east of Hwy 279.

As mentioned in the water resources section, the City of Cave Springs plans to build a wastewater line from Cave Springs to the NACA. The proposed improvement to the city's wastewater treatment and disposal system currently has three alternatives under consideration. Regardless of which alternative is chosen, this project will cross through areas having karst features, such as springs, caves, and losing streams. This project, combined with the Highway 112 widening (including the Cave Springs Bypass) and the proposed Northwest Arkansas National Airport Access project is expected by USFWS to have cumulative effects for karst species such as the Ozark cavefish and the Benton

County cave crayfish. In correspondence dated October 8, 2020, USFWS recommends that in order to minimize impacts to listed species, ARDOT should coordinate the paths of the Cave Springs Bypass, widening of Highway 112, and construction of the Northwest Arkansas National Airport Access road to overlap as much as possible and follow alignments being proposed for other actions, such as NACA. In addition, USFWS recommends following karst best management practices consistent with those previously developed for the Cave Springs Cave Recharge area.

Little historical data was available to determine specific areas of potentially affected habitat from past actions. However, based on aerial imagery, it is estimated that roughly 71 acres of wooded habitat within the RSA was removed as a result of the past construction of the SNB. The impact this project had on cave-obligate species is unknown, but the selected alignment did not allow access at the I-49/bypass directional interchange near the recharge area in order to limit induced development. Additionally, according to the Environmental Impact Statement and Record of Decision prepared for the project, drainage and stormwater runoff from the selected alternative would not discharge into the Cave Springs recharge area. Moreover, commitments for the selected alternative were established that limited access, additional interchanges, and the construction of frontage roads between Hwy 112 and I-49. For other past projects, the effects of past low-density residential development would have only minor impacts to species habitat (tree clearing is likely and potentially impacts to rail habitat could have occurred) compared with construction of large subdivisions which typically clear cut and grade entire areas during site preparation. Based on NWI data, none of the locatable subdivisions currently under construction impacted emergent wetlands. Large scale past developments (primarily residential but include commercial) have contributed to an overall decline in the amount of forested habitat. Establishment of the quarry located immediately south of the SNB appears to have removed approximately 46 acres of forested habitat and is located within both extremely high and high vulnerability zones for karst habitat. Based on historical aerial imagery, the three large recently disturbed areas (one intended for residential development and the other two appearing to be for surface mining and/or commercial developments) may have collectively impacted approximately 19 acres of woodlands.

Delineation of future impacted habitat for federally-listed species are difficult to quantify for these actions given the extensive size of the RSA. However, types of impacts expected to occur include tree removal which permanently converts wooded habitat to maintained ROW or residential/commercial development. Land disturbance associated with present and foreseeable project increases rates of erosion and sedimentation and can threaten water quality in this sensitive karst region in appropriate BMPs are not implemented. It is anticipated that the on-alignment portion of the future Hwy 112 widening project would not significantly impact species habitat compared to other new alignment projects because improvements would generally stay within existing right of way. Regardless, it is estimated that the Hwy. 112 project would impact 5 acres of suitable foraging habitat for bats, one spring, and 0.1 acre of emergent wetlands (for the Rail). However, the Cave Springs Bypass project would cross through areas having karst features, such as springs, caves, and losing streams. As previously mentioned, this project, combined with the

Highway 112 widening and the proposed Northwest Arkansas National Airport Access project is expected by USFWS to have cumulative effects for karst species such as the Ozark cavefish and the Benton County cave crayfish. The SNB extension will occur on entirely new alignment and may result in the clearing of approximately 10 acres of wooded habitat with the RSA. For the entire SBN project, the FEIS document reported a total of approximately 344 acres of woodland to be converted to highway ROW by the project. Additionally, as previously mentioned, because the SNB, the Hwy 112 widening, and the intersection improvements in Lowell all occur with a karst region, aquatic resources (including ponds) may be connected belowground or off-site to karst features and, therefore, the likelihood exists that impacts to these features could result in impacts to habitat for cave-obligate species. Yet, with each of these three future projects, analysis of impacts to each resource would be individually evaluated during project implementation.

To conservatively estimate "worst case" impacts from future actions, present (2016) tree cover quantities from the National Land Cover Database (NLCD) were compared to past (2001) quantities. In 2001, the NLCD shows approximately 13,357 acres of forested area in the T&E RSA, compared to 12,231 acres of forested area in 2016. This is an eight percent reduction for that 15-year period. If this trend continues, the amount of forested areas would decline by approximately 11 percent by 2040. Although this percentage does not seem staggering, if applied to the amount of forested areas within the RSA, this 11 percent represents approximately 1,305 acres, which can be a substantial amount of habitat loss for species that depend on these woodlands. However, this woodland reduction is, again, simply a worst-case scenario of woodland decline within the entire RSA and does not represent other types of habitat decline or reflect quality.

4. The Overall Effects of the Proposed Project Combined with Other Actions

As discussed in the water resources analysis, cumulative effects of freshwater system reductions can have hydrologic and ecological consequences. Moreover, adverse effects within the karst landscapes of the RSA (which coincides with habitat for some threatened and endangered species) can be pronounced in that these landscapes contain caves, sinkholes, springs, and losing streams (all of which can be direct conduits to groundwater resources).

The direct impacts of up to 75.5 acres of tree clearing (for the New Location Alternative) is a relatively small reduction of total wooded habitat found within the RSA. The indirect impacts of up to 6 acres of wooded habitat is a very small reduction of resources. The direct and indirect impacts (for the New location Alternative which would represent the largest combination of direct and indirect impacts to wooded areas) equates to an estimated maximum of 82 acres of tree clearing, which is approximately 0.7 percent of wooded area within the RSA. This reduction combined with the other actions where impacts are able to be estimated would produce a cumulative impact of 508 acres of tree clearing. However, this only represents a subset of the impacts resulting from other actions. Therefore, the cumulative impacts resulting from the worst-case scenario are also considered and these total to a loss of 11.7 percent (1,431 acres) of potential bat

habitat throughout the entire RSA. However, not all of these wooded areas may be suitable roosting habitat. Likely the true cumulative impact for the acreages of tree removal will be somewhere between these two values (i.e., between 508 and 1,431 acres).

Overall, given the relatively low percentage of woodland reduction, considering the future trend in development being less impactful on natural resources than historical development has been due to increased protections to karst regions, and assuming appropriate implementation of regulatory control strategies and policies, the proposed project is not expected to contribute substantial cumulative impacts to bat habitat for in the project vicinity. Cumulative impacts to aquatic cave-obligate and/or karst species is generally unknown given the subterranean and indirect nature of these potential impacts. However, given the proposed project, the Highway 112 widening project (including the Cave Springs Bypass), and the Cave Spring's wastewater improvements project will all cross through areas having karst features, such as springs, caves, and losing streams, cumulative effects of these developments and the supporting infrastructure is a concern for conservation and protection of at-risk species. Therefore, the USFWS recommends that in order to minimize impacts to listed species, ARDOT should coordinate the paths of the Cave Springs Bypass, widening of Highway 112, and construction of the XNA connector road to overlap as much as possible and follow alignments being proposed for other actions, such as NACA. Cumulative impacts to rail habitat (i.e. emergent wetlands) are not considered substantial given the very minimal impacts anticipated from direct, indirect, and other project actions.

5. Mitigation of Cumulative Impacts

For the proposed action, several standards and regulations can be applied to mitigate for cumulative impacts to habitat of federally-listed species. General minimization and mitigation measures such as erosion and sedimentation BMPs as a part of the SWPPP would be required for construction and would be implemented by the Developer/Contractor. These BMPs would help protect water quality within this important karst region and help to protect stream and/or spring habitats potentially utilized by threatened/endangered species. The ADEQ is the agency responsible with authorizing General Construction Stormwater permits and their associated SWPPPs. Development of a SWPPP and ADEQ approval will also be required for any of the other actions disturbing greater than 5 acres; which in this case will be most of the locatable projects previously described. Additionally, BMPs identified by USFSW (2007)⁶ will be used for the proposed action as a guide to ensure that any sedimentation is minimized and to help avoid impacts to groundwater and sensitive or endangered species. BMP measures employed can include the use of filter fences, straw bales, interceptor dikes and swales. sediment traps, detention basis, seeding and revegetation where appropriate. These USFWS BMPs may be required or utilized for some of the other actions as well. USFWS specifically recommended in their October 8, 2020 letter that the proposed project follow karst best management practices consistent with those previously developed for the Cave

⁶ United States Fish and Wildlife Service, 2007. Community Growth Best Management Practices for Conservation of Karst Recharge Areas, 14 pp.

Springs Cave Recharge area. Moreover, in sensitive areas such as karst areas, precautionary measures should be taken during construction of the proposed action to avoid impacts to groundwater and the aquatic habitat of sensitive species. In the event of cave discovery during construction, work will halt and the ARDOT Environmental Division shall be contacted.

Additionally, the cities of Rogers, Cave Springs, Lowell, and Springdale have adopted the Cave Springs Area Karst Resource Conservation Regulations drafted in 2015. These regulations apply to any development within the Cave Springs Direct Recharge Area in the city limits of the four above-listed cities. This conservation initiative was proposed to mitigate for any potentially adverse effects to sensitive resources resulting from possible secondary and cumulative development. Although the proposed action limits, as well as the areas of induced growth, are outside of the Cave Springs Direct Recharge Area, impacts to the region are still closely examined and the above-mentioned cities have implemented mitigation measures to protect karst regions in their drainage criteria manual or in their city ordinances. Thus, some of the other actions identified (e.g. the Lakewood and Timber Ridge Subdivisions in Lowell), will be required to comply with the Cave Springs Area Karst Resource Conservation Regulations. Impacts from the proposed action will be required to comply with Section 7 of the Endangered Species Act, as will any other federally-funded or permitted project.

Code tools such as a tree ordinance, a riparian buffer ordinance, or a conservation subdivision ordinance are other options to help minimize cumulative impacts. Land use planning can begin with community goals and, over time, be followed by zoning ordinances to minimize cumulative impacts resulting from development in sensitive areas.

Minimization and mitigation for impacts of other future actions utilizing federal funds should require the same standards and adhere to the same regulations as described above for the proposed action. Efforts should be taken through local, state, and federal regulations to avoid and minimize any adverse effects from development or future activities and include these considerations. Any impacts associated with future developments would be the responsibility of developers in coordination with the local municipalities and local agencies.

Land Use

1. Resource Study Area, Conditions, and Trends

The proposed project has the potential to impact land use. The RSA for the cumulative analysis of land use was delineated using the same Area of Interest (AOI) that was utilized for the induced-growth effects analysis. This RSA was determined using major roadways, existing development areas, and natural features. The land use RSA is shown in Figure 1 of the Induced-Growth Effects analysis and is approximately 13,710 acres in size. The same temporal limits (1998 to 2040) used for the cumulative analysis on other resources is applied for this analysis for the same reasons as discussed in the water resources section.

While undeveloped land is not in short supply within the RSA, it is considered a resource in decline. According to U.S. Census Bureau population data, the cities within and surrounding the RSA are experiencing an increasing growth trend. The RSA is primarily located in Benton County but also includes a portion of Washington County. Benton and Washington Counties have shown substantial population growth in the last 20 years. According to a 2018 article published in the Northwest Arkansas Democrat Gazette, the Fayetteville-Springdale-Rogers area was the 14th fastest growing metropolitan area in the United States in 2017. Based on the 2016 (most recent year available) National Land Cover Database (NLCD), approximately 18% of the RSA consists of developed land. Based on the NLCD only 15% of the area was developed in 2001. The region is noted to be mostly cleared for pastureland, hay land, or expanding residential development. Additionally, as discussed in the previous section on federally-protected species, the overall amount of forested habitat has steadily decreased over time due to increased development and changes in land use. Historical trends include additional infrastructure, additional residential developments, and land clearing for cattle or hay production.

2. Direct and Indirect Effects on Each Resource from the Proposed Project

Direct land use changes require the acquisition of approximately 242 acres of primarily pasture and forested land for the New Location Alternative, 101 acres for the Partial New Location Alternative, and 75 acres for the Improve Existing Highways Alternative. These impacts will permanently convert land to maintained highway ROW. Figure 15 in the wildlife impacts section of the EA document shows the direct land use impacts in relation to the 2016 NLCD.

Land use impacts resulting from induced-growth were determined from the proposed project. Three areas with the potential for induced growth were identified in the indirect effects analysis: an approximately 87-acre area at the intersection of the New Location Alternative with Hwy 264, an approximately 84-acre area at the intersection of the Partial New Location Alternative with Hwy 264, and an approximately 25-acre area at the intersection of the Partial New Location Alternative with Hwy 264, and an approximately 25-acre area at the intersection of the Partial New Location Alternative with Hwy 112. Based on input from city planners and the increased accessibility occurring at these three locations, land use changes from rural/undeveloped to commercial or even industrial are anticipated in these areas. Induced growth is expected to occur within these three areas and it is likely that

facilities such as gasoline stations or travel-related services will be developed around these intersections. While redevelopment along Highways 112 and 264 may occur as a result of the Improve the Existing Highways Alternative, and increased mobility is expected, areas of induced growth were not identified for this alternative as it will not cause increased accessibility (since the area is already accessible to existing users).

3. Other Actions – Past, Present, and Reasonably Foreseeable – and their Effect on Each Resource

As documented in the water resources analysis, numerous past, present, and reasonably foreseeable actions have occurred in the project vicinity. As the RSA established for land use changes is dramatically smaller than the water resources RSA, it only contains a subset of the previously-identified other actions, which include the two bridge improvement projects on Hwy 264, a portion of the Hwy 112 widening project, and portions of the past and future sections of the SNB. Permanent land use conversions are not anticipated to occur for either of the two bridge projects as little to no additional permanent ROW appears to be required. For the Hwy 112 widening project, an estimated 75 acres of land may be converted to highway and/or maintained ROW from the project. However, because the improvements are located immediately adjacent to the existing facility and several of the areas are already developed, no substantial change in direct land use would occur since the area is already utilized as a transportation corridor. For the past and future sections of the SNB in the RSA, an estimated 209 acres of rural land was converted to maintained ROW. Additionally, based on recent aerial imagery, three large areas appear to have been recently disturbed, resulting in conversion of rural/undeveloped areas to a total of 138 acres of residential, surface mining, and/or commercial developments.

4. The Overall Effects of the Proposed Project Combined with Other Actions

The direct and indirect acreages of rural/undeveloped lands converted to maintained ROW, combined with the conversion of 422 acres of undeveloped land to developed land use by other actions, results in a cumulative impact of 751 acres of converted lands. This cumulative value of converted land would represent approximately 6 percent of undeveloped land within the RSA based on the 2016 NLCD, which is a relatively minor reduction and not likely to contribute substantial cumulative impacts to land use changes in the project vicinity.

5. Mitigation of Cumulative Impacts

Based on the 2040 Metropolitan Transportation Plan developed for the project area, minimization and mitigation for some land use impacts may occur through the work on the Northwest Arkansas Regional Open Space Plan. Work on this Open Space Plan began in late 2014, with the public process to develop the Plan being carried out throughout 2015, and adopted in early 2016. The Plan identifies the natural landscapes and open spaces that make Northwest Arkansas an attractive place to live, and includes a comprehensive strategy for the conservation of these natural assets. Though focused

on conservation, this Plan is consistent with the regional goal of continued growth and development. Landowner participation in conservation programs is welcome and encouraged, but strictly voluntary. To this end, the Plan features a detailed mapping inventory of regional resources, and a 'toolbox' of strategies that landowners, developers, and governments can draw upon to balance regionally important goals of land conservation and development. Small park and publicly owned undeveloped lands are located in the Land Use RSA and include the area surrounding Cave Springs Cave (in Cave Springs) as well as two small areas in Elm Springs between Hwy 112 and I-49. Neither of these areas are proposed to be impacted by the proposed action or appear to be impacted by identified other actions. Thus, this Open Space Plan appears to offer little direct mitigation for cumulative impacts to land use.
XNA Connector Road Project Connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612) Benton County, Arkansas

Respondent Information

_{Date:} 2/26/2020

Name: Taylor Reamer

Organization/Title: Planning Director, Planning Department, Benton County

Address: 2113 W Walnut Street, Rogers AR 72756

Phone and Email: taylor.reamer@bentoncountyar.gov

Questions & Discussion Topics

- 1) What are the new major developments in your jurisdiction or planning area? Subdivision and single family residential construction
- 2) In your opinion, would the proposed project induce development in your area that would otherwise not
 - occur? Development is continual in the County's jurisdiction. The addition of an infrastructure project this size may produce more development potential in the project area.
- 3) In your opinion, would any redevelopment occur as a result of the proposed project? If so, where? Yes, throughout the project area.
- 4) In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and if

^{so, why?} No

- 5) In your opinion, would the proposed project affect or change the type of development within your jurisdiction and if so, why? Development and redevelopment in the County's jurisdiction. The addition of an infrastructure project this size may produce more development and redevelopment potential in the project area.
- 6) Any additional developments in the future (out to 20-30 years) that are reasonably foreseeable? Yes
- 7) What future development would you expect independent of the proposed project? Subdivision, single family residential, commercial, and industrial
- 8) In your opinion, would the proposed project affect the rate and intensity of these developments discussed from the previous question? Please rate on a scale of 1 (no influence) to 5 (strong influence).

4

From:	Shelli Kerr <skerr@bentonvillear.com></skerr@bentonvillear.com>
Sent:	Monday, February 24, 2020 1:03 PM
То:	Schmidt, Cassie P.
Subject:	RE: XNA Connector Road Project - Information Request
Attachments:	IndirectCumulative Impacts Questionnaire 2020-02-17_Bentonville comments.docx

Cassie,

Here's our response. Since we are outside of the study area, we don't anticipate it having a major impact on development activity in Bentonville.

Thanks, Shelli

From: Schmidt, Cassie P. <CPSchmidt@GarverUSA.com>
Sent: Monday, February 17, 2020 4:34 PM
To: Planning@BentonCountyAR.gov; community.development@rogersar.gov; randall.noblett@cavespringsar.gov; mcasey@fayetteville-ar.gov; Shelli Kerr <skerr@bentonvillear.com>; kdavis@lowellarkansas.gov
Subject: XNA Connector Road Project - Information Request

Good Afternoon,

On behalf of ARDOT, we are preparing a Environmental Assessment (EA) for the proposed XNA Connector Road project, which proposes a connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612); see attached exhibit showing proposed corridors. Specifically, I am working on an assessment of indirect and cumulative impacts for the proposed project. To assist with the assessment, please fill out the attached questionnaire and return to me at your earliest convenience. I have attached both a PDF and a word document. Please feel free to use which ever format makes your life easiest.

Please call or email me if you have any questions. Thank you in advance for your time and assistance!

Sincerely,



Cassie Schmidt Environmental Scientist/Environmental Specialist *Transportation Team*

J 479-287-4673

XNA Connector Road Project Connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612) Benton County, Arkansas

Respondent Information

Date: 02/24/2020	
Name:	Shelli Kerr, Comprehensive Planning Manager
Organization/Title:	City of Bentonville
Address:	305 SW A St
Phone and Email:	479-271-6822, skerr@bentonvillear.com

- 1) What are the new major developments in your jurisdiction or planning area? The new Walmart home office campus.
- In your opinion, would the proposed project induce development in your area that would otherwise not occur? No, due to its location, we don't see it have a major impact on encouraging new development.
- In your opinion, would any redevelopment occur as a result of the proposed project? If so, where? No. Our redevelopment opportunity and activity is downtown and is too far from the project site to have a major impact.
- In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and if so, why? No.
- 5) In your opinion, would the proposed project affect or change the type of development within your jurisdiction and if so, why? No.
- 6) Any additional developments in the future (out to 20-30 years) that are reasonably foreseeable? No.
- 7) What future development would you expect independent of the proposed project? Residential development in the southwest and redevelopment in the downtown.
- 8) In your opinion, would the proposed project affect the rate and intensity of these developments discussed from the previous question? Please rate on a scale of 1 (no influence) to 5 (strong influence). 1

From:	Randall Noblett <randall.noblett@cavespringsar.gov></randall.noblett@cavespringsar.gov>	
Sent:	Tuesday, February 18, 2020 10:01 AM	
То:	Schmidt, Cassie P.; Planning@BentonCountyAR.gov;	
	community.development@rogersar.gov; mcasey@fayetteville-ar.gov;	
	skerr@bentonvillear.com; kdavis@lowellarkansas.gov	
Subject:	RE: XNA Connector Road Project - Information Request	
Attachments:	IndirectCumulative Impacts Questionnaire 2020-02-17.pdf	

Ms. Schmidt,

I have attached the completed questionnaire. With experience from former employment, I feel that I have additional insight as to the impact of the airport traffic. I probably see this impact differently than most and my opinion has definitely changed over the past few years. If you would like to discuss it briefly, feel free to call my cell phone.



From: Schmidt, Cassie P. <CPSchmidt@GarverUSA.com>
Sent: Monday, February 17, 2020 4:34 PM
To: Planning@BentonCountyAR.gov; community.development@rogersar.gov; Randall Noblett
<randall.noblett@cavespringsar.gov>; mcasey@fayetteville-ar.gov; skerr@bentonvillear.com; kdavis@lowellarkansas.gov
Subject: XNA Connector Road Project - Information Request

Good Afternoon,

On behalf of ARDOT, we are preparing a Environmental Assessment (EA) for the proposed XNA Connector Road project, which proposes a connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612); see attached exhibit showing proposed corridors. Specifically, I am working on an assessment of indirect and cumulative impacts for the proposed project. To assist with the assessment, please fill out the attached questionnaire and return to me at your earliest convenience. I have attached both a PDF and a word document. Please feel free to use which ever format makes your life easiest.

Please call or email me if you have any questions. Thank you in advance for your time and assistance!

Sincerely,

XNA Connector Road Project Connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612) Benton County, Arkansas

Respondent Information

Date:	02-18-2020	
Name:	Randall J. Noblett	
Organiza	ation/Title: City of Cave Springs Mayor	
Address: 134 North Main Street, Cave Springs Ar. 72718		
Phone a	nd Email: (479) 248-1040 randall.noblett@cavespringsar.gov	

- What are the new major developments in your jurisdiction or planning area? We currently have residential subdivisions and commercial development, some proposed and some under construction.
- 2) In your opinion, would the proposed project induce development in your area that would otherwise not occur? Probably not. We are currently experiencing a great deal of development independent of road routes.
- 3) In your opinion, would any redevelopment occur as a result of the proposed project? If so, where? No
- 4) In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and if so, why?
 I don't believe that project will have an impact on our development.
- 5) In your opinion, would the proposed project affect or change the type of development within your jurisdiction and if so, why? I don't believe that project will have an impact on our development.
- 6) Any additional developments in the future (out to 20-30 years) that are reasonably foreseeable? Yes
- 7) What future development would you expect independent of the proposed project? Downtown Historic restoration and conforming new retail and multi-use
- 8) In your opinion, would the proposed project affect the rate and intensity of these developments discussed from the previous question? Please rate on a scale of 1 (no influence) to 5 (strong influence).

XNA Connector Road Project Connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612) Benton County, Arkansas

Respondent Information

Date:	21	24/	20
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Name: MATT CASEY

Organization/Title: CTTY OF ELM SPRINGS /PLANNING COMMISSION CHAIR

Address:_

Phone and Email: <u>Mcasey & fayetteville - ar. 900</u>

- 1) What are the new major developments in your jurisdiction or planning area? THERE ARE SOME RESIDENTIAL SUBDIVISIONS WITHIN THE CITY LINITS.
- In your opinion, would the proposed project induce development in your area that would otherwise not occur? NO
- 3) In your opinion, would any redevelopment occur as a result of the proposed project? If so, where? NO
- In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and if so, why? No
- 5) In your opinion, would the proposed project affect or change the type of development within your jurisdiction and if so, why? **NO**
- 6) Any additional developments in the future (out to 20-30 years) that are reasonably foreseeable? More Subjivisions
- 7) What future development would you expect independent of the proposed project? MORE SUB DIVISIONS
- 8) In your opinion, would the proposed project affect the rate and intensity of these developments discussed from the previous question? Please rate on a scale of 1 (no influence) to 5 (strong influence).

From:	Catrina Mills <cmills@highfillar.com></cmills@highfillar.com>
Sent:	Friday, February 28, 2020 1:41 PM
То:	Schmidt, Cassie P.
Cc:	Michelle Rieff
Subject:	RE: XNA Connector Road Project - Information Request
Attachments:	IndirectCumulative Impacts Questionnaire.docx

Good Afternoon Cassie,

Attached you will find the completed survey. Please let Mayor Michelle Rieff know if you have any questions.

Thank you!

Catrina Mills Interim Admin City of Highfill 479-736-5711

From: Schmidt, Cassie P. <CPSchmidt@GarverUSA.com>
Sent: Wednesday, February 26, 2020 9:03 AM
To: admin1 <admin@highfillar.com>
Subject: XNA Connector Road Project - Information Request

Good Morning Katrina,

I just received your voice message. Attached is the questionnaire I was referring to and below is a quick explanation of my request 😊

On behalf of ARDOT, we are preparing a Environmental Assessment (EA) for the proposed XNA Connector Road project, which proposes a connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612); see attached exhibit showing proposed corridors. Specifically, I am working on an assessment of indirect and cumulative impacts for the proposed project. To assist with the assessment, please fill out the attached questionnaire and return to me at your earliest convenience (if it's at all possible to get this to me by the end of the week that would be wonderful!). I have attached both a PDF and a word document; feel free to use which ever format makes your life easiest.

Please call or email me if you have any questions. Thank you in advance for your time and assistance!

Sincerely,



Cassie Schmidt Environmental Scientist/Environmental Specialist *Transportation Team*

J 479-287-4673

XNA Connector Road Project Connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612) Benton County, Arkansas

Respondent Information

Date:	02/28/2020	
Name:	Michelle Rieff	
Organization/Title	2:	City of Highfill / Mayor
Address:		15036 W. Hwy 12, Gentry, AR 72734
Phone and Email:		479-736-5711

- What are the new major developments in your jurisdiction or planning area? <u>None in the proposed new</u> <u>location.</u>
- In your opinion, would the proposed project induce development in your area that would otherwise not occur? <u>Yes.</u>
- 3) In your opinion, would any redevelopment occur as a result of the proposed project? If so, where? <u>Yes,</u> possible land rezoning from rural residential to industrial along the path of the connector road.
- 4) In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and if so, why? <u>Yes, the proposed project could prohibit some commercial and residential development.</u>
- 5) In your opinion, would the proposed project affect or change the type of development within your jurisdiction and if so, why? <u>Yes, there will be an increase in commercial and industrial development.</u>
- Any additional developments in the future (out to 20-30 years) that are reasonably foreseeable? <u>Normal</u> residential construction growth.
- 7) What future development would you expect independent of the proposed project? <u>Normal residential</u> <u>construction growth.</u>
- 8) In your opinion, would the proposed project affect the rate and intensity of these developments discussed from the previous question? Please rate on a scale of 1 (no influence) to 5 (strong influence).

Indirect and Cumulative Impacts Questionnaire XNA Connector Road Project Connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612)

Benton County, Arkansas

Respondent Information

Date: 02-24-2020	
Name: Karen Davis	
Organization/Title:	City of Lowell / Community Development Director
Address: 216 N Lincoln St	
Phone and Email:	479-770-2185 ext. 224

Questions & Discussion Topics

What are the new major developments in your jurisdiction or planning area?

Timber Ridge Subdivision, located on Bellview Street, is expanding to Phase 2 and adding 46 additional singlefamily housing units to their development. Lakewood Subdivision located on West Monroe Avenue is currently constructing Phases 5 and 6 of their 329 single-family housing development. Park View Subdivision is under construction and will develop a 171 lot subdivision located off East Apple Blossom Avenue. Lincoln Place Subdivision is under construction and will develop a 60 lot subdivision located off McClure Avenue.

Business development includes Matrix Racquet Club, located on Mills Lane and future Zion Church Road, an indoor/outdoor tennis facility which recently expanded to include indoor batting cages and an indoor infield for baseball, Matrix is scheduled to open in 2020. IDO is another new business in the area, located on North Goad Springs Road, the development offers over 185,000 sq. ft. of both warehouse and office spaces. Harps Grocery Store recently opened at the corner of North Goad Springs Road and West Monroe Avenue, bringing a much-needed business to the Lowell area. New developments in the Monroe Business Park, located on West Monroe Avenue, include Flip Side Ninja Park, a ninja warrior experience for all ages. Mr. Sparky, also located in Monroe Business Park, is relocating their home office to the centrally located area of Lowell. Both Grant Flex and Oelke Construction, located in Monroe Business Park, offer warehouse and office spaces to potential businesses. Dillard Commercial Park, located at the Southeast corner of South Goad Springs Road and West Monroe Avenue, is a new 33-acre development which is currently in the design phase, will offer spaces for commercial/retail, hotel and multiple office buildings. Arkansas State Police recently opened their doors to their new location on West Monroe Avenue.

North Goad Springs Road is in the construction phase of expanding to a three-lane road. The intersection of Bellview and West Monroe Avenue is currently being reviewed for a roundabout. Zion Church Road will expand from Bellview to Goad Springs Road.

The Kathleen Johnson Memorial Park, located along Bellview, is a 100-acre park in the preliminary stages of development. The conceptual plan for the park includes a walking trail, splash pad, disc golf, playground area, farmer's market, trailhead, Razorback Greenway connecting trail, Project Red Friday, NWA Space, Office of Human Concern, the new Fire Station and an amphitheater. The walking trail, disc golf area and fire station have already been constructed. The trailhead and the Razorback Greenway connecting trail and farmer's market have been designed and are awaiting design approval and will soon go out to bid for construction. NWA Space

will build a planetarium observatory and science center within the park. Office of Human Concern will locate their home office to the park location and offer programs to the pubic such as meals on wheels.

- In your opinion, would the proposed project induce development in your area that would otherwise not occur? It is my opinion that the proposed project would not increase development in the Lowell area as the project would be located outside of Lowell's proximity.
- 2) In your opinion, would any redevelopment occur as a result of the proposed project? If so, where? It is of my opinion that redevelopment would not occur in the Lowell area as a result of the proposed project.
- 3) In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and if so, why? The development would deter traffic from entering Lowell by highway 264, which currently crosses through the City of Lowell to access I-49.
- 4) In your opinion, would the proposed project affect or change the type of development within your jurisdiction and if so, why? Being along the I-49 corridor, I do not foresee the development impacting the type of developments in our area. Although, the traffic count for the western side of Lowell, west of I-49, may be impacted by the development, thus effecting the potential of new businesses locating to that area.
- 5) Any additional developments in the future (out to 20-30 years) that are reasonably foreseeable? The City of Lowell is currently growing at a rapid rate. The developments within the 20 to 30 year range are anticipated to be density housing and commercial development since Lowell has prime commercial spaces available for development.
- 6) What future development would you expect independent of the proposed project? Future development is anticipating to be a downtown revitalization, commercial growth and additional rooftops.
- In your opinion, would the proposed project affect the rate and intensity of these developments discussed from the previous question? Please rate on a scale of 1 (no influence) to 5 (strong influence). 3

From:	McCurdy, John <jmccurdy@rogersar.gov></jmccurdy@rogersar.gov>
Sent:	Friday, February 21, 2020 8:58 AM
То:	Schmidt, Cassie P.
Subject:	RE: XNA Connector Road Project - Information Request

Due to the alignment of the improvements well south of Rogers, these improvements don't impact Rogers. Although Rogers is the closest city to XNA, there is still unfortunately no direct route to the airport.



John McCurdy, CNU-A | Director Dept. of Community Development City of Rogers | <u>www.rogersar.gov</u> 301 W Chestnut St, Rogers, AR 72756 (479) 621-1186

From: Schmidt, Cassie P. [mailto:CPSchmidt@GarverUSA.com]
Sent: Monday, February 17, 2020 4:34 PM
To: Planning@BentonCountyAR.gov; Community Development <community.development@rogersar.gov>; randall.noblett@cavespringsar.gov; mcasey@fayetteville-ar.gov; skerr@bentonvillear.com; kdavis@lowellarkansas.gov
Subject: XNA Connector Road Project - Information Request

Good Afternoon,

On behalf of ARDOT, we are preparing a Environmental Assessment (EA) for the proposed XNA Connector Road project, which proposes a connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612); see attached exhibit showing proposed corridors. Specifically, I am working on an assessment of indirect and cumulative impacts for the proposed project. To assist with the assessment, please fill out the attached questionnaire and return to me at your earliest convenience. I have attached both a PDF and a word document. Please feel free to use which ever format makes your life easiest.

Please call or email me if you have any questions. Thank you in advance for your time and assistance!

Sincerely,



Cassie Schmidt Environmental Scientist/Environmental Specialist *Transportation Team*

J 479-287-4673

XNA Connector Road Project Connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612) Benton County, Arkansas

Respondent Information

Date:	2/26/20	
Name:	Patsy Christie	For #3, follow up correspondence clarified that
Organization/Title	Planning and Community Development Director	the two intersections Ms. Christie is referring to are the
Address:	201 Spring Street, Springdale AR 72764	proposed roadway's
Phone and Email:	479-750-8588 pchristie@springdalear.gov	(Hwy 612).

- What are the new major developments in your jurisdiction or planning area? Redevelopment projects in downtown town that includes mixed use multifamily; multifamily projects on both the east and west sides of Thompson Ave; construction of new 5 story office buildings in the southwest quadrant of the City; retail and services facilities throughout the city.
- 2) In your opinion, would the proposed project induce development in your area that would otherwise not occur? yes
- 3) In your opinion, would any redevelopment occur as a result of the proposed project? If so, where? Yes, area around the intersection of Highway 412 and 112 and the access road to the airport
- 4) In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and if so, why? no
- 5) In your opinion, would the proposed project affect or change the type of development within your jurisdiction and if so, why? Yes, the proposed project would increase the likelihood of commercial development in and around intersections
- 6) Any additional developments in the future (out to 20-30 years) that are reasonably foreseeable?
- 7) What future development would you expect independent of the proposed project?
- In your opinion, would the proposed project affect the rate and intensity of these developments discussed from the previous question? Please rate on a scale of 1 (no influence) to 5 (strong influence).

XNA Connector Road Project Connection between the Northwest Arkansas Regional Airport (XNA) and the Springdale Northern Bypass (Hwy. 612) Benton County, Arkansas

Respondent Information

Date:	3/2/20
Name:	Tim House
Organization/Title:	Northwest Arkansas National Airport, Director of Engineering
Address:	One Airport Blvd, Suite 100 Bentonville, AR 72713
Phone and Email:	(479) 205-1420 tim.house@flyxna.com

- 1) What are the new major developments in your jurisdiction or planning area? Master planned industrial park adjacent to the airport.
- 2) In your opinion, would the proposed project induce development in your area that would otherwise not occur? No, the development would likely occur adjacent to the airport but the timeline may be expedited.
- 3) In your opinion, would any redevelopment occur as a result of the proposed project? If so, where? Yes, but only on the Hwy 112/Hwy 264 route option. That option is not limited/partially controlled access. The likelihood of redevelopment along Hwy 264 is very high. The other options would not likely be redeveloped.
- 4) In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and if so, why? No, I do not foresee the project prohibiting development.
- 5) In your opinion, would the proposed project affect or change the type of development within your jurisdiction and if so, why? Yes, but only the time frame of the development. Truck traffic will be easier. Freight/warehousing would have better access to large parcels of land adjacent to the airport.
- 6) Any additional developments in the future (out to 20-30 years) that are reasonably foreseeable? Housing of all densities will likely utilize the route and fill in the outer limits of the areas. Support industries for the housing will also likely follow.
- 7) What future development would you expect independent of the proposed project? Continued growth of the airport, additional hangars, increased terminal and parking facilities. Commercial developments including warehousing and industrial facilities. Residential development along the existing rural highways.

8) In your opinion, would the proposed project affect the rate and intensity of these developments discussed from the previous question? Please rate on a scale of 1 (no influence) to 5 (strong influence). Yes, the easier access to and from the airport will increase differential travel time between our airport and other regional airports. Simply put, if it is quicker and easier to get to our airport more local passenger will use our airport. That will have a small influence so a rating of 2. For corporate traffic this will be slightly higher influence, so a rating of 3. Commercial development that utilize intermodal transportation have routinely developed around airports. With easier truck traffic they will be more likely to establish new businesses in the area. I would rate this as an influence level of 3. The residential development of the area will lag behind the industrial and aviation developments. They will not be profitable if they have to build all of the utility infrastructure. As infill projects they will likely occur. This is basically the same as the commercial development influence, level 3.

TERMINOLOGY

Direct Impacts are caused by the action and occur at the same time and place (40 C.F.R. 1508.8).

Type of Effect	Direct Impacts	Indirect Impacts	
Nature of Effect	Typical/Inevitable/Predictable	Reasonably Foreseeable/ Probable	
Cause of Effect	Project Only	Project's Direct and Indirect Effects	
Timing of Effect	Project Construction and Implementation	At Some Future Time other than Direct Effects	
Location of Effect	At the Project Location	Within Boundaries of Systems Affected by the Proposed Project	

Comparison of Direct and Indirect Impacts

Source: NCHRP Report 403, Guidance for Estimating the Indirect Effects of Proposed Transportation Projects (1989).

Indirect Impacts are caused by the action and are later in time and farther removed in distance, but are still reasonably foreseeable. Impacts may include growth-inducing effects and other effects related to induced changes in pattern of land use, population density or growth rate and related effects on air and water and other natural systems, including ecosystems (40 Code of Federal Regulations (C.F.R.) 1508.8).

Induced Growth Impacts are changes in the location, magnitude, or pace of future development that result from changes in accessibility caused by the project. An example of an induced growth effect is commercial development occurring around a new interchange and the environmental impacts associated with this development.

Reasonably foreseeable is an action that is probable, sufficiently likely to occur (excludes effects that are possible but not probable [e.g. "tabled" plans]). Impacts that are merely possible, or that are considered "speculative," are not reasonably foreseeable.

Cumulative Impacts are the impacts on the environment which results from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions (40 C.F.R. 1508.7). The purpose of a cumulative effects analysis is to view the direct and indirect impacts of the proposed project within the larger context of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future.



2049 E. Joyce Blvd. Suite 400 Fayetteville, AR 72703 TEL 479.527.9100 FAX 479.527.9101

www.GarverUSA.com

TELEPHONE MEMORANDUM

- Date: 2/10/2020
- Participants: Jeff Hawkins (NWARPC) & Cassie Schmidt (Garver)
 - Attn: File<u>\\garverinc.local\gdata\Projects\2017\17017600 XNA Access -</u> NEPA\Environmental\EA Studies\Indirect and Cumulative\Research\Phone Memo (CPS & Jeff Hawkins) 2020-02-10.docm
 - RE: XNA Connector Road (Future Projects for Indirect/Cumulative Impacts)

According to Mr. Hawkins, the 279 Corridor study (i.e., the North-South Connector Study) is not funded, is not likely to be built, and is definitely not likely to get build south of the Airport.

Jeff also stated that while there is money in the STIP for the 112 improvements, the whole thing will not necessarily get build.

Additionally, 264 west of I-49 is not likely to be constructed either as it's "not in the cards" that it's built due to all the environmental constraints. Hwy 264 over to Cave Springs is unlikely due to env. constraints and sensitive areas.

Jeff went on to mention that north of Healing Springs the Nature Conservancy has identified habitat and specific parcels as "open space acquisition", which is why 264 isn't feasible from that direction.