

1. PURPOSE AND NEED FOR PROPOSED ACTION

This section presents the Purpose and Need (P&N) for the US 412 Environmental Assessment. It references transportation-related problems and issues that prospective improvements to the corridor are intended to address. The P&N will be crucial in the development and evaluation of alternatives and reaching consensus for the most appropriate solutions to identified problems.

1.1 OVERVIEW

1.1.1 Sponsorship

The Missouri Department of Transportation's (MoDOT's) Southeast District, in cooperation with the Federal Highway Administration (FHWA) and Dunklin County, is conducting an environmental assessment (EA) of US 412 in southwestern Dunklin County. This portion of US 412 begins southwest of Kennett, MO and continues to the Arkansas state line, east of Paragould, AR. This project is approximately 20 miles in length and involves improvements to US 412. It will assess the corridor's needs and provide potential solutions to address them.

This portion of US 412 is part of the Bootheel Regional Planning Commission's priority corridors and MoDOT's long range transportation plan. It forms a vital connection between the communities of Kennett, MO and Paragould/Jonesboro, AR and other regions of the Bootheel of Missouri and northeast Arkansas.

1.1.2 Framework

The US 412 EA is being developed in accordance with the provisions of the National Environmental Policy Act (NEPA). An EA is a concise public document intended to detail NEPA compliance and provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement or a Finding of No Significant Impact (FONSI). NEPA established a national policy for proposed Federal actions and provides the framework for project environmental planning and decision-making requiring agencies to conduct environmental reviews which consider potential environmental impacts arising from proposed actions. This includes working cooperatively with all applicable/interested federal and state agencies, the public, and stakeholders to ensure all environmental issues are addressed.

NEPA requires FHWA, the lead federal agency, to consider avoiding, minimizing, and/or mitigating potential impacts to the human and natural environment before approving proposed transportation projects. Along with evaluation of potential environmental impacts, FHWA must consider the transportation needs of the public.

The FHWA NEPA study process considers potential impacts in an approach to balanced transportation decision making. It is FHWA policy (23 Code of Federal Regulations [CFR] § 771.105) that:

- Compliance with all applicable environmental requirements will be reflected in the environmental document required by this regulation.
- Alternative courses of action will be evaluated, and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the

proposed transportation improvement; and of national, state, and local environmental protection goals.

- Public involvement and a systematic interdisciplinary approach are essential parts of the development process for proposed actions.
- Measures necessary to mitigate adverse impacts are incorporated into the action.

1.2 PROJECT DESCRIPTION AND BACKGROUND

1.2.1 Summary of Dunklin County

Dunklin County occupies the western half of Missouri's "Bootheel" with primary population centers along the US 412 corridor that include Kennett, Senath, Cardwell, Arbyrd, and Hornersville. Employment, health care, and shopping areas are located outside the population centers in the northeast Arkansas communities of Paragould and Jonesboro, which increases traffic demands on this corridor.

The county's economy is largely based on agriculture throughout the entirety of the study area, contributing to consistent and slow-moving traffic due to cultivation, planting, harvesting, and product delivery vehicles and equipment. The presence of these slow-moving vehicles on a high-speed corridor complicates corridor operations and results in safety concerns and higher travel times. Growing agricultural diversity along the corridor and the addition of new processing facilities has introduced additional planting, harvesting and product transport vehicle types into traffic operations; and this trend will likely continue. Economic growth and accompanying employment opportunities in northeast Arkansas will continue to tax the corridor with increasing numbers of daily commuters. In addition, with the closure of the hospital in Kennett, primary healthcare and emergency care must be sought in Paragould or Jonesboro via US 412.

1.2.2 Existing US 412 Description

The portion of US 412 which is being evaluated for this project is a two-lane facility that encompasses approximately twenty miles beginning just southwest of Kennett at Dunklin County Route Y and continues to the Arkansas state line east of Paragould, AR at Dunklin County Route AC. It is the last segment which has not been upgraded to multiple lanes (four or more) between Paragould, Arkansas and Jackson, Tennessee. At the eastern end of the study area, US 412 transitions to a four-lane undivided roadway through the limits of Kennett and then becomes a four-lane divided expressway.

In 2002, MoDOT replaced the US 412 bridge crossing St. Francis River at the western end of the study area. Along with this replacement, a 0.5-mile section of four-lane divided expressway was constructed to accommodate future traffic demands. This divided expressway represents the western terminus of the study area.

Historic development of the roadway system in Missouri's Bootheel has resulted in a system that primarily follows east-west and north-south orientations. When present day US 412 (previously Missouri Route 25) was improved from Kennett to the Arkansas state line, it was built alongside the former St. Louis and San Francisco railroad. This railroad line traversed Dunklin County in a diagonal fashion with an angle of approximately 225 degrees. This orientation of US 412 has resulted in numerous state route and county road intersections that are skewed beyond what is typical for modern highway design.

1.2.3 Important Adjoining Roadways

US 412 is the primary route for traffic traveling to and from northeast Arkansas. Important regional routes feeding traffic to the study area include Missouri Route 25, I-55 and I-155 to the east and Missouri Route 53 to the north. The major east-west route intersecting with US 412 is Missouri Route 164. There are several important high-traffic state route connectors in the study area which include but are not limited to Routes P, 108, F, and AC.

1.3 PURPOSE AND NEED SUMMARY

The purpose of the US 412 EA is to investigate and identify improvements that result in a safe and efficient corridor between Route Y and AC. Within the context of this purpose, two specific transportation problems, or need elements, were identified. These specific transportation problems affecting operations along US 412 include:

- **Need to achieve travel efficiency and mobility** – Agricultural activities result in the contribution of very large equipment and vehicles to the US 412 roadway which creates a large disparity in travel speeds along the corridor resulting in traffic delays and platooning at speeds much lower than posted limits.
- **Need to correct deficient intersection geometry** -- Roadway deficiencies on the US 412 corridor includes substandard geometrics at the state and county road intersections.

Identification of a tentative Preferred Alternative will be based on how well it satisfies the EA's Purpose and Need and consideration of environmental, engineering, public, stakeholder and resource agencies input, and other factors.

The following sections examine the context of the transportation problems that affect the US 412 corridor. As defined herein, context refers to the overall nature, scope, and degree to which transportation problems affect the corridor.

1.3.1 Element 1 – Need to Achieve Travel Efficiency and Mobility

US 412 is part of the National Highway System extending from Springer, New Mexico to I-65 near Columbia, Tennessee which accounts for more than 1,130 miles. Recognizing the importance of this transportation corridor as an economic benefit, the states of Arkansas, Missouri, and Tennessee petitioned the American Association of State Highway and Transportation Officials to designate state routes between Walnut Ridge, Arkansas and Jackson, Tennessee as an United States route with the number "412" in 1980. Supported by each state's Chamber of Commerce and Departments of Transportation, agencies have worked diligently to improve and upgrade the auxiliary interstate since inception. These improvements have varied from intersection and safety improvements to upgrades in capacity.

In Missouri, MoDOT has upgraded high priority sections of the corridor with improvements from two to four lanes beginning in 1991. The states of Arkansas and Tennessee completed upgrades of the corridor to four lanes between Walnut Ridge, Arkansas and Jackson, Tennessee and continued to extend upgrades beyond those communities.

Traffic utilizing the US 412 corridor includes:

- Commuters traveling for work, school, or shopping
- Motorist's wishing to access health care facilities

- Commercial vehicles supporting retail and manufacturing interests
- Local circulation
- Movement of agricultural equipment, vehicles, and product
- Emergency services

Due to the traffic utilization and the importance of US 412 for travel, economic prosperity and mobility, the need to address the issues of improved travel efficiency and mobility is a priority for US 412.

Dunklin County is a major contributor to agricultural production for the state of Missouri, being the 5th largest producing market in the US for cotton and the 5th largest producer of rice in the state. Additional commodities produced in Dunklin County are soybeans, corn, peanuts, wheat, watermelons, cantaloupes, and potatoes. Agriculture is the dominant economic activity along the corridor and is the leading contributor to the oversized vehicles and equipment causing reduced sight lines for passing and reducing sufficient passing opportunities to clear the platooning identified along the corridor.

Information provided by Dr. Justin Calhoun of the Fisher Delta Research Center in Portageville, Missouri indicates agricultural vehicles utilize US 412 for a variety of reasons throughout the year for activities which include, but are not limited to, weed eradication (burndown) as early as February, soil nutrient application (fertilizing), tilling, planting, herbicide application (self-propelled spray rigs), cotton defoliant application, harvest, straw production/baling/hauling, and crop hauling/transport. During the primary harvest season of September, October, and November, platooning is pronounced although some of these agricultural activities are seasonal, and transportation of commodities occurs year-round.

A specific example of this production trend is related to the growth of peanut cultivation. Processing harvested peanuts has traditionally occurred in northeast Arkansas, but Delta Peanut Company has recently constructed a processing facility in Kennett, Missouri at the northern/eastern end of the corridor. Peanut production also differs from traditional grain cultivation in that harvested product is not transported to farmer owned bins for drying and storage. Corn and soybeans are stored in farmers' grain bins until commodity prices are optimal, sometimes months after harvest. For peanut production, harvested products are not stored but taken directly to processing facilities. As peanut farming becomes more prevalent, harvest months will see more tractor trailer combinations utilizing US 412 in the study area. The newly constructed peanut processing facility in Kennett will also result in additional transport trucks from outside the study area using US 412 to deliver peanut products for processing.

According to Dr. Calhoun, improvements in technology and farming techniques are expected to result in a significant increase in agricultural output in Dunklin County over the next decade. This production increase will result in additional harvest related agricultural vehicle demands placed upon US 412 and a corresponding increase in delay for following vehicles. Cotton is expected to remain the primary crop, but the cost efficiency of protein production, represented by peanut cultivation, will result in increased market share in comparison to all cultivars.

When utilizing roadways, working equipment generally travels at speeds of 25 to 35 miles per hour while transport equipment speeds ranged from 35 to 55 miles per hour. A recent speed study was conducted along the corridor to determine operational characteristics of the existing facility. This study occurred during harvest season along the corridor. The results of this study are included in Appendix XX. In summary, platooning was noted, and the overall corridor is expected to reach a Level of Service (LOS) of D with the expected increases in agricultural traffic.

The Highway Capacity Manual (HCM) LOS performance measures for rural two-lane highways include percent time spent following and average travel speed. Typical analysis methodologies account for components of the corridor such as traffic volumes, percent of the roadway that is a no-passing zone, and heavy vehicle percentages; however, they don't account for the impact of the significantly slower agricultural traffic or the driver behavior of choosing not to pass when passing is permitted. Field data was incorporated into the LOS analysis to help address these limitations; however, with agricultural traffic expected to increase in the years to come, future operations will likely be worse than the analysis results.

In addition to the speed study results, recent interviews (stakeholders, CAG, TAG, and public meetings) noted a large concern for the disparity in operating speeds among the public. Due to equipment size and difficult sight lines, passing opportunities can be limited and the delay to travelers, creates a common sense of frustration.

1.3.2 Element 2 – Need to correct deficient intersection geometry

The existing alignment of US 412 results in many intersections skewed beyond what modern design practices typically accept. This condition causes sight distance challenges and safety concerns for vehicles attempting access to US 412 which include, but are not limited to, difficulty in physically adjusting the point of view, sharp skew angles and obstructions, and views blocked by vehicle elements (i.e., side moldings and door frames of the car) at existing intersections. Improving intersection geometrics is a priority for US 412. MoDOT's EPG (233.2.22) guidelines suggest minimizing the skew of at-grade intersections and entrances. The desirable skew is at or below 20 degrees. Ideally, the intersection would have no skew at all.

Another potential contributing factor to the need for improved intersections relates to slow-moving agricultural equipment. Turning movements for these vehicles are generally very slow and can be further slowed by the need to turn and navigate the acute angles existing approach roadways currently present.

There are 16 intersections with other state routes and county roads that are skewed at 45 degrees which fall within the US 412 study areas. Each of these intersections presents operational challenges to agricultural vehicles and non-farming vehicles. When navigating the acute angles of these intersections, vehicles must slow to lower than typical speeds thereby contributing to further delay for following travelers. Comments from the CAG, TAG, both public meetings, as well as stakeholder interviews indicated a strong dissatisfaction with the functionality at these intersections thereby validating the need for correcting these deficient areas.