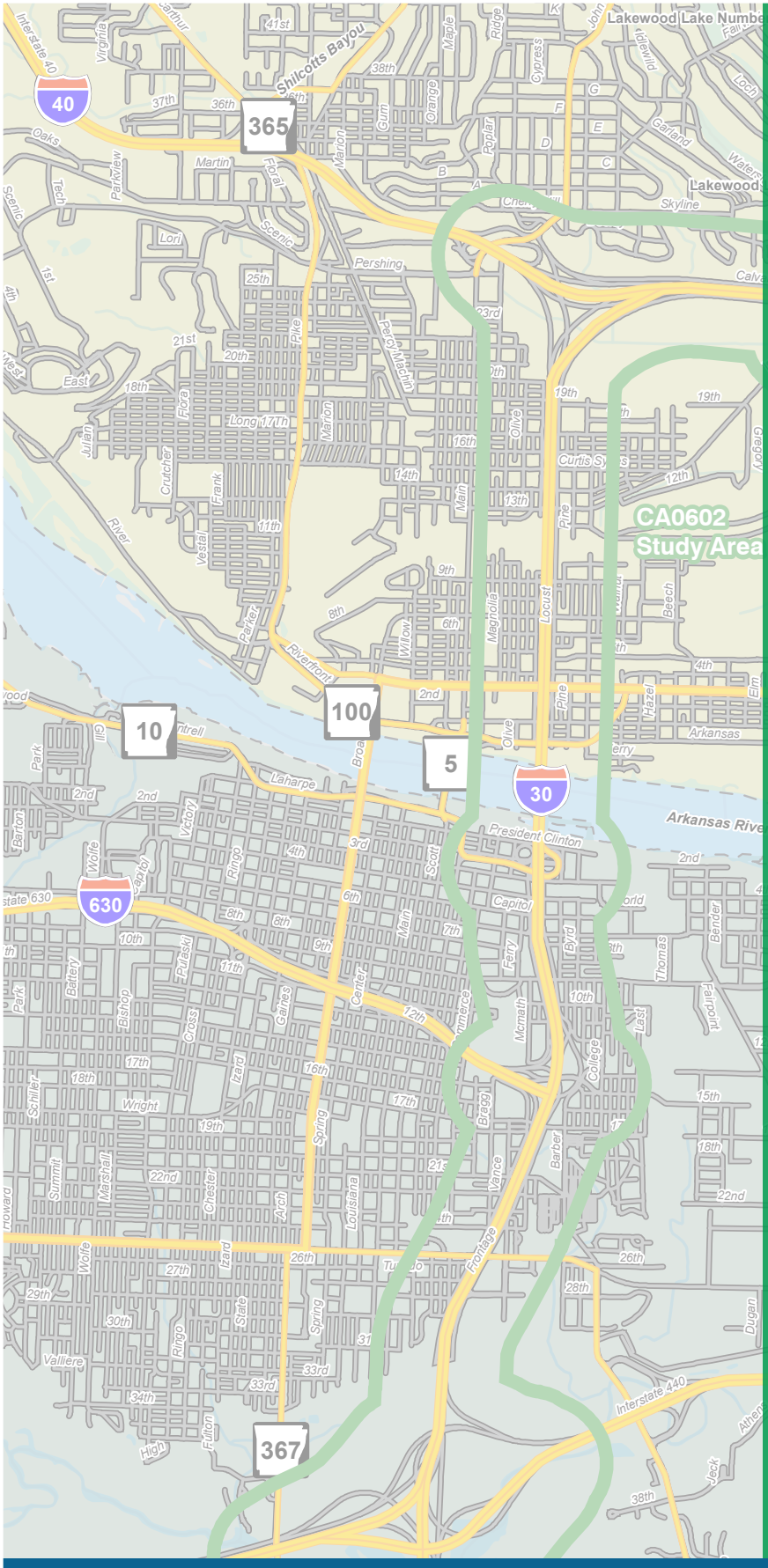

PLANNING AND ENVIRONMENTAL LINKAGES UNIVERSE OF ALTERNATIVES

INTERSTATE 30

CA0602

Interstate 530 – Highway 67

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CONNECTING ARKANSAS PROGRAM CAP

Arkansas State Highway & Transportation Department

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1.0 INTRODUCTION

The initial set of possible solutions to the transportation issues identified in the I-30 PEL Purpose and Need Technical Report, along I-30/I-40 within the study area,[1] is referred to herein as the *Universe of Alternatives* (Universe). Each alternative in the Universe will be screened in the areas of engineering, cost, environmental, and public input, as described in the I-30 PEL Alternative Screening Methodology, to determine how well it meets the Purpose and Need and the Study Goals that have been established for the project. Alternatives that do not satisfy the criteria will be eliminated from consideration, while successful alternatives will be refined and moved to the next level of screening. As the study progresses, more data will become available, which will allow for more detailed analysis. In the final screening stage, roadway, transit, bike/pedestrian, and congestion management alternatives will be combined to create the PEL Recommendations that best address the transportation needs for the corridor, which will then be moved into the NEPA process for further development.

2.0 BACKGROUND

The Universe of Alternatives for the I-30 PEL Study has been developed utilizing information from the following sources: the *2003 Central Arkansas Regional Transportation Study (CARTS) Areawide Freeway Study, Phase 1 Arkansas River Crossing Study*, *the Long Range Metropolitan Transportation Plan* for the CARTS area (METRO 2030.2), and *the I-30 PEL Purpose and Need Technical Report*, along with input from the Technical Work Group, public, and other stakeholders. Other past relevant studies include:

- Central Arkansas Regional Transportation Study (CARTS), Areawide Freeway Study, Phase 2 Areawide Study, 2003;
- River Rail Airport Study, Phase 2 Final Report, 2011;
- I-630 Fixed Guideway Alignment Study, 2010;
- The Six Bridges Framework Plan 6 Bridges Study, late 1990s; and
- I-630 (from I-430 to I-30) Final Environmental Impact Statement (FEIS), 1978.

3.0 PURPOSE AND NEED

The I-30 PEL Purpose and Need Technical Report serves as the guiding document for the alternative's development based on the following primary needs identified for the I-30 PEL study area.

3.1 Traffic Congestion

Traffic congestion addresses the need to improve mobility through the study area and to provide more efficient access into the downtown areas of Little Rock and North Little Rock. Alternatives were developed that included adding lanes to the existing I-30 corridor in the study area while optimizing access control to provide better access into

[1] The proposed I-30 PEL study area is located in central Arkansas, and stretches approximately 6.7 miles through Little Rock and North Little Rock. The study area begins at I-530 in the south and extends to I-40 in the north, and along I-40 eastwardly to its interchange with Hwy. 67 in North Little Rock.

the downtown areas. Other alternatives were developed to reduce the amount of traffic on the I-30 corridor such as adding parallel routes on new location and providing travel options by other modes such as transit and bicycle / pedestrian facilities.

3.2 Roadway Safety

Safety is important to all modes of travel in the corridor. The high traffic volumes in the study area combined with functional deficiencies of the roadway are important safety factors to be considered. Safety issues will be addressed by reducing congestion and improving geometric features along I-30/I-40 that contribute to the high crash rate through the corridor. Most of the entrance and exit ramps do not meet the current length or spacing requirements, and the weaving areas along the corridor do not provide adequate length for safe lane changes. Alternatives were developed utilizing access management principles to improve road geometry and reduce the number of conflict points at intersections and weaving areas. Vehicle conflicts with bicyclists and pedestrians were also considered. Alternatives such as wayfinding/signage improvements were also proposed to enhance driver awareness.

3.3 Structural Roadway Deficiencies

Roadway structural deficiencies are due to the deterioration of concrete and asphalt over the 50 plus years since the roadway was initially constructed. Portions of the I-30/I-40 corridor will need some level of rehabilitation within the expected timeframe of the project. Options for the Mainline Pavement Rehabilitation alternative include a simple asphalt overlay, mill and overlay, and complete reconstruction, depending on the results of structural analyses recently performed by AHTD on the existing roadway.

3.4 Functional Roadway Deficiencies

Roadway functional deficiencies include geometric features that do not meet current design standards, such as narrow lanes and shoulders, and inadequate ramp lengths and spacing as defined by the American Association of State Highway and Transportation Officials (AASHTO) and the Arkansas State Highway and Transportation Department (AHTD). Alternatives were developed to provide an adequate number of lanes for the projected traffic, remove horizontal and vertical curves that do not meet current standards, improve sub-standard shoulder widths, provide adequate ramp lengths for acceleration / deceleration, and improve ramp spacing to improve weaving operations.

3.5 Navigational Safety

The I-30 Bridge over the Arkansas River has a history of being struck by barges due to the location of a pier in the navigational channel. An August 2014 letter from the Arkansas Waterways Commission requested that the bridge provide a horizontal clearance of 332 feet and a vertical clearance of 62.4 feet. Two bridge rehabilitation alternatives and one bridge replacement alternative were developed to address these issues.

3.6 Structural Bridge Deficiencies

The I-30 Bridge over the Arkansas River was rated as Structurally Deficient[2] with a substructure rating of "poor" as a result of an October 2013 inspection by AHTD. One proposed alternative was developed to rehabilitate the existing substandard bridge components, and other alternatives were developed to replace the entire bridge to either the east or west of the existing location.

3.7 Functional Bridge Deficiencies

The width if the existing bridge is insufficient for the current peak hour traffic demands and the narrow shoulders do not meet current design standards. Alternatives were developed to widen or replace the existing bridge, with both alternatives providing the number of lanes required to support the projected future traffic and shoulder widths that meet current design standards.

4.0 GOALS

The following study goals, as listed in the I-30 PEL Purpose and Need Technical Report, provided guidance for the alternatives development process:

- Improve opportunity for east-west connectivity;
- Enhance mobility;
- Improve local vehicle access to and from downtown Little Rock/North Little Rock;
- Connect bicycle/pedestrian friendly facilities across I-30/I-40;
- Accommodate existing transit and future transit;
- Improve system reliability;
- Minimize roadway disruptions during construction;
- Minimize river navigation disruptions during/after construction;
- Follow through on commitment to voters to improve I-30 as part of the CAP
- Maximize cost efficiency;
- Optimize opportunities for economic development;
- Avoid and/or minimize impacts to the human and natural environment, including historic and archeological resources;
- Sustain public support for the I-30 Corridor improvements; and
- Improve safety.

Guiding principles that will influence the overall project include:

- Accelerated Project Delivery;
- Context Sensitive Solutions/Aesthetically Pleasing Facility;
- Minimize the real, perceived and visual barrier of the freeway;
- Open Public Participation Process; and

[2] Bridges are considered structurally deficient if significant load carrying elements are found to be in poor condition due to deterioration. Source: *FHWA 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance*; *AHTD Bridge Inspection, Oversight, and Maintenance Performance Audit (November 2008).*

- Support of Local, Regional, and Statewide Transportation Plans.

5.0 ALTERNATIVES

5.1 No-Action

The No-Action Alternative represents the baseline condition in the I-30 PEL study area as if no additional improvements are implemented other than those already programmed in the fiscally constrained Central Arkansas Regional Transportation Study (CARTS) Long-Range Metropolitan Transportation Plan (MTP).

The No-Action Alternative provides a baseline to gauge how effective various alternatives will be at accomplishing the Purpose and Need and Study Goals for the project. This alternative is required to be considered in the PEL and NEPA analyses.

In addition to the programmed transportation improvements that have been identified as fiscally constrained in the MTP, the No-Action Alternative includes the preservation of the existing transportation network and all of the short-term operational and maintenance improvements currently underway and planned within the study area.

5.2 Highway Build

Highway Build Alternatives represent capital improvements to the I-30/I-40 mainline, associated ramps and functional interchange areas.

5.2.1 Mainline Widening

This alternative includes the addition of lanes to the existing interstate mainline roadway, which is one of the most common methods used to increase roadway capacity.

5.2.2 Mainline Pavement Rehabilitation

This alternative rehabilitates pavement along the existing I-30/I-40 mainline.

5.2.3 Elevated Lanes

This alternative includes increasing roadway capacity in the existing right-of-way (ROW) by adding express lanes on structure directly above the existing roadway.

5.2.4 Collector/Distributor (C/D) Roads

C/D roads consist of local access lanes, usually parallel to, but separated from the existing corridor, in order to remove local traffic from the mainline through traffic. This alternative eliminates a significant amount of weaving from the mainline, allowing through traffic to flow more freely.

5.2.5 Auxiliary Lanes

This alternative provides an extra lane between on and off ramps to allow for safer weaving and merge / diverge movements.

5.2.6 Dedicated Truck Lanes / Ramps

The addition of trucks to the traffic stream reduces travel speeds and safety due to their large size and slow response time. This alternative provides truck-only lanes and ramps in order to separate trucks from mainline traffic.

5.2.7 Frontage Road Improvements

This alternative improves the geometry and connectivity of the frontage road system, allowing for more efficient separation of local traffic from the mainline.

5.2.8 Intersection Improvements

Intersection improvements consist of modifications to existing intersections near I-30/I-40 to improve traffic flow and reduce conflict points. This could include the addition or modification of signals, additional turning lanes, or control of traffic movement.

5.2.9 Interchange Improvements

Congested interchanges cause traffic to back up onto the mainline of the interstate, causing further congestion and unsafe conditions. This alternative replaces, or makes geometric improvements to, existing interchanges that are not functioning at an acceptable level.

5.2.10 Ramp Consolidation / Elimination

Current standards suggest a maximum of two ramps, per direction, per mile for urban interstates. One section of the study corridor has 10 ramps in one direction in a 2.5 mile span, and most of the ramps do not meet current length requirements for safe acceleration and deceleration. This alternative improves mainline traffic flow and safety by decreasing the number of entrance and exit points along the study corridor.

5.2.11 Roadway Shoulder Improvements

Adequate shoulders provide space for emergency stops, emergency vehicle access, provide the driver with a sense of comfort in congested areas, and improves the capacity of the mainline travel lanes. This alternative increases the width of shoulders in the corridor to current design standards.

5.2.12 Horizontal / Vertical Curve Improvements

The I-30/I-40 facility within the study area has several substandard horizontal and vertical curves that make the road less safe due to limited sight distance. This alternative will modify the roadway to meet existing American Association of State Highway and Transportation Officials (AASHTO) standards for horizontal and vertical curves.

5.2.13 Bottleneck Removal

Spot locations with recurring high congestion, or bottlenecks, cause significant delay and unsafe conditions. Many times these areas can be improved with alternatives focused on the immediate area in order to reduce the congestion at a lower cost than improvements to the whole corridor.

5.2.14 Bypass Route

The addition of an alternate route on new location can draw traffic from a congested route, thereby improving the level of service of the original route. This alternative involves a fourth connection across the Arkansas River, to the east or west of I-30.

5.3 I-30 Arkansas River Bridge

The I-30 Arkansas River Bridge alternatives represent capital investments to improve travel on I-30 across the Arkansas River.

5.3.1 Bridge Rehabilitation

The I-30 Bridge over the Arkansas River has been rated as structurally deficient, and the existing 6 lanes cause recurring bottlenecks during peak travel times. This alternative rehabilitates and widens the existing structure.

5.3.2 Bridge Replacement

This alternative provides a new improved I-30 Arkansas River Bridge to meet current design standards and provides acceptable horizontal clearance for navigational traffic on the Arkansas River.

5.3.3 Bridge - Elevated Lanes

This alternative constructs additional lanes within the existing ROW by building elevated lanes directly above the existing I-30 Arkansas River Bridge. This could be in combination with the *Elevated Lanes* roadway alternative, or as a stand-alone bridge option, with northbound traffic traveling on one level and southbound traffic traveling on the other.

5.4 Other Modes

Other travel mode alternatives represent capital and operating improvements to non-highway modes including transit, rail, bike, and pedestrian.

5.4.1 Arterial Bus Transit

This alternative provides new or expanded bus service along existing roadways.

5.4.2 I-30 Express Bus Transit

This alternative provides or expands bus service that operates on existing arterials or freeways to provide modal options to commuters who follow consistent work trip patterns. Buses usually stop every 3 to 5 miles in the suburban area and then travel non-stop into the downtown area.

5.4.3 Bus on Shoulder

Similar to *Express Bus Transit*, bus on shoulder provides the option for buses to travel on the highway shoulder during peak travel times or incidents.

5.4.4 Arterial Bus Lanes

This alternative provides exclusive lanes for bus transit on arterial routes.

5.4.5 Arterial Bus Rapid Transit

This alternative provides bus service that operates on exclusive ROW or in the existing traffic stream for advantages similar to rail transit with lower cost. Stops are usually at distances of ½ mile or greater.

5.4.6 Light Rail (Streetcar)

This alternative provides rail service that operates with a single railcar or multiple connected cars, either on exclusive ROW or in the traffic stream. Stops are usually at distances of ½ mile or greater.

5.4.7 Heavy Rail

This alternative provides rail service that operates on exclusive ROW with multiple connected passenger railcars. Stops are usually at distances of ½ mile or greater.

5.4.8 Commuter Rail

This alternative provides rail service that operates on freight rail corridors between city centers and suburbs with multiple connected cars. Stops are usually at distances of greater than 2 miles.

5.4.9 High Speed Rail

This alternative provides rail service that operates in exclusive ROW at significantly higher speeds than traditional rail. Stops are usually located at large cities along the rail corridor.

5.4.10 Bicycle / Pedestrian

This alternative provides improved or new sidewalks and bicycle lanes for better non-motorized connectivity.

5.5 Congestion Management

Congestion management strategies represent alternatives to general purpose highway lanes that focus on reducing congestion on I-30/I-40 by either adding capacity or reducing demand.

5.5.1 Information Systems / Advanced Traveler Information

This alternative includes use of en route traveler information systems and/or pre-trip advanced traveler information. Traveler information systems provide messages to drivers related to weather, travel times, emergencies, delays, upcoming construction projects, etc. For use en route, dynamic message signs display short messages to drivers, and radio broadcasts can provide information in greater detail. To disseminate advanced traveler information (pre-trip), a wide range of media can be used. Radio broadcasts, internet sites, and mobile devices can all be used to inform drivers of travel conditions before and during a trip.

5.5.2 Managed Lanes

This alternative provides a travel lane for transit, vehicles with more than one occupant and/or vehicles willing to pay a toll for travel time savings. Managed lanes provide many mobility benefits to motorists.

5.5.3 Reversible Lanes

Reversible lanes are useful in areas with high directional flow during peak hours. This alternative provides lanes that can be quickly modified to allow travel in either direction in response to peak travel periods.

5.5.4 Ramp Metering

This alternative includes signals placed at the end of entrance ramps to manage the number of vehicles entering the traffic stream. Ramp meters improve the rate of traffic flow and safety on the major roadway by reducing the number of vehicles entering the weaving area from minor roadways.

5.5.5 Hard Shoulder Running

Hard shoulder running is an active traffic management alternative that allows vehicles to use a paved shoulder as an additional lane during peak congestion periods. These lanes can allow all vehicles or certain vehicles such as transit, HOVs, or High Occupancy Toll (HOT) vehicles. Dynamic overhead signs are used to inform drivers if the shoulder is open for use. In addition to mitigating peak-period congestion, this technology can also mitigate congestion related to traffic incidents.

5.5.6 Travel Demand Management (TDM)

This alternative includes alternative work hours, telecommuting and ridesharing. Alternative work hours can help decrease the intensity of the peak congestion period by shifting some commuters to other times of the day. For some, telecommuting or working from home can eliminate the need to drive in to work altogether, resulting in a lower daily traffic volume. These alternatives both depend on whether or not employers allow for nontraditional work hours. Ridesharing is an alternative that can be used in accordance with Hard Shoulder Running or other managed lanes. By providing an incentive (the ability to use an HOV lane), commuters may be encouraged to carpool, resulting in a lower daily traffic volume. Other incentives, such as employer incentives, can also encourage the use of rideshare.

5.5.7 Transportation System Management (TSM)

TSM is a planning tool that increases the efficiency of the transportation system by using technology to minimize the effects of vehicle congestion. TSM can involve equipment, such as signals and communications equipment, and technology to monitor traffic and make adjustments to traffic operations on a real-time basis when more vehicles are using the road than can pass through without causing congestion. TSM can also involve improvements to the street and highway network such as lane modifications and parking configuration.

5.5.8 Wayfinding / Signage

This alternative improves signage along the study area to provide the traveler better information to aid in decision making, and allowing for a safer travel experience, i.e. last minute weaving to reach a desired exit.

5.5.9 Arterial Improvements

This alternative includes increasing capacity and safety on existing parallel arterial roads, which can reduce demand on the interstate mainline. Improvements could be, but are not limited to, additional lanes or traffic signal improvements.

5.5.10 Land Use Policy

This alternative includes the careful consideration of land use in relation to transportation, which plays a large role in mitigating congestion. Effective land use policy varies from place to place, depending on the area's specific needs and limitations.

5.6 Non-Recurring Congestion

Non-recurring traffic represents traffic incidents, bad weather, work zones, and special events.

5.6.1 Crash Investigation Sites

This alternative involves the implementation of crash investigation sites, which are designated zones off of the mainline where crashes can be investigated safely. By removing the vehicles from the original incident location, the persons and vehicles involved in the crash are safe from additional harm. Also, the mainline is less likely to experience secondary incidents. In the case of major incidents, these locations can serve as staging areas. These zones are typically placed in locations where crashes tend to occur more frequently.

5.6.2 Roadside / Motorist Assist Enhancements

Roadside and motorist assistance is an alternative or set of alternatives that can reduce the amount of time that an incident is impeding traffic flow. Quick response time can be vital not only to the incident at hand, but also to preventing secondary incidents from occurring. Frequent mile markers (as frequent as a tenth of a mile) help motorists to more precisely communicate their location. Service patrols also decrease response time and prevent incidents by removing obstructions or dealing with other possible sources of congestion.

5.6.3 Improvements to Detour Routes

This alternative includes increasing capacity and safety on detour routes during construction by using existing shoulders as additional lanes, widening the detour route to accommodate additional lanes, and improving the road surface to allow for higher speeds.

5.6.4 Variable Speed Limits (Speed Harmonization)

Speed harmonization is an incident management alternative that can include the use of dynamic overhead signs to communicate a variable speed limit on a freeway during an incident. Non-recurring reasons to vary the speed include construction, adverse weather conditions, traffic incidents, concerts, football games, etc. Variable speed limits in non-recurring conditions help reduce secondary crashes. The dynamic overhead signs can be multifunctional. Not only can they display the speed limit, they can communicate a lane closure due to an incident, or operate along with Hard Shoulder Running and Queue Warning.

5.6.5 Queue Warning

This alternative includes use of a queue warning system, which is typically utilized in addition to Speed Harmonization. Dynamic signs are mounted on the sides of the same gantries used for the speed harmonization signs, and a congestion icon is lit when congestion downstream is present. Queue warning systems have been reported to reduce the frequency of traffic incidents.