

ARKANSAS STATE HIGHWAY
AND
TRANSPORTATION DEPARTMENT

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RECEIVED

SEP 21 2010

CITY OF FAYETTEVILLE
MAYOR'S OFFICE

Dear Mayor:

Enclosed please find copies of Minute Orders relating to your City which were adopted by the Commission at their last meeting.

Should you have questions or comments regarding these or other matters, please advise.

Sincerely,

Dan Flowers
Director of Highways
and Transportation

Enclosures

MINUTE ORDER

District: Four
County: Washington
Category: Miscellaneous

WHEREAS, IN WASHINGTON COUNTY, Minute Order 2007-131 authorized a study to determine the appropriate cross section for improvements to Highway 112 between Highway 180 and Garland Avenue in the City of Fayetteville; and

WHEREAS, the Highway 112 (Razorback Road and Maple Street) Improvement Study has been completed and has identified the most appropriate cross section for improvements.

NOW THEREFORE, this study is adopted for use as a planning guide for scheduling future improvements in the area, and the Director is authorized to proceed with environmental studies, surveys, design, right-of-way acquisition, and construction as funds become available.

Approved: Carl A. Ruiz Chairman
[Signature] Vice-Chairman
[Signature] Member
[Signature] Member
[Signature] Member

Submitted By: Scott d. Bennett
Assistant Chief Engineer - Planning
Approved: [Signature] Director
Minute Order No. 2010 109
Date Passed JUL 13 2010

FW
RH

P&R:SP:ASB:6-14-10

Highway 112 (Razorback Road and Maple Street)

Improvement Study



Fayetteville

Washington County

July 2010

Highway 112 (Razorback Road and Maple Street)

Improvement Study

Fayetteville

Washington County

July 2010



Prepared by the
Planning and Research Division
Arkansas State Highway and Transportation Department
In Cooperation with the Federal Highway Administration

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

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AHTD:P&R:SP:ASB:06/14/10

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INTRODUCTION

At the request of local officials, the Arkansas State Highway Commission passed Minute Order 2007-131, which authorized a study to determine the appropriate cross-section for improvements to Highway 112 along Razorback Road and Maple Street between Highway 180 (6th Street) and Garland Avenue through the University of Arkansas (UA) campus in Fayetteville. The study area encompasses Job 040418, which was identified by the UA as a need in a May 7, 1999 letter to the City. The City of Fayetteville stated it as a need in a March 27, 2002 letter to the Arkansas State Highway and Transportation Department (AHTD). See Appendix A for Minute Order and correspondence. The regional Metropolitan Planning Organization (MPO) identified it as a need on their 2030 Long Range Plan (see Appendix B). Job 040418 was programmed in February 2003. See Figure 1 for a map of the study area.

Fayetteville is located in Washington County, in the northwest portion of the State. Based on 1990 and 2000 Census results, the population of Washington County increased 39.1 percent, from a population of 113,409 in 1990 to 157,715 in 2000. During the same period, Fayetteville grew 37.9 percent, from a population of 42,099 in 1990 to 58,047 in 2000. Based on the latest official Census count, Fayetteville grew to a population of 67,158 in 2006, a 15.7 percent increase from 2000. This results in an average annual growth rate of 3.0 percent per year over the time period 1990 to 2006. The enrollment at the UA over the past ten years has increased by 23.8 percent, from 15,060 students in the 1998 academic calendar year to 19,191 in 2008. This results in an average annual growth rate of 2.2 percent per year.

Highway 112 through Fayetteville, known as Razorback Road, Maple Street, and Garland Avenue, serves as an important highway to the City, as it provides connectivity to much of Fayetteville's arterial street network as well as serving as a north-south route. Highway 112 through the UA has two through lanes, variable pavement widths, variable shoulder widths, and variable curb and gutter locations. The entire route of Highway 112 through the City of Fayetteville is on the MPO-adopted regional bicycle/pedestrian plan (see Appendix C). Highway 112, functionally classified as a principal arterial south of Highway 180 and a minor arterial to the north (see Appendix D), also is a vital route for the UA.

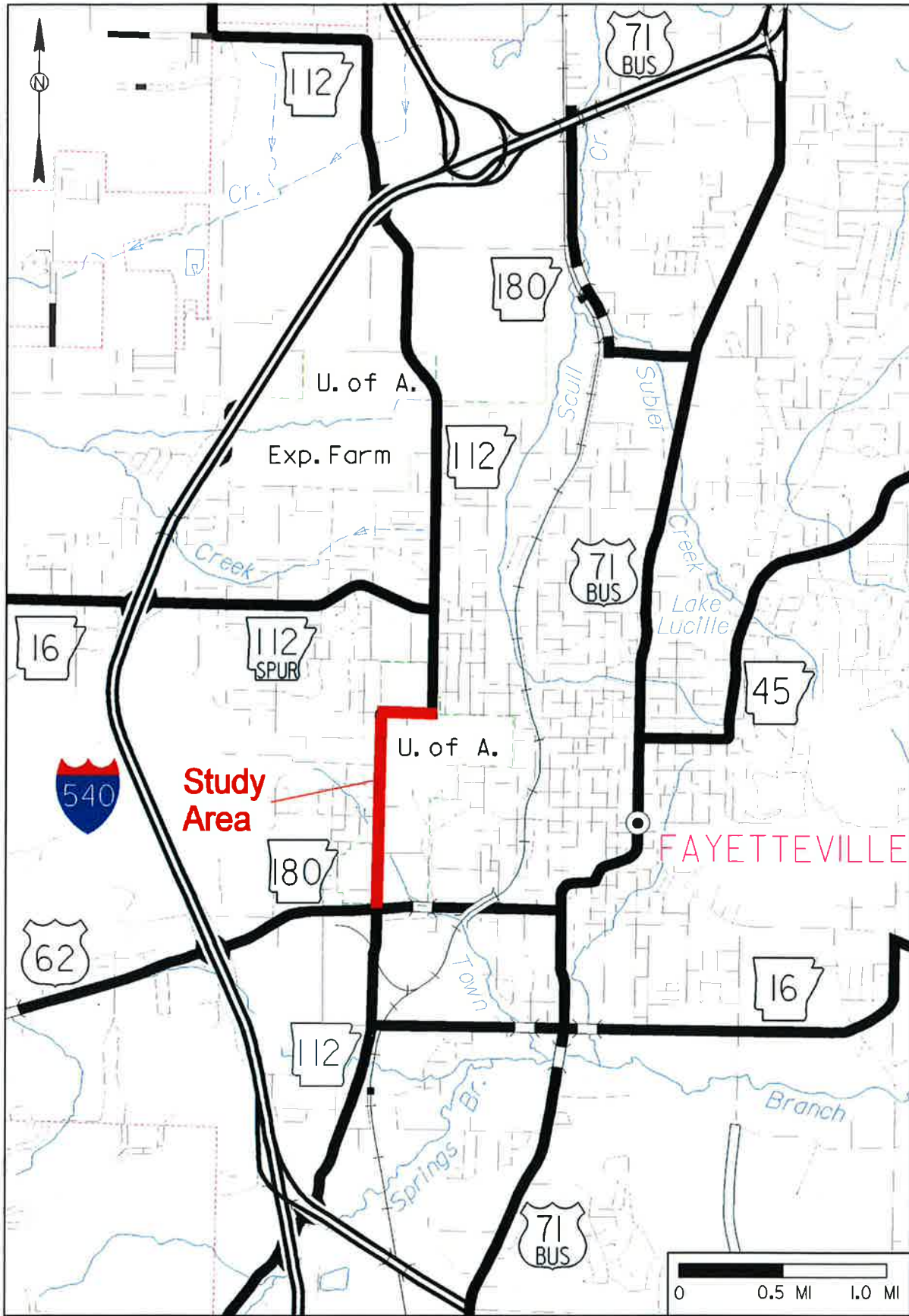


Figure 1. Study Area

Within the UA campus, Highway 112 is the principal north-south route for vehicular, pedestrian, and transit traffic. It also provides connectivity to other important streets within the campus, serves many campus parking lots, and serves many of the UA’s athletic facilities. For these reasons, Highway 112 is a vital route for UA commuter traffic and gameday traffic. See Figure 2 for a map of the UA campus.

Various segments of Highway 112 in Fayetteville have been improved in recent years or are programmed to be improved. See Table 1 for a list of Highway 112 projects.

Table 1. List of Highway 112 projects in Fayetteville completed or programmed

Job Number	Southern terminus	Northern terminus	Length (miles)	Date completed or programmed	Cross section description
040039	Hwy. 71/ Fulbright Expressway	Hwy. 16/ 15th St.	0.91	1997	Four 11-foot lanes, 12-foot turning lane, two 5-foot sidewalks
040399	Hwy. 16/ 15th St.	Hwy. 180/ 6th St.	0.56	2007	Four 11-foot lanes, 15-foot raised median, two 10-foot sidewalks
040418	Hwy. 180/ 6th St.	Maple St./ Garland Ave.	1.19	N/A	Segment under study
040273	Maple St./ Garland Ave.	Hwy. 112S/ North St./ Wedington Dr.	0.51	2004	Four 11-foot lanes, 15-foot raised median, one 10-foot sidewalk, one 5-foot sidewalk
040489	Hwy. 112S/ North St./ Wedington Dr.	TBD*	TBD*	TBD*	TBD*

*TBD: To be determined



Figure 2. UA Campus

As seen in Table 1, the three segments of Highway 112 that have already been improved have inconsistent cross-sections. The cross-section of Highway 112 to be constructed under Job 040489 has not been determined and the AHTD and the City are currently discussing the cross-section elements as a result of public involvement.

It should be noted that in a 2003 agreement between the AHTD and the City, \$1 million of Surface Transportation Program (STP) Federal-aid funds were committed to Job 040418. This agreement was re-confirmed in a February 21, 2008 letter to the AHTD from the City, who will provide the matching funds.

PURPOSE AND NEED

The purpose of the proposed improvements to Highway 112 within the study area (Job 040418) is to relieve traffic congestion, improve accommodations for pedestrians and bicyclists, and enhance safety through the UA campus. This need has already been cooperatively identified by the AHTD, the City, the UA, and the MPO. The purpose of this study is to determine the appropriate cross-section for Job 040418.

Because of the mix of vehicular, pedestrian, and bicycle traffic on Highway 112 in and around the UA campus, the type of cross-section for Highway 112 will be critical to ensure efficient and safe traffic flow for all modes of transportation. This is particularly true during special events, such as UA athletic events. See Figure 3 for pictures of typical weekday and football gameday traffic.



Figure 3. Typical weekday (above) and football day (below) traffic

Study Considerations

A serious consideration for determining the appropriate cross-section is existing constraints. This segment of Highway 112 through the UA campus is highly developed, particularly with significant UA athletics structures on the east side of the highway, such as John McDonnell Field, Willard & Pat Walker Pavilion (Razorback Football Indoor Practice Facility), and Donald W. Reynolds Razorback Stadium. Directly across from Razorback Stadium is a parking lot with retaining walls and an elevated walkway over Highway 112 into the Stadium.

Other major considerations for determining the appropriate cross-section are the transportation goals and plans of the City of Fayetteville and the UA, particularly accommodation of bicyclists and pedestrians. The City of Fayetteville Master Street Plan, adopted September 4, 2007, lists Highway 112 as a principal arterial (see Appendix E). The UA Campus Transportation Plan, published November 2005, recommended Razorback Road be improved to a four-lane, undivided cross-section with a 10-foot sidewalk (or “multi-use path”) on the east side and a six-foot sidewalk on the west side (see Appendix F). At the study kick-off meeting held February 7, 2008, the UA requested that these sidewalks and 10-foot setbacks be included in the project (except for the area immediately around Razorback Stadium and along Maple Street). This preference was reiterated by the City in an October 23, 2009 letter to the AHTD, and by an MPO letter to the AHTD dated October 22, 2009. See Appendix G for study meeting minutes and correspondence. The Campus Transportation Plan also recommended that Maple Street be improved to a three-lane cross-section with a six-foot sidewalk on each side and implementation of access management. Because the UA owns all but one parcel along Highway 112 in the study area, it intends to realign some side streets and consolidate some driveways in an effort to achieve access management goals as widening improvements are made.

Other important considerations are:

- The regional bicycle/pedestrian plan. The entire route of Highway 112 is on the MPO’s regional bicycle/pedestrian plan (see Appendix C).
- Transit routes and stops. Razorback Transit currently has five routes and two stops on Highway 112, both on Razorback Road.

- Highway 112 system continuity and consistency. As seen in Table 1, the cross-section of other improved portions of Highway 112 varies.

In summary, the considerations in this study can be seen as consistent with the Federal Highway Administration's (FHWA) context sensitive solutions, also defined in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005, Section 109(c) (2) of Title 23, U.S. Code. The seven "qualities that characterize excellence in transportation design" and eight "characteristics of the process that yield excellence" are as follows.

Qualities that Characterize Excellence in Transportation Design

- The project satisfies the purpose and needs as agreed to by a full range of stakeholders. This agreement is forged in the earliest phase of the project and amended as warranted as the project develops.
- The project is a safe facility for both the user and the community.
- The project is in harmony with the community, and it preserves environmental, scenic, aesthetic, historic, and natural resource values of the area (i.e., exhibits context sensitive design).
- The project exceeds the expectations of both designers and stakeholders and achieves a level of excellence in people's minds.
- The project involves efficient and effective use of the resources (time, budget, community) of all involved parties.
- The project is designed and built with minimal disruption to the community.
- The project is seen as having added lasting value to the community.

The Characteristics of the Process that will Yield Excellence in Transportation Design

- Communication with all stakeholders is open, honest, early, and continuous.
- A multidisciplinary team is established early, with disciplines based on the needs of the specific project, and with the inclusion of the public.
- A full range of stakeholders is involved with transportation officials in the scoping phase. The purposes of the project are clearly defined, and consensus on the scope is forged before proceeding.

- The highway development process is tailored to meet the circumstances. This process should examine multiple alternatives that will result in a consensus of approach methods.
- A commitment to the process from top agency officials and local leaders is secured.
- The public involvement process, which includes informal meetings, is tailored to the project.
- The landscape, the community, and valued resources are understood before engineering design is started.
- A full range of tools for communication about project alternatives is used (e.g., visualization).

Traffic Analysis

The traffic analysis conducted in this study included estimating current and projected average daily traffic (ADT). This information is shown in Figure 4. The percentage of truck traffic along Highway 112 is three percent. As part of this analysis, level of service (LOS) along Highway 112 was also considered. Because of the unique nature of Highway 112 through the study area, it does not fit into any of the criteria under the current Highway Capacity Manual (HCM2000) methodologies. Since the principal component of LOS on urban highways and streets is related to intersections, it was determined that LOS analyses would be conducted along Highway 112 at major intersections.

It should be noted that the current HCM2000 methodology only factors automobile traffic for LOS calculations. The upcoming HCM2010 LOS methodology will include all modes of transportation, such as bicyclists and pedestrians.

The HCM2000 defines LOS as a qualitative measure describing conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service, A through F, are defined in Appendix H. For an urban setting such as Highway 112 in the study area, LOS D is considered acceptable. See Figure 5 for a map of 2010 intersection LOS.

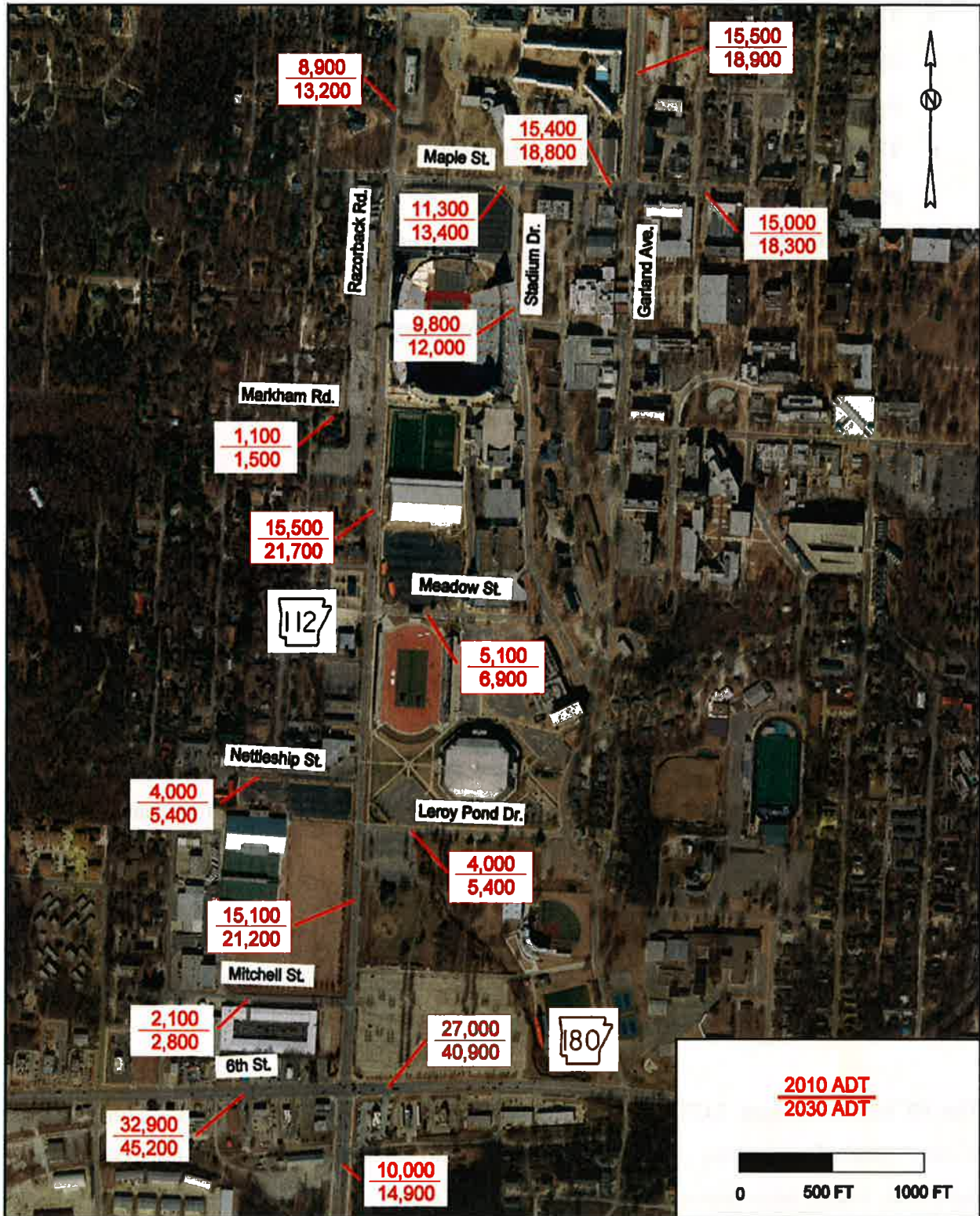


Figure 4. Current and Projected Average Daily Traffic (ADT)

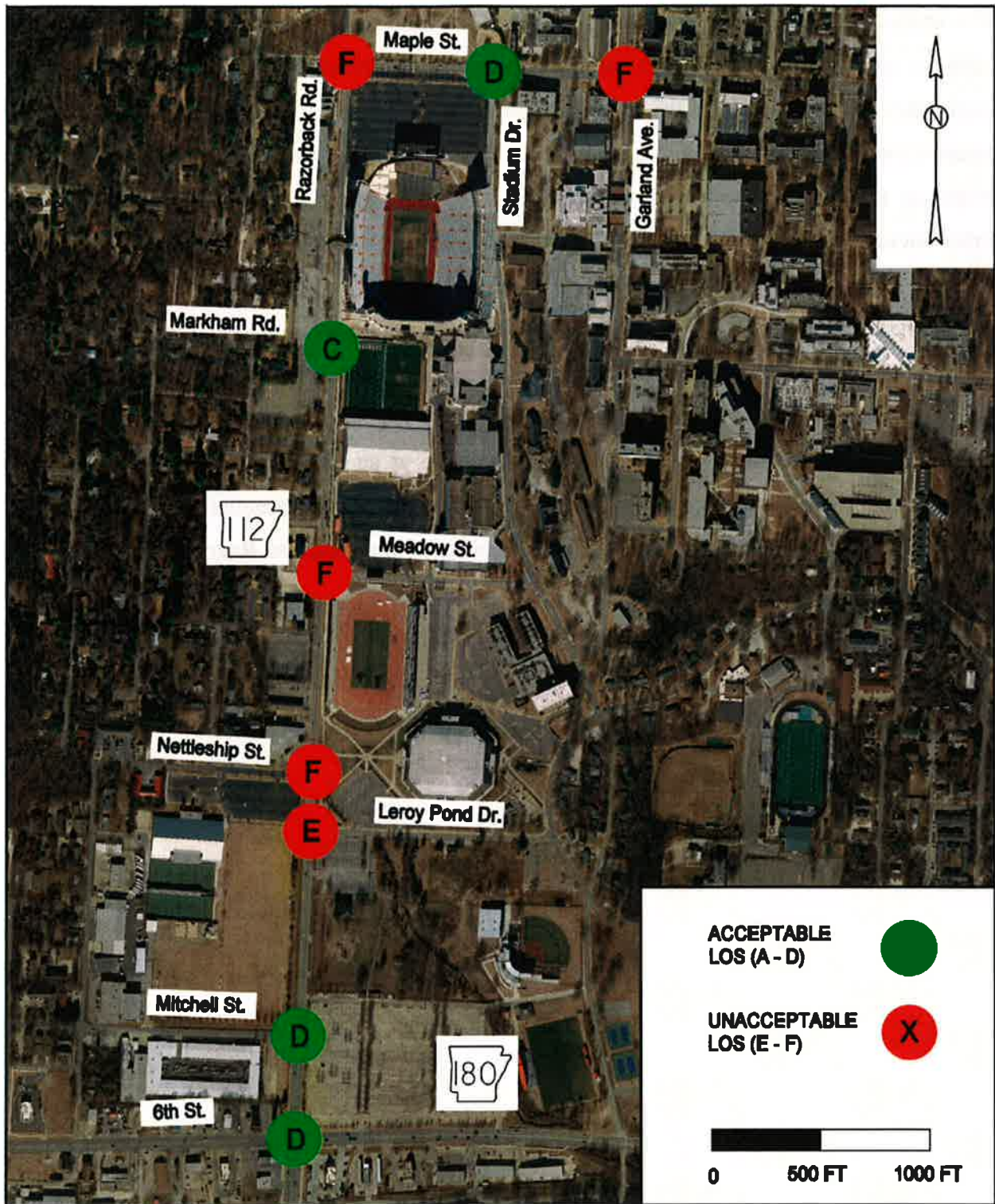


Figure 5. Current Intersection LOS (Based on 2010 Traffic)

The analysis of 2010 traffic indicates that out of the nine major intersections in the study area with an intersecting street with volumes greater than 1,000 vehicles per day, five currently experience an unacceptable LOS. Most of the delay on Highway 112 occurs at the signalized intersection of Garland Avenue and Maple Street. Some delay to Highway 112 traffic, albeit relatively minor, is due to left turning vehicles waiting for gaps in the opposite direction. The other intersections with an unacceptable LOS are at the stop-controlled side streets.

An analysis of projected 2030 traffic using VISSIM, a microsimulation traffic model, and HCM2000 indicates that, with the existing cross-sections, traffic will be so heavy that there will be substantial and unacceptable delay on both Highway 112 and the side streets. All nine of the major intersections within the study area will operate at an unacceptable LOS by 2030 (see Figure 6). VISSIM indicates that traffic on Highway 112 would essentially be near gridlock. This projected congestion will also result in significant impedance to Razorback transit routes along Highway 112.

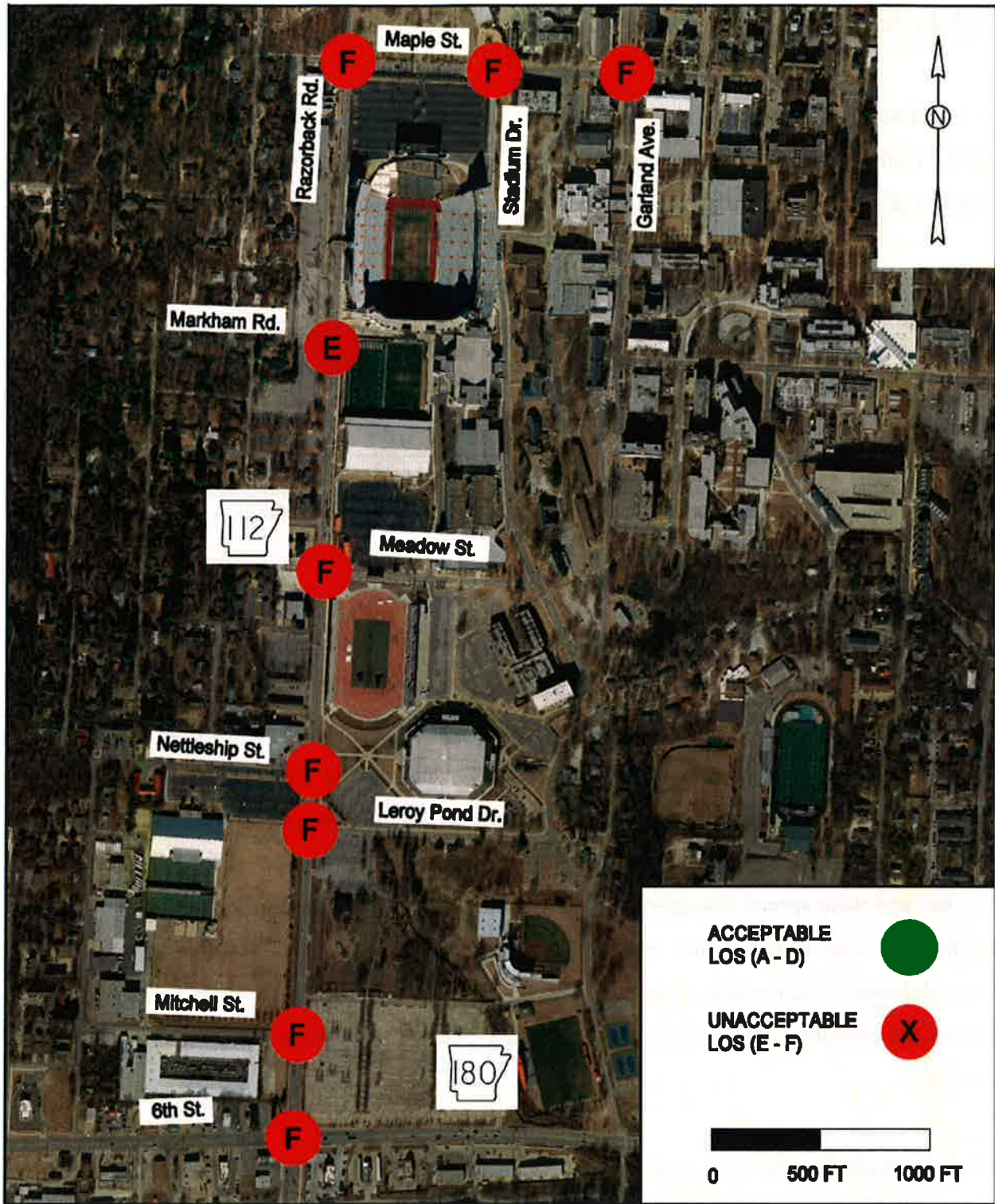


Figure 6. Projected Intersection LOS (Based on 2030 Traffic)

Safety Analysis

A crash analysis was conducted for Highway 112 within the study area using 2006, 2007, and 2008 crash data, the most recent years for which data is available. Crash rates, computed as the number of crashes per million vehicle miles (mvm) traveled, are shown in Table 2.

Table 2. Crash Rates for Highway 112

Segment	Year	Number of crashes	Crash rate*	Statewide average crash rate* for similar facilities ¹
6th Street to Garland Avenue (1.19 mi.)	2006	62	8.72	3.44
	2007	62	9.27	3.43
	2008	58	8.76	3.34

* Crash rates are measured in crashes per million vehicle miles traveled.

¹ Two-lane, undivided, urban highways

As can be seen in Table 2, the crash rates on Highway 112 for all three years analyzed were higher than the respective statewide averages for similar facilities. Of the 182 crashes in 2006, 2007, and 2008, no crashes were reported as severe, indicating low speed traffic and/or congested traffic. Five crashes involved pedestrians, spread out among four intersection locations. Rear-end collisions were reported as the most common type of crash on Highway 112 (55 percent). Also, driveway or intersection related collisions accounted for 64 percent of the crashes and were spread throughout the study area. These types of crashes may indicate a need for left turn lanes at appropriate intersections; a continuous, two-way, left turn lane; or additional through lanes. Additionally, only one crash on Highway 112 during the three years studied was a head-on collision. This indicates that crossing over the centerline is not significant cause of crashes.

A more detailed crash investigation was conducted for the Razorback Road and Maple Street intersection. This was done due to concerns from the City since only three legs of the intersection are stop-controlled, while the westbound Highway 112/Maple Street approach is not. The investigation showed that of the eight crashes that occurred at the intersection in 2007 and 2008, six were rear-end collisions at the stop-controlled approaches (one eastbound, three southbound, and two northbound). This indicates that the stop-controlled approaches may be

confusing to some drivers by violating their expectations. Also, none of the crashes were severe, indicating that speeding through the intersection is not a problem, and only one crash was due to failure to yield. The results of this investigation indicate that although there does appear to be some occasional driver confusion due to the traffic control at the intersection, there is not a significant safety problem.

DISCUSSION OF CROSS-SECTION ALTERNATIVES

Several cross-section options were considered and evaluated in addition to the no-build alternative.

Alternative 1 - No-Build

Alternative 1 would retain the existing two through lanes on Highway 112 along Razorback Road and Maple Street. All nine major intersections within the study area would operate at an unacceptable LOS by 2030. Queues from the Razorback Road and Highway 180/6th Street, Razorback Road and Maple Street, Maple Street and Stadium Drive, and Maple Street and Garland Avenue intersections would likely be so long as to create near gridlock throughout the corridor in the future.

Alternative 2 - Four Lanes with a Raised Median

Alternative 2 would widen the existing highway to four 11-foot through lanes with a 15-foot raised median. A 15-foot raised median, measured curb-face to curb-face, is typically used so that a four-foot curbed divider can serve as a pedestrian refuge when median breaks with 11-foot left turn bays are provided. Along the Razorback Road portion, Alternative 2 would include a 10-foot sidewalk with a 10-foot setback on the east side, and a six-foot sidewalk with a 10-foot setback on the west side. The 10-foot sidewalk is necessary to adequately accommodate pedestrian traffic during special events such as UA athletic events, and can function as a “multi-use trail” for bicyclists. The Maple Street portion would include at least a six-foot wide sidewalk on the north side and a 10-foot sidewalk on the south side, with possible variable setback widths due to geometric constraints and existing development.

This alternative would have two primary advantages: it would complement the UA’s access management goals for the corridor by controlling left-in and left-out movements, and it would provide pedestrian refuges at mid-block and unsignalized crosswalk locations. A raised median with pedestrian refuges could potentially enhance pedestrian safety at crosswalk locations.

The disadvantages of Alternative 2 would be:

- The potential additional impacts to adjacent buildings and parking lots compared to the other alternatives due to the extra cross-section width required—15 feet versus a 12-foot turning lane in Alternative 3, or no median treatment for Alternative 5.
- The 10-foot offset between the outside through lane and sidewalks may need to be reduced or eliminated to reduce potentially substantial impacts.
- Access management would already be achieved by the UA's commitment to limiting driveways and street intersections, as reiterated at the August 28, 2009 meeting.
- The cost of Alternative 2 is slightly greater than the other alternatives except for Alternative 3. The estimated cost is \$9.8 million (in 2010 dollars), which includes preliminary engineering (PE), right-of-way (ROW) acquisition, utilities relocation, construction, and construction engineering (CENG).

Alternative 3 - Four Lanes with a Continuous, Two-Way, Left Turn Lane

Alternative 3 would widen the existing highway to four 11-foot through lanes with a 12-foot continuous, two-way, left turn lane. Alternative 3 would have the same sidewalk and setback widths as Alternative 2. The primary advantage would be separating left turning traffic from the through lanes, which may enhance driver safety and add capacity versus an undivided cross-section.

The disadvantages of Alternative 3 would be:

- The potential additional impacts to adjacent buildings and parking lots compared to Alternatives 4 and 5, which have more narrow cross-sections.
- The 10-foot offset between the outside through lane and sidewalks may need to be reduced or eliminated, as in Alternative 2, to reduce potentially substantial impacts.
- The cost of Alternative 3 is greater than Alternatives 4 and 5 but similar to Alternative 2. The estimated cost is \$9.8 million (in 2010 dollars), which includes PE, ROW, utilities relocation, construction, and CENG. It should be noted that the final cost of ROW and utilities relocation may be less than Alternative 2 because the required ROW width would be reduced by three feet.

Alternative 4 - Two Lanes with a Continuous, Two-Way, Left Turn Lane

Alternative 4 would widen the existing highway to two 11-foot through lanes with a 12-foot continuous, two-way, left turn lane. Alternative 4 would have the same sidewalk and setback widths as Alternatives 2 and 3.

The primary advantages would be:

- Separation of left turning traffic from the through lanes.
- A potential reduction of impacts to adjacent structures compared to Alternatives 2 and 3.
- The cost savings, as the estimated cost of Alternative 4 is \$7.1 million (in 2010 dollars), which includes PE, ROW, utilities relocation, construction, and CENG.

It was determined, however, that Alternative 4 does not meet the purpose and need of the project. It does not improve traffic operations to an acceptable LOS. Even if Alternative 4 were only implemented on the Maple Street portion of the study segment as recommended in the UA Campus Transportation Plan, the queues would likely be so severe as to greatly impede traffic flow, including transit and bicycle traffic, in the area. This would be the case even if the Highway 112 traffic were diverted north along Razorback Road to Cleveland Street, which some view as a means of addressing the traffic flow problems along the Maple Street portion of Highway 112.

Alternative 5 - Four Lanes Undivided

Alternative 5 would widen the existing highway to four 11-foot through lanes with left turn lanes where warranted at selected locations. Alternative 5 would have the same sidewalk and setback widths as Alternatives 2, 3, and 4. This cross-section type was recommended in the UA's Campus Transportation Plan for the Razorback Road portion of Highway 112. Also, this cross-section type was recommended by the UA in the February 7, 2008 kick-off meeting, with agreement from the City of Fayetteville and the MPO, and reiterated at the August 28, 2009 meeting. This alternative preference was further reiterated by the City in an October 23, 2009 letter to the AHTD, and by an MPO letter to the AHTD dated October 22, 2009. See Appendix G.

The primary advantage of Alternative 5 is that it has a potentially lower cost estimate than Alternatives 2 and 3. The estimated cost of Alternative 5 is \$9.2 million (in 2010 dollars), which includes PE, ROW, utilities relocation, construction and CENG. Also, unlike Alternative 4, it meets the purpose and need of the project. The only disadvantage, when compared to Alternative 4, is the additional cost and potential additional impacts. Alternative 5 also does not include a median, which is included in the Alternative 2 cross-section. As mentioned previously, the crash analysis does not support the need for a median; however, a median does provide a pedestrian refuge.

Left Turn Lane Locations

To balance the need to safely and efficiently move all modes of traffic through the Highway 112 study area with the cost and impacts of the project, suitable justification for determining the need for left turn lanes at intersections was analyzed. The latest research and guidance from the American Association of State Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets, 2004, along with VISSIM models were used in the analysis.

It was determined that left turn lanes at the intersection of Highway 112 and Leroy Pond Drive, and the intersection of Highway 112 and Meadow Street, are justified on Highway 112 for the following reasons.

- The UA has expressed plans to realign Nettleship Street to intersect Highway 112 at Leroy Pond Drive and to extend Meadow Street to the west, likely increasing left-turning traffic from Highway 112.
- Both intersections have met signal warrants according to the Manual on Uniform Traffic Devices (MUTCD).
- The VISSIM models indicate that if the fourth legs of the above intersections are constructed, left turn lanes will be needed for the intersections to operate adequately and safely. In addition, by having a left turn lane with a dedicated green signal phase, north-south pedestrians can have a dedicated walk phase without conflict, which is not the case with no left turn lanes.

These issues were discussed at the February 2, 2010 meeting with the UA, the City, and the MPO (see Appendix G).

Access Management

Based on discussions with the UA at the February 7, 2008 and August 28, 2009 meetings, there is a strong commitment to access management, particularly in the elimination or realignment of driveways along Highway 112. The UA owns all but one parcel along Highway 112 within the study area.

At the August 28, 2009 meeting, the UA expressed concern about access to Lot 44, nicknamed “The Pit,” from the Razorback Road portion of Highway 112. There are currently three curb cuts for motorists: one-way in, one-way out, and one extra wide at the south end near the football stadium that also functions as a bus pull-off area for Razorback Transit. Because the internal parking lot “ring road” is paved to the back of the curb on Razorback Road, it is difficult for passenger cars to make a turn into or out of the parking aisles. Consequently, some motorists drive over the curb. The UA expressed a desire to combine the three driveways into one, while maintaining an appropriate distance from the Razorback Road/Maple Street intersection.

To address the UA’s concern, VISSIM was used to analyze Lot 44 and driveway locations to Highway 112. It was determined that one ingress/egress driveway to both Maple Street and Razorback Road are sufficient. The driveway to Razorback Road should be located approximately 275 feet south of Maple Street, across from the existing driveway south of the UA Alumni Center. This driveway location would provide access to the middle of Lot 44 while providing adequate distance from the Razorback Road/Maple Street intersection. This was presented and explained at the February 2, 2010 meeting.

Intersection of Highway 112 and Highway 180

The signalized intersection of Highway 112 and Highway 180/6th Street will continue to operate at LOS F through 2030, even if Alternative 5 were selected. This is largely because of the capacity constraints of Highway 180/6th Street. As seen in Figure 4, projected 2030 traffic on Highway 180/6th Street will be greater than 40,000 vehicles per day (vpd). The VISSIM analysis confirmed that in the 2030 PM peak hour, the worst hour analyzed, traffic on Highway 180/6th Street is so heavy that little green time can be given to Highway 112. Since a majority of southbound Highway 112/Razorback Road traffic desires to turn right to go west, long queues along Razorback Road may result, depending on future signal timing. However, the

queues, and resulting delays, would be less than what would be expected if Alternatives 1 or 4 were selected.

Maple Street portion of Highway 112

The Maple Street portion of Highway 112 has different traffic patterns which were also analyzed using VISSIM. Highway 112 “through” traffic has the option of using Cleveland Street, rather than Maple Street, which commonly happens today. Almost half of the westbound traffic on Maple Street west of Garland Avenue turns left onto Stadium Drive. Approximately half of the eastbound traffic in the same area turns left onto Garland Avenue. See Figure 7 for design year estimated turning movements along Maple Street.

Because of the unique combination of heavy turning demands at these closely spaced intersections, the intersection layouts are critical to the function of Highway 112. Based on a VISSIM analysis, an optimal configuration from an operational standpoint was created that would fit within a four-lane cross-section. See Figure 8 for proposed lane configurations between Garland Avenue and Stadium Drive.

At the Razorback Road/Maple Street intersection, it was determined that westbound dual left turn lanes would be needed to accommodate the Highway 112 southbound “through” movement. The northbound “through” movement would be a free right turn. This analysis assumed the intersection will be signalized, since it met traffic signal warrants in a study conducted in 2003.

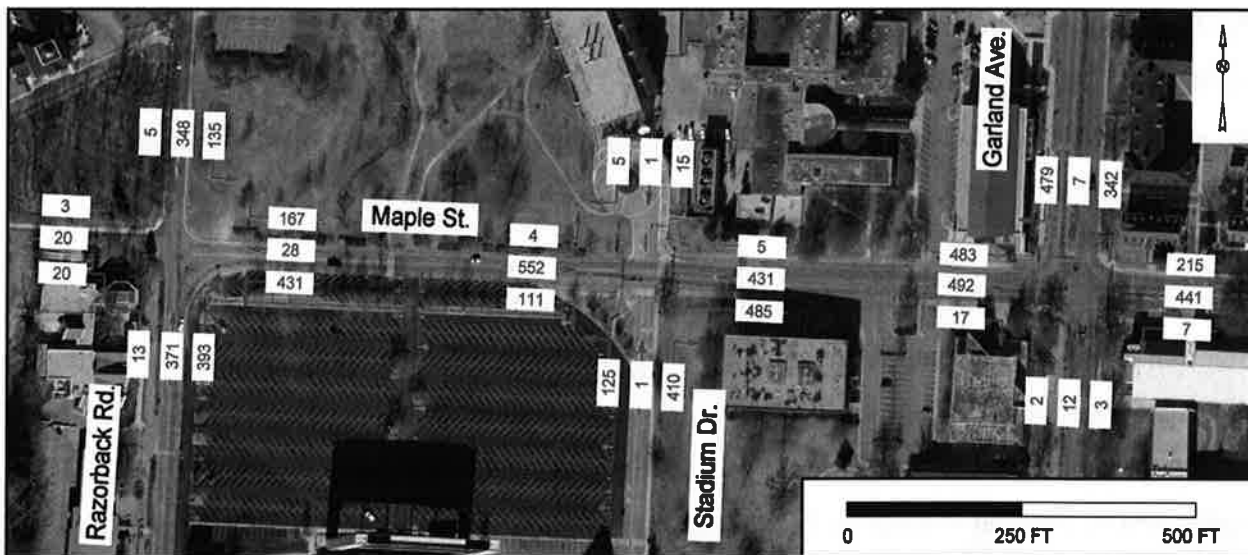


Figure 7. Design Year 2030 Projected Peak Hour Turning Movements



Figure 8. Proposed Lane Configurations for Maple Street between Stadium Drive and Garland Avenue

Although left turn volumes at the eastbound approach to the Maple Street/Stadium Drive intersection are minor, a left turn lane may be needed to provide these drivers adequate sight lines of opposing through traffic. Left turn volumes at the westbound approach warrants an exclusive left turn lane, since almost as many vehicles desire to turn left as to go through.

At the Maple Street/Garland Avenue intersection, dual left turn lanes should be provided for the northbound Highway 112 “through” movement. The southbound “through” movement should be adequately served because the traffic turning right can proceed when the eastbound left turning traffic receives a green in addition to when the southbound traffic receives a green.

The critical element for this segment of Maple Street is the length of the left turn bays between Stadium Drive and Garland Avenue, and the signal timing for these two intersections. With this proposed configuration, and with appropriate signal timings, this segment of Highway 112 can operate adequately now and through 2030. However, the delay for westbound Maple Street traffic east of Garland Avenue and southbound left turning traffic along Garland Avenue north of

Maple Street may be unacceptable. On the other hand, because of the street grid network, those drivers have other options for their travel.

Accommodation of Bicyclists

The intended use of the proposed 10-foot sidewalks on the east side of Razorback Road and south side of Maple Street for bicyclists is consistent with the MPO's Heritage Trail Plan, the UA's 2005 Campus Transportation Plan, and the City's Master Trail Plan (adopted September 1, 2009). However, in the October 22, 2009 letter to the AHTD, the MPO expressed support for additional accommodation of bicyclists through the MUTCD bicycle shared lane marking, or "sharrow," in the outside lanes. This support was also expressed by the City and UA through the October 23, 2009 letter to the AHTD. Although bicyclists already have a right to use roads with motorized vehicles, bicycle shared lane markings in other parts of the country have been used in low-speed (35 mph or less) urban areas to encourage bicyclists to ride in the same direction of traffic as motorized vehicles, increase awareness of drivers to the potential presence of bicyclists, and to guide bicyclists to ride within the shared lane marking where there is no room for dedicated bicycle lanes or there is the presence of on-street parking.

As noted in the UA's 2005 Campus Transportation Study, relatively few UA students ride bicycles compared to other college campuses. This lack of demand is partly due to the rolling terrain, lack of adequate bicycle parking in and around campus, and lack of adequate campus or City bicycle facilities such as trails, sidewalks, or on-street accommodations. Bicycling on sidewalks/shared-use paths/trails with heavy pedestrian traffic, as is often the case in and around the UA campus, can be undesirable. Experienced bicyclists will often prefer an on-street alternative for their route over other choices, particularly if the sidewalk/shared-use path/trail is adjacent to the road with many driveways and side-streets.

As part of this study, it was determined that much of the north-south bicycle traffic on the west side of campus mostly utilizes Stadium Drive, mainly due to its closer proximity to campus buildings and because of its lower automobile traffic and speeds. Because of this, and because Razorback Road serves mostly campus parking lots and athletic facilities, the need for north-south bicycle mobility along Razorback Road is currently minimal.

The demand for bicycle mobility along the Maple Street, including the portion of Highway 112, is also currently minimal. Although it serves as the main east-west route along the north part of campus near many UA buildings and is at least 32 feet wide from Razorback Road to Arkansas Avenue, it has heavy traffic and left turn lanes or on-street parking in many locations, making it unattractive for bicyclists.

Because Alternative 5 does not include bicycle lanes, and because the 10-foot sidewalk will likely accommodate increased pedestrian traffic in the future, the inclusion of the bicycle shared lane marking in the outside lanes is considered appropriate.

Accommodation of Pedestrians

All of the alternatives would provide a 10-foot sidewalk on the east side of Razorback Road and a 6-foot sidewalk on the west side of Razorback Road, and a 10-foot sidewalk on the south side of Maple Street and a 6-foot sidewalk on the north side of Maple Street. These sidewalks should satisfactorily accommodate pedestrian travel along both streets. A median was considered to assist pedestrians that are crossing either of these streets but was rejected because of right-of-way constraints.

Conclusion

Based on meetings with the UA, there is a commitment to access management along Highway 112 by consolidating or eliminating driveways and potentially realigning some side streets. The UA currently owns all but one parcel along Highway 112 in the study area. By reducing the number of conflicts and focusing traffic at side street intersections, the need for a median is reduced. Also, as indicated in the crash analysis, there is no indication of head-on crash problems, which also further reduces the need for a median.

A four-lane facility with limited left turn lane locations will improve vehicular traffic conditions to acceptable levels while improving pedestrian, bicycle, and transit traffic flow. This cross-section would meet the current and future traffic needs of Highway 112 and is consistent with FHWA's context sensitive solution goals by considering the needs and goals of the UA and the City. It is also consistent with the UA Campus Transportation Plan and the MPO's regional

bicycle/pedestrian plan while adhering to the right-of-way constraints of this corridor. The UA expressed its preference for this cross-section, with concurrence from the City and the MPO, in the February 7, 2008 kick-off meeting. The City, the UA, and the MPO also reiterated their preference for this cross-section in the August 28, 2009 meeting and in letters to the Department in October 2009. See Appendix G.

Because of the reasons above, it is concluded that Alternative 5 is the most appropriate cross-section for improvements to Highway 112. It is also recommended that pedestrian safety strategies be considered during the design phase at unsignalized pedestrian crossings, including the allowance of adequate sight distance between any additional landscaping done by the UA.

DISCUSSION OF PHASING ALTERNATIVES

Due to the availability of only \$1 million of Federal-aid funds in the current Statewide Transportation Improvement Program (STIP) to cover 80 percent of project costs and a 20 percent match from the City, only a phase of the entire corridor can be constructed in the foreseeable future.

Phase Alternative 1—Razorback Road between Highway 180 (6th Street) and Leroy Pond Drive

At the February 7, 2008 kick-off meeting, the southern-most portion of the corridor was discussed as a sensible location for Phase 1 improvements. It was discussed that widening and improvements could potentially be made from Highway 180 to the intersection with Leroy Pond Drive for \$1.25 million (i.e., \$1 million Federal-aid plus matching local funds). However, traffic along Highway 180, which is projected to be greater than 40,000 vehicles per day by 2030, will result in LOS F at the intersection with Highway 112 if no improvements are made to Highway 180. Traffic along Highway 180 is and will continue to be approximately twice the volume of traffic along Highway 112 near this intersection. Consequently, few operational benefits would be realized by widening Highway 112 between Highway 180 and Leroy Pond Drive, as can be seen in Figure 9.



Figure 9. Projected 2030 Traffic Conditions on Highway 112 between Highway 180 and Leroy Pond Drive

Nevertheless, there are three main benefits of widening and improving this portion first:

- Improving vehicular traffic flow at the intersection with Leroy Pond Drive, which currently operates at an unacceptable LOS,
- Improving pedestrian traffic flow and enhancing safety by adding sidewalks, particularly during UA athletic events, and
- Improving game day vehicular traffic flow, since many drivers enter and exit the area from the south along Highway 112.

Phase Alternative 2—Maple Street between Razorback Road and Garland Avenue

As seen in Figure 4, the ADT along Maple Street west of Garland Avenue is similar to the ADT along Razorback Road. However, the VISSIM analysis, verified with site visits, shows that much more vehicular traffic delay occurs along this segment of Maple Street.

Although the projected vehicular traffic volumes along this portion of Highway 112 are similar to the volumes in Phase Alternative 1, much more delay is realized because of the closely spaced signals at Garland Avenue and Stadium Drive and the significant amount of conflicting pedestrian traffic. The intersections with Garland Avenue and Stadium Drive have “Denver” pedestrian signal phases. That is, only one pedestrian is required to call the phase, which gives the traffic signal a red phase to all vehicular approaches (i.e., all pedestrians from all approaches are allowed to cross at once). Pedestrian traffic, particularly at the intersection with Garland Avenue, is expected to grow as the UA continues to grow to the north and northwest.

Phase Alternative 2, which can be seen in Figures 8 and 9, would result in the following significant benefits.

- Increasing on-street capacity at the Maple Street intersections with Garland Avenue and Stadium Drive, which will decrease delay along Highway 112. This will additionally help relieve westbound Maple Street traffic congestion at the Garland Avenue intersection by increasing their signal green time. This not only reduces delay for passenger cars, but also for transit and any bicyclists that ride on-street with traffic as desired by the City, the UA, and the MPO with the shared lane marking.

- Reducing traffic delay and adding capacity by adding a signal and improving the intersection of Maple Street and Razorback Road. A traffic signal warrants study was conducted by the AHTD at the request of the UA in 2003, which concluded that a signal is warranted at this intersection. This may also improve safety at the intersection by potentially reducing the confusion of the current traffic control by unfamiliar drivers.
- Improving pedestrian traffic conditions and potentially improving pedestrian safety by adding sidewalks along Maple Street between Stadium Drive and Razorback Road.

The estimated cost of Phase Alternative 2 is \$2.6 million (in 2010 dollars), which includes PE, ROW, utilities relocation, construction, and CENG. The City has informally indicated that they would not be willing to provide the \$1.6 million funds to match this phase alternative.

ENVIRONMENTAL CONSIDERATIONS

A cursory environmental review was conducted to identify any special environmental constraints or conditions that warrant consideration in the planning or design process. This review consisted of Geographic Information Systems (GIS) constraints mapping along with a records check for historic sites and a preliminary field survey. The preliminary analysis indicated that a historical cemetery may still have burials under the existing location of Maple Street just west of Garland Avenue. Excavation during the construction of the project should be kept to a minimum and deep trenching or digging should be avoided for at least 220 feet west along Maple Avenue from the intersection with Garland Avenue. Monitoring by the AHTD staff archeologists will be conducted during construction near this location and if human remains are encountered the project will be halted until mitigation can be conducted.

FINDINGS

Highway 112, known as Razorback Road and Maple Street through part of the UA campus, is an important arterial through the City of Fayetteville in addition to connecting several important and busy side streets. Highway 112 serves several modes of transportation other than typical vehicular traffic, including transit, pedestrians, and bicyclists.

Based on the traffic analysis, five of the nine major intersections along Highway 112 are currently operating at unacceptable levels of service, and all nine will operate unacceptably by the end of the 20-year design period if no improvements are made. The crash analysis indicated safety problems along Highway 112, partially due to the lack of left turn lanes. The crash analysis also indicated that there is a minor safety problem at the Razorback Road/Maple Street intersection that may be remedied by improving and signalizing the intersection.

Alternative 1, no-build, would not meet the needs of the study area. Alternative 4, keeping the two through lanes and adding a continuous, two-way, left turn lane, would slightly improve vehicular traffic conditions, but would still result in significant vehicular traffic congestion in 20 years, in addition to an impedance to Razorback transit routes along Highway 112.

Alternative 2, widening to four through lanes with a raised median, meets the needs identified in this study. It would also be consistent with the recently improved cross-sections immediately to the north and south along Highway 112. Alternative 3, widening to four through lanes with a continuous, two-way, left turn lane, also meets the needs along Highway 112 in the study area. However, both of these alternatives would likely result in costly impacts to adjacent buildings, parking lots, and other structures.

Alternative 5, widening to four through lanes with left turn lanes at Leroy Pond Drive and Meadow Street, also meets the needs identified in this study. Based on meetings with the UA, there is a commitment to access management along Highway 112 by consolidating or eliminating driveways and realigning side streets at Leroy Pond Drive and Meadow Street. The UA currently owns all but one parcel along Highway 112 in the study area. By reducing the number of conflicts and focusing traffic at side street intersections, the need for a median is

reduced. Also, as indicated in the crash analysis, there is no indication of head-on crash problems, which also further reduces the need for a median.

Because of the reasons above, it was concluded that Alternative 5, at an estimated cost of \$9.2 million (in 2010 dollars), which includes construction, PE, CENG, ROW, and utilities relocation, would be the most appropriate cross-section for improvements to Highway 112. A four-lane facility with left turn lanes at Leroy Pond Drive and Meadow Street would improve vehicular traffic conditions to acceptable levels while also improving pedestrian, bicycle, and transit traffic flow. This cross-section would meet the current and future traffic needs of Highway 112 and is consistent with FHWA's context sensitive solution goals by considering the needs and goals of the UA and the City. The proposed 10-foot sidewalks on the east side of Razorback Road and south side of Maple Street, and the sidewalks that would be six feet or more on the west side of Razorback Road and north side of Maple Street would be consistent with the UA Campus Transportation Plan, the MPO's regional bicycle/pedestrian plan, and the City's Master Trail Plan. The UA expressed its preference for this cross-section, with concurrence from the City and the MPO, in the February 7, 2008 kick-off meeting. This preference from all three parties was re-iterated at the August 28, 2009 meeting with AHTD staff, and via letters to the AHTD in October 2009 that also included preference for bicycle shared lane markings in the outside lanes.

Additionally, due to funding constraints, a possible location for Phase 1 construction was examined. It was determined that Phase Alternative 1, widening of Razorback Road from Highway 180 (6th Street) to Leroy Pond Drive, would not provide as many operational benefits as Phase Alternative 2, widening of Maple Street between Razorback Road and Garland Avenue. However, it was determined that Phase Alternative 1 would likely provide more safety benefits than Phase Alternative 2 since there currently are no sidewalks along that portion of Highway 112. Due to this reason, and because the UA has expressed a preference for this phase alternative and because the cost estimate of Phase Alternative 2 currently exceeds the amount available in the current STIP with an estimated cost of \$2.6 million in 2010 dollars, which includes construction, PE, CENG, ROW, and utilities relocation, Phase Alternative 1 is recommended.

It is also recommended that implementation of the bicycle shared lane markings be re-evaluated once funding for future phases of construction are obtained. Bicycle shared lane markings over a short distance in either phase alternative may potentially confuse drivers and bicyclists at the end of the Phase 1 improvement where the outside lane drops and traffic merges. Also, it is recommended that pedestrian safety strategies be considered during the design phase at unsignalized pedestrian crossings, including the allowance of adequate sight distance between any additional landscaping done by the UA.

APPENDIX A

MINUTE ORDER

District: Four
County: Washington
Category: Miscellaneous

Page 1 of 1 Page

WHEREAS, IN WASHINGTON COUNTY, in the City of Fayetteville, local officials have requested a study to determine the appropriate cross section for improvements to Highway 112 along Razorback Road and Maple Street between Highway 180 (Sixth Street) and Garland Avenue; and

WHEREAS, this study will require consultation with officials from the City of Fayetteville and the University of Arkansas due to the impacts on traffic operations in the area.

NOW THEREFORE, the Director is authorized to conduct a study to determine the appropriate cross section for improvements to Highway 112 between Highway 180 and Garland Avenue.

Approved: [Signature] Chairman
[Signature] Vice Chairman
[Signature] Member
[Signature] Member
[Signature] Member

Submitted By Scott d. Bennett
Assistant Chief Engineer - Planning
Approved: [Signature]
Director
Minute Order No. 2007 1 2 1
Date Passed SEP 18 2007



Office of the Chancellor
May 7, 1999

425 Administration Building
Fayetteville, Arkansas 72701
(501) 575-4148
FAX (501) 575-7076

Mayor Fred Hanna
City of Fayetteville
118 Mountain Street
Fayetteville, AR 72701

Dear Mr. Hanna:

As you know, the Arkansas State Highway and Transportation Department has been very supportive to the City of Fayetteville and to the University of Arkansas. Numerous projects have been constructed by the State throughout our City. One such great project is the widening of Wedington Drive and North Street. Follow up widening being designed and prepared for construction by the State is Garland Avenue widening south from North Street to Maple Avenue, next to the University. Another recent project constructed by the State was the Razorback Road extension south (Highway 112) from 15th Street to the Highway 71 bypass.

Considering the ease of traffic flow to the campus area from the north on Garland Street and the easy access on and off Highway 71 bypass from Razorback Road on the south, there will no doubt be even greater traffic flow through the campus on Highway 112 (Razorback Road and Garland Street improvement areas). Communication has existed between City of Fayetteville, Arkansas State Highway and Transportation Department, and University of Arkansas representatives about trying to make a joint project for widening the section of Highway 112 (Razorback Road and Maple Street) from 15th Street on the south to Garland Street on the north.

Please accept this letter as the University of Arkansas' offer to provide all right-of-way requirements, and to fund the engineering and preparation of Arkansas State Highway and Transportation Department construction documents for this area of street widening of Highway 112. ~~Since the City of Fayetteville and the Arkansas State Highway and Transportation Department will split all construction costs of this work.~~ It is hoped this joint project can therefore be accelerated to be designed and construction completed as soon as possible to be consistent with the current ongoing Garland Street widening project.

Please review this project sharing offer and get back to me as soon as possible. Please contact Mr. Leo Yanda, Director of Physical Plant, University of Arkansas, at telephone number 575-6601 about any desired details of this offer, or if you have any questions.

Sincerely,

John A. White
Chancellor

cc: Mr. Dan Flowers, Arkansas State Highway and Transportation Department
Don Pederson, Vice Chancellor for Finance and Administration
Leo Yanda, Director of Physical Plant

The University of Arkansas is an equal opportunity/affirmative action institution.

March 27, 2002

Mr. Dan Flowers, P.E.
Arkansas State Hwy. & Transportation Dept.
P.O. Box 2261
Little Rock, AR 72209

RE: Surface Transportation Program (STP)
Razorback Road (State Hwy. 265)
Fayetteville, Washington County, Arkansas

Dear Mr. Flowers,

Fayetteville's surface transportation system is becoming increasingly inadequate for the public's transportation needs. Continued community growth coupled with the unique demands of the University of Arkansas campus require infrastructure improvement projects that exceed local resources. To alleviate a pressing local transportation system deficiency, the City requests funding assistance for the improvement of Razorback Road, beginning at Sixth St. and continuing north to Garland Avenue. It is understood that the \$4 - 6 million project may obtain financial assistance under Arkansas Highway and Transportation Program (STP). Incorporation of the Razorback Road Project into the STP work plan is requested. In addition to providing a critically needed interior transportation corridor, this activity may provide long-term benefits by becoming an institutional drive of the University of Arkansas. Discussions with Don Pederson, Vice Chancellor of Finance at the University of Arkansas have confirmed this project to be a high priority for them, as it is for the City

The construction of this segment of Razorback Road is a crucial link between other transportation projects, and is essential for realization of full benefits from other projects. North of this project, the improvement of Garland Avenue, from Maple Street to Wedington Drive is nearing start of construction. South of this project, improvement of Razorback Road from Sixth Street to Fifteenth St. is scheduled; completion expected in the next two to three years. Full function and benefit of these transportation projects depends upon completion of the requested Razorback Road Improvements (see attached location map).

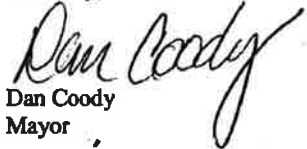
Fayetteville has placed a strong emphasis on local transportation needs and is securing a consultant to perform a comprehensive traffic study. This expected traffic

Dan Flowers
Arkansas Highway & Transportation Dept.
Page 2

analysis will further validate the need for Razorback Road Improvements as well as identify and prioritize other needs. It is requested that the Arkansas State Highway and Transportation Department include this middle segment of Razorback Road Improvements in its STP funding schedule, granting this need a high priority.

Should there be any questions, or if additional information is needed, please don't hesitate to contact me at 479-575-8330.

Sincerely,



Dan Coody
Mayor

cc: Greg Boettcher, Public Works Director
Jim Beavers, City Engineer
Don Pederson, University of Arkansas
Jonathan Barnett, Arkansas State Highway Commission

APPENDIX B

2030 NORTHWEST ARKANSAS REGIONAL TRANSPORTATION PLAN

FULL DOCUMENT

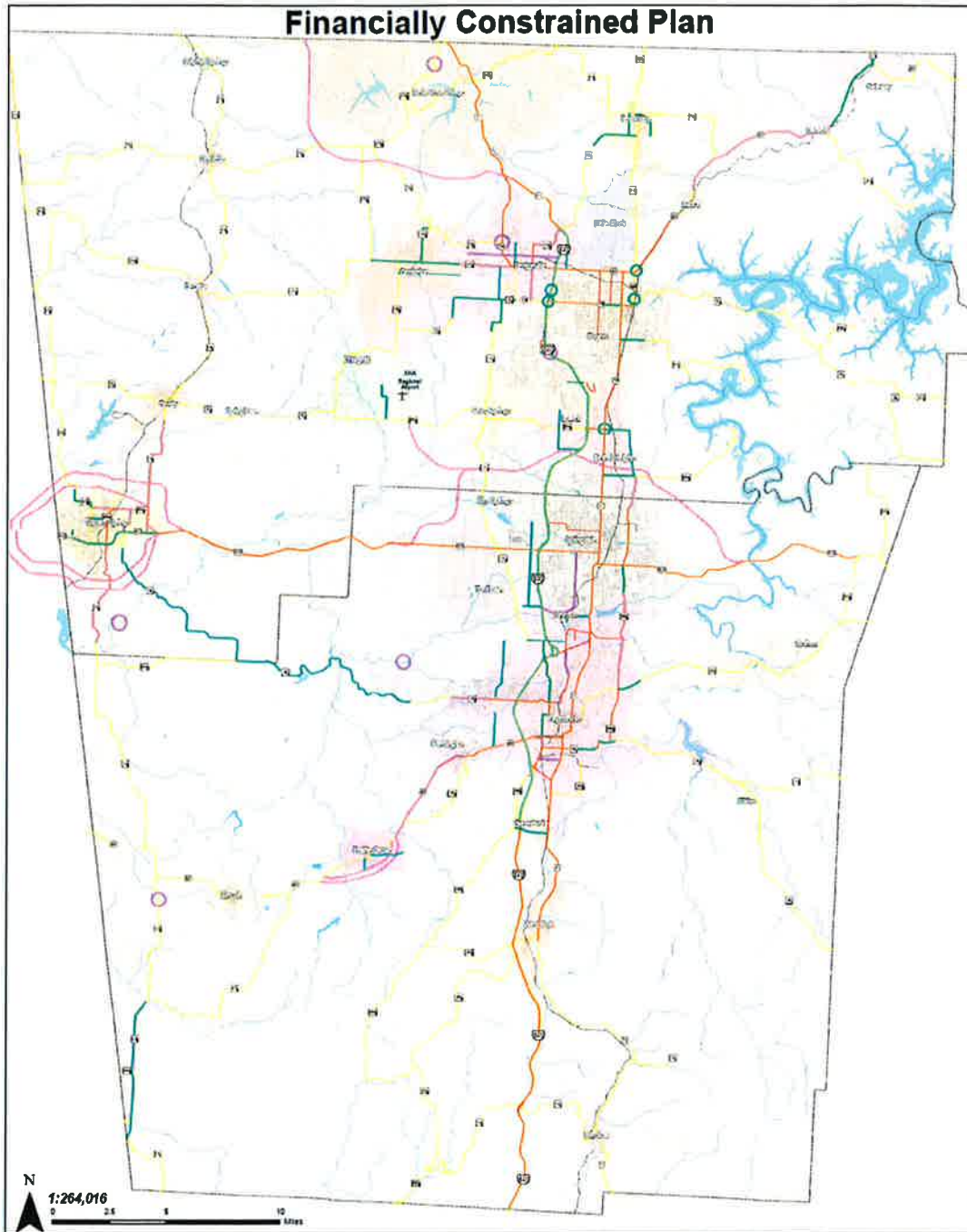


Prepared by the Northwest Arkansas Regional Planning Commission in cooperation with the Arkansas State Highway and Transportation Department and the United States Department of Transportation
April 20, 2006

STP Constrained Project List

<u>2006-10</u>					
<u>Job No.</u>	<u>Hwy.</u>	<u>Project</u>	<u>MILES</u>	<u>TOTAL</u>	<u>STP</u>
90174	102	Hwy. 279 North-Greenhouse Rd. (Phase I)	2.75	\$15,800,000	\$11,040,000
	16	Happy Hollow-Stonebridge (Fayetteville)	0.58	\$2,600,000	\$1,040,000
	62/94/102	Intersection Improvements (2nd & Hudson (Rogers)	-	\$1,000,000	\$400,000
	71B	Hwy. 71B /Hwy. 264 Intersection Imp. (Phase I) (Lowell)	-	\$1,500,000	\$1,200,000
	265	Hwy. 412-South City Limits (Springdale)	1.3	\$7,400,000	\$2,960,000
				\$28,300,000	\$16,640,000
<u>2011-2015</u>					
	<u>Hwy.</u>	<u>Project</u>	<u>MILES</u>	<u>TOTAL</u>	<u>STP</u>
	12	Hwy 71B - Greenhouse Road (Bentonville)	2.4	\$13,700,000	\$5,480,000
	43	Dawn Hill Rd. - City Limits (Siloam Springs)	0.75	\$4,300,000	\$1,720,000
	45	Hwy. 265 - Starr Road (Fayetteville)	0.5	\$2,800,000	\$1,120,000
	62	Prairie Grove Bypass ROW (part)	-	\$2,000,000	\$1,600,000
40418	112	Hwy. 180(6th St.)-Garland Ave. (Fayetteville)	1.2	\$6,800,000	\$1,720,000
	112	I-540-Van Asche (Fayetteville)	0.8	\$4,500,000	\$1,800,000
	412	Hwy. 412 Springdale Bypass (Right of Way)	-	\$10,000,000	\$8,000,000
	412	Hwy. 412 Improvements (Siloam Springs)	-	\$1,800,000	\$1,440,000
	62B	Hwy. 62B/Hwy. 12 Int. Impvts. (Rogers)	-	\$1,000,000	\$800,000
	71B	Hwy. 71B /Hwy. 264 Intersection Imp. (Phase II) (Lowell)	-	\$2,000,000	\$1,600,000
	71B	46th and 71B Intersection Imp. (Rogers)	-	\$2,000,000	\$1,600,000
				\$37,200,000	\$26,880,000
<u>2016-2030</u>					
	<u>Hwy.</u>	<u>Project</u>	<u>MILES</u>	<u>TOTAL</u>	<u>STP</u>
	12	Greenhouse Road to Wal-Mart Dist. Center (Bentonville)	1.6	\$9,500,000	\$3,800,000
	16	South College Ave.-Happy Hollow (15th St.) (Fayetteville)	1.25	\$5,200,000	\$2,080,000
	16	Washington Co. Line-West (Rehab/Minor Widening)	6.6	\$7,900,000	\$6,320,000
	16	Wedington Woods-Washington Co. Line (Rebab/Minor Widen)	8	\$9,600,000	\$7,680,000
	45	Starr Road - Oakland-Zion (Fayetteville)	0.75	\$4,300,000	\$1,720,000
	59	Hwy. 45-South (Sel. Sections) (Rehab. /Minor Widen)	3	\$3,600,000	\$2,880,000
90096	62	Hwy. 127-Gateway	4.14	\$14,500,000	\$11,600,000
	62	Prairie Grove Bypass (part)	-	\$2,000,000	\$1,600,000
	71B	8th-Dixieland Road Minor Widening (Rogers)	1	\$3,300,000	\$2,640,000
	72	Hwy. 94 -Mariano Rd. (Pea Ridge)	2.15	\$10,000,000	\$4,000,000
	94	Hwy. 71-Old Wire Road (Rogers)	1.15	\$6,000,000	\$4,800,000
90174	102	Hwy. 279 North-Greenhouse Rd. (Phase II)	1.25	\$7,200,000	\$5,760,000
	102B	Hwy. 102-Hwy. 72 Minor Widening (Center-ton)	1.78	\$2,200,000	\$1,760,000
	112	North Street-I-540 (Fayetteville)	2.04	\$11,300,000	\$4,520,000
	112	Van Asche - Howard Nickell (Fayetteville)	0.75	\$4,300,000	\$1,720,000
	112	Hwy 12 to Windmill (Bentonville)	1.8	\$7,000,000	\$2,800,000
	264	Hwy. 71B - Old Wire Rd. (Hwy. 264) (Springdale)	1.42	\$8,000,000	\$6,400,000
	412	Hwy. 412 Improvements (Siloam Springs)	-	\$5,500,000	\$4,400,000
				\$121,400,000	\$76,480,000
2006-2030 TOTAL				\$186,900,000	\$120,000,000

Financially Constrained Plan



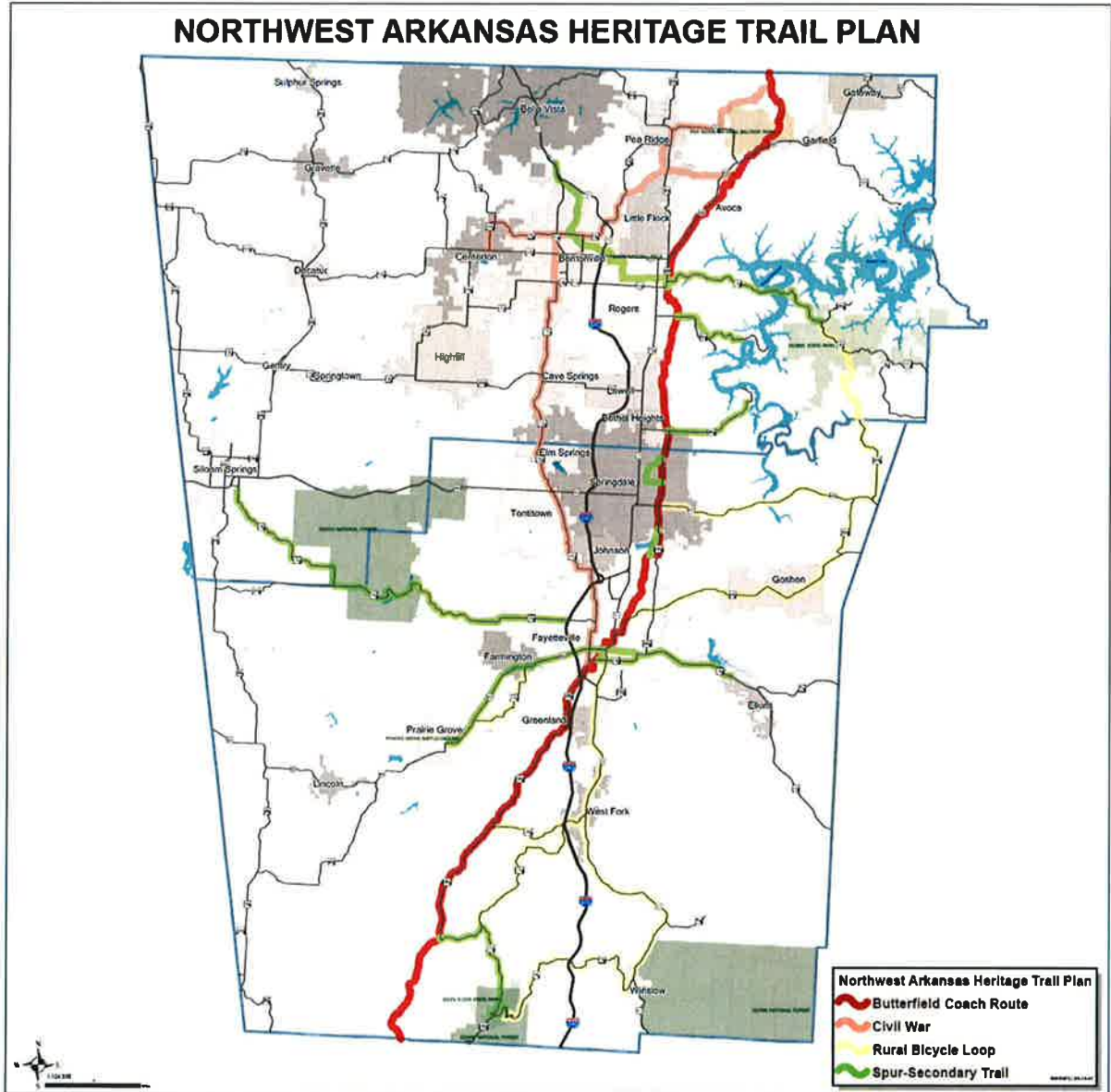
- T XNA
- Railroad
- Road
- Highway
- Interstate
- City Limit
- County Boundary
- Lake
- River
- Ozark National Forest
- Civil War Battleground
- National Forest Boundary

Financially Constrained Plan

Constrained Final List	2005-07 TIP	Current 4+ Lane
— Fully Funded	— Fully Funded	
— Partially Funded	— Partially Funded	
	— Western Beltway	

APPENDIX C

NORTHWEST ARKANSAS HERITAGE TRAIL PLAN



APPENDIX E

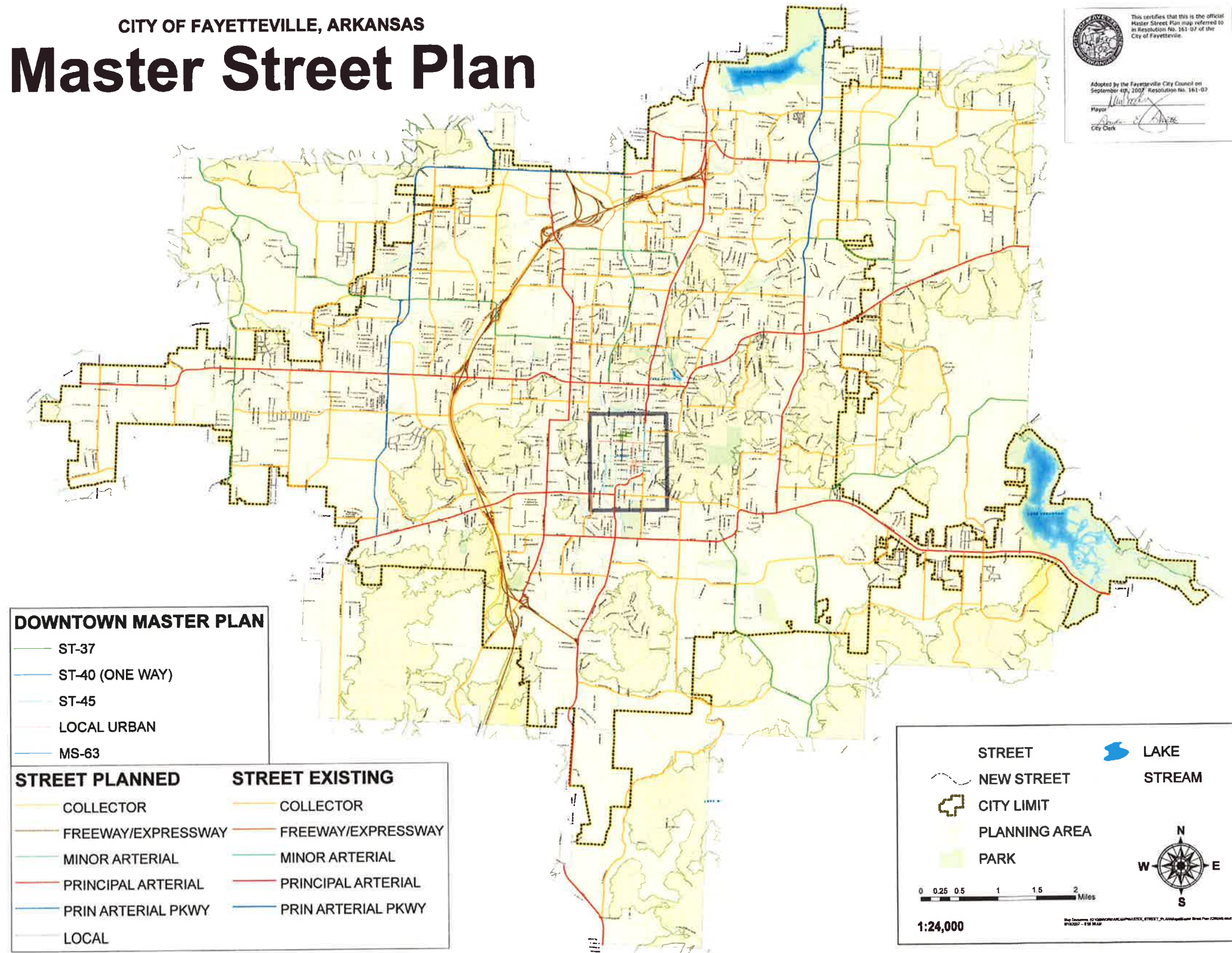
CITY OF FAYETTEVILLE, ARKANSAS

Master Street Plan

This certifies that this is the official Master Street Plan map referred to in Resolution No. 161-07 of the City of Fayetteville.

Adopted by the Fayetteville City Council on September 4th, 2007 Resolution No. 161-07

Mayor *[Signature]*
City Clerk *[Signature]*



DOWNTOWN MASTER PLAN

- ST-37
- ST-40 (ONE WAY)
- ST-45
- LOCAL URBAN
- MS-63

STREET PLANNED	STREET EXISTING
— COLLECTOR	— COLLECTOR
— FREEWAY/EXPRESSWAY	— FREEWAY/EXPRESSWAY
— MINOR ARTERIAL	— MINOR ARTERIAL
— PRINCIPAL ARTERIAL	— PRINCIPAL ARTERIAL
— PRIN ARTERIAL PKWY	— PRIN ARTERIAL PKWY
— LOCAL	

— STREET	LAKE
— NEW STREET	— STREAM
— CITY LIMIT	
— PLANNING AREA	
— PARK	

0 0.25 0.5 1 1.5 2 Miles

1:24,000

Map Document: G:\GIS\DATA\APPLIC\STREET_PLANNING.aprx
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12.2 MASTER STREET PLAN

*Amended September 17, 1996, Street Classifications, Res. No. 97-96
Amended September 6, 2005, Downtown Master Plan Street Classifications, Res. No. 183-05
Amended September 4, 2007, Res. No. 161-07*

Connecting Fayetteville to other population centers and to provide for circulation within the community requires consistent planning. New development must be provided with proper access to alleviate problems associated with congestion and safety by requiring streets in sufficient number and of adequate size to accommodate peak traffic volumes.

The following street cross-sections are functionally classified in accordance with the U.S. Department of Transportation's National Highway Functional Classification Study Manual. In addition, the street cross-sections provide sensitivity to context by providing options for both suburban and urban developments and accommodating cyclists and low-impact development neighborhoods.

The International Fire Code (IFC), which the State of Arkansas has adopted, requires a 20-foot minimum of unobstructed width on all roads, which is reflected in the proposed street cross-sections. If structures on either side of the road exceed 30 feet or three stories, then the IFC requires a 26-foot minimum of unobstructed width.

Additional Utility Easements will be required outside of the specified Right-of-Way on a project specific basis, as determined by the utility companies.

* ACCESS MANAGEMENT: providing access to land development in such a way as to preserve safety and reasonable traffic flow on public streets. Low, moderate and high designations are used for the level of access restrictions. A high level of access management uses medians to restrict mid-block turns, consolidates driveways and controls the spacing of intersections. A low level of access management limits full access at some intersections.

APPENDIX F



**University of Arkansas
Campus Transportation Plan**

Executive Summary

**Final Report
November 2005**



Streets

Many communities are seeking a more balanced approach to addressing traffic congestion by considering transportation within the wider context of community values and emphasizing more sustainable modes of travel. This approach is equally applicable to the streets that make up and surround the University campus. While moving traffic safely and efficiently is a goal of the *Campus Transportation Plan*, the intent from the outset was not to identify and recommend street capacity improvements that would provide a specific level of efficiency. Rather, improvements are considered within the broader context of the campus environment and principles. Street improvements are recommended to address projected congestion, to improve pedestrian safety and to improve the appearance of the street.



Razorback Road



Four-lane street with no median in Chapel Hill, NC

Razorback Road

Razorback Road, slated for widening between Maple Street and 6th Street, forms a significant edge to the campus. It is a major entry route to the campus (including major sporting events), but does not project a strong or positive image. It also lacks intersection treatments, crosswalks and sidewalks, making it unfriendly to pedestrians. Recommended improvements to Razorback Road include:

- Widening to four lanes with no median
- Adding three traffic signals
- Adding sidewalks, planting strips, and street trees to both sides of the street
- Adding and improving crosswalks and intersections for pedestrians

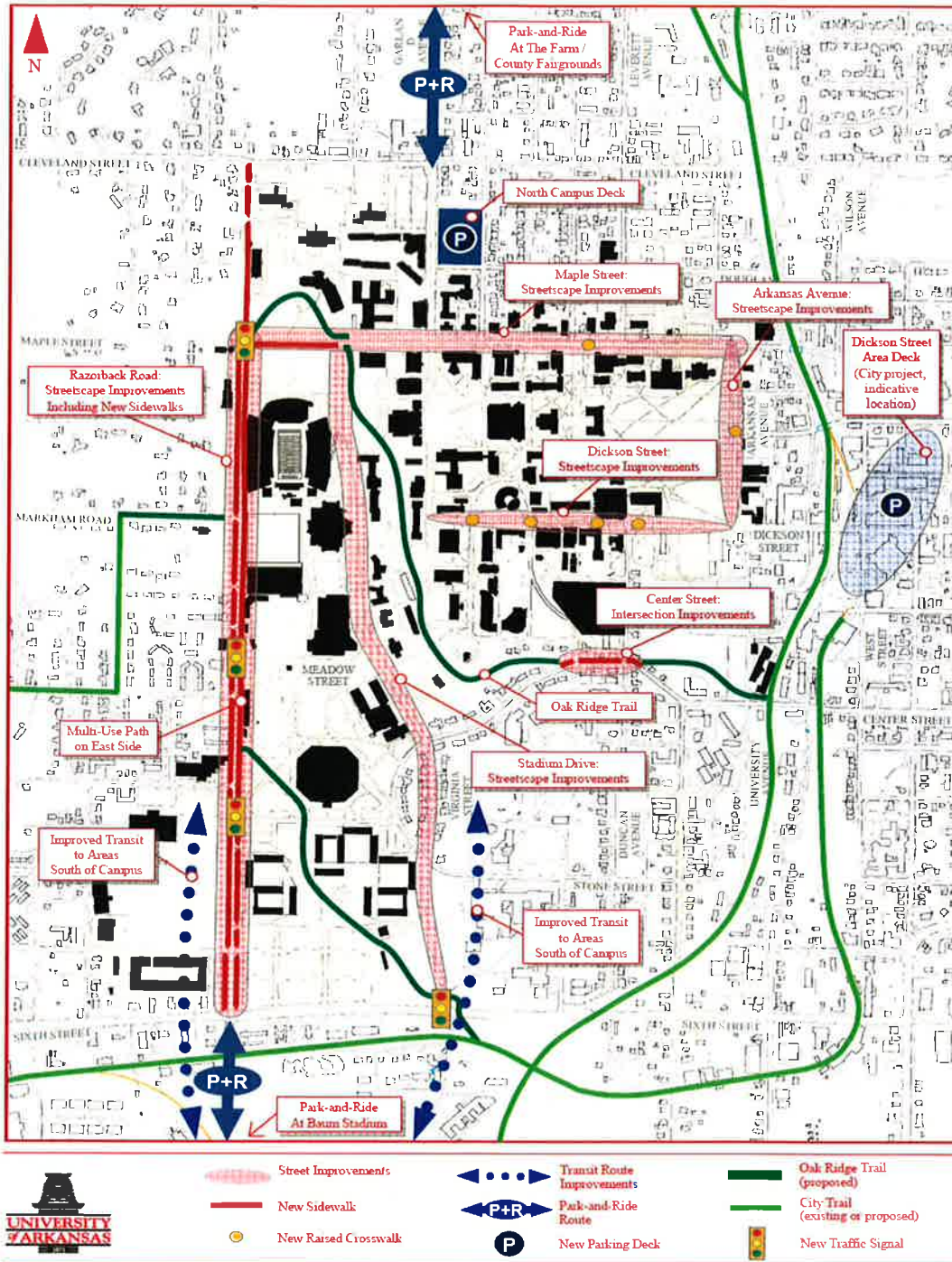
Other Campus Streets

Maple Street, Dickson Street, Stadium Drive and Arkansas Avenue function well for automobiles, but currently function poorly as important campus edge streets. Campus edge streets should not only move automobile traffic, but also accommodate pedestrians and bicycles and be attractive streets. Their character should also alert drivers that they are entering a pedestrian-oriented campus environment.

As part of the *Campus Transportation Plan*, new designs were developed for these four streets. The designs were developed not only to move commuters of all modes, but also to add to the academic and historic sense of place of the University. The design objectives, common to all four streets, included:

- Improving the safety and comfort of pedestrians walking along or crossing the road.
- Creating a street environment that projects the desired image of campus.
- Improving the appearance of the street with streetscaping.
- Providing a safer cycling environment.
- Providing for safe and effective traffic flow.

CAMPUS TRANSPORTATION PLAN



APPENDIX G

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

INTEROFFICE MEMORANDUM

February 11, 2008

TO: Highway 112/Razorback Road Study Files
FROM: Andrew Brewer, Transportation Engineer
SUBJECT: Kickoff meeting with local officials to discuss Highway 112/Razorback Road Improvement Study

On February 7, 2008, a meeting was held at the University of Arkansas Physical Plant to discuss the study of improvement needs on Highway 112 between Highway 180 and Garland Avenue. Attendees are listed below:

Ron Petrie (City Engineer, Fayetteville)
John McLarty (NARTS MPO Study Director, NWARPC)
Mike Johnson (Associate Vice Chancellor for Facilities Management, UA)
Jay Huneycutt (Associate Director, Planning, Facilities Management, UA)
Todd Furgason (Campus Planner, Facilities Management, UA)
Shawn Pierce (Construction Coordinator, Facilities Management, UA)
Scott Turley (Associate Director, Utilities, Facilities Management, UA)
Bob Beeler (Associate Director, Design and Construction, Facilities Management, UA)
Gene Kuettel (Utilities, ROW, AHTD)
Barry Cruz (Utilities, ROW, AHTD)
Joe Shipman (District 4, AHTD)
Chad Adams (District 4, AHTD)
John Mathis (Roadway, AHTD)
Paul Simms (Planning and Research, AHTD)
Andrew Brewer (Planning and Research, AHTD)

The following comments were made at the meeting.

- Mike Johnson stated that there were primarily three items he wished to discuss: cross section type, phasing, and timeframe for a possible first construction phase of the project.
- Mike stated the UA's desired construction phasing would be Razorback Road from Highway 180 to Leroy Pond Drive (phase 1), Maple Street (phase 2), and Razorback Road from Leroy Pond Drive to Maple Street (phase 3). Ron Petrie agreed to the location of phase 1.
- The UA stated that an earmark has been requested for the rest of this project.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

INTEROFFICE MEMORANDUM

February 11, 2008

TO: Highway 112/Razorback Road Study Files
FROM: Andrew Brewer, Transportation Engineer
SUBJECT: Kickoff meeting with local officials to discuss Highway 112/Razorback Road Improvement Study (Page 2)

- John Mathis stated that the STP-U funds and the local match would approximately cover the construction cost for the proposed phase 1 from Highway 180 to Leroy Pond Drive.
- The UA and City agreed with the four-lane undivided typical cross section with 10-foot setbacks and a 10-foot walk on the east side and 6-foot walk on the west side. It was concluded the only main question regarding the cross section would be the location and number of left-turn bays along Razorback Road and the lane configurations along Maple Street.
- The UA discussed their master plan for the campus, which includes the re-alignment of Nettleship Street to the existing Razorback Road/Leroy Pond Drive intersection, and the extension of Meadow Street to the west. It was envisioned that these two intersections may require signalization. The UA also plans on consolidating driveways along Razorback Road.
- The UA expressed no special concerns with pedestrian or transit issues.
- The UA stated that a possible location for a parking deck may be east on Leroy Pond Drive. Other than that, no major traffic generators are planned in the vicinity of Razorback Road.
- The UA brought up the question of whether or not their portion of the survey work, which has already been done, could be considered for a portion of the local match for the STP-U funds. The cost of the surveys cannot be used as part of their local match because the consultant selection procedures were not followed.
- The possibility of de-mapping Highway 112 from the Highway system was discussed. However, it was pointed out that if Highway 112 was de-mapped, the Department would be responsible for maintaining this portion of Razorback Road as an institutional drive.

c: District 4 Engineer
Programs and Contracts
Roadway Design

ASB:al

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

INTEROFFICE MEMORANDUM

September 9, 2009

TO: Highway 112 (Razorback & Maple) Improvements Study (Job 040418) Files
FROM: Andrew Brewer, Transportation Planning Engineer
SUBJECT: Meeting with Local Officials

On August 28, 2009, a meeting was held at the University of Arkansas Physical Plant to discuss the study of improvement needs on Highway 112 between Highway 180 and Garland Avenue. Attendees are listed below:

Chris Brown (City Engineer, City of Fayetteville)
John McLarty (NARTS MPO Study Director, NWARPC)
Mike Johnson (Associate Vice Chancellor for Facilities Management, UA)
Jay Huneycutt (Associate Director, Planning, Facilities Management, UA)
Todd Furgason (Campus Planner, Facilities Management, UA)
Jill Anthes (Campus Planner, Facilities Management, UA)
Kevin Santos (Facilities Use Planner, Facilities Management, UA)
Scott Turley (Associate Director, Utilities, Facilities Management, UA)
Bob Beeler (Associate Director, Design and Construction, Facilities Management, UA)
Joe Shipman (District Engineer, District 4, AHTD)
Jeff Stroud (Resident Engineer, District 4, AHTD)
Andrew Brewer (Transportation Planning Engineer, Planning and Research, AHTD)

The following comments were made at the meeting.

- The UA expressed concern regarding the time frame for deciding on a typical cross-section for improvements and design, particularly because new utilities are being installed within the study/project area. *AHTD-P&R staff will notify AHTD administration of this concern.*
- The UA showed its conceptual plans for consolidating driveways along the study corridor. It also re-affirmed its plans for realigning Nettleship to the existing intersection with Leroy Pond and extending Meadow across Highway 112/Razorback to the west. *UA-FM staff will send their conceptual plans to AHTD staff.*
- The UA expressed concern about pedestrian friendliness and safety along the study corridor. In this regard, the UA is concerned that the improvement project resulting from this study will increase motor vehicle traffic speeds, particularly if there are left-turn lanes and/or wider lanes. The City stated that their Street Committee should have opportunity for input and review.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

INTEROFFICE MEMORANDUM

September 9, 2009

TO: Highway 112 (Razorback & Maple) Improvements Study (Job 040418) Files
FROM: Andrew Brewer, Transportation Planning Engineer
SUBJECT: Meeting with Local Officials (Page 2)

AHTD-P&R staff will conduct a complete VISSIM microsimulation analysis of the study corridor, including locations where left-turn lanes may be possible and interactions with transit and non-motorized traffic. The analysis will include the possibility of realigning Nettleship and extending Meadow.

AHTD-P&R staff will note the UA's desire for narrow lane widths to AHTD-Roadway Design. AHTD-P&R staff will also note the UA's desire to keep the total cross-section width the same through the intersections that may have left-turn lanes to AHTD-Roadway Design.

- The UA expressed concern about access to Lot 44 ("The Pit") north of the football stadium, particularly in relation to the intersection of Razorback and Maple. *AHTD-P&R staff will include proposed consolidated driveways in the VISSIM analysis, including particular focus to Lot 44.*
- Accommodations for other modes of transportation (e.g., bicyclists and pedestrians) were expressed as a priority for the study corridor by the UA. The UA re-affirmed its desire for a six-foot sidewalk on the west side of Razorback (north side of Maple), and a 10-foot sidewalk on the east side of Razorback (south side of Maple) with 10-foot setbacks. It was discussed that the 10-foot sidewalk, considered a shared-use path, will accommodate bicyclists, which is consistent with the MPO's Heritage Trail Plan and the UA's 2005 Campus Transportation Plan. The UA stated that most bicyclists utilize Stadium Drive which is more bicycle friendly and has more bicycle origins and destinations, thus reducing the need for a bicycle route along the study portion of Highway 112. The AHTD noted that Highway 112 on either side of the study portion does not have bicycle lanes, but does have 10-foot sidewalks/shared-use paths. The City stated that their Master Street Plan calls for bicycle lanes on all arterials (including Highway 112), and that their Street Committee would need to have opportunity for input and review. It was also questioned whether there is enough width under the football stadium pedestrian overpass to accommodate bicycle lanes. *AHTD will conduct a thorough study for accommodations of other modes of transportation. AHTD will re-evaluate their Bicycle Facility Accommodation Policy for clarification and notify the UA and the City. AHTD will check the horizontal clearance under the existing pedestrian overpass.*

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

INTEROFFICE MEMORANDUM

September 9, 2009

TO: Highway 112 (Razorback & Maple) Improvements Study (Job 040418) Files
FROM: Andrew Brewer, Transportation Planning Engineer
SUBJECT: Meeting with Local Officials (Page 3)

- The UA stated that it wants the southern end of Razorback to be improved as part of the STP-U project (considered Phase 1 of improvements), primarily due to pedestrian safety concerns since there is no sidewalk on either side of Highway 112 south of Leroy Pond to Highway 180. AHTD-P&R stated that in terms of motor vehicle traffic operations, more benefit would be realized by improving the northern end. The City stated that they have received complaints regarding the safety of Razorback and Maple intersection, and thus would like to have their Street Committee have opportunity for input on the location of Phase 1 improvements. *AHTD-P&R-Traffic Safety Section will conduct a complete intersection safety/crash analysis of the Razorback and Maple intersection.*
- *AHTD-P&R staff will contact the UA and the City once all items from the meeting are addressed and incorporated into the study. AHTD-P&R staff can discuss the revised preliminary findings and present the simulation models.*

Copies will be made via e-mail

ASB



City of Fayetteville
Engineering Division
113 West Mountain
Fayetteville, AR 72701
ph: 479-575-8206
fax: 479-575-8202

October 23, 2009

Mr. Frank Vozel, P.E.
Deputy Director/Chief Engineer
Arkansas State Highway and Transportation Department
P.O. Box 2261
Little Rock, AR 72203-2261

RE: Job No 040418
Hwy. 180-Garland Ave. (Hwy 112)(Fayetteville)(S)
Washington County

Dear Mr. Vozel:

Subsequent to a meeting held by Andy Brewer with City and University of Arkansas officials regarding the study to be completed on the above referenced project, the City and UA collaborated to develop preferred cross sections, as follows:

- 1) A 4-lane cross section for Razorback Road
- 2) A 5-lane cross section for Razorback Road
- 3) A 4-lane cross section for Maple Street

These cross sections were reviewed and approved by the City of Fayetteville Street Committee, and are therefore presented to the Department as the City and UA preferred cross sections to be used on the project.

Note that each cross section includes dotted line striping and bicycle markings in the outer lanes. This striping configuration is presented for your consideration as an experimental striping configuration. I have attached a letter from the Northwest Arkansas Regional Planning Commission advocating the use of this striping as well.

Please contact me with any questions at (479) 575-8206.

Sincerely,

Chris Brown, P.E.
City Engineer

cc: John McLarty, NWARPC (by email)
Mike Johnson, University of Arkansas (by email)



1311 CLAYTON ST. • SPRINGDALE, ARKANSAS 72762
(479) 751-7125 FAX (479) 751-7150

October 22, 2009

Andrew Brewer
AHTD Planning & Research Division
P.O. Box 2261
Little Rock, Arkansas 72203-2261

Re: Bicycle Priority Lanes on Highway 112/Razorback Road Project

Dear Mr. Brewer,

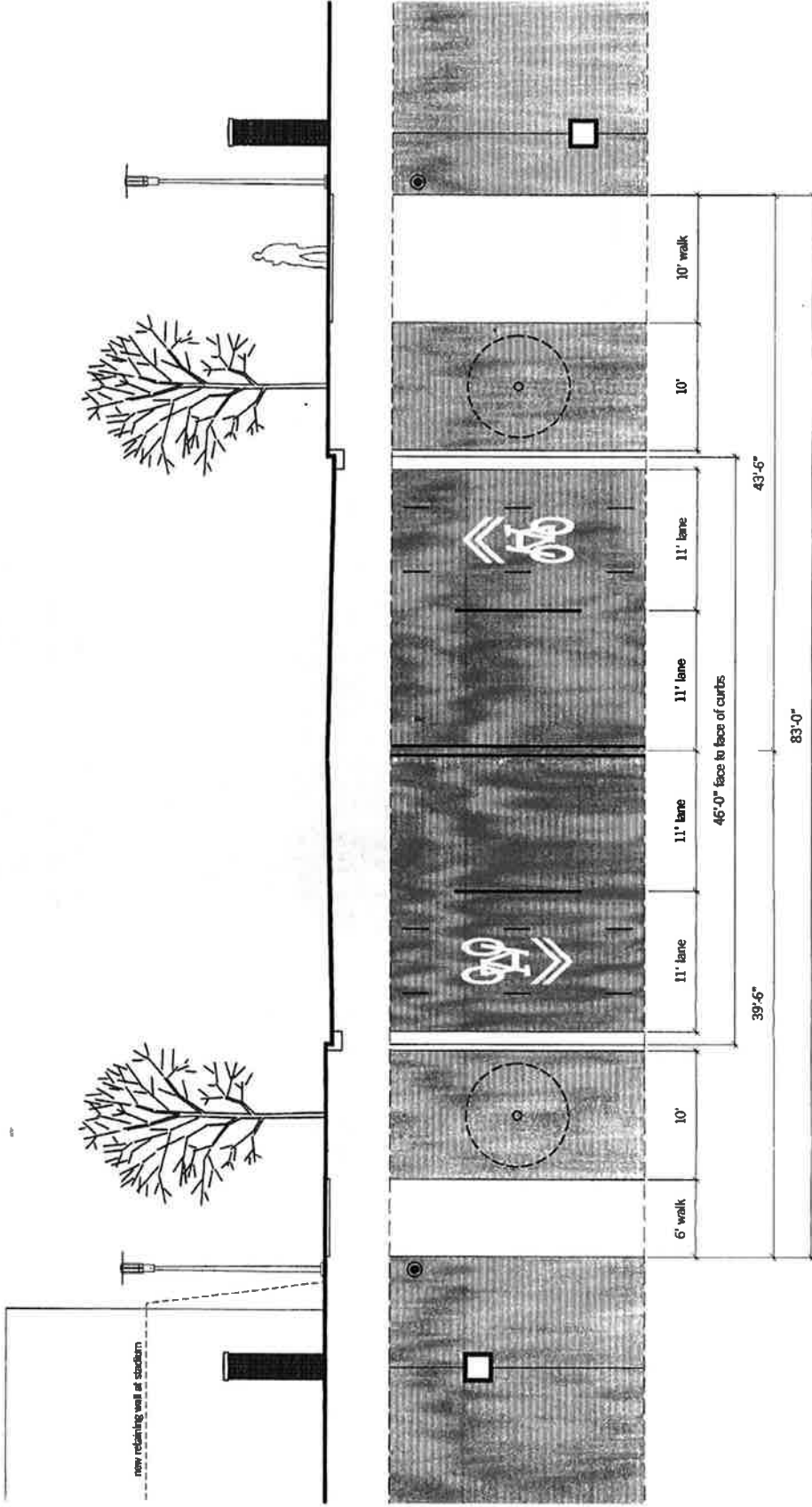
The NARTS MPO staff supports the design of the cross section of the Highway 112/Razorback Road with the bicycle priority lanes as shown in the attached graphic. We feel this is an innovative way to coordinate the interaction of motorists and bicyclists on a designated bicycle route.

The project location is an excellent candidate to demonstrate this design. If it is successful, we can foresee it being used on other designated bicycle routes where a specific bicycle lane is not feasible.

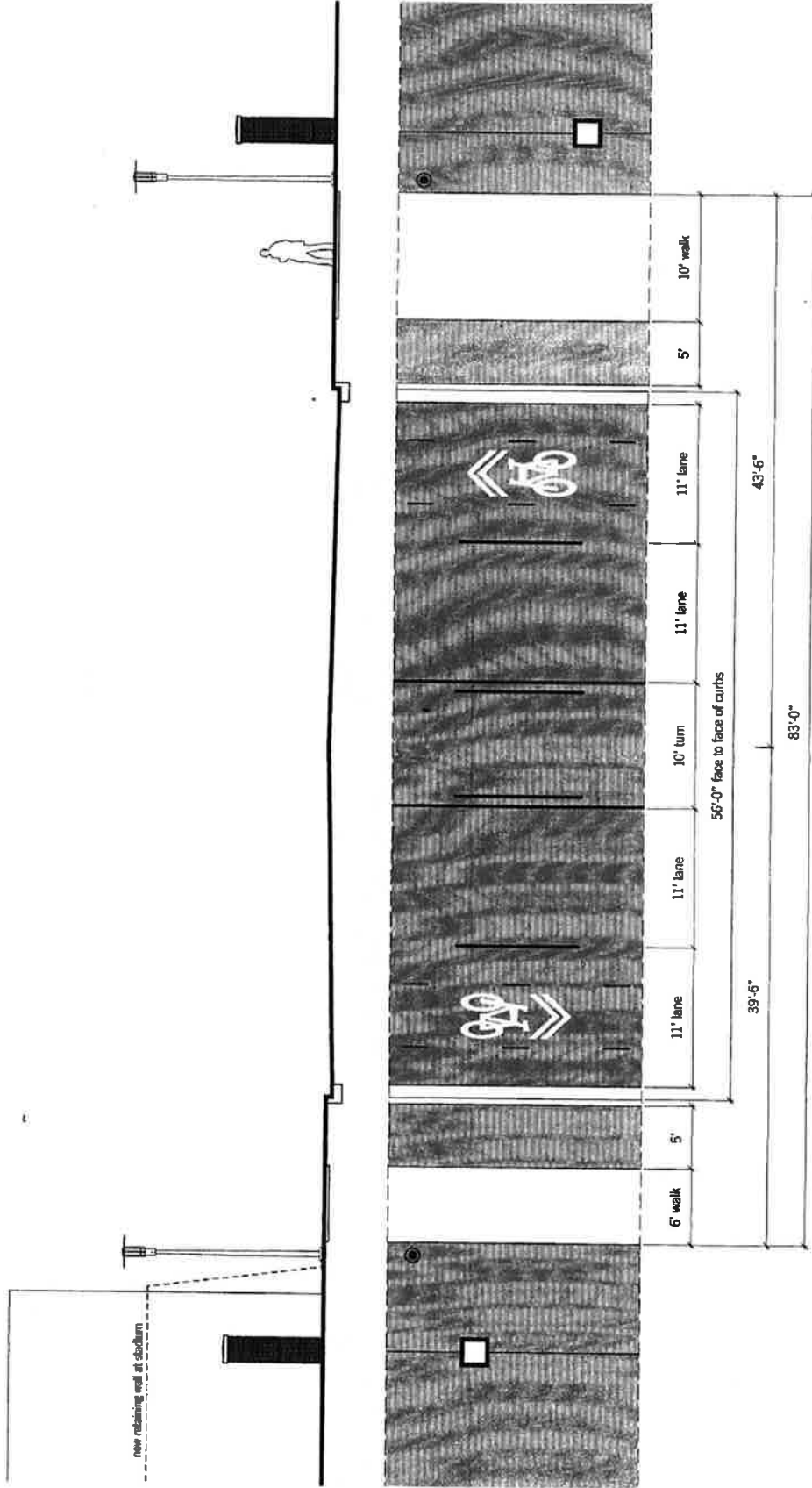
If you have any questions, please feel free to call.

Sincerely,

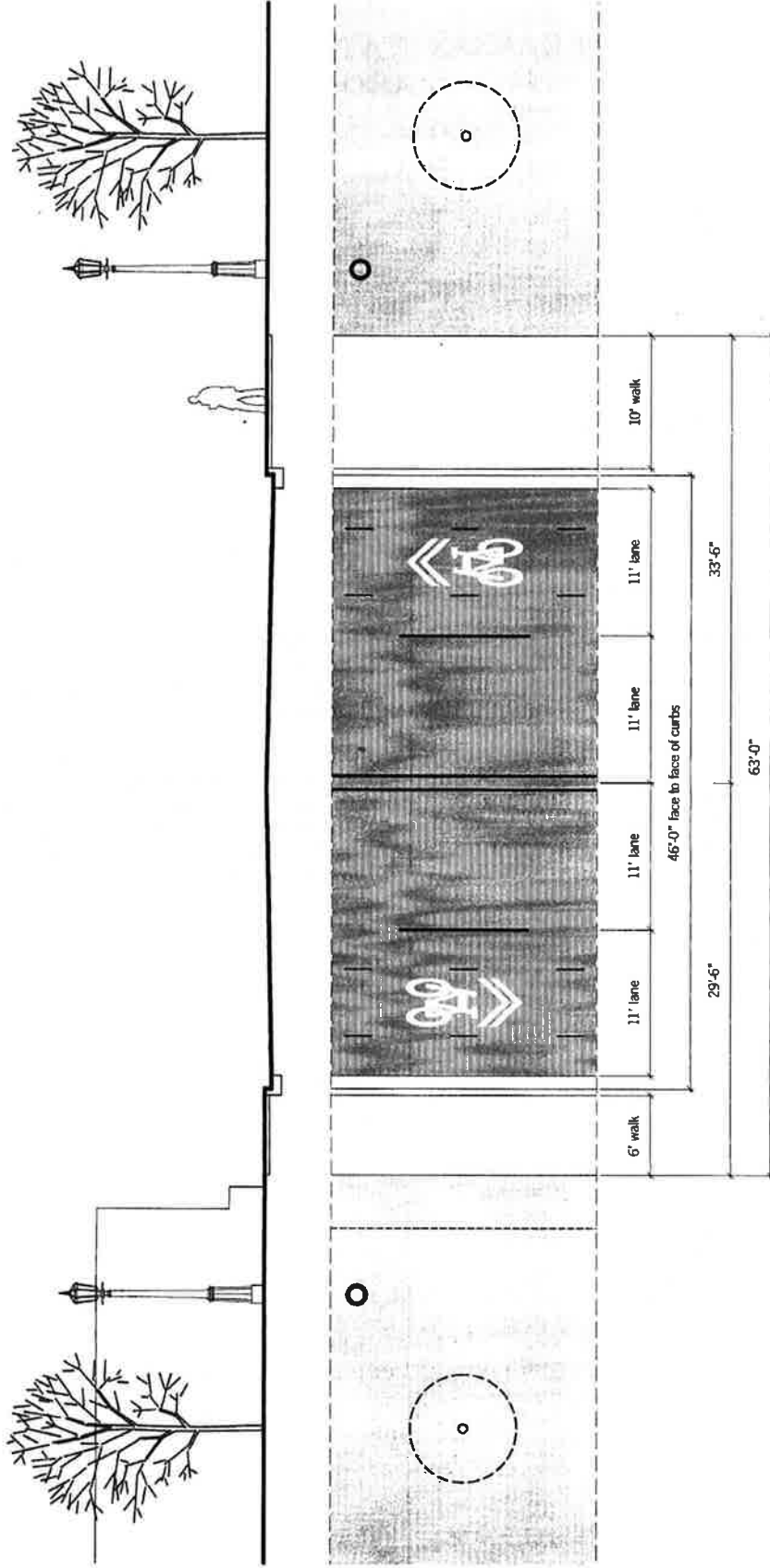
John McLarty
NWARPC
Transportation Study Director
479-751-7125



Highway I12 - Razorback Road
 typical section with priority bike lanes



Highway 112 - Razorback Road
 section with turn lane with priority bike lanes



Highway 112 - Maple Street
 typical section with priority bike lanes

ARKANSAS STATE HIGHWAY
AND
TRANSPORTATION DEPARTMENT

Dan Flowers
Director
Phone (501) 569-2000 Fax (501) 569-2400



P.O. Box 2261
Little Rock, Arkansas 72203-2261
WWW.ARKANSASHIGHWAYS.COM

November 18, 2009

Mr. Chris Brown
City Engineer
City of Fayetteville
113 West Mountain Street
Fayetteville, AR 72701

Dear Mr. Brown:

Reference is made to your recent letter regarding preferred cross sections from the City of Fayetteville and the University of Arkansas for the proposed improvements to Highway 112 between Highway 180 and Garland Avenue.

As you are aware, the Department is conducting a study to determine the appropriate cross section for improvements to this section of Highway 112. Your proposed cross sections, including the experimental bicycle shared lane marking or "sharrow," will be evaluated as part of this study. We anticipate that the study will be completed in early 2010.

As part of the study, options for the first phase of improvements to Highway 112 in this area will be evaluated. As you are aware, \$1 million in Federal-aid Surface Transportation Program funding is available for this first phase. The applicability of "sharrows" will also be evaluated for this first phase. However, if proposed revisions to the Manual on Uniform Traffic Control Devices to include these pavement markings have not been adopted at the time of plan development, special approval from the Federal Highway Administration for their use will be required.

If additional information is needed, please advise.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Frank Vozel'.

Frank Vozel
Deputy Director and
Chief Engineer

c: Director
Assistant Chief Engineer – Planning
Assistant Chief Engineer – Design
Planning and Research
Roadway Design
District 4 Engineer
Jeff Hawkins, NWARPC
Mike Johnson, University of Arkansas

FV:ASB:saw:bpm
Statewide\Correspondence\AndyJob 040418 Razorback&Maple_response letter to Fayetteville regarding cross section.doc

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

INTEROFFICE MEMORANDUM

February 2, 2010

TO: Highway 112 (Razorback & Maple) Improvements Study (Job 040418) Files
FROM: Andrew Brewer, Transportation Planning Engineer
SUBJECT: Meeting with Local Officials

On February 2, 2010, a meeting was held at the University of Arkansas Physical Plant to discuss the study of improvement needs on Highway 112 between Highway 180 and Garland Avenue. Attendees are listed below:

Chris Brown (City Engineer, City of Fayetteville)
Shannon Jones (Engineer, City of Fayetteville)
John McLarty (NARTS MPO Study Director, NWARPC)
Mike Johnson (Associate Vice Chancellor for Facilities Management, UA)
Jay Huneycutt (Associate Director, Planning, Facilities Management, UA)
Todd Furgason (Campus Planner, Facilities Management, UA)
Jill Anthes (Campus Planner, Facilities Management, UA)
Scott Turley (Associate Director, Utilities, Facilities Management, UA)
Bob Beeler (Associate Director, Design and Construction, Facilities Management, UA)
Kyle Cook (Construction Coordinator, Facilities Management, UA)
Joe Shipman (District Engineer, District 4, AHTD)
Andrew Brewer (Transportation Planning Engineer, Planning and Research, AHTD)

The following comments were made at the meeting.

- Bicycle shared lane markings (“sharrows”) were discussed; specifically, it was discussed that the markings would be addressed during future construction phases as appropriate.
- The safety of the Razorback and Maple intersection was discussed. Brewer discussed the results of the traffic safety study that was conducted, and stated that the preliminary findings of the study were that there is no significant safety problems with the intersection. The City asked if signals could be installed now—Shipman indicated that it may not be desirable or practical at that location.
- It was asked if signal warrant studies had been conducted for Razorback and Meadow, and Razorback and Leroy Pond intersections. Brewer said he would follow up with that.
- The UA said that right now they have just under 20,000 students enrolled, and they project 22,500 students by 2015, and 25,000 students by 2021.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

INTEROFFICE MEMORANDUM

February 2, 2010

TO: Highway 112 (Razorback & Maple) Improvements Study (Job 040418) Files
FROM: Andrew Brewer, Transportation Planning Engineer
SUBJECT: Meeting with Local Officials (Page 2)

- Brewer showed VISSIM videos of projected future traffic (vehicles, bicyclists, pedestrians, and transit) with the four-lane undivided alternative and various scenarios.
 - Brewer explained that a driveway to Lot 44 ("The Pit") from Razorback Road located approximately 275 feet south of Maple Street would be sufficient (a concern expressed by the UA at the August 28, 2009 meeting).
 - The UA planning staff expressed concern regarding left-turn lanes at the Razorback and Maple intersection north and west approaches. Brewer stated that they would be evaluated during design, as from a strictly capacity or operational standpoint they may not be needed.
 - The location of bus stops and pull-off areas were discussed. The UA stated they will discuss with Razorback Transit.
 - The UA stated that there should be enough room on the east approach of the Razorback and Leroy Pond intersection for a turn lane.
 - Brewer stated that the preliminary findings of the study were that left-turn lanes were justified at the Razorback and Meadow, and Razorback and Leroy Pond intersections (which were shown as a scenario in the videos). The UA planning staff expressed concern regarding left-turn lanes, even with their plan to add a fourth leg on the west side of both of the intersections at some point in the future, and even if the intersections were signalized. Brewer stated that once signal warrant studies were completed for the two intersections, he would re-examine the need for left-turn lanes and consider their comments in the study.

ASB

APPENDIX H

DESCRIPTIONS OF LEVEL OF SERVICE

Multi-Lane Highway

LOS A - LOS A represents free flow conditions where individual users are unaffected by the presence of others in the traffic stream.

LOS B - Traffic flow in LOS B is stable, but other users in the traffic stream are noticeable.

LOS C - At LOS C, maneuverability begins to be significantly affected by other vehicles.

LOS D - LOS D represents dense but stable flow where speed and maneuverability are severely restricted.

LOS E - Traffic volumes approach peak capacity for given operating conditions at LOS E; speeds are low and operation at this level is unstable.

LOS F - Minor interruptions in the traffic stream will cause breakdown in the flow and deterioration to LOS F, which is characterized by forced flow operation at low speeds and an unstable stop-and-go traffic stream.

Signalized Intersection

LOS A - LOS A describes operations with low control delay, where progression is extremely favorable and most vehicles arrive during the green phase.

LOS B - Where there is good progression, short cycle lengths, or both, LOS B typically occurs.

LOS C - LOS C may be the result of only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level.

LOS D - At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high volume/capacity ratios.

LOS E - LOS E describes high delays that generally indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent.

LOS F - LOS F describes control delay in excess of 80 seconds/vehicle. This level, considered unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of lane groups.

Stop-Controlled Intersection

The LOS concepts for an unsignalized intersection are similar to those of a signalized intersection, with the exception that the category thresholds are different. This is because drivers expect different levels of performance for distinct types of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than a stop-controlled intersection. Thus a higher level of control delay is acceptable at a signalized intersection for the same LOS.