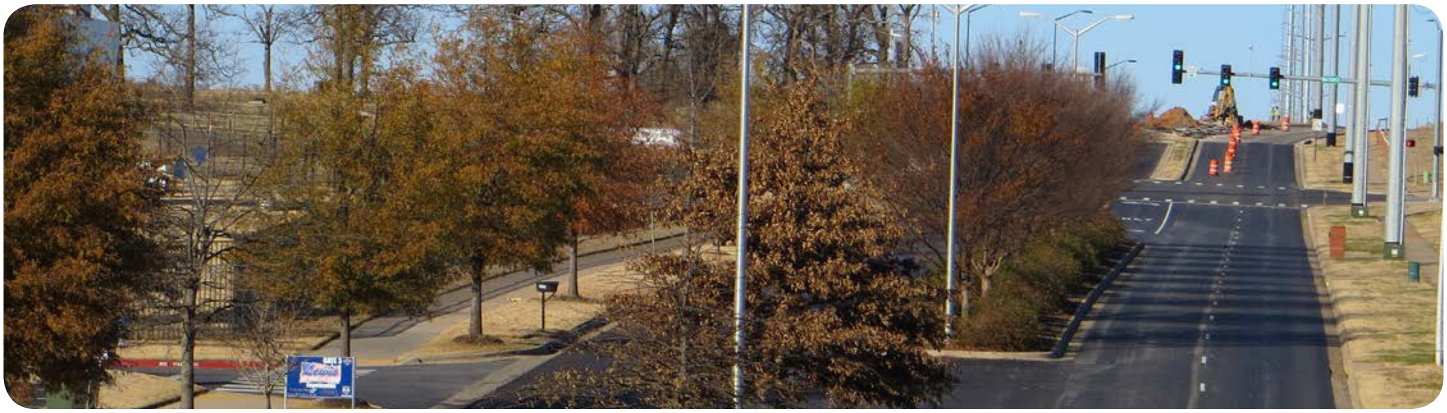


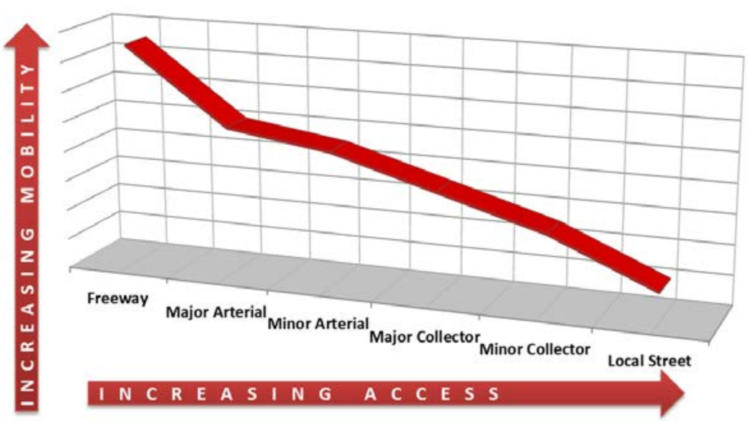
CHAPTER 8. FACILITY DESIGN, MANAGEMENT AND OPERATIONS, AND SYSTEM PERFORMANCE

TRANSPORTATION DESIGN

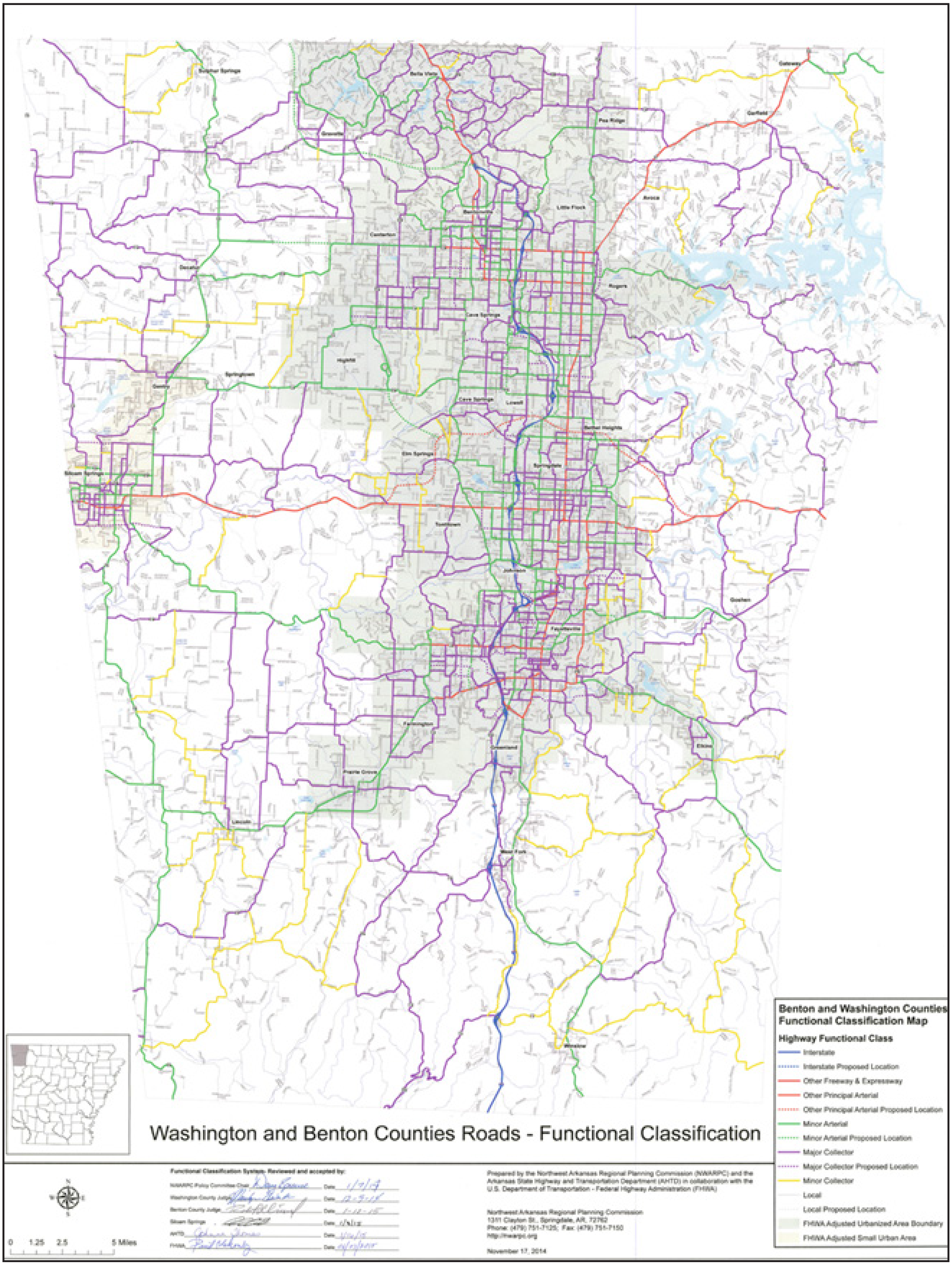
Roadway facilities are classified as Freeway/Expressways, Major Arterials, Minor Arterials, Major Collectors, Minor Collectors and Local Streets. These classifications reflect the utility of the various facilities as illustrated below, with the higher classifications more responsible for moving traffic long distances while the lower functional classes are primarily responsible for access to land. It is necessary for roadways to be on the State's functionally classified system to qualify for State and Federal funding. Map 8.1 on the next page shows the functionally classified system.

Of particular importance to the rapidly growing area of Northwest Arkansas is adequate protection of right of way and setbacks adjacent to current and proposed roads. A primary tool for this protection is the adopted master street plan of the cities and road plan of the counties.

The area's cities and counties are urged to consider the existing functionally classified system as well as the proposed 2040 network to protect the necessary rights-of-way through their adopted plan and ordinances.



It should also be noted that the cross-section designs in the 2040 MTP reflect recommended designs and that some areas of commercial or industrial development will require cross-section designs higher than the typical cross-section of the designated functional class of the roadway. Cities should identify those areas and preserve the necessary right-of-way for the higher design.



Map 8.1 - Washington and Benton Counties Functionally Classified Roads

COMPLETE STREETS

"Complete Streets" involves designing streets not just for the automobile but for all users. Generally, the elements that make up a complete street, according to the National Complete Streets Coalition, are sidewalks, bicycle lanes, shared-use paths, designated bus lanes, safe and accessible transit stops, and frequent and safe crossings for pedestrians, including median islands, accessible pedestrian signals, and curb extensions. There is no one design for complete streets since different areas have different road uses. However, all complete street designs should balance safety and convenience for everyone using the street.

The MTP recommends the development and adoption of Complete Streets policies. Complete Streets policies direct transportation planners and engineers to consistently design the right-of-way to accommodate all users – drivers, transit riders, pedestrians, and bicyclists, as well as for older people, children, and people with disabilities. Complete streets provide a safer and more accessible transportation system for all users.

The MTP identifies a series of cross-sections as a guide to implement complete streets concepts as transportation facilities are designed. The illustrations demonstrate how complete street design elements may be incorporated as part of the design process. The complete street cross-sections illustrated in the MTP are based on the following National Complete Street policy, guidance, and resources:

National Complete Streets Coalition:
http://www.smartgrowthamerica.org/complete-streets

NACTO Urban Street Design Guide:
http://nacto.org/usdg/

ITE - Designing Walkable Urban Thoroughfares: A Context Sensitive Approach:
http://www.ite.org/css/RP-036A-E.pdf

Jurisdictions are also encouraged to implement complete streets policies. These polices are also included in the adopted Northwest Arkansas Regional Bicycle and Pedestrian Master Plan. In addition to the Northwest Arkansas Regional Bicycle and Pedestrian Master Plan, 25 individual community plans have been developed and adopted along with recommended complete streets catalyst projects. All jurisdictions making major improvements to roads shown in the Northwest Arkansas Regional Bicycle and Pedestrian Master Plan should make every effort to include bicycle and pedestrian facilities. The following sample resolution has been developed to encourage complete streets throughout the region.

Sample Complete Streets Resolution for NWA Communities:

WHEREAS Complete Streets are important for our community's economy, health, mobility, and quality of life for residents, businesses and visitors,

LET IT BE RESOLVED that [Municipality / Adopting body] hereby recognizes the importance of creating Complete Streets that enable safe travel by all users, including pedestrians, bicyclists, transit riders and motorists, and people of all ages and abilities, including children, youth, families, older adults, and individuals with disabilities.

BE IT FURTHER RESOLVED that [Municipality / Adopting body] affirms that Complete Streets infrastructure addressing the needs of all users can be incorporated into all planning, design, approval, and implementation processes for construction, reconstruction, retrofit, maintenance, alteration, or repair of streets, bridges, or other portions of the transportation network; provided, however, that such infrastructure may be excluded, upon written approval by [insert senior manager, such as City Manager or the head of an appropriate agency], where documentation and data indicate that: 1. Use by non-motorized users is prohibited by law; 2. The cost would be excessively disproportionate to the need or probable future use over the long term; 3. There is an absence of current or future need; or 4. Inclusion of such infrastructure would be unreasonable or inappropriate in light of the scope of the project.

BE IT FURTHER RESOLVED that the head of each affected agency or department should report back to the [Adopting body] [annually / within one year of the date of passage of this resolution] regarding: the steps taken to implement this Resolution; additional steps planned; and any desired actions that would need to be taken by [Adopting body] or other agencies or departments to implement the steps taken or planned.

BE IT FURTHER RESOLVED that a committee is hereby created, to be composed of [insert desired committee composition] and appointed by [the Mayor / President of adopting body / other], to recommend short-term and long-term steps, planning, and policy adoption necessary to create a comprehensive and integrated transportation network serving the needs of all users; to assess potential obstacles to implementing Complete Streets in [Municipality]; and to suggest revisions to the [insert name of Municipality's comprehensive plan equivalent], zoning code, subdivision code, and other applicable law.

The following COMPLETE STREET cross-sections have been developed as a guide:

MINOR STREET

Description

Provides access to properties within a neighborhood or district. Not intended for long-distance auto trips.

Conforms to Minor Street dimensions of 30 feet from curb-to-curb.

- Minor streets generally require no lane markings.
- Minor streets can be further optimized for bicycle travel by applying bicycle boulevard treatments (described in these design guidelines in the Northwest Arkansas Regional Bicycle and Pedestrian Master Plan).
- Parking may be permitted or prohibited based on demand and adjacent land use.

COLLECTOR STREET

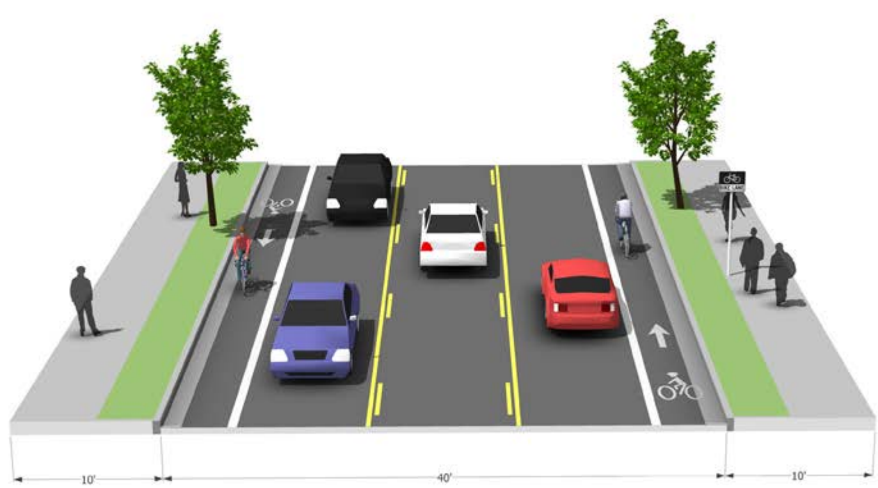
Description

Provides traffic circulation within neighborhoods, commercial and industrial areas. Collects traffic from local streets in neighborhoods and channels it into the arterial system.

Conforms to Collector Street dimensions of 40 feet from curb-to-curb.

Function

- Connections between arterials should be indirect in order to discourage use by traffic from outside the neighborhood.
- Design Service Volume: 4,000 vpd; 6,000 vpd with left turn bays
- Speed: 25-30 mph



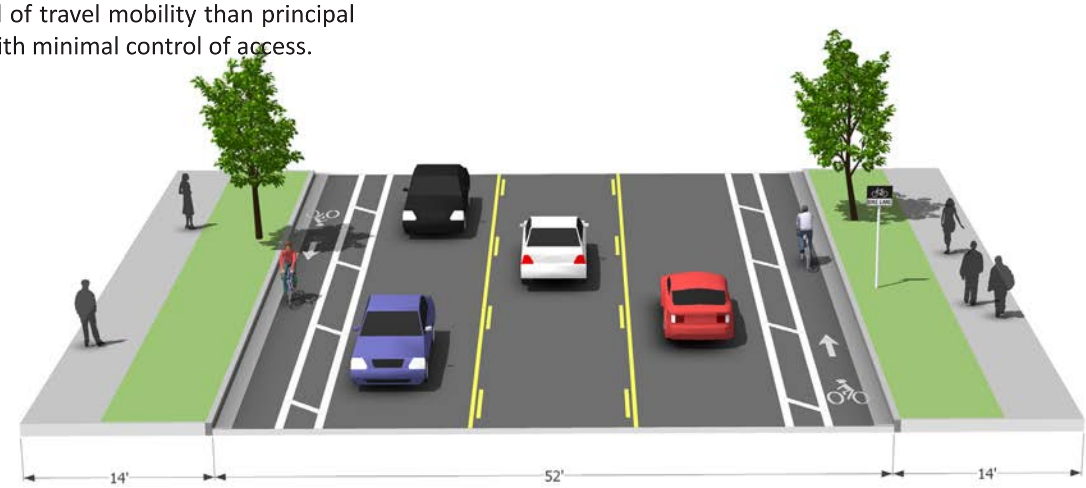
MINOR ARTERIAL

Function

Connects higher functional class facilities, activity centers, regions of the area, and major county roads at the edge of the metropolitan area. Traffic is composed predominantly of trips across and within regions of the city.

Provides service to traffic at a somewhat lower level of travel mobility than principal arterials with minimal control of access.

- Ideally does not penetrate neighborhoods.
- Design Service Volume: 12,200 vpd; 14,800 vpd with left turn bays
- Speed: 35-40 mph



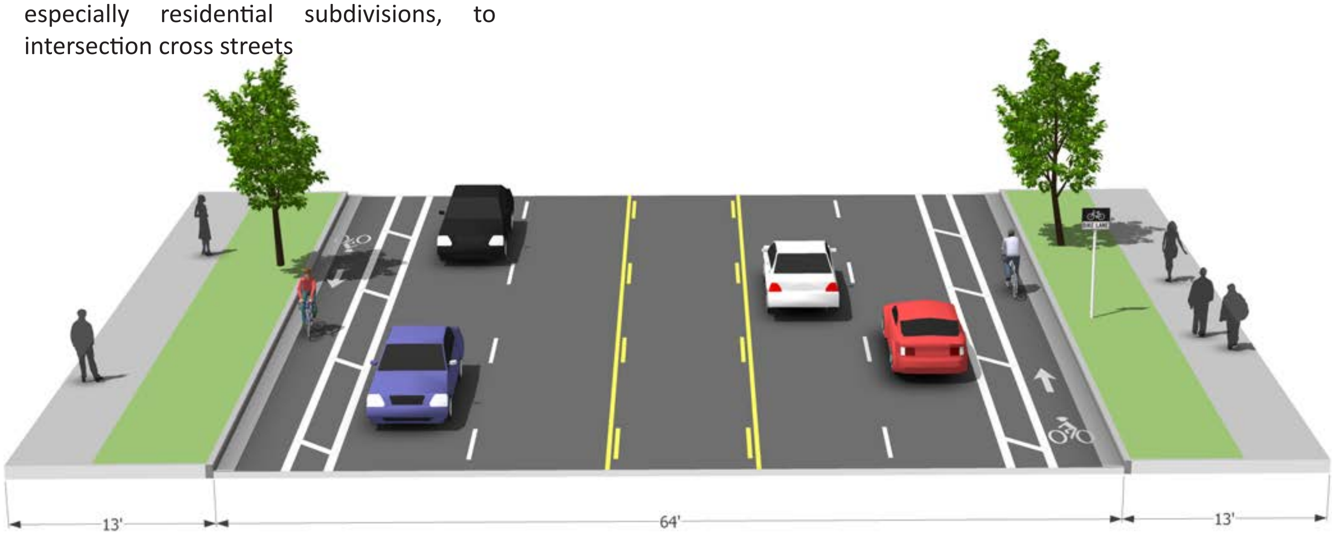
MAJOR ARTERIAL

Function

Connects freeway/expressways, rural highways at the edge of the metropolitan area, and major urban activity centers within the metropolitan area. Traffic is composed predominantly of traffic across or through the city.

Access may be controlled through medians or by the limitation of curb cuts through the orientation of access for new developments, especially residential subdivisions, to intersection cross streets

- Design Service Volume: 17,600 vpd – 20,600 vpd with left turn lane
- Speed: 40-45 mph



FREEWAY/EXPRESSWAY

Function

High speed, multi-lane facilities with a high degree of access control. These facilities serve the major centers of activity of the metropolitan area and are well integrated with the urban arterials and major rural arterials routes entering the region. They should provide a high level of traffic service to travelers who do not have local destinations and wish to bypass the city.

- Design Service Volume: 28,300 vpd expressway; 44,800 vpd freeways
- Speed: 55-70 MPH
- Lanes: Four or more 12-foot lanes; 10-foot outside shoulders and 6-foot inside shoulders
- Median: Either acceptable depressed median or raised median with safety barrier

AHTD POLICY REGARDING BICYCLE LANES AND SIDEWALKS:

The AHTD Policy regarding sidewalks calls for five foot sidewalks with a three foot buffer between the roadway and the sidewalk. Any State Highway project with wider sidewalks or buffer zones will have a cost share requirement from the local jurisdiction. AHTD Policy regarding bike lanes indicates that they will be considered if the facility is on an adopted master trail plan. From the AHTD Policy:

- When bicycle accommodations are to be made on routes with an open shoulder section, the paved shoulder will be used to accommodate bicycles. Shoulder widths shall conform to the widths recommended in the American Association of State Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets" 6th Edition, 2011.
- When bicycle accommodations are to be made on routes with a curb and gutter section, the bicycle lane will be in accordance with recommendations in the AASHTO Guide for the Development of Bicycle Facilities. Generally, a bicycle lane width of four feet (measured from the lane edge to the edge of the gutter) will be considered.
- If local or regional design standards specify bicycle facility widths greater than the standards noted above, the additional right-of-way and construction costs associated with the greater width shall be funded by the local jurisdiction that adopted the higher design standards.

The complete AHTD Policy for Pedestrian and Bicycle Facilities can be found at http://www.arkansashighways.com/planning_research/statewide_planning/bicycle_pedestrian_planning/AR%20bike%20ped%20policy.pdf.

The MTP recommends that all roads (AHTD and local) crossing named waterways prominently display a sign naming the waterway.

ACCESS MANAGEMENT

Access Management provides an important means of maintaining mobility, improving safety and system reliability. It calls for effective ingress and egress to a facility, efficient spacing and design to preserve the functional integrity and overall operational viability of street and road systems. Good access management promotes safe and efficient use of the transportation network.

NWARPC has worked toward development of regional policies and a Model Access Management Ordinance. The Model Access Management Ordinance is available to local governments to use and tailor to their unique and specific needs and situations. Please see Appendix C: Model Access Management Ordinance.

Access Management should address, among other things, the following areas:

ACCESS MANAGEMENT PLAN AGREEMENT
For
HIGHWAY 265 IN FAYETTEVILLE

I. PARTIES – This agreement is made between the City of Fayetteville (the City), the Arkansas State Highway Commission (the Commission) acting through the Arkansas State Highway and Transportation Department (the Department) and the Northwest Arkansas Regional Planning Commission as the designated metropolitan planning organization for Northwest Arkansas under federal transportation regulations (the MPO). Although a very short portion of the east side of the corridor north and south of Clear Creek Drive is in the City of Springdale, Springdale is not a formal party to the agreement. However, Springdale officials have been consulted during the Plan development and will be consulted on the rare occasion that Springdale property may be impacted.

II. ROUTE – This access management agreement pertains to Highway 265, also known as Crossover Road south of Clear Creek Drive and Old Missouri Road to the north, from the intersection with Township Street north to the intersection with Ivey Lane, (the Roadway). See Appendix A, Figure 1.

III. STATEMENT OF PURPOSE – Highway 265 is a principal arterial on the City master street plan and serves as an intra-regional arterial roadway connecting the City to its economic region. The primary purpose for this agreement is to protect the capacity of the roadway to carry significant local and intra-regional traffic while increasing the safety for drivers, bicyclists, and pedestrians that use this facility. It is the intent of this agreement to provide access to abutting properties consistent with this objective.

IV. AUTHORITY – Both the City and the Commission have specific legal authority to regulate access to public roads. In the case of the City, it is found in Arkansas Code Annotated 14-56-419. In the case of the Commission, it is found in Arkansas Code Annotated 27-65-107. The MPO is hereby granted standing in this access management agreement by the City and the Commission in recognition of its role in transportation planning within the metropolitan area.

V. ACCESS PLAN – Management of access to the roadway is necessary to achieve the primary purpose of the agreement. The access management plan (the Plan) is detailed in Appendix A. The Plan is a Specific Access Management Plan in which all median breaks are specifically identified. Standards for driveways are also established to be applied during plat review

1

- **Facility hierarchy**
- **Intersection and interchange spacing**
- **Driveway spacing**
- **Traffic signal spacing**
- **Median treatments and median openings**
- **Turning lanes and auxiliary lanes**
- **Street connections**

Highway 265 in Fayetteville

In areas of rapid land development, it is important for jurisdictions to develop access standards that achieve a balance between property access and functional integrity of the road system. Studies show that implementing access management provides three major benefits to transportation systems:

- Increased roadway capacity
- Reduced crashes
- Shortened travel time for motorists

Effective access management will accomplish the following:

1) Limit the number of conflict points at driveway locations. Conflict points are indicators of the potential for accidents. The more conflict points that occur at an intersection, the higher is the potential for vehicular crashes. When left turns and cross street through movements are restricted, the number of conflict points is significantly reduced.

2) Separate conflict areas. Intersections created by streets and driveways represent basic conflict areas. Adequate spacing between intersections allows drivers to react to one intersection at a time, and reduces the potential for conflicts.
3) Reduce interference for through traffic. Through traffic often needs to slow down for vehicles exiting, entering, or turning across the roadway. Providing turning lanes, designing driveways with appropriate turning radii, and restricting turning movements in and out of driveways allows turning traffic to get out of the way of through traffic.
4) Provide sufficient spacing for at-grade, signalized intersections. Good spacing of signalized intersections reduces conflict areas and increases the potential for smooth traffic progression.
5) Provide adequate on-site circulation and storage. The design of good internal vehicle circulation in parking areas and on local streets reduces the number of driveways that businesses need for access to the major roadway.

Access Management encompasses a set of techniques that state and local governments can use to control access to highways, major arterials, and other roadways. The FHWA lists the following techniques:
- Access Spacing: Increasing the distance between traffic signals improves the flow of traffic on major arterials, reduces congestion, and improves air quality for heavily traveled corridors.
- Driveway Spacing: Fewer driveways spaced further apart allow for more orderly merging of traffic and present fewer challenges to drivers.
- Safe Turning Lanes: Dedicated left and right-turn, indirect left-turns and U-turns, and roundabouts keep through traffic flowing. Roundabouts represent an opportunity to reduce an intersection with many conflict points or a severe crash history (T-bone crashes) to one that operates with fewer conflict points and less severe crashes (sideswipes) if they occur.
- Median Treatments: Two-way left-turn lanes (TWLTL) and non-traversable, raised medians are examples of some of the most effective means to regulate access and reduce crashes.
- Right-of-Way Management: As it pertains to right-of-way reservation for future widening, good sight distance, access location, and other access-related issues.

REGIONAL ACCESS MANAGEMENT POLICIES AND OBJECTIVES

Regional Policy:
The MTP recommends that local jurisdictions, AHTD and MoDOT implement access management techniques and plans as transportation facilities are planned, programmed, and constructed.

Regional Objectives:
- Coordinate with AHTD and MoDOT.
- Protect the capacity of the roadway to carry significant local and regional traffic while increasing the safety for drivers, bicyclists, and pedestrians that use the facility.
- Maximize safety and capacity of the corridor in light of possible future development and/or redevelopment.
- Provide a mechanism to balance national, State, regional, and local interests in a manner that protects the function of the roadway as well as the existing and future investments in it, along with allowing reasonable economic development opportunities.
- Improve the environment for pedestrians, bicycles, and motor vehicles by reducing and consolidating driveway conflict points.
- Effective local access management requires planning as well as regulatory solutions. Where applicable, communities should establish a policy framework that supports access management in the local comprehensive plan, prepare corridor or access management plans for specific problem areas, and encourage good site planning techniques. Local comprehensive plans should establish how the community would balance mobility with access, identify the desired access management approach, and designate corridors that will receive special treatment. This may be supplemented through functional plans, such as an access management or thoroughfare plan, or through sub area plans, such as an interchange or corridor plan. By establishing the relationship between regulatory strategies and public health, safety, and welfare, the comprehensive plan can serve as the legal basis for access controls.

- Remedial access management techniques are recommended for areas that are already developed. Remedial access management focuses on reducing congestion, improving safety and improving aesthetic conditions on arterials that have developed into the familiar strip pattern with numerous separated driveways.
  - Closing or consolidating driveways, sharing driveways, improving on-site circulation, linking adjoining parking lots, and constructing parallel access roads are common access management techniques applied in existing developed areas.
  - Remedial access management efforts can be accomplished through alternative driveway design and applied during site plan review for a parcel as it goes through the permitting process for changes in use, expansion, etc.
  - Another effective time to implement remedial access management techniques is when new roadway improvements are being made.

AHTD/Local Jurisdiction Individual Corridor Access Management Plans on State Numbered Highways:

- Individual Access Management plans will specifically identify all median breaks.
- Establish standards for driveways to be applied during plat review prior to development approval by the local jurisdiction.
- Access Management Plan Agreement - Each Access Management Plan Agreement will be deemed adopted when passed in identical form by the local jurisdiction, the NWARPC acting in its capacity as MPO, and the Arkansas State Highway Commission (when the Plan applies to a State Highway).
- The Access Management Plan agreement may be terminated or modified, in whole or in part only by mutual agreement of all of the parties as evidenced by resolutions adopted by each governing body.
- Amending the Access Management Plan – An Access Management Plan amendment (variance) will be considered at the request of any of the parties to the Agreement or at the request of an applicant whose permit request has been denied by any of the parties. The proposed amendment must be adopted in identical form by the local jurisdiction, the NWARPC, and Arkansas State Highway Commission to become effective. The Access Management Plan will be updated immediately after construction of each widened portion of the roadway is completed to reflect any changes to driveway location due to that construction if necessary.

Access Management Model Ordinance

Local government adoption of implementing regulations, standards and procedures is critical to an effective regional access management effort. Without local government enforcement of implementing regulations, the regional access management effort may be undermined by inconsistent decisions during the development review and permitting process. The MTP includes an Access Management Model Ordinance whose purpose is not to identify specific projects, rather, it is to establish guidelines that will promote safe and efficient traffic flow and which will enhance and sustain economic development along the corridor over which it is laid. It is understood that the Model Ordinance may be amended or tailored to suit each local jurisdiction's individual needs. The Access Management Model Ordinance may be found in Appendix C.

CONTEXT SENSITIVE SOLUTIONS

Context Sensitive Solutions (CSS), previously known as Context Sensitive Design, is another "alternative approach" to transportation development that has shown very promising results throughout the country. By resolving design issues in the beginning of a transportation project much time and money can be saved. The FHWA defines CSS as: "a collaborative, interdisciplinary approach that involves all stakeholders in providing a transportation facility that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions."
http://www.fhwa.dot.gov/planning/csstp/css_primer/whatis.cfm#consensus

The process differs from traditional processes in that it considers a range of goals that extends beyond the transportation problem. It includes goals related to community livability and sustainability, and seeks to identify and evaluate diverse objectives earlier in the process and with greater participation by those affected. The result is greater consensus and a streamlined project during later stages of project development and delivery. And although CSS processes are often associated with design, the approach is most effective when used during each step of planning and project development – from long-range transportation plans to individual corridor strategies.

While every project has unique circumstances, all CSS processes should build consensus around these issues before solutions are identified:

- Project context, including geography and community values.
- Problem to be addressed.
- Implementation plan and decision-making process and roles.
- Vision, goals, and evaluation factors.

Once stakeholders agree on these, the team can begin to identify and evaluate alternatives and make decisions. The steps for building agreement are flexible and can be adapted to suit individual projects. At the heart of the approach is the methodical integration of diverse values at each step of the process.

Figure 8.1 illustrates a CSS process that becomes less contentious as the design becomes more complex. Public and stakeholder involvement might be a primary activity early in the project, but by the time engineers are producing detailed plans, stakeholders only wish to be kept informed about progress and involved when changes arise. This front-loaded community participation and decision-making process allows stakeholders to influence outcomes by raising issues early when they can still be addressed.

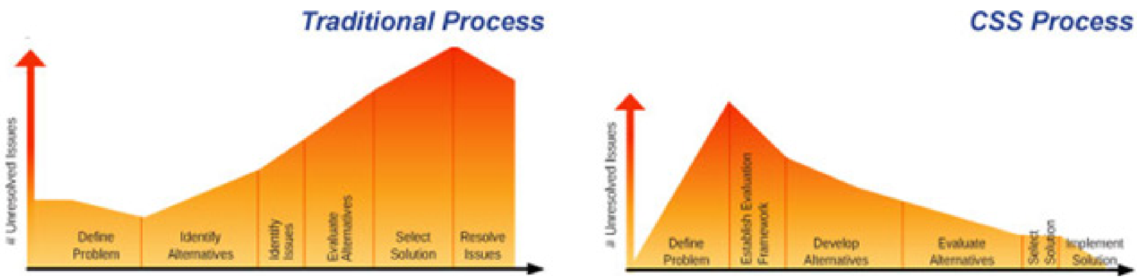


Figure 8.1 - CSS Process

Characteristics of the CSS Products or Design:

- The project is in harmony with the community, and it preserves environmental, scenic, aesthetic, historic, and natural resource values of the area.
- The project is a safe facility for all users and the community.
- The project solves problems and satisfies the purpose and needs identified by a full range of stakeholders.
- The project exceeds the expectations of both designers and stakeholders and is perceived as adding lasting value to the community as a whole.
- The project involves efficient and effective use of resources (time, budget) of all involved parties.

These before and after photos from the College Ave/Hwy. 71B (Fayetteville, Arkansas) illustrate how context sensitive projects improve safety and mobility for a variety of users. The photo illustrates improved sidewalks, street trees, and tree-lined boulevard.

CSS projects consider new and emerging technologies, funding sources, and public policy issues aimed at addressing major drivers such as energy supply, climate change, and sustainability initiatives. CSS projects also address livability issues such as bicycle and pedestrian facilities, transit, and multimodal connections. Additionally, CSS projects embrace sustainability principles such as stormwater management, water quality, and the use of recycled materials throughout their lifecycles.

Given the potential of avoiding transportation project delays and costs, and at the same time meeting the needs of interested individuals and stakeholders, the CSS process would be an important alternative approach for the Northwest Arkansas region to consider adopting into the planning process.

CONGESTION MANAGEMENT PROCESS

Congestion management is the use of strategies to optimize operations of a transportation system through management and operation of the existing system. As such, a congestion management process (CMP) is a systematic regional approach that provides current performance measures detailing the system performance and evaluates strategies that meet the local objectives.

The CMP is intended to serve as a systematic process that provides for safe and effective integrated management and operation of the multimodal transportation system. The process includes:

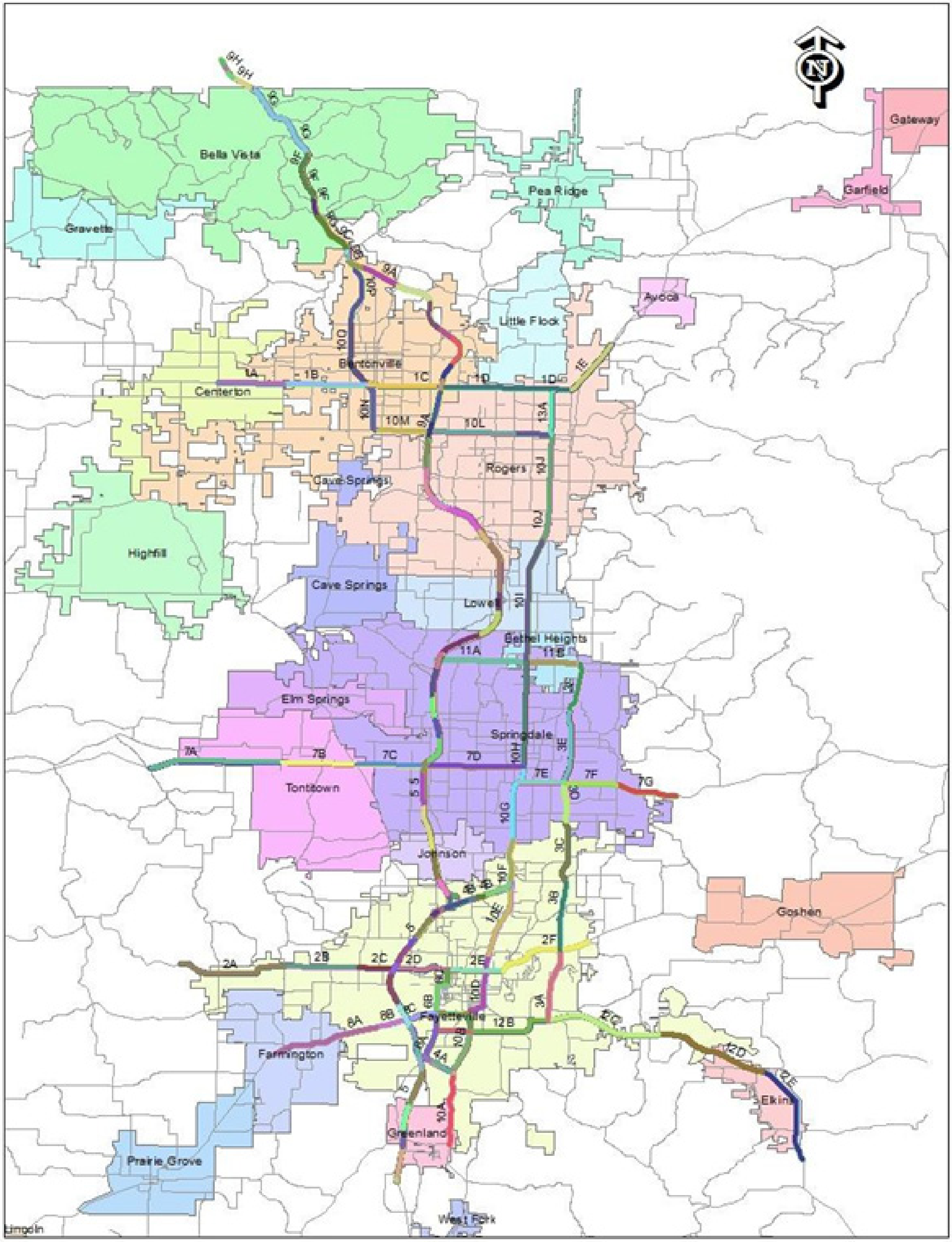
- Development of congestion management objectives.
- Establishment of measures of multimodal transportation system performance.
- Collection of data and system performance monitoring to define the extent and duration of congestion and determine the causes of congestion.
- Identification of congestion management strategies.

The Northwest Arkansas CMP provides a structure for responding to congestion in a consistent, coordinated fashion by responding to congestion through a process that involves developing congestion management objectives, developing performance measures to support these objectives, collecting data, analyzing problems, identifying solutions, and evaluating the effectiveness of implemented strategies.

The goal of the CMP is to ensure optimal performance of the transportation system by identifying congested areas and related transportation deficiencies.

The CMP network includes 224.5 centerline miles of roadway spread over 13 different roadways divided into 234 directional links bound by a traffic signal, stop sign, or major cross street. Of the 242 directional miles studied in the morning peak and afternoon peak periods, it was determined to classify the top 15 percent of the segments as congested including both the results of the AM and PM periods. The AM period was defined from 7:00-9:00 AM, while the PM period was defined from 4:30-6:30 PM. Map 8.2 shows the 2015 CMP Network.

Hwy. 412 (Sunset Ave)



Map 8.2 - 2015 CMP Network

CONGESTION PERFORMANCE MEASURES

The purpose of the CMP Study was to identify and quantify problem areas in the region using 2013 private sector travel speed data and AHTD volume data. Private sector 2013 travel speed data was procured for the region which covered the National Highway System (NHS) and arterial network in the urbanized area. Through the use of private sector travel speed data, various performance measures were calculated.

NWARPC has introduced the use of congestion index (CI) as one element of performance in the CMP. This performance measure allows easy comparison of the efficiency of roadways as a ratio of average travel speed to the posted speed limit. The second measure is volume delay per mile. This performance measure calculates the delay or amount of time drivers wait as compared to traveling at the posted speed. Also, by multiplying it by the link volume, the overall impact of the delay can be measured. CI is purely a measure of delay time, but does not relate the number of cars in the delay. In many cases the minor or secondary roads are high on the CI ranking but rank lower on the volume delay because fewer vehicles and people are affected on these secondary roads. The CMP segments vary in length across the board between those on arterials and freeways. In order to standardize the results and allow direct comparison across the network, the volume-delay results were divided by the length. This measure provides a result with the units of vehicle hours of delay per mile, thus allowing a more direct comparison between segments. As a result, the preferred performance measure was determined and used to identify the operating results of each link of the CMP network.

Congestion Index (CI)	**Actual Average Speed / Weighted Average Posted Speed Limit**
Actual Average Speed	**Average speed of all INRIX data on the segment**
Weighted Average Posted Speed Limit	**Average of all posted speed limits on the segment weighted by length**
Volume Delay (VD/mile)	**Delay X Segment Volume / Segment Length**

Based on the local conditions in the region, attention was focused on the peak periods. The duration of congestion and other performance measures were not as much of a concern with the short peaking of congestion within the region. This also is applicable in most areas of the region to performance measures based on volume. There are a few areas within the region where capacity is an issue, but most delay occurs at the node level and is not a link problem. Because volume is measured mid-block and does not consider the operations of the nodes (intersections), attention is being focused at the location where the MPO can get the most benefit.

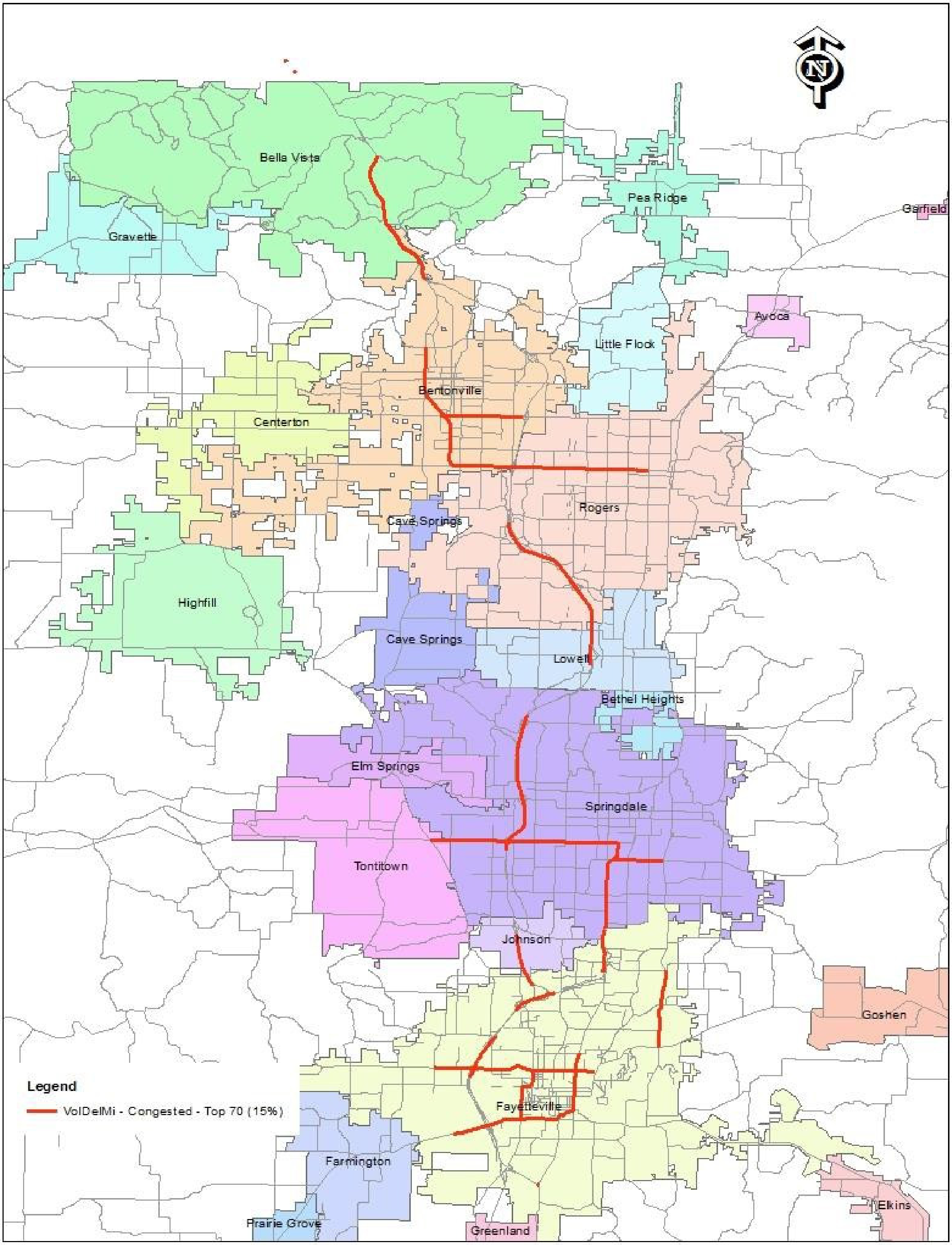
The primary performance measure is volume delay per mile. In order to narrow the focus on those roadway segments that need attention and commonly have recurring delay, the results were tabulated and the highest 15 percent of the network was categorized as congested. Over time, with future updates, the region will be able to revisit these thresholds and adjust as desired. FHWA encourages flexibility with the process and customization of the methodology and performance measures to respond to the local and regional objectives.

The region can also consider adding other performance measures in future updates that are multi-modal based that reflect the accessibility of transit, bike, and pedestrian facilities. This can be as direct on the regional level as the percent of jobs or households within ¼ mile of transit. This will serve as an indicator of the accessibility to transit and should have some correlation to the ridership.

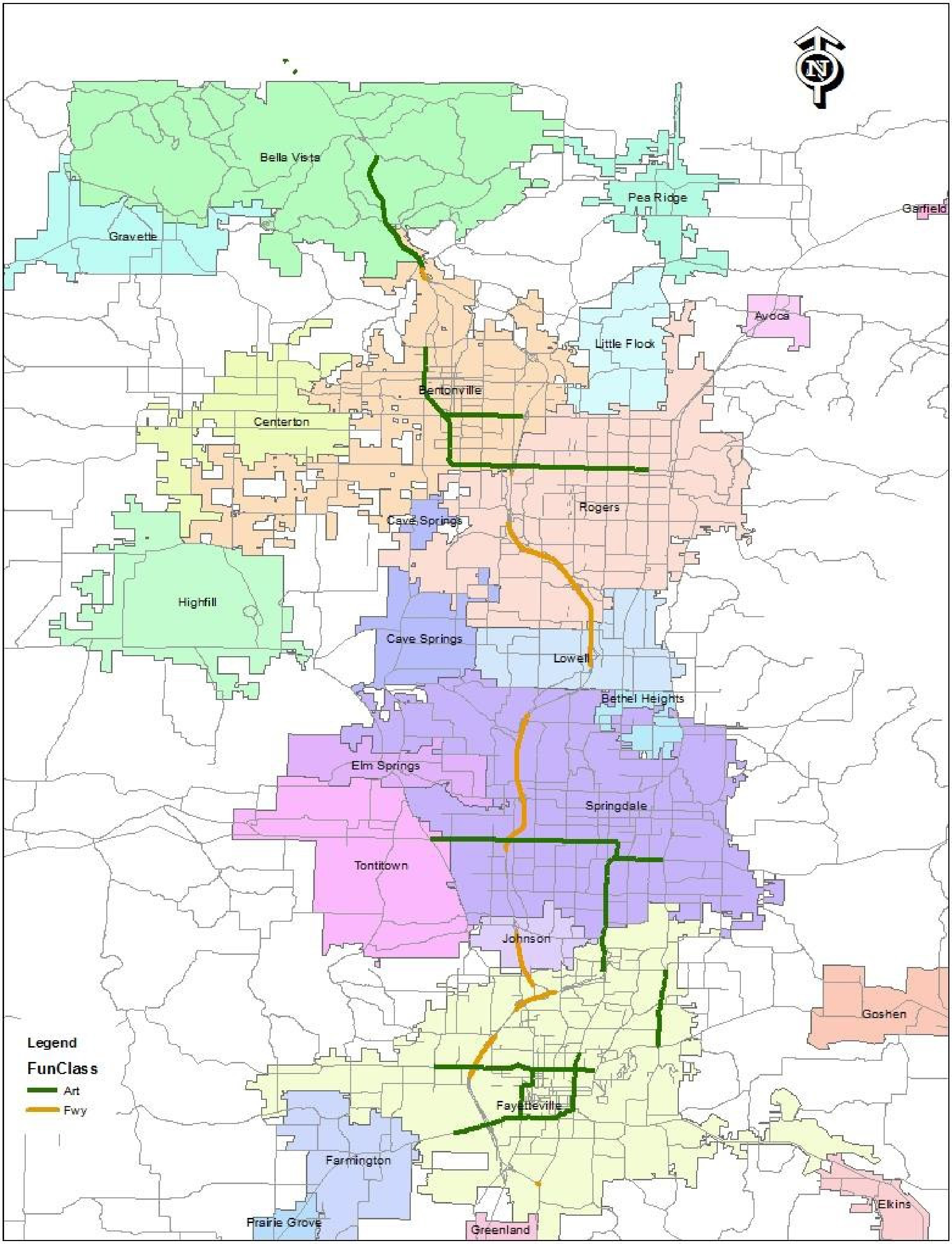
Table 8.1 and Maps 8.3 and 8.4 show the Top 20 congested segments in CMP Study based on the volume-delay per mile performance measure for both the AM and PM peak period. This results in some segments being classified as "congested" for both periods.

Top 20 Rank (Art/Fwy)	SegmentId	Route	Segment Name	Time Period	Func Class	City	Length (mi)	Weighted Avg Speed Limit	Congestion Index	Volume Delay per Mile
1	9E	Hwy 71 - SB	Mercy Way to Riorden Rd	AM	Art	Bella Vista	1.61	45.0	0.51	194.2
2	9C	Hwy 71 - SB	Peach Orchard Rd to Mercy Way	AM	Art	Bella Vista	1.34	45.0	0.49	168.1
3	2E	North St - EB	Oakland Ave to Hwy 45	PM	Art	Fayetteville	1.37	26.4	0.38	155.0
4	5389030	I-49 - SB	South of Fullbright	PM	Fwy	Fayetteville	0.27	60.0	0.68	123.3
5	2E	North St - EB	Oakland Ave to Hwy 45	AM	Art	Fayetteville	1.37	26.4	0.45	106.4
6	5369443	I-49 SB	Short segment at on-ramp from Walnut	PM	Fwy	Rogers	0.21	70.0	0.44	103.4
7	10M	Hwy 71B - EB	I-49 to Rainbow Rd	PM	Art	Bentonville	1.34	45.0	0.46	79.2
8	5369443	I-49 SB	Short segment at on-ramp from Walnut	AM	Fwy	Rogers	0.21	70.0	0.48	73.1
9	2C	Hwy 16 - EB	Rupple Rd to Futtrall	PM	Art	Fayetteville	1.07	43.9	0.48	70.1
10	2C	Hwy 16 - WB	Rupple Rd to Futtrall	PM	Art	Fayetteville	1.07	43.9	0.48	69.7
11	5389031	I-49 - SB	West of Hwy 112	PM	Fwy	Fayetteville	0.25	60.0	0.65	67.2
12	5369409	I-49 - NB	South of Walton on-ramp	PM	Fwy	Bentonville	0.34	54.4	0.47	66.6
13	10M	Hwy 71B - Walton Blvd - WB	I-49 to Rainbow Rd	PM	Art	Bentonville	1.34	45.0	0.50	65.7
14	9C	Hwy 71 - NB	Peach Orchard Rd to Mercy Way	PM	Art	Bella Vista	1.34	45.0	0.71	60.9
15	5402368	Hwy 71 - SB	North CMP limits	PM	Art	Missouri	0.06	45.0	0.40	58.5
16	10F	Hwy 71B - NB	Shiloh to Tyson Pkwy	PM	Art	Springdale	1.70	43.3	0.55	55.4
17	5389276	I-49 - NB	North of Hwy 412	AM	Fwy	Springdale	0.54	70.0	0.67	53.6
18	5402369	Hwy 71 - NB	North CMP limits	PM	Art	Missouri	0.06	45.0	0.42	52.7
19	5389139	Fullbright - WB	Within I-49 interchange	PM	Fwy	Fayetteville	0.61	60.0	0.71	51.6
20	5389081	I-49 - NB	South of Fullbright interchange	AM	Fwy	Fayetteville	0.43	63.5	0.73	51.0

Table 8.1 - Top 20 Congested Segments in the CMP Study



Map 8.3 - Congested Road Segments



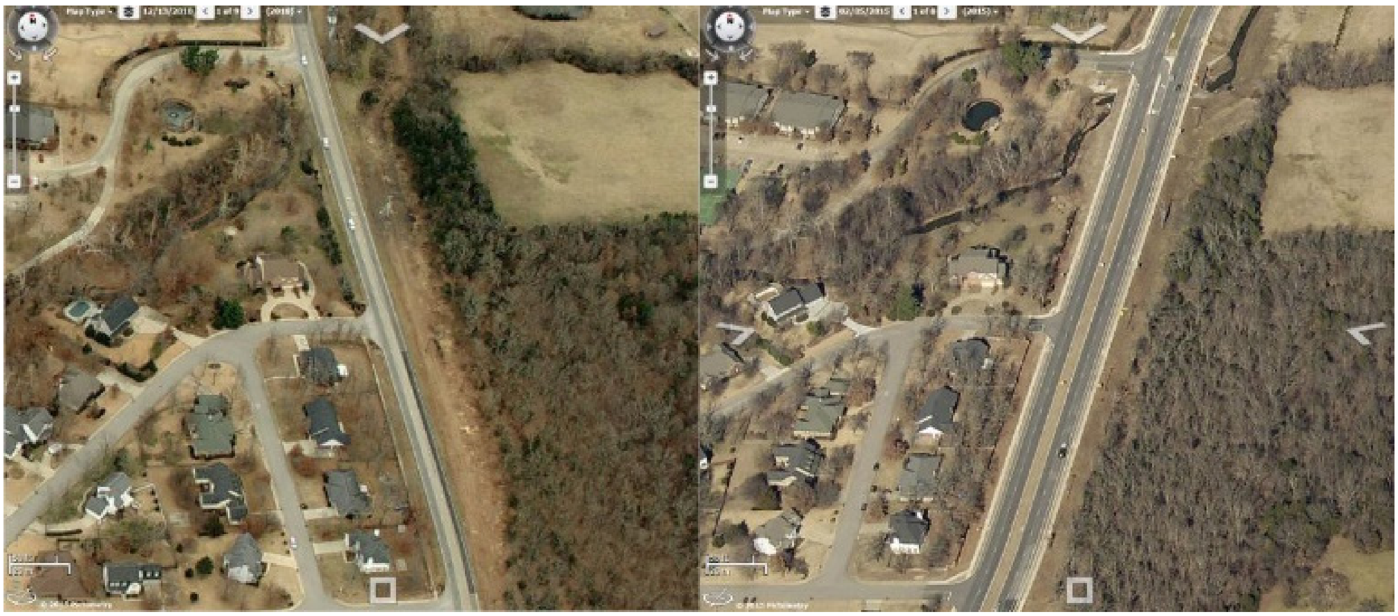
Map 8.4 - Congested Road Segments by Functional Class

CONGESTION MANAGEMENT STRATEGIES

Access Management

Access management is accomplished in a variety of ways such as managing the design of access points, the location of access points, the number of access points allowed within a given distance (access density), and the roadway median treatment. Generally, the number of access points is minimized and regularly spaced from each other so that conflict points are separated.

2013 **2015**



Highway 265 Access Management Plan – 3-lane Undivided to 4-lane Divided Median Boulevard, Bike Lanes, and Sidewalks

Signal Timing

Signal timing improvements are a relatively inexpensive way to make significant improvements on a transportation network. Improved signal timing can decrease delay by appropriately allocating green time among competing phases. This allows more traffic to pass through the signal with less delay. By adjusting cycle lengths and offsets, drivers can travel longer distances along a corridor before having to stop for a red light. This decreases travel time and improves air quality. Both signal timing optimization and traffic signal progression are low cost improvements to make the best use of existing capacity and optimize allocation of funding. The cost for a signal timing improvement project varies depending on the number of traffic signals, the controller capabilities, the location of the traffic signals and adjacent signals, the number of timing plans required, and implementation and fine-tuning needs. Adaptive signal control as has been implemented along Hwy. 71B in Springdale and Rogers and Hwy. 62 in Rogers and will be more expensive per intersection than just occasional signal optimization, but depending on the application, may be cost effective in the long run.

Signal timing is an area that deserves attention within the region to allow maximum efficiency of the existing system before costly widening to add capacity. The results will be very evident as has been demonstrated previously with localized projects. A regional perspective would produce consistent travel time runs even when crossing from one city/agency to another.

As transportation funding continues to be limited, operations are being highlighted by many regions across the country. It has been clearly proven locally and nationally that operational improvements provide the highest benefit/cost ratio and on a regional scale as compared to local capacity projects that benefit a smaller portion of the area.

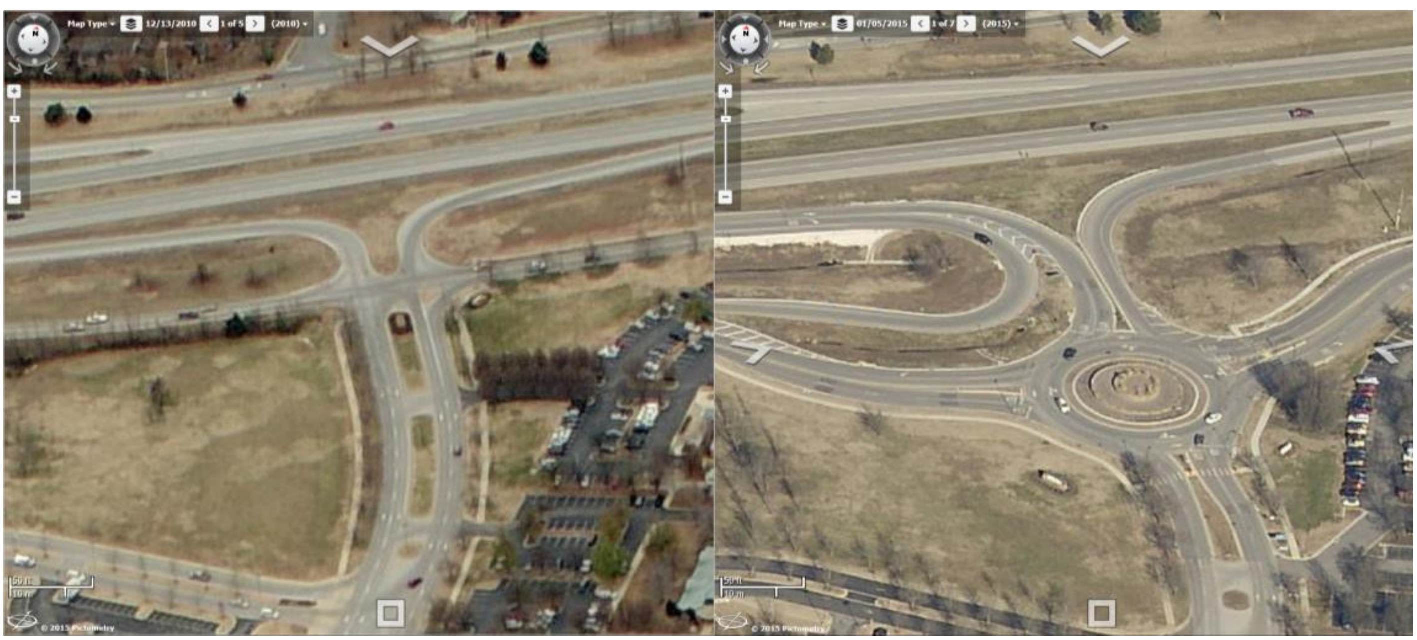
Data collection, development of a model for each desired timing plan, signal timing optimization, and implementation can be accomplished along a corridor for around $3,000 per intersection (not including any necessary hardware in the signal cabinet).

The methods will vary as to how to accomplish the desired results depending on the signal hardware currently in place and the expansion capabilities. It can be as simple as installing a GPS clock at each intersection ($500) to synchronizing the controller clocks, to more advanced systems where each intersection needs vehicle detection ($15,000) and wireless communications ($2,500) between signals. Either way, the benefit/cost ratio of this type of work is unmatched in today's funding environment.

Intersection and Interchange Geometrics and Control

Adding signals or roundabouts, when warranted, may be an improvement at all-way stop intersections or intersections with heavy major-street and cross-street traffic. This reduces delay for previously stop-controlled movements but may increase delay for movements that were not controlled. As traffic volumes increase, traffic signals or other types of intersection design such as roundabouts or continuous flow intersections should be considered to efficiently move traffic. Local intersection improvements also can result in big reductions in delays through bottleneck mitigation. Local improvements include geometric changes related to increased queue storage to channelized right turns and overlapping signal phases.

2010 **2015**



Fulbright Expressway - Northhills Boulevard - Futrall Drive Roundabout

2010 2015

Fayetteville Flyover/Fulbright Expressway

Incident Management

Non-reoccurring congestion based on traffic incidents (crashes) can account for up to 25 percent as the source of congestion. Incident management plays a large roll in reducing delays and secondary incidents. By identifying incidents early and having quick responses from tow trucks available in close proximity that may be stationed or roving, clearing of incidents helps traffic return to normal operations as quick as possible.

Safety Projects – Roadway Departures, Grade Separated Bicycle and Pedestrian Crossings

Safety projects reduce crash rates and the severity of crashes. The region should continue to deploy rumble strips as needed, cable median barriers, enhanced signing at curves and high friction pavements to reduce crash rates on the CMP network. Additionally, two Razorback Regional Greenway trail crossings have been grade separated (MLK/Hwy 180, and S. Walton Blvd./Hwy. 71B) on the CMP network which improves the safety and reliability of both systems.

2010 2015

I-49 Cable Median Barrier Project, Springdale, AR

AHTD is installing approximately 600 miles of cable barrier installations statewide. Within the MPA, AHTD has installed approximately 46 miles of cable barrier with 24 miles of cable barriers along I-49 between Fayetteville and Bentonville (Table 8.2). The safety project was completed in 2012 between Fayetteville and Rogers. AHTD reported that from 2007 to 2011, before the cable barriers were installed, there were 17 serious median crossover crashes that resulted in 10 fatalities along I-49, an average of two fatalities per year. In areas where I-49 is being widened, a concrete barrier wall will preplace the cable median barrier.

Jobs Completed/Under construction/Programmed			
County	**Location**	**Length**	**Total Length**
Benton	Hwy 71, Section 190, LM 0 - 5.5	5.5	25.97
	Hwy 412, Section 010, LM 4.83 - 13.64	8.81	
	I-49, Section 050, LM 74.19 - 85.85	11.66	
Washington	Hwy 71, Section 160, LM 22.39 - 23.32	0.93	18.54
	Hwy 412, Section 020, LM 0 - 2.49	2.49	
	I-49, Section 040, LM 40.2 - 41.13	0.93	
	I-49, Section 040, LM 60 - 60.56	0.56	
	I-49, Section 040, LM 60.56 - 74.19	13.63	

Table 8.2 - Cable Barrier Jobs

2010 2015

MLK Blvd - Razorback Regional Greenway Pedestrian and Bicycle Underpass

Capacity

Roadway widening is necessary where traffic signal timing and access management are unable to provide enough capacity for heavy traffic volumes. Some segments may improve in the short term with optimized signal timing, but may ultimately warrant additional capacity through widening. Widening could include adding a through lane for a long section of road, or providing turn lanes at intersections. Capacity improvements on I-49 (widening) and designing urban interchanges to accommodate anticipated traffic continues to be a priority for the region.

2010 2015

Don Tyson Parkway Interchange/I-49

TRANSPORTATION DEMAND MANAGEMENT (TDM)

TDM (also known as Mobility Management) is a general term for various strategies that increase transportation system efficiency. TDM treats mobility as a means to an end, rather than an end in itself, and so helps individuals and communities meet their transport needs in the most efficient way, which often reduces total vehicle traffic. TDM prioritizes travel based on the value and costs of each trip, giving higher value trips and lower cost modes priority over lower value, higher cost travel, when doing so increases overall system efficiency. It emphasizes the movement of people and goods, rather than motor vehicles, and so gives priority to public transit, ridesharing and non-motorized travel, particularly under congested urban conditions.

There are many different TDM strategies with a variety of transportation impacts. Some improve the transportation options available to consumers. Some cause changes in trip scheduling, route, destination or mode. Others reduce the need for physical travel through more efficient land use, or transportation substitutes such as telecommuting. TDM is an increasingly common response to transport problems. Although most individual TDM strategies only affect a small portion of total travel, the cumulative impacts of a comprehensive TDM program can be significant.

TRANSIT ORIENTED DEVELOPMENT (TOD)

Urban designers and planners who advocate more infill and compact development suggest TOD as one alternative. TOD is compact, walkable development occurring within one-half mile of a transit stop. In general, transit oriented developments include a mix of uses, such as housing, shopping, employment, and recreational facilities within a design that puts a high priority on accommodating transit, pedestrians and bicycles. Besides providing direct access to transit, transit oriented developments can offer a variety of destinations close to one another, making it possible to move around without exclusive reliance on a car. If possible, transit oriented developments should incorporate an attractive public area —for example, streets with trees, furniture, and plazas—to encourage pedestrian activity.

Opportunities for TOD in Northwest Arkansas may include downtown locations in large and small cities. Also, locations near major freeways, such as I-49, might be adaptable to TODs should bus rapid transit become available.

Proponents of TOD maintain that people living within walking distance of public transit can reduce their transportation costs considerably by becoming a one-car family and driving less.

Dickson Street in Fayetteville

Lower transportation costs, according to TOD advocates, can offset the higher housing costs of living in an urban neighborhood. Urban neighborhoods tend to have high housing costs but lower transportation costs. Current mortgage assessments only consider housing costs and treats automobile ownership as a financial asset rather than a liability, encouraging homebuyers to choose automobile-dependent locations. Higher density, location-efficient development creates a more neutral housing market.

Even though there may be many benefits with TOD, there are also many obstacles to their development. Neighborhood groups usually oppose high-density developments that might attract more traffic. Local development codes around transit stations usually favors low-density, auto-oriented uses. Mixed-use, higher density projects with reduced amounts of parking (such as in TOD) can significantly increase risks for developers and financers. TOD can be more costly, and can be subject to more regulations and more complex local approval processes, as compared to conventional automobile oriented development. Lenders typically have concerns about financing mixed-use projects or those with lower parking ratios as with TOD.

Given the listed potential advantages of TOD and the possible funding sources the region should consider how such developments might be encouraged in Northwest Arkansas.

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

ITS is the application of advanced sensor, computer, electronics, and communication technologies and management strategies—in an integrated manner—to improve the safety and efficiency of the surface transportation system.

ITS covers a broad range of wireless and wireline communications-based information, control and electronics technologies. When integrated into the transportation system infrastructure, and in vehicles themselves, these technologies help monitor and manage traffic flow, reduce congestion, provide alternate routes to travelers, enhance productivity, and save lives, time and money. Intelligent Transportation Systems provide the tools for transportation professionals to collect, analyze, and archive data about the performance of the system during the hours of peak use. Having this data enhances traffic operators' ability to respond to incidents, adverse weather or other capacity constricting events.

Examples of Intelligent Transportations Systems include:

Advanced Traveler Information Systems deliver data directly to travelers, empowering them to make better choices about alternate routes or modes of transportation. When archived, this historical data provides transportation planners with accurate travel pattern information, optimizing the transportation planning process.

Advanced Traffic Management Systems employ a variety of relatively inexpensive detectors, cameras, and communication systems to monitor traffic, optimize signal timings on major arterials, and control the flow of traffic.

Incident Management Systems, for their part, provide traffic operators with the tools to allow quick and efficient response to accidents, hazardous spills, and other emergencies. Redundant communications systems link data collection points, transportation operations centers, and travel information portals into an integrated network that can be operated efficiently and "intelligently."

ITS Regional Architecture Development

The FHWA issued a final rule to implement Section 5206(e) of the Transportation Equity Act for the 21st Century (TEA-21) in January 2001. This final rule requires that ITS projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards.

To meet these requirements and ensure future Federal funding eligibility for ITS, NWARPC in conjunction with the AHTD initiated the development of a Regional ITS Architecture and Deployment Plan. The Regional ITS Architecture provides a framework for ITS systems, services, integration, and interoperability, and the Regional ITS Deployment Plan identifies specific projects and timeframes for ITS implementation to support the vision developed by stakeholders in the Architecture.

The NWARPC in conjunction with local stakeholders and the consulting firm Kimley Horn developed the Regional ITS Architecture and Deployment Plan in 2006 and 2007. A kick off meeting was held on September 14, 2006 and numerous meetings and workshops followed. The final ITS Regional Architecture and Deployment Plan was presented to the TAC and RPC Policy Committee on April 26, 2007. A process was initiated to amend the Architecture and Deployment Plan into the 2030 Northwest Arkansas Regional Transportation Plan. The TAC and Policy Committee met on May 24, 2007 and voted in favor of the amendment.

Some of the benefits of the Regional ITS Architecture are:

- Allows ITS implementation to be efficiently structured.
- Builds a foundation for explicitly incorporating operations and management into decision-making.
- Encourages stakeholder buy-in.
- Assists in estimating funding needs.
- Serves as a tool for education/regional information exchange.
- Assists in identifying gaps in existing services.

The Regional ITS Architecture and Deployment Plan was evaluated in early 2011 and was retained without any changes as a part of the 2035 Northwest Arkansas Regional Transportation Plan.

A committee was established to evaluate the Regional ITS Architecture and Deployment Plan as a part of the 2040 NWA Metropolitan Transportation Plan update process. The committee met on October 15, 2015 and November 19, 2015. As a result of the work of this committee, the following updates were made to the Regional ITS Architecture and Deployment Plan as it is retained in the 2040 Northwest Arkansas Regional Transportation Plan:

- The Geographic Boundary was expanded to include the part of Missouri that is in the MTP Study Area.
- The ITS Stakeholder List was updated as shown in Tables 8.3A and 8.3B.
- AHTD, the cities, and transit agencies have implemented significant ITS projects in the last five years as shown in the following summary. Since the implementation of ITS technologies is not fully complete in each project category, the Regional Priorities have remained unchanged from the original document.

A brief summary of Regional Priorities from the ITS Deployment Plan:

- Continue municipal and county traffic signal system coordination and signal equipment upgrades.
- Continue pursuit of DMS deployment on I-49.
- Transit agencies will continue implementation of vehicle tracking and traveler information deployments.
- AHTD will continue deployment of the I Drive Arkansas system.

An additional favorable outcome of the Management and Operations Committee was the determination to begin meeting on a regular basis to discuss ITS progress and challenges such as signal coordination between cities and signal preemption issues.

NORTHWEST ARKANSAS ITS ACCOMPLISHMENTS 2010-2015:

Razorback Transit:

- Vehicle AVL System for operational data collection.
- Implemented Electronic Vehicle Inspection and Remote Diagnostics Solution.
- Transit Station and Maintenance Facility Security Cameras.
- Fixed Route Stop Annunciators.
- Implemented Real Time Passenger Information System (Mobile Real Time Route Tracking and Alert Notification).
- Installed Security Cameras in all revenue service vehicles.
- Digital Route Departure Board in Union Station.

Ozark Regional Transit:

- Installation of vehicle AVL.
- Installation of voice annunciator.
- Installation of on-board cameras.
- Installation of facility cameras.
- Installation of fixed route mobile application.
- Installation of web portal.

Bentonville:

- Hired Traffic Engineering Consultants annually to coordinate 22 traffic signals along three main corridors, with TACTICS Central Traffic Management Software.
- Worked with AHTD to coordinate a corridor of three traffic signals that adjoin a TEC coordinated corridor and a neighboring community.
- Worked with AHTD to coordinate a corridor of four signals with TACTICS Central Traffic Management Software using their Traffic Responsive technology.
- Used the server based TACTICS Central Traffic Management Software for reporting, once per second controller status, controller database management, coordination control, traffic responsive, diagnose and correct malfunctions remotely. TACTICS sends instant messaging to the technicians on major malfunctions and power outages for quicker response.
- GPS Emergency Vehicle Preemption installed in 38 traffic signals, the full fleet of 25 Fire Department vehicles and one Transportation Department vehicle.
- The server based Opticom Central Management Software is used for monitoring, maintaining, data logging,

reporting, diagnosing and troubleshooting all preemption equipment remotely.
- Battery Backup Systems installed at all traffic signal locations. This BBS will operate on battery power for a minimum of eight hours.
- Use fiber communication with one Gbit Ethernet throughout City traffic signals with over four miles of fiber installed and maintain over 215 pieces of equipment with an IP Address.
- Have 33 traffic signals with 200 video feeds for live video and recording over the fiber communications and used in the Traffic Management Center, with Video Management Software. The video wall has eight large format monitors for displaying live or recorded video.
- Assist the Police Department with the Video Management Software recording cameras for a large variety of Police matters.
- Assist the City Planning Department with collecting and compiling traffic count data from the video detection software.

Rogers:
- The City of Rogers implemented adaptive signal technology on approximately one-third of its signal network and has installed radio communication equipment in approximately one-half of its signal network.

Fayetteville:
- Expanding/upgrading the wireless communication system to 100 traffic signals to an IP based network. Currently 58 percent are updated and all new construction meets those requirements. All signals are connected to the central office.
- Approximately 36 percent of the City's signals are involved in coordination systems at various times of the day. There are nine subsystems on five arterial corridors. All are by time-based coordination settings.

Springdale:
- Has adaptive signal technology on 18 intersections which is approximately 25 percent of their signals.
- Added wireless communications to 31 intersections and have fiber to 10 intersections, and over 50 percent of City intersections have high speed communications.

Arkansas Highway and Transportation Department:
- Implemented the I Drive Arkansas system.

Tables 8.3A and Table 8.3B include the Northwest Arkansas Stakeholder Agencies and Contacts:

Hwy. 12 Regional Airport Intersection

Stakeholder Agency	Address	Contact	Phone
Arkansas Highway Patrol	P.O. Box 6633 Springdale, AR 72766	Capt. Lance King	479-751-6663
AHTD District 4	PO Box 1424 Ft. Smith, AR 72901	Chad Adams	479-646-5501
AHTD District 9	P.O. Box 610 Harrison, AR 72601	Mitchell Archer	870-743-2100
AHTD Transportation Planning & Policy Div.	10324 Interstate 30 Little Rock, AR 72209	Paul Simms	501-569-2100
Benton County	1206 SW 14th Street Bentonville, AR 72712	Bob Clinard	479-271-1000
Benton County	215 East Central Avenue Bentonville, AR 72712	John Sudduth	479-871-1096
Benton County Public Safety	215 East Central Avenue Bentonville, AR 72712	Marshal Watson	479-271-1004
Benton County Roads	1206 SW 14th Street Bentonville, AR 72712	Jeff Clark	479-271-1053
Benton County Sheriff's Office	1300 SW 14th Street Bentonville, AR 72712	Shawn Holloway	479-271-1008
City of Bentonville	305 Southwest A Street Bentonville, AR 72712	Brian Bahr	479-271-5997
City of Bentonville	117 West Central Bentonville, AR 72712	Mike Churchwell	479-271-6840
City of Bentonville	117 West Central Bentonville, AR 72712	Bob McCaslin	479-271-5966
City of Bentonville Fire Department	211 S.W "A" Street Bentonville, AR 72712	Brent Boydston	479-2713151
City of Bentonville Police Department	908 SE 14th Street Bentonville, AR 72712	Jon Simpson	479-271-3170
City of Fayetteville	113 West Mountain Fayetteville, AR 72701	Brad Anderson	479-575-8376
City of Fayetteville Fire Department	303 W. Center St. Fayetteville, AR 72701	Brian Sloat	479-575-8365
City of Fayetteville Police Department	100-A West Rock Street Fayetteville, AR 72701	Greg Tabor	479-587-3555
City of Fayetteville School District	PO Box 849 Fayetteville, AR 72702	Tommy K. Davenport	479-444-3095
City of Lowell	PO Box 979 Lowell, AR 72745	Eldon Long	479-770-2185
City of Lowell	PO Box 979 Lowell, AR 72745	Kris Sullivan	479-770-2185
City of Pea Ridge	PO Box 10 Pea Ridge, AR 72751	Jackie Crabtree	479-451-1100
City of Prairie Grove	PO Box 1275 Prairie Grove, AR 72753	Sonny Hudson	479-846-2961
City of Rogers	301 West Chestnut Rogers, AR 72756	Nathan Becknell	479-621-1186
City of Rogers Police Department	1905 South Dixieland Rogers, AR 72758	Hayes Minor	479-636-4141
City of Rogers Street Department	3101 West Oak Street Rogers, AR 72758	Frankie Guyll	479-621-1140
City of Siloam Springs Planning Department	P.O. Box 80 Siloam Springs, AR 72761	Ben Rhoads	479-238-0932
City of Siloam Springs Engineering Department	P.O. Box 80 Siloam Springs, AR 72761	Justin Bland	479-238-0927

Table 8.3A - NWA Stakeholder Agencies and Contacts

Stakeholder Agency	Address	Contact	Phone
City of Siloam Springs Traffic Department	P.O. Box 80 Siloam Springs, AR 72761	Glen Severn	479-524-3777
City of Springdale Public Works	269 East Randall Wobbe Springdale, AR 72764	Sam Goade	479-750-8135
City of Springdale Police Department	201 N. Spring Street Springdale, AR 72764	Mike Peters	479-751-4542
J. B. Hunt Transport Services, Inc.	615 JB Hunt Corporate Drive Lowell, AR 72745	Greer Woodruff	479-820-0000
Northwest Arkansas Regional Airport	One Airport Boulevard Bentonville, AR 72712	Scott Van-Landingham	479-205-1000
Northwest Arkansas Regional Planning Commission	1311 Clayton Street Springdale, AR 72762	Celia Scott-Silkwood	479-751-7125
Northwest Arkansas Regional Planning Commission	1311 Clayton Street Springdale, AR 72762	Tim Conklin	479-751-7125
Ozark Regional Transit	2423 East Robinson Avenue Springdale, AR 72764	Joel Gardner	479-361-8742
Razorback Transit University of Arkansas	240 Eastern – Bus B Fayetteville, AR 72701	Gary Smith	479-575-3304
University of Arkansas Facilities Management	521 S. Razorback Road Fayetteville, AR 72701	Mike Johnson	479-575-6601
Washington County Road Department	280 North College Av Fayetteville, AR 72701	Charles Ward	479-444-1610
Washington County Department of Emergency Management	2615 Brink Drive, Suite 104 Fayetteville, AR 72701	John Luther	479-444-1722
Washington County Sheriff's Department	1155 Clydesdale Drive Fayetteville, AR 72701	John Moore	479-444-5700
Frontier MPO	P.O. Box 2267 Fort Smith, AR 72901	Dianne Morrison	479-785-2651
HWA Arkansas Division	700 W. Capital Room 3130 Little Rock, AR 72201	Amy Heflin	501-324-6435
Missouri Department of Transportation	3025 E. Kearny Springfield, MO 65803	Frank Miller	417-895-7727

Table 8.3B - NWA Stakeholder Agencies and Contacts

PERFORMANCE MANAGEMENT AND SYSTEM MEASURES

MAP-21/FAST Act established a performance and outcome-based program. NWARPC, AHTD and MoDOT are required to develop plans and programs that help achieve the national goals for (1) Safety, (2) Infrastructure Condition, (3) Congestion Reduction, (4) System Reliability,(5) Freight Movement and Economic Vitality, (6) Environmental Sustainability, and (7) Reduced Project Delivery Delays.

Over the next several years, final rules on performance measures and targets will be published by FHWA and FTA. MoDOT, AHTD, and NWARPC will continue to work together to identify measures and develop systems/methodologies to implement performance-based transportation planning and programming.

NWARPC 2040 MTP Goals		Potential 2040 MTP System Measures
Preserve and Maintain Infrastructure	Maintain the existing and planned transportation system through ongoing maintenance, rehabilitation, reconstruction, and/or preservation.	Bridge Condition on NHS Pavement Condition on NHS Transit Bus/Fleet Age/Condition
Improve safety	Increase transportation safety for all modes of travel	Serious Injures per VMT Fatalities per VMT Number of Serious Injuries per 100K Pop Number of Fatalities per 100K Pop
Reduce Congestion Improve Reliability	Maximize the capacity and reliability of existing facilities on regionally significant routes and minimize the need for new roadways.	Volume Delay Per Mile on CMP Congestion Index on CMP Travel Time Index on CMP
Improve Regional Mobility	Increase transportation mobility and accessibility for both persons and freight, thus promoting economic vitality in the region.	Miles of Complete Streets Miles of roadways with Access Management Number of Bike and Pedestrian Catalyst Projects Miles of improved Arterial Network % population served by public transit with 1/4 mile Unlinked Trips per Passenger Mile (Transit, NTD) Unlinked Trips per Revenue Hour (Transit, NTD)
Protect the Environment	To enhance the performance of the transportation system while protecting and enhancing the natural environment.	Number of Jurisdictions with drainage criteria manuals Number of jurisdictions with Karst BMP's Cave Springs Recharge Area

SAFETY

Safety of the transportation system is one of the national goals and a performance measurement area under MAP-21/FAST Act. Safety currently is measured nationally, by individual state, and by county based on data reported to the States and U.S. DOT. Safety performance is generally measured by calculating the fatality and serious injury rates of the system based on vehicle miles of travel (VMT) and 100,000 population.

Travel is measured as vehicle miles of travel (VMT) and is calculated and published each year by AHTD in the Road and Street Mileage Report. This annual calculation is based on the Annual Average Daily Traffic (AATD) counts and mileage of the transportation system (AADT x Length of the roadway system = Vehicle Miles of Travel).

The rate of fatalities is generally expressed as rate per 100,000 population and as 100 million annual vehicle miles of travel (100 million VMT). These rates are generally compared to the U.S., State, and other counties.

NWARPC has provided the fatality and serious injury rates expressed in per 100,000 population and 100 million VMT. The Arkansas portion of the MPA boundary (Benton and Washington County) is calculated as one rate and McDonald County is calculated separately utilizing the Fatality Analysis Reporting System (FARS) and the Arkansas State Police Database.

The rates shown should be viewed as a baseline data for the region in anticipation of future safety performance targets and performance measures as required by the final rule making by FHWA and FTA. NWARPC will work with its planning partners as AHTD, MoDOT, and NWARPC identify and develop safety performance targets and/or performance measures under MAP-21/FAST Act.

Safety Analysis

From 2009–2013, Benton and Washington County, Arkansas averaged 43 fatalities and 318 serious injuries each year. The total number of fatalities has ranged from 49 in 2011 to 33 in 2015.

Year	Fatalities	Rate per 100K
2009	48	394
2010	45	297
2011	49	313
2012	40	269
2013	33	317

Table 8.4 - Benton and Washington County Serious Injury and Fatalities

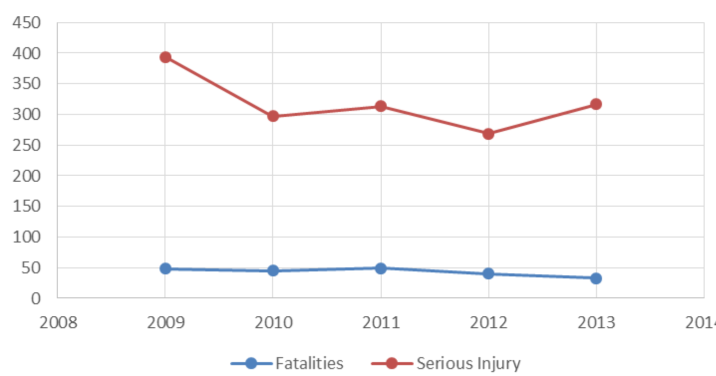


Figure 8.2 - Benton and Washington Counties Fatalities and Serious Injury 2009-2013

2013 Fatalities per 100,000 Population

Benton and Washington County fatal crash rate for 2013 was 7.27 per 100,000. The national rate for 2013 was 10.34 per 100,000 and the rate for Arkansas was 16.32 per 100,000. The last two years have seen a declining rate that is below the national average.

Year	Fatalities	Rate per 100K
2009	48	11.53
2010	45	10.54
2011	49	11.25
2012	40	9.00
2013	33	7.27

Table 8.4 - Benton and Washington Counties Fatalities and Rate per 100,000 Population 2009-2013

Figure 8.3 - Benton and Washington Counties Fatalities per 100,000 Population 2009-2013

Crash Rate per Vehicle Miles of Travel (VMT)

In 2013, Benton and Washington County fatalities per 100 million vehicles traveled was 0.84 which was below the national and state rate. The Arkansas rate was 1.44 fatalities per 100M VMT and the U.S. rate of 1.09 fatalities per 100M VMT.

Fatalities	Fatalities per 100M VMT		
Year	Benton& Washington Co.	Arkansas	U.S.
2009	1.34	1.8	1.14
2010	1.23	1.7	1.11
2011	1.33	1.67	1.1
2012	1.04	1.67	1.14
2013	0.84	1.44	1.09

Table 8.5 - Benton and Washington Counties, Arkansas and U.S. Fatalities per 100M VMT 2009-2013

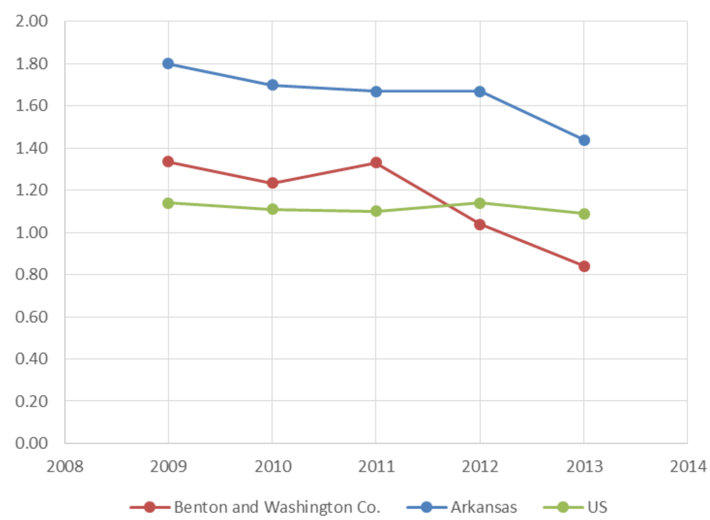


Figure 8.4 - Benton and Washington Counties Fatalities per 100M VMT 2009-2013

Arkansas and U.S. Rates

The Arkansas rates per 100 million VMT and 100K population have declined over the last four years but are still higher than the U.S. rate.

	Fatalities Per 100 Million VMT		Fatalities Per 100,000 Population	
	Arkansas	US	Arkansas	US
2010	1.7	1.11	19.54	10.67
2011	1.67	1.1	18.75	10.42
2012	1.67	1.14	18.99	10.75
2013	1.44	1.09	16.32	10.34

Table 8.6 - Benton and Washington Counties, Arkansas and U.S. Fatalities per 100M VMT, 2010-2013

Bicycle and Pedestrian Safety Analysis

This section reviews data for crashes involving pedestrians and bicyclists in Benton and Washington Counties (2009-2013), as reported by the Arkansas State Police.

There are approximately 75-110 reported crashes annually that have resulted in 245 or more injuries and 27 fatalities over the course of five years. While 2013 saw a dip, bicyclist crashes in particular appear to be trending upwards, perhaps reflecting the fact that bicycling is becoming more common. Additional data on the number of bicycle trips that took place each year would be needed to understand if the crash rate (i.e., crashes per bicycle trip) is going up or down.

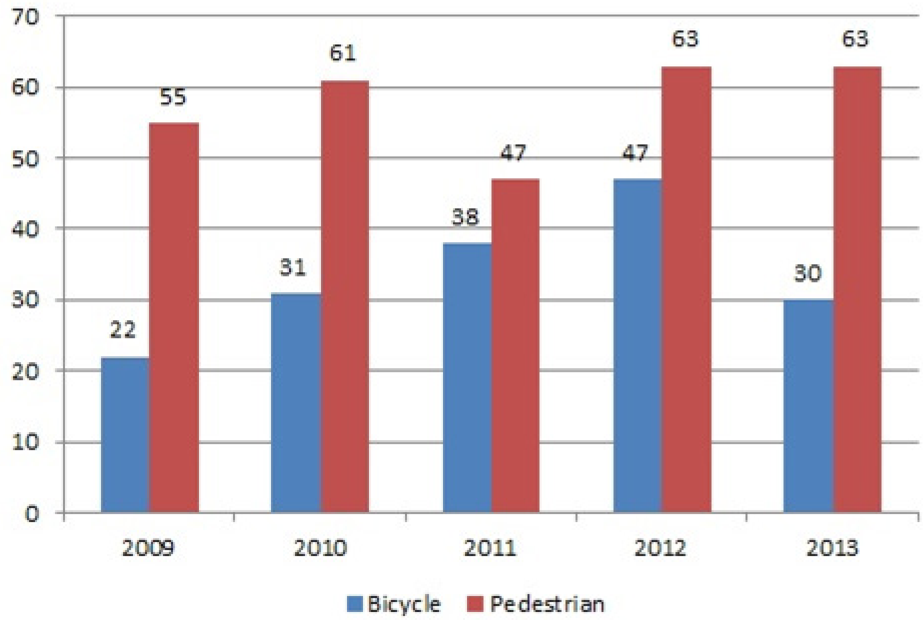


Figure 8.5 - Number of Bicyclist and Pedestrian Crashes (2009-2013) Benton and Washington County

Severity	Bicycle	Pedestrian	Total
Fatal Injury	2	25	27
Incapacitating Injury	14	42	56
Non-Incapacitating Injury	54	109	163
Possible Injury	63	71	111
Non-Injury/Property Damage Only	35	42	77
Grand Total	168	289	457

Table 8.7 - Number and Severity of Bicyclist and Pedestrian Crashes (2009-2013) Benton and Washington County

Opportunities for Improved Crash Data

The crash data provides only limited information to understand the nature of crashes involving pedestrians and bicyclists. Below are three categories that could be improved or added to the data to provide greater clarity and increase the ability to match appropriate countermeasures with particular safety issues:

There may be opportunities to change and increase use of the contributing factor field for collision reports. More than 40 percent of crashes listed the contributing factor as 'none' while over 10 percent listed the factor as 'unknown'. Common contributing factors are 'careless/prohibited driving' and 'failure to yield,' which yield little insight.

Similarly, the pedestrian action/location listed a response of "other" or "N/A" for 32 percent of pedestrian crashes and 65 percent of bicyclist crashes. Regular trainings with police officers can result in a higher response rate to this category for both bicyclist and pedestrian involved crashes.

Bicyclist and pedestrian crash maps

Map 8.5 and Map 8.6 illustrate the location and severity of reported bicyclist and pedestrian crashes in NWA.

These maps illustrate several themes:

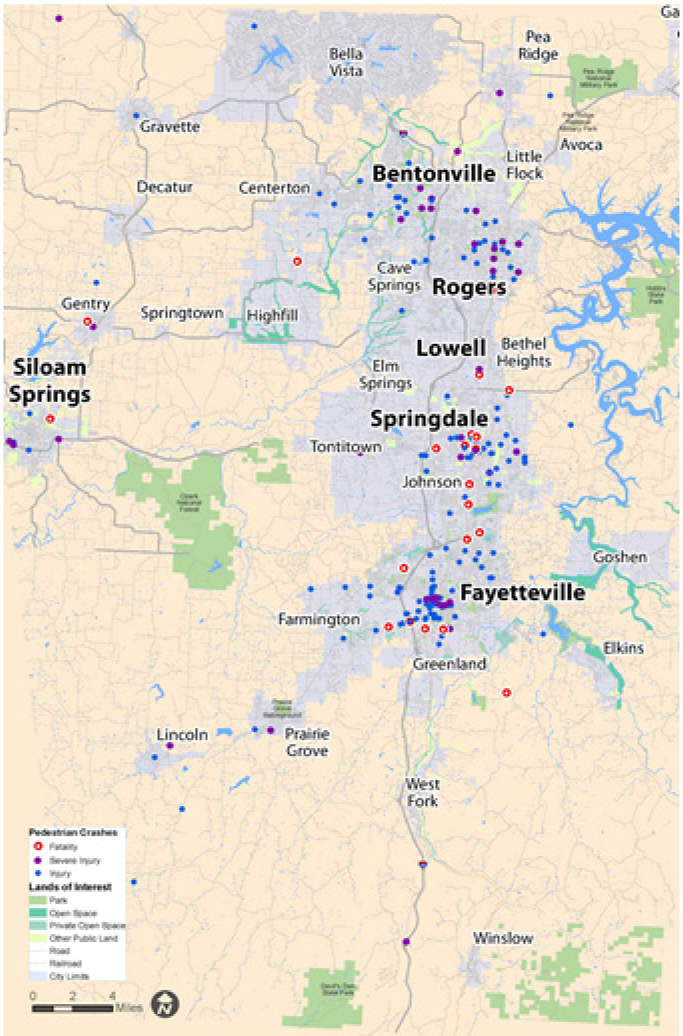
Downtown Centers – Clusters of bicyclist and pedestrian crashes are found in the downtown centers of Rogers, Springdale, and Fayetteville. Within these cities, there are many crashes along higher traffic corridors where bicyclists and pedestrians are likely attempting to access businesses, schools, and connect to residential areas. These higher crash corridors include:

- Walnut St., Dixieland Rd., and 8th St. in Rogers
- Thompson St. and Sunset Ave. in Springdale
- North St., Garland Ave., Razorback Rd., Maple St., Hwy. 71B, and Martin Luther King Jr. Blvd. in Fayetteville

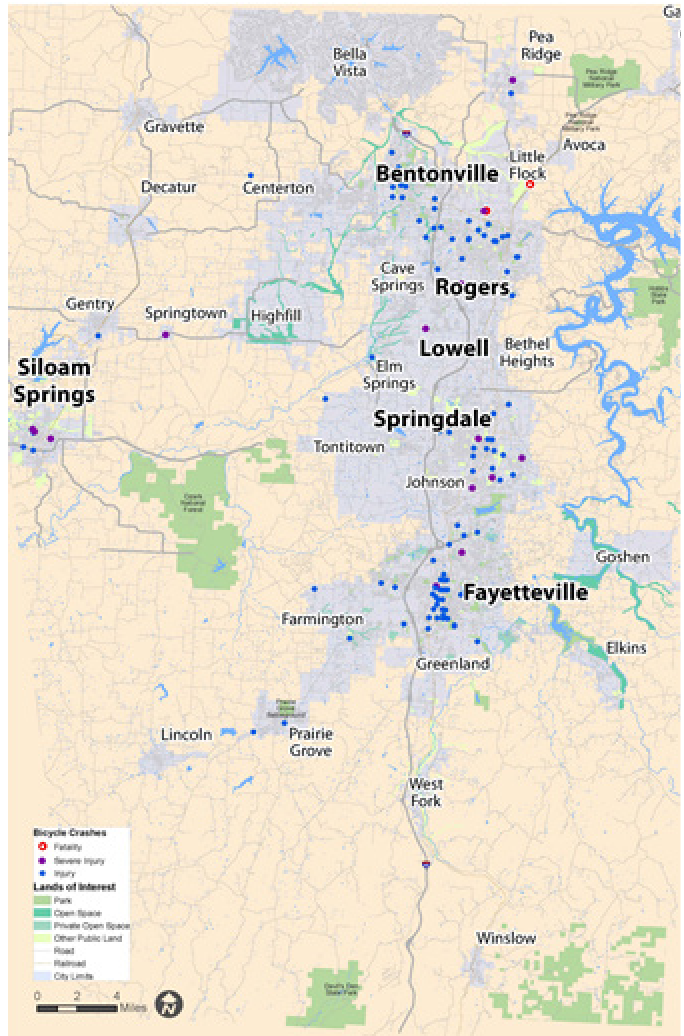
University of Arkansas – Thousands of students from the University of Arkansas, located in downtown Fayetteville, walk and bike to campus daily. The crash data highlights several corridors through campus where conflicts occur, with Garland Ave., Razorback Rd., Dickson St., Maple St., and Martin Luther King Blvd. each experiencing multiple crashes.

Arterial corridors – Northwest Arkansas has many wide, high traffic roads that are difficult to walk or bike along and which also serve as barriers that inhibit connectivity between adjacent areas that are more comfortable for walking and biking.

Several of these corridors have experienced multiple reported crashes, including Highways 71, 112, 62, and 412.



Map 8.5 - Pedestrian Crash Locations in NWA by Severity (2009-2013)



Map 8.6 - Bicyclist Crash Locations in NWA by Severity (2009-2013)

Statewide Safety Plans

State highway system safety is addressed through the Arkansas Strategic Highway Safety Plan – 2013 (AHTD) and the Arkansas Highway Safety Office (Arkansas State Police). Both plans have goals, performance measures, and specific strategies to reduce the number of fatalities and serious injuries rates on the state highway system.

Arkansas Strategic Highway Safety Plan's focus is "Toward Zero Deaths." This goal supports the national goal of a "Toward Zero Death" strategy. The 2013 plan is organized into primary, secondary and special emphasis areas with a focus on specific engineering, education, enforcement, and emergency services strategies to reduce the rate of fatalities and serious injuries.

The Arkansas State Police-Arkansas Highway Safety Office "coordinates a statewide behavioral highway safety program making effective use of federal and state highway safety funds and other resources to save lives and reduce injuries on the State's roads."

Primary Emphasis Areas	Secondary Emphasis Area
Roadway Departure	Pedestrians
Intersections	Bicyclists
Impaired Driving	Older Drivers
Aggressive Driving	Drowsy Driving
Distracted Driving	Large Commercial Vehicles
Younger Drivers	Work Zones
Safety Restraints	Railroad Crossings
Motorcycles	Emergency Services Capabilities
	Traffic Data Systems
	Safety Management System

The annual Highway Safety Plan is prepared by the Highway Safety Office and includes safety goals, objectives and recommended projects each year. The plan outlines the goal of reducing fatalities by "identifying driver behaviors that cause fatal crashes and targeting problem areas where fatal crashes occur." The plan has focused in areas of impaired driving, occupant protection and speed issues.