

Technical Memorandum

TO: Joel DeNunzio, P.E.
Residency Administrator
Charlottesville Residency

FROM: Jamison Brown
Traffic Engineer
Culpeper District Traffic Engineering

DATE: April 18, 2017

SUBJECT: Study Requests
Batesville, VA
Albemarle County



VDOT Northwest Regional Operations
Culpeper, VA
Traffic Engineering

Background

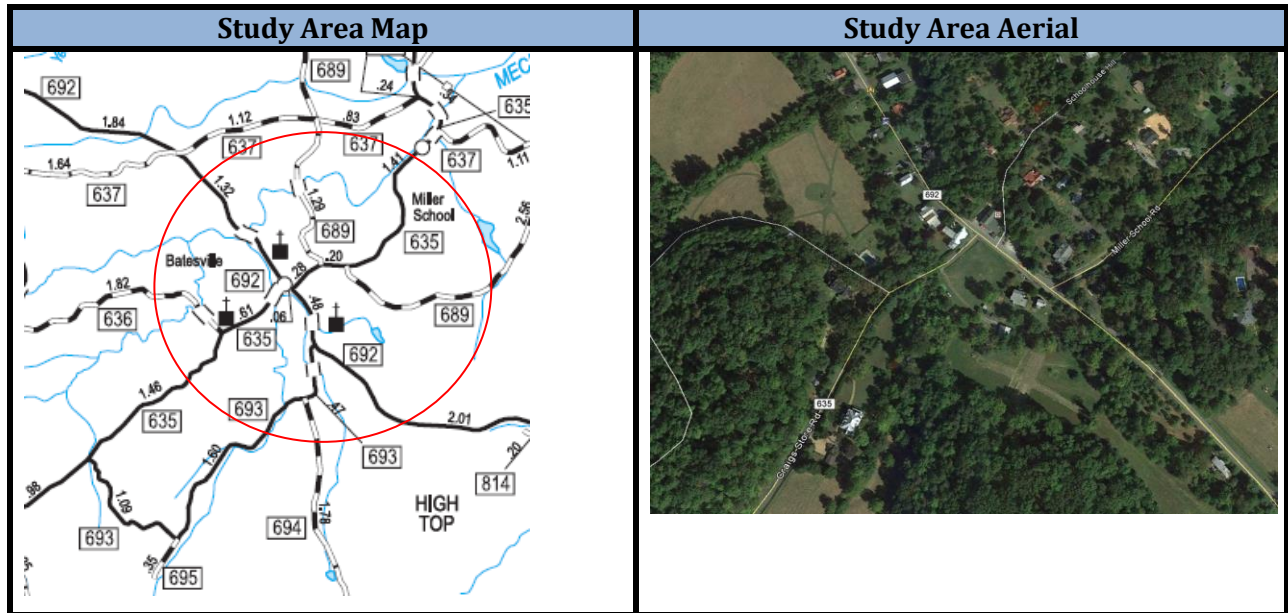
This study was performed in response to study requests for various traffic related items in Batesville, Virginia beginning in July 2016 and continuing until the current time. This report will provide an overview of each study request, findings and recommendations, and summaries. The requests in order of receipt are as follows:

1. Request for speed data on Routes 692 and 635 on July 5, 2016.
2. Request for speed humps to address truck noise between the hours of 5:30 and 6:00 AM on July 7, 2016.
3. Request for additional bridge signing for the 18 ton weight limit bridge on August 7, 2016.
4. Request for bicycle signing and pavement markings in October 2016.
5. Request for traffic calming via pavement markings in February 2017.
6. Request for revision of recommendations provided in February 2017.

Requests were answered in various ways and through various channels of communication. Recommendations for each are listed below.

1. Speed data was collected on July 26, 2016 and provided to the residency.
2. Communications with residency staff on July 7, 2016 provided information about traffic calming guidelines and the noise levels that speed humps create.
3. Additional bridge signing was installed on Route 29 on September 27, 2016.
4. It is not clear whether the recommendations from that study were ever shared with Residency staff. The memo related to the bicycle signing is attached, and its recommendations will be included in recommendations made in this report.
5. Installation of centerline was recommended via memorandum through a section that previously had only edgeline, likely by mistake. The section was recently resurfaced and had no markings.
6. This memorandum is intended to clear any confusion about outstanding requests and provide information gathered in previous and new reviews of the area for the residency's use in response to citizens.

Figure 1: Study Area Location



Note: Map is provided for illustrative purposes and might not accurately depict the most recent roadway conditions.

Existing Conditions

Volume Counts and Classification

Route 692, Plank Road, is a two lane rural major collector, as is Miller School Road. Route 635 south of Plank Road, Craig Store Road, is a rural minor collector. Published AADT information and truck percentages are available in Table 1 below.

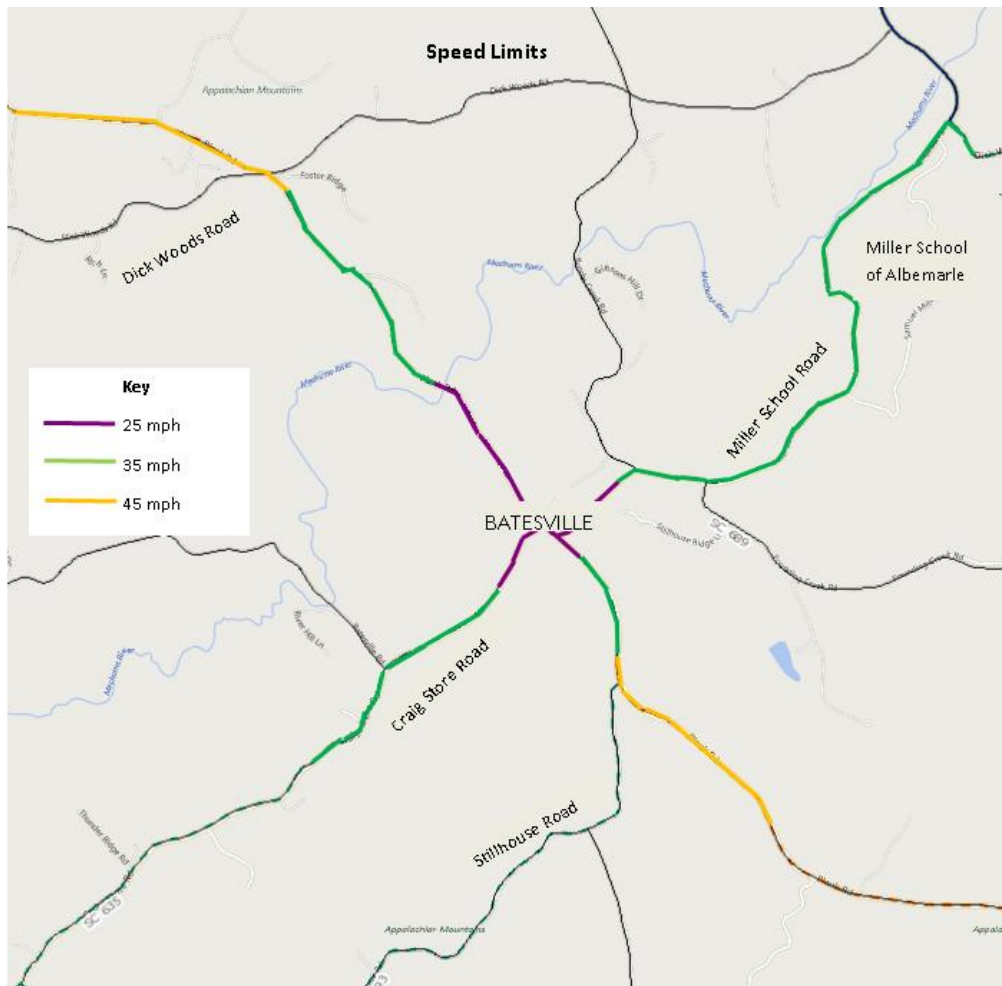
Table 1: Published AADT and Classification Data

Published AADT and Classification Data									
Route #	Route Name	Begin	End	Length (miles)	AADT (VPD)	Cars (%)	Trucks		
							2 Axle (%)	3+ Axle (%)	1 Trailer (%)
692	Plank Road	Ortman Road	Craig Store Road	3.24	810	93	1	5	1
692	Plank Road	Miller School Road	Monacan Trail	4.82	2000	93	1	5	1
635	Craig Store Road	Nelson County Line	Plank Road	4.66	500	97	1	1	1
635	Miller School Road	Plank Road	Dick Woods Road	2.01	1200	97	1	1	1

Speed Limits and Measured Speeds

Speed limits vary throughout the study area, and speed data was collected in the 25 mile per hour zones surrounding the Village of Batesville. Figures 3 and 4 outline the posted speed limits and the measured speeds of all vehicles and trucks. North of Miller School of Albemarle on Route 635, the speed limit changes to 50 miles per hour for cars and 45 miles per hour for trucks.

Figure 2: Posted Speed Limits



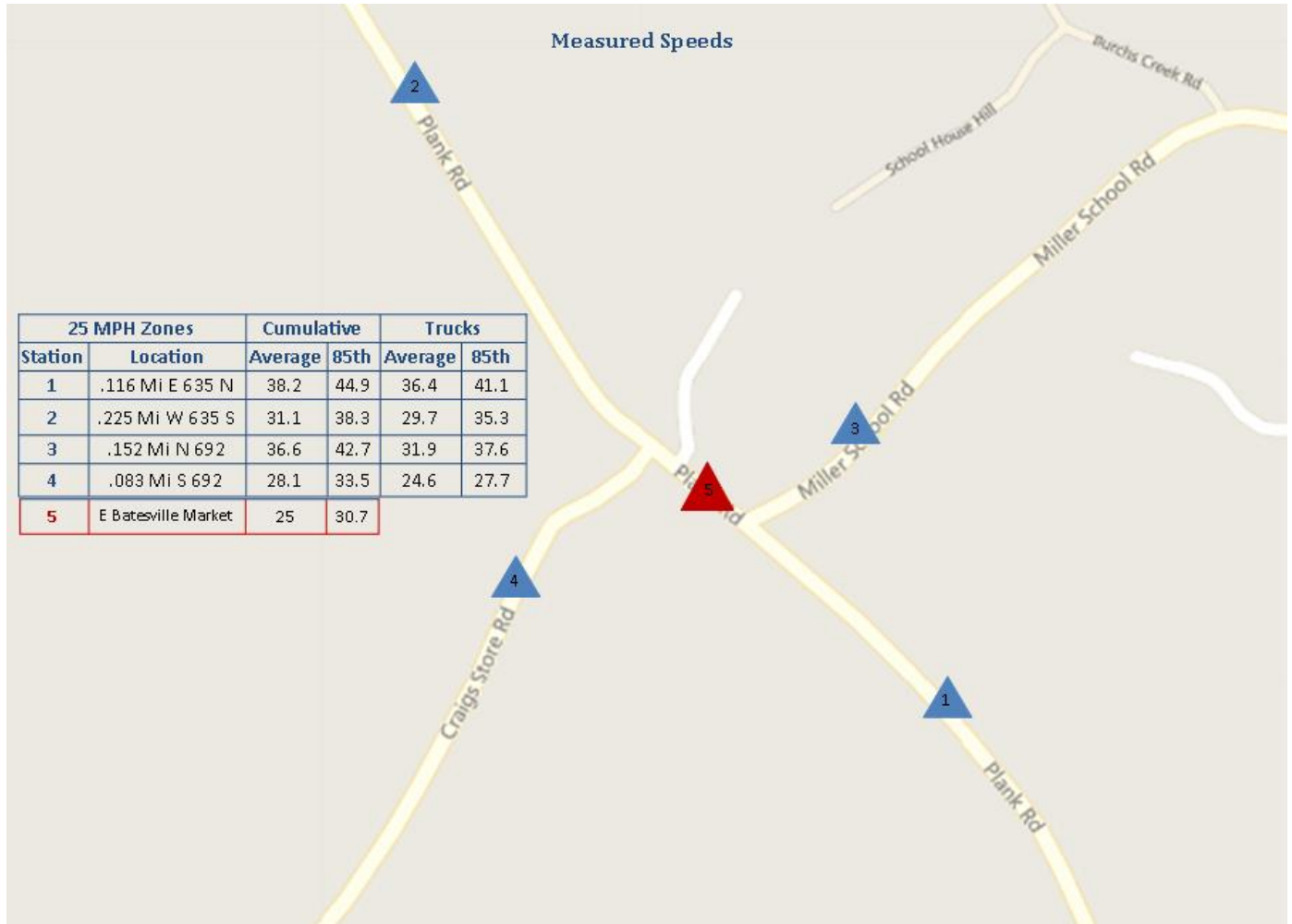
Data for Figure 3 was gathered on July 26, 2016 on each leg of Plank Road and Route 635. On average, the cumulative average speeds were 8.5 miles per hour above the posted speed limit of 25 miles per hour. Average truck speeds were lower than the cumulative total, but were still higher than the posted speed with the trucks averaging across all stations at 5.65 miles per hour above the speed limit. Note that on the Craig Store approach, trucks averaged below the speed limit. Average speeds were highest at station 1 on Plank Road east of Batesville and at station 3 on Miller School Road.

85th percentile speeds on average were 14.65 miles per hour over the posted speed limit for the cumulative data and 10.3 miles per hour higher than the posted speed for trucks. The MUTCD states that the speed limit should be posted within 5 miles per hour of the 85th percentile speeds, suggesting

that the speed limit on the outskirts of the Village of Batesville may be posted too low. Posted speeds lower than the 85th percentile speed do not increase compliance without frequent police enforcement.

Additional data, shown at station five, was taken on March 2, 2017. Data was not separated into cumulative and truck speeds and instead is available only as a cumulative value. Average speed on March 2 was 25 miles per hour and the 85th percentile speed was 30.68 miles per hour, suggesting that through the more developed area directly surrounding and encompassed by Craigs Store Road and Miller School Road, the posted speed limit is more appropriately posted than otherwise in the study area.

Figure 3: Measured Speeds



Roadway Characteristics and Roadside Development

Route 692 is a two-lane undivided route with alignment that generally follows the terrain. Plank Road is largely characterized by horizontal curves that may block sight distance from adjacent driveways and pavement widths that vary from 20-24'. North of Batesville on Plank Road is a bridge with a weight limit of 18 tons with guardrail and narrower pavement width than the rest of the route between Dick Woods Road and Stillhouse Road. There are no paved shoulders on the road and the grass shoulder varies in width from 0-4'. There are four state routes that intersect Plank Road in the study area: Dick Woods Road, Craig Store Road, Miller School Road, and Stillhouse Road. All are unsignalized and stop controlled

at the intersection. Most of the development in the area consists of single family homes with private or shared entrances surrounded by agriculture, with the exception of the area directly in Batesville. Batesville has a market, a post office, multiple homes and churches with parking strips adjacent to the roadway. According to the *Highway Capacity Manual*, access point density is the total number of active intersections and driveways on the right side of the road divided by the length of the segment. The HCM also states that a 3 mile (or longer) section should be used to calculate access density. There are approximately 30 entrances located within the 1.87 mile section between Dick Woods Road and Stillhouse Creek Road, with 22 entrances in the westbound direction and 18 entrances eastbound. Averaging the number of entrances on both sides gives an access density of 10.7 entrances per mile. At 11 entrances per mile, the access density development type could be considered Low-Density Suburban, but because the section used was shorter than the recommended three miles the access density is skewed higher in this area. Between Route 29 and Route 250, there are approximately 80 entrances and 10 field entrances, with rural access density of 9 entrances per mile.

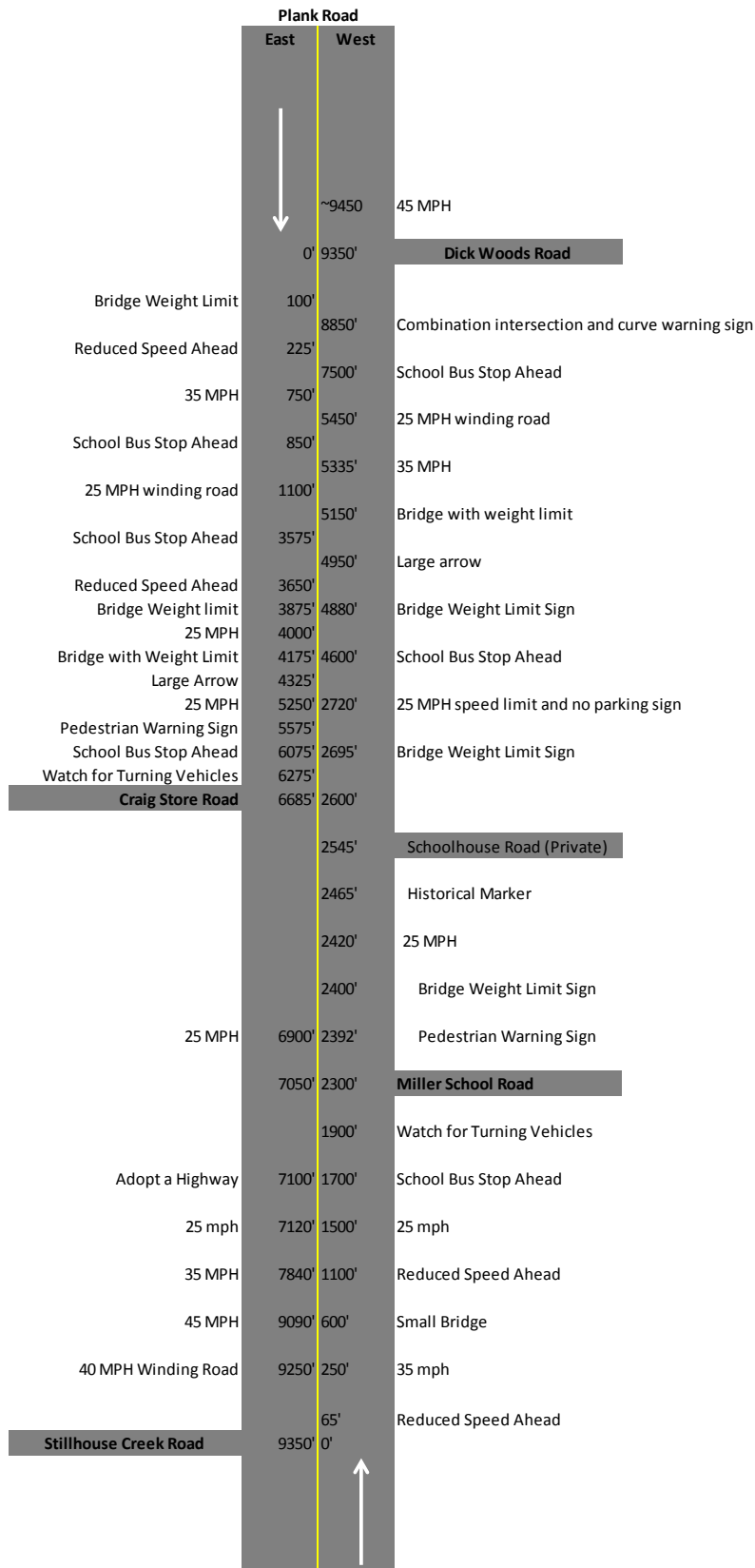
South of Plank Road, Craig Store Road is a narrow, winding route with no centerline or edgeline. Directly south of Plank, there is a one lane bridge. Miller School Road between Plank Road and Miller School of Albemarle is also narrow, winding, and rolling with curve warning advisory speeds as low as 15 miles per hour. The study area ends at Miller School of Albemarle, where Route 635 widens and has centerline and edgeline as it continues north to Route 250 and Crozet and the speed limit changes from 35 to 50 mph. Both sections of Route 635 are low access density with little volume, stop controlled intersections, and serve mainly as access to the single family homes on the routes.

Traffic Control Devices

Curves and intersections are clearly indicated on appropriate signs and the bridge weight limit has excellent signing around Batesville. Unfortunately, sign clutter is a major problem through the village, where signs are closely installed and regulatory bridge signs block speed limit signs. Street signs and Adopt-a-Highway signs that are barely legible are also installed and contribute to clutter. Miller School Road and Craig Store Road have adequate signing for their use and AADT, particularly on the southern portion of Miller School Road between Miller School of Albemarle and Plank Road.

The existing signing in and around Batesville on Route 692 can be viewed in Figure 4. Note that distances in the eastbound direction are provided from Dick Woods Road and in the westbound direction from Stillhouse Creek Road. No street name signs are shown, although each intersection shown has them.

Figure 4: Existing Signing

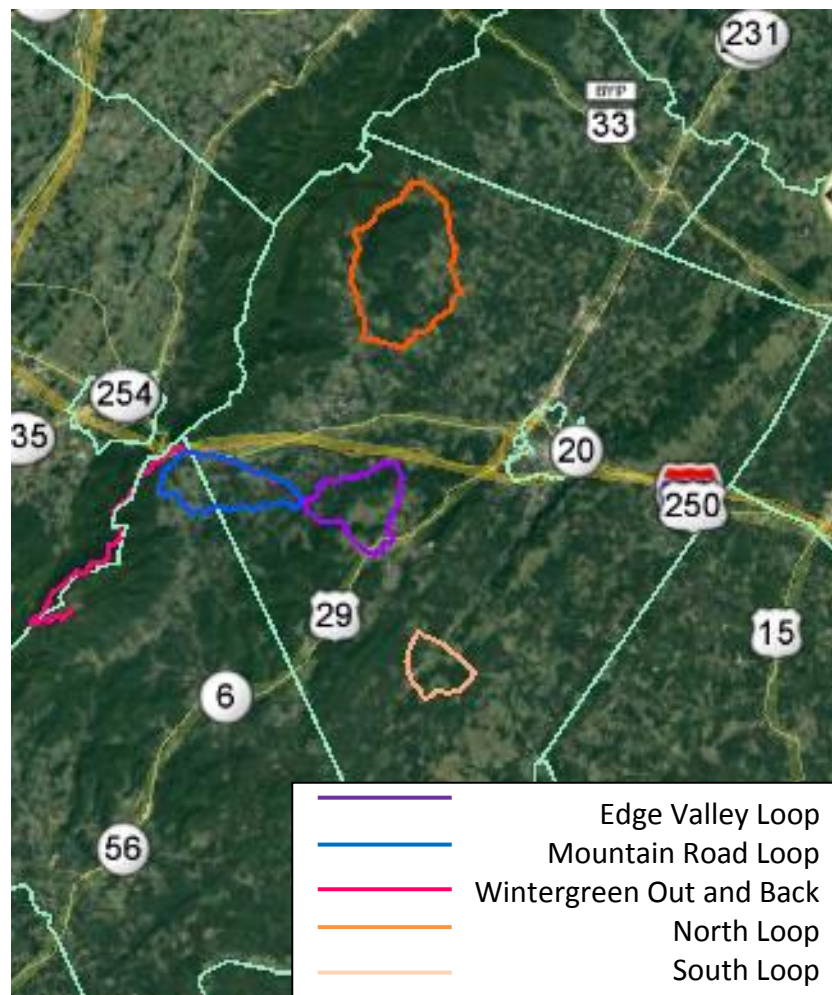


Bicycle and Pedestrian Activity

Field reviews have shown no evidence of bicycle activity in the study area, but Miller School of Albemarle is known to have a cycling program. Pedestrian activity seems to be limited to retrieving mail outside of the village due to the lack of trip generators and an easily traversable shoulder or sidewalk. In the village, pedestrians were present during multiple field reviews, mainly getting mail, or visiting the businesses or homes.

Communication with Miller School of Albemarle provided a list of common routes, shown below. The cycling team has 22 riders and four coaches, who ride the roads surround MSA 7 days a week. Cycling does not occur during freezing rain or snow. While the JV riders traditionally use gravel roads like Dick Woods Road and internal trails, the varsity team covers between 35 and 110 miles per day on public roads. The most common loop, and the loop used for the annual cycling competition, is the “Edge Valley Loop.” All other competitive events are held on school grounds.

Figure 5: MSA Frequent Bike Routes



The routes used for each of the cycling routes are listed below.

- Edge Valley Loop
 1. Dick Woods Rd,
 2. Taylor's Gap Road

- 3. Plank Road
- 4. Miller School Road
- Afton Mountain Road Loop
 - 1. Miller School Road
 - 2. Plank Road
 - 3. Route 250
 - 4. Old Turnpike Road,
 - 5. Route 6
 - 6. Mountain Road
 - 7. Tanbark Road
 - 8. Avon Road
 - 9. Batesville Road
 - 10. Ortman Road
 - 11. Plank Road
 - 12. Miller School Road.
- Wintergreen Out and Back
 - 1. Miller School Road
 - 2. Plank Road
 - 3. Route 250
 - 4. Old Turnpike Road
 - 5. Route 250
 - 6. Blue Ridge Parkway
 - 7. Beech Grove Road
 - 8. Wintergreen Drive to top
 - 9. Reverse Home
- North Loop
 - 1. Browns Gap Turnpike
 - 2. Free Union Road
 - 3. Millington Road
 - 4. Garth Road
- South Loop
 - 1. Plank Road
 - 2. Alberene Road
 - 3. Esmont Road

All riders on the cycling team are required to wear high visibility jackets or jerseys and are taught how to follow rules of the road—two abreast when no vehicles are present and single file when a vehicle approaches to pass.

A particular need for bike lanes was identified by Miller School of Albemarle on the following routes:

- Miller School Road from Route 250 to Plank Road
- Dick Woods Road from Route 29 to Ortman Road
- Craig Store Road from Plank Road to the Nelson County line
- Route 250 from Plank Road to the Blue Ridge Parkway

For the foreseeable future, the nature of the routes identified by MSA and the prohibitive cost associated with the roadway widening to provide centerline, edgeline and bike lanes will prevent the

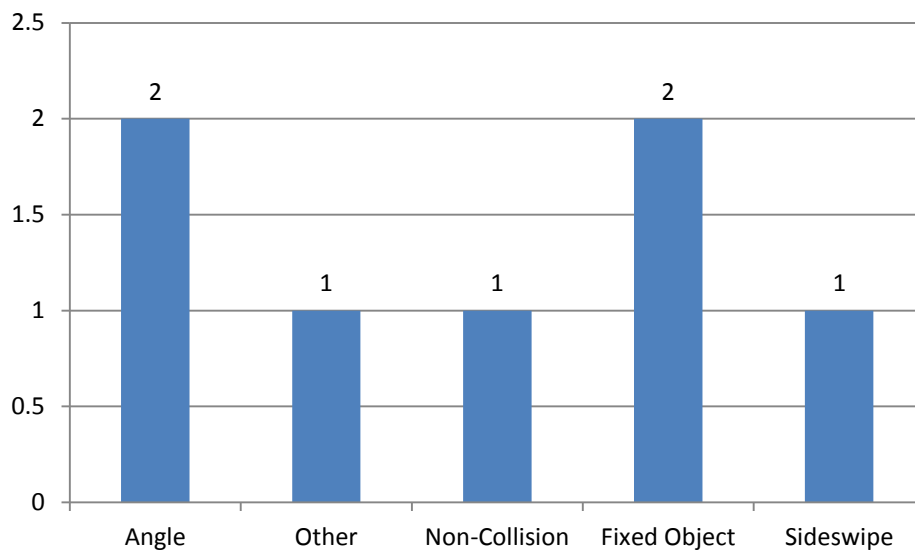
installation. However, it is important to note here that a citizen need has been identified and should be kept in mind should funding become available for such an enterprise. Shared lane markings, or “sharrows” are used frequently when cyclists are expected to navigate high-traffic roads or in short segments between bike lanes. Sharrows are not allowable on roadways with traveling or posted speeds higher than 35 miles per hour or on routes without full longitudinal markings. Additionally, FHWA has discouraged use of the supplemental “Share the Road” plaque on bicycle warning signs since the latest update to the MUTCD, citing that the wording was unclear and confused both cyclists and motorists. Bicycle warning signs are the remaining option for routes not designated by county officials as a cycling route. If desired, MSA could work with the county to create marked bicycling routes.

Crash Analysis

Crash data was collected for the period from November 30, 2013 to November 30, 2016 between mile points 3.55 and 5.0 on Plank Road. This area encompasses the 35 mph and 25 mile per hour zones in and around Batesville. During that time, there were seven reportable crashes, five of which occurred in 2015. The remaining crashes occurred in 2013 and 2014, and there were no reported crashes in 2016 (through November). One of the 7 crashes resulted in 2 injuries. Two crashes were angle crashes, misclassified as head on, both of which occurred at the intersection of Miller School Road and Plank Road. The non-collision involved a truck stuck in the road after failing to note the signing regarding the bridge weight limit. Two of the drivers (28.57%) involved in collisions were speeding, and two of the drivers were distracted. It should be noted that one of the speeding drivers was also distracted, and is counted twice.

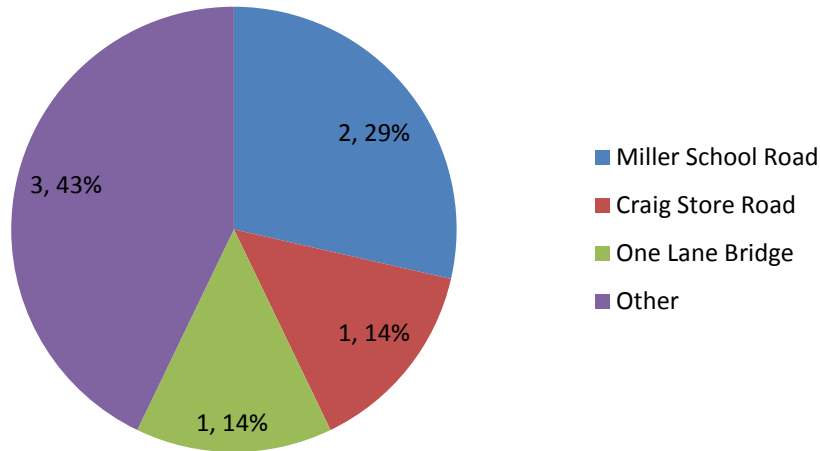
Additional statistics are available below.

Figure 6: Crash Types



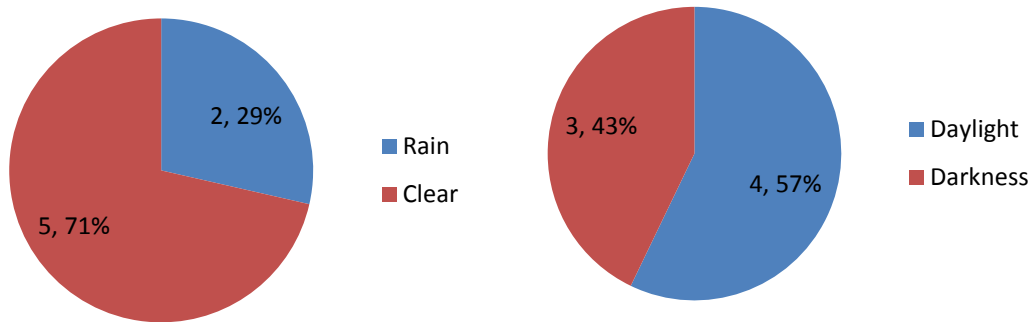
Crash types in Batesville are typical of those found in isolated rural communities with narrow lanes and small intersections. Usually, more rear end crashes are observed around intersections with no left turn lanes, but in Batesville it does not seem to be a problem. This may be due to the low speeds and traffic volumes.

Figure 7: Crash Location



As stated above, both of the angle crashes occurred at Miller School Road as a failure to yield. The sideswipe occurred at Craig Store Road when a left-turning vehicle from Plank Road hit a stopped vehicle at Craig Store Road.

Figure 8: Weather and Lighting Condition



Crash patterns shown when crashes are split by the weather or lighting condition are typical for this area of the state. Both of the crashes at Miller School Road occurred in daylight on dry pavement.

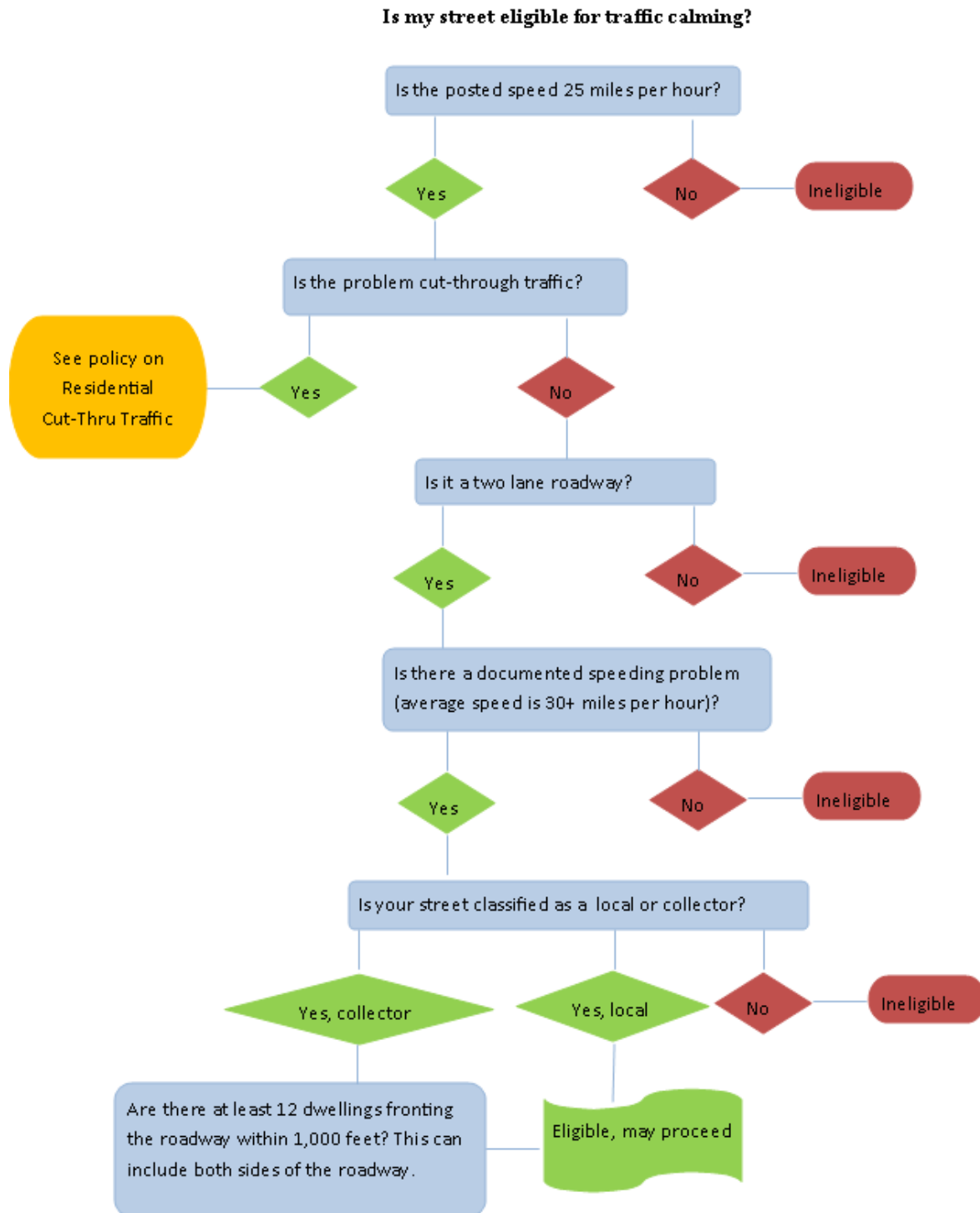
Figure 9: Crash Rates

Reported crash experience for most recent:		3 -year period			
"RNS" records show crashes:					
From:	2013-11(Nov)-30				
To:	2016-11(Nov)-30				
Route:	692				
Between State Milepost:	3.55				
and State Milepost:	5.00	for a distance of:	1.45 miles		
AADT:	1,405	vpd			
According to our records, the total number of reported crashes for this section of highway is:			7		
And, the total number of reported injuries for this section of highway is:			2		
And, the total number of reported fatalities for this section of highway is:			0		
Summary of Crash Data:					
The crash rate for this section of highway is:		313.50	per 100 million VMT		
The injury rate for this section of highway is:		89.57	per 100 million VMT		
The fatality rate for this section of highway is:		0.00	per 100 million VMT		
For Secondary Highways:					
The published 2013 Summary of Crash Data indicates:					
The districtwide average crash rate is:		238.71	per 100 million VMT		
The districtwide average injury rate is:		112.72	per 100 million VMT		
The district average fatality rate is:		1.95	per 100 million VMT		
Tabulated Data					
Accidents	Injuries	Fatalities	% of Total		
7					
	2		28.6%		
		0	0.0%		
Accidents	Injuries	Fatalities	% of Total	% of Total	% of Total
0	0	0	0.0%	0.0%	0.0%
2	0	0	28.6%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
1	2	0	14.3%	28.6%	0.0%
0	0	0	0.0%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
1	0	0	14.3%	0.0%	0.0%
2	0	0	28.6%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
0	0	0	0.0%	0.0%	0.0%
1	0	0	14.3%	0.0%	0.0%
7	2	0	100.0%	28.6%	0.0%
Note: Only crashes involving an injury or fatality or property damage exceeding \$1,500 are reportable and available through the Department of Motor Vehicles (DMV).					
Also, due to the time required for DMV to process and code reported crashes, data for the previous six (6) months may not be available.					
Note: Accident quantities show the number of individual incidents that occur, whereas, Injury & Fatality quantities show victim totals which may or may not be more than one per incident.					
i.e. One accident may have three injury victims involved.					

Traffic Calming

In 2001, VDOT implemented the Traffic Calming Guide for Local Residential Streets. The guide notes that the goal of traffic calming is to slow speeding traffic on in residential neighborhoods on local streets with a focus on subdivisions, although some collectors with the characteristics of a local residential road may also qualify. The traffic calming guide is not used to address cut-through traffic, but is intended for use in locations where the majority of traffic is generated from within the residential area included in the study. The traffic calming process is traditionally initiated through a process involving a community meeting, a board resolution with support data, and a petition. While none of those initial stages were completed in the requests concerning Batesville, the eligibility of Plank Road for traffic calming measures is examined in the contents of this section. Once the technical requirements are met and summarized, a petition requesting traffic calming signed by at least 75% of the total occupied households within the petition area must be obtained. The petition area is defined by VDOT and the county. Figure 10 (below) outlines the technical requirements for traffic calming.

Figure 10: Traffic Calming Flowchart



In Batesville, there is a posted speed of 25 miles per hour. While the problem may be cut-through traffic, the routes surrounding Batesville are collectors and Batesville will experience more cut-through traffic than residential streets by its nature. Route 692 is a two lane roadway, except for the bridge. There is a documented speeding problem outside of the areas with the necessary density to qualify for traffic calming measures. Within the area with more than 12 dwellings fronting the road in 1,000 feet, the average speed and posted speed are both 25 miles per hour and there is no speeding problem. In this situation, review of the speed limits, signing and enforcement will have a positive effect on the compliance with the posted speed limit.

Conclusion and Recommendations

Batesville is an area made up of the intersection of Plank Road, Miller School Road, and Craig Store Road. All of the routes in Batesville are classified as collectors and have posted speeds of 25 miles per hour. Speed data shows that the 25 mile per hour speed zone is inappropriately long, with little compliance outside the village. Given the remoteness of the area and the limited roadside space for enforcement, shortening the speed zone is recommended and will increase compliance. A resolution is attached for the section of Route 692 between Route 250 and Route 29. The resolution is an attempt to update the current resolutions to a simpler format by including all speed zones in the area. Centerline through the village is recommended to draw attention to the area. Cluttered signing presents a serious problem in Batesville and recommended work is attached. Because of the frequency of cyclists on the routes surrounding Miller School, bicycle warning signs may be installed at the discretion of the residency. Future study in Batesville is not recommended for at least 5 years, unless the nature of the area changes dramatically.

Signing and Pavement Marking Recommendations

1. School officials should be contacted about continued need for School Bus Stop Ahead signs in the study area. Any signs that are not currently serving a purpose should be removed.
2. Remove "Adopt a Highway" signs if the adoption is no longer valid.
3. Remove bridge weight limit sign 2695' W Stillhouse Road. There are multiple other bridge warnings in place that give ample warning.
4. Remove damaged "No Parking" sign from 25 mile per hour speed limit sign 2720' W Stillhouse Road.
5. Move 25 MPH Reduced speed ahead sign and 25 MPH sign (EB) and the 35 MPH speed limit sign (WB) 1,480 feet east. The resolution for the change is attached. Signs should be field adjusted as necessary to maintain spacing standards and sight distance from adjacent driveways.
6. Bicycle signing (W11-1) may be installed on the state-maintained bike routes shown in this report at the discretion of the residency, maintaining spacing standards with previously installed signs.
7. Install centerline within the 25 mile per hour zone. Roadway width is insufficient for edgeline installation west of Craig Store Road. Maintain break in centerline for Craig Store Road.

Memorandum

To: Joel DeNunzio
Residency Administrator

From: Rebecca Abecassis
Traffic Engineer

Date: September 28, 2016

Re: Rt. 692, Plank Road, Albemarle County

Reference:

A work order request was received to review a segment of Rt. 692, Plank Rd., from Rt. 250 to Rt. 635, in Albemarle County. The request included verification that the speed zones and advance warning signs are correct in the Batesville area, determine if bicycle Shared Lane Pavement Markings can be added to a newly paved segment of Rt. 692, and determine if bicycle signing can be added in Batesville within the areas with posted speed limits of 25 mph and 35 mph.

Review:

The location and length of the speed zones were found in studies performed by traffic engineering and verified in RNS. The 35 mph speed zones are 0.31 mi. (from 0.15 mi E. Rt. 635 to 0.07 mi. W Rt. 693) and 0.72 mi. (from 0.08 mi. E. Rt. 637 to 0.52 mi. W Rt. 635) and the 25 mph speed zone is .67 mi (0.52 mi W. Rt. 635 to 0.15 mi E. Rt. 635). These distances were found to be correct when field measured.

Reduced speed limit ahead signs were found to have been updated to the W3-5 signs. The location of the signs was found to be acceptable.

Spot measurements of the road width within the newly paved section were found to range from 19' – 20', and it was noted that the pavement is wider through the curves. The minimum road width for installation of centerline markings is 18'. Three – year crash data from 1/1/2013 – 12/31/2015 found 7 crashes occurred along the segment or roadway encompassing the 35 mph speed zones and 25 mph speed zone. However, none involved conflicts involving bicyclists. The AADT is 811 vpd. The minimum volume is 500 vpd for installation of centerline markings.

The 2009 *MUTCD* states, with regard to Shared Lane Markings, that they may be used to assist bicyclists with lateral positioning in lanes that are too narrow for a vehicle and bicycle to travel side by side within the same traffic lane. They may also be used to alert motorists of the lateral location bicyclists are likely to use within the travel lane and to encourage safe passing of bicyclists by drivers. Spacing of the markings should be no greater than 250' apart.

Per the 2009 *MUTCD*, bicycle related signing includes Bike Warning signs may be used to alert motorists to locations where unexpected entry of bicycles may occur. Bicycles May Use Full Lane signs may be used where no dedicated bicycle lanes or shoulders are usable by bicyclists and where travel lanes are too narrow for bicyclists and vehicles to operate side by side. This sign may also be used where it is important to inform motorists that bicyclists may occupy the travel lane.

Recommendations:

As previously noted, the 35 mph speed zones and 25 mph speed zone are correct as well as the advanced warning signing. In addition, the advanced warning signs were found to be the most current signs. Therefore, no signing adjustments or updated signs are needed. In addition, the road width of 19' – 20' and AADT of 811 vpd meets the minimums of 18' road width and 500 vpd for installation of centerline pavement markings.

Based on the data collected, including the speed limit and road width that does not permit motorists and bicyclists to travel side by side in the same lane, Shared Lane Signs may be installed on Rt. 692 beginning at the 35 mph speed zones in both the eastbound and westbound directions. Due to the required spacing of 250' for the Shared Lane Markings coupled with the distance of the proposed location making the number of markings required cost prohibitive, these markings are not recommended. Additionally, the Residency should confirm that bicyclists use this route to the extent that signing is necessary, as no bicyclists were observed during the field review. Note that these signs should only be utilized in areas with daily bicycle use. If it is determined that the consistency of bicycle use negates the need for permanent signing, it is suggested that groups or organizations sponsoring group bike rides purchase and set out temporary warning signing that alert motorists of bicyclists using the roadway. Further, if bicyclists ride a specific route, they may consider working with the County to develop a bicycle route and submit the information for addition to the County's comprehensive plan for a marked bicycle route.