



TRAFFIC SAFETY MANUAL

for

COLE COUNTY, MISSOURI

Prepared for:

Cole County Department of Public Works

under the

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Traffic Engineering Assistance Program



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1.0 INTRODUCTION

The Cole County, Missouri Traffic Safety Manual was originally developed and adopted in July 1989. Through funding from the MoDOT Transportation Engineering Assistance Program (TEAP), Bucher, Willis & Ratliff Corporation has reviewed and updated the manual. Existing sections were edited and new sections have been added. The Cole County Staff and members of the Traffic Advisory Committee and Staff have provided review of this document.

This manual provides guidelines and procedures that will be used as goals to maintain and improve traffic safety along the roads and streets under the jurisdiction of Cole County. Maintaining and improving traffic safety is a very complex problem. Although this manual will be used by county personnel and officials to determine courses of action in many cases, it is not all inclusive and is not intended to be used as a substitute for engineering judgment or to replace the many applicable design standards which exist.

The guidelines and procedures described in this manual recognize that in many cases there are differences between what could or should be done to treat existing conditions and what could or should be done when constructing or reconstructing a roadway. This manual also considers that in the application of many traffic safety measures there is a difference between roads with traffic volumes below 400 vehicles per day (Low Volume Roads) and those with higher traffic volumes.

2.0 TRAFFIC CONTROL AT INTERSECTIONS

Traffic control devices are necessary for regulating, warning, and guiding traffic and are a primary determinant in the safe and efficient operation of intersections. The MUTCD outlines national standards for when and where traffic control is warranted. AASHTO sets forth guidelines for variables that impact traffic control such as sight distance requirements.

The uses of regulatory signs inform highway users of traffic laws or regulations and indicate the applicability of legal requirements that would not otherwise be apparent. Common regulatory signs from the right-of-way series include the STOP sign (R1-1) and YIELD sign (R1-2). The application of stop signs, multiway stop signs, and yield signs are discussed in the following sections.

2.1 Stop Signs

STOP signs are intended for use where traffic is required to stop. The standard size of a STOP sign used in Cole County will be 30" x 30". Where greater emphasis or visibility is required, a larger size sign should be considered.

Because the STOP sign causes a substantial inconvenience to motorists, it should be used only where warranted (see Table 1). Prior to the application of a STOP sign, consideration of less restrictive measures, such as the YIELD sign should be examined. Periodic reviews of existing installations may be conducted to determine if less restrictive control or no control could accommodate traffic demands safely and more effectively.

In a situation where two main highways intersect, the STOP sign or signs should normally be posted on the minor street to stop the lesser flow of traffic. Traffic engineering studies, however, may justify the installation of a STOP sign or signs on the major street. Such a situation may occur at a three-way intersection where safety considerations may justify stopping the greater flow of traffic to permit a left-turning movement.

2.2 Multiway Stop Signs

A multiway stop installation is useful as a safety measure at some locations. It should be ordinarily used only where the volume of traffic on the intersecting roads is approximately equal. Table 1 includes conditions that may warrant the installation of a multiway stop.

At a multiway stop intersection, Cole County will use a supplementary plate (R1-3) 12" x 6" in size that will be mounted just below the STOP sign. If the number of approach legs to the intersection is three or more, the numeral on the supplementary plate shall correspond to the actual number of legs (i.e., 3-WAY or 4-WAY).

2.3 Yield Signs

The YIELD sign assigns right-of-way to traffic on certain approaches to an intersection. Vehicles controlled by a YIELD sign need stop only when necessary to avoid interference with other traffic that is given the right-of-way. Table 1 outlines conditions when a YIELD sign may be warranted.

The standard size of a YIELD sign used in Cole County will be 36" x 36" x 36". YIELD signs generally should not be placed to control the major flow of traffic at an intersection. However, YIELD signs may be installed to control traffic movement where a majority of drivers in that movement are making right turns. At such an intersection, YIELD signs should not be erected on more than one approach.

Table 1. Summary of Warrants for Stop, Multiway Stop, and Yield Conditions

Traffic Control Devices	Conditions That Might Warrant a Traffic Control Device
<p>STOP Sign (R1-1) Standard Size 30" x 30"</p> 	1. Intersection of a less important road with a main road where application of the normal right-of-way rule is unduly hazardous.
	2. Street entering a through highway or street.
	3. Unsignalized intersection in a signalized area.
	4. Other intersections where a combination of high speed, restricted view, and serious accident record indicates a need for control by the stop sign.
<p>MULTIWAY STOP Sign (R1-1) used in conjunction with (R1-3)</p>   <p>R1-3 (12" x 6")</p>	1. Where traffic signals are warranted and urgently needed, the multiway stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the signal installation.
	2. An accident problem, as indicated by five or more reported accidents of a type susceptible or correction by a multiway installation in a 12-month period. Such accidents include right- and left-turn collisions as well as right-angle collisions.
	3. Minimum traffic volumes. <ul style="list-style-type: none"> a) The total vehicular volume entering the intersection from all approaches must average at least 500 vehicles per hour for any 8 hours of an average day, and b) The combined vehicular and pedestrian volume from the minor street or highway must average at least 200 units per hour for the same 8 hours, with an average delay to minor street vehicular traffic of at least 30 seconds per vehicle during the maximum hour, but c) When the 85-percentile approach speed of the major street traffic exceeds 40 miles per hour, the minimum vehicular volume warrant is 70 percent of the above requirements. (350 vph for any 8 hours of an average day and the combined vehicular and pedestrian volume from the minor street or highway must average at least 140 units per hour for the same 8 hours.)
<p>YIELD Sign (R1-2) Standard Size 36" x 36" x 36"</p> 	1. At the entrance to an intersection where it is necessary to assign right-of-way and where the safe approach speed on the entrance exceeds 10 miles per hour.
	2. Where there is a separate or channelized right-turn lane, without an adequate acceleration lane.
	3. At any intersection where a special problem exists and where an engineering study indicates that problem to be susceptible to correction by use of the YIELD sign.

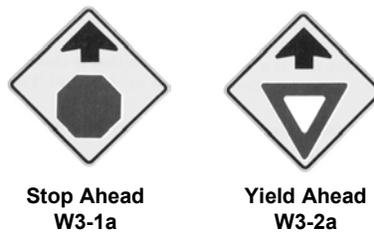
Source: Manual on Uniform Traffic Control Devices, 1988 Edition. (pages 2B-2 through 2B-5)

2.4 Location of Stop Sign and Yield Sign

A STOP sign should be erected at the point where the vehicle is to stop or as near thereto as possible. If accident trends or engineering analysis indicate a reoccurring violation of this standard, the County should consider adding a stop line and/or the word STOP on the pavement. A YIELD sign should be erected in the same manner, at the point where the vehicle is to stop if necessary to yield the right-of-way. Where a marked crosswalk on pavement exists, the sign should be erected approximately four (4) feet in advance of the crosswalk line nearest to approaching traffic.

In a situation where the visibility of a STOP sign or a YIELD sign is restricted, the STOP sign or YIELD sign shall be located as specified, and a STOP AHEAD (W3-1a) or a YIELD AHEAD (W3-2a) sign shall be erected in advance of the STOP or YIELD sign. The minimum standard size for the STOP AHEAD and YIELD AHEAD warning signs to be used in Cole County will be 30" x 30". In instances where there is a history of poor observance of the STOP sign, the County will install a STOP AHEAD warning sign. The placement of the STOP AHEAD and YIELD AHEAD sign shall be determined from Table 6 (Condition B) on page 11. Figure 1 displays the advance warning signs to be used by Cole County.

Figure 1. Stop Ahead and Yield Ahead Warning Signs



2.5 Intersections with No Traffic Control

In a situation where an intersection crossing is not controlled by yield signs, stops signs, or traffic signals, the operator of a vehicle approaching an intersection must be able to perceive a hazard in sufficient time to alter the vehicle's speed as necessary before reaching the intersection. Figure 2 displays an intersection with no traffic control. In this situation, no obstructions should be present within the sight triangle. To determine the appropriate distance (d) of the sight triangle legs, the speeds along the major and minor roads should be determined. Based upon these speeds, Table 2 will be used to determine the dimensions of the sight triangle legs.

Figure 2. Example of Intersection with No Traffic Control

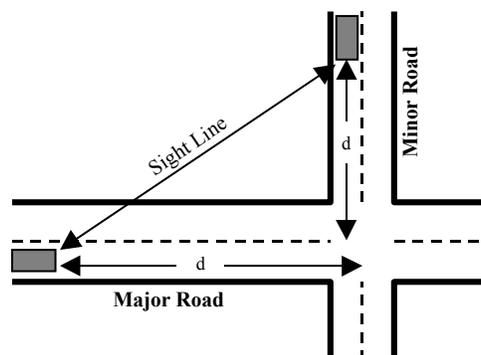


Table 2. Sight Distance required at No Control Intersections

Speed		Distance	
MPH	km/h	FEET	METER
15	20	70	20
20	30	90	25
25	40	115	35
30	50	130	40
40	60	180	50
45	70	200	60
50	80	220	65
55	90	250	75
60	100	280	85
65	110	300	90
70	120	330	100

Source: A Policy on Geometric Design of Highways and Streets, AASHTO, 1994. (Table IX-7, page 699)

For example, a roadway at 40-mph intersecting a roadway at 25 mph would result in the legs of the sight triangle equal to 180 feet and 115 feet respectively. These, or greater distances, will permit a vehicle on either road to change speed before reaching the intersection.

Intersections with sight triangles having dimensions approximately equal to those indicated are not necessarily safe. There is the potential for confusion to operators with the possibility of a driver on one highway being confronted with a succession of vehicles on the intersecting highway. Another important factor is that a vehicle approaching a noncontrolled intersection must yield the right-of-way to vehicles approaching the intersection on the right. Noncontrolled intersections should be used only in the design of rural intersections on lightly traveled two lane roads where the cost of achieving greater sight distance is prohibitive. Where this minimum sight triangle cannot be provided, traffic control devices should be used to slow down or stop vehicles on one or both roads even if both roads are lightly traveled.

2.6 Intersection Stopping Sight Distance

Sight distance is the length of roadway ahead visible to the driver. The minimum stopping sight distance available on a roadway should be sufficiently long to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path. Table 3 outlines the stopping sight distance guidelines.

Table 3. Stopping Sight Distance Requirements

Design Speed		Minimum Stopping Sight Distance	
MPH	km/h	feet	meters
20	30	100	29.6
25	40	150	44.4
30	50	190	57.4
40	60	250	74.3
45	70	310	94.1
50	80	370	112.8
55	90	430	131.2
60	100	515	157.0
65	110	590	179.5
70	120	670	202.9

Source: A Policy on Geometric Design of Highways and Streets, AASHTO, 1994. (page 120)

Where adequate stopping sight distance at the intersection is not available to the through traffic at the posted speed, then intersection warning signs (W2-1 through W2-5) should be installed on the main road approaches. The standard size of the intersection warning signs used in Cole County will be 30" x 30". Examples of these signs are displayed in Figure 3. The placement of these signs is determined by using Table 6 on page 11 (Condition B).

Figure 3. Intersection Warning Signs



Source: Manual on Uniform Traffic Control Devices, 1988 Edition. (pages 2C-6 and 2C-7).

2.7 Unwarranted Traffic Control Devices

STOP signs will not be installed by the County solely to control vehicle speeds or divert traffic. STOP signs installed in the wrong places for the wrong purposes usually create more problems than they solve. The County will not use portable or part-time STOP signs except for emergency purposes.

The County will not misuse stop signs to arbitrarily interrupt traffic, either by causing it to stop or by causing such an inconvenience that motorists are forced to use other routes. Studies made in many other parts of the country show that there is a high incidence of intentional violations where stop signs are installed as “nuisances” or “speed breakers.” These studies showed that speed was reduced in the immediate vicinity of the “nuisance” stop signs. But, speeds were actually higher between intersections than they would have been if these signs had not been installed.

At the right place and under the right conditions, a STOP sign tells the drivers and pedestrians who has the right of way. Nationally recognized standards have been established to determine when STOP signs should be used. These standards, or “warrants,” take into consideration, among other things, traffic speed and volume, sight distance and the frequency of traffic “gaps” which will allow safe vehicle entry or pedestrian crossing.

Most drivers are reasonable and prudent. But, when confronted with unreasonable restrictions, they frequently violate them and develop a general contempt for all traffic controls – often with tragic results.

3.0 ROUTE SPEEDS

3.1 Design Speeds

Table 4 sets forth guidelines to be used to determine the appropriate design speed for local and collector roads in rural areas. The design speed is based upon the type of terrain and the current or projected traffic volumes (ADT). For the design of new routes or reconstruction of existing roads, the recommended minimum design speeds are identified in Table 4. The county should strive for higher values than the minimum where conditions of safety dictate and costs can be supported. In spot locations or segments where design speeds cannot be economically provided, appropriate warning and traffic control signs or devices will be installed.

Table 4. Minimum Design Speeds (MPH)

Facility	Type of Terrain	Design Volumes of:					
		ADT under 50	ADT 50 - 250	ADT 250 - 400	ADT 400 - 1500	ADT 1500 - 2000	ADT over 2000
Local	Level	30	30	40	50	50	50
	Rolling	20	30	30	40	40	40
Collector	Level	40	40	40	50	50	60
	Rolling	30	30	30	40	40	50

Source: A Policy on Geometric Design of Highways and Streets, AASHTO, 1994. (Local Roads and Streets, Table V-1, page 419) (Collector Roads and Streets (Rural areas), Table VI-1, page 461). NOTE: Units have been converted to miles per hour.

3.2 Posting of Speed Limits

Speed limits on County roads will be posted adjacent to intersecting State routes or other major County roads and at other strategic locations where it becomes apparent that drivers should be reminded of the appropriate route speed. The posted speed will generally be about five-mph less than the design speed. On existing roads where the design speed is not known, the posted speed will be based on engineering analysis of the following factors (MUTCD, page 2B-6):

1. Road surface characteristics, shoulder condition, grade, alignment and sight distance.
2. The 85th-percentile speed and pace speed.
3. Roadside development and culture and roadside friction.
4. Safe speed for curves or hazardous locations within the zone.
5. Parking practices and pedestrian activity.
6. Reported accident experience for a recent 12-month period.

The speed limit on Cole County roads will be 55 mph unless posted otherwise. Where road conditions or other factors indicate the need for lower speeds, the posted speed limit will be based on the measured 85th-percentile speeds, but not exceeding the statutory limits.

On U.S. and State numbered routes entering Cole County, speed limit signs indicating the statutory speed limits shall be erected. A special oversize sign is often desirable at these locations. The Reduced Speed Ahead (R2-5) should be used in rural areas to inform motorists of a reduced speed zone when an advance notice is needed to comply with the speed limit posted ahead. A Speed Limit sign erected at the beginning of the zone where the altered speed limit applies shall always follow this sign. The minimum standard size of Reduced Speed Ahead signs will be 24" x 30". Figure 4 displays examples of the Reduced Speed Ahead signs.

Figure 4. Reduced Speed Ahead Signs (R2-5 series)



3.3 Advisory Speed Limits on Turns and Curves

Whenever it is practical, the curves along a route in Cole County will be constructed at the overall route design speed. However, when this cannot be done on new roads or has not been done on existing roads then studies will be completed to determine if warning signs are needed. Whether or not a curve should be provided with warning signs depends on the posted speed limit and the computed or measured safe travel speed. If the radius and superelevation is known, the safe travel speed will be determined from computations or available charts (depicted in Figure 7). On County roads where this information is not available, measurement of the safe speeds will be completed using an instrument called a ball bank indicator* mounted on a survey vehicle. A series of test runs will be conducted on each curve along a route to determine the ball deflection readings for various speeds. Readings of 10° will be used to identify the safe speed of the curve.

If the safe curve speed is less than the posted speed limit, then either turn or curve warning signs (i.e., W1-1, W1-2, W1-3, W1-4, or W1-5) will be installed as prescribed in the MUTCD. Examples of the turn and curve signs are shown in Figure 5. Turn signs should be used for speeds of 25 m.p.h. or less, and curve signs should be used for speeds of 30 m.p.h. or greater. Additional protection may be provided by use of advisory speed plates. The minimum standard size for signs W1-1 through W1-5 will be 30" x 30".

Winding road signs are applicable where three or more turns or curves, are separated by less than 600 feet of tangent. For added emphasis on turns, a large arrow sign (W1-6) may be placed on the outside of a turn. The minimum standard size for the large arrow sign will be 48" x 24". The large arrow sign is shown in Figure 6.

Table 5 sets forth guidelines to determine the appropriate warning signs based on the results of the ball bank indicator. The appropriate placement of the turn or curve warning signs shall be determined based upon Table 6 on page 11 (Condition C).

Figure 5. Curve and Turn Signs



* The ball bank indicator consists of a steel ball sealed in a curved glass tube with a liquid. The ball is free to move except for the dampening effect of the liquid. The movement or deflection of the ball up either side of the curved glass tube is governed by the roadway superelevation (i.e. gravity) and the centrifugal force developed as the survey vehicle travels around a curve at a given speed.

Source: Manual on Uniform Traffic Control Devices, 1988 Edition. (pages 2C-3 and 2C-4).

Figure 6. Large Arrow Sign



Large Arrow
W1-6

Source: Manual on Uniform Traffic Control Devices, 1988 Edition. (page 2C-5).

Figure 7. Recommended Safe Speed

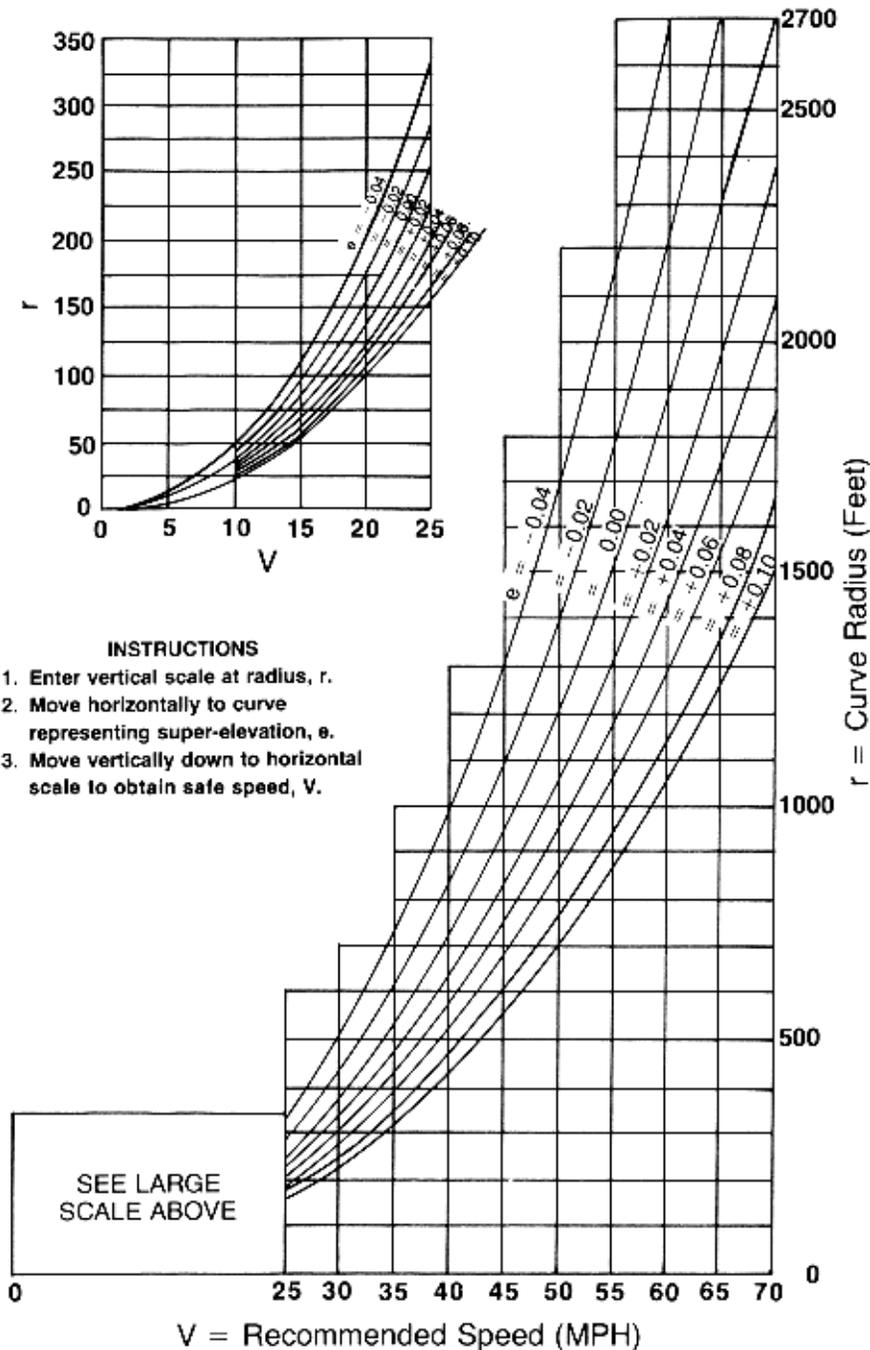


Table 5. Signing for Curves and Turns

		Advisory Speed Based on Ball Bank Indicator (MPH)								
		60	55	50	45	40	35	30	25	20 or less
Usual Operating Speed (MPH)	60		C	C	CA	CA	CA	TA	TA	TA
	55			C	C	CA	CA	TA	TA	TA
	50				C	C	CA	TA	TA	TA
	45					C	C	TA	TA	TA
	40						C	T	TA	TA
	35							T	T	TA
	30								T	T
	25									T
	20 or less									

C = Curve Sign, Reverse Curve Sign (or winding road sign if applicable)
T = Turn Sign, Reverse Turn Sign (or winding road sign if applicable)
A = Advisory Speed Plate

Source: Handbook of Traffic Control Practices for Low Volume Rural Roads,
 Kansas Department of Transportation, 1991, modified to reflect practice of
 Missouri Department of Transportation.

Table 6. A Guide for Advance Warning Sign Placement Distance

Posted or 85th percentile speed (MPH)	Condition A high judgment needed ³ (10 secs. PIEV)	General Warning Signs ⁽³⁾					
		Condition B stop condition	Condition C - Deceleration condition to listed advisory speed - MPH (or desired speed at condition)				
			0	10	20	30	40
20	175 ⁽⁵⁾	(4)	(4)				
25	250	(4)	100 ⁽²⁾				
30	325	100 ⁽⁵⁾	150	100 ⁽⁵⁾			
35	400	150	200	175			
40	475	225	275	250	175 ⁽⁵⁾		
45	550	300	350	300	250		
50	625	375	425	400	325	225 ⁽⁵⁾	
55	700	450	500	475	400	300	
60	775	550	575	550	500	400	300 ⁽⁵⁾
65	850	650	650	625	575	500	375

Typical Signs for the Listed Conditions in Table 6.

Condition A - Merge, Right Lane Ends, etc.

Condition B - Cross Road, Stop Ahead, Signal Ahead, Ped-Xing, etc.

Condition C - Turn, Curve, Divided Road, Hill, Dip, etc.

(1) Distances shown are for level roadways. Corrections should be made for grades. If 48-inch signs are used, the legibility distance may be increase to 200 feet. This would allow reducing the above distance by 75 feet.

(2) In urban areas, a supplementary plate underneath the warning sign should be used specifying the distance to the condition if there is an in-between intersection which might confuse the motorist.

(3) Distance provides for 3-second PIEV, 125 feet Sign Legibility Distance, Braking Distance for Condition B and Comfortable Braking Distance for condition C as indicated in *A Policy on Geometric Design of Highways and Streets*, 1984, AASHTO, Figure II-13.

(4) No suggested minimum distance provided. At these speeds, sign location depends on physical conditions at site.

(5) Feet

Source: Manual on Uniform Traffic Control Devices, 1988 Edition. (Table II-1, page 2c-2a)

3.4 Posting of Lower Speed Limits

The County will not post low speed limits solely based on local requests to “improve safety.” A common belief is that posting a speed limit will influence drivers to drive at that speed. The facts indicate otherwise.

Many studies conducted over several decades in all parts of the country have shown that a driver’s speed is influenced more by the appearance of the roadway and the prevailing traffic conditions than it is by the posted speed limit. Some drivers will obey the lower posted speed while others will feel it’s unreasonable and simply ignore it. This disrupts the uniform traffic flow and increases accident potential between the faster and the slower drivers. When traffic is traveling at different speeds, the number of gaps in traffic to permit safe crossing is reduced. Pedestrians also have greater difficulty in judging the speed of approaching vehicles.

Cole County may post intermediate speed limits - those between 25 and 55 mph, but these speed limits will be based on traffic engineering surveys, which include an analysis of roadway conditions, accident records and the prevailing speed of prudent drivers.

4.0 PAVEMENT MARKINGS

The decisions regarding which routes should be provided with pavement markings will be based on detailed engineering analyses of traffic accidents and volumes, roadway widths and expected striping life. Cole County will conduct a program to provide and maintain pavement markings based on the following criteria.

4.1 Center Lines

It is the policy of Cole County to provide centerlines on paved highways when the following conditions are met:

1. In rural districts on two-lane pavements 16 feet or more in width with prevailing speeds greater than 35 MPH.
2. In residence or business districts on all through highways, and on other highways where there are significant traffic volumes.
3. On all undivided pavements of four or more lanes.
4. At other locations where an engineering study indicates a need for them.

The pavement width used in this analysis will be the predominant width, which exists along a segment of at least three miles in length. The traffic speeds used in this analysis will be the 85th percentile speed that was measured and used to set the route speed limits.

The centerline markings on two-lane, two-way highways shall be either:

1. A normal, broken yellow line where passing is permitted.
2. A double line consisting of a normal broken yellow line and a normal, solid yellow line where passing is permitted in one direction.
3. A double line consisting of two normal solid yellow lines where passing is prohibited in both directions.

4.2 Passing Zones

It is the policy of Cole County that where centerlines are installed, no-passing zones shall be established at vertical and horizontal curves and elsewhere on two-lane and three-lane highways where an engineering study indicates passing must be prohibited because of inadequate sight distances or other special conditions.

A no-passing zone at a horizontal or vertical curve is warranted where the sight distance, as defined below, is less than the minimum necessary for safe passing at the prevailing speed of traffic. Passing sight distance on a vertical curve is the distance at which an object 3.50 feet above the pavement surface can just be seen from a point 3.50 feet above the pavement. Where center lines are installed and a curve warrants a no-passing zone, it should be so marked where the sight distance is equal to or less than that listed in Table 7 for the prevailing off-peak 85 percentile speed or the posted speed limit, whichever is higher.

Table 7. Passing Sight Distance (feet)

85th Percentile Speed (MPH)	Minimum Passing Sight Distance (feet)
25	450
30	500
35	550
40	600
45	700
50	800
55	900
60	1,000
65	1,100
70	1,200

Source: Manual on Uniform Traffic Control Devices, 1988 Edition. (Page 3B-8)

4.3 Pavement Edge Lines

The County shall have the option of providing pavement edge line markings. Pavement edge line markings provide an edge of pavement guide for drivers. They have unique value as a visual reference for the guidance of drivers during adverse weather and visibility conditions.

Pavement edge lines may be considered in areas where a review of accident history indicates a trend of run-off-the-road accidents or when a traffic engineering study indicates that their use could be beneficial. All pavement edge lines on two-lane roadways shall be a solid white color. Edge lines shall not be continued through intersections and should not be broken for driveway access.

4.4 Stop Lines

Stop lines are solid white lines, normally 12 to 24 inches wide, extending across all approach lanes. It is the policy of Cole County to provide stop lines in both rural and urban areas where it is important to emphasize the point behind which vehicles are required to stop in compliance with a STOP sign, traffic signal, officer's direction, or other legal requirement.

When used, stop lines should ordinarily be placed 4 feet in advance of and parallel to the nearest crosswalk line. When no marked crosswalk is present, the stop line should be placed at the desired stopping point, in no case more than 30 feet or less than 4 feet from the nearest edge of the intersecting roadway. If a stop line is used in conjunction with a STOP sign, it should ordinarily be placed in line with the STOP sign. However, if the sign cannot be located exactly where vehicles are expected to stop, the stop line should be placed at the stopping point.

4.5 Crosswalks and Crosswalk Lines

Crosswalk lines shall be solid white lines, marking both edges of the crosswalk. They shall not be less than 6 inches in width and should not be spaced less than 6 feet apart. Under special circumstances where a stop line is not provided or where vehicular speeds exceed 35 MPH or where crosswalks are unexpected, it may be desirable to increase the width of the crosswalk line up to 24" in width. Crosswalk lines on both sides of the crosswalk should extend across the full width of the pavement to discourage diagonal walking between crosswalks.

Crosswalks should be marked at all intersections where there is substantial conflict between vehicle and pedestrian movements. Marked crosswalks should also be provided at other appropriate points of

pedestrian concentration. Crosswalk markings should not be used indiscriminately. An engineering study should be required before they are installed at locations away from traffic signals or STOP signs.

Since non-intersectional pedestrian crossings are generally unexpected by the motorist, warning signs should be installed and adequate visibility provided by parking prohibitions.

4.6 Railroad Crossing Markings

Pavement markings in advance of a grade crossing shall consist of an X, the letters RR, a no passing marking (two-lane roads), and certain transverse lines. Identical markings shall be placed in each approach lane on all paved approaches to grade crossings where grade crossing signals or automatic gates are located. Cole County will also use pavement markings at all other grade crossings where the prevailing speed of highway traffic is 40 mph or greater.

Pavement markings will also be used at crossing where an engineering study indicates there is a significant potential conflict between vehicles and trains. All pavement markings will be installed in conformance with the MUTCD.

4.7 Additional Pavement Markings

Other pavement markings used for turn lane channelization, symbols, or special applications will be installed in conformance with the Manual on Uniform Traffic Control Devices.

5.0 NON-STANDARD TRAFFIC CONTROL DEVICES

Cole County will avoid the use of non-standard and unproven traffic control devices such as “Children at Play” signs or “Speed Bumps.”

5.1 Children at Play Signs

While some other states may post “SLOW – CHILDREN AT PLAY” or similar messages, the State of Missouri does not recognize the use of this sign. Parental concern for the safety of children in the street near home, and a misplaced but wide-spread public faith in traffic signs to provide protection often prompt the request for these types of signs.

While such signs may be used in other states, no factual evidence has been presented to document their success in reducing pedestrian accidents, vehicle operating speeds or legal liability. Studies have shown that many types of signs attempting to warn of normal conditions in residential areas have failed to achieve the desired safety benefits. If signs encourage parents and children to believe they have an added degree of protection, which the signs do not and cannot provide, a great disservice results. Children should not be encouraged to play within the street travelways. This sign has long been rejected since it is a direct and open suggestion that this behavior is acceptable.

The “SLOW – CHILDREN AT PLAY” sign should not be misunderstood with specific signs used for school zones. The MUTCD dedicates an entire chapter to traffic control for school zones. Specific standards (i.e., signs, markings, signals, etc) are outlined in Chapter Seven of the MUTCD.

5.2 Speed Bumps

The control of speeding in residential neighborhoods, while maintaining acceptably safe street and roadway conditions, is a widespread concern, which requires persistent law enforcement effort. The inability of posted speed limit signs to curb the intentional violator, leads to frequent demands for installation of “speed bumps” in public streets. However, actual tests and studies of various experimental designs have demonstrated the physical inability of a speed bump to control all types of lightweight and heavyweight vehicles successfully. In fact, a soft sprung sedan is encouraged to increase speed for a better ride, while some vehicles may lose control.

The reduction of speeding in residential neighborhoods is a wide spread concern, which Cole County will control as required through persistent law enforcement efforts...not speed bumps.

6.0 ROADWAY CROSS-SECTION

6.1 Through Traveled Way and Shoulder Widths

As the design speed and traffic volumes increase, the elements of the cross-section become more critical. These elements include the through traveled way, shoulders and clear zones; the side slopes of the clear zones; and the obstructions allowed in the clear zones. Table 8 sets guidelines for pavement and shoulder width on new or reconstructed roads in rural areas where feasible. In the areas these criteria may not be economically feasible, specific analyses of design criteria will be necessary.

Table 8. Recommended Through Traveled Way and Shoulder Widths for Local Roads and Collector Roads

Design Speed		Width for Design Volume (Traveled Way) ^a							
		ADT less than 400		ADT 400 - 1500		ADT 1500 - 2000		ADT over 2000	
MPH	km/h	FEET	METER	FEET	METER	FEET	METER	FEET	METER
20	30	18 / 20 ^b	5.4 / 6.0 ^b	20 ^c / 20	6.0 ^c / 6.0	22	6.6	24	7.2
25	40	18 / 20 ^b	5.4 / 6.0 ^b	20 ^c / 20	6.0 ^c / 6.0	22	6.6	24	7.2
30	50	18 / 20 ^b	5.4 / 6.0 ^b	20 ^c / 20	6.0 ^c / 6.0	22	6.6	24	7.2
40	60	18 / 20 ^b	5.4 / 6.0 ^b	20 ^c / 22	6.0 ^c / 6.6	22	6.6	24	7.2
45	70	20	6.0	22	6.6	22	6.6	24	7.2
50	80	20	6.0	22	6.6	22	6.6	24	7.2
55	90	22 / 20	6.6 / 6.0	22	6.6	24	7.2	24	7.2
60	100	22 / 20	6.6 / 6.0	22	6.6	24	7.2	24	7.2
		Width of Graded Shoulder (each side)							
		FEET	METER	FEET	METER	FEET	METER	FEET	METER
All Speeds		2	0.6	4 ^c / 4 ^d	1.5 ^c / 1.5 ^d	6	1.8	8	2.4

NOTE: Single values indicate the same for both local roads and collector roads. Values for local roads represented first followed by collector roads (Local Roads / Collector Roads) when greater than one value shown.

^a Where the width of traveled way is shown to be 7.2m, the width of the traveled way may remain at 6.6m on reconstructed highways where alignment and safety results are satisfactory.

^b 5.4m (18 feet) minimum for ADT under 250.

^c May be adjusted to achieve a minimum roadway width of 9m for design speed of 60 km/h or less.

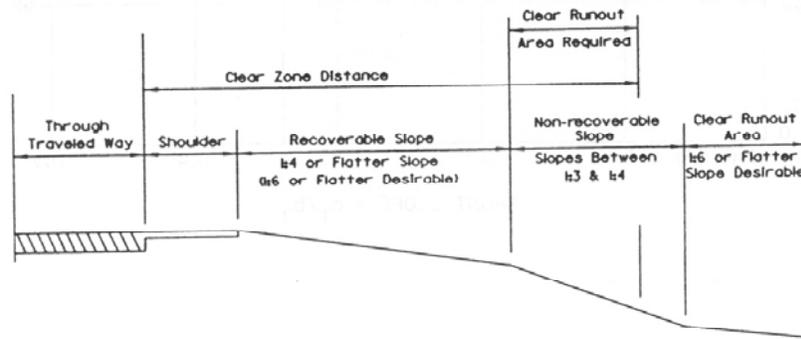
^d May be adjusted to achieve a minimum roadway width of 9m for design speed of 50 km/h or less.

Source: A Policy on Geometric Design of Highways and Streets, AASHTO, 1994 (Table V-6, page 422) (Table VI-4, page 465)

6.2 Clear Zones

Table 9 outlines the recommended clear zone distances in feet. Figure 8 displays a typical cross section showing the clear zone. A basic understanding of the clear zone concept is critical to its proper application. The data presented in Table 9 is based on limited empirical data, which has been extrapolated to provide data for a wide range of conditions. Thus, the numbers presented in Table 9 represent a reasonable measure of the degree of safety suggested for a particular roadside; but they are neither absolute nor precise. In some cases, it is reasonable to leave a fixed object within the clear zone; in other instances, an object beyond the clear zone may require removal or shielding. Use of an appropriate clear zone distance amounts to a compromise between maximum safety and minimum construction costs. Appropriate application of the clear zone concept will often result in more than one possible solution.

Figure 8. Typical Cross Section



Source: Roadside Design Guide, AASHTO, January 1996 (Figure 3.7, page 3-10).

Table 9. Clear Zone Distances (in feet from edge of driving lane)

Design Speed	Design ADT	Fill Slopes			Cut Slopes		
		1:6 or flatter	1:5 to 1:4	1:3	1:3	1:5 to 1:4	1:6 or flatter
35 MPH or less	Under 750	7 to 10	7 to 10	**	7 to 10	7 to 10	7 to 10
	750 -1,500	10 to 12	12 to 15	**	10 to 12	10 to 12	10 to 12
	1,500-6,000	12 to 15	15 to 17	**	12 to 15	12 to 15	12 to 15
	Over 6,000	15 to 17	17 to 18	**	15 to 17	15 to 17	15 to 17
40 to 50 MPH	Under 750	10 to 12	12 to 15	**	9 to 10	9 to 10	10 to 12
	750 -1,500	15 to 17	17 to 20	**	10 to 12	12 to 15	15 to 17
	1,500-6,000	17 to 18	20 to 27	**	12 to 15	15 to 17	17 to 18
	Over 6,000	20 to 22	25 to 28	**	15 to 17	18 to 20	20 to 22
55 MPH	Under 750	12 to 15	15 to 18	**	9 to 10	10 to 12	10 to 12
	750 -1,500	17 to 18	20 to 25	**	10 to 12	15 to 17	17 to 18
	1,500-6,000	20 to 22	25 to 30	**	15 to 17	17 to 18	20 to 22
	Over 6,000	22 to 25	27 to 33 *	**	17 to 18	20 to 22	22 to 25
60 MPH	Under 750	17 to 18	20 to 25	**	10 to 12	12 to 15	15 to 17
	750 -1,500	20 to 25	27 to 33 *	**	12 to 15	17 to 18	20 to 22
	1,500-6,000	27 to 30	33 to 40 *	**	15 to 18	18 to 22	25 to 27
	Over 6,000	30 to 33 *	36 to 45 *	**	20 to 22	25 to 27	27 to 28
65 MPH	Under 750	18 to 20	20 to 27	**	10 to 12	15 to 17	15 to 17
	750 -1,500	25 to 27	28 to 36 *	**	12 to 17	18 to 20	20 to 22
	1,500-6,000	28 to 33 *	35 to 43 *	**	17 to 20	22 to 25	27 to 28
	Over 6,000	30 to 35 *	38 to 46 *	**	22 to 25	27 to 30	28 to 30

* Where a site specific investigation indicates a high probability of continuing accidents, or such occurrences are indicated by accident history, the designer may provide clear zone distances greater than 30 feet as indicated. Clear zones may be limited to 30 feet for practicality and to provide a consistent roadway template if previous experience with similar projects or designs indicates satisfactory performance.

** Since recovery is less likely on the unshielded, traversable 1:3 slopes, fixed objects should not be present in the vicinity of the toe of these slopes. Recovery of high-speed vehicles that encroach beyond the edge of the shoulder may be expected to occur beyond the toe of slope. Determination of the width of recovery area at the toe of slope should take into consideration right-of-way availability, environmental concerns, economic factors, safety needs, and accident histories. Also, the distance between the edge of the travel lane and the beginning of the 1:3 slope should influence the recovery area provided at the toe of slope.

Source: Roadside Design Guide, AASHTO, January 1996. (Table 3-1, page 3-4)

NOTE: This table has been converted from meters to feet.

A common consideration of the clear zone application as it applies to a rural area is what to do in a heavily forested area. As stated previously, a use of an appropriate clear zone distance amounts to a compromise between maximum safety and minimum construction costs. The Roadside Design Guide (AASHTO, January 1996) provides some guidance as to this type of situation. Under a situation where the available clear zone distance is less than the recommended recovery area, a review of accident data may provide guidance on the appropriate action that should be taken. When an area has a significant number of run-of-the-road accidents, it may be appropriate to consider shielding or removing the entire row of trees, or other objects, within the accident area. If a section of road consistently has the recommended clear zone distance, then one isolated tree located within the clear zone could represent a more significant hazard and should be considered for removal. Again, the clear zone distance is an approximate number at best and individual objects should be analyzed in relation to other nearby obstacles.

7.0 PARKING RESTRICTIONS

Street lanes for moving traffic preferably should be at least 12 feet wide and where feasible they should be 14 feet wide. Where needed and where limitations exist in residential areas, a parallel-parking lane at least 7 feet wide should be provided on one or both sides, as conditions require. On residential streets where the primary service is to provide land service and foster a safe and pleasant environment, at least one unobstructed moving lane must be ensured even when parking occurs on both sides. In general, parking will not be allowed on curves where hazardous situations may be created.

When it is determined that parking signs (R7 series) are needed, the proper installment of such signs shall follow the MUTCD. Generally, parking signs should display the following information as appropriate:

1. Restriction or prohibition.
2. Time of day if applicable, if not all hours.
3. Days of week if applicable, if not every day.

7.1 Parking

It is the policy of Cole County that every motor vehicle stopped or parked upon a highway or road shall be so stopped or parked with the right hand wheels of such vehicle parallel to or within eighteen (18) inches of the right edge of the roadway if there is no shoulder or berm or when a shoulder or berm is available as near to the right edge of the highway as reasonable practicable.

7.2 Obedience to Parking Signs or Markers

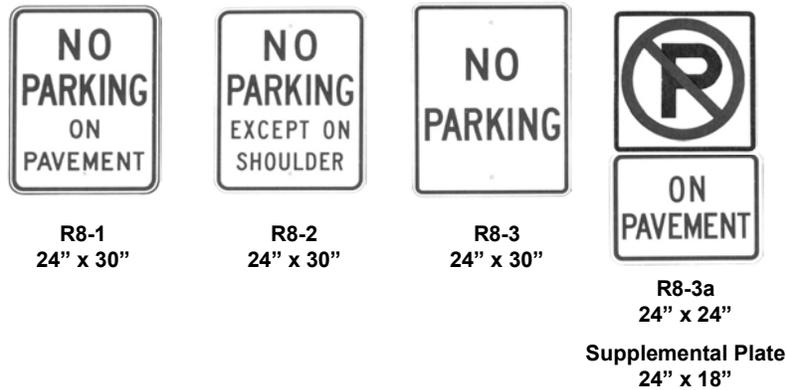
No person shall park on any highway that has been signed or marked by means of official traffic control device except in compliance with the traffic control device and the requirements of these regulations. Figure 9 shows typical parking restriction signs used in urban environments.

Figure 9. Parking Restriction Signs



In rural districts, special parking prohibition signs may be used to emphasize that no person shall stop, park, or leave standing any vehicle on the paved or traveled part of the highway. The legend on rural parking signs must be appropriate to the restrictions imposed. Figure 10 displays common rural parking restriction signs.

Figure 10. Rural Parking Restriction Signs



7.3 Stopping, Standing or Parking Prohibited

Except when necessary to avoid a safety hazard with other traffic, or in compliance with law or the directions of a law enforcement official or official traffic control device, no person shall:

- 7.3.1 Stop, stand or park a vehicle on a roadway side of any vehicle stopped or parked at the edge or curb of a roadway; or stop, stand or park a vehicle on a sidewalk, intersection, crosswalk, between a safety zone and the adjacent curb or within thirty (30) feet of a highway intersection unless indicated otherwise by signs or marking; or stop, stand or park a vehicle alongside or opposite any roadway excavation or obstruction when stopping, standing or parking would obstruct traffic; or stop, stand or park a vehicle upon any bridge or any other elevated structure upon a highway or upon any railroad tracks and at any place where official signs prohibit stopping, standing or parking; or stop, stand or park in a handicapped parking space or zone unless the vehicle so parked is authorized by law or lawful regulation to use handicapped parking spaces or zones; or stop, stand or park in a parking space signed or marked as reserved or restricted to the use of specified vehicles or persons when the person stopping, standing or parking a vehicle is not authorized to do so by such sign or marking or by the person who owns or has a lawful possessory interest in the restricted parking space.
- 7.3.2 No person shall stand or park a vehicle, whether occupied or not, except momentarily to pickup or discharge a passenger or passengers or to momentarily load or unload such vehicle when in front of a public or private driveway, within fifteen (15) feet of fire hydrant or mailbox used for receipt or deposit of mail transported by the United States Postal Service, within twenty (20) feet of a crosswalk at any intersection, within thirty (30) feet upon the approach to any flashing signal, stop sign or traffic control signal located at the side of a roadway or within twenty (20) feet of a driveway entrance to any fire station or on the side of a street opposite the entrance to a fire station within seventy-five (75) feet of said entrance and sign posted at any place where official traffic control device prohibits standing.
- 7.3.3 No person shall park a vehicle, whether occupied or not, except temporarily for purpose of and while actually engaged in loading or unloading personal property or passengers, within fifty (50) feet of the nearest rail of a railroad crossing or at any place where official traffic control device prohibits parking.

7.4 Parking Not to Obstruct Traffic

No person shall park any vehicle upon a highway or street in such a manner and under such conditions as to leave available less than twelve (12) feet of width of the roadway for free movement of vehicular traffic. If no centerline is present, minimum travel width shall be sixteen (16) feet.

7.5 Parking Unlicensed Cars on Highways Prohibited

No person shall park or keep any motor vehicle on or along any highway unless such vehicle is currently registered with the Missouri Department of Revenue or other governmental authority of another state and displays a current valid license plate or other governmentally issued evidence of current motor vehicle licensing and registration.

7.6 Parking of Wrecked or Disabled Vehicles on Highways Prohibited

No person shall park, keep or permit the parking or keeping of any motor vehicle upon any highway or street which is wrecked or disabled for any longer than is necessary to remove such vehicle from the highway and in no event in excess of twenty-four (24) hours. No person shall park a vehicle upon any roadway for more than seventy-two hours for the principal purpose of: displaying such vehicle for sale or repairing such vehicle.

7.7 Removal of Motor Vehicles Generally; Removed Vehicles Deemed Abandoned or Disabled.

7.7.1 Law Enforcement officers are authorized to have a motor vehicle removed from a street or highway to a service station, garage or other place of safety:

- 1) When any vehicle is left unattended upon any bridge, viaduct or causeway, or in any tube or tunnel where such vehicle constitutes an obstruction to traffic.
- 2) When a vehicle upon a street or highway is so disabled as to constitute an obstruction to traffic, and the person in charge of the vehicle is, by reason of physical injury, incapacitated to such an extent as to be unable to provide for its custody or removal.
- 3) When any vehicle is left unattended upon a street and is parked illegally so as to constitute a definite hazard or obstruction to the normal movement of traffic.

7.7.2 Any motor vehicle removed from a street or highway maintained by the county, under the provisions of this section shall be considered an abandoned or disabled motor vehicle and the provisions and procedures contained in Section 9 shall apply and be observed.

7.7.3 Any law enforcement officer authorizing the tow shall make an inquiry with the statewide computer system and National Crime Information Center (NCIC) to determine if the abandoned property has been reported stolen. The sheriff's department shall enter the abandoned property information into the statewide computer system.

7.8 Removal and Disposition of Abandoned or Disabled Vehicles.

7.8.1 Any law enforcement officer may have any abandoned or disabled motor vehicle towed away and stored by any service station or garage licensed to do business in the county. If the vehicle is unclaimed after a period of seventy-two (72) hours, the vehicle may be stored outside the county boundary by the service station or garage; provided, that the storage areas are within a reasonable distance of the county and the vehicle is accessible for reclaim during normal business hours. A report showing the location of the stored vehicle shall be filed, by the law enforcement officer who authorized its removal, with the sheriff, who shall notify the owner or any holder of a security interest appearing on the title of such vehicle of the location of the vehicle, and instructions for redeeming the vehicle, by certified mail.

- 7.8.2 The owner of any vehicle in this county under the provisions of subsection (a) of this section, or the holder of a security interest in the vehicle, which interest is in default, may reclaim such vehicle from the service station or garage upon proof of ownership or valid security interest which is in default and full payment of all charges for the towing and storage of the vehicle. If the owner or lienholder believe the vehicle was improperly towed, they shall have the right to request a hearing before the sheriff. If they are dissatisfied with the results of the hearing, they may seek review before the Associate Circuit Court of Cole County. Any review by the Associate Circuit Court of Cole County shall be consolidated with the hearing on any citation issued related to the towing incident.
- 7.8.3 The owner of the service station or garage towing and storing of a vehicle under the provisions of subsection (a) of this section, may sell the vehicle for salvage or the vehicle may be sold at public auction, if it remains unclaimed for thirty (30) days. Notice of the sale of a motor vehicle at public auction shall be posted for at least ten (10) days prior to the sale, at the service station or storage area where the vehicle is located, on the bulletin board in the county courthouse. The notice shall include any identifying marks or numbers, date and place where the vehicle was found, time and place of the public auction and any accrued charges against the vehicle. When any vehicle is sold for salvage or is sold at a public auction, the service station or garage shall immediately notify the sheriff and the recorder of deeds/assessor/county clerk, in writing, of the sale of such vehicle.
- 7.8.4 The proceeds of the sale shall first be used to pay the cost of the sale, all towing and storage costs accrued against the vehicle, and the balance, if any, shall be paid into the general revenue fund of the county, unless otherwise stipulated in a contract with a service station or garage providing towing and storing services for the County.

7.9 Responsibility of Owner for Violations.

- 7.9.1 In any prosecution for a violation of any of the provisions of this division, proof that the vehicle described in the complaint was parked in violation of any provisions of this division, together with proof that the defendant named in the complaint was at the time of such parking the owner of the vehicle, shall constitute in evidence a prima facie presumption that the owner of the vehicle was the person who parked the vehicle at the point where, and for the time during which, such violation occurred.
- 7.9.2 If any vehicle is found upon any alley, roadway, street or property in violation of any provision of these ordinances, the owner or person in whose name such vehicle is registered in the records of any city, county or state shall be held prima facie responsible for such violation, if the driver thereof is not present.
- 7.9.3 Failure to display current license plates and renewal tabs as issued by the Director of the Missouri Department of Revenue shall be prima facie evidence that the vehicle is improperly registered.

7.10 Bill of Sale Requirements.

The bill of sale issued by the county upon the sale of abandoned property shall be lawful proof of ownership. The bill of sale must include:

1. Year, make, identification number and model of the abandoned property;

2. Odometer disclosure on vehicles that are less than 10 years of age. The disclosure must include the printed names and signatures of the buyer(s) and seller(s);
3. Date of sale;
4. Printed name and signature of the municipal clerk or deputy;
5. Printed name and signature of the buyer; and
6. The official seal of the municipality.

The purchaser of the abandoned property must apply for a junking certificate or salvage certificate of title designated with "Salvage/Abandoned Property" on the face within thirty (30) days of purchase.

7.11 Disposition of Vehicles Left Unattended

Any person who removes a motor vehicle at the Direction of a law enforcement officer as provided in this ordinance shall have a lien for all reasonable charges for the towing and storage of the vehicle, until possession of the vehicle is voluntarily relinquished to the owner of the vehicle, or to the holder of a valid security interest thereon which is in default. Any personal property within the vehicle need not be released to the owner thereof until the reasonable or agreed charges for such recovery, transportation or safekeeping have been paid or satisfactory arrangements for payment have been made, except that personal medical supplies shall be released to the owner thereof upon request. Such lien shall be enforced as dictated by RSMo. 304.155 Subsections 7-(1), (2), (3 a, b, c & d), Subsection & Subsection 9.

8.0 SIGHT DISTANCE FOR DRIVEWAYS

Preparation for issuing a driveway permit must include a prior inspection of the driveway site to insure that vehicles can enter and exit from the proposed driveway with a minimum hazard and disruption of traffic along the roadway. Sight distance for driveway construction should be considered essential in the design of commercial or industrial type driveways and desirable with respect to residential driveways. If there is a request to construct a driveway at a questionable location, a traffic study must include an on-site inspection to evaluate the sight distance.

There are two basic concerns of responsibility when considering the sight distance requirements for any driveway. The first concern is to provide maximum safety for the motoring public. The second concern is to provide for access to the adjacent property owners. Vertical and horizontal alignments of many existing supplementary routes are based on 50 kmph (30 mph) design speed while the posted speed is often 90 kmph (55 mph).

Fortunately, adjacent property owners who are constructing new driveways to an existing route are usually anxious to consider the safest location for a driveway.

The following criteria based on the American Association of State Highway and Transportation Officials (AASHTO) guidelines and the Design Manual has been developed in order to establish a uniform method of determining the necessary sight distance for a driveway constructed by permit. There are three different sight distances used. They are: ***Design Entering Sight Distance, Minimum Entering Sight Distance and Minimum Entrance Stopping Sight Distance***. All sight distance measurements are based on a 1070 mm (3.5 foot) height of eye and a 1300 mm (4.25 foot) height of object. The use of the 1300 mm (4.25 foot) object is based on fact that typically the only change in the roadway is that there is now an additional entrance to the roadway and a vehicle is the expected object using the driveway and the existing route. Cole County traffic personnel must review the ***Minimum Entrance Stopping Sight Distance***.

1. If the driveway location meets or exceeds the requirements for the ***design entering sight distance*** for the posted speed of the roadway as established in Table 10, a permit may be written.
2. If a driveway location within the limits of the property frontage has less than the ***design entering sight distance***, but equal to or more than the ***minimum entering sight distance***, a permit may be written for the driveway construction but must include the Applicant's Responsibility Clause as follows: "Applicant understands the presence of this driveway creates a potential sight distance problem and has been so informed in writing by the department." In this instance, it is imperative that property owners be on the site to be certain they understand the conditions of this driveway construction.
3. If the measured sight distance is less than the ***minimum entering sight distance*** and greater than the ***minimum entrance stopping sight distance***, Cole County traffic personnel must review the ***minimum entrance stopping sight distance***. If the review substantiates that minimum entrance stopping sight distance measured for the proposed driveway is greater than the ***minimum entrance stopping sight distance*** shown in Table 10, the District Engineer may approve the driveway location if all of the following conditions are met:
 - a) The proposed driveway location has the maximum sight distance available for the property frontage. The applicant should be advised of minor work on their property, which could improve sight distance such as minor grading or brush removal.

- b) There is no other access available, which has greater sight distance. (i.e., city street or cross access).
- c) The applicant agrees to signing the permit application that states in addition to the normal responsibility clause the following statement. “Applicant is aware that the sight distance of this driveway is severely restricted. The sight distance is the minimum distance necessary for a vehicle traveling at the posted speed to complete a stop prior to the driveway.”

If these conditions are not met the permit shall not be issued for the driveway. If an appeal for the access is made, it should be sent to the Cole County Traffic Advisory Committee for additional review.

- 4. The County may allow the widening of a driveway with limited sight distance or may allow the relocation of a driveway with limited sight distance to a location on the property frontage with better sight distance without County approval. This will be allowed on routes with normal right-of-way, provided there is no change in driveway usage. The following responsibility clause must be added to the permit.

“Applicant understands that the existing sight distance for this driveway is less than current design standards and the driveway modification, while beneficial to the property owner, will not remedy the sight distance limitation.”

Both vertical and horizontal alignment can limit sight distance. In order to measure actual sight distance limited by vertical alignment, place a sighting target 1300 mm (4.25 feet) above the edge of pavement at a point 3.6 meter (12 feet) from the edge of pavement (approximate location of a driver approaching the roadway) at the proposed driveway location. Sighting from a height of 1070 mm (3.5 feet), move along the roadway away from the proposed driveway site to a point beyond where the target disappears. Now move toward the target until it can first be seen and place a mark on the pavement. Measure the distance along the roadway between the mark and the target. Measurement may be made with an accurate measuring device mounted on an automobile. This measured distance is the sight distance.

Posted speed at horizontal curves may be used to determine required sight distance for driveways within the limits of a horizontal curve.

Even when the applicant is present, sight distance measurements in terms of meters (feet) may be difficult for an applicant to understand when it comes to getting on and off the roadway. A measurement of time lapse may help the applicant get a better understanding of critical nature of the situation.

A sight distance visibility time for the driver exiting a driveway to see an approaching vehicle can be used. A value of 7 seconds enables a stopped passenger car to cross a 2-lane highway. A value of 10 seconds allows vehicles exiting the driveway to turn left or right onto 2-lane roads without interference (slowing down) of through traffic at speeds up to 50kmph (30mph). At speeds greater than 50 kmph (30 mph), the value of 10 seconds will require some slowing of through traffic.

Trucks require greater sight distance than needed for passenger cars, however, the greater driver eye height, typically over 1.8 meter (6 feet), provides an allowance for vertical curve conditions. If the obstruction to sight is a horizontal curve or other lateral blockage, a 50 percent increase in visibility time is recommended.

Grading on the right-of-way to improve sight distance should be considered and included in the permit for driveway construction.

Public street entrances should meet or exceed Design Entering Sight Distance.

Table 10. Sight Distance Requirements

POSTED SPEED		MINIMUM ENTRANCE STOPPING SIGHT DISTANCE		MINIMUM ENTERING SIGHT DISTANCE		DESIGN ENTERING SIGHT DISTANCE	
kmpH	mph	meter	feet	meter	feet	meter	feet
50	30	60	200	95	310	120	395
	35		225		360		450
60	40	75	275	125	410	175	575
70	45	95	325	135	445	200	655
80	50	115	375	155	510	250	820
90	55	135	425	170	560	300	985
100	60	160	525	190	625	365	1,200
110	65	180	600	210	700	450	1,340
120	70	205	700	225	740	475	1,560

Source: The above distances are based on Table III-1 and Figure IX-41 of the AASHTO Green Book 1994 edition and the MHTD Metric Design Manual.

Notes regarding using Sight Distance Requirements (Table 10):

If the sight distance is less than the **Design Entering Sight Distance** but greater than the **Minimum Entering Sight Distance**, the following Applicant's Responsibility Clause must be added to the permit. "Applicant understands the presence of this driveway creates a potential sight distance problem and has been so informed in writing by the department."

If the sight distance is less than the **Minimum Entering Sight Distance** but greater than or equal to the distance shown for **Minimum Entrance Stopping Sight Distance**, a permit may be issued. However, the applicant responsibility clause and the following statement must both be shown on the permit. "Applicant is aware that the sight distance of this driveway is severely restricted. The sight distance is the minimum distance necessary for a vehicle traveling at the posted speed to complete a stop prior to the driveway."

9.0 MOWING

1. Under normal conditions it will be the goal of the County to mow the shoulders along all County routes with A.D.T. of at least 400 vpd once or twice per year to maintain traffic safety.
2. The critical areas for traffic safety at the crests of hills and adjacent to side roads and driveways will be mowed more frequently. These shoulder areas should be mowed for a width of ten feet from the edge of road and a distance of 200 feet on both sides of a hillcrest or a side road or driveway.
3. As an alternate, the County will consider treating critical areas with growth retardant or seeding of short growth grasses or plants.
4. As much as possible, the mowing will be timed to precede major holidays when traffic volumes and exposure to the public will be greater.
5. The County will encourage the local property owners to mow their respective right-of-way areas (as required within municipalities).

10.0 TRAFFIC SAFETY ADMINISTRATION

The County shall have as a goal to establish and maintain certain data files, establish review and analysis procedures and designate an individual to act as a road and sign inspector. Data files that include recent traffic counts traffic accident history reports, traffic safety complaints and maintenance history records are important tools necessary for the County to respond to traffic safety concerns in a timely matter and to document a discretionary decision, when required.

1. Traffic count data will be obtained on all county roads and updated as necessary. County arterial routes and routes where rapid land use growth is occurring will be counted annually, while normal collector routes will be counted every two or three years and local roads counted four or five years. This data, including volumes and dates, will be posted on a map for quick reference.
2. Traffic accident history reports available from the state highway safety offices will be reviewed periodically and posted on maps for quick visual identification of routes or areas where special attention should be given.
3. A system will be set up to formally record traffic safety complaints or concerns as described by the general public, county employees or officials, law enforcement personnel and others. A reporting form that will be supplied to all public works department employees to either receive or record complaints or problems is included in the Appendix. These complaints or problems will also be posted on a map like the accident data.
4. Records of maintenance procedures, which have been completed for pavements, ditches, bridges, traffic controls and other items, will be kept. This information will likewise be posted on maps to identify areas where excessive maintenance has been required, areas where total reconstruction might be more effective, areas which should be checked because little or no maintenance have been completed and other patterns which should be analyzed further.

The County will have the following policies as a goal to provide as much roadside safety as is practical.

1. Construct all new or upgraded roads to provide the pavement and shoulder widths listed in Table 8, as well as a clear zone listed in Table 9.
2. Conduct an inventory of all roadside obstructions, steep side slopes and deep ditches along all routes with traffic volumes of more than 400 vpd.
3. Require that all new utility poles on the outside of roadway curves be located at least ten feet from the shoulder or modified to a breakaway design.
4. Set up a systematic removal program to cut all trees with truck diameters greater than six inches located within ten feet of the shoulder on the outside of roadway curves within the right-of-way of County maintained routes.
5. Set up a program to systematically regrade roadside ditches, which have eroded up to the pavements. This will require inspection and reporting by County public works, Sheriff's patrols and general citizens as part of daily work or travel within the County. (See the Complaint Form included in the Appendix.)
6. Adopt the proposed regulation regarding mailboxes/newspaper delivery boxes located in the public right-of-way, which is included in the Appendix.

7. Adopt a regulation that would eliminate perhaps the most dangerous and controllable roadside obstacle by prohibiting the parking of vehicles within the public right-of-way except along curbed streets where adequate pavement width exists to safely accommodate the parked vehicles.
8. Adopt a regulation, which would prohibit anyone from placing or constructing structures, walls, fences, signs, poles, posts, bushes, trees, boulders, or other obstructions within the public right-of-way.
9. Adopt a regulation which would require that permits be required for all new or reconstructed driveway or access road connections to County routes to insure that such driveways meet County standards regarding such design elements as distance of crossroad culverts from the main County route, the entrance radii, the width of driveways and the locations of driveways with respect to roadway intersections and other driveways. (See recommended Driveway/Entrance Standards in the Appendix.)

Authority of chief of police; emergency and experimental regulations; testing of traffic control devices.

10. The Cole County Sheriff by and with the approval of the Cole County Director of Public Works is hereby empowered to make regulations necessary to make effective the provisions of this chapter and other traffic ordinances of the County, and to make and enforce temporary and experimental regulations, to cover emergencies or special conditions. No such temporary or experimental regulations shall remain in effect for more than ninety (90) days.
11. The Cole County Director of Public Works may test traffic control devices under actual conditions of traffic.

11.0 REGULATION FOR THE ACCOMMODATION OF MAILBOXES AND NEWSPAPER DELIVERY BOXES ON COLE COUNTY HIGHWAY RIGHTS-OF-WAY

No mailbox or newspaper delivery box (hereafter referred to as mailbox) will be allowed to exist on Cole County rights-of-way if it interferes with the safety of the traveling public or the function, maintenance, or operation of the highway system. A mailbox installation that does not conform to the provisions of the regulation is an unauthorized encroachment under State Code Section 229.030.

The location and construction of mailboxes shall conform to the rules and regulations of the U.S. Postal Service as well as to standards established by Cole County. Cole County standards for the location and construction of mailboxes are available from:

**Cole County
Department of Public Works
5055 Monticello Road
Jefferson City, Missouri 65109**

In mailbox installation that conforms to the following criteria will be considered acceptable unless in the judgment of the Cole County Director of Public Works the installation interferes with the safety of the traveling public or the function, maintenance, or operation of the highway system.

11.1 Location

1. No mailbox will be permitted where access is obtained from the lanes of a freeway or where law or regulation otherwise prohibits access.
2. Mailboxes shall be located on the right-hand side of the roadway in the direction of the delivery route except on one-way streets where they may be placed on the left-hand side. The bottom of the box shall be set at an elevation established by the U.S. Postal Service, usually between 3'6" and 4'0" above the roadway service. The roadside face of the box shall be offset from the edge of the traveled way a minimum distance of the greater of the following: eight feet (where no paved shoulder exists), the width of the all-weather shoulder presents plus 8 to 12 inches.
3. Exceptions to the lateral placement criteria above will exist on residential streets and certain designated rural roads where Cole County deems it in the public interest to permit lesser clearances or to require greater clearance. On curbed streets, the roadside face of the mailbox shall be set back from the face of curb a distance between 6 to 12 inches. On residential streets without curbs or all-weather shoulders and that carry low-traffic volumes operating at low speeds, the roadside face of a mailbox shall be offset between 8 and 12 inches behind the edge of pavement. On very low-volume rural roads with low-operating speeds, Cole County may find it acceptable to offset mailboxes a minimum of 6'8" from the traveled ways and under some low-volume, low-speed conditions may find clearances as low as 2'8" acceptable.
4. Where a mailbox is located at a driveway entrance, it shall be placed on the far side of the driveway in the direction of the delivery route.
5. Where a mailbox is located at an intersecting road, it shall be located a minimum of 100 feet beyond the center of the intersecting road in the direction of the delivery route. This distance shall be

increased to 200 feet when the average daily traffic on the intersecting road exceeds 400 vehicles per day.

11.2 Structure

1. Mailboxes shall be of light sheet metal or plastic construction conforming to the requirements of the U.S. Postal Service. Newspaper delivery boxes shall be of light sheet metal or plastic construction of minimum dimensions suitable for holding a newspaper.
2. No more than two mailboxes may be mounted on a support structure unless the support structure and mailbox arrangements have been shown to be safe by crash testing. However, lightweight newspaper boxes may be mounted below the mailbox on the side of the mailbox support.
3. A single 4-inch x 4-inch or 4 ½ -inch diameter wooden post or a metal post with a strength no greater than a 2-inch diameter standard strength steel pipe and embedded no more than 24 inches into the ground will be acceptable as a mailbox support. A metal post shall not be fitted with an anchor plate, but it may have an anti-twist device that extends not more than 10 inches below the ground surface.
4. The post-to-box attachment details should be of sufficient strength to prevent the box from separating from the post top if a vehicle strikes the installation.
5. The minimum spacing between the centers of support posts shall be three-fourths the height of the posts above the ground-line.
6. Mailbox support designs not described in this regulation will be acceptable if approved by the Cole County Director of Public Works.

11.3 Shoulder And Parking Area Construction

1. It will be the responsibility of the postal patron to inform Cole County of any new or existing mailbox installation where shoulder construction is inadequate to permit all-weather vehicular access to the mailbox.

11.4 Removal Of Nonconforming Or Unsafe Mailboxes

1. The postal patron upon notification by the Cole County Director of Public Works shall remove any mailbox that is found to violate the intent of this regulation. At the discretion of the Cole County Director of Public Works based on an assessment of hazard to the public, the patron will be granted not less than 24 hours nor more than 30 days to remove an unacceptable mailbox. After the specified removal period has expired, the unacceptable mailbox will be removed by Cole County at the postal patron's expense.

12.0 ROAD AND SIGN INSPECTION

The Cole County Department of Public Works will have an employee or employees designated “Road and Sign Inspector(s).”

12.1 Duties of Road and Sign Inspector(s)

1. The “Road and Sign Inspector(s)” will have the duties of inspection of roads and signs in the Cole County Highway System. The inspector(s) will both physically and through others carry out a formal system of inspecting the County roads under the jurisdiction of the Cole County Department of Public Works and will maintain records regarding such inspections. The inspector(s) will complete and maintain record forms entitled “Inspection System Report of Road and Sign Inspector.” The “Road and Sign Inspector(s)” will have other duties or jobs, but will attempt, as far as possible to give this job the required priority.
2. The “Road and Sign Inspector(s)” shall set up a regular schedule for inspection of the roads under the Cole County Department of Public Works jurisdiction on a yearly basis.
3. A copy of the route to be traveled on inspection showing the frequency of such travel will be kept on file with the “Inspection System Report of Road and Sign Inspector” at the County Public Works Facility. Since the route traveled and the frequency of such travel requires a determination of policy considering the overall operation of the Department, the ultimate decision on these matters shall remain with the Director of Public Works and the copy of the route and frequency will be approved by the Cole County Commission.
4. The “Road and Sign Inspector(s)” will not be able to note all possible defects or problems with signs and the roads and still be able to effectively carry out this program, therefore, he shall look specifically for these problems:
 - a. Missing, damaged or defective stop signs;
 - b. Missing, damaged or defective Stop Ahead, T intersection, or other intersectional marking signs;
 - c. Missing Advance Warning signs; and
 - d. Conditions on the road that the “Road & Sign Inspector(s)” deems to need attention within 24 hours.
5. The “Road and Sign Inspector(s)” should carry on the inspection trips, the following:
 - a. Two (2) Stop signs;
 - b. One (1) Yield sign;
 - c. Two (2) Stop Ahead signs;
 - d. Two (2) “T” Intersection warning signs;
 - e. Two (2) sign posts, and

- f. Two (2) Portable Barricades
- 6. The “Road and Sign Inspector(s)” shall promptly, upon becoming aware of their absence, replace any missing Stop, Yield, Stop Ahead, or “T” Intersection warning signs. The inspector(s) shall use his reasonable judgment, as how to effect these replacements as soon as is possible.
- 7. Missing Road Name Signs will generally be replaced within ten working days from date of notice that sign is missing.

12.2 Suggestion to All Department Employees

- 1. All Cole County Department of Public Works employees are requested to note and inspect Cole County roads on their way to from work. They are requested to take particular note for the following:
 - a. Missing Stop Signs;
 - b. Missing Yield signs;
 - c. Missing Stop Ahead signs;
 - d. Missing “T” Intersection signs or intersectional signs;
 - e. Missing Advanced Warning signs; and
 - f. Any defect in the road that they feel might cause an accident.
- 2. Upon noting such a defect, the employee should promptly report such defect to the “Road and Sign Inspector(s)”, foreman or office. If the employee has the material to make temporary repairs, they should be made after reporting to the proper authority.
- 3. All employees, in driving to and from various job sites in the course of the day, shall attempt, in their best judgment, to drive on the county Highway System looking for defects in the road or damaged or missing signs. Upon noting a defect or missing sign, they shall immediately report such problem. This shall be done unless it is not reasonable and practical under the circumstances.
- 4. All employees noticing signs or defects in roads under the jurisdiction other than the County Department of Public Works shall report the same to the Road and Sign Inspector or office who shall call the appropriate jurisdiction and advise the location and the defect in question.

12.3 Publication for Repairs

1. The Cole County Director of Public Works will make arrangements to place an “ad” in the most prominent newspaper in the County, requesting the public to call the Department concerning downed or missing signs or defects in the roads.

Such ad might read:

“Safe driving and roads depend on everyone. Please help us keep your County Highways safe by reporting missing or damaged signs or other defects to the Cole County Department of Public Works at 314-636-3614. “Working together. to serve”. With your help we can.

Cole County Director of Public Works.

12.4 Calls from Other Agencies

1. The Director of Public Works will yearly write to local law enforcement agencies requesting their help in reporting missing signs and defects on Cole County Highway with the numbers to call for assistance.

COLE COUNTY TRAFFIC & SAFETY ADVISORY BOARD BYLAWS

Revised April _____, 2001

The Cole County Commission (hereinafter referred to as the Commission) created the COLE COUNTY TRAFFIC & SAFETY ADVISORY BOARD (hereinafter referred to as the Board) on August 5, 1988.

MEMBERS

- A. The Board shall consist of ten (10) members. Of the ten (10) members:
1. Three (3) shall be ex officio members without a vote. These shall be:
 - a. Director of Public Works or his delegate;
 - b. County Engineer or his delegate;
 - c. County Sheriff or his delegate.
 2. Six (6) shall be regular members, who are residents of the County.
 3. One (1) shall be a Commission member, who shall be a voting member. Another Commission member may be appointed as an alternate, and shall attend at will and replaces the primary member in his absence.
- B. The term of office shall be three (3) years with one-third of the positions being available for appointment each year. Upon creation of this Board, the Commission shall name three (3) members for three-year appointments, two (2) members for two-year appointments, and two (2) members for one-year appointments. Thereafter, all Board members shall serve full three-year terms.
- C. The Commission, with majority vote, shall appoint and confirmed persons to serve on the Board.
- D. The Commission, with a majority vote, may remove any member of the Board for failure or inability to attend meetings or for other good cause shown.
- E. The appointed members of the Board shall receive no compensation but shall receive reimbursement for costs incurred with their service.
- F. A vacancy on the Board shall be filled by appointment and approval in like manner for the un-expired portion of the term. All members shall continue to serve until their successors shall have been appointed and qualified.
- G. The Commission shall purchase and keep in force a public liability insurance policy that shall cover all Board members in regards to any liability incurred because of their duties or positions as Board members. An exception to the coverage is misconduct or negligence excluded by the insurance policy.

OFFICERS

The members of the Board shall choose the chairman of the Traffic & Safety Advisory Board from those persons confirmed as regular members by the Commission. The chairman shall serve for a one-year term. The chairman shall be a voting member although he is not permitted to make motions. The Board may pick a vice-chairman and any other officers they deem necessary. The secretary to the Director of Public Works shall serve as the Recording Secretary for the Board and record all minutes.

MEETING, QUORUM, RULES AND PROCEDURES

- A. The Board shall hold a regular business meeting at least quarterly or at such time and place the Board shall establish. The Board may hold additional business meetings as deemed necessary.
- B. Four (4) voting members shall constitute a quorum for the transaction of business.
- C. The Board may establish such rules and procedures, as it believes are reasonably necessary for expeditious transaction of its business affairs and which are in conformance with County policy.
- D. All meetings shall be open and public, and the date, time and location of it shall be posted and be public information at least twenty-four (24) hours prior to the meeting.

DUTIES GENERALLY

The duties of the Board shall generally include, but not limited to, the duty:

- 1. To consider and recommend the establishment and regulation of speed zones; no parking zones; and stop signs, whether electrical or non-electrical.
- 2. To consider and recommend the location, type, timing, and specifications of all traffic-control devices, including, but not limited to, electrical signals, signs, markers, pavement and curb painting.
- 3. To consider and recommend the establishment of any motor vehicle, traffic or parking regulations which, in the opinion of the Board, promotes traffic safety or decreases traffic congestion within the unincorporated boundaries of the county.
- 4. To call upon and receive the cooperation and assistance of all departments, officers and employees of the county, and to promote cooperation and coordination with other governmental agencies.
- 5. To provide for the attendance of one of its members at traffic and safety forums, seminars or institutions where special instruction courses in the field of traffic and safety may be offered.
- 6. To recommend the employment of a qualified consultant, or seek internal assistance, when the need for trained technical assistance on traffic matters arises.
- 7. To develop written guidelines for the establishment of a Traffic and Safety manual to be adopted by the Commission.
- 8. To review and recommend as necessary county laws and court orders relating traffic control of motor vehicles.
- 9. To consider all request, petitions or suggestions concerning the regulation of traffic and establishment of no parking zones upon study and consideration of such requests, petitions or suggestions, to make a recommendation to the Commission.
- 10. To provide the Commission with minutes of all its meetings and reports of specific recommendations.

REPORTS; ACTION BY COUNTY COMMISSION

The Commission, following receipt of the report and minutes of the Traffic & Safety Advisory Board, shall review and consider all recommendations and request the preparation of all necessary court orders to implement the recommendations which have the Commission support.

Approved this 4771 day of DECEMBER, 2001.

Traffic Safety Advisory Committee

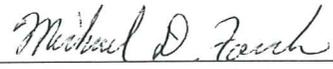
Donald F. James, P.E., Chairman
C.R. "Dick" Duncan
John J. Rodeman
Don Neumann, P.E.
Don Schnieders
Tim Tinnin



Robert Jones, Presiding Commissioner



Eric Peters, Western District Commissioner



Mike Forck, Eastern District Commissioner

Ex Officio Members:
Chris Yarnell, P.E.
Larry Benz, P.E.
Lt. Gary Woodward
Eric Peters