



# ALABAMA DEPARTMENT OF TRANSPORTATION

## Bureau of County Transportation

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Robert Bentley  
Governor

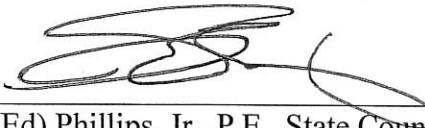
John R Cooper  
Transportation Director

August 25, 2016

### MEMORANDUM 2016-09

To: County Engineers

Cc: Regional County Transportation Engineers

From:   
D.E. (Ed) Phillips, Jr., P.E., State County Transportation Engineer

RE: Pavement Preservation Policy

Please find attached the revised ALDOT County Road Design Policy. This revision involves the creation of a new Pavement Preservation project type, scope of work and associated procedures. This new project type was identified and criteria set by an ALDOT/ACEA working group. Due to its limited scope of work, projects meeting these criteria warrant a streamlining of previous procedures. The new Policy will take effect as of this date, with the initial submission of projects not currently in the system, beginning with the new project initiation procedure.

Please read through this Policy carefully as many procedures for the new Pavement Preservation projects differ dramatically from existing 3R procedures. Please feel to contact this office should you have any questions or comments.

DEP/dep

Cc: Mr. John R. Cooper, Transportation Director  
Mr. Don T. Arkle, Chief Engineer  
Mr. Ed Austin, Assistant Chief Engineer, Policy and Planning  
Mr. Sonny Brasfield, Executive Director, ACCA  
File

# ALABAMA

Department of Transportation

## County Road Design Policy

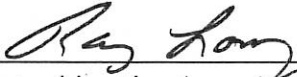
Proposed By ACEA



Adopted by the Association of County Engineers of Alabama

5/10/16

Date

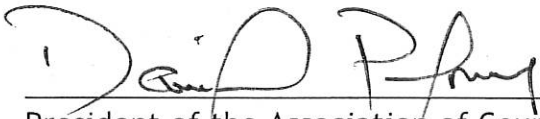


Adopted by the Association of County Commissions of Alabama

8/16/16

Date

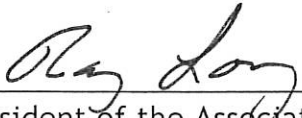
Recommended for Approval



President of the Association of County Engineers of Alabama

8/16/16

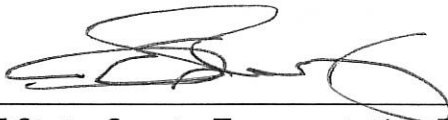
Date



President of the Association of County Commissions of Alabama

8/16/16

Date



ALDOT State County Transportation Engineer

8/22/16

Date

Approved



ALDOT Chief Engineer

8/24/16

Date

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Design speed for Pavement Preservation projects shall be defined as the selected speed for the roadway determined by analyzing factors such as average speed, posted speed, or roadway geometric features along with a review of accident data.

Chapter 6 Design Criteria for Resurfacing, Restoration and Rehabilitation (3R) (All Traffic Volumes with Design Speeds 45 MPH or Less)

Design speed for 3R projects shall be defined as the selected speed for the roadway determined by analyzing factors such as average speed, posted speed, or roadway geometric features along with a review of accident data.

Chapter 7 Design Criteria for New Roadways and Bridges with Traffic Volumes Less Than 2,500 ADT Designed for 45 MPH or Less

Design speed for this chapter shall be defined by AASHTO's *A Policy of Geometric Design of Highways and Streets*.

# Chapter 1

## Design Policies

These design criteria have been approved by the State of Alabama Department of Transportation for county roads for projects which qualify for and are actually funded through the Alabama Department of Transportation.

All projects approved by and funded through the Alabama Department of Transportation must be designed and constructed according to these criteria.

These criteria shall not apply to any roads not funded through the Alabama Department of Transportation.

Industrial Access Projects must meet the minimum cross sections of 1600-2500 ADT regardless of actual design ADT, unless the design ADT is greater than 2500, then AASHTO criteria will apply.

Transportation Research Board (TRB) *Special Report 214* shall be used as a guide for Pavement Preservation projects and Resurfacing, Restoration and Rehabilitation (3R) projects **designed for 50 MPH or greater**. If the recommended minimum geometric design values contained in TRB 214 are met, and the accident history and traffic counts are documented, then no design exception is required.

Pavement Preservation projects designed for 45 MPH or less shall refer to Chapter 5 of the *Alabama Department of Transportation County Road Design Policy*.

3R projects designed for 45 MPH or less shall refer to Chapter 6 of the *Alabama Department of Transportation County Road Design Policy*.

The design of new roadways and bridges with **design traffic counts of 2,500 ADT or more, or a design speed of 50 MPH or greater** will be based on the AASHTO publication, *A Policy on Geometric Design of Highways and Streets, current edition*. Chapter V will apply to all local roads and streets; Chapter VI will apply to all collector roads. Other sections of this book are also applicable to these projects.

New roadways and bridges having **less than 2,500 design year ADT designed for 45 MPH or less** will be based on Chapter 7 of the *Alabama Department of Transportation County Road Design Policy*. All design criteria will be based on the future (i.e., 20 year) ADT.

Any feature not meeting the above standards must be approved by the State County Transportation Engineer as a design exception.

## Chapter 2

### Clear Zone Requirements

The following is given as guidance for clear zones and treatment for slope and drainage structure protection for different type projects:

NEW ROADWAYS AND BRIDGES WITH DESIGN TRAFFIC COUNTS  
BELOW 2,500 ADT DESIGNED FOR 45 MPH OR LESS.

The suggested clear zone width is shown in Chapter 7 of the *Alabama Department of Transportation County Road Design Policy*.

NEW ROADWAYS AND BRIDGES WITH DESIGN TRAFFIC COUNTS  
OF 2,500 ADT OR MORE OR DESIGNED FOR 50 MPH OR GREATER.

The suggested clear zone width is shown in the American Association of State Highway and Transportation Officials publication, *A Policy on Geometric Design of Highways and Streets, current edition*.

# Chapter 3

## Scope of Work Review Requirements

### Pavement Preservation Projects

The Region County Transportation Engineer or representative is required to conduct a scope of work review in company with the County Engineer or his/her representative for **all projects excluding bridge replacement projects with minor or no approach work**. The Bureau of County Transportation should be notified of the time and date of this review. The designer should make recommendations for design and safety improvements. The following should be addressed, if applicable:

1. Provide the Functional Classification of the proposed project.
2. Provide a brief description including the limits of the project, design speed, scope of work review date, and persons attending.
3. Include the present and future traffic counts, truck percentage and existing pavement width.
4. Specify the type and thickness of the existing pavement as well as the proposed pavement buildup and/or surface treatments. Indicate if planing is required and if yes, specify the depth of planing needed. Also state material for flushing shoulders, if applicable.
5. Indicate the existing shoulder width as well as the existing Right-of-Way width.
6. Indicate whether or not there are any existing bridges located within the project limits. Also indicate if a guardrail system and end anchors are in place. If not, specify whether or not guardrail will be installed as part of the project or as non-contract items of work. **Note: Existing guardrail and end anchors at bridge approaches should be reviewed by visual inspection to determine if repair or replacement of the guardrail system is needed. Guardrail related items are addressed in “GUARDRAIL REQUIREMENTS” as shown in chapter 4 of this design policy.**
7. Indicate if bridge width meets requirements as outlined in Chapter 5 of Alabama Department of Transportation County Road Design Policy or TRB 214, whichever is applicable. Also, indicate if bridge posting is required and if posting signs are in place.

8. Indicate if there are any bridge culverts located within the project limits and if so, provide the BIN, begin & end culvert station, skew angle and the overall bridge culvert width. Also, indicate whether or not guardrail is in place as well as if guardrail installation is required.
9. Determine if there is a railroad crossing within the project limits or adjacent to the project. If yes, see section 8 of the current edition of ALDOT's "Procedural Guidelines for County Projects".
10. Indicate whether or not there are any existing sidewalks, pedestrian or school crossings, or other features within the project limits that will require upgrading to meet the Americans with Disabilities Act. If so, specify the general location and general description of the required upgrades.
11. Determine if there is any evidence of any informal bicycle/pedestrian activities within the project limits or the surrounding area that would require accommodations.
12. Determine if any non-contract items of work will be performed by the county and if so, specify the type of work.

The scope of work, as prepared by the county, shall be furnished to the Region allowing ample time for approval by both the Region and Bureau of County Transportation; conducting the PS&E review; and having the final plans received by the Region and sent to the Bureau of County Transportation at least **10** weeks prior to the anticipated letting date.

### 3R Projects

**A detailed scope of work is essential with these 3R guidelines and should include recommendations for eliminating any unusual condition which may be considered hazardous.**

The Region County Transportation Engineer or his/her representative is required to conduct a scope of work review in company with the County Engineer or his/her representative for **all projects excluding bridge replacement projects with minor or no approach work**. The Bureau of County Transportation should be notified of the time and date of this review. The designer should make recommendations for design and safety improvements. The following should be addressed, if applicable:

1. Provide a brief project description including limits of the project, scope of work review date, persons attending, and tentative letting date.

2. Indicate the design speed and the clear zone requirements of the section to be reviewed.
3. Provide the number and location of the existing horizontal and vertical curves that will not accommodate the design speed. The design speed of the existing sub-standard curves must also be included. The proposed improvements for these sub-standard curves must be indicated.
4. Include the accident data of the section to be reviewed. Also, show the present and future traffic counts and truck percentage.
5. State the width and type of the existing and proposed pavement. The general condition of the existing pavement must also be addressed. Indicate whether patching is needed and if leveling and/or planing is required for cross slope correction. Retain current slopes (without steepening side slopes) when widening lane and shoulders, unless warranted by special circumstances.
6. The widths and types of the existing and proposed shoulders must be shown. Indicate what type of work will need to be done to the shoulders (i.e., machine grading shoulders, additional borrow needed, etc.)
7. Indicate the width and condition of all existing bridges. Provide the bridge identification number (BIN) and bridge stations. **NOTE: Guardrail related items are addressed in “GUARDRAIL REQUIREMENTS” as shown in chapter 4 of this design policy.**
8. Provide a general statement concerning the length and condition of existing culverts and crossdrain pipes. Any relocation or replacement of sidedrain pipes and headwalls must also be indicated. Crossdrain pipes and culverts will only be extended as required to provide the width for the pavement and shoulders. Headwalls will be retained on existing crossdrain structures that will not require adjustment to obtain the width for the pavement and shoulders. Sidedrain pipe will be relocated as required to obtain the width for the pavement and shoulders, and slope paved headwalls provided. Headwalls will not be replaced on existing sidedrain pipe that will remain in place. **Consideration will be given to replacing large vertical headwalls that are close to the pavement and are a potential hazard.**
9. Indicate if intersection improvements are required.
10. Include recommendations for eliminating any unusual condition that may be considered hazardous.



11. Indicate any environmental considerations (e.g., wetland impact, stormwater permit, etc.). Indicate if erosion or sedimentation control items are needed.
12. Clearly define the work to be performed by the contractor and work performed by the county.
13. State the existing right-of-way width and whether right-of-way will be required.
14. Indicate any utility conflicts.
15. Determine if there is a railroad crossing within the project limits or adjacent to the project. See section 8 of the current edition of ALDOT's "Procedural Guidelines for County Projects".
16. Indicate whether or not there are any existing sidewalks, pedestrian or school crossings, or other features within the project limits that will require upgrading to meet the Americans with Disabilities Act. If so, specify the general location and general description of the required upgrades.
17. Determine if there is any evidence of any informal bicycle/pedestrian activities within the project limits or the surrounding area that would require accommodations.

The scope of work, as prepared by the county, shall be furnished to the Region allowing ample time for preparing the Project Engineering Record; completing the plans; conducting the PS&E review; and having the Construction Bureau review plans received by the Region and sent to the Bureau of County Transportation at least 16 weeks prior to the anticipated letting date.

# Chapter 4

## Guardrail Requirements

Projects utilizing federal aid funds **shall** require guardrail and end anchor protection at existing and proposed bridge and culvert structures in accordance with the following guidelines:

For County projects with **design speeds of 45 mph or less and design year traffic of 2,500 ADT or less**, the *\*length of need* requirement is waived and the approach guardrail length is dictated by the type anchors used, applicable drawings, and warranty criteria.

For County projects with **design speeds greater than 45 mph or design year traffic greater than 2,500 ADT**, a 75 foot *\*length of need* is applicable.

*\*Note: The "Length of Need" is defined as the total length of a longitudinal barrier needed to shield an area of concern.*

For County pavement preservation projects, any guardrail that is not damaged and in good working condition shall be allowed to remain in place. Missing or unconnected bridge approach guardrail shall be included as part of the project or as non-contract items of work. All guardrail end anchors shall meet the requirements of NCHRP 230. Any new guardrail and end anchors that are to be installed on a pavement preservation project must meet the applicable guardrail length of need requirements previously listed in this chapter.

The Scope of Work review should include the following guardrail related items.

1. Indicate the areas of proposed guardrail and/or end anchor placement such as on bridges or at bridge ends, culverts, and at other hazardous locations. Indicate whether there is any in place guardrail or end anchors that will need to be removed and what type, if known.
2. For bridges requiring guardrail work, indicate what type of barrier is across the structure (e.g., class A or class B steel beam guardrail, concrete rail, etc.). Also, provide the post spacing and the bridge clear width (curb to curb). Indicate whether the guardrail is blocked out properly or if the blockouts are to be reconfigured. A project detail sketch should be added to the plans if

blockouts are to be reconfigured. For projects where steel beam guardrail across a structure is to be replaced, the review should include the condition of the existing bolts and whether bolts are to be retained or replaced.

3. For culverts requiring guardrail and/or end anchor work, provide the length of parapet wall (station to station), final proposed shoulder width, distance from the outside edge of the proposed shoulder to the first edge of the parapet wall, and the approximate slope from the outside edge of the final shoulder to the first edge of the parapet wall.
4. Guardrail should be considered for all slopes and structures within the clear zone that do not satisfy clear zone requirements.

# Chapter 5

## Design Criteria for Pavement Preservation (All Traffic Volumes with Design Speeds 45 MPH or Less)

Pavement Preservation projects shall not exceed an overlay of 225 lbs/sy with less than 50% of the existing roadway requiring spot leveling. All overlays shall conform to the laydown rate requirements found in *ALDOT's Guidelines for Operations*, Section 6-10. Planing the existing pavement to provide depth for the required overlay is acceptable under this design criteria. **If widening is required to meet the minimum lane widths shown in this chapter, the roadway will not be eligible for pavement preservation. In such cases, the county shall refer to the "3R" design procedures found in chapter 6 of this document.**

Before developing construction plans, the designer shall prepare a Pavement Preservation Scope of Work based on the 7 guidelines listed below. This document shall be submitted to Alabama Department of Transportation for review and approval. (See page 12.69 - 12.73).

### Assess Current Conditions

**Guideline 1:** Designers should assess existing physical and operational conditions affecting safety:

- Conduct a thorough site inspection of all physical elements and geometry within the project limits that are maintained by your agency.
- Analyze existing roadway users, functional classification, ADT, and design criteria (see page 9.3).
- Analyze crash data, to include field inspection, and concerns expressed by the public to determine site-specific locations where crash data may indicate the need for additional improvements.

## Determine Project Scope

**Guideline 2:** In addition to pavement restoration, the designers should consider, where appropriate, to incorporate; intersection, roadside, and traffic control improvements that may enhance safety. Based on guideline #1 the designer should:

## Determine Lane and Shoulder Width

**Guideline 3:** The following values should be considered:

### US Customary

Design Year ADT <sup>a</sup>	Design Speed <sup>b</sup> (mph)	< 10% Trucks/ Machinery <sup>c</sup>		≥ 10% Trucks/ Machinery <sup>c</sup>	
		Lane Width	Shoulder Width	Lane Width	Shoulder Width
1 - 750	≤45	9 ft	2 ft	10 ft	2 ft
751 - 2000	≤45	10 ft	2 ft	10 ft	2 ft
2000 >	≤45	11 ft	3 ft	12 ft	3 ft

<sup>a</sup> Design Year ADT should be based on a 10 year projection

<sup>b</sup> Design speed for pavement preservation projects shall be defined as the selected speed for the roadway determined by analyzing factors such as average speed, posted speed, or roadway geometric features along with a review of accident data. Projects with design speeds exceeding 45 MPH shall refer to the TRB 214.

<sup>c</sup> Some types of vehicles may require additional roadway widths

## Determine Bridge Width

**Guideline 4:** The designer should evaluate bridge replacement or widening if the bridge is less than 100 ft. long and the usable width of the bridge is less than:

Design Year ADT <sup>a</sup>	Design Speed (mph)	Usable Bridge Width <sup>b, c, d</sup>
1 - 1000	≤45	Width of approach lanes
1001 - 4000	≤45	Width of approach lanes plus 2 ft
4000 >	≤45	Width of approach lanes plus 3 ft

- a Design Year ADT should be based on a 10 year projection
- b If the roadway width (lane plus shoulder) is paved, the bridge should be equal in width
- c Bridge usage by trucks, farm machinery, or recreational vehicles should be considered in determining the appropriate width
- d Existing bridges may remain in place without widening unless there is evidence of a site-specific safety problem

## Determine Guardrail Need for Bridge Approaches

**Guideline 5:** The designer should develop consistent procedures for evaluating the need for guardrail, with the following considerations:

- Determine if bridge approaches contain guardrail and/or end anchors. If no guardrail and/or end anchors are in place, determine if the guardrail system will be installed by the contractor as part of the project or if this work will be done as non-contract items of work. **Note: Existing guardrail and end anchors at bridge approaches should be reviewed by visual inspection to determine if repair or replacement of the guardrail system is needed. If guardrail and/or end anchors are needed, they must conform to the applicable length of need requirements as shown in chapter 4 of this document.**
- Identify site-specific safety locations.

# Evaluate Right-of-Way Encroachments

**Guideline 6:** The designer should evaluate right-of-way encroachments based upon the following definition and guidelines:

## Definition

Encroachment: An item that occupies or utilizes the county's rights of way without authorization from the County. A fence that meets the following criteria is not considered an encroachment:

1. The fence is determined to be in the public interest and serves a transportation related purpose; and
2. The fence shall not impair or interfere with the free and safe flow of traffic; and
3. The fence is located outside of the clear zone as defined in the County Road Design Policy or the AASHTO Roadside Design Guide (whichever is applicable to the subject road/ project).

## Identify and Remove Encroachments

Counties should diligently review their rights-of-way to prevent new items from being placed within the county's rights-of-way. Prior to the scope of work review, the County Engineer shall review the project for any encroachments placed within the County's rights of way.

Mailboxes and utilities are authorized to be within the clear zone. Non-breakaway mailboxes shall be removed and replaced with a breakaway type structure meeting federal standards.

During the scope of work review, the County Engineer shall identify to ALDOT the encroachments that will be removed prior to project authorization. Plan preparation and review shall not be contingent on receipt of the Encroachment Certification Letter (see page 12.65) from the County. However, receipt of the Encroachment Certification Letter will be required prior to project authorization.

An example notification letter (see page 12.66) is provided for landowners who have encroachments that must be removed from the County rights-of way.

The County should also provide notice to the adjacent land owner of any fence that is allowed to remain in the County's rights of way. This notification should specify the terms and conditions under which the use will be authorized. This notice shall remain in the project file and be available for ALDOT and/or FHWA review (see page 12.67)

# Determine Pavement Edge Drop and Shoulder Type

**Guideline 7:** The designer should develop consistent procedures for evaluating pavement edge drop problems and the type of shoulder construction, with the following objective:

- All shoulders shall be flushed up to the required pavement utilizing any number of applicable shoulder construction applications. No shoulder widening will be permissible under the pavement preservation policy, with the exception of required shoulder widening for guardrail and/or guardrail end anchor installation.
- Selectively pave shoulders at points where there is site-specific safety problems (outside or inside of horizontal curves, across from intersecting roads, etc.).



# Chapter 6

## Design Criteria for Resurfacing, Restoration and Rehabilitation (3R) (All Traffic Volumes with Design Speeds 45 MPH or Less)

Significant improvements in safety should be systematically designed into each county roadway 3R project. Designers should seek opportunities specific to each project and apply sound safety and traffic engineering principles. Attention to safety, along with documentation of the design process improve design decisions.

Before developing construction plans, the designer shall prepare a Project Engineering Record based on the 12 guidelines shown below. Additional information regarding specific elements, not mentioned above, may be included in this report.

This document shall be submitted to Alabama Department of Transportation for review and approval. The format of the document will be established by the Alabama Department of Transportation. Any waivers of the design criteria shall be submitted to and approved by the Alabama Department of Transportation.

### Assess Current Conditions

**Guideline 1:** Designers should assess existing physical and operational conditions affecting safety:

- Conduct a thorough site inspection of all physical elements and geometry within the roadway limits that are maintained by your agency.
- Analyze existing roadway users, functional classification, ADT, and design criteria (see page 9.3).
- Analyze crash data, to include field inspection, and concerns expressed by the public to determine site-specific locations where crash data may indicate the need for additional improvements.

## Determine Project Scope

**Guideline 2:** In addition to pavement repairs, the designers should consider, where appropriate, to incorporate; intersection, roadside, and traffic control improvements that may enhance safety. Based on guideline #1 the designer should:

## Determine Lane and Shoulder Width

**Guideline 3:** The following values should be considered:

### US Customary

Design Year ADT <sup>a</sup>	Design Speed <sup>b</sup> (mph)	< 10% Trucks/ Machinery <sup>c</sup>		≥ 10% Trucks/ Machinery <sup>c</sup>	
		Lane Width	Shoulder Width	Lane Width	Shoulder Width
1 - 750	≤45	9 ft	2 ft	10 ft	2 ft
751 - 2000	≤45	10 ft	2 ft	10 ft	2 ft
2000 >	≤45	11 ft	3 ft	12 ft	3 ft

<sup>a</sup> Design Year ADT should be based on a 10 year projection

<sup>b</sup> Design speed for 3R projects shall be defined as the selected speed for the roadway determined by analyzing factors such as average speed, posted speed, or roadway geometric features along with a review of accident data. Projects with design speeds exceeding 45 MPH shall refer to the TRB 214.

<sup>c</sup> Some types of vehicles may require additional roadway widths.

## Determine Normal Pavement Crown

**Guideline 4:** The designer should develop consistent procedures for evaluating the existing pavement crown, with the following objectives:

- The pavement cross slope should match existing normal crown criteria. Typically 2 - 2.5 % cross slope.
- The shoulder cross slope should allow rainfall to drain the roadway. Typically 4 - 6 % cross slope.

## Determine Horizontal Curvature and Superelevation

**Guideline 5:** The designer should review each horizontal curve to determine the appropriate action that may be required.

- The designer should adjust the existing cross section with increased superelevation to match the average speed of vehicles.
- It is acceptable for the designer, when evaluating curves with low average vehicle speeds, **<45 mph**, to resurface without changing the existing curve geometry and cross section if the nominal design speed of the curve is within **15 mph** of the average vehicle speeds, and if there is no clear evidence of a site-specific safety problem associated with the curve.
- The designer, when evaluating curves with high average vehicle speeds, **45 mph and higher**, should consider reconstruction when the nominal design speed of the existing curve is more than **15 mph** below the average vehicle speeds, and the projected traffic volume is greater than 1000 ADT, or if there is a site-specific safety problem associated with the curve.
- Acceptable substitutes for curve reconstruction include measures to reduce speed (signing, pavement markings, rumble strips, traffic control devices, etc.), measures to improve the roadside (clearing slopes, flattening steep side-slopes, removing, relocating, or shielding obstacles, etc.), or measures to improve the roadway (widening lane width, widening shoulder width, paving shoulders, etc.).

# Determine Vertical Curvature and Stopping Sight Distance

**Guideline 6:** The designer should review each vertical curve to determine the appropriate action that may be required.

- It is acceptable for the designer, when evaluating curves with low average vehicle speeds, **<45 mph**, to resurface without changing the existing curve geometry if the nominal design speed of the curve is within **20 mph** of the average vehicle speeds, and if there is no clear evidence of a site-specific safety problem associated with the curve.
- The designer, when evaluating curves with high average vehicle speeds, **45 mph and higher**, should consider reconstruction when the design speed of the existing curve is more than **20 mph** below the average vehicle speeds, and the projected traffic volume is greater than 1000 ADT, or there is a site-specific safety problem associated with the curve.
- Acceptable substitutes for curve reconstruction include measures to reduce speed (signing, traffic control devices, etc.) and/ or measures to improve the roadside (removing, relocating, or shielding driveways, intersections, sharp horizontal curves, narrow bridge, etc.).
- Sag vertical curves typically do not create sight restrictions and do not have to be reconstructed, unless there is a site-specific safety problem.

## Determine Bridge Width

**Guideline 7:** The designer should evaluate bridge replacement or widening if the bridge is less than 100 ft. long and the usable width of the bridge is less than:

Design Year ADT <sup>a</sup>	Design Speed (mph)	Usable Bridge Width <sup>b, c, d</sup>
1 - 1000	≤45	Width of approach lanes
1001 - 4000	≤45	Width of approach lanes plus 2 ft
4000 >	≤45	Width of approach lanes plus 3 ft

<sup>a</sup> Design Year ADT should be based on a 10 year projection

<sup>b</sup> If the roadway width (lane plus shoulder) is paved, the bridge should be equal in width

<sup>c</sup> Bridge usage by trucks, farm machinery, or recreational vehicles should be considered in determining the appropriate width

<sup>d</sup> Existing bridges may remain in place without widening unless there is evidence of a site-specific safety problem

## Determine Side Slopes and Clear Zones

**Guideline 8:** The designer should develop consistent procedures for evaluating and improving roadside features with the following objectives:

- A clear zone of any width should provide some contribution to safety. Thus, where clear zones can be provided at little or no additional cost, their incorporation in design should be considered. A 2 - 3 ft. shoulder is recommended.
- Retain current slopes (without steepening side slopes) when widening lane and shoulders, unless warranted by special circumstances.
- Flatten side slopes steeper than 3:1 at site-specific locations where there is evidence of safety problems.
- Remove, relocate, or shield isolated roadside obstacles.
- Where constraints of; cost, terrain, right-of-way, or potential social / environmental impacts make the provision for a clear recovery area impractical, clear recovery areas less than desired may be used.

# Evaluate Right-of-Way Encroachments

**Guideline 9:** The designer should evaluate right-of-way encroachments based upon the following definition and guidelines:

## Definition

Encroachment: An item that occupies or utilizes the county's rights of way without authorization from the County. A fence that meets the following criteria is not considered an encroachment:

1. The fence is determined to be in the public interest and serves a transportation related purpose; and
2. The fence shall not impair or interfere with the free and safe flow of traffic; and
3. The fence is located outside of the clear zone as defined in the County Road Design Policy or the AASHTO Roadside Design Guide (whichever is applicable to the subject road/ project).

## Identify and Remove Encroachments

Counties should diligently review their rights-of-way to prevent new items from being placed within the county's rights-of-way. Prior to the scope of work review, the County Engineer shall review the project for any encroachments placed within the County's rights of way.

Mailboxes and utilities are authorized to be within the clear zone. Non-breakaway mailboxes shall be removed and replaced with a breakaway type structure meeting federal standards.

During the scope of work review, the County Engineer shall identify to ALDOT the encroachments that will be removed prior to project authorization. Plan preparation and review shall not be contingent on receipt of the Encroachment Certification Letter (see page 12.65) in Procedural Guidelines) from the County. However, receipt of the Encroachment Certification Letter will be required prior to project authorization.

An example notification letter (see page 12.66) is provided for landowners who have encroachments that must be removed from the County rights-of way.

The County should also provide notice to the adjacent land owner of any fence that is allowed to remain in the County's rights of way. This notification should specify the terms and conditions under which the use will be authorized. This notice shall remain in the project file and be available for ALDOT and/or FHWA review (see page 12.67)

## Determine Guardrail Need for Embankments and Culverts

**Guideline 10:** The designer should develop consistent procedures for evaluating the need for guardrail, with the following considerations:

- Examining the shoulder slopes and culvert sizes.
- Identify site-specific safety locations.
- Clear zone encroachments

## Determine Pavement Edge Drop and Shoulder Type

**Guideline 11:** The designer should develop consistent procedures for evaluating pavement edge drop problems and the type of shoulder construction, with the following objectives:

- All shoulders shall be flushed up to the required pavement utilizing any number of applicable shoulder construction applications.
- Selectively pave shoulders at points where there is site-specific safety problems (outside or inside of horizontal curves, across from intersecting roads, etc.).

# Determine Intersection Improvements

**Guideline 12:** The designer should develop consistent procedures for evaluating intersection improvements, with the following:

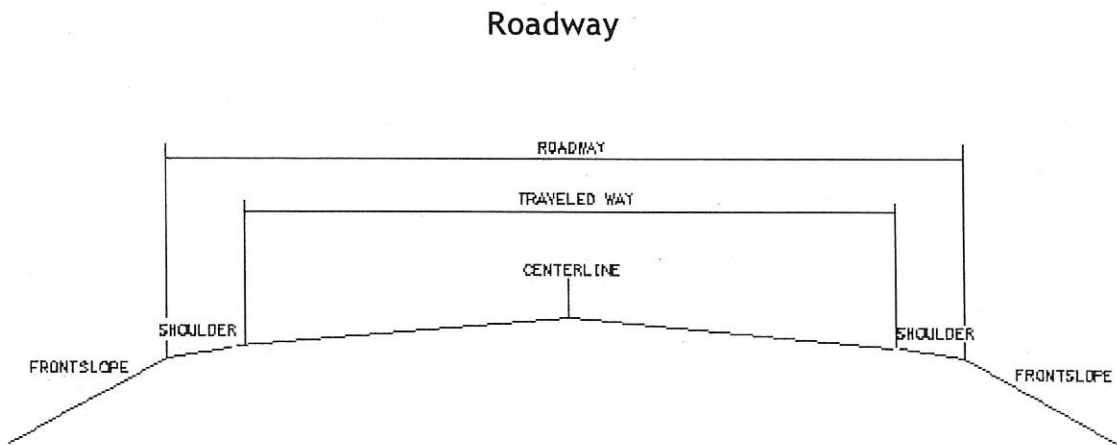
- Collision diagrams showing vehicle paths, time of occurrence, and weather conditions.
- Condition diagrams showing important physical features that affect traffic movements.
- Field review of the intersection to detect hazards not apparent from collision and condition diagrams.
- Designer should consider intersection improvements to site-specific safety problem areas.
- Improvements may be organized on three primary design objectives: reduction of potential conflicts (traffic signals, turn lanes, etc.), improve driver decision-making (longer lines of sight, lane markings, etc.), and improve the braking capability of the vehicle (warning signs, increased pavement skid resistance, etc.).



# Chapter 7

## Design Criteria for New Roadways and Bridges with Traffic Volumes Less Than 2,500 ADT Designed for 45 MPH or Less

### Typical Roadway Cross Section



## Typical Design Speed <sup>1</sup>

Type of Terrain	1 - 99 ADT (mph)	100 - 399 ADT (mph)	400 - 1599 ADT (mph)	1600 - 2500 ADT (mph)
Level	20	25	30	40
Rolling	15	20	25	30
Mountainous	10	15	20	25

<sup>1</sup> Design speeds, for some roads, may be a lower or higher speed based on its functional classification. For county road design projects involving traffic volumes greater than 2,500 ADT, consult *AASHTO, A Policy on Geometric Design of Highway and Streets*.

## Minimum Hydrology

Side Drain	10 year flood
Cross Drain	25 year flood

## Typical Bridge Width and Loading Design <sup>2</sup>

24' Minimum or Traveled Way + 4 ft. Whichever is greater	HS - 20
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<sup>2</sup> Bridge widths, for some roads, may need additional width based on its functional classification. For county road design projects involving traffic volumes greater than 2,500 ADT, consult *AASHTO, A Policy on Geometric Design of Highway and Streets*.

## Roadway Design Criteria for 1 - 99 ADT

Design Speed (mph)	Traveled Way Width (ft)	Shoulder Width (ft)	Clear Zone <sup>3</sup> (ft)
15	18	2	2
20	18	2	2
25	18	2	2
30	18	2	2
35	18	2	2
40	18	2	2
45	20	2	4

<sup>3</sup>Clear Zone: The area adjacent to the traveled way that is clear of obstructions and having a slope no steeper than 3 horizontal to 1 vertical foreslopes.

## Roadway Design Criteria for 100 - 399 ADT

Design Speed (mph)	Traveled Way Width (ft)	Shoulder Width (ft)	Clear Zone <sup>3</sup> (ft)
15	18	2	2
20	18	2	2
25	18	2	2
30	18	2	2
35	18	2	4
40	18	2	4
45	20	2	6

<sup>3</sup>Clear Zone: The area adjacent to the traveled way that is clear of obstructions and having a slope no steeper than 3 horizontal to 1 vertical foreslopes.

## Roadway Design Criteria for 400 - 1599 ADT

Design Speed (mph)	Traveled Way Width (ft)	Shoulder Width (ft)	Clear Zone <sup>3</sup> (ft)
20	18	2	2
25	18	3	4
30	20	3	4
35	20	3	4
40	20	3	6
45	22	3	6

<sup>3</sup> Clear Zone: The area adjacent to the traveled way that is clear of obstructions and having a slope no steeper than 3 horizontal to 1 vertical foreslopes.

## Roadway Design Criteria for 1600 - 2500 ADT

Design Speed (mph)	Traveled Way Width (ft)	Shoulder Width (ft)	Clear Zone <sup>3</sup> (ft)
25	20	4	4
30	22	4	4
35	22	4	6
40	22	5	6
45	22	5	8

<sup>3</sup> Clear Zone: The area adjacent to the traveled way that is clear of obstructions and having a slope no steeper than 3 horizontal to 1 vertical foreslopes.

# Superelevation

**COUNTY ROAD DESIGN POLICY SUPERELEVATION CHART FOR 2-LANE ROADWAY**

e (%)	DESIGN SPEED																	
	15 mph		20 mph		25 mph		30 mph		35 mph		40 mph		45 mph		50 mph		55 mph	
	R (ft)	STL	R (ft)	STL	R (ft)	STL	R (ft)	STL	R (ft)	STL	R (ft)	STL	R (ft)	STL	R (ft)	STL	R (ft)	STL
NC	932	0	1640	0	2370	0	3240	0	4260	0	5410	0	6710	0	8150	0	9720	0
RC	676	70	1190	70	1720	70	2370	80	3120	80	3970	90	4930	90	5990	100	7150	110
2.20	605	70	1070	70	1550	80	2130	80	2800	90	3570	90	4440	100	5400	110	6450	110
2.40	546	80	959	80	1400	80	1930	90	2540	90	3240	100	4030	100	4910	110	5870	120
2.60	496	80	872	80	1280	80	1760	90	2320	90	2960	100	3690	110	4490	120	5310	120
2.80	453	80	796	80	1110	80	1610	90	2130	100	2720	100	3390	110	4130	120	4950	130
3.00	415	80	730	90	1070	90	1480	100	1960	100	2510	110	3130	120	3820	120	4580	130
3.20	382	80	672	90	985	90	1370	100	1820	110	2330	110	2900	120	3550	130	4250	140
3.40	352	90	620	90	911	100	1270	100	1680	110	2170	120	2700	120	3300	130	3970	140
3.60	324	90	572	100	845	100	1180	110	1570	110	2020	120	2520	130	3090	140	3710	150
3.80	300	90	530	100	784	100	1100	110	1470	120	1890	120	2360	130	2890	140	3480	150
4.00	277	100	490	100	729	110	1030	110	1370	120	1770	130	2220	140	2720	150	3270	160
4.20	255	100	453	110	678	110	955	120	1280	120	1660	130	2080	140	2560	150	3080	160
4.40	235	100	418	110	630	110	893	120	1200	130	1560	140	1960	150	2410	160	2910	170
4.60	215	110	384	110	585	120	834	130	1130	130	1470	140	1850	150	2280	160	2750	170
4.80	193	110	349	120	542	120	779	130	1060	140	1390	150	1750	160	2160	170	2610	180
5.00	172	110	314	120	499	130	721	130	981	140	1310	150	1650	160	2040	170	2470	180
5.20	154	120	284	120	457	130	676	140	929	140	1230	150	1560	160	1930	180	2350	190
5.40	139	120	258	120	420	130	621	140	870	150	1160	160	1480	170	1830	180	2230	190
5.60	126	120	236	130	387	140	582	140	813	150	1090	160	1390	170	1740	190	2120	200
5.80	115	120	216	130	358	140	542	150	761	160	1030	170	1320	180	1650	190	2010	200
6.00	105	130	199	130	332	140	506	150	713	160	965	170	1250	180	1560	200	1920	210
6.20	97	130	184	140	308	150	472	150	669	170	909	170	1180	190	1480	200	1820	210
6.40	89	130	170	140	287	150	442	160	628	170	857	180	1110	190	1400	210	1730	220
6.60	82	140	151	140	267	150	413	160	590	170	808	180	1050	200	1330	210	1650	220
6.80	76	140	146	150	248	160	386	170	553	180	761	190	990	200	1260	220	1560	230
7.00	70	140	135	150	231	160	360	170	518	180	716	190	933	200	1190	220	1480	240
7.20	64	150	125	150	214	160	336	170	485	180	672	190	818	210	1120	230	1400	240
7.40	59	150	115	160	198	170	312	180	451	190	628	200	765	210	1060	230	1320	250
7.60	54	150	105	160	182	170	287	180	417	190	583	200	715	220	980	240	1230	250
7.80	48	160	94	160	164	170	261	180	380	190	533	210	701	220	901	240	1140	260
8.00	38	160	76	170	134	180	214	190	314	200	444	210	587	230	758	240	960	260

- NOTES: 1. WITH DESIGN SPEEDS OF 20 MPH OR LESS, CONDITIONS MAY WARRANT THE ELIMINATION OF SUPERELEVATION.
2. STL LENGTHS, AS SHOWN, ARE BASED ON 12" LANES, 2% NC'S, AND ROTATION ABOUT CENTERLINE OF ROADWAY. FOR LANE WIDTHS LESS THAN 12', REFER TO DRAWING SPEC 1 (INDEX NO. 807) FOR STL CALCULATIONS.
3. FOR RESURFACING PROJECTS ON EXISTING ROADWAYS, IN-PLACE SUPERELEVATION TRANSITION LENGTHS THAT VARY FROM THOSE PRESCRIBED HERE MAY BE RETAINED, PROVIDED THAT NO OPERATIONAL OR DRAINAGE PROBLEMS ARE KNOWN.

## Crest and Sag Vertical Curves

US Customary

Design Speed (mph)	Crest Vertical Rate, $K^4$	Sag Vertical Rate, $K^4$
15	3	10
20	7	17
25	12	26
30	19	37
35	29	49
40	44	64
45	61	79

<sup>4</sup> Rate of vertical curvature,  $K$ , is the length of curve per percent of algebraic difference in intersecting grades ( $A$ ).  $K=L/A$

## Maximum Percent Grade

Design Speed (mph)	Percent Grade <sup>5</sup> %
15	17
20	16
25	15
30	14
35	13
40	13
45	12

<sup>5</sup> For roadway grade less than 1000 ft in length, the maximum grade may be increased by 2 percent.

# Stopping and Passing Sight Distances

US Customary

Design Speed (mph)	Stopping Sight Distance (ft)	Passing Sight Distance (ft)
15	80	----
20	115	400
25	155	450
30	200	500
35	250	550
40	305	600
45	360	700

## Intersection Sight Distance

US Customary

Design Speed (mph)	Distance for Left Turn Maneuver from Stop <sup>6</sup>
15	170
20	225
25	280
30	335
35	390
40	445
45	500

<sup>6</sup> Intersection Sight distance is measured from a point on the minor road 15 ft. from the edge of the major road pavement and measured from an eye height of 3.5 ft. on the minor road to an object height of 3.5 ft. on the major road. Guidance in determining additional sight distances is provided in AASHTO, *Policy on Geometric Design of Highways and Streets*.