



An introduction to Pavement
Preservation / Rehabilitation
/ Replacement
(PRR) Design Guidelines





What Exactly
are PRR
Design
Guidelines
and
Why do we
need them?





Louisiana Revised Statutes (LRS 48:35)

States in Part:



The department of transportation and development shall adopt minimum safety guidelines with respect to highway and bridge design , construction, and maintenance. These guidelines shall correlate with and, so far as possible, conform to the system then current as approved by AASHTO allowing flexibilities incorporated therein. Hereafter, the state highway system shall conform to such safety guidelines.





Design Guidelines are published and adopted to guide DOTD policies and procedures related to highway design and Plan development



Louisiana Department of Transportation and Development
Minimum Design Guidelines

Draft Date: May 3, 2016
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Element			Urban	Rural
Design Speed (mph)	Freeway	Acceptable	60 - 70	70 - 80
	Arterial/Collector	Acceptable	30 - 60	45 - 65
	Local	Acceptable	20 - 30	30 - 60
	Ramp	Acceptable	See AASHTO	

Legend	
AASHTO	2011 AASHTO Green Book
T %	Truck traffic percentage
Bridge Width	Defined as gutter line - gutter line
DS	Design Speed
ADT	Average Daily Traffic (vpd)
TDDHV	Truck Directional Design Hourly Volume



The Design Guidelines define the critical design elements for the functional system of roadway. Values are give for preferred and acceptable conditions with a directive to strive for the preferred design except for when conditions warrant otherwise.

Element	Urban & Rural								
	Freeway			4 – Lane	6 – Lane		Auxiliary Lane		
Preferred		Inside	6	T DDHV > 250 veh/hr	T DDHV < 250 veh/hr				
Shoulder Width (ft.)	Freeway	Outside	10	12	10		N/A		
		Acceptable	Inside	4	10			Freeway shoulder width	
	Urban	Preferred	Curb	4 ft. outside and ft. inside	No Curb	Refer to rural		N/A	
			Acceptable	ft. inside and outside	2 ft. inside and outside			Ramp shoulder width	
	Shoulder Type	Arterial, Collector, & Local	Preferred	Through Lanes (Inside/Outside)				Auxiliary Lanes	
				Arterial	Acceptable	ADT (vpd)		# of lanes	
		< 400	2			4	6		
		400 – 1500	4	4/8	4/8 ¹	Design Speed ≤ 45 mph	See through lane		
		1500 – 2000	6						
		2000 +	8						
Collector		Acceptable	< 400	2	4/8	4/8 ¹			
			400 – 1500	5					
			1500 – 2000	6					
Local		Acceptable	< 400	2	4/8	4/8 ¹			
	400 – 1500		5						
	1500 – 2000		6						
				2000 +	8				
¹ 8/8 Preferred									
Ramp	See AASHTO								
Shoulder Type	Freeway	Preferred	Urban		Rural				
		Acceptable	Inside paved	Outside paved	Inside paved	Outside paved			
Shoulder Type	Arterial & Collector	Preferred	4 ft. min paved on 4 lane facilities		4 ft. min paved on 4 lane facilities				
		Acceptable	Paved		Aggregate (2 ft. minimum paved)				
Shoulder Type	Local	Preferred	Paved		Aggregate (2 ft. minimum paved)				
		Acceptable	Paved		Aggregate (2 ft. minimum paved)				
				Aggregate					





When do the Design Guidelines apply?

The Design Guidelines apply to new construction projects or where the department is reconstructing the roadway.

Examples include:

- New Roadway including subbase
- New alignment
- Major changes to alignment
- Addition of travel lanes





PRR Guidelines

Preservation, Replacement, or Rehabilitation

Where the scope of the project is to maintain or rehabilitate an existing roadway, the law allows the department to develop guidelines with design values that may be less than those required in the Design Guidelines. In such cases the department has developed and adopted **PRR** guidelines.

LRS 48:35:B

The chief engineer may designate highways within the state highway system for reconstruction or repair at guidelines which are less than those as approved by the American Association of State Highway and Transportation Officials....





3R Guidelines

3R Guidelines are design guidelines applicable to **NHS (National Highway System)** Urban, Suburban, and Rural Non-Interstate Routes.

Generally:

PRR < 3R < DOTD Minimum Design Guidelines

Note: In cases where certain PRR design values are more stringent than 3R design guidelines, PRR design values would govern





Definitions

Reconstruction

Typically consists of new pavement structure (pavement, base, and subbase), the addition of travel lanes, or extensive changes in horizontal and vertical geometry, typically requiring right-of-way.

Reconstruction projects Typically are designed according to DOTD Minimum Design Guidelines





Replacement

Replacement

The replacement of the existing pavement structure with an equivalent or increased pavement structure generally within the existing crown. These pavements would be designed for a 20 year design life.



Rehabilitation

Rehabilitation

Consists of structural enhancements that extend the service life of an existing pavement and/or improve its load-carrying capability generally within the existing crown . These pavements would be typically designed for a minimum 10 to 15 year design life.

Examples of Major Rehabilitation

- Rubblization and Overlay
- Bonded Concrete Overlay
- Unbonded Concrete Overlay
- Single lift and Multi-lift Asphaltic Concrete Overlay (>2")
- Base Rehabilitation
- Minor Widening and Overlay
- Minor Geometric Changes to Alignment
- Addition of Turn Lanes or Lengthening of Ramps, etc.





Minor Rehabilitation

Single lift Asphaltic Concrete Overlay ($\leq 2''$) of which the existing pavement required prior cold planing and/or patching. Typical Examples include:

- Patching with Single-Lift Overlay ($\leq 2''$) (Patching is limited to 10% of area within project limits)
- Cold Plane with Single-Lift Overlay ($\leq 2''$)





Preservation

Preservation

Refers to Pavement Preservation, which consists of light minor rehabilitation, preventative maintenance, and routine maintenance.

Light Minor Rehabilitation

Refers to Pavement Preservation, which consists of light minor rehabilitation, preventative maintenance, and routine maintenance.

Typical Examples include:

- Single Lift Asphaltic Concrete Overlay (≤ 2 ")(no patching or cold planing required)
- Asphalt or Concrete Patching Only
- Pavement Diamond Grooving/Grinding only
- Load Transfer Restoration only, etc.





Preservation

Preventative Maintenance

Is a planned strategy of cost-effective, non-structural treatments to the existing pavements that preserves the current condition and retards future deterioration.

Typical Examples include:

- Chip Seals
- Micro-Surfacing
- Thin Asphaltic Concrete Overlay (<1.5")
- Micro-Overlays
- Joint Cleaning and Resealing
- Crack Sealing (working cracks)
- Crack Filling (Non-working cracks)





Preservation

Routine Maintenance

Repair work typically performed by Department forces that is planned and carried out on a scheduled basis to maintain the pavement.

Typical Examples include:

- Pothole Patching
- Bump Grinding
- Spot Leveling
- Machine Leveling





Guidance for PRR Projects

GUIDANCE FOR PRESERVATION/REHABILITATION/REPLACEMENT (PRR) PROJECTS				
System	Classification	Type of Work	Design Guidelines	Design Exception Approval
NHS	NHS	Replacment and Major Rehabilitation	DOTD Minimum Design Guidelines	FHWA/DOTD
		Minor Rehabilitation	Match Existing	N/A
		Preservation	Match Existing	N/A
	NON-INTERSTATE	Replacment and Major Rehabilitation	PRR Design Guidelines (required) 3R Guidelines (desirable)	FHWA/DOTD
		Minor Rehabilitation	Match Existing	N/A
		Preservation	Match Existing	N/A
Non-NHS	ALL ROADS	Replacment and Major Rehabilitation	PRR Design Guidelines	FHWA/DOTD
		Minor Rehabilitation	Match Existing	N/A
		Preservation	Match Existing	N/A





3R Guidelines (Rural Non-Interstate Routes)

3R MINIMUM DESIGN GUIDELINES RURAL NHS - NON INTERSTATE ROUTES REPLACEMENT AND MAJOR REHABILITATION

POSTED SPEED	CURRENT ADT	TRUCKS < 10%		TRUCKS ≥ 10%		BRIDGE WIDTH^^	
		LANE WIDTH*	SHLDR WIDTH** (2' min. paved)	LANE WIDTH*	SHLDR WIDTH** (2' min. paved)	MIN (2 LANES)	DESIRABLE
< 50	0 - 1500	11'	2'	11'	3'	24'	Travel Width + 2'
> 50		11'	3'	12'	4'	24'	Travel Width + 2'
< 50	1501 - 4000	11'	3'	12'	3'	24'(T<10%)/28'(T≥10%)	Travel Width + 4'
> 50		12'	3'	12'	4'		Travel Width + 4'
ALL	> 4000	12'	6'	12'	6'	30'	Travel Width + 6'

*Minimum widths.

**Minimum widths. For divided highways, provide 4' inside shoulder with 2' min. paved. 4' minimum paved outside shoulder is desirable.

^^ If clear width < travel width plus shoulder widths, delineate approaches by striping and/or signing. Update approach guard rail and end treatments, as applicable.

Roadway Cross slope = 2.5%

Horizontal Clearance = 10' minimum

Horizontal Curvature = Match existing. If curve advisory speed < roadway posted speed minus 15 mph, low cost safety improvements shall be considered.

Use 12' lanes in curves if degree of curve exceeds 5° for ADT < 1501 and 4° for ADT > 1500.

Vertical Curvature = Match existing.

Stopping Sight Distance (SSD) = Match existing. If SSD < required for roadway posted speed minus 20 mph, low cost safety improvements shall be considered.

Superelevation & Transitions = Match existing but not less than minimum shown in "Superelevation Values for Preservation/Rehabilitation/Replacement (PRR) Projects".

When existing foreslope rates can be maintained within existing right-of-way, desirable values for superelevation and transitions are to be used.

Foreslope = Match existing. If crash history, 3h:1v or flatter is desirable.

Roadway Grade = Match existing.

Vertical Clearance = Match existing.

Structural Capacity = Match existing. Capacity must be checked by Bridge Design Section if any work is done to bridge deck and/or bridge rails.

For minor rehabilitation and preservation projects, refer to "Guidance for Preservation/Rehabilitation/Replacement (PRR) Projects".

For reconstruction projects (new structure including subbase, new alignment, major changes to alignment, or addition of travel lanes), refer to DOTD Minimum Design Guidelines.

For ADA requirements, refer to "Guidance for Preservation/Rehabilitation/Replacement (PRR) Projects".

Justification is required in the PRR Report if any of the above criteria is not met.

DOTD Pavement PRR Minimum Design Guidelines also apply.

9/1/2010

Approved:

Ruth Z. Savan 9.30.10
DOTD Chief Engineer Date





3R Guidelines

(Urban & Suburban Non-Interstate Routes)

3R MINIMUM DESIGN GUIDELINES URBAN & SUBURBAN NHS - NON INTERSTATE ROUTES REPLACEMENT AND MAJOR REHABILITATION

POSTED SPEED	CURRENT ADT	SECTION	TRUCKS < 10%		TRUCKS ≥ 10%		BRIDGE WIDTH*
			LANE WIDTH*	PAVED SHLDR WIDTH*	LANE WIDTH*	PAVED SHLDR WIDTH*	
ALL	ALL	CURB	10'	0'	11' (12'desirable)	0'	Travel Width
		NO CURB	11'	6' Outside, 4' Inside	11' (12'desirable)	6' Outside, 4' Inside	Travel Width + 6' (30' min)

* Minimum widths

Roadway Cross Slope = Match existing for curbed sections. 2.5% desirable.

Roadway Cross slope = 2.5% for non curbed sections.

Horizontal Clearance = Match existing.

Horizontal Curvature = Match existing. If curve advisory speed < roadway posted speed minus 15 mph, low cost safety improvements shall be considered.

Vertical Curvature = Match existing.

Stopping Sight Distance (SSD) = Match existing. If SSD < required for roadway posted speed minus 20 mph, low cost safety improvements shall be considered.

Superelevation & Transitions = Match existing but not less than minimum shown in "Superelevation Values for Preservation/Rehabilitation/Replacement (PRR) Projects".

Foreslope = Match existing. If crash history, 3h:1v or flatter is desirable (No Curb).

Roadway Grade = Match existing.

Vertical Clearance = Match existing.

Structural Capacity = Match existing. Capacity must be checked by Bridge Design Section if any work is done to bridge deck and/or rails.

Urban/Suburban refers to functional class of roadway and not geographic location.

For minor rehabilitation and preservation projects, refer to "Guidance for Preservation/Rehabilitation/Replacement (PRR) Projects".

For reconstruction projects (new structure including subbase, new alignment, major changes to alignment, or addition of travel lanes), refer to DOTD Minimum Design Guidelines.

For ADA requirements, refer to "Guidance for Preservation/Rehabilitation/Replacement (PRR) Projects".

Justification is required in the PRR Report if any of the above criteria is not met.

DOTD Pavement PRR Minimum Design Guidelines also apply.

9/1/2010

Approved:

Ruid L. Jurein 9.30.10
 DOTD Chief Engineer Date





PRR Guidelines (Rural Non-Interstate)

DOTD PAVEMENT PRR MINIMUM DESIGN GUIDELINES RURAL NON INTERSTATE ROUTES REPLACEMENT AND MAJOR REHABILITATION

CURRENT ADT	TRUCKS < 10%				TRUCKS ≥ 10%			BRIDGE WIDTHS ^{AA}
	LANE WIDTH	SHOULDER		LANE WIDTH	SHOULDER			
		Width	Type		Width	Type		
0 - 400	9' - 10' (11' desirable)	#	Aggregate	10' (11' desirable)	#	Aggregate	Existing	
401 - 1500	11'	#	Aggregate	11'	#	Aggregate	Existing	
1501 - 4000	11' (12' desirable)	#	2' min. paved is desired	12'	#	2' min. paved is desired	Existing	
> 4000	11' (12' desirable)	#	2' min. paved is desired	12'	#	2' min. paved is desired	Existing	

* 9' acceptable to remain with concurrence from District Traffic Operations Engineer

Width as necessary to maintain existing crown. 2' minimum is desired.

^{AA} If clear width < travel width plus shoulder widths, delineate approaches by striping and/or signing. Update approach guard rail and end treatments, as applicable.

Roadway Cross slope = 2.5%

Horizontal Clearance = Match existing.

Horizontal Curvature = Match existing. If curve advisory speed < roadway posted speed minus 15 mph, low cost safety improvements shall be considered.

Use 12' lanes in curves if degree of curve exceeds 5° for ADT 401 - 1500 and 4° for ADT > 1500.

Vertical Curvature = Match existing.

Stopping Sight Distance (SSD) = Match existing. If SSD < required for roadway posted speed minus 20 mph, low cost safety improvements shall be considered.

Superelevation & Transitions = Match existing but not less than minimum shown in "Superelevation Values for Preservation/Rehabilitation/Replacement (PRR) Projects".

When existing foreslope rates can be maintained within existing right-of-way, desirable values for superelevation and transitions should be used.

Foreslope = Match existing. If crash history, 3h:1v or flatter is desirable.

Roadway Grade = Match existing.

Vertical Clearance = Match existing.

Structural Capacity = Match existing. Capacity must be checked by Bridge Design Section if any work is done to bridge deck and/or bridge rails.

For minor rehabilitation and preservation projects, refer to "Guidance for Preservation/Rehabilitation/Replacement (PRR) Projects".

For reconstruction projects (new structure including subbase, new alignment, major changes to alignment, or addition of travel lanes), refer to DOTD Minimum Design Guidelines.

For ADA requirements, refer to "Guidance for Preservation/Rehabilitation/Replacement (PRR) Projects".

A formal exception is required, via justification in the PRR Report, if any of the above criteria is not met.

For non Interstate NHS routes, 3R Minimum Design Guidelines also apply.

9/1/2016

Approved:

Rudolph Savin 9.30.16
DOTD Chief Engineer Date





PRR Guidelines

(Urban & Suburban Non-Interstate)

DOTD PAVEMENT PRR MINIMUM DESIGN GUIDELINES URBAN & SUBURBAN NON-INTERSTATE ROUTES REPLACEMENT AND MAJOR REHABILITATION

CURRENT ADT	SECTION	TRUCKS < 10%		TRUCKS ≥ 10%		BRIDGE WIDTHS
		LANE WIDTH*	PAVED SHLDR WIDTH*	LANE WIDTH*	PAVED SHLDR WIDTH*	
ALL	CURB	9'	0'	**	**	Existing
0 - 2000	NO CURB	9'	#	10'	#	Existing
>2000	NO CURB	10' (11' desirable)	#	11' (12' desirable)	#	Existing

* Minimum Widths

** Sum of Lane and Shoulder Width = 12' minimum

Width as necessary to maintain existing crown. 2' minimum is desired.

Roadway Cross Slope = Match existing for curbed sections. 2.5% desirable.

Roadway Cross slope = 2.5% for non curbed sections.

Horizontal Clearance = Match existing.

Horizontal Curvature = Match existing. If curve advisory speed < roadway posted speed minus 15 mph, low cost safety improvements shall be considered.

Vertical Curvature = Match existing.

Stopping Sight Distance (SSD) = Match existing. If SSD < roadway posted speed minus 20 mph, low cost safety improvements shall be considered.

Superelevation & Transitions = Match existing but not less than minimum shown in "Superelevation Values for Preservation/Rehabilitation/Replacement (PRR) Projects".

Foreslope = Match existing. If crash history, 3h:1v or flatter is desirable (No Curb).

Roadway Grade = Match existing.

Vertical Clearance = Match existing.

Structural Capacity = Match existing. Capacity must be checked by Bridge Design Section if any work is done to bridge deck and/or rails.

Urban & Suburban applies to functional classification of roadway and not geographic location.

For minor rehabilitation and preservation projects, refer to "Guidance for Preservation/Rehabilitation/Replacement (PRR) Projects".

For reconstruction projects (new structure including subbase, new alignment, major changes to alignment, or addition of travel lanes), refer to DOTD Minimum Design Guidelines.

For ADA requirements, refer to "Guidance for Preservation/Rehabilitation/Replacement (PRR) Projects".

A formal exception is required, via justification in the PRR Report, if any of the above criteria is not met.

For non Interstate NHS routes, 3R Minimum Design Guidelines also apply.

9/1/2010

Approved:

Pichay Savai 9.30.10
DOTD Chief Engineer Date





Questions???

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It's almost that time.....

