

INSTRUCTIONAL MEMORANDUMS

To Local Public Agencies



To: Counties and Cities	Date: October 1, 2013
From: Office of Local Systems	I.M. No. 3.214
Subject: 3R Guidelines	

Contents: This Instructional Memorandum (I.M.) provides guidelines for design of Local Public Agency (LPA) Federal-aid Resurfacing, Restoration, or Rehabilitation (3R) projects on both urban and rural roads.

Introduction

It is apparent that available funding is insufficient to improve existing roads to the geometric requirements desirable for new construction. Roads constructed to previous design criteria are still capable of performing a useful transportation service; and in many cases, minor improvements will make such roads serviceable for many more years.

Definitions

Resurfacing – These projects include resurfacing or overlays that result in less than an additional nominal 4 inches to the pavement structure. Other types of work such as pavement patching or short areas of reconstruction, joint replacement or repair, and shouldering may be included. Usually no additional right-of-way is required.

Restoration – These projects are primarily for the major resurfacing or overlays which add a considerable amount of structure to the existing pavement. Usually resurfacings or overlays that result in an additional nominal 4 inches or more to the pavement structure are included. In addition, some pavement widening, short sections of pavement reconstruction, shoulder widening, flattening foreslopes on high fills, and intersection reconstruction may be involved. Consideration may be given to improving isolated grades, curves, or sight distance by construction or traffic control measures. In some cases minor right-of-way acquisitions or easements may be required.

Rehabilitation – For these projects, the traffic service improvement and safety needs may be of equal importance to the need to improve the riding quality. Projects may involve intersection reconstruction; pavement widening; pavement replacement; shoulder widening; flattening foreslopes; drainage improvement; and in the context of such improvements, improvement of isolated grades, curves, or sight distance by reconstruction. Some additional right-of-way may be necessary.

Safety Considerations

In addition to extending the service life of an existing street or highway, Federal-aid 3R projects shall also include consideration of safety improvements. To satisfy this requirement, a description of how each of the following safety considerations have been addressed, including supporting documentation, shall be included with the Concept Statement submittal, as per [I.M. 3.105](#), Concept Statement Instructions.

1. All bridges and culverts within the recommended clear zone distance, as per [I.M. 3.215](#), Clear Zone Guidelines, which are not presently shielded should be reviewed according to [I.M. 3.213](#), Traffic Barriers (Guardrail and Bridge Rail). If culverts need to be extended for reasons other than safety (e.g., lane widening), consideration should be given to extending them outside the recommended clear zone distance or made safely traversable. Document this consideration by describing how bridges and culverts will be addressed.
2. All signing and marking should be in conformance with the Manual on Uniform Traffic Control Devices (MUTCD). Document this consideration by stating the signs and markings were reviewed. If any signing or marking is found not to be in conformance with the MUTCD, identify what improvements or upgrades will be made.
3. The last 5-year crash history should be analyzed with respect to number, rate, location, type, and severity in order to identify areas that offer the greatest potential for safety enhancements. Document this consideration by providing a summary of the crash history analysis, including a copy of the crash data printout. Crash data and analysis tools are available on the Iowa DOT Office of Traffic and Safety [Crash Analysis Resources](#) web page.

4. If the project is located on a rural roadway, "Use as constructed" (U.A.C.) of bridges narrower than the approach pavement width will require a design exception. Additional guidance for this type of design exception is provided in [I.M. 3.218](#), Design Exception Process. If approved, the guardrail should be erected, delineated with reflectors, and an edge line extending 300 feet from all 4 corners should be painted. This is in addition to the narrow bridge signs. Document this consideration by stating whether existing bridges comply with this requirement. If any bridges do not comply with this requirement, reference the prior design exception approval or include the design exception request information, as outlined by I.M. 3.218. Also state the proposed mitigation, as indicated above.
5. Bridge rails and guardrails on existing bridges should be reviewed for structural adequacy. If found to be structurally inadequate and functionally obsolete such that it cannot adequately contain and redirect vehicles without snagging, penetrating, or vaulting, it should be considered for upgrading. For additional guidance, refer to [I.M. 3.213](#), Traffic Barriers (Guardrail and Bridge Rail). Document this consideration by stating whether the existing bridge rails and approach guard rails will be left in place, delineated, retrofitted, or replaced.
6. All horizontal curves with recommended speeds less than the speed limit should be signed with curve or turn signs and advisory speed plates. Intersections or narrow bridges, which exist within the stopping sight distance of a crest vertical curve, should be signed accordingly. Document this consideration by indicating if advisory speed plates or other warning signs will be installed, and if so, the type of signs and general locations where they will be installed.
7. Obstacles within the recommended clear zone distance, as per [I.M. 3.215](#), Clear Zone Guidelines, except for bridges and culverts, should be reviewed for both rural and urban projects, as indicated below. Bridges and culverts should be addressed as per Safety Considerations 1, 4, and 5 above.

Rural Projects: A clear zone review shall be conducted as follows:

- a) Determine the recommended clear zone distance.
- b) Review the crash data and site conditions to determine if there are crashes related to inadequate clear zone distance. Generally speaking, these would include crashes associated with an obstacle located within or near the recommended clear zone distance. If such a review indicates there are no crashes related to clear zone distance, document this finding and the clear zone review is complete. If the review finds there are some crashes related to clear zone distance, proceed to the next step.
- c) Review the possible treatment options, as per [I.M. 3.215](#), and determine which treatment would be most appropriate for the situation. If a treatment option other than delineation is proposed, document which option will be used and the clear zone review is complete. If delineation is proposed, proceed to the next step.
- d) For the least expensive treatment option considered (other than delineation), perform a benefit-cost calculation, as per [I.M. 3.216](#), Economic Analysis (Benefit-to-Cost Ratio). If the least expensive treatment option is cost effective, include this work in the project. If it is not cost effective, delineate the obstacle. Document the decision by providing a copy of the benefit-cost calculation and indicating which treatment option will be used.

If a LPA is interested in making safety improvements as part of the project, the project may be eligible for the [Traffic Safety Improvement Program \(TSIP\)](#).

Urban Projects: If the project is located on an urban roadway, fixed objects (utility poles, traffic signal supports, etc.) within the recommended clear zone distance should be reviewed. Fixed objects that must be installed or relocated within the recommended clear zone distance should be fitted with breakaway devices if possible. Otherwise, they should be installed or relocated outside the recommended clear zone distance or at the right-of-way line, whichever is less. Fixed objects that do not have to be relocated because of the project should also be considered for removal, relocation, or use of a breakaway device, in those locations where identifiable safety problems associated with inadequate clear zone distance exist.

Document this consideration by indicating the proposed set back for newly installed or relocated fixed objects. If any safety problems associated with existing fixed objects exist, identify what types of improvements will be made or explain why it is not practical to provide the recommended clear zone distance.

3R Table For Rural Collectors

This table contains acceptable design values for Federal-aid resurfacing, restoration, or rehabilitation (3R) projects on rural collector roads. Each project must be considered individually to determine what improvements are feasible to extend the useful service life and enhance safety. Design values below those shown on this table may be used on a project-by-project basis, provided that a design exception or justification is approved by the Iowa DOT Administering Office, as per [I.M. 3.218](#), Design Exception Process.

Design Elements	Resurfacing			Restoration			Rehabilitation		
	> 2000	2000-750	< 750	> 2000	2000-750	< 750	> 2000	2000-750	< 750
Design Volume (ADT)	> 2000	2000-750	< 750	> 2000	2000-750	< 750	> 2000	2000-750	< 750
Design Speed (mph)	Existing	Existing	Existing	40	40	40	40	40	40
Stopping Sight Distance (ft)	250	Existing	Existing	305	305	305	305	305	305
Minimum Radius (ft) (1)	465	465	Existing	465	465	465	465	465	465
Maximum Gradient (%)	Existing	Existing	Existing	Existing	Existing	Existing	7	8	9
Pavement Width (ft)	22	22	20	22	22	20	24	22	22
Shoulder Width (ft)	6	3	2	6	3	2	6	3	2
Roadway Top Width (ft)	34	28	24	34	28	24	36	28	26
Existing Bridge Roadway Width (ft) (2)	22	22	20	26	24	22	28	24	22
Foreslope (ft)	Existing	Existing	Existing	3:1	3:1	2:1	3:1	3:1	3:1
Clear Zone Distance (ft)	Existing (except as required by Safety Consideration No. 7 in this I.M.)								

Notes:

- (1) a. Based on maximum superelevation (e) of 0.08.
b. Curves more than 15 mph below the posted speed should be delineated.
- (2) Existing Bridge Roadway Width should be greater than or equal to the Traveled Way width, unless a design exception has been approved.

3R Table For Urban Arterials and Collectors

This table contains acceptable design values for Federal-aid resurfacing, restoration, or rehabilitation (3R) projects on urban arterials and collector streets. Each project must be considered individually to determine what improvements are feasible to extend the useful service life and enhance safety. Design values below those shown on this table may be used on a project-by-project basis, provided that a design exception is approved by the Iowa DOT Administering Office, as per [I.M. 3.218](#), Design Exception Process.

Design Elements	Arterial (1)				Collector (1)			
	Commercial or Industrial		Fringe or Residential		Commercial or Industrial		Fringe or Residential	
Traffic Lanes (number) (2)	4	2	4	2	4	2	4	2
Design Speed (mph) (3)	Existing							
Stopping Sight Distance (ft.) (4)	(Based on Design Speed)							
Horizontal Curve Radius (ft.) (5)	(Based on Design Speed)							
Maximum Gradient (percent)	Existing							
Travel Lane Width (ft.)	11	11	10	10	11	11	10	10
Parking Lane Width (ft.) (6)	9	9	8	8	8	8	7	7
Curb & Gutter Width (ft.)	(no separate gutter width required)							
Raised Median Width (ft.)	2	NA	2	NA	2	NA	2	NA
Raised Median Width with Lt. Turn (ft.)	12	NA	12	NA	10	NA	10	NA
Two Way Left Turn Lane Width (ft.)	10	NA	10	NA	10	NA	10	NA
Border Area Width (ft.)	Existing							
Vertical Clearance (ft.)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Object Setback (ft.) (7)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Clear Zone Distance (ft.)	Existing (except as required by Safety Consideration No. 7 in this I.M.)							
Existing Bridge Roadway Width (ft.) (8)	44	22	40	20	44	22	40	20

Notes:

- (1) Use the roadway classification corresponding to the existing Federal Functional Classification.
- (2) Actual number of lanes equal to existing.
- (3) Design Speed should be equal to or greater than posted speed.
- (4) Distance required by the driver traveling at the design speed to bring a vehicle to a stop after an object on the road becomes visible (eye height = 3.5 feet and object height = 2 feet).
- (5) Minimum radius should be compatible with the design speed.
- (6) Gutter width may be included as part of the parking lane width.
- (7) Measured from the face of curb. This area should be free of all fixed objects in order to provide a minimum operational clearance to permit curbside parking or to avoid negative impacts on traffic flow.
- (8) a. Existing Bridge Roadway Width should be greater than or equal to the Traveled Way width, unless a design exception has been approved.
b. Design loading should be at least HS-15.