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**DEPARTMENT OF TRANSPORTATION**

**[4910-22-P]**

**Federal Highway Administration**

**[FHWA Docket No. FHWA-2015-0020]**

**Revision of Thirteen Controlling Criteria for Design and Documentation of Design Exceptions**

**AGENCY:** Federal Highway Administration (FHWA), Department of Transportation (DOT).

**ACTION:** Notice.

**SUMMARY:** The geometric design standards for projects on the National Highway System (NHS) are incorporated by reference in FHWA regulations in 23 CFR 625 and apply regardless of funding source. These design standards are comprehensive in nature, covering a multitude of design characteristics, while allowing flexibility in application. Exceptions may be approved on a project basis for designs that do not conform to the minimum or limiting criteria set forth in the standards, policies, and standard specifications.

The FHWA is updating its 1985 policy regarding controlling criteria for design, applicable to projects on the NHS, to reduce the number of controlling criteria from 13 to 10, and to apply only 2 of those criteria to low speed roadways. The FHWA is also issuing guidance to clarify when design exceptions are needed and the documentation that is expected to support such requests. The FHWA's guidance memorandum, which is available in the docket (FHWA-2015-0020), transmits this policy to FHWA field offices.

**FOR FURTHER INFORMATION CONTACT:** For questions, contact Elizabeth Hilton, Geometric Design Engineer, FHWA Office of Program Administration, telephone 512-536-5970, or via e-mail at Elizabeth.Hilton@dot.gov. For legal questions, please contact Robert Black, Office of the Chief Counsel, telephone 202-366-1359, or via e-mail at Robert.Black@dot.gov, Federal Highway Administration, 1200 New Jersey Avenue, S.E., Washington, D.C. 20590. Business hours for the FHWA are from 8:00 a.m. to 4:30 p.m., e.t., Monday through Friday, except Federal holidays.

**SUPPLEMENTARY INFORMATION:**

**Electronic Access and Filing**

This document, the request for comments notice, and all comments received may be viewed online through the Federal eRulemaking portal at: <http://www.regulations.gov>. The docket identification number is FHWA-2015-0020. The Web site is available 24 hours each day, 365 days each year. Anyone can search the electronic form of all comments in any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, or labor union). You may review DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477), or you may visit <http://DocketsInfo.dot.gov>.

**Request for Comments**

On October 7, 2015, FHWA published a Notice with Request for Comments (80 FR 60732) soliciting public comments on proposed revisions to the 13 controlling criteria for the design and the documentation that is expected to support requests for design

exceptions. When used in this notice, the term “design exception” refers to documentation prepared for projects on the NHS when a controlling criterion is not met, and that must be approved in accordance with 23 CFR 625.3(f), by FHWA or on behalf of FHWA if a State Transportation Agency (STA) has assumed this responsibility through a Stewardship and Oversight agreement.

### **Background**

As codified in 23 CFR 625.3 and 625.4, the geometric design standards for projects on the NHS are A Policy on Geometric Design of Highways and Streets (2011) and A Policy on Design Standards Interstate System (2005), published by the American Association of State Highway and Transportation Officials (AASHTO). As codified in 23 CFR 625.3(f), exceptions may be approved on a project basis for designs that do not conform to the minimum or limiting criteria set forth in the standards, policies, and standard specifications adopted in 23 CFR 625. In 1985, FHWA designated 13 criteria as controlling criteria, requiring design exceptions when any of these 13 criteria were not met.

The FHWA proposed to eliminate 3 criteria, rename others, and focus the application of most criteria on high-speed roadways (i.e., design speed  $\geq 50$  mph). The 10 controlling criteria proposed for design of projects on the NHS were: Design Speed, Lane Width, Shoulder Width, Horizontal Curve Radius, Superelevation, Stopping Sight Distance, Maximum Grade, Cross Slope, Vertical Clearance, and Design Loading Structural Capacity. The FHWA proposed that all 10 controlling criteria would apply to

high-speed roadways on the NHS, and that only two, Design Speed and Design Loading Structural Capacity, would apply on low-speed roadways (i.e., design speed <50 mph) on the NHS.

### **Purpose of the Notice**

The purpose of this notice is to publish final designation of the controlling criteria for design of projects on the NHS and how they will be applied in various contexts, and describe the design documentation needed to support requests for design exceptions. While all of the criteria contained in the adopted standards are important design considerations, they do not all affect the safety and operations of a roadway to the same degree, and therefore do not require the same level of administrative control. The FHWA encourages agencies to document design decisions to demonstrate compliance with accepted engineering principles and the reasons for the decision. Deviations from criteria contained in the standards for projects on the NHS which are not considered to be controlling criteria should be documented by the STA in accordance with State laws, regulations, directives, and safety standards. States can determine their own level of documentation depending on State laws and risk management practices.

### **Designation of Controlling Criteria**

Based on the comments received in response to FHWA's proposal, combined with FHWA's own experience and the findings of National Cooperative Highway Research Program (NCHRP) Report 783 "Evaluation of the 13 Controlling Criteria for Geometric Design" (2014), the 10 controlling criteria for design are:

- Design Speed;
- Lane Width;
- Shoulder Width;
- Horizontal Curve Radius;
- Superelevation Rate;
- Stopping Sight Distance (SSD);
- Maximum Grade;
- Cross Slope;
- Vertical Clearance; and
- Design Loading Structural Capacity.

All 10 controlling criteria apply to high-speed (i.e., Interstate highways, other freeways, and roadways with design speed  $\geq 50$  mph) roadways on the NHS. The SSD applies to horizontal alignments and vertical alignments except for sag vertical curves. On low-speed roadways (i.e., non-freeways with design speed  $<50$  mph) on the NHS, only the following two controlling criteria apply:

- Design Loading Structural Capacity; and
- Design Speed.

### **Design Documentation**

Design exceptions, subject to approval by FHWA, or on behalf of FHWA if an STA has assumed the responsibility through a Stewardship and Oversight agreement, are

required for projects on the NHS only when the controlling criteria are not met. The FHWA expects documentation of design exceptions to describe all of the following:

- Specific design criteria that will not be met.
- Existing roadway characteristics.
- Alternatives considered.
- Comparison of the safety and operational performance of the roadway and other impacts such as right-of-way, community, environmental, cost, and usability by all modes of transportation.
- Proposed mitigation measures.
- Compatibility with adjacent sections of roadway.

Design Speed and Design Loading Structural Capacity are fundamental criteria in the design of a project. Exceptions to these criteria should be extremely rare and FHWA expects the documentation to provide the following additional information:

- Design Speed exceptions:
  - Length of section with reduced design speed compared to overall length of project.
  - Measures used in transitions to adjacent sections with higher or lower design or operating speeds.
- Design Loading Structural Capacity exceptions:

- Verification of safe load-carrying capacity (load rating) for all State unrestricted legal loads or routine permit loads and, in the case of bridges and tunnels on the Interstate, all Federal legal loads.

The FHWA encourages agencies to document all design decisions to demonstrate compliance with accepted engineering principles and the reasons for the decision. The approval of deviations from applicable design criteria are to be handled as follows:

1. The project is located on a NHS roadway and controlling criteria are not met: In accordance with 23 CFR 625.3(f), design exceptions are required and FHWA is the approving authority, or exceptions may be approved on behalf of FHWA if an STA has assumed the responsibility through a Stewardship and Oversight agreement, with documentation as stated above.
2. The project is located on a NHS roadway and non-controlling criteria are not met: STA is the approving authority for design deviations,<sup>1</sup> in accordance with State laws, regulations, directives, and safety standards. States can determine their own level of documentation depending on State laws and risk management practices.
3. The project is located on a non-NHS roadway and the State design criteria are not met on a Federal-aid project: STA is the approving authority for design deviations, in accordance with State laws, regulations, directives, and safety

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<sup>1</sup> The term “deviation,” when used in this document, refers to any departure from design criteria that does not require FHWA approval because either the criteria is non-controlling or the facility is not on the NHS. States often refer to these instances as design deviations or variances.

standards. States can determine their own level of documentation depending on their State laws and risk management practices.

### **Analysis of Comments**

The FHWA received comments from 2,327 individuals and organizations on the proposed changes to the controlling criteria. Of these, 2,167 were individual form-letter comments delivered to the docket by Transportation for America. Of the remaining, 87 were from individuals, 23 from STAs, 22 from other public entities, 18 from private organizations, 5 from industry associations, 4 from private firms, and 1 from an elected official. The comments are summarized below.

### **General Comments**

Many commenters referred to the proposed changes as a rulemaking. The controlling criteria are not established by Federal regulation, instead they are a matter of policy. The proposed changes are not a rulemaking as they will not modify the CFR and will not impose binding requirements that have the force and effect of law. The proposal was published as a notice in the Federal Register as a way to invite public comment on the proposed policy changes.

### **Controlling Criteria**

All but 7 of the 2,327 commenters support revisions to the controlling criteria. Some supporters suggested changes which were considered by FHWA, as shown below.

1. Over 2,100 commenters asked FHWA to replace the term “design speed” with “target speed” for low-speed NHS roadways so that roadway design elements

could be selected to meet community needs and provide safety for all modes of transportation.

Response: No changes were made. The proposed changes, combined with recent clarification by FHWA about design speeds and posted speeds (available at <http://www.fhwa.dot.gov/design/standards/151007.cfm>), allow agencies the flexibility to design based on target speed while remaining consistent with the terminology used in the adopted AASHTO standards. The FHWA forwarded this comment to the AASHTO Technical Committee on Geometric Design for its consideration.

2. The National Association of City Transportation Officials asked FHWA to clarify that there is no minimum design speed.

Response: No changes were made. Minimum design speeds are included in the adopted standards for the NHS and design exceptions are required if a lower design speed is selected. The FHWA forwarded this comment to the AASHTO Technical Committee on Geometric Design for its consideration.

3. Three STAs recommended retaining vertical clearance as a controlling criterion on low-speed roadways to ensure that insufficient vertical clearance on a minor roadway would not result in damage to an overpassing high-speed roadway, such as an Interstate highway or other freeway.

Response: No changes were made. The FHWA agrees that vertical clearance is an important criterion and that insufficient clearance on one roadway may negatively impact the overpassing roadway. However, States are already managing the scenario described if the low-speed roadway is not on the NHS. Under this revised policy, States would continue to manage the risks associated with insufficient vertical clearance for all low-speed roadways (non-freeway), including those on the NHS.

4. The Oregon DOT and a few individuals thought that 50 mph was too high for the threshold between high- and low-speed roadways, citing concerns about urban expressways and that freight vehicles need wider lanes.

Response: The speed threshold remains unchanged. The intent was to capture all freeways in the high-speed category. For clarification, FHWA revised the definition of high-speed roadway for the purposes of this policy to include all Interstate highways, other freeways, and roadways with design speed greater than or equal to 50 mph.

5. The Wisconsin DOT recommended using a posted speed of 40 mph to define the threshold, stating that a design speed of 50 mph is too high given the likelihood of pedestrian fatalities at that speed.

Response: No changes were made. The proposed threshold was chosen for consistency with AASHTO policy documents adopted through

regulation at 23 CFR 625.4. The policy allows maximum design flexibility for roads with a design speed less than 50 mph which can be applied in ways that improve pedestrian safety.

6. The Indiana DOT asked FHWA to clarify that the superelevation criterion is for rate only, and that transition length and distribution are not subject to a design exception.

Response: The FHWA concurs and clarified the term in the controlling criteria list.

7. The Indiana DOT asked FHWA to clarify the application of SSD to vertical and horizontal curves.

Response: Clarification was added. The SSD applies to a variety of situations and is well described in A Policy on Geometric Design of Highways and Streets (2011). As noted in NCHRP Report 783, SSD has little impact on the safety and operations at sag vertical curves under daytime conditions when the driver can see beyond the sag vertical curve, or at night, when vehicle taillights and headlights make another vehicle on the road ahead visible in or beyond a sag vertical curve. Therefore, the application of SSD at sag vertical curves is excluded from the controlling criterion.

8. The Minnesota DOT suggested eliminating design speed as a controlling criterion on low-speed roadways.

Response: No changes were made. Design speed must be retained because it is a fundamental criterion in the design of the project and because it sets the threshold for application of the controlling criteria. If, for example, design speed was not a controlling criterion for low-speed roadways, practitioners could simply select a lower design speed to avoid the controlling criteria requirements for high-speed roadways.

9. The Georgia DOT and two others commented that lateral offset to obstruction should be retained as a controlling criterion.

Response: No changes were made. Lateral offset is most relevant to urban and suburban roadways to ensure that mirrors or other appurtenances of heavy vehicles do not strike roadway objects and passengers in parked cars are able to open their doors. While these are important considerations, they do not rise to the same level of effect as other controlling criteria proposed to be retained and do not require the same level of administrative control.

10. The Wisconsin DOT recommended retaining lane width, superelevation, stopping sight distance, and cross slope as controlling criteria for low-speed roadways, and adding a new controlling criterion for critical length of grade.

Response: No changes were made. The FHWA finds that removing these controlling criteria from application in low-speed environments is supported by research and provides additional flexibility to better accommodate all modes of transportation. No new controlling criteria are proposed at this time.

11. The Wisconsin DOT commented that bridge width is not redundant if lane and shoulder widths are dropped from the controlling criteria list in the low-speed environment, which may result in choke points that are expensive to correct. They also commented that vertical and horizontal clearances can influence structural ratings; that stopping sight distances at intersections can be critical; and that the combination of flat grades and cross slopes is problematic.

Response: No changes were made. While these criteria are important, the risk of deviations can be handled by STAs in accordance with their risk management practices.

12. The Wisconsin DOT asked why clear zone was not included in the updated controlling criteria.

Response: No changes were made. The Roadside Design Guide was not adopted as a standard under 23 CFR 625. Instead it serves as guidance with regard to roadside safety. Therefore, adoption of values in the Roadside Design Guide as controlling criteria would not be appropriate.

13. A few commenters asked FHWA to adopt additional controlling criteria to require the provision of bicycle and/or pedestrian facilities on roadways.

Response: No changes were made. Such a policy would require a regulatory change which is beyond the scope of this controlling criteria policy.

Several commenters supporting changes to the 1985 policy requested clarifying guidance in the final notice, as follows:

1. Clarify requirements for non-NHS Federal-aid projects.

Response: This policy change does not modify existing regulations. Per 23 CFR 625.3(a)(2), “Federal-aid projects not on the NHS are to be designed, constructed, operated, and maintained in accordance with State laws, regulations, directives, safety standards, design standards, and construction standards.” The FHWA reiterated in this notice that the controlling criteria apply only to the NHS.

2. Limit application on the NHS to new construction and reconstruction projects, and/or clarify that the proposed modifications will not reduce current State flexibility regarding projects that are not new construction or reconstruction.

Response: This policy change does not modify existing regulations. It is not limited to new construction and reconstruction projects on the NHS. Title 23 CFR 625.4(a)(3) states that “resurfacing, restoration, and

rehabilitation (RRR) projects on NHS highways other than freeways” may utilize the design criteria established by the State and approved by FHWA. The regulations do not allow the adoption of RRR criteria for NHS freeways. The FHWA Division Administrator is allowed to determine the applicability of the roadway geometric design standards to traffic engineering, safety, and preventive maintenance projects which include very minor or no roadway work under 23 CFR 625.3(e).

3. One commenter asked FHWA to clarify that States can be more restrictive than Federal guidance proposed here, while other commenters asked FHWA to encourage State DOTs to apply the same logic to non-NHS facilities.

Response: States may adopt policies that are more restrictive than the revised FHWA policy published here. The FHWA encourages agencies to work together with stakeholders to develop context sensitive solutions that enhance communities and provide multiple transportation options to connect people to work, school, and other critical destinations. The FHWA notes that the Fixing America’s Surface Transportation (FAST) Act of 2015 includes new provisions encouraging design flexibility. The FHWA also issued a memorandum in 2013 expressing support for taking a flexible approach to bicycle and pedestrian facility design. The memorandum is available at

[http://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/guidance/design\\_flexibility.cfm](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_flexibility.cfm).

4. A few commenters expressed concern that FHWA is abandoning safety on low speed roadways, or that some designers will view non-controlling criteria as less important.

Response: The FHWA developed this proposal, based on the findings in NCHRP Report 783 and FHWA's experience, to give agencies the flexibility to balance the safety and operations of all modes of transportation, while reducing administrative requirements where they do not clearly result in improved safety and operations. The FHWA encourages agencies to document all design decisions to demonstrate compliance with accepted engineering principles and the reasons for the decision. Deviations from criteria contained in the standards for projects on the NHS which are not considered to be controlling criteria should be documented by the STA in accordance with State laws, regulations, directives, and safety standards. States can determine their own level of documentation depending on State laws and risk management practices. Agencies are responsible for the training and development of their employees.

5. Clarify that design exceptions are not required for non-controlling criteria.

Response: Clarifying language was added to the Design Documentation section that stated design exceptions are not required for non-controlling criteria.

6. For low-speed roadways, clarify that elements dependent on design speed that are substandard do not require a design exception. For example, design speed is 40 mph (and does not require a design exception), but the minimum curve radius provided meets 35 mph (no design exception is required).

Response: For non-freeways, the controlling criteria categories are based on design speed, which puts the project in one of two groups: high-speed or low-speed. Within each category, design exceptions are only required when the controlling criteria are not met. In the example provided, a non-freeway with a 40 mph design speed in accordance with the AASHTO criteria would be classified as low-speed. Design exceptions would only be required if the design speed or design loading structural capacity criteria were not met. No changes were made to the text of the policy.

7. The Wisconsin DOT asked what will be allowed for the National Network (Federally designated long truck routes per 23 CFR 658) if lane and shoulder widths are not important for safety and operations.

Response: All of the criteria contained in the adopted standards are important design considerations. They do not all affect the safety and

operations of a roadway to the same degree, and therefore should not require the same level of administrative control. Changes to the controlling criteria policy do not modify the regulations contained in 23 CFR 658.

8. The Wisconsin DOT asked what consideration was given to oversize and overweight vehicles.

Response: As noted in Chapter 2 of the A Policy on Geometric Design of Highways and Streets, the designer should consider the largest design vehicle that is likely to use that facility with considerable frequency or a design vehicle with special characteristics appropriate to a particular location in determining the design of such critical features as radii at intersections and radii of turning roadways. Designers are responsible for proper consideration of oversize and overweight vehicles and all other aspects of the project context.

9. The Southern Environmental Law Center asked FHWA to clarify whether rural roads with a design speed of less than 50 mph remain subject to the 10 remaining design criteria.

Response: No changes were made. The application of the controlling criteria is the same regardless of urban or rural designation.

Seven private citizens oppose changes to the controlling criteria policy. Five of the seven who oppose the changes believe the proposed flexibility will divert scarce Federal gasoline and road taxes to non-highway purposes.

No changes were made as a result of these comments. The design standards for the NHS and design exception process apply regardless of project funding. Revising the controlling criteria gives communities the ability to develop a transportation system that best serves their needs, but does not change existing laws or regulations pertaining to project expenses eligible for Federal reimbursement.

Several comments were received that do not pertain directly to the controlling criteria policy. The Southern Environmental Law Center recommends changes to the design speeds shown in the AASHTO Green Book to reflect a range instead of a single minimum number, as currently shown for three of the categories (rural freeway, urban freeway, and urban collector). The criterion for urban collectors should vary according to the different types of terrain. Likewise, the low end of the design speed range for urban collectors in mountainous terrain should be the same 20 mph minimum used for collectors in rural mountainous terrain. Finally, the definition of the term “urban” should be revised to include areas of low density sprawl that now surround most cities.

This comment is outside the scope of this notice. The FHWA forwarded this comment to the AASHTO Technical Committee on Geometric Design for its consideration.

Comments pertaining to the need for bicycle and pedestrian accommodation on bridges; appraisal ratings contained in the National Bridge Inspection Standards; the definition of pavement reconstruction; design loading for military vehicles; and the methods for determining posted speeds were also received.

These comments are outside the scope of this notice but were forwarded to the appropriate program office within FHWA for consideration.

### **Design Exception Documentation**

Sixteen commenters provided comments on the proposed documentation expected in support of requests for design exceptions. Fourteen STAs, AASHTO, and the Chicago DOT all commented that the level of documentation proposed for design exceptions would be burdensome and would result in less flexibility than currently exists for roadways with a design speed greater than 50 mph. They also believe that such a requirement is at odds with FHWA's current emphasis on Performance Based Practical Design (PBPD). Instead of providing an inclusive list of items to be addressed in design documentation, they recommend that any list be more suggestive in nature. Agencies asked FHWA to remove the requirement for quantitative operational and safety analysis, and expressed concern that references to the environment and community would add too much specificity.

The PBPD is a design-up approach to address the purpose and need of a project and emphasizes the need to document design decisions made under this approach. Therefore, FHWA sees no inconsistency between the design documentation proposed

here and the PBPD approach. In response to the concerns expressed, FHWA modified the language regarding the safety and operational analysis such that it does not require a quantitative analysis in all cases. The level of analysis should be commensurate with the complexity of the project. The FHWA notes however, that the FAST Act adds the Highway Safety Manual (HSM) to the list of publications FHWA shall consider when developing design criteria for the NHS. The FHWA strongly encourages agencies to utilize the HSM procedures to the maximum extent applicable. The FHWA retained references to the environment and community because design exceptions to address these concerns are not uncommon, and therefore need to be a part of any documentation.

### **Conclusion**

The overwhelming support for changes to the controlling criteria indicate that the changes will support agency and community efforts to develop transportation projects that support community goals and are appropriate to the project context. The provisions included here for design documentation will result in more consistent evaluation of exceptions to the adopted design standards when controlling criteria are not met on NHS highways.

**Authority:** 23 U.S.C. 109 and 315; 23 CFR 1.32 and 625; 49 CFR 1.85.

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