



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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FROM: Tim M. Little, PE 
Chief Engineer

DATE: January 27, 2020

SUBJECT: The American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets* (2018 Green Book)

AASHTO has released the 2018, (*A Policy on Geometric Design of Highways and Streets*), commonly referred to as the Green Book. The Federal Highway Administration (FHWA) has reviewed the 2018 Green Book and has found that the updates meet or improve upon the criteria of the 2011 Green Book. As a result, State DOTs may adopt the 2018 Green Book for use on national highway system projects without requesting a formal design exception.

This serves as notification that the North Carolina Department of Transportation has accepted the 2018, 7th Edition of the Green Book as the official update to, and hereby officially supersedes, the previous 2011, 6th Edition of the Green Book for application on transportation projects in North Carolina.

All designers should begin using the 2018 Green Book immediately. All projects that do not have approved design criteria at the issuing of this memo will need to be updated to guidance in the 2018 Green Book. Projects with approved design criteria can continue using guidance from the 2011, 6th Edition of the Green Book.

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A brief summary, provided by AASHTO, of the changes to this edition of the Green Book as well as FHWA's memo concerning adoption of the 2018 Green Book are attached for your reference.

If there are any questions or concerns, please contact Brenda Moore, PE, State Roadway Design Engineer or Jordan A. Woodard, PE, Deputy State Roadway Design Engineer at (919) 707-6200.

TML/jw

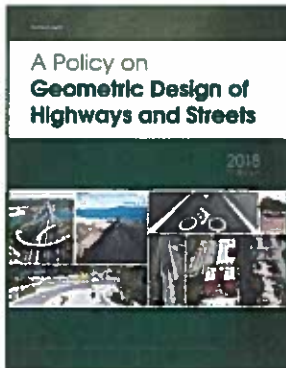
Cc: Brad Hibbs (FHWA)
Chris Werner, PE
Bill Kincannon, PE
Chris Peoples, PE
Louis Mitchell, PE
Ronnie Keeter, PE

Attachments

A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS

7TH EDITION

SUMMARY OF KEY REVISIONS AND UPDATES



The 2018 seventh edition of *A Policy on Geometric Design of Highways and Streets* (The AASHTO "Green Book") includes a number of key revisions and updates from the sixth edition, published in 2011.

The Green Book provides guidance to highway engineers and designers who strive to make unique design solutions that meet the needs of highway and street users, while maintaining the integrity of the environment. The seventh edition, specifically, describes how geometric design elements affect multiple transportation modes and recognizes the relationship between geometric design features and traffic operations.

The following table summarizes the key revisions and updates made to each chapter of the seventh edition.

CHAPTER 1: NEW FRAMEWORK FOR GEOMETRIC DESIGN	Chapter 1 is a new chapter that explains application of the Green Book to accomplish flexible, performance-based design. The chapter presents the traditional functional classifications for roadways (local roads and streets, collectors, arterials, and freeways), as well as a new set of context classifications (rural, rural town, suburban, urban, and urban core) to guide geometric design. The chapter also explains how the functional and context classifications can be used together in a flexible and performance-based manner in the design of new construction projects, reconstruction projects, and projects on existing roads.
CHAPTER 2: DESIGN CONTROLS AND CRITERIA	Chapter 2 has been reorganized to emphasize transportation of people, rather than focusing primarily on moving vehicles. The chapter discusses multimodal level of service and puts greater emphasis on lower-speed, walkable, urban zones. The pedestrian walking speeds have been updated based on recent research.

**CHAPTER 3:
ELEMENTS OF DESIGN**

The key changes to **Chapter 3** include the following:

- Added an 85 mph [140 km/h] design speed to the tables for stopping sight distance
- Explained how to compute superelevation and minimum radius for design speeds greater than 80 mph [130 km/h]
- Provided more flexibility in the distribution and rate of rotation of superelevation in superelevation transitions
- Added an equation to check for potential oversupply of superelevation through superelevation transitions

**CHAPTER 4:
CROSS SECTION ELEMENTS**

The key changes to **Chapter 4** include the following:

- Expanded discussion of driveway width guidelines
- Expanded discussion of median geometry to reduce cross-median crashes
- Updated noise abatement discussion based on latest FHWA guidance

**CHAPTER 5:
LOCAL ROADS AND STREETS**

Chapter 5 now includes the following:

- Revised rural traveled way and shoulder widths to more right-sized values
- Added material presenting design speed ranges for specific contexts
- Added a new section on driveways in rural areas
- Revised discussions of lane widths for urban streets to better align with the guidance for urban arterials
- Reorganized discussion of recreational roads and special purpose roads into separate sections
- Updated minimum curve radii for unpaved roads based on U.S. Forest Service guidance

**CHAPTER 6:
COLLECTOR ROADS AND STREETS**

Chapter 6 now includes the following:

- Revised rural traveled way and shoulder widths to more right-sized values
- Added material presenting design speed ranges for specific contexts
- Added discussion of high-speed to low-speed transition zones
- Revised discussions of lane widths for urban streets to better align with the guidance for urban arterials

<p>CHAPTER 7: ARTERIAL ROADS AND STREETS</p>	<p>The title of Chapter 7 has been changed to Arterial Roads and Streets for consistency with Chapters 5 and 6. Key changes to Chapter 7 include the following:</p> <ul style="list-style-type: none"> • Added section on design for the rural town context • Added section on speed management in design for urban areas • Added discussion of high-speed to low-speed transition zones
<p>CHAPTER 8: FREEWAYS</p>	<p>Key changes to Chapter 8 include the following:</p> <ul style="list-style-type: none"> • Revised design speed guidance to encourage right-sized and context sensitive designs in urban and suburban settings • Removed material targeting specific levels of service
<p>CHAPTER 9: INTERSECTIONS</p>	<p>Chapter 9 has been updated as follows:</p> <ul style="list-style-type: none"> • Added or revised drawings and text on channelized right-turn lanes, offset left-turn lanes, bypass lanes, and reduced-conflict intersections • Removed seldom-used figures and tables on edge-of-traveled-way designs, median design layouts, and intersection sight distance • Added table on characteristics of non-motorized users • Added intersection sight distance discussion for roundabouts • Revised criteria for turn-lane length
<p>CHAPTER 10: GRADE SEPARATIONS AND INTERCHANGES</p>	<p>Chapter 10 now includes the following:</p> <ul style="list-style-type: none"> • Added section on diverging diamond interchanges • Added table on maximum ramp grade • Expanded tables of acceleration and deceleration lane lengths to include 80 mph [130 km/h] design speeds



U.S. Department
of Transportation
Federal Highway
Administration

Memorandum

Subject: **INFORMATION:** A Policy on Geometric Design Highways
and Streets, 2018 (Green Book)

Date: May 10, 2019

From: /s/ Brian J. Fouch
Director, Office of Preconstruction,
Construction, and Pavements

In Reply
Refer To: HICP-10

To: Resource Center Directors
Division Administrators
Federal Lands Highway Division Directors

In September 2018, the American Association of State Highway and Transportation Officials (AASHTO) published the 7th edition of “A Policy on Geometric Design of Highways and Streets,” (also known as the ‘2018 Green Book’). Many State departments of transportation (SDOT) have expressed interest in adopting this new edition for use on National Highway System (NHS) projects.

As specified in part 625 of title 23, Code of Federal Regulations, the 2011 Green Book (6th edition) is currently the incorporated reference establishing the criteria for acceptable standards, policies, and standard specifications, approved by the Secretary of Transportation in cooperation with the SDOTs, for construction and reconstruction projects on the NHS. The 2018 Green Book was developed through the typical AASHTO consensus process and is an incremental evolution of the 2011 Green Book.

Until 23 CFR part 625 is updated through rulemaking procedure, the 2018 Green Book should be considered guidance only and the 2011 Green Book is still the adopted standard for construction and reconstruction projects on the NHS. However, FHWA has reviewed the 2018 Green Book and finds that the updates meet or improve upon the criteria of the 2011 Green Book. As a result, a SDOT may adopt the 2018 Green Book for use *on* NHS projects without requesting a formal design exception. As always, SDOTs maintain the discretion to adopt any standard they choose for use with projects on their State roads *off* the NHS.

Refer to Appendix A for additional information on the 2018 Green Book. Any questions regarding this topic should be directed to Robert Mooney (Robert.mooney@dot.gov) or Elizabeth Hilton (Elizabeth.hilton@dot.gov).

Appendix A

Information on the AASHTO 2018 Green Book

The 2018 Green Book introduces new definitions of project types—new construction, reconstruction, and projects on existing roads—and explains how design flexibility is provided for each project type as part of the project development process. The project type of “projects on existing roads,” with the additional caveat in the policy “that do not change the basic roadway type,” has traditionally been referred to as a resurfacing, restoration or rehabilitation (RRR) project. The American Association of State Highway and Transportation Officials does not define the phrase “projects on existing roads that do not change the basic roadway type,” leaving room for FHWA to interpret this phrase in a manner consistent with Federal regulations.

The FHWA generally considers projects that change the general geometric character of a highway, such as widening to provide additional through motor vehicle lanes, widening to add a raised or depressed median where none currently exists, and projects that substantially modify horizontal or vertical alignments to be among those that result in a “change in the basic roadway type”. Road changes that are accomplished with no, or only minimal widening, such as lane reconfigurations (road diets), adding turn lanes, adding channelizing islands, or adding median curbs for access management are *not* considered a “change in the basic roadway type”.

In addition, the 2018 Green Book states that full-depth pavement replacement projects that retain existing geometrics are not considered a “change in the basic roadway type”. The FHWA finds this interpretation acceptable for the purposes of determining geometric design criteria when applying the 2018 Green Book, but not for other purposes, such as pavement design.

The FHWA publication *Mitigation Strategies for Design Exceptions*, 2007 [FHWA-SA-07-011] is now considered obsolete and has been archived on the FHWA website. While the guidance regarding mitigation for design exceptions is still useful, much of the policy information in this publication is outdated.