

FOREWORD

PURPOSE

The purpose of the “Highway Geometric Design Guide” (HGDG) is to promote uniformity for highway design in Alberta and to encourage the provision of safe and efficient roads for the well-being of the travelling public and society in general. The guide establishes uniform geometric design standards and procedures to carry out the highway design functions of Alberta Transportation (AT). It is neither intended as, nor does it establish, a legal standard for these functions.

The Technical Standards Branch of the Planning, Finance and Technical Standards Division, Alberta Transportation prepared this guide.

SCOPE

The HGDG is not a textbook or a substitute for engineering knowledge, experience or judgement. It includes techniques as well as graphs and tables not ordinarily found in textbooks to aid in the quick solution of design problems. No attempt is made to detail basic engineering techniques found in standard textbooks.

Standards in this guide are general since they cannot cover all site-specific conditions. The standards are based on prevailing and anticipated future conditions of vehicle dimensions and performance, driver characteristics and transportation demands. These conditions vary with time and therefore it is normal that standards be revised and updated periodically, based on the latest research and best practices. Revised design standards do not imply that former standards are unsafe, or that existing roadways designed to former standards are therefore unsafe. Updated values provide a design that is more consistent with current methodology and are suitable for new facilities as well as for major reconstruction projects on existing facilities where new horizontal alignments are used.

For projects involving retrofit of existing roadways, the standards in this guide (except for Chapter G, see below) should not be used as a simple checklist. The "standards of the day" based on the year of construction should be considered when evaluating the appropriateness of standards on existing roads.

It is intended that this guide will be used appropriately, depending on the nature of the facility. For new construction on a new alignment, it is expected that the standards in the guide will be treated as a minimum, and usually will be exceeded except where constraints (for example physical, financial or environmental), are particularly severe.

Resurfacing, restoration, rehabilitation (3R) and reconstruction projects (4R) on existing paved roads are sometimes subject to severe constraints and controls. Consequently, Chapter G, “3R/4R Geometric Design Guidelines” has been developed for assessment of existing paved roads. Chapter G is to be used as a supplement to the rest of the guide. It provides more emphasis on safety, cost-effectiveness, and greater flexibility in geometric controls, which is appropriate in the assessment of existing infrastructure. The design standards shown elsewhere in the guide are more appropriate for the design of new roadways.

FORMAT

Each chapter in the “Highway Geometric Design Guide” has a reference letter that is used in all section titles, tables and figures. Table and figure numbers begin with the same number as the relevant section to allow easy reference to the text.

The HGDG is primarily intended for use as a digital file. The guide is a “live” document that will be updated as needed to ensure users will always have access to the latest information. The date shown in the upper corner of each sheet (e.g., SEPT 2020) is the current version. When new information and/or updates are provided (e.g., text, tables, figures, etc.) for a particular chapter, the entire chapter will be reissued with the date of the new version in the upper corner of the sheet.

Design Bulletin #99 tracks the updates to the “Highway Geometric Design Guide” and includes a revision table that provides a summary of the changes. The design bulletin is located at:

<https://open.alberta.ca/publications/design-bulletin-99-2018>

To receive notifications when updates occur, subscribe to the [One Window Notification](#) mailing list.

GEOMETRIC DESIGN, GUIDES, STANDARDS, DESIGN EXCEPTIONS

Geometric Design is defined as the selection of the visible elements of the road.

Design Guides are not, and cannot be, a substitute for thoughtful informed decision-making on the selection of geometric design parameters. This document represents customary practice that is generally recognized by AT to be sound.

The terms standard, minimum standard and desirable standard as used in this guide are defined below:

A standard is a value for specific feature, which practice or theory has shown to be appropriate, where the prevailing circumstances are normal and general, and where no unusual constraints influence the design. The lowest value that would normally be applied in these circumstances is the minimum standard.

Where constraints are severe and the requirement to meet the minimum standard would impose significant property or environmental impact, or would incur excessive cost, values below minimum standard may be acceptable. The degree of deviation below the minimum value that is acceptable is a matter of judgement, and depends on the nature of the standard and the severity of the constraints. A few standards are inviolate while others have latitude, and are applied with discretion. Financial consideration is often a constraint that needs to be addressed in the design process.

In situations where conditions allow standards to be exceeded without significant cost, property or environmental impact, the minimum values are normally avoided in favour of higher values. In such cases, the desirable standards, where shown, represent a target for which to aim.

Design Exceptions are defined as instances where values lower than the minimum standard are used. Design exceptions may be accepted at either the planning or design stage. For future reference, the acceptance of all exceptions should be documented and filed according to highway control section.

RESPONSIBILITY

During the planning or preliminary engineering phases, the consultant should provide Alberta Transportation with the appropriate level of documented analysis, assessment or evaluation with a conclusion and recommendation for review and acceptance by Alberta Transportation.

Infrastructure facilities designed and built within right of way owned by the Province of Alberta, or for which the Province of Alberta is legally responsible, shall be designed to standards in this guideline and other relevant Alberta Transportation documents. The purpose of this is to minimize risk to the travelling public and Alberta Transportation through the provision of consistent roads, bridges and other facilities. Exceptions to this practice may be considered, and should follow the Design Exception process.

RELATED ALBERTA TRANSPORTATION PUBLICATIONS

The following is a list of Alberta Transportation publications frequently used with the “Highway Geometric Design Guide”. Other publications are also available on the Alberta Transportation website at:

<https://www.alberta.ca/transportation.aspx>

- [Benefit Cost Model](#)
- [Bridge Conceptual Design Guidelines](#)
- [Design Bulletins](#)
- [Design Exceptions Guideline](#)
- [Engineering Consultant Guidelines for Highway, Bridge, and Water Projects - Volume 1: Design and Tender](#)
- [Engineering Consultant Guidelines for Highway, Bridge, and Water Projects - Volume 2: Construction Contract Administration](#)
- [Environmental Management System Manual](#)
- [Erosion and Sediment Control Manual](#)
- [Highway Standard Plates \(CB6\)](#)
- [Pavement Design Manual](#)
- [Roadside Design Guide](#)
- [Traffic Accommodation in Work Zones Manual](#)
- [Traffic Control Standards](#)