Chapter 1230 Geometric Cross Section Basics

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When choosing any geometric cross section dimension, including lane or shoulder width, read the guidance that is specific to the facility type. Also, read the general guidance related to common elements such as lanes, shoulders, side slopes, etc.

See Chapter 1106 *for the general dimensioning guidance.*

This chapter also contains guidance related to jurisdiction.

1230.01 General

The geometric cross section is composed of multiple lateral design elements such as lanes, shoulders, medians, bike facilities, and sidewalks. The designer's task is to select, size, and document these elements appropriately. There is flexibility in the selection of design element dimensioning.

All WSDOT routes, regardless of context, are referred to in the *Design Manual* as "highways." Under this definition, freeways are a subset of highways while Interstate freeways are one specific type of freeway.

Refer to the Design Manual Glossary of Terms for many of the terms used in this chapter. See Chapter 300 for design documentation requirements.

1230.02 Guidance for Specific Facility Types

Guidance regarding geometric cross sections is located in various *Design Manual* chapters. The chapter depends on the facility type. Examples of specific facility types include:

- Highways (general)
- Freeways
- Ramps
- Auxiliary lanes
- Collector-Distributor lanes
- Service lanes
- Frontage roads
- HOV facilities
- Median U-turns and crossovers
- Transit facilities including bus pull-outs
- Enforcement areas
- Slow vehicle turn-outs
- Truck weighing facilities
- Shared use paths
- Sidewalks
- Bicycle Facilities

Exhibit 1230-1 shows some common facility types along with the corresponding chapter that geometric cross section guidance can be found in.

Exhibit 1230-1 Geometric Cross Section - Guide to Chapters

Facility Type	Lane width	Turning roadway width	Shoulder width	Median width	Lateral clearance to curb or barrier	Side slope	Cross slope
Highways (General)	Chapter 1231	Chapter 1240	Chapter 1231	Chapter 1239	Chapter 1239	Chapter 1239	Chapter 1250
Freeways	Chapter 1232	Chapter 1240	Chapter 1232	Chapter 1239	Chapter 1239	Chapter 1239	Chapter 1250
Ramps	Chapter 1360	Chapter 1240	Chapter 1360	Chapter 1360	Chapter 1239	Chapter 1239	Chapter 1360 & Chapter 1250
Auxiliary lanes	Chapter 1270 or Chapter 1360 [1]	Chapter 1240	Chapter 1270 or Chapter 1360 [1]	N/A	Chapter 1239	Chapter 1239	Chapter 1270
C-D roadways	Chapter 1360	Chapter 1240	Chapter 1360	N/A	Chapter 1239	Chapter 1239	Chapter 1360
HOV lanes, ramp bypass lanes, etc.	Chapter 1410	Chapter 1410	Chapter 1410	N/A	Chapter 1410 & Chapter 1239	Chapter 1239	Chapter 1410
Left-side direct HOV access (DHOV) facilities	Chapter 1420	Chapter 1420	Chapter 1420	Chapter 1420 (for DHOV)	Chapter 1420 & Chapter 1239	Chapter 1239	Chapter 1250
Part-time shoulders	Chapter 1430	Chapter 1240	Chapter 1430	Chapter 1239	Chapter 1430	Chapter 1239	Chapter 1250 & Chapter 1430
Metered shoulders	Chapter 1440	Chapter 1240 & Chapter 1440	Chapter 1440	Chapter 1360	Chapter 1440	Chapter 1239	Chapter 1360 & Chapter 1250
Shared use path	Chapter 1515	Chapter 1515	Chapter 1515	N/A	Chapter 1515	Chapter 1515	Chapter 1515
Other	Geometric cross section guidance for other special purpose facilities is in various chapters. Examples include special use lanes, bridges, transit facilities, bus pull outs, median U-turns and crossovers, enforcement areas, truck weighing facilities, pedestrian bridges and tunnels, sidewalks & bicycle facilities						

Notes:

General guidance for curb design is in Chapter 1239. Guidance for curb is also found for numerous types of facilities (Chapter 1310 and others.)

[1] Passing and climbing lanes, see Chapter 1270; Auxiliary lanes between interchanges see Chapter 1360.

Exhibit 1230-1 is not a comprehensive list of guidance associated with either a facility or a design element. It is intended to be a quick reference to the chapter containing the primary guidance related to the specific element and facility type.

For guidance related to intersections see Chapter 1310. For guidance related to sidewalks see Chapter 1510. For guidance related to bicycle facilities see Chapter 1520. For guidance related to bridges see Chapter 720.

1230.03 Common Elements

In addition to the guidance specific to the facility type, also see the general guidance related to cross-sectional elements that are common to various facility types:

- Lanes Chapter 1231
- Shoulders, side slopes, medians & curbs Chapter 1239
- Lateral clearance to curb and barrier Chapter 1239
- Parking & streetside (behind the curb) elements Chapter 1238
- Cross slope and superelevation Chapter 1250

1230.04 Jurisdiction for Design and Maintenance

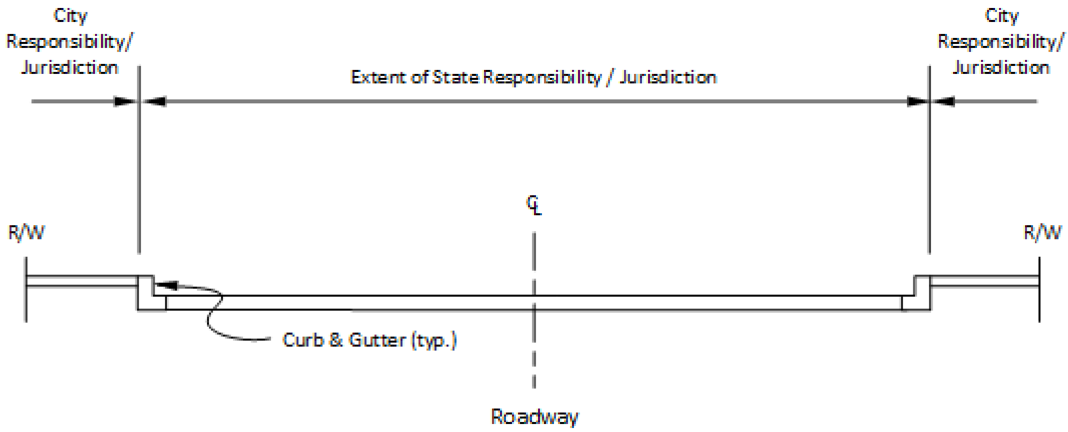
On all state highways in locations outside of cities or towns and within limited access design areas, geometric design is to be consistent with this *Design Manual*.

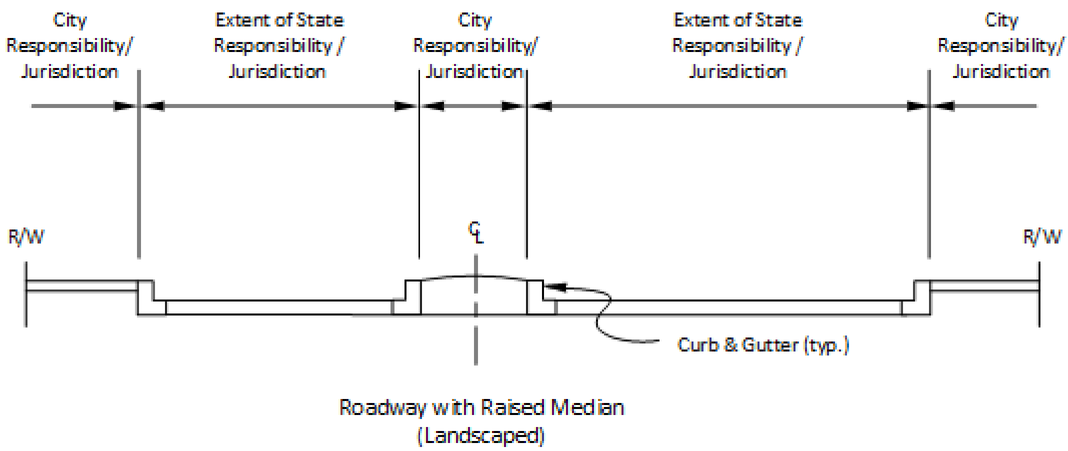
On state highways within an incorporated city or town, develop design features in cooperation with the local agency. For NHS routes, use the *Design Manual*. For non-NHS routes, the *Local Agency Guidelines* may be used for dimensioning design elements.

Cross-sectional design within incorporated cities or towns can get complicated due to the joint-jurisdictional authority. WSDOT typically has jurisdiction between the backs of curbs, and cities typically have jurisdiction outside the backs of curbs (see Exhibit 1230-2). When no curb is present, the city or town holds responsibility for the roadside outside the paved shoulder. Despite the jurisdictional differences, it is extremely important to cooperatively determine a cross-sectional design.

Refer to Chapter 301 for additional information on jurisdictional maintenance responsibilities and considerations for maintenance agreements.

Exhibit 1230-2 State and City Jurisdictional Responsibilities





1230.05 References

1230.05(1) Design Guidance

Highway Runoff Manual, M 31-16, WSDOT

Local Agency Guidelines (LAG), M 36-63, WSDOT

Plans Preparation Manual, M 22-31, WSDOT

Standard Plans for Road, Bridge, and Municipal Construction, M 21-01, WSDOT

Standard Specifications for Road, Bridge, and Municipal Construction, M 41-10, WSDOT

1230.05(2) Supporting Information

Understanding Flexibility in Transportation Design – Washington, WA-RD 638.1, Washington State Department of Transportation, 2005

www.wsdot.wa.gov/research/reports/fullreports/638.1.pdf

Urban Street Design Guide, National Association of City Transportation Officials, New York, NY, 2013

www.nacto.org

A Policy on Geometric Design of Highways and Streets (Green Book), AASHTO, current edition

Available from the WSDOT Library.