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## CHAPTER FIFTY-THREE

# Geometric Design Tables (New Construction/Reconstruction)

This chapter provides the Department's criteria for the design of a new construction or reconstruction (4R) project. The following should be considered in the use of the figures.

1. Project Scope of Work (Freeway). The geometric design criteria shown in Figure 53-1 apply to new construction or complete reconstruction of a freeway. The Department has adopted separate criteria for a 3R project or a partial 4R project on a freeway. See Chapter Fifty-four. Chapters Forty and Fifty-four provide definitions for the freeway-project scope of work, which will determine which set of criteria should be used for project design.
2. Project Scope of Work (Non-Freeway). The geometric design criteria shown in Figures 53-2 through 53-9 apply to a new construction or reconstruction (4R) project on a non-freeway. The Department has adopted separate criteria for the geometric design of a 3R non-freeway project. See Chapter Fifty-five. Chapter Forty provides definitions for the non-freeway-project scope of work, which will determine which set of criteria should be used for project design.
3. Functional Classification. The selection of design values depends on the functional classification of the highway facility. This is discussed in Section 40-1.01. Functional-classification maps for all public roads are available from the Planning Division.

See Section 40-1.01 for definitions of the functional classifications.

4. Urban Design Subcategories. Within an urbanized or urban area, the selection of design values depends on the design subcategory of the facility. Separate criteria are provided for suburban, intermediate, and built-up subcategories. These classifications are defined as follows.
  - a. Suburban. This type of area is located at the fringe of an urbanized or small urban area. The predominant character of the surrounding environment is residential, but it may include a considerable number of commercial establishments, especially strip development along a suburban arterial. There may also be a few industrial parks. On a suburban road or street, a motorist has a significant degree of freedom but, nonetheless, he or she must also devote some of their attention to entering and exiting vehicles. Roadside development is characterized by low to moderate density.

Pedestrian activity may or may not be a significant design factor. Right of way is often available for roadway improvements.

A local or collector street is located in a residential area, but may also serve a commercial area. The posted speed limit ranges between 30 and 50 mph. The majority of intersections will have stop or yield control, but there will be an occasional traffic signal. A suburban arterial will have strip commercial development and perhaps a few residential properties. The posted speed limit ranges between 35 and 55 mph, and there will usually be a few signalized intersections along the arterial.

- b. Intermediate. As the name implies, an intermediate area is between a suburban and a built-up area. The surrounding environment may be either residential, commercial, or industrial or a combination of these. The extent of roadside development will have a significant impact on the selected speeds of motorists. The increasing frequency of intersections is also a control on average speed. Pedestrian activity has now become a significant design consideration, and sidewalks and cross walks at intersections are common. The available right of way will restrict the practical extent of roadway improvements.

A local or collector street has a posted speed limit ranging between 30 and 45 mph. The frequency of signalized intersections has increased substantially if compared to a suburban area. An arterial will have intensive commercial development along its roadside. The posted speed limit ranges between 35 and 50 mph. Such an arterial has several signalized intersections per kilometer.

- c. Built-up. This type of area refers to the central business district within an urbanized or small urban area. The roadside development has a high density and is often commercial. However, a substantial number of roads and streets pass through a high-density environment (e.g. apartment complexes, row houses). Access to property is the primary function of the road network. Pedestrian considerations may be as important as vehicular considerations, especially at intersections. Right of way for roadway improvements is usually not available.

Because of the high density of development, the distinction between the functional classifications (local, collector, or arterial) becomes less important when considering signalization and speeds. The primary distinction among the three functional classes is often the relative traffic volume and, therefore, the number of lanes. As many as half the intersections may be signalized. The posted speed limit ranges between 25 and 35 mph.

5. Rural-Area Figures. These do not provide design criteria for sub-categories. However, there are many rural facilities which pass through relatively built-up, but unincorporated, areas. It may be inappropriate to use the rural-area design criteria. The designer may, as an option, use the suburban criteria for a functional classification (e.g., arterial) in a relatively built-up rural area. Therefore, if the area is urban in character (e.g., a densely populated area with a grid-like street system), it may be appropriate to use the urban-area design criteria even though the facility is rural. This decision will be documented in the Engineer's Report (see Chapter Seven).
6. Cross-Section Elements. Some of the cross-section elements included in a figure (e.g., sidewalk width) are not automatically warranted in the project design. The values will only apply after the decision has been made to include the element in the highway cross section.
7. Manual Section References. The figures are intended to provide a concise listing of design values for easy use. However, the designer should review the *Manual* section references for greater insight into the design elements.
8. Footnotes. The figures include many footnotes, which are identified by a number in parentheses, e.g., (6). The information in the footnotes is critical to the proper use of the figures.