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**Chapter Twenty-two LOCAL ROADS AND STREETS**

Local roads and streets primarily serve as access roads to farms, residences, businesses or other abutting properties. They distribute traffic to highways in the higher functional classification network. Local roads and streets are often designed to the minimum criteria and without the same degree of engineering detail and analysis afforded the higher classification highways.

This Chapter discusses the minimum criteria used in the design of local roads and streets. Information that is also applicable to the design of rural and urban local roads and streets is included in the following chapters:

* Chapter 2 discusses Participation Agreements between the Department and local officials.
* Chapter 7 discusses local funding programs including State programs for local facilities.
* Chapters 9, 10, 11, 12 and 13 provide guidance on the geometric design elements.
* Chapter 14 provides guidelines on roadside safety issues.
* Chapter 15 provides information on the design of intersections, including intersection alignment, left- and right-turn lanes and channelization.

**22.1 GENERAL**

**22.1.1 Descriptions**

1. Rural. A major part of the rural highway system consists of two-lane local roads. These roadways should be designed to accommodate the highest practical criteria compatible with traffic and topography.
2. Urban. A local urban street is a public roadway for vehicular travel including public transit and refers to and includes the entire area within the right of way. The street also serves pedestrian and bicycle traffic and usually accommodates public utility facilities within the right of way. The development or improvement of these streets should be based on a functional street classification that is part of a comprehensive community development plan. The design criteria should be appropriate for the planned development. The two major design controls are (1) the type and extent of urban development with its limitations on rights of way,

and (2) zoning or regulatory restrictions. Local streets primarily serve to provide access to adjacent residential development areas. The overriding consideration is to foster a safe and pleasant environment whereas the convenience of the motorist is secondary. Other local streets not only provide access to adjacent development but also serve limited through traffic. Traffic service features may be an important concern on these streets (e.g., traffic signals, left-turn lanes).

**22.1.2 Secondary and State “C” Construction Projects**

State roads and streets constructed under the Secondary and State’s “C” Programs are divided into four separate groups:

* Group 1 – roads and streets in subdivisions or residential areas;
* Group 2 – roads and streets that are ½ mile or less in length, are not major connecting road/streets (e.g., to major traffic generator), are not dead-end roads/streets, and have ADT’s less than 250;
* Group 3 – roads and streets that are between ½ and 1 mile in length, are not a connecting road/street and have ADT’s of 500 or less; and
* Group 4 – all other Secondary or “C” roads, except subdivision streets.

The geometric design criteria presented in Figure 22.3A for Groups 1 through 4 is the minimum criteria for State secondary roads and “C” projects.

**22.1.3 Jurisdictional Systems**

Local roads and streets may be part of the State Highway System, county road system or a municipal system. These systems are described in Section 7.3. The following sections will apply to local roads and streets.

**22.1.3.1 State Highway System**

The State Highway System consists of all highways under the jurisdiction of the South Carolina Department of Transportation. Any State facility functionally classified as a local road or street must meet the criteria in this Chapter.

The Department may, in its discretion, add additional highways to the State Highway System by constructing new highways or taking over highways from the county or the municipal street systems. These additions must meet the criteria for transfer in Section

22.1.4. Also, the Department cannot exceed any existing county mileage cap for State highways. This mileage cap varies per county.

The Department and any municipality may agree to construct any street in the State Highway System as a different type beyond that required by the Department, provided the municipality pays for the extra construction cost.

**22.1.3.2 County System**

The county governments are responsible for all rural roads within their boundaries that are not on the State or Municipal Highway Systems. Corporate limit changes due to annexation or disconnection of territory by municipalities do not automatically change the termini of county highways or extensions to county highways. County highways that may be included by annexation or extensions that are excluded by disconnection retain their existing status until formal action to change the status is taken by the county board.

**22.1.3.3 Municipal System**

A municipality includes a city or incorporated town. Corporate authorities mean (1) the city council or similar body when the reference is to cities, (2) the council when the reference is to municipalities under the commission form of government, and (3) the board of trustees or similar body when the reference is to incorporated towns.

The municipal street system includes existing streets and streets established in municipalities that are not a part of the State Highway System or County Highway System, together with roads outside their corporate limits over which they have jurisdiction.

Streets outside of municipal corporate limits, which are continuations of municipal streets, leading to, and within a reasonable distance of, definite objectives (e.g., a State highway, cemetery, school) may be constructed and maintained by the municipality.

State or county highways that are included within the corporate limits of a municipality by reason of annexation remain under the jurisdiction of the State or county until a formal agreement is executed transferring jurisdiction to the municipality.

**22.1.3.4 Jurisdictional Transfers**

When a local agency has the jurisdiction of a street or highway, it has various responsibilities (e.g., reconstruction, signing, maintenance). All of these responsibilities remain with the local agency until the jurisdiction is transferred to another entity.

The transfer of jurisdiction for any highway from one highway system to another must be accomplished by agreement between the two involved highway authorities.

**22.1.4 Adding Routes to State Highway System**

The following criteria apply to rural and urban local roads and streets that will be added to the State Highway System for construction and maintenance.

**22.1.4.1 Subdivision Roads and Streets**

1. These roads and streets must be publicly maintained. Publicly maintained means that the road or street is maintained by the county, municipality or other political entity having jurisdiction.
2. All roads and streets should be adequately drained.
3. In order for a road or street in any subdivision to be accepted into the System, a minimum of 20 percent of the lots on the road or street must have a house constructed on them.
4. Each road or street must have a minimum right of way width of 50 feet unless extenuating circumstances dictate otherwise.
5. Each road or street must be contiguous to the State Highway System.
6. The road or street must not possess any unusual features that will cause the construction cost to be abnormally high.
7. The road or street cannot cross a dam that has been constructed for the purpose of impounding surface waters.
8. The road or street cannot be located where a narrow buffer strip is maintained between the right of way of the road or street and adjacent property in a manner that restricts access to other adjacent landowners.
9. Plats of subdivisions in which roads or streets are located which are requested to be accepted into the System will be made available to the Department.

**22.1.4.2 Non-Subdivision Roads**

1. Non-subdivision roads or streets must be publicly maintained. Publicly maintained means that the road or street is maintained by the county, municipality or other political entity having jurisdiction.

2. Each road or street must be contiguous to the State Highway System.

3. The road or street must not possess any unusual features that will cause the construction cost to be abnormally high.

4. No road or street will serve essentially as a drive to private residences, private businesses, or private recreational areas. All roads or streets will serve public interest.

5. The road or street cannot cross a dam that has been constructed for the purpose of impounding surface water.

6. All roads and streets should be adequately drained.

7. Each road or street must have a minimum right of way width of 50 feet unless extenuating circumstances dictate otherwise.

**22.1.4.3 Maintenance for Paved Roads under the Belt Line Act**

1. The riding surface should have reasonably good riding qualities and be in good condition.
2. The traveled way width and shoulder widths should be adequate to provide for the safe movement of the anticipated traffic volumes.
3. The geometry (vertical and horizontal alignment) must meet minimum safety requirements.
4. The overall roadbed should be structurally adequate to carry the anticipated loads.
5. The roadway drainage should be adequate with sufficient outfall drainage.
6. Where adjacent property has been subdivided for development purposes, a minimum of 20 percent of the lots must have a house constructed on them.
7. The road or street cannot cross a dam that has been constructed for the purpose of impounding surface waters.
8. If the above conditions are not met and the road or street is entered into the State system, it must be done so with the understanding that “C” funds will be used for its improvement.

All roads or streets that are programmed for construction, whether they are in a subdivision or not, must have a sufficient traffic volume as determined by the Department to justify the improvement.

Each of the roads requested for improvement under the Belt Line Act must be inspected to insure the criteria outlined above is met. It is the District Engineering Administrator’s responsibility to have the road evaluated and forward a recommendation to the State Highway Engineer.

**22.2 DESIGN ELEMENTS**

The design criteria discussed in this Section applies to all local roads and streets included in the State Highway System. For roads and streets maintained by local governments, additional guidance can be found in the AASHTO publications, A Policy on Geometric Design of Highways and Streets and the Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400).

**22.2.1 Traffic Volume**

Traffic volume is not usually a major factor in determining the geometric design criteria to be used in designing residential streets. Traditionally, these streets are designed with a standard two-lane cross section, but a four-lane cross section may be appropriate in certain urban areas, as governed by traffic volume, administrative policy or other community considerations. However, to provide the requisite traffic mobility and safety together with the essential economy in construction, maintenance and operation, they must be planned, located and designed to be suitable for predictable traffic operations and must be consistent with the development and culture abutting the right of way.

For streets serving industrial or commercial areas, traffic volume may be a major factor. For these streets, the ADT projected to 20 years is desirable.

**22.2.2 Design Speed**

Design speed is a selected speed used to determine the various design features of the roadway. Geometric design features should be consistent with a specific design speed selected as appropriate for environmental and terrain conditions. Typically, design speeds are between 20 and 55 miles per hour for local roads and streets. See Section

22.3 for additional guidance on the selection of design speed.

**22.2.3 Sight Distances**

The minimum stopping, passing and intersection sight distances should be included when designing for local roads and streets, wherever possible. Chapter 10 provides a detailed discussion on sight distance criteria and Section 22.3 provides specific sight distance values for local roads and streets.

**22.2.4 Horizontal Alignment**

Local roads and streets with lower speeds can support adjustments in superelevation rates to better fit the terrain of adjoining properties. See Section 11.3 for a discussion on superelevation rates for low-speed urban streets.

**22.2.5 Roadside Safety**

The Department requires that the roadside be cleared, except for designated trees. These trees should be identified at the Design Field Review and noted on the Plans.

**22.2.6 Bridges**

The minimum clear roadway width (traveled way plus shoulders) for new and reconstructed bridges should equal the approach roadway width and have a design loading structural capacity of HL-93.

Figure 22.2A provides the design criteria for existing bridges on local roads and streets.

**22.2.7 Typical Sections**

Figures 22.2B through 22.2D present sample cross sections for both rural and urban local roads and streets. The use of curb and gutter and valley gutter sections are common on urban streets to reduce right of way requirements. A large majority of urban residential streets provide two travel lanes with or without parking lanes on one or both sides. The large majority of roads and streets developed under the “C” Program do not have provisions for parking.

For specific design criteria, see the tables of design criteria (see Figure 22.3A).

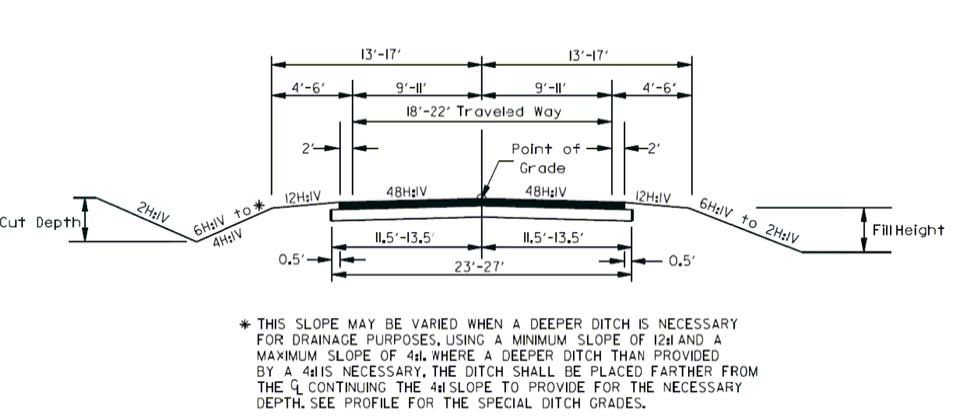
|  |  |  |
| --- | --- | --- |
| Design Volume (veh/day) | Minimum Clear Roadway Width(1), (2), (3) | Design Loading Structural Capacity |
| 0 to 50 | 20 ft | H 10 |
| 50 to 250 | 20 ft | H 15 |
| 250 to 1500 | 22 ft | H 15 |
| 1500 to 2000 | 24 ft | H 15 |
| > 2000 | 28 ft | H 15 |

Notes:

1. Clear width between curbs or rails, whichever is the lesser.
2. Minimum clear widths that are 2 feet narrower may be used on roads with few trucks. In no case should the minimum clear width be less than the approach traveled way width.
3. For single-lane bridges, use 18 feet.

**MINIMUM CLEAR ROADWAY WIDTHS AND DESIGN LOADINGS FOR BRIDGES TO REMAIN IN PLACE**

**Figure 22.2A**



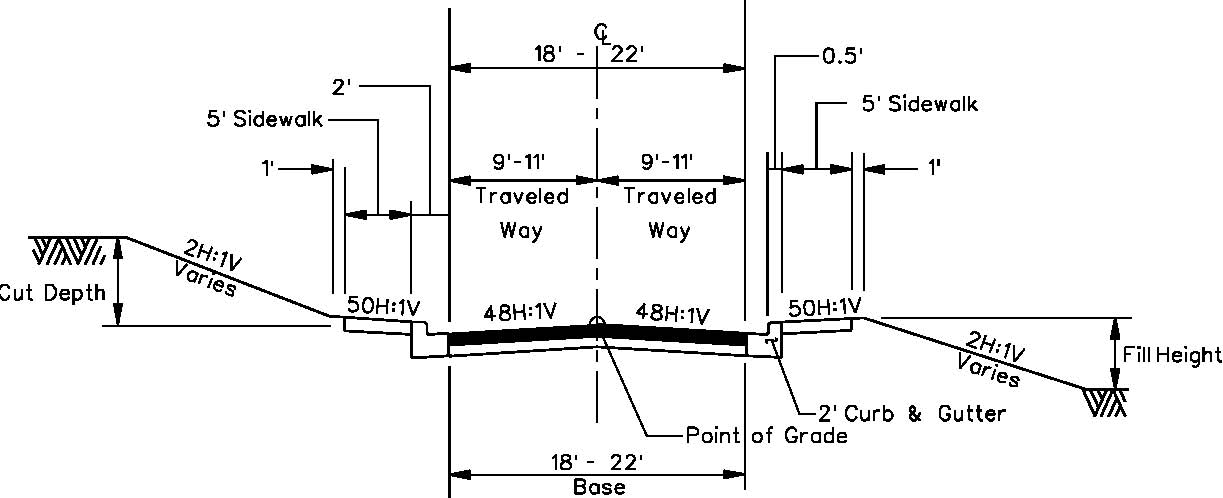
*Note: See Figure 22.3A for specific road group criteria.*

**TYPICAL LOCAL ROAD OR STREET (With Shoulders)**

**Figure 22.2B**

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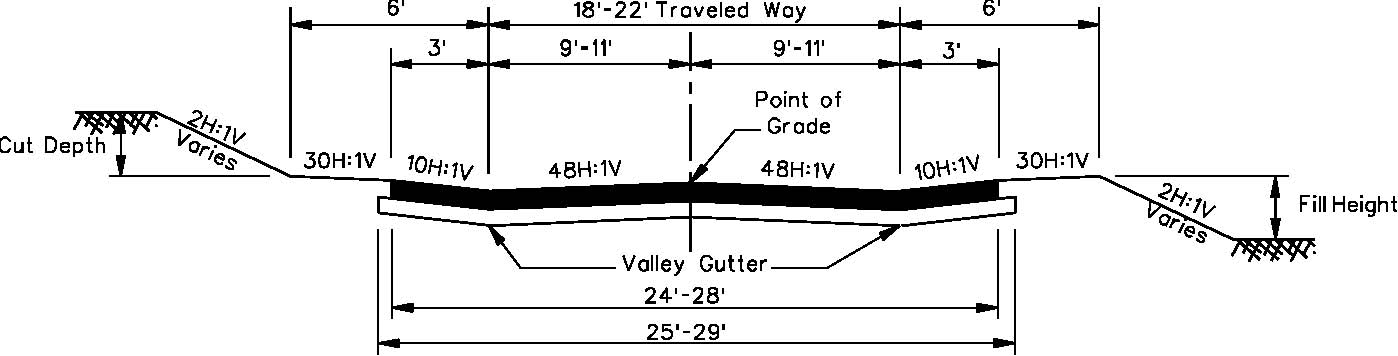
Note: See Figure 22.3A for specific road group criteria.

**TYPICAL URBAN LOCAL STREET (With Curb and Gutter)**

**Figure 22.2C**

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Note: See Figure 22.3A for specific road group criteria.

**TYPICAL URBAN LOCAL STREET (With Valley Gutter)**

**Figure 22.2D**

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**22.3 TABLES OF DESIGN CRITERIA**

Figures 22.3A through 22.3C present the Department’s design and alignment criteria for rural and urban local roads and streets. The designer should consider the following when using these figures:

1. Functional Classification. To determine the latest functional classification of a facility, the designer should contact Road Data Services.
2. Applicability. Note that some of the cross-section elements included in the figures (e.g., TWLTL) are not automatically warranted in the project design. The values in the figures only apply after the decision has been made to include the design element in the highway cross section.
3. Manual Section References. These figures are intended to provide a concise listing of design values for easy use. However, the designer should review the Manual section references for more information on the design elements.
4. Footnotes. The figures include many footnotes, which are identified by a number in parentheses (e.g., (3)). The information in the footnotes is critical to the proper use of the design tables.
5. Controlling Design Criteria. The figures provide an asterisk to indicate controlling design criteria. If the values in the tables cannot be met, the designer should contact the Program Manager for alternatives. Section 9.2 discusses this in more detail and presents the process for approving design exceptions to controlling criteria.
6. Group Designations. Figure 22.3A has been segregated according to the Group designations defined in Section 22.1.2.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Design Element** | | | **Manual Section** |  | | **Design Criteria** | |  | |
| **Group 1** | | **Group 2** | **Group 3** | **Group 4** | |
| **DesignControls** | Design Forecast Year **(1)** |  | | | 9.6.2 | 20 years | | 20 years | 20 years | 20 years |
| \*Design Speed |  | | | 9.5.2 | **(2a)** | | 20 – 50 mph | 30 – 50 mph | 35 - 60 mph |
| Access Control |  | | | 9.8 | Controlled by Regulation | | Controlled by Regulation | Controlled by Regulation | Controlled by Regulation |
| Level of Service |  | | | 9.6.4 | N/A | | N/A | N/A | N/A |
| **Cross Section Elements** | \*Travel Lane Width |  | | | 13.2.3 | Min: 9′ | | Des.: 10′ Min.: 9′ | Des.: 11′ Min.: 10′ | 11′ |
| \*Shoulder Width **(3)** |  | | | 13.2.4 | 4′ or C/G | | Des.: 6′ Min.: 4′ or C/G | Des.: 6′ Min.: 4′ or C/G | 6′ or C/G |
| Auxiliary Lanes |  | Lane Width | | 13.2.5 | N/A | | N/A | N/A | Min. 11′ **(4)** |
| Shoulder Width | | N/A | | N/A | N/A | 6′ or C/G |
| Cross Slope |  | \*Travel Lane | | 13.2.3.3 | 2.08% | | 2.08% | 2.08% | 2.08% |
| Auxiliary Lane | | 13.2.5 | N/A | | N/A | N/A | 2.08% |
| \*Shoulder | | 13.2.4.3 | 8.33% | | 8.33% | 8.33% | 8.33% |
| Bicycle |  | Lane Width **(5)** | | 13.2.3 | 4′ | | 4′ | 4′ | 4′ |
| Shared Roadway Width | | N/A | | N/A | N/A | 14′ Outside Travel Lane |
| Curb & Gutter (Urban) |  | Type | | 21.2.9 |  | | Vertical or Sloping | |  |
| Width | |  | | 2′ | |  |
| Sidewalk Width |  | | | 21.2.10 | 5′ | | 5′ | 5′ | 5′ |
| Median Width |  | TWLTL | | 21.2.6 | N/A | | N/A | N/A | 15′ |
| **Roadway Elements** | Side Slopes |  | Cut Section | Foreslope | 13.3.1 | 6H:1V to 4H:1V | | 6H:1V to 4H:1V | 6H:1V to 4H:1V | 6H:1V to 4H:1V |
| Ditch Type | V Ditch | | V Ditch | V Ditch | V Ditch |
| Back Slope | 2H:1V | | 2H:1V | 2H:1V | 2H:1V |
| Fill Section | | 6H:1V to 2H:1V | |  | 6H:1V to 2H:1V | 6H:1V to 2H:1V | 6H:1V to 2H:1V |
| Median Slopes |  | TWLTL | | 21.2.7 | N/A | | N/A | N/A | 2.08% |
| Clear Zone |  | | | 14.3 | **(6a)** | | **(6a)** | **(6a)** | **(6b)** |

\*Controlling design criteria (see Section 9.2)

**GEOMETRIC DESIGN CRITERIA FOR SECONDARY AND STATE “C” ROADS (New Construction/Reconstruction)**

**Figure 22.3A**

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|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Design Element** | | | **Manual Section** | **Design Criteria** | | |  |
| **Group 1** | **Group 2** | **Group 3** | **Group 4** |
| **Bridges** | New and Reconstructed Bridges | \*Structural Capacity |  | HL-93 | | |  |
| \*Clear Roadway Width | 13.5.1.1 | **(7)** | **(7)** | **(7)** | **(7)** |
| Existing Bridges to Remain in Place | \*Structural Capacity |  | H-10 to H-15 | H-10 to H-15 | H-10 to H-15 | H-10 to H-15 |
| \*Clear Roadway Width | 13.5.1.1 | **(8)** | **(8)** | **(8)** | **(8)** |
| \*Vertical Clearance (Local Roads Under) **(9a)** | New/Replaced Overpassing Bridges **(9b)** | 12.6 | 16c - 0s | 16c - 0” | 16c - 0s | 16c - 0” |
| Existing Overpassing Bridges | 14c - 0s | 14c - 0” | 14c - 0s | 14c - 0” |
| Pedestrian Bridges | 17c– 0s | 17c – 0s | 17c– 0s | 17c – 0s |
| Overhead Signs | 17c – 6s | 17c – 6s | 17c – 6s | 17c – 6s |
| Clearance (Local Roads Over) | \*Railroads | 12.6 | 23c – 0s | 23c – 0s | 23c – 0s | 23c – 0s |
| Underpass Width | 13.5.2 | Approach Roadway Width Including Sidewalks, Where Applicable. | | | Traveled Way Plus Clear Zone |

\*Controlling design criteria (see Section 9.2)

(Continued)

**Figure 22.3A**

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**GEOMETRIC DESIGN CRITERIA FOR SECONDARY AND STATE “C” ROADS (New Construction/Reconstruction)**

Footnotes to Figure 22.3A

(1) Design Forecast Year. Table values are desirable. For rural roads, the design year may be current traffic volumes. For urban streets, the minimum design year is 10 years.

(2) Design Speed.

* + 1. Design speed is not a major factor for Group 1 roads and streets. Select a design speed based on available right of way, terrain, likely pedestrian presence, adjacent development and other area controls.
    2. Group 4 roads may be designed for 45 miles per hour on selected rural routes and “C” projects, if agreed upon during the Design Field Review.

(3) Shoulder Width. Shoulders should be increased by 3.5 feet where guardrail is used.

(4) Auxiliary Lane Width. The auxiliary lane width should be the same as the adjacent travel lane.

(5) Bicycle Facilities Lane Width. If cub and gutter is provided, provide a 5-foot width from the face of curb. For design speeds greater than 45 miles per hour, the bike lane width should be increased in accordance with AASHTO Guide for the Development of Bicycle Facilities.

(6) Clear Zone.

* + 1. Desirably provide a 7 to 10 foot clear area from the edge of traveled way for rural roads. Curbs do not have a significant redirection capability. Obstructions behind a curb should be located at or beyond the minimum clear zone distances. Where minimum recommended clear zones cannot be provided, locate fixed objects as far from traveled way as practical, desirable 5.5 feet but in no case closer than 1.5 feet from the face of curb.
    2. The clear zone will vary according to design speed, traffic volumes, side slopes and horizontal curvature. In addition, guardrail will be installed at bridge ends and along fill slopes steeper than 4H:1V exceeding 10 feet in height.

(7) New and Reconstructed Bridge Widths. See Section 22.2.6

(8) Existing Bridge Widths to Remain in Place. See Section 22.2.6

(9) Vertical Clearance (Local Roads Under).

* + 1. The clearance must be available over the traveled way, shoulders, and any anticipated future widening.
    2. Table value includes allowance for future overlays.

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|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Design** |  | **Manual** |  |  | **Design Speed** | | | |  |  |
| **Element** |  | **Section** | 20 mph | 25 mph | 30 mph | 35 mph | 40 mph | 45 mph | 50 mph | 55 mph |
| \*Stopping Sight Distance **(1)** |  | 10.1 | 115ƍ | 155ƍ | 200ƍ | 250ƍ | 305ƍ | 360ƍ | 425ƍ | 495ƍ |
| Passing Sight Distance |  | 10.2 | 710ƍ | 900ƍ | 1090ƍ | 1280ƍ | 1470ƍ | 1625ƍ | 1835ƍ | 1985ƍ |
| Intersection Sight Distance **(2)** |  | 10.4 | 225ƍ | 280ƍ | 335ƍ | 390ƍ | 445ƍ | 500ƍ | 555ƍ | 610ƍ |
| \*Minimum Radii | emax = 8% | 11.2.3 | - | - | - | - | - | - | - | 965ƍ |
| emax = 6% | 115ƍ | 185ƍ | 275ƍ | 380ƍ | 510ƍ | 660ƍ | 835’ | - |
| \*Superelevation Rate **(3)** |  | 11.3 | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 8% |
| \*Horizontal Sight Distance **(4)** |  | 11.4 | 14.5ƍ | 16.0ƍ | 18.0ƍ | 20.5ƍ | 23.0ƍ | 24.5ƍ | 30.0ƍ | 32.0ƍ |
| \*Minimum Vertical Curvature (K-values) **(5)** | Crest | 12.5 | 7 | 12 | 19 | 29 | 44 | 61 | 84 | 114 |
| Sag | 17 | 26 | 37 | 49 | 64 | 79 | 96 | 115 |
|  | Level |  | 8% | 7% | 7% | 7% | 7% | 6% | 6% | 6% |
| \*Maximum Grade | Rolling | 12.3.1 | 11% | 11% | 10% | 10% | 9% | 8% | 7% | 7% |
|  | Mountainous |  | 16% | 15% | 14% | 13% | 12% | 10% | 10% | 10% |
| Minimum Grade **(6)** |  | 12.3.2 |  |  | Des.: 0.5% Min.: 0.0% | | | |  |  |

\*Controlling design criteria (see Section 9.2).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (1) | Stopping Sight Distance. | | Table values are for passenger cars on level grade. | |
| (2) | Intersection Sight Distance. | | | Table values are for passenger cars for assumed conditions described in Figure 10.4C. |
| (3) | Superelevation Rate. | | See Section 11.3 for superelevation rates based on emax, design speed and radii of horizontal curves. | |
| (4) | Horizontal Sight Distance. | | The table provides the necessary middle ordinate, assuming the maximum radii and stopping sight distance. | |
| (5) | Vertical Curvature (K-values). | | | K-values are based on level stopping sight distances. |
| (6) | Minimum Grade. | The minimum grade of 0 percent can only be used on ditch sections where there is an adequate roadway cross slope | | |
|  | and ditch grade. The minimum for curb and gutter is 0.3 percent and for valley gutter it is 0.4 percent. | | | |
|  | **ALIGNMENT CRITERIA FOR RURAL LOCAL ROADS AND STREETS** | | | |
|  | **Figure 22.3B** | | | |

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|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Design** |  | **Manual** |  |  | **Design Speed** | | | |  |  |
| **Element** |  | **Section** | 20 mph | 25 mph | 30 mph | 35 mph | 40 mph | 45 mph | 50 mph | 55 mph |
| \*Stopping Sight Distance **(1)** |  | 10.1 | 115ƍ | 155ƍ | 200ƍ | 250ƍ | 305ƍ | 360ƍ | 425ƍ | 495ƍ |
| Intersection Sight Distance **(2)** |  | 10.4 | 225ƍ | 280ƍ | 335ƍ | 390ƍ | 445ƍ | 500ƍ | 555ƍ | 610ƍ |
|  | emax = 8% |  | - | - | - | - | - | - | - | 965ƍ |
| \*Minimum Radii | emax = 6% | 11.2.3 | - | - | - | - | - | - | 835c | - |
|  | emax = 4% |  | 125ƍ | 205ƍ | 300ƍ | 420ƍ | 565ƍ | 730ƍ | - | - |
| \*Superelevation Rate **(3)** |  | 11.3 | 4% | 4% | 4% | 4% | 4% | 4% | 6% | 8% |
| \*Horizontal Sight Distance **(4)** |  | 11.5 | 13.0ƍ | 15.0ƍ | 16.5ƍ | 18.5ƍ | 20.5ƍ | 22.5ƍ | 30.0ƍ | 32.0ƍ |
| \*Minimum Vertical Curvature (K-values) **(5)** | Crest | 12.5 | 7 | 12 | 19 | 29 | 44 | 61 | 84 | 114 |
| Sag | 17 | 26 | 37 | 49 | 64 | 79 | 96 | 115 |
|  | Level |  | 8% | 7% | 7% | 7% | 7% | 6% | 6% | 6% |
| \*Maximum Grade **(6)** | Rolling | 12.3 | 11% | 11% | 10% | 10% | 9% | 8% | 7% | 7% |
|  | Mountainous |  | 15% | 15% | 14% | 13% | 12% | 10% | 10% | 10% |
| Minimum Grade |  | 12.3 |  |  | Des.: 0.5% Min.: 0.3% | | | |  |  |

\*Controlling design criteria (see Section 9.2).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| (1) | Stopping Sight Distance. | | Table values are for passenger cars on level grade. | | |
| (2) | Intersection Sight Distance. | | | | Table values are for passenger cars for assumed conditions described in Figure 10.4C. |
| (3) | Superelevation Rate. | See Section 11.3 for superelevation rates based on emax, design speed and radii of horizontal curves. | | | |
| (4) | Horizontal Sight Distance. | | | The table provides the necessary middle ordinate, assuming the maximum radii and stopping sight | |

distance.

(5) Vertical Curvature (K-values). K-values are based on level stopping sight distances.

(6) Maximum Grades. For urban streets in commercial and industrial areas, grades should be limited to 8% or less.

**ALIGNMENT CRITERIA FOR URBAN LOCAL ROADS AND STREETS Figure 22.3C**

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**22.4 REFERENCES**

1. A Policy on Geometric Design of Highways and Streets, AASHTO, 2001.
2. Highway Safety Design and Operations Guide, AASHTO, 1997.
3. Roadside Design Guide, AASHTO, 2002.
4. Highway Capacity Manual 2000, TRB, 2000.
5. Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400), AASHTO, 2001.
6. Guide for the Development of Bicycle Facilities, AASHTO, 1999.