

CEDAR RAPIDS METRO DESIGN STANDARDS CHAPTER 5 – ROADWAY DESIGN

Supplemental to SUDAS Chapter 5

Chapter 5 – Roadway Design

Replace SUDAS Chapter 5I with this section

CHAPTER 5I ACCESS MANAGEMENT

A. General

The efficiency and safety of a street or highway depends to a large extent upon the amount and character of interruptions to the movement of traffic. The primary cause of these interruptions is vehicular movements to and from businesses, residences and other developments along the street or highway. Regulation and overall control of access is necessary to provide efficient and safe highway operation and to utilize the full potential of the highway investment.

B. Access Permit Procedure

An Access Permit may be required from the Jurisdictional Engineer for a public or private access constructed to a public street. The Jurisdictional Engineer will determine if a permit is required. Access to streets or highways under the jurisdiction of the Iowa Department of Transportation (IDOT) will be governed by requirements of the IDOT with Jurisdictional review.

The following general criteria will be used by the Jurisdiction when reviewing an access request:

1. Safety to the traveling public.
2. Perpetuation of the traffic-carrying capacity of the thoroughfare (pedestrian, bicycle, transit, heavy vehicles and passenger cars)
3. Protection of the rights of the traveling public and of property owners including the rights of abutting property owners.

C. Definitions

The following terms are defined:

1. Access: A means of ingress or egress between public right-of-way and abutting properties.
2. Built-Up Area: An area adjacent to a roadway that meets the follow general criteria -
 - A. The lots or areas abutting the roadway do not have sufficient setback for the construction of a frontage road, and the development in depth precludes the establishment of a frontage-type road to the rear of the lots or area.
 - B. When a "built-up area" exists on one side of roadway, the other side of the road is also considered to be "built-up" to determine access requirements.

3. Entrance: A physical connection between a highway or street and abutting property for the purpose of access.
4. Fringe Area: A suburban-type area adjacent to a roadway that meets the following general criteria: The layout of the lots or area abutting the roadway including intermittent or unrelated development, permits construction of a frontage road in front of, or a frontage-type road to the rear of, the development.
5. Frontage: The length along public right-of-way of an individual lot. Corner property at an intersection of two public roads has separate frontage along each roadway.
6. Frontage Road: A public or private road or street auxiliary to and usually located alongside and parallel to a roadway for maintaining local road continuity and for control of access.
7. Median: The portion of a divided highway or divided entrance separating the traveled ways from opposing traffic. Medians may be depressed, raised or painted. Openings in the roadway median to accommodate entrances are governed by the following:
 - A. New median openings should not be permitted except to accommodate intersecting local public roads or streets or large traffic generating facilities such as large shopping centers or industrial plants. Median openings may be permitted in these instances if satisfactorily justified and in the public interest.
 - B. If a median opening exists prior to the construction of a driveway of local public road or street, the opening may be modified to accommodate the turning movements of the traffic expected.
8. Predetermined Access Location: A location of access reserved for the adjacent property at the time access rights are acquired.

D. Entrance Type

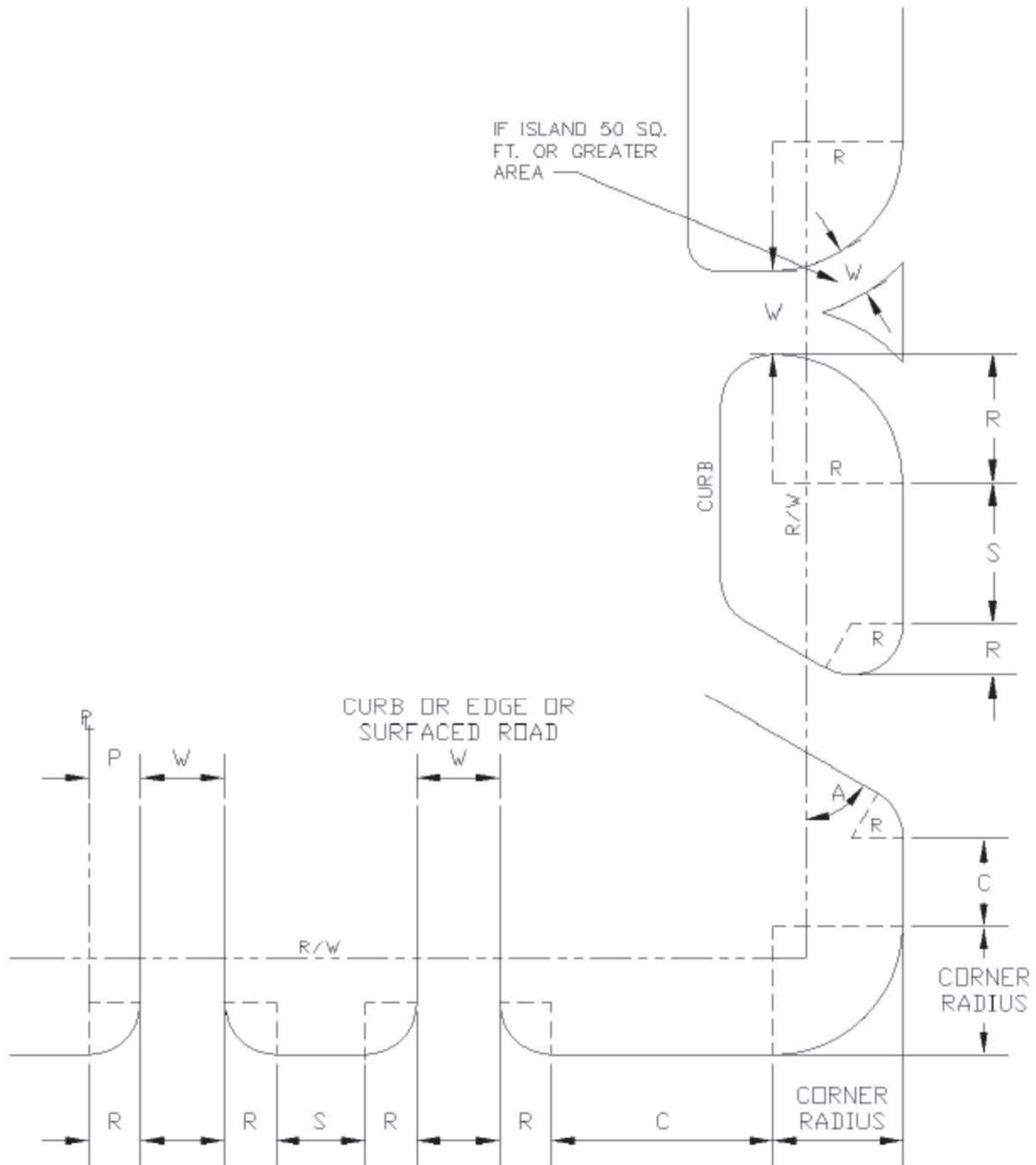
1. Type "A" Entrance. An entrance developed to carry sporadic or continuous heavy concentrations of traffic. An entrance of this type would normally consist of multiple approach lanes and may incorporate a median. Examples: racetracks, large industrial plants, shopping centers, subdivisions or amusement parks.
2. Type "B" Entrance. An entrance developed to serve moderate traffic volumes. An entrance of this type would normally consist of one inbound and one outbound traffic lane. Examples: Service stations, small businesses, drive-in banks or light industrial plants.
3. Type "C" Entrance. An entrance developed to serve light traffic volumes. The entrance would not normally accommodate simultaneous inbound and outbound vehicles. Examples: residential, farm or field entrances.

E. Entrance Design Criteria

1. Width Measurement: The width of an entrance shall be measured at the property end of the radius return or flared taper. The curb opening may exceed the maximum allowable width of the entrance to accommodate the allowable radius or taper.

2. Dimensions and Spacings: Refer to Figure 5I-1.01 and Table 5I-1.01 for typical entrance dimensions and spacing.

FIGURE 5I-1.01



ENTRANCE DIMENSIONS AND SPACING

TABLE 5I-1.01 ENTRANCE DIMENSIONS (FT)

		Posted Speed <35 mph				Posted Speed >=35 mph			
Dimension Reference (See Fig. 5I-1.01)		Residential	Commercial	Industrial	Agricultural	Residential	Commercial	Industrial	Agricultural
Entrance Type		C	A or B	A or B	C	C	A or B	A or B	C
Width ¹	W								
Minimum		10	24	24	15	10	24	24	15
Maximum ⁷		24	30	40	30	24	40	50	30
Right Turn Radius ²	R								
Minimum		5	15	20	10	5	15	20	15
Maximum		10	20	30	20	15	35	50	25
Minimum Spacing ³									
From property line	P	R/F	R+10	R+10	R	R/F	R+10	R+10	R
From street corner	C	10	10	10	50	300	300-600	300-600	300
Between Driveways on same lot	S	30	60	60	300	30	60	60	300
Angle ⁴	A	90°	90°	90°	90°	90°	90°	90°	90°
Pavement Thickness in ROW		5"	6"	8"	N/A	5"	6"	8"	N/A

1. The minimum width of commercial or industrial driveways is 15 ft. for one-way operation. The width is intended to be measured along the right-of-way line, in most instances at the inner limit of a curbed radius or between the line of the radius and the near edge of a curbed island of at least 50 square feet in area.

2. Flares (F) may be used for residential entrances in lieu of radii, with a minimum 2:1 ratio (the 2 dimension being at a right angle to the street).

3. Measured along the curb or edge of pavement from the roadway end of the curb radius.

4. Any variation from 90° will be evaluated on a case basis. The minimum acute angle (measured from the edge of the pavement) for any one-way commercial or industrial driveway is 70°. The minimum acute angle for any residential driveway is 60°.

5. Shared driveways shall be approved by the Jurisdiction.

6. The spacing from an entrance to a cross street with speed limits of 35 mph or greater may be less than 300 feet if justified by a traffic study, entrance is right-in/right-out, or other site-specifics have been evaluated by the Jurisdiction.

7. Driveway on local residential streets may have a maximum width of 36 feet for a garage with three or more stalls except where located within a cul-de-sac bulb, where maximum width shall be 24 feet regardless of number of stalls.

- A. For individual properties, the number of entrances will be as follows:
 - 1. Single Family (SF) Residential - In general, each SF residential property shall have one access point. However where houses are located on corner lots, where frontage length is at least twice the width of the structure, or access is from heavy traveled roadway, more than one access point may be permitted.
 - 2. Multi-Family (MF) Residential - In general, access shall be determined a traffic study as required and Jurisdiction's concerns.
 - 3. Commercial - Commercial property with less than 200 feet of frontage and located mid-block shall be limited to one access point. A second access point may be allowed for commercial property having more than 200 feet of frontage. For commercial property located on a corner, one access to each street may be permitted provided there is adequate spacing between the intersecting street and the proposed entrance.
 - 4. Industrial - Access shall be determined on a case-by-case basis. The Jurisdiction may require submittal of a traffic study.
 - 5. Agricultural - Two accesses at minimum 300 foot intervals may be permitted provided there is a minimum spacing of 30 feet between two adjacent culverts.

3. Sight Distance

- A. An access location should be established with adequate intersection sight distance according to the AASHTO Green Book. Increased sight distance may be required when grades are significant and/or when a significant number of trucks will be using the entrance.
- B. On a four-lane divided primary highway where access is proposed at a location not to be served by a median crossover, sight distance is required only in the direction of the flow of traffic.
- C. An access location should be established where desirable sight distance is available and shall not be authorized in a location providing less than minimum sight distance, as shown on the following table:

**TABLE 5I-1.02
ACCESS SIGHT DISTANCE**

Posted Speed (mph)	Minimum Sight Distance (ft) All Entrances	Minimum Sight Distance (ft) Type C Entrance on Local Street or Lane/Alley
15	180	150
20	240	150
25	295	150
30	355	200
35	415	225-150
40	475	275-325
45	530	325-400
50	590	400-475
55	650	450-550

Distances based on acceleration rates for passenger vehicles at nearly level conditions. Adjustment to these distances required when grades are greater than 3% and/or heavy vehicles are regularly present.

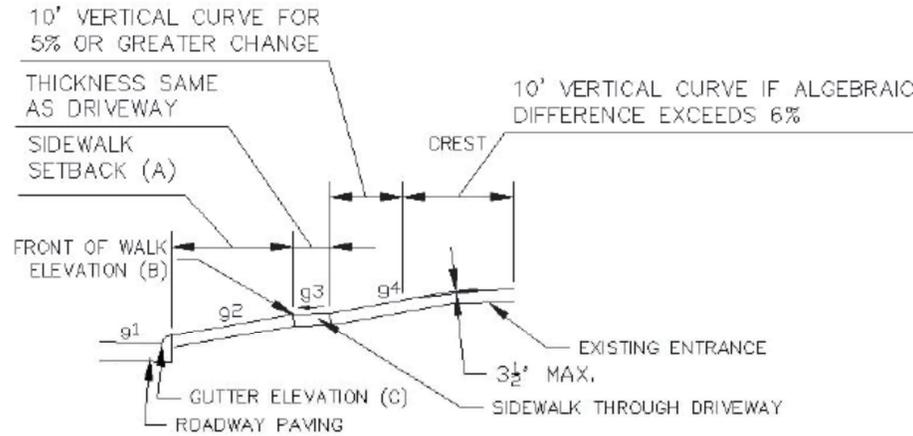
4. Grades and Dimensions

- A. Curb and Gutter Streets – Table 5I-1.01 and Figures 5I-1.02 and 5I-1.03 show the required grades and dimensions for an entrance connecting to a curb and gutter street.
- B. Non-Curb and Gutter Roadways
- C. Access to non curb and gutter streets should be located per Table 5I-1.01. A culvert sized for the ditch flow should be installed at the established roadside ditch flowline beneath the private drive access.

5. Other Criteria

- A. Adjustments to utility poles, street lights, fire hydrants, sewer structures, traffic signs and signals or other improvements as a result of curb openings or driveways shall be accomplished without cost to the Jurisdiction.
- B. Driveways functioning as an entrance only or an exit only shall be signed by and at the expense of the property owner subject to approval of the Jurisdictional Engineer.
- C. Abandoned curb openings or driveways shall be removed and the parking area and full-height curb restored by the property owner.
- D. No depressed sidewalk through the entrance. Sidewalk must be at a higher elevation than the back of curb. Driveways shall rise from the gutter line to the sidewalk to keep major storm runoff in the right-of-way.

FIGURE 5I-1.02
TYPICAL SECTION – COMMERCIAL/INDUSTRIAL ENTRANCE



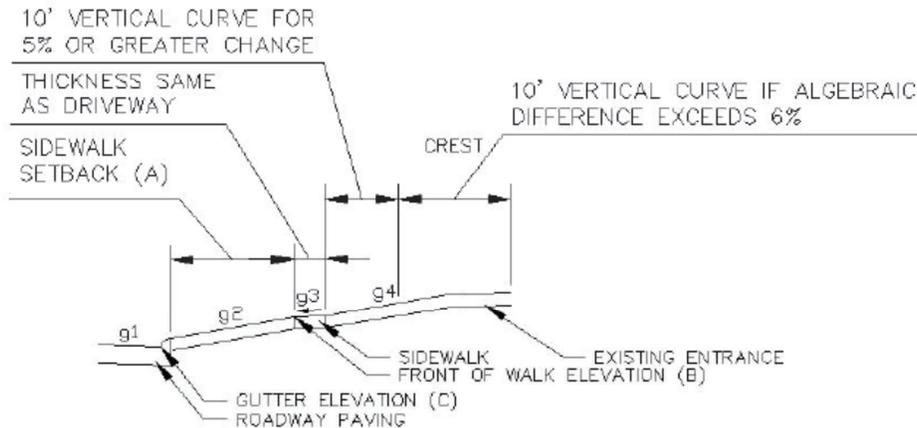
Notes:

1. g1 and g2 - Algebraic difference between g1 and g2 shall not exceed 9%.
2. g3 - Maximum slope 2%. Minimum slope 1.5%.
3. g4 - Maximum slope 9% Inclusive of tolerance; Use vertical curve between g3 and g4 if grade change is 5% or greater.
4. Surface drainage onto public right-of-way must be approved by jurisdictional engineer.

Table 5.7 Standard Sidewalk Elevations At Commercial/Industrial Driveway Entrance

SETBACK FROM BACK OF CURB TO FRONT OF WALK IN FEET (A)	FRONT OF WALK ELEVATION ABOVE GUTTER ELEVATION IN FEET (B-C)	FRONT OF WALK ELEVATION ABOVE GUTTER ELEVATION IN INCHES (B-C)
6	0.46'	5.50"
7	0.50'	6.50"
8	0.56'	6.75"
9	0.62'	7.50"
10	0.69'	8.25"
11	0.75'	9.00"
12	0.81'	9.75"
13	0.87'	10.50"
14	0.94'	11.25"
15	1.00'	12.00"
16	1.04'	12.50"
(B-C) VERTICAL TOLERANCE = ±0.04 FT OR ±1/2"		
(A) HORIZONTAL TOLERANCE = ±0.16 FT OR ±2"		

**FIGURE 5I-1.03
TYPICAL SECTION – RESIDENTIAL ENTRANCE**



Notes:

1. g1 and g2 - Algebraic differences between g1 and g2 shall not exceed 12%.
2. g2 and g3 and/or g3 and g4 - Algebraic difference not to exceed 8%.
3. g3 - Maximum slope 2%. Minimum Slope 1.5%.
4. g4 - Slope (Max. 10% Inclusive of tolerance) - Use vertical curve between g3 and g4 if grade change is 5% or greater.

Table 5.8 Standard Sidewalk Elevations At Residential Driveway Entrance

SETBACK FROM BACK OF CURB TO FRONT OF WALK IN FEET (A)	FRONT OF WALK ELEVATION ABOVE GUTTER ELEVATION IN FEET (B-C)	FRONT OF WALK ELEVATION ABOVE GUTTER ELEVATION IN INCHES (B-C)
5	0.54'	6.50"
6	0.62'	7.50"
7	0.71'	8.50"
8	0.81'	9.75"
9	0.86'	10.25"
10	0.90'	10.75"
11	0.94'	11.25"
12	0.98'	11.75"
13	1.02'	12.25"
14	1.06'	12.75"
15	1.10'	13.25"
16	1.14'	13.75"
(B-C) VERTICAL TOLERANCE = ±0.04 FT OR ±1/2"		
(A) HORIZONTAL TOLERANCE = ±0.16 FT OR ±2"		