

CITY OF SWISHER

SUPPLEMENTAL DESIGN STANDARDS

TO

**IOWA STATEWIDE URBAN DESIGN
STANDARDS FOR PUBLIC IMPROVEMENTS**

April 2023

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DESIGN MANUAL

CHAPTER 1 – GENERAL PROVISIONS

SECTION 1B-1 – CLASSIFICATIONS OF IMPROVEMENTS AND DEFINITIONS

Replace Article A.4 with:

4. Sanitary Sewer Lift Station

A facility used to convey sanitary sewage from one or more sanitary sewers that cannot be conveyed by gravity flow thru the public sewer system. This facility is owned and maintained by the Jurisdiction. Warning alarm systems shall be required to automatically communicate to locations designated by the Jurisdiction. This facility is constructed on property deeded to the Jurisdiction or on private property with an easement held by the Jurisdiction.

Construction Standard: SUDAS Specifications; Iowa DNR permit required.

Replace Article B.1 with:

1. Water System

Since the Jurisdiction currently does not have a community water system, subdividers shall be required to install, own, operate and maintain a water system meeting the standards set forth by the Jurisdiction with the intent of connecting to a community system in the future.

A water system is used to distribute water to consumers for domestic, industrial and firefighting purposes.

Construction Standard: SUDAS Specifications; Iowa DNR permit required.

Replace Article C.3 with:

3. Footing Drain Collector

In predominantly wet areas, areas containing hydric soils, and other such areas designated by the Jurisdiction, a footing drain collector shall be provided. A footing drain collector is used to convey groundwater from private footing drains and sump pumps to a public storm sewer or drainage way. This footing drain collector is owned and maintained by the Jurisdiction and constructed on public property or on private property with an easement held by the Jurisdiction. For location of footing drain collector, see Figure 1B-1.05.

Construction Standard: SUDAS Specifications.

Replace Article C.5 with:

5. Ditch (Swale)

Natural or manmade stormwater drainage ditches (swales) function as an integral part of the Jurisdiction’s informational drainage system within the public right-of-way or dedicated public drainage easements. These drainage ditches (swales) are not to be altered, except for maintenance as originally constructed. The primary function of drainage ditches (swales) is to collect runoff from roadways and areas adjacent to the public right-of-way or public easements and transport this accumulated water to an acceptable outlet point. A secondary function of drainage ditches (swales) is to drain the base of the public roadway to prevent saturation and loss of support for the roadway surfacing. All public roadways without curb and gutter shall be required to have drainage ditches (swales) along both sides. To preserve the integrity and operation of the drainage ditches (swales), any proposed modifications must be approved by the Jurisdiction. Entrances may be constructed over these drainage ditches (swales). For location of ditch, See Figure 1B-1.07.

Construction Standard: SUDAS Specifications: contact Iowa DNR for potential 401 Water Quality and NPDES permit requirements; U.S. Army Corps of Engineers for 404 permit.

Add Article I:

I. Retaining Walls

Private retaining walls are not allowed within public right-of-way without an agreement for temporary use of public right-of-way approved by the Jurisdiction.

Construction Standard: SUDAS Specifications, Jurisdictional Approval.

Add Article J:

J. Street Lighting

Private subdividers shall be required to install at their expense all street lighting. The private utility provider shall verify all such installations.

Construction Standard: SUDAS Specifications, Private Utility Provider Approval.

CHAPTER 2 –STORMWATER

SECTION 2A-1 – GENERAL INFORMATION

Replace Article E with:

E. Floodplain Management

Although not a direct element of the municipal stormwater conveyance design, floodplain management should be considered along with the overall Stormwater management plan to manage the floodplain as it related to the various stormwater conveyance means, pipes, culverts, streams, and open channels. Streets in floodplains shall be elevated at their lowest point to the 100-year flood elevation.

Floodplain management, when integrated with the overall stormwater management program, provides a regulatory means to improve the surface water system throughout the municipality.

CHAPTER 3 – SANITARY SEWERS

SECTION 3B-1 – FLOW DETERMINATION

Replace Article B with:

B. Footing Drain Inflow

If a proposed sewer is to serve an older developed area with existing footing drain inflow, additional extraneous flow allowances may be warranted where high groundwater levels, significant inflow sources, or higher than average per capita wastewater flow rates are expected to occur over the design life of the sewer. Special design information should be obtained from the Jurisdiction. If no information is available, an assumed infiltration design allowance for existing sewers should be added to the design flow. For existing systems, the minimum infiltration design allowance for the existing sewers shall be no less than 200 gallons per inch of pipe diameter per mile of pipe. Allowances for service lines should be included.

SECTION 3C-1 – FACILITY DESIGN

Replace Article M.1 with:

1. Each structure or complex under one ownership should be served by service lines connected to a public or private sanitary sewer. The services should be perpendicular to the sewer line where possible, with tee or wye connections to the public sewer.

Only sewage shall be permitted in the sanitary sewers. Footing drains, downspouts, sump pumps, etc., conveying clear water will not be allowed to discharge into the public sewer.

Flows from commercial car washes must be discharged to the public sewer after passing through oil and sediment traps approved by the Jurisdiction.

Replace Article M.3 with:

3. Unless individual on-site treatment systems are allowed, all sewer services shall be in accordance with Table 3C-1.04.

TABLE 3C-1.04:
Sewer Service Connections

<u>Type</u>	<u>Number of Connections and Size of Service Pipe</u>	<u>Sewer Connection Location</u>
SINGLE FAMILY	1 – 4” Service	Existing Service Connection of Correct Size of Closet Pipe
DUPLEX OR ZERO-LOT LINE	1 – 6” Service of 2 – 4” Services	Existing Service Connection of Correct Size or Closest Pipe
TOWNHOUSE OR MULTIPLE SIDE-BY-SIDE APTS.	1 – 6” Service for Each 2 Units or 1 – 4” Service Per Unit	Existing Service Connection of Correct Size or Closest Pipe
MULTI-STORY APARTMENTS MAX. 6 UNITS	1 – 6” Service (Max. 6 Units) or 1 – 4” Service for each 2 Units	Existing Service Connection of Correct Size or Closest Pipe
MULTI-STORY APARTMENTS 7 UNITS OR MORE	1 – 8” Service (Max. 12 Units) or 1 – 6” Service per 6 Units or 1 – 4” Service per 2 Units	Existing Service Connection of Correct Size or Closest Pipe. May require larger private service line built to Jurisdiction Standards.
COMMERCIAL MIXED USE DEVELOPMENT	Requires Jurisdictional Engineer Approval. Must be sized for per IDNR requirements.	Requires City Engineer Approval. May require larger private line built to Jurisdiction standards.

CHAPTER 4 – WATER MAINS

SECTION 4B-1 – SIZE DETERMINATION

Replace Article D.2.b with:

- b. Distribution Mains:** All water mains should be sized large enough to provide existing and future residential, commercial, and industrial water demands and fire protection flows to the area to be served. The minimum water main size is 6 inches in diameter, unless otherwise approved by the Jurisdictional Engineer. The Jurisdiction reserves the right to increase the size of mains to meet future water demands.

SECTION 4C-1 – FACILITY DESIGN

Replace Article B.3 with:

3. New main installation should be located in the parking area (between curb and the property line) of the right-of-way and minimum of 4 feet behind the curb. Where possible, water mains should be located along the south and east sides of the street.

New mains installed outside of the right-of-way shall be in a dedicated water main public easement. To limit damage to structures in the event of a main break, mains shall be placed a minimum distance of 1.5 times the depth of the main from building setback lines. Public water main easements should have a minimum total width of 10 feet or 2 times the depth of the main, whichever is greater, with the main centered in the easement. Additional width may be required by the Jurisdictional Engineer to ensure proper access for maintenance equipment.

Provisions must be made to provide public access to the water main easements from public streets.

Replace Article E.1 with:

1. Hydrants should comply with AWWA C502. The connecting pipe between the supply main and the hydrants should be a minimum of 6 inches in diameter and be independently valved. Fire hydrants are only to be installed on a system that can provide 500 gallons per minute and maintain a 20-psi residual pressure. Blowoffs or approved flushing devices will be installed in lieu of fire hydrants when conditions stated above cannot be met.

Replace Article F with:

Water service stubs in accordance with Table 4C-1.00 should be provided, including corporation stop, services line, and curb stop (shut-off) with box. Check with the Jurisdiction to determine appropriate placement location. In no case should the shut-off be in the sidewalk. Avoid locations where driveway approaches are likely to be constructed in the future.

TABLE 4C-1.00:
Water Service Stubs ⁽¹⁾

<u>Type</u>	<u>Number of Stubs and Size of Service Pipe</u>	<u>Sewer Connection Location</u>
SINGLE FAMILY	1 – 3/4"	1 Meter. Individual Billing.
DUPLEX OR ZERO-LOT LINE	1 – 1" or 2 – 3/4"	1 Meter for Each Unit. Individual Billing.
TOWNHOUSE OR MULTIPLE SIDE-BY-SIDE APTS.	1 – 1-1/2" or 1 – 1" for each 2 units or 1 – 3/4" for each unit	All units must be plumbed for individual meters. Apartments or condominiums with specific by-laws may have single meter and billing.
MULTI-STORY APARTMENTS MAX. 6 UNITS	1 – 1-1/2" or 1 – 1" for each 2 units or 1 – 3/4" for each unit	All units must be plumbed for individual meters. Apartments or condominiums with specific by-laws may have single meter and billing.
MULTI-STORY APARTMENTS 7 UNITS OR MORE	Requires Jurisdictional Engineer approval. Must be sized for available main pressures and line distances. May require larger private service built to Jurisdiction standards.	All units must be plumbed for individual meters. Apartments or condominiums with specific by-laws may have single meter and billing.
COMMERCIAL MIXED USE DEVELOPMENT	Requires Jurisdictional Engineer approval. Must be sized for available main pressures and line distances. May require larger private service built to Jurisdiction standards.	All units must be plumbed for individual meters. Commercial and residential users must have separate meters and billing.

(1) All services shall be designed to accommodate available pressures in existing watermain, distances from the main to the user, and the Jurisdiction's fire protection requirements.

** Apartment or condominiums with three habitable stories or any other structure with 9 or more dwelling units is required to provide a fire protection sprinkler system. This system must be designed in accordance with the Jurisdiction's Building Code requirements, and be approved by the Jurisdictional Engineer.

CHAPTER 5 – ROADWAY DESIGN

SECTION 5C-1 – GEOMETRIC DESIGN TABLES

Replace Table 5C1.01 and Footnotes with:

Table 5C-1.01: Preferred Roadway Elements

Elements Related to Functional Classification

Design Element	Local		Collector		Arterial	
	Res.	C/I	Res.	C/I	Res.	C/I
General						
Design Level of Service ¹	D	D	C/D	C/D	C/D	C/D
Lane width (single lane) (ft) ²	12	12	12	12	12	12
Two-way left-turn lanes (TWLTL) (ft)	N/A	N/A	14	14	14	14
Width of new bridges (ft) ³	See Footnote 3					
Width of bridges to remain in place (ft) ⁴	----	----	----	----	----	----
Vertical clearance (ft) ⁵	14.5	14.5	14.5	14.5	16.5	16.5
Object setback (ft) ⁶	3	3	3	3	3	3
Clear zone (ft)	Refer to Tables 5C-1.03, 5C-1.04, and 5C-1.05					
Right-of-Way (ft)	60	60/80 ¹⁵	66	66/80 ¹⁵	80	80
Curb offset (ft) ⁷	2	2	2	3	3	3
Parking lane width (ft)	8	8	8	10	N/A	N/A
Roadway width with parking on one side ⁸	31 ⁹	31/34 ¹⁶	34	37	N/A	N/A
Roadway width without parking ¹⁰	31	31/34 ¹⁶	31	31/34 ¹⁶	34	34
Raised median with left-turn lane (ft) ¹¹	N/A	N/A	19.5	20.5	20.5	20.5
Cul-de-sac radius (ft) ¹⁷	50	50	N/A	N/A	N/A	N/A
Rural Sections in Urban Areas						
Shoulder Width (ft)						
ADT: under 400	4	4	6	6	10	10
ADT: 400 to 1,500	6	6	6	6	10	10
ADT: 1,500 to 2,000	8	8	8	8	10	10
ADT: above 2,000	8	8	8	8	10	10
Foreslope (H:V)	4:1	4:1	4:1	4:1	6:1	6:1
Backslope (H:V)	4:1	4:1	4:1	4:1	4:1	4:1

Res. = Residential, C/I = Commercial/Industrial

Elements Related to Design Speed

Design Element	Design Speed, mph ¹²							
	25	30	35	40	45	50	55	60
Stopping sight distance (ft)	155	200	250	305	360	425	495	570
Passing sight distance (ft)	900	1,090	1,280	1,470	1,625	1,835	1,985	2,135
Min. horizontal curve radius (ft) ¹³	198	333	510	762	1,039	926	1,190	1,500
Min. vertical curve length (ft)	50	75	105	120	135	150	165	180
Min. rate of vertical curvature, Crest (K) ¹⁴	18	30	47	71	98	136	185	245
Min. rate of vertical curvature, Sag (K)	26	37	49	64	79	96	115	136
Minimum gradient (percent)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Maximum gradient (percent)	5	5	5	5	5	5	5	5

Note: For federal-aid projects, documentation must be provided to explain why the preferred values are not being met. For non-federal aid projects, the designer must contact the Jurisdiction to determine what level of documentation, if any, is required prior to utilizing design values between the "Preferred" and "Acceptable" tables.

Table 5C-1.01 Footnotes:

- ¹ Number of traffic lanes, turn lanes, intersection configuration, etc. should be designed to provide the overall specified LOS at the design year ADT. Two LOS values are shown for the collectors and arterials. The first indicated the minimum overall LOS for the roadway as a whole; the second is the minimum LOS for individual movements at intersections.
- ² Width shown is for through lanes and turn lanes.
- ³ Bridge width is measured as the clear width between curbs or railings. Minimum bridge width is based upon the width of the traveled way (lane widths) plus 4 feet clearance on each side; but no less than the curb-face to curb-face width of the approaching roadway. Minimum bridge widths do not include medians, turn lanes, parking, or sidewalks. At least one sidewalk should be extended across the bridge.
- ⁴ See Table 5C-1.02, for acceptable values for width of bridges to remain in place.
- ⁵ Vertical clearance includes a 0.5 foot allowance for future resurfacing.
- ⁶ Object setback does not apply to mailboxes, constructed and installed according to US Postal Service regulations, including breakaway supports.
- ⁷ Values shown are measured from the edge of the traveled way to the back of curb. Curb offset is not required for turn lanes. On roadways with an anticipated posted speed of 45 mph or greater, mountable curbs are required. For pavements with gutterline jointing, the curb offset should be equal to or greater than the distance between the back of curb and longitudinal gutterline joint.
- ⁸ Parking is allowed along one side of local or collector streets unless restricted by the Jurisdiction. Some jurisdictions allow parking on both sides of the street. When this occurs, each jurisdiction will set their own standards to allow for proper clearances, including passage of large emergency vehicles. Parking is normally not allowed along arterial roadways.

- 9 For local, low volume residential streets, two free flowing lanes are not required and a 31 foot (back to back) roadway may be used where parking is allowed on one side or both sides respectively. For higher volume residential streets, which require two continuously free flowing traffic lanes, a 31 foot or 37 foot roadway should be used for one sided or two sided parking respectively.
- 10 Some minimum roadway widths have been increased to match standard roadway widths. Unless approved by the Jurisdiction, all two lane roadways must comply with standard widths of 31, 34, or 37 feet.
- 11 Median width is measure between the edges of the traveled way of the inside lanes and includes the curb offset on each side of the median. Values include a left turn lane with a 6 foot raised median as required to accommodate a pedestrian access route (refer to Chapter 12) through the median (crosswalk cut through). At locations where a crosswalk does not cut through the median, the widths shown can be reduced by 2 feet to provide a 4 foot raised median.
- 12 It is preferred to select a design speed that is at least 5 mph greater than the anticipated posted speed limit of the roadway. Selecting a design speed equal to the posted speed limit may also be acceptable and should be evaluated on a project by project basis, subject to approval of the Engineer.
- 13 Values for low design speed (<50 mph) assume no removal of crown (i.e. negative 2% superelevation on outside of curve). Radii for design speeds of 50 mph or greater are based upon a superelevation rate of 4%. For radii corresponding to other superelevation rates, refer to the AASHTO's "Green Book."
- 14 Assumes stopping sight distance with 6 inch object.
- 15 Industrial right-of-way shall be a minimum width of 80 feet.
- 16 Collector streets to have a minimum roadway width of 31 feet. Industrial streets to have a minimum roadway width of 34 feet.
- 17 Cul-de-sac right-of-way shall be a minimum of 130 feet in diameter.

Replace Table 5C-1.02 and Footnotes with:

Table 5C-1.02: Acceptable Roadway Elements
Elements Related to Functional Classification

Design Element	Local		Collector		Arterial	
	Res.	C/I	Res.	C/I	Res.	C/I
General						
Design Level of Service ¹	D	D	D/E	D/E	D/E	D/E
Lane width (single lane) (ft) ²	12	12	12	12	12	12
Two-way left-turn lanes (TWLTL) (ft)	N/A	N/A	12	12	12	12
Width of new bridges (ft) ³	See Footnote 3					
Width of bridges to remain in place (ft) ⁴	20	22	24	24	26	26
Vertical clearance (ft) ⁵	14.5	14.5	14.5	14.5	14.5	14.5
Object setback (ft) ⁶	1.5	1.5	1.5	1.5	1.5	1.5
Clear zone (ft)	Refer to Tables 5C-1.03, 5C-1.04, and 5C-1.05					
Right-of-Way (ft)	60	60/80 ²⁰	66	66/80 ²⁰	80	80
Curb offset (ft) ⁷	1.5 ⁸	1.5 ⁸	1.5 ⁸	1.5 ⁸	2	2
Parking lane width (ft)	7.5	7.5	7.5	9	10	10
Roadway width with parking on one side ^{9, 11}	31	31/34 ²¹	31	34 ¹¹	34	34
Roadway width without parking ¹¹	31	31/34 ²¹	31	31/34 ²¹	34	34
Raised median with left-turn lane (ft) ¹²	N/A	N/A	18	18	18.5	18.5
Cul-de-sac radius (ft) ²²	50	50	N/A	N/A	N/A	N/A
Rural Sections in Urban Areas						
Shoulder Width (ft)						
ADT: under 400	2	2	2	2	8	8
ADT: 400 to 1,500	5	5	5	5	8	8
ADT: 1,500 to 2,000	6	6	6	6	8	8
ADT: above 2,000	8	8	8	8	8	8
Foreslope (H:V) ¹³	3:1	3:1	3:1	3:1	4:1	4:1
Backslope (H:V)	3:1	3:1	3:1	3:1	3:1	3:1

Res. = Residential, C/I = Commercial/Industrial

Element Related to Design Speed

Design Element	Design Speed, mph ¹⁴															
	25		30		35		40		45		50		55		60	
Stopping sight distance (ft)	155		200		250		305		360		425		495		570	
Passing sight distance (ft)	900		1,090		1,280		1,470		1,625		1,835		1,985		2,135	
Min. horizontal curve radius (ft) ¹⁵	198		333		510		762		1,039		833		1,060		1,330	
Min. vertical curve length (ft)	50		75		105		120		135		150		165		180	
Min. rate of vertical curve, Crest (K) ¹⁶	12		19		29		44		61		84		114		151	
Min. rate of vertical curve, Sag (K)	26		37		49		64		79		96		115		136	
Min. rate of vert. curve, Sag (K) based on driver comfort/overhead lighting ¹⁷	14		20		27		35		44		54		66		78	
Minimum gradient (percent) ¹⁸	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Maximum gradient (percent) ¹⁹	R	C/I	R	C/I	R	C/I	R	C/I	R	C/I	R	C/I	R	C/I	R	C/I
Local	12	10	12	9	11	9	11	9	10	8	9	8	N/A	N/A	N/A	N/A
Collector	12	9	11	9	10	9	10	9	9	8	8	7	N/A	N/A	N/A	N/A
Arterial	N/A	N/A	9	9	8	8	8	8	N/A	7	N/A	7	N/A	6	N/A	6

Res. = Residential, C/I = Commercial/Industrial

Note: For federal-aid projects, proposed design values that do not meet the “Acceptable” table may require design exceptions. Design exceptions will be considered on a project-by-project basis and must have concurrence of the Iowa DOT when applicable (Refer to Iowa DOT Instructional Memorandum 3.205). For non-federal aid projects, the designer should contact the Jurisdiction to determine what level of documentation, if any, is required prior to utilizing design values that do not meet the “Acceptable” table.

Table 5C-1.02 Footnotes:

- 1 Number of traffic lanes, turn lanes, intersection configuration, etc. should be designed to provide the specified LOS at the design year ADT.
- 2 Width shown is for through lanes and turn lanes.
- 3 Bridge width is measured as the clear width between curbs or railings. Minimum bridge width is based upon the width of the traveled way (lane widths) plus 3 feet clearance on each side; but no less than the curb-face to curb-face width of the approaching roadway. Minimum bridge widths do not include medians, turn lanes, parking, or sidewalks. At least one sidewalk should be extended across the bridge.

- 4 The values shown are the clear width across the bridge between curbs or railings. Values are based upon the width of the traveled way (lane width) and include a 1 foot and 2 foot offset on each side for collectors and arterials respectively. Values do not include medians, turn lanes, parking, or sidewalks. In no case should the minimum clear width across the bridge be less than the width of the traveled way of the approach road.
- 5 Vertical clearance includes a 0.5 foot allowance for future resurfacing. Vertical clearance of 14.5 feet on arterials is allowed only if an alternate route with 16 feet of clearance is available.
- 6 Object setback does not apply to mailboxes, constructed and installed according to US Postal Service regulations, including breakaway supports.
- 7 Values shown are measured from the edge of the traveled way to the back of curb. Curb offset is not required for turn lanes. On roadways with an anticipated posted speed of 45 mph or greater, mountable curbs are required. For pavements with gutterline jointing, the curb offset should be equal to or greater than the distance between the back of curb and longitudinal gutterline joint.
- 8 At locations where a 1.5 foot curb offset is used, an alternative intake boxout, with the intake set back a minimum of 6 inches from the curb line, must be used to prevent intake grates from encroaching into the traveled way.
- 9 Some jurisdictions allow parking on both sides of the street. When this occurs, each jurisdiction will set their own standards to allow for proper clearances, including passage of large emergency vehicles.
- 10 For low volume residential streets, two free flowing lanes are not required and a 31 foot roadway may be used where parking is allowed on one side only. For higher volume residential streets, which require two continuously free flowing traffic lanes, a 31 foot roadway should be used.
- 11 Some minimum roadway widths have been increased to match standard roadway widths. Unless approved by Jurisdiction, all two lane roadways must comply with standard widths of 31, 34, or 37 feet.
- 12 Median width is measure between the edges of the traveled way of the inside lanes and includes the curb offset on each side of the median. Values include a left turn lane with a 6 foot raised median as required to accommodate a pedestrian access route (refer to Chapter 12) through the median (crosswalk cut through). At locations where a crosswalk does not cut through the median, the widths shown can be reduced by 2 feet to provide a 4 foot raised median.
- 13 The use of 3:1 foreslopes is allowed, as shown, but may require a wider clear zone as slopes steeper than 4:1 are not considered recoverable by errant vehicles.
- 14 It is preferred to select a design speed that is at least 5 mph greater than the anticipated posted speed limit of the roadway. Selecting a design speed equal to the posted speed limit may also be acceptable and should be evaluated on a project by project basis, subject to approval of the Engineer.
- 15 Values for low design speed (<50 mph) assume no removal of crown (i.e. negative 2% superelevation on outside of curve). Radii for design speeds of 50 mph or greater are based upon a superelevation rate of 6%. For radii corresponding to other superelevation rates, refer to the AASHTO's "Green Book."
- 16 Assumes stopping sight distance with 2 foot object.
- 17 Use only if roadway has continuous overhead lighting.
- 18 A typical minimum grade is 0.5%, but grade of 0.4% may be used in isolated areas where the pavement is accurately crowned and supported on firm subgrade.
- 19 Maximum gradient may be steepened by 2% for short distances and for one way downgrades.
- 20 Industrial right-of-way shall be a minimum width of 80 feet.
- 21 Collector streets to have a minimum roadway width of 31 feet. Industrial streets to have a minimum roadway width of 34 feet.
- 22 Cul-de-sac right-of-way shall be a minimum of 130 feet in diameter.

SECTION 5C-2 – GEOMETRIC DESIGN ELEMENTS

Replace Article L with:

Border area is the area between the roadway and the right-of-way line and is sometimes referred to as the “Parking” in urban areas. The grade of the border area is normally 2%. The border area between the roadway and the right-of-way line should be wide enough to serve several purposes including provision of a buffer space between pedestrians and vehicular traffic, sidewalk space, and an area for both underground and above ground utilities such as storm sewer, traffic signals, parking meters, and fire hydrants. The border area also provides snow storage and aesthetic features such as grass or other landscaping features.

At minimum the border area shall be grassed in residential areas. Alternative materials may be used in narrow or commercial areas upon approval by the Jurisdiction.

The border width ranges from 14.5 to 23 feet, including the sidewalk width. Traffic signals, utility poles, fire hydrants, and other utilities should be placed as far back of the curb as practical for safety reasons. Breakaway features should be built when feasible and as an aid to safety considerations.

Replace Table 5C-2.02 with:

Table 5C-2.02: Preferred Border Area

Street Classification	Border Area Width (feet)
Major/minor arterial	23
Collector/Residential	17.5
Collector/Commercial	17.5
Collector/Industrial	23
Local Streets/Residential	14.5
Local Streets/Commercial	14.5
Local Streets/Industrial	23

Replace Article M.2 with:

- 2. Curb and Gutter:** The typical curb and gutter cross-section shall consist of a 6 inch high, 6 inch wide curb with a concrete gutter section. For design speeds greater than 40 mph, a 1 foot wide, 6 inch high sloped curb with a minimum 2 foot gutter offset may be used upon Jurisdictional approval.

Replace Article O with:

The use of cul-de-sacs is strongly discouraged and subject to the approval of the Jurisdiction.

A local street open at one end only should have a cul-de-sac constructed at the closed end. The minimum radius for cul-de-sacs is 50 feet, which may be increased in commercial areas or if significant truck traffic is anticipated. The transition radius with the approach street will be 50 feet for residential streets and 75 feet for commercial and industrial streets. The maximum length of the approach street from the nearest intersecting street shall be 600 feet. The border area around the cul-de-sac shall be a minimum of 15 feet.

Replace Article R with:

The minimum required pavement thicknesses are shown in Table 5C-2.10 below:

Table 5C-2.10: Minimum Required Pavement Thickness

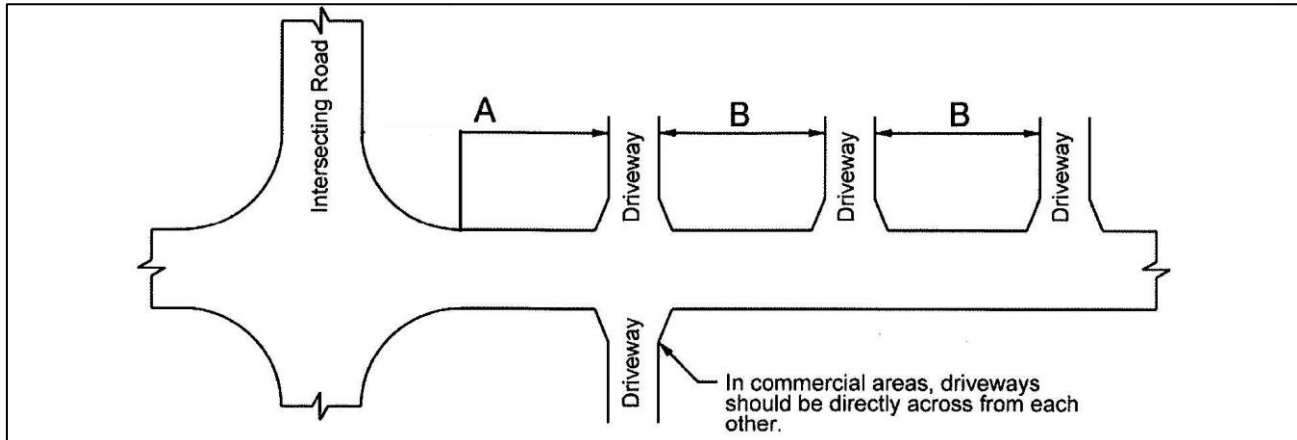
Street Class	Portland Cement Concrete	Hot Mix Asphalt
Arterial	9 inches minimum	10 inch minimum
Collector and Industrial	8 inches	9 inches minimum
Residential	7 inches	8 inch minimum

A minimum of 6 inches of drainable subbase on compacted subgrade with longitudinal subdrains shall be required under all pavement. Additional pavement thickness, subbase, and subgrade treatment may be required based on soil conditions and traffic loading. Refer to Section 5F-1 for pavement thickness determination and design information.

SECTION 5I-3 – ACCESS LOCATION, SPACING, TURN LANES, AND MEDIANS

Replace Table 5L-3.05 with:

Table 5L-3.05: Minimum Distance between Driveways or from Intersecting Streets



	Minor Arterial			Collector			Local		
	Res. Area	C/I Area	Ag Area	Res. Area ³	C/I Area	Ag Area	Res. Area ³	C/I Area	Ag Area
A. Minimum intersection clearance ¹	125'	150'	280'	80'	80'	280'	20'	20'	20'
B. Minimum driveway spacing ²	100'	200'	300'	75'	100'	300'	6' ⁴	6' ⁴	150'

Res=Residential, C/I=Commercial/Industrial

¹ Values are measured from the end of radius/return of the intersecting road to the adjacent driveway near edge.

² Values are measured between driveway edges.

³ One access drive allowed per lot. Depending on lot size, an additional drive may be allowed upon approval of the Jurisdiction.

⁴ Minimum distance between curb cuts at the curb line.

SECTION 5I-4 – DRIVEWAY DESIGN CRITERIA

Replace Article C.5 with:

5. The entrance pavement thickness (T) is based on the following:

PCC-Class “A” or “C” – 4,000 PSI

HMA – Greater than or equal to 100K ESAL (optional for rural area).

All proposed entrances must be hard surfaced from the street to the property line. Other entrance surfaces may be used upon approval by the Jurisdiction.

Replace Article E.3.a with:

- a. Private drive access to local, collector, or arterial streets that have no curb and/or gutter improvements shall be constructed with grades and dimensions as shown in Figure 5L-4.03. A culvert properly sized for the ditch flow should be installed at the established roadside ditch flowline beneath the private drive access. Culvert should be 15 inches minimum and 18 inches desirable. The culvert should be either corrugated metal or reinforced concrete with a minimum of 1 foot of cover desirable over the pipe.

Culverts are the responsibility of the Property Owner. The Jurisdiction accepts no responsibility for maintenance, repair, replacement, or procurement of contractors. Failure to install culverts in accordance with the Jurisdiction's requirements will result in removal and replacement at the Property Owner's expense.

CHAPTER 6 – GEOTECHNICAL

SECTION 6C-1 – PAVEMENT SYSTEMS

Replace Article A.3 with:

3. **Subbase:** Consists of the granular materials underlying the pavement and above the subgrade layer. A minimum of 6 inches of subbase is required under all pavements.

SECTION 6F-1 – PAVEMENT SUBBASE DESIGN AND CONSTRUCTION

Replace Article B.5 with:

5. **Thickness Requirement:** A minimum of 6 inches of subbase is required under all pavements. Additional thickness beyond 6 inches may be required based on soil conditions and traffic loading. Potential pavement problems resulting from consolidation of the subbase over time for thicknesses greater than 6 inches should be considered during design.

SECTION 6G-1 – SUBSURFACE DRAINAGE SYSTEM

Replace Article D.3.a with:

- a. **New Construction:** Subdrains shall be required for all new pavements. Subdrains for new construction generally consist of pipe in a trench lined with non-woven geotextile (engineering fabric) and filled with aggregate. Typical installation sections are shown in Figure 6G-1.03, Cases B, C, and E. Design of subdrains for new construction and major reconstruction projects consists of ensuring that the trench backfill and subdrain pipe have the capacity to handle the design flow from the subbase.

The size of pipe is often based on maintenance requirements for cleaning capabilities and reasonable distance between outlets. Although FHWA recommends a minimum pipe diameter of four inches, the SUDAS Specifications require a minimum of 6 inch diameter pipe for Type 1 subdrain installations and a minimum of eight inch diameter pipe for Type 2 combination subdrain/footing drain collectors. The larger diameter subdrain pipe allows for additional capacity, easier cleaning, and inspection. Cleanouts are required for all Type 2 subdrains, at the end of line or at 300 feet spacings. For exceptionally long Type 1 installations, greater than 300 feet from an outlet, consideration should be given to providing cleanouts as required for Type 2 subdrains.

Trench backfill aggregate could be the same as the subbase or a material with greater permeability. AASHTO No. 57 stone, Iowa DOT Gradation No. 3 has been used for trench backfill. The SUDAS Specifications Section 3010 requires porous backfill to comply with Iowa DOT Gradation No. 29 or the use of commercially available pea gravel. The non-woven geotextile used to line the subdrain trench must be designed as a filter, considering both the subbase and subgrade soils. The geotextile should not be extended between the interface of the subbase and the trench backfill aggregate because it may form a barrier. Also, geotextile should not be wrapped around the perforated drainage pipe.

One of the most critical items for subdrains is the grade of the invert. Construction control of very flat grades usually is not possible, leaving ponding areas that result in subgrade weakening and premature failures. It may be necessary to raise the pavement grade to develop adequate drain slopes for the subsurface drainage facilities. To achieve a desirable drainage capacity, a minimum slope that is greater than the slope of the road may be required for the subdrain, although this is often not practical and the pipe will mostly be sloped the same as the roadway. When adequate slopes cannot be achieved, rigorous maintenance should be anticipated.

The outlet for the subdrain must be low and large enough so that flow from the subdrain does not back up. FHWA recommends that the outlet pipe be at least 6 inches above the 10-year storm flow line of the ditch or hydraulic structure into which the outlet is flowing.

The designed drain trench and backfill must be constructible with normal construction equipment. Construction of subdrains is time-consuming. Care must be taken so that the trench backfill does not become contaminated with adjacent soil that might clog the drainage capacity.

CHAPTER 12 – SIDEWALKS AND BICYCLE FACILITIES

SECTION 12A-1 – GENERAL SIDEWALK REQUIREMENTS

Add Article B.4:

Class B sidewalks on both sides of the street shall be generally required by the Jurisdiction. Other cases may be used upon approval by the Jurisdiction.

Minimum sidewalk widths shall be in accordance with Table 12A-1.01:

Table 12A-1.01: Sidewalk Widths

Local	4 Feet ¹
Collector	4 Feet ¹
Arterial	4 Feet ^{1,2}
Commercial	As Directed by the Jurisdiction
Industrial	4 Feet ^{1,2}
Major Bridges	4 Feet ^{1,2}

¹ 5 Feet Preferred

² A widened sidewalk of up to 10 feet may be required by the Jurisdiction on one side of the street in special circumstances.

SECTION 12B-2 – SHARED USE PATH DESIGN

Replace Article C.2 with:

- 2. Minimum Surface Thickness:** For Iowa DOT projects, contact the Pavement Design Section in the Office of Design for a pavement determination. For local agency projects administered through Iowa DOT, Iowa DOT will accept the thickness design as determined by the Engineer.

For local projects, the pavement depth for both PCC and HMA pavements should have a minimum of 4 inches and a recommended thickness of 5 inches; if pavement thickness is proposed to be less than 4 inches, a pavement determination should be completed and documented.

For unpaved paths, a 4 inch minimum thickness of 3/4 inch (minus) crushed angular stone shall be required as a base course, with a 2 inch minimum thickness of 3/8 inch (minus) crushed angular stone required as a surface course.