Sight Distance Values ${ }^{5}$

| $\begin{aligned} & \text { DESIGN } \\ & \text { SPEED } \\ & \text { MPH } \end{aligned}$ | SIGHT DISTANCE - FEET |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | STOPPING SIGHT DISTANCE | DECISION SIGHT DISTANCE ${ }^{1}$ |  |  |  |  | $\begin{aligned} & \text { PASSING } \\ & \text { SIGHT } \\ & \text { ISTANCE } 3,4 \end{aligned}$ |  |
|  |  | AVOIDANCE MANEUVER ${ }^{2}$ |  |  |  |  |  |  |
|  |  | A | B | c | D | E |  |  |
| 25 | 155 | --- | --- | --- | --- | --- | 450 |  |
| 30 | 200 | 220 | 490 | 450 | 535 | 620 | 500 |  |
| 35 | 250 | 275 | 590 | 525 | 625 | 720 | 550 |  |
| 40 | 305 | 330 | 690 | 600 | 715 | 825 | 600 |  |
| 45 | 360 | 395 | 800 | 675 | 800 | 930 | 700 |  |
| 50 | 425 | 465 | 910 | 750 | 890 | 1030 | 800 |  |
| 55 | 495 | 535 | 1030 | 865 | 980 | 1135 | 900 |  |
| 60 | 570 | 610 | 1150 | 990 | 1125 | 1280 | 1000 |  |
| 65 | 645 | 695 | 1275 | 1050 | 1220 | 1365 | 1100 |  |
| 70 | 730 | 780 | 1410 | 1105 | 1275 | 1445 | 1200 |  |
| 75 | 820 | 875 | 1545 | 1180 | 1365 | 1545 | 1300 |  |

## Notes

1 From Table 3-1, page 3-4, 2018 GDHS. (GDHS hyperlink is only available to WisDOT staff.)

2 Avoidance maneuver A:
Avoidance maneuver B:
Avoidance maneuver C :
Avoidance maneuver D:
Avoidance maneuver E:

Stop on rural road $-\mathrm{t}=3.0 \mathrm{~s}$
Stop on urban road $-\mathrm{t}=9.1 \mathrm{~s}$
Speed/path/direction change on rural road - t varies between 10.2 and 11.2 s
Speed/path/direction change on suburban road - t varies between 12.1 and 12.9 s
Speed/path/direction change on urban road - t varies between 14.0 and 14.5 s

3 See Chapter 3 of the Wisconsin Traffic Engineering, Operations and Safety Manual (TEOpS) for No passing zone standards.
4 See Attachment 5.8 for vertical curve design for Passing Sight Distance.
5 See Attachment 5.2 for Sight Distance Category Application

Sight Distance Categories - Application and Sight Distance Boundaries

| Category | Locations to Apply | Sight Distance Boundaries (SDB) |  |
| :---: | :---: | :---: | :---: |
|  |  | Begin | End |
| 1 | Default - <br> All locations not in Category 2 | End limit of Category 2 | Begin limit of Category 2 |
| 2 | Mainline approach to an Interchange entrance ramp where there is a continuous auxiliary lane to the next downstream interchange exit (See Example 1) | At a distance $=$ DSD-C ${ }^{1}$ from the entrance ramp gore of the upstream interchange ${ }^{2}$ | At the entrance ramp gore of the upstream interchange ${ }^{2}$ |
|  | Crossroad approach to an Interchange ramp terminal where the posted speed is 40 mph or less | At a distance $=$ DSD-C ${ }^{1}$ from the CL of the ramp terminal intersection | At the CL of the ramp terminal intersection |
|  | Lane drop on a non-freeway or non-expressway | At a distance $=$ DSD-C ${ }^{1}$ from the start of the lane drop | At the end of the lane drop |
|  | Railroad / highway at-grade crossings (See Example 2) | At a distance = DSD-C ${ }^{1}$ from the stop bar upstream from the RR tracks | At the stop bar upstream from the RR tracks |
|  | High speed multilane highway approach to an intersection with a right turn but no left turn in the direction of travel (See Example 3) | At a distance $=$ DSD-C ${ }^{1}$ from the back of the design queue ${ }^{3}$ | At the CL of the intersection |
|  | Approach to an intersection where a thru lane becomes a "turn only" lane |  |  |
|  | Two-lane highway or non-high speed multi-lane road approach to an Intersection with an unusual configuration, including multiple right-turn lanes or multiple left-turn lanes |  |  |
|  | Side road approach to an at-grade intersection with a bypass roadway or expressway |  |  |
|  | High-speed 2-lane rural highway approach to an isolated stop sign, traffic signal, or roundabout where such control is unexpected because it is not typical |  |  |


| Mainline thru lane that becomes an "exit only" <br> lane at an interchange (See Example 4) | At a distance = DSD-C ${ }^{1}$ <br> from the begin taper to exit ramp | At the exit ramp gore ${ }^{2}$ |
| :--- | :--- | :--- |
| Mainline approach to an interchange exit ramp <br> (See Example 1) | At a distance = DSD-C ${ }^{1}$ <br> from the begin taper to exit ramp | At the exit ramp gore ${ }^{2}$ |
| Mainline approach to an interchange entrance <br> ramp, except an entrance ramp where there is a <br> continuous auxiliary lane to the next downstream <br> interchange exit. <br> (See Example 5 for entrance ramp) | At a distance = DSD-C ${ }^{1}$ <br> from the entrance ramp gore ${ }^{2}$ | At the end taper from entrance ramp |
| Mainline approach to an Interchange with unusual <br> features, e.g., multiple entrance or exit points; <br> short weaving sections | At a distance = DSD-C ${ }^{1}$ <br> from the 1st upstream feature, i.e., begin taper to <br> exit ramp, or entrance ramp gore ${ }^{2}$ | At the last downstream feature, i.e., the exit ramp <br> gore, or the end taper from entrance ramp ${ }^{2}$ |
| High-speed multilane highway approach to an <br> intersection with a left turn in the direction of <br> travel (See Example 6) | At a distance = DSD-C ${ }^{1}$ <br> from the back of the design queue ${ }^{3}$ | At the CL of the intersection |
| Crossroad approach to an interchange ramp <br> terminal intersection where the posted speed is <br> 45 mph or greater | At a distance = DSD-C ${ }^{1}$ <br> from the CL of the ramp terminal intersection | At the CL of the ramp terminal intersection |
| Lane drop on freeways or expressways | At a distance = DSD-C ${ }^{1}$ <br> from the start of the lane drop | At the end of the lane drop |
| Approach to a major fork on a freeway or <br> expressway | At a distance = DSD-C ${ }^{1}$ <br> from the start of widening | At the point of divergence |
| Approach to a branch connection on a freeway or <br> expressway | At a distance = DSD-C ${ }^{1}$ <br> from the point of convergence | At the end of lane reduction [or, if there is no lane <br> reduction, at the point of convergence] |

## Notes

1. DSD-C = Decision Sight Distance Avoidance Maneuver C (see Table 3-3, page 3-8, 2018 GDHS) (GDHS hyperlink is only available to WisDOT staff.)
2. Gore $=$ "painted nose" as defined on page 10-114 and as depicted in Figure 10-63, 2018 GDHS
3. Check queue lengths for the thru, left turn, and right turn movement, and use whichever is furthest from the intersection. See FDM 11-25-1, FDM 11-25-5, and FDM 11-25-10 for guidance on queue length requirements. Also, confer with region traffic staff.


## Example 1:

| (CATEGORY 2 Sight Distance) Mainline approach to an interchange entrance where |
| :---: |
| there is a continuous auxiliary lane to the next downstream interchange exit |
| AND |
| (CATEGORY 2 Sight Distance) Mainline approach to an interchange exit ramp (Eastbound (EB) shown) |

## Legend

I
I = SDB = Sight Distance Boundary **


* DCD-C = Decision Sight Distance Avoidance Maneuver C (See Table 3-3, Page 3-8, 2018 GDHS)
** see p. 2-3 of this Attachment


## Example 2:

(CATEGORY 2 Sight Distance) Railroad / Highway at-grade crossing
(Eastbound (EB) shown - Westbound (WB) similar)
(Drawing adapted from MUTCD FIG 8B-6)

## Legend

I
= SDB = Sight Distance Boundary **


* DCD-C = Decision Sight Distance Avoidance Maneuver C
(See Table 3-3, Page 3-8, 2018 GDHS)
** see p. 2 of this Attachment


## Example 3:

(CATEGORY 2 Sight Distance) High speed multilane highway approach to and intersection with a right turn but no left turn in the direction of travel (applies to Eastbound (EB) but not Westbound (WB))

## Legend

=SDB = Sight Distance Boundary **


* DCD-C = Decision Sight Distance Avoidance Maneuver C (See Table 3-3, Page 3-8, 2018 GDHS)
** see p. 2 of this Attachment


## Example 4:

(CATEGORY 2 Sight Distance) Mainline thru lane that becomes "exit only" lane at an interchange (Eastbound (EB) shown)

## Legend

I
I = SDB = Sight Distance Boundary **


* DCD-C = Decision Sight Distance Avoidance Maneuver C (See Table 3-3, Page 3-8, 2018 GDHS)
** see p. 3 of this Attachment



## Example 5:

(CATEGORY 2 Sight Distance) Mainline approach to an interchange entrance ramp (Eastbound (EB) shown)

## Legend

।
= SDB = Sight Distance Boundary **


* DCD-C = Decision Sight Distance Avoidance Maneuver C (See Table 3-3, Page 3-8, 2018 GDHS)
** see p. 3 of this Attachment


## Example 6:

(CATEGORY 2 Sight $\mathrm{D}_{\mathbf{2}}$ ance) High speed multilane highway approach to an intersection with a left turn in the direction of travel
(applies to both Eastbound (EB) and Westbound (WB))

## Legend

I
I = SDB = Sight Distance Boundary **

** see p. 3 of this Attachment

Maximum Grades (\%) for Rural Highways by Functional Classification ${ }^{1}$

| RURAL ARTERIALS ${ }^{2}$ |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | DESIGN SPEED |  |  |  |  |  |
| TYPE OF TERRAIN ${ }^{5}$ | 20 MPH | 30 MPH | 40 MPH | 50 MPH | 60 MPH | 70 MPH |
| LEVEL | - | - | - | 4 | 3 | 3 |
| ROLLING | - | - | - | 5 | 4 | 4 |


| RURAL COLLECTORS ${ }^{3}$ |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | DESIGN SPEED |  |  |  |  |  |
| TYPE OF TERRAIN ${ }^{5}$ | 20 MPH | 30 MPH | 40 MPH | 50 MPH | 60 MPH | 70 MPH |
| LEVEL | 7 | 7 | 7 | 6 | 5 | - |
| ROLLING | 10 | 9 | 8 | 7 | 6 | - |


| RURAL LOCAL ROADS ${ }^{4}$ |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | DESIGN SPEED |  |  |  |  |  |
| TYPE OF TERRAIN ${ }^{5}$ | 20 MPH | 30 MPH | 40 MPH | 50 MPH | 60 MPH | 70 MPH |
| LEVEL | 8 | 7 | 7 | 6 | 5 | - |
| ROLLING | 11 | 10 | 10 | 8 | 6 | - |

Notes:
1
For Max. Grades under Urban Conditions refer to:

- Arterials: 2018 GDHS, Table 7-4a, Page 7-38; (GDHS hyperlink is only available to WisDOT staff.)
- Freeways: 2018 GDHS, Table 8-1, Page 8-5;
- Interstate: AASHTO Interstate Design Standards 2016, Page 3;
- Collectors: 2018 GDHS, Table 6-7, Page 6-15; and
- Local Streets: 2018 GDHS, Section 5.3.1.5, Page 5-15

| 2 | See 2018 GDHS, Table 7-2, Page 7-6 <br> See 2018 GDHS, Table 8-1, Page 8-5 <br> See AASHTO Interstate Design Standards 2016, Page 3 for Interstates |
| :---: | :--- |
| 3 | See 2018 GDHS, Table 6-2, Page 6-4 |
| 4 | See 2018 GDHS, Table 5-2, Page 5-4 |
| 5 | See Highway Capacity Manual, $7^{\text {th }}$ Edition (Chapter 12-3) for a discussion of <br> terrain types |



| Object Height | When $S>L$ | When $S<L$ |
| :---: | :---: | :---: |
| 24 -inches | $\mathrm{L}=2 \mathrm{~S}-\frac{2158}{\mathrm{~A}}$ | $\mathrm{~L}=\frac{\mathrm{AS}}{}{ }^{2}$ |

L= Length of Vertical Curve (feet)
$\mathbf{S}=$ Sight Distance (feet) (either SSD or DSD value, depending on category)
$K=L / A$; $L=K x A$

Crest Vertical Curves - Sight Distance, Object Height and Minimum Length Criteria

| Design Speed (V) (mph) | Category | DECISION DIGHT DISTANCE ${ }^{\text {B }}$ |  |  | STOPPING SIGHT DISTANCE ${ }^{\text {B }}$ |  |  | $\begin{gathered} \text { Min. VC } \\ \text { L= } \\ 3 \times V \\ \text { (feet) }{ }^{\text {D }} \end{gathered}$ | Category ${ }^{\text {A }}$ | Design Speed (V) (mph) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Sight Distance (feet) ${ }^{\text {c }}$ | obj. hgt. (inches) | * Kcr | Sight Distance (feet) ${ }^{\text {c }}$ | obj. hgt. (inches) | * Kcr |  |  |  |
| 25 | 2 | 375 | 24 | 66 | 155 | 24 | 12 | 75 | 1,2 | 25 |
| 30 | 2 | 450 | 24 | 94 | 200 | 24 | 19 | 90 | 1,2 | 30 |
| 35 | 2 | 525 | 24 | 128 | 250 | 24 | 29 | 105 | 1,2 | 35 |
| 40 | 2 | 600 | 24 | 167 | 305 | 24 | 44 | 120 | 1,2 | 40 |
| 45 | 2 | 675 | 24 | 212 | 360 | 24 | 61 | 135 | 1,2 | 45 |
| 50 | 2 | 750 | 24 | 261 | 425 | 24 | 84 | 150 | 1,2 | 50 |
| 55 | 2 | 865 | 24 | 347 | 495 | 24 | 114 | 165 | 1,2 | 55 |
| 60 | 2 | 990 | 24 | 455 | 570 | 24 | 151 | 180 | 1,2 | 60 |
| 65 | 2 | 1050 | 24 | 511 | 645 | 24 | 193 | 195 | 1,2 | 65 |
| 70 | 2 | 1105 | 24 | 566 | 730 | 24 | 247 | 210 | 1,2 | 70 |
| 75 | 2 | 1180 | 24 | 646 | 820 | 24 | 312 | 225 | 1,2 | 75 |
| 80 | 2 | 1260 | 24 | 736 | 910 | 24 | 384 | 240 | 1,2 | 80 |
| 85 | 2 | 1340 | 24 | 833 | 1010 | 24 | 473 | 255 | 1, 2 | 85 |

A See section "Stopping Sight Distance (SSD); Decision Sight Distance (DSD)" in text for definitions and criteria for Sight Distance Categories
B $\operatorname{SSD}=$ Stopping Sight Distance
DSD = Decision Sight Distance for Avoidance Maneuver C
(GDHS hyperlink is only available to WisDOT staff)
C DSD Avoidance Maneuver C, See Table 3-3, Page 3-8, 2018 GDHS/SSD, See Table 3-1, Page 3-4, 2018 GDHS
D Minimum length of crest vertical curve $=$ the greater of either ( $\mathrm{Kcr} \times \mathrm{A}$ ), OR a distance in feet equal to $3 \times$ the design speed in $\mathrm{mph}(3 \times \mathrm{V})$

$\mathbf{L}=$ Length of Vertical Curve (feet) $\quad \mathbf{S}=$ Sight Distance (feet) (either SSD or DSD required, depending on $\mathbf{A}=$ Algebraic Grade Difference (Percent) K = L/A ; L=KA

Sag Vertical Curves - Sight Distance and Minimum Length Requirements

| Design Speed (V) (mph) | Category | DECISION SIGHT DISTANCE |  | STOPPING SIGHT DISTANCE |  | $\left\lvert\, \begin{array}{\|r} \text { Min. VC } \\ L= \\ 3 \times V \\ (\text { feet }) \\ \hline \end{array}\right.$ | Category <br> A | Design Speed (V) (mph) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Sight Distance (feet) | Ksag | Sight Distance (feet) ${ }^{\text {c }}$ | Ksag |  |  |  |
| 25 | 2 | 375 | 83 | 155 | 26 | 75 | 1,2 | 25 |
| 30 | 2 | 450 | 103 | 200 | 37 | 90 | 1,2 | 30 |
| 35 | 2 | 525 | 124 | 250 | 49 | 105 | 1,2 | 35 |
| 40 | 2 | 600 | 144 | 305 | 64 | 120 | 1,2 | 40 |
| 45 | 2 | 675 | 165 | 360 | 79 | 135 | 1,2 | 45 |
| 50 | 2 | 750 | 186 | 425 | 96 | 150 | 1,2 | 50 |
| 55 | 2 | 865 | 219 | 495 | 115 | 165 | 1,2 | 55 |
| 60 | 2 | 990 | 254 | 570 | 136 | 180 | 1,2 | 60 |
| 65 | 2 | 1050 | 271 | 645 | 157 | 195 | 1,2 | 65 |
| 70 | 2 | 1105 | 287 | 730 | 181 | 210 | 1,2 | 70 |
| 75 | 2 | 1180 | 308 | 820 | 206 | 225 | 1,2 | 75 |
| 80 | 2 | 1260 | 331 | 910 | 231 | 240 | 1,2 | 80 |
| 85 | 2 | 1340 | 353 | 1010 | 260 | 255 | 1,2 | 85 |

A See section "Stopping Sight Distance (SSD); Decision Sight Distance (DSD)" in text for definitions and criteria for Sight Distance Categories
B $\quad \mathrm{SSD}=$ Stopping Sight Distance
DSD = Decision Sight Distance for Avoidance Maneuver C
(GDHS hyperlink is only available to WisDOT staff)
C See DSD Avoidance Maneuver C, See Table 3-3, Page 3-8, 2018 GDHS/SSD, See Table 3-1, Page 3-4, 2018 GDHS
D Minimum length of sag vertical curve $=$ the greater of either (KSAG $\times$ A), OR a distance in feet equal to $3 x$ the design speed in mph ( $3 \times \mathrm{V}$ )

## Passing Sight Distance for Crest Vertical Curves



| When $S>L$ | When $S<L$ |
| :---: | :---: |
| $L=2 S-\frac{2800}{A}$ | $L=\frac{A S^{2}}{2800}$ |

$L=$ Length of Vertical Curve (feet)
A = Algebraic Grade Difference (Percent)
S = Sight Distance (feet)

| Design <br> Speed <br> (mph) | AASHTO Passing <br> Sight Distance | Minimum Crest K <br> Value to achieve <br> PSD |
| :---: | :---: | :---: |
| 25 | 450 | 72 |
| 30 | 500 | 89 |
| 35 | 550 | 108 |
| 40 | 600 | 129 |
| 45 | 700 | 175 |
| 50 | 800 | 229 |
| 55 | 1000 | 289 |
| 60 | 1100 | 357 |
| 70 | 1200 | 432 |
| 75 | 1300 | 514 |
| 80 | 1400 | 604 |

Source: A Policy on Geometric Design of Highway and Streets, $7^{\text {th }}$ Edition, AASHTO 2018



Design Controls for Stopping Sight Distance (SSD) on Horizontal Curves



Design Controls for Decision Sight Distance for Avoidance Maneuver C (DSD-C) on Horizontal Curves

## Profile and Cross Sections of Two-Lane Highway to the Right


*ANGULAR BREAKS MUST BE APPROPRIATELY ROUNDED, SUGGESTED VERTICAL CURVE LENGTH IN FEET = DESIGN SPEED IN MPH (FOR EXAMPLE 50-FT FOR 50 MPH ) (SEE 2018 GDHS, FIGURE 3-8 AND SECTION 3.3.8.7 FOR ADDITIONAL GUIDANCE)


NOTES
(1) When normal shoulder is greater than superelevation, retain normal shoulder slope
(2) High-side shoulder slope $=$ FLAT at section B-B

| V.C. $=$ Vertical Curve | R.C. | $=$ Remove adverse crown slope (section C-C) |  |
| :--- | :--- | :--- | :--- |
| P.C. | $=$ Beginning of Horizontal Curve | N.C. | $=$ Normal crown slope (\%) |
| e | $=$ Rate of superelevation (\%) | L | $=$ Minimum length of Runoff |
| X | $=$ Tangent runout |  |  |

See FDM 11-10 Exhibit 5.1 for definitions, equations and values for $L, X$, and $T$.

Superelevation Transition of Divided Highway Curve to the Right


NOTES:
(1) When Normal shoulder slope IS GREATER THAN SUPERELEVATION, retain normal shoulder slope.
(2) HIGH SIDE SHOULDER SLOPE = FLAT at SECTION b-b

## Profile and Cross Sections of Divided Highway Curve to Right


*ANGULAR BREAKS MUST BE APPROPRIATELY ROUNDED, SUGGESTED VERTICAL CURVE LENGTH IN FEET = DESIGN SPEED IN MPH (FOR EXAMPLE 50-FT FOR 50 MPH ) (SEE 2018 GDHS, FIGURE 3-8 AND SECTIONS 3.3.8.7 \& 3.3.8.8 FOR ADDITIONAL GUIDANCE)

## NOTES:

Superelevation rotation is about median edges of pavement.
N.C. $=$ Normal crown slope, (\%)
R.C. = Remove adverse crown slope superelevate at normal crown slope retain slope on both shoulders.
P.C. $=$ Beginning of Horizontal Curve
V.C. $=$ Vertical Curve
e = Rate of superelevation (\%)
$L=$ Minimum length of Runoff
$X=$ Tangent runout
See FDM 11-10 Exhibit 5.1 for definitions, equations and values for $L, X$, and $T$.


Example Intersection Layouts

| * Posted Speed (mph) | ** Distance "Avt" (feet) | Distance "Bvi" (feet) |  |
| :---: | :---: | :---: | :---: |
|  |  | **THRU movement possible from sideroad | ***NO THRU movement possible from sideroad ("T" intersection) |
| 25 | 90 | 90 | 75 |
| 30 | 105 | 105 | 75 |
| 35 | 120 | 120 | 75 |
| 40 | 135 | 135 | 75 |
| 45 | 150 | 150 | 75 |
| 50 | 165 | 165 | 75 |
| 55 | 180 | 180 | 75 |
| 65 | 210 | 210 | 75 |


| Example 1 | 4-LEG INTERSECTION (THRU MOVEMENT POSSIBLE ON SIDEROAD) |
| :---: | :---: |
| GIVEN | POSTED SPEED IS 55 MPH ON THE MAJOR ROAD POSTED SPEED IS 45 MPH ON THE SIDEROAD |
| SOLUTION | READING FROM THE TABLE: <br> DISTANCE Avt ON MAJOR ROAD $=180$ FT DISTANCE Bvt ON SIDEROAD $=150 \mathrm{FT}$ |
| Example 2 | T INTERSECTION (NO THRU MOVEMENT POSSIBLE ON SIDEROAD) |
| GIVEN | POSTED SPEED IS 55 MPH ON THE MAJOR ROAD POSTED SPEED IS 45 MPH ON THE SIDEROAD |
| SOLUTION | READING FROM THE TABLE: <br> DISTANCE Avt ON MAJOR ROAD $=180$ FT DISTANCE Bvt ON SIDEROAD $=75 \mathrm{FT}$ |

* Use the posted speed of the Major Highway to determine distance "A" se the posted speed of the sideroad to determine distance "B".
** Based on distance traveled in 2 seconds at Posted speed +5 mph .
*** Based on distance traveled in 2 seconds at 25 mph because vehicle approaching intersection on sideroad has to slow down to make a turn.
NO THRU Movement means either existing or proposed.


## NOTES:

Distances are approximate and may be adjusted to fit site conditions.
These guidelines are for the Vision Triangle only, and are not to be interpreted as Intersection Sight Distance (ISD) or Stopping Sight Distance (SSD) requirements.
The Vision Triangle must be free of all obstructions.

## Example computation of Intersection Sight Distance for Cases B1, B2, and B3

Given

- Mainline: 4-lane divided bi-directional road (2 lanes in each direction); design speed $=50$ mph ; tangent alignment; lane width = 12 feet; median width $=30$ feet; shoulder width $=10 \mathrm{ft}$
- Side road: arterial; grade $<3 \%$; design speed $=$ 40 mph
- Intersection: type B1 with 12 ft wide right turn lane

Find

- Design vehicle for intersection sight distance
- Required Intersection Sight Distances for both a passenger car and for the design vehicle



## Solution

- From FDM 11-10 Table 5.1 the design vehicle for an arterial is a combination truck.
- Intersection Sight Distance to the LEFT is the greater of that required for Case B2-Right turn from the minor road, and Case B3-Crossing maneuver from the minor road.
- Intersection Sight Distance to the RIGHT is the greater of that required for Case B1 - Left turn from the minor road, and Case B3-Crossing maneuver from the minor road.

| Intersection Sight Distances (ISDs) to LEFT |  |  | Intersection Sight Distances (ISDs) to RIGHT |  |
| :---: | :---: | :---: | :---: | :---: |
| Case B2 | Case B3 | PASSENGER CAR | Case B1 | Case B3 |
| 8.0 | 7.0 | UPPER MINIMUM time gap $(\mathrm{sec})^{\mathrm{A}}$ | 10.0 | 7.0 |
| 590 | 515 | UPPER MINIMUM ISD (feet) ${ }^{\text {A }}$ | 735 | 515 |
| 19 | 19 | Vehicle length (feet) ${ }^{\text {B }}$ | 19 | 19 |
| NA | NA | Vehicle length +6 ' $<$ Median width? | Yes | Yes |
| Cross 12-ft right turn lane | Cross 12-ft right turn lane | ADJUSTMENT description | None | None |
| 0.5 | 0.5 | Additional time (sec) ${ }^{\text {C }}$ | -- | -- |
| 35 | 35 | Additional ISD (feet) | -- | -- |
| 625 | 550 | Total ISD (feet) | 735 | 515 |
| 625 |  | Controlling ISD (feet) | 735 |  |
| 14.5 ft from the edg 26.5 ft from the e | e of right turn lane= dge of travel lane. | Side road decision point location | 11.0 feet from the med travel | an edge of the far side lanes |
| Case B2 | Case B3 | COMBINATION TRUCK <br> (DESIGN VEHICLE) | Case B1 | Case B3 |
| 12.0 | 13.0 | UPPER MINIMUM time gap $(\mathrm{sec})^{\mathrm{A}}$ | 13.0 | 13.0 |
| 885 | 960 | UPPER MINIMUM ISD (feet) ${ }^{\text {A }}$ | 960 | 960 |
| Greater than 55 ft | Greater than 55 ft | Vehicle length (feet) ${ }^{\text {B }}$ | Greater than 55 ft | Greater than 55 ft |
| NA | NA | Vehicle length +6 ' $<$ Median width? | No | No |
| Cross 12-ft right turn lane | Cross 12-ft right turn lane | ADJUSTMENT description | Cross an additional 54feet $=4.5$ lanes (12' right turn lane $+12^{\prime}$ travel lane $+30^{\prime}$ median) | $\begin{aligned} & \text { Cross an additional 66- } \\ & \text { feet }=5.5 \text { lanes }\left(12^{\prime}\right. \\ & \text { right turn lane }+2 \times 12^{\prime} \\ & \text { travel lanes }+30^{\prime} \\ & \text { median) } \end{aligned}$ |
| 0.7 | 0.7 | Additional time (sec) ${ }^{\text {c }}$ | $0.7 \times 4.5=3.15$ | $0.7 \times 5.5=3.85$ |
| 50 | 50 | Additional ISD (feet) | 230 | 285 |
| 935 | 1010 | Total ISD (feet) | 1190 | 1245 |
|  | 1010 | Controlling ISD (feet) |  | 1245 |
| 14.5 ft from the edge of right turn lane=26.5 ft from the edge of travel lane. |  | Side road decision point location | 14.5 ft from the edge of right turn lane $=26.5 \mathrm{ft}$ from the edge of travel lane. |  |
| A See FDM 11-10 Table 5.2. |  |  |  |  |
| B See Figure 2-23, Page 2-76 2018 GDHS (GDHS hyperlink is only available to WisDOT staff.) |  |  |  |  |
| C See FDM 11-10 Table 5.2, Notes B \& C |  |  |  |  |

