11-2.0  INTERSECTION SIGHT DISTANCE (ISD)

11-2.01  General

All intersections within the project limits and any intersection outside the project limits that is
influenced by the transportation improvement must be analyzed to determine if sufficient ISD
exists. The designer needs to review the ISD values for left turns, right turns, crossing
movements and turning left across oncoming traffic for each intersection. At each intersection,
ensure that sufficient sight distance is provided for a driver to perceive potential conflicts and to
perform the actions needed to negotiate the intersection safely. The additional costs and
impacts to achieve this sight distance are often justified based on the safety and operational
considerations.

In general, intersection sight distance (ISD) refers to the available distance that allows a driver
corner sight distance available in intersection quadrants that allows a driver approaching an
intersection to observe the actions of vehicles on the crossing leg(s). ISD evaluations involve
establishing the needed sight triangle in each quadrant by determining the legs of the triangle
on the two intersecting roadways. The necessary clear sight triangle is based on the type of
traffic control at the intersection and on the design speeds of the two roadways. The types of
traffic control and maneuvers are as follows:

- Case A – Intersections with no control,
- Case B – Intersections with stop control on the minor road:
  + Case B1 – Left-turn from the minor road,
  + Case B2 – Right-turn from the minor road,
  + Case B3 – Crossing maneuver from the minor road,
- Case C – Intersections with yield control on the minor road:
  + Case C1 – Crossing maneuver from the minor road,
  + Case C2 – Left or right-turn from the minor road,
- Case D – Intersections with traffic signal control,
- Case E – Intersections with all-way stop control, and
- Case F – Left turns from the major road.

Because all intersections on State highways are either stop controlled or signalized, no
guidelines are provided for no control intersections. The use of yield-controlled intersections is
limited to right turns that are channelized at major intersections and separated from the signal.
For these types of intersections, the designer should review NCHRP Report 383, Intersection
Sight Distance and/or the 2001 AASHTO Policy on the Geometric Design of Highways and
Streets for additional guidance.

11-2.02  Design Procedures

The Department uses gap acceptance as the conceptual basis for its intersection sight distance
(ISD) criteria at stop-controlled and traffic-signal controlled intersections. The intersection sight
distance is obtained by providing clear sight triangles both to the right and left as shown in
Figure 11-2A. All legs of the intersections must be addressed similarly. The following discussion assumes a stop-controlled side street entering a major through street:

1. **Minor Road.** The length of leg along the minor road is based on two parts. The first is the location of the driver's eye on the minor road. This is typically assumed to be 15 feet from the edge of the major road and in the center of the lane on the minor road; see Figure 11-2A. In restricted locations, this may be a minimum of 15 ft from the traveled way of the major road. The second part is based on the distance to the center of the vehicle on the major road. For right-turning vehicles, this is assumed to be the center of the closest travel lane from the left. For left-turning vehicles, this is assumed to be the center of the closest travel lane for vehicles approaching from the right; see Figure 11-2A.

2. **Major Road.** The length of the sight triangle leg or ISD along the major road is determined using the following equation:

\[
ISD = 1.47 V_{maj} t_g
\]  

*(Equation 11-2.1)*

Where:

- \( ISD \) = length of sight triangle leg along major road (ft)
- \( V_{maj} \) = design speed of major road (mph)
- \( t_g \) = time gap for entering the major road (sec)

The time gap \( t_g \) varies according to the design vehicle, the maneuver type, the grade on the minor road approach, the number of lanes on the major roadway, the type of operation and the intersection skew.

3. **Height of Eye/Object.** The height of eye for passenger cars is assumed to be 3.5 feet above the surface of the minor road. The height of object (approaching vehicle on the major road) is also assumed to be 3.5 feet. An object height of 3.5 feet assumes that a sufficient portion of the oncoming vehicle must be visible to identify it as an object of concern by the minor road driver. If there are a sufficient number of trucks to warrant their consideration, assume an eye height of 7.6 feet for a tractor/semitrailer and 6 feet for single-unit trucks and buses. If a truck is the assumed entering vehicle, the object height will still be 3.5 feet for the passenger car on the major road. The designer must also ensure that adequate ISD for passenger cars is provided, because there are situations where trucks have ISD and smaller vehicles do not.

Within this clear sight triangle, if practical, the objective is to remove, lower any object, trim lower tree branches, etc., that obstruct the driver's view. These objects may include buildings, parked or turning vehicles, trees, hedges, tall crops, unmowed grass, fences, retaining walls and the actual ground line. In addition, where a crossroad intersects the major road near a bridge on a crest vertical curve, items such as bridge parapets, piers, abutments, guardrail or the crest vertical curve itself may restrict the clear sight triangle.
CLEAR SIGHT TRIANGLE FOR VIEWING TRAFFIC APPROACHING FROM THE LEFT

CLEAR SIGHT TRIANGLE FOR VIEWING TRAFFIC APPROACHING FROM THE RIGHT

* Desirably measured from the edge of road. However, can be measured from edge of traveled way where restrictions limit offset.

CLEAR SIGHT TRIANGLES (STOP-CONTROLLED) INTERSECTIONS

Figure 11-2A
Design Exceptions. The following will apply:

a. ISD is a ConnDOT controlling criteria at all signalized and un-signalized intersections which connect to State highways.

b. Commercial drives and multi-residential drives shall meet the same ISD standards as street intersections. An exception to standards is required when ISD requirements are not met.

c. ISD from all drives to a single family residential dwelling unit should meet full ISD standards. If the existing ISD meets standards, the drive must be designed to meet standards. If the drive has limited existing ISD, it shall not be reduced. If the project adds lanes or otherwise increases the need for ISD at a drive with limited existing ISD, the designer shall provide ISD of equivalent design speed to the preexisting condition. Exceptions are required if these conditions are not met.

d. The presence of permanent fixed objects (e.g., buildings, cut slopes, parking lots, etc.) within the sight triangle will require a design exception. The designer shall not create new sightline restrictions within the sight triangle as part of the project design.

e. A design exception is not required where the minimum ISD is not met due to the parked vehicles within the roadway.

f. ISD is not a controlling criterion for projects designed by municipalities for roadways owned and maintained by the municipality (i.e., local road projects). In the event a local road project intersects a State highway, the designer shall evaluate the ISD at the State highway intersection, make improvements as feasible, and request a design exception if the minimum ISD cannot be obtained. Note that the designer is still responsible for providing ISD according to Town standards on the Town road system even though it is exempt from the State exception process.

g. See Section 6-6.0 for design exception procedures.

11-2.03 Case B – Intersections with Stop Control on the Minor Road

Where traffic on the minor road of an intersection is controlled by stop signs, the driver of the vehicle on the minor road must have sufficient sight distance for a safe departure from the stopped position assuming that the approaching vehicle comes into view as the stopped vehicle begins its departure. At a four-leg intersection, the designer should also check the sight distance across the intersection.