

## I. Sight Distance

All intersections and all access point connections must meet the Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD) requirements set forth in Sections 505.I.1 and 505.I.2 of this chapter. Sight distance requirements for both stopping and intersection as referenced in the following sections are based on passenger car operations and do not in all cases account for heavy vehicle operating characteristics.

1. **Stopping Sight Distance (SSD)** is the sum of two distances: the distance traveled during perception and reaction time and the distance to stop the vehicle. Roadway geometrics shall be designed to provide stopping sight distance equaling or exceeding the values given in Table 4 at all points along the traveled ways and on all intersecting traveled ways. Stopping sight distance is measured from an eye height of 3.50 feet to an object height of 0.50 feet within the traveled way lanes respectively (see Drawing 505.I-1).

**TABLE 4 – MINIMUM SSD ON LEVEL GROUND OR ON GRADES**

Design Speed (mph)	Stopping Sight Distance (SSD) (ft)						
	Level	Down Grade			Up Grade		
	0%	-3%	-6%	-9%	3%	6%	9%
25	155	158	165	173	147	143	140
30	200	205	215	227	190	184	179
35	250	258	271	288	237	229	222
40	305	315	333	354	289	278	269
45	360	378	401	428	345	331	320
50	425	447	474	508	405	389	375
55	495	520	553	594	470	450	433

Note: Source of Table and equation below is WSDOT Design Manual. (June 2009)

For stopping sight distances on grades not listed, interpolate between the values given or use the following equation.

$$SSD = 1.47Vt + \frac{V^2}{30 \left[ \left( \frac{a}{32.2} \right) \pm \frac{G}{100} \right]}$$

SSD = Stopping Sight Distance (ft)  
 V = Design Speed (mph)  
 t = Perception/reaction time (2.5 seconds)  
 a = Deceleration rate (11.2 ft/sec<sup>2</sup>)  
 G = Grade (%)

2. **Intersection Sight Distance (ISD)** is the length of roadway visible to the driver of a vehicle entering an intersection. This section defines the required lengths of the traveled way lanes visible to a driver of a vehicle entering or crossing an intersection to permit the driver to anticipate and avoid potential collisions. Intersection sight distances shall be designed to equal or exceed the values given in Table 5 unless the intersection/access connection has been determined to be a low volume approach pursuant to Section 505.I.2.b.

Intersection sight triangles (see Drawing 505.I-1) shall be provided at all intersections/access connections to allow the drivers of stopped vehicles a sufficient view of the traveled way they are about to enter or cross in order to complete all legal maneuvers before an approaching vehicle on the through traveled way would reach the intersection/access connection. The intersection sight triangles shall be clear of obstructions (including but not limited to vegetation, cut banks, signs, landscaping, fencing, parking, buildings, and other improvements) that might block a driver's view of potentially conflicting vehicles.

Typically the County will not allow any portion of the intersection sight triangle to cross over private property. In certain situations, at the discretion of the County Engineer, a recorded sight triangle easement over the private property with assigned maintenance responsibilities may be allowed.

- a) The line of sight used to determine intersection sight triangles is formed as measured 18 feet (min) from the edge of the traveled way from an eye height of 3.50 feet to an object height of 3.50 feet within the respective traveled way lanes and at the minimum linear distance shown in Table 5 based on the appropriate design speed and using the appropriate design vehicle (see Drawing 505.I-1). If there is significant truck traffic on any leg of the intersection, as determined by the County Engineer, the design shall use the current version of the WSDOT Design Manual for the County Engineer designated design vehicle.

**TABLE 5 - Minimum Sight Distance at Intersections  
(P = design vehicle)**

Design Speed (mph)**	Intersection Sight Distance (ft)*
25	280
30	335
35	390
40	445
45	500
50	555
55	610

Source: Derived from Equation in WSDOT Design Manual (ex. 1310-27a July 2010) and repeated below.

\*Distances are rounded up to the nearest multiple of five and are based on the passenger car (P) as the design vehicle

\*\* Design Speed is applied to the intersecting/cross road segment based on the leg being analyzed.

**Intersection Sight Distance Equation:**

$$S_i = 1.47Vt_g$$

Where:

$S_i$  = Intersection Sight Distance (ft)

$V$  = Design speed of the through roadway (mph)

$t_g$  = Time gap for the minor roadway traffic to enter or cross the through roadway (sec)

**Intersection Sight Distance Gap Times ( $t_g$ )**

Design Vehicle	Time Gap ( $t_g$ ) in Sec
Passenger car (P)	7.5
Single-unit trucks and buses (SU & BUS)	9.5
Combination trucks (WB-40, WB-50, &WB-67)	11.5

**Note:**

Values are for a stopped vehicle to turn left onto a two-lane two-way roadway with no median and grades 3% or less.

The  $t_g$  values listed may have the following adjustments:

**Crossing or right-turn maneuvers:** All vehicles subtract 1.0 sec

**Multilane roadways:**

Left turns, for each lane in excess of one to be crossed and for medians wider than 4 ft:

Passenger cars add 0.5 sec

All trucks and buses add 0.7 sec

Crossing maneuvers, for each lane in excess of two to be crossed and for medians wider than 4 ft:

Passenger cars add 0.5 sec

All trucks and buses add 0.7 sec

Note: Where medians are wide enough to store the design vehicle, determine the sight distance as two maneuvers.

**Crossroad grade greater than 3%:**

All movements upgrade, for each percent that exceeds 3%: All vehicles add 0.2 sec

- b) A Low Volume Approach (LVA) is an intersection/access connection designed to accommodate a stopped vehicle on the low volume approach leg where the ADT is 160 (16 single family users or equivalent) or less, to enter onto a roadway where there is less than 1000 ADT. In the case of an LVA, the line of sight for the intersection sight triangle is formed as measured 15 feet (min) from the edge of the traveled way from an eye height of 3.50 feet to an object height of 3.50 feet within the respective traveled way lanes and at a minimum linear distance as shown in Table 4, and as referenced on Drawing 505.I-1. The LVA shall not be used where the low volume approach leg has significant truck traffic, as determined by the County Engineer.

It should be noted that although the distance for the LVA sight triangle segment along the traveled way may correspond to the values shown in the SSD - Table 4 for a given design speed, the intersection and stopping sight distance elements are measured in uniquely different ways as referenced in Sections 1 and 2 above. A permitted LVA location shall meet or exceed both the LVA intersection sight triangle and the stopping sight distance criteria.

3. **Passing Sight Distance (PSD)** for the use in design should be determined on the basis of the length needed to complete normal passing maneuvers in which the passing driver can determine that there are no potentially conflicting vehicles ahead before beginning the maneuver. Passing sight distance for arterials and collectors shall equal or exceed the values given in Table 6. Sight distance is measured from an eye height of 3.50 feet and an object height of 3.50 feet.

**TABLE 6 - MINIMUM PASSING SIGHT DISTANCE**

Design Speed (mph)	Passing Sight Distance (ft)
25	900
30	1090
35	1280
40	1470
45	1625
50	1835
55	1985

*Note: Source of table is WSDOT Design Manual. (June 2009)*

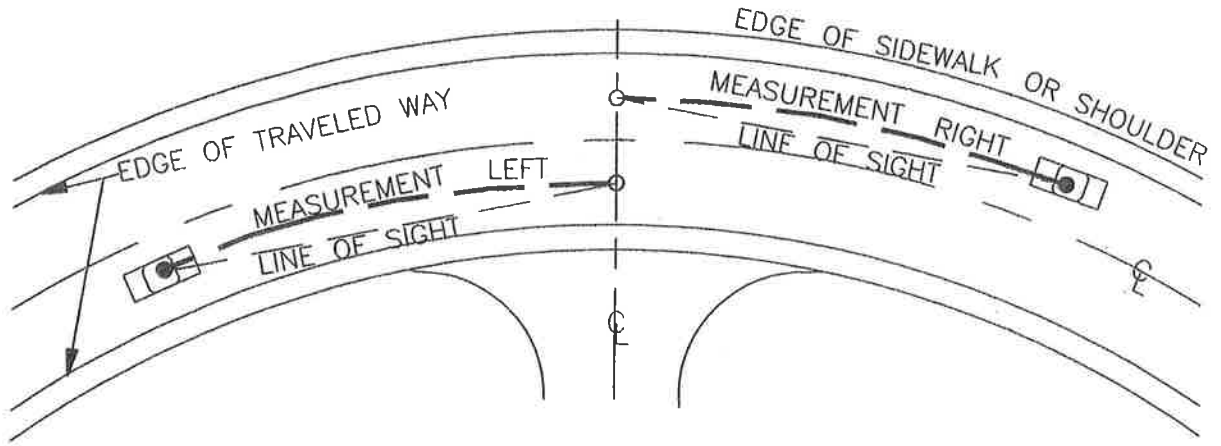
4. **Other Considerations:**
- a) Provide design stopping sight distance at all points on the roadway including the through traveled way and all intersection/approach connection legs within the functional intersection area.
  - b) The County Engineer may require Decision Sight Distance (see WSDOT Design Manual) to be used when warranted by conditions or based upon his/her judgment.
  - c) Use of landscaping plants in median areas or within any portions of the sight triangles or along the sight lines shall be evaluated as to height, spread, and the foliage density of the proposed plants at maturity.
5. **Documentation of Sight Distance**

To verify the various acceptable sight distance elements, the County Engineer may require a developer to evaluate and document the existing sight distance conditions. The evaluation and documentation of the sight distance elements may be required to be completed by a Professional Civil Engineer or Professional Land Surveyor and shall include the following:

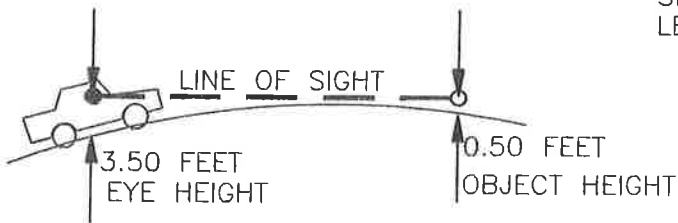
- Plan, profile, and cross-section drawings along the sight line
- The eye height to object height lines of sight
- Design speed, operating speed and/or speed study data
- Right-of-way and easement limits (existing and proposed)
- The sight triangle areas and associated topography
- Additional information as may be necessary to make a determination

When the County Engineer determines from the documentation presented that a location has insufficient sight distance, a plan to improve the location in order to satisfy the various elements of the sight distance sections of these standards will be required.

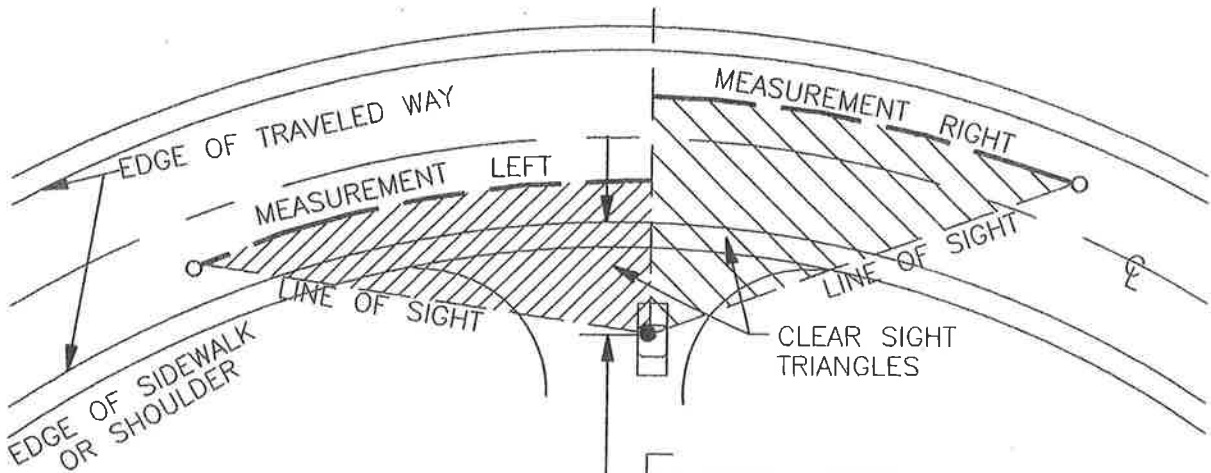
# STOPPING SIGHT DISTANCE AT INTERSECTIONS



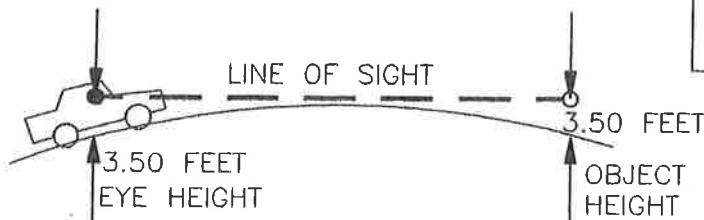
SEE SECTION 505.1.1 FOR LENGTH OF DISTANCE MEASUREMENT



## INTERSECTION SIGHT DISTANCE & LOW VOLUME APPROACH



18 FEET, INTERSECTION SIGHT DISTANCE, SEE SECTION 505.1.2.a FOR LENGTH OF DISTANCE MEASUREMENT  
 15 FEET, LOW VOLUME APPROACH, SEE SECTION 505.1.2.b FOR LENGTH OF DISTANCE MEASUREMENT



DRAWING 505.1-1

SIGHT DISTANCE MEASUREMENTS

WHATCOM COUNTY DEPARTMENT OF PUBLIC WORKS