

# DESIGN MEMO 4.11

To: Designers, Contractors, and City Departments

Date: 3/30/2022

Subject: Sight Triangles

Category: Horizontal and Vertical Design

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Until further notice, this direction will be used for scoping, design, and construction of plans within the City of Columbus Right-of-Way.

## I. PURPOSE

The purpose of this design memo is to establish minimum requirements to be used when evaluating sight distance for ensuring safety and adequate sight distance at an intersection, a private driveway, or a commercial driveway. Evaluation shall occur as part of plan preparation for public and private projects, as part of studies for traffic safety and operations analyses, for major changes in traffic control such as removing a traffic signal or converting street directionality, and for establishing guidelines for proposed private and commercial driveways.

## II. APPLICABILITY

- A. The provisions of this design memo shall apply to all areas of public right-of-way and private property within a required sight triangle.
- B. All areas within a required sight triangle should be free of any objects that might obstruct the driver's view of potentially conflicting vehicles. Any objects that cannot be removed should be lowered to be no higher than 2.5 feet above the centerline elevation of the adjacent roadways. The designer should contact the Division of Traffic Management for guidance on any locations where this cannot be achieved.
  - 1. Objects that may be potential sight obstructions may include, but are not limited to the following: buildings, walls, roadside barriers, fences, bus stop shelters, utility towers and cabinets, street trees/shrubs/plantings/unmowed vegetation, bridge railings/piers/abutments, parking areas, commercial signage, interactive electronic wayfinding boards, grading and the terrain itself.
- C. If any areas within a required sight triangle as defined by this design memo include areas of private property, coordination with Code Enforcement shall occur to ensure that Section 3321.05 of the Columbus City Code is being maintained, where applicable.
- D. This design memo shall also apply to private and commercial driveways accessing the public right-of-way. A commercial driveway includes driveways serving multi-family residential properties with four or more units and all driveways serving commercial, industrial, manufacturing or institutional uses.

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### III. GENERAL

- A. Proposed intersections of public roadways, commercial driveways, and placement of potential sight obstructions (including right-of-way permit applications), should be planned and located to provide as much sight distance as practical. In achieving a safe roadway design, at minimum, there should be sufficient sight distance from intersections for the driver on the minor roadway to cross the major roadway or make a turning movement onto the major roadway without requiring approaching traffic to reduce speed.
- B. In consideration of the need of on-street parking and the presence of existing infrastructure in established urban environments, sight distance values for areas where the posted speed limit is 35 MPH or less have been reduced from typical sight distance standards. As such, the requirements listed in this memo are minimums, and locations where there are no existing urban infrastructure issues should be planned and located to provide as much sight distance as practical based on the standards found in the most recent edition of A Policy on Geometric Design of Highways and Streets by AASHTO.
- C. The Minimum Sight Distance Values Table is for stop control, not yield conditions.
- D. Draw sight distance triangles early in the study or plan development process in order to identify or prevent potential sight distance issues.
  1. Sight distance triangle figure(s) or exhibit(s) should be included in submissions for:
    - a. Traffic access and traffic impact studies
    - b. Traffic operations and safety studies
    - c. Feasibility studies
    - d. Preliminary alignment
    - e. Site Compliance plans and Right-of-way Permit applications
      - New access points
      - Applications for driveways to public roadways that are being added to existing developments.
      - Within 15 feet of public right-of-way, any proposed improvements, including expansions and new: buildings, walls, roadside barriers, fences, bus stop shelters, street trees/shrubs/plantings, bridge railings/piers/abutments, parking areas, interactive wayfinding boards, and grading.
    - f. Other studies where appropriate
  2. Sight distance triangle figure(s) or exhibit(s) should be scaled drawings (CAD preferred), utilizing the most accurate information available and include:
    - a. At a minimum the following information: Roadway pavement markings, major utilities, right-of-way, and existing landmarks.
    - b. If available, figure(s) or exhibit(s) should utilize information from plan sheets including survey data and the following information: Roadway signage, limits of parking, landscape and grading, street trees and other plantings, private signage and other sight information as appropriate.
    - c. Sight distance triangle figure(s) or exhibit(s) should also illustrate Clear Vision Triangles outlined in Columbus City Code as appropriate (see Figure 1 – Type of Sight Triangles).
  3. Sight distance triangle figure(s) or exhibit(s) should be submitted as a separate exhibit for all private development projects.

4. Sight distance triangle figure(s) or exhibit(s) should be added to all submittals listed in Section 9.1-9.4 of the City of Columbus General Design Requirements – Capital Improvement Projects document.
5. Sight distance triangle figure(s) or exhibit(s) should be added to all submittals listed in the Plan Design section of the ROW Plan Routing Manual.
  - a. Drawings should initially be shown on separate figure(s) for preliminary approval and then integrated as necessary within further submittals as directed.
- E. All investigations are to be based on scaled CAD drawing files for most locations and include field inspection for complex locations, such as along roadway segments with horizontal or vertical curvature. Field inspection may also be necessary in order to confirm existing sight distance conditions.
  1. The field inspection is to be done with a minimum disruption to normal traffic and with proper safety procedures followed by the investigator.

#### IV. PROCEDURE

- A. Each existing location being investigated for safety and adequate sight distance is to be evaluated separately with consideration given to the following:
  1. Determine the available sight distance from the normal final stop position (decision point) for the subject intersection (See Figures 1 and 2).
    - a. For multilane minor road approaches (>18 feet wide), the sight distance shall be checked from each approach lane. The offset is located 3 feet from the applicable lane pavement marking (centerline or channelizing line) or center of unmarked roadway.
    - b. The decision point for narrow minor roadways (<18 feet wide) is located on the center line of the minor roadway, as opposed to 3 feet offset from center line of the minor roadway, or a location based on engineering judgement.
    - c. At signalized locations where right-turns on red are permitted, the right-turning sight distance should be checked.
    - d. The leg of the sight triangle along the minor road should follow the alignment of that road (if the minor road is skewed compared to the major road, the sight triangle will not be a right triangle).
    - e. The leg of the triangle along the major road should follow the alignment of the travel lane being checked (incorporate curves if the major road has horizontal curvature).
    - f. Curb lanes where parking is permitted during off peak hours but restricted on peak hours should be treated as a travel lane.
  2. Comparison with the Minimum Sight Distance Values Table.
  3. Unusual geometrics, such as horizontal or vertical roadway curvature, minor roadways or commercial/industrial driveways with high truck percentages and/or grades affecting speed judgment (>3%): the designer should contact the Division of Traffic Management for guidance.
- B. Examples of sight distance triangles, including curves as well as turning vehicles at high and low speeds are included as an addendum to this design memo as additional guidance to the designer.

#### V. RECOMMENDATIONS

- In order to make recommendations, the triangles should be examined to determine if there are any objects within that do not meet the requirements of Section 2.
- A. Parking – In urban areas, parking within the sight distance triangle should not initially be removed in its entirety unless necessary based on crash history at the

intersection. A check of crash history has been included in the addendum as additional guidance to the designer.

1. If establishing a parking area or making initial changes to existing conditions (no crash pattern susceptible to correction), then parking is removed to a point where the sight distance triangle crosses the curb line.
  2. If parking is being adjusted to mitigate a known crash issue (crash types susceptible to correction by additional corner clearance), then parking should be removed to a point where the sight distance triangle crosses the midpoint of the parking lane.
- B. Other Objects – Removable objects such as brush, should also be removed from/not placed within the sight distance triangle.
1. Objects within the sight distance triangle, but outside the clear vision triangle are typically removed by city forces.
  2. Objects within any portion of the clear vision triangle (inside or outside the sight distance triangle) should be removed by the property owner via code enforcement.
- C. Signalized Intersections – If checks for right-turning sight distance find that obstructions exist:
1. The objects causing the obstruction should be removed.
  2. Objects that cannot be moved, such as existing buildings or retaining walls, should be addressed by restricting the right-turn on red movement.
- D. New Developments – No objects or plantings meeting the requirements of Section 2 should be placed within clear vision triangles or sight distance triangles.
1. Exceptions, such as street trees with high canopies or other objects can be placed within the triangle only with approval.

**VI. UPDATE HISTORY**

This design memo updates the previous memo effective 5/24/2021 as well as the previous Sight Distance at Intersections policy effective 1/1/2014.

**Minimum Sight Distance Values Table**

Speed (MPH)*								
15	20	25	30	35	40	45	50	55
Normal Final Stop Position								
Use Decision Point of 10 FT			Use Decision Point of 12 FT			Use Decision Point of 14.5 FT		
Minimum Sight Distance (FT)								
For Left & Right Turning Vehicles					For Left Turning Vehicles			
					500	555	610	665
115      155      200      320      375					For Right Turning & Crossing Vehicles			
					430	480	530	575
* Speed should be posted speed unless a higher design speed has been approved.								