TECHNICAL MEMORANDUM

TO Jorden Hiser & Joy, PLC
Attn: Mr. Doug Jorden
5080 N 40th Street
Suite 245
Phoenix, AZ 85018

DATE April 18, 2017 **JOB NO. 17-0500**

RE ***El Chorro Monument Sign Resize***

CC File

Dear Mr. Jorden:

The planned monument sign for El Chorro restaurant is now proposed to be 54 inches instead of the previous concept of 36 inches. The proposed location and footprint of the sign has not changed. The height of the sign is not stated within the *El Chorro Sight Distance Evaluation*, dated April 7, 2017, and the sign is not within the recommended visibility triangles. Thus, the height of the sign is no i mport to the recommended visibility triangles and does not invalidate the evaluation. Furthermore, if the sign is proposed to be resized again or moved to another location, the results of the evaluation would not change as long as the sign is proposed outside of the recommended visibility triangles.

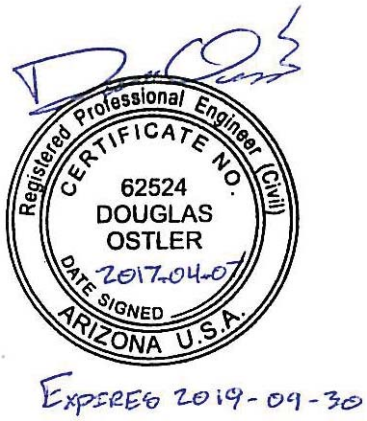
Should there be any questions regarding the sight distance recommendations for the driveways, please contact me at 480-659-4250.

CivTech Inc.

Doug Ostler, P.E.

Attachments:
[None]

CivTech



April 7, 2017

Jorden Hiser & Joy, PLC
Attn: Mr. Doug Jorden
5080 N 40th Street
Suite 245
Phoenix, AZ 85018

RE: El Chorro Sight Distance Evaluation

Dear Mr. Jorden:

CivTech has been retained to prepare a sight distance analysis for the existing intersection of 56th Street/El Chorro Driveway and Lincoln Drive in the Town of Paradise Valley, Arizona. The purpose of this letter is to address the minimum sight distances required at this intersection to ensure proper safety. This evaluation is focused on the east side of the driveway where a new sign is proposed within the area typically designated as a corner vision triangle.

To maintain intersection safety and operation, there must be sufficient unobstructed sight distance along both approaches of an intersection and across their included corners to allow operators of vehicles to detect approaching vehicles in order to prevent a collision. The sight triangle is the area encompassed by the line of sight from a stopped vehicle on the minor roadway to the approaching vehicle on the major roadway.

The Town has classified Lincoln Drive as a major arterial. The posted speed limit along Lincoln Drive is 40 mph. It consists of two (2) lanes in each direction, separated by a raised median with openings for left turn lanes and two-way left turn lanes. Lincoln Drive begins to the west near 24th Street, continuing east to Scottsdale Road with non-arterial segments east of Scottsdale Road. The driveway for El Chorro forms the north leg on the intersection of 56th Street and Lincoln Drive. The intersection has sidewalks on all corners and operates with a standard 2-phase cycle with all left turn movements operating under permitted phasing.

The American Association of State and Highway Transportation Officials (AASHTO) provides sight distance requirements in the 2011 publication *A Policy on Geometric Design of Highways and Streets.* AASHTO uses a standard set of equations for the case of a minor road stopping at a major road. These calculations provide the sight distance requirements for vehicles making a left-hand turn (Case B1), a right-hand turn and for crossing the roadway (Cases B2 and B3). These calculations assume a stopped position for the vehicle attempting to enter the roadway and are dependent upon the major roadway typical section and design speed. The “decision point” of each sight triangle is a minimum of 14.5 feet to a desired 18-feet from the edge of the major-road traveled way. Cases B2 and B3 calculate the length of the shorter leg as the distance from the decision point to the center of the width of approaching lanes to the left. Case B1 calculates the shorter leg of the sight distance triangle as the distance from the decision point to the center of the width of approaching lanes to the right.

An intersection sight distance analysis was performed to set guidelines for establishing line of sight for the intersection of El Chorro Driveway and Lincoln Drive. Using the guidelines set forth by AASHTO, **Table 1** was generated for the existing intersection. Vehicle travel speed is a primary factor in calculating sight distance. The posted speed limit along Lincoln Drive is 40 miles per hour (mph) and a design speed of 45 mph was applied. **Table 1** below summarizes the sight triangle length along Lincoln Drive to the left of the driver's eye required for this intersection on the northeast corner of the intersection.

Table 1 – Intersection Sight Distance Analysis

Intersection	Design Speed	Case B1- Right (East of Driveway)
56th Street/El Chorro Driveway and Lincoln Drive	45 mph	570'

In summary, the required sight distance for vehicles stopped on 56th Street/El Chorro Driveway is 505 feet to the left (east) of the intersection.

The Town currently utilizes their published standard in Section 8-1-13B of 50'x50' for corner visibility at all corner lots intersections regardless of street classification. While this applied standard is applied in all locations, it does not specifically reference private driveways for this requirement and the full area is not required to meet the safe stopping sight distance as shown in AASHTO's *Geometric Design of Highways and Streets 2011*. The Town of Paradise Valley Code, provided in the **Attachments**, states that sight distance must promote adequate protection "for the safety of children, pedestrians, and the operators of vehicles". Although the AASHTO publication does not specifically address pedestrian sight distance, a study conducted by the National Association of City Transportation Officials (NACTO) states that the sight distance triangle "provides the driver of a vehicle approaching an intersection an unobstructed view of any conflicting vehicles or pedestrians." An excerpt of this study is included in **Attachments**. To satisfy both vehicle and pedestrian sight distance, it is recommended to utilize the sight distance requirements documented by AASHTO. Sight distance calculations are provided in **Attachments**.

The application of traffic safety triangles was explored in the City of Scottsdale and the City of Phoenix. The City of Scottsdale's *Design Standards and Policy Manual* Figure 5.3-26 provides an exhibit (**Attached**) depicting the location of the sight distance triangle. Scottsdale defers to AASHTO distances for the lengths along the cross street. The reference point for the triangle vertices are different, though the differences are relatively minor (ex. 5' from lane line instead of center of travel lane). The City of Phoenix requires standard 10'x20' triangles at all private driveways where 10' is measured along the edge of the driveway and 20' is measured along the right-of-way boundary of the public road except where dedicated right-of-way is wider than the minimum required per the City's cross section standards. In such cases, the triangle is offset 7' from the back of curb. The existing sidewalk is approximately 7 feet wide and City of Phoenix-style measurements within this study are made from the edge of the sidewalk.

It is recommended that the application of sight distance for private driveways by both Scottsdale guidelines and the City of Phoenix be provided for the driveway. Both visibility triangles have been added to an enlarged site plan (**Attached**). The site plan indicates that the existing sign and lamp located to the east of the driveway, will be removed as well as all mature landscaping

within the utility easement and replaced with new landscaping with 18" or lower groundcover and a new sign. The sign is proposed to be approximately 19' north of the existing face-of-curb and approximately 30' east of the curb return. This location is located within a potential 50'x50' corner vision triangle but is not located within the visibility triangles recommended in this evaluation.

CivTech visited the site and observed visibility conditions at the driveway. The existing sign, gas lamp, signal pole, a variety of plants and possibly 1 or 2 decorative boulders are within the visibility triangle to the east of the driveway. The existing sign, gas lamp and mature landscaping are planned to be removed with new groundcover 18 inches or lower. This will leave only the signal pole as the only object greater than 36", which is not greater than 1 foot in diameter, within the visibility triangle.

In summary, the Town's typical corner vision triangle of 50'x50' can be reduced in this location while maintaining the sight distance requirements established by AASHTO. In addition, a 10'x20' traffic safety triangles are recommended to be applied at the edge of the Lincoln Drive sidewalk.

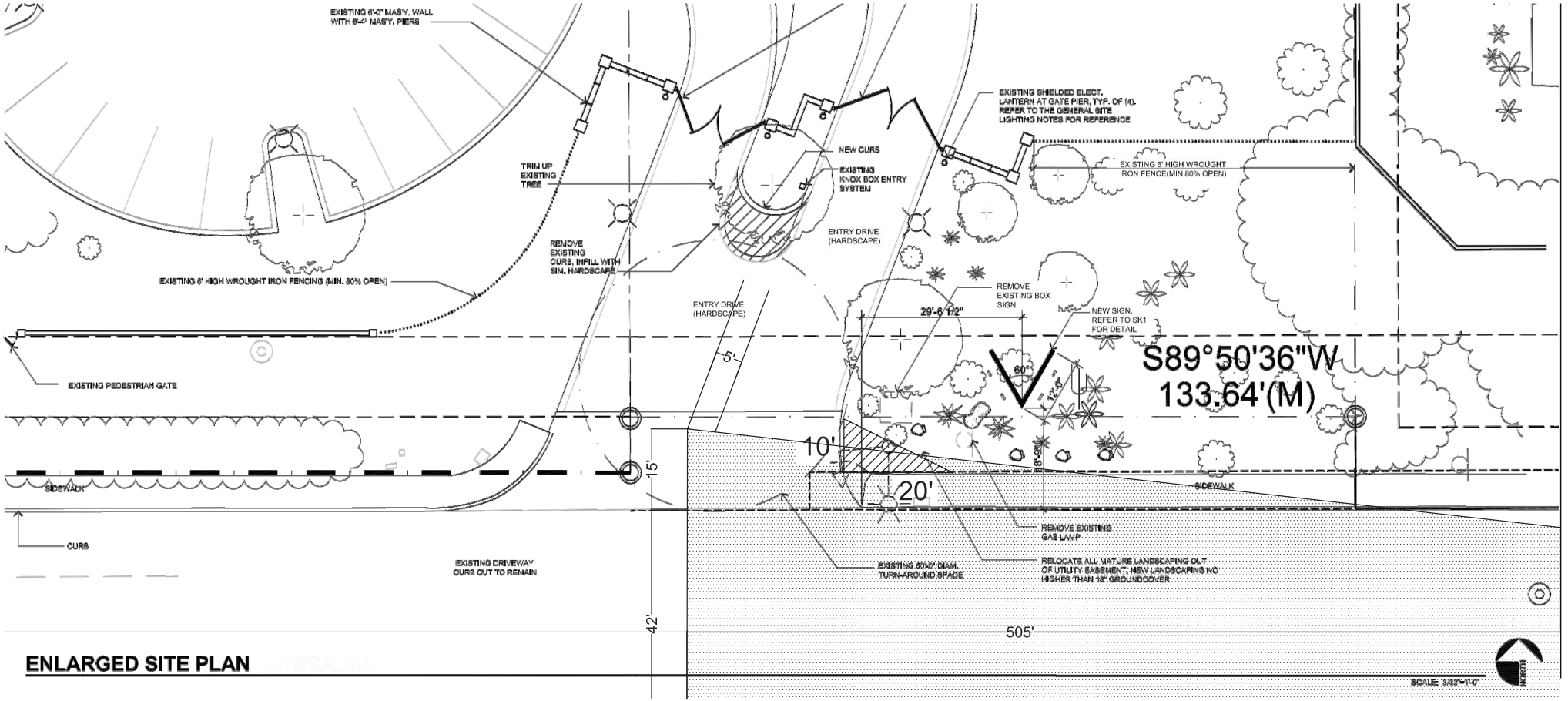
Should there be any questions regarding the sight distance recommendations for the driveways, please contact me at 480-659-4250.

Sincerely,

CivTech

Doug Ostler
Project Engineer

Attachments:
Site Plan with Added Sight Distance/Visibility Triangles
Town of Paradise Valley Corner Vision Requirements
Sight Distance (Excerpts from NACTO)
Sight Distance Calculations
City of Scottsdale Sight Distance Requirements
City of Mesa Corner Clearance Requirements



ENLARGED SITE PLAN

SCALE: 3/32"=1'-0"

swimming pools, spas, ponds, fountains, sprinklers, hoses, pipes, ditches, standpipes, berms, irrigation structures or equipment, valves or gates.

Section 8-1-11 Obstruction of Watercourses (Repealed 418 6/13/96)

Section 8-1-12 Weeds

A. Every person owning, occupying, or controlling any premises fronting on any street, alley, or public place in the Town shall cut or cause to be cut all grass and weeds growing on such frontage as often as the same may require cutting, to the end that said grasses or weeds shall not attain a height of over six inches, and every person who shall permit grass or weeds to grow to a height exceeding six inches between the property line of such property and the street shall be guilty of a violation of this Code.

B. Every person owning, occupying, or controlling any lot or lots within the Town shall cause all weeds and other noxious growths to be cut thereon as often as the same may require cutting to prevent the same from attaining a height of over six inches, and every person owning, occupying or controlling any lot or lots within the Town who shall permit on such lot or lots weeds or other noxious growth to grow to a height exceeding six inches, or who shall permit any rubbish, dirt, debris, or other matter to accumulate upon such lot or lots, shall be guilty of a violation of this Code.

Section 8-1-13 Corner Vision [369] [456]

As an aid to safe movement of vehicles at and near street intersections and in order to promote more adequate protection for the safety of children, pedestrians, and operators of vehicles, there shall be limitations on the height of fences, walls, gateways, ornamental structures, hedges, shrubbery and other fixtures, construction and planting on all corner lots.

A. Such barriers to clear, unobstructed vision at corners of intersecting streets shall be limited to a height of not over two (2) feet above the street elevation of the nearest edge of pavement, for a distance of fifty (50) feet along both the front and side lot lines, measured as indicated below.

B. Within the triangle formed by connecting the ends of the respective fifty (50) foot distances as illustrated in figure 8-1-13, all the structures, fixtures, construction, hedges, shrubbery and other plantings shall be limited to a height of two (2) feet above the elevation of the nearest edge of pavement at the said intersecting streets.

C. Paragraphs A and B of this Section notwithstanding, trees may be located within the fifty (50) foot clear distance if their trunks are no more than eight (8) inches in diameter at a height of twelve (12) inches from the ground, and the foliage is cleared to a height of eight (8) feet above the ground. [456]

D. In interpreting this ordinance, the diagrams shown in Figure 8-1-13 shall be utilized to determine the fifty (50) foot segments and the triangle within which structures are limited in height. In any situation not specifically covered in these diagrams, this Section shall be interpreted in a manner to provide maximum sight distance at the intersection.

E. This Section is applicable to that area within the property, but the property owner is also responsible for that area between the property line and the curb, and to the pavement where no curb exists. [456]

F. A sight distance triangle shall be eligible for modification by the Town Engineer if one or both of the intersecting streets are controlled by stop signs or traffic signals and no decrease in sight distance would occur as a result of the modification. [456]

Section 8-1-14 Landscaping [369] Repealed by Ordinance #448, 1/22/98

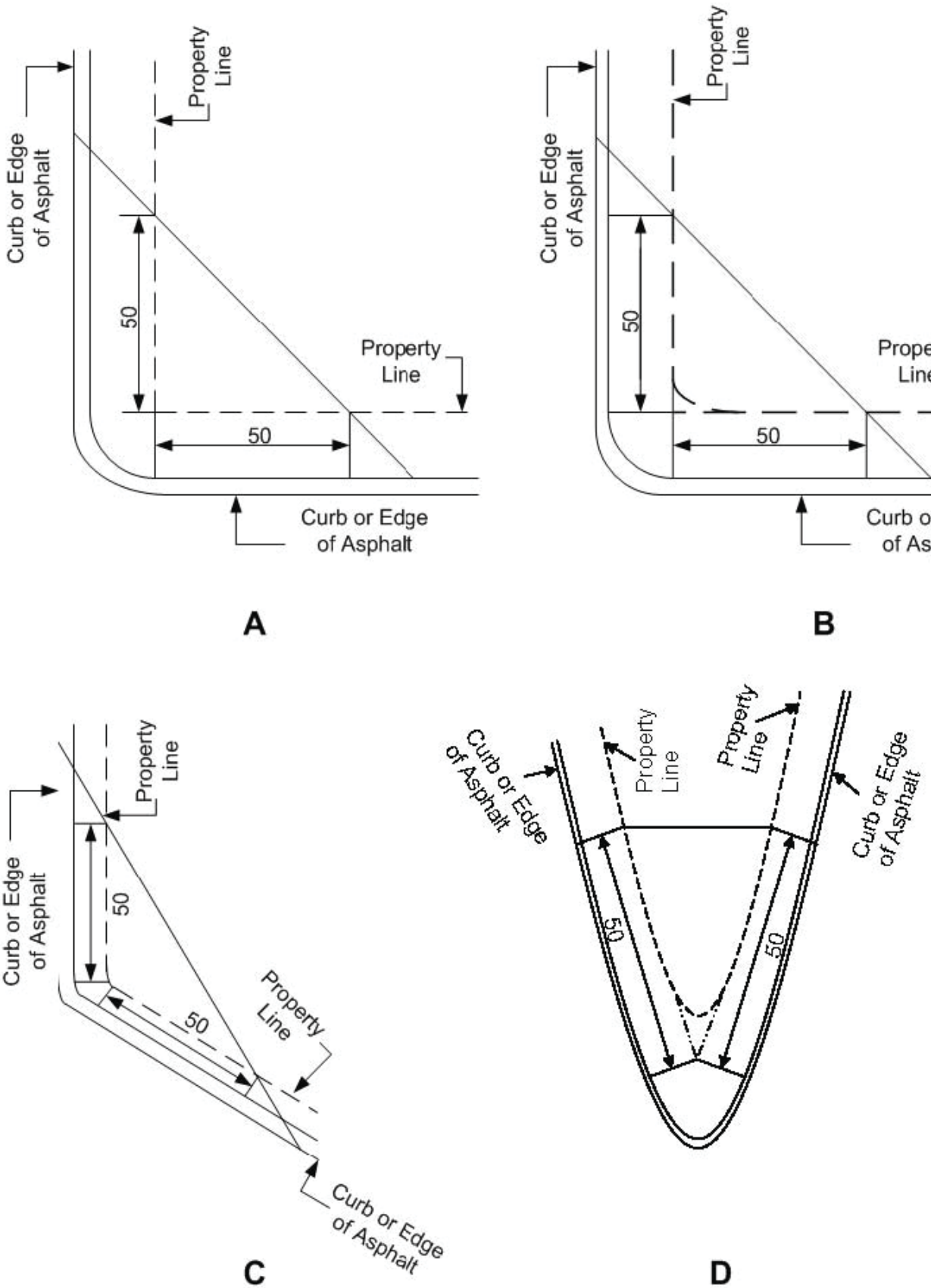
Section 8-1-15 Public Utility Walls [396]

A. Contrary to any terms in the Paradise Valley Zoning Ordinance, it is permissible for electric utility companies to surround electrical substations with walls eight feet high, measured from finished grade.

B. all walls built under the terms of Section 8-1-15 must comply with the terms of Section 8-1-13.

C. These facilities, although necessary for the health, safety and welfare of the citizens, are a hazard to the citizens and especially the children of the community, and are considered by most to be unsightly.

Figure 8-1-13


Curb or Edge of Asphalt
Property Line
50
Property Line
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A
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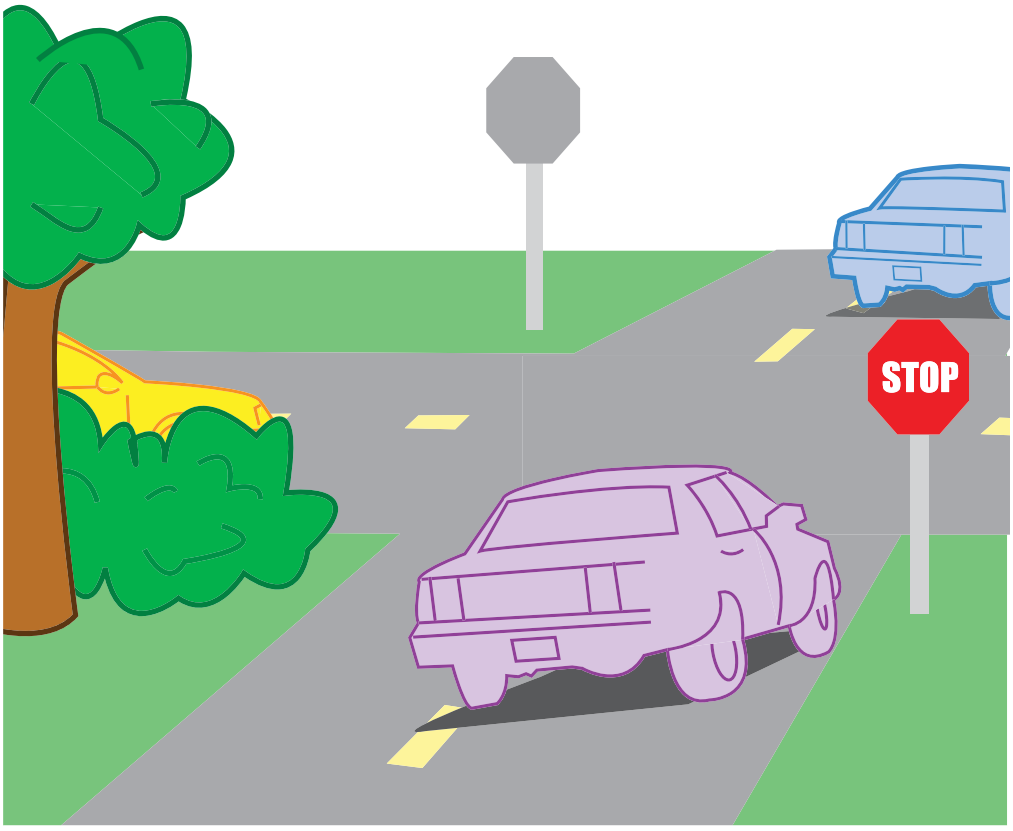
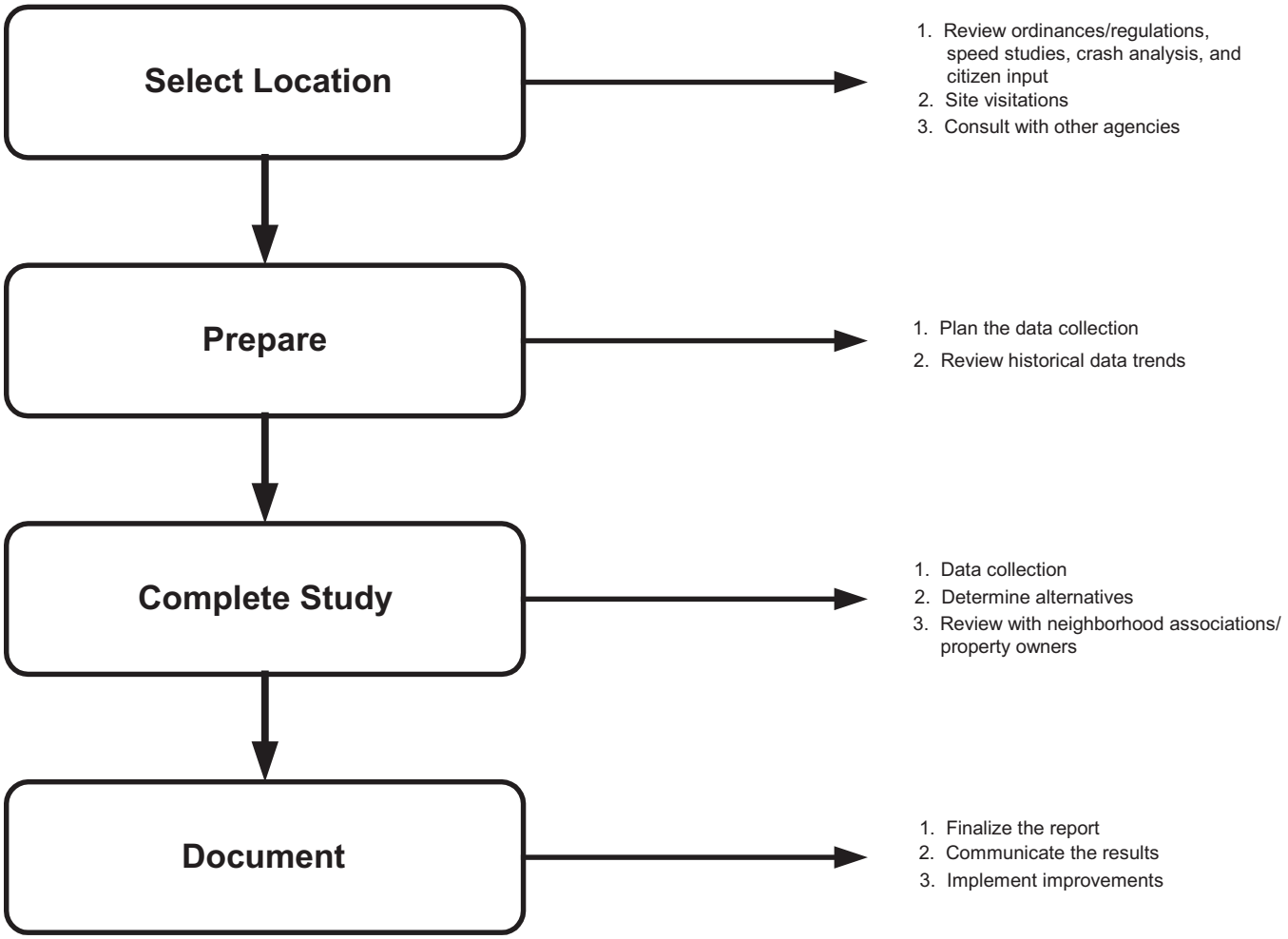
4 Sight Distance



Sight Distance



INTRODUCTION

Sight distance is the length of roadway visible to a driver. The three types of sight distance common in roadway design are intersection sight distance, stopping sight distance, and passing sight distance. This handbook will not discuss passing sight distance because it primarily occurs in rural settings and this handbook generally addresses urban areas. (Information on passing sight distance can be found in Chapter 3 of the AASHTO *Green Book* and in the CTRE *Iowa Traffic Control Devices and Pavement Markings* manual.)

INTERSECTION SIGHT DISTANCE

The driver of a vehicle approaching or departing from an intersection should have an unobstructed view of the intersection, including any traffic control devices, and sufficient lengths along the intersecting highway to permit the driver to anticipate and avoid potential collisions (Maze and Plazak 2000). These unobstructed views form triangular areas known as sight triangles.

A typical intersection is divided into areas between each leg known as quadrants. There may be three quadrants, such as for a "T" intersection, or four, such as for a four-legged intersection. Sight triangles are the specified areas along an intersection's approach legs and across the included corners (see Figures 4.1 and 4.2 for an illustration). These areas should be clear of obstructions that might block a driver's view of conflicting vehicles or pedestrians. The two types of sight triangles are approach sight triangles and departure sight triangles (AASHTO, *Green Book*, 2001).

Approach Sight Triangles

Approach sight triangles provide the driver of a vehicle approaching an intersection an unobstructed view of any conflicting vehicles or pedestrians. These triangular areas should be large enough that drivers can see approaching vehicles and pedestrians in sufficient time to slow or stop and avoid a crash. Approach sight triangles are illustrated in Figure 4.1.

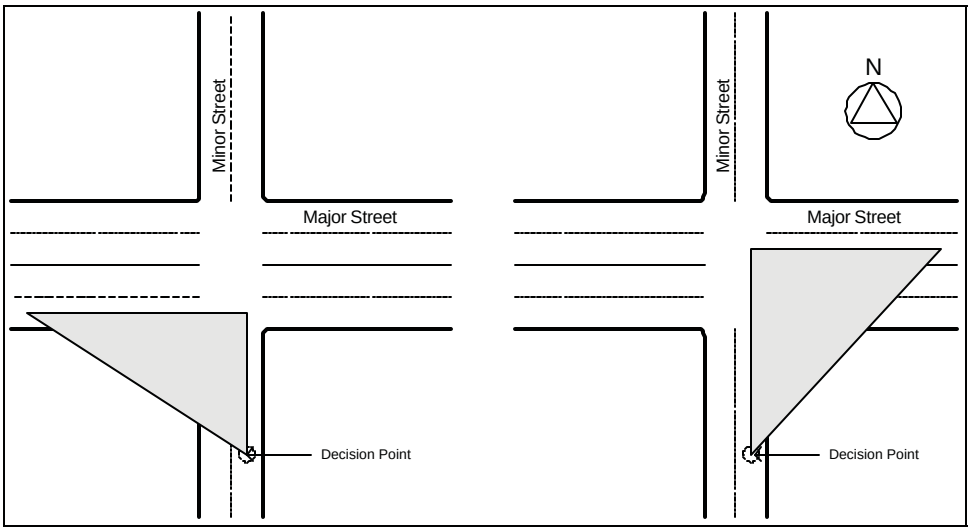


Figure 4.1. Approach Sight Triangles

Departure Sight Triangles

Departure sight triangles provide adequate sight distance for a stopped driver on a minor roadway to depart from the intersection and enter or cross the major roadway. These sight triangles should be provided in each quadrant of a controlled intersection. Departure sight triangles are illustrated in Figure 4.2.

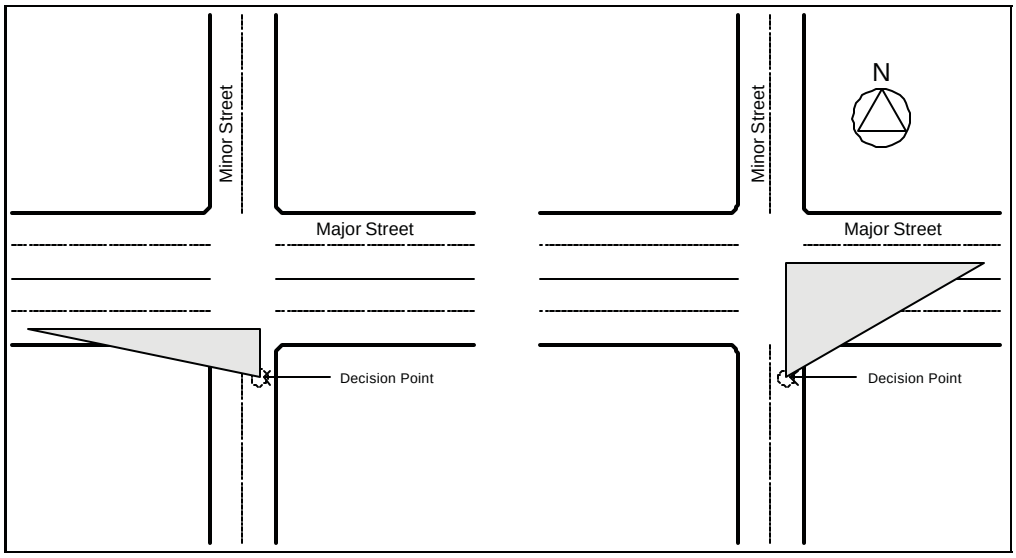


Figure 4.2. Departure Sight Triangles

Location: 56th St. & Lincoln Dr., Paradise Valley

Assumptions and/or Givens

Elements of Design from AASHTO	*6th Edition*		*AASHTO Ref*
Driver Eye Height			
Passenger Vehicle	3.50	ft	§3.2.6, p 3-14
Truck	7.60	ft	§3.2.6, p 3-14
Object Height			
Stopping Sight Distance	2.00	ft	§3.2.6, p 3-14
Passing Sight Distance	3.50	ft	§3.2.6, p 3-14
Vehicle Height	4.25	ft	§3.2.6, p 3-14
Driver Eye Location			
From Edge of Major Rd Traveled Way	14.50	ft	9.5.3, B1
Deceleration Rate (a)			
Passenger Vehicle	11.20	ft/sec^2	§3.2.2, p 3-3
Truck	N/A	ft	
Brake reaction time (t)	2.50	sec	§3.2.2, p 3-4

Site Specific Data

Major Street Design Speed (V_{major})	45	MPH	
Grades - Approaching Minor Street from: (– = approaching downhill)			
Left (G_L)		%	
Right (G_R)		%	
Approach Grade Adjustment Factor	Left 1.0		Tbl 9-4, p 9-35
	Right 1.0		
Major Road Through Lanes on Each Approach	2.0		
Median Width (in "Lane Equivalents")	1.2		
Bicycle Lane Width (in "Lane Equivalents")	0.0		
Minor Road Approach Upgrade, if >3%		%	
Minor Road Access (check restricted)	LI	LO/Th	RO

Stopping Sight Distance = Brake Reaction Distance + Braking Distance

Neglecting Effect of Grade

$$d=1.47Vt+1.075\frac{V^2}{a}$$ Eq 3-2, p 3-4

Calculated d= 359.8 ft
Design d= 360 ft

With Effect of Grade

$$d=1.47Vt+\frac{V^2}{30((\frac{a}{32.2})\pm G)}$$ Eq 3-3, p 3-5

Calculated d= 359.1 ft - left
360 ft - right
Design d= 359.1 ft - left
360 ft - right

SSD's do not consider design for truck operations, since better visibility is considered to offset longer braking distance. §3.2.2, p 3-6

Location: 56th St. & Lincoln Dr., Paradise Valley

Intersection Sight Distances

Case B–Intersections with Stop Control on the Minor Road §9.5.3, p 9-36

Case B1–Left Turn from the Minor Road §9.5.3, p 9-36

Design Vehicle	Time Gap (t_g)	
Passenger Car	7.5 sec	Tbl 9-5, p 9-37
Single-Unit Tuck	9.5 sec	Tbl 9-5, p 9-37
Combination Truck	11.5 sec	Tbl 9-5, p 9-37
Time gap adjustments		
Add'l lanes to cross (1st is assumed)		
Passenger Car	0.5 sec	See Notes
Trucks	0.7 sec	below
Minor Approach Upgrade (Per each 1%>3%)	0.2 sec	Tbl 9-5, p 9-37
Site data		
Major Road + Bike Lanes on Left Approach	2.0	§9.5.3, p 9-37
Minor Road Approach Upgrade, if >3%	0 %	§9.5.3, p 9-37

Time Gap based on site data

Design Vehicle Gap+Adj for Approach Grade>3%+Adjs for Add'l Lanes & Median

Passenger Car	8.6 sec
Single-Unit Tuck	11.0 sec
Combination Truck	13.0 sec

ISD to left & right along Major Road $ISD=1.47V_{major}t_g$ (ft) Eq 9-1, p 9-37

			ISD to Left and Right	
Passenger Car	calculated	ISD=	568.9	ft
	design	ISD=	570	ft
Single-Unit Tuck	calculated	ISD=	730.3	ft
	design	ISD=	735	ft
Combination Truck	calculated	ISD=	862.6	ft
	design	ISD=	865	ft

Intersection Sight Distances (cont'd)

			AASHTO Ref
Case B2—Right Turn from the Minor Road			§9.5.3, p 9-40
&			
Case B3—Crossing Maneuver from the Minor Road			§9.5.3, p 9-43
Design Vehicle	Time Gap (t_g)		
Passenger Car	6.5 sec		Tbl 9-7, p 9-40
Single-Unit Tuck	8.5 sec		Tbl 9-7, p 9-40
Combination Truck	10.5 sec		Tbl 9-7, p 9-40
Time gap adjustments - Case B-3 Only*			
Add'l lanes to cross (1st is assumed)			
Passenger Car	0.5 sec		See Notes
Trucks	0.7 sec		below
Minor Approach Upgrade (Per each 1%>3%)	0.1 sec		Tbl 9-7, p 9-40
Site data			
Major Road + Bike Lanes on Left Approach	2.0		§9.5.3, p 9-40
Minor Road Approach Upgrade, if >3%	0 %		§9.5.3, p 9-40

Time Gap based on site data (sec)	B2 & B3	B3 Only
Design Vehicle Gap+Adj for Approach Grade>3%(+Adjs for Add'l Lanes & Median for B3)		
Passenger Car	7.6	8.1
Single-Unit Tuck	10.0	10.7
Combination Truck	12.0	12.7

ISD to left (B2/B3) & right (B3) along Major Rd $ISD=1.47V_{major}t_g$ (ft) Eq 9-1, p 9-37

			ISD to Left (B2 & B3)	ISD to right (B3 Only)
Passenger Car	calculated	ISD=	502.7	535.8
	design	ISD=	505	540
Single-Unit Tuck	calculated	ISD=	664.1	710.5
	design	ISD=	665	715
Combination Truck	calculated	ISD=	796.4	842.8
	design	ISD=	800	845

*Number of major road lanes is irrelevant in Case B2.

The differences between Case B1 and Cases B2 & B3 are reduced time gaps and time gap adjustment for the minor approach upgrade. §9.5.3, p 9-43

Intersection Sight Distances (cont'd)

			AASHTO Ref
Case F—Left Turns from the Major Road			§9.5.3, p 9-51
Design Vehicle	Time Gap (t_g)		
Passenger Car	5.5 sec		bl 9-13, p 9-51
Single-Unit Tuck	6.5 sec		bl 9-13, p 9-51
Combination Truck	7.5 sec		bl 9-13, p 9-51
Time gap adjustments			
Add'l lanes to cross (1 assumed)			
Passenger Car	0.5 sec		See Notes to
Trucks	0.7 sec		bl 9-13, p 9-51
Site data			
Opposing Lanes (adj'd for x-wide median)	2.2		
Time Gap based on site data			
Design Vehicle Gap+Adj for Add'l Opposing Lanes			
Passenger Car	6.6 sec		
Single-Unit Tuck	8.0 sec		
Combination Truck	9.0 sec		

ISD to front along Major Road $ISD=1.47V_{major}t_g$ (ft) Eq 9-1, p 9-37

Passenger Car	calculated	ISD=	436.6	ft
	design	ISD=	440	ft
Single-Unit Tuck	calculated	ISD=	531.8	ft
	design	ISD=	535	ft
Combination Truck	calculated	ISD=	598.0	ft
	design	ISD=	600	ft

The differences between Case F and Cases B1, B2 & B3 are reduced time gaps and no time gap adjustment for any minor approach upgrade. §9.5.3, p 9-43

SIGHT DISTANCE SUMMARY

Sight Distance Type	Governing Case	Car	SU Truck	Combo Truck
Stopping				
Without effect of grade		360	N/A	N/A
With effect of grade on left		360	N/A	N/A
With effect of grade on right		360	N/A	N/A
Intersection				
To Right	B1	570	735	865
To Left	B2/B3	505	665	800
On Major Road	F	440	535	600

B. Angle of Intersection

A right-angle intersection provides the shortest crossing distance for intersecting traffic streams. It also provides the most favorable condition for drivers to judge the relative position and speed of intersecting vehicles. Where special conditions exist, intersection angles may diverge from a right-angle by a maximum of 2 degrees (up to 4 degrees with approval of the Transportation Department) on arterial streets and major collector streets; and by a maximum of 4 degrees (up to 15 degrees with approval of the Transportation Department) on minor and local collector streets, couplets and local streets.

C. Alignment and Profile

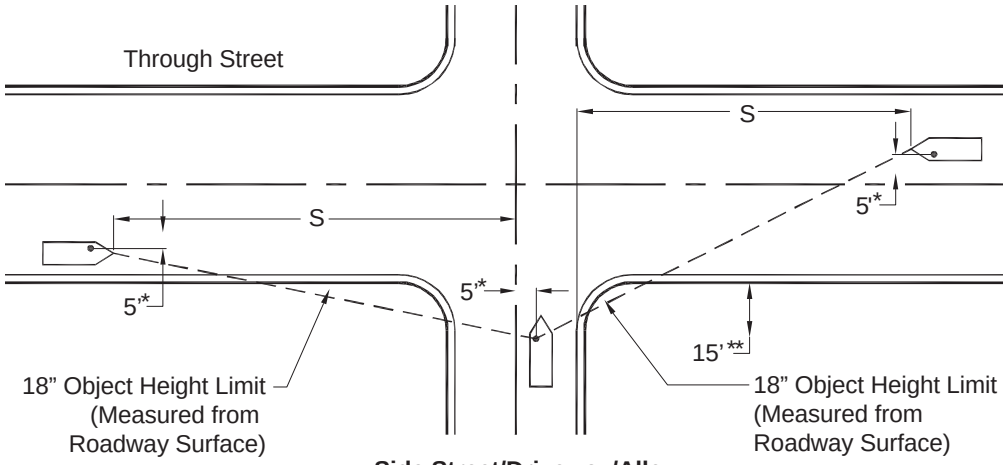
Intersections occurring on horizontal or crest vertical curves are undesirable. When there is latitude in the selection of intersection locations, vertical or horizontal curvature should be avoided. A line or grade change is frequently warranted when major intersections are involved. If a curve is unavoidable, it should be as flat as site conditions permit. Where the grade of the through roadway is steep, flattening through the intersection is desirable as a safety measure.

The maximum profile grade through an intersection is 6 percent for arterials and collector streets and 8 percent for local streets. The intersecting streets' profiles and cross slopes need to be coordinated with one another to ensure a safe and comfortable driving surface. Typically this may mean extending grades through the intersection for approximately 75 feet to 150 feet. Short vertical curves may be necessary in lieu of grade breaks.

D. Intersection and Driveway Sight Distance

In order to provide the opportunity for vehicles at an intersection to safely cross or make left or right turns onto a through street, **adequate sight distance must be provided**. Sight distance must also be provided for left turning traffic turning from the main street as described in AASHTO Intersection Sight Distance Case F. If opposing left turn lanes are present, the opposing left turns must be off-set in a positive way to allow for sight distance when opposing vehicles are present. See Figure 5.3-28 and Figure 5.3-29 for options. Sight distance should be based on the design speed for the roadway. Design speeds for new roadways should conform to those identified in Section 5-3.100 and Appendix 5-3A and Appendix 5-3B. Typically design speeds are 10 m.p.h. higher than the anticipated posted speed limit. The sight distance requirements outlined below are required for all private and public street intersections and at all intersections of driveways onto public or private streets. Internal driveway intersections on private property are excluded from these requirements.

Figure 5.3-26 depicts the technique used to determine the driver's eye location and an approaching vehicle; a line is then drawn to connect these 2 points. Continuous unobstructed line of sight must be provided along this line and throughout the approach to the intersection, providing an unobstructed sight triangle to the side street driver. Sight lines are to be drawn on roadway and landscaping plans to represent the areas that must be free of all objects and topography in excess of 18 inches above the roadway surface, however, certain vegetation will be allowed. Vegetation placed within the sight triangle will be of a low variety that remains below 18 inches when mature. Trees can be considered within the triangle as long as the canopies are above 8 feet, they are a single trunk variety, and they are not spaced in a configuration that creates a "picket fence" effect.



Side Street/Driveway/Alley
(Applies to stop controlled side street or all approaches to a signalized intersection for right-on-red traffic.

* 5 feet measured to nearest lane line or centerline.

**15 feet measured from face-of-curb or edge-of-travelway.

S = Intersection sight distance in feet on drivers left and right for right turns, left turns and through traffic. (See *2004 AASHTO Geometric Design of Highways and Streets* for additional sight distance requirements.)

*(*See Appendix 5-3A, Appendix 5-3B and Appendix 5-3C for distance S.*)*

FIGURE 5.3-26 INTERSECTION & DRIVEWAY DEPARTURE SIGHT DISTANCE REQUIREMENTS

1. Right-Angle Intersections

Right-angle intersections are those whose legs meet at an angle of 88 to 90 degrees. For these right-angle intersections the sight distances shown in Appendix 5-3A, Appendix 5-3B and Appendix 5-3C are to be used with Figure 5.3-26 to calculate the sight triangle. Appendices 5-3A and 5-3B present the intersection sight distances for all street classifications which were determined assuming passenger car traffic. Appendix 5-3C presents the sight distance requirements for varying roadway widths and design speeds for passenger cars, single unit trucks and combination trucks. If high volumes of truck traffic are anticipated, sight distances given in Appendix 5-3C will be used. Sight distances for vehicles turning left from the main street should also be considered and calculated based on the *AASHTO Geometric Design of Highways and Streets.*

2. Skewed Intersections

For skewed intersections where the intersection angles are less than 88 degrees, sight distances must be calculated in accordance with the procedures described in *AASHTO's Geometric Design of Highways and Streets.* Skewed intersection design must include appropriate design for pedestrian crossings and the location of curb ramps.

3. Intersections Within or Near a Curve

Sight distance measurements, identified as S in Figure 5.3-26, need to follow the curved street alignment when the intersection is within or near a horizontal curve.

4. Traffic Safety Triangles

Traffic Safety Triangles should be used as a means to limit the height of structures, vegetation and other improvements on corner properties immediately adjacent to intersections. **Safety triangles are not to be used as a substitute for intersection sight distance!** Safety triangles provide additional visibility around corners for all intersection approaches and should be applied to the design of perimeter walls and

space per pick-up window. queuing lengths shall be a linear measurement for the point of service. +18

d. All other drive-through facilities not addressed shall have a minimum of one hundred (100) linear feet of queuing space per bay or pick-up window. Queuing lengths shall be a linear measurement from the point of service. +18

e. Facilities providing multiple bays or points of service shall provide a minimum of two (2) approach lanes. +18

7. **Screening.** +18

a. *Residential districts.* Screening of parking is required in residential districts when the lot serves any use, except single-family units or a multi-family project of less than sixteen (16) units. A screen consisting of a solid wall or landscaping shall be required, detailed as follows: +18

(1) Along that portion of the perimeter of the parking area bounding or within side or rear yards, the wall shall not be less than four (4) feet nor more than six (6) feet in height. Landscaping, when matured, shall be a minimum of four (4) feet in height and shall be maintained in a living condition. +18

(2) Along that portion of the perimeter of the parking area bounding or within a front yard, the wall shall be three (3) feet in height. Landscaping shall, when matured, be a minimum of three (3) feet in height and shall be maintained in a living condition. +18

(3) All landscaping or wall construction adjacent to driveway entrances is not to exceed three (3) feet in height within a triangle measuring ten (10) feet in depth from the property line tapering to the property line twenty (20) feet on either side of the driveway. All landscaping and wall construction shall comply with the vision obscurement requirement of the Phoenix City Code. +18

(4) All required walls and landscaping shall be maintained in a neat and orderly condition. +18

(5) Landscaping as required in this Section shall provide at least continuous evergreen (broad leaf or conifer) shrubs or hedges in a planting area which shall be a minimum of three (3) feet in width. +18

b. *Non-residential districts.* Screening of the parking area is required in nonresidential districts, when the following conditions exist: The lot serves any use, except single-family units or a multi-family project of less than sixteen (16) units, and the lot adjoins a residential zoning district or is separated from a residential district by an alley, locale or collector street. A screen consisting of a solid wall or landscaping shall be required along the portions of the parking lot and drives which adjoin or are across the street or alley from the residential zoning district, detailed as follows: +18

(1) Along that portion of the perimeter of the parking area bounding or within interior, side or rear yards, the wall shall not be less then [than] four (4) feet nor more than six (6) feet in height. Landscaping, when matured, shall be a minimum of four (4) feet in height and shall be maintained in a living condition. +18

(2) Along that portion of the perimeter of the parking area bounding or within a street side or front yard, the wall shall be three (3) feet in height. Landscaping shall, when matured, be a minimum of three (3) feet in height and shall be maintained in a living condition. +18

(3) All landscaping or wall construction adjacent to driveway entrances is not to exceed three (3) feet in height within a triangle measuring ten (10) feet in depth from the property line tapering to the property line twenty (20) feet on either side of me [the] driveway. All landscaping and wall construction shall comply with the vision obscurement requirement of the Phoenix City Code. +18

(4) All required walls and landscaping shall be maintained in a neat and orderly condition. +18

(5) Landscaping as required in this section shall provide at least continuous evergreen (broad leaf or conifer) shrubs or hedges in a planting area which shall be a minimum of three (3) feet in width. +18

C. **Parking Requirements.** Off-street automobile parking space or area shall be provided according to the following table, except for large scale retail commercial uses (see Section 702.D). The parking ratios in the table identify the minimum level of parking required to serve that use and receive site plan approval. *18

Type of Land Use	**Parking Requirements**
+18 Art Gallery	1 space per 300 sq. ft.
+18 Art Studio	1 space per 500 sq. ft. or 1 per 1.5 employees
+12 Basketball and Volleyball Courts	9 spaces per court, 6 spaces per half-court
Batting Cages	1 space per 60 s.f. of batting area (area where batter is standing)
Billiard Parlors	1.5 spaces per table (3 feet around pool tables will not be counted for parking in bars & lounges)
Car Wash, Automated	1 space per 3 non-office employees and 1 space per 300 s.f. of office and sales area and 2 space per 24 feet of wash bay
Churches, Synagogues, Temples, or Other Places of Worship (See Public	1 space per 3 seats or 1 space per 58 lineal inches of pew space

31-13 Obstructing visibility at intersections.

(a) On all corner lots at public street intersections in any area zoned as residential there shall be no fence, wall, hedge or other landscaping higher than three feet, nor any obstruction to vision other than a post, column or tree not exceeding one foot in its greatest cross-sectional dimension between a height of three feet and a height of ten feet above the established grade of either street within that triangular area (unobstructed sight triangle) formed by the lot lines on the street side of such lot and a diagonal line joining points located at distances from the point of their intersection as enumerated in the following table:

SIZE OF UNOBSTRUCTED SIGHT TRIANGLE AT CORNER LOTS

Classification of Intersecting Public Streets*	Distance Measured Along Each Street (feet)
Local—Local	33
Local—Collector	33
Collector—Collector	33
Collector—Arterial	33
Arterial—Arterial	33
Arterial—Local	15 along local street 33 along arterial street

*As defined by the City of Phoenix Street Classification Map.

(b) At all public street intersections in all areas not zoned as residential, there shall be no landscaping higher than three feet, other than a post, column or tree not exceeding one foot in greatest cross-sectional dimension between a height of three feet and a height of ten feet above the established grade of either street within that triangular area (unobstructed sight triangle) formed by the lot lines on the street side of such lot and a diagonal line joining points on such lot lines located at distances from the point of their intersection as provided in subparagraph (a) above. These restrictions shall not apply to structures otherwise permitted by the Zoning Ordinance.

(c) At intersections where over-width right of way exists, the measurement for the unobstructed sight triangle at public street intersections shall be measured from a point seven feet from the back of curb. The unobstructed sight triangle shall be formed by two separate lines parallel to the street property lines, which are offset 7 feet from the back of the street curbs, and joined by a diagonal line connecting the two separate lines at the distance defined in the previous table, and as shown in Illustration 1 below. Over-width right-of-way is defined as the width or right-of-way that exceeds the amount required as shown on the street classification map.

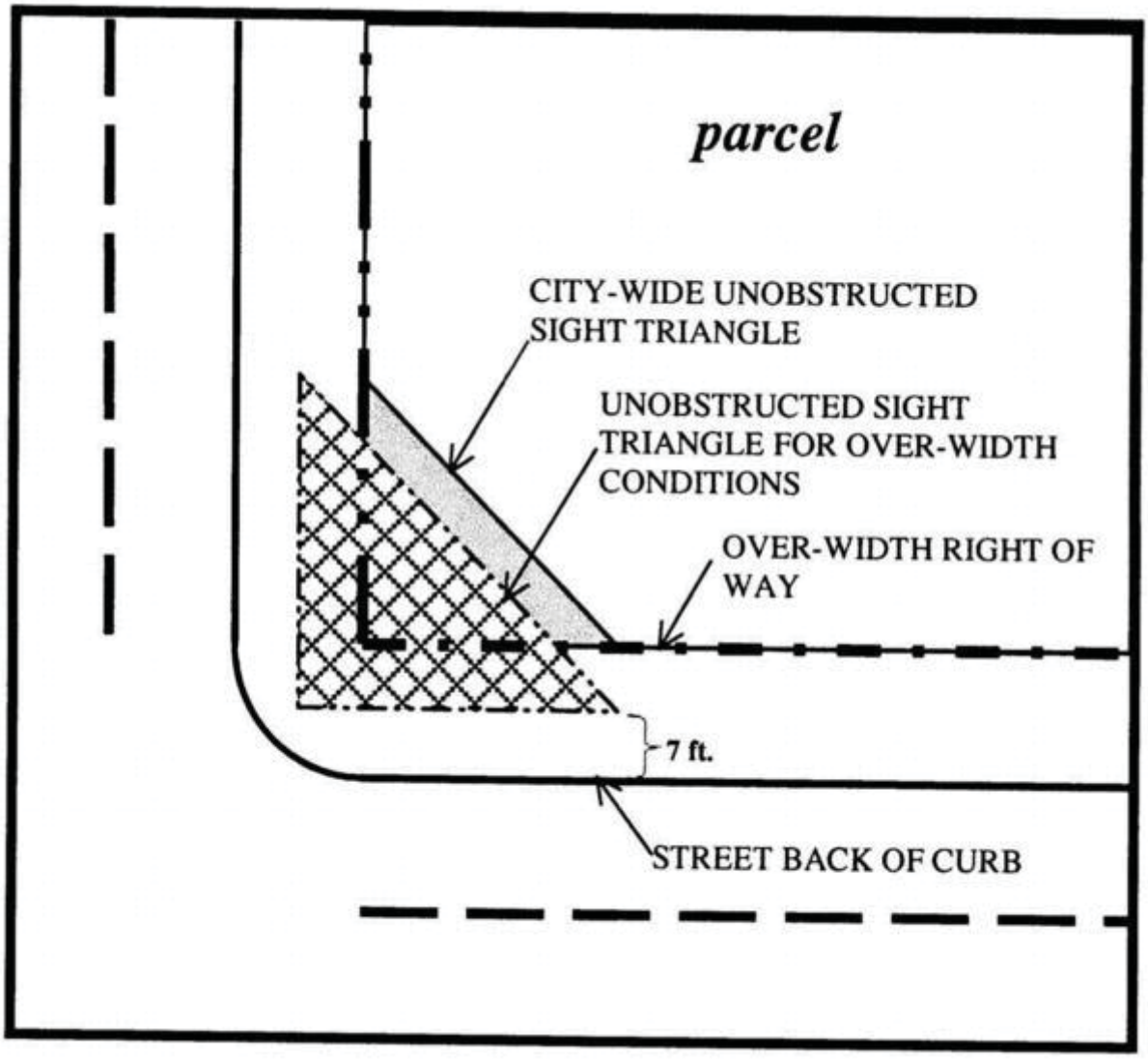


Illustration 1

(d) In the event of any violation of this section, and in addition to the penalty set forth in Section 1-5, Code of the City of Phoenix, the City, at the direction of the Street Transportation Director, is authorized, after giving the owner of the real property fourteen days' notice, to go upon said real property and to take any action reasonably necessary to effect full compliance with the provisions of this section, and a fee totaling twice the cost thereof shall be charged against the owner of said real property and shall be a lien against the property from which such obstruction is removed.

(e) The lien created by this section shall run with the land and the City, in its sole option, may record the lien with the County Recorder.

(f) Service of notice. Notice shall be served on the owner, lessee or person occupying such property by the City's authorized representative by personal service in a manner provided in Rule 4(d) of the Arizona Rules of Civil Procedure, or mailed to the owner, lessee or person occupying such property at his last known address or, if unknown, the address to which the tax bill for the property was last mailed. Such mailed notice shall be certified or registered mail. If the owner does not reside on such property, a duplicate notice shall also be sent to him at his last known address or, if unknown, the address to which the tax bill for the property was last mailed. For service of notice under this section the lessee and the occupant of the property shall each be deemed to be the agent of the owner.

(g) An owner, lessee or occupant (hereinafter referred to as appellant) who objects to the notice or to the amount of the charge may obtain a review by filing his objections in writing with the City Auditor Department within the time specified in the notice or no later than thirty days following the day upon which the first billing was mailed to him. The written objection shall include the following:

(1) Statement of the amount under protest;

(2) Statement of the reason why the notice or billing was incorrect and should be adjusted; and

(3) Request for a hearing if one is desired.

(h) The protest shall be assigned to and considered by a hearing officer permanently assigned to such position within the office of the City Auditor, or a person ("hearing officer") designated by the City Auditor. Such hearing officer or designee shall in no event be an employee of the Street Transportation Department.

If a hearing is not requested, a decision will be made on the protest based on the written evidence submitted.

(i) The hearing officer shall provide to the Street Transportation Department a copy of the appellant's protest and shall request from the Street Transportation Department a response to the issues raised. The Street Transportation Department shall submit to the hearing officer, and to the appellant, a written response to the hearing officer's request within thirty days of receipt of such request.

(j) Upon receiving a written request for an extension of time at any time prior to a deadline in this section, the hearing officer shall be empowered to grant extensions of time.

(k) A hearing, if requested, shall be scheduled as soon as practicable after the response in subsection (h) is submitted. The conduct of the hearing will be in accordance with rules and procedures established by the City Auditor. Hearings shall be conducted informally and the rules of evidence shall not apply, except that the decision of the hearing officer shall be made solely upon substantial and reliable evidence. The appellant shall have the opportunity to appear with witnesses and counsel to present information on behalf of the appellant. All expenses incurred in the hearing, including counsel fees, witness fees, mileage, reproduction of documents, and other similar costs, shall be borne by the party who incurred them.

(l) After the hearing on the matter, the hearing officer shall, within thirty calendar days, make a written determination on the evidence presented. The determination shall consist of findings of fact and the disposition of the dispute.

(m) The hearing officer shall be empowered to make a final decision as to the validity of the appellant's objection. If the hearing officer determines the appellant's objection to be valid, the officer shall be empowered to make an appropriate adjustment to the appellant's bill or notice. The determination of the hearing officer shall be final and conclusive between the City and the appellant as to the objection submitted for determination. If the hearing officer determines that an amount is due from the appellant to the City, the amount shall be immediately due and payable upon issuance of the written determination provided in subparagraph (k).

(Code 1962, § 35-10; Ord. No. G-2094, § 1; Ord. No. G-3077, § 1; Ord. No. G-3313, § 1; Ord. No. G-4736, § 1(Exh. A), adopted 9-7-2005, eff. 10-7-2005)

Cross reference—Trees and vegetation, ch. 34; zoning, ch. 41.