Report on Stop Sign Warrant Process

Summary

The City of Othello desires to document the decision making process when choosing to install stop signs as traffic control.

Consistency in the use of traffic control devices is the goal of the City of Othello so that similar situations are treated in a similar way. This approach will simplify the task of the road user because it aids in recognition and understanding. Consistency, or uniformity, also assists road users, law enforcement officers, and traffic courts by giving everyone the same interpretation of traffic control used.

This report provides warrants, or decision making criteria, for stop sign installations. It is anticipated to be used by the City for internal purposes, as well as application to private development.

Background

This document will assist The City of Othello in establishing a policy for the installation of stop signs.

The Manual of Uniform Traffic Control Devices (MUTCD) is a document produced by the Federal Highway Administration (FHWA). The MUTCD is accepted by the Federal government, State government, and often by Local governments as the primary guidance for traffic control.

The MUTCD should be the starting point for reviewing traffic control, such as stop signs.

Other tools to help in the review of traffic control is the use of engineering judgement, defined in the MUTCD as,

> The evaluation of available pertinent information, and the application of appropriate principles, provisions, and practices as contained in this Manual and other sources, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device. Engineering judgment shall be exercised by an engineer, or by an individual working under the supervision of an engineer, through the application of procedures and criteria established by the engineer. Documentation of engineering judgment is not required.

The use of engineering judgement should also include input from all available sources, including other City staff members and the community at large.

In chapters 1 and 2 of the MUTCD general comments regarding the uniform use of traffic control include,

● Traffic control devices should be placed and operated in a uniform and consistent manner.
● YIELD or STOP signs should not be used for speed control.
● Unnecessary traffic control devices should be removed.
● Uniformity of devices simplifies the task of the road user because it aids in recognition and understanding
● Uniformity assists road users, law enforcement officers, and traffic courts by giving everyone the same interpretation.
● Uniformity means treating similar situations in a similar way. A standard device used where it is not appropriate is as objectionable as a non-standard device; in fact, this might be worse, because such misuse might result in disrespect at those locations where the device is needed and appropriate.

Liability

The installation of a stop sign does not absolve the City from potential liability. The City is exposed to liability whether or not stop signs are installed at a particular intersection.

The primary purpose of stop signs is to control intersection right-of-way. The stop sign is a useful regulatory traffic control device that directs motorists to stop at all times before proceeding through an intersection.

A fully justified and properly installed stop sign can facilitate traffic movement, effectively assign right-of-way, reduce vehicle delay and decrease accidents. A stop sign is not a cure-all and is not a substitute for other potential traffic control devices.

Consistency With Current City Plans

This report is consistent with the City of Othello Comprehensive Plan as stated in Chapter 4, the Transportation chapter, where it refers to “Controlled intersections are minimized to prevent the interruption of traffic flow.” and “Controlled intersections are limited to arterials.”

Public Contact

Public comment is encouraged in the review of this document

Recommendation

It is recommended that this report be accepted by City staff as a management tool to be used when questions regarding stop signs come up. Alternative uses of this report could be to use it as a guideline, a City policy, or incorporated into the City design standards.

City of Othello Stop Sign Warrant Process

Intersection Control

Chapter 2B of the MUTCD addresses intersection control in the following way,

> State or local laws written in accordance with the "Uniform Vehicle Code" establish the right-of-way rule at intersections having no regulatory traffic control signs such that the driver of a vehicle approaching an intersection must yield the right-of-way to any vehicle or pedestrian already in the intersection.
>
> When two vehicles approach an intersection from different streets or highways at approximately the same time, the right-of-way rule requires the driver of the vehicle on the left to yield the right-of-way to the vehicle on the right.
>
> The right-of-way can be modified at through streets or highways by placing yield signs or stop signs on one or more approaches.

Engineering Study and Engineering Judgement

The MUTCD gives guidance on how to uniformly look at intersections and the use of traffic control.

If there are questions about how an intersection is functioning and if traffic control is needed a study will often be conducted. The study will usually include the following,

- Vehicular, bicycle, and pedestrian traffic volumes on all approaches
- Number and angle of approaches
- Approach speeds
- Sight distance available on each approach
- Reported crash experience
- Land uses adjacent to the intersection

An engineering study collects the data and details of a situation but, as previously described, engineering judgement is used to interpret and evaluate the data in relation to the MUTCD and other applicable codes that lead to a decision.

Intersection Visibility

Intersection visibility can have a significant impact on how an intersection functions. The MUTCD mentions that traffic control should be considered if,

> The ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop or yield in compliance with the normal right-of-way rule if such

stopping or yielding is necessary;

Appendix 1 is a proposed City of Othello standard for visibility at intersections and driveways to be used in the process of considering whether a stop sign should be installed.

All Way Stop Control

An all way stop is defined as a condition where all legs entering an intersection are stopped controlled. This can be in the form of a 3-way or 4-way stop.

Chapter 2B of the MUTCD addresses warrants, or decision criteria, from the MUTCD for an all way stop include,

> Where traffic control signals are justified.

This means that if a traffic signal is scheduled for the future an all way stop can be installed while waiting for that traffic signal.

> Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation.

This criteria shows the need for a consistent pattern of collisions. The clarification that such crashes should be subject to correction by an all way stop is important. If there are a number of collisions, but they are not of a type that an all way stop could correct, such as rear end, sideswipe, or DUI for example then the installation of an all way stop would not help that collision history.

> Minimum volumes:
> The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and
>
> The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours.

The criteria used here is specific to traffic volumes, especially conflicting traffic volumes, as well as other intersection users, like bicyclists and pedestrians. This highlights why traffic volumes are an important part of a study and if volumes are too low, there is a high likelihood that drivers will ignore stop signs.

Two Way Stop Control

For a typical intersection with 4 legs, two way stop control refers to adding stop signs to both approaches of one street while allowing the other street to run with no traffic

control.

This condition is most often seen at the intersection of an arterial and non-arterial street. Controlling the traffic on streets that intersect an arterial with stop signs is what gives the arterial street the right of way.

The installation of only two stops on the side streets adjacent to another street also have criteria as outlined in the MUTCD.

The criteria are similar to an all way stop, looking at traffic volumes and speeds, the ability of a driver to safely see to enter and intersection, and collision history.

If there is a documented need for assigning the right of way by stop signs a closer look should be considered for the intersection and the corridor. Is there a visibility issue that can be corrected? Is this corridor performing more like an arterial and should be considered for a street classification change?

Stopping traffic with a two way stop controls on residential streets is not encouraged. This practice assigns the right of way with traffic control when is it already addressed by the right of way rule, as identified in State regulations.

By assigning the right of way with stop signs on streets that do not need, or warrant, stop signs it can create other concerns like the poor habits of disobeying stop signs and speeding between stop signs to make up perceived lost time spend slowing down or stopping.

Community Guide

To address questions that the community may have regarding traffic control refer to **Appendix 2** for an examples of guidance documents that could be used as an informational piece to be shared with the community on a variety of platforms.

Local Alternative Approaches

Most cities have specific street classifications such as arterial streets and residential streets.

Arterial streets are designated to carry more traffic at higher speeds. Arterials have the right of way and residential streets intersecting with an arterial are stop controlled.

Intersections where two arterials intersect can be controlled by a traffic signal, all way stop, or if the arterial intersection has a major and a minor arterial, the minor arterial may be stop controlled.

While the use of stop controls is identified in the MUTCD, local jurisdictions can use their site specific knowledge and engineering judgement when reviewing the installation

of traffic control such as stop signs.

Alternative Examples

It is recognized that cities with small populations may not meet the criteria as established in the MUTCD for the installation of stop signs, but they may still have concerns about traffic control.

Factors such as proximity to a school, park, or other pedestrian generator may have an impact on the decision to install traffic control. Additional factors such as whether a sidewalk is present or if the street in question has an established bike route can also have an impact.

Traffic volumes in cities with lower populations may not realistically reach the thresholds found in the MUTCD.

As an **example**, lower volumes might be selected as decision criteria based on site specific conditions and engineering judgement. Many residential streets may begin to have issues when traffic volumes reaching a higher volume, such as 1,000 vehicles entering the intersection in a 24 hour period, for example.

Judgement should be used in these types of situations. Is the volume close to 1,000 entering vehicles but is the majority on one street rather than the other? If this is the case it may be prudent to review the current arterial designations and determine if the higher volume street is acting more like an arterial.

If the traffic volumes are approaching 1,000 entering vehicles but they are balanced between all legs, then an all way stop might be considered.

This is just an example for discussion purposes. Other factors should also be considered like visibility, collision history, and adjacent land uses for example.

Appendix 3 is a possible site inventory sheet to review a specific intersection.

APPENDIX 1

Clear Sight Triangle

General

These guidelines establish clear sight triangles around all intersections and driveways, which shall be kept clear of sight obstructions. The clear sight triangle is determined by the type of intersection control and the speed limit on the major road or street entered upon.

In cases involving grades greater than three (3) percent, number of lanes greater than two (2), skewed intersections, or for design vehicles other than passenger cars, the below sections shall be adjusted based on the sight distance procedures in the most current edition of A Policy on Geometric Design, AASHTO.

For sight triangle requirements as they relate to bicycle facilities, refer to the most current edition of A Guide for the Development of Bicycle Facilities, AASHTO.

Obstructions

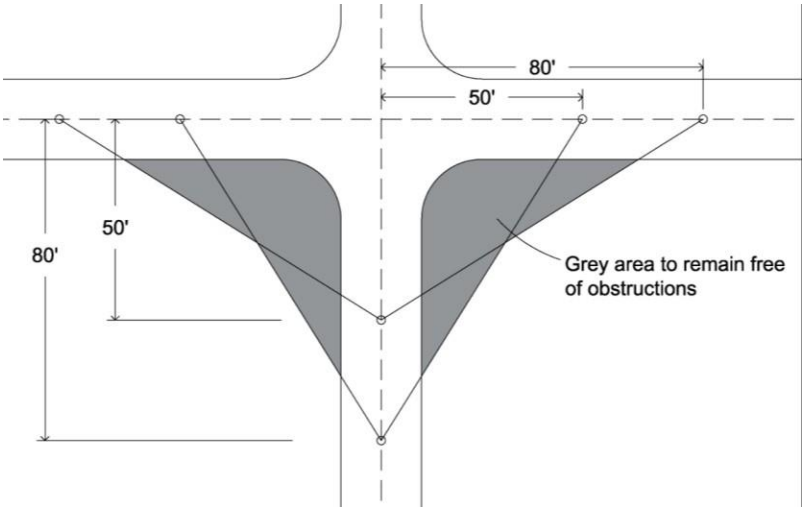
Unless specifically approved by the City, no structure, improvement, vegetation or other object between two and a half (2.5) feet and eight (8) feet above street grade may be within the clear sight triangle. The driver's eye height position shall be taken from a position three and a half (3.5) feet above pavement grade.

Clear Sight Triangle Dimensions – Intersections:

Uncontrolled Intersection

For intersections with no traffic control on any approach the clear sight triangle for vehicles shall be defined as shown in Figure 1.

Figure 1. Sight Triangles for Uncontrolled or Yield Controlled Intersections



Stop Control on Minor Street

For intersections with stop control on the minor street only, the clear sight triangle for vehicles shall be defined as shown in Figure 2 and Table 1. For stop control intersections the decision point shall be ten (10) feet back from the edge of the traveled way. The minimum required sight distance is the Stopping Sight Distance for the major roadway, shown in Table 1 below.

The traveled way is the portion of the road intended for the movement of vehicles and bicycles exclusive of shoulders, turn lanes, and on street parking.

Figure 2. Departure Sight Triangles for Stop Control on Minor Street

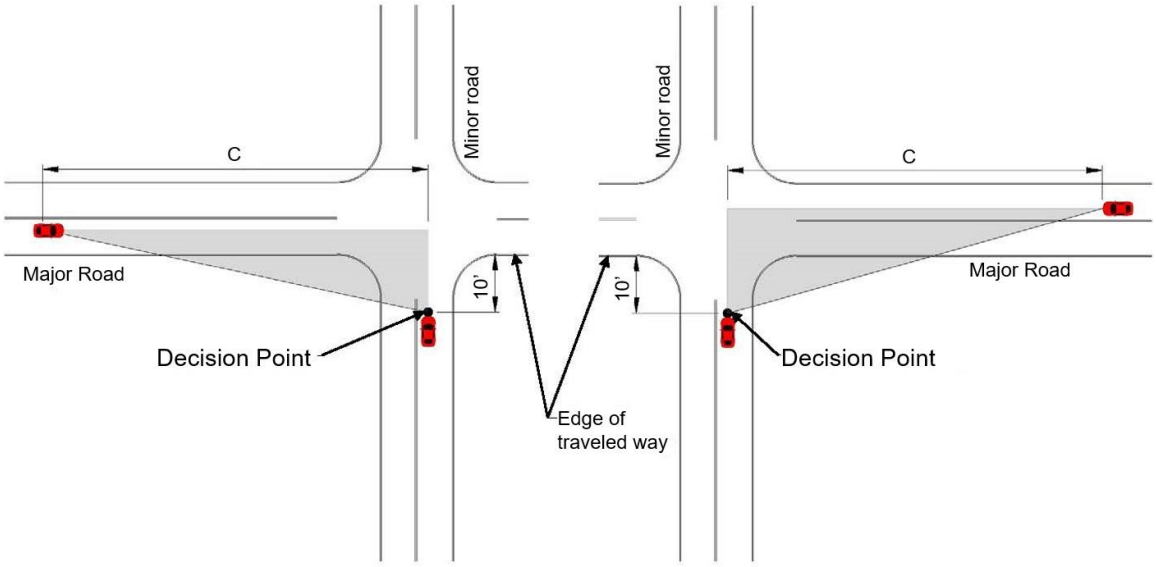


Table 1. Sight Distance for Stop Control on Minor Street

Posted Speed Limit (mph) on Major Road	Recommended C (ft) *Desirable*	Required C (ft) *Minimum**
25	280	145
30	335	180
35	390	220
40	445	260

*Minimum shall only be used to evaluate existing conditions or when Desirable cannot be obtained.

Signalized Intersection

At signalized intersections, the first vehicle stopped on one approach shall be visible to the driver of the first vehicle or bicycle stopped on each of the other approaches. The first stopped vehicle on one approach shall also be able to see pedestrians within the legal crosswalk on all of the approaches. Left-turning vehicles shall have sufficient sight distance to select gaps in oncoming traffic and complete left turns. For sight lines to traffic signal displays, refer to WSDOT Design Manual Chapter 1330. For right turn on red movements, criteria for stop control on minor streets (Figure 2 and Table 1) shall apply.

All-Way Stop Intersection:

At intersections with all-way stop control, the first stopped vehicle on one approach shall be visible to the drivers of the first stopped vehicles or bicycles on each of the other approaches. The first stopped vehicle on one approach shall also be able to see pedestrians within the legal crosswalk on all of the approaches.

Clear Sight Triangle Dimensions – Driveways

Driveways not controlled by traffic signals operate like intersections with stop control on the minor approach. The applicable sight distance triangles for vehicles and pedestrians are shown in Figure 3 and Table 2.

Figure 3. Driveway Sight Triangles

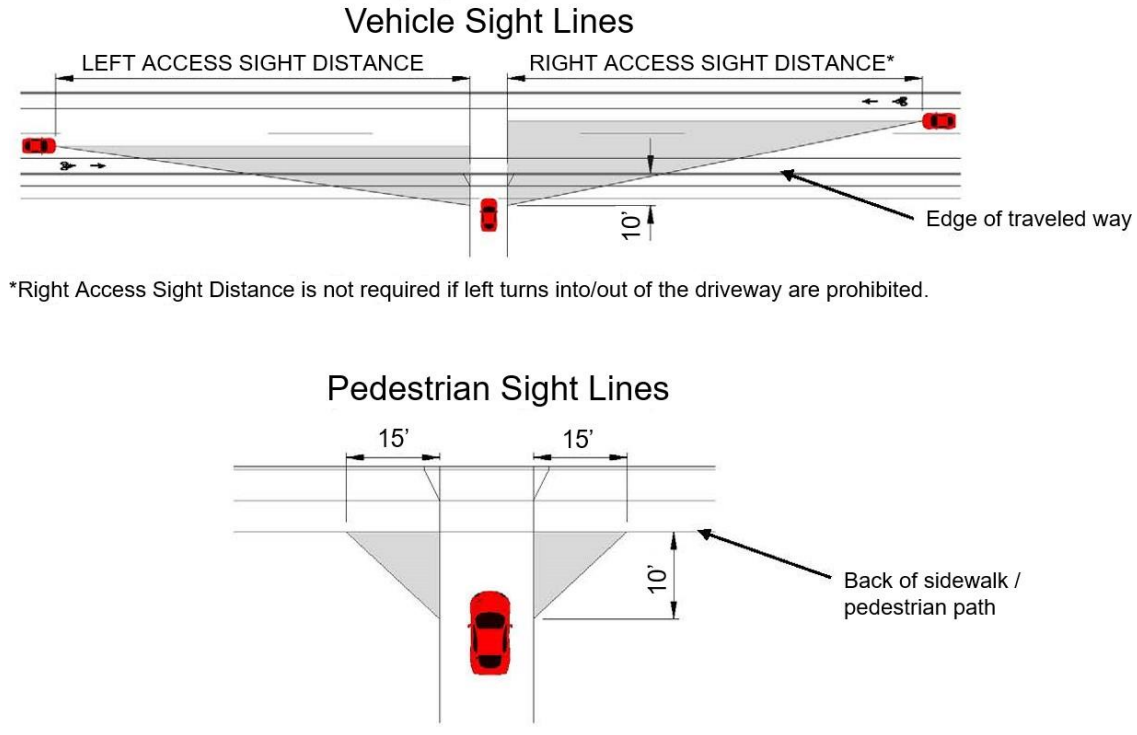


Table 2. Clear Sight Distance for Driveways

Major Road Volume (ADT)	Major Road Speed Limit (MPH)	Access Sight Distance (ft) *Desireable*	Access Sight Distance (ft) *Minimum**
<6000	25	155	155
	30	200	200
	35	250	250
>6000	25	280	155
	30	335	200
	35	390	250
	40	445	305

*Minimum shall only be used when Desirable cannot be obtained.

Pedestrian Sight Distance

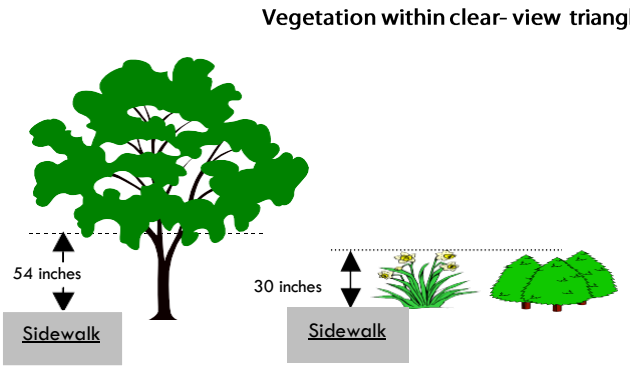
The minimum sight distance for pedestrian safety shall be determined as follows: the driver of an existing vehicle shall be able to view a one (1) foot high object 15 feet from either edge of the exit lane at the driveway throat when the driver's eye is ten (10) feet behind the back of the pedestrian walkway.

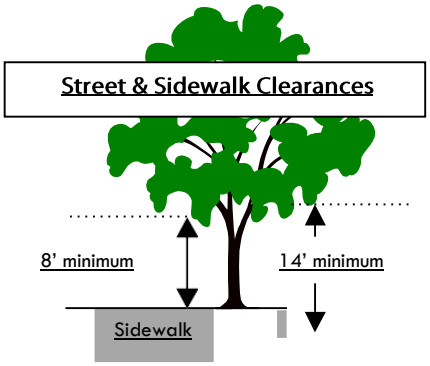
The minimum sight distance shall be maintained at all driveways, buildings, and garage entrances where structures, wing walls, etc., are located adjacent to or in close proximity to a pedestrian walkway.

A Clear View: Vegetation & Traffic Safety

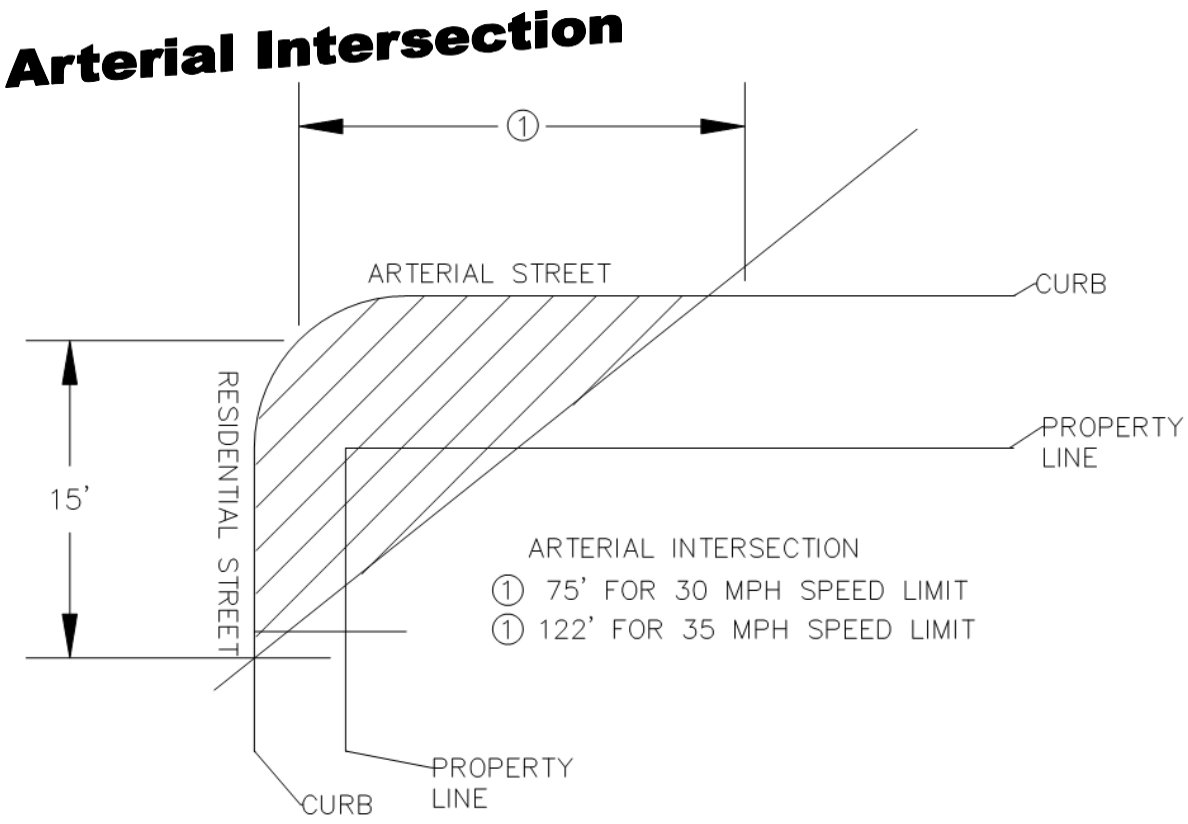
A way To Make Our Streets Safer:

Overgrown vegetation impedes the safe flow of traffic when it blocks our view of traffic signs, pedestrians and other vehicles. If vegetation is blocking visibility in the street or an intersection, it is your responsibility as the adjacent property owner or resident to trim the vegetation.

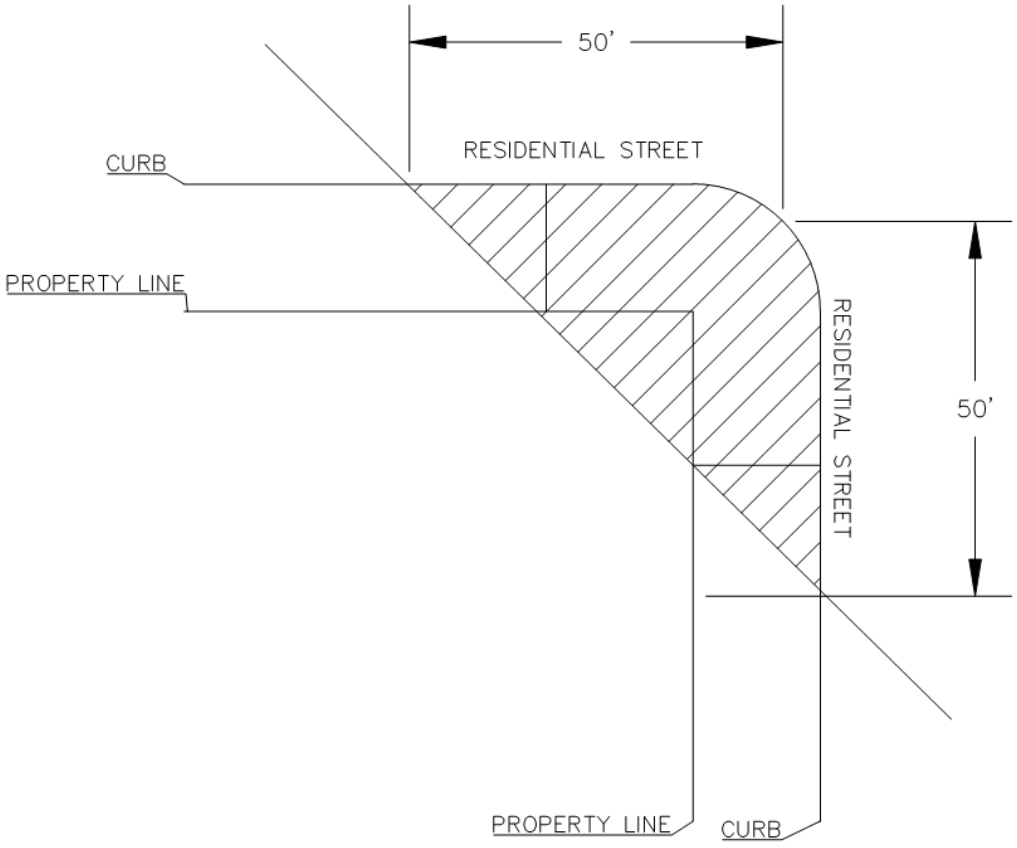




Types of Intersections (Diagonal Lines = Clear View Triangle):



Residential Intersection



Visibility Standards:

	Description of Existing Vegetation	Vegetation Requirements
1.	Shrubs/Hedge/Plants existing in Clear Triangle.	Trim Shrubs/Hedge/Plants to 30 inches in Height measured from top of curb.
2.	Tree branches and any vegetation overhanging in Clear Triangle (no sidewalk).	Remove all tree limbs/vegetation existing from ground level to minimum height of 54 inches.
3.	Tree branches and any vegetation overhanging sidewalk (in and outside Clear Triangle).	Remove all branches/vegetation existing from sidewalk level to minimum height of 8 feet.
4.	Tree branches and any vegetation overhanging street (in and outside Clear Triangle).	Remove all branches/vegetation existing from street level to a minimum height of 14 feet.

APPENDIX 2

TRAFFIC QUESTIONS

WHY CAN'T WE HAVE AN ALL-WAY STOP TO REDUCE ACCIDENTS?

All-Way or four-way stop signs are not always the answer to reducing intersection crashes. Crash analysis can be complex and usually identifies multiple causes to a crash. Stop signs that are not warranted can be seen by drivers as unnecessary and many times the drivers become impatient. Impatient drivers may cause crashes.

All-way stops are necessary in many instances, where traffic volumes are high and approximately equal, or where there is a history of crashes that can be corrected by an all -way stop. Before an all-way stop is installed the intersection should be studied and other alternative traffic control or options should be considered first.

For Your Information – What Is Required For The Installation Of An All-Way Stop?

Three warrants have been developed and are listed in the Manual on Uniform Traffic Control Devices (MUTCD). An all-way stop may be warranted at an intersection if any of the following conditions exist:

1. Traffic signals are warranted and urgently needed, and the multiway stop signs are an interim measure.

2. A crash problem, as indicated by five or more reported accidents of a type susceptible to correction by a multiway stop installation in a 12-month period.

3. Minimum traffic volumes.

(a) The total vehicular volume entering the intersection from all approaches must average at least 300 vehicles per hour for any eight hours of an average day; and

(b) the combined vehicular and pedestrian volume from the minor street or highway must average at least 200 units per hour for the same eight hours, with an average delay to minor street vehicular traffic of at least 30 seconds per vehicle during the maximum hour.

An all-way stop installation should only be used when traffic volumes on the intersecting roadways are approximately equal.

TRAFFIC QUESTIONS

WHAT CAN WE DO INSTEAD OF INSTALLING A NEW STOP SIGN?

There are many alternatives to stop signs. For example, a concept called traffic calming, the combination of physical controls and community support, might be a good alternative for some communities.

Calming measures can be installed as part of an area wide traffic management plan or on a single street and involve local law enforcement, emergency, and maintenance officials, engineers, and the community.

Some communities also start neighborhood awareness programs to address the problem of the speeding and safety in their neighborhood areas. Often times, the true problem stems mostly from drivers that live in the neighborhood. By simply raising awareness of the issue, drivers in the neighborhood may adjust their driving and decrease their speeds.

Other measures to consider before installing a stop sign include,

● Improving intersection visibility
● Adding streetlights for better nighttime visibility
● Limiting parking close to the intersection if that is a contributing factor to the intersection problems
● Adding mobile or permanent speed feedback signs to help educate drivers on their speed.

While it may be challenging to consider, there is no definitive solution to the problem of speeding traffic. There will always be drivers that speed through residential areas. It is important for residents in a neighborhood to be aware of this issue.

TRAFFIC QUESTIONS

CAN STOP SIGNS CONTROL SPEED?

Many studies have shown that stop signs are not an effective measure for controlling or reducing midblock speeds. In fact, the overuse of stop signs may cause drivers to carelessly stop at the stop signs that are installed.

In stop sign observance studies approximately half of all motorists came to a rolling stop and 25 percent did not stop at all.

Stop signs can give pedestrians a false sense of safety if it is assumed that all vehicles will come to a complete stop at the proper location.

One study showed that placing stop signs along a street may actually increase the peak speed of vehicles, because motorists tend to increase their speed between stop signs to regain the time spent at the stop signs.

TRAFFIC QUESTIONS

WHY CAN'T WE HAVE STOP SIGNS TO REDUCE SPEEDING ALONG MY STREET?

One of the complaints that people have in residential areas is that vehicles speed by the front of their house. They are concerned about the safety of their children. These residents frequently request the erection of additional stop signs. The addition of a stop sign, however, usually does not solve the problem.

A stop sign that is not warranted due to low traffic volumes in residential areas is seen by motorists as not needed. They will often roll through, or not even stop, at a stop signs that is not warranted. Drivers will also feel they need to make up for the time that they had to slow or stop for the stop sign and increase their speed as they leave the stop. This is why the Manual on Uniform Traffic Control Devices (MUTCD) does not support the use of stop signs for speed control.

Because of this, stop signs should only be placed if they meet the MUTCD warrants. Stop signs are frequently violated if unwarranted. Before warrants are even considered, however, less restrictive measures (such as a yield sign) are usually considered. In certain cases, the use of less restrictive measure or no control at all will accommodate traffic demands safely and effectively.

Warrants for a stop sign

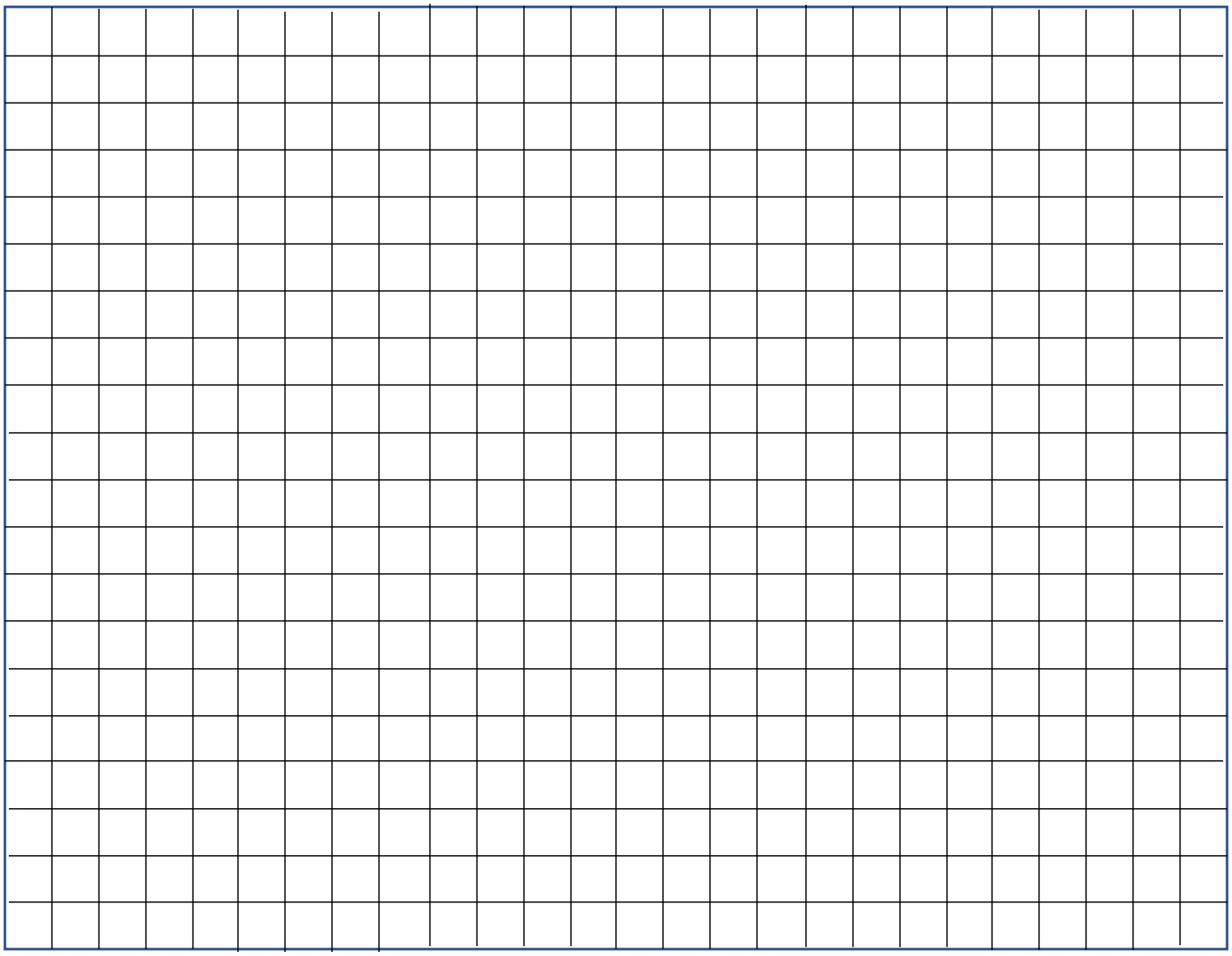
Because a stop sign does create delay to through traffic, it should be used only where needed. A stop sign may be warranted at an intersection where one or more of the following conditions exist:

● Intersection of a less important road with a main road where application of the regular right-of- way rule is hazardous;
● Street entering a through highway or street;
● Unsignalized intersection in a signalized area;
● Other intersections where a combination of high speed, restricted view, and serious accident record indicates a need for control by the stop sign.

APPENDIX 3

Intersection: **Date:**

Field Inventory Sheet



Identify

☐ Visibility Issue(s) and Location: _____

_____

☐Sidewalks

☐Bike Route

☐School

☐Park

☐Community Center

☐Other Pedestrian Generator: _____

Data

☐1,000 vehicles entering the intersection in 24 hours

☐2 or more injury collisions of a type preventable by a stop sign

☐Traffic volumes from all legs of the intersection are approximately equal

☐Other mitigations attempted before the consideration of a stop sign

Notes: