CEDS TRAFFIC EVALUATION PROCEDURES

For a detailed description of how to prevent growth from increasing traffic congestion and accidents visit the CEDS webpage *Traffic, Development & Neighborhood Quality of Life* (ceds.org/traffic.html). The purpose of the research described in these procedures is to gather the data needed to determine if a proposed development project will cause excessive traffic congestion or jeopardize safety. These procedures also make it possible to verify the data contained in traffic impact studies for proposed development projects. If you find discrepancies between your findings and that presented in a traffic study, then treat them as tentative. Traffic engineering is a complex field and the indicators given in these procedures are not universal much less infallible. If you believe a discrepancy exists then contact CEDS at 410-654-3021 or Help@ceds.org.

These procedures cover:

- Degree of delay at stop signs and signalized intersections,
- Traffic volume, and
- Sight-distance *(ability to see approaching vehicles)*.

THINGS YOU'LL NEED

- Brightly colored safety vest,
- A stop watch or a cell phone with an app that includes a timer,
- A clipboard and pen for each person, and
- Data forms which you'll find at the end of these procedures.

BEST TIME TO GATHER TRAFFIC DATA

If you have folks gathering data at different locations then they should do so at the same time. The optimum time and conditions are:

- During the morning rush-hour period which usually occurs between 7:00 and 9:00 am,
- On a weekday,
- Avoid holidays,
- Weather is clear, and
- On a school day. If schools are not in session and you need an initial set of data now then do the counts when the first four conditions are met.

SPECIFICS LOCATIONS FROM WHICH TO GATHER DATA

Data gathering should begin at locations directly affected by the proposed development project. These locations are usually:

- the roads which will first receive traffic coming from the proposed development site,
- the first intersections along the road(s) directly affected by the project, and
- the first signalized intersection along the directly affected road.

It's usually easiest and safest to do the counts while sitting in a car. But be certain that you park at a point:

- That is safe;
- Does not obstruct the view of drivers,
- Does not impede traffic; and
- You can clearly see vehicles traveling on the affected roads.

It's OK to have two or more people in the same vehicle provided all can see the location each is monitoring. ***Always wear a brightly colored safety vest when outside a vehicle and anywhere near travel lanes.***

TRAFFIC COUNT PROCEDURES

The purpose of these procedures is to verify the existing traffic volumes shown in a traffic impact study. A form for recording traffic counts will be found at the end of these procedures.

1. Begin the count at least a half-hour before you anticipate the maximum volume of traffic. In most locations peak-traffic occurs between 7:00 and 9:00 am then from 4:00 to 7:00 pm.

2. Make counts in 15-minute increments. If you begin at 7:00 AM then count the number of vehicles traveling the road from 7:00 to 7:15 AM. Begin the count again for the period of 7:16 to 7:30 AM, and so forth.

3. As shown in the example to the right, use hatch marks to record each vehicle. At the end of each 15-minute period record the total hatch marks as shown to the right.

4. When the counts are completed determine the peak-hour traffic volume for each movement. This is the four consecutive 15-minute periods with the highest total traffic volume. For example, the data for *Left onto*

CEDS TRAFFIC COUNT DATA FORM

Date: 10 June 2016 Weather: Clear Street/Road: Liter Drive

Name of Data Gatherer	Phone Number	Email Address
Richard Klein	4106543021	Rklein@ceds.org

From	To	For each of these three columns note the traffic movement being recorded					
		Left onto MD99		Right onto MD99		From MD99 to Liter Drive	
7:00	7:15	𝍸 I	6	III	3		
7:16	7:30	𝍸 III	8	𝍸	5		
7:31	7:45	𝍸 II	7	𝍸 I	7	I	1
7:46	8:00	𝍸 𝍸	10	𝍸 IIII	9	II	2
8:01	8:15	𝍸 𝍸 III	13	𝍸 𝍸 IIII	14		
8:16	8:30	𝍸 𝍸 I	11	𝍸 II	7		
8:31	8:45	𝍸 III	8	𝍸	5		
8:46	9:00	𝍸	5	III	3		
	Total		68		53		3

MD99 above, the peak-hour occurred from 7:46 to 8:45. For *Right onto MD99* the peak-hour was 7:31 to 8:30.

5. Compare the peak-hour volume from your counts with those given in the traffic impact study. This comparison should be made for each lane of each road included in both your counts and the study. If the counts given in the traffic study differs significantly from that you measured then cause for concern may exist. Contact CEDS at 410-654-3021 or Help@ceds.org to discuss next steps.

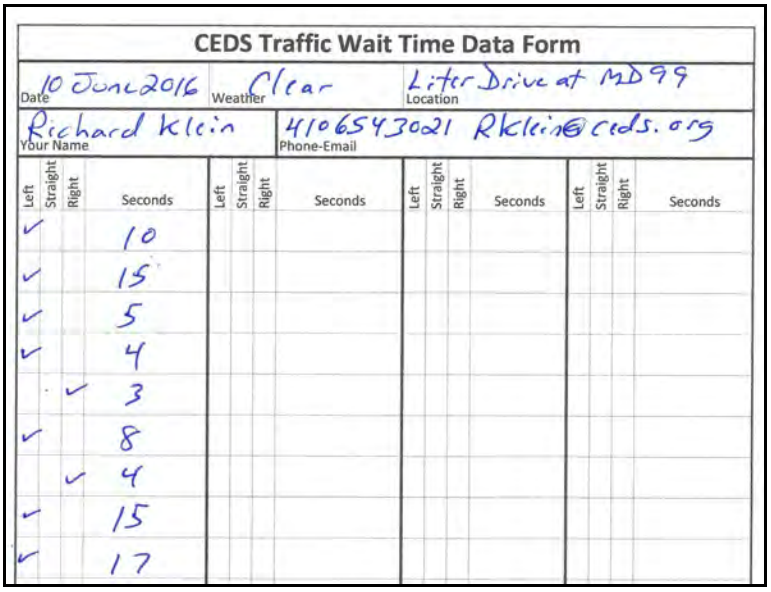
STOP SIGN WAIT TIME PROCEDURES

The purpose of these procedures is to determine how long drivers must wait at a stop sign before being able to safely proceed. Delay is generally considered excessive if it ***averages*** 30 seconds or more at peak-hour. A form for recording wait times will be found at the end of these procedures.

1. Start your stopwatch or a cell-phone timer app, as soon as a vehicle comes to a stop.

2. Record the number of seconds that elapse before the driver accelerates to turn or go straight. Rolling stops can be difficult so measure the seconds between the moment a vehicle reaches a stop sign then accelerates to turn.

3. Place a check mark in the appropriate column to show whether the vehicle turned left, right or went straight.



CEDS Traffic Wait Time Data Form

Date: 10 June 2016 | Weather: Clear | Location: Liter Drive at MD99

Your Name: Richard Klein | Phone-Email: 4106543021 RKlein@ceds.org

Left	Straight	Right	Seconds	Left	Straight	Right	Seconds	Left	Straight	Right	Seconds	Left	Straight	Right	Seconds
✓			10												
✓			15												
✓			5												
✓			4												
	✓		3												
✓			8												
	✓		4												
✓			15												
✓			17												

In the example above the average delay is 9 seconds, well below the 30 second threshold. If the average seconds of delay given in the traffic study differs significantly from that you measured then cause for concern may exist. Contact CEDS at 410-654-3021 or Help@ceds.org to discuss next steps.

LEVEL OF SERVICE & SIGNALIZED INTERSECTION DELAY

Intersections with traffic signals and road segments are rated on a scale of A to F with regard to congestion. This system is known as *Level Of Service* or LOS. Most roads operate at a congestion-free "A" LOS during the wee hours of the morning. But LOS is based upon conditions during the morning (7:00 - 9:00 am) and evening (4:00 - 7:00 pm) peak-hours (a.k.a.

rush-hours). An LOS of "E" and "F" is generally considered unacceptable. In fact an "F" LOS is gridlock.

If it usually takes more than one green cycle to get through a signalized intersection during peak-hour then existing traffic volume may be causing excessive delay. If this is the case then the Level of Service is probably D, E or F. If the traffic study states that LOS is A to C then it may be based on erroneous data or calculations. Contact CEDS at 410-654-3021 or Help@ceds.org to discuss next steps.

SIGHT-DISTANCE

The phrase *sight-distance* refers to how far ahead a driver can see a stopped or approaching vehicle. For example, while sitting at a stop sign you should be able to see a car approaching from the left or right about ten seconds before they arrive at your location. This allows sufficient time for you to turn onto the road without forcing the driver of the approaching vehicle to brake excessively.

Sight distance increases with the speed of approaching vehicles. Generally you need about 11 feet of sight distance for every mile of posted speed limit plus 10. If the posted speed limit is 40 miles per hour then you must be able to see approaching vehicles when they are (40 mph + 10 = 50 x 11 =) 550 feet distant. For proposed intersections sight distance should be measured at the point where a driver would be stopped with your eye about 3.5 feet above the ground surface. If a hill, vegetation or other objects block sight-distance then the developer usually has the option of removing the obstruction provided it is on their land or they can get the landowners permission.

Stand at each proposed intersection and count the number of seconds that elapses from the time you can first see approaching vehicles until they arrive at your location. Do this for vehicles approaching from the left and right. If it takes at least ten seconds for most vehicles to reach you then sight-distance is probably okay.

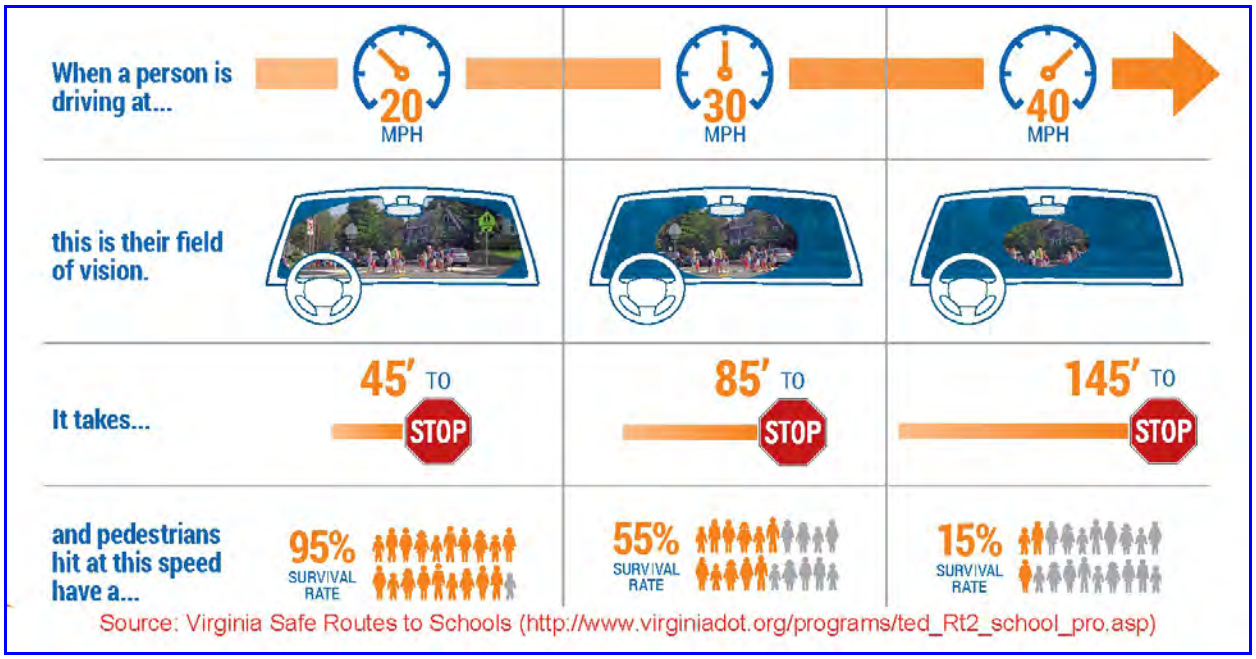
If not then see if this apparent sight-distance deficiency is noted in the traffic impact study. If it is then does the study recommend solutions? Contact CEDS at 410-654-3021 or Help@ceds.org to discuss next steps.

TRIP GENERATION

This phrase refers to the amount of traffic a proposed development project will generate. The Institute of Transportation Engineers publishes the primary reference on this topic: Trip Generation. This expensive tome contains trip generation rates for a large number of land uses. A table giving rates for common land uses can be found at: Common Trip Generation Rates. Compare the trip generation rate given in the traffic impact study with those in this table. If the rates different significantly then contact CEDS at 410-654-3021 or Help@ceds.org to discuss next steps.

SPEED STUDY

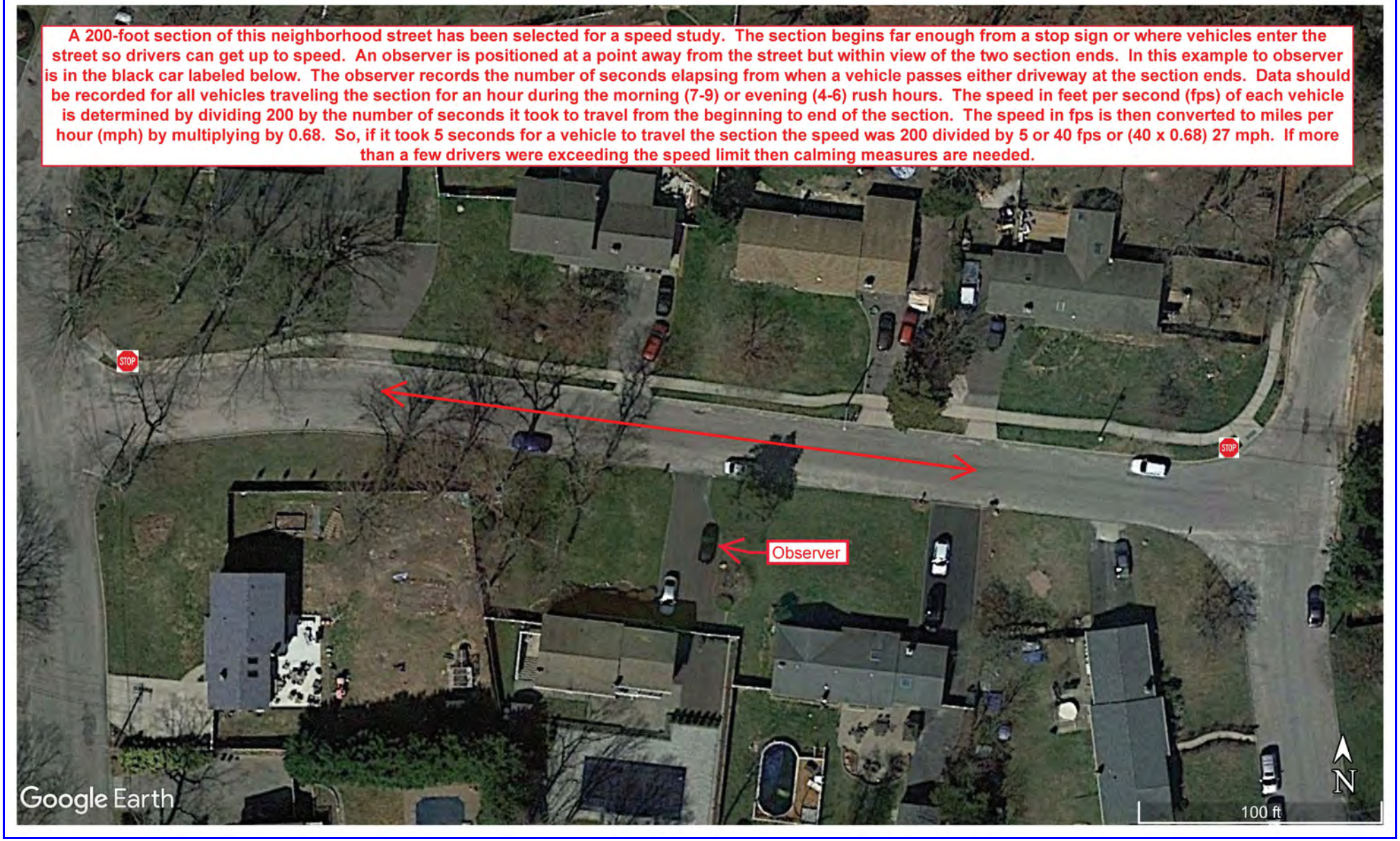
As illustrated below increasing traffic speed leads to a rise in the likelihood of an accident and serious injury.



A number of jurisdictions around the country are now setting neighborhood posted speed limits at 25 Miles Per Hour (mph) or lower. There are three basic options for gathering data on the speed at which vehicles travel a neighborhood street:

- Automatic counters,
- Radar guns,
- Traffic speed apps, and
- Manual counts.

While automatic counters are the most accurate they are also the most expensive since installation by a traffic engineer or other trained professional is required. Radar guns are cheaper but have the drawback of causing drivers to slow when they see someone pointing an object at them. A similar problem arises with phone apps that can measure vehicle speed though if you are standing near a street and appear to be viewing something on your phone there may be less of an effect on speed. Fortunately there's an inexpensive, low-tech alternative that will produce accurate speed data. Find a street section that's several hundred feet long. The section should begin and end at fixed points that you can see from a point away from the street. If drivers can see you watching them then they may slow down. The section should be far enough from stop signs, connecting streets, etc. that drivers can get up to speed by the time the section is entered. See the illustration on the next page for further advice. A form to record speed is at the end of this document.


A 200-foot section of this neighborhood street has been selected for a speed study. The section begins far enough from a stop sign or where vehicles enter the street so drivers can get up to speed. An observer is positioned at a point away from the street but within view of the two section ends. In this example to observer is in the black car labeled below. The observer records the number of seconds elapsing from when a vehicle passes either driveway at the section ends. Data should be recorded for all vehicles traveling the section for an hour during the morning (7-9) or evening (4-6) rush hours. The speed in feet per second (fps) of each vehicle is determined by dividing 200 by the number of seconds it took to travel from the beginning to end of the section. The speed in fps is then converted to miles per hour (mph) by multiplying by 0.68. So, if it took 5 seconds for a vehicle to travel the section the speed was 200 divided by 5 or 40 fps or (40 x 0.68) 27 mph. If more than a few drivers were exceeding the speed limit then calming measures are needed.
STOP
STOP
Observer
Google Earth
N
100 ft

CEDS TRAFFIC COUNT DATA FORM

Date:_____ Weather:_____ Street/Road:_____

Name of Data Gatherer	Phone Number	Email Address

From	To	For each of these three columns note the traffic movement being recorded		
7:00	7:15			
7:16	7:30			
7:31	7:45			
7:46	8:00			
8:01	8:15			
8:16	8:30			
8:31	8:45			
8:46	9:00			
Total				

CEDS Traffic Wait Time Data Form

Date	Weather	Location
Your Name	Phone-Email	

Left	Straight	Right	Seconds	Left	Straight	Right	Seconds	Left	Straight	Right	Seconds	Left	Straight	Right	Seconds

CEDS SPEED STUDY DATA FORM

Street Name:____

Section Start Point:____

Section End Point:____

Section Length (feet):__________ Date:____________ Start Time:___________ End Time:____________

Average Speed (mph):_________ Fastest Speed (mph):___________ Slowest Speed (mph):_____________

Observer:______________________ Phone:_____________ Email:____________________________

Seconds	Feet/Second	x 0.68	Miles/Hour		Seconds	Feet/Second	x 0.68	Miles/Hour