Anne Arundel County Traffic Engineering Division
Neighborhood Traffic Control Guidelines

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PURPOSE: Residents throughout Anne Arundel County, as well as those in neighboring jurisdictions, are often concerned about what they perceive as undesirable high travel speeds in residential areas. This speeding contributes to a sense of uneasiness and in many cases presents unnecessary hazards to residents, pedestrians, and motorists. Although Police Department enforcement may be temporarily effective in lowering speeds somewhat, our experience indicates that longer term solutions require changing the behavior of motorists. This may be done by effectively reminding drivers to slow down, changing travel patterns, or instituting physical changes which limit the speed at which a motorist may comfortably drive.

These guidelines are intended to provide a general overview of the process which Anne Arundel County uses to address traffic concerns in residential areas. They are not rules and regulations of the Director of Public Works. These Guidelines will be revised and fined-tuned in the future as additional experience is gained.

COUNTY AUTHORITY: These guidelines apply only to roadways which are owned and maintained by Anne Arundel County. In all such cases, the County has and retains the authority and responsibility to determine what changes to the roadway and/or traffic control, if any, are appropriate [County Code, Article 13, Sections 2-101(a) and 2-301]. Safety concerns and sound engineering judgement shall take precedence in all decisions. Nothing in these guidelines shall compel or constrain the County to take or not take an action against its better judgment. The Traffic Engineering Division (Traffic Engineering) of the Department of Public Works has primary responsibility for the County's neighborhood traffic control efforts.

PROCESS: The process of working with a community is as important as the actual plans which arise from the process. Communities which feel that their concerns have not been adequately addressed may oppose plans even though they are demonstrably beneficial. Failure to correctly define and document problems may lead to recommendations that do not address the actual cause of concern.

Traffic Engineering will address any concern (within its area of responsibility) in a professional and timely manner. In most cases, other than routine repairs and slight modifications to traffic controls, it is helpful to deal with representatives of all groups and individuals who are affected by the problem or who may be impacted by proposed solutions. By the same token, large public meetings do not allow for effective communication and discussion. When individual citizens contact Traffic Engineering with complaints that impact more than just themselves, they should be encouraged to bring their concern to us through an appropriate community organization. Ideally, we would like to work with a group of 5 to 12 persons representing the affected area(s) to study the problem and propose solutions. This might be the Board of Directors of the community association, a public works or safety committee of an association, or an ad hoc committee dedicated to dealing with the specific issue(s). If the citizen who contacts Traffic Engineering individually is unable or unwilling to work through such a group, Traffic Engineering will attempt to make appropriate contacts before

or after conducting studies and developing recommendations. Unless Traffic Engineering determines that immediate action is warranted, no major changes in traffic patterns or control will be made without some type of public involvement or notification. (See also the paragraph entitled COMMUNITY INPUT.)

As noted, the study process must be comprehensive and fair. By working with a group of citizens, both of these goals can be achieved. The citizens can provide valuable input into defining the problems and what "the community wants", and their participation in the process can serve to reassure the rest of the community that their concerns were addressed. It is easier to implement changes if members of the affected community have been a part of the process and will vouch for its integrity. Working with a small group, the process should include the following steps:

·Define the problem(s). The group is asked to brainstorm a list of concerns (relating to traffic issues). No one is allowed to dismiss anyone else's concerns as not valid or unimportant. Very often, the community members themselves do not agree on what is wrong. This step makes certain that all of the relevant issues are on the table.

·Document the problem(s). Traffic Engineering will collect whatever data is necessary to document the scope of the problem; for example: how many cut-through cars are there? how fast are they going? This data sometimes shows that there is a perception problem, not an actual problem. The documentation may lead to a redefining of the problem.

·Define desired results. Given the actual performance of the roadways, the community is asked to identify what they would like the results to be; how will we know if we have successfully solved the problems? Try to develop goals that can be measured in terms of the data collected earlier.

·Define constraints. There may be certain conditions that the community (or Traffic Engineering) insists must be met. Examples might include a desire to maintain on-street

parking, maintain access to several collector routes, the need to meet the standards of the Manual on Uniform Traffic Control Devices, etc. The constraints may lead to a further redefinition of the problems.

·Develop options. Using the information gathered thus far, Traffic Engineering will develop one or more options for consideration. The analysis should attempt to identify the benefits and impacts of each action so that the community understands all of the ramifications. Where there are undesirable impacts, the County will attempt to identify ways to mitigate those impacts.

·Decide on a plan. Working together, the committee and Traffic Engineering consider the options. They may decide to recommend one, make modifications, or once again redefine the problem. They may decide that the solutions are worse than the problems, and therefore decide to take no action. This is a valid conclusion so long as all options have gotten fair consideration and there is no overwhelming safety problem that demands Traffic Engineering's attention.

·Develop community consent. The committee (including the Traffic Engineering staff) will

report back to the larger community to present its findings and recommendations. The citizen members of the committee can vouch for the integrity of the process, making it easier to reach agreement. On occasion, Traffic Engineering staff may also need to obtain approval at the Department or Administration level. Implementation of recommendations will typically require significant community support in the form of a recommendation by the community association and substantial support of those directly affected by the problem(s) and/or proposed solution(s). (See also the paragraph entitled COMMUNITY INPUT.)

·Do it. The plan is then implemented.

·Document the results. Were the desired results achieved? Should the plan be modified? Should the problem be redefined? The results of this step may lead to closing the project, making a temporary installation permanent, modifying of actions, or beginning the process over again. In the absence of a serious traffic safety issue which requires Traffic Engineering or Police action, we will consider the matter closed once the community is satisfied with the results.

TECHNIQUES: There are a variety of techniques available for use in slowing or diverting traffic. These are described briefly below:

Educational Measures. In many cases, it is the residents themselves who are the primary violators of the posted speed limit. In other cases, through traffic may not be aware of the impact caused by excessive speeds and/or volumes. The following measures may be helpful in raising drivers' awareness of their driving habits.

·Speed trailer - A self-contained, solar-powered device which displays vehicle travel speeds as determined by a radar gun. The device is housed in a trailer which is set up in a neighborhood for four to five days at a time and operates automatically. The Police Department also has several portable boards which can be loaned to community organizations.

·Monitoring/publication of speeds - Traffic Engineering will allow community members to witness radar speed monitoring conducted by Traffic Engineering personnel. The citizens may record the license number and speed of vehicles on the roadway, and this information can be published in a community newsletter. (The following vehicles were observed speeding on such date, etc.) This can be an effective way to raise the issue within a community, but it may also cause divisiveness within the community.

·Fliers/newsletter articles - Communities may wish to publish articles in their newsletters asking residents to drive more responsibly or create special fliers on the issue. One community took a picture of all of the neighborhood children posing by the community sign and added the caption "28 Reasons Not To Speed in Our Community". This is less confrontational than speed monitoring, but it does not directly present drivers with evidence of their own behavior.

·Demonstrations - Community groups can organize demonstrations along a roadway (such as a sidewalk parade or signs) to encourage drivers to slow down. Care must be

taken to assure that the demonstration does not create a safety hazard for pedestrians or drivers, or become confrontational.

Physical Changes. Most drivers travel at a speed which feels comfortable. By changing the physical characteristics of the roadway, the speed at which they feel comfortable can be lowered. All such changes must be reviewed and approved by Road Operations, Solid Waste, the Board of Education, and the Fire Department before implementation to assure that there is no unacceptable impact to the delivery of their services. In general, physical changes should be designed to accommodate any vehicle which was previously able to use the roadway (albeit at a reduced rate of speed). Diverters and one-way roadways are obvious exceptions to this goal, but even they can be designed to permit passage by certain vehicles.

In general, physical changes (including pavement markings) to County roadways for the purpose of controlling speeds will be considered only if the following speed thresholds are met:

Daily Volume	24 Hr 85th Percentile Speed	Highest Hour 85th Percentile Speed
<1000 Vehicles	At least 13 mph over posted limit	At least 17 mph over posted limit
≥ 1000 Vehicles	At least 8 mph over posted limit	At least 12 mph over posted limit

More specific warrants apply for speed humps.

·Edgelines - On wide roadways (typically 36 feet or wider), the painting of edgelines can make the travel way appear narrower and thus reduce travel speeds. Generally, the two edgelines are painted 18 feet apart with no centerline. The area outside of the edgelines can be used as a parking lane, bike path, or shoulder area. Consideration should be given to prohibiting parking if there is not sufficient room to park between the curb and edgeline. It is not desirable to have parked cars straddling the edgeline.

·Islands/Circles/Chokers - These are devices which slow drivers by forcing them to maneuver around an object in the roadway. Circles are raised areas within an intersection. Traffic traveling straight through the intersection must pass to the right of the circle. Left turning vehicles may turn left in front of the circle or travel 270 degrees to the right of the circle. (Specific circumstances at particular installations may require prohibiting one of those movements.) Islands are raised areas in the middle of a roadway between intersections. Vehicles in each direction pass to the right of the island. Chokers are raised areas on the outside edge of the roadway which are passed to the left (they mimic a parked car). These devices are typically tested using pre-cast concrete curb sections. This permits modifications (size or shape) to be made easily and allows the community to experience the change before committing to a permanent structure. If the device is successful and the community supports its use, a permanent structure can be installed. Design information is available in Traffic Engineering Policy E.4, Circles, Islands, and Chokers.

·Diverters - Diverters are channelizing devices which prevent certain movements from being made at an intersection. These can be effective in reducing through traffic volumes.

·One-way/Do Not Enter Traffic Patterns - ONE WAY and DO NOT ENTER signs can be used to control traffic flows and reduce through traffic volumes. However, one-way travel patterns may lead to an increase in speeding as motorists do not face opposing traffic which might tend to hold down speeds.

·Speed Humps - A speed hump is an undulation in the pavement surface which causes vertical displacement as a vehicle passes. They are designed to be tolerable at or near the posted limit, but uncomfortable at higher speeds. They typically rise 3 inches in height over a distance of 6 feet and then fall the same height in another 6 foot distance with a ten foot flat section between the rise and fall. Parking lot style speed bumps (typically 6 to 8 inches high, 8 to 24 inches wide) can cause loss of control and will not be used on public roadways in Anne Arundel County.

Speed humps cause an increase in emergency response time and are somewhat uncomfortable in many vehicles traveling at the posted speed limit. Accordingly, Anne Arundel County has endeavored to avoid an over-proliferation of speed humps by establishing the following conditions:

· Speed humps will not be considered on roadways which are classified by the Highway Master Plan as an arterial or higher function.
· Speed humps will not be placed on roadways that are less than 1000 feet long.
· Speed humps will generally not be considered on roadways where the average daily volume is more than 10,000 vehicles.
· Speed humps will only be considered on roadways where the posted speed limit is 25 or 30 mph. Speed limits will not be lowered solely for the purpose of meeting this criterion.
· The following volume, speed, and community funding warrants must be met.

If the Average Daily Volume is at least ...	and the Prevailing Travel Speed (85th percentile) is at least ...	Speed humps will be allowed if the Community funds ...
750 vehicles	15 mph above the posted limit	100% of construction
1000 vehicles	10 mph above the posted limit	100% of construction
1000 vehicles	15 mph above the posted limit	40% of construction
1500 vehicles	10 mph above the posted limit	40% of construction

· On roadways where there is some extraordinary circumstance, Traffic Engineering may decide to fund 100% of the costs of speed humps. These will be evaluated on a case-by-case basis.
· Except in extraordinary circumstances, no more than six speed humps will be placed along the primary response route between any dwelling unit and the first-responding fire station.

· Anne Arundel County retains the right to modify or waive these conditions as it alone considers necessary or advisable.

·Raised Crosswalks/Intersections - These devices are similar to speed humps in terms of vertical displacement and are used to slow vehicles at crosswalks or intersections. The criteria noted above for the installation of speed humps also apply to raised crosswalks and intersections.

Speed Activated Signs – While static signs have not proven to be very effective in changing driver behavior, Anne Arundel County has successfully deployed devices that are activated by the speed of approaching vehicles.
The current generation of these devices employs a variable message panel. The panel is blank unless a vehicle approaches at too great a speed (as measured by loops or an integrated radar unit). The devices flash a SPEED LIMIT XX (where XX is the speed limit) message if the approach speed exceeds a predetermined limit. At still higher speeds, the message changes to SLOW DOWN XX.

These devices have also been integrated with pre-timed school flashing beacons. During school arrival and dismissal times, the device displays a steady SCHOOL ZONE XX message. If an approaching vehicle is travelling too quickly, the device flashes SCHOOL ZONE XX or SLOW DOWN XX, depending upon the speed.

This type of device has shown speed reductions of 4 – 7 mph, and those results have persisted over a number of years in most cases. Accordingly, they will not be considered for use on County roadways under the following conditions:

- Speed activated signs are intended for use primarily on arterial roadways where other traffic calming measures are not appropriate. They will not be installed on local roads and will generally not be considered for collectors (except in the case of a school zone, an area with a history of speed related accidents, or other unusual circumstance). They will generally not be considered unless other appropriate traffic calming measures have been tried and found to be ineffective.

- Speed activated signs will be considered only when the measured 85th percentile speed is at least 10 mph greater than the posted speed limit.

- Except for school zones, speed activated signs will only be considered for roadways with an average daily traffic volume of at least 2500 vehicles.

- Speed activated signs will be considered for school zones if there is significant pedestrian activity near the school or there is some geometric problem (sight distance, sharp curve, accident history) that can not be easily corrected. The devices will be deployed for high schools only on roadways with a posted speed limit of 40 mph or greater.

- When considering the use of speed activated signs, the following placement issues must be taken into account: adequate lateral clearance,

potential impact of flashing lights on nearby residences, and the availability of electrical power or a solar view sufficient to power the device.

Speed activated flashers will generally not be placed at spacings of less than 1 mile in one direction along any roadway.

Other Techniques

·Enforcement - Police enforcement of speed limits can be effective if it occurs consistently over a long period of time. This may not be an efficient use of Police personnel on relatively low volume residential streets, and often leads to community resentment ("How come you're giving the tickets to the residents and not those outside speeders?"). Accordingly, it is not often effective in controlling speeding in residential areas.

- Speed Cameras (Automated Enforcement) – Although the State of Maryland has passed legislation which permits local jurisdictions to implement automated speed enforcement, Anne Arundel County has not chosen to pass enabling legislation to set up such a program. Accordingly, speed cameras are not an option in the County (except within the City of Annapolis which has chosen to implement such a program).

·Rumble Strips - Rumble strips are closely spaced raised bands of material on top of the pavement which cause vibration and noise when driven over. The resulting noise is usually not acceptable in a residential area, and the use of these devices is therefore limited to alerting drivers of particular hazards.

·Multi- way STOPS - The Manual on Uniform Traffic Control Devices (MUTCD), a national standard for the design and installation of traffic control devices, recommends that multi-way STOP signs not be used to control speeding. STOP signs are designed to designate right-of-way, and extensive experience across the country has demonstrated that they are ineffective in slowing traffic. Drivers on the main road soon learn that there is very little likelihood of encountering a vehicle coming from the side street and tend to roll through the intersection without stopping. As a general rule-of-thumb, we expect to see only 25% of the main street drivers come to a complete stop at an unwarranted STOP sign. Half of the drivers typically roll through the intersection at a reduced rate of speed, and the remaining 25% do not slow at all. At one location in Anne Arundel County, fully one half of the main street drivers did not use their brakes when going through a multi-way STOP controlled intersection. Under certain specific conditions, multi-way STOPS may be an effective method of controlling an intersection. This generally occurs when there are relatively equal, moderate to heavy volumes on each street. In such cases, multi-way STOPS cause the right-of-way to be shared by both roadways and may prevent conflicts within the intersection. The MUTCD lists specific warrants for the use of multi-way STOPS.

- CHILDREN AT PLAY Signs – Anne Arundel County does not install CHILDREN

AT PLAY signs on its roadways for a variety of reasons. The signs are not recognized by the Manual on Uniform Traffic Control Devices (MUTCD). The signs do not display a meaningful message; they only suggest that children may be present and we want drivers to assume that is always the case in a residential area. Finally, they may give children and parents a false sense of security leading to unsafe behavior.

·Roundabouts - A roundabout is (typically) a small traffic circle such as is found in Europe and Australia. All entering vehicles must yield to traffic in the circle (as opposed to Washington, D.C. or New Jersey circles where traffic in the circle is often required to yield to entering traffic). All traffic must move around the roundabout in a counterclockwise direction (as opposed to the speed control circles described above). The principal benefit in using a roundabout is that it allows for more efficient use of the intersection than either STOP signs or traffic signals (in most cases) since very few vehicles are required to come to a complete stop. By limiting the number of conflict points presented to each entering driver, a roundabout will also increase the safety of most intersections. A side benefit of a roundabout is that it will slow through traffic. However, roundabouts usually can not be fit into an existing intersection without encroaching on the corner lots, so they are not often appropriate for speed control in existing neighborhoods.

Road Closures - While a road closure should not be considered for speed control, closing a road may be an option where a significant volume of "cut thru" traffic occurs. However, it is important that the negative impacts of road closures are discussed with the community before a decision is made to close a road. Road closures may create unacceptable inconveniences to residents and, in some cases, may increase traffic on either side of the closure. In addition, road closures may negatively impact public services such as mail delivery, school bus service, trash removal, recycling service, and snow removal. Road closures may also increase response times for emergency police and fire department services.

The attached table lists the criteria which should be considered when selecting what type of action(s) should be considered to control traffic in a residential area.

COMMUNITY INPUT: Anne Arundel County retains the responsibility for its roads and rights-of-way, and has the sole authority to decide whether or not any physical or regulatory changes will be implemented. In the absence of an identified safety problem, however, neighborhood traffic control techniques will not be implemented unless there is substantial agreement and support within the affected communities. Speed humps and other physical changes such as islands, circles, and chokers will only be installed after completion of a Neighborhood Traffic Study and in accordance with County standards regarding type, design, location, and spacing of devices. Specifically, residents must be made aware of the signing and markings associated with speed humps and the possibility that emergency response vehicles will be delayed by 3 to 9 seconds per hump. Depending upon the actual design, similar delays may be expected for circles, islands, and chokers.

Traffic Engineering will not rely on pre-set community approval ratings, but rather will strive to help the impacted community reach general agreement on the nature of the problem and the proposed

solution. The assumption underlying this approach is that neighborhoods will support the use of traffic calming techniques (even though they involve some negative impacts) if the citizenry agree that: there is a problem; the proposed solution is the most appropriate; and their concerns have been addressed and mitigated as well as possible. This support will generally be in the form of a recommendation by the community association and the agreement of most of the affected property owners. The definition of "most of the affected property owners" will, of necessity, need to be considered on a case-by-case basis. At the very least, it will include properties near the proposed devices, properties along the road on which the devices are proposed, and properties whose only route of access includes the road on which the devices are proposed, with primary consideration being given to those living in the area directly impacted by the problem and proposed solution. Nearby residents who do not necessarily need to use the route in question should also be notified, particularly where the placement of speed humps in one community may affect the number of humps allowed in another community. Where the implementation of a plan may tend to divert traffic to other residential areas, those areas will also be included in the plan review and approval process.

Traffic Engineering will require proof of community involvement and discussion of any proposed changes. The community must demonstrate that all impacted residents have been made aware of the problem(s) and proposed solution(s) and have been given an opportunity to ask questions, receive answers to those questions, and offer comments. Such proof can be in the form of copies of newsletters/fliers, community meeting minutes, or petitions/ballots.

OTHER AGENCY INPUT: Physical devices such as speed humps, circles, islands, and chokers will generally be placed at spacings of not less than 400 to 600 feet. They will be installed only after review by the Fire Department, Board of Education, Solid Waste, and Road Operations Division to assure that they will not impose an undue hardship on the operation of fire trucks, school buses, trash trucks, or snow plow equipment.

GUIDELINES FOR SELECTION OF NEIGHBORHOOD TRAFFIC CONTROL DEVICES

TECHNIQUE	BENEFITS:	IMPACTS:	TYPICAL APPLICATIONS:
Speed Trailer	Short term speed reduction Easy to set-up Does not require physical changes May be effective where traffic is predominantly local	Minimal long-term effectiveness Must be monitored to prevent vandalism May encourage high speeds by motorists testing the device	Average Daily Traffic (ADT) = 500 – 5000 vehicles/day (vpd) Only one through lane in each direction Requires adequate room for equipment.
Publication of speeds	Does not require physical changes May be effective where traffic is predominantly local	Requires continuous commitment May cause divisiveness within the community	ADT = 500 – 5000 vpd Collector or below.
Fliers/Articles	Useful for locations where drivers are local Does not require physical changes	No effect on cut-thru traffic	Information provided by Community using data collected by Traffic Engineering Division
Demonstrations	May raise awareness of speeding issues within community	Requires substantial community involvement Care must be taken so it does not cause safety hazard or become confrontational	ADT = 500 – 5000 vpd Collector or below with sufficient room away from roadway surface.
Edgelines	May reduce average speeds up to 3 mph No impact on emergency service Creates buffer next to travel lane	May impact parking due to narrow road width	ADT = 500 – 10,000 vpd Collector or below with $\geq$32' width (or consider parking restrictions).
Islands/Circle	May reduce speeds by 3 – 5 mph. Initially installation is temporary, allowing for modifications to achieve desired results May be combined with chokers for improved effectiveness	Slows response time of emergency services May reduce on-street parking Certain measures are incompatible with school bus and other large vehicle operations Vehicles may damage temporary installations	ADT = 500 – 10,000 vpd Collector or below.
Chokers	Chokers are easily negotiable by large vehicles May reduce speeds by 3 – 5 mph. May be combined with islands and circles for improved effectiveness	May require bicyclists to briefly merge with vehicular traffic May require the elimination of some on-street parking	Roadway width $\geq$ 26’ Minimum spacing between chokers = 20’
Diverter	Diagonal Diverters do not require a closure per se, only a redirection of existing streets Able to maintain full pedestrian and bicycle access Reduce traffic volumes	May cause local residents to take longer routes. Could divert traffic to roads that previously had minimal traffic May cause circuitous routes for local residents and emergency services May require reconstruction of corner curbs	Must be an appropriate alternate route.
One-Way/Do Not Enter	May reduce cut-thru traffic One-way system may provide for more-on-street parking	May need enforcement to be effective Speeds may increase due to lack of oncoming traffic	Must be an appropriate alternate route.
Rumble Strips	Alerts motorists to change in geometric conditions or other unexpected situation	Noise caused by rumble strips typically unacceptable in residential areas	ADT = 500 – 5,000 vpd
Speed Humps / Raised Crosswalks	Typically reduce 50% (average) speed to 26-28 mph No effect on access or parking No effect on snow plow operations	Required signage and pavement markings may impact aesthetics Emergency response vehicles will be delayed up to 10 seconds per hump Large vehicles and loaded vehicles may cause noise when traveling at higher speed	ADT = 1,000 – 10,000 vpd Collector or below. Posted Limit $\leq$ 30 mph Prevailing speed >10 mph over posted limit. Speed limit will not be lowered to meet criteria. Requires community participation in funding.
Raised Intersections	May improve safety for both pedestrians and vehicles	Tend to be expensive, varying by materials used Impact on drainage needs to be considered Less effective in reducing speeds than speed humps or raised crosswalks	ADT = 1,000 – 10,000 vpd Collector or below. Posted Limit $\geq$ 30 mph. 85%ile $\geq$10 mph over posted limit. May require additional storm drain inlet(s).
Full Closures	Pedestrian and bicycle access may still be provided. Very effective in reducing traffic volume	Requires extensive community involvement Will cause circuitous routes for local residents and emergency services May be expensive due to geometric modifications	Must be an appropriate alternate route.
Speed Activated Signs	Reduce speeds 4 to 6 mph Appropriate for arterial roadways	Flashing lights may bother adjacent residents	ADT = 2500 & up Arterials or where other devices are not appropriate
Enforcement	Effective only during period of enforcements Short-term improvement	Little long-term effectiveness Limited police resources	Major collector or above.