CITY OF STAMFORD
POLICY AND GUIDELINES
FOR
SPEED HUMP INSTALLATION

INTRODUCTION

Speed humps are roadway features designed to create a ~~vertival~~vertical ~~deflection in~~deflection in the traveled way for the expressed purpose of controlling vehicle speeds. Speed humps are widely ~~have been increasingly~~ recognized by engineers as an effective ~~suitable geometric design~~ technique for controlling traffic speeds under appropriate roadway circumstances. However, speed humps can influence ~~motorists~~motorists' choice of route and may inadvertently divert volume to alternate roadways. This policy and guideline describes those appropriate roadway circumstances and details of geometric design requirements for speed humps as well as the community process applicable in the City of Stamford

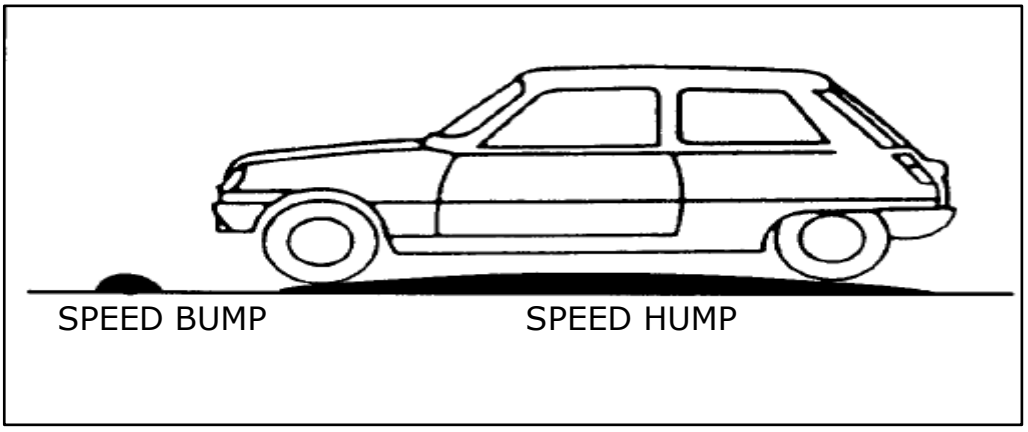
USE OF THIS POLICY & GUIDELINES

This document is to be used in conjunction with good professional engineering judgment and practice. The guidelines herein do not constitute either final and/or complete evaluation criteria for installation of speed humps on city streets. Local site conditions must be evaluated for all speed hump installations. In addition, specific terrain, roadway, traffic or land use characteristics or other unusual conditions may require case-specific modification of or exception to these guidelines.

DEFINITIONS

A speed hump is a roadway ~~geometric~~ design feature consisting of raised pavement extending transversely across (or partly across) a roadway for the primary purpose of reducing the speed of vehicles traveling in the section of the street. In a speed hump, the pavement area normally rises and returns to the prevailing grade of the surrounding pavement over a distance of at least 14 feet in the direction of travel, with a typical~~maximum~~ rise of 3 inches. Most speed humps are parabolic in cross-section. Flat-topped sections and elongated forms to 22 feet in the direction of travel are also recognized.

The considerable length in the direction of travel and limited maximum height is what physically distinguishes speed humps from the speed "bumps" commonly found in private drives and parking lots. Although there are no explicit standards for speed bumps, they generally have heights of over 3” to a maximum of 6”; and lengths in the direction of travel of less than 3 feet. Following Figure illustrates the difference between the cross section of a speed hump and an abrupt parking lot speed bump.



From an operational performance perspective, speed humps and speed bumps have different effects on vehicles and their occupants. Within the range of typical residential street speeds, speed humps cause a gentle wave motion to moving vehicle that causes mild discomfort to drivers and passengers, with the level of discomfort tending to increase the faster the vehicle passes over the speed humps, which is an effect consistent with the objective of inducing drivers to travel at speeds reasonable for neighborhood streets. Drivers typically choose to cross speed humps at speeds between 15 and 20 miles per hour. Speed bumps, by contrast, cause significant driver discomfort at typical desirable residential street speeds. In a performance effect, which is completely contrary to the intended purpose of the bumps, driver/passenger discomfort tends to decrease the faster a vehicle is driven over an speed bump, because vehicle suspensions are expressly designed to absorb the jolts of quick passage over bumps rather than transmitting them to the passenger compartment. As a result, when confronted with a speed bump, most drivers cross over the bump at extremely low speeds

GUIDELINES FOR SPEED HUMP USE

ENGINEERING STUDY

Speed humps should only be installed where the engineering study concludes that:

- Speed conditions to which speed humps respond approximately exist;
- Judicious use of other guide, warning or regulatory control devices has been considered;
- A reasonable level of enforcement has not solved or appears unlikely to solve the problem, or that a necessary level of enforcement is unlikely to be made available; and
- Key design guidelines, as outlined herein for location, placement, configuration details and related street and traffic conditions, can be reasonably conformed-to at the site under consideration.

~~Street~~ Functional Classification ~~& Use~~

Speed humps can only be installed on those roadways ~~facilities~~ functionally classified as "local" streets in the City of Stamford. The street segments streets classified as "collector" streets or higher classes of streets in the functional classification hierarchy will not be eligible to be considered as candidates for speed hump installation.

Street Width & Number of Lanes

Speed humps should be used only on streets with no more than two travel lanes and only on streets where pavement width is no greater than 40 feet.

Pavement Characteristics

Overall pavement on streets considered for speed humps should have good surface and drainage qualities. On streets where major resurfacing/reconstruction of a street is planned for the near future, speed hump installation should be deferred and incorporated in the resurfacing process.

Street Grades

Speed humps should not be employed on streets with grades exceeding five (5%) percent approaching the speed hump site. When installed on streets with sustained downgrades, special care should be taken to ensure that vehicles will not approach a speed hump at excessive speeds.

Horizontal & Vertical Alignment

Speed humps should not be placed within severe horizontal or vertical curves that might result in substantial lateral or vertical forces on a vehicle traversing the speed hump. Speed humps should be avoided within horizontal curves of less than 250 feet centerline radius and on vertical curves with less than the minimum safe stopping sight distance of 300'. At mid-block locations on typical residential streets, the stopping sight distance requirement is usually at least 200 feet, the nominal stopping sight distance for vehicles traveling at 30 mph. If possible, speed humps should be located on tangent sections rather than curve sections.

Sight Distance

Speed humps should generally be installed only where the minimum safe stopping sight distance (as defined in AASHTO's *A Policy On Geometric Design Of Streets)* can be provided. For mid- block locations on typical residential streets, a minimum safe stopping sight distance allowance would normally be at least 200 feet, nominal stopping sight distance for vehicles traveling at 30 mph. Depending on the character of the intersection and the control devices employed, sight distance requirements might be less for speed humps located within the influence area of intersections. Speed humps could be placed as close as 60 feet from the intersection where the primary approach is STOP controlled, and where there are clear sight triangles from the cross street, and speeds of traffic approaching the speed hump from the cross street are necessarily slow. Where the approach from the humped street is uncontrolled, or there is substantial prevalence of high speed turns from the cross street, or there is significant obstruction of the sight triangles from the cross street, then minimum separation of the speed hump from the intersection should tend toward the 200 foot limit.

Traffic Speeds

Speed humps should only be used on streets where traffic speeds are intended to be low. Speed humps should not be installed on streets where the posted speed limit is considerably greater than speeds at which most motorists feel comfortable in traversing the speed humps. Speed humps should generally be installed only on streets where the posted speed limit is

30 mph or less.

When speed humps are considered to be installed to address speeding concerns, studies should be performed to confirm the magnitude of the speeding problem to ensure that the installation of speed humps can be expected to address that problem. As justification for speed humps on streets intended for low speed, numbers of vehicles exceeding speed limits, percentage of all vehicles exceeding speed limits, 85th percentile speed and speed of fastest vehicles may all be considered in evaluating whether there is a speed problem which speed humps should be used to counter and in allocating available community resources among sites experiencing problems.

In the City of Stamford specific criteria for excessive speeding are as follows:

- ~~If~~ 85th percentile speed is 10 MPH over the posted speed limit, or
- ~~-~~2/3 of total number of vehicles using the residential street exceed the posted speed limit, or
- 15 % of observed are over 45 MPH.

Traffic Volumes

~~Speed humps should be installed only on streets classified as "l~~Local~~"~~ streets~~. Such streets~~ typically serve an estimated average daily traffic volume of 10 vehicle~~s~~ trips per day per household unit ~~in the neighborhood surrounded~~within a 500' radius. Traffic exceeding this volume may indicate ~~to evaluate & verify if the traffic being generated from within the neighborhood or is it~~the presence of "cut through" traffic. ~~The study will also evaluate "If the street *really* a "local" street that is simply impacted by too much and too fast traffic?" Only, then speed humps may be an appropriate response.~~ Also, the City will evaluate if the street is ~~really~~ actually fulfilling a necessary and appropriate collector function in the City's circulation network (in essence, is its designation as "local" a misclassification)? In this latter case, the level of control speed humps exert is probably too restrictive and speed humps should not be used; the City might even consider upgrading the functional classification of the street.

In allocation of community resources to implement speed humps, subject to the above consideration of nominal ceiling volume indicating service of more than "local" street function, streets with the highest volume and largest numbers of vehicles exceeding speed limits would tend to receive priority over streets with lower volumes and number of vehicles exceeding posted

speed limit regulation. However, no minimum volume threshold shall preclude speed humps being used in cases where low volume streets experience very high proportions of high speed incursions.

Traffic Safety

When installed for the purpose of addressing documented or anticipated vehicle or pedestrian crashes, the causes of those accidents should be susceptible to correction by speed control. Proposed speed hump locations must be evaluated in the field to determine that such installations will not introduce increased crash potential on the subject street.

Vehicle Mix

Speed humps should not be installed on streets ~~that carry~~on which ~~less~~ more than 5% of the total traffic volumes ~~of~~ consists of vehicles with five or more ax~~e~~les. ~~Also, t~~The City will evaluate if there exists a reasonable alternative route for truck traffic in the vicinity. Typically, heavy or long-wheelbase vehicles (three or more axles) constitute up to 10 percent of all traffic ~~is considered normal~~; the heavy vehicle component would have to be well above ten (10) percent of all traffic to be considered "significant" enough to refuse hump installation in a situation where speed humps would otherwise seem desirable or necessary. Special consideration of ~~reasonableness of effects on heavy vehicles is also indicated in the anomalous situation where~~must be given when a significant generator of long wheel-base vehicle traffic is located with access and egress only from streets classified "local".

Bicyclists, motorcyclists, ~~low-riders~~ and operators of other types of special vehicles often consider speed humps annoying. However, nothing in the experience with speed humps to date indicates the speed humps constitute any type of unusual hazard or obstruction for these types of vehicles. Therefore, possible presence of the vehicle types is **not** reason to deny approval of speed humps in circumstances where they would otherwise appear desirable or needed.

Emergency Vehicle Access

Speed humps should not be installed on streets that are defined or used as primary emergency vehicle access routes. Primary Emergency vehicle routes

are comprised of two types of streets:

1. Routes used by emergency vehicles to cross large parts of the community or on paths logically used to service large numbers of potential destinations. Routes of this type are generally on the City's designated circulation system of streets of collector level and higher. Hence, they are normally already ineligible for speed humps based on their functional classification.

2. Streets of generally local service character which happen to serve as the immediate egress route from an emergency vehicle dispatch point or immediate access route to a regular destination for emergency vehicles (such as where a fire station or a hospital emergency room access is located on a street Classified "local"). Such circumstances will negate the eligibility of streets which would otherwise be eligible for speed humps.

~~The City has a duty to maintain a street system which reasonably allows for timely emergency service response. However, on local streets the City has other compelling duties which may to some degree conflict with maintaining the streets in a manner to optimize emergency service response. Those duties include attempting to maintain local residential streets in a manner which will induce traffic behavior consistent with areas where children or pedestrians in the street may be expected or to maintain the streets in a manner which induces traffic behavior assuring residents the quiet enjoyment of their homes secure from traffic impacts. On local residential streets which are **not** on primary emergency response routes, what is reasonable accommodation for timely emergency service response may be quite different from what is reasonable on the primary emergency routes. In those circumstances, hump placement which causes minor potential increases to emergency service response time affecting small numbers of properties would be acceptable. The ability of fire vehicles to tolerate hump crossing speeds of 20 mph is crucial since it implies a zero impact on response time; fire vehicles rarely if ever achieve speeds of 20 mph on the types of local access streets where speed humps would normally be employed.~~

~~The City will normally seek to identify and implement measures which offset the effects of neighborhood traffic management on emergency response and to avoid implementations where the cumulative effect of neighborhood traffic controls dramatically alters the actual delivery of emergency response.~~

Transit Routes

Speed humps generally should not be installed along streets with established conventional bus transit routes with normal service frequency. School transit, shuttle vans, para-transit vehicles and similar services of conventional transit are not included in this consideration because they can reasonably be expected to operate in the neighborhood environment at speeds where speed humps would not pose problems. In addition, many of these vehicles are not exceptionally long wheelbase vehicles. If speed humps are installed on conventional bus transit routes, or streets which serve a confluence of school transit routes, they should not have a height greater than three (3") inches

Citizen Support

Where speed humps are to be considered, a petition with a written request to the Director of Operations requesting speed humps signed by at least 65 percent of the property owners or residents in the area of influence along with elected district representatives of the primary residential neighborhood area of the speed hump request. The Traffic Advisory Committee will act on the petition only when this threshold is met. The area of influence shall be defined by the Director of Operations or his/her designee on a case by case basis prior to discussions at the Traffic Advisory Committee. The Area of Influence is defined as the area within the neighborhood which will potentially experience changes, both positive and negative, in traffic patterns if such speed humps are installed.

If the engineering criteria are met, then 65% of the owners/residents and the representatives within the area of influence must support implementation before construction of the speed hump can proceed.

~~Where speed humps are to be considered, a petition with a written request to the Director of Operations with, a petition requesting humps signed by at least sixty five percent (65%) of the property owners or residents along with elected district representatives of in the primary residential neighborhood area of the speed humps, for the Traffic Advisory Committee to act on the petition. The area of influence shall be~~

~~defined by the Director of Operations or his/her designee on a case by case basis prior to discussions at the Traffic Advisory Committee. The Area of Influence is defines as the area within the neighborhood which will potentially experience dramatic negative changes in traffic patterns if traffic calming is implemented~~

DESIGN & CONSTRUCTION CONSIDERATIONS

Dimensions & Cross Sections

The profile of the parabolic speed hump to be employed in the City of Stamford will be of 3 inches ~~of maximum~~in height with a 14 foot length ~~profile is the desired profile~~ with an acceptable construction variation tolerance of 0.25 inch. ~~(giving a hump range from 2.75 to 3.25 inch in maximum height).~~ Speed humps in this height range are expected to cause crossing speeds of 20 to 25 mph

Traffic Control

Speed humps will be accompanied by standard warning signs on both approaches ~~in advance (200' to 250') of the speed hump & a sign placed~~ generally adjacent to each hump. Sign locations and supplementary plates will be as directed by the Traffic Engineer.

The speed humps shall be marked with 12 inch reflective white stripes set parallel to the centerline tangent on 6-foot centers with the center-most stripes offset by 3 feet on centers from the centerline. The word message BUMP in eight (8) foot white reflective letters shall be placed fifty (50) feet in advance on each approach to each hump.

Spacing & Location

Location and spacing of speed humps will be determined on a case by case basis by the City Traffic Engineer. On short blocks (less than 500 feet in length), a single hump per block would be typical. In ~~all except ve1y unusual~~most cases, speed humps intended to operate in series would be located no closer than 200 feet apart and no farther than 750 feet apart. ~~Where unaffected by compounding locational factors, they would normally be located at least 300 feet apart and no farther than 600 feet apart within a single block. On short blocks (less than 500 feet in length), a~~

~~single hump per block would be typical.~~ Spacing and number of speed humps will vary substantially depending on absence or presence and type of control at intersections at the limits of and within the segment where speed humps are to be employed.

The first hump from either direction in a series should, if practical, be located in a position where it is least likely to be approached at very high speed. Possible placements to achieve this objective include putting the first hump in a system close to (but not less than) minimum safe stopping sight distance from an intersection, preferably a controlled one, close to minimum safe stopping sight distance of a small radius curve or at the top of a hill (rather than the middle or the bottom) where a lengthy downgrade is involved. When a single speed hump is installed, a placement objective is to minimize the likelihood of a very high speed approach from either direction, usually leading to placement roughly at mid-block.

Maximum and minimum spacing criteria may be adjusted by the Traffic Engineer to conform to particular site conditions.

Installation Angle

Speed humps should be installed at a right angle to the centerline ~~tangent~~ of the roadway.

Utilities

Speed humps will not be located over utility manholes, gate valves, pull-boxes, access vaults or ventilation gratings or located immediately adjacent to fire hydrants.

Drainage & Roadway Edge Treatment

The specific hump cross-sections presented above provide edge treatment designed to maintain existing gutter flows. In ideal circumstances, speed humps would be located close downgrade from existing drainage inlets and locations immediately upgrade from inlets would be avoided. However, because the edge tapers are designed to maintain gutter flows, this consideration is subordinated to other locational criterion.

Speed humps should not be installed in the immediate vicinity of features designed for surface cross drainage or where surface cross run-off flow is a known problem.

If speed humps are installed on roadways without vertical curb defining the edge of the traveled way, it may be necessary to consider measures to discourage drivers from attempting radical hump avoidance maneuvers outside the traveled way. Countermeasures include placement of the speed humps at points where existing roadside features like trees or utility poles are adjacent to the hump or placing bollards or delineators adjacent to the travel way at the hump.

Coordination With Street Geometry And Adjacent Features

Speed humps will not be installed where on-site assessment of roadway geometrics finds that the proposed location constitutes a critical point in the roadway system, e.g., a severe combination of horizontal, vertical curvature and/or street cross-slope and/or complicating abutting use conditions or street features.

Intersections & Driveways

Speed humps should not be installed within an intersection or driveway. On approaches to intersections controlled by traffic signals, safe stopping distance separation should be maintained so that motorists preoccupied with hump crossing will still have time to perceive and react to changes in the signal indication.

Parking

Each hump installation will be evaluated individually for site specific considerations involving on-street parking. While speed humps should not normally be cause for on-street parking restrictions, such measures could be contemplated where parked vehicles seriously diminish the effectiveness of warning signing and markings or seriously compromise drainage flows at the speed humps.

Street Lighting

There is no requirement to provide special nighttime illumination of speed

humps. However, where street lighting exists on streets being considered for speed humps, the speed humps will be placed to take advantage of the available lighting unless other compelling location and spacing criteria make placement in the best illuminated areas unfeasible or impractical.

Construction Methods & Material

Prior to speed hump construction, construct a wooden template/screed to the dimensions shown on the plans. Prior to placing Asphalt Concrete, a tack coat, asphaltic emulsion per Form 860 of the CTDOT Specifications shall be applied to all horizontal and vertical surfaces. Sweep clean the pavement of all soil and debris immediately prior to application of the tack coat. Apply the tack coat to existing pavement at a rate of 0.05 to 0.10 gallons per square yard of surface covered or as directed by the Engineer. Spread and compact asphalt concrete in accordance with CTDOT Standards and the following requirements. Hand lay the asphalt concrete using the template/screed allowing for compaction. Asphalt concrete shall conform Form 860 CTDOT Standard Specifications and shall be 3/8 inch maximum fine graded. Construct the hump to the dimensions specified on Figures with a dimensional tolerance of ± 0.25 inch. Compaction of Asphalt Concrete shall be equivalent to an 8 ton static roller. It is suggested that that the Asphalt Concrete to be placed in two lifts. Experience indicates that adequate conformance to design tolerance can be achieved in a single lift through use of the template/screed and reasonable diligence of workmanship and inspection. If the two lift method is used, separate templates should be constructed and used for each lift.

SUMMARY

Speed Humps ~~must~~ may be installed only when all of the following conditions are met:

1. Petition to Director of Operations requesting a speed hump study signed by 65% of affected owners/residents/representatives
~~1.~~2. ~~Classified as l~~Local street ~~in the~~ Functional Classification ~~of Roadways~~
~~2.~~3. Two lanes or fewer ~~street (two way) or one-way street~~
~~3.~~4. Street widths of less than forty (40') feet
~~4.~~5. Roadway pavement in satisfactory condition for installation of Speed Humps
~~5.~~6. Grades less than five (5%) in the areas of humps
~~6.~~7. Horizontal curves of no less than 300 foot centerline radius or vertical curves with no less than safe stopping sight distance
~~7.~~8. ~~Streets p~~Posted with a SPEED LIMIT of 30 MPH or less
~~8.~~9. ~~8~~Not a designated emergency vehicle route~~Streets used occasionally by emergency vehicles operating at low to moderate speeds~~
~~9.~~10. ~~Streets not used by frequent & regularly-scheduled public transit routes. Use by school buses are acceptable.~~Not a designated transit bus route.
~~10.~~11. Low volume Streets (2,500 vehicles per day)
12. Streets used by relatively low percentage of trucks.
13. Documented speeding problem
~~11.~~14. 65% citizen support for implementation

~~Speeding Problem should be addressed only with enforcement:~~

- ~~85th Percentile speed will determine the speeding problem.~~
- ~~If 85th percentile speed is 10 MPH over the posted speed limit or 2/3 of total number of vehicles using the residential street exceed the posted speed limit or 15 % of observed are over 45 MPH~~

Design & Construction Considerations

- ~~*Maximum h*~~*Height: 3* inches, ~~*Minimum l*~~*Length~~:~~: 14 feet.
- *Signs ~~and markings~~: ~~Advanced and~~ At Location*
- *Markings: Advance and at Location*

- *Spacing:* 200 feet to 750 feet;
- *Location: Minimum of 100'* from intersections;
- *Sight Distance:* 200-250 feet for all locations.
- *Drainage:* Maintain gutter flows.
- *Illumination:* Locate to take advantage of existing street lighting
- *Appearance:* Minimize visibility of signs & markings from closest homes.

Avoid the following:

- Locations within intersections
- Locations at driveways
- Locations over utility manholes, gate valves, pull boxes, access vaults or ventilation gratings
- Locations at fire hydrants
- Locations immediately upgrade from drainage inlets.
- Locations at or adjacent to surface cross drains.