Appendix B

Active Traffic Calming Measures

The primary purposes of active traffic calming devices are to reduce the speed of traffic, improve bike and pedestrian safety, and raise awareness of traffic problems in a residential area. These methods are more expensive than passive devices because they often affect the geometry of the roadway, which requires extensive construction and maintenance. Active traffic calming devices include speed humps, traffic circles, and splitters.

General advantages of active traffic calming devices:

- Effective at solving specific traffic issues, especially speeding
- Raises awareness of drivers to speeding problems

General disadvantages of active traffic calming devices:

- May pose restrictions for bicycle traffic
- May negatively impact transit or emergency services
- Higher cost than passive traffic calming measures

B-1. Standard Speed Humps

Description:

The standard speed hump is a 22-foot long, four to six inch high, and constructed of asphalt or concrete, extending the entire width of the roadway which causes vertical displacement of the vehicle. The hump consists of two 6 foot long ramps flanking a 10 foot flat section. Humps can be colored and/or textured to add aesthetic appeal.

Primary Purpose:

Reduce vehicle speeds by providing vertical displacement of the vehicle that result in a jolt if the vehicle's speed is too high.

Advantages:

- Reduces vehicle speeds – encouraging 25 mph vehicle speeds.
- Pose no restrictions for bicycles.
- Do not affect intersection capacity or operation.

Disadvantages:

- Potentially increase traffic noise from braking and acceleration of vehicles, particularly buses and trucks

Transit Service Impacts:

- 22-foot speed humps create a minor impact to transit scheduling.

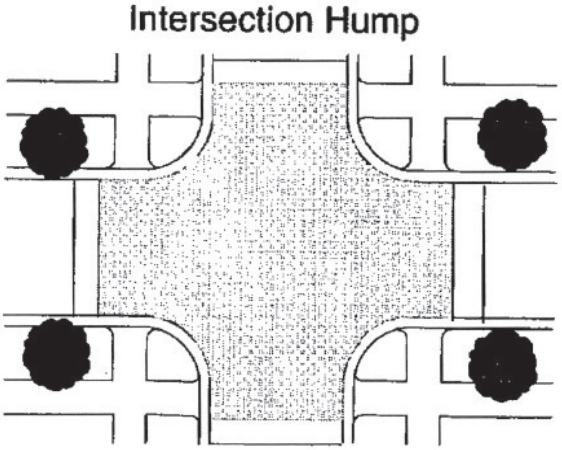
Emergency Services Impacts:

- When speed hump designs are selected for any street, one should consider whether it is used as a primary response route. Minor impacts to response time may occur.

Other Considerations:

- Speed humps should not be considered on grades of eight percent or greater.

B-2. Intersection Hump



Description:

Similar to the speed hump, the intersection hump slopes are all straight lines and are typically constructed out of concrete with a surface treatment or patterning. The top of the intersection hump is flat, and the one pictured above extends beyond the boundary of the intersection providing a spot close to the curb for pedestrians to safely cross. The structure does not extend into the gutter areas for necessary drainage concerns.

Primary Purpose:

Reduce vehicle speeds at intersections by providing vertical displacement of the vehicle that result in a jolt if the vehicle's speed is too high. They may also provide a place for pedestrians to safely navigate the intersection. At an intersection where an all-way stop is unwarranted, an intersection hump forces motorists to navigate the intersection more slowly, making them more likely to yield the right-of-way to other motorists and pedestrians.

Advantages:

- Reduce vehicle speeds – encourage 25 mph vehicle speeds.
- Pose no restrictions for bicycles.
- Increase pedestrian safety by providing a distinct location for drivers to yield right-of-way.
- Increase intersection safety by providing a distinct location for drivers to yield right-of-way to other legs of the intersection.

Disadvantages:

- Potentially increase traffic noise from braking and acceleration of vehicles particularly buses and trucks.
- Noise from tires hitting the structure.

- Perception from real estate industry that speed tables affect property values negatively. Advertises "a speeding problem."

Transit Service Impacts:

- Intersection humps do not significantly impede transit services.

Emergency Services Impacts:

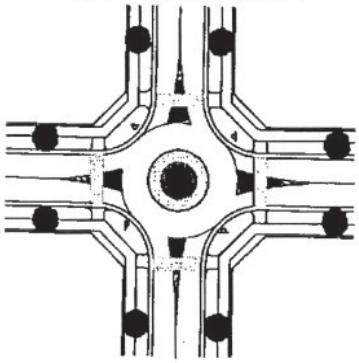
- When intersection hump designs are selected for any street, one should consider whether it is used as a primary response route. Intersection humps may cause difficulty with the turning radii of large vehicles.

Other Considerations:

- Intersection humps should not be considered on grades of eight percent or greater. Intersection hump may also pose challenges with surface water management.

B-3. Neighborhood Traffic Circles (Roundabouts)

TRAFFIC CIRCLE



Description:

Traffic circles or roundabouts consist of a landscaped island in the center of the intersection with appropriate signage and marking. A driver enters a traffic circle by turning right, after yielding to any traffic coming from the left. All turns from a roadway intersection that has a traffic circle are right in, right-out.

Primary Purpose:

Reduce speeds through intersections and assist drivers in proper yielding.

Advantages:

- Increase operational safety by reducing the number of conflicting movements.
- Reduce speeds in the intersection.
- Cannot be ignored like an intersection controlled by stop signs.
- May improve intersection capacity and operation.
- Accommodates intersections with a wide range of access points (i.e. three to five way intersections) and can include driveways in the intersection.

Disadvantages:

- Provides a potential obstruction for collision.
- Maintenance costs increase over all-way stop due to increased landscaping and/or pavement.

Transit Service Impacts:

- Traffic circles can be designed such that buses can navigate left turns by going the wrong way through a traffic circle. On roads with high average daily traffic that would make such maneuvers infeasible, traffic circles should be designed large enough for buses to navigate.

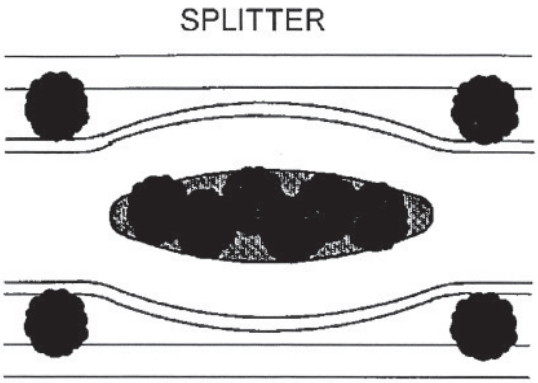
Emergency Services Impacts:

- Traffic circles can be designed such that emergency service vehicles can navigate left turns by going the wrong way through a traffic circle. On roads with high average daily traffic that would make such maneuvers infeasible, traffic circles should be designed large enough for emergency service vehicles to navigate.

Other Considerations:

- Driveways can directly access the traffic circle.
- Installation of a traffic circle typically requires modifying the existing corners. While this work can typically be done within the right of way, it impacts perceived property.
- Visibility of the device should be optimized through the use of raised pavement markers, striping, and signs.

B-4. Splitters (short median)



Description:

Splitter islands divert traffic laterally, often narrowing the roadway, while providing one-way flow for short intervals. Splitters are frequently landscaped for aesthetic appeal. Splitters must maintain a 20ft wide lane for emergency services

Primary Purpose:

Reduce though traffic speeds.

Advantages:

- Reduce speeds on roadways through lateral deflection and roadway narrowing.
- Provide areas for landscaping and improving the aesthetic value of the neighborhood.
- Provide locations for safer mid-block pedestrian crossings.
- Allowable on grades of eight percent or higher.

Disadvantages:

- Create obstructions for potential collision
- Expensive design that may require right-of-way to be acquired for concept
- Maintenance costs increase due to increased landscaping and/or pavement

Transit Service Impacts:

- There is no significant impact to transit services.

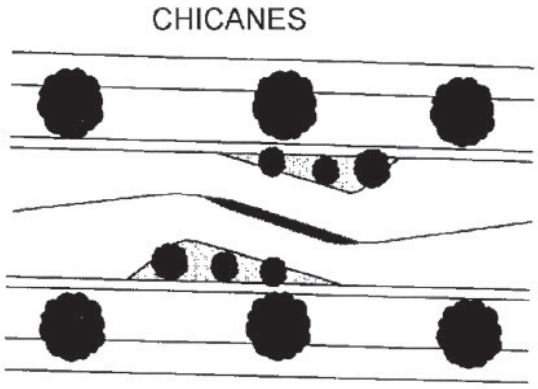
Emergency Services Impacts:

- There is no significant impact to emergency services.

Other Considerations:

- Driveways with access directly to the splitter are not allowable. If there is hardship in the placement of splitters due to driveway locations, chicanes could be considered.
- Installation of a splitter island requires modifying the adjacent property. While this work can usually be done within the right of way, it impacts perceived property.
- Visibility of the device should be optimized through the use of raised pavement markers, striping, and signs.

B-5. Chicanes (deflectors)



Description:

Chicanes change the physical characteristics of a roadway section from an existing straight alignment to a series of horizontal curves, causing horizontal displacement of the vehicle.

Primary Purpose:

Reduce vehicle speeds by providing horizontal deflection and a narrowed vehicle travel path, as well as potentially reducing sight distance that is too great for desired speed.

Advantages:

- Reduce vehicle speeds with less impact on emergency service vehicles.
- Pose no restrictions for bicycle.
- Allowable on grades of eight percent or higher.

Disadvantages:

- Existing driveways can limit placement
- Create obstructions for potential collision
- Maintenance costs increase due to increased landscaping and pavement
- May pose challenges with surface water management

Transit Service Impacts:

- There is no significant impact to transit services.

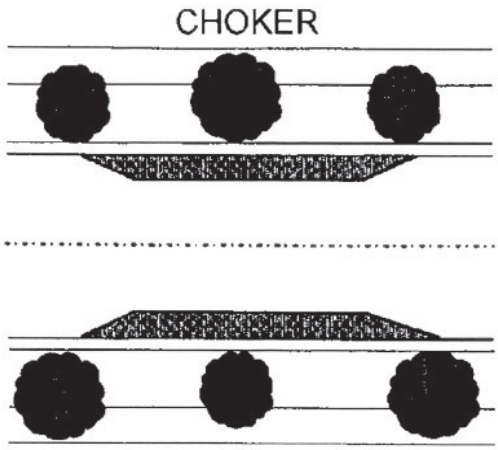
Emergency Services Impacts:

- There is no significant impact to emergency services.

Other Considerations:

- Visibility of the device should be optimized through the use of raised pavement markers, striping, and signs.

B-6. Chokers (neck-downs)



Description:

Chokers narrow a street at an intersection or mid-block by construction of a wider sidewalk, landscape strip, or gateway treatment. Alternatively, lanes can be reduced to 10' by moving the curb lines.

Primary Purpose:

Reduce vehicle speeds by providing horizontal deflection and a narrowed vehicle travel path, as well as potentially reducing sight distance that is too great for desired speed.

Advantages:

- Reduce vehicle speeds with less impact on emergency service vehicles.
- Provide shorter pedestrian crossing distances and better motorist-pedestrian visibility.
- Discourage truck traffic.
- Allowable on grades of eight percent or higher.

Disadvantages:

- Existing driveways can limit placement
- Create obstruction for potential collision
- Potentially impede bicycle safety and mobility
- Maintenance costs increase due to increased landscaping and pavement
- May pose challenges with surface water management
- May result in the loss of curbside parking

Transit Service Impacts:

- There is no significant impact to transit services.

Emergency Services Impacts:

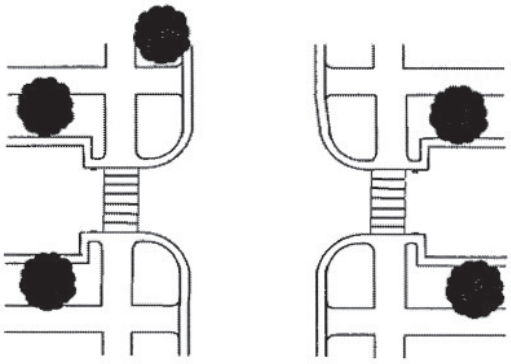
- There is no significant impact to emergency services.

Other Considerations:

- Visibility of the device should be optimized through the use of raised pavement markers, striping, and signs.

B-7. Curb Extensions

CURB EXTENSIONS



Description:

Curb extensions narrow the roadway to make pedestrian crossing faster and safer. They can be installed either at intersections or mid-block.

Primary Purpose:

Improve pedestrian safety by reducing the street crossing distance and increasing sight distance. Curb extensions are similar to chokers (neck-downs) and chicanes, but their primary purposes differ.

Advantages:

- Reduce pedestrian crossing distance and time.
- Make pedestrian crossing points more visible to drivers.
- Prevent vehicles from passing other vehicles that are turning at an intersection.
- Provide transition from a through lane to on street parking, dependent upon road width.
- Visually enhance the street through landscaping or textured treatment.

Disadvantages:

- May reduce the amount of on-street parking.
- Makes accommodating full bicycle lanes difficult.

Transit Service Impacts:

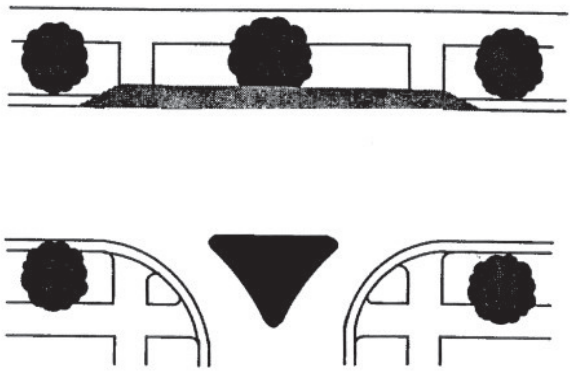
- Enhance service by moving the curb so riders step directly between the sidewalk and bus door.

Emergency Services Impacts:

- There is no significant impact to emergency services.

B-8. Modified Intersections

MODIFIED INTERSECTION



Description:

Barriers that restrict movement may be located at problem intersections. Pictured above is a right-in, right-out intersection that restricts all left turn movements to and from the minor road. Other possibilities include increasing or decreasing the curb radii to encourage different turning speeds at the intersection.

Primary Purpose:

Control traffic flow though neighborhoods.

Advantages:

- Improve safety by reducing the number of conflicting movements in that intersection.
- Reduce local street volumes.
- Reduce the need for future traffic control.
- Restrict vehicular access while retaining bicycle and pedestrian access.
- Provide safer areas for pedestrians to cross the intersection.
- Reduce the speeds at intersections.

Disadvantages:

- May relocate traffic to other locations where turning opportunities exist.
- May inconvenience local residents who are forced to drive longer, more circuitous routes to reach their destination.
- Maintenance costs increase due to increased landscaping and/or pavement.

Transit Service Impacts:

- To minimize the negative effect, transit routes should be planned to accommodate modified intersections. They should not be placed at any location where transit service performs a relevant turning movement.

Emergency Services Impacts:

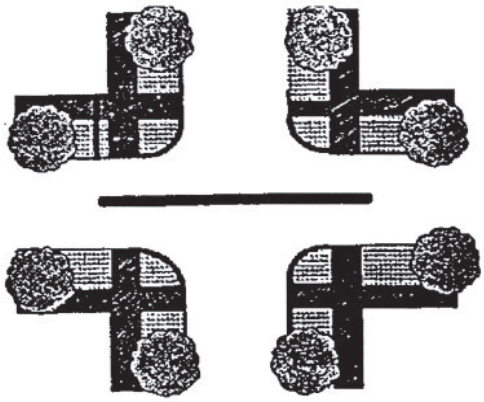
- Even though these barriers would restrict turns for emergency vehicles, they can be designed and installed to provide for emergency access. If desired, the modification can be constructed with breakaway posts and striping, which would allow emergency services while strongly discouraging the target movements.

Other Considerations:

- Striping is easliy violated.

B-9. Median Barriers

MEDIAN BARRIER



Description:

Provide a physical barrier on the major street at an intersection that can effectively eliminate left turns from the major street onto the minor street as well as eliminate minor street straight-through traffic and left turn traffic across the major street. Median barriers usually consist of a concrete curbed island with a decorative landscaping and/or surface treatment.

Primary Purpose:

Restrict traffic flow

Advantages:

- Improve safety by reducing the number of conflicting movements in that intersection.
- Reduce local street volumes.
- Negate the need for future traffic signals.
- Restrict vehicular access while retaining bicycle and pedestrian access.
- Provide safer areas for pedestrians to cross the intersection.

Disadvantages:

- May relocate traffic to other locations where left-turn opportunities exist.
- May inconvenience local residents who may be forced to drive longer, more circuitous routes to reach their destination.
- Maintenance costs increase due to increased landscaping and/or pavement.

Transit Service Impacts:

- To minimize the negative effect, transit routes should be planned to accommodate median barriers. They should not be placed at any location where transit service performs a relevant turning movement.

Emergency Services Impacts:

Even though median barriers would restrict turns for emergency vehicles, they can be designed and installed to provide for emergency access. If desired, the median can be constructed with breakaway posts and striping or ro

- l back/mountable curbing, which would allow emergency services while strongly discouraging left turns.

Other Considerations:

- A full median with no breaks can also be used to prohibit all left turns.