

City of Escondido

**TRAFFIC
MANAGEMENT
TOOLBOX**

City of Escondido Traffic Management Toolbox is the inventory of applicable traffic management and traffic calming measures that can be implemented in different areas that need traffic management due to potential or existing problems caused by speeding, cut-through traffic or unwanted turns issues. The purpose of this Toolbox is to establish a framework on when and how to initiate traffic management and provide guidance on selection and application of the traffic calming measures.

Official signs and striping placed in the public right-of-way and recognized by the public are known as Traffic Control Devices. These devices and their specifications have been officially approved by the State of California Department of Transportation (Caltrans) in CA-MUTCD. Traffic management measures in this “Toolbox”, however, also include features that may not be officially approved through legislative action by the State of California. While the Manual is supplemental to the CA-MUTCD, it is intended to augment and not supersede it.

As mentioned, this Toolbox will provide alternative means that target speeding and/or cut-through problems. Each tool listed is unique and has a specific purpose for addressing and resolving these problems. More than just a structural feature on a street, traffic calming tools also encompass education, enforcement and engineering. Tools are classified in three different groups.

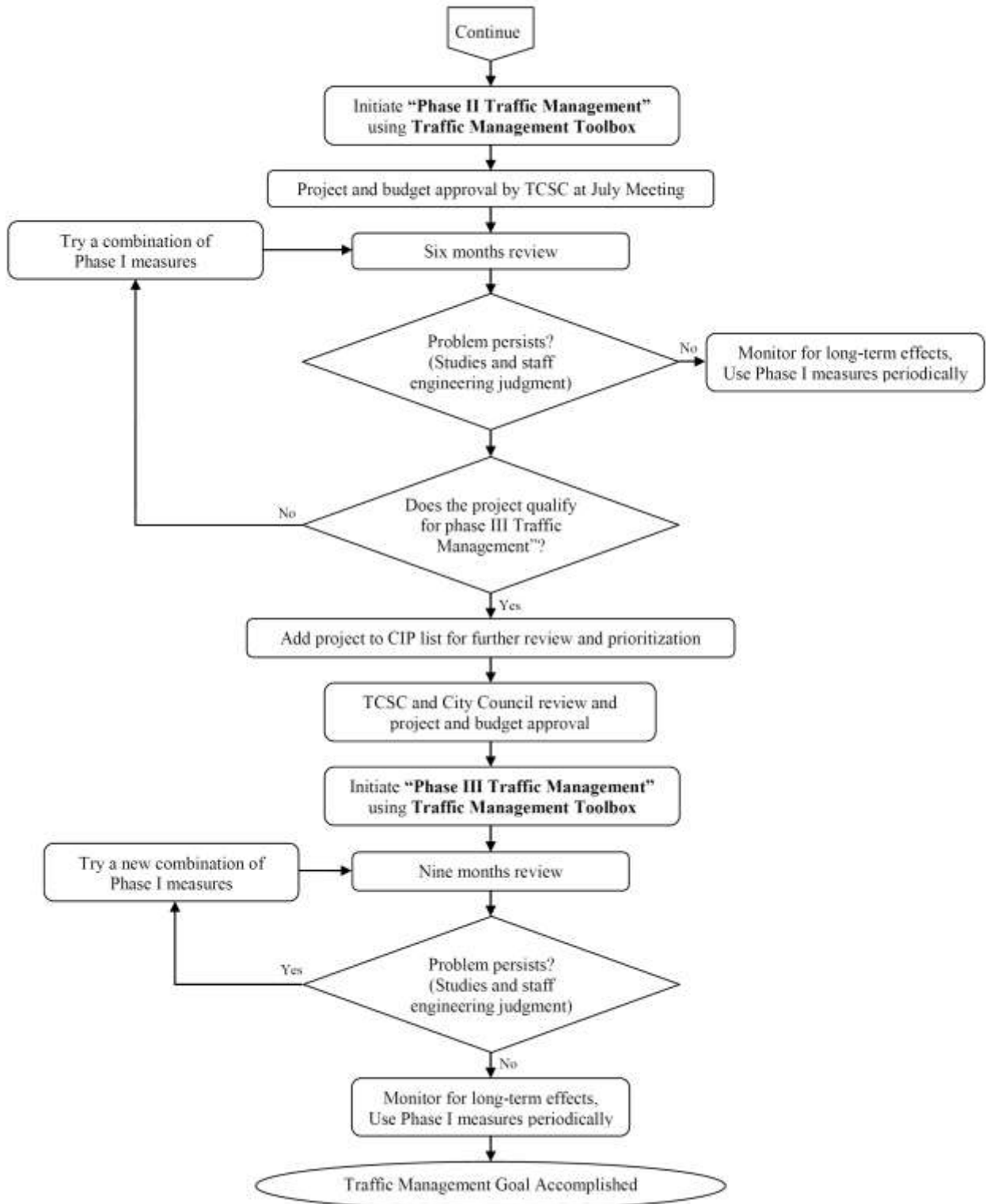
Class I tools are mainly non-physical measures related to Education and Enforcement and also include minor signage. City will fund the class I measures using its “Signals& Intersections” budget. Class II tools mainly consist of signing and striping projects leading to traffic management and some physical speed management measures. Finally class III tools are the ones that require serious physical improvement of the streets and modification of their existing conditions. Class II and Class III measures are funded by Transportation and Community Safety Commission (TCSC) of the City of Escondido and will be implemented on highest priority projects selected by TCSC from the City’s Traffic Management Projects List (TMPL). These projects can also be included in the City’s CIP projects list and be funded through CIP process.

The following pages identify tools that have been endorsed and are available for use in the City of Escondido. This set of measures constitutes Escondido’s “Traffic Management Toolbox”. These measures were chosen based on:

- Acceptability of the measures to the Escondido Residents
- Acceptability of the measures to stakeholders including the Fire and Police and Public Works Departments
- Acceptability of the measures to the City Appearance Committee
- Feasibility and appropriateness to address and resolve traffic concerns in the City
- Compatibility of the measures to national standards and guidelines
- Availability of financial resources

In this Toolbox, all approved traffic management and traffic calming measures are briefly described, application for their usage is listed and possible advantages and disadvantages of the tools are also clarified. Photographic examples of different measures are presented in the following figures.





Escondido PD Presence and Enforcement – Class I

Description:

Escondido Police presence will help to make a visual showing in residential neighborhoods and discourage speeding. Enforcement entails the presence of police to monitor speeds and other illegal traffic behavior and issue citations if necessary. It is an initial attempt to reduce speed on streets with speeding problems.

Application:

Streets with documented speeding problem. It can also be used during the learning period when new devices or restrictions are first implemented.

Advantages:

- Very effective while officer is actually present at the location
- Can be targeted to specific time periods that are deemed to be most problematic
- Can be implemented on short notice
- Targets only violators without affecting normal traffic

Disadvantages:

- It is a temporary measure, usually only effective when the officer is present
- Enforcement may be limited by police availability and other policing duties
- Long term financial commitment of police personnel
- Short “memory effect” on motorists when enforcement officer no longer present



Safety Education – Class I

Description:

Safety education programs include efforts to make the public more aware of their own driving behavior and the impact it has on others. Pedestrian and bicycle safety programs alert and educate pedestrians and bicyclists on road safety. Driver safety information and education on existing laws can help improve driver behavior.

Application:

Neighborhood and School Safety programs and field training workshops can be arranged. Bike-Walk Escondido Committee can also help in educating schools and neighborhood residents.

Advantages:

- Has a long term effect
- Affects and helps both sides (local drivers and also bikes and pedestrians)
- Relatively cheap

Disadvantages:

- Very time consuming
- Needs help of EPD, volunteers and also arrangement and scheduling
- Many people might not be interested or may not participate
- Usually should be accompanied by some other measures to be effective



Speed Limit Signs – Class I

Description:

Signs that define the legal driving speed under normal conditions. The speed limit is based on undertaken surveys or based on established rules and regulations.

Application:

At Streets where speeding is a problem and ongoing enforcement is realistic.

Advantages:

- Provides clear definition of legal speed limit
- Provides context for enforcement efforts
- Provides goal for traffic calming efforts

Disadvantages:

- Typically not effective in and of itself
- Not self-enforcing
- Requires on-going police enforcement
- Unrealistically low speed limits are difficult to enforce and tend to be disregarded
- More visual pollution from signs in the neighborhood



Speed Monitoring Trailers – Class I

Description:

Mobile trailer mounted radar display that informs drivers of their speed. As drivers approach the sign, they are detected by radar and their speed displayed in flashing or static lights.

Application:

Any street where speeding is a problem

Advantages:

- Educational tool
- Good public relations
- Effective for temporary speed reduction needs

Disadvantages:

- Some motorists may speed up to try to register a high speed
- Duration of effectiveness may be limited
- Not self-enforcing



Restricted Movement Signs – Class I

Description:

Sign that prohibits certain movements at an intersection on certain days of the weeks and in a certain period of time based on the existing problem

Application:

Streets where reducing cut-through traffic is desired

Advantages:

- Redirects traffic to main streets
- Reduces cut-through traffic
- Addresses time-of-day problems

Disadvantages:

- Not self-enforcing (low voluntary compliance)
- May increase trip length for some drivers
- Increases number of downstream turning movements
- More visual pollution from signs in the neighborhood
- May lead to confusion at busy intersections



Stop Signs – Class I

Description:

Stop signs are basically not meant to be traffic calming devices and should not be used for the sole purpose of speed reduction; but when used properly in conjunction with other traffic management measures they are very effective in right-of-way management and also calming the traffic.

Application:

Streets where roads with different classifications intersect and there is a speeding problem on one or both corridors

Advantages:

- Self-enforcing
- Provides context for enforcement efforts
- Relatively cheap

Disadvantages:

- More visual pollution from signs in the neighborhood
- May lead to sharper speed profiles between intersections
- Drivers try to make up the lost time by speeding even more



Radar Speed Display Signs – Class II

Description:

As drivers approach the sign, they are detected by radar and their speed displayed in flashing or static lights on the sign panel. These signs are intended for residential streets with moderate traffic volumes.

Application:

Residential streets where speeding is a problem

Advantages:

- Increases driver awareness of speed and the posted speed limit
- Can be turned off at a higher speed threshold in order to discourage deliberate speeding
- Drivers driving at the speed limit or less don't trigger the sign
- Educational tool
- Can be solar powered
- Can collect speed data

Disadvantages:

- Added cost to install and maintain
- Long-term effectiveness may be limited for everyday drivers
- Duration of effectiveness may be limited
- Not self-enforcing



High Visibility Crosswalks – Class II

Description:

High visibility crosswalks established by painting stripes between the crosswalk's outer boundary stripes.

Application:

Residential, local collector and collector roads where pedestrian crossing demand is considerable

Advantages:

- Relatively cheap
- More visible to the driver than traditional crosswalks.

Disadvantages:

- Not an active intersection control measure
- May give false sense of security to pedestrians
- Higher maintenance costs



Lane Narrowing – Class II

Description:

Lane narrowing physically restricts the final width of a lane between ten to twelve feet, while expanding sidewalks and landscaped areas.

Application:

Residential, local collector and collector roads where speeding is a problem

Advantages:

- Good for pedestrians and bicyclists due to shorter crossing distance
- Slows traffic without significant impact on first responders
- Most effective on streets where excessive speed is primarily due to street width

Disadvantages:

- May increase accidents, if opposing traffic is brought closer
- Narrowing by center cross-hatch needs extensive maintenance
- Results in less relaxed driving



Bike Lanes – Class II

Description:

Marked lanes located within a road right-of-way, designated for use by cyclists and from which vehicular traffic is generally excluded.

Application:

Street segments with potential bicyclists and/or where lane narrowing is intended

Advantages:

- Good for bicyclists due to separation of vehicular traffic and bicycles
- Helps Traffic Calming goals since it usually leads to some sort of lane narrowing
- Can be implemented with Street Maintenance Program
- Can be consistent with City’s Bicycle Master Plan

Disadvantages:

- Necessary width is not always available
- Right-of-way issues at intersections
- Turning movement problems at intersections (mainly left-turns)



Bike Buffers – Class II

Description:

A safe no-man’s-land usually cross-hatched area marked between bike-lanes and the adjacent travel lane to completely separate vehicular traffic from bicyclists.

Application:

Street segments with potential bicyclists and higher 85% speed and/or where lane narrowing is intended

Advantages:

- Good for bicyclists due to separation of vehicular traffic and bicycles
- Helps Traffic Calming goals since it usually leads to some sort of lane narrowing
- Can be implemented with Street Maintenance Program
- Can be consistent with City’s Bicycle Master Plan

Disadvantages:

- Maintenance costs
- Necessary width is not always available
- Right-of-way issues at intersections



Edge Lines – Class II

Description:

Marking the edge of the outside travel lane and clarification of the travel way width

Application:

Rural, Residential, local collector and collector roads where speeding is a problem due to width of the road and/or roads with large number of pedestrians using sidewalks

Advantages:

- Good for pedestrians and bicyclists using sidewalks since it usually creates a safe area between them and the vehicular traffic
- Most effective on streets where excessive speed is primarily due to street width

Disadvantages:

- Not a very effective Traffic Calming measure when implemented without other measures
- Pedestrians use the remaining width of the AC out of the edge line to walk in areas with no sidewalk



Speed Tables – Class II

Description:

Speed table is a short, raised street section that extends across the roadway. Speed tables are gradual changes in the roadway surface and have little or no effect on a vehicle driving the posted speed limit or slower, but can produce discomfort when the speed limit is exceeded

Application:

Rural, Residential, local collector roads where speeding is a problem

Advantages:

- Increases pedestrian safety
- Self-enforcing
- Relatively inexpensive
- Parking allowed on table
- Does not affect drainage

Disadvantages:

- May increase response time for emergency vehicles
- May generate minor noise at table when traversed by large trucks or buses
- Some discomfort for short wheel-based vehicles



Raised Crosswalks – Class II

Description:

Raised crosswalks are flat-topped speed tables, built as a pedestrian crosswalk, with vehicle ramps on the approaches.

Application:

Local collector and local roads where speed control and pedestrian crossing designation are desired

Advantages:

- Increases pedestrian visibility in the crosswalks
- Requires minimal maintenance
- Affects cut-through traffic

Disadvantages:

- May increase traffic noise in vicinity of crosswalk
- May create drainage issues where raised crossing extends from curb to curb
- May require extensive warning signs to be effective



HAWK Beacons – Class III

Description:

A HAWK beacon (High-Intensity Activated crossWalk beacon) is a traffic signal used to stop road traffic and allow pedestrians to cross safely. It is also known as "pedestrian hybrid beacon" or "HAWK signal". The purpose of a HAWK beacon is to allow protected pedestrian crossings, stopping road traffic only as needed.

Application:

Mid-block pedestrian crossing in areas with higher ADT and/or average speed of vehicles and high number of crossing pedestrians

Advantages:

- Active Intersection Control Device
- High Visibility
- Usually very effective (over 97%)

Disadvantages:

- Can provide false sense of security
- Drivers are unfamiliar with HAWK
- Not effective on the whole segment



Turn Forcing Islands – Class III

Description:

Turn forcing islands are raised median islands that restrict through movement in one direction at an intersection.

Application:

Turn forcing islands are most applicable to local streets where cut-through traffic in one direction is a major problem.

Advantages:

- Reduces cut-through traffic
- More self-enforcing than signs
- Shorter pedestrian crossing distances

Disadvantages:

- Will re-direct traffic to other local streets
- Causes increased travel time for local residents
- Is a permanent measure, even though problem may be limited to certain periods
- Needs significant warning and guiding signs



Entry Islands with Neighborhood Signs – Class III

Description:

A raised island in the center of a two-way street that identifies the entrance to a neighborhood

Application:

Placed in a roadway to define the entry to a residential area and/or to narrow each direction of travel and interrupt sight distance along the center of the roadway

Advantages:

- Notifies motorists of change in roadway character
- Helps slow traffic
- Opportunity for landscaping and/or monumentation for aesthetic improvements
- May discourage cut-through traffic

Disadvantages:

- Need for maintenance (and irrigation)
- May necessitate removal of parking



Intersection Neckdowns (Bulbouts) – Class III

Description:

Curb extensions at intersections that reduce roadway width curb-to-curb

Application:

Typically used at intersections where two or more adjacent legs have parking lanes and the width can be used to narrow roadway and shorten pedestrian crossings at the intersection

Advantages:

- Increase in pedestrian visibility and crossing distance reduction
- Can “reclaim” pavement for pedestrian and streetscape amenities
- Breaks up drivers’ line-of-sight (mainly turning vehicles)
- May provide opportunity for decorative crosswalk treatment

Disadvantages:

- Effect on vehicle speeds is limited by the absence of pronounced vertical or horizontal deflection
- Creates drainage issues where curb and gutter exist
- May create an obstruction for bicyclists



Mid-Block Chokers – Class III

Description:

Chokers are raised islands in the parking zone that can be detached from the curb line to allow for drainage.

Application:

Mid-Block chokers narrow the roadway and are most applicable on wide streets with speeding and cut-through problems.

Advantages:

- Speed reduction
- Breaks up driver's sight-line
- Reduces pedestrian crossing
- Increases pedestrian and motorist visibility

Disadvantages:

- May require partial or total removal of on-street parking
- Increases maintenance for areas where street sweeping equipment cannot reach between the choker and the curb line
- Can lead to liability on certain accidents



Diverter – Class III

Description:

Diverter are raised areas placed diagonally across a four-way intersection that restrict all through movements and force a turn in some directions.

Application:

Diverter are most applicable to local streets where cut-through traffic is a major problem.

Advantages:

- Reduces cut-through traffic
- Channels traffic flow, thus eliminating conflicts at an intersection
- Can be designed to accommodate emergency vehicles
- Can accommodate bicycle traffic through intersection

Disadvantages:

- Will re-direct traffic to other local streets
- Causes increased travel time for local residents
- Is a permanent measure, even though problem may be limited to certain periods
- May require partial or total removal of parking near intersection
- Needs significant warning and guiding signs



Chicanes – Class III

Description:

This Curved street alignment can be designed into new developments or retrofitted in existing right-of-ways. The curvilinear alignment requires additional maneuvering and shortens drivers' sight-lines, resulting in lower average speed

Application:

Can be applied to any street where speed control is desired, provided the street is wide enough to accommodate the curvilinear design

Advantages:

- Changes the look of the street, making it more pleasing
- Has minimal impact on emergency response
- Usually very effective

Disadvantages:

- Involves extensive design and expensive implementation
- May require partial or total removal of on-street parking
- Additional maintenance for service vehicles to maneuver a curvilinear street
- May require modification of drainage features and other utilities



Medians and Center Islands – Class III

Description:

Raised island in the center of the roadway with one-way traffic on each side

Application:

Used on wide streets to narrow each direction of travel and to interrupt sight distances down the center of the roadway

Advantages:

- Narrowed travel lanes provide “friction” and can slow vehicle speeds
- Significant opportunity for landscaping and visual enhancement of the neighborhood
- Can utilize space which otherwise would be “unused” pavement
- Can be used to control traffic access to adjacent properties if desired

Disadvantages:

- Medians are very expensive
- Long medians may impact emergency access and operations due to left-turn limitation
- May interrupt driveway access and result in downstream U-turns
- May require removal of parking



Median Barriers – Class III

Description:

Median barriers are raised islands in the center of the roadway that separate traffic directions. Extended medians reach beyond cross street(s), thus eliminating left turns and through traffic.

Application:

Medians Barriers are used on wide streets to narrow the travel lanes, discourage cut-through traffic on the other direction and interrupt sight distances

Advantages:

- Helps pedestrian crossing
- Narrowed travel lanes can slow vehicle speeds
- Opportunity for landscaping and visual enhancements to the neighborhood
- Reduces cut-through traffic

Disadvantages:

- Relatively significant impact on emergency access and operations
- May interrupt driveway access and result in U-turns
- May require removal of parking
- Relatively expensive



Traffic Circles – Class III

Description:

Traffic circles are raised circular medians in an intersection with counterclockwise traffic flow. Vehicles must change their travel path to maneuver around the circle and are typically controlled by “Yield on Entry” on all approaches.

Application:

Intersections and streets where speed control and improved side-street access is desired

Advantages:

- Provides increased access to street from side street
- Slows traffic as it drives around circle
- Breaks up sight-lines on straight streets
- Opportunity for landscaping in the intersection

Disadvantages:

- Unclear definition of right-of-way for some users
- May impede emergency response when smaller diameters are used and causes problems for left turns maneuvers by large vehicles
- On streets with bicycle facilities, bikes must merge with traffic around circle



Mini-Roundabouts – Class III

Description:

The raised circular median (inner circle) directs traffic flow in a counterclockwise direction through an intersection. Vehicles must change their travel path to maneuver through the roundabout, which will be controlled by “Yield on Entry” on all approaches.

Application:

Mini-Roundabouts are designed for all levels of local collector and below classifications usually in neighborhoods with acceptable traffic conditions and lower volumes.

Advantages:

- Provides increased access to major street from side street
- Slows traffic as drivers maneuver around the circle
- Breaks up sight-lines on straight streets
- Opportunity for landscaping and visual enhancements to the neighborhood
- Possible Congestion Relief

Disadvantages:

- Unclear definition of right-of-way for some users
- Usually expensive
- May impact flow of pedestrians and bicyclists



Roundabouts – Class III

Description:

The raised circular median (inner circle) directs traffic flow in a counterclockwise direction through an intersection. Vehicles must change their travel path to maneuver through the roundabout, which will be controlled by “Yield on Entry” on all approaches.

Application:

Roundabouts are high capacity, minimum delay safety features, designed for all levels of arterial and collector traffic conditions.

Advantages:

- Provides increased access to major street from side street
- Slows traffic as drivers maneuver around the circle
- Breaks up sight-lines on straight streets
- Opportunity for landscaping and visual enhancements to the neighborhood
- Possible Congestion Relief

Disadvantages:

- Unclear definition of right-of-way for some users
- Usually very expensive
- Impacts flow of pedestrians and bicyclists

