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Traffic Engineering Division

Residential Neighborhood Traffic Management Program

for the City of Orange
……..…February 2006

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City of Orange Commits to the Safety and Livability of Residential Neighborhoods.

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Residential Neighborhood Traffic Management Plan

for the City of Orange

Introduction

The City has been receiving, in recent years, numerous concerns and complaints regarding a variety of traffic related problems mostly within residential neighborhoods. These concerns are generally regarding perceived excessive speeds and at times are focused on high traffic volumes or number of accidents. These characteristics mostly have their root causes in issues such as urban sprawl, unmitigated densification of land uses, population growth and social/cultural trends in the society which are obviously beyond the domain of conventional municipal traffic engineering. Nevertheless, traffic professionals over the years have developed techniques to reduce the negative impacts of such problems in urban settings. This program, prepared for the City of Orange, has been developed through a comprehensive survey and evaluation of similar efforts in other municipalities in North America (U.S. and Canada), Western Europe and Australia. Some of the material presented in this report is drawn from similar documents prepared for those municipalities. Obviously, each community must carefully evaluate and

choose only those techniques that are suitable for their needs and will enjoy public support.

This report provides a “Tool Box” of traffic management and traffic calming measures identifying each technique’s advantages and disadvantages, establishing general design parameters (where possible), and policies/procedures for their implementation.

The following is a list of techniques/measures evaluated and presented in this report:

1. Traffic Circles
2. Speed Humps
3. Narrowings (mid-block or at intersections)
4. Diverters (partial or full) [turn-restriction signs]
5. Offset narrowings of streets
6. Neighborhood Traffic Watch
7. Video/Photo Enforcement
8. Speed Wagon/Trailer
9. Driver Education
10. Selective Traffic Enforcement
11. Slow Points (mid-block and intersection)

Conventional passive types of control such as speed limit signs are already regulated by State laws and are not presented here. Also, regulatory traffic control devices such as traffic signals and STOP signs serve a different purpose and their use for traffic management/calming is strongly discouraged by federal and state guidelines such as the Manual for Uniform Traffic Control Devices (MUTCD) [Section 2B-5].

Full street closures are not discussed in detail in this report. Such drastic measures are strongly discouraged due to their many adverse impacts. Any street closure project must be programmed and evaluated individually going through full environmental clearance and budget appropriation processes.

Program Objectives

The overall objectives of the Program are derived from existing City policy and are as follows:

1. Encourage through traffic to use higher classification arterials, as designated on the City's Master Plan of Streets & Highways.

2. Improve neighborhood livability by mitigating the adverse impacts of vehicular traffic on residential neighborhoods; i.e., noise, air pollution, safety, etc.

3. Promote safe and pleasant conditions for residents, motorists, bicyclists, and pedestrians on residential streets.

4. Encourage and incorporate citizen participation in all phases of Traffic Management/Calming Program activities.

5. Make efficient use of City resources by prioritizing projects.

6. Reduce collision frequency and severity.

7. Maximize the use of self-enforcing measures.

Program Policies

The following policies are established to guide the staff, the community and the policy-makers in selecting the appropriate measures for each individual case.

1. A combination of education, enforcement, and engineering methods should be employed. Appropriate measures should be planned and designed in keeping with sound engineering and planning practices. The City Traffic Engineer shall direct the installation of devices as needed to accomplish the project, in compliance with the municipal code, and acceptable professional traffic engineering practices.

2. Emergency vehicle access should be accommodated consistent with response standards. If current emergency vehicle access does not meet the existing response standard, traffic calming efforts should not further degrade the response time.

3. Transit service and school bus access, safety, and scheduling should not be significantly impacted.

4. Reasonable automobile access should be maintained. Pedestrian, bicycle, and transit access should be encouraged and enhanced wherever possible within budget limitations.

5. Parking removal should be considered on a project-by-project basis. Parking needs of residents should be balanced with the equally important functions of traffic, emergency vehicle access, transit, bicycle, and pedestrian movement. However, it should be acknowledged that the implementation of many of the traffic calming measures will require elimination of on-street parking spaces.

6. Application of the Program shall be limited to those neighborhood streets that are within a "residence district" as defined by the California Vehicle Code (CVC) Sections 240 and 515.

7. Traffic may be rerouted from one local street to another as a result of a traffic calming project. The acceptable traffic diversion should be defined on a project-by-project basis.

8. To implement the Program, certain procedures should be followed by the Traffic Engineering Division in processing traffic calming requests in accordance with applicable codes and related policies within the limits of available resources. At a minimum, the procedures (defined later in this report) shall provide for submittal of project proposals, project evaluation and selection, citizen participation, communication of any test results and specific findings to project area residents and affected organizations and appropriate City Traffic Commission and City Council review and approvals before installation of permanent traffic calming devices.

9. The potential increased liability to the City associated with the installation of such measures should be assessed by the City Attorney on a project-by-project basis.

10. Cost sharing options between City and the area residents must be seriously considered for the implementation of the recommended measures, especially for any unfunded projects.

Thresholds

In order to maximize the benefits of this Program through effective allocation of personnel and financial resources to address "real" needs, the "candidate" street (or streets) must meet certain conditions before the City considers initiation of any traffic management/calming study.

Candidate street(s) shall meet all of the following requirements:

a) Street must not be more than one lane in each direction.

b) Street must not be wider than 40 feet, curb-to-curb.

c) Street must not be on the City's Master Plan of Streets & Highways or on the County's Master Plan of Arterial Highways.

d) Street must not be on an established Orange County Transit District Route as adopted by the OCTA.

e) Street must not be used as a secondary emergency response route by the City of Orange Fire Department as highlighted on the accompanying map.

f) Street must be in a "residence district" as defined by Sections 240 and 515 of the California Vehicle Code (CVC).

In addition to meeting all of the above conditions, the candidate street(s) must meet at least one of the following criteria as well:

a) The 85th percentile speed of traffic (as measured for an average weekday for a period of one-hour during off-peak hours) must be equal to or greater than 35 miles per hour (MPH) and an average daily traffic volume of 700 vehicles.

b) The average daily traffic volume (measured by averaging 3-day count from Tuesday through Thursday) must be at least 2,500 vehicles, total in both directions, in a 24-hour period.

c) The accident rate for the candidate street during the 12-month period preceding the date of the study must be greater than the "Expected Accident Rate" for such a roadway as established by the California Department of Transportation.

Procedures

The procedures specified in this section are the City's policy for processing traffic related requests in residential neighborhoods. Any special cases or requests not foreseen in these procedures, will be determined administratively by the City Traffic Engineer. These procedures complement the City's Municipal Code, Ordinances and Council Resolutions and do not supersede them. In the case of any apparent conflict, those shall prevail over this policy.

1. Initial request should be made by the resident(s) in writing, explaining their specific concerns and identifying their requested device(s), if any.

2. The applicant shall be provided information regarding City's Residential Neighborhood Traffic Management Program as a handout package. This package will be prepared and updated by Traffic Engineering Division staff and not exceed 4 pages.

3. If the streets encompassed by the applicant's request meet the minimum criteria established in the "Threshold" section of this report, staff will advise the applicant of the initiation of a "Residential Neighborhood Traffic Management Program" study. Staff will collect the necessary field data such as the average daily traffic volume and traffic speed information as part of this eligibility determination.

4. If the included street(s) meets the requirements in the "Threshold" section of this report, Traffic Engineering Division staff will evaluate the field conditions and recommend appropriate traffic management/calming measure(s) as described in this policy. The City Traffic Engineer will review and approve the staff recommendation(s). The applicant(s) will then be notified of the staff's recommendation(s). If the applicant(s) disagree(s) with the staff's findings, he may request that the project be presented to the City Traffic Commission for their review and recommendation.

5. If the applicant(s) agree(s) with staff's recommendation(s) and decide(s) to pursue further, staff will prepare a petition for the study area (which could be one or more streets) and send it to the applicant(s) via certified mail. The petition will briefly outline the staff recommendation(s) and the City's program and policies regarding installation and removal of traffic management/calming measures and the costs associated with them. Each household is allowed one signature which must be that of the head of household.

6. Seventy-five percent (75%) of all the households in the study must sign the petition in favor of the staff's recommendation(s)

acknowledging the implications of the installation of the proposed devices. The petition will clearly state staff's (or the City Traffic Commission's) recommendation and will indicate the location of any proposed devices, i.e., speed humps. This information will be shown on every individual signature page of the petition. The placement of calming devices is a technical decision that should be made by the City Traffic Engineer and is not contingent upon consent of adjacent property owner(s)/resident(s). Applicant(s) will be given 45 calendar days (from the date the petition is mailed by the City) to complete the petition and return it to the City. Failure to accomplish this will terminate the process, and any further requests (even on the same streets) will require another eligibility check by staff as prescribed in this section. All attempts should be made to ensure that all households within the study area are given the opportunity to review and sign the petition.

7. Upon the receipt of the completed petition (meeting requirements specified in Items 5 and 6 herein), staff will present the project to the City Traffic Commission for review and approval for a three-month trial period. Note that <u>all</u> resident addresses on the petition will be notified of the City Traffic Commission meeting. Staff will obtain additional

technical data during the trial period and report back to the City Traffic Commission and area residents on the effectiveness/acceptance of the traffic calming device(s).

8. At the end of the trial process the request is returned to the City Traffic Commission for final approval provided the device(s) is functioning as expected and the majority of area residents accept the proposed device(s) on a permanent basis.

9. After the City Traffic Commission action, the request is forwarded to the City Council along with a cost estimate for final approval.

10. Any request for removal of the permanently installed devices must be accompanied with a petition meeting the requirements specified in Item 5 of this section. Eighty percent (80%) of all the households in the study area must sign the petition in favor of the removal of devices. No removal petition will be accepted during the three-month trial period as specified by the Commission.

11. Removal petitions will be presented to the City Traffic Commission for review and recommendation. City Traffic Commission action regarding removal of devices will be final unless appealed to the City Council.

12. City considers staff time associated with processing such requests as legitimate expenditures promoting public interest at large and does not require financial participation in the installation of either temporary or permanent traffic calming measures, when directed by the City Council and/or the City Traffic Commission to install such devices. However, the cost remove any permanent traffic calming device shall be assessed to the entire neighborhood. Any follow-up requests on the same streets (made after devices are installed on permanent basis or are removed according to these procedures) will be subject to application fees of $2,650 and $2,170 for installation and removal requests, respectively. Those fees will be due after staff's determination of a street's eligibility according the requirements established in the "Threshold" section of this report.

13. All clarifications or administrative interpretations of these procedures will be made by the City Traffic Engineer.

Traffic Circles

Traffic circles are raised (or unraised, temporary trial installation) islands placed in the center of an intersection. Their primary purpose is to slow high-speed traffic. They can be installed at either controlled or uncontrolled intersections. Traffic circles are most effective when constructed in series. The raised median forming the circle can be either landscaped or hardscaped. Plan views of typical traffic circles are presented in Exhibits 1 and 2.

ADVANTAGES	DISADVANTAGES
• Effectively reduce speeds • Improve safety conditions (i.e., reducing left-turn accidents) • Visually attractive (if landscaped properly)	• Requires some parking removal. • Can potentially increase bicycle/ auto accidents due to narrower lanes • May restrict emergency vehicle access, if cars park illegally near the circle.

The traffic circles can be designed and constructed according to dimensions specified in Exhibits 3 and 4.

The potential location and number of traffic circles will be determined by the City Traffic Engineer in consultation with the area residents and City's Fire and Police Departments. Temporary circles using flexible posts may be tried on an interim trial basis before constructing the permanent islands.

COST: Depending on the size and treatment of the raised islands, a typical traffic circle at a residential street intersection can cost between $8,000 (hardscaped) and $12,000 (landscaped).

SPEED HUMPS

Speed Humps are usually constructed as “Single-Curvature” or “Flat Top.” (“Flat Top” configuration is also referred to as a “Speed Bed.”) The “Single Curvature” speed hump is a gradual rise and fall of the street profile in the direction of travel shaped as a single parabolic curve (see Exhibit 6). The “Flat Top” speed hump is a gradual rise in the street profile, in the direction of travel, through a parabolic curve followed by an elevated section then a fall back to the normal profile through a second parabolic curve. Either of the two configurations can be designed and constructed safely. Speed humps have been proven to be very effective in reducing traffic speeds, if designed and installed properly. A typical plan view of a speed hump is shown in Exhibit 5.

ADVANTAGES	DISADVANTAGES
• Effectively reduce traffic speeds. • Do not require parking removal. • Pose no restrictions to bicycles. • Do not affect intersection operation.	• Can possibly increase traffic noise From braking and acceleration of Vehicles, particularly busses and trucks.

Speed humps, Single-Curvature or Flat Top, can be designed and constructed according to Exhibits 2 and 3, respectively. The City Traffic Engineer, in consultation with the adjacent community, will determine the type of speed hump which is more appropriate on a project-by-project basis.

COST: Approximately $3,000 per undulation of "Single-Curvature," and $5,000 for the "Flat Top" per installation.

The placement of speed humps shall be in conformance with the following guidelines:

1. Speed humps shall not be installed on residential roadways with grades of five percent (5%) or greater.

2. There shall be no public or private street intersections within 150 feet of the proposed location of speed humps.

3. There shall be a reasonable minimum length of uninterrupted street segment (preferably 1,200 feet or more) to be considered for installation of humps. The City Traffic Engineer on an individual basis will evaluate this requirement.

4. The City Traffic Engineer will determine the number of humps, their locations, and spacing between them. The City's Fire and Police Departments will be consulted for these determinations.

5. The installation of humps may shift or divert some traffic onto parallel residential routes. Any insignificant shift or diversion of traffic should be accepted as a by-product of these devices without need for further mitigation. All significant re-routings as determined by the City Traffic Engineer, will be mitigated to the fullest possible extent on individual basis.

NARROWINGS

Narrowings of street cross-sections (usually at intersection approaches, but could be at mid-block locations as well) is reducing the roadway width by widening sidewalks and/or parkways. Narrowings reduce traffic speeds, but

they also enhance pedestrian safety by making crossing points more visible and by reducing crossing distance across the roadway. Plan views of typical narrowings are presented in Exhibits 7 and 8. Typical dimensions for a narrowing at an intersection are shown on Exhibit 9.

ADVANTAGES	DISADVANTAGES
• Slightly reduces speeds. • Improves pedestrian safety. • Aesthetically improves the street (if done properly). • Provides opportunity for gateway treatment to define neighborhoods. • Allows signs to be placed closer to driver's line of vision.	• Creates additional potential collision obstacle. • Usually results in loss of some on-street parking. • May require re-working of street drainage which could be very costly.

Probably the greatest attribute of narrowings (also known as "curb-extensions") are their psychological effect when used properly at several locations throughout the neighborhood. Key factors to consider in their placement are loss of parking, street drainage, emergency vehicle operation, and impact on City services such as street sweeping and waste collection.

Narrowings must be designed individually. Their locations and configurations shall to be approved by the City Traffic Engineer.

COST: Depending on the drainage needs of the intersection, cost of narrowings can vary. If no major re-work of drainage is needed, they can be done for about $6,000 per location.

Diverters

Diverters are physical barriers across the street. They could be partial diverters (barrier across half of the street) or full diverters (barrier across full width of the street). Diverters are mostly used at intersections and can be designed in a variety of configurations depending on the project needs. Some examples are diagonal diverter and forced-turn channelization. The primary

use of diverters is to shift and re-route vehicles in the cases of excessive "cut-through" traffic. Examples of diverters are shown on Exhibits 10 through 13.

ADVANTAGES	DISADVANTAGES
• Self-enforcing. • Completely eliminates "cut-through" traffic.	• Usually shifts the problem elsewhere. • Separates communities. • May adversely impact emergency response time and City services.

Diverters are very restrictive forms of traffic management and have significant impacts on area wide traffic patterns. Their placement should only be considered after a comprehensive traffic study and through active community participation and public hearings.

Under certain conditions, to be determined by the City Traffic Engineer, the function of diverters may be accomplished through the use of turn-restriction signs only. However, such regulatory signs are usually effective only when combined with extensive enforcement activity and are not considered self-enforcing in most cases.

COST: Varies depending on the project and the type of diverters.

OFFSET-NARROWINGS

Offset-Narrowings are artificial blockages on opposite sides of the streets at an off-set configuration to create an S-curvature on a naturally straight street. The purpose of the offset-narrowing is to reduce traffic speed and produce

caution in the driver. Typical layouts for offset-narrowings are shown on Exhibit 14.

ADVANTAGES	DISADVANTAGES
• Reduces traffic speed. • Aesthetically improves the street.	• Usually results in significant loss of on-street parking. • Expensive to implement as usually requires extensive street re-work and even utilities relocation. • Not effective on streets with substantial horizontal curvature or where crest-vertical curves limit sight distance.

Offset-narrowings may only be placed through a detailed re-design of the street. This can only be done subsequent to extensive community participation and budgeting a specific project.

COST: Varies depending on the project.

Neighborhood Traffic Watch

This program requires extensive community involvement and public education. Radar units are purchased and provided by the City. Volunteer residents are trained on the use of the radar unit and the appropriate field operation and precautions. The residents will record the license plates of habitual speeders in the area and report them to the City. The City's Police Department forwards a courtesy letter to the registered owner of the vehicle informing him/her of the observed violations with a reminder to observe the speed laws.

In order to minimize amount of training and possible conflicts between "over zealous" residents and speeding drivers, the previously established cadre of "volunteers" in the Police Dept. may be used for implementation of this program. These individuals have already received some training, and as they do not live in the "Study Area" they will not over-extend their limited monitoring functions to enforcement activities.

ADVANTAGES	DISADVANTAGES
• Involves the community in the solution of problem. • Potentially reduces speeds and on occasions divert traffic resulting in lower volumes.	• Requires extensive residents involvement. • Requires extensive and ongoing public education to minimize adverse legal implications.

- Could be used in many neighborhoods in the City at a reasonable cost.
- It usually takes a few months to observe the effectiveness of the program.

These programs, if implemented properly, could be effective. Most of the violators who receive the courtesy letters from the Police Department either change their travel routes or reduce their speeds on the study street. SCAQMD has a similar program for identifying potential mobile sources of pollution.

COST: Radar units are about $2,000 per unit. To have an effective program, the City of Orange will need at least 5 units. The staff time estimated to administer this program (inclusive of Police Department) is about $55,000 per year (this cost may be lower in the future years after the program is more developed).

Video/Photo Enforcement

These units monitor traffic speeds automatically and take a picture of the license plate of vehicles that are speeding. The pictures are used to issue citations. The units are mobile and can be used at different locations throughout the City.

ADVANTAGES	DISADVANTAGES
• Speeds are reduced when units are present. • May have longer term effects, if properly combined with a public education campaign. • Can be used at different locations.	• Results usually diminish once units are moved. • Will take weeks (or months) for the violators to receive the Citations. This will be frustrating to residents as the effects will not be visible for a long time. • Can only be placed at locations with a good visibility (to minimize the collision potential).

California State laws currently allow use of such devices, yet some of the citations have been challenged in the Courts. The Courts in northern California have not looked at these units favorably and the whole issue is being considered by the District 9 Court of Appeals. These units will only be effective, if several of them are used strategically on a rotation program

throughout the city combined with a well publicized public education program.

COST: Private firms provide at no cost to the City. They share ticket revenues.

Speed Wagon/Radar Trailers

These are portable radar units that are capable of measuring and displaying vehicle speeds. They have a very limited effect on reducing speeds when the units are present. This limited effect completely disappears once the unit is relocated to another location. The City currently has one such unit that is being used at different locations depending on needs.

ADVANTAGES	DISADVANTAGES
• Units are mobile and can be used at the different locations. • Speeds are usually reduced when units are present. • Units may have long term effects (psychologically) by raising driver's consciousness about speeding.	• Effects usually disappear once unit is relocated. • May only be used at locations with good visibility (to minimize collision potential).

COST: About $12,000 per unit plus staff time to move the units to different sites.

Driver Education

At locations where the "cut-through" traffic or habitual speeders are an identifiable group of individuals; i.e., schools in the area or large office complexes, driver education program can be effective in changing driver behavior and/or travel patterns. City staff (Traffic Engineering Division and Police Department) meet in group format with the target audience and attempt to resolve the problems without any measures on the street.

ADVANTAGES	DISADVANTAGES
• Solves the problem without any changes to the streets. • Involves the violators in the solution of the problems.	• May only be used at locations where violators are an identifiable (and accessible) group of people. • Requires extensive and well-coordinated staff effort on a continuous basis.

COST: Varies.

Selective (Focused) Police Enforcement

Focused and visible enforcement of speed laws has proven to be the most effective method for reducing traffic speeds. However, this technique can not, unfortunately, be sustained on a long term basis due to the limited availability of law enforcement resources and other competing priorities. Nevertheless, for certain types of problems demanding quick action, an increased focused enforcement may yield desirable outcome, albeit temporarily.

ADVANTAGES	DISADVANTAGES
• May be deployed quickly with no special procedure needed. • Usually is very effective in reducing speeds (temporarily). • Penalizes the violators.	• Can not be sustained for long term projects. • Effects usually diminish once the enforcement level is decreased. • Diverts limited law enforcement resources to non-violent crimes.

COST: Varies.

Slow Points (Mid-Block or Intersection)

Slow points are small islands in the middle of the street narrowing travel lanes. They can be installed either at intersections or mid-block. Slow points are used to enhance pedestrian crossing points and depending on their location and configuration may also result in small to moderate reductions in traffic speed. Plan views of typical slow points are presented on Exhibit 15.

ADVANTAGES	DISADVANTAGES
• May reduce traffic speed. • Make pedestrian crossing points more visible. • Prevent vehicles passing other vehicles that are turning (at intersections).	• Requires removal of some on-street parking.

The location and configuration of Slow Points should be determined by the City Traffic Engineer on individual basis.

COST: Varies. Typical installation will cost about $2,500.