



CITY OF SACRAMENTO

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TRAFFIC ENGINEERING DIVISION

1023 J STREET — SUITE 202

SACRAMENTO, CALIF. 95814

TELEPHONES (916)
TRAFFIC ENGINEERING 449-5307
OFF-STREET PARKING 449-5354
ON-STREET PARKING 449-5644

October 29, 1982

City Council
Sacramento, California

Honorable Members in Session:

SUBJECT: Criteria for Placing Traffic Controls and Status of Control Measures

SUMMARY

The Planning & Community Development Committee reviewed the attached report at their October 27, 1982, meeting and approved it with one revision.

BACKGROUND

The Planning & Community Development Committee unanimously approved the recommendation that the City Council reaffirm the criteria, warrants, policies and procedures for the placement of the traffic controls described in the attached report. They also requested that a section on Speed Limits be added to the report which has been done.

APPROVED
BY THE CITY COUNCIL

FINANCIAL DATA

None.

NOV - 9 1982

RECOMMENDATION

OFFICE OF THE
CITY CLERK

It is recommended that the Council concur with the Planning & Community Development Committee action.

Respectfully submitted,

Recommendation Approved:

L. M. Frink
Traffic Engineer

Walter J. Slipes, City Manager

LMF/mf
Attachment

November 9, 1982
All Districts



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September 29, 1982

City Council
Sacramento, California

Honorable Members in Session:

SUBJECT: Criteria for Placing Traffic Controls and Status of Control Measures

SUMMARY

It has been almost three years since the Council instituted the policy of using stop and yield signs for speed control. This report outlines the status of the program and restates the criteria for the placement of various traffic controls.

BACKGROUND

The demands for public works improvements generally exceed the available funds for providing such improvements. Therefore, projects that involve significant amounts of money are constructed on the basis of some measure of priority. Traffic signals and undulations are placed based on the needs at various locations in priority order. However, the placement of signs and pavement markings are relatively inexpensive on an individual basis so they are placed wherever certain minimum criteria are met. The controlling factor is the knowledge that over use of traffic controls will destroy their effectiveness.

There are nationally established warrants for the placement of most traffic controls; and, in some cases, there are requirements in the California Vehicle Code that limit local options for the placement of signs and markings. For example, the State passed a tough "speed trap" law a few years ago because it was felt many communities were not posting realistic speed limits. As a result, local authorities now have very little latitude in establishing speed limits on their street systems.

Several warrants or sets of criteria used in the City of Sacramento need to be restated from time to time in response to inquiries about how certain controls are placed on the city streets. The following sections describe these warrants along with the status of various programs.

Stops and Yields for Speed Control

In October 1979, the City Council adopted a policy for using stop and yield signs in an effort to control speed on certain streets. Criteria were established for

such controls to avoid over use of regulatory signs. The adopted minimum requirements for this program are as follows:

<u>Item</u>	<u>Stop Signs</u>	<u>Yield Signs</u>
Distance Between Signs (feet)	1,000	750
Traffic Volume (vehicles per day)	750	500
Percent of Traffic Exceeding Speed Limit (%)	50	50

The distance requirement is to avoid placing signs at every intersection along a street that meets the other two requirements. The volume requirement is to avoid placing signs on every minor local street and the percent over the speed limit is to assure that signs are placed at locations where there are real rather than imagined problems.

Since the program started, signs have been placed at 59 intersections, 45 with stop signs and 14 with yield signs. At 15 locations, the placement of stop signs to control speed resulted in 4-way stops because there were already stop signs on the side streets.

Undulations

The first undulations were placed on Sandburg Drive in River Park on October 11, 1979. Since that time, they have been placed on 36 streets throughout the city to control speed. This type of speed control is intended for streets where stop or yield signs would be inappropriate because there are no intersecting streets or all side streets are the "T" type. Many of the streets parallel freeways, railroads or water courses, and the side streets all intersect from one side. The established requirements for a street to qualify for undulations are as follows:

1. It must be primarily a neighborhood collector street as opposed to local or major streets.
2. It should be at least 75% residential.
3. It must be 1,500 feet long.
4. All intersections must be the "T" type.
5. The speed limit should be 25 or 30 mph.
6. It cannot be a bus route.

Since undulations are expensive and the city can only afford to install a few each year, a priority system has been developed to be sure the locations most in need are taken care of first. There are currently 91 locations on the list, and the priority points are established based on the following:

1. One point is assigned for every 50 vehicles (i.e., 500 vehicles per day equals 10 points).
2. One point is assigned for every percent of traffic exceeding the speed limit (i.e., 37 percent exceeding the limit equals 37 points).
3. One point is assigned for each house fronting on the street and/or one point for every 70 feet of school, park, playground or apartment frontage.

The top location on the current list has 182 points, and the lowest location has 61 points.

Traffic Signals

There is a complex set of nationally established warrants for the placement of traffic signals. It would not be appropriate in this report to attempt to qualify the signal warrants except to indicate that they cover the following categories:

1. Minimum vehicular volume
2. Interruption of continuous traffic
3. Minimum pedestrian volume
4. Progressive movement
5. Accident experience
6. Combinations of the above

Since it is very expensive to signalize an intersection, a priority listing procedure has been developed to assess the relative needs at each location. Points are assigned to such factors as traffic volume, accidents, pedestrians, distance to other signals, speed, railroad crossings and visibility.

The current signal priority list contains 45 locations, and 13 others are in the process of being designed or constructed. There are 420 signalized intersections in the city, and we are placing new signals at about six locations per year.

Crossing Guards

In 1973, the staff made a complete re-evaluation of the crossing guard situation in the city. As a result, guards were placed at several locations and eventually removed at several others. A set of criteria for the placement and removal of guards was adopted by the City Council that was about half as stringent as the State and national standards. Even with this fairly liberal policy, we have fewer guards than nine years ago because of changes in school boundaries and the busing of school children (24 in 1973, 20 now).

The method for determining if a crossing guard is needed is to assign points for the following factors:

- Traffic gaps
- Number of children
- Traffic speed
- Heavy turning movements
- Unusual geometric configurations
- Visibility obstructions
- Heavy truck movements
- Railroad crossings

The number of points will usually be between 0 and 200 for the gap analysis, which is the most important factor. This analysis measures the number of gaps in the

traffic stream that are adequate for a child to safely cross the street. At signalized intersections, the gap analysis only includes turning vehicles while pedestrians have the green or walk light. Points for the number of children can vary between -50 and +50. Minus points are assigned for locations with less than 30 children; and if there are less than 20, the location does not qualify regardless of other factors. One point is given for each mile per hour that the speed limit is over 25 mph. The other items are given 0 - 20 points based on a subjective evaluation.

A total of 100 or more points will qualify a location for a crossing guard; and if at any time the number of children drops below 20, the guard will be removed.

4-Way Stops

The nationally established warrants for 4-way stops are as follows:

1. Five hundred vehicles per hour for the eight highest hours.
2. At least 40% of the traffic on the minor street.
3. Five or more accidents per year of a type correctible with this type of control.
4. As an interim measure at locations to soon be signalized.

The volume warrant is two thirds of the basic warrant for traffic signals. The following intersections in various parts of the city currently carry about 500 vehicles per hour. Familiarity with conditions at any of these intersections will illustrate the magnitude of this amount of traffic.

Gloria Drive & Greenhaven Drive

Heritage Lane & Response Road

24th Street & 2nd Avenue

W Street & 26th Street

Bell Avenue & Marysville Boulevard

Although the 500 vehicles per hour warrant is not adhered to in all cases, it is important to have a significant volume of traffic at an intersection before considering 4-way stops. Otherwise, motorists frequently arrive at the intersection and find no other traffic in sight. After this happens a few times, they begin having difficulty finding any reason to stop.

The requirement for at least 40% of the traffic on the minor street is probably the most important warrant. The purpose of this is to have nearly equal traffic on both streets. If an intersection has highly imbalanced traffic such as the intersection of a major street with a minor side street, motorists on the major street will not expect to encounter a stop sign and rear-end collisions could increase significantly after 4-way stops are placed. For this reason, 4-way stops can only be used as an interim measure for signals at locations where the traffic is fairly well balanced.

As stated earlier in this report, 4-way stops have been placed at 15 locations as part of the speed control program. In addition, 4-way stops have been placed at 11 other locations based on the above warrants for a total of 26 intersections in the past 3½ years.

Speed Limits

As stated before, the placement of speed limits is controlled by the California Vehicle Code. Unless the state requirements are met, the speed limit is considered a "speed trap" and cannot be enforced with radar.

Streets with 16 houses per quarter mile (or 13 houses if they are all on one side) have a 25 MPH speed limit unless posted otherwise based on an engineering survey. Streets with over 50 percent commercial development fall in the same category. All other streets have a 55 MPH speed limit unless posted otherwise based on an engineering survey.

The engineering survey is limited to analysis of the three following factors:

- Prevailing speed
- Speed related accidents
- Hidden roadside conditions

The speed limit must be established within 5 MPH of the 85 percentile speed. This assumes that no more than 15% of the drivers operate their vehicles "too fast". If it can be shown that there are an unusual number of speed-related accidents or that there are hidden roadside conditions, a reduced speed can be posted. However, it is almost never possible to apply the accident or hidden roadside conditions rules.

Staff is working with other traffic engineers through the California Traffic Control Devices Committee to have the state law changed in regard to speed limits on two-lane neighborhood collector streets. Many of these must be posted for 35 or 40 MPH under current law. We advocate a prima facie limit of 30 MPH on such streets.

Conclusion

A common denominator to all of the above criteria, warrants, policies and procedures is that they all relate to physical conditions in the field, i.e., volume, speed, accidents, road configurations, roadside developments, etc. Placing traffic controls based on such physical conditions is defensible when justifying control at one location but not at another or one type at one location and another type at a different location. However, the most important reason for placing traffic controls based on physical conditions in the field is that this practice is defensible in court. We are generally on firm ground as defendants in a law suit if we can show that we use logical, systematic methods for the placement of various traffic controls.

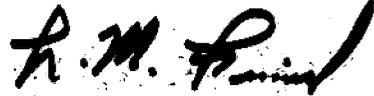
FINANCIAL DATA

None.

RECOMMENDATION

It is recommended that the City Council reaffirm the criteria, warrants, policies and procedures for the placement of the traffic controls described in this report.

Respectfully submitted,



L. M. Frink
Traffic Engineer

Report revised based on October 27, 1982
Planning & Community Development action.

LME/mf