



7

DEPARTMENT OF  
PUBLIC WORKS

CITY OF SACRAMENTO  
CALIFORNIA

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SACRAMENTO, CA  
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TRANSPORTATION DIVISION  
October 25, 1990

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Joint Budget & Finance and  
Transportation & Community Development Committee  
Sacramento, California

Honorable Members in Session:

SUBJECT: TRAFFIC SPEED CONTROL ALTERNATIVES

SUMMARY

This is a report back in response to the issue of increasing travel speeds in residential areas. This report recommends that the Transportation and Community Development Committee approve this report and refer it to the full City Council for action. Further, it is recommended that City Council adopt the attached resolution that approves two experimental programs involving single set undulations and three-way stop installations and amends the FY 1990-91 City CIP budget for this purpose.

BACKGROUND INFORMATION

On July 24, 1990 the Joint Budget and Finance/Transportation and Community Development Committee received the annual update of the Traffic Undulation Priority List and requested a report-back that would address other types of speed control alternatives.

The undulation program was instituted in 1980 in part as a response to concerns about excessive traffic speed in residential areas. The issue of vehicle speeds in residential areas continues to cause concern among more and more residents in neighborhoods throughout Sacramento. Traditionally, only Police Department enforcement was used to address this problem. As the problem has grown and police resources dwindled, other programs have been added to reduce speeds on certain types of residential streets.

EXISTING TRAFFIC SPEED CONTROL ALTERNATIVES

I. UNDULATIONS:

In 1980, the City of Sacramento began installing undulations on residential streets after a 1979 study of their effectiveness. Two years into the program (1982), the City Council adopted specific criteria by which residential streets would qualify for undulations and be prioritized for the undulation program. Then in 1987, the criteria by which a street would qualify for undulations were upgraded and the program was expanded to add a separate listing and criteria for streets fronting on parks and schools (Exhibit A).

The City has, to date, installed two or more sets of undulations on 117 independent street segments. Despite these installations, the residential prioritized list still has 98 streets which have qualified for undulations while the parks and schools list is comprised of 39 qualified streets. New streets are studied for minimum qualifying criteria and priority ranking every year. These new streets are chosen for evaluation on the basis of requests from the public - either the specific street requested by the public is studied or an area surrounding the requested street is studied. Streets already included on the Undulation Priority List are scheduled for re-evaluation and update of the street's data and qualifications. This program has been successful in slowing traffic speeds.

## II. STOP SIGNS:

The use of stop signs for speed control was rejected for a number of reasons. The Manual of Uniform Traffic Control Devices (MUTCD) Handbook is the Federal guideline for the installation of traffic control devices and describes the effects of unnecessary stop signs in this way:

Traffic experts agree that unnecessary stop signs:

- Cause accidents they are designed to prevent
- Breed contempt for other necessary STOP signs
- Waste millions of gallons of gasoline annually
- Create added noise and air pollution
- Increase, rather than decrease, speeds between intersections

Still the problem of residential speeding grew worse and neighborhood safety concerns had to be weighed. Policies were changed to allow the installation of STOP signs for speed control on streets that met certain criteria, such as vehicular and pedestrian volume, accidents and visibility.

## III. RADAR SPEED BOARD:

Recently a speed monitoring board was purchased by the Public Works Department. It is used in concert with Police enforcement in an effort to inform the public of the speed that they are traveling. This device depends on the drivers' modification of their behavior as they become aware of their speed.

## PROPOSED TRAFFIC SPEED CONTROL ALTERNATIVES

### I. THREE WAY STOPS:

The issue of three-way stop installation has been the focus of debate in California for a number of years. Traditional traffic engineering thought has been that three-way stops are unsafe for the same reasons stop signs are unsafe, as stated above in the MUTCD Handbook. However, in recent years a number of jurisdictions have begun to install three-way stops at selected locations in order to combat the increased speeds that are occurring on neighborhood streets. Locally, the County of Sacramento has placed a number of "all-way" stops at this type of intersection.

In the City, a three-way stop was recently installed at Azevedo Drive & Bannon Creek Drive on the basis of a combination of accidents and visibility. This installation was augmented with flashing yellow lights, raised pavement markers and oversized stop signs. Observation of this location a few weeks after installation showed that 29 vehicles out of 369 came to a full stop in the north bound direction. A rolling stop was made by 315 of the vehicles while 25 made no stop at all. These numbers are indicative of the way an all-way stop normally functions when the major street has much higher volumes than the minor approach street.

Based on the increasing demand for some type of speed control on neighborhood streets, staff has selected eight intersections in the City that meet the County's warrants for all-way stop signs (Exhibit B). It is proposed that these locations have three-way stops installed and their operation monitored at six months and 12 months. The three-way stop concept and the County's warrants could then be evaluated as to their application to City streets and any modifications could be recommended.

Exhibit C lists the proposed streets to be included in the City's evaluation.

### II. SINGLE SET UNDULATIONS:

One of the major contributors to speeding on certain residential streets is bypass traffic. Vehicles that are using a neighborhood street to avoid a signal at two major streets or that have found a short cut around some other cause of congestion make up this type of traffic.

When undulations were originally studied, they were shown to reduce speeds on streets. They also produced another positive benefit by reducing traffic volumes by diverting traffic that did not need to use that residential street, i.e. drivers that are using the street as a shortcut through the neighborhood.

Five streets had single sets of undulations installed this past year and of those five, two were identified as bypass streets. Results of before and after studies are given below for the two bypass streets.

55TH STREET BETWEEN  
 FRUITRIDGE ROAD AND JANSEN

<u>Volume</u>		<u>Speed</u>	
Before	After	Before	After
1074	857	31	26.5

ENSENADA AVENUE BETWEEN  
 EVERGREEN AND OLIVERA

<u>Volume</u>		<u>Speed</u>	
Before	After	Before	After
231	251	27	26

This data indicates that the single set undulation was effective on 55th St. The volumes on Ensenada, though, are so small that no effect is evident. A minimum volume of 1000 vehicles per day would be necessary to achieve any significant diversion.

Staff has identified eight locations that are functioning as bypasses. It is proposed that 18 single sets of undulations be installed in FY 90-91, (Exhibit D). These locations will be studied over a period of one year and if the single sets of undulations are successful, they may be considered as an additional technique to be used in reducing speeds on residential streets not qualifying for the full sets of undulations.

III. DEVELOPER FUNDED UNDULATIONS:

It has been suggested that developers fund the installation of undulations on certain newly constructed streets. There are two major reasons not to encourage this:

1. New streets should be designed so that they do not possess the characteristics that create the need for undulations to control speeds.
2. Similarly by requiring developers to fund undulations, the City would be authorizing the construction of streets that are subject to abusive speeding.

Staff does not recommend that developer-funded undulations be included as a traffic speed control alternative. However, there may be a case where a street is installed by one developer and then extended by another which, at that point creates a need for undulations. This has occurred only rarely in the City and should not happen very often in the future. Staff recommends that this be handled as a special case condition of the new development.

FINANCIAL DATA

Estimated cost for the three way stop program for FY 1990-91 is \$1,600. The necessary funds for the installation of the stop signs are available in the FY 1990-91 operating budget of the Transportation Division, Traffic Signs and Markings organization.

It is estimated that design and construction costs for 18 single sets of undulations will be approximately \$18,000. It is necessary that a new CIP be established for this purpose and \$18,000 be transferred from the CIP for Miscellaneous Minor Improvements/Traffic Signal Maintenance (SB46). There is currently a total balance of \$158,892 in this project.

### POLICY CONSIDERATIONS

No formal policy changes are recommended. Experimental installations only of 3-way stops and single sets of undulations are recommended. Any necessary policy changes or policy additions resulting from the experimental programs will be recommended when staff reports on the status of the programs in 12 months.

#### Undulations

The current City Council-adopted policy on undulations is attached as Exhibit A. Any policy regarding single sets of undulations would be added to the existing policy for full sets of undulations following staff's report-back at the end of the one year experimental installation.

#### Three Way Stops

One policy consideration that may arise out of the successful installation of three-way stop signs involves the undulation program. Many of the streets on the undulation priority list may qualify for the installation of three-way stops if it is shown that speeds are reduced by the three-way stop test. When a formal policy is adopted for the installation of three-way stops, a determination will have to be made as to whether or not streets should be controlled with three-way stop signs and removed from the undulation priority list. Common traffic engineering practice indicates that the lower form of control be used before other measures are installed. There would be a substantial cost savings in using three-way stops versus undulations. This would necessitate a change in the undulation policy as well as the addition of a policy regarding three-way stops.

### MBE/WBE EFFORTS

There will be no effect on MBE/WBE efforts.

### RECOMMENDATION

It is recommended that the Transportation and Community Development Committee approve this report and refer it to the full City Council for action. Further, it is recommended that City Council adopt the attached resolution that directs staff to proceed with an experimental installation of three-way stops on the eight streets listed in Exhibit C and experimental installation of 18 single sets of undulations at the eight locations identified in Exhibit D and report back in 12 months on the results of the installations.

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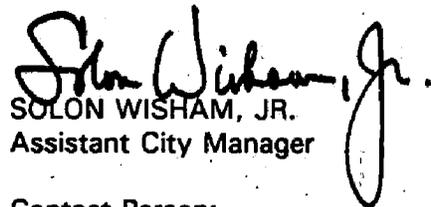
Further, it is recommended that a CIP for the single sets of undulations be established and \$18,000 be transferred from the FY 1990-91 CIP for Miscellaneous Minor Improvements and Traffic Signal Maintenance (SB46) for installation of the undulations.

Respectfully submitted,



MARILYN KUNTEMEYER  
Supervising Engineer

RECOMMENDATION APPROVED:



SOLON WISHAM, JR.  
Assistant City Manager

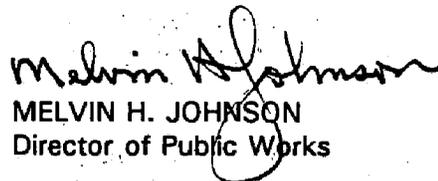
Contact Person:

Dave Cullivan, Senior Engineer  
Transportation Division, 449-5307

DC:lm  
CA3-22.L  
10.1290

Attachment

APPROVED:



MELVIN H. JOHNSON  
Director of Public Works

October 25, 1990  
All Districts

# RESOLUTION NO.

ADOPTED BY THE SACRAMENTO CITY COUNCIL

ON DATE OF \_\_\_\_\_

## APPROVAL OF EXPERIMENTAL TRAFFIC SPEED CONTROL ALTERNATIVES AND AMENDMENT OF THE FY 1990-91 CITY CIP

WHEREAS, excessive vehicle speeds in residential areas of the city have increased; the number of speeding vehicles has increased, and traffic speed has become a focus of concern for the safety of neighborhoods and residents;

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF SACRAMENTO:

1. That Transportation Division staff are hereby directed to proceed with experimental installation of three-way stops and single sets of undulations and report back in twelve months on the results of the installations; and
2. That the FY 1990-91 City CIP be amended by establishing a project for the Installation of Single Sets of Undulations and transferring \$18,000 from the existing capital project for Miscellaneous Minor Traffic Improvements and Traffic Signal Maintenance to the project for the Installation of Single Sets of Undulations, as follows:

202-500-SB46-4820	(\$18,000)
202-500-XXXX-4820	\$18,000

\_\_\_\_\_  
MAYOR

ATTEST:

\_\_\_\_\_  
CITY CLERK

CA 3-22.L

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FOR CITY CLERK USE ONLY

RESOLUTION NO.: \_\_\_\_\_

DATE ADOPTED: \_\_\_\_\_



DEPARTMENT OF  
PUBLIC WORKS  
  
ENGINEERING DIVISION

CITY OF SACRAMENTO  
CALIFORNIA

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915 I STREET  
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THOMAS M. FINLEY  
ENGINEERING DIVISION  
MANAGER

June 9, 1987

Joint Transportation and Community Development Committee  
Budget and Finance Committee  
Sacramento, California

Honorable Members in Session:

SUBJECT: City Policy and Procedure for the Installation of Undulations

SUMMARY

Nearly five years have passed since the City Council last updated the policies and criteria which staff utilize to evaluate proposed undulation projects. In response to the issue of appropriate criteria for undulations near parks and schools, it is now recommended that the attached policies, procedures and criteria, (see attached Exhibit A), be adopted as the official guidelines for undulation installations.

BACKGROUND

In December 1979, the City Council authorized the installation of the first undulations in Sacramento. In February 1980, the Council adopted the basic criteria from which warrants for undulations would be determined. Set forth were these basic requirements:

1. The street must be primarily a neighborhood collector street.
2. Abutting land uses along the street shall be at least 75% residential.
3. The street must be a minimum of 1,500 feet or more in length between intervening four-way intersections.
4. All street intersections within the measured length must be "T" or three-legged intersections only.

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Streets determined to warrant the installation of undulations were then prioritized using a simple point formula based on three factors:

1. The length of the street for which a range of 1,000' - 6,000' was used, assigning a point value of "0" for 1,000' and "100" for 6,000'. This then permitted an assignment of one (1) point for each 50' of street length over 1,000'.
2. The average daily traffic volume for which a range of 0 - 5,000 was used, assigning one point for every 50 vehicles counted in a 24-hour period.
3. The percentage of vehicles in excess of the speed limit for which one point was assigned for every percentage point of traffic determined by radar study to be exceeding the speed limit.

Again, in September 1982, the City Council adopted a set of more refined criteria for evaluating and prioritizing candidate streets for undulations. The minimum qualifications were expanded and the points assigned for the length of the street were re-evaluated. The basic requirements set forth were:

1. The street must be primarily a neighborhood collector street as opposed to local or major streets.
2. The abutting land uses should be at least 75% residential.
3. The street must be a minimum of 1,500 feet in length.
4. All street intersections within the measured length must be "T" or three-legged intersections only.
5. The posted speed limit shall be 25 or 30 mph.
6. The subject street cannot be a bus route.

The change in point assignments was as follows:

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

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During the last five years the criteria previously described have been used to evaluate and prioritize requested undulation projects. Experience obtained during these five years indicates the need for a more comprehensive set of procedures and guidelines for accompanying the adopted criteria (see attached Exhibit A). The proposed new policy and procedures thus contains minimum qualifying and priority ranking criteria, as well as guidelines for undulation location selection, signing, striping, design specifications, moving and/or removal of undulations, Regional Transit coordination and public notifications. The consolidation and documentation of these policies and procedures will assist staff in efficiently carrying out the speed control undulation program.

Summarization:

Two separate qualifying categories will be created: one category for residential streets and another for streets fronting parks or schools. Each category will be independent of the other and will be prioritized on separate lists. Yearly budgeting for the undulation program will be divided evenly between the two categories of qualifying streets.

Following is a summary of the changes being proposed to update the City's policies concerning the Traffic Undulation Program. These changes refer to minimum qualifying criteria and a priority ranking system. A comparison of the changes relative to the 1982 criteria is shown below:

MINIMUM QUALIFYING CRITERIA

1982 CRITERIA

1987 CRITERIA

RESIDENTIAL

RESIDENTIAL

PARKS & SCHOOLS

1500 feet in length between traffic controls with no four-way intersections.

1500 feet in length between traffic controls with no four-way intersections.

1000 feet in length between traffic controls with no four-way intersections.

Street frontage of subject street segment must be 75% residential.

Street frontage of subject street segment must be 75% residential.

\*Street frontage of subject street segment must contain a school or park.

Posted speed must be 25 or 30 MPH.

Posted speed must be 25 or 30 MPH.

Posted speed must be 25 or 30 MPH.

School, Elementary or Junior High School

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Street cannot be part of the  
 Regional Transit bus network.

Street cannot be part of  
 Regional Transit bus  
 network.

Street cannot be  
 part of Regional  
 Transit bus network.

Street contains no curves  
 with greater than a 70°  
 angle.

Street contains no  
 curves with greater  
 than a 70° angle.

Two-thirds majority  
 residential approval  
 required.

#### PRIORITY RANKING POINT SYSTEM FOR QUALIFYING STREETS

##### 1982 POINT SYSTEM

###### RESIDENTIAL

One point for every 50 vehicles  
 travelling the street in a  
 24-hour period.

One point for each residential  
 unit fronting the street plus  
 one point for each 70 feet of  
 school, park, playground or  
 apartment frontage.

One point for every percentage  
 point of traffic exceeding the  
 speed limit.

##### 1987 POINT SYSTEM

###### RESIDENTIAL

One point for every 50  
 vehicles travelling the  
 street in a 24-hour  
 study period.

One point for each  
 residential unit front-  
 ing the street plus one  
 point for each 70 feet  
 of school, park, play-  
 ground or apartment  
 frontage.

One point for every  
 percentage point of  
 traffic exceeding the  
 speed limit, plus one-  
 half point for each  
 mile per hour of speed  
 differential between the  
 posted speed and the 85  
 percentile speed.

###### PARKS & SCHOOLS

One point for every  
 50 vehicles travel-  
 ling the street in a  
 24-hour study period.

One point for each  
 residential unit  
 fronting the street  
 plus one point for  
 each 70 feet of  
 school, park, play-  
 ground or apartment  
 frontage.

One point for every  
 percentage point of  
 traffic exceeding  
 the speed limit.  
 plus one-half point  
 for each mile per hour  
 of speed differential  
 between the posted  
 speed and the 85 per-  
 centile speed.

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Note: The purpose of placing undulations near parks and schools is to create a safer environment for young children (preschool through junior high school). Streets fronting high schools will be considered using the standard minimum criteria for residential streets as high school students are more responsible and fall into the category of young adults.

FINANCIAL

Undulation contracts go to bid on a cost per linear foot basis. The current accumulative cost for a set of undulations ranges from \$1,300 to \$1,800 per set, depending on the width of the street. Through the annual Capital Improvement Program, the City's Budget and Finance Committee has generally budgeted \$40,000 per year to the undulation program. This funding is enough to construct approximately 30 sets of undulations divided among ten streets. The cost of undulations will vary from year to year depending on the amount of the low bid and economic fluctuations, as well as annual fiscal appropriation levels.

Neighborhood groups wishing to have undulations installed on a specific street in their community may contribute the total cost of installing undulations, according to the following guidelines:

1. All streets must meet minimum criteria standards.
2. When the total cost is being borne by residents, the projected cost will be paid to the City prior to the awarding of bids for the undulation program in the year installation is to take place.

RECOMMENDATION

It is recommended that the City Council adopt the updated set of policies and procedures dealing with the City's undulation program.

Respectfully submitted,



THOMAS M. FINLEY  
 Engineering Division Manager

Recommendation Approved:

Approved:

SOLON WISHAM, JR.  
 Assistant City Manager

MELVIN H. JOHNSON  
 Director of Public Works

ES  
 TD 07.D  
 05.2287.6

June 9, 1987  
 All Districts

## EXHIBIT A

## SPEED CONTROL UNDULATIONS

Policies and ProceduresProgram Objective

The purpose of installing undulations on residential streets in the City is to reduce vehicle speeds and to reduce through traffic on residential streets and on streets adjacent to parks and elementary schools. The application of undulations is limited to streets where geometric configuration or design fails to passively deter many drivers from exceeding the speed limit. When vehicle speeds are reduced, public safety is enhanced.

General

Undulations are intended to have two direct impacts on the traffic flow of a particular street. These impacts are "average vehicle speed" and "average daily traffic", both of which would be expected to decrease. Average speeds would decrease as drivers would be urged to reduce speeds when crossing undulations because of the discomfort incurred when crossing undulations too fast. Also, a percentage of vehicles which access side streets as alternative routes, would be deterred from using streets with undulations because of the forced speed reduction.

Minimum Criteria

Installation of undulations may be warranted:

1. On a residential street which is at least 1,500 feet in length between controls, has no four-way intersections and no curves greater than 70° angle. The street frontage must consist of at least 75% residential development. The street may not serve as a Regional Transit bus route and must have a speed limit of 30 MPH or less.

and

A two-thirds majority of residents having direct access to the street in question. Each household will have one vote.

2. Where frontage includes a school or park, the street is at least 1,000 feet in length between controls and has no four-way intersections and no curves greater than 70° angle. The street may not serve as a Regional Transit bus route and must have a speed limit of 30 MPH or less.

NOTE: Only preschools through middle schools are eligible for consideration under the reduced length criteria.

NOTE: The two sets of minimum criteria are independent of each other.

Priority Ranking

Priority ranking is done annually using a point system. Streets under consideration are investigated and data accumulated. The data collection includes a traffic count to determine the average daily traffic volume, and speed surveys to determine the range and percentages of vehicle speeds. A count is taken of the number of houses fronting the street, with the balance of frontage being measured and categorized by school, park, playground or multi-family dwellings. Points are awarded in the following manner:

Point System

1. One point for every 50 vehicles which travel the street in a 24-hour study period.
2. One point for each percentage point of traffic exceeding the posted speed limit, plus one-half point for each mile per hour speed differential between the posted speed limit and the 85th percentile speed.
3. One point for every residential unit fronting the street, plus one point for each 50' of school, park, playground or apartment frontage.

NOTE: Two separate priority lists will be maintained, each according to type of qualifying minimum criteria.

Undulations Construction Specifications

Upon installation, asphaltic concrete undulations will have a width of 12 feet, a height of three inches (3") to three and one-half inches (3-1/2"), and a vertical curvature of 72 feet (See Figure 1). Undulations will extend from lip of curb to lip of curb. There will be a two foot (2') horizontal taper originating at the crest of the undulation and converging at the lip of curb. At the time of construction the temperature of the asphalt will range between 250°F and 400°F. The outside air temperature will be no less than 70°F.

Location Selection Guidelines

In selecting precise locations for undulation installation the following guidelines shall be followed:

1. Undulations will not be located over manholes, water valves or street monumentation or within 25 feet of fire hydrants.
2. Undulations should be located five to ten feet away from driveways, where possible.
3. Undulations should be located on property lines whenever possible.
4. Undulations should be located near street lights when possible in order to illuminate them at night.

Warning Signs and Striping

There are two types of advanced warning devices used to alert motorists of upcoming undulations:

- Street signs; and,
- Pavement markings

The signing includes a 30 inch sign stating "UNDULATIONS" in four inch (4") series "C" letters, above which is a pictorial of a pair of undulations. A second sign recommending a 15 MPH speed is placed directly below the warning sign. (See Figure 2).

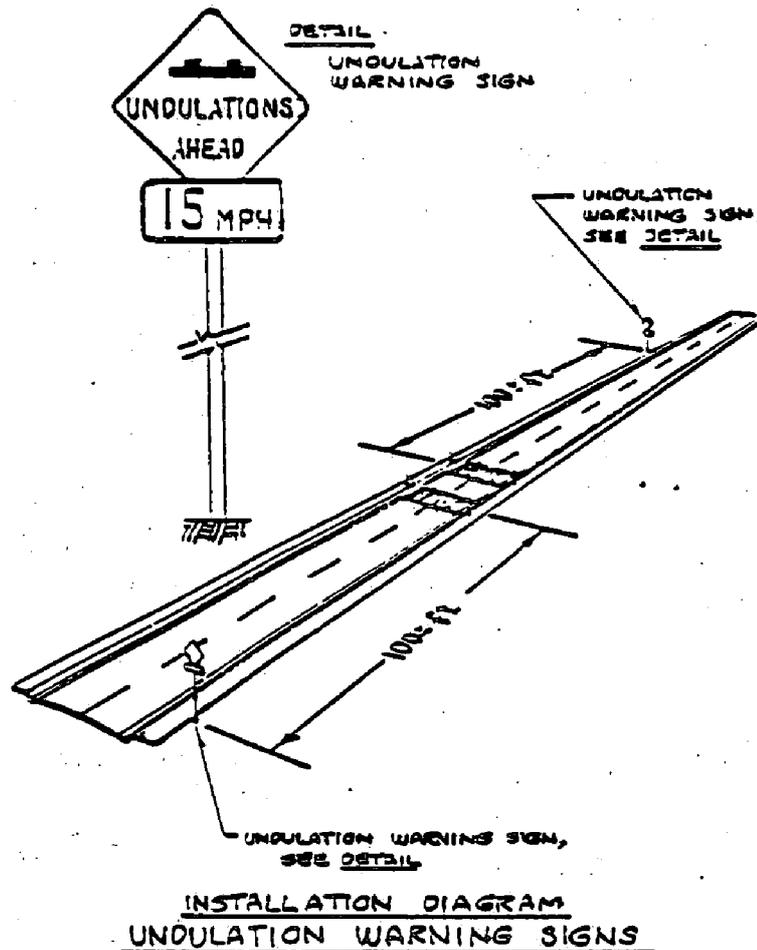


FIG. 2

5. Undulations should be located a distance of 150 feet from corners, when possible, but at a minimum never within a corner radius.
6. Undulations will not be located on sharp horizontal curves due to motorcycle and bicycle stability problems.
7. Each pair of undulations will be spaced at a maximum of 42 feet on center, and a minimum of 24 feet on center (See Figure 1).
8. Undulations will be spaced at a minimum interval of 500 feet and a maximum of 1,000 feet. Undulations will be placed no closer than 250 feet from traffic control devices or four-way intersections.
9. No less than two sets of undulations will be placed on a given street, as one set is not effective for speed control. The maximum number of sets is dictated by street length and spacing requirements.
10. To deter drivers from driving around undulations, there may be two inch (2") pipes set in the sidewalk, centered on the undulation in each approach direction. The pipes will be placed at a maximum of six inches (6") from the back of the curb. (See Figure 3).

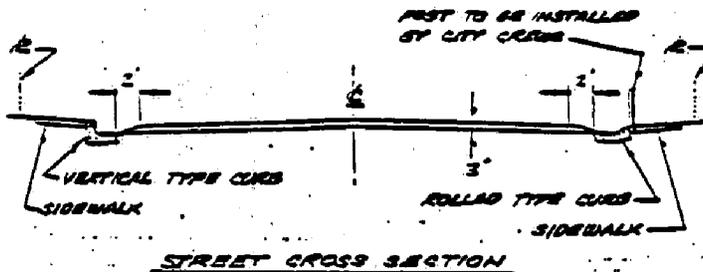
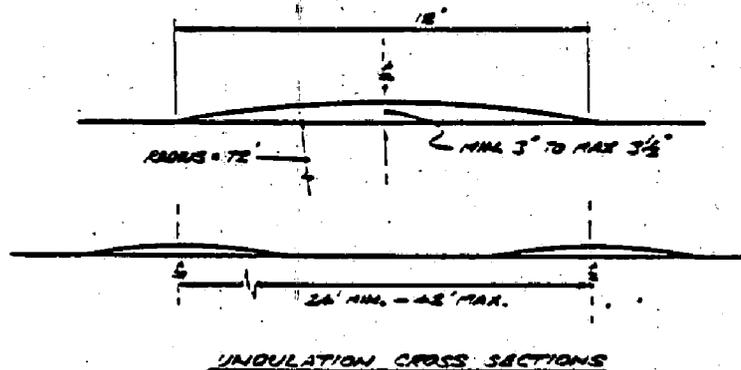


FIG. 1

Pavement markings should include 12" wide longitudinal ladder markings at four feet on center, which are stenciled across each undulation. In addition, raised reflectorized pavement markers shall be installed and placed on the centerline, positioned on the crest and in the front of the undulation from approach directions. This provides warning during the night and early morning hours (See Figure 3). All warning devices should be easily visible on approaches to undulations.

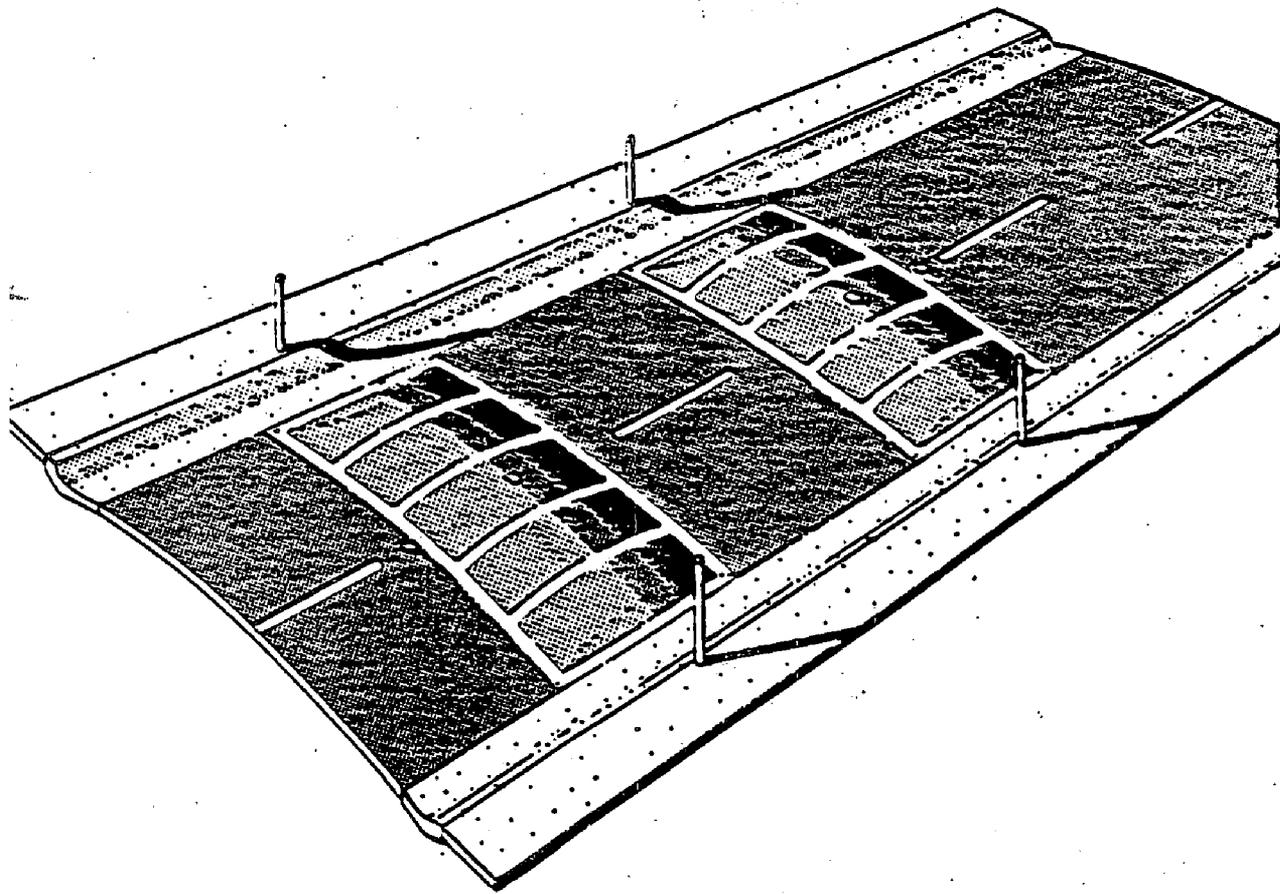


FIG. 3

Relocation of Undulations

Changing the location of undulations on a street or the removal of undulations may be considered when all the criteria listed below are met:

1. Undulations are ineffective in reducing speeds and volumes of vehicles.
2. Undulations were placed in a location conflicting with adopted guidelines.
3. There is evidence that the original location is no longer in the best interest of the community.
4. There is a petition with a two-thirds majority of residents signatures in favor of relocation.

Removal of Undulations

1. Undulations are ineffective in reducing speeds and volumes of vehicles.
2. Undulations were placed in a location conflicting with adopted guidelines.
3. There is evidence that the original location is no longer in the best interest of the community.
4. There is a petition with a two-thirds majority of resident's signatures in favor of relocation or removal.
5. Undulations have been installed for at least two years.

Removal of undulations which have been installed for less than two years will only be considered if the City is compensated by those requesting undulation removal for the full cost of the original installation, including design, construction and inspection. This would not apply if a street became a Regional Transit bus route.

These are the specific guidelines to be followed prior to recommending the relocation or removal of undulations. The guidelines are intended to confirm whether such a decision would be in the public's interest.

Procedure

The guidelines for the relocation/removal procedure are:

1. Conduct an additional volume count.
2. Conduct additional speed surveys.

3. Survey the portion of the public that would be affected by said actions.
4. Hold a community meeting with the support of the district's City Councilmember to discuss the advantages of undulations.

If the decision is made to take action on existing undulations, a Council letter must be drafted to that effect. When passed by the City Council, the relocation or removal procedures may be initiated.

#### Undulations and Regional Transit

Regional Transit (RT) adopted a policy on bus routing with regard to undulations in 1982. This policy authorizes RT staff to modify bus routes so they do not utilize streets with existing or future undulations or other known problems and to coordinate future placement of such devices.

The Departmental policy is to provide RT with the locations of future undulations so that problems which this might create can be resolved prior to the installation. Undulations will not be placed on streets where RT bus service exists. If a majority of residents are in favor of installing undulations on their street, which is a Regional Transit route, it will be the responsibility of Regional Transit to change their bus routing accordingly.

#### Public Notification

Public Notifications, which are used to inform residents in a given area of potential undulations and other changes to their street system, may be distributed to residents by one of two methods:

1. Fliers may be hand delivered to residences where the fliers are attached to or slipped under a door. (Note: It is illegal to place fliers in a resident's mailbox.) Hand delivering of fliers should only be done in special cases where mailing would not be time effective.
2. The fliers may be mailed out through the City Manager's office. Two copies of a flier, accompanied by the range of addresses to which the fliers are to be sent, are delivered to the Citizen's Assistance Officer, located in the City Manager's office. The Citizen's Assistance Officer requires 21 days advance notice to ensure that the fliers arrive on time. Fliers which require a response should be sent out far enough in advance to reach the public one full week prior to the response deadline.

**GUIDELINES FOR INSTALLATION OF ALL-WAY STOPS**

Intersections with Less Than 5,000 Vehicles on the Major Street Per Day

All-way stop sign installations may be considered at locations meeting all of conditions (A, B & C) and any one or more of conditions (1-4):

	Yes	No
A. No existing controls, yield signs, stop signs or traffic signals within a distance of 1,000 feet.	—	—
B. The intersection has streets extending 1,000 feet or more away from the intersection on at least three sides.	—	—
C. Installation of an all-way stop sign is compatible with overall traffic circulation needs for a residential area.	—	—
1. <u>VOLUME:</u>  Total vehicular volume entering the intersection from all approaches averages at least 175 vehicles per hour for 4 hours of an average day and:  In addition, the vehicle volume entering the intersection from the major street compared to the minor street has a ratio of 4:1 or less. The volumes of pedestrians and bicycles crossing the major street shall be added to the minor street volume for purposes of determining the ratio. Locations having a large percentage of conflicting movements may be considered with a somewhat higher ratio.	—	—
2. <u>VOLUME - PEDESTRIAN:</u>  A vehicular volume greater than 175 vehicles per hour conflicts with a combined pedestrian and/or bicycle volume greater than 25 crossing the major street during the same hour.	—	—
3. <u>ACCIDENTS:</u>  Three or more of types susceptible to correction by stop signs are reported within a 12 month period, with satisfactory observance and enforcement of less restrictive control.	—	—
4. <u>VISIBILITY:</u>  The sight distance on one or more approaches of the street is less than the following:	—	—

<u>Approach Speed</u>	<u>Sight Distance</u>
25 mph	280 ft.
30 mph	330 ft.
35 mph	390 ft.
40 mph	440 ft.
45 mph	500 ft.
50 mph	550 ft.
55 mph	600 ft.

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Investigator

Date

EW:lm  
EW6-09.L

**GUIDELINES FOR INSTALLATION OF ALL-WAY STOPS**

**Intersections With More Than 5,000 Vehicles On The Major Street Per Day**

All-way stop sign installation may be considered when any of the following conditions exist at an intersection:

- |    |  | Yes   | No    |
|----|--|-------|-------|
| 1. | <b><u>VOLUME:</u></b>  |       |       |
| A. | Total vehicular volume entering the intersection from all approaches averages 300 vehicles per hour for 6 hours of an average day, <u>and</u> ,  | _____ | _____ |
| B. | In addition, the vehicular volume entering the intersection from the major street compared to the minor street has a ratio of 3:1 or less. The volumes of pedestrians and bicycles crossing the major street shall be added to the minor street volume for purposes of determining the ratio. Locations having a large percentage of conflicting movements may be considered with a somewhat higher ratio. | _____ | _____ |

- |    |   |       |       |
|----|---|-------|-------|
| 2. | <b><u>ACCIDENTS:</u></b>  |       |       |
|    | Four or more of types susceptible to correction by stop signs within a 12 month period are reported, with satisfactory observance and enforcement of less restrictive control <u>and</u> the minor street approach volume is near the volume requirement of the traffic signal warrant. The approach volume for eight hours from a single minor street approach equals or exceeds 80 vehicles per hour. At four-way intersections, the higher of the two minor street approaches should be considered in determining the highest 8 hours. For major streets with a speed limit at or above 40 mph, the minor street single approach, minimum volume required is 56 vehicles per hour for 8 hours. | _____ | _____ |

- |    |  |       |       |
|----|--|-------|-------|
| 3. | <b><u>VISIBILITY:</u></b>  |       |       |
|    | The sight distance on one or more approaches of the street is less than the following: | _____ | _____ |

<u>Approach Speed</u>	<u>Sight Distance</u>
25 mph	280 ft
30 mph	330 ft
35 mph	390 ft
40 mph	440 ft
45 mph	500 ft
50 mph	550 ft
55 mph	600 ft



**PROPOSED 3-WAY STOPS**

LOCATION

Silver Eagle & Mabel

University & Breckenwood

Notre Dame & Julliard

Ehrhardt & Carlin

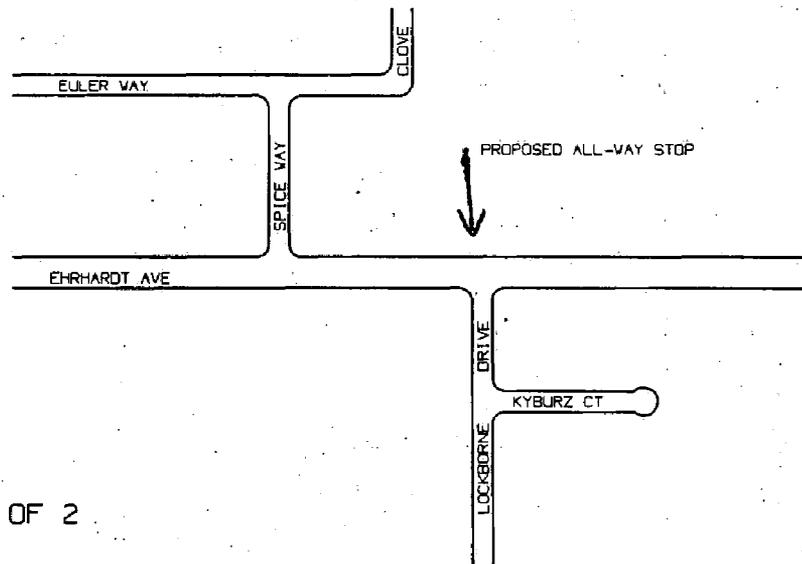
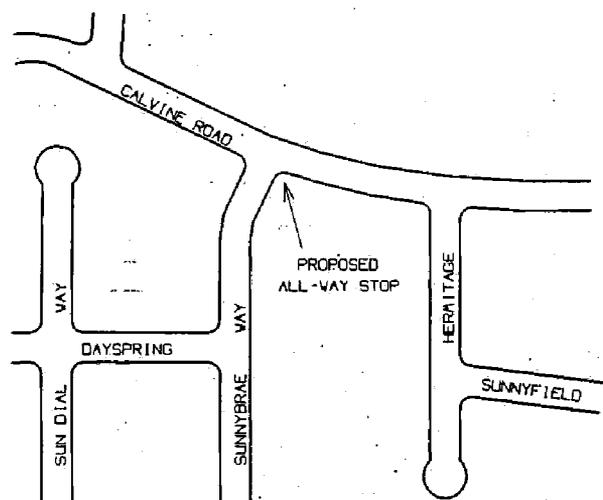
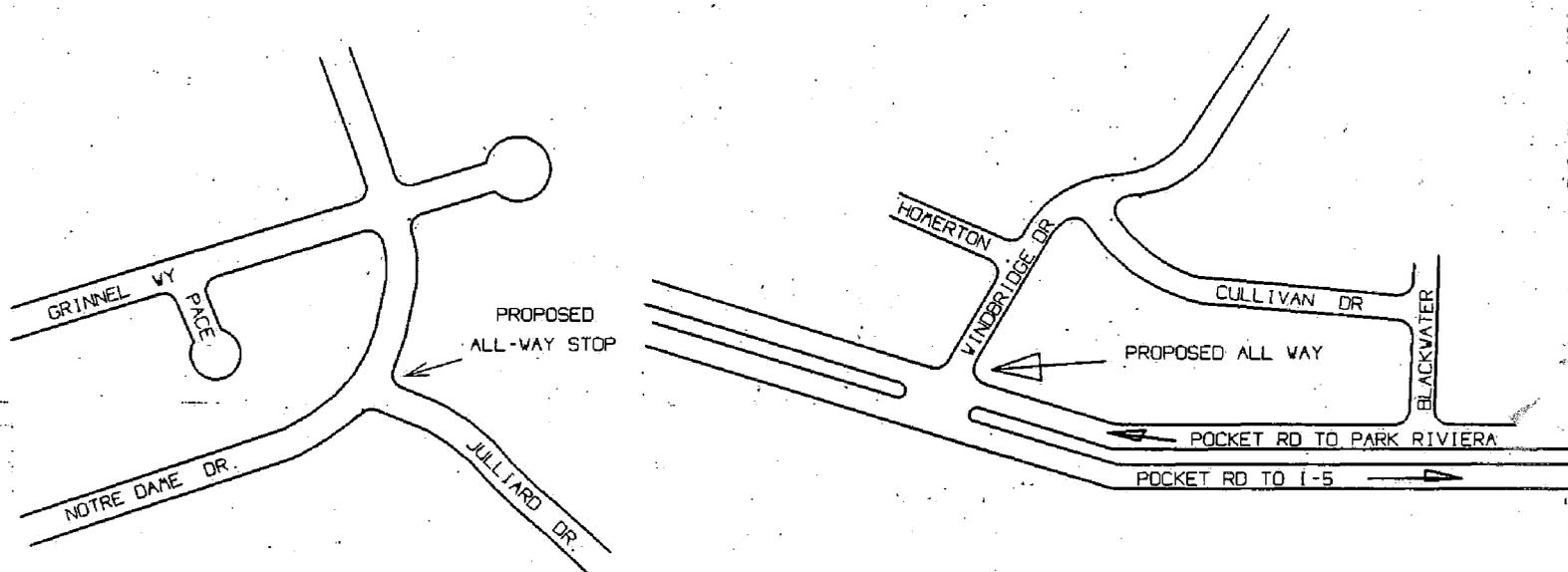
Ehrhardt & Lockborn

South Land Park Drive & Golden Oak

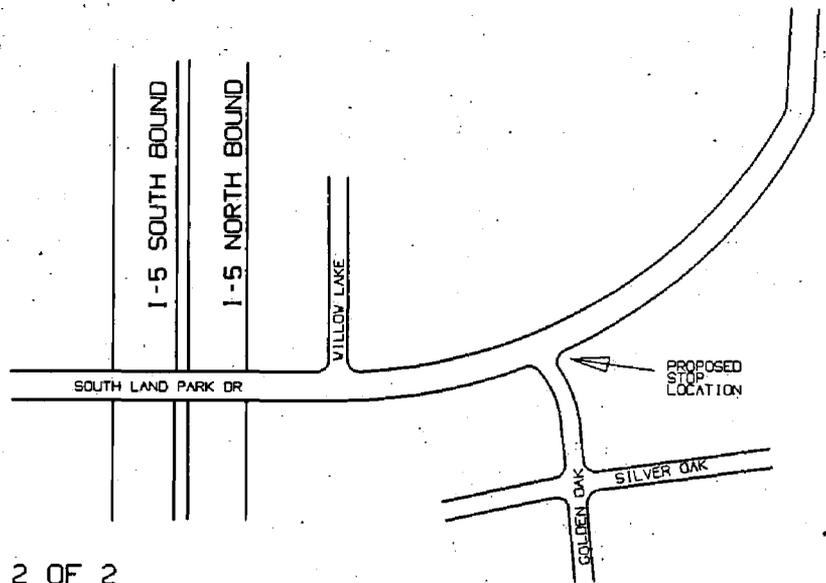
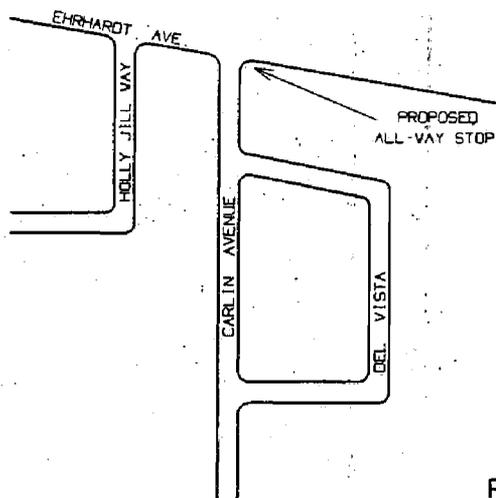
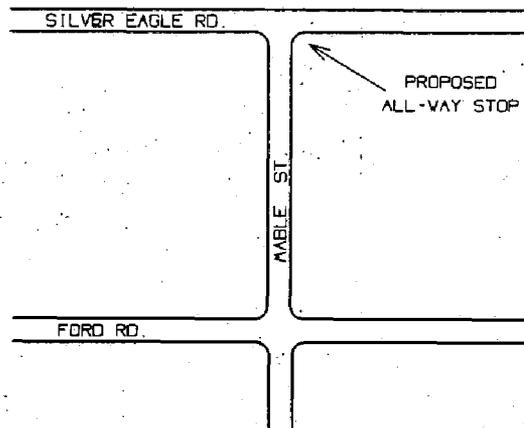
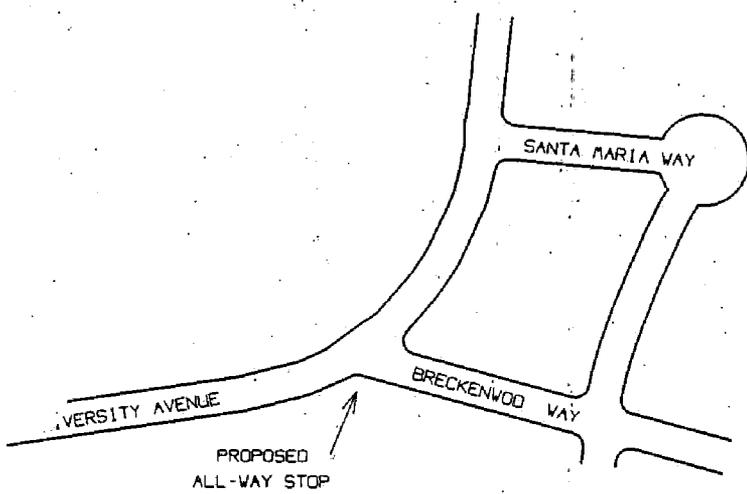
Windbridge & Pocket

Sunny Brae & Calvine

# PROPOSED ALL-WAY STOP LOCATIONS



# PROPOSED ALL-WAY STOP LOCATIONS

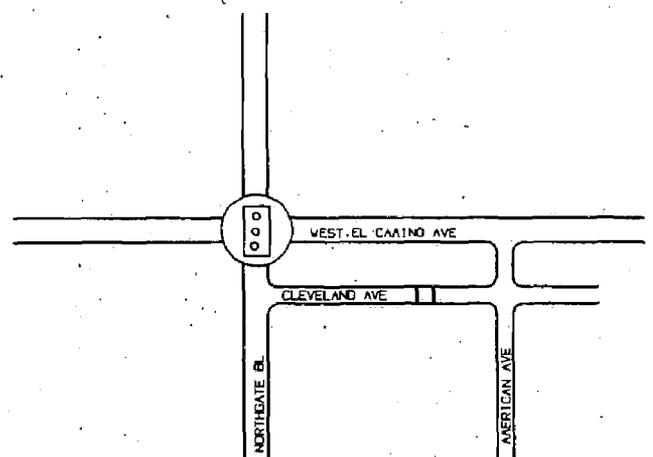
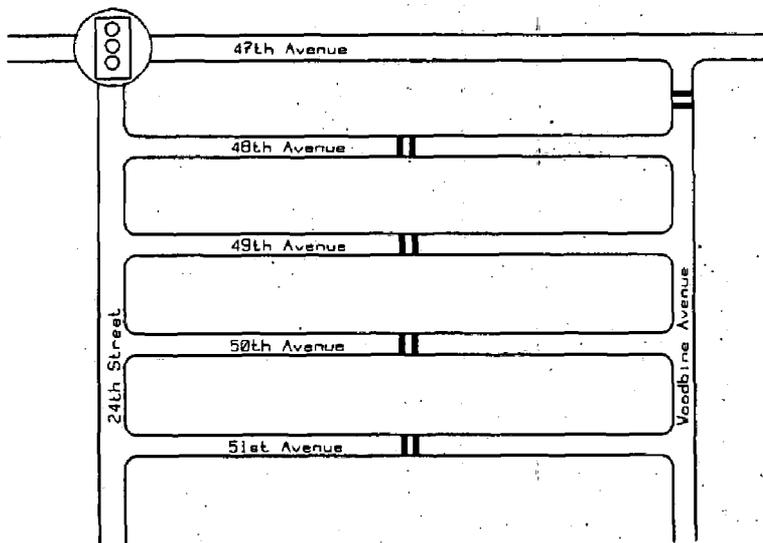
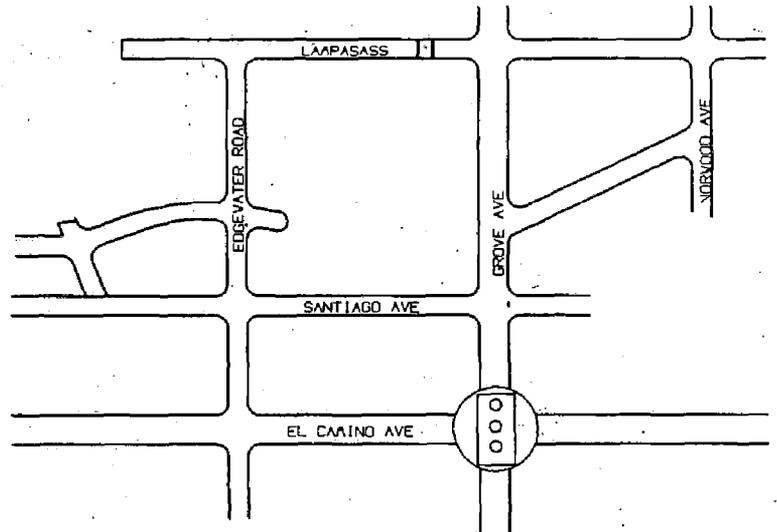
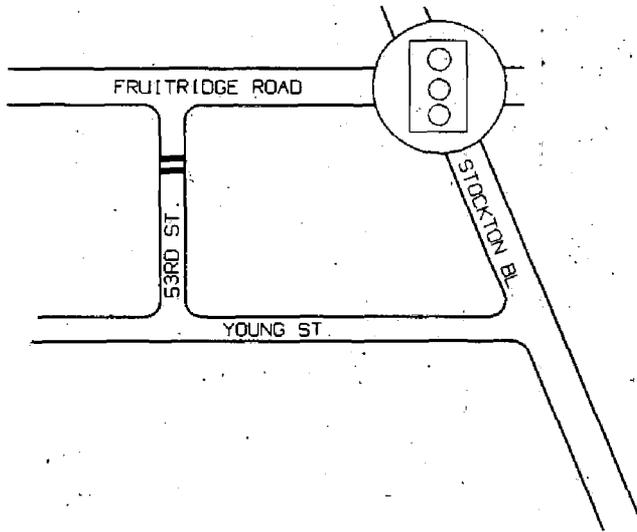


**BY PASS LOCATIONS  
FOR  
SINGLE SETS OF UNDULATIONS**

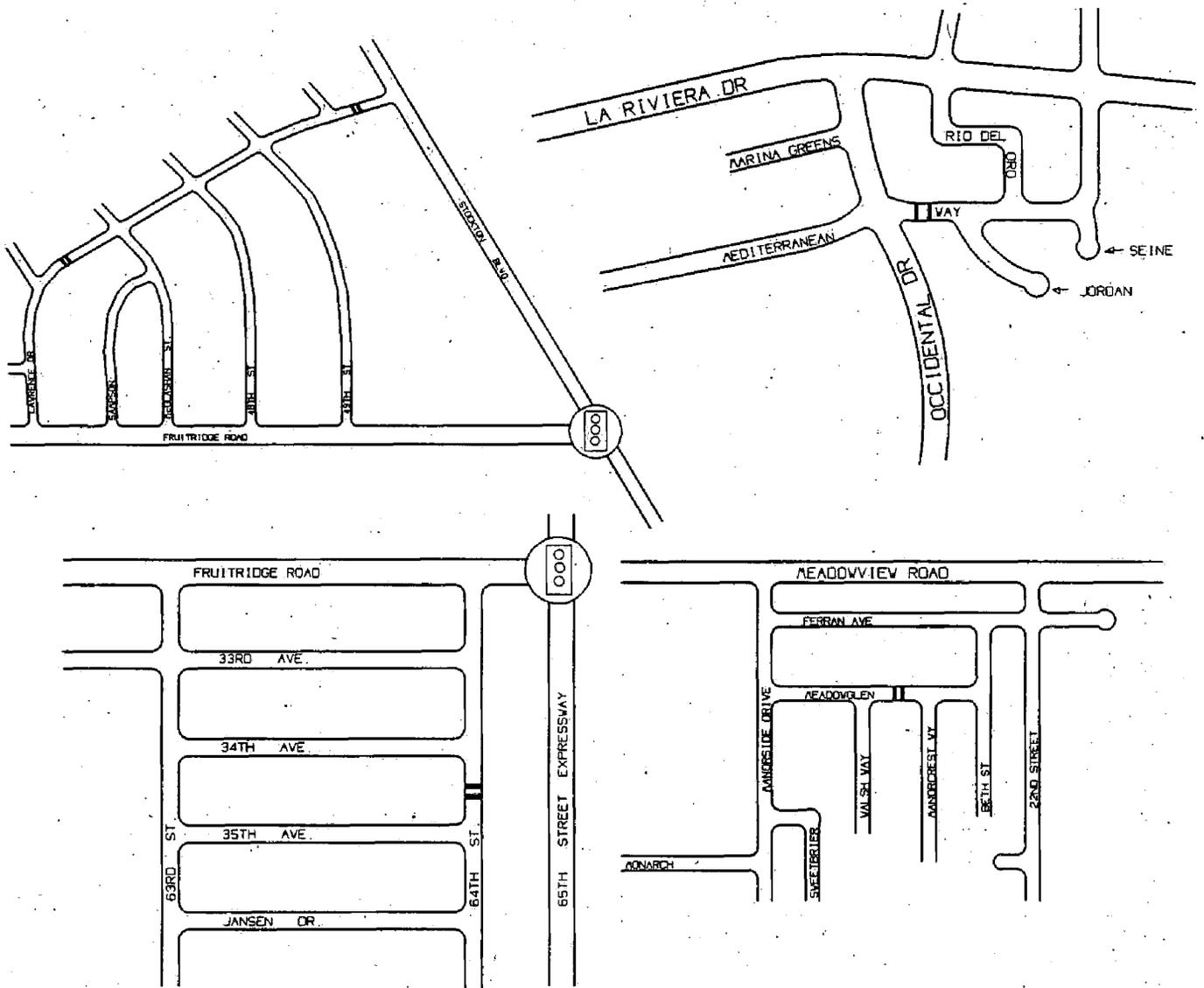
<u>LOCATION</u>	<u>NUMBER</u>
Woodbine & 47th Avenue	5
64th Street between Jansen & Fruitridge	1
James Way and Fruitridge	2
Young and Stockton Boulevard	1
Lawrence and Fruitridge	2
Cleveland and Northgate	1
Edgewater and Lampasas	1
Meadowglen and Manorside	1
Mediterranean and Rio De Oro	1
79th Street and 32nd Avenue	3

JW:mk  
JW1-02.L

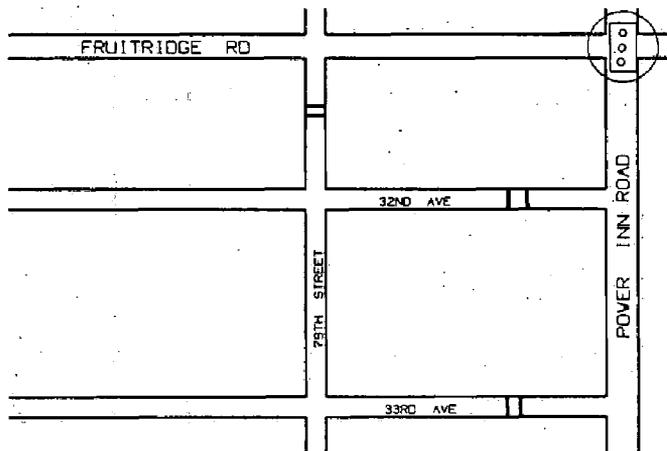
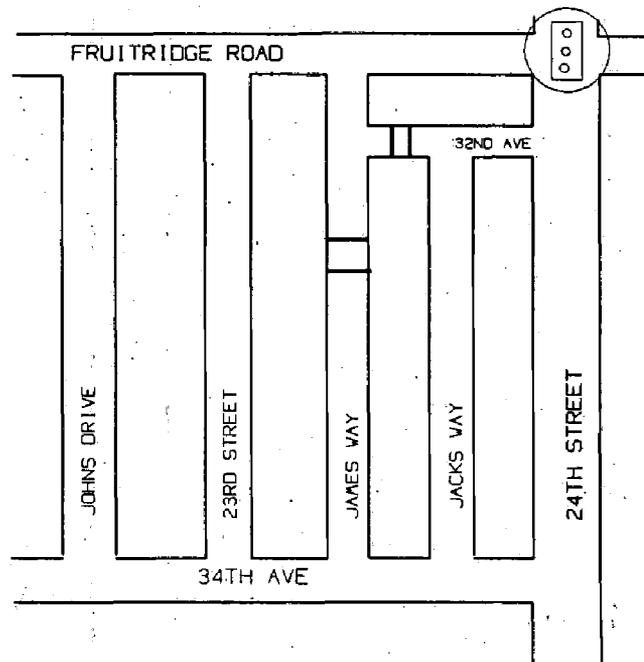
# BYPASS LOCATIONS FOR SINGLE SETS OF UNDULATIONS



# BYPASS LOCATIONS FOR SINGLE SETS OF UNDULATIONS



# BYPASS LOCATIONS FOR SINGLE SETS OF UNDULATIONS



BUDGET AND FINANCE/  
TRANSPORTATION & COMMUNITY DEVELOPMENT COMMITTEES  
AGENDA

October 30, 1990

2:00 P.M.

City Council Chambers  
915 I Street  
Sacramento, CA

1. Proposed Hotel Development at Haggin Oaks Golf Course. (D2)
  - A. Resolution Authorizing the City Manager to Execute an Offer to Lease Agreement with Lama Interests and Authorizing Staff to Negotiate a Ground Lease and Development Agreement for a Proposed Hotel Development at Haggin Oaks Golf Course.

RECOMMENDATION OF STAFF: RECOMMEND APPROVAL AND FORWARD TO COUNCIL

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2. Policy Recommendations regarding Private use of Public Easements Relating to Underground Parking Garages. (D-All)

RECOMMENDATION OF STAFF: COMMITTEE REVIEW AND DIRECTION

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3. North Natomas Community Plan. VERBAL REPORT (D-All)

RECOMMENDATION OF STAFF: COMMITTEE INFORMATION

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COMMITTEE MEMBERS: Mueller (Chair), Chinn, Fargo, Ferris, Kastanis,  
Pane, Robie, Serna