

CITY OF LAFAYETTE
TRAFFIC SAFETY STUDY

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This project is part of the California Safety Program and was made possible by the support of the State of California, Business and Transportation Agency, Office of Traffic Safety, the U.S. Department of Transportation, National Traffic Safety Administration and Federal Highway Administration.

ACKNOWLEDGMENTS

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The options, findings and conclusions expressed in this publication are those of the authors and not necessarily of the Office of Traffic Safety, the National Highway Safety Administration or the Federal Highway Administration.

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INTRODUCTION/EXECUTIVE SUMMARY

Background

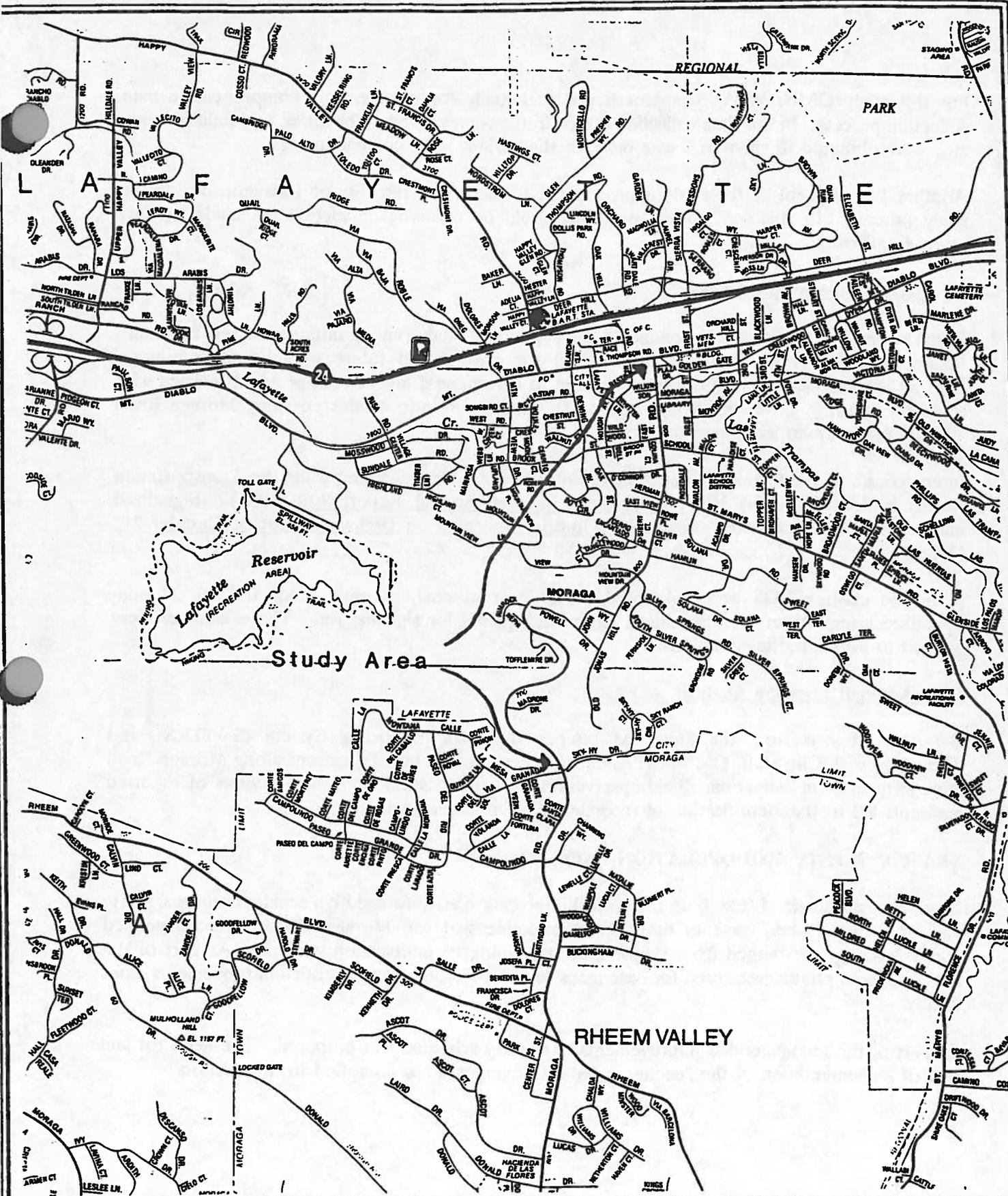
The City of Lafayette is located adjacent to State Highway 24 in Central Contra Costa County (refer to Figure 1). While the City is primarily a residential bedroom community, it also has local retail and office business areas along the Mt. Diablo Boulevard and Moraga Road corridors

The traffic operations and safety problems that currently exist in Lafayette are the result of traffic being focused on relatively few arterial streets. Moraga Road is the main north-south arterial street that provides access through downtown Lafayette as well as serving residential areas. High traffic volumes on this street combine with driveway access, pedestrian crossings, school activity and intersection operation to create vehicle and/or pedestrian conflicts.

To improve traffic operations and safety along Moraga Road while establishing an ongoing program for continued observation and solution of traffic safety problems, the City of Lafayette established the following objectives for the study:

1. Conduct peak hour counts at 6 key intersections and three driveways in the business area as well as 24 hour daily traffic counts at three locations.
2. Identify high accident areas along Moraga Road.
3. Analyze and recommend traffic safety and operation improvements; Alternative solutions to the problems identified will be developed.
4. Establish a schedule and improvement budget. A priority schedule for implementation of recommended improvements will be prepared based on the overall analysis.

OMNI-MEANS, Ltd. was selected by the City of Lafayette to perform a traffic safety study under the Office of Traffic Safety Grant.



Site Location Map



For this study OMNI-MEANS' approach was to initially concentrate on a comprehensive data collection process. In this data collection effort, traffic counts, accident histories, and field reviews, etc., were obtained to serve as a data base for the various study components.

Another key element of the study approach was to meet with the City of Lafayette during the study process. In this way, special problems could be reviewed or suggestions made by City representatives.

Intersection Operations Analysis

Based on recent traffic counts conducted for a previous study (and counts conducted by Omni-Means, Ltd.); six intersections were analyzed for existing and future operational conditions. Existing levels-of-service (LOS) were calculated to determine if any current problems existed with respect to turning movement delays. Driveway counts were also conducted along Moraga Road and the driveways' operation evaluated.

Intersections where the side street or driveway is stopped were analyzed using the Transportation Research Board's (TRB) Highway Capacity Manual: Special Report 209 (1985). Signalized intersections were evaluated using TRB's Interim Materials on Highway Capacity: Circular 212 (1988).

on what is... accident... creation... Best for... Core... all... planned

After the existing LOS were calculated, signal warrant analyses were conducted for all non-signalized intersections to determine if any would qualify for signalization. These analyses were applied to future traffic conditions.

High Accident Location Analysis

Based on reports from the Statewide Integrated Traffic Reporting System (SWITRS), and discussions with City Staff, OMNI-MEANS, Ltd. developed a list of locations along Moraga Road most in need of investigation. Field observations of each location along with reviews of reported accidents led to the identification of recommended improvements.

TRAFFIC SAFETY AND OPERATION IMPROVEMENTS

Based on data obtained from both the critical intersection analysis and high accident analysis, safety and operational improvements have been recommended for Moraga Road. Recommended improvements have ranged from simple lane re-striping to intersection widening. As part of the analysis, aerial photos were used for base maps in order to show recommended improvements more clearly.

As part of the recommended improvements, a priority schedule was prepared. The need for and cost of implementation of the recommended improvements are identified in this section.

CHAPTER 1

CRITICAL INTERSECTION ANALYSIS

Study Intersections and LOS Concept

In order to evaluate traffic flow conditions along Moraga Road, key intersections were evaluated for existing operating conditions. Based on discussions with Lafayette City Staff, it was determined that the following six intersections would be evaluated for existing traffic flow conditions:

1. Moraga Road/Moraga Boulevard -- Stop sign controlled, minor street
2. Moraga Road/Brook-School Streets -- Signalized
3. Moraga Road/St. Mary's Road -- Signalized
4. Moraga Road/Hamlin Road -- Stop sign controlled, minor street
5. Moraga Road/Silver Springs-Mountain View Dr. -- Stop sign controlled, minor streets
6. Moraga Road/Old Jonas Hill -- Stop sign controlled, minor street

Level-of-Service (LOS) is the primary indicator for traffic operation performance at intersections. At a signalized intersection, LOS is determined by calculating the volume of conflicting traffic movements at an intersection during one-hour and dividing that total by the capacity designed to accommodate those turning movements. The resulting calculations are expressed by LOS ratings which range from LOS "A" to LOS "F". The range describes increasing traffic demand, delays and deterioration of services (see Appendix).

At intersections where the minor street is controlled by stop-signs, the LOS reflects delays experienced by that minor street traffic. Thus, while an intersection's overall LOS may be "C" or better, a specific turning movement from the minor street could experience delay equivalent to LOS "E"- "F". When through traffic on the major street is relatively heavy, there are limited gaps in that traffic for vehicles entering from the minor street. Under these conditions, the vehicles entering from the minor street would experience long delays. Typically, the greatest delays are experienced by vehicles attempting to turn left from the minor streets (or driveways) onto the major street or travel directly across the major street.

Existing Traffic Flow Conditions

Vehicle turning movement counts for the six study intersections have been derived from a previous study. Both AM peak hour (7:30-8:30AM) and PM peak hour (4:30-5:30PM) volumes were used to analyze existing traffic flows along Moraga Road. (See Figures 2 and 3 for existing peak hour intersection volumes).

From the existing conditions shown in Table 1, it is evident that some intersections are experiencing operational difficulties during the AM and PM peak hours. A brief description of the operating conditions of each intersection follows (more detailed discussions of operational and safety characteristics are included in Chapter 2).

Moraga Rd./Moraga Blvd. -- This intersection is currently functioning at LOS "E" for both the AM and PM peak hours. Very long delays are being experienced by both the westbound right-turning and left-turning vehicles from Moraga Boulevard onto Moraga Road. The southbound left-turn movement from Moraga Road onto Moraga Boulevard experiences long delays.

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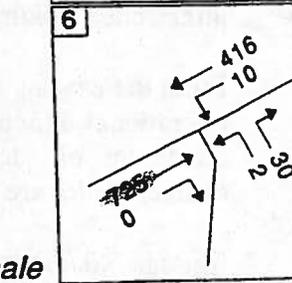
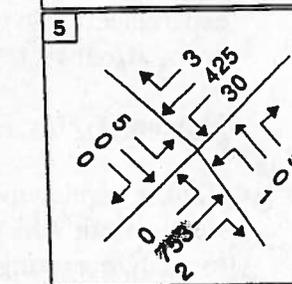
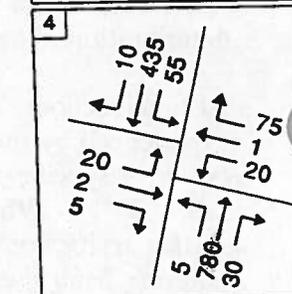
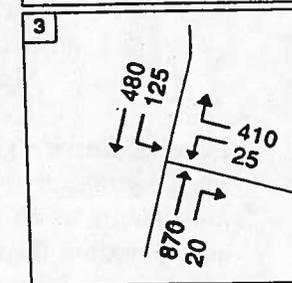
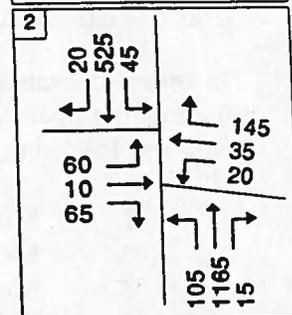
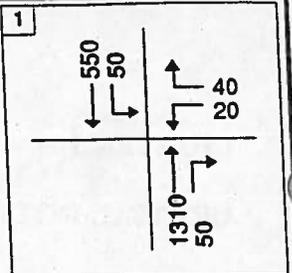
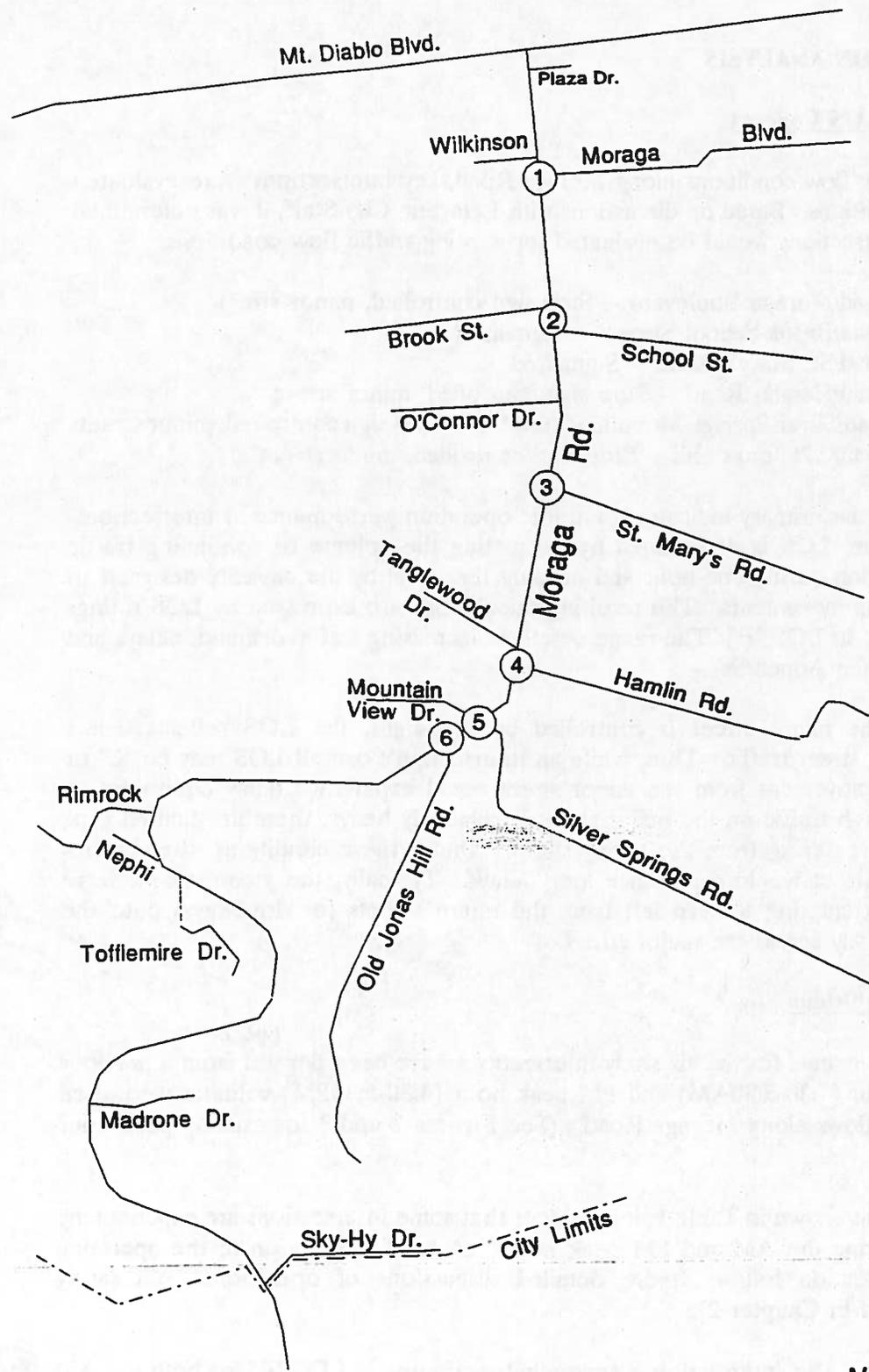
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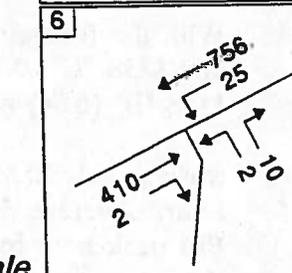
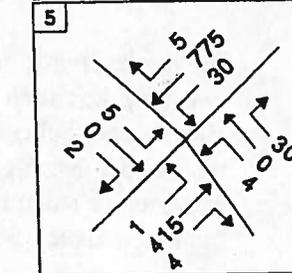
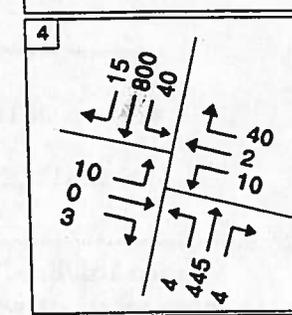
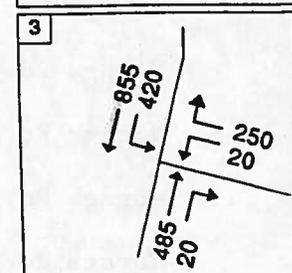
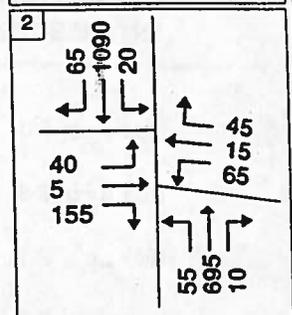
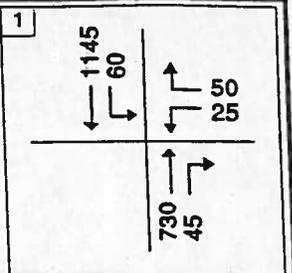
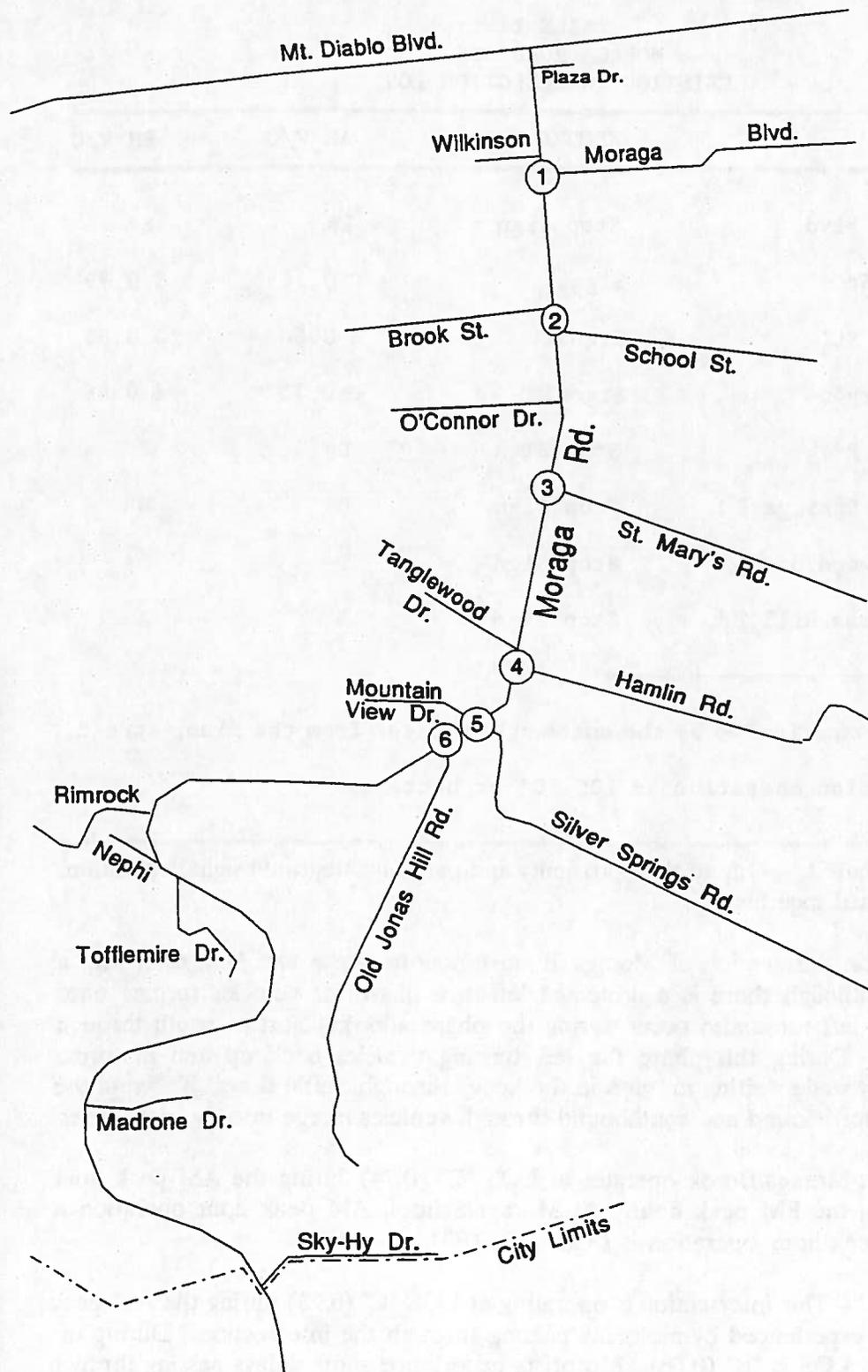
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Not to Scale

Existing Traffic Volumes
AM Peak Hour
(7:30-8:30 AM - 1988 Counts)





Not to Scale

Existing Traffic Volumes
PM Peak Hour
(4:30-5:30 PM - 1988 Counts)



**TABLE 1
MORAGA ROAD OTS
EXISTING INTERSECTION LOS**

INTERSECTION	CONTROL	AM V/C	PM V/C
Moraga Rd./Moraga Blvd.	Stop Sign	E*	E*
Moraga Rd./Brook St.	Signal	C 0.74	C 0.79
Moraga Rd./School St.	Signal	B 0.64	D 0.83
Moraga Rd./St. Mary's	Signal	C 0.73	B 0.66
Moraga Rd./Hamlin Rd.	Stop Sign	D*	B
Moraga Rd./Silver Springs Rd.	Stop Sign	D*	D*
Moraga Rd./Tanglewood Dr.	Stop Sign	D*	D*
Moraga Rd./Old Jonas Hill Rd.	Stop Sign	B	A

*These delays are experienced by the outbound vehicles from the minor street.

Overall intersection operation is LOS "C" or better.

Moraga Rd./Brook St.-School St. -- Due to their proximity and partially integrated signal operation, these locations were analyzed together.

Field observations show that this section of Moraga Road functions like a two lane road with a two-way left-turn lane. Although there is a protected left-turn phase for vehicles turning onto Brook and School Streets, left turns also occur during the phase allowing north - south through traffic on Moraga Road. During this phase the left turning vehicles back up and motorists experience substantial delay while waiting for gaps in the heavy through traffic flows. To avoid the back-ups over 75% of all northbound and southbound through vehicles merge into the right lanes.

With the foregoing factors, Moraga/Brook operates at LOS "C" (0.74) during the AM peak hour and LOS "C" (0.79) during the PM peak hour. At Moraga/School, AM peak hour operation is LOS "B" (0.64) and PM peak hour operation is LOS "D" (0.83).

Moraga Rd./St. Mary's Rd. -- This intersection is operating at LOS "C" (0.73) during the AM peak hour. Average delays are experienced by motorists passing through the intersection. During the PM peak hour intersection LOS is "B" (0.66). Motorists experience short delays passing through the intersection.

Moraga Rd./Hamlin Rd. -- This intersection is operating at LOS "D" during the AM peak hour. Long delays are experienced by motorists wishing to make the westbound right-turn and left-turn movements from Hamlin Road onto Moraga Road. During the PM peak hour the intersection LOS is to "B" with motorists having only short delays out of Hamlin Drive. All other turning movements are functioning at LOS "A".

Moraga Rd./Silver Springs Rd.- Mountain View Dr. -- This intersection is functioning at LOS "D" during both the AM and PM peak hours. It should be noted that this intersection LOS is experienced only by outbound motorists from Mountain View Drive onto Moraga Road. The Silver Springs Road approach is operating at LOS "B" during the AM peak hour and LOS "A" during the PM peak hour. Overall intersection LOS is "A" or better.

Moraga Rd./Old Jonas Hill --This intersection is functioning at a relatively free-flowing LOS of "B" in the AM peak hour and "A" in the PM peak hour. Minimal to short delays are being experienced by the right-turn and left-turn movements from Old Jonas Hill Road.

Traffic Signal Assessment

All of the unsignalized intersections have also been checked to determine if existing peak hour volumes could warrant traffic signalization. The "peak hour signal warrants" referenced in this section refer to minimum traffic volume thresholds identified by the U.S. Department of Transportation (and Caltrans). When an intersection's peak hour volumes exceed the minimum thresholds, a traffic signal could be warranted. Intersections which qualify for signalization (under the peak hour criteria) would require further analyses of accident history, proximity of other intersections/driveways, and potential volume increases. All of these factors should be examined before a signal is actually installed.

Based upon the peak hour signal warrants, none of the unsignalized study intersections currently have volumes which could justify signalization (warrant calculation sheets are attached as appendices). It should be noted however that the intersection of Hamlin/Moraga is approaching the minimum volumes for which a signal could be warranted (during the AM peak hour). Traffic volumes on the minor street (Hamlin Rd.) are about 90% of threshold levels and should continue to be monitored.

Average Daily Traffic Volumes

Average Daily Volume (ADT) counts were conducted along Moraga Road at the following three locations: south of the City limits, south of Herman Road, and south of Moraga Boulevard. The City of Lafayette has historically conducted ADT counts at these locations and these data give insight into the capacity of the various sections of Moraga Road. Existing 1989 ADT counts have been shown in Table 2.

**TABLE 2
MORAGA ROAD AVERAGE DAILY TRAFFIC - 1989**

a.	Moraga Road -- south of City Limits	-- 14,057 ADT	<i>measurement site?</i>
b.	Moraga Road -- south Herman Road	-- 16,600 ADT	
c.	Moraga Road -- south of Moraga Boulevard	-- 22,700 ADT	<i>8,650 w/lat. traffic? St M's adds same Moraga traffic</i>

ADT volumes along Moraga Road suggest that at all locations the road is essentially functioning at capacity. The capacity of a two-lane roadway can vary greatly depending on the width of lanes, number of left-turn vehicles, and the amount of truck traffic. It is generally estimated that a two-lane, suburban arterial like Moraga Road could carry up to 15,000 ADT. From the ADT counts, the section near Herman Road is currently nearing or at full capacity. The other location south of the City limits appears to be operating slightly below capacity.

South of Moraga Boulevard, Moraga Road currently is carrying 22,700 vehicles. At this point Moraga Road has four travel lanes. The capacity at this location would be a maximum of about 24,000 vehicles. With the lack of left-turn lanes, Moraga Road at this location is functioning nearly at capacity.

Vehicle Speed Surveys

Vehicle speed surveys were conducted by the City in December of 1987 at five separate locations along Moraga Road. These locations and speeds are shown in Table 3. The posted speed limit is 35 mph south of Silver Springs Road and 25 mph north of Silver Springs Road. Surveyed vehicle speeds along Moraga Road indicate that while motorists are not in conformance with posted speed limits, the speeds are generally no more than 5 - 10 mph above the limits. The exception to this would be at Oliver Court where speeds are about 15 mph higher than the 25 mph posted speed limit.

copy to Moraga Council

Effects of Future Traffic Growth

As a part of the operations analyses, Omni-Means has considered the potential traffic growth that could occur in the Moraga Road corridor. This study has not attempted to create a comprehensive data base of the entire area's cumulative development. Rather, the operational and safety characteristics have been assessed relative to their "sensitivity" to traffic volume increases. Examples of specific potential development have been used in this review.

The two components in corridor traffic growth would reflect locally generated increases (to/from the side streets) and through traffic increases (to/from Moraga). A review with City staff suggests that very limited locally generated increases are expected. However, there is a greater potential for through traffic increases as a result of Moraga development. Because Moraga Road provides access to the Lafayette BART station and Route 24, it is expected that a substantial portion of new Moraga development traffic would use this route.

An example of traffic growth potential is reflected in the proposed "Preston Ranch" project in Moraga. Located just south of the Lafayette City limits, access to this development would be totally dependent upon Moraga Road. While the project's traffic analysis has not been completed (as a part of the project EIR) preliminary traffic projections can be estimated. Using Lafayette's trip generation standards, the 263 Preston Ranch units would generate 300-325 peak hour trips. Based upon current traffic flow characteristics, 80 - 90% of these trips would be to/from the north on Moraga Road. The addition of approximately 275 peak hour vehicle trips would measurably affect traffic flow in the Moraga Road corridor. Specifically, at 4 of the 5 intersections with stop sign controls (Moraga Boulevard, Hamlin Road, Silver Springs Road and Tanglewood Drive) the side street traffic would experience very long delays. At all of the signalized intersections (Brook Street, School Street and St. Mary's Road) one or both of the peak hours would degrade to LOS "D" (with LOS "E" at Moraga Boulevard during the AM peak hour).

Further growth in through traffic would probably result in severe congestion and delay (LOS "E") * at virtually all of the key intersections along the corridor. The likelihood of this growth is tenuous to predict within the context of this traffic safety study. Further Moraga development (particularly in the Rheem area) would, however, add traffic to the Moraga Road corridor.

TABLE 3
MORAGA ROAD VEHICLE SPEED SURVEYS - 1987

<u>Location</u>	<u>85th Percentile Speed</u>	<u>Speed Limit</u>
1. At Madrone	40.8 mph	35 mph
2. At Silver Springs	35.6 mph	35/25 mph
3. At Oliver	39.3 mph	25 mph
4. At Moraga Boulevard (southbound)	33.7 mph	25 mph
5. At Moraga Boulevard (northbound)	33.5 mph	25 mph

CHAPTER 2

DETAILED ACCIDENT/OPERATIONS ANALYSIS

INTRODUCTION

Moraga Road is one of two main arterial streets that provide access into the Town of Moraga. From Mt. Diablo Boulevard in Lafayette, Moraga Road runs in a north/south direction accessing commercial-retail areas. South to St. Mary's Road, Moraga Road has straight alignment. South of St. Mary's Road, Moraga Road becomes a curving, two-lane street passing through residential areas as it winds up the hill towards Moraga.

Many of the current traffic safety problems that occur along Moraga Road are the result of traffic from numerous minor streets and private driveways conflicting with high through traffic volumes. As a result, some locations have experienced high accident rates and, with continued traffic growth, accident problems can only be expected to worsen. To reduce the potential for accidents, a High Accident Location Analysis has been made a part of this study.

The High Accident Location Analysis has been divided into four parts:

- Identification of locations warranting study through review of traffic accident histories;
- Analysis of factors contributing to accidents to isolate probable causes; and
- Recommendation of improvements to reduce the potential for future accidents.
- Establishments of the procedures for a continuing accident surveillance program.

HIGH ACCIDENT LOCATION IDENTIFICATION

The Statewide Integrated Traffic Records System (SWITRS) report for the City of Lafayette was the primary basis for preliminary identification of the accident locations to be analyzed. Based on this background information, a total of 19 potential study locations were included in a preliminary screening for Lafayette (See Table 4)

TABLE 4

PRELIMINARY SCREENING OF ACCIDENT STUDY
LOCATIONS IN LAFAYETTE

<u>Location</u> (1) (2)	<u>Total 1986-88 Accidents</u> ⁽³⁾	
1. Plaza Dr./Moraga Rd.		19 ⁽⁴⁾
2. Moraga Blvd./Moraga Rd.		16
3. Brook St./Moraga Rd.		11
4. Madrone Dr./Moraga Rd.		11
5. School St./Moraga Rd.	7	
6. Tofflemire Dr./Moraga Rd.		7
7. St. Mary's Rd./Moraga Rd.		6
8. Sky Hy Dr./Moraga Rd.	5	
9. Silver Springs Rd./Moraga Rd.	4	
10. Old Jonas Hill Rd./Moraga Rd.	4	
11. Herman Rd./Moraga Rd.	3	
12. Rowe Pl./Moraga Rd.		3
13. Rosedale Ave./Moraga Rd.		2
14. Nephi Ct./Moraga Rd.		1
15. Wilkinson Ln./Moraga Rd.		1
16. Rimrock Dr./Moraga Rd.	1	
17. O'Connor Dr./Moraga Rd.		1
18. Oliver Ct./Moraga Rd.	1	
19. Tanglewood Dr.-Hamlin Rd./Moraga Rd.	1	

-
- 1) Includes collisions within 250 feet of intersection.
 - 2) Includes all SWITRS recorded accidents along Moraga Road in Lafayette.
 - 3) Records include January 1, 1980 - September 30, 1988
 - 4) Accident period precedes installation of a raised median on Moraga Road.

While this preliminary ranking based on accident history is useful in providing an initial basis for intersection evaluations, the final study location selection must be tempered with knowledge of local conditions and citizens' concerns. Recognizing this inherent problem, OMNI-MEAN'S preliminary ranking was used to determine which locations would most need evaluation. The initial list is presented as an informational tool for both the City of Lafayette and the consultant. Based on discussions with City staff, it was determined that six intersections would be assessed as high accident locations. Table 5 lists the final study locations.

TABLE 5

FINAL HIGH ACCIDENT LOCATIONS

<u>Location</u>	<u>1986-88 Accidents</u>
1. Moraga Blvd./Moraga Rd.	15
2. Brook-School St./Moraga Rd.	18
3. St. Mary's Rd./Moraga Rd.	6
4. Silver Springs Rd./Moraga Rd.	4
5. Old Jonas Hill Rd./Moraga Rd.	4
6. Tanglewood Dr. - Hamlin Rd./Moraga Rd.	1

ANALYSIS OF FACTORS CONTRIBUTING TO ACCIDENTS

Having identified locations for further analysis, Omni-Means isolated and analyzed those factors contributing to recent accidents. By understanding the fundamental reasons for accidents that have occurred in the past, it is possible to determine measures to reduce the potential for accidents in the future.

In identifying accident causes, a variety of information sources were used, including:

- Statewide Integrated Traffic Records System (SWITRS) reports supplied by the City of Lafayette for the years 1986 through 1988.
- Radar speed surveys conducted by the Lafayette Police Department along Moraga Road in 1988.
- Peak hour traffic counts conducted by the Goodrich Traffic Group.
- In-field observations of each location by OMNI-MEANS, Ltd. team members with input from the Lafayette City Engineer. *Not the Traffic Engineer?*

Following identification of accident causes, possible solutions were determined by study team members. Solutions were based on past experiences with similar problems and state-of-the-art techniques for traffic control, tempered with recognition of the special considerations present in Lafayette.

Existing traffic conditions, accident causes, and possible solutions for the six (6) specific study locations have been summarized in the following pages.

LOCATION: Moraga Rd./Moraga Blvd.

FACTORS ASSOCIATED WITH TRAFFIC ACCIDENTS

1. Where Moraga Boulevard intersects Moraga Road, Moraga Road is four lanes wide. North of this intersection is one of the highest volume intersections in Lafayette; Moraga Rd./Mt. Diablo Boulevard. Outbound motorists from Moraga Boulevard must cross a high volume of two-way traffic when making the left-turn (results in left-turn accidents).
2. Westbound vehicles on Moraga Boulevard delay through traffic when making a left or right turning movement onto Moraga Road (results in rear-end collisions).
3. Existing off-street parking in the adjacent office complex (located on the southeast corner of intersection) can obscure vehicle site distance to the south. This causes vehicles on Moraga Boulevard to extend out into Moraga Road to improve motorists view of through-traffic. Faded pavement markings also create motorist uncertainty (results in right angle collisions).

POSSIBLE SOLUTIONS

- DO 1. Repaint all stop bars and legends.
- DO 2. Remove curb parking (8-10 spaces) and bike lanes on Moraga Road and restripe to accommodate a southbound left-turn lane.

8-10 spaces only

How many accidents are caused by delay only. Metering like 5th street w/ head-on.

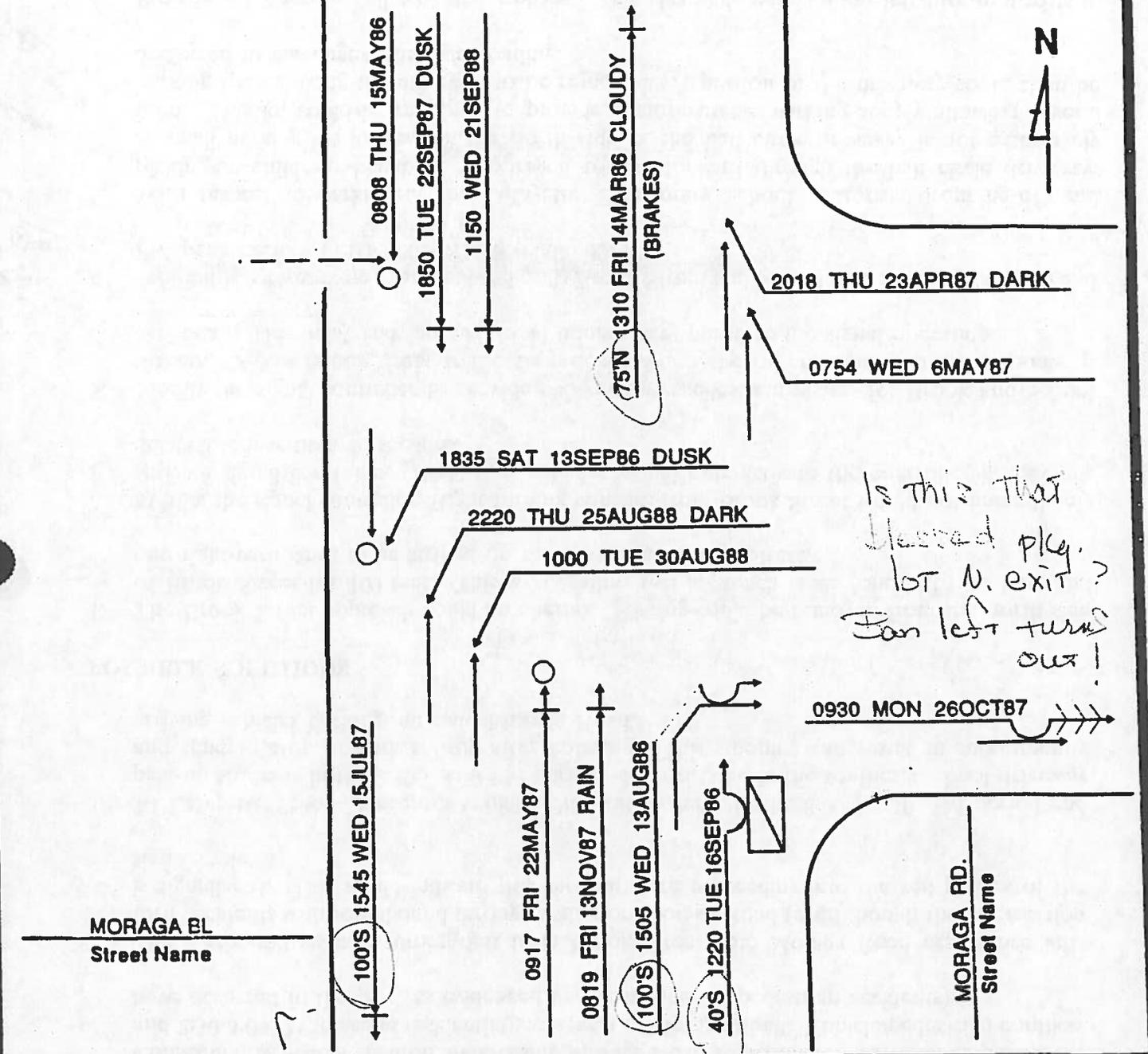
DO => metering light
DO +) Prohibit left turns, N. exit, Sutton shoe lot

COLLISION DIAGRAM

INTERSECTION MORAGA RD. AND MORAGA BLVD.

PERIOD 2.75 YEARS FROM 1/1/86 TO 9/1/88

CITY LAFAYETTE PREPARED BY OMNI-MEANS



NUMBER OF ACCIDENTS	SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
12 PROPERTY DAMAGE ONLY	<ul style="list-style-type: none"> ← MOVING VEHICLE ←>>> BACKING VEHICLE ↑ NON-INVOLVED VEHICLE ↑ PEDESTRIAN ▭ PARKED VEHICLE ▭ FIXED OBJECT ⊙ COMPLAINT OF PAIN ⊙ VISIBLE INJURY ⊙ SEVERE INJURY ⊙ FATAL ● TOTAL ACCIDENTS 	<ul style="list-style-type: none"> ←> REAR END ←> HEAD ON ←> SIDE SWIPE ←> OUT OF CONTROL ←> LEFT TURN ↑ RIGHT ANGLE 	<ol style="list-style-type: none"> DISTANCE FROM INTERSECTION (IF GREATER THAN 25') TIME, DAY, DATE WEATHER AND ROAD SURFACE (IF UNUSUAL CONDITION) PERIOD OF DAY (IF NOT DAYLIGHT) ALCOHOL AND/OR DRUGS INVOLVED (A/D)
3 COMPLAINT OF PAIN			
VISIBLE INJURY			
SEVERE INJURY			
FATAL			
15 TOTAL ACCIDENTS			

figure 4

LOCATION : MORAGA RD./BROOK ST.

FACTORS ASSOCIATED WITH TRAFFIC ACCIDENTS

These improvements would increase the efficiency of M.T./M. Roadway
circumventing left turn out of Brook Street
overhead
2-1
2-1

1. The Brook Street intersection on Moraga Road is located just south of the Lafayette Elementary School. As such, this intersection experiences relatively high pedestrian traffic during certain hours of the day. The school's hours are from 8:30 AM to 2:30 PM. Consequently, school children are crossing Moraga Road approximately between 8:00-8:30AM and 2:30-3:00PM to access residential areas west of Moraga Road. Vehicle/pedestrian conflicts have occurred in the past (as evidenced by the number of pedestrian accidents).
2. The eastbound vehicles turning left from Brook Street onto Moraga Road experience left-turn accidents with southbound through traffic on Moraga Road (even though the intersection is signalized). This would indicate that motorists are proceeding into the red phases of the signal cycle.
3. At Lafayette School, numerous vehicles drop-off students in the 8:00 - 8:30 AM period and pick-up students in the 2:30 - 3:00 PM period. Motorists enter the southerly school driveway and tend to stop or park shortly after entering. This stopping can result in subsequently arriving vehicles backing out onto Moraga Road.

POSSIBLE SOLUTIONS

or do we want to prohibit left turns ^{out} at some time, which caused the accident

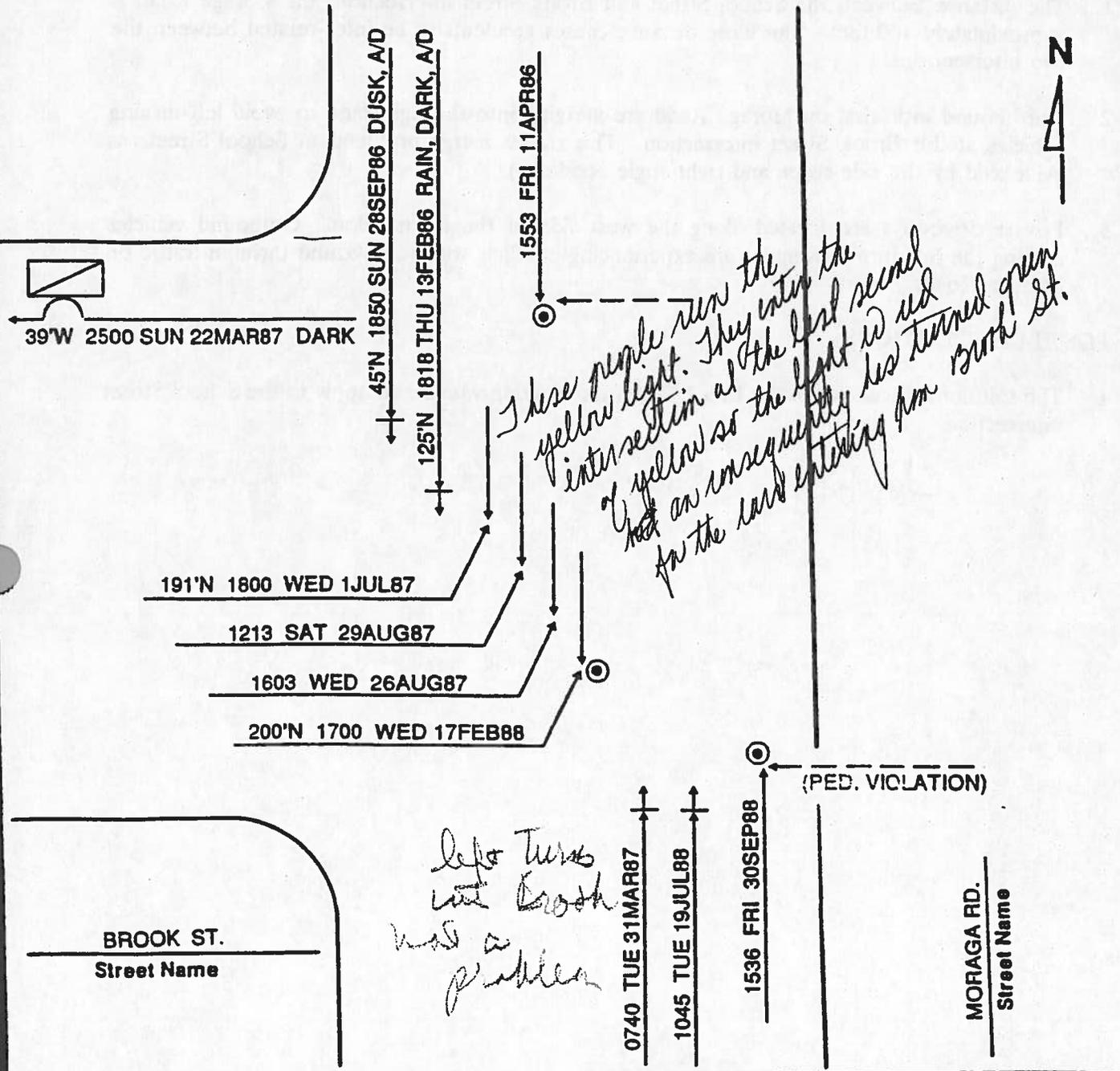
1. The Brook Street approach could be altered. Parking could be removed from the north side of Brook Street for 100 feet. This would allow two approach lanes (one left-turn lane and one right-turn lane) to be striped on the eastbound Brook Street.
2. Modify the signal controller; Right-turning vehicles from Brook Street would not immediately activate signal controller. Right-turn vehicles would only activate the controller if they are delayed longer than 10 seconds.
3. Modify the signal controller to provide two separate pedestrian phases for Brook and School Streets. Allow minor street traffic to proceed when the other street pedestrian phase is activated. This delay adds an additional unnecessary phase to the signal operation.
4. Prohibit left turns from Moraga Road onto Brook Street and School Street during the AM and PM peak periods (7:00-9:00AM and 4:00-6:00PM).
with MG traffic on 1st St. headed for Stanley & me. To Moraga / 1st
5. With respect to parking at the Lafayette Elementary School, motorists dropping-off and picking-up children should be encouraged to pull forward through the half circle driveway. A small parking lot located on the north side of the half circle driveway is not extensively used. This lot could be restriped to provide a more usable parking supply allowing several parking spaces along the driveway to be removed. A portion of the driveway could then be dedicated to passenger loading/unloading.
6. Provide a 1-2 second "all red" signal phase. This clearance would allow left-turn motorists to clear the intersection before opposing through traffic proceeds.

Do Check!
Check!
less or to do with Dist.

7) prohibit left turns out of Brook?

COLLISION DIAGRAM

INTERSECTION MORAGA RD. AND BROOK ST.
 PERIOD 2.75 YEARS FROM 1/1/86 TO 9/1/88
 CITY LAFAYETTE PREPARED BY OMNI-MEANS



NUMBER OF ACCIDENTS	SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<u>8</u> PROPERTY DAMAGE ONLY	← MOVING VEHICLE	←← REAR END	1. DISTANCE FROM INTERSECTION (IF GREATER THAN 25')
COMPLAINT OF PAIN	←←← BACKING VEHICLE	←× HEAD ON	2. TIME, DAY, DATE
<u>3</u> VISIBLE INJURY	← NON-INVOLVED VEHICLE	←→ SIDE SWIPE	3. WEATHER AND ROAD SURFACE (IF UNUSUAL CONDITION)
SEVERE INJURY	← PEDESTRIAN	←⊙ OUT OF CONTROL	4. PERIOD OF DAY (IF NOT DAYLIGHT)
FATAL	▭ PARKED VEHICLE	←↘ LEFT TURN	5. ALCOHOL AND/OR DRUGS INVOLVED (A/D)
<u>11</u> TOTAL ACCIDENTS	□ FIXED OBJECT	↑↘ RIGHT ANGLE	
	○ COMPLAINT OF PAIN		
	⊙ VISIBLE INJURY		
	⊕ SEVERE INJURY		
	● FATAL ACCIDENT		

figure 5

LOCATION: MORAGA RD./SCHOOL ST.

FACTORS ASSOCIATED WITH TRAFFIC ACCIDENTS

1. The distance between the School Street and Brook Street intersections on Moraga Road is approximately 100 feet. This close distance causes accidents to be inter-related between the two intersections.
2. Northbound motorists on Moraga Road are merging into the right lane to avoid left-turning vehicles at the Brook Street intersection. This causes merge problems at School Street (as evidenced by the side-swipe and right-angle accidents).
3. Private driveways are located along the west side of the intersection. Outbound vehicles making the left-turn movement are experiencing conflicts with southbound through-traffic on Moraga Road.

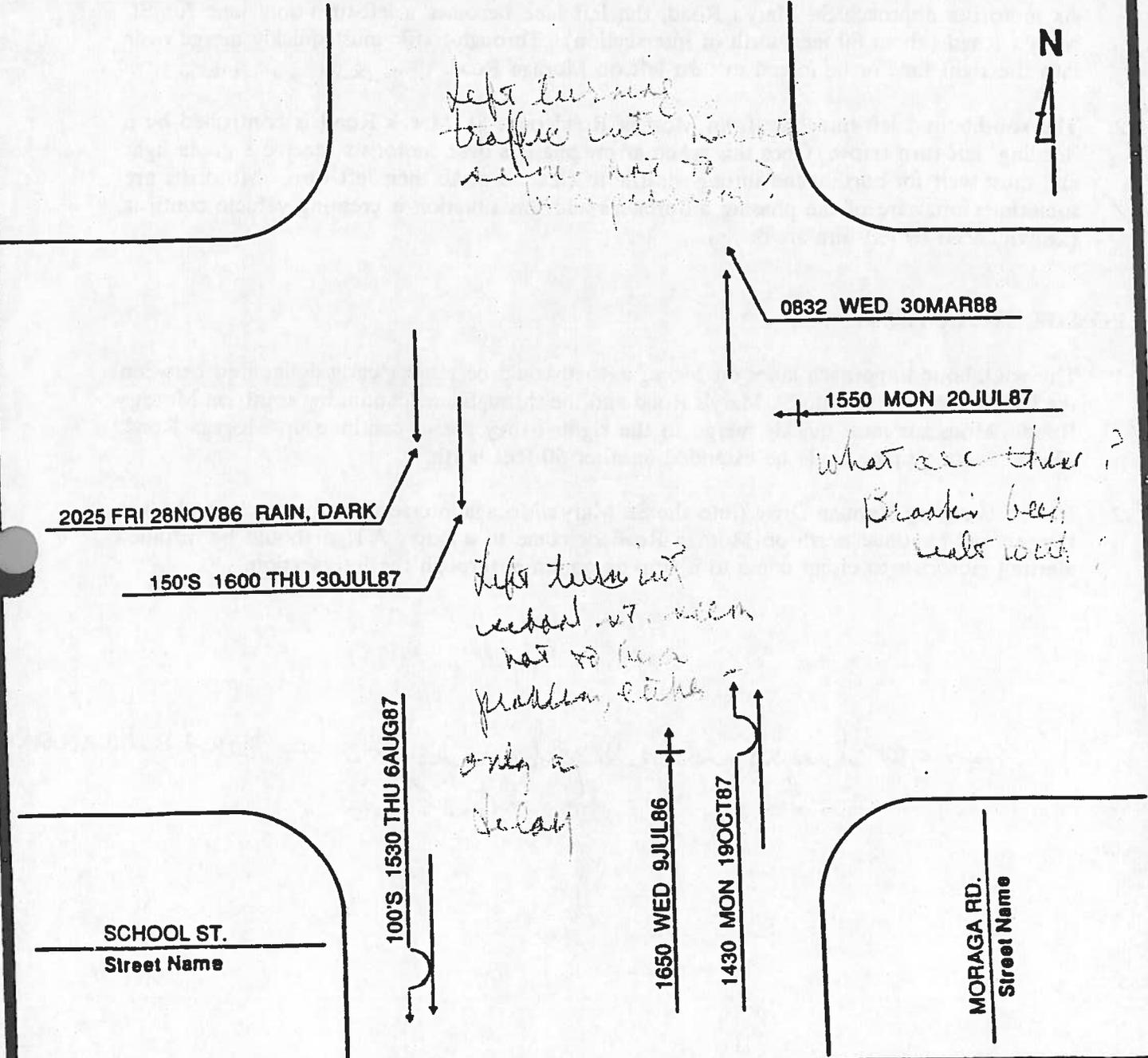
POSSIBLE SOLUTIONS

1. The solutions discussed for the Brook Street intersection would also apply to the School Street intersection.

Clarify - ^{assumed} not included - lane is striping?

COLLISION DIAGRAM

INTERSECTION MORAGA RD. AND SCHOOL ST.
 PERIOD 2.75 YEARS FROM 1/1/86 TO 9/1/88
 CITY LAFAYETTE PREPARED BY OMNI-MEANS



NUMBER OF ACCIDENTS	SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
7 PROPERTY DAMAGE ONLY	← MOVING VEHICLE	←← REAR END	1. DISTANCE FROM INTERSECTION (IF GREATER THAN 25') 2. TIME, DAY, DATE 3. WEATHER AND ROAD SURFACE (IF UNUSUAL CONDITION) 4. PERIOD OF DAY (IF NOT DAYLIGHT) 5. ALCOHOL AND/OR DRUGS INVOLVED (A/D)
COMPLAINT OF PAIN	←←← BACKING VEHICLE	←→ HEAD ON	
VISIBLE INJURY	←--- NON-INVOLVED VEHICLE	←→ SIDE SWIPE	
SEVERE INJURY	←--- PEDESTRIAN	←⊗ OUT OF CONTROL	
FATAL	⊗ PARKED VEHICLE	←→ LEFT TURN	
7 TOTAL ACCIDENTS	⊗ FIXED OBJECT	↑← RIGHT ANGLE	
	⊗ COMPLAINT OF PAIN		
	⊗ VISIBLE INJURY		
	⊗ SEVERE INJURY		
	● FATAL ACCIDENT		

figure 6

LOCATION: MORAGA RD./ST. MARY'S RD.

FACTORS ASSOCIATED WITH TRAFFIC ACCIDENTS

1. Southbound traffic on Moraga Road has two travel lanes past the School Street intersection. As motorists approach St. Mary's Road, the left lane becomes a left-turn-only lane for St. Mary's Road (about 80 feet north of intersection). Through-traffic must quickly merge over into the right lane or be forced to turn left on Moraga Road. *side merge req*
2. The southbound left-turn lane from Moraga Road onto St. Mary's Road is controlled by a "leading" left-turn arrow. Once this green-arrow phase is over, motorists receive a green light and must wait for northbound through-traffic to clear to make their left turn. Motorists are sometimes unaware of the phasing differences and this situation is creating vehicle conflicts (as evidenced by left-turn accidents).



POSSIBLE SOLUTIONS

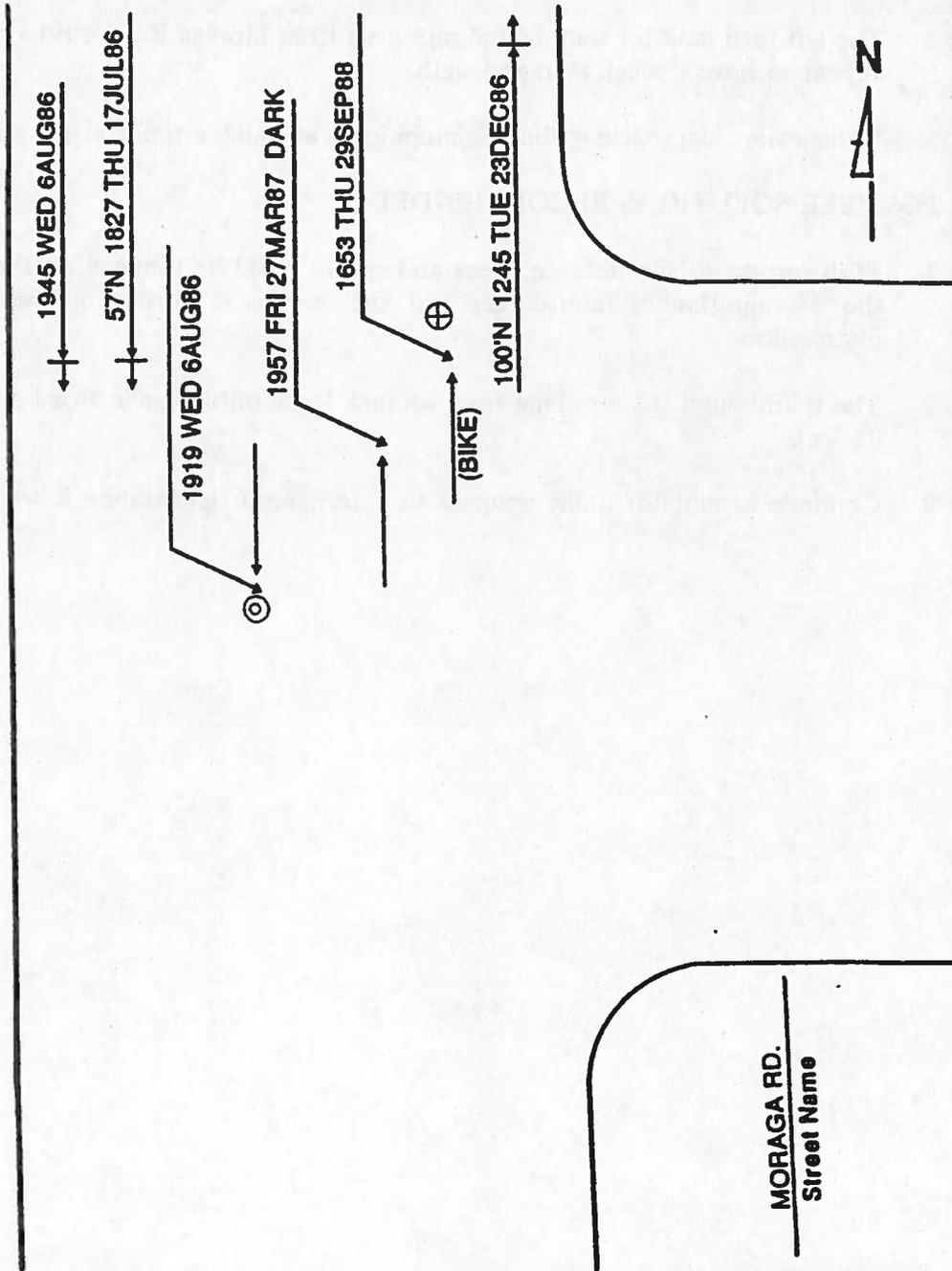
1. The southbound approach lanes on Moraga Road could be more clearly delineated between the left-turn-only lane onto St. Mary's Road and the through lane continuing south on Moraga Road. Motorists must quickly merge to the right if they are to continue up Moraga Road. The 8" white striping could be extended another 50 feet north.
2. Motorists exiting Herman Drive (into the St. Mary's/Moraga intersection) are unclear whether they should continue north on Moraga Road or come to a stop. A sign should be installed alerting motorists to either come to a stop or continue through the intersection.

*of advance to signal
clarify*

3) change light lead phasing to be comprehensible to motorists

COLLISION DIAGRAM

INTERSECTION MORAGA RD. AND ST. MARY'S RD.
 PERIOD 2.75 YEARS FROM 1/1/86 TO 9/1/88
 CITY LAFAYETTE PREPARED BY OMNI-MEANS



NUMBER OF ACCIDENTS	SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<u>4</u> PROPERTY DAMAGE ONLY	← MOVING VEHICLE	⇄ REAR END	1. DISTANCE FROM INTERSECTION (IF GREATER THAN 25') 2. TIME, DAY, DATE 3. WEATHER AND ROAD SURFACE (IF UNUSUAL CONDITION) 4. PERIOD OF DAY (IF NOT DAYLIGHT) 5. ALCOHOL AND/OR DRUGS INVOLVED (A/D)
COMPLAINT OF PAIN	←⇄ BACKING VEHICLE	⇄ HEAD ON	
<u>1</u> VISIBLE INJURY	↑ NON-INVOLVED VEHICLE	⇄ SIDE SWIPE	
<u>1</u> SEVERE INJURY	↑ PEDESTRIAN	⇄ OUT OF CONTROL	
FATAL	⊙ PARKED VEHICLE	⇄ LEFT TURN	
<u>6</u> TOTAL ACCIDENTS	⊙ FIXED OBJECT	⇄ RIGHT ANGLE	
	⊙ COMPLAINT OF PAIN		
	⊙ VISIBLE INJURY		
	⊙ SEVERE INJURY		
	● FATAL ACCIDENT		

figure 7

LOCATION: MORAGA RD./HAMLIN-TANGLEWOOD

1. Although only one accident has been recorded near this location in the last three years, sight distance is a problem for motorists on both Hamlin Road and Tanglewood Drive.
2. The left-turn lane for southbound motorists from Moraga Road onto Hamlin Road does not appear to have enough storage length.
3. Volumes are approaching the minimum level at which a traffic signal could be warranted.

POSSIBLE SOLUTIONS RECOMMENDED

- Y6
1. With respect to site distance, trees and shrubs could be trimmed on the southeast corner of the Moraga/Hamlin intersection and the northwest corner of the Moraga/Tanglewood intersection.
 2. The southbound left-turn lane from Moraga Road onto Hamlin Road could be lengthened by 25 feet.
 3. Continue to monitor traffic volumes to determine if signalization is warranted.
- Y0
- A

LOCATION: MORAGA RD./SILVER SPRINGS RD.

FACTORS ASSOCIATED WITH TRAFFIC ACCIDENTS

1. Silver Springs Road enters Moraga Road at a northwesterly angle. As such, motorists must look back at more than a 90 degree angle to see northbound through traffic along Moraga Road. Vehicle speeds are relatively high on Moraga Road and site distance is reduced due to guard rails and the intersection angle (as evidenced by a right-angle accident and fixed object accident).
2. The heavy through traffic on Moraga Road results in long delays (LOS "D") for vehicles turning left from Silver Springs Road and Mt. View Drive.

Card Singer - most don't go south,

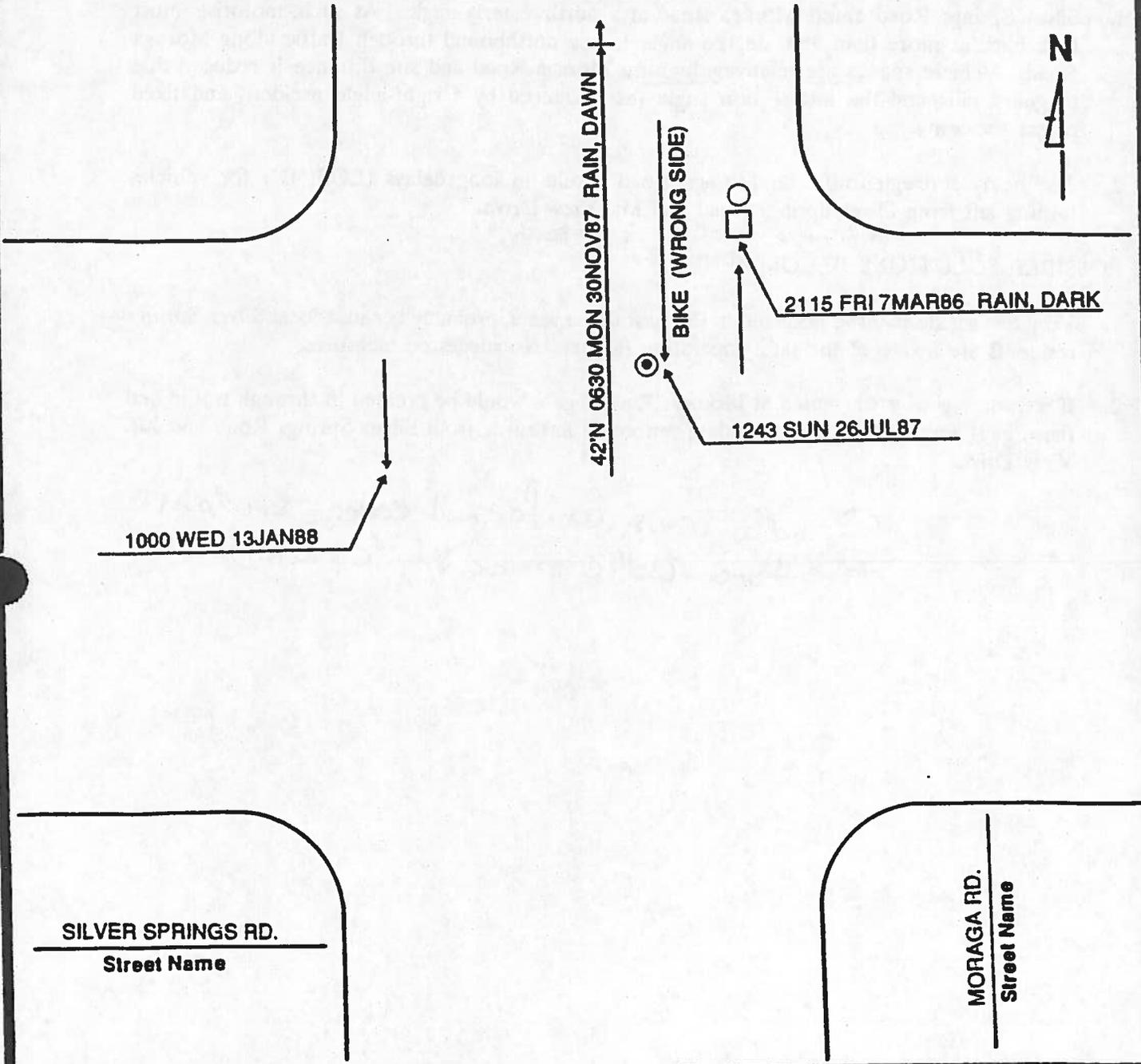
POSSIBLE SOLUTIONS RECOMMENDED

1. Very few accidents have occurred in the past three years, probably because local Silver Springs residents are aware of the safety/operation factors. No suggested measures.
2. If a traffic signal is warranted at Moraga/Hamlin, gaps would be created in through traffic and these gaps would better accommodate outbound left-turns from Silver Springs Road and Mt. View Drive.

*Orinda uses uniformed college students
to enforce traffic speeds! \$6 per h.*

COLLISION DIAGRAM

INTERSECTION MORAGA RD. AND SILVER SPRINGS RD.
 PERIOD 2.75 YEARS FROM 1/1/86 TO 9/1/88
 CITY LAFAYETTE PREPARED BY OMNI-MEANS



NUMBER OF ACCIDENTS	SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<u>2</u> PROPERTY DAMAGE ONLY	← MOVING VEHICLE	←← REAR END	1. DISTANCE FROM INTERSECTION (IF GREATER THAN 25') 2. TIME, DAY, DATE 3. WEATHER AND ROAD SURFACE (IF UNUSUAL CONDITION) 4. PERIOD OF DAY (IF NOT DAYLIGHT) 5. ALCOHOL AND/OR DRUGS INVOLVED (A/D)
<u>1</u> COMPLAINT OF PAIN	←>>> BACKING VEHICLE	→ X ← HEAD ON	
<u>1</u> VISIBLE INJURY	← NON-INVOLVED VEHICLE	←> SIDE SWIPE	
SEVERE INJURY	← PEDESTRIAN	←>>> OUT OF CONTROL	
FATAL	▭ PARKED VEHICLE	→ ↙ LEFT TURN	
<u>4</u> TOTAL ACCIDENTS	□ FIXED OBJECT	↑ ↘ RIGHT ANGLE	
	⊙ COMPLAINT OF PAIN		
	⊕ VISIBLE INJURY		
	⊗ SEVERE INJURY		
	● FATAL ACCIDENT		

figure 8

LOCATION: MORAGA RD./MADRONE DR.

FACTORS ASSOCIATED WITH TRAFFIC ACCIDENTS

1. The curve on Moraga Road at Madrone Drive results in limited sight distance in both directions. Motorists attempting either the left or right turn outbound, or inbound left turn have limited visibility.
2. The curve at Madrone Drive is not well lit and has no guard rails. Vehicle speeds are also high as they travel around the curve (40 MPH +). This section of Moraga Road has been a location for vehicle control problems (as evidenced by the number of out-of-control accidents).

POSSIBLE SOLUTIONS RECOMMENDED

*Inquiry
letter
to
residents*

not an accident reduction item

1. Moraga Road could be widened at its intersection with Madrone Drive to provide an inbound left-turn lane. *resident aware district / city march*
2. With a number of vehicle accidents occurring about 1,000 feet north of the Madrone intersection, guard rails should be installed on the east side of Moraga Road.
3. Reflective markers could be placed along the upper portion of Moraga Road to better define the shoulders as well as the curves. *Some dot*

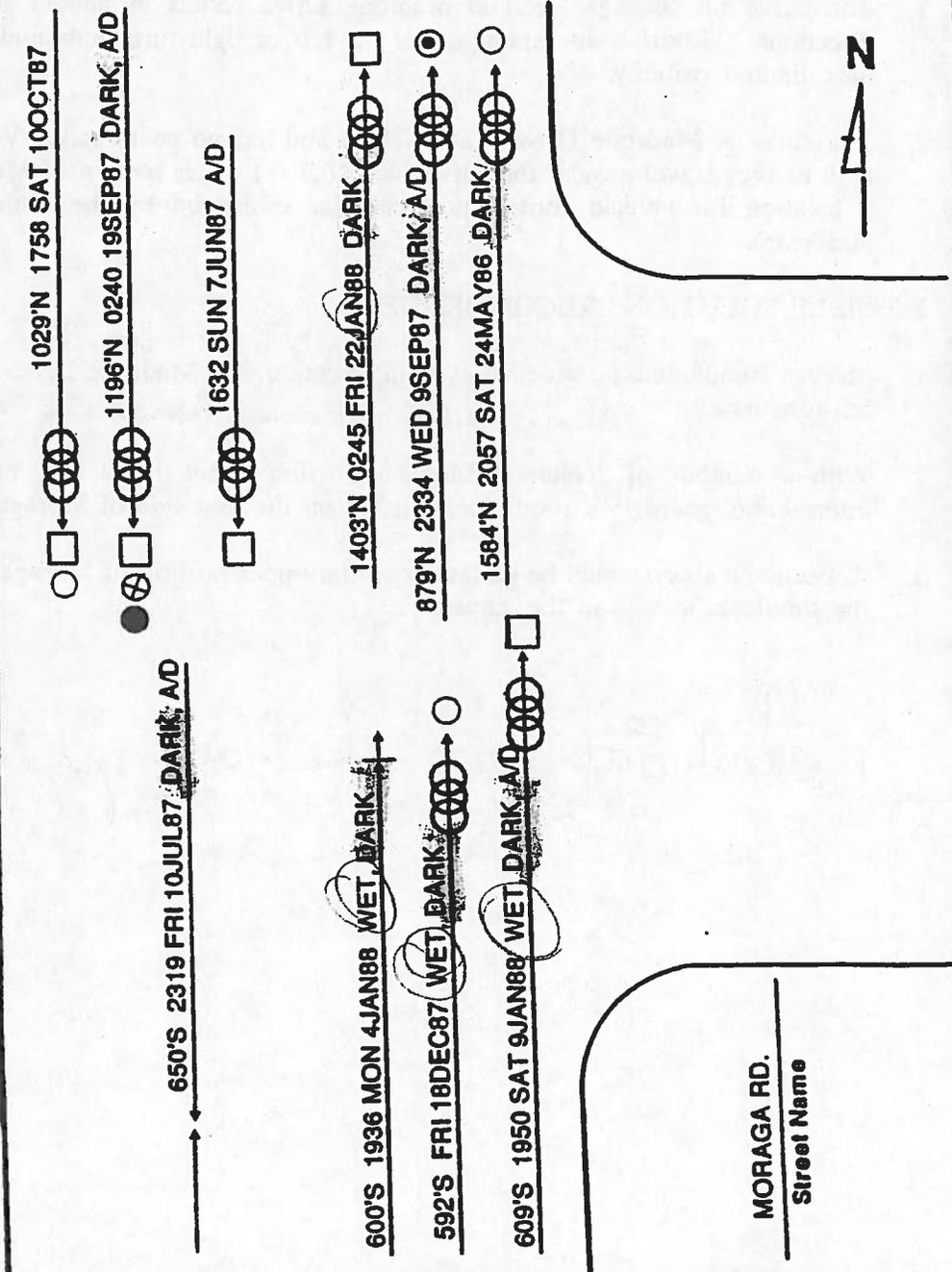
DO

DO

*4) flag to
pave with non-skid open graded asphalt*

COLLISION DIAGRAM

INTERSECTION MORAGA RD. AND MADRONE DR.
 PERIOD 2.75 YEARS FROM 1/1/86 TO 9/1/88
 CITY LAFAYETTE PREPARED BY OMNI-MEANS



NUMBER OF ACCIDENTS	SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<u>5</u> PROPERTY DAMAGE ONLY	← MOVING VEHICLE	←← REAR END	1. DISTANCE FROM INTERSECTION (IF GREATER THAN 25')
<u>3</u> COMPLAINT OF PAIN	←←← BACKING VEHICLE	←× HEAD ON	2. TIME, DAY, DATE
<u>1</u> VISIBLE INJURY	↑ NON-INVOLVED VEHICLE	←↘ SIDE SWIPE	3. WEATHER AND ROAD SURFACE (IF UNUSUAL CONDITION)
<u>1</u> SEVERE INJURY	↑ PEDESTRIAN	←⊙ OUT OF CONTROL	4. PERIOD OF DAY (IF NOT DAYLIGHT)
<u>1</u> FATAL	▭ PARKED VEHICLE	←↙ LEFT TURN	5. ALCOHOL AND/OR DRUGS INVOLVED (A/D)
<u>10</u> TOTAL ACCIDENTS	□ FIXED OBJECT	↑↘ RIGHT ANGLE	
	⊙ COMPLAINT OF PAIN		
	⊙ VISIBLE INJURY		
	⊙ SEVERE INJURY		
	● FATAL ACCIDENT		

figure 9

GENERAL MORAGA ROAD OBSERVATIONS

BIKE LANES IN THE DOWNTOWN AREA

*ad. Council was
not a @ minute ride
2 after school
weekend ride*

A general observation in the downtown area is that the bike lanes should be revised or eliminated. Omni-Mean's counts indicated that the Moraga Road bike lanes are very lightly traveled with no more than 5 - 10 bicyclists during either the AM, mid-afternoon, or PM peak hours. The majority of all bicyclists use the sidewalks along Moraga Road or simply use the parallel route along First Street.

not if they come from areas W. of Moraga Rd.

The current Moraga Road bike lanes do not meet the minimum guidelines established by the California Department of Transportation (Caltrans). Where striped curb parking is provided, the minimum bike lane width is 5 feet, measured from the center of the bike lane stripe to the center of the parking space stripe. Currently, the lane along the west side of Moraga Road is 4 - 4.5 feet wide. Where parking is prohibited, the bike lane must be at least 4 feet wide measured from the face of curb to the center of the bike lane stripe. In addition, there must be at least 3 feet of pavement width between the edge of the gutter and the center of the bike lane stripe. Existing bike lanes on the east side of Moraga Road are less than 4 feet wide in total and have less than 3 feet of pavement width.

*asphalt
striped
curb
parking
space
stripe*

*was adapted
as such
various
requirements
had to
be added
accdy
to
when*

? we paved to curb.

Due to the very limited bicycle volumes and the fact that bike lanes do not meet minimum standards, consideration should be given to either eliminating the bike lanes or reconstructing Moraga Road to provide standard width lanes.

RE STRIPE ← originally note

ROADWAY WIDTH ALONG THE UPPER SECTION OF MORAGA ROAD

The upper section of Moraga Road (south of Old Jonas Hill Road) is a basic two lane facility with limited shoulders and no left-turn lanes. Through traffic is disrupted by vehicles waiting to turn left and disabled vehicles which must stop along the roadway. Police officers also have few locations to which they can direct a vehicle receiving a citation. Motorists are also less likely to use the current shoulders which are poorly graded.

The shoulder areas could be increased and improved with relatively minor measures. In a number of locations, existing shoulder areas could be improved by adding and compacting roadway aggregate. New shoulder areas could be created by placing drain pipe in ditches and covering the pipe with compacted aggregate. Although full width (6 - 8 foot) shoulders would not be possible in most instances, even a minimal 3-4 foot should area could accommodate a disabled vehicle while allowing through traffic to pass.

Beyond these remedial measures, a full scale widening project would be needed to fully address the shoulder and left-turn lane requirements. The numerous private streets and driveways would result in substantially fewer conflicts if a virtually continuous two-way left-turn lane was provided on Moraga Road. The turn lane would separate through and turning vehicles, improving the traffic operations and safety along the entire corridor.

Benefits from Moraga road widening

An issue related to roadway width is the limited pedestrian access and the potential for conflicts between pedestrians and vehicles. South of Old Jonas Hill Road, residential density is very low and pedestrian activity is light. However, beginning at Old Jonas Hill Road, pedestrian volumes increase, primarily a result of the students walking to/from Lafayette Elementary School and

Stanley Intermediate School. Provisions for pedestrian travel vary substantially in this area. From Old Jonas Hill Road to Silver Springs Road, the pedestrian pathway is a relatively undefined pavement area immediately adjacent to the east side of Moraga Road. Only the white pavement edge stripe separates the northbound travel lane from the pedestrian area. Beginning at Silver Springs Road and continuing to a point just north of Hamlin Road, a pedestrian pathway is behind a guardrail. The pathway then returns to an adjacent paved area from north of Hamlin Road to St. Mary's Road. From St. Mary's Road to Rosedale Avenue, a separate paved path is available and beginning at Rosedale Avenue, standard curb, gutter, and sidewalk is in place.

CHAPTER 3

TRAFFIC SAFETY AND OPERATIONS IMPROVEMENT

INTRODUCTION

Existing traffic along Moraga Road generally operates efficiently, but certain congestion and/or safety problem areas do exist. Through an evaluation of the intersection operation and identification of high accident locations, it has been found that certain circulation improvements could improve traffic flows along Moraga Road. City staff has expressed a concern that these problems would continue to increase along Moraga Road particularly with the expected growth in through traffic to/from Moraga.

OMNI-MEANS, Ltd. has identified locations along Moraga Road where traffic operations/safety problems are likely to occur over the next 10 years. Data has been utilized from every phase of the study to help identify specific locations that may experience congestion. This analysis was based on peak hour intersection counts, ADT counts, bicycle/pedestrian counts, and accident history along Moraga Road. From this data, further analysis incorporated Caltrans traffic signal warrants, pedestrian volumes, and vehicle speeds.

Traffic circulation improvements proposed for Moraga Road have been listed by degree of improvement. These measures range from minor, short-term improvements to major improvements involving longer-term planning.

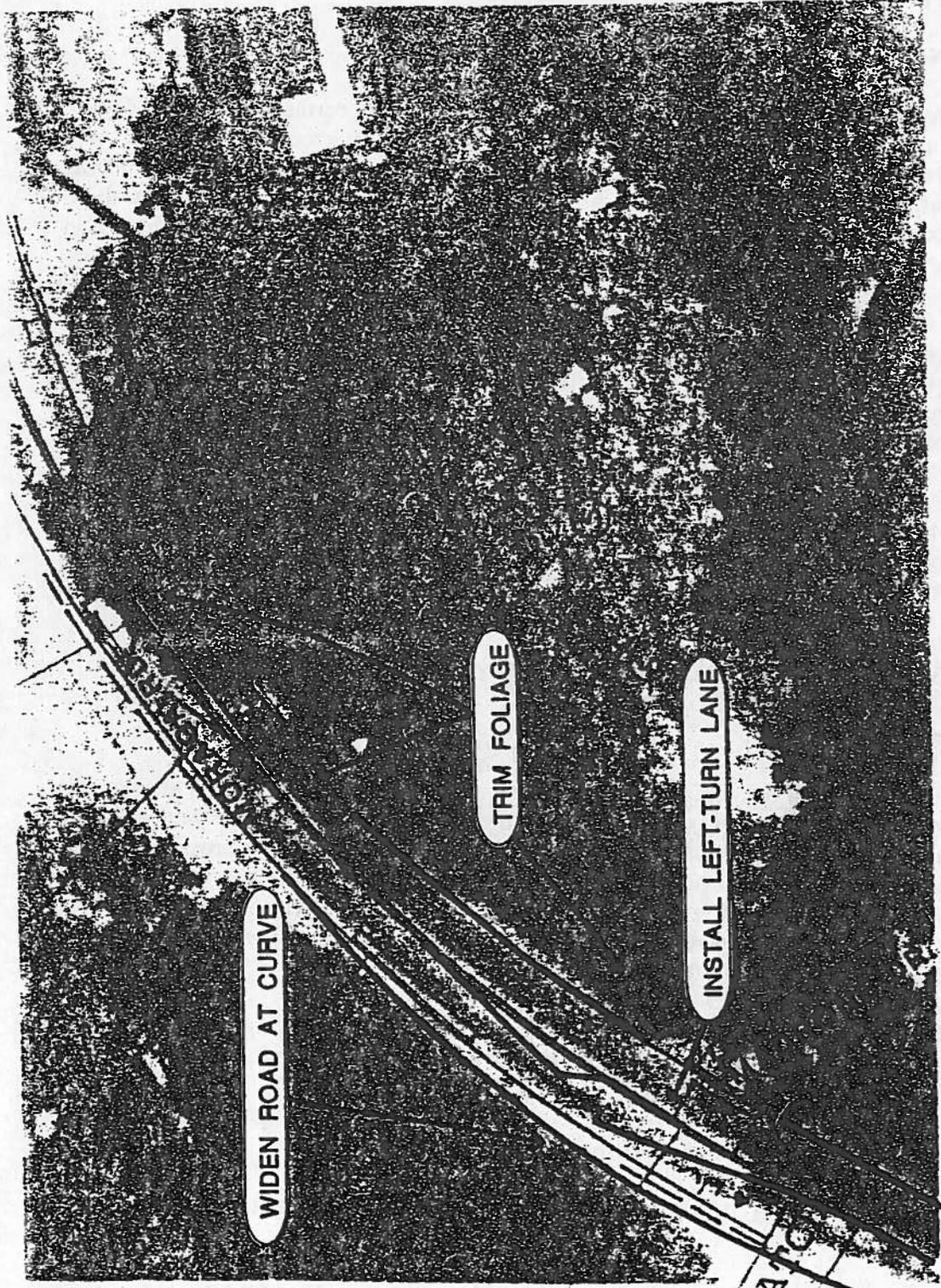
1. MORAGA ROAD CIRCULATION IMPROVEMENTS (Specific Locations)

A. Madrone Dr./Moraga Rd.

This area along Moraga Road has experienced a number of accidents over the past three years. Many of these accidents are occurring during the evening hours when the curve is not well lit or defined. Based on accident history, motorists are losing control of their vehicles approximately 1,000 feet north of Madrone Street. Other problems occurring nearer the intersection at include vehicle delays caused by inbound left-turning vehicles from Moraga Road onto Madrone Street. Outbound vehicles from Madrone Street also have a sight distance problem in either direction. In response, the following measures are recommended (see Figures 10 and 11):

1. Provide Caltrans standard edge-delineators on both sides of Moraga Road around the curve at Madrone Drive as well as 1,000-1,500 feet north of Madrone Drive.
2. Trim all trees and foliage on both sides of Moraga Road to provide improved sight distance for motorists entering and exiting Madrone Drive.
3. Install a guard rail along the east side of Moraga Road approximately 1,000 feet past Madrone Drive.
4. Widen the intersection of Moraga/Madrone to provide a left-turn lane for inbound motorists into Madrone Drive.

§) open graded asphalt

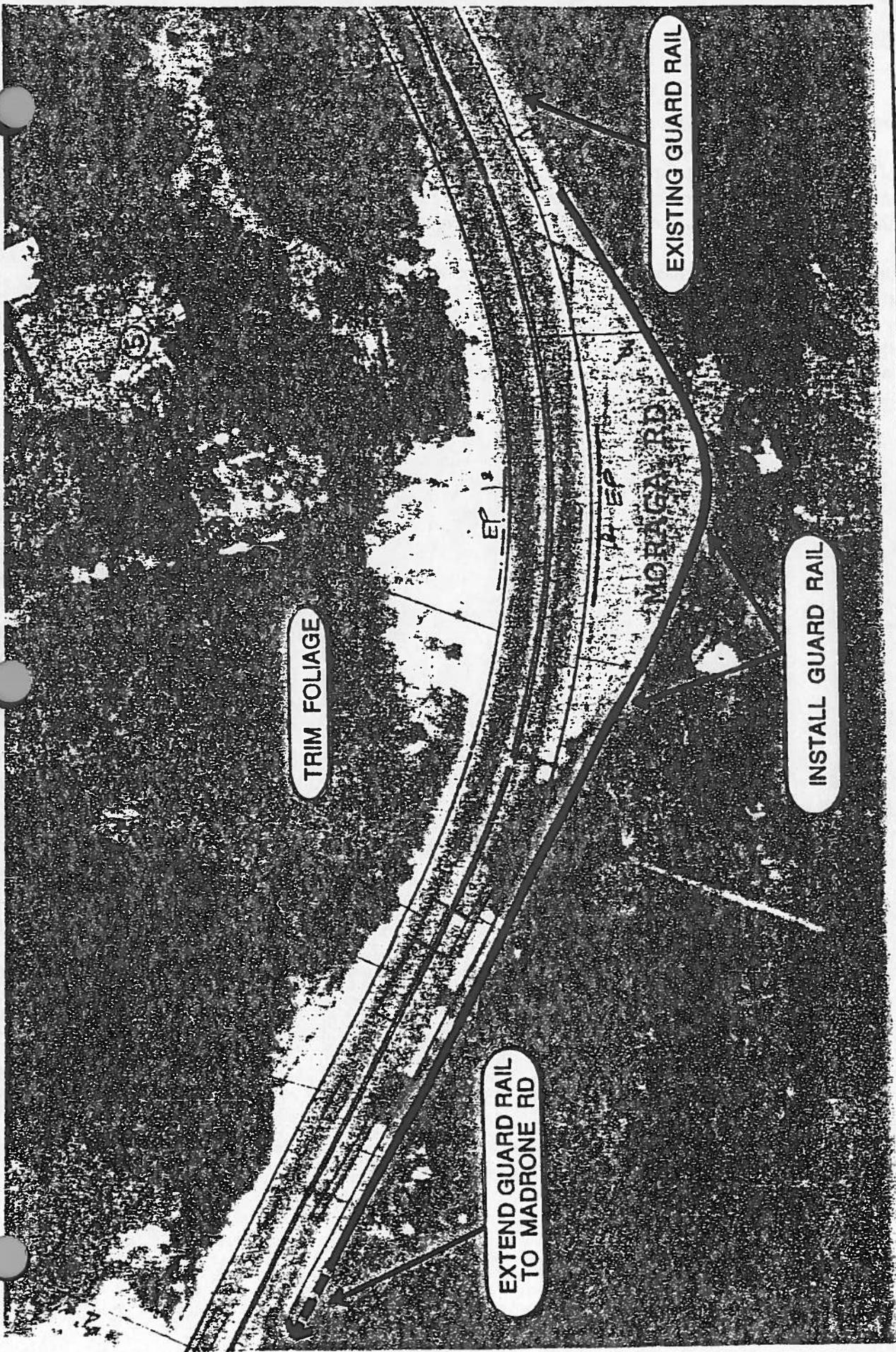


POTENTIAL IMPROVEMENTS AT MORAGA/MADRONE

figure 10



omn means



POTENTIAL IMPROVEMENTS NORTH OF MADRONE DRIVE

figure 11

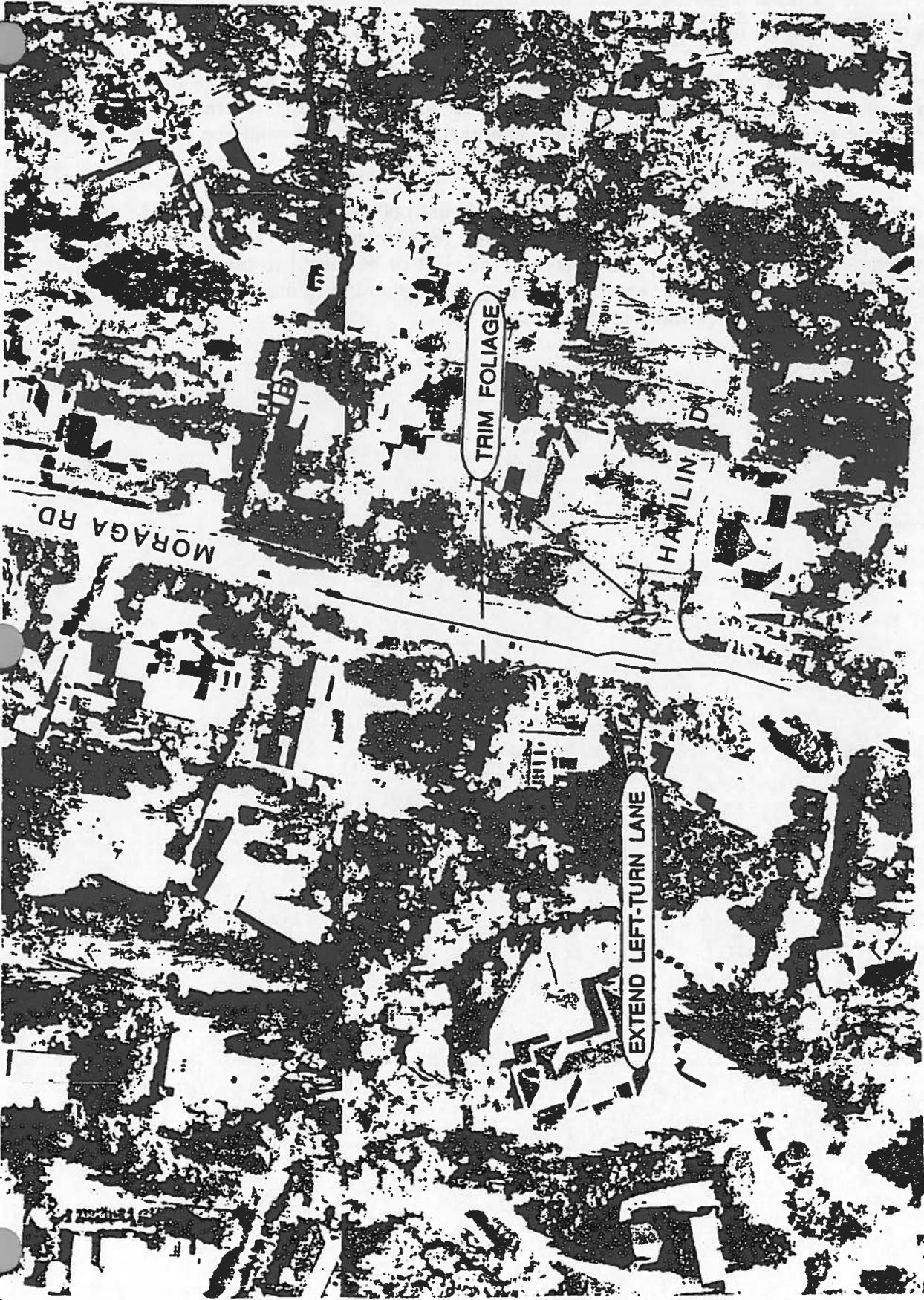


omni • means

B. Tanglewood Dr.-Hamlin Rd/Moraga Rd.

This area of Moraga Road is functioning reasonably well in terms of peak hour traffic flows. Some minor corrections could be undertaken to improve vehicle sight distance and left turn storage. In response, the following measures are recommended (see Figure 12):

1. Trim foliage on the southeast corner of Hamlin/Moraga and the northwest corner of Tanglewood/Moraga to improve sight distance.
2. Lengthen the southbound left-turn lane from Moraga Road onto Hamlin Road by 25 feet to allow more storage length for inbound motorists during the peak hour.



POTENTIAL IMPROVEMENTS AT MORAGA/HAMLIN

figure 12



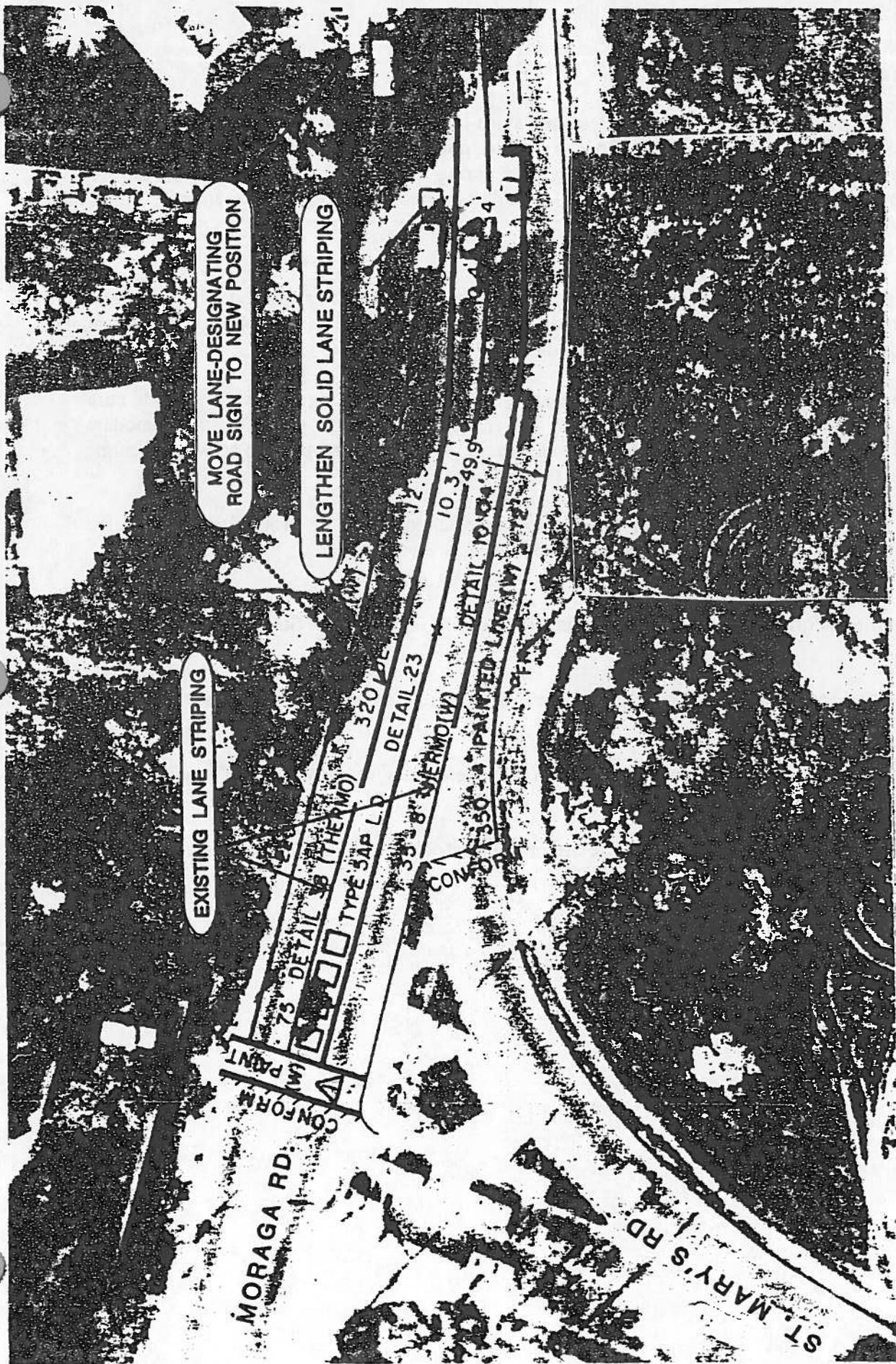
omni • means

C. St. Mary's Rd./Moraga Rd.

The intersection of St. Mary's Rd./Moraga Rd. is currently causing some vehicle merge problems. While some of these conflicts may be unavoidable due to the physical constraints of the intersection, some additional lane-striping may help motorists. Lane-striping would be specifically for southbound vehicles on Moraga Road.

1. Extend the solid white stripe along Moraga (southbound) 80-100 feet to further divide the left-turn lane from the through lane that continues on Moraga Road. Motorists that are travelling Moraga Road must quickly merge to the right or be forced to turn left onto St. Mary's Road. As part of the extended striping, the sign warning motorists of the lane designations should be relocated appropriately.

2) correct signal lead time



POTENTIAL IMPROVEMENTS AT MORAGA/ST. MARYS

figure 13



omni • means

D. Brook St. - School St./Moraga Rd.

These two intersections are being treated as one since they are in such close proximity to each other. Vehicle delays along Moraga Road are most noticeable at these intersections. Field observations have shown that this is especially true during the school hours when children are being dropped off or picked up. In response, the following measures are recommended.

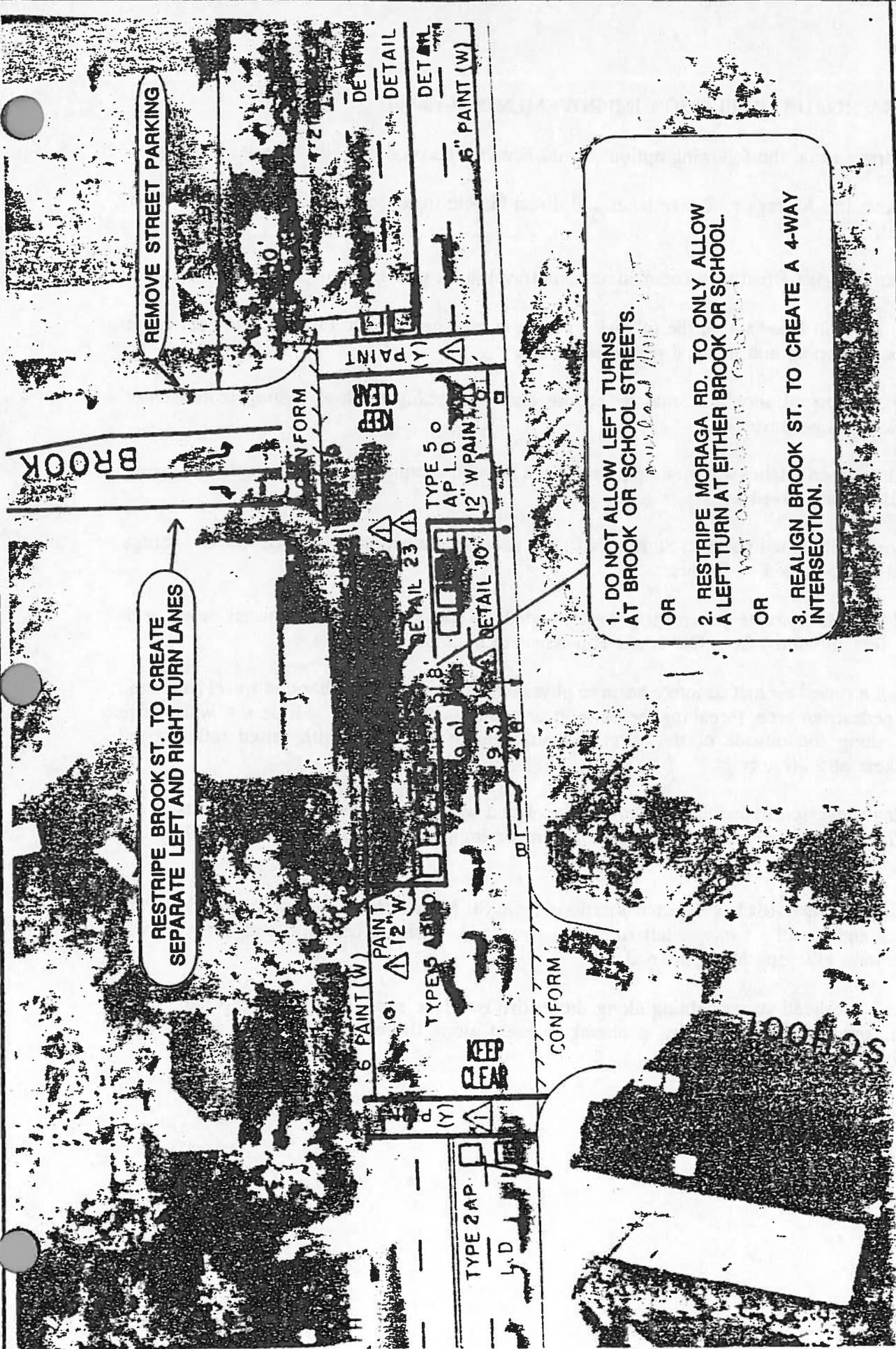
1. Modify the eastbound Brook Street approach to include separate right and left turn lanes. Curb side vehicle parking would have to be removed on the north side of Brook Street in order to accommodate the two lane widths.
2. Revise Lafayette School access by designating 3-4 passenger loading spaces along inside curb of driveway. Restripe existing parking lot (north of driveway) to better accommodate vehicles. Encourage school administrators to monitor drop-off and pick-up activity, directing motorists to proceed forward through the driveway.
3. Prohibit left turns from Moraga Road onto either School Street or Brook Street during the peak periods of 7:00-9:00 AM and 4:00-6:00 PM.
4. Restripe Moraga Road to allow one left turn lane at either Brook Street or School Street.
5. Widen Moraga Road (without bike lanes) to allow side by side left turn lanes for School Street and Brook Street.
6. Purchase right-of-way and totally reconstruct the streets to provide an aligned four-way intersection.
7. Remove the traffic signal at Brook Street and restrict access to right-turns only.

to
do
look to
see
?

maybe

check
overload

See p. 16



1. DO NOT ALLOW LEFT TURNS AT BROOK OR SCHOOL STREETS.
- OR
2. RESTRIPE MORAGA RD. TO ONLY ALLOW A LEFT TURN AT EITHER BROOK OR SCHOOL
- OR
3. REALIGN BROOK ST. TO CREATE A 4-WAY INTERSECTION.



omni • means

POTENTIAL IMPROVEMENTS AT MORAGA/BROOK-SCHOOL



figure 14

2. MORAGA ROAD CIRCULATION IMPROVEMENTS (General)

In the downtown area, the following options would address the problem with bike lane design:

1. Remove the Moraga road bike lanes and direct bicycle travel to the parallel route on First Street.
2. Widen Moraga Road to accommodate four travel lanes plus Caltrans standard bike lanes.

From Old Jonas Hill Road south, the following measures are suggested to enhance shoulder areas for emergency stopping and minimal pedestrian areas:

1. Improve current shoulder areas by adding and compacting roadway aggregate (shoulder areas could be paved.)
2. Replace open ditches with drain pipe and back fill with compacted roadway aggregate (areas could also be paved.)

From Old Jonas Hill Road north to St. Mary's Road, pedestrian travel (on the east side of Moraga Road) could be enhanced as follows:

1. Add asphalt concrete pavement (where needed) to provide area a continuous paved area (4-5 feet in width) from Old Jonas Hill Road to St. Mary's Road.
2. Install a raised asphalt concrete berm to physically separate the northbound travel lane from the pedestrian area, (breaking the berm at driveways and bus stop). Stripe a 4" white edge line along the outside of the berm and supplement the stripe with raised reflectorized markers at 24' intervals.

The following suggested improvements for Moraga Road would encompass larger segments of the roadway. These measures would be considered major improvements and are listed at least for discussion purposes.

1. Widen Moraga Road at selected locations from St. Mary's Road southward past Madrone Drive and install a two-way left turn lane to provide easier access into and out of private driveways all along Moraga Road.
2. Install overhead street lighting along the entire two lane section of Moraga Road. While some overhead street lighting is already present along the arterial, further lighting would define dark portions clearly.

CHAPTER 4

CONTINUING ACCIDENT SURVEILLANCE PROGRAM

Program Purpose

In the previous section, analyses were conducted for accident and traffic conditions as they now exist and recommendations were made to facilitate accident reduction. It is however, necessary to continuously monitor the accident situation in order to maintain a viable and current traffic safety program. Traffic conditions and accident statistics must be continually updated to detect any new or changing accident problems along Moraga Road. Monitoring can be a very costly and time consuming process unless it is organized to take advantage of data and methods which are readily available. This section will focus on identifying efficient procedures for maintaining an on-going accident surveillance program.

The City of Lafayette has a part time Traffic Engineer on their staff. This section will outline the tasks that have to be accomplished by staff as part of the continuing monitoring of accident patterns along Moraga Road.

Surveillance Program

There are seven basic steps in a study of accident experience of selected locations in a city. They are listed below:

1. Obtain adequate vehicle accident reports;
2. Maintain accident records;
3. Select hazardous locations for detailed study;
4. Prepare collision diagrams;
5. Summarize facts;
6. Supplement accident data with field observations during peak traffic and/or peak accident hours; and,
7. Analyze the summary facts and field data to prepare a remedial program for each study location.

Each of these elements are discussed below, both in the context of existing and recommended operations.

Obtain Vehicle Accident Reports

The Public Works Department has access to computerized accident summary reports (SWITRS) received quarterly by the Police Department from the California Highway Patrol. (All recorded accidents in the City are transmitted to Sacramento for inclusion in SWITRS).

The SWITRS listings summarize accident occurrences at each location. Not all accidents are recorded on SWITRS since minor accidents may not be reported to Police. However, the SWITRS reports do summarize the majority of accidents and include all accidents which result in major property damage, injury or fatality. Because minor accidents would tend to be unreported citywide, the absence of such records (both in City records and SWITRS) would not affect the relative listing of accident locations.

Select Hazardous Locations for Detailed Study

In conducting a continuing study, a very detailed selection process as utilized by the consultant is not necessary. Simple inspection of the accidents records will reveal high accident locations. The following minimum guidelines should be used to determine locations requiring additional attention in a community such as Lafayette.

1. For intersection locations, three or more accidents per year; and
2. For mid-block locations, two or more accidents per year.

Prepare Collision Diagrams

Once a high accident location has been identified, a collision diagram should be prepared. The collision diagram illustrates graphically the type of all accidents occurring at the location by means of symbols.

The collision diagram should indicate by arrows the direction of movement of each vehicle or pedestrian involved. Scale is not critical, however, it is important that approximate locations are given relative to their position within the intersection or at mid-block locations.

The date and approximate time (day, night, dawn or dusk) of the accident should be noted along side each arrow. Weather and pavement conditions, as well as night accidents, should be recorded. Any other factors that may contribute to the accident should also be noted.

The collision diagram is especially useful in revealing accidents falling into one or more of the following classifications:

1. Right-angle collisions between vehicles entering on intersecting streets;
2. Left-turn collisions involving vehicles approaching one another;
3. Rear-end collisions;
4. Pedestrian vs. vehicle collisions;
5. Collisions between vehicles traveling in the same direction involving turning, lane changing or sideswiping.
6. Head on collisions;
7. Vehicles running off the roadway at curves or constrictions in the roadway;
8. Collisions with fixed objects near the roadside or within the intersection; and
9. Collisions with parked vehicles.

The collision diagram may also reveal certain time periods when most accidents tend to occur.

It is desirable to prepare collision diagrams for every high accident intersection within the City. This would enable staff to review a location's cumulative accident experience by simply examining a one page collision diagram. Typical collision diagrams with standard symbols are in the previous chapter.

Summarize Facts

At some locations, the need to summarize accident facts will become obvious as the details on the collision diagram become more numerous. However, the preparation of such a summary for