

**FINAL**

**LAMORINDA  
TRAFFIC STUDY**

**Transportation Improvement  
Program**

*Prepared for*

**Lamorinda Communities of  
Lafayette, Moraga, and Orinda, California  
and  
Contra Costa Transportation Authority**

*Prepared by*

**Barton-Aschman Associates, Inc.  
Berkeley, California**

**August 1, 1994**

## Acknowledgements

Considerable effort on the part of the Lamorinda Project Management Committee has shaped both the process and the content of this important study. Through its guidance, this collaborative effort has resulted in the assembly and analysis of much useful information upon which many significant planning decisions will be made. The leadership of the Committee is gratefully acknowledged for their dedication, insight, and commitment.

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## Supporting Documents Prepared During Development of LTIP

### Executive Summary of Final Report

Workpaper 1	Study Area
Workpaper 2	Study Issues
Workpaper 3	Existing Data
Workpaper 4	Existing Conditions
Workpaper 5	Accident Study
Workpaper 6	Workshop I
Workpaper 7	Workshop II
Workpaper 8	Workshop III
Workpaper 9	Consolidated Growth Management Element
Workpaper 10	Action Plan Initial Study
Workpaper 11	Zone Definition and Land Use
Workpaper 12	Network Definition
Workpaper 13	Special Land Uses
Workpaper 14	Preliminary 2010 Forecasts
Workpaper 15	Forecast Report
Workpaper 16	Evaluation of Potential Actions and Strategies
Workpaper 17	Draft Lamorinda Transportation Improvement Master Plan

# 1 Introduction

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**T**HE PURPOSE OF THE Lamorinda Traffic Study (LTS) was to address transportation problems within the Lamorinda communities of Lafayette, Moraga, and Orinda by identifying actions and measures to mitigate the impacts of traffic congestion between Highway 24 and the Town of Moraga.<sup>1</sup> The LTS study area comprises Lafayette, Moraga, and Orinda south of State Route 24 (SR-24). This area and the area-wide circulation system are shown in Figure 1 (Page 2). The Lamorinda Transportation Improvement Program (LTIP) is the final product of the LTS. It consolidates the actions and measures adopted by the three communities. The communities will now proceed through the funding and implementation process defined by Measure C and the Contra Costa Transportation Authority (CCTA).

Funding for both the study and the LTIP is through the Measure C Gateway/Lamorinda Traffic Program. Community involvement throughout the LTS process directed that safety and project impact play a primary role in the development and adoption of the LTIP.

The LTS was sponsored by the Contra Costa Transportation Authority (CCTA). The consulting team of Barton-Aschman Associates, Inc., with assistance from Moore, Iacofano, Goltzman, Inc. in the conduct of public workshops, and Mundie & Associates in the area of land use planning conducted the

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<sup>1</sup> *The Revised Contra Costa Transportation Improvement and Growth Management Program, Contra Costa Transportation Partnership Commission, Adopted August 3, 1988.*

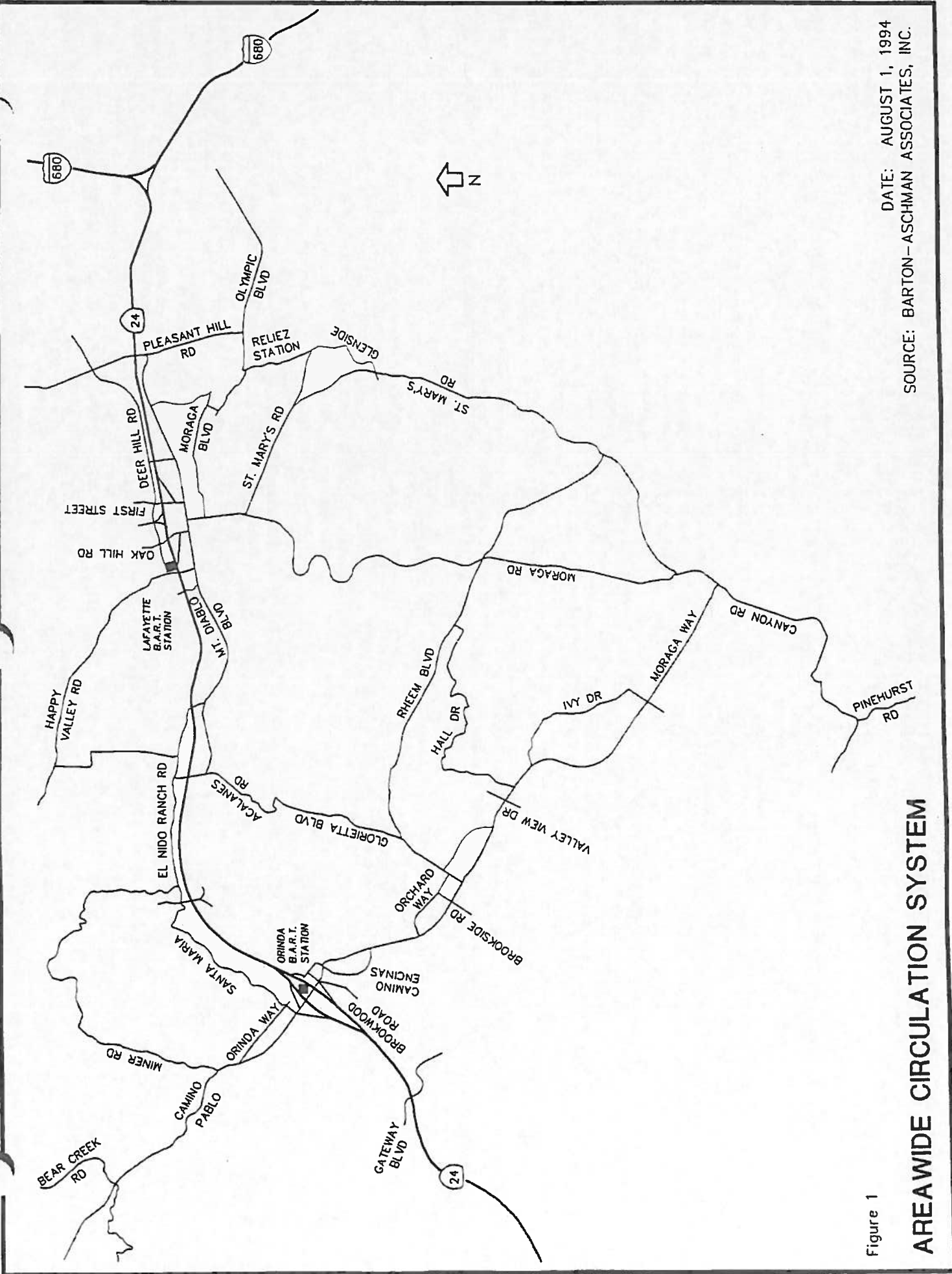


Figure 1

**AREAWIDE CIRCULATION SYSTEM**

DATE: AUGUST 1, 1994  
 SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.

study. The LTS was overseen by the Lamorinda Project Management Committee (LPMC). The LPMC was comprised of council members and staff from the City of Lafayette, the Town of Moraga, and the City of Orinda. Representatives from the CCTA, as well as Contra Costa County were also involved with the LPMC. The primary function of the LPMC was to provide direction to the consulting team on local issues, review work products, answer questions and identify sources of pertinent information to support the consulting team's efforts. The LPMC met about once every 3 to 4 weeks (approximately 30 meetings) during the course of the study.

## Study Process

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During the course of the study, 17 workpapers were published that recorded and summarized the study. This Final Report summarizes those Workpapers (listed below).

Workpaper 1	Study Area
Workpaper 2	Study Issues
Workpaper 3	Existing Data
Workpaper 4	Existing Conditions
Workpaper 5	Accident Study
Workpaper 6	Workshop I
Workpaper 7	Workshop II
Workpaper 8	Workshop III
Workpaper 9	Consolidated Growth Management Element
Workpaper 10	Action Plan Initial Study
Workpaper 11	Zone Definition and Land Use
Workpaper 12	Network Definition
Workpaper 13	Special Land Uses
Workpaper 14	Preliminary 2010 Forecasts
Workpaper 15	Forecast Report
Workpaper 16	Evaluation of Potential Actions and Strategies
Workpaper 17	Draft Lamorinda Transportation Improvement Master Plan

The consultant began work in July, 1991. The LTS and LTIP preparation can be divided into 4 primary phases.

### *Phase 1 Identification of Existing "Transportation Problem" Areas*

The first phase of the LTS included the collection of existing data, evaluation of that data, and identification and quantification of the existing traffic problems. The first phase culmi-

nated with the first community workshop that provided information to the public and solicited public comment regarding existing transportation problems and potential solutions.

## **Phase 2 Identification of Potential Transportation Strategies and Programs**

Potential actions and strategies were developed by the consultant using input from the community, the LPMC, previous studies, and an evaluation of existing problems. These actions and strategies reflected an exhaustive group of projects and programs and were described in Workpaper 16. They were also presented to the Lamorinda communities in the second public workshop for review and comment.

The potential actions and strategies were reduced to a smaller set of projects identified as the LTS Master Plan. The projects in the LTS Master Plan were analyzed in more detail to identify congestion relief and potential economic and environmental impact. This work was presented in Workpaper 17 and to the public for review and comment in the third workshop.

## **Phase 3 Adoption of the Lamorinda Transportation Improvement Program**

Each council held separate meetings in February and March, 1993, to review the LTS Master Plan and obtain public input regarding projects that should (should not) be funded through the Gateway/Lamorinda Traffic Program. Using this input, the information in the technical workpapers and input from the consultant, each council selected the set of projects that their individual community felt to be the most beneficial.

The three Lamorinda councils held a joint meeting in March, 1993 and individually over the months of April and May to develop a consensus project list called the Lamorinda Transportation Improvement Program (LTIP).

## **Phase 4 LTIP Implementation**

Actual implementation of the LTIP using Gateway/Lamorinda Traffic Program funds can only occur if the project is on the Measure C Master Project List and is given programming priority and funding in the seven-year *Strategic Plan* from the \$19 million (1988 dollars) specifically identified in the Measure C legislation. The Lamorinda Transportation Improvement Program was submitted to SWAT (Southwest Area Transportation Planning Committee) on June 7, 1993 to request placement on the Measure C Master Project List and to



receive programming priority in the current update of the seven-year *Strategic Plan*, which is updated every two years.

SWAT first determined the eligibility of the individual projects. All eligible projects were then specifically identified in the Master Project List and a determination of programming priority of each project in competition with all other SWAT region projects was made. The CCTA Board then determines overall programming priorities within Contra Costa County.

The *Strategic Plan* was approved by CCTA on September 15, 1993. Once added to the *Strategic Plan* and given a funding time-frame, the individual LTIP projects can be implemented by their sponsors.

### Future Strategic Plan Updates

The LPMC reserved an amount of money to address unsolved problems. The LPMC will continue to meet as a project implementation review panel, and in future updates of the *Strategic Plan*, the Lamorinda communities will request funding for additional projects if funds are available. The Committee will review additional projects in keeping with the direct language of Measure C:

"to identify actions/measures to mitigate the traffic density between Highway 24 and the Town of Moraga including cost benefit analysis. Implementation of preferred project alternative (Lamorinda cities to jointly review and establish criteria for project implementation)."

Projects would first be reviewed by the sponsoring community. The project documentation and other supporting information would be packaged and submitted to the LPMC for consideration. Following LPMC review, the project could be submitted to each of the councils for review/approval. It would then be submitted to SWAT and the CCTA to be added to the *Strategic Plan*, and proceed through the approval process.

## Report Organization

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The remainder of this Final Report is organized into two parts. The first part (Chapter 2) describes the Lamorinda Transportation Improvement Program and its implementation, and the second part (Chapter 3) summarizes the background information and process by which the LTIP was developed.

## 2

# Lamorinda Transportation Improvement Program and Implementation

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**D**uring the course of the LTS, a Master Plan project list was developed. The Master Plan was essentially a "toolbox" of projects that had no formal approval by the three Lamorinda communities. The three Lamorinda communities determined that they would be more likely to receive high programming priority from the CCTA if a consensus list of projects, defined as the Lamorinda Transportation Improvement Program (LTIP), was presented to the CCTA for funding. This is not specifically required in any Measure C documents and it is possible that each community could independently submit lists that do not recognize other Lamorinda projects. However, at some point in the funding process, approval by the Lamorinda communities would be requested and, even though not specifically required, a project that experienced significant opposition could be rejected or receive a low funding priority and could jeopardize other project funding. Thus, to ensure a united front, a process was established to develop a consensus project list that recognized possible funding constraints and future projects.

The three Lamorinda councils first met individually in February and March 1993 to begin development of the LTIP. Using the Master Plan project list, public comment, and the technical evaluations contained in the LTS workpapers, each council adopted individual lists of projects that they felt should be funded through the Measure C Gateway/Lamorinda Traffic Program. These three individual community lists included most of the projects from the Master Plan list except for the Major Capital Improvement Program projects. The three councils concurred with the majority of community sentiment as expressed during workshops and council meetings that the

Major Capital Investment Program projects were too costly, both in terms of capital expenditures as well as transportation related impacts, when compared with the relative benefit in terms of congestion relief. The specific projects were the Gateway Extension, the Bollinger Canyon Extension and the Pleasant Hill Extension. This decision reflects the communities' concerns regarding impacts on the environment, on growth, and on adjacent neighborhoods. In addition, the Moraga Road/Mt. Diablo Boulevard By-pass projects were replaced with a study to coordinate reduction of congestion through this intersection with the ongoing update of the Lafayette General Plan as it relates to downtown Lafayette. Several projects that did not specifically appear on the Master Plan list were added by Orinda to address potential impacts on safety and side-street access associated with the implementation of the Local Operational Improvement Program projects on the Master Plan list.

A joint meeting of the three councils followed in March 1993 to develop a consolidated consensus list that included projects that all three councils had said could be implemented. Subsequent meetings of the LPMC and three councils resulted in the addition of several other projects to the final LTIP that had not received initial consensus.

Table 1 (Page 8) presents the LTIP Project List that was submitted to the Southwest Area Transportation group (SWAT), the sub-regional transportation planning committee of the CCTA, on June 7, 1993. All LTIP projects and programs will improve traffic conditions in the Lamorinda area. Not all of the benefits and consequences will be equal. Some projects and programs will significantly improve traffic conditions only at specific locations, but not overall. Some projects will improve safety but not relieve congestion. Some actions will physically alter the transportation system while others will affect only travel behavior. On balance, the total program is intended to provide for mitigation of traffic density between the Town of Moraga and SR-24. Table 2 (Page 11) compares the different consequences and effectiveness of the projects in the LTIP.

The LTIP project list in Table 1 (Page 8) includes requested funding levels for each project. These funding levels were submitted in 1988 dollars, as required by CCTA. They represent 80% of the 1993 costs developed for projects in Workpaper 17 except for the transit improvement program, for which funding of \$500,000 per year for the life of the Measure C legislation was specified by the three councils. In terms of priorities, this transit funding would first be used to

**Table 1  
 Lamorinda Transportation Improvement Program Project List <1>**

Program Elements	1993 Strategic Plan Program Cost (1988 \$'s) <2>
<b>Joint Jurisdiction Projects</b>	
<u>Transit Related Projects.</u> Develop a plan and fund school buses to grade and intermediate schools; study the feasibility of providing expanded bus service to high schools; increase CCCTA bus service in Lamorinda; and provide BART shuttle bus service.	\$500,000/year <7>
<u>Policies and Strategies.</u> Adopt standardized Lamorinda definitions of significant impacts; Develop a coordinated Lamorinda TDM program; work with schools to stagger school start times, review school boundaries to minimize trip lengths; develop and implement a coordinated Lamorinda emergency evacuation plan; support BART, CCCTA, Caltrans, and CCTA planning programs; and support independent carrier commuter bus service.	\$52,000 + \$1,000/year
<i>Total Joint Jurisdiction Request</i>	<i>\$52,000 + \$501,000/year</i>
<b>Orinda Projects</b>	
Coordinate Camino Pablo signals at Santa Maria, Brookwood, and Camino Encinas.	\$40,000
Provide dual right-turn lanes from northbound Camino Pablo to the westbound SR-24 on-ramp.	\$128,000
Restripe the right-turn lane as a through/right on northbound Camino Pablo at Santa Maria.	\$32,000
Provide a third westbound lane on Santa Maria at Camino Pablo.	\$152,000
Extend the third northbound through lane on Camino Pablo from Brookwood to south of Camino Encinas.	\$160,000
Extend the southbound merge on Moraga Way at Camino Encinas to Overhill and restripe northbound lanes.	\$344,000
Balance approach delay at the Moraga Way/Glorietta intersection.	\$800
Add a right-turn lane to the northbound and westbound approaches at Moraga Way/Glorietta Boulevard intersection.	\$680,000
Add carpool parking lots: Camino Pablo @ Santa Maria; Orinda Way north of Santa Maria.	\$72,000 + \$3,400/year
Modify Moraga Way/Glorietta intersection to include a grade correction at the Glorietta Boulevard approach to Moraga Way.	\$240,000
Improve pedestrian access at all bus stops. Provide designated carpool parking and bike lockers at selected stops.	\$24,000

Table 1 Continued

**Table 1 (Continued)**  
**Lamorinda Transportation Improvement Program Project List <1>**

Program Elements	1993 Strategic Plan Program Cost (1988 \$'s) <2>
Add a traffic signal at the Glorietta/Rheem intersection.	\$80,000
Relocate the bike lane from Highway 24 to Brookwood. Modify striping on Highway 24 to allow shoulder use for an exit only lane.	\$416,000
Study the need for pedestrian walkways on Moraga Way. <3> <4>	\$50,000
<i>Total Orinda Request</i>	\$2,418,800 + \$3,400/year
<b>Moraga Projects</b>	
Modify access to Campolindo High School at Moraga Road.	\$32,000
<i>Total Moraga Request</i>	\$32,000
<b>Lafayette Projects</b>	
Signalize the Moraga Road/Hamlin-Tanglewood intersection.	\$208,000
Coordinate traffic signals on Mt. Diablo Blvd and Moraga Road.	\$220,000
Modify the right-turn lane from First Street to eastbound SR-24 on-ramp.	\$32,000
Re-design the right-turn lane from SR-24 eastbound off-ramp to Oak Hill.	\$16,000
Add a left-turn lane at Moraga Road/Madrone Drive intersection. <5>	\$40,000
Modify the Brook-School/Moraga Road intersection to separate through and left-turn movements on Moraga Road. <5>	\$2,064,000
Restrict left turn access at Moraga Road/Moraga Boulevard. <5>	\$8,000
Eliminate the sub-standard bike lane on Moraga Road. <5>	\$1,600
Add a third eastbound through lane on Mt. Diablo between Oak Hill and Moraga Road. <5>	\$824,000
Add carpool parking lots at: Pleasant Hill at Olympic, Deer Hill and Lafayette Community Center.	\$572,000 + \$1,700/year
Feasibility study and preliminary engineering of a project to reduce traffic congestion in downtown Lafayette through the Moraga Road/Mt. Diablo Boulevard intersection. <3> <4> <5> <6>	\$120,000
<i>Total Lafayette Request</i>	\$4,105,600 + \$1,700/year
<b>Safety Improvement Program</b>	
Increase yellow/red time at Camino Pablo/Santa Maria;	\$500
Split north and south signal phases at First Street;	\$2,500

Table 1 Continued

**Table 1 (Continued)**  
**Lamorinda Transportation Improvement Program Project List <1>**

Program Elements	1993 Strategic Plan Program Cost (1988 \$'s) <2>
Extend red and yellow phases at Pleasant Hill/Mt. Diablo and Pleasant Hill/Tunnel Road;	\$500
Eliminate Plaza Drive crosswalk;	\$2,500
Install raised pavement markers through the Oak Hill/Mt. Diablo intersection;	\$500
Trim vegetation restricting sight distance at Moraga Way/Brookside, Moraga Road/Corliss, Moraga Road/Alta Mesa, and Moraga Road/Ascot;	\$2,500
Remove the eucalyptus tree at Rheem/St. Mary's;	\$3,000
Repaint lines and legends at Moraga Road/Moraga Boulevard, Moraga Road/Alta Mesa, and Rheem/St. Mary's Road;	\$3,000
Implement school safety programs including Suggested Route to School Plan and bike rodeos.	\$25,000
<i>Total Safety Improvement Request</i>	<i>\$40,000</i>

**Total Areawide Improvement Costs**

One-time Costs	\$6,648,400
Annual Costs	\$506,100
Total Cost to 2001	\$9,685,000
Total Cost to 2010	\$14,746,000
Remaining Measure C Funds <4>	\$2,034,000

- <1> The LTIP Projects were approved by each council and then submitted to SWAT on June 7, 1993.  
 <2> The funding request through the Gateway/Lamorinda Traffic Program in the *Lamorinda Traffic Study* were projected in January 1993 dollars. The costs shown in this column are 20 percent less to reflect 1988 dollars, which is how the *Strategic Plan* funding is determined.  
 <3> The criteria to be used in the study analysis, the consultant selection, and report review will be the joint responsibility of the three communities through the LPMC.  
 <4> The LPMC will review requests for implementation of additional projects in keeping with the Language of Measure C.  
 <5> Includes funding to coordinate this project with the Lafayette General Plan circulation element.  
 <6> This study replaces the two Moraga Road/Mt. Diablo Boulevard By-pass major capital investment projects that were not adopted because of conflicts with land-use and the uncertainty of future downtown land use planning.  
 <7> This cost does not provide for full funding. Additional funding sources (e.g., parents) will be required to implement an areawide school busing program.

Table 2  
 Comparison of LTIP Projects

Program	Cost (1988 \$'s)/a/		Impact on Traffic Operations	Transportation Related Benefits & Impacts
	Capital	Annual/b/		
<b>Joint Jurisdiction Projects</b>				
Major Transit Investment Program				
- School Buses		\$500,000	Improvement in operations would be approximately 5% and would be associated with traffic volume reductions. Greatest improvements would occur near schools. Some improvement in operations near SR-24. Noticeable peak hour improvements confined to AM peak hour would be associated with school buses.	Would not encourage growth. Noise and odor increase on bus routes.
- Expanded CCCTA bus service				
- BART shuttle service				
<b>Policies and Strategies</b>				
	\$52,000	1,000	Does not directly improve traffic operations.	Growth would not be encouraged. Focuses on changing travel behavior and control of future traffic growth.
<b>Orinda Projects</b>				
Camino Pablo Projects				
- Coordinate Signals	\$40,000		Operations would improve through the interchange. Traffic would be distributed more efficiently over the traffic lanes. Operations would improve by 15% to 20% in this area. Traffic volumes would not change.	Emissions would be reduced. Pedestrian safety would be improved. Minor environmental impacts would occur. The gas station at the northeast corner of Camino Pablo and Santa Maria could be impacted. Growth would not be encouraged.
- Dual right-turn lanes to WB SR-24	\$128,000			
- Restripe NB Camino Pablo at Santa Maria	\$32,000			
- 3rd WB lane on Santa Maria	\$152,000			
- Extend 3rd NB lane on Camino Pablo to Camino Encinas	\$160,000			
- Extend SB merge on Moraga Way to Camino Encinas	\$344,000			
Morega Way/Glorietta				
- Balance approach delay	\$800		Operations will improve at the intersection by 15% to 20%. Traffic volumes would not be reduced. By-pass traffic on Orchard Way could be reduced.	Emissions would be reduced. Bike safety would be improved. There would be some environmental impact including visual impacts and impacts on adjacent property owners. Growth would not be encouraged.
- Add right-turn lanes on NB and WB approaches	\$680,000			
Provide carpool parking lots on Camino Pablo at Santa Maria and on Orinda, north of Santa Maria	\$72,000	\$3,400	Operations would not be significantly improved. Would support the Transit Improvement Program.	Potential to reduce traffic volumes by encouraging carpooling. Growth would not be encouraged. Would improve safety because of improved sight distance. Could impact driveways to parcels adjacent to Glorietta. Growth would not be encouraged.
Correct grade on Glorietta Boulevard at Moraga Way	\$240,000		Would facilitate right turns from Glorietta.	

Table 2 Continued

Table 2  
 Comparison of LTIP Projects (Continued)

Program	Cost (1988 \$'s)/a/		Impact on Traffic Operations	Transportation Related Benefits & Impacts
	Capital	Annual/b/		
Improve pedestrian access at CCTA bus stops	\$24,000		No change in traffic operations would occur.	Would facilitate the use of buses. Growth would not be encouraged.
Signalize Glorietta Blvd./Rheem Blvd. intersection	\$80,000		Would reduce delay for STOP controlled approaches at intersection. Operation would be improved.	Pedestrian safety would be improved and right-of-way more clearly defined.
Relocate bike lane from EB SR-24.	\$416,000		Would reduce queues on SR-24 in right-lane, increasing the capacity for through traffic during the PM peak.	Would require relocating bike lane. Would improve safety on SR-24. Growth would not be encouraged, the Caldecott Tunnel controls the total flow of traffic on SR-24.
Study pedestrian walkways at selected locations on Moraga Way.	\$50,000		Traffic operations would not be changed.	The project would improve pedestrian safety. It could encourage the use of alternatives to the auto. Growth would not be encouraged.
<b>Moraga Projects</b>				
Modify access to Campolindo High School on Moraga Road	\$32,000		Turning delays and long queues on Moraga Road would be eliminated at this location.	Safety would be improved. There would be negligible environmental impact. Growth would not be encouraged.
<b>Lafayette Projects</b>				
Signalize Moraga Road/Hamlin-Tanglewood intersection	\$208,000		Access to Moraga Road would be improved from side streets. Delay would increase for through traffic.	Minor environmental impact. May be some visual impact. Growth would not be encouraged.
Coordinate signals on Mt. Diablo Boulevard and on Moraga Road	\$220,000		As a system, traffic operations would improve by as much as 5%.	Emissions would be reduced. Growth would not be encouraged.
Modify right-turn lane from First Street to EB SR-24	\$32,000		Would promote the more efficient use of existing road capacity. Could improve operations by 5% through First/Mt. Diablo intersection.	Minimal environmental impact. Growth would not be encouraged.
Add left-turn lane on Moraga Road at Madrone Drive	\$40,000		Would improve through traffic flow, reducing delay, and would improve access to Madrone.	Growth would not be encouraged.

Table 2 Continued



Table 2  
 Comparison of LTIP Projects (Continued)

Program	Cost (1988 \$'s)/a/		Impact on Traffic Operations	Transportation Related Benefits & Impacts
	Capital	Annual/b/		
Modify Moraga Road/Brook-School intersection	\$2,064,000		Would significantly improve traffic flow through this intersection by as much as 50% if completed in conjunction with improvements to Mt. Diablo Boulevard intersection.	Pedestrian safety would be improved. Auto accident potential would be reduced by simplifying the intersection. Growth would not be encouraged.
Restrict left turn access at Moraga Road/Moraga Blvd.	\$8,000		Would improve traffic flow through the intersection on Moraga Road.	By-pass traffic through the residential neighborhood would be reduced. Safety on Moraga road would be improved. Growth would not be encouraged. Right-of-way could be required, depending upon final design.
Eliminate sub-standard bike lane on Moraga Road	\$1,600		Auto operations would not change.	Bike safety would be improved.
Add 3rd EB through lane on Mt. Diablo between Oak Hill and Moraga Road	\$824,000		Operations at the Moraga Road/Mt. Diablo Blvd. intersection would be improved in the PM peak by about 5%.	Mt. Diablo would have to be widened, potentially impacting adjacent property owners. Growth would not be encouraged.
Add carpool parking lots at: Pleasant Hill/Olympic Blvd., Deer Hill and Lafayette Community Center	\$572,000	\$1,700	Operations would not be significantly improved. Would support the Transit Improvement Program.	Potential to reduce traffic volumes by encouraging carpooling. Growth would not be encouraged.
Feasibility study and preliminary engineering to coordinate a plan to reduce traffic congestion through Moraga Road/Mt. Diablo Blvd. intersection and the update of the Lafayette downtown plan.	\$120,000		Final project will reduce congestion through the Moraga Road/Mt. Diablo intersection. Improvement will maximize benefit of the operational improvements on Moraga Road.	Coordinates LTS planning with General Plan update.

/a/ Costs are based on 1988 dollars and include costs to implement the total program. Program funding would be primarily from Measure C Gateway/Lamorinda Funds to be supplemented from other sources when possible.  
 /b/ Includes annual operating costs, lease costs for park and ride lots.  
 /c/ Includes impacts to safety, air quality, noise, and visual impacts.  
 /d/ If Glorietta improvements are implemented without improvements to Camino Encinas, and Brookwood intersections, the overall improvement in flow along Moraga Way would not improve. The reduction in delay projected at Glorietta would just be transferred to Camino Encinas as an increase in delay.  
 /e/ To achieve full positive impact of the improvements on Moraga Road, any improvement at Brook and School streets should be accompanied by a compensating improvement at the Moraga Road/Mt. Diablo intersection

Source: Barton-Aschman Associates, Inc.

support a school bus system. Secondly, any remaining funds could be used to support added CCCTA bus service and/or BART shuttles.

The total funding request submitted to SWAT was \$9,685,000 (1988 \$'s) through the year 2001. An additional \$5,061,000 is programmed between the year 2001 and 2010. The LPMC reserved an amount of money (\$2,034,000) to address unsolved problems. The LPMC will continue to meet as a project implementation review panel, and in future updates of the *Strategic Plan*, the Lamorinda communities will request funding for additional projects if funds are available. The Committee will review additional projects in keeping with the direct language of Measure C:

to identify action/measures to mitigate the traffic density between Highway 24 and the Town of Moraga including cost benefit analysis. Implementation of preferred project alternative (Lamorinda cities to jointly review and establish criteria for project implementation)."

## Description of LTIP Program Components

The LTIP projects are described below. They have been grouped under joint jurisdiction projects, Orinda projects, Moraga projects, Lafayette projects, and Safety projects corresponding to Table 1 (Page 8).

### *Joint Jurisdiction Projects*

#### *Transit Program Component*

There are three components to the Transit Program. These include (a) providing a school bus system, (b) providing a BART shuttle bus system, and (c) expanding/maintaining the CCCTA bus system. The three Lamorinda councils identified the School Bus Program as deserving the highest priority for funding and implementation. Each is discussed below.

- *Implement a School Bus System.* This proposal, as approved by the three city councils, will provide school bus service to the Lamorinda grade schools and intermediate schools. The high schools will continue to be served by CCCTA buses. Current K through 8th enrollment is approximately 6,800 students in the three school districts.

The actual operating plan will be established during a formal school bus study that the three school districts will

direct. This study will be the first step in implementing a school bus program. Decisions that must be made during this study include: who will operate and manage the program; how will the three districts work together to provide a coordinated plan; what routing structure will be followed; will there be central bus stops or will buses cover most streets; how much will the system cost and what portion of the cost will have to be covered by funds from sources other than Gateway/Lamorinda funds, etc.

The costs associated with the operation of a school bus system depend upon the density of children, the efficiency of the road network, the number of students served, the geographical area served, labor costs, start-up costs, etc. These costs will be determined during the preliminary school bus study that will establish an operating program for the school bus system. The funding request for this project recognized that it would not be fully funded through the Measure C Gateway/Lamorinda Traffic Program.

- *Implement BART Shuttles.* Work with BART to implement the shuttle service plan serving the Orinda and Lafayette BART stations developed by the BART Planning Department. The program would use 17-passenger vans that would operate from 6 AM to 9 AM and 4 PM to 7 PM.
- *Expand/Maintain CCCTA Bus Service.* Work with CCCTA to maintain existing bus service in Lamorinda. Where possible, expand existing service on Moraga Road and St. Mary's Road to 15-minute headways during peak periods. Consider providing new bus service to Rheem Boulevard. Particular emphasis should be placed on providing service to the high schools.

### *Policy and Program Components*

There are several policies and programs that could be implemented to reduce travel, control growth, and minimize traffic congestion. To obtain the greatest benefit from these programs, the three communities must adopt similar programs. These programs are summarized below.

- *Adopt Standardized Lamorinda Methodology to Identify Future Project Impact.* Both the Growth Management Program (GMP) and the Congestion Management Program (CMP) have methodologies to assess traffic impacts of proposed projects that include a requirement for consultation between adjacent jurisdictions. However, they are both limited in the breadth of application of that analysis and the capacity methodology used. If these limitations

are addressed in the Lamorinda area, true sub-regional planning can be implemented. By adopting a uniform definition of significant traffic impact and an approach to mitigation, the three jurisdictions will accomplish the following:

- (1) Impacts on adjacent jurisdictions can be fairly evaluated;
- (2) There can be a standard method of evaluating mitigation; and
- (3) The function of the transportation system would be improved.

- *Develop a Lamorinda TDM Program.* Each of the three communities has adopted similar Travel Demand Management (TDM) ordinances based upon the Contra Costa Congestion Management Program Model TSM Ordinance. The three ordinances contain an average vehicle ridership goal and define the need for a TDM coordinator, a TDM implementing body, TDM reporting and monitoring requirements, and employer-based TDM programs. The Moraga and Lafayette ordinances are exactly the same. The Orinda ordinance varies from these two ordinances in only one area. It contains language on school trip reduction programs and includes a special category of applicable projects called "development project."

These three community TDM programs should be coordinated and implemented together wherever possible to ensure the greatest effectiveness and cost saving. Lafayette and Moraga should consider including the added language that is contained in the Orinda TDM ordinance. The school trip reduction language supports the transit component of the LTIP.

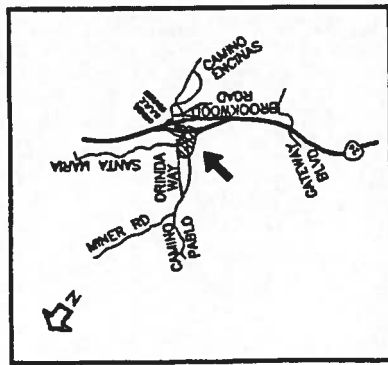
To ensure a coordinated effort in implementing their TDM ordinances, the three communities should coordinate their TDM programs. SWAT could serve in this capacity. The members of this organization could hire a TDM coordinator who would ensure compliance with TDM ordinances, develop a TDM marketing plan, and work with schools to minimize school travel.

- *Develop Policies that Support Public Transportation Agency Planning.* Develop and adopt positions on planning issues and programs being promoted by transportation agencies such as BART, CCCTA, Caltrans, MTC, etc.

- *Develop an Emergency Evacuation Plan.* Develop a coordinated Lamorinda emergency evacuation plan. Each of the Lamorinda communities has emergency preparedness plans and committees. These committees should be consolidated into one Lamorinda emergency preparedness committee. The Lamorinda committee should review the three plans in view of the recent Oakland fire and other potential disasters to determine if they have been developed to respond to these emergencies.

### Orinda Projects

- *Signal Coordination.* Optimize signal timing and coordinate signals at the Camino Pablo/Santa Maria, Camino Pablo/Camino Encinas and Moraga Way/Brookwood intersections to minimize delay through the SR-24 interchange area and reduce vehicle queues.
- *Camino Pablo North of the BART Entrance.* Restripe the outside northbound through lane to a through/right-turn lane on Camino Pablo to allow dual right turns to the westbound SR-24 on-ramp. Widen the on-ramp to provide a merge from two lanes to one lane. This could eventually be incorporated into a "ramp metering with carpool bypass" program as a part of the SR-24 Action Plan (Figure 2, Page 18).
- *Camino Pablo/Santa Maria.* Restripe the northbound auxiliary/right-turn lane on the approach to the Santa Maria intersection to a through/right-turn lane beginning at the west SR-24 off-ramp. Merge the three northbound through lanes back to two through lanes north of Santa Maria. The beginning of the bike lane will be shifted to just north of the completion of the merge to maintain safety (Figure 2, Page 18).
- *Camino Pablo/Santa Maria.* Add a third lane to the westbound Santa Maria approach and restripe the approach to provide one through/right-turn lane and two exclusive left-turn lanes. This action will require the purchase of right-of-way and widening the existing westbound approach by approximately 12 feet. The existing traffic signal pole in the northeast corner at Santa Maria will have to be relocated. The signal at Camino Pablo will have to be modified, and the guardrail on the west leg relocated. The drainage system will probably be impacted and the gas station could lose one parking space and some landscaping (Figure 2, Page 18).



**LOCATION MAP**

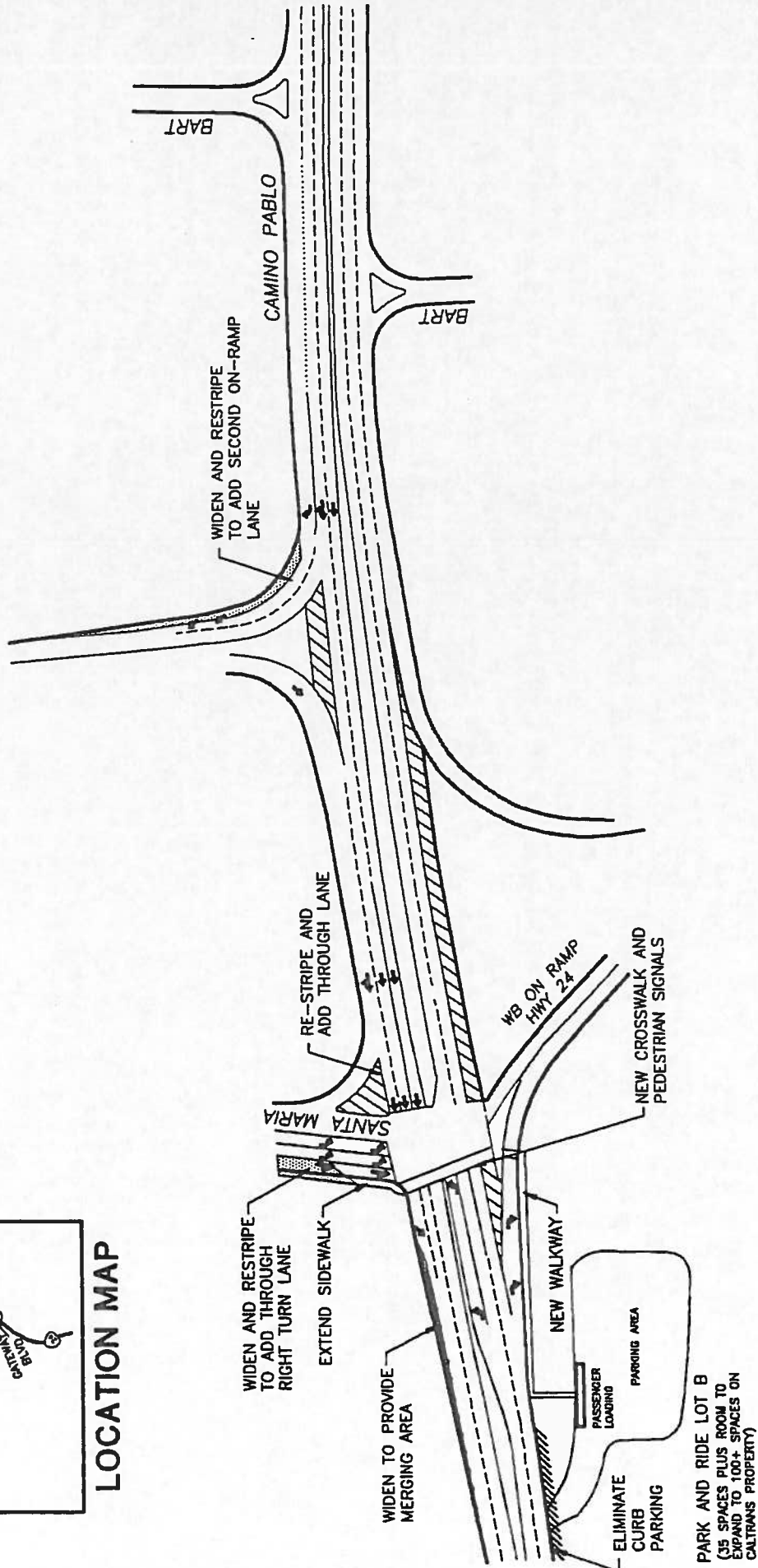
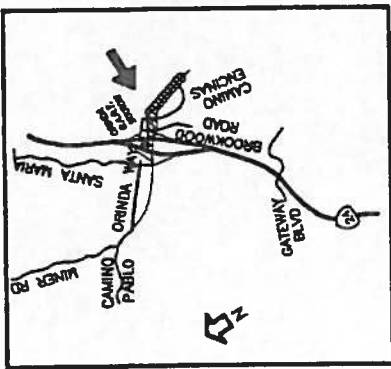


Figure 2

**CAMINO PABLO/SANTA MARIA IMPROVEMENTS**

DATE: AUGUST 1, 1994  
 SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.

- *Camino Pablo South of Brookwood.* Extend the third northbound through lane at Brookwood back to Camino Encinas. This requires shifting the median on the north leg and eliminating the pedestrian island on the north-west corner, which will improve pedestrian safety as right turns from southbound Camino Pablo to Camino Encinas will not be made at such a high speed. If the eastbound approach is realigned, it is likely that the PG&E transmission tower will have to be relocated. This will have to be confirmed during the preliminary engineering studies for the project (Figure 3, Page 20).
- *Camino Pablo-Moraga Way/Camino Encinas.* Eliminate the sub-standard merging conditions on the southbound receiving lanes on Moraga Way by extending the merging area to meet Caltrans design standards for transition and sight distance; and include a bike lane. The transition will extend almost to Overhill Road. A retaining wall will have to be constructed and right-of-way purchased. It appears that this project can be constructed without interfering with the PG&E transmission tower, but this will have to be confirmed during preliminary engineering. However, as noted above, it is likely that it will be necessary to relocate the tower as a part of the extension of the third northbound lane on Camino Pablo. Restripe the northbound approach to lengthen the two through lanes at Camino Encinas to provide more storage and optimize operations. This will eliminate the left-turn lane on Moraga Way serving a small business. These turns can be made from the southbound through lane without significant disruption to southbound traffic (Figure 3, Page 20).
- *Moraga Way/Glorietta.* Modify signal timing to balance delays on the westbound and northbound approaches in the AM peak.
- *Moraga Way/Glorietta.* Add right-turn lanes on the westbound and northbound approaches. Bike lane designs should conform with Caltrans *Highway Design Manual, Bikeway Planning and Design* standards for Class II bike lanes. This document recommends that for long right-turn lanes, such as those being proposed, the bike lane designation be eliminated to reduce confusion over merging conditions. For this intersection, it is recommended that the right-turn lanes be 14 feet wide, rather than the more standard 12 feet because of the elimination of the bike lane striping, with a 5 foot shoulder. The right-turn lanes will be designated with a solid 6-inch white line back to



**LOCATION MAP**

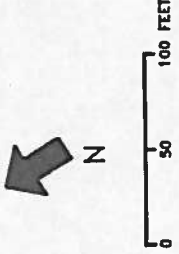
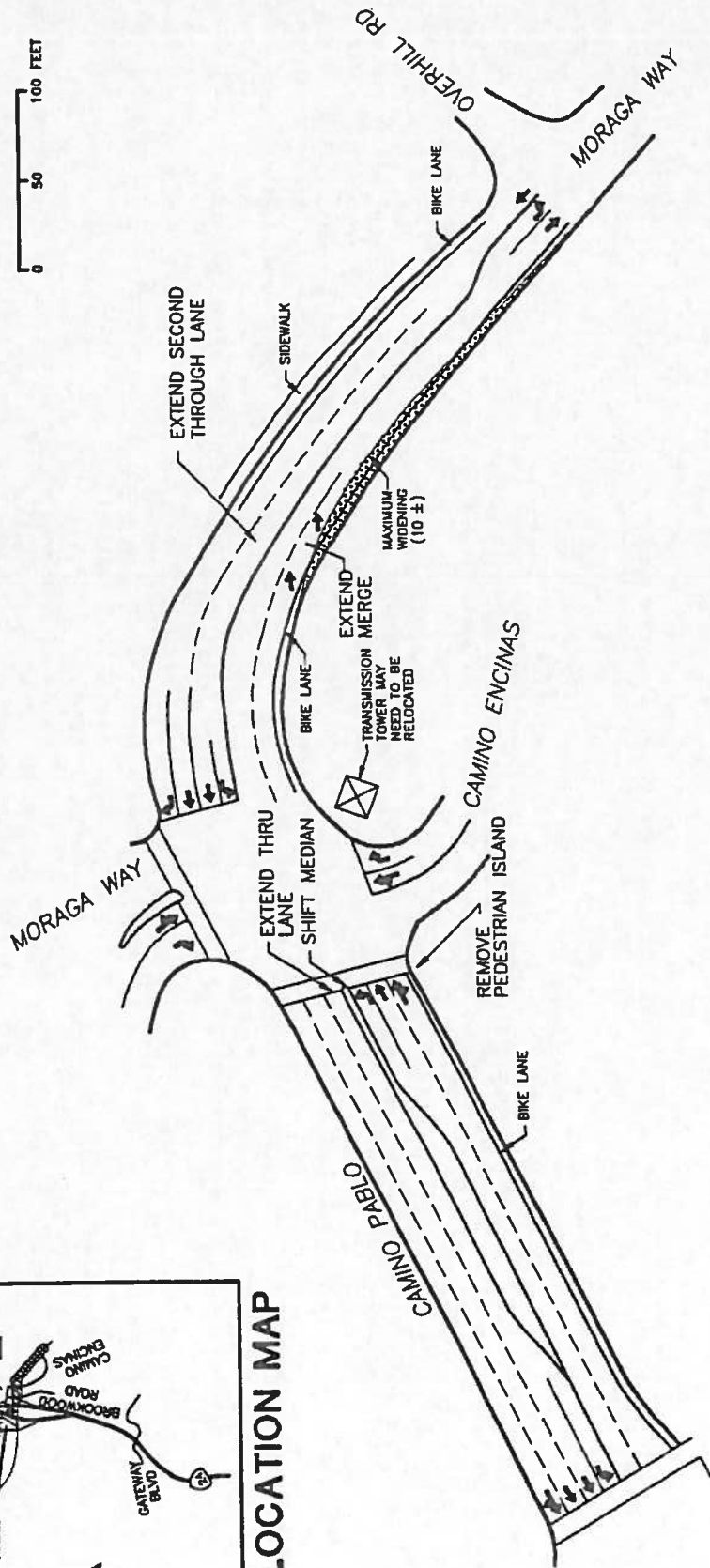


Figure 3

**CAMINO PABLO/MORAGA WAY /  
CAMINO ENCINAS IMPROVEMENTS**

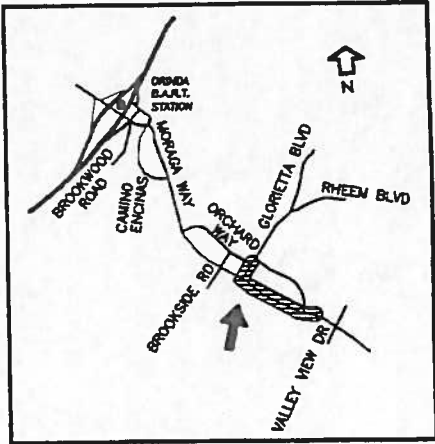
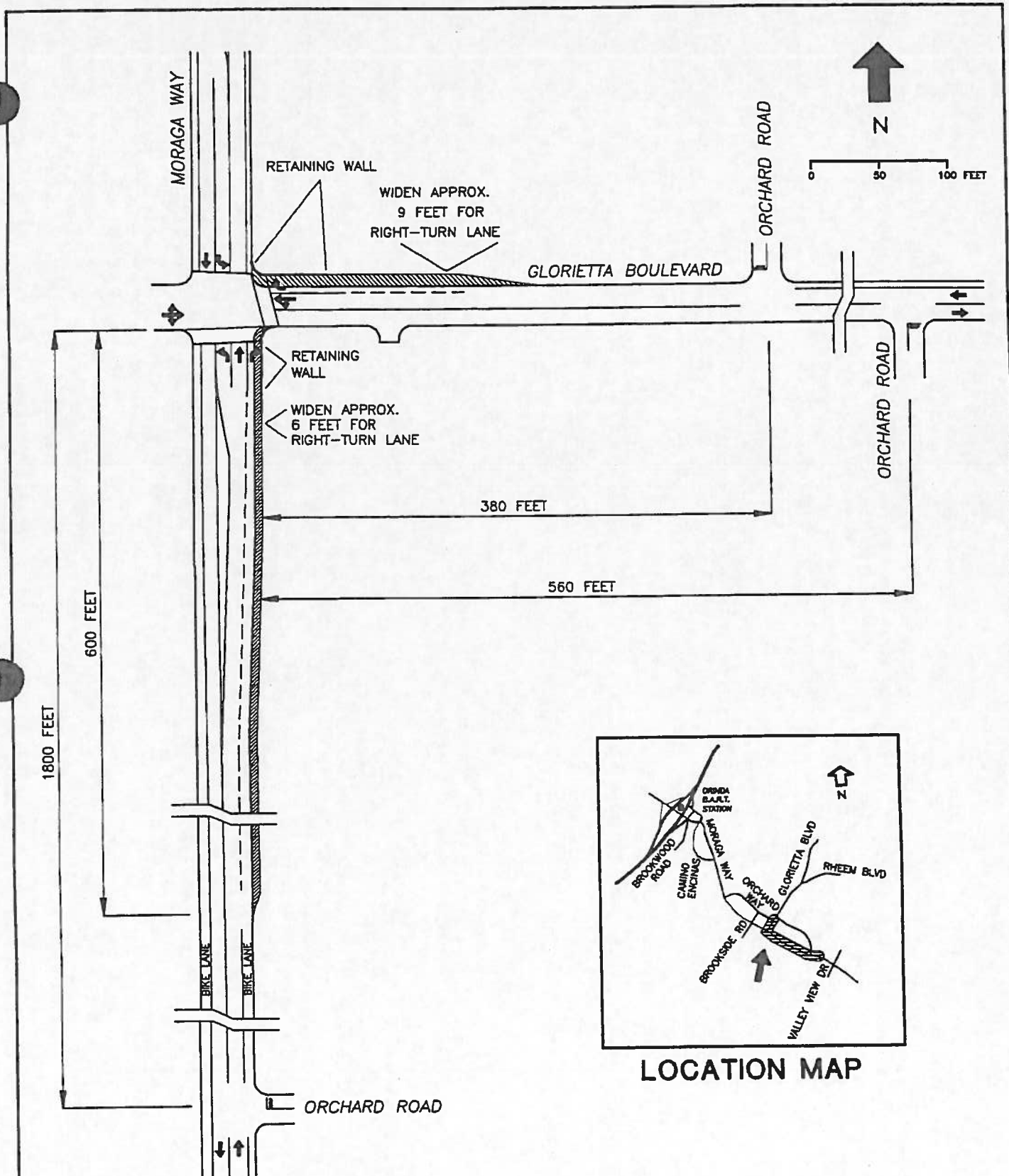
DATE: AUGUST 1, 1994  
SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.



the first driveway and then continue as a dashed white line. The westbound right-turn lane plus transition should extend back approximately 190 feet. The northbound right-turn lane should extend back to the limit of the through movement queue on Moraga Way (AM peak), or to Orchard Drive, whichever is shorter. (Figure 4, Page 22).

Acquisition of right-of-way will be required along with the relocation of the existing signal controller/service cabinets, existing traffic signal, existing guard rail, and some utility poles. A retaining wall will also be required on both approaches.

- *Park and Ride Lots.* Add park and ride lots at strategic locations to promote casual and formal carpooling and transit use.
  1. Construct a lot in the northwest quadrant of the Camino Pablo/Santa Maria intersection for 35 spaces to serve north Orinda residents and other drivers accessing SR-24 from the north. Incorporate a second BART casual carpool location in the lot to eliminate southbound BART casual carpool trips from the Brookwood intersection. Provide a queuing area for at least 15 cars, signing for casual carpoolers, and a bus shelter.
  2. Lease 20 spaces at the Santa Maria Church on Orinda Way to serve north Orinda residents and drivers accessing SR-24 from the north.
- *Moraga Way/Glorietta Boulevard.* Reduce the grade on westbound Glorietta Boulevard approaching Moraga Way. This approach has poor visibility due to the grade at the intersection. This improvement will be implemented with construction of the right-turn lanes at the Moraga Way/Glorietta Boulevard intersection.
- *Improve Pedestrian Access at all Bus Stops.* Improve pedestrian access from side streets. Designate park and ride curb parking spaces with signs on the side street and bike lockers at the bus stops. Request the installation of CCCTA bus shelters at selected bus stops.
- *Rheem/Glorietta.* Signalize this intersection.
- *Eastbound SR-24 Off-Ramp.* Widen eastbound SR-24 to provide an auxiliary (exit only) lane from SR-24 at the



**LOCATION MAP**

Figure 4

**MORAGA WAY/  
GLORIETTA BOULEVARD  
INTERSECTION IMPROVEMENTS**

DATE: AUGUST 1, 1994  
SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.

Camino Pablo off-ramp. This will require relocating the eastbound bike lane from SR-24 to Brookwood Drive. Bike vs vehicle safety will be enhanced.

- *Study the Addition of up to Four Signals on Moraga Way.* Monitor various collector roads for signalization. Consideration should be given to safety, side-street access, and pedestrian traffic. Warrants used to support signalization should be standard warrants typically used by the City of Orinda. Possible locations for signalization along Moraga Way include Hall Drive, Ivy Drive (north), Orchard Road, Brookside Drive, and Valley View Road.

The criteria to be used in the analysis, the consultant selection, and report review will be the joint responsibility of the three communities through the LPMC.

- *Study the Need for Pedestrian Walks Along Moraga Way.* Identify locations to add walkways along Moraga Way that would improve safety and access near transit stops, schools and other locations where pedestrian activity exists.

The criteria to be used in the analysis, the consultant selection, and report review will be the joint responsibility of the three communities through the LPMC.

### *Moraga Projects*

- *Moraga Road / Campolindo High School Entrance.* Consolidate the separate entrance and exit driveways on Moraga Road at Campolindo High School into one driveway by eliminating the southern exit driveway and widening the entrance driveway to allow one inbound lane, one outbound left-turn lane and one outbound right-turn lane and an internal circulation loop. Remove low bushes and trim lower branches of trees to maximize sight distance. On Moraga Road, provide a two-way left-turn lane for the school entrance and extend it south past Woodford Drive, eliminating the left-turn lane at Woodford. Provide a northbound storage lane in the median for left turning traffic from the school onto Moraga Road northbound. (Figure 5, Page 24).

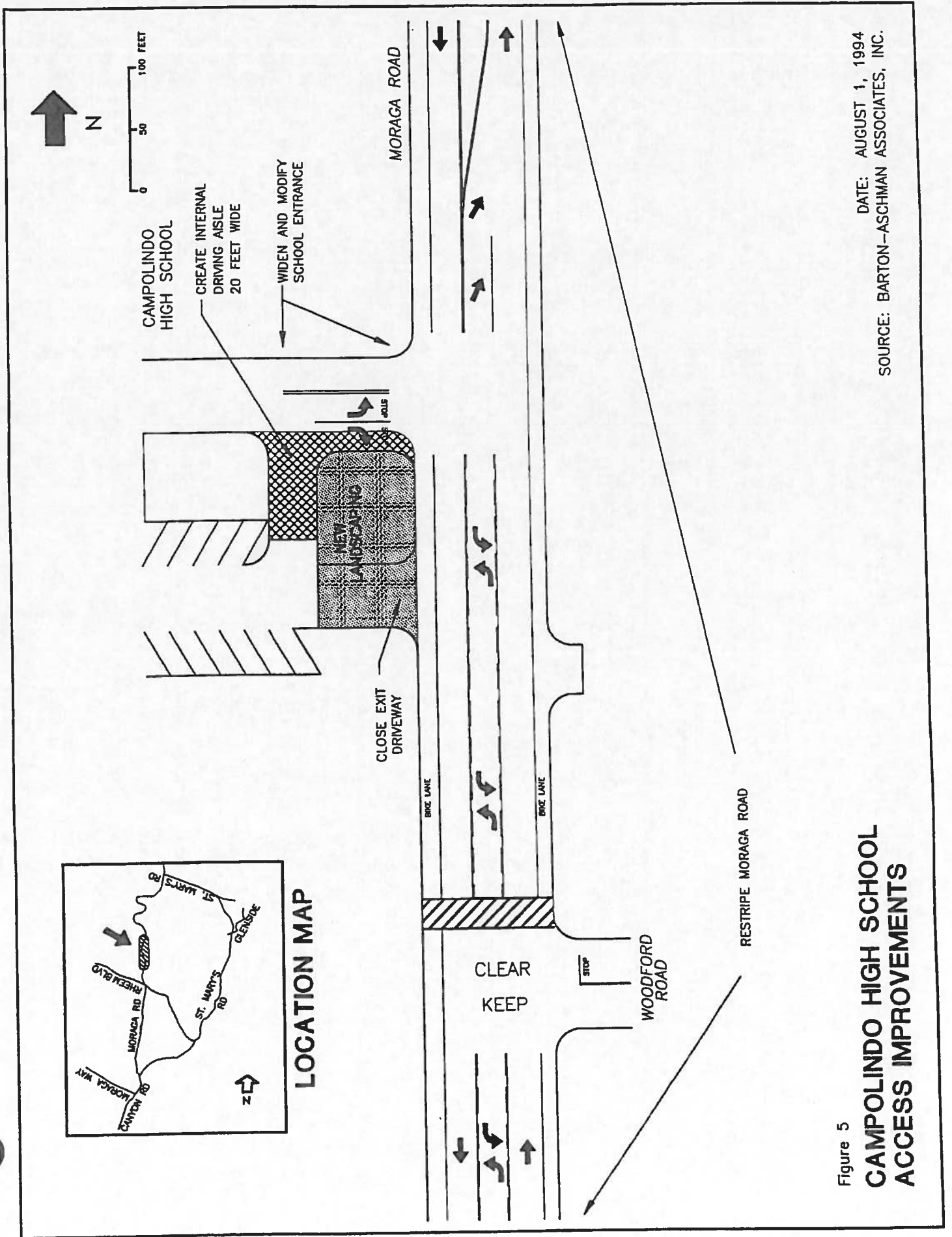


Figure 5  
**CAMPOLINDO HIGH SCHOOL  
 ACCESS IMPROVEMENTS**

DATE: AUGUST 1, 1994  
 SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.

## Lafayette Projects

- *Moraga Road/Hamlin Road-Tanglewood Drive.* Signalize this split intersection.<sup>1</sup> This requires two signals and relocation of the bus stop to the south side of the intersection with a more formalized pedestrian access from Hamlin Road. The signals will be interconnected and coordinated with the signal at St. Mary's Road.
- *Signal Coordination.* Implement the signal optimization plan developed in the Mt. Diablo Boulevard Signal Timing Study with modifications as recommended by the Lafayette Traffic Commission where appropriate. All signalized intersections between Dolores Road and Brown Avenue/Almanor Avenue will be incorporated into the coordination plan. When the BART block develops, the South Thompson-Lafayette Circle/Mt. Diablo Boulevard intersection should be incorporated into the coordination system and the intersection realigned from an off-set intersection to a standard four-legged intersection.

Coordinate the Brook-School traffic signals with those at St. Mary's Road and Mt. Diablo Boulevard inclusively to improve traffic flow on Moraga Road. Coordinating signals will require compatible signal hardware at each of the signalized intersections.

- *First Street/SR-24 Eastbound On-Ramp.* Modify the SR-24 eastbound on-ramp at First Street to accommodate dual right-turns from First Street and restripe First Street north of Mt. Diablo Boulevard by either:

Alternative 1: Restripe the northbound outside through lane as an exclusive right-turn lane and the northbound inside through lane as a through lane with an optional right-turn. Retain the Lucky's outbound left turn. North of the on-ramp, First Street will continue with two through lanes (Figure 6, Page 26); or

Alternative 2: North of Mt. Diablo Boulevard, provide an exclusive northbound through, a through/right and an exclusive right-turn lane onto the ramp. Eliminate the outbound left-turn lane from Lucky's and the inbound left-turn lane into the parcel on the northeast corner of the First Street intersection. (Figure 7, Page 27).

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<sup>1</sup> The *Moraga Road Safety Study* identified that this intersection was within 90% of meeting peak hour signal warrants.

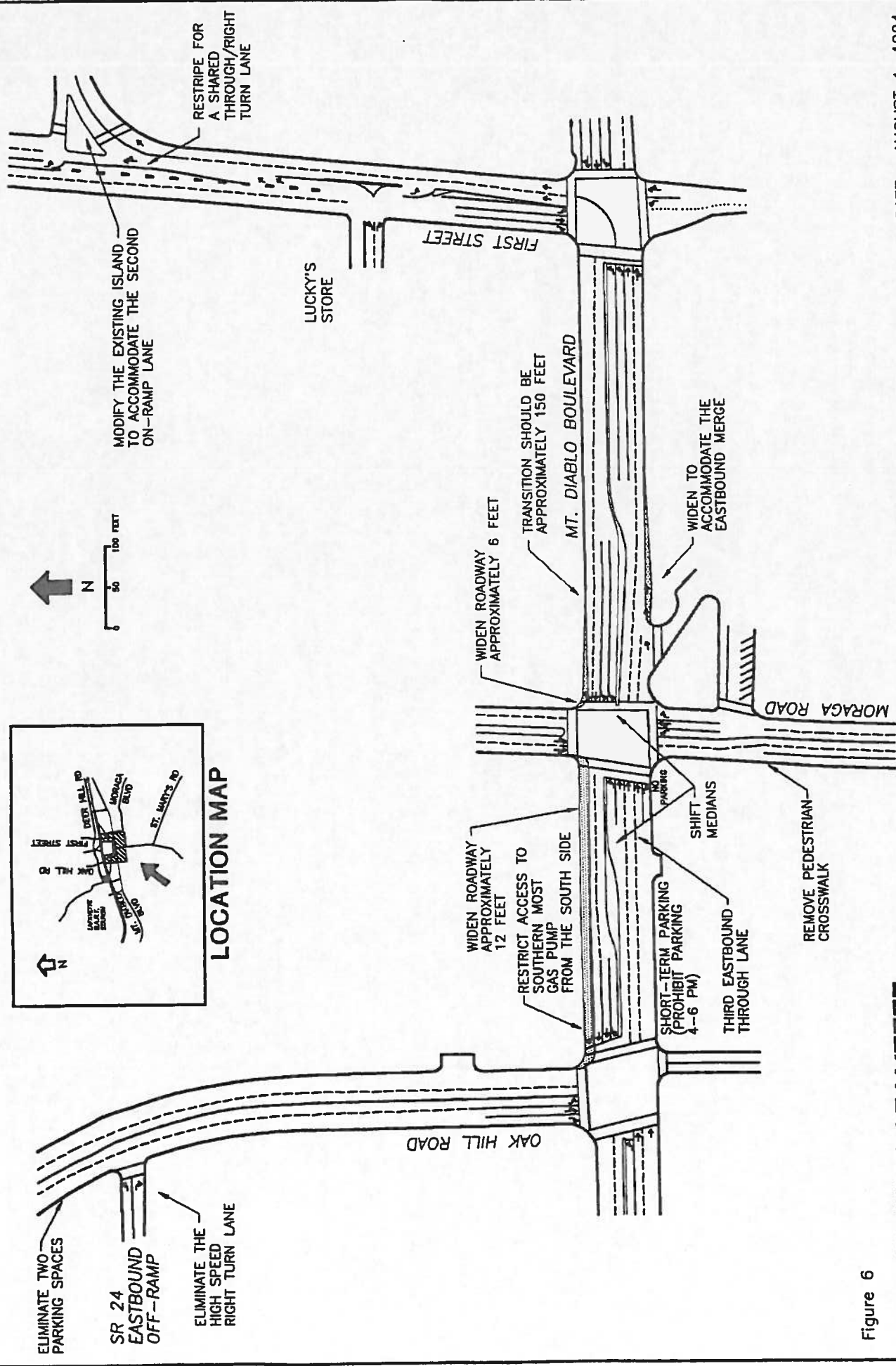
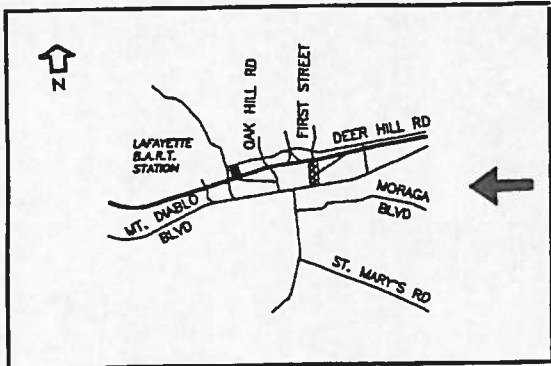


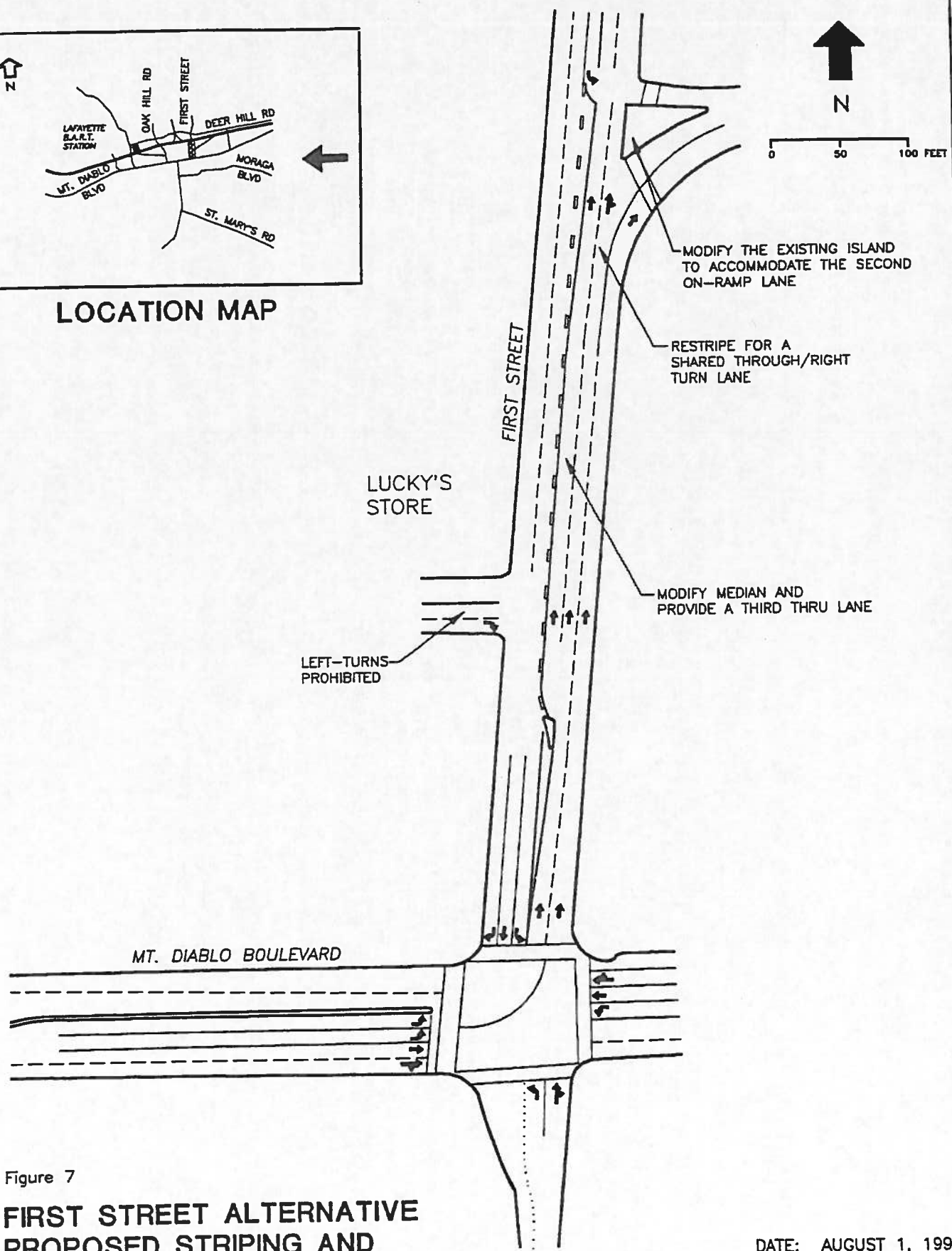
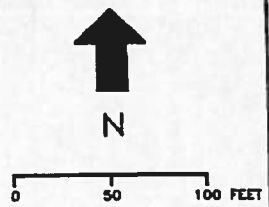
Figure 6

# DOWNTOWN LAFAYETTE OPERATIONAL IMPROVEMENTS

DATE: AUGUST 1, 1994  
SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.



**LOCATION MAP**



**Figure 7**  
**FIRST STREET ALTERNATIVE**  
**PROPOSED STRIPING AND**  
**MEDIAN CHANGES**

DATE: AUGUST 1, 1994  
 SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.

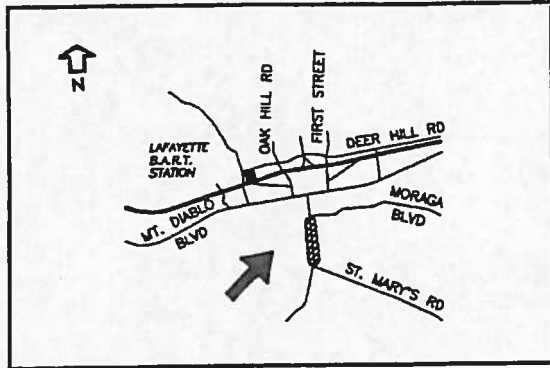
- *Oak Hill/SR-24 Eastbound Off-Ramp.* Eliminate at least two curb parking spaces on Oak Hill Road on the southbound approach to the off-ramp intersection. Realign the right-turn lane by replacing the high speed right-turn lane with a more standard, smaller radius, urban turn lane. Increase lighting levels under the overpass during the day (Figure 6, Page 26).
- *Moraga Road/Madrone Drive.* Add left-turn pockets at Madrone Drive to improve access, as recommended in the *Moraga Road Traffic Study*.
- *Moraga Road/Brook Street-School Street.* Eliminate congestion and delay produced by left-turning traffic at Brook Street and School Street by either:

Alternative 1: Prohibit left turns from Moraga Road between 7 AM to 9 AM and 4 PM to 6 PM northbound at Brook Street and southbound at School Street; or Alternative 2: Prohibit left turns at Brook Street only and restripe Moraga Road to provide a left-turn lane at School Street. This will improve flow through the intersection, reduce by-pass traffic on Brook Street, and maintain access to the middle school on School Street. This can be accomplished by eliminating the bike lanes (as recommended in the Safety Program) and restriping (Figure 8, Page 29); or

Alternative 3: In addition to implementing Alternative 2 above, eliminate the signal at Brook Street, restrict turns to right turns in and out of Brook Street, and consolidate the pedestrian crossing to School Street. This will improve flow through the intersection, eliminate by-pass traffic on Brook Street, and maintain access to the middle school on School Street. The consolidation of the crosswalks to one intersection will improve pedestrian safety. This will require signal modification in addition to the work involved in Alternative 2 (Figure 9, Page 30); or

Alternative 4: Provide side-by-side left-turn lanes on Moraga Road between Brook Street and School Street to separate the through and left-turn movements on Moraga Road. In order to implement this improvement, Moraga Road needs to be widened 14 feet and the bike lanes relocated to the sidewalk, which will be widened to 10 feet on both sides of the street. Seven of the 14 feet will be taken from the west side of Moraga Road and seven feet taken from the east side. The widening needs to extend approximately 150 feet north of Brook Street and 150 feet





LOCATION MAP

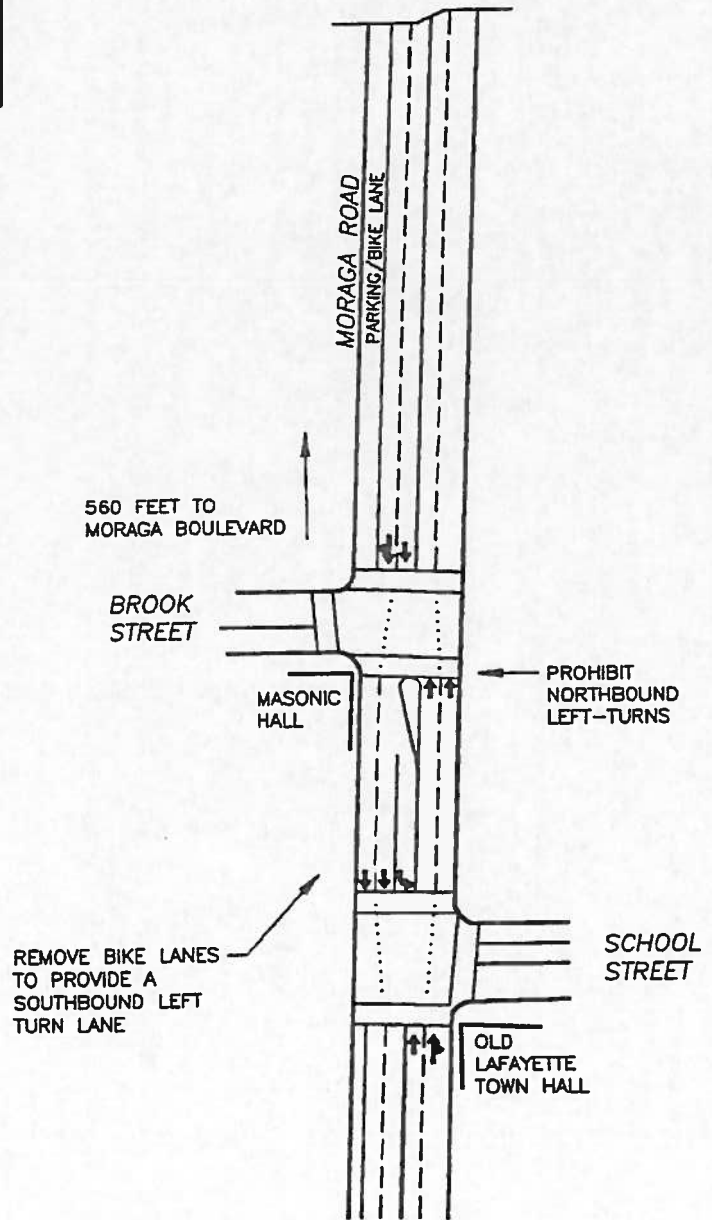
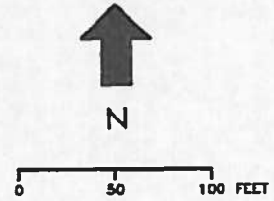
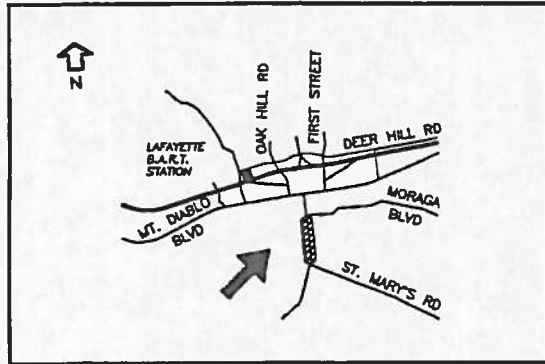


Figure 8

**PROPOSED SOUTHBOUND  
LEFT-TURN LANE ON  
MORAGA ROAD AT  
SCHOOL STREET**

DATE: AUGUST 1, 1994  
SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.



LOCATION MAP

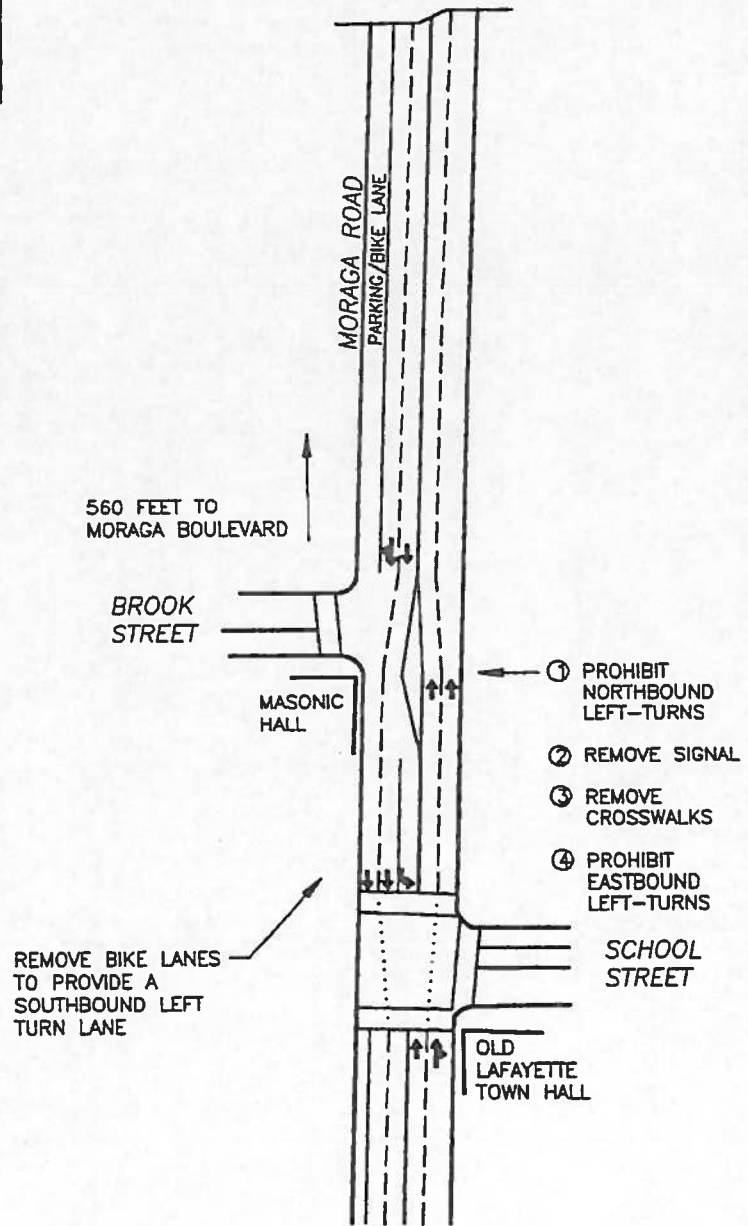
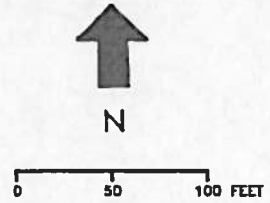


Figure 9

**PROPOSED SOUTHBOUND  
LEFT-TURN LANE ON  
MORAGA ROAD AT  
SCHOOL STREET  
PLUS SIGNAL  
REMOVAL AT  
BROOK STREET**

DATE: AUGUST 1, 1994  
SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.

south of School Street to accommodate the necessary left-turn transitions. This project requires relocation of both the Masonic Hall on the west side of Moraga Road and the old Lafayette Town Hall on the east side of the road, which is an historical landmark (Figure 10, Page 32); or

Alternative 5: Re-align Brook Street to intersect Moraga Road at School Street to eliminate the off-set intersection forming one standard four-legged intersection. This project will require widening Moraga Road and the removal of the Masonic Hall on the west side of Moraga Road, four condominiums west of the Masonic Hall, and the building immediately south of the Masonic Hall. It is possible that the Masonic Hall can be left as is and only the bike lanes on Moraga Road eliminated. The Masonic Hall parking lot would then be reconfigured (Figure 11, Page 33).

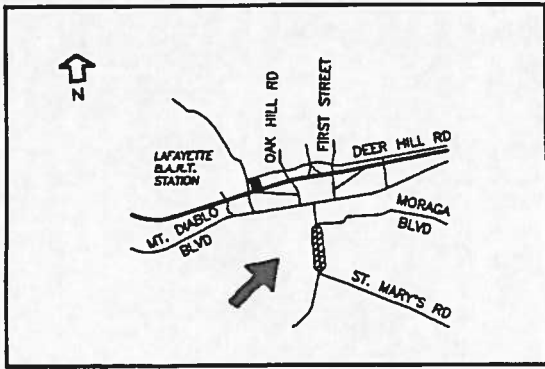
- *Moraga Road / Moraga Boulevard.* Eliminate congestion, delay and safety hazards on southbound Moraga Road at Moraga Boulevard by either:

Alternative 1: Prohibit left turns from Moraga Road to Moraga Boulevard during the peak hours; or

Alternative 2: Prohibit left turns from Moraga Road to Moraga Boulevard at all times. Left turns from Moraga Boulevard will also be prohibited by constructing a median.

- *Moraga Road / Mt. Diablo Boulevard.* Add a third eastbound through lane on Mt. Diablo Boulevard between Oak Hill Road and Moraga Road. The parking and sidewalk on the south side of the street will be preserved in place. The third eastbound lane will be provided by pushing the existing median to the north 12 feet and widening Mt. Diablo Boulevard 12 feet along the parking lot on the north side of the street, which is buffered by landscaping.

This will require right-of-way purchase from the gas station on the corner of Oak Hill and Mt. Diablo Boulevard. Purchase of the right-of-way can be delayed because of underground tank clean-up requirements. The widening can be minimized by eliminating the right-turn lane at Oak Hill Road. This is only recommended in the short term to deal with any difficulties associated with the gas station right-of-way purchase (Figure 6, Page 26).



LOCATION MAP

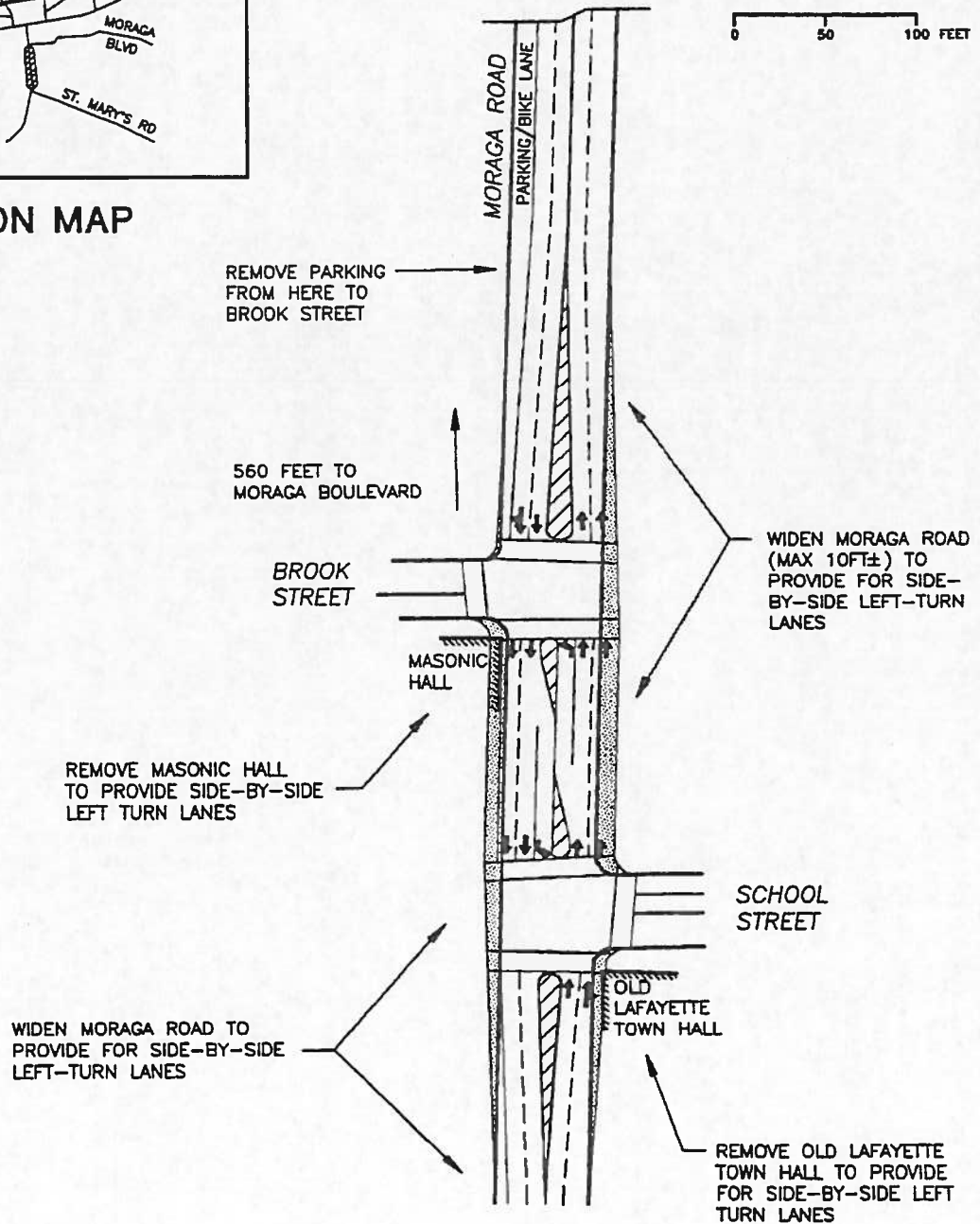
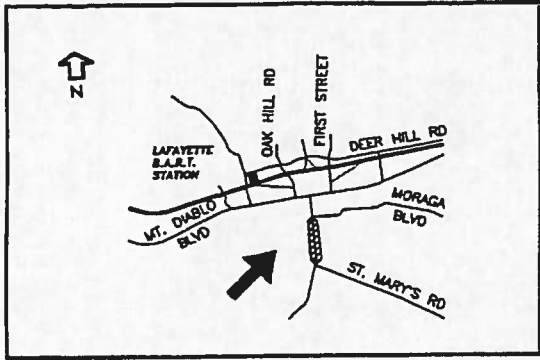


Figure 10

**PROPOSED SIDE-BY-SIDE  
LEFT-TURN LANES ON  
MORAGA ROAD AT  
BROOK/SCHOOL STREET**

DATE: AUGUST 1, 1994  
SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.



LOCATION MAP

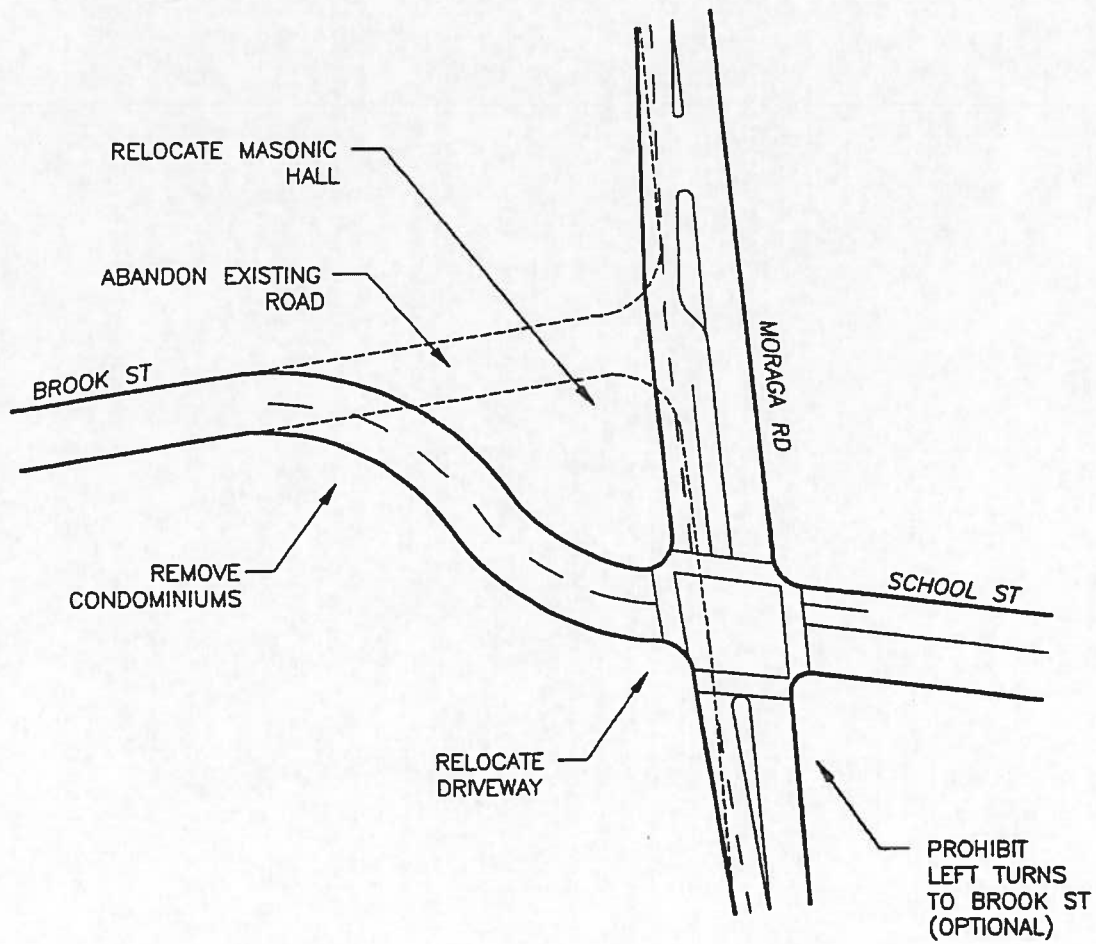
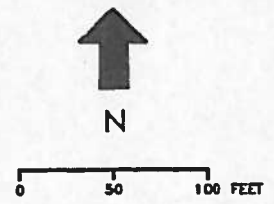


Figure 11

**BROOK STREET/  
SCHOOL STREET  
REALIGNMENT  
ALTERNATIVE**

DATE: AUGUST 1, 1994  
SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.

- *Park and Ride Lots.* Add park and ride lots at strategic locations to promote casual and formal carpooling as well as transit use.
  1. Lease 10 spaces at the Lafayette Community Center on St. Mary's Road.
  2. Expand the existing Lafayette-Moraga Trail lot at Pleasant Hill Road/Olympic Boulevard to accommodate 30 new spaces. This property is owned by the Contra Costa County Flood control district. They have indicated that they have leased out as much space to the East Bay Regional Park District as they are willing to lease at this time. They plan to subdivide the remainder of their property for development purposes. It is assumed that enough of this property could be purchased to add 30 spaces for carpools.
  3. Construct 30 new spaces at Pleasant Hill Road/Deer Hill Road. This will require the purchase of right-of-way.
  4. Widen Deer Hill Road on north side between Happy Valley Road and Oak Hill Road by eight feet to provide curb parking for casual carpoolers and a sidewalk. Retain the bike lane. No right-of-way will be required. The enforcement of this parking to ensure its availability for use by casual carpoolers is not practical.

Spaces in lots used for other purposes such as churches and on the Lafayette-Moraga Trail will be reserved for carpoolers weekdays between 6 and 10 am and then made available for everyone's use at other times. The added spaces in the lots on the trail will increase accessibility to the trail system. The East Bay Regional Park District is concerned about increased maintenance cost as well as added liability.

- *Feasibility and Preliminary Engineering Study for Downtown Lafayette.* Prepare a feasibility study and preliminary engineering to identify and develop a project to reduce traffic congestion in downtown Lafayette through the Moraga Road/Mt. Diablo Boulevard intersection. This study replaces the two Moraga Road/Mt. Diablo Boulevard bypass major capital investment projects that were not adopted because of conflicts with land use and the uncertainty of future downtown land use planning associated with the update of the Lafayette General Plan. The study

will be coordinated with the update of the Lafayette General Plan.

The criteria to be used in the analysis, the consultant selection, and report review will be the joint responsibility of the three communities through the LPMC.

### Safety Program Projects

There are three components of the Safety Program. They include (a) signal modifications, (b) intersection safety, and (c) pedestrian and bicycle safety. Each is discussed below.

#### Signal Modification Component

- *Camino Pablo / Westbound SR-24 On-Ramp-Santa Maria.* Increase the "yellow" clearance interval between northbound Camino Pablo and westbound Santa Maria Way traffic by one second each and add an "all-red" clearance interval between signal phases of 3 seconds.
- *First Street / Mt. Diablo Boulevard.* Split the northbound and southbound signal phases to reduce the accident potential associated with the restricted sight distance that results from the steep grade.
- *Pleasant Hill Road / Mt. Diablo Boulevard and Pleasant Hill Road / Old Tunnel Road.* Review the signal timing, and either add an all-red interval of 3 seconds to clear the intersection or extend the yellow phase by 1 second each.

#### Intersection Safety Component

- *Moraga Road / Plaza Drive.* Eliminate the Plaza Drive crosswalk and add No Pedestrian crossing signs and barriers at the intersection. Pedestrians can cross farther south or at Mt. Diablo Boulevard.
- *Oak Hill / Mount Diablo Boulevard.* Install raised pavement markers through the intersection to direct left-turn traffic to provide more definition of the travel lanes.
- *Moraga Way / Brookside Road.* Determine right of way lines. Trim vegetation on both Brookside approaches; request that PG&E relocate power pole on eastbound approach; and require that property owners remove any fences or vegetation in right-of-way that restrict sight distance.
- *Moraga Road / Moraga Boulevard.* Repaint the STOP bar and legend to define the intersection boundaries and right-of-way hierarchy.

- *Moraga Road/Alta Mesa.* Paint "Keep Clear" in the intersection and repaint existing striping. Trim vegetation in the median to improve sight distance. This may require removing some trees.
- *Moraga Road/Corliss Drive.* Remove bushes in front of low decorative wall to improve sight distance.
- *Moraga Road/Ascot Drive.* Trim vegetation to maintain sight distance. Where vegetation has encroached into the right of way from adjacent parcels, require property owners to trim back to right-of-way line.
- *St. Mary's Road/Rheem Boulevard.* Remove the eucalyptus tree, make sure all vegetation is well trimmed, and repaint all surface striping to improve sight distance and better define the intersection.

### *Pedestrian and Bicycle Safety Component*

- *Moraga Road Bike Lanes.* Eliminate the striping and signs indicating the bike lane on Moraga Road between School Street and Mt. Diablo Boulevard. The formal striping and signing of a bike lane gives the message that it provides a safe place to ride because it meets certain minimum design standards. This is not the case on Moraga Road in this area. The width is designed to be the minimum allowed but is slightly substandard in some places. When combined with the 10-foot through-lanes, they do not provide the minimum width for safe riding conditions, based upon Caltrans standards.<sup>1</sup> Alternates to this would be to widen the sidewalk by four feet and allow bikes on the sidewalk or to eliminate parking on the west-side of Moraga Road and widen the bike lanes.
- *School Safety Program.* Develop a "Suggested Route to School" plan<sup>2</sup> for: Glorietta Elementary, Del Rey Elementary, Orinda Intermediate School, Rheem Elementary, Camino Pablo Elementary, Joaquin Moraga Intermediate,

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<sup>1</sup> The striping of both the southbound and northbound bike lanes provides the minimum widths, with a few exceptions, as recommended by the Caltrans *Highway Design Manual*. There are locations along the northbound bike lane that are less than the minimum of 4 feet. This can be remedied by restriping. However, both the northbound and southbound bike lanes are located adjacent to 10-foot motor vehicle lanes. This is less than the recommended 12-foot lane and even the allowable (under certain circumstances) 11-foot lane. This produces a substandard condition, as the separation of motor vehicles and bikes is less than recommended and should be modified to meet standards.

<sup>2</sup> Program developed by the California State Automobile Association and adopted by Caltrans in the Caltrans Traffic Manual. According to Russ Tnft. of the CSAA, there have not been any instances of litigation associated with implementing these programs. In fact, schools are required to have a suggested route to school plan to implement many of the school safety traffic control measures in the Caltrans manual.



Burton Valley Elementary, Lafayette Elementary, and Stanley Intermediate schools. The plans will recommend pedestrian and bike routes to each school from the residential areas served by the school. Each plan must be reviewed by a registered traffic engineer to insure that it does not create unsafe practices or designs before it is implemented. Conduct annual bike rodeos at schools to teach children safe bike habits using the CSAA program as a guideline.

## Lamorinda Transportation Improvement Program Implementation

On November 8, 1988 the voters of Contra Costa County approved Measure C, which became effective in April 1989. The Measure C *Expenditure Plan* directs funds generated through Measure C to a wide variety of planning, operational and capital improvements, collectively designed to improve transportation service in Contra Costa County. The *Expenditure Plan* includes Capital Improvement *projects* that fall into three categories: Highways and Arterials; Transit; and Trails. In addition there are five *programs* included within Measure C: Elderly and Handicapped Transit Service; Local Street Maintenance and Improvements; Carpools, Vanpools and Park and Ride Lots; Bus Transit Improvements and Coordination; and Regional Transportation Planning and Growth Management. Approximately 70 percent of the revenues are allocated to capital improvement projects and 30 percent to programs. The seven-year *Strategic Plan* provides detailed specific commitments for specific projects. The balance of the program is represented as lump sum amounts shown by year. The current *Strategic Plan* is detailed through fiscal year 1997. It is updated every two years and is currently undergoing its first update.

The major Measure C funding source for the LTIP is the Gateway/Lamorinda Traffic Program, which is specifically listed in the *Expenditure Plan* under the Measure C Highways and Arterials Projects category of funding at a funding level of \$19,000,000 (1988 dollars). Since the Gateway/Lamorinda Traffic Program is explicitly listed in Measure C, and the LTIP, as defined to date, describes that program, the LTIP is by definition eligible to be funded. Thus, specific projects are eligible for funding as long as they fall within the following areas:

Project planning, engineering, environmental studies, right-of-way, construction or other measures that

mitigate traffic density between Route 24 and the Town of Moraga.

Even though the Gateway/Lamorinda Traffic program falls in the Projects category of Measure C, which by definition only includes capital improvements, initial discussions with CCTA and SWAT have indicated that these funds can also be used to pay for operating costs of a project.

Actual implementation of LTIP projects using Gateway/Lamorinda Traffic Program funds can only occur if the project is on the Measure C Master Project List and is given programming priority and funding in the seven-year *Strategic Plan* from the \$19 million (1988 dollars) specifically identified in the Measure C legislation. Programming priority for projects is made during the biennial update of the *Strategic Plan*. To that end, the LTIP project list was submitted to SWAT to request placement on the Master Project List and programming priority in the current update to the seven-year *Strategic Plan* (1994-2001).

All eligible projects (as determined by SWAT) are specifically added to the Master Project List. A determination of programming priority of each project in competition with all other SWAT region projects will be made. Then the CCTA Board determines overall programming priorities within Contra Costa County.

A set of evaluation criteria to help set programming priorities has been established by CCTA and is listed below:

1. Project is specifically listed within the Measure C Expenditure Plan.
2. Project will provide county-wide benefit.
3. Project is ready for construction, or is proceeding on a project development track that will lead to construction within the next seven years of the *Strategic Plan*.
4. Project will reduce congestion and provide a significant benefit for regional traffic in reducing travel time and delays.
5. Project will use Measure C funds to leverage significant additional local, state or federal funds.
6. Project will improve air quality or provide other environmental benefits.

7. Project increases effectiveness of the existing or planned system.
8. Project will rehabilitate existing facilities to enhance the life of the system or provide safety improvements.

The CCTA has adopted an additional criterion<sup>1</sup> relating to specific projects cited in Measure C. It is stated that projects specifically cited in the Measure may be viewed as a commitment to the voters regardless of their effectiveness in congestion relief.

To date, \$4 million has been included in the *Strategic Plan* for Gateway/Lamorinda Traffic Program for unspecified projects. Funding can be, and is encouraged to be, supplemented through other sources. These funds must also be in place before implementation can occur.

The individual projects in the LTIP will each have to pass through this programming priority process. It is possible that if priority for a project is low, Gateway/Lamorinda Traffic Program funds could be allocated at the end of the Measure C program rather than at the beginning.

The following funding schedule is included in the current seven-year *Strategic Plan* through fiscal year 1997 for the Gateway/Lamorinda Traffic Program:

Fiscal Year 1990	\$ 0
Fiscal Year 1991	\$ 20,000
Fiscal Year 1992	\$ 480,000
Fiscal Year 1993	\$ 1,000,000
Fiscal Year 1994	\$ 1,500,000
Fiscal Year 1995	\$ 1,000,000
Fiscal Year 1996	\$ 0
Fiscal Year 1997	<u>\$ 0</u>
Total Funded	\$ 4,000,000
Total Remaining <sup>2</sup>	\$15,000,000

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<sup>1</sup> Resolution 93-11-P, *Policies to Guide the Update to the 1993 Strategic Plan*.

<sup>2</sup> It should be noted that the \$19,000,000 is in 1988 dollars and all estimates of future revenues and construction costs made for Measure C were also made in 1988 dollars. Thus, inflation should be compensated for in future conditions. However, the current recession was not accounted for and it appears that costs may be ahead of revenues by approximately 10 percent. Since cost estimates made for this study have been made using current data, this discrepancy should not impact funds ultimately received.

To date, these funds have paid for the Lamorinda Traffic Study and will be used to help assist in the implementation of the LTIP.

### *Supplemental Funding*

To implement the largest percentage of the projects in the LTIP, it is desirable to supplement the Gateway/Lamorinda Traffic Program funds with other funding sources. The intent of Measure C (when it was created) was to use Measure C funds to leverage other state, federal, and local funds. This way a mix of funds would support most construction projects.

There are several funding sources that can supplement Gateway/Lamorinda Traffic Program funds to implement LTIP projects. Alternative Measure C funding programs include: (a) Local Street Maintenance and Improvement Program (b) Carpools, Vanpools and Park and Ride Lot Program, and (c) Bus Transit Improvements and Coordination Program. Other funding sources include Proposition 111 funds otherwise known as the Congestion Management Program (CMP); State Local Partnership Program (Senate Bill 2839); Air District TDM funds (AB434); and Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

These supplemental funding sources have been used and are being used to implement other transportation projects in the Lamorinda communities. These include the improvements to St. Mary's Road in Lafayette, the improvements to Camino Pablo in Orinda and the future park and ride lot on Moraga Road at Sky Hy Road in Moraga.

Measure C funding policy states that to the extent to which existing traffic and new traffic linked to growth can be separately identified for proposed facility improvements, costs associated with new growth should be borne by development fees or other funding sources. Where improvements clearly serve adjacent new development, developer contributions for sidewalks, sound walls, and other items of direct benefit to the new development should be sought.

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**Lamorinda Traffic Study  
Summary of Initial Phases**

## Phase 1 Identification of Existing "Transportation Problem" Areas

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**T**HE CITY OF LAFAYETTE, Town of Moraga, City of Orinda, Bay Area Rapid Transit (BART) District, Contra Costa County Transit Authority (CCCTA), and Caltrans all contributed existing data in the form of traffic counts, transit ridership, street plans, accident data, and background documents. The consultant conducted additional data collection with respect to street geometry, surrounding land uses, and traffic operations. These data are summarized in this chapter.

### Study Issues and Goals

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Lamorinda Project Management Committee (LPMC) staff, in conjunction with citizen participation, identified a number of issues at the outset of the study to guide the development of the Lamorinda Traffic Study (LTS). The issues revolve around the impact of high-volume peak hour traffic on arterial operations, access from side-streets and residences to arterials, traffic safety for pedestrians and bicyclists (primarily children), traffic speeds, noise, through-traffic volumes on local streets that are a result of arterial and collector street congestion, overall congestion, and transit accessibility.

The three communities have several similar goals in their General Plans that delineate the range of possibilities available to solve traffic congestion within the communities. These goals promote the image of the semi-rural residential character of the communities, limitations on growth, and improved safety.

### Roadway System

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The LTS Study Area was defined in the Measure C Gateway/Lamorinda Traffic Program as the portions of the City of Lafayette, the Town of Moraga, the City of Orinda, and Contra Costa County south of SR-24. The areawide circulation system is shown in Figure 1.

The LTS focused on the arterial roadways that provide access to SR-24 from the Lamorinda areas south of SR-24. An arterial is a major street carrying the traffic of local and collector

streets to and from freeways and other major streets, with controlled intersections. A major arterial provides through-service between communities and minor arterials generally carry shorter trips. Arterial roadways included in the LTS are Camino Pablo, Moraga Way, Glorietta Boulevard/Acalanes Road, Rheem Boulevard, Moraga Road, Mt. Diablo Boulevard, First Street and Oak Hill Road.

The combination of Glenside Drive, Reliez Station Road, and Olympic Boulevard connect Pleasant Hill Road with St. Mary's Road. Glenside Drive and Reliez Station Road are two-lane residential roads that serve dually as residential collector roads and minor arterials, but were designed for lower volumes of traffic. The shift in work-places from San Francisco to Contra Costa County has produced increased traffic volumes on this corridor as it is the shortest route to eastbound SR-24 and southbound I-680.

A total of six interchanges provide access between Lamorinda and SR-24: Gateway Boulevard, Camino Pablo, St. Stephens Drive, Acalanes Road, Central Lafayette, and Pleasant Hill Road. Interchanges serving Moraga Way and Moraga Road, the primary north/south corridors include:

*The Camino Pablo interchange*, which provides access to Camino Pablo between the Village and Crossroads, is the most heavily used Orinda interchange. Along with the capacity restriction at the eastbound off-ramp, substantial peak-hour operational difficulties are encountered on the local street system in the vicinity of this interchange.

*The Central Lafayette interchanges*, serve downtown Lafayette and residential areas south of SR-24, as well as BART and residential areas north of SR-24. Travel between areas south of SR-24 and the interchange creates congestion in downtown Lafayette, particularly through the Mt. Diablo Boulevard/Moraga Road intersection.

### **Roadway Operational Characteristics**

The operations of 53 intersections were evaluated to establish existing operating conditions. The following observations summarize the current transportation conditions and levels of congestion in the Lamorinda study area.

- The major arterial corridors within the Lamorinda study area near SR-24, including Moraga Way, Moraga Road, and Mt. Diablo Boulevard have been operating at or near capacity for several years.

- Unacceptable traffic operating conditions occur on Moraga Way at Glorietta Boulevard and through downtown Orinda, in the vicinity of SR-24.
- Unacceptable operating conditions along Moraga Road occur primarily in downtown Lafayette, in the vicinity of Brook Street/School Street and Mt. Diablo Boulevard.
- Unacceptable traffic operating conditions occur along Mt. Diablo Boulevard through downtown Lafayette because east/west traffic conflicts with north/south traffic associated with the BART station and SR-24.
- Corridor analysis and subsequent observations confirm the unacceptable level of congestion on Moraga Way and Moraga Road and Mt. Diablo Boulevard.
- Vehicle speeds on Moraga Road during off peak hours frequently exceed the posted speed limits. Generally, speeds are no more than 5-10 mph above the limits; however, vehicles are observed to exceed the limit by 15 mph.
- Vehicles speeds on Moraga Way frequently exceed the posted speed limits during off-peak hours. Vehicle speeds tend to be 5-10 mph above the posted limits.
- Most access points along Moraga Way and Moraga Road do not meet standard warrants for signalization (as defined by Caltrans) because side-street traffic does not exceed the minimum threshold for signalization. Locations that may meet signal warrants on Moraga Way include Orchard Road (north) and Ivy Drive (north). Locations that may meet signal warrants on Moraga Road include Hamlin-Tanglewood.

## Transit Service

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The Lamorinda area has two BART stations that provide transit services to area residents. These stations located in Orinda and Lafayette are on the Concord/Daly City BART line. During the PM peak period (4-6:30 pm), this line carries approximately 13,000 passengers in the peak direction.

At the Orinda and Lafayette BART stations approximately 64 percent of the BART passengers arrive by single occupant vehicles. Sixteen percent arrive either by carpool or drop-off.



Eleven percent arrive by bus. Seven percent walk to the BART station.

The Contra Costa County Transit Authority (CCCTA) operates five bus routes in the Lamorinda area. These routes include Route 106, Route 123, Route 125, Route 150, and Route 990. Combined, these routes carry approximately 1,700 passengers during a typical weekday. Over 60 percent (1,060) of these riders use Route 106.

## Pedestrians and Bikes

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Sidewalks are generally not provided along roads in the Lamorinda area outside of the commercial areas. This is in keeping with the semi-rural character that has guided most past development in the area. Pedestrians and bicyclists use shoulders along Moraga Way and Moraga Road, Rheem Boulevard, and Glorietta Boulevard. The Lafayette/Moraga trail, following the general alignment of St. Mary's Road, serves both pedestrians and bicyclists and is heavily used for recreation and access to schools along the trail.

## Accidents

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The LTS accident study is presented in Workpaper 5. Two criteria were used to evaluate accident data: (a) accident rates and (b) accident patterns. These criteria are briefly discussed below.

*Accident rates* are used in area-wide accident studies to identify those locations that should be investigated first in terms of reducing accident potential. There is no industry standard that defines at what level an accident rate is considered unsatisfactory. This is because reporting practices can vary from one jurisdiction to another. For the purposes of this study, an accident rate of 0.50 accidents per million vehicles passing through the intersection per year (MAV) or greater was determined to be large enough to warrant additional study. Fourteen intersections in the Lamorinda study area meet this criterion.

*Accident patterns* were used as the second criterion. An intersection was defined as exhibiting a pattern of accidents if five or more accidents occurred in any one category over the three year study period (e.g., five rear-end accidents or five

right-angle accidents.) The accident analysis indicated that 15 intersections have accident patterns that meet this criteria.

These two groups of intersections were consolidated into one list. A total of 18 intersections were identified for further study. Eleven intersections met both criteria. This list is presented in Table 3 (Page 47). Factors contributing to accidents at each of the intersections were identified and possible solutions developed. These were incorporated into the improvement options.

## Public Participation

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During this phase of the LTS process, a public workshop was held at the Lafayette Community Center on November 6, 1991, to solicit public comment and opinion. The workshop provided the initial opportunity for involvement of the larger Lamorinda community in the LTS. The purpose of this first public meeting (Workshop 1) was to provide an overview of the LTS and to solicit opinions about the nature and extent of traffic issues and concerns and to begin to develop ideas for potential improvements. Approximately 50 residents from Lafayette (28%), Moraga (39%), and Orinda (33%) attended this workshop.

Participant comments were made in the following areas:

- Congestion and access;
- School buses;
- Growth management implications/opportunities;
- Public transportation and transit;
- Control and management of speed;
- Bike and pedestrian facilities;
- Parking at/near BART Stations;
- Use of car/van pools (need alternatives for single-car occupancy);
- Cost/funding options for transportation improvements;
- Caldecott Tunnel and other bottlenecks;
- Traffic noise;
- Provision of emergency access;
- Sub-standard streets required to perform as arterials;
- Poorly timed stop lights; and
- Shifts of traffic load from arterials to local streets during peak hour.

The single most important issue for most participants was congestion and access. The roadways of greatest concern were:

**Table 3  
Intersections Warranting Additional Study Because of Accident History**

Intersection	Jurisdiction	Accident Rate/a/	Meets Accident Type Criteria/b/	Factors That Meet Criteria/b/
Oak Hill Road/SR 24 eastbound Off-Ramp	Lafayette	1.39	Y	Rear-end, speed
Moraga Way/Brookwood Road	Orinda	1.37	N	Dark, Fixed Object
Glorietta Drive/Rheem Boulevard	Orinda	1.02	Y	Rear-end, Broadside, Dark, R-O-W, F.O.S.
Camino Pablo/Brookwood Road	Orinda	0.98	Y	Broadside, Dark, Imp. Turn, Imp. Move, F.O.S.
Pleasant Hill Road/Mt. Diablo Boulevard	Lafayette	0.81	Y	Rear-end, Broadside, Dark, Speed, F.O.S.
Moraga Road/Mt. Diablo Boulevard	Lafayette	0.73	Y	Sideswipe, Rear-end, Broadside, Imp. Turn
Camino Pablo/Santa Maria Way	Orinda	0.71	Y	Rear-end, Broadside, R-O-W, Speed.
Moraga Road/Moraga Boulevard	Lafayette	0.67	Y	Broadside, F.O.S.
Pleasant Hill Road/Old Tunnel Road	Lafayette	0.62	Y	Broadside
St. Mary's Road/Rheem Boulevard	Moraga	0.58	N	Broadside, Dark, R-O-W, Speed, F.O.S.
Moraga Road/Alta Mesa Drive	Moraga	0.58	Y	Broadside, F.O.S.
Camino Pablo/Moraga Way	Orinda	0.54	Y	Broadside, F.O.S.
Pleasant Hill Road/SR-24 eastbound Off-Ramp	Lafayette	0.52	Y	Broadside, F.O.S.
Moraga Road/Corliss Drive	Moraga	0.52	N	
Moraga Road/Ascot Drive	Moraga	0.49	Y	R-O-W
First Street/Mt. Diablo Boulevard	Lafayette	0.49	Y	Rear-end
Moraga Way/Brookside Road	Orinda	0.41	Y	Rear-end, Speed
Oak Hill Road/Mt. Diablo Boulevard	Lafayette	0.39	Y	Side Swipe, Rear-end, Imp. Turn, Speed.

/a/ Total reported accidents over 3 year period (1988-1990) divided by million vehicles entering intersection over the same period.

/b/ Intersections with 5 or more accidents having the same cause or contributing factor.

R-O-W = Failure to grant right-of-way.

F.O.S. = Failure to observe signal or sign control.

Moraga Way, Moraga Road, St. Mary's Road, Pleasant Hill Road, Olympic Boulevard, Camino Pablo, Rheem Boulevard, and Mt. Diablo Boulevard. Through/commute traffic was seen as the prime source of local area congestion. Many local residents have a difficult time accessing these roads (particularly Moraga Way and Moraga Road) from driveways and side-streets during commute hours because of a lack of gaps in traffic sufficient to allow side traffic to enter safely.

Traffic generated by local schools was seen as contributing significantly to congestion. The lack of school buses was seen as a primary factor in the increase of local area congestion. Several participants also raised questions regarding the impact of commute patterns associated with St. Mary's College on local peak hour travel.

Most participants were skeptical about the potential for new by-pass routes to actually relieve congestion. Some participants felt that projects such as the Gateway Boulevard Extension would increase growth in the area and may provide only a short-term solution. Some participants argued that increasing a roadway's capacity does not necessarily relieve congestion, and may increase development pressures in areas where growth may not be environmentally appropriate. Some participants felt that limiting the capacity of the existing roadway network was not an effective growth management strategy.

## Phase 2 Identification of Potential Transportation Strategies and Programs

**T**HE SECOND PHASE of work undertaken as part of the Lamorinda Traffic Study (LTS) involved the development of potential improvement options throughout the Lamorinda study area that would eventually be defined into the LTS Master Plan.

### Initial Improvement Actions and Strategies

The initial improvement options were organized by the five study corridors that had been defined within the Lamorinda study area: (1) Moraga Way Corridor, (2) Rheem Boulevard Corridor, (3) Moraga Road Corridor, (4) St. Mary's Road Corridor, and (5) downtown Lafayette Corridor. The results of

this work included the preliminary evaluation of approximately 100 transportation improvement actions and strategies ranging from minor safety improvement projects to major roadway and transit projects, which were developed after an assessment of the study issues, existing transportation conditions, and public comment and insight.

Each action and strategy was developed in enough detail to assess its physical feasibility, its potential effectiveness in reducing congested conditions and improving safety, and its potential cost and funding sources. Secondary impacts of the 100 actions and strategies on safety, air quality, and travel through neighborhoods were evaluated qualitatively. These are discussed in detail in Workpaper 16 (August 21, 1992) and are summarized in Table 4 (Page 50).

## Public Participation

The 100 or so projects were presented to the Lamorinda community at the second public workshop held at St. Mary's College on May 19, 1992. The primary purpose of the workshop was to obtain feedback from those present regarding their opinions on the various actions and strategies presented. Approximately 180 residents from Lafayette (25%), Moraga (15%), and Orinda (60%) areas attended the second workshop.

Participants in Workshop II were separated into focus groups. The focus groups then reviewed each of the 100 actions and strategies. In addition, participants of the focus groups were provided comment sheets and a summary table of the actions and strategies to facilitate prioritization.

Workshop participants approved of most of the local intersection improvements. For example, signal coordination, balancing signal timing delays, providing appropriate pedestrian crosswalks, and providing additional turn lanes at intersections were considered positive projects. Larger extension projects (major capital improvements) such as Gateway Boulevard and Bollinger Canyon were considered a low priority by the workshop participants because the benefit due to reduced congestion was out-weighed by the secondary impacts on the environment and quality of life. Many workshop participants stated that they would rather see the money spent to provide school bus service and other less extreme measures, such as signal timing improvements, channelization changes, etc.

**Table 4  
 Preliminary Actions and Strategies**

Location	Project Description	Included in Master Plan List
Camino Pablo/Santa Maria	a. Increase yellow and red times	yes
	b. Add 3rd lane to westbound approach	yes
	c. Add 3rd lane to northbound approach	yes
	d. Coordinate signal w/ Brookwood	yes
	e. Modify northbound Camino Pablo striping	yes
Camino Pablo/Brookwood and Camino Pablo/Camino Encinas	a. Optimize signals	yes
	b. Extend merge to Overhill	yes
	c. Extend 3rd northbound lane to Camino Encinas	yes
	d. Add third lane to off-ramp	yes
	e. Add fourth lane (long term) to off-ramp	no
	f. Relocate SR-24 bike lane	yes
	g. Shift Brookwood traffic to Camino Encinas	no
	h. Connect Orinda Way & Moraga Way	no
	i. Relocate BART Casual Carpool	yes
Moraga Way/Brookwood	a. Remove intersection diagonal parking	yes
Moraga Way/Brookside	a. Trim vegetation	yes
	b. Change east leg to one-way eastbound	no
Moraga Way/Glorietta	a. Balance signal delay	yes
	b. Add right turn lane to northbound approach	yes
	c. Add right turn lane to westbound Glorietta Blvd.	yes
	d. Correct grade	yes
Overall Study Area Operations	a. Signal coordination	no
	b. Meter traffic Moraga Way and Rheem Blvd	no
	c. Two-way left turn lanes	no
	d. Widen to 4 lanes	no
	e. Construct Gateway Boulevard extension	yes
	f. "e" plus Brookside connection	yes
Glorietta/Rheem	a. Implement Wright & Associates study	no
Moraga Road/Alta Mesa	a. Add "Keep Clear" marking	yes
	b. Remove median vegetation	yes
	c. Rights in/out or modify median	no
	d. Possible future signal	no
Moraga Rd/Cortiss Dr	a. Trim vegetation	yes

Table 4 Continued

**Table 4 (Continued)  
 Preliminary Actions and Strategies**

Location	Project Description	Included in Master Plan List
Moraga Road/Ascot Drive	a. Trim vegetation	yes
	b. Consolidate 7-11 driveways	yes
Moraga Rd @ Campolindo HS	a. Improve left turn access	yes
Moraga Road Between Sky-Hy and St. Mary's	a. Trim vegetation	no
	b. Improve striping	yes
	c. Meter Moraga Road	no
	d. Signalize Hamlin-Tanglewood	yes
Moraga Road/Brook-School	a. Coordinate Brook/School signals	yes
	b. Eliminate all-pedestrian phase	no
	c. Widen to add left-turn lanes	yes
	d. Connect School and Brook	yes
	e. Restrict Turns	yes
Moraga Road/Moraga Boulevard	a. Striping	yes
	b. Add southbound left turn lane	yes
	c. Restrict turns	yes
	d. Study signalization	no
Moraga Road/Mt. Diablo Boulevard	a. Eliminate Plaza Drive crosswalk	yes
	b. Eliminate Mt. Diablo parking	yes
	c. Implement signal optimization	yes
	d. Extend Golden Gate to Moraga Rd.	yes
	e. Upgrade First & Moraga Blvd.	yes
	f. "d" plus add eastbound SR-24 eastbound off-ramp at 1st	yes
	g. Extend First to St. Mary's Rd.	no
	h. Connect Moraga Rd w/ Frontage Road	no
	i. Through traffic to Deer Hill & delete 1 westbound lane Mt. Diablo	no
	j. Add 3rd eastbound through to Mt. Diablo	yes
	k. "j" plus delete westbound through on Mt. Diablo	no
First Street/Mt. Diablo Boulevard	a. Split northbound and southbound signal phases	yes
	b. Add northbound free flow lane to on-ramp; eliminate left-turn from Lucky's	yes

Table 4 Continued

**Table 4 (Continued)  
 Preliminary Actions and Strategies**

Location	Project Description	Included in Master Plan List
Oak Hill/Lafayette Circle	a. Eliminate driveway @ Oak Hill	yes
	b. Install raised pavement markers	yes
	c. Lafayette Circle to one-way southbound	no
	d. Align Lafayette Circle-Oak Hill	yes
Oak Hill Rd/Eastbound SR-24 Off-Ramp	a. Eliminate 2 southbound curb spaces	yes
	b. Eliminate high speed right turn	yes
	c. Increase daylight lighting	yes
St. Mary's Road/Rheem Boulevard	a. Remove eucalyptus; trim vegetation; repaint	yes
	b. Realign St. Mary's; Rheem to Bollinger	no
	c. Add all-way STOP	yes
Glenside Corridor	a. Meter St. Mary's Road	no
	b. Extend Pleasant Hill to St. Mary's	no
	c. Extend Pleasant Hill Road to Glenside	yes
	d. Restrict access to Glenside-Reliez Station	no
	e. Bollinger extension to Crow Canyon	yes
	f. Sacramento Northern r-o-w	no
Pleasant Hill/ Mt. Diablo & Pleasant Hill/Tunnel	a. Add all-red or extend yellow	yes
	b. Add southbound through- from Deer Hill to Mt. Diablo	yes
Safety	a. "Suggested route to school" programs	yes
Safety	b. Bike rodeos	yes
	c. Sidewalks and paths on arterial streets	yes
Safety	a. Enforcement, striping, speed limit signs	yes
Safety	a. Emergency evacuation plan	yes
Dependence on Auto	a. Re-instate school buses (AM benefit only)	yes
	b. Increase CCCTA bus service	yes
	c. Develop a high school TDM plan	yes
Dependence on Auto	a. Improve CCCTA service	yes
	b. Provide BART shuttles	yes
	c. Charge for parking at BART and provide free parking for carpools	yes
	d. Add park and ride lots	yes
	e. Ramp metering to SR-24 w/carpool by-pass	yes
Dependence on Auto	a. Do not add BART parking garages	yes

Table 4 Continued



**Table 4 (Continued)  
 Preliminary Actions and Strategies**

Location	Project Description	Included in Master Plan List
Future Traffic Impacts	a. Adopt standardized Lamorinda definition of significant traffic impact	yes
	b. Develop a TDM program including transportation improvement fee	yes
	c. Adopt Lamorinda trip reduction goal to improve existing conditions	yes
	d. Add trip reduction goals to GME & TDM plans for future conditions	yes
	e. Reduce development potential or associate cumulative impacts with fee	yes

Source: Workpaper 16, August 21, 1992

The workshop participants were particularly interested in the safety improvement options. These types of improvements included: intersection and sight distance improvements; left-turn lane channelization; improved striping; improved pedestrian accessibility; and restricted through-movement traffic on local residential streets.

### Lamorinda Traffic Study Master Plan

Initially, the final product of the LTS was to be a set of specific programs that would relieve congestion and that could be implemented in a straightforward fashion with a fixed implementation schedule. However, early on in the LTS process it became apparent that there was no "clear-cut" solution that could meet the following criteria for a fixed program:

1. Provide desired congestion relief;
2. Require no further environmental or design studies; and
3. Have the support of the three Lamorinda communities.

It was clear that the congestion relief associated with the chosen improvement program had to be balanced against its costs and environmental impact consequences and that all of those issues could not be finalized within the context of the

LTS. It was also clear that the timing of some potential improvement options would be such that even if they met these other criteria, they could not be implemented for many years because of design and environmental requirements as well as funding availability. Some programs could be implemented in the near term to provide some relief, not necessarily "fixing" the congestion problems, while additional feasibility studies are conducted and additional funding sources sought for more major projects.

Thus, it was determined by the LPMC that a Master Plan approach would be used rather than a specific fixed program approach. The LTS Master Plan would include a range of projects that could be (but did not have to be) implemented. The travel benefits and development consequences of these programs would not all be equal; some would be more effective than others in relieving congestion; some would be primarily safety related; and some would be policy programmatic approaches. However, all would provide some benefit to the transportation system in Lamorinda.

### *LTS Master Plan*

The initial list of approximately 100 possible actions and strategies was reduced in size to a more manageable group of projects and defined as the Master Plan list. Approximately 75 percent of the actions and strategies were carried forward to the Master Plan for more intensive analysis. These were identified using a rating scheme developed by the consultant. The performance of each action and strategy was evaluated using the technical work that supported the development of the actions and strategies, community feedback, and input from the Lamorinda Project Management Committee (LPMC). A numerical value was assigned under three rating categories (mobility, cost, and viability) for every action and strategy and then summed to produce a total rating for each action and strategy. At this stage of the LTS, mobility was defined as the primary evaluation criteria. Secondary impacts were not specifically included at this level of analysis. They were included indirectly under the viability category (community support). The rating was not used to define the relative importance or rank of a project but rather whether the project should be carried forward for further study. After this step, the ratings were discarded from further consideration. All actions and strategies with zero mobility rating and/or with a total rating of less than seven were not carried on for further analysis.

Barton-Aschman was responsible for the development of the initial rating system and criteria. The LPMC reviewed the results, and modifications to the conclusions were made. The group of projects carried forward to Workpaper 17 for additional study and evaluation are identified in Table 4 (Page 50) and was called the LTS Master Plan.

The LTS Master Plan projects from Table 4 (Page 50) were grouped into five categories of improvement programs: Local Operational Improvement Program, Major Capital Investment Program, Major Transit Improvement Program, Transportation Policy and Strategy Program, and Safety Improvement Program. Table 5 (Page 56) presents the LTS Master Plan.

*Local Operational  
Improvement Program*

This program category includes actions that have been combined into a larger, coordinated improvement program to optimize the operations of road segments within the transportation system. They improve the operations at the intersections where they are proposed, improve transit access, and encourage carpooling. These programs do not include actions that significantly reduce traffic volumes, improve access from side streets, appreciably reduce travel time or delay for through traffic, or produce significant changes in travel behavior. In other words they improve the operation of the existing transportation system but would not significantly increase the overall capacity of the transportation system.

*Major Capital Investment  
Program*

This category includes improvements that significantly increase the capacity of the local transportation system by adding new roadways. They also require significant capital investment and could have significant environmental impacts. They have the potential to reduce traffic on congested routes by shifting traffic to new routes.

*Major Transit Investment  
Program*

This category includes improvements that would increase the capacity of the local transportation system by increasing transit service. It requires significant investment in transportation operating costs rather than capital expenditures. It has the potential to reduce traffic on congested routes by shifting travel from the automobile to buses.

*Policy and Strategy Pro-  
gram*

This program category includes policies and strategies that can be adopted and uniformly followed by the three Lamorinda communities to reduce travel, control growth, and minimize traffic congestion. They address future growth in the Lamorinda communities with the goals of minimizing the transportation impacts of that growth, accurately assessing the impacts of that growth, and mitigating identified impacts

## Table 5 LTS Master Plan

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### Local Operational Improvements

#### *Moraga Way Local Corridor Program*

- Coordinate Camino Pablo/Santa Maria, Camino Pablo/Brookwood SR-24 Off-Ramp, and Camino/Pablo-Moraga Way/Camino Encinas signals;
- Provide dual right-turn lanes from northbound Camino Pablo to the westbound SR-24 on-ramp;
- Restripe right-turn lane on northbound Camino Pablo at Santa Maria to an optional through/right;
- Provide a third westbound lane on Santa Maria at Camino Pablo;
- Add a third lane to the SR-24 eastbound off-ramp at Brookwood;
- Extend the third northbound through lane from Brookwood to south of Camino Encinas;
- Extend the southbound merge at Camino Encinas to Overhill and restripe northbound lanes;
- Balance approach delay at Moraga Way/Glorietta;
- Add a right-turn lane to the northbound and westbound approaches at Moraga Way/Glorietta Boulevard;
- Add carpool parking lots: Camino Pablo @ Santa Maria; Orinda Way north of Santa Maria; and
- Provide CCCTA bus shelters and improved pedestrian access at all bus stops. Provide designated carpool parking and bike lockers at selected stops.

#### *Moraga Road Local Corridor Program*

- Improve access to Campolindo High School;
- Signalize Moraga Road/Hamlin-Tanglewood;
- Add left-turn lane at Moraga Road/Madrone Drive;
- Restrict left turn access at Moraga Road/Moraga Boulevard:  
Alternative 1: Prohibit left-turn movements from Moraga Road during peak hours; or  
Alternative 2: Prohibit left-turn movements from Moraga Road at all times;
- Modify the Brook-School/Moraga Road intersection:  
Alternative 1: Prohibit left-turns to Brook and School Streets; or  
Alternative 2: Prohibit left-turns to Brook and add left-turn lane at School Street; or  
Alternative 3: Remove signal at Brook, restrict turns at Brook and add left-turn lane at School Street; or  
Alternative 4: Widen Moraga Road to provide left-turn lanes to Brook Street and School Street; or  
Alternative 5: Align Brook Street and School Street;
- Eliminate the driveway on Mt. Diablo Boulevard opposite Oak Hill Road;
- Prohibit peak hour curb parking on Mt. Diablo between Lafayette Circle and Moraga Road;
- Provide a third eastbound through lane on Mt. Diablo between Oak Hill and Moraga Road;
- Coordinate traffic signals on Mt. Diablo Boulevard and on Moraga Road;
- Provide dual right-turn lanes from First Street to eastbound SR-24 on-ramp;
- Change the high speed right-turn lane from SR-24 eastbound off-ramp to Oak Hill to a standard intersection;
- Add carpool parking lots at: Pleasant Hill at Olympic, Deer Hill, St. Mary's Road/Rheem, St. Mary's Road/Lafayette Community Center; and
- Provide CCCTA bus shelters and improved pedestrian access at all bus stops. Provide designated carpool parking and bike lockers at selected stops.

Table 5 Continued

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**Table 5 (Continued)**  
**LTS Master Plan**

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**Major Capital Investment Program**

- Construct Gateway Boulevard extension from SR 24 to Moraga Way at/near the Town of Moraga:  
Alternative 1: Without Brookside Connection; or  
Alternative 2: With Brookside Connection.
- Construct Moraga Road/Mt. Diablo Boulevard By-Pass  
Alternative 1: Construct a new eastbound SR 24 off-ramp at First Street and the First Street by-pass to the Moraga Road/Mt. Diablo Boulevard intersection via Golden Gate Way; or  
Alternative 2: Extend Oak Hill to Moraga Road to meet First Street extension.
- Extend Pleasant Hill Road to Glenside.
- Extend Bollinger Canyon Road to Crow Canyon Road.

**Major Transit Investment Program**

- Provide school bus service;
- Increase CCCTA bus service in Lamorinda; and
- Provide BART shuttle bus service.

**Policy and Strategy Program**

- Adopt standardized Lamorinda definitions of significant impacts;
- Develop a coordinated Lamorinda TDM program;
- Designate critical roads as Routes of Regional Significance;
- Work with schools to stagger school start times, review school boundaries to minimize trip lengths;
- Develop and implement a coordinated Lamorinda emergency evacuation plan;
- Support BART, CCCTA, Caltrans, and CCTA Planning Program; and
- Support independent carrier commuter bus service.

**Safety Improvement Program**

- Increase yellow/red time at Camino Pablo/Santa Maria;
  - Split north and south signal phases at First Street;
  - Extend red and yellow phases at Pleasant Hill/Mt. Diablo and Pleasant Hill/Tunnel Road;
  - Remove intersection diagonal parking at Moraga Way/Brookwood;
  - Eliminate Plaza Drive crosswalk;
  - Install raised pavement markers through Oak Hill/Mt. Diablo intersection;
  - Consolidate the 7-11 driveways at Moraga Road/Ascot;
  - Improve sight distance and access to side streets. Trim vegetation restricting sight distance at: Moraga Way/Brookside Road; Moraga Road/Corliss; Moraga Road/Alta Mesa; and Moraga Road/Ascot;
  - Remove the eucalyptus tree at Rheem/St. Mary's;
  - Repaint lines and legends at: Moraga Road/Moraga Boulevard; Moraga Road/Alta Mesa; and Rheem/St. Mary's Road;
  - Eliminate sub-standard bike lane on Moraga Road;
  - Implement school safety programs including: Suggested Route to School Plan and bike rodeos.
- 
-

on a community-wide basis. This category includes actions that do not physically affect roadways and transit service in the Lamorinda area. Instead these actions focus on reducing or shifting demand and coordinating growth in demand with increased capacity of the transportation system.

### *Safety Improvement Program*

The safety improvement program includes those actions that should be implemented to make traffic movement safer for both pedestrians and vehicles throughout the Lamorinda Traffic Study area. These improvements are generally low cost (under \$10,000), and can be carried out by either adjacent landowners or the individual jurisdiction. These safety improvements do not necessarily improve traffic operations. Some may even reduce the capacity of the transportation system. This potential reduction in capacity must be taken into account when developing projects that address congestion relief as part of the LTS study and compliance with the Measure C Growth Management Program.

## **Effectiveness of Potential LTS Master Plan Programs in Relieving Traffic Congestion**

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This section summarizes the evaluation of the LTS Master Plan programs in relieving traffic congestion in the Lamorinda area. The subsequent section addresses the transportation related impacts (air quality, noise, visual, neighborhood, geotechnical, land-use) of the LTS Master Plan programs.

### *Traffic Condition Assumptions*

The effectiveness of the potential LTS Master Plan programs were tested first under existing conditions (1990), as required by Measure C language.

The programs were also tested for 2010 conditions to determine if additional mitigation must be implemented to meet future growth in traffic. Future 2010 traffic volumes were forecast using the Central/Lamorinda Travel Forecasting Model. Future congestion should be mitigated by future developments that create additional congestion.

Sixty-five traffic zones were defined for the Lamorinda area for use in the Central/Lamorinda Travel Forecasting Model, a sub model of the Central Contra Costa County Travel Forecasting Model. These traffic zones were developed to track land use demographics and trip-making characteristics. Within each traffic zone, land use forecasts were developed by

CCTA utilizing several sources including: 1) Association of Bay Area Governments (ABAG) *Projections '90*, Revised 1992; 2) 1990 Census Data; and 3) Employment Development Department of the State of California. Each of the local jurisdictions were consulted during the land use forecasting process. In summary, by 2010 an additional 2,100 houses and 3,300 jobs will be added to the Lamorinda Study area. This represents a 25 percent increase in houses and a 10 percent increase in jobs.

The only significant future roadway improvements in the vicinity of the LTS study area that were included were the widening of I-680 and the completion of the I-680/SR-24 interchange between Rudgear Road in Walnut Creek and Willow Pass Road in Concord.

### Measures of Effectiveness

The effectiveness of the LTS Master Plan programs in relieving traffic congestion were evaluated using two measures: level of service, and reduction in traffic volume.

Level of service, as reported in this document, was established using the 1985 *Highway Capacity Manual* capacity calculation methodology, operations method, because it gives a more accurate reflection of the constraints at each intersection and the potential change in traffic operation associated with the wide range of improvements proposed (signal timing changes, changes in lane width and grade, changes in lane utilization, signal coordination, pedestrian requirements, etc.). These types of changes can not be evaluated using the CCTA methodology.<sup>1</sup> The results of the analyses are summarized in Tables 6 (Page 60) and 7 (Page 61) for the Local Operational, Major Capital, and Major Transit Improvement Programs for critical signalized intersections.

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<sup>1</sup> The results of the HCM capacity calculations should not be used in compliance reports in association with the CCTA Growth Management Program. That program specifically requires the use of the CCTA capacity calculation methodology to ensure consistency of analysis results in all communities within Contra Costa County. The capacity calculations in this final report were also performed using the CCTA capacity calculation methodology to maintain compliance with the CCTA Growth Management Program. The results of those calculations have been submitted to each Lamorinda community in the technical appendix for Workpaper 17.

# Table 6 Levels of Service: LTS Master Plan Programs—AM Peak

Intersection	1990 LOS <sup>a/</sup> by Improvement <sup>a/</sup>									2010 LOS <sup>b/</sup> by Improvement <sup>b/</sup>								
	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9
Camino Pablo/Santa Anita	B 0.63	A 0.59	B 0.63	B 0.63	B 0.63	B 0.63	B 0.63	B 0.63	A 0.59	E 0.91	C 0.78	E 0.91	E 0.91	E 0.91	E 0.91	E 0.91	E 0.91	D 0.89
Camino Pablo/Brookwood	D 0.87	B 0.65	C 0.70	B 0.66	D 0.81	D 0.81	D 0.81	C 0.79	D 0.83	F 1.04	D 0.83	D 0.86	D 0.83	E 0.97	E 0.97	E 0.97	E 0.97	E 1.00
Camino Pablo/Camino Encinas/Moraga Way	D 0.88	C 0.74	C 0.76	C 0.73	D 0.88	D 0.88	D 0.88	D 0.83	C 0.79	F 1.04	D 0.82	D 0.84	D 0.82	F 1.04	F 1.04	F 1.04	F 1.04	E 0.97
Moraga Way/Glorietta Blvd.	F 1.28	D 0.84	E 0.95	F 1.03	F 1.16	F 1.16	F 1.15	F 1.10	F 1.06	F 1.35	E 1.00	F 1.11	F 1.20	F 1.35	F 1.35	F 1.34	F 1.34	F 1.24
Moraga Way/Brookside	—	—	—	D	—	—	—	—	—	—	—	—	E	—	—	—	—	—
Moraga Way/Ivy Drive	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	A	A	A
Oak Hill/Mt. Diablo Blvd.	0.53	0.53	0.55	0.55	0.53	0.53	0.53	0.53	0.48	0.59	0.59	0.62	0.62	0.59	0.59	0.59	0.59	0.54
Moraga Rd./Mt. Diablo Blvd.	A	A	A	A	A	A	A	A	A	C	B	C	C	B	B	C	C	B
First St./Mt. Diablo Blvd.	0.52	0.51	0.51	0.51	0.50	0.51	0.52	0.52	0.48	0.70	0.69	0.70	0.70	0.68	0.68	0.70	0.70	0.67
Moraga Road/Golden Gate Way (New)	D	E	D	D	B	B	C	C	D	F	F	E	E	C	C	E	E	E
Moraga Rd./School/Brook/c/	0.85	0.90	0.80	0.80	0.61	0.61	0.79	0.75	0.76	1.05	1.09	0.98	0.98	0.74	0.79	0.94	0.94	0.96
Moraga Rd./St. Mary's	B	A	A	A	A	A	A	A	A	C	C	B	B	A	A	B	B	B
	0.60	0.57	0.57	0.57	0.50	0.48	0.55	0.55	0.54	0.70	0.67	0.67	0.67	0.56	0.54	0.63	0.64	0.63
	—	—	—	—	B	B	—	—	—	—	—	—	—	C	D	—	—	—
	—	—	—	—	0.69	0.69	—	—	—	—	—	—	—	0.78	0.86	—	—	—
	F	B	F	F	F	F	F	F	F	F	B	F	F	F	F	F	F	F
	1.38	0.64	1.28	1.28	1.38	1.38	1.20	1.05	1.21	1.52	0.66	1.41	1.41	1.52	1.52	1.35	1.37	1.36
	C	C	C	C	C	C	C	C	B	D	D	C	C	D	D	D	D	C
	0.75	0.75	0.72	0.72	0.75	0.75	0.75	0.72	0.64	0.83	0.83	0.77	0.77	0.83	0.83	0.83	0.77	0.75

<sup>a/</sup> Calculated using Highway Capacity Manual, operations method; B = Level of Service, based upon volume-to-capacity ratio and 0.00 = Volume-to-Capacity ratio for entire intersection

<sup>b/</sup> Improvement: The Major Investment Programs are analyzed separately and do not include the Local Operational Improvement program except for the eastbound SB-24 off-ramp and the signal coordination projects, which are funded.

- No. 1 Existing Configuration
- No. 2 Existing with Local Improvements (not included in Programs 3 through 9)
- No. 3 Existing with Gateway Boulevard Extension
- No. 4 Existing with Gateway Boulevard Extension w/ Brookside
- No. 5 Existing with First-Golden Gate Way Extension
- No. 6 Existing with Golden Gate Way - Oak Hill -Y-
- No. 7 Existing with Pleasant Hill Road Extension
- No. 8 Existing with Bollinger Canyon Road Extension
- No. 9 Existing with Major Transit Investment

<sup>c/</sup> The Level of Service under No. 2 reflects either removal of the Brook Signal or intersection realignment. Left-turn prohibition would produce LOS D, V/C = 0.88.

Source: Barton-Aschman Associates, Inc.



**Table 7**  
**Levels of Service: LTS Master Plan Programs—PM Peak**

Intersection	1990 LOS <sup>a/</sup> by Improvement <sup>b/</sup>									2010 LOS <sup>a/</sup> by Improvement <sup>b/</sup>								
	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9
Camino Pablo/Santa Maria	D	D	D	D	D	D	D	D	D	F	E	F	F	F	F	F	F	F
Camino Pablo/Brookwood	0.89	0.82	0.89	0.89	0.89	0.89	0.89	0.89	0.88	1.42	0.94	1.42	1.42	1.42	1.42	1.42	1.42	1.41
Camino Pablo/Camino Encinas-Moraga Way	E	C	B	B	C	C	C	C	E	F	D	C	C	D	D	D	D	F
	0.93	0.77	0.67	0.63	0.78	0.77	0.77	0.75	0.92	1.00	0.85	0.76	0.72	0.85	0.85	0.85	0.85	1.07
Moraga Way/Glorietta Blvd.	D	B	B	B	D	D	D	C	C	E	C	C	C	E	E	E	E	E
	0.81	0.69	0.69	0.59	0.81	0.81	0.81	0.74	0.79	0.98	0.76	0.77	0.73	0.98	0.98	0.98	0.95	0.96
Moraga Way/Brookside	D	C	C	C	D	D	D	D	D	F	D	D	D	F	F	F	F	E
	0.85	0.70	0.74	0.76	0.82	0.82	0.82	0.75	0.82	1.01	0.81	0.86	0.89	1.01	1.01	1.01	1.01	0.98
Moraga Way/Ivy Drive	..	..	..	C	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	..	0.77	..	..	..	..	..	..	..	..	0.84	..	..	..	..	..
Oak Hill/Mt. Diablo Blvd.	0.60	0.60	0.63	0.63	0.60	0.60	0.60	0.59	0.55	0.71	0.71	0.73	0.73	0.71	0.71	0.71	0.71	0.68
Moraga Rd./Mt. Diablo Blvd.	E	D	D	D	C	C	D	D	E	F	F	F	F	E	D	E	E	F
	0.90	0.89	0.87	0.87	0.79	0.75	0.85	0.85	0.88	1.05	1.02	1.03	1.03	0.93	0.86	0.99	0.96	1.03
First St./Mt. Diablo Blvd.	D	D	D	D	A	B	D	D	D	F	E	F	F	C	C	F	E	F
	0.87	0.81	0.87	0.87	0.59	0.64	0.84	0.80	0.85	1.07	0.96	1.06	1.06	0.73	0.77	1.02	1.00	1.05
Moraga Road/Golden Gate Way (New)	A	A	A	A	A	A	A	A	A	C	B	C	C	C	B	B	C	B
	0.58	0.56	0.59	0.59	0.58	0.53	0.58	0.58	0.56	0.71	0.69	0.71	0.71	0.70	0.68	0.68	0.74	0.69
Moraga Rd./School-Brook/c/	..	..	..	..	B	B	..	..	..	..	..	..	..	C	D	..	..	..
	..	..	..	..	0.60	0.61	..	..	..	..	..	..	..	0.72	0.88	..	..	..
Moraga Rd./St. Mary's	F	A	F	F	F	F	F	F	F	F	B	F	F	F	F	F	F	F
	1.18	0.58	1.17	1.17	1.18	1.18	1.10	1.05	1.16	1.40	0.67	1.38	1.38	1.40	1.40	1.30	1.29	1.38
	D	D	C	C	D	D	C	C	D	E	E	E	E	E	E	D	D	E
	0.86	0.86	0.79	0.79	0.86	0.88	0.76	0.74	0.83	0.97	0.97	0.94	0.84	0.97	0.97	0.89	0.86	0.94

<sup>a/</sup> Calculated using Highway Capacity Manual, operations method; B = Level of Service, based upon volume-to-capacity ratio and 0.00 = Volume-to-Capacity ratio for entire intersection

<sup>b/</sup> Improvement: The Major Investment Programs are analyzed separately and do not include the Local Operational Improvement program except for the eastbound SR-24 off-ramp and the signal coordination projects, which are funded.

- No. 1 Existing Configuration
- No. 2 Existing with Local Improvements (not included in Programs 3 through 9)
- No. 3 Existing with Gateway Boulevard Extension
- No. 4 Existing with Gateway Boulevard Extension w/ Brookside
- No. 5 Existing with First-Golden Gate Way Extension
- No. 6 Existing with Pleasant Hill Road Extension
- No. 7 Existing with Bollinger Canyon Road Extension
- No. 8 Existing with Major Transit Investment
- No. 9 Existing with Golden Gate Way - Oak Hill -Y"

<sup>c/</sup> The Level of Service under No. 2 reflects either removal of the Brook Signal or intersection realignment. Left-turn prohibition would produce LOS D, V/C = 0.88

Source: Barton-Aschman Associates, Inc.

A projected change in traffic volume on a major route that is associated with the implementation of changes to the network and when land uses do not change indicates a change in overall traffic flow and operation. A reduction indicates an improvement in operation, less congestion and fewer accidents in congested areas. A reduction could produce an increase in speed, up to the level that occurs during off-peak periods if traffic volumes decrease to that level. Changing volumes are associated with traffic shifting from one route to another because capacity has been added making it more attractive or travel is shifted from single occupant vehicles through TDM and transit programs.

### *Effectiveness of Local Operational Improvement Program*

The Local Operational Improvement Program projects were evaluated for effectiveness under the assumption that all projects within a specific corridor (Moraga Way or Moraga Road) were implemented. The following describes the results of the analyses of the two corridor programs.

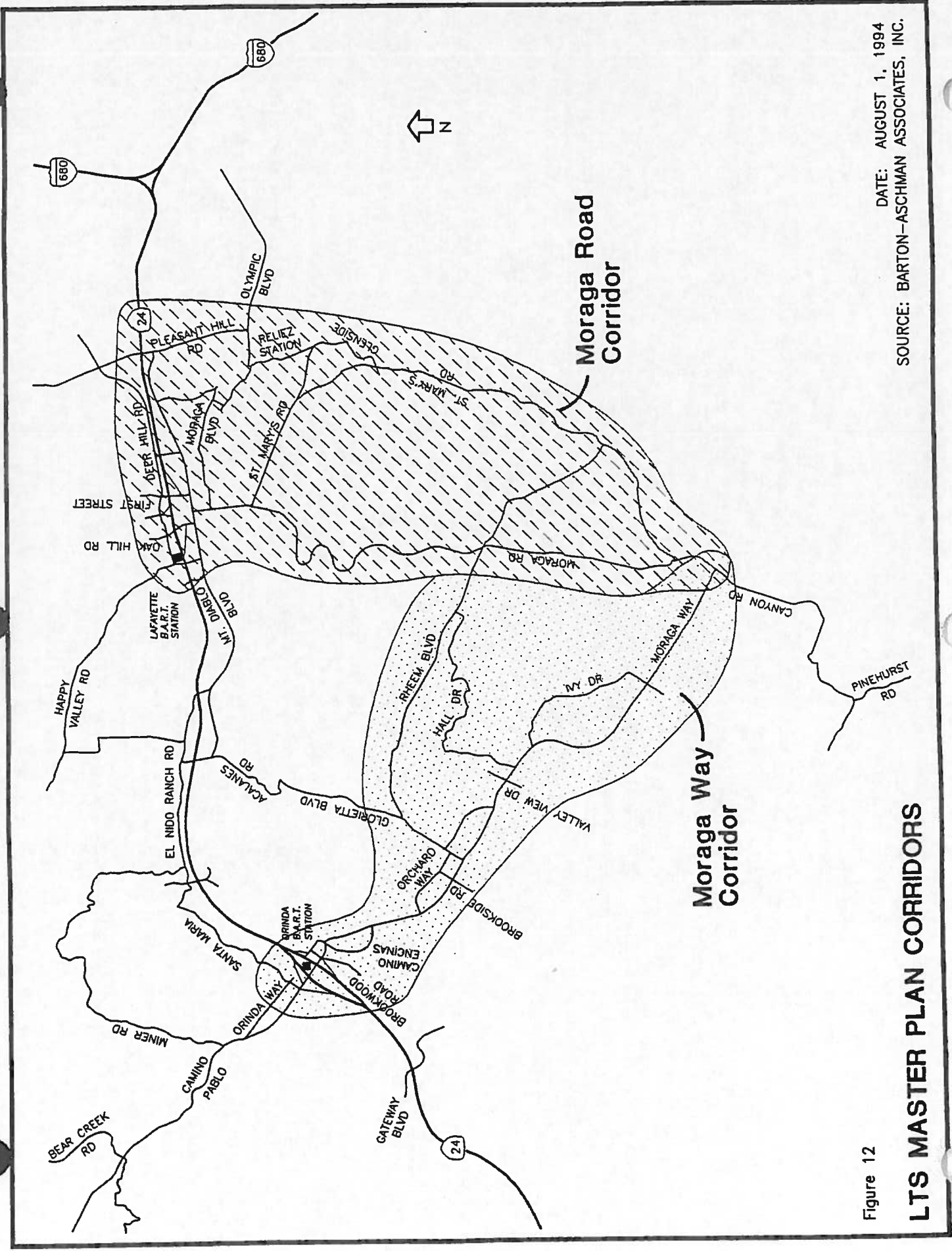
The Moraga Way Corridor is composed of major roads connecting Moraga through Orinda to SR-24 in a north/south orientation including Camino Pablo, Moraga Way, Rheem Boulevard, Glorietta Boulevard and the potential Gateway Boulevard extension. Figure 12 (Page 63) shows the general location of this corridor with respect to the Lamorinda study areas.

The Moraga Road Corridor includes those major roads connecting Moraga and Lafayette and SR-24. These are Moraga Road, St. Mary's Road, Mt. Diablo Boulevard, Glenside, Reliez Station Road, and Pleasant Hill Road, Figure 12 (Page 63) shows the general location of these corridors with respect to the Lamorinda study area.

#### *Moraga Way Corridor*

Under existing conditions, the implementation of all the Local Operational Improvement Program projects along the Moraga Way Corridor would improve traffic operations by reducing delay through the SR-24 interchange area and optimizing the operations of the Moraga Way/Glorietta Boulevard intersection. In the future, the operation improvements associated with this program would gradually erode until they approach existing (1990) levels.

Under existing conditions with implementation of these improvements, operations on Moraga Way in the interchange area would improve by about 10 to 15 percent compared with



DATE: AUGUST 1, 1994  
 SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.

Figure 12

**LTS MASTER PLAN CORRIDORS**

existing conditions. Operations would improve along the corridor (from south of Glorietta Boulevard to SR-24) reducing northbound travel during peak periods. Existing vehicle queues in the corridor would be reduced by 25 to 40 percent depending on location. To achieve this improvement, all of the proposed projects must be implemented. Travel through the interchange area would be smoother and distributed more uniformly over the travel lanes. There would be less confusion, which translates into safer conditions. However, congested conditions would still exist.

This program would not produce shifts in traffic volume from one route to another and would not reduce vehicle miles travelled. Operations on Moraga Way would not improve enough to attract traffic from other routes. Traffic volume would remain essentially unchanged. Trip reduction associated with the shifting of single occupant drivers to carpools or transit because of the improved bus stops and carpool parking would be very small in terms of reduction in peak hour vehicle trips. Changes in peak hour traffic density would be insignificant.

### Moraga Road Corridor

Under existing conditions, the Local Operational Improvement Program would generally improve traffic operations along the Moraga Road corridor by reducing delay at Campolindo High School and through the Lafayette downtown area. In the future, the improvements in operations associated with this program would erode to such a degree that traffic operations would have become *worse* than 1990 levels.

The introduction of the signal at Hamlin/Tanglewood would increase delay for through traffic on Moraga Road and could increase the potential for rear-end accidents. However, access to Moraga Road from Hamlin-Tanglewood would be improved.

Under existing traffic conditions, operations at the study intersections on Moraga Road and Mt. Diablo Boulevard would generally improve, with the greatest change possible at the Brook-School intersection. The exception to this is during the AM peak at the Moraga Road/Mt. Diablo Boulevard intersection where LOS becomes worse because queues at Brook-School Streets would shift with modification to that intersection. The elimination of the left-turn movement from Moraga Road at Moraga Boulevard would increase the through southbound movement capacity on Moraga Road. The modified access to the First Street on-ramp would encourage drivers to use the dual left-turn lanes from Mt. Diablo Boulevard more effectively.

Traffic volumes would remain essentially unchanged with this program. Operations on Moraga Road would not improve enough to attract traffic from Glenside or Reliez Station. Trip reduction associated with the shifting of single occupant drivers to carpools or transit because of the improved bus stops and carpool parking would be very small in terms of reduction in peak hour vehicle trips. Changes in peak hour traffic volume would be insignificant.

### *Effectiveness of Major Capital Investment Program Projects*

The Major Capital Investment Program projects were evaluated for effectiveness under the assumption that the Local Operational Improvement Program was not implemented, except the addition of the third lane to the SR-24 off-ramp and the optimization of signals, which have received funding. The projects in the Major Capital Investment Programs were analyzed individually.

#### *Gateway Boulevard Extension*

The Gateway Boulevard Extension would improve overall level of service along Moraga Way by drawing traffic away from Moraga Way. The addition of connectors, in particular the Brookside connector, would increase the volume of traffic drawn away from Moraga Way north of Glorietta Boulevard, further improving in operations. In the future, traffic improvements from the Gateway Boulevard Extension would erode to such a degree that traffic operations would have returned to 1990 levels in the AM peak. Operations for the PM peak would remain slightly better.

During the AM peak, the Gateway Boulevard Extension would improve overall levels of service at Moraga Way intersections by about the same amount as the Local Operational Improvement program. During the PM peak, the Gateway project would improve traffic conditions to a level that is about 10 percent better than with the local improvements. Approximately 20 percent of the peak direction traffic volume, approximately 350 trips, would shift to Gateway Boulevard in the AM peak with an additional shift of 150 trips from St. Mary's Road and Moraga Road. In the PM peak this shift would be 400 trips and 40 trips, respectively.

The addition of connectors to the Gateway Boulevard Extension would further reduce volume on Moraga Way. The primary connector that serves through traffic would be Brookside Road. All other connectors would serve only local trips. Through trips would not use other intermediate connectors because of non-competitive travel times. In the AM peak, 540 trips would shift from Moraga Way to Gateway and in the PM

peak 610 trips would shift. Of these trips, 280 AM peak trips and 260 PM peak trips would use the Brookside connector. There would be an increase of 50 AM peak trips and 40 PM peak trips on Rheem with the construction of the Brookside connection. This traffic would shift from Moraga Road in Lafayette.

There could be a policy to "force" additional traffic (approximately 50 to 100 trips) from Moraga Way to Gateway Boulevard through the use of signal timing measures that increase travel time along Moraga Way by reducing the speed limit to 25 mph and installing measures to enforce this reduced speed limit. This would require introducing more signals along Moraga Way. As discussed in Workpaper 16, in order to be effective, the signals have to be separated by no more than one quarter of a mile.

*First Street-Golden Gate  
Way Extension and First  
Street-Golden Gate  
Way/Oak Hill Road "Y"*

Either of these projects would reduce the volume of traffic (900 AM and 1,000 PM peak hour trips) through the critical Moraga Road/Mt. Diablo Boulevard intersection. Turn movements would be significantly reduced. Either project would produce essentially the same improvements in operations. By the year 2010, the improvement in operations associated with either of these projects would erode.

Travel through the Moraga Road/Mt. Diablo Boulevard intersection would be simplified and the operation of the intersection improved to satisfactory levels. Pedestrian safety would be improved along Moraga Road south of Mt. Diablo Boulevard. The implementation of either of these projects would require the elimination of the left-turn movement from Moraga Road to Moraga Boulevard. To achieve full effectiveness of this improvement, one of the Local Operation Improvement Program alternatives at the Brook/School Street intersection should be implemented.

Traffic volume on Glenside Drive and Reliez Station would not be reduced. The combination of the School/Brook improvements with one of these projects would reduce traffic volume on this corridor by about 100 trips in the peak direction.

*Pleasant Hill Road  
Extension*

There would be some reduction in traffic on St. Mary's Road into downtown Lafayette via Moraga Road associated with the shifting of traffic to the new road. Operations would improve by approximately 5 percent. By the year 2010, the improvement in operations associated with this program would erode to such a degree that operations would have become worse than 1990 levels.

### *Bollinger Canyon Road Extension*

The Pleasant Hill Road extension would eliminate through trips and local trips with destinations south of Glenside Drive from Reliez Station Road. Trips would divert to Glenside from St. Mary's Road with this project. Traffic volume on Glenside Drive west of Michael Lane could increase by 200 AM peak trips and 170 PM peak trips. The alternative improvement to the Pleasant Hill extension would not improve operations on Moraga Road. It would provide some relief for residents in the area of improvement.

With the Bollinger Canyon Road extension, the improvement in levels of service on Moraga Way would not be as great as with the Gateway Boulevard extension. Most of the improvement at Moraga Way intersections is associated with the optimization of traffic signal timing and the addition of a third lane to the SR-24 eastbound off-ramp, which are funded. The improvement in levels of service on Moraga Road would be better than the Local Operation Improvement Program in the AM and PM peak, with the exception of the School/Brook intersection, which without improvement would continue to operate at unsatisfactory levels.

In the AM peak 70 trips would shift from Moraga Way. This shift would be 40 trips in the PM peak. The shift from Moraga Road and St. Mary's Road would be greater. Approximately 90 trips would shift in the AM peak from Moraga Road and 60 trips in the PM peak. There would be a shift of 180 trips in the AM peak and 150 trips in the PM peak from St. Mary's. The extension would reduce trips on Glenside and Reliez Station in the AM and PM peak by 230 and 200, respectively.

Even though the Bollinger Canyon Road extension would parallel I-680, the travel time through Lamorinda and the diversion travel time from I-680 are long enough to discourage the use of the extension as a by-pass to I-680. This road would probably be considered a new scenic corridor between Crow Canyon and St. Mary's Road and as such could attract through traffic that would otherwise not use the road. This traffic would generally occur in the off-peak and not impact peak traffic operations.

The improvement in operations associated with this project would erode to such a degree that traffic operations would be worse than 1990 levels in both the AM and PM peaks. The one exception to this would be the Glenside-Reliez Station corridor, which would operate at current levels.

### ***Effectiveness of Major Transit Investment Program***

The Major Transit Improvement Program evaluated in this final report has been updated to reflect the community desire to provide school busing to the K through 8th grades. The initial evaluation of the Major Transit Improvement Program (Workpaper 17) included K through 5th/6th grade busing. Expanding the service to include the intermediate schools would further reduce traffic volumes. These reductions would be most apparent during the AM peak hour on Moraga Way north of Ivy Drive (north) and on Moraga Road north of Saint Mary's Road (north). The PM peak hour would not realize a reduction in traffic volumes associated with the K through 8th grade school busing program. There would be a reduction in mid-day traffic associated with the school busing program. However, the traffic improvement effectiveness rating presented in this report does not consider the mid-day peak.

The combination of the addition of school buses, the addition of peak period transit service to Rheem and Glorietta, the provision of 15 minute schedules on St. Mary's and Moraga Road, and the maintenance of 15-minute headways on Moraga Way could reduce vehicular travel. The reduction in the AM peak would be greater than in the PM peak because school traffic has minimal impact on the PM peak. In the future, the improvement in operations associated with this program would erode to such a degree that operations would have become worse than 1990 levels.

The improvement associated with school buses would be most pronounced near schools. The congestion associated with drop-offs and pick-ups would be reduced. This would improve operations along Moraga Road near the School/Brook intersections. Not all school "drop-off" trips would be eliminated. Many students would continue to be dropped off by parents on their way to work or would attend before and after school care that would preclude them from taking the bus.

### ***Effectiveness of Policy and Strategy Program***

This program would have impacts in two areas: reduction in travel through Transportation Demand Management (TDM) and control of impacts associated with future growth.

The TDM program by itself would not produce significant reductions in existing traffic levels. Its main focus would be on future traffic growth. The primary benefit would be associated with trip reduction from major employers. It would enhance



the potential reductions in auto travel associated with the Transit Program. The benefits would primarily be seen in larger employment centers such as in the downtown area.

An observable change in traffic levels would mean that 1 out of 20 existing drivers would have to *permanently* change their driving habits. It is unlikely that such reductions could be achieved. The actions that would achieve the greatest reduction in trips are those that penalize the driver of the single-occupant vehicle—either by increasing out of pocket cost or time—while rewarding other modes. Charging for parking at BART and providing free parking for carpools are good examples. These are not popular programs, though they could be effective if part of a larger region-wide program.

### *Effectiveness of Safety Program*

The Safety Improvement Program would not improve traffic operations. The change of the signal timing at the Camino Pablo/Santa Maria intersection and at the Pleasant Hill Road intersections would reduce the capacity of the intersections in the same proportion as the clearance intervals are increased. Any signal changes should be reviewed for consistency with the overall coordinated signal system operations. If changes are implemented, the signals in the system should be reviewed regularly to insure that the modifications have not created unforeseen problems. Six months after the completion of any adjustments, a full analysis should be performed to assess operations.

## Transportation-Related Impacts of LTS Master Plan

The LTS Master Plan programs were also qualitatively evaluated in terms of their potential transportation-related impacts on noise, air quality, views, neighborhoods, soil stability, and land use. Many of the programs (e.g., major capital improvement projects) may require subsequent environmental review. This section is not intended to constitute environmental assessment under CEQA.

### *Transportation Related Impacts of Local Operational Improvement Program*

#### *Moraga Way Corridor*

There would be no discernable change in noise levels along Moraga Way produced by this program. Any reduction in traffic volumes associated with the carpool parking facilities and the bus shelters would not produce significant changes in noise levels. The improvements in vehicle flow that reduce

delays and queues would improve air quality, but not significantly. Most of the actions included in this program would not produce significant visual impacts. However, the added bus shelters and signs would produce local changes in the low-density character of Moraga Way.

The right-turn lanes at Glorietta would produce visual impacts on the adjacent properties. The low-density character would be modified near the intersection. The major benefit of right-turn lanes at Glorietta would be to reduce the volume of cars that use Orchard Road as a by-pass to the Moraga Way/Glorietta intersection in both the northbound and east-bound directions.

### *Moraga Road Corridor*

There would be no discernable change in noise levels along the Moraga Road corridor. The improvements in vehicle flow that reduce delays and queues would improve air quality, but not significantly. Most of the actions included in this program would not produce significant visual impacts. The added bus shelters and signs would produce local changes in the low density character of Moraga Road and St. Mary's Road. The alternative to consolidate the School/Brook intersections would impact two structures, one of them a historical landmark.

Elimination of left turns to and possibly from Moraga Boulevard would have the positive benefits of reducing congestion and reducing through traffic on Moraga Boulevard.

The restriction of left turns at School Street and Brook Street would restrict access to the middle school on School Street, residential areas served by Brook and School Streets, and commercial areas served by Brook Street. There would also be a reduction in through traffic on Brook Street, which impacts the residential areas along Brook Street. Alternatively, the provision of left-turn lanes at Brook Street could encourage additional by-pass traffic on Brook Street. Elimination of southbound left-turns onto School Street could redirect school oriented traffic to residential areas on Moraga Boulevard and First Street, creating negative impacts.

### *Transportation Related Impacts of Major Capital Investment Programs*

#### *Moraga Way Corridor*

The Major Capital Investment Program project in the Moraga Way Corridor is construction of the extension of Gateway Boulevard from SR-24 to Moraga Way either by itself or with the addition of a Brookside connector. It requires a large capital investment in infrastructure.

Measure J on the November 3 ballot in Orinda requested the non-binding vote by Orinda residents as to whether or not Gateway should be extended. The vote was in favor of not extending Gateway Boulevard as a through route to Moraga Way. The City of Orinda is in the process of considering a General Plan Amendment to remove all reference to Gateway Boulevard in its General Plan.

The construction of Gateway Boulevard from SR-24 to a terminus near the Town of Moraga boundary with or without the addition of a Brookside Road connector could result in adverse impacts on other environmental conditions and natural resources.

The increased noise levels along the Gateway Boulevard extension alignment could impact homes near the southern terminus of the extension and along the Brookside connection. The reduction in average noise levels along Moraga Way associated with reductions in traffic would be imperceptible.

Extending Gateway Boulevard would not affect *regional* air pollutant emissions, but would generally have a positive effect on *local* carbon monoxide (CO) concentrations. The extension alignment may skirt a number of mapped ancient landslide deposits requiring the use of various grading and de-watering schemes, provided the slides are not too large. In particular, "catching" the landslides would require extensive engineering geologic review of the extension during both the planning and construction stages. Decisions about grading must consider such trade-offs as construction costs, costs of ongoing maintenance and repair, and volume of traffic carried by the road.

The different routes considered for the final segment (in the Town of Moraga) of Gateway Boulevard to Moraga Way would have varying effects on land uses in Moraga. Several of the alternatives would abut or cross Miramonte High School property. Depending upon the alignment of the southern terminus, one or more of these routes would require a new entrance to the school and/or reconfiguration of parking and sports fields. The golf course at the Moraga Country Club could also be impacted by the alignment choice; potentially resulting in the loss of the nine golf holes located in the Caltrans owned right-of-way.

The Brookside connector could impact the nursery at Moraga Way, perhaps requiring relocation of some of their parking. It could also heavily impact the existing creek since the existing road would have to be widened.

Without mitigation, through traffic on the residential streets east of Moraga Way (Orchard Road and Brookside Road) would increase. This problem would have to be mitigated through the implementation of traffic management measures.

Views from existing residential areas like Lost Valley are not expected to be adversely impacted. The visual impacts of the extension, outside of the Gateway Specific Plan Area, south of the Zuckerman Saddle, would impact existing residences with the greater view impact occurring in the Crestview Court area and secondarily in the Snow Court area. The view from both of these areas would be changed in that residents would see areas of changed topography due to cuts and fills and possibly views of the road.

The construction of Gateway Boulevard would provide an alternative access to south Orinda and Moraga in the case of emergencies such as fire or other natural catastrophes. The provision of a Brookside Road connector could improve emergency vehicle access times from other areas of Orinda as well as Moraga (in the case of MFPD automatic aid).

### *Moraga Road Corridor*

The Major Capital Investment Program projects in the Moraga Road Corridor include: (a) Extend Golden Gate Way to Moraga Road and add a new eastbound SR-24 off-ramp at First Street; (b) Extend Oak Hill and Golden Gate Way to Moraga Road; (c) Extend Pleasant Hill Road to Glenside; (d) Glenside by-pass; and (e) Extend Bollinger Canyon Road. These would require a large capital investment in infrastructure and have the potential to create significant environmental impacts.

In general, these major road projects would probably not significantly affect regional air quality. The projects would generally have a positive effect on local carbon monoxide concentrations because of reduced congestion levels at existing intersections.

***Moraga/Mt. Diablo By-Pass Projects.*** One of these bypass (with or without the Oak Hill extension) projects could reduce existing bypass traffic through nearby residential neighborhoods to the south on First Street and Moraga Boulevard and, with the Oak Hill Road extension, on Lafayette Circle. The First Street-Golden Gate Way extension and the Oak Hill Road extension would require the removal of existing buildings and loss of tax revenue from those buildings. It would provide a physical demarcation between downtown Lafayette and adjacent residential areas. The First Street-Golden Gate Way extension would be constructed along creeks.

Increased noise levels associated with the First Street-Golden Gate Way extension could impact the senior housing located on the south side of the extension. There could be some visual impacts associated with the addition of a second off-ramp from SR-24 to First Street, depending upon final alignment and design. The ramp would not be higher than the freeway, so views would not be impacted.

*Pleasant Hill Road Extension and Glenside ByPass.* It would be likely that homes within 100 feet of the Pleasant Hill Road extension would experience noticeable changes in noise levels. It is also likely that reductions in traffic along arterials such as St. Mary's Road and Moraga Road would not be great enough to produce perceptible reductions in noise levels. The potentially significant reduction in traffic volume on Reliez Station Road associated with the Pleasant Hill Extension would produce a significant reduction in noise levels along Reliez Station Road.

The Pleasant Hill Road extension would require the purchase of one or two homes and would introduce a road into what today exists as open space and grazing land. The Lafayette General Plan generally supports the preservation of open space. The Pleasant Hill Road extension would be constructed through areas that are similar to the terrain that Gateway Boulevard extension would be constructed through. The steep grades and unstable soil of the area would require careful engineering to minimize slides, erosion, etc. The engineering for such roads is more involved than for roads constructed on flat, stable land, but not impossible.

The Pleasant Hill Road extension would introduce a road thorough an area that is currently used for grazing. Any homes with views of this area would have their views changed, either through the addition of the road into that view or the change in the landscape because of grading and construction. If the alternative local bypass were constructed, there would be visual impacts on residents on Murray Lane.

*Bollinger Canyon Road Extension.* The Bollinger Canyon Road extension would generally follow the historical alignment of this road. It would pass through privately owned lands and through Las Trampas Regional Wilderness. Its construction through the park would be contrary to all current planning and proposed uses for the park. It would increase access to the park, disrupt wildlife, vegetation, and probably require earthwork in order to upgrade the road to arterial standards.

The Bollinger Canyon Road extension would be constructed through areas that are similar to the terrain that the Gateway Boulevard extension would be constructed through. The steep grades and unstable soil of the area would require careful engineering to minimize slides, erosion, etc. The engineering for such roads is more involved than for roads constructed on flat, stable land, but not impossible. Even though it would be likely that the Bollinger Canyon Road would follow its existing alignment, it is likely that modifications would be required to accommodate a higher design that has fewer curves and changes in grade, and that provides bike lanes and shoulders. The Bollinger Canyon Road extension would be constructed along creeks.

The visual impacts of the Bollinger Canyon Road extension would vary along its length. Along the existing paved road, at both the north and south ends, there would be some changes in the road to upgrade it to arterial standards, and visual impacts would probably be minimal. Since the unpaved portion of the road passes through primarily undeveloped land, there would be little visual impact on existing residences. However, views from trails in Las Trampas Regional Park would be impacted. The Bollinger Canyon Road extension would provide an excellent alternative evacuation route from southern Lamorinda.

### *Transportation Related Impacts of Major Transit Improvement Program*

There would be increases in noise levels along the routes of each road with additional bus service. Increasing transit service in the Lamorinda area would probably not significantly affect regional air quality as the reduction in auto travel is not projected to be significant.

### *Transportation Related Impacts of Safety Improvement Program*

The implementation of this program would enhance safety and would not increase noise, lessen air quality or induce growth. This program would enhance safety for all persons that travel on these corridors. It would reduce accident potential, improve pedestrian safety in the Crossroads area, and help develop "smart" pedestrian and bicycle habits of school age children. It would impact the Crossroads area merchants by reducing parking by approximately seven spaces.

## Encouragement of Future Growth

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Usually this is referred to as "Growth Inducement." The word "inducement," as it is customarily used in discussing growth issues, implies that an action would lead inexorably to additional growth. The word "induce" implies that the improvements would cause growth where it would not occur "naturally." It is more correct to say that to the extent that a project removes an obstacle to development approval, the project could be considered to "facilitate" growth. Also, to the extent that a project makes one area more accessible than another, it could be considered to "encourage" local growth. Such growth would require General Plan amendments in the respective jurisdictions and conformance to county-wide Growth Management and Congestion Management plans.

The projects included in the Moraga Way and Moraga Road Local Operational Improvement Program would not encourage local growth or facilitate additional growth. There would be no discernable decrease in traffic volume that would provide added capacity.

The development of Gateway Boulevard as a through route could be a factor in the pressure for additional development beyond that included in the future land use projections for those areas that would be served by this facility.

The First Street/Golden Gate Way and the Oak Hill/Golden Gate Way bypass projects could facilitate growth in areas served by Moraga Road as additional capacity would be added that could remove some impediments to development approval.

The Pleasant Hill extension and the Bollinger Canyon extension projects could encourage local growth by making the area traversed by the extension more accessible and facilitate growth by removing obstacles to development approval, i.e. capacity restraints.

Based upon the analysis performed for the LTS, there would not be enough capacity to serve the development that is included in the future projections for 2010, without combining *several* major improvement programs. By themselves, none of the major improvement programs creates enough excess capacity to support additional development above that assumed in the analysis. Thus, there is a ceiling above which levels of service cannot go without additional actions and improvements. There would not be excess capacity by the year

2010 under any of the Master Plan programs during either the AM or the PM peak periods.

Relieving congestion can have the effect in some cases of causing more people to decide to drive. This phenomenon, known as "latent demand" reflects the assumption that people's original preference is to drive, that congestion is the primary reason that they use an alternative, and that any reduction in congestion would cause them to shift from alternatives back to auto use. Using this reasoning, the idea of providing capacity to meet peak demands is not viable because traffic volume increases as capacity increases.

This argument is difficult to apply to the Lamorinda area. In the first place, most people drive already so the potential shift would be small. Those that use transit as part of their trip primarily use BART and most drive to BART. The fraction of a percent that this argument applies to would not "use up" the added capacity of any of the programs being discussed, particularly large major capital investment programs such as the Gateway Boulevard extension.

Compliance with Measure C level of service standards in 2010 would not be achieved by any of the programs if they were implemented by themselves. In every case, there would be at least one location where the standard would be violated. Thus, to meet the Measure C standard it would be necessary to implement a combination of programs. For example, in Lafayette, the combination of the Golden Gate Way-Oak Hill extension with the Brook-School improvements would mitigate traffic conditions into the future except at the St. Mary's intersection where additional improvement may be necessary.

## Comparison of LTS Master Plan Projects

The overall effectiveness and relative impact of the projects in the five programs that form the LTS Master Plan were evaluated based upon the information presented above. This evaluation is summarized in Table 8 (Page 77). It was developed in order to assist in the assessment of these programs by the Lamorinda community. The travel benefits and development consequences of these programs are not all equal. Some are more effective than others in relieving congestion but could have more environmental impacts. However, all provide some benefit to the transportation system in Lamorinda. Not all would be implemented. It is up to the three jurisdictions within Lamorinda to determine which approach would be the



Table 8  
 Comparison of LTS Master Plan Projects

Program	Cost (\$1,000's)/yr		Impact on Traffic Operations		Program Funding	Intersection Operational/	Change in Traffic Volume	Related Impacts/d/	Growth Encouragement	Implementation Constrains
	Capital	Annual/yr	Operational/	Change in Traffic Volume						
<b>Local Operational Program</b>										
• TDMA Carpool Lots & Bus Shelters	\$1,008	\$5		Negligible Improvement	Measure C LTS primary source; Possible developer funding through TOM; AB434, ISTEPA potential.		Negligible Change	No perceptible change in noise or emissions; some visual impacts with shelters and new lots. Limited impacts on adjacent property owners; Improves transit access.	None	May experience some local objections from residents adjacent to enhanced stops.
• Camino Pablo Moraga Way Santa Maria to Camino Encinas fe/	\$1,020			15-20%	Measure C LTS primary source; Minimal developer funds; ISTEPA potential.		No Change	No perceptible change in noise; localized reduction in emissions; low visual impact Possible impact on gas station on Santa Maria	None	Some R-OW required; possible soil contamination at gas station on Santa Maria Way.
• Moraga Way/Glorietta Boulevard fe/	\$651			15-20%	Measure C LTS primary source; Minimal developer funds through mitigation programs		No Change	No perceptible change in noise; localized reduction in emissions; some visual impact on rural character and possible visual impacts on adjacent property owners; reduction in by-pass traffic on Orchard.	None	Some R-OW required. Retaining wall required.
• Moraga Road south of St. Mary's (north)	\$350				Measure C LTS primary source; Minimal developer funds; Other Measure C funding programs	Signal adds delay to through traffic	No Change	No perceptible change in noise or emissions; low visual impacts; signal could increase frequency of some accidents; limited impacts on adjacent property owners; better access at Hamlin and Tanglewood	None	
• Moraga Road St. Mary's (north) to Mt. Diablo Boulevard//	\$4-\$2,500			10-15%	Measure C LTS primary source; Minimal developer funds; ISTEPA potential.		No Change	No perceptible change in noise; localized reduction in emissions; low visual impacts; reduction in by-pass traffic on Moraga Blvd. and Brook. Relocation or demolition of Masonic Hall and Old Lafayette Town Hall may be required; safety improved; restricted turns could reduce access to Brook and School Streets and through traffic	None	R-OW could be required; historical structure impacted and may have to be removed; some projects may require mitigated negative declarations.
• Lafayette Downtown Traffic Flow Improvements	\$1,082 \$1,097			5%	Measure C LTS primary source; Minimal developer funds; ISTEPA potential		No Change	No perceptible change in noise; localized reduction in emissions; low visual impacts; limited impacts on adjacent property owners; gas station at Oak Hill and possibly Lucky entrance.	None	Some R-OW required; some projects may require mitigated negative declarations
• Mt. Diablo Boulevard and Moraga Road Signal Coordination	\$275			5%	Measure C LTS primary source; Minimal developer funds; ISTEPA and AB434		No Change	No perceptible change in noise; localized reduction in emissions; low visual impacts; coordination could create more gaps in traffic and improve driveway access on Mt. Diablo Boulevard	None	

Table 8 (Continued)  
 Comparison of LTS Master Plan Projects

Program	Cost (\$1,000's)/a/		Program Funding	Impact on Traffic Operations		Growth Encouragement	Implementation Constraints
	Capital	Annual/b/		Intersection Operations/c/	Change in Traffic Volume		
<ul style="list-style-type: none"> <li>Gateway Boulevard extension</li> </ul>	\$40,740	\$120	About 50% could be funded through developer funds. Remaining through LTS funds; Possibly ISTEA.	15-20%	Shift 350 AM peak and 400 PM peak direction trips from Moraga Way; and 150 AM and 50 PM from Moraga Rd and St. Mary's Rd	Yes. Opens up the potential for development in areas served by Gateway Boulevard.	Potentially difficult R.O.W purchase; full EIR; community opposition; funding limitations.
<ul style="list-style-type: none"> <li>Add Brookside connection to Gateway Boulevard extension</li> </ul>	\$14,230	\$30	LTS funds primary source; Possible r.o.w by Signat Hill Developer	20%	Shift additional 200 peak direction trips in AM and PM Moraga Way n. Glorieta; 50 AM and PM shift from Moraga R & St. Mary's Rd	Yes. Development of Glorieta, Rheem, and Moraga could benefit. Would require added capacity at Glorieta.	R.O.W purchase; full EIR; community opposition; funding limitations
<ul style="list-style-type: none"> <li>Extend Golden Gate Way to Moraga Rd.; add New Eastbound SR 24 off-ramp at First Street</li> </ul>	\$7,450		LTS primary source; possible to create redevelopment district to supplement funding; possible ISTEA supplement	15% /g/	Shift 900 AM and 1,000 PM trips from Moraga Rd/MI Diablo intersection ±30% decrease	Some. This primarily improves existing deficiencies; Moraga Rd/St. Mary's would be controlling intersection	R.O.W purchase; Full EIR; Community Opposition. Funding limitations; Ramp must meet Caltrans standards; Mokelumne Aqueduct, parking impacts; creek issues
<ul style="list-style-type: none"> <li>Extend Oak Hill and Golden Gate Way to Moraga Road</li> </ul>	\$6,120		LTS primary source; possible to create redevelopment district to supplement funding; possible ISTEA supplement	15% /g/	Shift 900 AM and 1,000 PM trips from Moraga Rd/MI Diablo intersection ±30% decrease.	Some. This primarily improves existing deficiencies; Moraga Rd/St. Mary's would be controlling intersection	R.O.W purchase, Full EIR; Community Opposition. Funding limitations; Parking impacts

Table 8 (Continued)  
 Comparison of LTS Master Plan Projects

Program	Cost (\$1,000's)/a/			Impact on Traffic Operations			Growth Encouragement	Implementation Constraints
	Capital	Annual/b/	Annual/c/	Intersection Operations/c/	Change in Traffic Volume	Related Impacts/d/		
* Extend Pleasant Hill Road to Glenside	\$14,500	\$30	LTS primary source; some developer contribution; possible ISTEVA supplement.	5%	Shift 100% through traffic from Relief Station Road (800 trips); add 200 trips to Glenside	Noise level increase, visual impact, possibly remove one house, loss "open space", eliminates traffic impacts on residents on Relief Station, could increase impacts on Glenside	Some, makes area served by extension more accessible and therefore developable	R-O-W purchase, Full EIR; Community opposition; open space issues.
* Glenside By-Pass and local mitigation	\$9,100	--	LTS primary source; developer contribution.	<1%	Shift 100% through traffic from Glenside	Noise level increase, visual impact, possibly remove one house, loss "open space"; eliminates traffic impacts on residents on Glenside.	No, this is a local improvement	R-O-W purchase, Full EIR; Community opposition, open space issues
* Extend Bollinger Canyon Road	\$64,000	\$120	LTS primary source, possible ISTEVA supplement, some developer contribution also possible	5-10%	Shifts 540 AM and 480 PM trips from Moraga W=70/40, Moraga R=90/60, Si Marys=180/150, and Glenside=200/230	Requires passage through Wilderness area; visual impacts, open space impacts; impacts on existing residential areas along Bollinger south of the Wilderness Park	Yes - Allows development of private lands accessed by Bollinger	Contrary to Las Triunpas Plan, Full EIR; R-O-W purchase, open space issues, community opposition
Major Transit Investment Program	\$1,750	\$1,965	LTS primary source, CMP and ISTEVA for Capital portion, AB434, negligible developer contribution	5%	Reduces traffic on arterials near SR 24 interchanges served by Transit routes by 5%, more near schools	Noise and odor increase on bus routes, school buses only improve AM peak, PM peak conditions not improved, congestion near schools would be reduced	None	Very difficult to fund
Policies and Strategies	\$40,565	\$83	LTS primary source, supported Transportation fee.	Limits growth impacts	None	Could increase costs to develop and restrict size of development	None, potentially provides more control of growth	Requires consensus regarding policy
Safety Improvement Program	\$50	--	Local Streets and Maintenance funds primary source	None	None	Minimal, improves safety.	None	Minimal

a/ Costs are based on January 1993 dollars and include cost to implement the total program.

b/ Includes annual operating costs, lease costs for park and ride lots, and significant increases in road maintenance costs associated with new roads.

c/ Improvement in LOS and delay at critical intersections, i.e. signalized intersections impacted by program, in peak congested direction of travel.

d/ Includes noise, air quality, visual, geotechnical impacts.

e/ If Glorietta improvements are implemented without improvements to Camino Encinas and Brookwood Intersections, the overall improvement in flow along Moraga Way would not improve. The reduction in delay projected at Glorietta would just be transferred to Camino Encinas as an increase in delay.

f/ To achieve full positive impact of the improvements, any improvement at Brook and School streets should be accompanied by a compensating improvement at Mt. Diablo Boulevard.

g/ Adding one of the School/Brook improvement projects to this program would increase the effectiveness of this project to 20%, and would still approximately 100 peak direction trips from Glenside and Relief Station Rd.

Source: Barton-Aschman Associates, Inc.

most beneficial for the least cost. The factors used to compare the effectiveness and impacts of the LTS Master Plan Programs are described below:

*Program costs* are the sum of the total costs (not already funded). In some cases there could be a range reflecting the possible alternative improvements. Annual costs represent possible operating costs associated with operating additional buses and leasing land for park and ride lots. For the new road extensions, the annual maintenance costs have been estimated.

The CCTA *Cost Estimating Guide* (updated September 1991) was used to develop these costs. The "Initial Estimates" approach, as defined by CCTA, was used to prepare the estimates. This approach includes 25% for contingencies, 20% for engineering and management and a project reserve of 10%. Right-of-way costs have been estimated where appropriate and are identified separately. Right-of-way costs do not include contingencies for loss of business or hardship.

*Program Funding* indicates the possible funding sources that can be utilized in addition to the Gateway/Lamorinda Traffic Program funds.

*Impacts on Traffic Operations* is a summary of the possible improvement in operations that can be assumed to occur with the implementation of the program and includes intersection operations and change in traffic volume associated with shifts of traffic from one facility to another.

*Related Impact* is an assessment of the potential impacts on noise, air quality, visual, traffic through neighborhoods, etc. of the program.

*Growth Encouragement* is an assessment of the potential growth encouragement of the program.

*Implementation Constraints* are assessments of the potential implementation constraints, which could include environmental review, lack of community support, purchase of homes or businesses possibly requiring the use of eminent domain, lack of conformance with regional planning guidelines, etc.

## Public Participation

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The purpose of the third public meeting held at Miramonte High School on January 6, 1993 (Workshop 3) was to present the LTS Master Plan and solicit opinions/comments. Approximately 185 residents from Lafayette (49%), Moraga (21%), and Orinda (28%) attended the workshop. Two percent came from outside the study area.

The workshop began with a one-hour presentation by Barton-Aschman. The presentation focused on the LTS Master Plan as presented in Workpaper 17. Following the presentation, Workshop participants were given the opportunity to ask specific questions or make comments on specific projects presented in Workpaper 17. Comment cards were collected throughout the evening from participants who did not wish to speak. Workpaper 8 included the reproduction of all written and verbal comments.

The sentiment of the workshop participants was that no new roads or bypasses should be constructed. Many of the participants felt that school buses and expansion of existing transit services would provide the best benefit with the least impact. Other actions and strategies that the participants supported included the local intersection improvements along Moraga Way and Moraga Road as well as the policies and programs and the safety improvements. The workshop participants felt that building new roads or bypasses would ultimately result in additional development and, therefore, not solve the traffic and transportation problems in the Lamorinda area.