The following scenarios were analyzed for Task 1.

Existing Conditions

1) Existing volumes, road geometry and signal timings.

Interim Conditions

1) Existing traffic volumes and geometry with modified signal timings;
2) As in item 1 *PLUS* 2.5 feet per second pedestrian crossing time at all signalized study intersections; and
3) Existing geometry and modified signal timings with performance threshold volumes.

Proposed Conditions

1) Existing traffic volumes with modified geometry and signal timings;
2) As above *PLUS* 2.5 feet per second pedestrian crossing time at all signalized study intersections; and
3) Modified geometry and signal timings with performance threshold volumes.

II. Existing Conditions

Existing conditions refers to the operational characteristics of the study area prior to the week of March 6, 2000 (subsequent to this date roadway operations resemble Interim conditions because the modified signal timings were physically implemented). Figure 2 shows the existing intersection geometry. Turning movement counts were conducted between February 29 and March 2, 2000. Figures 3 and 4 show the existing morning (7:45 to 8:45 AM), and evening (4:45 to 5:45 PM) peak hour turning movement volumes for the Mount Diablo Boulevard, Moraga Road corridors respectively. Figure 5 shows the mid-afternoon (2:30 to 3:30 PM) turning movement volumes and show that all critical movements are lower during the mid-afternoon than the morning and evening peak hours. Thus, analysis of this period is not included as morning and evening analysis involves more critical volumes.

Existing operations were observed in the field and quantified using saturation flow rate, travel time, and queue length studies. This work was used to validate the CORSIM model, thus insuring more accurate analysis of alternatives.

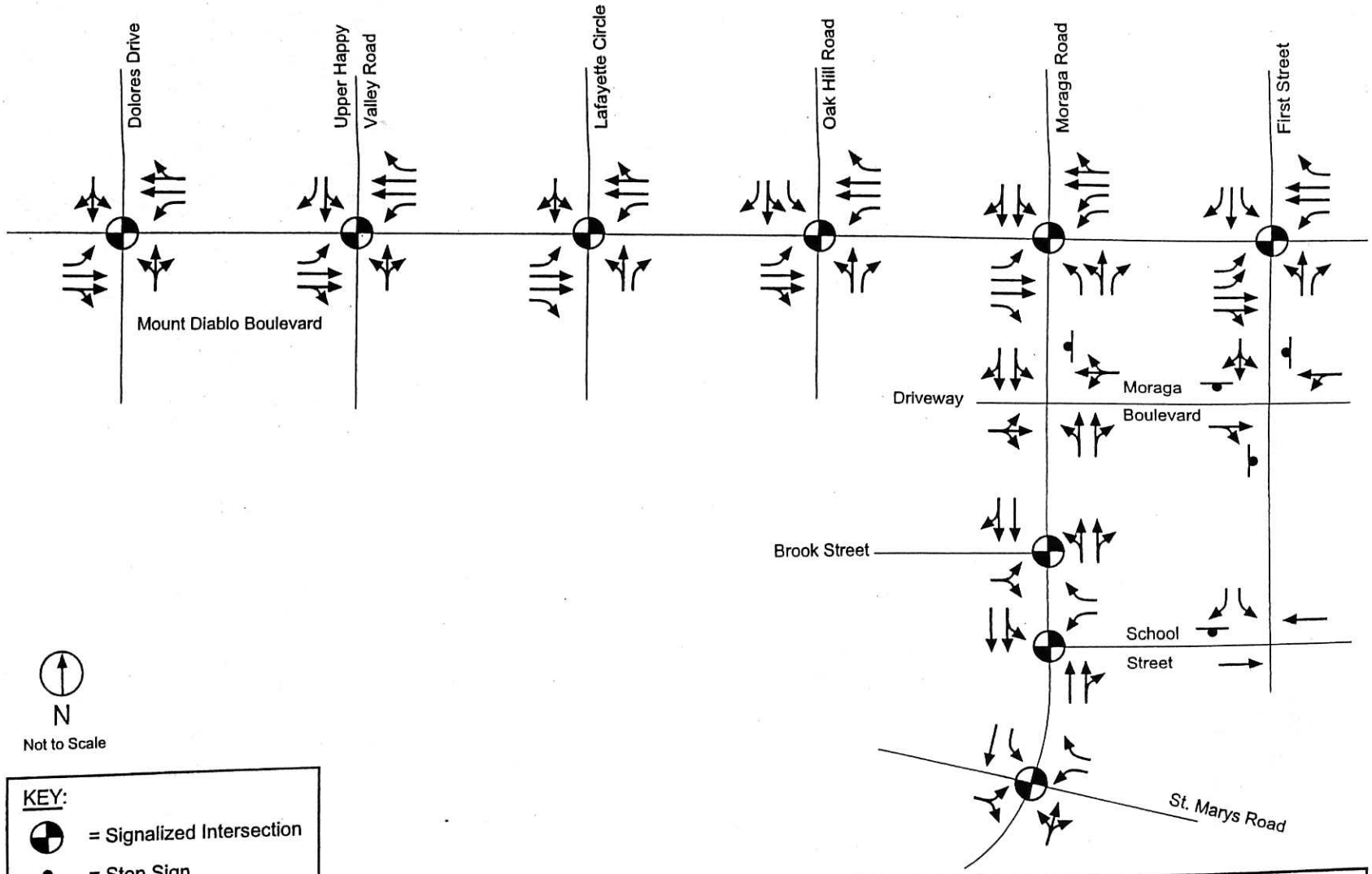
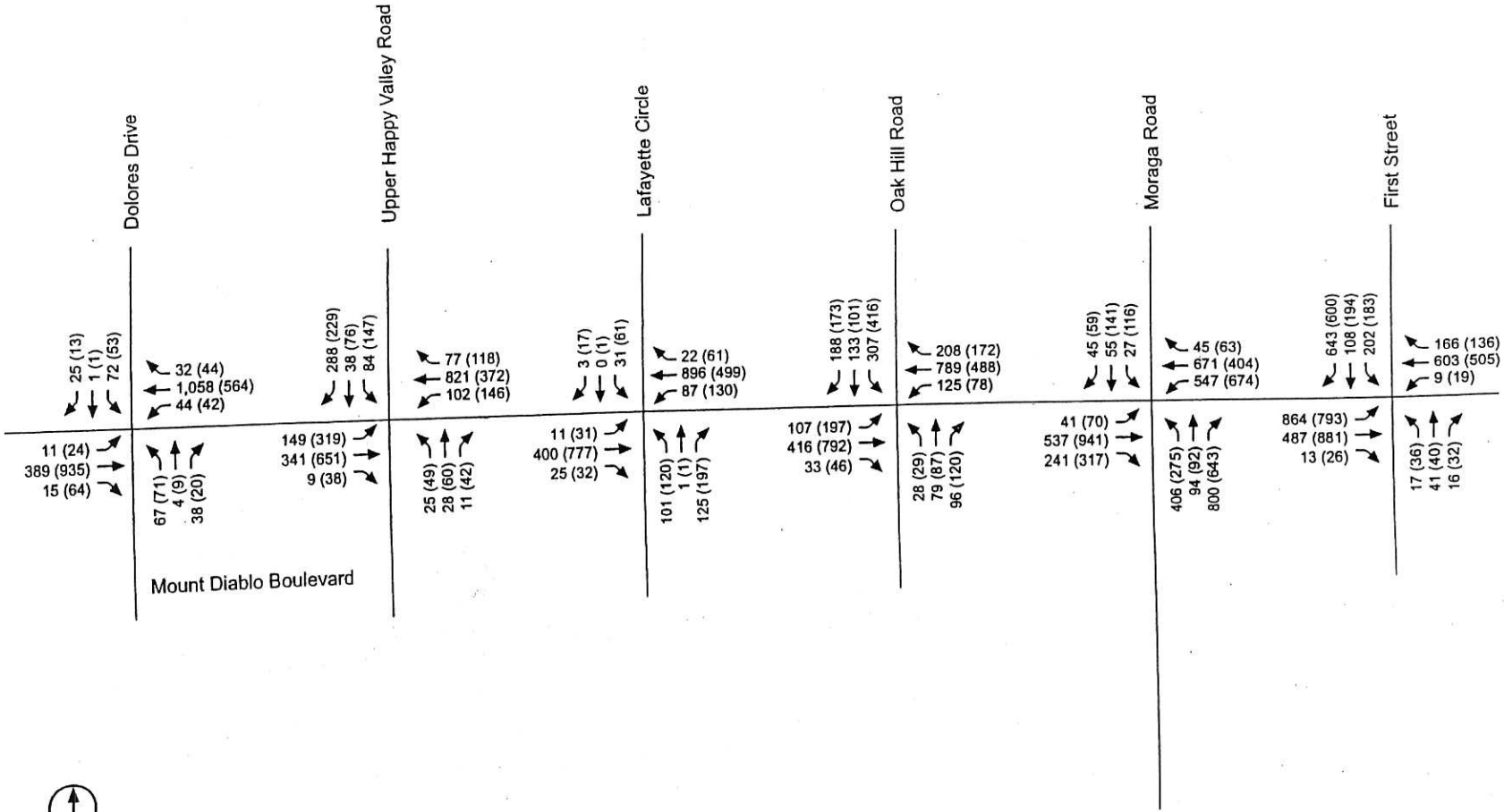


Figure 2 **EXISTING LANE GEOMETRY AND TRAFFIC CONTROL**

1533-13



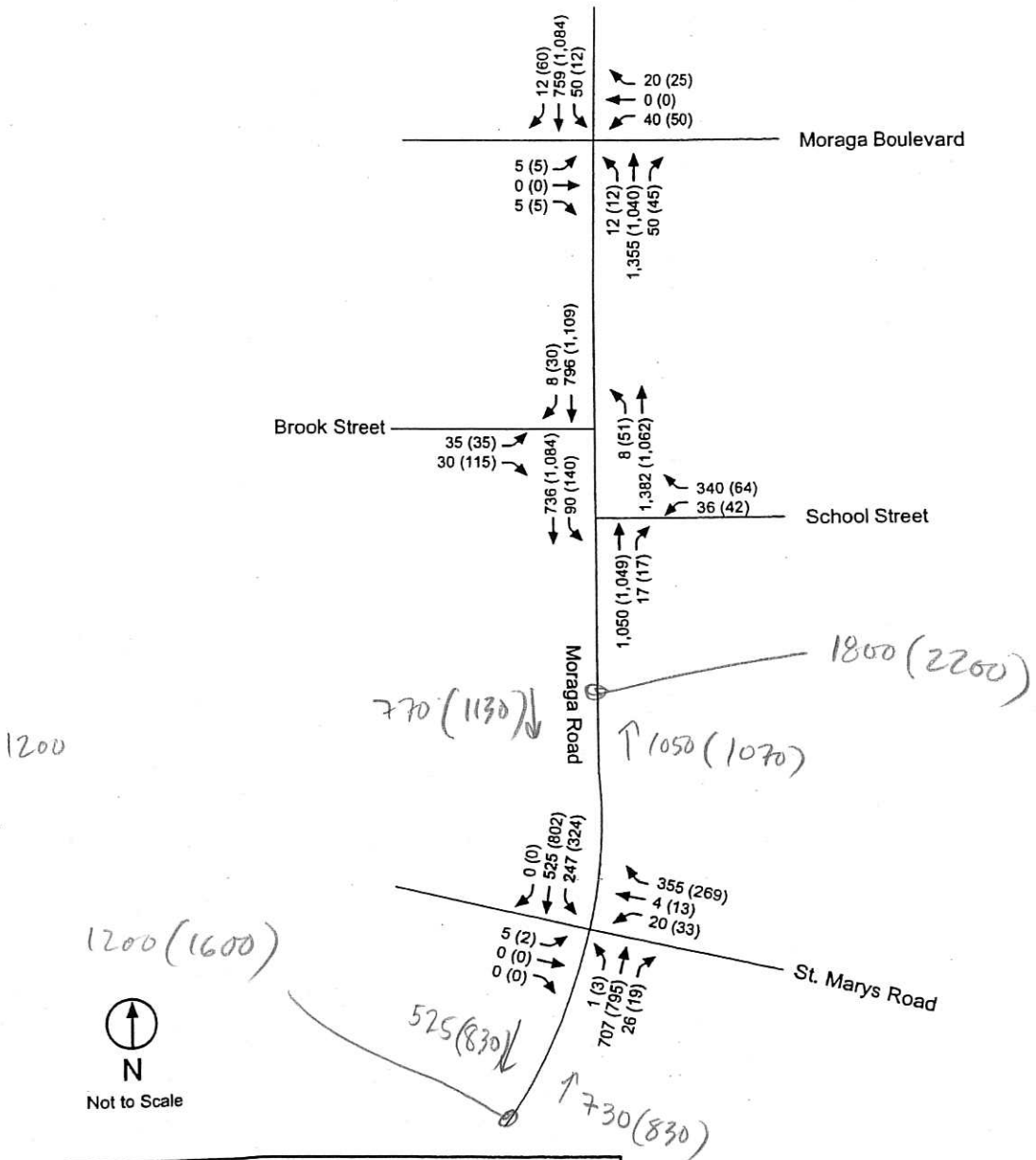
KEY: XXX (XXX) = AM (PM) Peak Hour Volumes

NOTE: Counts conducted 02/29/2000 to 03/02/2000.

Figure 3

1533-12

EXISTING PEAK HOUR VOLUMES

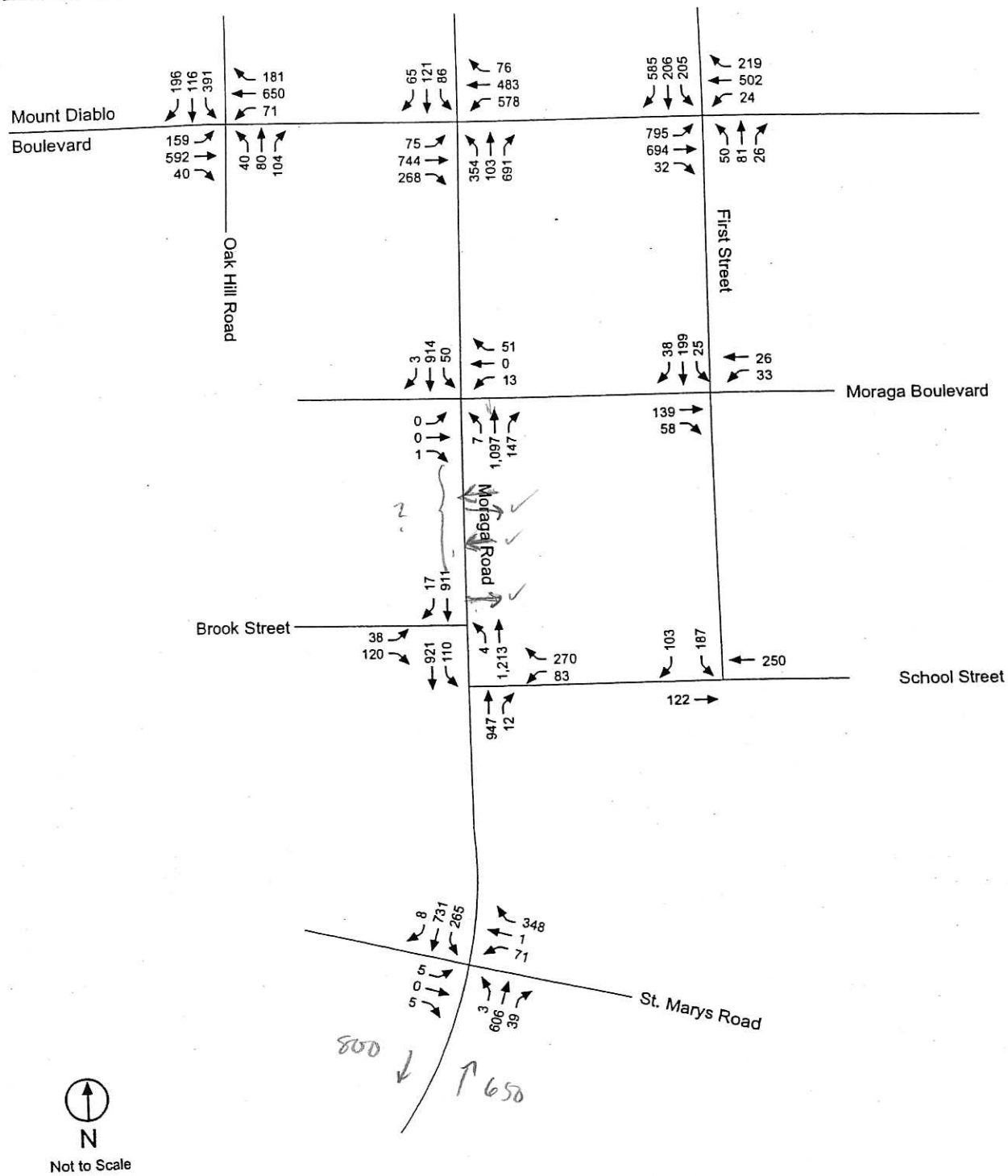


KEY: XXX (XXX) = AM (PM) Peak Hour Volumes

NOTE: Counts conducted 02/29/2000 to 03/02/2000.

Figure 4
1533-21

EXISTING PEAK HOUR VOLUMES-MORAGA ROAD



KEY: XXX (XXX) = AM (PM) Peak Hour Volumes

NOTE: Counts conducted 02/29/2000 to 03/02/2000.

Figure 5

EXISTING MIDDAY PEAK HOUR VOLUMES

1533-22

Field observation highlighted the following issues.

AM Peak Hour

Congestion is focused along the Moraga Road corridor, particularly in the region of the Brook Street/School Street signalized intersection. This congestion exists for both the northbound (more severe in the northbound direction) and southbound traffic and is due largely to the heavy pedestrian demand reducing green time available to vehicles.

The operation of the northbound approach at the Mount Diablo Boulevard/Moraga Road intersection is inefficient due to the lane utilization imbalance of the left-turning vehicles. Operations are further impacted by the close proximity of the intersection to a moderately used crosswalk (at Plaza Way), which disrupts traffic flow and poses safety concerns for crossing pedestrians. Due to the split-phase requirements of the signal phasing, pedestrian actuation causes significant inefficiencies to occur. For example, the traffic leaving the Safeway site is relatively low, 4% of the total intersection volume, but demands approximately 25% of available green time when a pedestrian call occurs.

The impact of the Lafayette School and Stanley Intermediate School traffic on the corridor is quite apparent. While specific turning movement conflicts were not perceived as a problem, the volume of traffic added to the roadway by the schools is significant. Attached to this memorandum is a 24-hour count and traffic characteristic that shows how the later start time of Stanley Intermediate on Wednesday (9:00 AM compared to 8:15 AM) moves the AM peak hour for this approach from 7:45-8:45 AM to 8:15-9:15 AM. Pushing the peak hour later appears to reduce the conflict between commuter traffic and school traffic, resulting in less congestion along Moraga Road on Wednesday mornings than other workdays.

PM Peak Hour

Significant congestion exists throughout the study area due to the lack of available capacity at the intersection of Mount Diablo Boulevard and Moraga Road. Queue spillback along Mount Diablo Boulevard from this intersection has a negative impact on the adjacent intersections at First Street and Oak Hill Road. As with the AM peak hour, the split-phase operation of Mount Diablo Boulevard/Moraga Road in conjunction with moderate pedestrian levels, leads to inefficient operation of this signal.

Parking maneuvers and delivery operations between Oak Hill Road and Moraga Road, along Mount Diablo Boulevard, also add friction to the corridor and reduce further the available capacity.

Table 1 shows the validation results for the CORSIM model.

Table 1
EXISTING + CORSIM VALIDATION
TRAVEL TIME – SECONDS

Road and Direction	Scenario	AM Peak Hour		PM Peak Hour	
		Average	SD	Average	SD.
WB on Mt. Diablo Blvd. (First St. to Laf. Cr. W.)	Existing - Observed	90	40	93	34
	Existing - CORSIM	96		105	
EB on Mt. Diablo Blvd. (Laf. Cr. W. to First St.)	Existing - Observed	120	17	137	32
	Existing - CORSIM	109		168	
NB on Moraga Rd. (St. Mary to Mnt. Diablo)	Existing - Observed	224	93	106	27
	Existing - CORSIM	238		99	
SB on Moraga Rd. (Mnt. Diablo to St. Mary)	Existing - Observed	229	127	100	18
	Existing - CORSIM	215		117	

Note: Average refers to the average of five travel time runs. SD is the standard deviation of the runs.

Source: Fehr & Peers Associates

The validation results show that the model was able to replicate existing operations well and within the standard deviation of field results.

Figure 6 and Table 2 show the existing conditions level of service (LOS) and delay per vehicle. Table 3 shows queues for critical approaches in the study area.

These results confirm the field observations that delay is focused along Moraga Road in the AM peak hour, and around the Mount Diablo/Moraga Road intersection during the PM peak hour.

Table 2
EXISTING LEVELS OF SERVICE AND DELAYS

Intersection	AM Peak Hour Delay (LOS)	PM Peak Hour Delay (LOS)
Mt. Diablo Blvd/Lafayette Circle	5.5 (B)	8.2 (B)
Mt. Diablo Blvd/Oak Hill Road	21.0 (C)	70.0 (F)
Mt. Diablo Blvd/Moraga Road	24.0 (C)	43.4 (E)
Mt. Diablo Blvd/First Street	19.3 (C)	17.9 (B)
Moraga Road/Moraga Blvd	7.5 (B)	1.4 (A)
Moraga Road/Brook Street	29.1 (D)	7.5 (B)
Moraga Road/School Street	46.8 (E)	1.8 (A)
Moraga Road/St. Mary's Road	16.6 (C)	10.6 (B)
Weighted Average	21.9 (C)	22.8 (C)

Note: Delay is expressed in average seconds per vehicle of stopped delay

Source: Fehr & Peers Associates

Table 3
QUEUE LENGTHS PER LANE FOR CRITICAL MOVEMENTS

Approach	AM Peak Hour Queued Veh.	PM Peak Hour Queued Veh.
NB Left/Thru - Diablo/Moraga	16	15
WB Left – Diablo/Moraga	10	12
EB Thru – Diablo/Moraga	11	22
WB Right – Diablo/Oak Hill	8	3
EB Thru – Diablo/Oak Hill	9	17

Note: Queue length is expressed in maximum number of vehicles per lane

Source: Fehr & Peers Associates

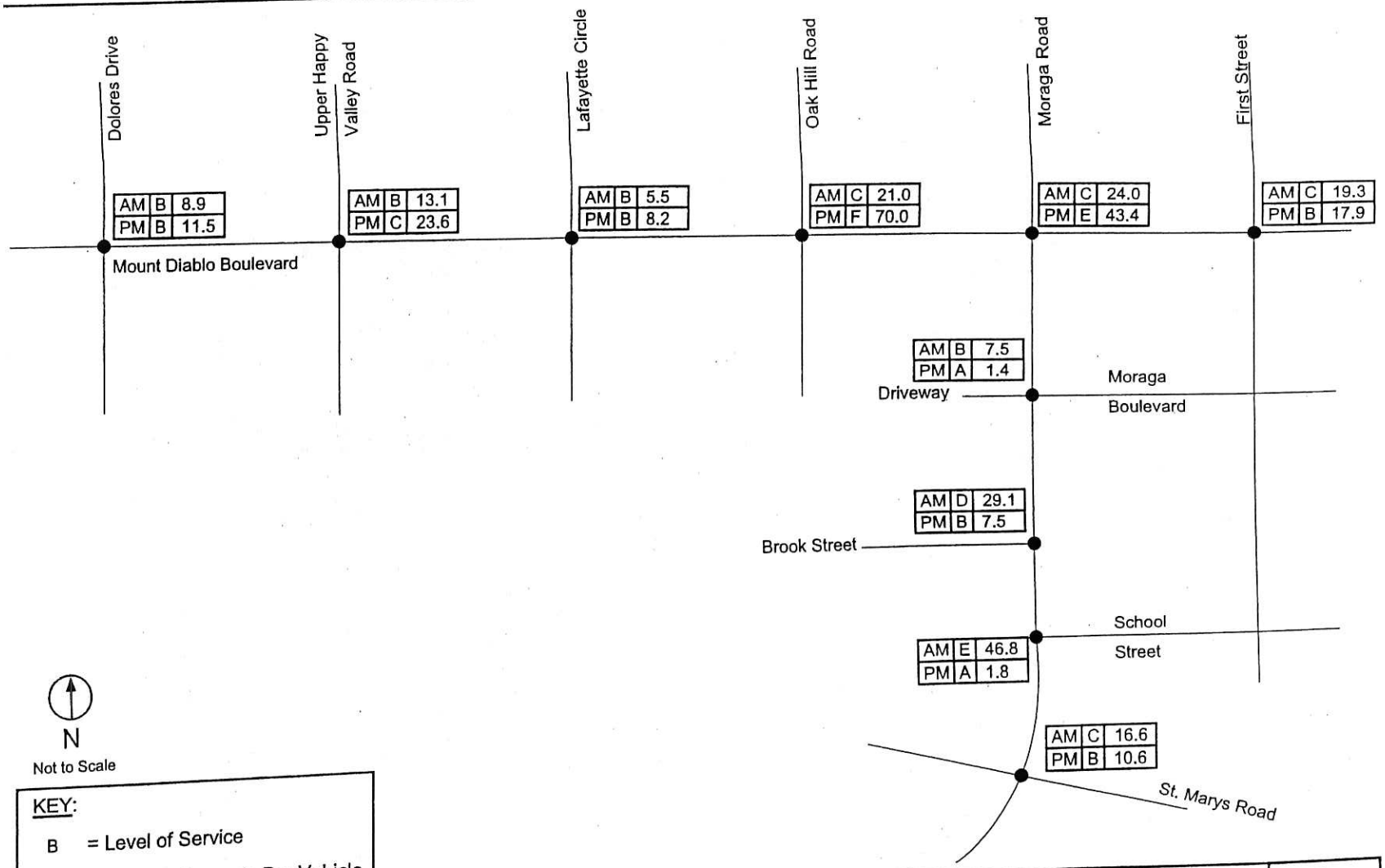


Figure 6 **EXISTING LEVEL OF SERVICE AND DELAY**

1533-14

III. Description of the Scenarios

Interim Scenario

The Interim scenario entails signal coordination and timing modifications to the study area intersections along Mount Diablo Boulevard (no changes to the intersection of Brook Street/School Street with Moraga Road were made, but are scheduled for later in the study process). The approach used to reduce delays and increase capacity relies on the premise that the corridor is viewed as a system, i.e., the successful operation of a signal is dependent upon managing the operation at every other signal in the system. Key objectives were to:

- Spread delay evenly amongst all approaches;
- Minimize cycle lengths where possible;
- Establish entry points to the system that meter entering traffic volumes based on downstream capacity; and
- Coordinate to the end of vehicle platoons to reduce the likelihood of queue spillback.

Table 4 shows the resulting signal timing plan details.

Table 4
SIGNAL TIMING

Time of Day	Hours of Operation	Cycle Length (sec)
AM	7:00 - 9:00	100
Mid	11:00 - 15:30	105
PM	15:30 - 19:00	110

Source: Fehr & Peers Associates

All timing plans benefit from phasing changes made at the intersection of Mount Diablo Boulevard/Moraga Road. Running the pedestrian phase with the heavy westbound movement reduces the inefficiency of southbound traffic receiving excessive green time due to a pedestrian call. Modified timings give the southbound movement green time proportional to vehicular demand.

During the AM plan, the main objective was to improve operations for the northbound approach to the intersection of Mount Diablo Boulevard/Moraga Road while maintaining acceptable operations for other movements. Green time was reduced for east and westbound traffic (coordination with adjacent intersections was modified to offset this reduction), but increased for the northbound movement. The northbound movement was also coordinated to receive a green phase at the intersection of Mount Diablo Boulevard/Oak Hill Road.

For the PM plan, the objective was to improve the flow of eastbound vehicles. The objective was reached by metering the amount of traffic that can enter the study area (heading eastbound) at any one time. The Mount Diablo Boulevard intersections at Lafayette Circle West and Oak Hill Road purposely introduce delay to traffic heading eastbound and southbound respectively. The result is less delay spread amongst a number of intersections rather than higher delay focused at one resulting in failure (delay increases exponentially as operations degrade, thus avoiding operational failure results in less total delay).

Proposed Scenario

In addition to improving signal timings, based on the approach described above (except that less traffic metering is required for this alternative), this scenario incorporates the proposed City of Lafayette Improvement plan. This plan consists of:

- Widen Mount Diablo Boulevard to three lanes in the eastbound direction between Oak Hill Road and First Street;
- Lengthen turn pockets on the eastbound approach to the intersection of Mount Diablo Boulevard/Moraga Road;
- Remove the westbound right-turn pocket at the intersection of Mount Diablo Boulevard/Oak Hill Road;
- Change the alignment of the northbound approach at the Mount Diablo Boulevard/Moraga Road intersection to a left-turn lane, left-through lane, and right turn pocket (existing is left-turn pocket, left-through lane, and right-turn lane);
- Remove an entry lane into the Safeway site and reconfigure the median to allow for two outbound lanes and a left-turn pocket; and
- Convert Plaza Way into a one-way road eastbound, and convert Golden Gate Way into a bi-directional road.

IV. Scenario Analysis

Existing vs. Interim vs. Proposed

These scenarios were analyzed using the CORSIM simulation tool for the AM and PM peak hour periods. Five runs of each scenario were performed with different random seed numbers to increase the statistical significance of the results.

Table 5 shows the AM and PM peak hour LOS and delay results by intersection for the Existing, Interim and Proposed scenarios. Figures 7 and 8 show the AM and PM peak hour LOS and delay results by intersection for the Interim and Proposed scenarios respectively. Table 6 shows the travel time results.

The results show that both the Interim and Proposed scenarios reduce the average intersection stopped delay (seconds per vehicle) for the study area; AM from 21.9 (Existing) to 20.6 (Interim) to 17.5 (Proposed); PM from 22.8 (Existing) to 13.0 (Interim) to 12.5 (Proposed). Also, all modified intersections now operate at LOS D or better in both the AM and PM peak hours, as opposed to LOS E/F operation under Existing conditions. It should be remembered that the average intersection delay includes those intersections along Moraga Road that are not modified in this analysis.

At most intersections, the Proposed scenario operates with less delay than the Interim scenario. However, the proposed improvements on the northbound approach at the intersection of Mount Diablo Boulevard/Moraga Road operate no better than the existing geometry. This is due to the lane alignment on the approach that concentrates the volume in the right-most lane, as this lane now serves northbound right turning traffic, northbound through traffic, and northbound left traffic going to Oak Hill Road.

Watching the simulation it is apparent that the Interim solution is more susceptible (performance degrades) to short-term events such as; parking maneuvers, lane changes, slow vehicles, or spikes in the traffic volume. The additional lane in the Proposed scenario helps to absorb the impact of short-term events, which leads to better operations.

Table 5
EXISTING, INTERIM, AND PROPOSED SCENARIO
LEVELS OF SERVICE AND DELAYS

Intersection	Existing		Interim		Proposed	
	AM	PM	AM	PM	AM	PM
	Delay (LOS)	Delay (LOS)	Delay (LOS)	Delay (LOS)	Delay (LOS)	Delay (LOS)
Mt. Diablo Blvd/Lafayette Circle	5.5 (B)	8.2 (B)	8.5 (B)	15.7 (C)	9.3 (B)	15.8 (C)
Mt. Diablo Blvd/Oak Hill Road	21.0 (C)	70.0 (F)	17.3 (C)	19.1 (C)	15.8 (C)	18.3 (C)
Mt. Diablo Blvd/Moraga Road	24.0 (C)	43.4 (E)	25.2 (D)	24.2 (C)	21.9 (C)	22.1 (C)
Mt. Diablo Blvd/First Street	19.3 (C)	17.9 (C)	16.8 (C)	15.5 (C)	19.4 (C)	14.8 (B)
Moraga Road/Moraga Blvd	7.5 (B)	1.4 (A)	6.6 (B)	1.1 (A)	2.6 (A)	1.2 (A)
Moraga Road/Brook Street	29.1 (D)	7.5 (B)	27.9 (D)	8.1 (B)	24.7 (C)	8.1 (B)
Moraga Road/School Street	46.8 (E)	1.8 (A)	42.3 (E)	1.7 (A)	33.2 (D)	2.0 (A)
Moraga Road/St. Mary's Road	16.6 (C)	10.6 (B)	15.2 (C)	10.4 (B)	4.1 (A)	10.3 (B)
Weighted Average	21.9 (C)	22.8 (C)	20.6 (C)	13.0 (B)	17.5 (C)	12.5 (B)

Note: Delay is expressed in average seconds per vehicle of stopped delay

Source: Fehr & Peers Associates

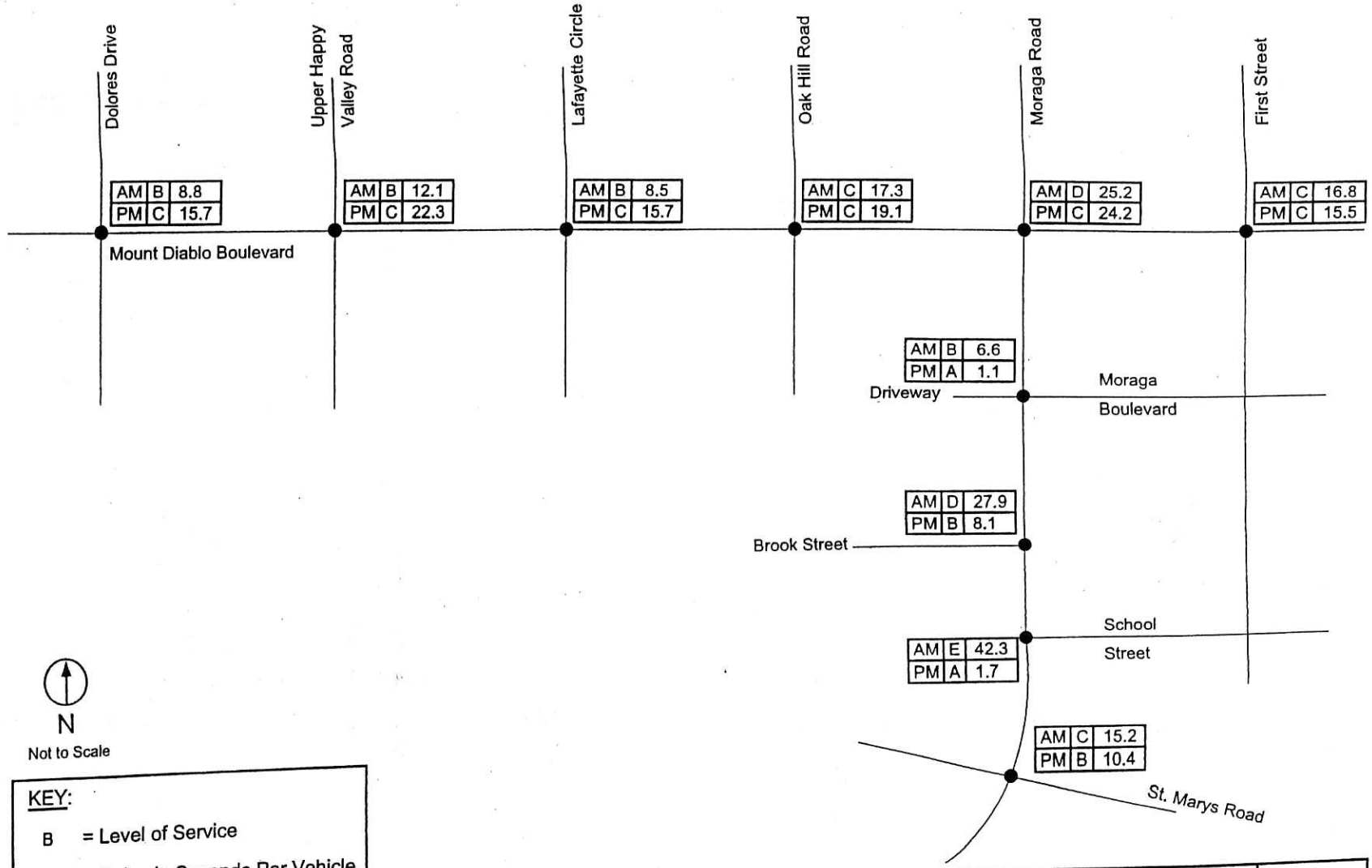


Figure 7 **INTERIM LEVEL OF SERVICE AND DELAY**

1533-15

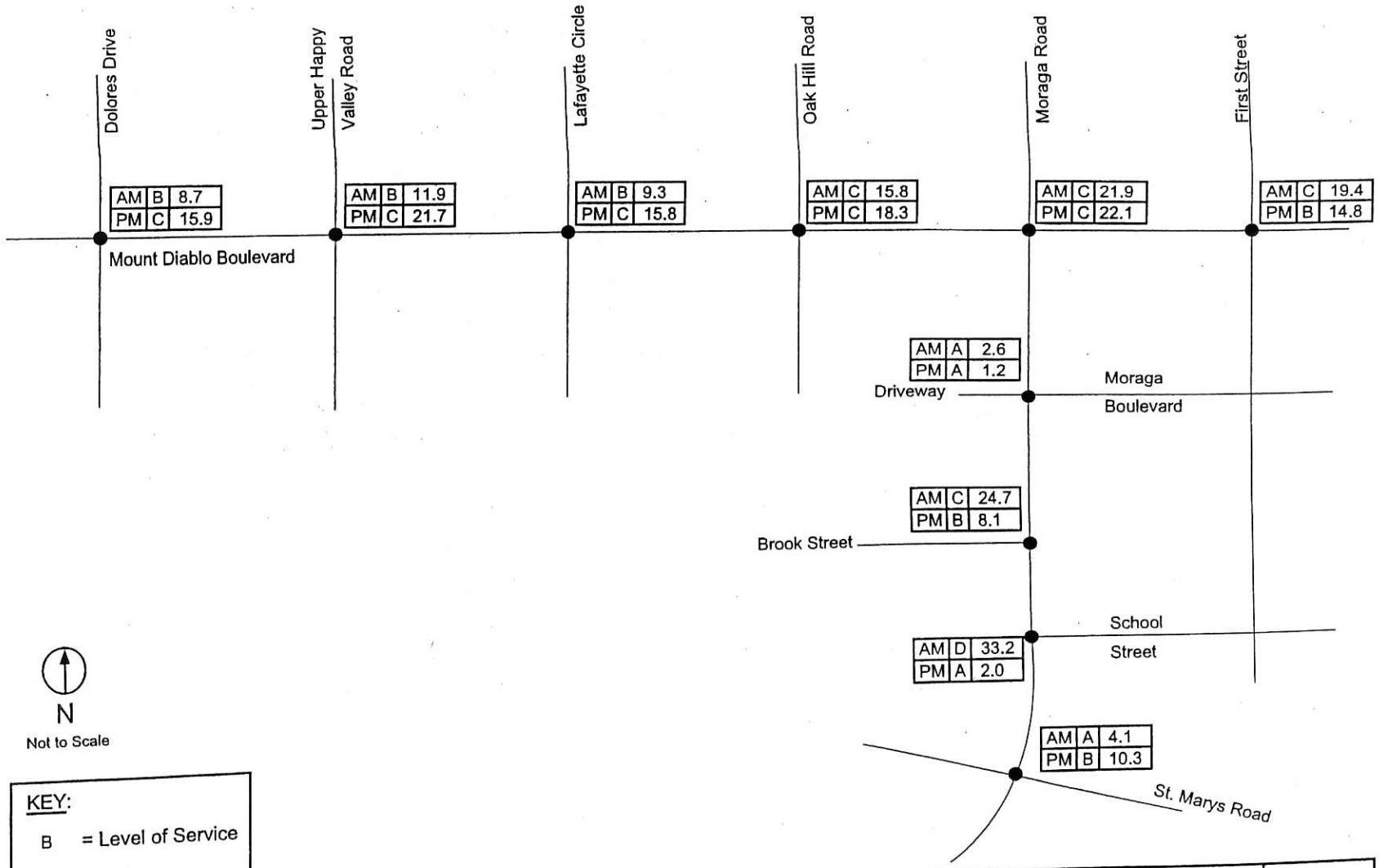


Figure 8 **PROPOSED PROJECT LEVEL OF SERVICE AND DELAY**

1533-16

Table 6
EXISTING , INTERIM, AND PROPOSED SCENARIO
TRAVEL TIME – SECONDS

Road and Direction	Scenario	AM Peak Hour	PM Peak Hour
WB on Mt. Diablo Blvd. (First St. to Laf. Cr. W.)	Existing	96	105
	Interim	84	85
	Proposed	80	94
EB on Mt. Diablo Blvd. (Laf. Cr. W. to First St.)	Existing	109	168
	Interim	127	118
	Proposed	121	95
NB on Moraga Rd. (St. Mary to Mnt. Diablo)	Existing	238	99
	Interim	225	85
	Proposed	208	88
SB on Moraga Rd. (Mnt. Diablo to St. Mary)	Existing	215	117
	Interim	196	117
	Proposed	188	121

Source: Fehr & Peers Associates

The travel time results show that AM performance for the improvement scenarios would remain similar to that of Existing conditions. During the PM peak hour, significant improvements are seen in travel times along Mount Diablo Boulevard (as much as a 43% reduction). In summary, both improvement scenarios would perform better than Existing on the whole. There is little difference between the Interim and Proposed scenario results, with the latter offering slightly better results.

Pedestrian Crossing Speed of 2.5 Feet per Second

Currently, all signalized pedestrian crossings in the study area receive a minimum of 5 seconds of walk time and a clearance interval "flashing don't walk" that equates to a crossing speed of 4 feet per second. This scenario examines the operation of the study intersections assuming that the clearance interval requires a slower crossing speed of 2.5 feet per second as has been suggested by some community members. Operationally, the extra crossing time would be given to the walk phase, leaving the clearance interval the same as today. The end result is that pedestrian will see a much longer walk time that precedes the "flashing don't walk" phase.

The longer crossing time requirements were factored into the Interim and Proposed models. In order to maximize the intersection efficiency, the cycle lengths had to be extended by 10 seconds for both scenarios, thus increasing traffic delay.

Tables 7 and 8, and Figures 9 and 10 show the results of increasing the pedestrian crossing requirements.

Table 7
INTERIM LEVELS OF SERVICE AND DELAYS –
With varying pedestrian crossing times

Intersection	Interim 4 feet per sec.		Interim 2.5 feet per sec.	
	AM	PM	AM	PM
	Delay (LOS)	Delay (LOS)	Delay (LOS)	Delay (LOS)
Mt. Diablo Blvd/Lafayette Circle	8.5 (B)	15.7 (C)	9.6 (B)	60.0 (E)
Mt. Diablo Blvd/Oak Hill Road	17.3 (C)	19.1 (C)	28.6 (D)	61.1 (F)
Mt. Diablo Blvd/Moraga Road	25.2 (D)	24.2 (C)	25.7 (D)	43.9 (E)
Mt. Diablo Blvd/First Street	16.8 (C)	15.5 (C)	18.3 (C)	17.6 (C)
Moraga Road/Moraga Blvd	6.6 (B)	1.1 (A)	10.1 (C)	1.2 (A)
Moraga Road/Brook Street	27.9 (D)	8.1 (B)	35.4 (D)	7.7 (B)
Moraga Road/School Street	42.3 (E)	1.7 (A)	58.7 (E)	1.7 (A)
Moraga Road/St. Mary's Road	15.2 (C)	10.4 (B)	34.3 (D)	10.5 (B)
Weighted Average	20.6 (C)	13.0 (B)	27.3 (D)	26.4 (D)

Note: Delay is expressed in average seconds per vehicle of stopped delay

Source: Fehr & Peers Associates

Table 8
PROPOSED LEVELS OF SERVICE AND DELAYS –
With varying pedestrian crossing time

Intersection	Proposed 4 feet per sec.		Proposed 2.5 feet per sec.
	AM	PM	PM
	Delay (LOS)	Delay (LOS)	Delay (LOS)
Mt. Diablo Blvd/Lafayette Circle	9.3 (B)	15.8 (C)	18.0 (C)
Mt. Diablo Blvd/Oak Hill Road	15.8 (C)	18.3 (C)	24.3 (C)
Mt. Diablo Blvd/Moraga Road	21.9 (C)	22.1 (C)	25.5 (D)
Mt. Diablo Blvd/First Street	19.4 (C)	14.8 (B)	15.6 (C)
Moraga Road/Moraga Blvd	2.6 (A)	1.2 (A)	1.1 (A)
Moraga Road/Brook Street	24.7 (C)	8.1 (B)	7.7 (B)
Moraga Road/School Street	33.2 (D)	2.0 (A)	2.1 (A)
Moraga Road/St. Mary's Road	4.1 (A)	10.3 (B)	10.7 (B)
Weighted Average	17.5 (C)	12.5 (B)	14.2 (B)

Note: Delay is expressed in average seconds per vehicle of stopped delay
The morning peak hour, with the 2.5 feet per second crossing speed, was not analyzed for the Proposed scenario as the Interim analysis showed the main impact to be at the unimproved intersection of School and Brook Street with Moraga Road.

Source: Fehr & Peers Associates

The results show that increasing the time for pedestrian crossings would increase vehicular delay by 33% (Interim AM) and by 103% (Interim PM) and by 13% (Proposed PM). Average pedestrian delay can be calculated by subtracting the walk time from the cycle length and dividing by two. Thus, a 4-foot per second crossing speed results in delays of 47.5 seconds (AM) and 52.5 seconds (PM). A 2.5 foot per second equivalent crossing speed requires longer cycle lengths and results in a delay of 52.5 seconds for both peak hours. These results indicate that the Proposed scenario can accommodate the longer pedestrian crossing time and maintain acceptable operations while the Interim scenario cannot. However, under the Interim scenario longer crossing times could be run with certain movements that already require higher amounts of green time.

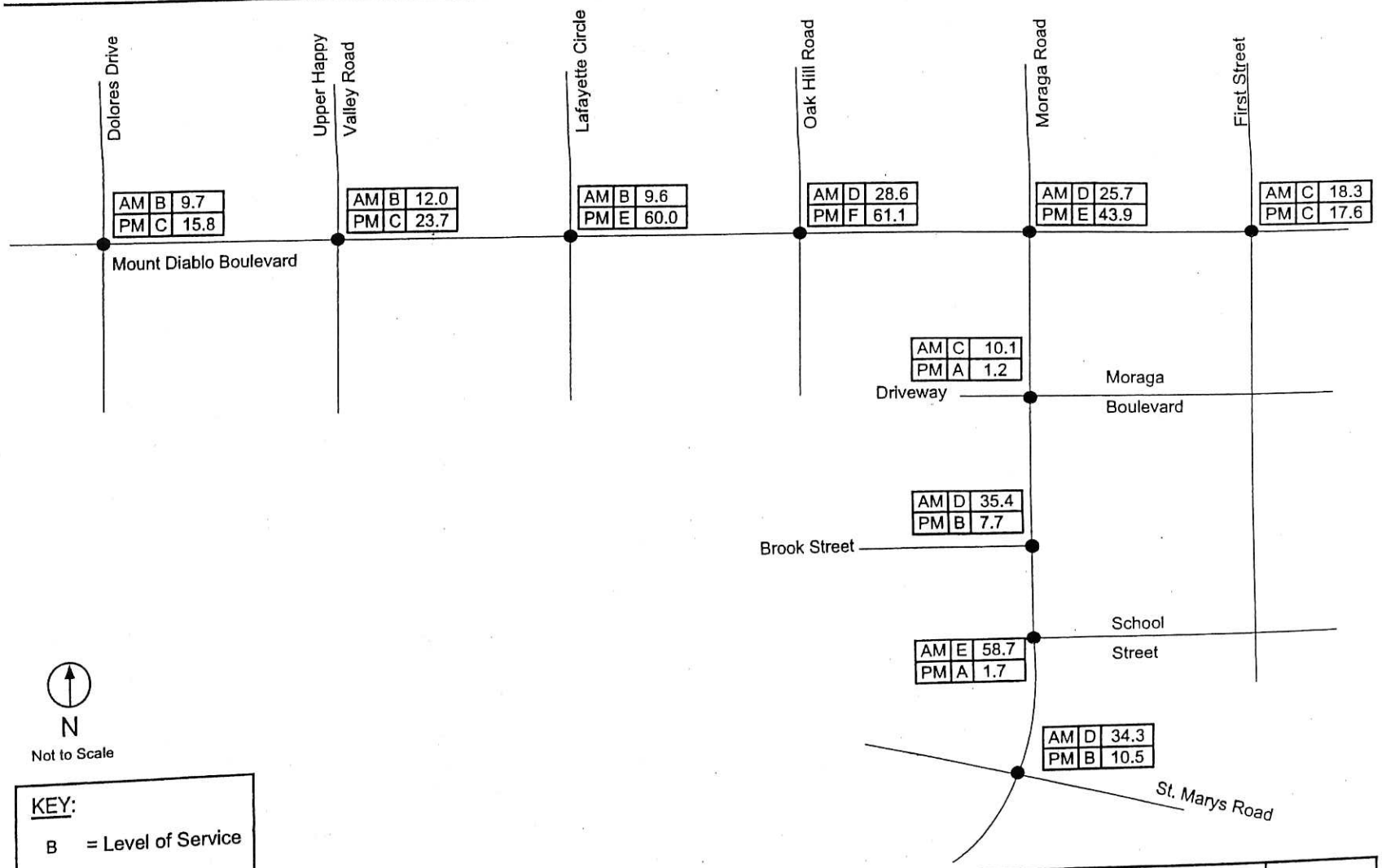


Figure 9 **INTERIM PLUS 2.5 FEET PER SECOND LEVEL OF SERVICE AND DELAY**

1533-17

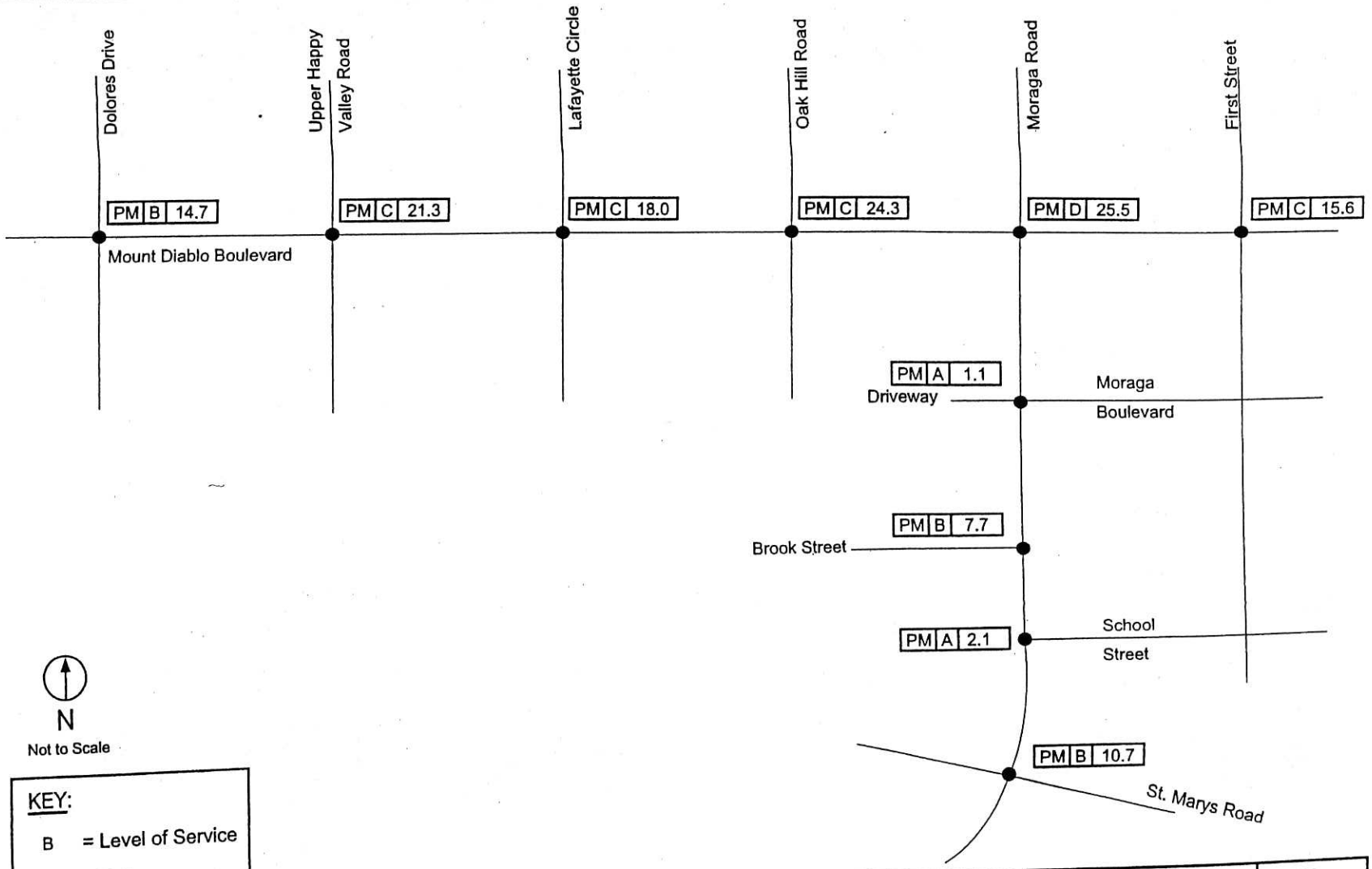


Figure 10

PROPOSED PLUS 2.5 FEET PER SECOND LEVEL OF SERVICE AND DELAY

1533-18

Excess Capacity Determination

This analysis focused on determining the excess capacity created in the Interim and Proposed scenarios. The PM peak hour scenario is the critical peak hour due to the high volumes; thus analysis for excess capacity was only performed for this scenario. Further, during the AM peak hour the Brook Street/School Street signal is at capacity, so no additional traffic can pass through that location to impact the Mount Diablo Boulevard corridor. Signal timings were adjusted to maximize intersection capacity, and signalization of the Moraga Road/Moraga Boulevard intersection was also assumed.

First, Existing volumes were increased by adding three significant approved projects (Campolindo Swim Center, Palos Colorados, and St Marys Aquatic Center). The resulting volumes were then increased until the scenario being analyzed no longer operated acceptably (similar to the conditions under the Existing scenario). The volumes for the three approved projects can be seen in Figure 11.

The analysis results showed that the Interim scenario has approximately 12% excess capacity during the PM peak hour. The Proposed scenario would still operate acceptably along Mount Diablo Boulevard with a 19% increase in volumes, however the Moraga Road corridor failed at this level impacting Mount Diablo Boulevard operations. Assuming a 1.5% growth rate (established from the year 2020 CCTA Central County Model), this equates to 8 years of additional capacity for the Interim scenario and 12 years additional capacity for the Proposed scenario.

The Available Roadway Capacity Study by Robert L Harrison (excerpt is attached), January 1999, estimated that an additional 384 PM peak hour trips would travel through the Mount Diablo Boulevard/Moraga Road intersection as a result of Lamorinda-area approved projects. This equates to a 10% increase over existing volumes. Based on these numbers, it is reasonable to assume that both alternatives could accommodate this approved growth while maintaining acceptable operations. The Proposed scenario would have more excess capacity available for projects not yet approved.

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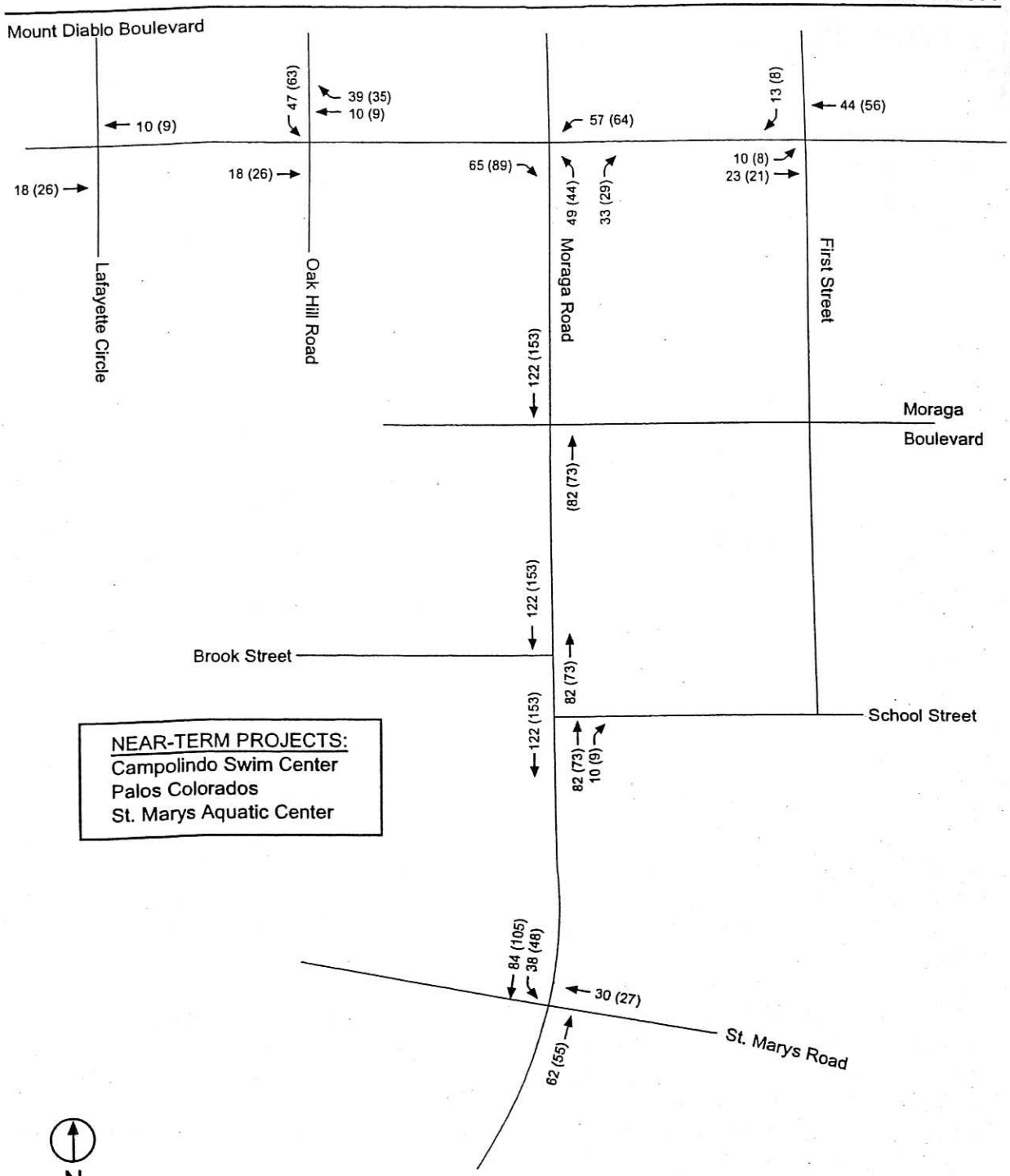


KEY: XXX (XXX) = AM (PM) Peak Hour Volumes

Figure 11 — **GROWTH FROM NEAR-TERM PROJECTS**

1533-23

V. Summary and Recommendations

Task 1 completed the validation of the existing conditions model and generated existing conditions results. The analysis of the Interim and Proposed scenarios showed that both options would operate better than existing and provide additional excess capacity beyond today's volumes and sufficient capacity for traffic volumes resulting from projects currently approved in the Lamorinda area. The Proposed scenario provides more vehicular capacity than the Interim scenario, which translates into slightly lower delays and less susceptibility to short term events, such as parking maneuvers and traffic volume spikes.

It was determined that lengthening the pedestrian crossing requirement at all crossings based on a 2.5 feet per second walking speed would negatively impact vehicle operations to the point of eliminating the vehicular benefits associated with the Interim improvement scenario. However, under the Interim scenario longer crossing times could be run with certain movements that already require higher amounts of green time. The Proposed scenario can successfully accommodate the additional pedestrian crossing time but operations would degrade slightly. It should be remembered that this would not reduce delay for pedestrians, due to the required increase in cycle length, but a longer pedestrian crossing period would be provided.

A different geometric design for the northbound approach at the intersection of Mount Diablo Boulevard and Moraga Road is recommended. It is suggested that the current lane alignment be kept and the "Plaza Way" crosswalk be removed along with some of the southbound on-street parking spaces. This would allow the northbound left-turn lane to be extended, better serving vehicle demand (optimal extension length has not been determined). Pedestrians would be able to cross at either Moraga Road/Mount Diablo Boulevard or Moraga Road/Moraga Boulevard. We would still change Plaza Way to one way operation eastbound.

VI. Other Potential Solutions

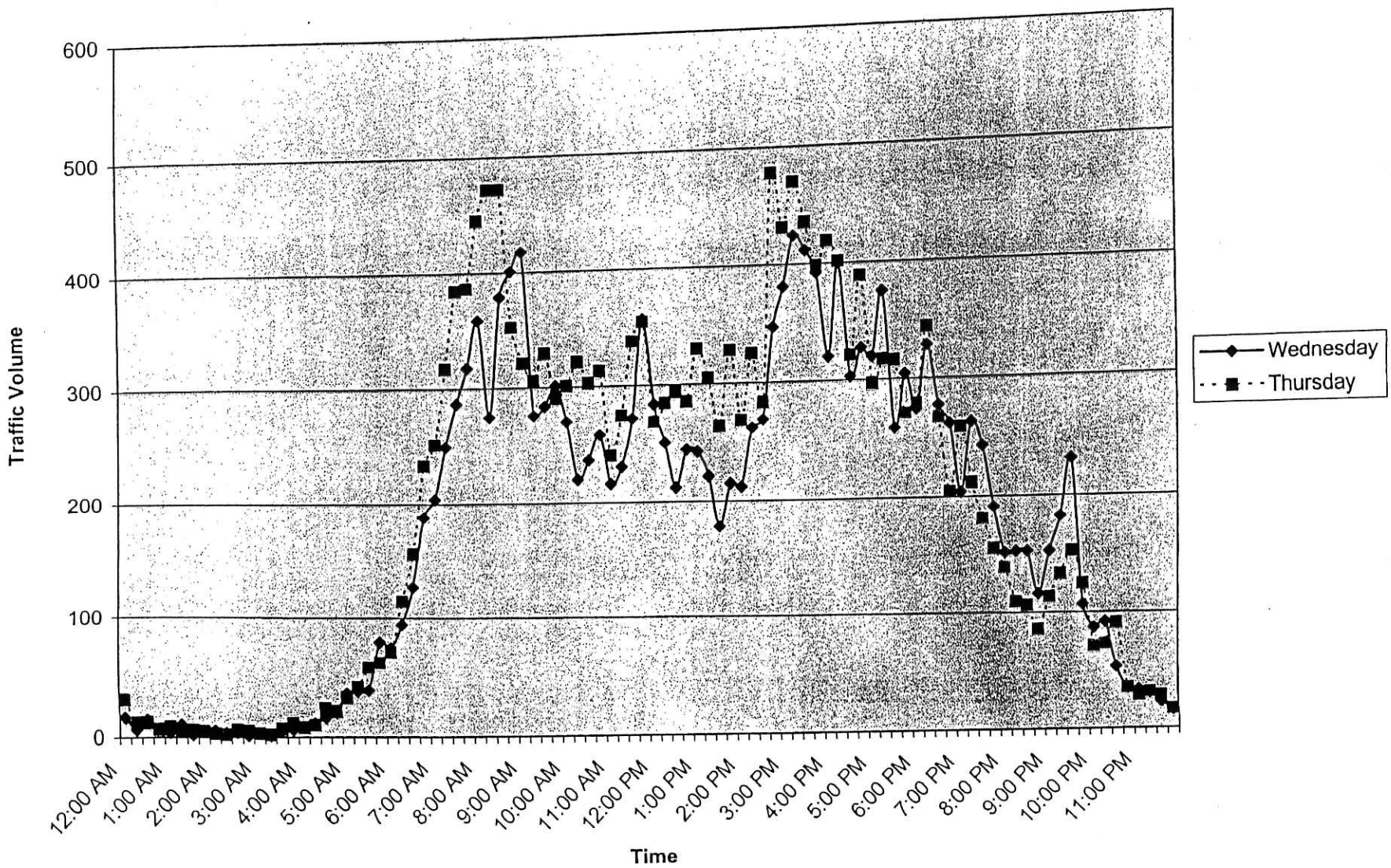
While the Proposed scenario would provide additional capacity over the Interim scenario, widening the road is considered by some to be contrary to the downtown setting in which it would be implemented. The City may want to consider other options, such as (all options assume the Interim scenario as a base):

- Restrict PM peak hour on-street parking eastbound on Mount Diablo Boulevard between Oak Hill Road and Moraga Road;
- Improve the northbound approach at the intersection of Mount Diablo Boulevard and Moraga Road as described above;
- Improve the southbound approach at the intersection of Mount Diablo Boulevard and Moraga Road as for the Proposed scenario;
- Modify the southbound approach (Safeway driveway) at the intersection of Mount Diablo Boulevard and Moraga Road to reduce vehicle demand during peak periods thus providing more green time to heavier movements;
- Increase the green-time available to the eastbound left-turn at the intersection of Mount Diablo Boulevard/Upper Happy Valley Road, to encourage more traffic to use Deer Hill Road;
- Install signals at the intersections along Deer Hill Road, if warranted, to encourage more traffic to bypass the Mount Diablo Boulevard corridor; and
- Encourage Stanley Intermediate School and Lafayette School to modify their start times, to limit the overlap with commute traffic.

/dr

1001-1533

Northbound Traffic on Moraga Rd. (between Brook St. and Moraga Blvd.)



Start Date: 03/08/2000
File I.D. : MORAGA-S
Page : 1

eet name :MORAGA RD. BTWN BROOK ST. & MORAGA BL. SOUTHBOUND

n	Wed. 03/08		Thur. 03/09		Fri. 03/10		Daily Avg.	
e	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
00	22	186	16	202	*	*	19	194
15	13	213	16	191	*	*	14	202
30	17	178	13	190	*	*	15	184
45	18	174	11	199	*	*	14	186
00	6	184	8	199	*	*	7	192
15	13	169	6	214	*	*	10	192
30	9	210	9	237	*	*	9	224
45	9	163	8	249	*	*	8	206
00	6	188	11	242	*	*	8	215
15	5	223	5	245	*	*	5	234
30	1	247	8	272	*	*	4	260
45	8	308	5	346	*	*	6	327
00	5	256	3	284	*	*	4	270
15	5	271	6	274	*	*	6	272
30	7	215	7	328	*	*	7	272
45	7	277	7	221	*	*	7	249
00	7	275	7	245	*	*	7	260
15	19	234	10	293	*	*	14	264
30	7	226	5	280	*	*	6	253
45	11	216	6	289	*	*	8	252
00	11	244	8	286	*	*	10	265
15	16	265	19	300	*	*	18	282
30	21	280	16	302	*	*	18	291
45	48	285	31	283	*	*	40	284
00	35	288	33	289	*	*	34	288
15	44	263	47	262	*	*	46	262
30	56	263	67	286	*	*	62	274
45	109	280	117	257	*	*	113	268
00	109	249	95	278	*	*	102	264
15	180	238	154	215	*	*	167	226
30	168	232	154	190	*	*	161	211
45	254	194	249	178	*	*	252	186
00	194	147	266	130	*	*	230	138
15	212	125	257	132	*	*	234	128
:30	225	117	206	144	*	*	216	130
:45	262	140	206	126	*	*	234	133
:00	243	122	186	119	*	*	214	120
:15	148	125	176	149	*	*	162	137
:30	188	119	164	121	*	*	176	120
:45	178	117	169	116	*	*	174	116
:00	162	81	135	112	*	*	148	96
:15	143	90	175	80	*	*	159	85
:30	156	61	182	70	*	*	169	66
:45	166	44	176	50	*	*	171	47
:00	175	35	167	59	*	*	171	47
:15	191	44	196	33	*	*	194	38
:30	170	43	196	28	*	*	183	36
:45	195	29	211	26	*	*	203	28
tal	4254	8933	4225	9621	0	0	4239	9274
mbined	13187		13846		0		13513	
ak Hour	08:15	05:15	07:45	02:45			07:45	
lume	942	1118	978	1232			932	
H.F.	.89	.97	.91	.89			.92	

DTs

$31,048

LAFAYETTE

KAKAS TRAFFIC DATA SERVICE

Site Code : 000000000000
Start Date: 03/07/2000
File I.D. : MORAGA-N
Page : 1

Name :MORAGA RD. BTWN BROCK ST. & MORAGA BL. NORTHBOUND

Tues. 03/07		Wed. 03/08		Thur. 03/09		Daily Avg.	
A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
8	294	16	284	30	269	18	282
9	250	6	250	12	285	9	262
7	243	14	212	12	294	11	250
7	242	7	244	7	286	7	257
5	246	4	242	9	330	6	273
1	246	10	221	6	305	6	257
5	237	2	177	6	264	4	226
6	225	5	215	5	328	5	256
8	209	5	212	3	269	5	230
6	261	3	262	2	325	4	283
3	280	4	269	6	284	4	278
1	328	1	347	5	478	2	384
8	334	3	381	3	432	5	382
3	357	1	425	2	470	2	417
5	413	6	412	7	436	6	420
10	381	6	392	11	399	9	391
5	399	8	320	8	420	7	380
19	347	11	400	10	402	13	383
21	324	16	303	23	321	20	316
19	253	20	327	21	389	20	323
27	278	35	319	32	297	31	298
39	319	37	375	41	317	39	337
45	233	38	259	58	316	47	269
68	223	79	304	62	272	70	266
71	237	74	275	71	280	72	264
109	234	94	328	115	344	106	302
144	185	127	278	156	268	142	244
173	189	188	262	233	205	198	219
186	198	204	204	251	259	214	220
278	170	249	263	317	212	281	215
330	150	287	242	385	181	334	191
337	151	317	191	367	155	347	166
347	126	359	151	446	139	384	139
398	129	275	152	472	110	382	130
375	74	379	152	472	107	409	111
307	82	401	116	353	86	354	95
290	84	418	152	321	114	343	117
264	101	276	182	306	133	282	139
286	77	284	230	329	152	300	153
257	92	301	107	291	125	283	108
254	65	270	87	301	72	275	75
234	61	220	92	321	74	258	76
254	35	236	54	303	91	264	60
224	31	258	35	313	36	265	34
236	25	216	34	240	29	231	29
243	16	230	31	275	32	249	26
274	16	272	23	338	29	295	23
323	15	357	16	355	17	345	16
6529	9465	6629	10809	7732	11438	6963	10572
ed 15994		17438		19170		17535	
our 07:45	03:15	08:30	03:00	07:45	02:45	08:00	
1457	1550	1474	1610	1777	1816	1529	
.91	.93	.88	.94	.94	.94	.93	

H-15

Approved Projects' Trips Assigned by Travel Corridor

	Travel Corridors					
	Moraga Way		Moraga Road		Reliez Station Etc.	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Total Approved Projects' Trips	125	178	102	178	48	70

Approved Projects' Trips by City

	Trip Generation		Travel Corridors: Moraga Way			Moraga Road			Reliez Station Etc.		
	AM Peak	PM Peak	% of	Trips		% of	Trips		% of	Trips	
Project Name	Hour	Hour	Total	AM Peak	PM Peak	Total	AM Peak	PM Peak	Total	AM Peak	PM Peak
Lafayette Projects											
Town Center	68	70									
	73	274									
	40	49									
Less:	-39	-27									
Totals*	142	366	0%	0	0	15%	21	55	0%	0	0
La Fiesta	0	0	100%	0	0	0%	0	0	0%	0	0
Club Sport**	112	301	5%	6	15	10%	11	30	0%	0	0
Gousias	3	5	0%	0	0	100%	3	5	0%	0	0
French	3	3	0%	0	0	100%	3	3	0%	0	0
Bruzzone	7	9	0%	0	0	80%	5	7	20%	1	2
Focus Realty	8	10	0%	0	0	0%	0	0	100%	8	10
Hourany	2	2	0%	0	0	100%	2	2	0%	0	0
De Silva	3	5	0%	0	0	0%	0	0	100%	3	5
Lafayette Totals	279	701		6	15		45	102		12	16

*Project totals at Mt.Diablo/Moraga Road Intersection

Trips on Mt. Diablo Blvd.	40%	57	146
Total at Mt. Diablo/Moraga Rd Intersection		78	201

**Project totals at Mt.Diablo/Moraga Road Intersection

Trips on Mt. Diablo Blvd.	20%	22	60
Total at Mt. Diablo/Moraga Rd Intersection		34	90

Orinda Projects											
Montanera	189	254	20%	38	51	0%	0	0	0%	0	0
Castlegate	35	47	100%	35	47	0%	0	0	0%	0	0
Zuckerman	3	5	100%	3	5	0%	0	0	0%	0	0
Urban	2	2	100%	2	2	0%	0	0	0%	0	0
Orinda Totals	229	308		78	105		0	0		0	0

Approved Projects' Trips Assigned by Travel Corridor

Project Name	Trip Generation AM Peak Hour	Trip Generation PM Peak Hour	Moraga Way % of Total	Moraga Way Trips AM Peak	Moraga Way Trips PM Peak	Moraga Road % of Total	Moraga Road Trips AM Peak	Moraga Road Trips PM Peak	Reliez Station Etc. % of Total	Reliez Station Etc. Trips AM Peak	Reliez Station Etc. Trips PM Peak
Moraga Projects											
Mulholland Hill	5	7	25%	1	2	65%	3	4	10%	1	1
Oakbay KimberlyDr	5	7	75%	4	5	20%	1	1	5%	0	0
Batavia/Longwood	4	5	25%	1	1	65%	3	3	10%	0	1
Camino Moraga	8	10	30%	2	3	42%	3	4	28%	2	3
Moraga Valley Lane	21	28	40%	8	11	36%	8	10	24%	5	7
Country Club Vista	13	18	40%	5	7	36%	5	7	24%	3	4
MoragaCountryClul	19	26	40%	8	10	36%	7	9	24%	5	6
MoragaCountryClul	38	51	40%	15	20	36%	14	18	24%	9	12
MS602-91 Thoms	2	3	75%	1	2	20%	0	1	5%	0	0
OakmontSeniorCar	5	13	40%	2	5	36%	2	5	24%	1	3
Luxor Apartments	15	18	25%	4	5	65%	10	12	10%	1	2
St. Mary's Dorms	24	40	0%	0	0	20%	5	8	80%	19	32
Rheem Theatre	0	0	25%	0	0	65%	0	0	10%	0	0
BofA ATM Kiosk	0	0	25%	0	0	65%	0	0	10%	0	0
Adv.MobileSolution											
Product Dev. Ctr	45	46	25%	11	12	60%	27	28	15%	7	7
Moraga Barn	2	16	30%	1	5	40%	1	7	30%	1	5
Moraga Totals	205	288		63	88		87	117		54	83
Moraga Regional Trips	65% of Total	133	187	41	(Adds to Traffic in Orinda and Lafayette) 57		56	76		35	54
Moraga Local Trips	35% of Total	72	101	22	31		30	41		19	29

Approved Projects Trip Generation

	Daily	AM Peak Hour	PM Peak Hour
otal Lamorinda Approved Projects' Trip Generation	12,544	713	1,298

pproved Projects' Trip Generation by City

Project Name	Land Use Type	Amount	Units	Daily Rate	Daily Trips	AM Peak Hour Rate	AM Peak Hour Trips	PM Peak Hour Rate	PM Peak Hour Trips
afayette Projects									
Town Center	Office	26	GFA 000's	18	472	Note 1	68	Note 1	70
	Retail	25	GFA 000's	112	2,795	Note 1	73	Note 1	274
	MF Residentia	75	D.U.s	7.73	580	Note 1	40	Note 1	49
Less:	Existing Trips		(Parking Lot)		(150)		(39)		(27)
Town CenterTotals					3,697		142		366
	Retail (Existing Rehabilitation)				0		0		0
La Fiesta	Health Club	70	GFA 000's	40	2,800	1.6	112	4.3	301
Club Sport	SF Residential	4	D.U.s	10.67	43	0.84	3	1.13	5
Gousias	SF Residential	3	D.U.s	10.67	32	0.84	3	1.13	3
French	SF Residential	8	D.U.s	10.67	85	0.84	7	1.13	9
Bruzzone	SF Residential	9	D.U.s	10.67	96	0.84	8	1.13	10
Focus Realty	SF Residential	2	D.U.s	10.67	21	0.84	2	1.13	2
Hourany	SF Residential	4	D.U.s	10.67	43	0.84	3	1.13	5
De Silva									
Lafayette Totals					6,817		279		701

Note 1: Trips from the "Updated Lafayette Town Center Traffic Impact Study", Korve Engineering. March 6, 1997.

Orinda Projects									
Montanera in Gateway Valley	SF Residential	225	D.U.s	10.67	2401	0.84	189	1.13	254
Castlegate	SF Residential	42	D.U.s	10.67	448	0.84	35	1.13	47
Zuckerman	SF Residential	4	D.U.s	10.67	43	0.84	3	1.13	5
Urban	SF Residential	2	D.U.s	10.67	21	0.84	2	1.13	2
Orinda Totals					2,913		229		308

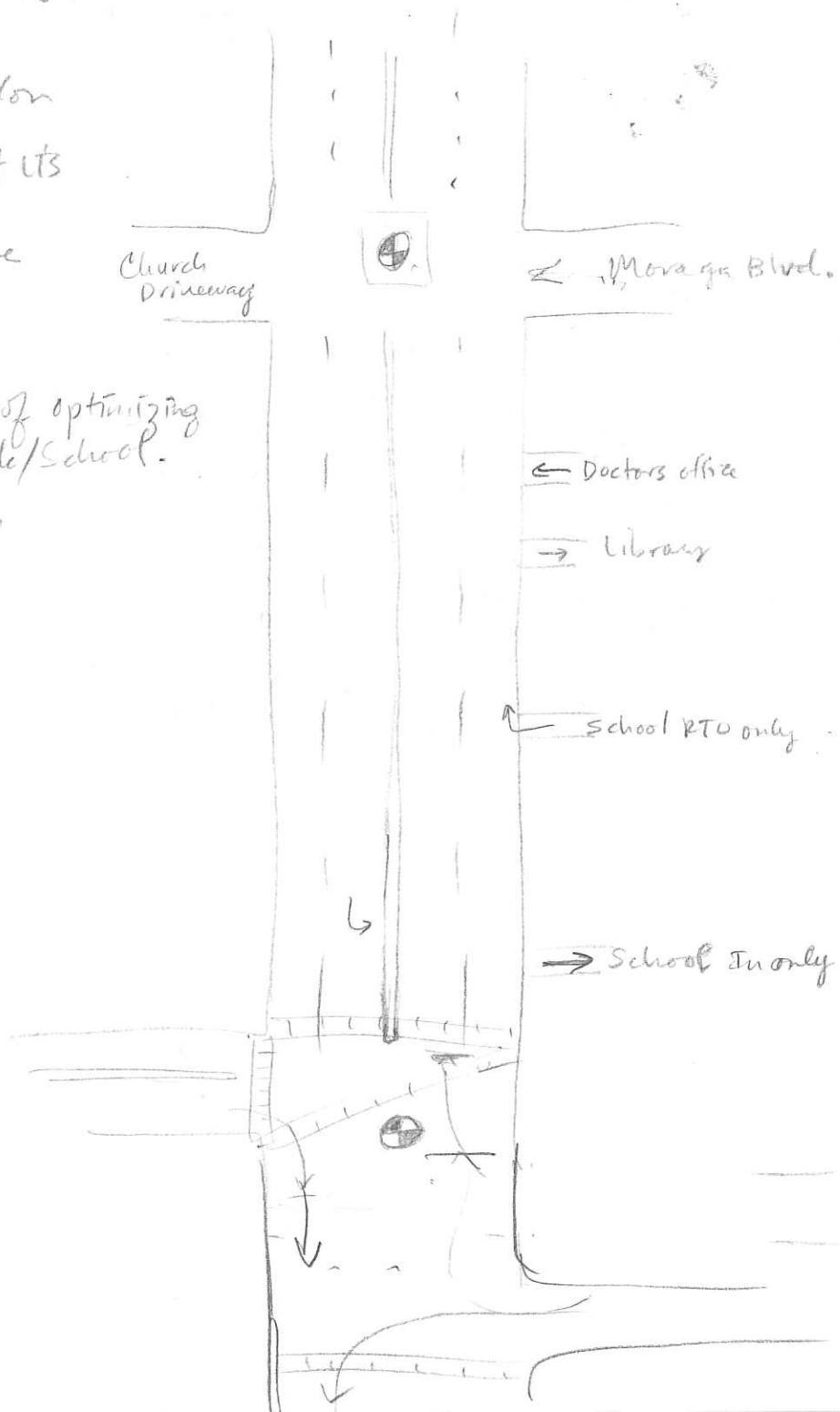
Approved Projects Trip Generation

Project Name	Land Use Type	Amount	Units	Trip Generation Daily Rate	Daily Trips	AM Peak Hour Rate	AM Peak Hour Trips	PM Peak Hour Rate	PM Peak Hour Trips
Moraga Projects									
LL01 Mulholland Hill	SF Residential	6	D.U.s	10.67	64	0.84	5	1.13	7
UP-08-97 Oakbay Kimberly Dr.	SF Residential	5	D.U.s	12.47	62	0.98	5	1.32	7
UP-01-97 Batavia / Longwood	SF Residential	4	D.U.s	12.47	50	0.98	4	1.32	5
Sub8067 Camino Moraga	SF Residential	9	D.U.s	10.67	96	0.84	8	1.13	10
Sub7301 Moraga Valley Lane	SF Residential	25	D.U.s	10.67	267	0.84	21	1.13	28
Sub7764 Country Club Vista	SF Residential	16	D.U.s	10.67	171	0.84	13	1.13	18
Sub7351 Moraga Country Club	SF Residential	23	D.U.s	10.67	245	0.84	19	1.13	26
Sub7747 Moraga Country Club	SF Residential	45	D.U.s	10.67	480	0.84	38	1.13	51
MS602-91 Thoms	SF Residential	2	D.U.s	12.47	25	0.98	2	1.32	3
UP-10-96 Oakmont Senior Ass. Care Facility		76	Rooms	2.15	163	0.06	5	0.17	13
UP-03-95 Luxor Apartments	MF Residentia	25	D.U.s	7.73	193	0.59	15	0.72	18
UP-05-97 St. Mary's College Dormitories		80	Rooms	5	400	0.3	24	0.5	40
UP-12-97 Rheem Theatre	Movie Theatre	-499	Seats		0		0		0
UP-11-97 BofA ATM Kiosk	Auto Teller	(Exist.Conversion)			0		0		0
UP-06-97 Advanced Mobile Solutions Product Development Cente	R + D	28	GFA 000's	15.31	429	1.59	45	1.65	46
UP-03-97 Moraga Barn	Restaurant	35	Seats	4.83	169	0.01	2	0.47	16
Moraga Totals					2,815		205		288

Discussion w/ Tony

'98 Dowling study has LT's for school, library
Make up others as needed.

MOE's: delay from Moraga to S... travel speed
(EP → LOS?, access?)
SIMTRAFFIC/CORSIM

Peds:

1. Sim Ex Con
2. Prohibit LTs
3. 5th Lane
phase 2
4. effect of optimizing Brook/School.