Hatch Mott MacDonald
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User-Based Microanalysis of State Route 1, Pacific Coast Highway

El Segundo, California
Manhattan Beach, California
Hermosa Beach, California
Redondo Beach, California
Torrance, California

Prepared for:

Southern California Association of Governments.
Los Angeles, California

South Bay Cities Council of Governments
Rancho Palos Verdes, California

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1 INTRODUCTION

This report provides the conclusions and recommendations of the User-based Microanalysis of State Route 1 (SR 1), Pacific Coast Highway (PCH) Study. The study involved the analysis of SR 1 in the South Bay Cities area of Los Angeles County to identify short-term, low cost improvements that would improve traffic operations on the corridor.

The study corridor is 11 miles in length and extends between Imperial Highway in El Segundo and Crenshaw Boulevard in Torrance. SR 1 is a state facility and the study segment traverses the following five local jurisdictions:

1. El Segundo
2. Manhattan Beach
3. Hermosa Beach
4. Redondo Beach
5. Torrance

Exhibit 1 shows the SR 1 study segment.

The various traffic management policies set forth by the five local jurisdictions and Caltrans along the study corridor were investigated in this study. Existing traffic operations and the physical design elements of the corridor were documented. In addition, a major component of this study included the collection and consideration of personal observations and recommendations by people who actually drive the study corridor.

The following are highlights of the project objectives:

1. Identify and compare existing management practices (e.g., on-street parking policies, speed limits, lane channelization, etc.) within the various jurisdictions along the study corridor.

2. Develop an integrated operational strategy regarding corridor management practices that will treat the study corridor as a single transportation artery.

3. Document personal observations from actual users of the study corridor.

4. Identify short-term, low cost improvements and possible long-term improvements to reduce traffic congestion along the study corridor.

Study Approach

The study consisted of the following elements:

1. User Travel and Opinion Surveys
    a. Travel opinion survey distributed to major employers in El Segundo and nearby areas; and
    b. Trip diary survey – completed by a select number of corridor users to obtain greater detail of traffic operations and congestion.

2. Documentation of Corridor Characteristics
    a. Physical Design
    b. Operational Characteristics
    c. Corridor Management

3. Corridor Improvement Plan

Each study element is described in additional detail below.

User Travel and Opinion Survey

An online travel survey was utilized to solicit from users of the corridor their opinions of existing traffic operations on the corridor and suggestions for improvements. The survey was distributed to employees of major employers in the El Segundo area. The El Segundo Employers Association (ESEA) and the South Bay Cities Council of Governments (SBCCOG) assisted in obtaining the participation of ESEA companies.

The online survey was designed to gather the following types of information:

Origin, destination, major roadways traveled to and from work
Stops to and from work
Major congestion locations
Travel time to and from work
Other activities accomplished while traveling to or from work
Improvement suggestions

The travel opinion survey was developed as an electronic survey instrument that was posted on a website. The survey was designed to collect as much information, including opinions, with closed ended questions. This was done to limit the amount of tabulation that would be required and to reduce the time that would be required to complete the survey. Respondents were provided an opportunity to provide suggestions for improvement and observations of corridor traffic operations in a text box. The survey questions and the tabulation of the 3,036 surveys that were returned are contained in Appendix A.

Trip Diary

Respondents completing the online survey were asked to participate in a trip diary survey. Trip diaries were completed by 19 people. The trip diary participants recorded their personal observations of traffic conditions for a period of one week. The goal was to obtain additional detailed information from the users' perspective. Additionally, for a selected portion of study participants, the participant's travel patterns and travel times were recorded using GPS based technology. The travel time runs were completed by nine people. The trip diary questions and the results of the trip diary are contained in Appendix A.

Corridor Characteristics

Sources of secondary relevant data were requested from the participating cities and Caltrans. Information was also obtained via online sources. These reference materials include traffic counts from individual cities along the corridor, EIR's and traffic studies for recent development proposals, General Plan studies, Capital Improvement Plans, zoning maps, and other relevant information from other agencies. The secondary sources were the source information for existing traffic volumes, traffic operating conditions, planned and programmed improvements and corridor management policies. Existing geometric and traffic control characteristics including signalization, exclusive left-turn phasing and parking restrictions were verified and documented during a field inventory of the corridor.

Global Positioning System (GPS) and Geographical Information Systems (GIS)-based technology were used to conduct and document travel time runs along the study corridor during the morning and evening peak commute hours. The travel time runs provide a way to evaluate road segment and corridor operations based on the actual conditions that exist in the field. The method involves the use of a test vehicle equipped with a global positioning device. As the test vehicle travels along the study corridor, the GPS device records the position of the test vehicle in one-second intervals. The collected data was then used to determine the travel speed and travel time along the corridor.

The corridor characteristics are documented in Appendix B.

Zip Code Analysis

Besides participation in the online survey, companies were requested to provide the zip codes of their employees working in El Segundo. Based on employee zip code information provided by participating employers, a zip code map showing the residential distribution of employees was prepared. This map provides the basis for estimating the percentage of employees that use SR 1 and commute patterns, particularly commute patterns for people living south and southeast of the study corridor. People living south and southeast of the study corridor and working in El Segundo have alternative routes available to them. The zip code data provided a basis for estimating the potential usage on the southern segments of SR 1 to I-110. The zip code analysis is contained in Appendix C.

Corridor Improvement Plan

A Corridor Improvement Plan based on the results of the analysis was prepared that provides recommendations for physical improvements and traffic control policies. Conceptual improvement plans for 10 locations were prepared. Location-specific improvements and recommendations not shown on conceptual plans were identified in tabular form. Recommendations that fall into broader categories, such as corridor management and travel demand management policies were also identified.

The study identified improvements at 54 of the 125 intersections located on the study corridor. To minimize capital costs, a strategy of identifying improvements that could be implemented with pavement striping within the existing pavement width was employed. Pavement restriping is a low cost improvement that can usually be funded with gas tax funds. However, not all improvements identified in the study consist solely of pavement restriping. The list of improvements includes projects that require minor widening and projects that require extensive capital expenditures to construct.

Improvements were considered at all intersections with additional consideration given to "hot spots" and other locations that were identified in the study as experiencing poor traffic operations. The data collected for the study and the study findings were considered when reviewing possible improvements for each intersection. Factors considered include existing geometrics, right-of-way availability, existing volumes and intersection levels of service, where available, and suggestions and comments provided by the online and trip diary participants.

Report Organization

Appendix A of this report contains a memorandum that documents the results of the travel survey, Appendix B contains a memorandum that documents the physical and operational characteristics of the corridor and the corridor management practices and Appendix C contains the results of the employee home residence zip code analysis. The study conclusions are presented in Section 2 of this report and the study recommendations are presented in Section 3 of this report.

2 STUDY CONCLUSIONS

This section presents the conclusions for the User-based Microanalysis of Pacific Coast Highway Study. The conclusions are derived from the analysis of the traffic data collected and compiled for this study, the results of the travel opinion and trip diary surveys, review of planning documents related to the corridor and observations of traffic operations on the corridor.

The SR 1 study corridor between Crenshaw Boulevard and Imperial Highway provides important access and circulation functions for five different cities in the South Bay Cities area. It is a key component of the north-south circulation system that provides access to the El Segundo employment area bound by Imperial Highway, Sepulveda Boulevard (SR 1), Rosecrans Avenue and Aviation Boulevard.

In addition, SR 1 serves other local and regional generated trips. The study corridor is a key access route to LAX. The South Bay Cities are significant generators of recreation and tourist traffic that also utilize SR 1 for circulation and access. SR 1 provides primary access to commercial, employment and residential land uses that front SR 1 throughout the corridor. In addition to traffic on the corridor, significant volumes of cross traffic are generated on key arterials that intersect the corridor. While the predominant traffic flow on SR 1 south of El Segundo during the AM peak period is northbound and the predominant traffic flow during the PM peak commute period is southbound, the traffic generating and trip distribution characteristics of non-El Segundo area employment trips create traffic flows that conflict with the predominant commute traffic flows.

The following is a list of key findings and conclusions of this study:

1. Some corridor segments and intersections are currently over-saturated during periods of peak travel demand. In other words, the traffic demand exceeds intersection and segment capacity. The critical area of over-saturation is the intersection at Rosecrans Avenue and the segment between Rosecrans Avenue and Manhattan Beach Boulevard. The intersections at Hawthorne Boulevard and Crenshaw Boulevard also are over-saturated during the peak commute periods.

2. While a state-of-the-art Adaptive Traffic-Signal Control System (ATCS) has been installed on the SR 1 corridor, signal timing and synchronization appear to be an issue along the corridor, during both the peak commute and off-peak periods. Signal timing and synchronization are perceived by the public to not be efficient.

3. SR 1 traffic signals through the study area are controlled by an Adaptive Traffic-Signal Control System. ATCS is a state-of-the-art system that determines traffic signal timing parameters based on real-time traffic flows. Based on observations of corridor operations, good coordination and platoon progression are achieved on some segments of the corridor. However, the system is limited in its ability to serve over-saturated conditions and significant congestion occurs at several locations on the corridor.

Under over-saturated conditions, all traffic movements cannot be provided sufficient green time to serve the traffic demand. The system is currently programmed to favor through movements on SR 1 at the expense of turning movements from the side street approaches and left turn movements from SR 1. That is, the SR 1 through movements are provided long green times to maintain traffic flow progression on the corridor.

Side street approaches and left turn movements from SR 1 are not (and cannot be) provided sufficient green time to clear the vehicle queues at the oversaturated locations. Left turn queue spillback occurs on the side street approaches as well as on SR 1 itself. This affects the efficiency of other traffic movements on the approach. Under these conditions, motorists frequently resort to unsafe vehicle maneuvers due to excessive delays. These include red light running and intersection blocking.

4. Traffic demand at the SR 1/Rosecrans Avenue intersection exceeds available capacity during the PM peak commute period. This results in traffic queues forming in the southbound direction north of the intersection during the PM peak hour at this intersection. During the PM peak hour, the southbound right turn lane on SR 1 at Rosecrans is used as a "bypass" lane by through traffic and the left turn queue in the southbound direction extends beyond the existing left turn storage. Both of these events reduce the efficiency of the southbound through movement through this intersection during the PM peak hour. Significant queuing also occurs on the Rosecrans Avenue approaches to SR 1, particularly in the westbound direction during the PM peak period.

5. Critical choke points along the corridor are Catalina Avenue during the AM peak period and Rosecrans Avenue, Manhattan Beach Boulevard, Pier Avenue, Aviation Boulevard and Torrance Boulevard during the PM peak period. The Manhattan Beach Boulevard intersection is a significant choke point during the PM peak commute period and it meters southbound traffic flow during the PM peak period. Once through this intersection, southbound traffic can most often continue to Pier Avenue/Aviation Boulevard traffic queue before stopping. If the capacity limitation in the southbound direction were relieved at Manhattan Beach Boulevard, traffic conditions further south would be worse, particularly on the approach to Aviation Boulevard.

6. Inadequate left turn storage is an issue at many locations along the corridor, particularly in the southbound direction during the PM commute period. The survey respondents identified several locations along the corridor where left turn queue spillback is a problem. Generally, segments in El Segundo and Manhattan Beach were identified as having left turn spillback problems with the southbound approach of SR 1 at Rosecrans Avenue and Torrance Boulevard identified most often. Locations identified by the user survey with left turn spillback include:

    a. Mariposa Avenue
    b. Grand Avenue
    c. Plaza El Segundo
    d. Manhattan Beach Mall (33rd Street)
    e. Marine Avenue
    f. Target Driveway (14th Street)

g. Manhattan Beach Boulevard
h. Artesia Boulevard-Gould Avenue
i. Aviation Boulevard
j. Anita Street
k. Torrance Boulevard
l. Palos Verdes Boulevard

Inadequate left turn storage length results in 1) left turn spillback, which causes the vehicles in the left turn queue to block the inside through lane and 2) left turn lane blocking, which occurs when the through traffic queue extends beyond the entry into the left turn lane prohibiting vehicles from entering the left turn storage bay. Left turn restrictions from the major street at unsignalized mid-block intersections can contribute to left turn spillback and left turn lane blocking. The left turn restrictions at the unsignalized intersections cause traffic to concentrate at signalized intersections. Unless the left turn lanes at the signalized intersection are properly sized and provided adequate green time to clear vehicles, the additional traffic that is required to turn lane at a signalized intersection increases the left turn demand at the intersection and can contribute to left turn spillback.

4. Side street approaches that were identified by survey respondents with left turn queuing issues are as follows:

   a. El Segundo Boulevard
   b. Rosecrans Avenue
   c. Artesia Boulevard-Gould Avenue
   d. Torrance Boulevard
   e. Palos Verdes Boulevard
   f. Hawthorne Boulevard
   g. Crenshaw Boulevard

   Many, but not all of these locations were noted during field visits during the course of this study and in studies performed by each of the cities along the corridor.

   The lack of left turn channelization on SR 1 at intersections in the southern portion of Redondo Beach causes delays to through traffic when vehicles stop in the inside through lane to perform a left turn movement. Due to the location of existing development along SR 1 through Redondo Beach, SR 1 cannot be widened. The only way to provide left turn lanes at these locations in the near term is to remove existing on-street parking. Off-street parking is limited in this area. Therefore, the removal of on-street parking would have a negative impact on nearby businesses and residents. The SR 1 right-of-way in Redondo Beach is typically 80 feet in width. The City is obtaining an additional 20 feet of right-of-way as parcels fronting SR 1 redevelop. With the additional width, left turn channelization could be provided on SR 1 through Redondo Beach. However, this will take several years to achieve.

5. On-street parking along the corridor appears to contribute to a higher collision rate than segments with no on-street parking. Vehicles stopping at the curb and pulling away from the curb and sight distance reduction for vehicles on side street approaches are conditions that increase the potential safety hazard created by on-street parking. Vehicles parked in the curb lane during peak commute periods also reduce corridor capacity.

6. There are no bus turnouts throughout most of the study corridor. Buses stopped at bus stops occupy a travel lane, thus reducing corridor capacity and creating a potential safety hazard.

7. Construction and/or closed lanes during peak commute periods reduces corridor capacity and creates a potential safety hazard.

8. Delivery and garbage trucks stopped in outside lane during peak commute periods reduces corridor capacity and creates a potential safety hazard.

9. Congestion occurs at most lane drop locations (where the road transitions from four lanes to three lanes or three lanes to two lanes). The most critical lane drop locations are southbound SR 1 at Rosecrans Avenue and eastbound SR 1 at Crenshaw Boulevard.

A list of "hot spots" on the SR 1 study corridor is presented below. The location of each hot spot is shown on Exhibit 2.

1. SR 1/Rosecrans – demand exceeds capacity; four southbound lanes transitions to three southbound lanes.
2. SR 1/Marine Avenue – close spacing to adjacent intersection to the east creates inefficient signal timing and traffic operation.
3. SR 1/Manhattan Beach Boulevard – choke point for southbound traffic during the PM peak commute due to high intersecting volumes that must be provided green time.
4. SR 1/Pier Avenue and SR 1/Aviation Boulevard – high volumes from intersecting street (Aviation Boulevard) reduces green time available for other movements.
5. Northbound SR 1 approaching Catalina Avenue – high volumes intersecting from Catalina Avenue during the AM peak period reduces green time available to northbound traffic. At Catalina Avenue, northbound lanes transition from two lanes to three lanes, but the third SR 1 lane northbound at Catalina is short such that its lane utilization may not be 100 percent during congested periods. Also, the proximity of the Catalina Avenue intersection with respect to the Anita Street-Herondo Street intersection is a challenging condition to efficiently coordinate.
6. Unrestricted left turns through Redondo Beach with no left turn lanes at several locations.
7. Inadequate left turn storage on SR 1 throughout the corridor, but particularly at Mariposa Avenue, Grand Avenue, Rosecrans Avenue, 33rd Avenue (Manhattan Village Mall), Marine Avenue, Manhattan Beach Boulevard, Target Driveway, Artesia Boulevard-Gould Avenue, Torrance Boulevard, Palos Verdes Boulevard – Avenue I, Aviation Boulevard, Anita Street.
8. Inadequate storage on side street approaches, particularly at Rosecrans Avenue, Marine Avenue, Manhattan Beach Boulevard, Artesia Boulevard-Gould Avenue, Torrance Boulevard, Hawthorne Boulevard and Crenshaw Boulevard.

9. Northbound right turn movement at Imperial Highway – extended queue during the PM peak period.
10. Eastbound SR 1 approaching Crenshaw – transition from three eastbound lanes to two eastbound lanes.

Throughout the corridor, no bus turnouts, stopped vehicles in the outside curb lane during peak commute periods where parking is prohibited and lane closures are conditions that negatively impact traffic operations during the peak commute periods.

3 CORRIDOR IMPROVEMENT PLAN

This section documents recommendations for improvements to SR 1 between Crenshaw Boulevard in Torrance and Imperial Highway in El Segundo. Intersection improvements, corridor management, and travel demand management recommendations are provided. The recommendations were derived from an analysis and review of all data collected for the study User-based Microanalysis of SR 1. Memorandums documenting the results of the travel opinion survey and trip diary survey are included in Appendix A and the physical characteristics, operational characteristics and corridor management are included in Appendix B.

The objective of this study is to identify low-cost, short-term improvements and corridor management practices that can be implemented to improve traffic operations on the SR 1 corridor through the South Bay Cities community. Right of way availability is limited along many sections of the corridor and where available is very expensive. Significant new capacity is not achievable along the SR 1 study corridor without significant capital expenditures to widen the existing roadway and/or develop/improve alternative, parallel routes. Significant widening of the corridor or alternative routes would cause significant economic and social disruptions. Therefore, the physical improvements focus on changes that can be made within the existing curb-to-curb widths.

In addition, the recommendations of this study focus on providing additional capacity on the side street approaches to SR 1, increasing left turn storage space on SR 1 as well as corridor and travel demand management strategies. Additional capacity on the side street approaches would reduce the amount of green time required to serve side street approaches, which would increase the green time available for through movements on SR 1. Providing additional left turn storage space on SR 1, particularly in the southbound direction, would reduce the potential for left turn spillback into the adjacent through lanes.

Intersection Improvements

In this section, recommended improvements at the study intersections are described. Because right of way costs are expensive with limited availability at some locations, the focus was to identify improvements that would only require restriping and modification of an existing raised median. In some cases, modification of existing signals may be required and right of way may be required. Therefore, not all improvements recommended in this study are necessarily low-cost improvements.

To reduce the need for additional right of way, lanes widths less than 12 feet wide are recommended at several locations on SR 1 and on the intersecting approaches. The Caltrans standard lane width is 12 feet, but 10 foot widths are acceptable with a design exception. The lane width recommendations will require approval from Caltrans and the local cities.

Exhibit 3 provides a tabular listing of the recommended intersection improvements. The improvements are individually discussed below.

SR 1 (Sepulveda Blvd.) / Imperial Highway (#1) is a signalized intersection operating at LOS F during the AM and PM peak hours. The northbound SR 1 right turn queue extends several hundred feet south from the intersection approach during the PM peak period. A second northbound right turn lane is recommended to increase right turn capacity and to reduce the length of the vehicle queue. This could be accomplished by converting the striped island on the south leg of this intersection into a right turn lane. **A conceptual plan of this improvement is provided as Exhibit L-1.**

SR 1 (Sepulveda Blvd.) / Sycamore Avenue (#3) is a stop controlled intersection. It is recommended that the left and through movements from the eastbound approach on Sycamore Avenue be prohibited. This improvement is also recommended at other unsignalized intersections on SR 1 in El Segundo to reduce intersection conflicts.

SR 1 (Sepulveda Blvd.) / Maple Avenue (#4) is a signalized intersection operating at LOS B during the AM and PM peak hours. There are no significant operational problems at this intersection. Additional capacity could be provided by adding a second westbound Maple Avenue left turn lane. This could be accomplished by moving the centerline striping to the south on westbound Maple Avenue.

SR 1 (Sepulveda Blvd.) / Palm Avenue (#5) is a stop controlled intersection. Install improvements to prohibit eastbound Palm Avenue left turn movements.

SR 1 (Sepulveda Blvd.) / Mariposa Avenue (#6) is a signalized intersection operating at LOS C during the AM and PM peak hours. Demand exceeds capacity for the westbound Mariposa Avenue left turn during the PM peak period. Add a second westbound Mariposa Avenue left turn lane and protected left turn phasing on the eastbound and westbound approaches. This could be accomplished by eliminating the striped median and modifying the signal. **A conceptual plan of this improvement is provided as Exhibit L-2.**

SR 1 (Sepulveda Blvd.) / Holly Avenue (#7) is a stop controlled intersection. Install improvements to prohibit eastbound Holly Avenue left turns and through movements.

SR 1 (Sepulveda Blvd.) / Grand Avenue (#8) is a signalized intersection operating at LOS C during the AM and PM peak hours. The northbound SR 1 left turn lane overflows during peak periods based on observations at the intersection. Add a second northbound left turn lane. This could be accomplished by eliminating the raised median and narrowing the lanes on the northbound approach. **A conceptual plan of this improvement is provided as Exhibit L-3.**

SR 1 (Sepulveda Blvd.) / El Segundo Boulevard (#10) is a signalized intersection operating at LOS E during the AM peak hour and LOS D during the PM peak hour. Demand exceeds capacity for the westbound El Segundo Boulevard left turn during the PM peak period. Restripe the westbound El Segundo Boulevard approach to provide two exclusive left turn lanes, a shared left/through lane and a right turn lane. This improvement will require the installation of traffic control signs indicating the configuration of the lanes on the westbound approach. This improvement would provide three left turn lanes for the westbound approach. **A conceptual plan of this improvement is provided as Exhibit L-4.**

SR 1 (Sepulveda Blvd.) / Rosecrans Avenue (#13) is a signalized intersection operating at LOS F during the AM and PM peak hours. The northbound and southbound SR 1 left turn lanes overflow into the adjacent through lanes. Modify the SR 1 median to accommodate the lengthening of the left turn lanes on the northbound SR 1 approach. Restripe the northbound lanes on the north leg of the intersection to accommodate lengthening of the southbound SR 1 left turn lanes. Modify the median on the eastbound approach to accommodate longer eastbound left turn lanes. Modify the roadway striping to open a fourth northbound through lane on northbound SR 1 and to include a northbound receiving lane for the westbound free right turns. The City of Manhattan Beach has a planned project that would widen the SR 1 bridge located south of Rosecrans. When widened, four northbound lanes will be provided from Marine Avenue through Rosecrans Avenue. The City of Manhattan Beach estimates that the bridge widening project will be constructed in 2013 assuming full funding is achieved. **A conceptual plan of these improvements is provided as Exhibit L-5.**

SR 1 (Sepulveda Blvd.) / N. Valley Drive (#14) is a stop controlled intersection. Install improvements to prohibit eastbound N. Valley Drive left turns. Prohibit northbound SR 1 left turns and eliminate the northbound SR 1 left turn lane.

SR 1 (Sepulveda Blvd.) / 33rd Street (#15) is a signalized intersection operating at LOS B and LOS D during the AM and PM peak hours, respectively. The southbound left turn queue extends into the southbound SR 1 through lanes. Also, the vehicle queue on the eastbound Village Mall access road extends from the ring road into SR 1 during periods of peak travel demand. Restripe SR 1 to accommodate a longer southbound SR 1 left turn lane. This would require the elimination of the northbound left turn lane at the N. Valley Drive intersection, as discussed above. Modify the traffic control at the three leg intersection at 33rd St./Manhattan Village ring road. Currently, the inbound 33rd St. approach to the ring road is stop controlled. Remove the stop sign on the inbound approach and add stop control to the ring road approaches. Remove the north-south crosswalk and add east-west crosswalks across both ring road approaches.

SR 1 (Sepulveda Blvd.) / 30th Street (#16) is a signalized intersection operating at LOS A and LOS D during the AM and PM peak hours, respectively. Modify the median to accommodate a longer northbound SR 1 left turn lane.

SR 1 (Sepulveda Blvd.) / Marine Avenue (#18) is a signalized intersection operating at LOS D during the AM and PM peak hours. The adjacent intersection of Cedar Avenue / Marine Avenue is approximately 350 feet to the east of the SR 1 / Marine Avenue intersection. The vehicle queue on the eastbound Marine Avenue approach to Cedar Avenue was observed extending into and through the SR 1/Marine Avenue intersection. The coordination between the signals on Marine Avenue at SR 1 and Cedar Avenue should be re-evaluated to determine if the queue spillback from the Cedar Avenue intersection into SR 1 can be eliminated. The City of Manhattan Beach has a planned project that will add a second left turn lane on the westbound Marine Avenue approach to SR 1. It is recommended that conversion of the full signal at the Cedar Avenue / Marine Avenue intersection to a half signal be considered. Closing the south leg (Cedar Avenue) of the intersection and converting the westbound Marine Avenue left turn lane at Cedar Avenue into a westbound through lane would improve traffic operations at this location are reduce the complexities of coordinating the operation of the two intersections. In addition, add an eastbound acceleration lane and lengthen the southbound left turn lane at the Cedar

Avenue / Marine Avenue intersection. **A conceptual plan of these improvements is provided as Exhibit L-6.**

SR 1 (Sepulveda Blvd.) / 14th Street (#23) is a stop controlled intersection. Modify the median to accommodate a longer southbound SR 1 left turn lane that serves the Target store. Left turn spillback at this location was specifically cited in the user survey as a problem.

SR 1 (Sepulveda Blvd.) / Manhattan Beach Boulevard (#24) is a signalized intersection operating at LOS D and LOS F during the AM and PM peak hours, respectively. There is significant congestion at this intersection, particularly on the east and west legs, which carry a relatively high volume of east-west traffic during the peak periods. The City of Manhattan Beach has a planned project that would construct dual left turn lanes on the eastbound Manhattan Beach and northbound SR 1 approaches. It is recommended that dual left turns on the westbound approach also be considered as this left turn lane experiences queue spillback during the peak periods. Also, prohibit southbound SR 1 left turns into the Target Store driveway just north of Manhattan Beach Boulevard.

SR 1 (Sepulveda Blvd.) from 11th Street to Tennyson Street (#25 to #42) – Remove the raised median to accommodate a two-way-left-turn lane where short left turn lanes are provided.

SR 1 (Sepulveda Blvd.) / 2nd Street (#33) is a signalized intersection operating at LOS A and LOS C during the AM and PM peak hours, respectively. Lengthen the eastbound 2nd Street left turn lane.

SR 1 (Pacific Coast Highway) / 14th Street-Pier Avenue (#53) is a signalized intersection operating at LOS C during the AM and PM peak hours. Remove on-street parking on the south side of Pier Avenue to accommodate a longer eastbound Pier Avenue right turn lane. This improvement will ensure that right turn motorists will avoid the eastbound queue on Pier Avenue on the approach to SR 1.

SR 1 (Pacific Coast Highway) / Aviation Boulevard (#57) is a signalized intersection operating at LOS F and LOS E during the AM and PM peak hours, respectively. Aviation Boulevard parallels SR 1 north of this intersection and it provides an alternative north-south travel route. Southbound traffic converges at this location in the PM peak period. The left turn queue in the southbound direction on SR 1 spills back into the southbound through lanes during the PM peak period. The City of Hermosa Beach has proposed improvements at the Aviation Boulevard intersection that would provide two left turn lanes on the southbound approach. This would require providing two eastbound lanes on Aviation Boulevard east of SR 1. As an alternative or in addition to the two southbound left turn lanes, it is recommended that a third left turn lane be provided on the westbound Aviation Boulevard approach to SR 1. A concept plan is attached that shows how the improvement could be accomplished without the second southbound SR 1 left turn lane, but with a longer southbound left turn lane. The median on the north leg of the intersection would be modified to accommodate a longer southbound SR 1 left turn lane. To provide three left turn lanes on the east leg of the intersection, the eastbound Aviation Boulevard left turn lane into the Park Pacific Shopping Center is eliminated and the lane converted to a third westbound Aviation Boulevard left turn lane at SR 1. Should it not be possible to eliminate the left turn access into the shopping center, widening into the park on the north side of Aviation

Boulevard would be required. **A conceptual plan of this improvement is provided as Exhibit L-7.**

SR 1 (Pacific Coast Highway) / 1st Street (#73) is a stop controlled intersection. Prohibit eastbound 1st Street left turns and through movements. This would be required to accommodate the recommended improvements at the SR 1 / Anita Street-Herondo Street intersection (below). Prohibit northbound left turn from SR 1 to 1st Street.

SR 1 (Pacific Coast Highway) / Anita Street-Herondo Street (#74) is a signalized intersection operating at LOS E during the AM and PM peak hours. Modify the median on the north leg of the intersection to accommodate a longer southbound SR 1 left turn lane at Anita Street-Herondo Street.

SR 1 (Pacific Coast Highway) / Catalina Avenue (#75) is a signalized intersection operating at LOS B and LOS E during the AM and PM peak hours, respectively. The LOS B operation in the AM peak hour may be understated (worse than calculated). A third northbound lane begins immediately south of this intersection. Because of the short length of the third northbound lane, it is probably not fully utilized by northbound traffic during the AM peak period. It is recommended that the median striping on eastbound Catalina Avenue be modified to accommodate a third eastbound Catalina Avenue left turn lane.

SR 1 (Pacific Coast Highway) / Guadalupe Avenue (#78) is a stop controlled intersection. Left turn channelization is not provided on southbound SR 1 at Guadalupe Avenue. Modify the signing and striping at this intersection to prohibit westbound Guadalupe Avenue left turns and southbound SR 1 left turns.

SR 1 (Pacific Coast Highway) / Beryl Street (#79) is a signal controlled intersection operating at LOS D and LOS E during the AM and PM peak hours, respectively. Redondo Beach has a planned improvement to add a second left turn lane on the northbound approach. The project is not funded and there is no timeline for implementation.

SR 1 (Pacific Coast Highway) / Diamond Street (#81) is a signalized intersection operating at LOS B and LOS A during the AM and PM peak hours, respectively. Install lane line extensions through the intersection on the northbound and southbound approaches to improve traffic flow through the intersection.

SR 1 (Pacific Coast Highway) / Torrance Boulevard (#85) is a signalized intersection operating at LOS D and LOS E during the AM and PM peak hours, respectively. The southbound SR 1 left turn lane overflows during peak periods based on field observations at the intersection. Eliminate parking on the west side of SR 1 to accommodate a longer southbound SR 1 left turn lane and modify the striping on westbound Torrance Boulevard to a accommodate a longer westbound Torrance Boulevard right turn lane. Redondo Beach has a planned improvement to add a right turn lane on the northbound approach. The project is not funded and there is no schedule for implementation. **A conceptual plan of these improvements is provided as Exhibit L-8.**

SR 1 (Pacific Coast Highway) / Avenue B (#92) is a stop controlled intersection. Restripe the roadway as necessary to accommodate northbound and southbound left turn lanes on SR 1. This could be accomplished by shifting the southbound through lanes to the west and shifting the northbound through lanes to the east and eliminating parking where necessary. As an alternative, prohibit left turns from SR 1.

SR 1 (Pacific Coast Highway) / Avenue D (#94) is a stop controlled intersection. Restripe the roadway as necessary to accommodate northbound and southbound left turn lanes on SR 1. This could be accomplished by shifting the southbound through lanes to the west and shifting the northbound through lanes to the east and eliminating parking where necessary. As an alternative, prohibit left turns from SR 1.

SR 1 (Pacific Coast Highway) / Avenue E (#95) is a stop controlled intersection. Restripe the roadway as necessary to accommodate northbound and southbound left turn lanes on SR 1. This could be accomplished by shifting the southbound through lanes to the west and shifting the northbound through lanes to the east and eliminating parking where necessary. As an alternative, prohibit left turns from SR 1.

SR 1 (Pacific Coast Highway) / Avenue G (#97) is a stop controlled intersection. Restripe the roadway as necessary to accommodate northbound and southbound left turn lanes on SR 1. This could be accomplished by shifting the southbound through lanes to the west and shifting the northbound through lanes to the east and eliminating parking where necessary. As an alternative, prohibit left turns from SR 1.

SR 1 (Pacific Coast Highway) / Avenue I (#100) is a stop controlled intersection. In conjunction with the improvements recommended at the SR 1 / Palos Verdes Boulevard intersection (discussed below), lengthen the westbound SR 1 left turn lane at Avenue I by shifting the westbound SR 1 receiving lanes to the north and removing on-street parking on the north side of SR 1 where necessary.

SR 1 (Pacific Coast Highway) / Palos Verdes Boulevard (#102) is a signalized intersection operating at LOS D and LOS E during the AM and PM peak hours, respectively. The adjacent intersection of SR 1 (Pacific Coast Highway) / Avenue I is approximately 165 feet north of the SR 1 / Palos Verdes Boulevard intersection. The westbound SR 1 left turning traffic at Avenue I overflows to the SR 1 / Palos Verdes Boulevard intersection and the eastbound SR 1 left turn queue spills back into the eastbound through lanes during periods of peak travel demand. To alleviate congestion at the Palos Verdes Boulevard intersection, create side-by-side left turns on SR 1 between Avenue I and Palos Verdes Boulevard. This will require shifting the westbound SR 1 travel lanes to the north, removal of on-street parking on the north side of SR 1 where necessary and removal of the median channelization island. Restripe the eastbound SR 1 approach to accommodate a short right turn lane at Palos Verdes Boulevard. Add a second northbound Palos Verdes Boulevard left turn lane by reducing all lane widths to 10 feet. **A conceptual plan of the recommended improvements is provided as Exhibit L-9.** The Redondo Beach Circulation Element of the General Plan identifies a planned improvement consisting of adding right turn lanes to the southbound Palos Verdes Boulevard and eastbound SR 1 approaches.

SR 1 (Pacific Coast Highway) / Calle Mayor (#109) is a signalized intersection operating at LOS F during the AM and PM peak hours. Widening the intersection to provide additional lanes is difficult to accomplish given topography constraints and existing development adjacent to the intersection. Intersection operations would be improved by adding a right turn lane on the westbound SR 1 approach. This would require eliminating the median and reducing and/or eliminating bike lanes.

SR 1 (Pacific Coast Highway) / High School Driveway (#110) is a stop controlled intersection. Traffic congestion occurs during the morning peak period as parents drop students off at the high school. The addition of a westbound SR 1 right turn lane at the school driveway is recommended. Also, additional enforcement of no drop-off and pick-up restrictions on SR 1 at the high school should be considered.

SR 1 (Pacific Coast Highway) / Vista Montana - Anza Avenue (#112) is a signalized intersection operating at LOS D during the AM and PM peak hours. The City of Torrance has a planned project that would restripe to add a southbound through lane and convert the north-south phasing to protected left turns. It is recommended that the additional lane on the north leg be utilized as a second left turn lane. This can be accomplished by eliminating the median on the north leg and modifying the striping on the northbound Anza Avenue receiving lanes to accommodate a second southbound Anza Avenue left turn lane. Also, modify the roadway striping to accommodate a longer northbound Vista Montana left turn lane.

SR 1 (Pacific Coast Highway) / Hawthorne Boulevard (#116) is a signalized intersection operating in the near-term at LOS D during the AM and PM peak hours according to the City of Torrance. Caltrans completed a Project Study Report in 2002 to provide improvements at the intersection to increase intersection capacity. The improvement alternatives would add one left turn lane on eastbound SR 1, one left turn lane on westbound SR 1, one right turn lane on eastbound SR 1, one right turn lane on westbound SR 1 and one right turn lane on northbound Hawthorne Boulevard. Subsequent to the completion of the PSR, the City of Torrance is proposing to implement the northbound right turn lane on Hawthorne and the additional right turn lanes on SR 1. The proposed project is not currently funded for construction. Appendix D contains a conceptual plan of the proposed improvements at the Hawthorne Boulevard intersection.

SR 1 (Pacific Coast Highway) / Rolling Hills Way (#124) is a signalized intersection operating at LOS A and LOS B during the AM and PM peak hours. Modify the striping to accommodate a longer northbound Rolling Hills Way left turn lane.

SR 1 (Sepulveda Blvd.) / Crenshaw Boulevard (#125) is a signalized intersection operating in the near-term at LOS E and LOS F during the AM and PM peak hours, respectively, according to the City of Torrance. The southbound Crenshaw Boulevard left turn lane queue extends into the southbound through lanes. The lane drop from three lanes to two lanes on eastbound SR 1 west of Crenshaw constrains eastbound capacity on SR 1. Improvements recommended at this intersection are to add a second southbound left turn lane on Crenshaw Boulevard. Adding the second southbound left turn lane within the existing curb-to-curb width should be evaluated. By removing the median, shifting the northbound Crenshaw Boulevard through lane striping to the east and shifting the southbound Crenshaw Boulevard through lane striping to the west, it may be

possible to accommodate a second southbound left turn lane on Crenshaw Boulevard without widening the roadway. Also, add an overlap phase to the northbound Crenshaw Boulevard right turn. The City of Torrance has proposed these improvements at this location as well as providing the third eastbound through lane through the intersection. However, the proposed concept plans prepared by the City of Torrance require right of way on both Crenshaw Boulevard and SR 1 for the improvements. In addition to the improvements listed above, a bus turn-out for eastbound busses on SR 1 on the southeast corner of the SR 1 / Crenshaw Boulevard intersection is recommended. This will require right-of-way acquisition in the existing parking strip area and a signal modification at the southeast corner of the intersection. Ultimately, this right of way will be required for the third eastbound through lane on SR 1 and the bus turnout would be eliminated. **A conceptual plan of these improvements is provided as Exhibit L-10.** Appendix D contains a conceptual plan of improvements proposed by the City of Torrance at the Crenshaw Boulevard intersection.

Recommendations contained in this report may conflict with policies and objectives of the local jurisdictions in the South Bay area. One example is the raised landscaped median on SR 1 in the City of Manhattan Beach. The raised median is landscaped, which enhances SR 1 visually and provides defined left turn lanes that are easily controlled with traffic control signs. However, the raised median defines the maximum amount of storage space that is available for left turns and provides no flexibility when demand exceeds capacity. A flush median with a two-way left turn lane provides flexibility in serving traffic demands that vary throughout the day and removing the left turn channelization to provide a flush two-way left turn lane is recommended at several locations to provide additional left turn storage space. The southbound left turn movement to the Target store at 14th Street, which is not prohibited during the PM peak period is one location where modification of the raised median to provide additional left turn storage space should be considered. This is one location identified by users in the online survey that experiences left turn spill back problems.

Providing bus turnouts on SR 1 would improve corridor capacity and reduce potential safety hazards caused by stopped buses. At any one time, it is estimated that there are three to four buses on the corridor in the peak direction based on headways between buses. Limited existing right of way and development located adjacent to the travel way are constraints for locating bus turnouts on the corridor at the present time. As properties redevelop, additional right of way should be obtained to provide for bus turnouts.

Corridor Management

Signal Timing/Coordination

The challenge for achieving maximum capacity of the SR 1 corridor is to balance the green time provided to through movements on SR 1 with green time provided to left turn movements from SR 1 and side street movements. Traffic progression on SR 1 is best achieved by maximizing the green time allocated SR 1 while minimizing the green time provided to the intersecting streets. When insufficient green time is provided to side street movements to clear side street traffic queues, traffic diversion to alternative routes, if available, is encouraged (including residential streets). In addition, illegal or unsafe movements may be encouraged such as red light running and intersection blocking. When inadequate green time is provided to the left turn

movements on SR 1 in the peak direction, left turn queue spillback reduces the capacity of the through lanes on SR 1.

It is recommended that the current signal timing and coordination parameters for the corridor be re-evaluated. While vehicle progression is relatively good on some segments of SR 1, adequate green time for left turn movements from SR 1 may be too short relative to the demand. Similarly, green time for left turns from the side streets may be too short, particularly on the northern sections of the SR 1. The following issues should be considered:

1. The current signal timing parameters may not fully reflect traffic generated by Plaza El Segundo.
2. Off-peak timing parameters should be reassessed. The travel time run conducted at midnight encountered a 60 second delay at Park Place in the northbound direction. This would appear to be excessive delay at that location at that time of day.
3. Cycling the left turn phases on SR 1 twice during a single signal cycle should be considered if not currently utilized. This allows the left turn signal in the peak direction to turn green prior to the green for the opposing through movements and to turn green a second time after the opposing though movements have been provided green time. This operation clears the left turn lane twice during the signal cycle.
4. Methods for vehicle detection should be reviewed as vehicle demand in some turning lanes may be underestimated due to queue spillback or lane blockage.
5. Signal timing and coordination on streets that intersect SR 1 and on routes that parallel SR 1, such as Aviation Boulevard, should also be considered to improve traffic operations in the area.

Over-saturated traffic conditions may be the main cause of congestion at some of the intersections such that signal timing enhancements by itself would not provide significant benefits to the operation of the system. Roadway widening, including acquisition of additional right of way, would be required to improve traffic operations. Further, good vehicle progression may not be achievable when traffic flows in opposing directions on SR 1 are more evenly balanced and where intersecting traffic volumes are high. This is generally the condition in Torrance and at the Hawthorne and Crenshaw intersections in particular.

Left Turn Management

It is recommended that left turn movements be prohibited at locations that do not have left turn lanes. As an alternative, left turn lanes could be provided at these locations, but this would require elimination of on-street parking on SR 1. The locations without left turn channelization are in Redondo Beach.

Left turn lanes on SR 1 should be extended where feasible, particularly in the southbound direction. Signal timing at these locations should be reviewed to ensure that adequate green time is provided to the movements.

On-Street Parking

Eliminating on-street parking on the corridor is not a recommendation of this study. However, eliminating on-street parking at locations to lengthen left turn lanes or provide left turn channelization should be considered. Traffic operations on the corridor would be more efficient and potential hazardous locations would be reduced if parking were eliminated on the corridor. However, off-street alternatives to current on-street parking are not readily available along the corridor. As sections of the corridor redevelop, additional off-street parking alternatives should be considered so that on-street parking can be removed on SR 1.

Parked vehicles in the dual use curb lane during restricted parking times requires continuous enforcement. The curb parking lane should be cleared prior to each peak period and towing services available to tow parked and disabled vehicles throughout the peak periods. This is primarily required in Manhattan Beach and Hermosa Beach. Enforcing no stopping/parking restrictions on delivery vehicles to businesses located on the corridor requires coordination between each local jurisdiction and the businesses that front SR 1 along the study corridor. It is recommended that each city request the cooperation of businesses located on the corridor to schedule pick-ups and deliveries outside the peak commute periods.

Incident Response

Vehicles involved in accidents and disabled vehicles disrupt traffic flow and can affect traffic flow for multiple hours after the incident is cleared. Quick response and clear times are important in maintaining stable flow on the corridor. The installation of CCTV cameras on SR 1 would expedite response time to accidents, vehicle breakdowns and illegal parking.

Intelligent Transportation Systems (ITS)

Considerable emphasis is being placed in ITS improvements throughout Los Angeles County including the South Bay Cities area as a means of improving the efficiency of the existing transportation system. The City of Torrance recently brought online a Traffic Management Center that allows the City to monitor traffic conditions on streets throughout the city. SR 1 is monitored by Caltrans and they have the ability to modify timing plans to adapt to changing traffic conditions. The City of Redondo Beach is also planning to implement a Traffic Management Center. Ultimately, an Information Exchange Network will be established in the South Bay region that will allow traffic signal data to be shared across jurisdictional boundaries. It is important given the deficit in roadway capacity versus traffic demand throughout the system that the existing system of traffic signals be linked and coordinated. This includes ultimately coordinating the SR 1 system with signals on the intersecting streets.

Access Management

Access management strategies should be considered, particularly as individual segments and blocks redevelop. Left turn restrictions is one type of access management that is currently utilized on the corridor to reduce vehicle conflicts during the peak commute periods. Other access management strategies that should be considered are consolidation of existing driveways, conversion of side streets to one-way couplets where appropriate and right-in-right-out only

driveways where feasible. Reciprocal access between adjacent parcels on the same block would allow the number of existing curb cuts to be removed. Right turn lanes should be considered at major intersections and driveways to high trip generating land uses. Minimally, driveway designs that include a taper should be considered. These driveway designs are currently used in Torrance.

Travel Demand Management

The large companies in the El Segundo employment areas currently maintain extensive Transportation Demand Management programs. These programs strive to reduce single-occupant vehicle trips. The programs include incentives to promote transit use, vanpooling, carpooling, biking and walking.

Carpool and vanpool usage increases as distances between home and work increase. The commuting distance of employees living along the corridor would not appear to be of sufficient length to encourage significant percentages of El Segundo commuters living in the South Bay communities to form carpools and vanpools.

The travel time runs collected for this study and input from the survey respondents indicate traffic conditions are better along the corridor before 7:30 AM than after 7:30 AM and before 4:30 PM than after 4:30 PM. The participating companies already have a significant number of employees arriving before 7:30 AM (46%). However, it appears that with more capacity available before 7:30 AM than after 7:30 AM, employees that could shift to an earlier starting time would experience better driving conditions in the morning. Also, employees beginning work earlier and leaving work earlier would experience better driving conditions for the work to home commute as well.

The establishment of satellite offices for El Segundo employers in the southern portion of the study area is a strategy that could reduce commute trips on the study corridor. The amount of commute trip reduction would depend on the number of employees that live in the South Bay area that could be relocated from the primary job location in El Segundo to a satellite office. Security policies of the individual companies and the need to synergize employee functions at one location would be constraints to a satellite office strategy.

Future Considerations

SR 1 through the South Bay area functions to provide through traffic circulation as well as access to development located immediately adjacent to the facility and local circulation for traffic generated by other development located in the vicinity of the corridor. The roadway design and traffic control requirements for the through traffic function may conflict with the requirements of the local circulation and access function. For example, through traffic requires through lane capacity while local traffic requires left and right turn capacity including green time to enter and exit the corridor. The challenge is to provide a design and management strategy that balances both.

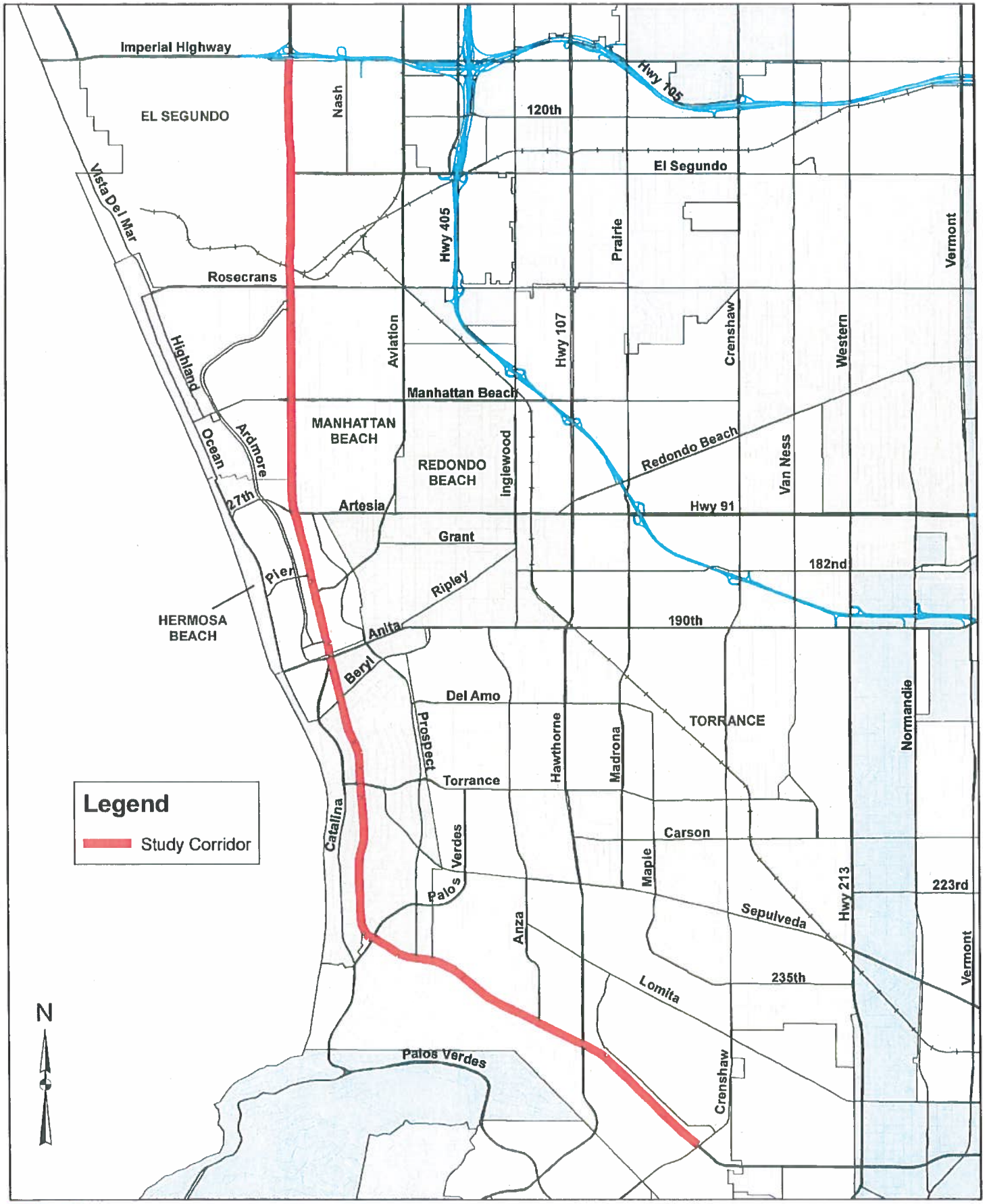
Within each city, the relative importance of the through traffic and local circulation and access functions may not be the same. Therefore, the roadway design needs and corridor management strategies should be tailored to each city's specific needs. It is recommended that a corridor design and management plan be developed that defines the ultimate right of way that would be available on each segment and defines the cross-sectional elements of the roadway. In addition, the plan should include integrated operational strategies for the corridor. Future plans for the corridor should consider that the through traffic function of the corridor will remain important, particularly on the northern half of the study corridor, as long as a significant employment center remains in El Segundo and additional capacity via an alternative route is not available for South Bay commuters.

The availability of additional right of way is an issue along most of the corridor. The right of way beyond the current travel way is minimal along much of the corridor. Potential additional right of way is limited through much of the corridor due to the proximity of existing development along the corridor. Development set backs are generally widest along the northerly segments of the corridor in El Segundo. The availability of additional right of way along the corridor would provide more flexibility and opportunities for providing additional through lanes, turn lanes and bus turnouts. As properties redevelop, it is recommended that sufficient right of way is obtained to provide bus turnouts as well as left turn channelization.

Also, as property redevelops these issues should be considered:

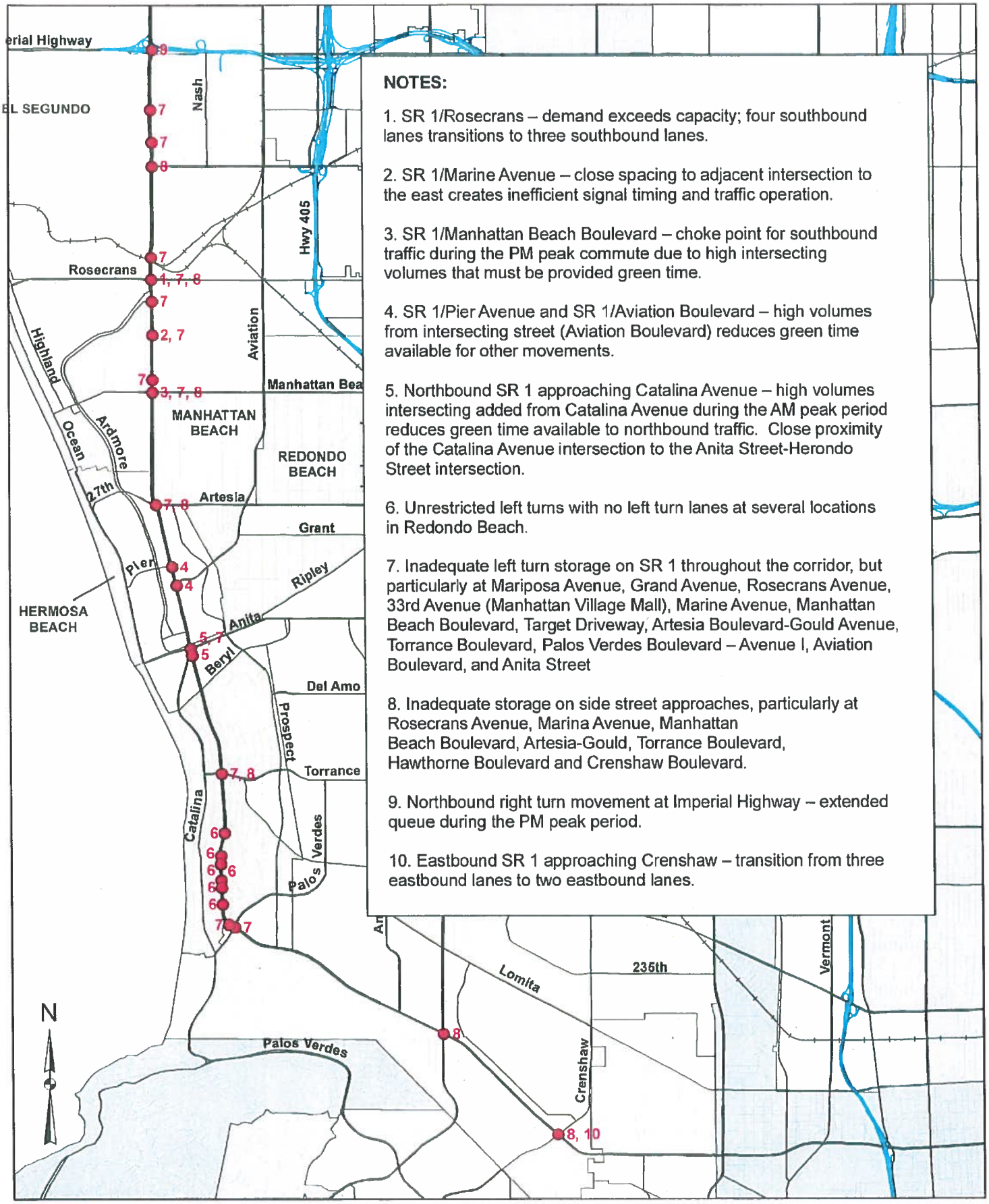
1. Uniform site plan review requirements along the corridor.
2. The maximum number of driveways per property frontage.
3. Access to small property frontages.
4. Access to side streets (where possible) in lieu of new driveways on SR 1.
5. Parking restrictions on the SR 1 next to driveways to increase driveway turning speeds and improve corner sight distance.
6. Connections between adjacent properties (even when each has driveway access).
7. Underground overhead utilities for beautification and to remove fixed objects that could be safety hazards.
8. Strategically locate new development where capacity exists.

Funding for infrastructure improvements is extremely scarce at the current time. Where improvements only consist of restriping, it may be possible to fund the improvement with gas tax funds. A corridor-wide impact fee for transportation improvements should be considered to fund improvements on the corridor. Imposed on new development, the fee would be in addition to any local impact fees and would assist in the funding of improvements on the corridor. For example, fees collected could be used to help fund improvements on the northern segments of the corridor that are impacted by all commuter traffic on the corridor.



Hatch Mott MacDonald

EXHIBIT 1
STUDY CORRIDOR



NOTES:

1. SR 1/Rosecrans – demand exceeds capacity; four southbound lanes transitions to three southbound lanes.

2. SR 1/Marine Avenue – close spacing to adjacent intersection to the east creates inefficient signal timing and traffic operation.

3. SR 1/Manhattan Beach Boulevard – choke point for southbound traffic during the PM peak commute due to high intersecting volumes that must be provided green time.

4. SR 1/Pier Avenue and SR 1/Aviation Boulevard – high volumes from intersecting street (Aviation Boulevard) reduces green time available for other movements.

5. Northbound SR 1 approaching Catalina Avenue – high volumes intersecting added from Catalina Avenue during the AM peak period reduces green time available to northbound traffic. Close proximity of the Catalina Avenue intersection to the Anita Street-Herondo Street intersection.

6. Unrestricted left turns with no left turn lanes at several locations in Redondo Beach.

7. Inadequate left turn storage on SR 1 throughout the corridor, but particularly at Mariposa Avenue, Grand Avenue, Rosecrans Avenue, 33rd Avenue (Manhattan Village Mall), Marine Avenue, Manhattan Beach Boulevard, Target Driveway, Artesia Boulevard-Gould Avenue, Torrance Boulevard, Palos Verdes Boulevard – Avenue I, Aviation Boulevard, and Anita Street

8. Inadequate storage on side street approaches, particularly at Rosecrans Avenue, Marina Avenue, Manhattan Beach Boulevard, Artesia-Gould, Torrance Boulevard, Hawthorne Boulevard and Crenshaw Boulevard.

9. Northbound right turn movement at Imperial Highway – extended queue during the PM peak period.

10. Eastbound SR 1 approaching Crenshaw – transition from three eastbound lanes to two eastbound lanes.

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EXHIBIT 2
CORRIDOR HOT SPOTS

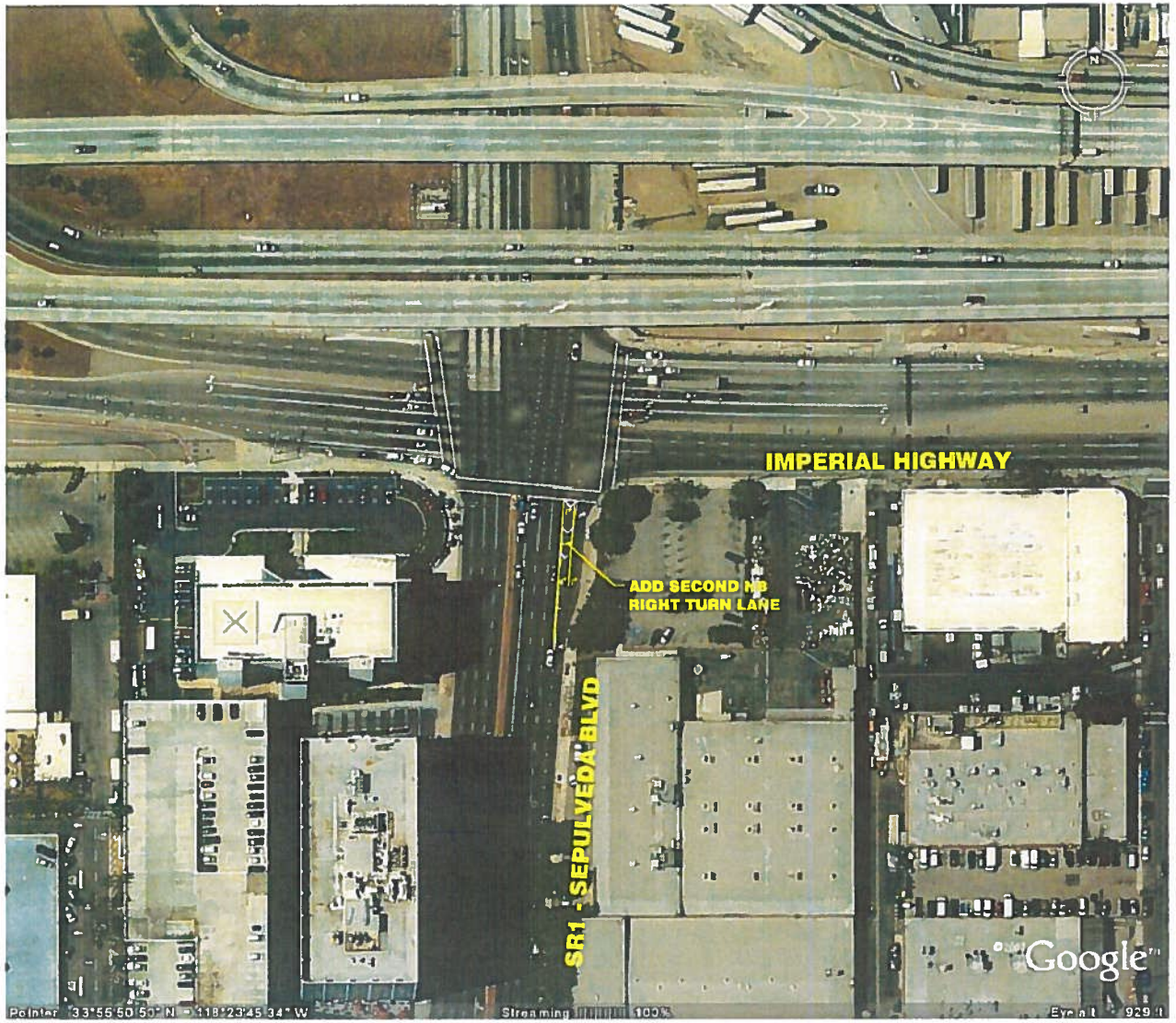
	City	Intersection Type	Intersection Traffic Control	Intersection LOS AM	Intersection LOS PM	Concept Plan	Existing Deficiencies	Recommendations
1 Imperial Highway	El Segundo	4-Leg	Signal	F	F	X	Extended queue for NB SR1 right turn. Intersection operates at LOS E (AM) and LOS F (PM). Right turn traffic out in queue reducing operating efficiency.	Add second SR 1 NB right turn lane.
2 Walnut Ave	El Segundo	4-Leg	Signal	B	B			
3 Sycamore Ave	El Segundo	3-Leg	Stop	-	-			Prohibit EB Sycamore Ave. left turns and through movements.
4 Maple Ave	El Segundo	4-Leg	Signal	B	B		No significant existing deficiencies.	Restripe east leg to add 2nd WB Maple Ave. left turn lane.
5 Palm Ave	El Segundo	4-Leg	Stop	-	-			Prohibit EB Palm Ave. left turns.
6 Mariposa Ave	El Segundo	4-Leg	Signal	C	C	X	Intersection operates at LOS C (AM) and LOS C (PM). Left turn capacity of WB Mariposa Ave. left turn lane exceeds capacity during the PM peak period.	Add second WB Mariposa Avenue left turn lane, add protected left turn phasing on E/W approaches.
7 Holly Ave	El Segundo	3-Leg	Stop	-	-			Prohibit EB Holly Ave. left turns and through movements.
8 Grand Ave	El Segundo	4-Leg	Signal	C	C	X	NB left turn lane observed to overflow during peak periods. Intersection operates at LOS C during AM and PM peak hours.	Add second NB SR 1 left turn lane.
9 Xerox Center	El Segundo	3-Leg (RTO)	Stop	-	-			
10 El Segundo Blvd	El Segundo	4-Leg	Signal	E	D	X	WB El Segundo Blvd. left turn lane overflows. Intersection operates at LOS E during AM and PM peak hours.	Restripe the westbound approach to provide two exclusive left turn lanes, a shared left/through lane and a right turn lane.
11 Hughes Way	El Segundo	4-Leg	Signal	A	B			
12 Park Place	El Segundo	3-Leg	Signal	-	-			
13 Rosecrans Ave	Manhattan Beach	4-Leg	Signal	F	F	X	NB & SB SR1 left turns lanes overflow. Intersection operates at LOS F during AM and PM peak hours.	Lengthen NB, SB & EB left turn lanes; add/open fourth NB SR1 through lane; add NB receiving lane for WB free right. The City of Manhattan Beach has a planned project that would widen the SR 1 bridge located south of Rosecrans. When widened, four northbound lanes will be provided from Marine Avenue through Rosecrans Avenue. It is estimated that this project will be constructed in 2013 assuming full funding is achieved.
14 N. Valley Dr	Manhattan Beach	3-Leg	Stop	-	-			Prohibit NB SR 1 left turns 24 hours, eliminate NB SR 1 left turn lane. Prohibit EB N. Valley Dr. left turns 24 hours.
15 33rd St	Manhattan Beach	4-Leg	Signal	B	C		SB SR 1 left turn lane overflows. Queue on eastbound 33rd St. into Manhattan	Lengthen SB SR 1 left turn lane. This would require prohibiting NB SR 1 left turns at N. Valley Dr.
							Queue on inbound Village Mall access at 33rd extends into SR 1.	Modify traffic control at three leg intersection at 33rd St./Manhattan Village ring road. Currently, the inbound 33rd St. approach to the ring road is stop controlled. Remove stop sign on inbound approach and add stop control to the ring road approaches. Remove north-south crosswalk and add east-west crosswalks across both ring road approaches
16 30th St	Manhattan Beach	4-Leg	Signal	A	C			Lengthen NB SR 1 left turn lane.
17 27th St	Manhattan Beach	4-Leg (RTO)	Stop	-				
18 Marine Ave	Manhattan Beach	4-Leg	Signal	D	C	X	EB Marine Ave. queue at Cedar Ave. extends into SR1 intersection. SR1/Marine Ave operates at LOS D during AM and PM peak hours.	At Marine Ave. / Cedar Ave. intersection: Lengthen SB left turn lane, close south leg of intersection; convert WB left turn lane to third WB through lane; convert intersection to half signal, coordinate Cedar and SR 1 signals on Marine.
19 22nd St	Manhattan Beach	3-Leg	Stop	-	-			
20 18th St	Manhattan Beach	4-Leg	Stop	-	-			
21 16th St	Manhattan Beach	4-Leg	Signal	B	A			
22 17th St	Manhattan Beach	4-Leg	Stop		-			
23 14th St	Manhattan Beach	4-Leg	Stop	-	-		SB SR 1 left turn queue extends into southbound through lane.	Lengthen SB SR 1 left turn lane. Prohibit SB left turns into Target shopping center at south Target driveway.
24 Manhattan Beach Blvd	Manhattan Beach	4-Leg	Signal	D	F		Significant queues on all approaches, particularly the west and east legs.	The City of Manhattan Beach has a planned project that would construct dual left turn lanes on the eastbound Manhattan Beach and northbound SR 1 approaches. It is recommended that dual left turns on the westbound approach also be considered as this left turn lane experiences queue spillback during the peak periods. Also, prohibit southbound SR 1 left turns into the Target Store driveway just north of Manhattan Beach Boulevard. Prohibit SB left turns into Target shopping center at south Target driveway.
25 11th St	Manhattan Beach	4-Leg	Stop					Convert median to two-way-left-turn lanes where short left turn lanes are provided.
26 10th St	Manhattan Beach	4-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
27 9th St	Manhattan Beach	4-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
28 8th St	Manhattan Beach	4-Leg	Signal	B	B			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
29 E. 6th St	Manhattan Beach	3-Leg offset	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
30 W. 6th St	Manhattan Beach	3-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
31 5th St	Manhattan Beach	3-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
32 3rd St	Manhattan Beach	4-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
33 2nd St	Manhattan Beach	4-Leg	Signal	A	C			Convert median to two-way-left-turn lanes where short left turn lanes are provided. Lengthen EB left turn lane to provide additional storage space.
34 1st St	Manhattan Beach	3-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
35 Rosa Dr	Manhattan Beach	4-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
36 Duncan Pl	Manhattan Beach	3-Leg (RTO)	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
37 Duncan Ave-Duncan Dr	Manhattan Beach	4-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
38 Boundary Pl	Manhattan Beach	3-Leg (RTO)	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
39 Longfellow Ave	Manhattan Beach	4-Leg	Signal	A	A			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
40 30th St	Manhattan Beach	3-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
41 Keats St	Manhattan Beach	3-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
42 Tennyson St	Manhattan Beach	3-Leg	Stop	-	-			Convert median to two-way-left-turn lanes where short left turn lanes are provided.
43 Artesia Blvd Gould Ave	Hermosa Beach	4-Leg	Signal	F	D			
44 24th Pl	Hermosa Beach	4-Leg	Stop	-	-			
45 24th St	Hermosa Beach	3-Leg	Stop	-	-			
46 21st St	Hermosa Beach	4-Leg	Signal	B	A			
47 20th St	Hermosa Beach	3-Leg	Stop					
48 19th St	Hermosa Beach	3-Leg	Stop	-	-			
49 18th St	Hermosa Beach	3-Leg	Stop	-	-			
50 17th St	Hermosa Beach	3-Leg	Stop	-	-			
51 16th St	Hermosa Beach	4-Leg	Signal	B	B			
52 15th St	Hermosa Beach	4-Leg (offset)	Stop	-	-			
53 14th St-Pier Ave	Hermosa Beach	4-Leg	Signal	C	C			Lengthen EB right turn lane. Requires removing on-street parking on Pier Avenue. Improvement ensures EB right turn motorists can enter right turn lane
54 13th St	Hermosa Beach	3-Leg (RTO)	Stop	-	-			
55 11th Pl	Hermosa Beach	3-Leg (RTO)	Stop	-	-			
56 11th St	Hermosa Beach	3-Leg (RTO)	Stop	-	-			
57 Aviation Blvd-10th St	Hermosa Beach	4-Leg	Signal	F	E	K	Intersection operates at LOS F (AM) and LOS E (PM). Major intersection of traffic from alternate north-south routes. SB left turn spillback into SB through lanes.	Lengthen SB SR 1 left turn lane, eliminate EB Aviation left turn lane into Park Pacific Shopping Center & convert into 3rd WB Aviation Blvd. left turn lane at SR 1. The City of Hermosa Beach has proposed to provide two southbound left turn lanes on SR 1.
58 10th St	Hermosa Beach	3-Leg	Stop	-	-			
59 9th St	Hermosa Beach	4-Leg	Stop	-	-			
60 8th Pl	Hermosa Beach	4-Leg	Stop	-	-			
61 8th St	Hermosa Beach	4-Leg	Signal	C	D			
62 7th St	Hermosa Beach	3-Leg	Stop	-	-			
63 6th St	Hermosa Beach	4-Leg	Stop	-	-			
64 5th St	Hermosa Beach	4-Leg (offset)	Signal	A	A			
65 W. 4th St	Hermosa Beach	3-Leg	Stop	-	-			
66 E. 4th St		3-Leg	Stop	-	-			

EXHIBIT 3
RECOMMENDED INTERSECTION IMPROVEMENTS

	City	Intersection Type	Intersection Traffic Control	Intersection LOS AM	Intersection LOS PM	Concept Plan	Existing Deficiencies	Recommendations
67 W. 3rd St	Hermosa Beach	3-Leg	Stop	-	-			
68 E. 3rd St	Hermosa Beach	3-Leg	Stop	-	-			
69 W. 2nd St	Hermosa Beach	3-Leg	Signal	-	-			
70 E. 2nd St	Hermosa Beach	3 Leg	Signal	A	B			
71 1st Pl	Hermosa Beach	3-Leg	Stop	-	-			
72 E. 1st St	Hermosa Beach	3-Leg	Stop	-	-			
73 W. 1st St	Hermosa Beach	4-Leg	Stop	-	-			Prohibit EB 1st St. left turns and through movements and NB SR 1 left turn movement.
74 Anita St Herondo St	Hermosa Beach	5-Leg	Signal	E	E		Southbound left turn queue spillback into through lanes.	Lengthen SB SR 1 left turn lane
75 Catalina Ave	Redondo Beach	3-Leg	Signal	B	E		Catalina Avenue adds a large volume of traffic to SR 1 during the AM peak hour. LOS operation during the AM peak is understated because 3rd NB thru is added at this location and lane utilization is not 1.0.	Add 3rd EB Catalina Ave left turn lane.
76 Irena Ave	Redondo Beach	4-Leg	Signal	A	A			
77 Agate St	Redondo Beach	4-Leg	Stop	-	-			
78 Guadalupe Ave	Redondo Beach	3-Leg	Stop	-	-		Left turn channelization is not provided on SR 1	Prohibit WB Guadalupe Ave left turns and SB SR 1 left turns.
79 Beryl St	Redondo Beach	4-Leg	Signal	D	E			Redondo Beach has a planned improvement to add a second left turn lane on the northbound approach. The project is not funded and there is no timeline for implementation
80 Camelian St	Redondo Beach	4-Leg	Signal	A	A			
81 Diamond St	Redondo Beach	4-Leg	Signal	B	A			Add lane line extensions through intersection on NB & SB approaches
82 Vincent St	Redondo Beach	4-Leg	Signal	A	A			
83 Emerald St	Redondo Beach	4-Leg	Signal	A	A			
84 Camel St	Redondo Beach	4-Leg	Signal	B	B			
85 Torrance Blvd	Redondo Beach	4-Leg	Signal	D	E	X	SB SR1 left turn lane overflows. Intersection operates at LOS D (AM) and LOS E (PM).	Lengthen WB right turn lane; lengthen SB left turn lane. This improvement requires the removal of on-street parking on SR 1. Redondo Beach has a planned improvement to add a right turn lane on the northbound approach. The project is not funded and there is no schedule for implementation.
86 Pearl St	Redondo Beach	4-Leg	Stop	-	-			
87 Ruby St-Guadalupe Ave	Redondo Beach	6-Leg	Signal	A	A			
88 Sapphire St Francisca Ave	Redondo Beach	5-Leg	Signal	B	B			
89 Topaz St	Redondo Beach	4-Leg	Stop	-	-			
90 Knob Hill Ave	Redondo Beach	4-Leg	Signal	A	A			
91 Avenue A	Redondo Beach	4 Leg	Stop					
92 Avenue B	Redondo Beach	4-Leg	Stop	-	-			Add SR 1 NB & SB left turn lanes. This would require removing on-street parking on SR 1 Alternative improvement: prohibit left turns from SR 1
93 Avenue C	Redondo Beach	4 Leg	Signal	B	B			
94 Avenue D	Redondo Beach	4-Leg	Stop	-	-			Add SR 1 NB & SB left turn lanes. This would require removing on-street parking on SR 1 Alternative improvement: prohibit left turns from SR 1
95 Avenue E	Redondo Beach	4-Leg	Stop	-	-			Add SR 1 NB & SB left turn lanes. This would require removing on-street parking on SR 1 Alternative improvement: prohibit left turns from SR 1
96 Avenue F	Redondo Beach	4-Leg	Signal	A	A			Left turns from SR 1 are currently prohibited at this location
97 Avenue G	Redondo Beach	4-Leg	Stop	-	-			Add SR 1 NB & SB left turn lanes. This would require removing on-street parking on SR 1 Alternative improvement: prohibit left turns from SR 1
98 Avenue H	Redondo Beach	4-Leg	Signal	A	D			
99 S. Elena Ave	Redondo Beach	4 Leg	Signal	A	A			
100 Avenue I	Redondo Beach	3-Leg	Stop	-	-	X	WB SR1 left turn lane at Avenue I overflows into through lane.	Shift and lengthen WB SR 1 left turn lane. See discussion and conceptual plan for Palos Verdes Boulevard.
101 Vista del Mar	Torrance	3-Leg (RTO)	Stop	-	-			
102 Palos Verdes Blvd	Torrance	4-Leg	Signal	D	E	X	EB SR1 left turn lane extends into through lane. High northbound left turn movement from Palos Verdes Blvd. Intersection operates at LOS D (AM) and LOS E (PM).	Lengthen EB SR1 left turn lane; add EB SR1 right turn lane; shift and lengthen WB left turn lane at Avenue I, add 2nd NB Palos Verdes left turn lane. These improvements would require removal of parking on SR 1. The Redondo Beach Circulation Element recommends adding right turn lanes to the southbound and eastbound approaches.
103 Camino de Las Colinas	Torrance	4-Leg	Stop	-	-			
104 Paseo de Las Delicias	Torrance	4-Leg	Stop	-	-			
105 Vista del Parque	Torrance	4-Leg	Signal	A	A			
106 Prospect Ave-Vista del Parque	Torrance	4 Leg	Signal	B	C			
107 Paseo de Gracia	Torrance	3-Leg	Stop	-	-			
108 Robert Rd	Torrance	3-Leg	Stop	-	-			
109 Calle Mayor	Torrance	4-Leg	Signal	F	F		LOS F operations during both peak hours.	Adding a WB SR 1 right turn lane would improve operations, but is difficult to implement gi topography constraints and existing development at the intersection.
110 HS Driveway	Torrance	3 Leg (RTO)	Stop	-	-			Add WB SR 1 right turn lane. Also, enforcement of no drop-offs/pick-ups restrictions on SR 1 at the high school should be considered.
111 Janet Ln	Torrance	4-Leg	Stop	-	-			
112 Vista Montana-Anza Ave	Torrance	4-Leg	Signal	D	D		High left turn volumes on the southbound Anza Avenue approach.	The City of Torrance has a planned project that would restripe to add a southbound through lane and convert the north-south phasing to protected left turns. It is recommended that the additional lane added to the north leg be a second left turn lane. Lengthen NB Vista Montana left turn lane.
113 Ladeene Ave	Torrance	4-Leg	Stop	-	-			
114 Ocean Ave	Torrance	4-Leg	Stop	-	-			
115 Neece Ave	Torrance	4 Leg (RTO)	Stop	-	-			
116 Hawthorne Blvd	Torrance	4-Leg	Signal	D	D			Caltrans completed a Project Study Report in 2002 to provide improvements at the intersection to increase intersection capacity. The improvement alternatives would add one left turn lane on eastbound SR 1, one left turn lane on westbound SR 1, one right turn lane on eastbound SR 1, one right turn lane on westbound SR 1 and one right turn lane on northbound Hawthorne Boulevard. Subsequent to the completion of the PSR, the City of Torrance is proposing to implement the northbound right turn lane on Hawthorne and the additional right turn lanes on SR 1. The proposed project is not currently funded for
117 W. 242nd St	Torrance	4-Leg	Stop	-	-			
118 Ward St	Torrance	3-Leg	Stop	-	-			
119 Madison St	Torrance	4 Leg	Signal	B	B			
120 Winlock Dr	Torrance	4 Leg	Stop	-	-			
121 Zamperini Way-Aero Way	Torrance	3-Leg	Signal	A	A			
122 Ballanca Way	Torrance	3-Leg	Stop	-	-			
123 Newton St-Robinson Way	Torrance	4-Leg	Signal	A	B			
124 Rolling Hills Way	Torrance	4 Leg	Signal	A	B			Lengthen NB Rolling Hills Way left turn lane.
125 Crenshaw Blvd		4 Leg	Signal	E	F	X	SB Crenshaw Blvd. left turn lane overflows. Intersection operates at LOS E (AM) and LOS F (PM).	Add second Crenshaw Blvd. SB left turn lane; add NB right turn overlap phase, construct bus turn-out for EB busses on SR 1 on SE corner of intersection. The bus stop will require right of way in the southeast corner of the intersection.

Notes:
1. RTO: Right Turns Only

EXHIBIT 3
RECOMMENDED INTERSECTION IMPROVEMENTS



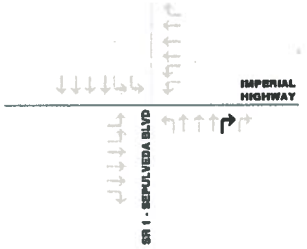
EXISTING DEFICIENCIES

NB SR 1 RIGHT TURN LANE OVERFLOWS.

INTERSECTION OPERATES AT LOS E (AM) & LOS F (PM).

RECOMMENDATION

ADD 2ND NB SR 1 RIGHT TURN LANE.



PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

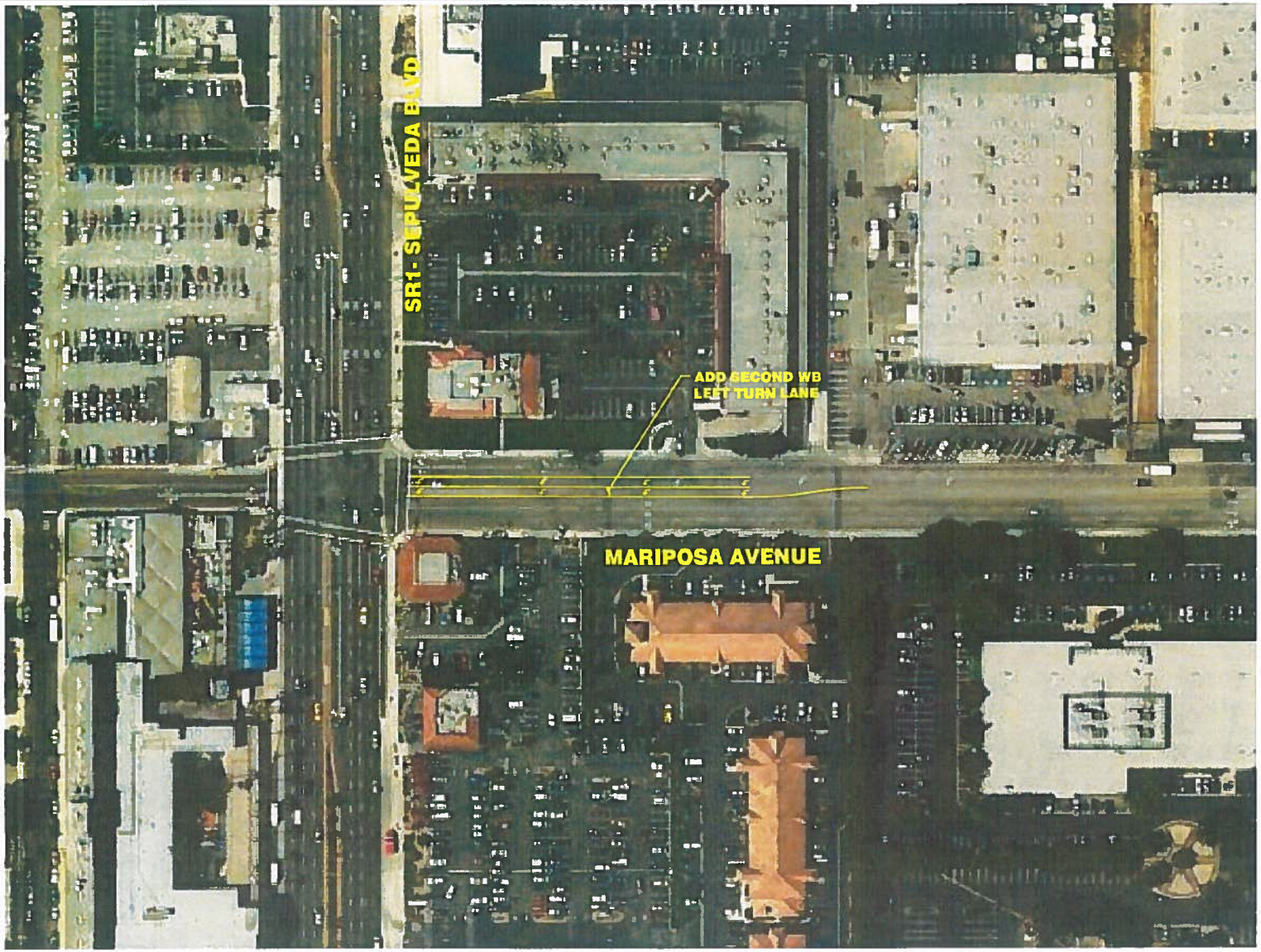
GRAPHIC SCALE

Hatch Mott MacDonald
1300-B FIRST STREET
GILROY, CA 95020
(408)848-3122
WWW.HATCHMOTT.COM

PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

SR 1 - SEPULVEDA BLVD /
IMPERIAL HIGHWAY

DATE: 06/09/09	SCALE:	LOS ANGELES COUNTY	L-1
ACAD FILE NO: 254670 IMPERIAL	1"=50'	CALIFORNIA	SHEET 1 OF 19



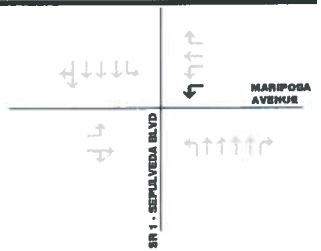
EXISTING DEFICIENCIES

WB MARIPOSA AVENUE LEFT TURN LANE DOES NOT CLEAR IN ONE SIGNAL CYCLE.

INTERSECTION OPERATES AT LOS C (AM) & LOS F (PM).

RECOMMENDATION

ADD SECOND WB LEFT TURN LANE; ADD PROTECTED LEFT TURN PHASING IN THE E/W APPROACHES.



PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

GRAPHIC SCALE

(IN FEET)

Hatch Mott MacDonald

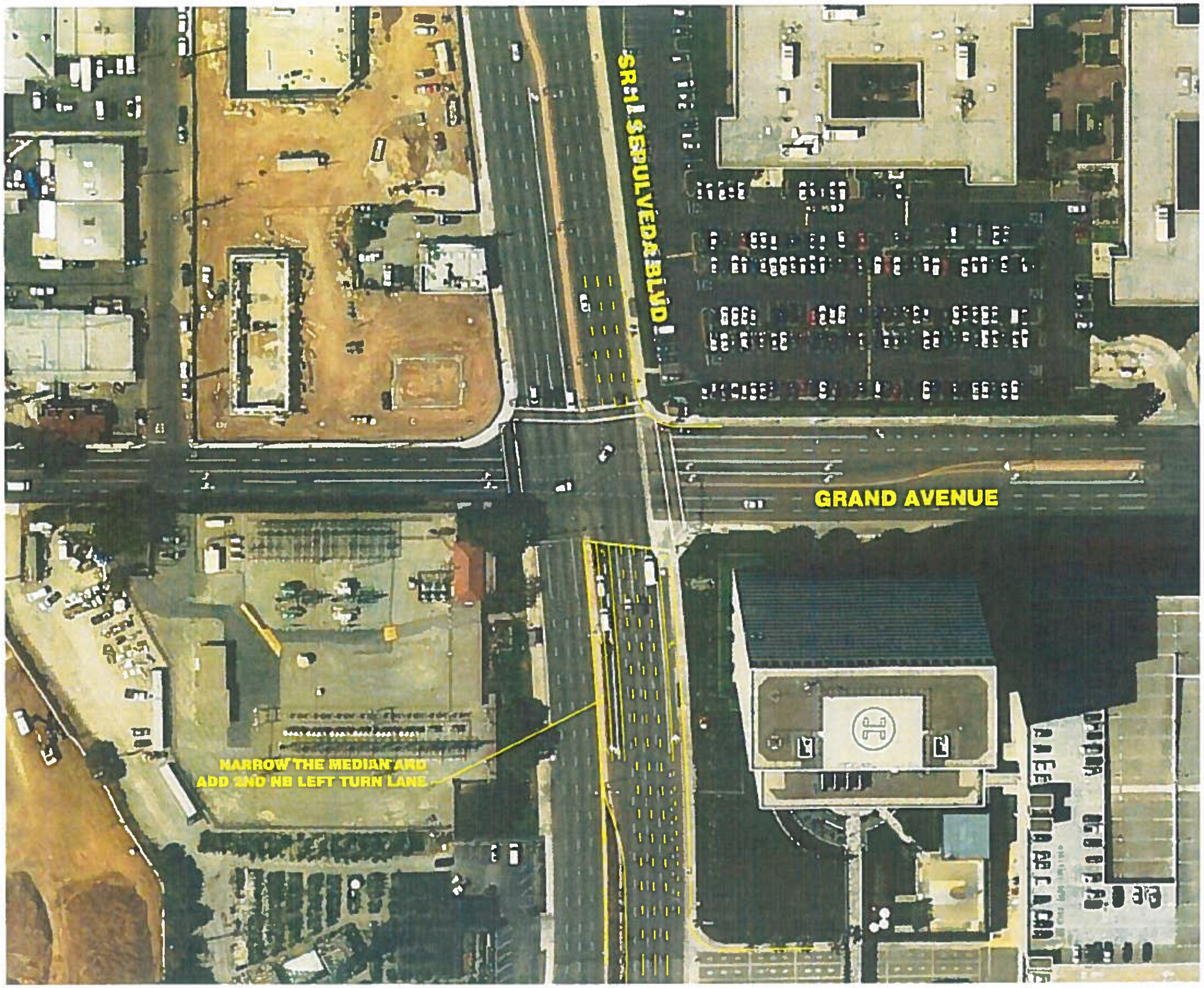
1300-B FIRST STREET
GILROY, CA 95020
(408)848-3122
WWW.HATCHMOTT.COM

PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

SR 1 - SEPULVEDA BLVD /
MARIPOSA AVENUE

DATE: 09/09/08	SCALE:	LOS ANGELES COUNTY	L-2
ACAD FILE NO: 234973 MARIPOSA	1"=50'	CALIFORNIA	SHEET 2 OF 10

Jun 10 2009, 1:35pm



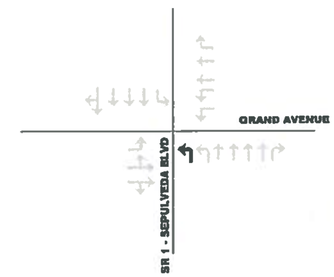
EXISTING DEFICIENCIES

NB SR 1 LEFT TURN OBSERVED TO OVERFLOW DURING PEAK PERIODS.

INTERSECTION OPERATES AT LOS C (AM & PM).

RECOMMENDATION

ADD SECOND NB SR 1 LEFT TURN LANE.



PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

Hatch Mott MacDonald
1303-B FIRST STREET
GILROY, CA 95020
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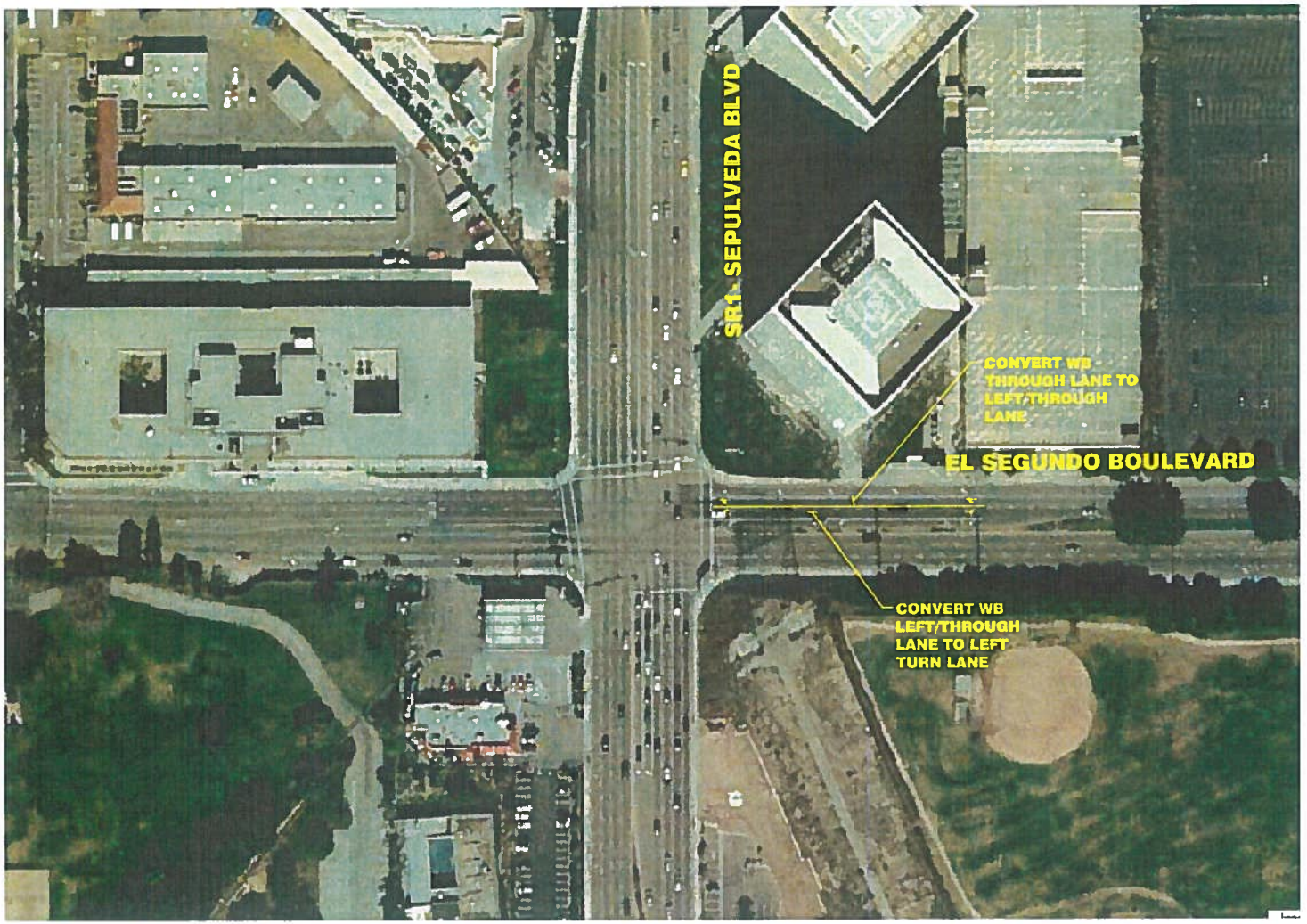
PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

SR 1 - SEPULVEDA BLVD /
GRAND AVENUE

DATE: 06/09/09	SCALE	LOS ANGELES COUNTY	L-3
ACAD FILE NO: 254070 GRAND	1"=50'	CALIFORNIA	SHEET 3 OF 10

Drawing: J:\2008\HMM Jobs\254070\254070 GRAND C1.dwg
Jun 19, 2009, 1:35pm



EXISTING DEFICIENCIES

WB EL SEGUNDO BLVD. LEFT TURN LANE OVERFLOWS.

INTERSECTION OPERATES AT LOS E (AM & PM).

RECOMMENDATION

CONVERT WB LEFT/THROUGH TO LEFT TURN LANE; CONVERT WB THROUGH TO LEFT/THROUGH LANE

PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

GRAPHIC SCALE

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GILROY, CA 95020
(408)848-3122
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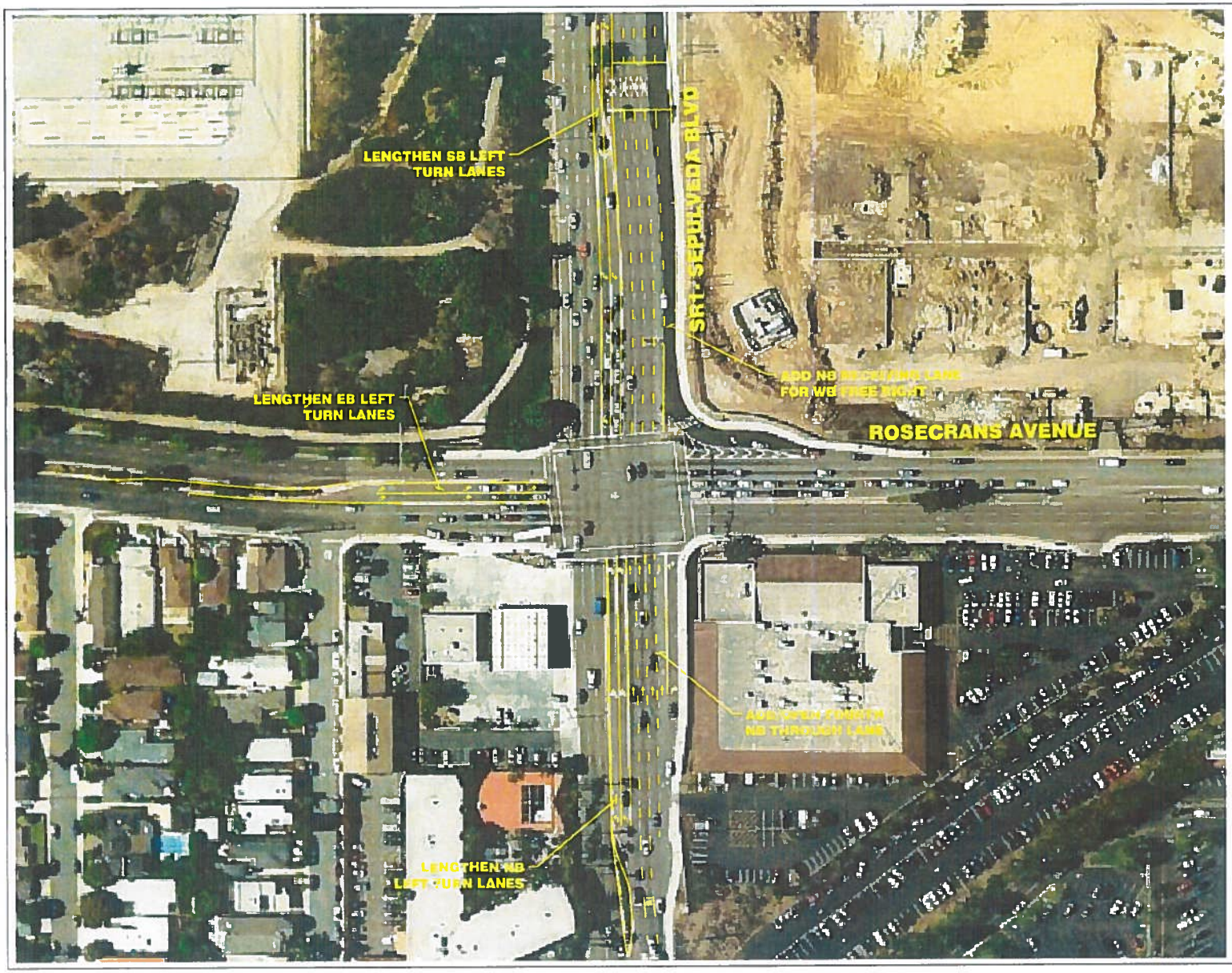
PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

SR 1 - SEPULVEDA BLVD /
EL SEGUNDO BOULEVARD

DATE: 06/09/08	SCALE:	LOS ANGELES COUNTY	L-4
ACAD FILE NO: 2340PD\EL SEGUNDO	1"=50'	CALIFORNIA	SHEET 4 OF 10



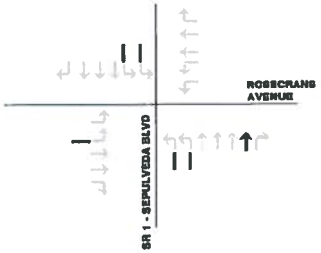
EXISTING DEFICIENCIES

NB & SB SR1 LEFT TURN LANE OVERFLOWS.

INTERSECTION OPERATES AT LOS F (AM & PM).

RECOMMENDATION

LENGTHEN NB, SB, & EB LEFT TURN LANES; ADD/OPEN FOURTH NB SR 1 THROUGH LANE; ADD NB RECEIVING LANE FOR WB FREE RIGHT



PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

Hatch Mott MacDonald
1100-B FIRST STREET
GILROY, CA 95020
(408)848-3122
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PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

SR 1 - SEPULVEDA BLVD / ROSECRANS AVENUE

DATE: 06/09/08	SCALE:	LOS ANGELES COUNTY	L-5
ACAD FILE NO: 254078 ROSECRANS	1"=50'	CALIFORNIA	SHEET 5 OF 10

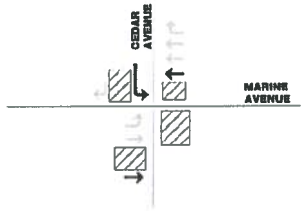
EXISTING DEFICIENCIES

EB MARINE AVENUE LANES AT CEDAR AVENUE OVERFLOW TO SR 1.

SR 1/MARINE AVENUE INTERSECTION OPERATES AT LOS D (AM & PM).

RECOMMENDATION

LENGTHEN SB LEFT TURN LANE; CLOSE SOUTH LEG OF INTERSECTION; CONVERT WB LEFT TURN LANE TO 3RD WB THRU LANE; CONVERT INTERSECTION TO HALF SIGNAL.



PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

GRAPHIC SCALE

(IN FEET)

Hatch Mott MacDonald
1300-B FIRST STREET
GILROY, CA 95020
(408)848-1122
WWW.HATCHMOTT.COM

PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

MARINE AVENUE /
CEDAR AVENUE

DATE: 06/09/08	SCALE	LOS ANGELES COUNTY	L-6
ACAD FILE NO 25437BCEDAR	1"=50'	CALIFORNIA	SHEET 8 OF 13

EXISTING DEFICIENCIES

SB SR1 LEFT TURN OVERFLOWS INTO THROUGH LANE.

INTERSECTION OPERATES AT LOS F (AM) & LOS E (PM).

RECOMMENDATION

LENGTHEN SB SR 1 LEFT TURN LANE.
ON AVIATION BLVD, CONVERT EB LEFT TURN LANE AT SHOPPING CENTER INTO WB LEFT TURN LANE.

PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

Hatch Mott MacDonald
1300-B FIRST STREET
GILROY, CA 95020
(408)848-3122
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PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

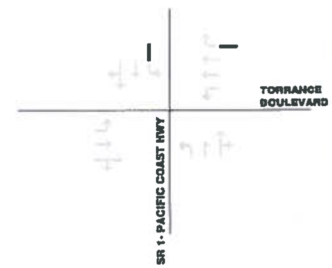
PACIFIC COAST HIGHWAY / AVIATION BOULEVARD

DATE: 06/09/09	SCALE	LOS ANGELES COUNTY	L-7
ACAD FILE NO: 25497E AVIATION	1"=50'	CALIFORNIA	SHEET * OF 15

Drawing: J:\2009\Mad Jobs\25497E-PCH\25497E AVIATION 5.dwg
Jun 19, 2009, 1:54pm

EXISTING DEFICIENCIES
SB SR1 LEFT TURN LANE OVERFOWS. INTERSECTION OPERATES AT LOS D (AM) & LOS E (PM).

RECOMMENDATION
LENGTHEN WB RIGHT TURN LANE; LENGTHEN SB LEFT TURN LANE.



PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

Hatch Mott MacDonald
1300-B FIRST STREET
GILROY, CA 95020
(408)848-3122
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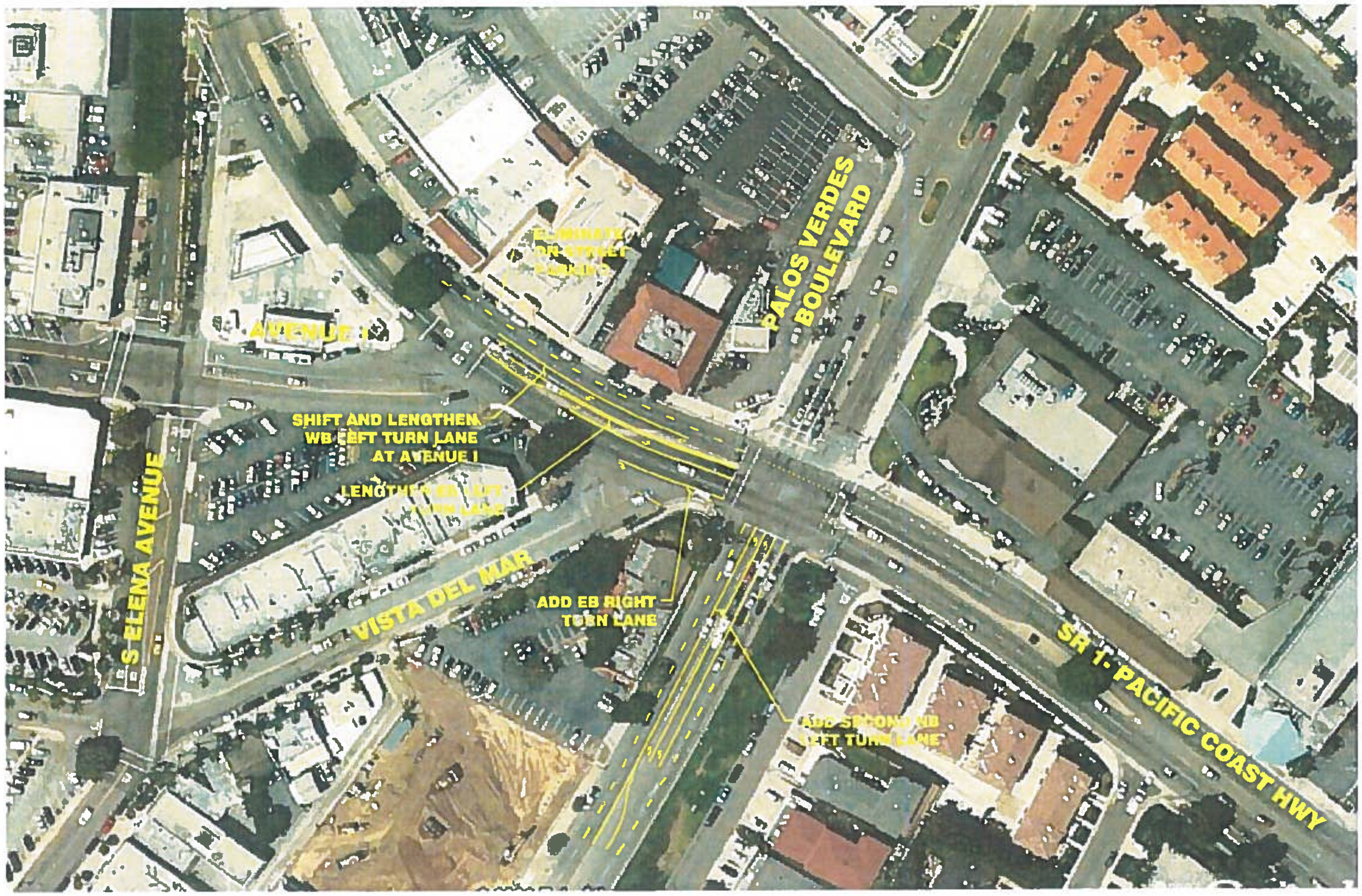
PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

PACIFIC COAST HIGHWAY /
TORRANCE BOULEVARD

DATE: 06/09/09	SCALE:	LOS ANGELES COUNTY	L-8
ACAD FILE NO. 254673 TORRANCE	1"=50'	CALIFORNIA	SHEET 8 OF 10

Jun 10, 2009, 1:51pm



EXISTING DEFICIENCIES

WB LEFT TURN AT AVENUE I OVERFLOWS INTO THRU LANE.

INTERSECTION OPERATES AT LOS D (AM) & LOS E (PM).

RECOMMENDATION

LENGTHEN EB LEFT TURN LANE; ADD EB RIGHT TURN LANE; SHIFT AND LENGTHEN WB LEFT TURN LANE AT AVENUE I; ADD 2ND NB LEFT TURN LANE.

PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.

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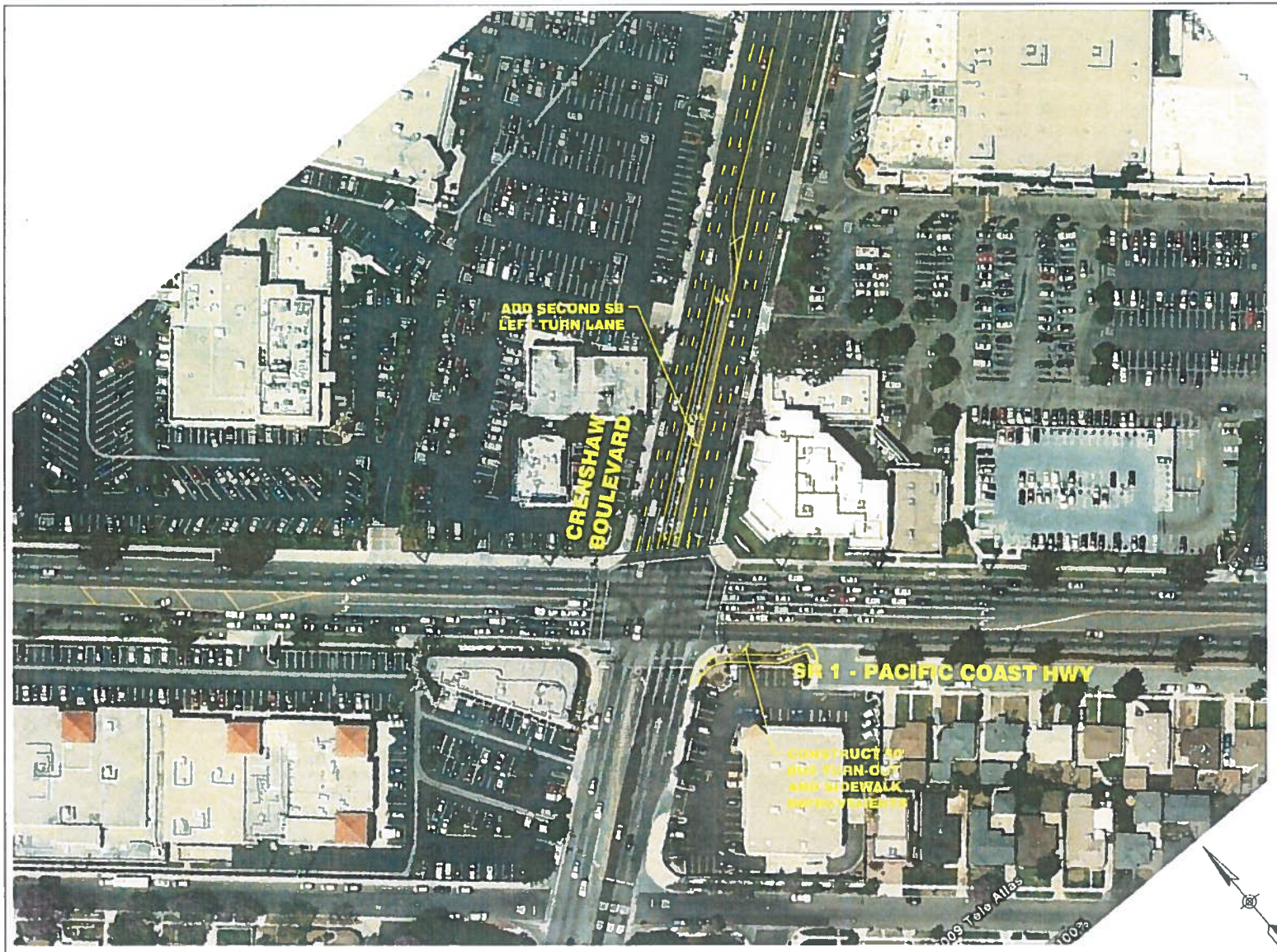
PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

PACIFIC COAST HIGHWAY /
PALOS VERDES BOULEVARD

DATE: 06/09/08	SCALE: 1"=50'	LOS ANGELES COUNTY CALIFORNIA	L-9
ACAC FILE NO. 25470 PALOS VERDES			SHEET 5 OF 10



EXISTING DEFICIENCIES

SB CRENSHAW BLVD. LEFT TURN LANE OVERFLOWS.

INTERSECTION OPERATES AT LOS E (AM) & LOS F (PM).

RECOMMENDATION

ADD SECOND SB LEFT; ADD NB RIGHT TURN OVERLAP PHASE; CONSTRUCT 50' LONG BUS TURN-OUT FOR EB SR 1.

PROPOSED LANE CONFIGURATIONS

LEGEND:

RECOMMENDED IMPROVEMENTS

GRAPHIC SCALE

Hatch Mott MacDonald
1300-B FIRST STREET
GILROY, CA 95020
(408)848-3112
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PACIFIC COAST HIGHWAY
RECOMMENDED
INTERSECTION IMPROVEMENTS

PACIFIC COAST HIGHWAY /
CRENSHAW BOULEVARD

DATE: 09/09/09	SCALE: 1"=50'	LOS ANGELES COUNTY CALIFORNIA	L-10
ACAD FILE NO: 25470 CRENSHAW			SHEET 10 OF 10