Pomona Valley
ITS Project

Project Deliverable 2.3.2
Final Route 60 Feasibility Study Report

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PROJECT DESCRIPTION

The County of Los Angeles, in cooperation with the cities within the Pomona Valley, has determined that development of an Intelligent Transportation System (ITS) in the Pomona Valley would help to reduce congestion, enhance mobility, provide traveler information during non-recurring and event traffic congestion, and manage event traffic. The Pomona Valley Intelligent Transportation Systems (PVITS) project was conceived as a recommendation from the Pomona Valley Feasibility Study completed by the MTA in 1995. The ultimate objectives of the Project are to:

- Improve mobility by optimizing traffic management on arterials and freeways;
- Enhance Route 60 capacity by better coordinating freeway traffic with parallel arterials;
- Improve agency efficiency by coordinating management of operations and maintenance efforts among and between agencies; and
- Increase agency staff productivity by providing low-maintenance, high-quality communications and computational tools to assist in daily management and coordination activities.

Phase 1 of the PVITS project is the development of a conceptual design that defines solutions to enhance capacity, reduce congestion, and improve traveler information in the Pomona Valley.

1.0 BACKGROUND

1.1 Purpose of Document

This document provides a description of the need for and benefits of an incident management, advanced traffic management, and traveler information system for the Route 60 Corridor between I-605 and SR 57. The conceptual design for the Route 60 is defined in this deliverable and defines a system that coordinates these strategies to improve mobility.

This report describes the analysis and recommendations for the conceptual design of the Route 60 Corridor Advanced Traffic Management System (ATMS). The conceptual design is based upon a cooperative, multi-agency effort to optimize corridor-level traffic flows by better managing traffic to utilize additional capacity on arterials in combination with the freeway. The Corridor subregion of the overall PVITS study area that this report focuses on is depicted in **Figure 1**. This conceptual design will be a guide for the development of tools to coordinate daily traffic control and traffic management activities within the Corridor.

The Route 60 conceptual design identifies technologies and deployment locations to achieve:

- Improved progression and traffic flow on arterials adjacent to Route 60;
- Increased use of alternative travel modes;
- Reduced congestion on Route 60;
- Faster emergency vehicle response to incidents on Route 60; and
- Coordination of events such as closures, construction, and special events within the Corridor.

The intention of this document is to enable Los Angeles County and project stakeholders to evaluate and comment on the analysis and recommendations for the Route 60 Corridor.

1.2 Methodology

The study area includes Route 60 and three parallel arterials:

- Gale Avenue;
- Colima Road; and
- Valley Boulevard.

The Corridor also includes the crossing, north-south arterials (described in **Section 2.1**) for access to and from the different alternative routes. The Corridor extends from I-605 in the west to SR 57 in the east. Data available from the three major stakeholders for the Route 60 Corridor: Los Angeles County, the City of Industry and Caltrans, was compiled and summarized in order to describe the Corridor's existing state, needs, and issues. The existing conditions and planned projects and improvements in the Corridor were analyzed to determine whether ITS would be able to solve the issues and needs of the Corridor. A list of potential strategies was then developed to address traffic management, traveler information, and interjurisdictional needs related especially to operations and maintenance. This report documents our analysis and recommendations to improve traffic flow on Route 60 and several preferred alternative routes.

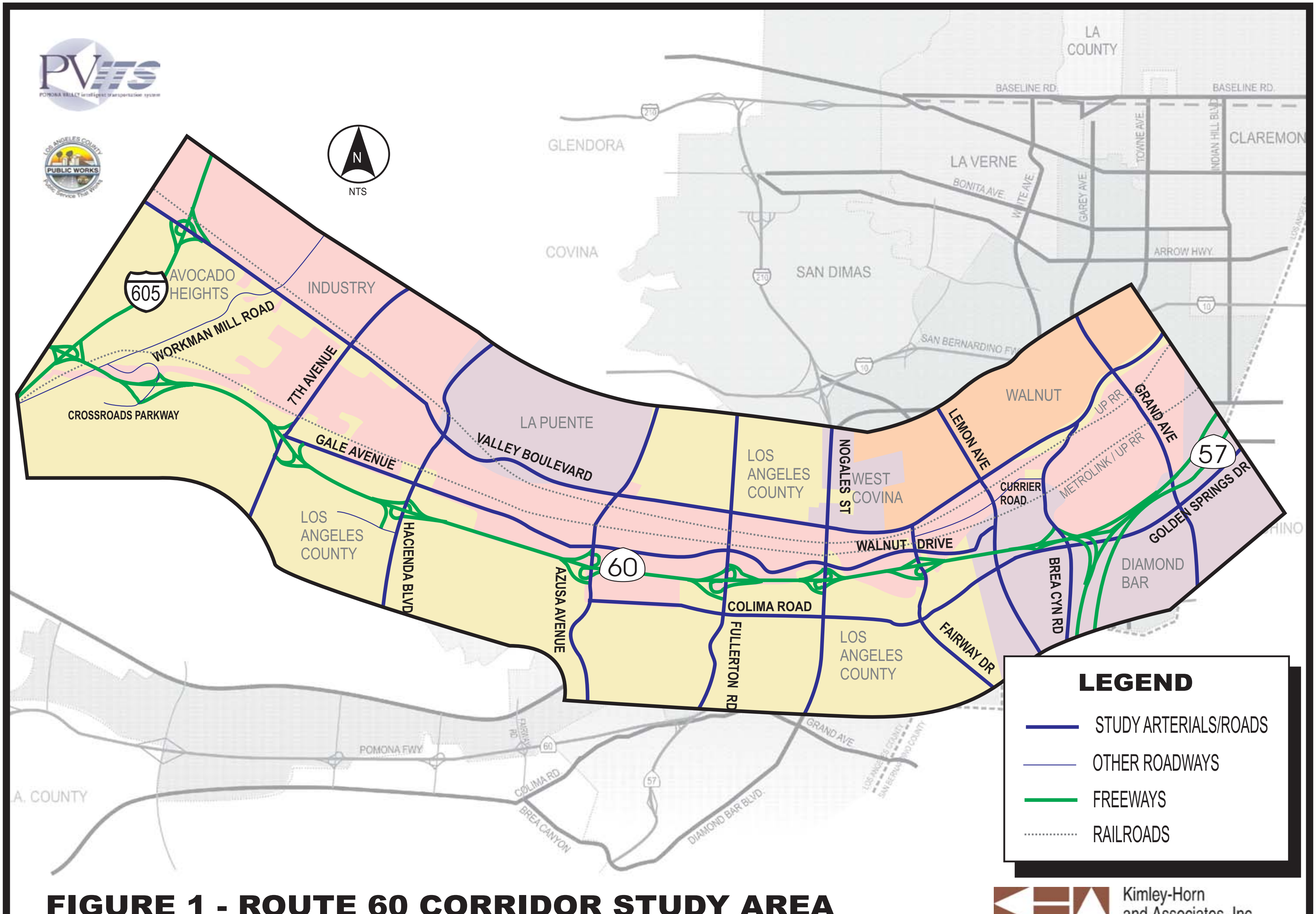

FIGURE 1 - ROUTE 60 CORRIDOR STUDY AREA

1.3 Report Organization

Section 2 of this report describes the existing conditions of the Corridor study area. Section 3 describes the traffic-related needs in the Corridor. Section 4 defines potential strategies for improving traffic flow within the Corridor. Section 5 evaluates the potential strategy alternatives. Section 6 summarizes the recommendations for improvements within the Corridor. Section 7 assesses potential air quality benefits that can be expected due to the implementation of these strategies.

2.0 EXISTING CONDITIONS

2.1 Project Study Area

The Corridor study area is located in Los Angeles County between I-605 and SR 57 along State Route 60 (the Pomona Freeway). The primary stakeholders include the Cities of Industry, Diamond Bar and Walnut, Caltrans, and Los Angeles County. Within the corridor, the Pomona Freeway is an eight-lane access-controlled facility that provides a primary transportation thoroughfare linking Los Angeles County and the City of Los Angeles to the west with Riverside County to the east. This section of Route 60 currently carries an average two-way daily traffic (ADT) volume of approximately 220,000 vehicles per day (vpd). Local, full-access interchanges within the corridor are provided at:

- Crossroads Parkway;
- 7th Avenue;
- Hacienda Boulevard;
- Azusa Avenue;
- Nogales Street;
- Fullerton Road;
- Fairway Drive;
- Brea Canyon Road; and
- Grand Avenue.

Major east-west arterials within this corridor are:

- Valley Boulevard between I-605 and Brea Canyon Road;
- Colima Road between Azusa Avenue and Brea Canyon Road; and
- Gale Avenue/Walnut Drive between 7th Avenue and Lemon Avenue.

The following paragraphs provide descriptions of these arterials:

Valley Boulevard is an east/west arterial that serves as a primary thoroughfare between the cities of the San Gabriel Valley and those of the Pomona Valley. Within the corridor, Valley Boulevard is a four-lane roadway with painted and raised medians providing separation of directional traffic. The posted speed limit is 50 MPH and this section of Valley Boulevard currently carries an ADT of approximately 30,000 vpd. Parking is permitted intermittently along Valley Boulevard in the study area.

Colima Road is an east/west arterial that serves as a primary thoroughfare between the City of Whittier and the City of Diamond Bar. Within the corridor, Colima Road is a four-lane roadway with painted and raised medians providing separation of directional traffic. The posted speed limit is 50 MPH. This section of Colima Road currently carries an ADT of approximately 47,000 vpd. Parking is not permitted along most of Colima Road with the exception of a few spaces in front of businesses east of Nogales Street.

Gale Avenue is an east/west arterial that serves as a thoroughfare between 7th Avenue and Nogales Street. Within the corridor, Gale Avenue provides two lanes in each direction. Gale Avenue currently carries an ADT of approximately-23,000 to 26,000 vpd. Parking is permitted intermittently along Gale Avenue. Commercial parking is prohibited along most of Gale Avenue.

Walnut Drive is an east/west roadway that extends from Gale Avenue/Nogales Street in the west to Lemon Avenue in the east. Within the corridor, Walnut Drive provides two lanes in each direction. Walnut Drive currently carries an ADT of approximately-23,000 to 26,000 vpd. Parking is permitted intermittently along Walnut Drive. Commercial parking is prohibited along most of Walnut Drive.

North-south arterials in the Corridor study area that bisect Route 60 include:

- 7th Avenue;
- Hacienda Boulevard;
- Azusa Avenue;
- Fullerton Road;
- Nogales Street;
- Fairway Drive;
- Lemon Avenue;
- Brea Canyon Road; and
- Grand Avenue.

The following paragraphs provide descriptions of these arterials:

7th Avenue is a north-south arterial with two lanes in each direction. Seventh Avenue has raised median islands and a two-way striped left turn lane. No on-street parking is allowed on either side. The posted speed is 35 MPH.

Hacienda Boulevard is a north-south arterial with 3 lanes in each direction and a raised median island. North of Valley Boulevard, Hacienda crosses over the UPRR line. There is no on-street parking allowed. Hacienda Boulevard has a posted speed of 35 MPH.

Azusa Avenue is a north/south arterial that serves as a significant thoroughfare between Rowland Heights and the City of Azusa. Azusa Avenue is on the Congestion Management Plan (CMP) Highway System from Colima Road to I-10. The posted speed limit varies from 45 MPH to 50 MPH. Azusa Avenue carries approximately 48,000 vehicles per day (vpd) north of Gale Avenue and approximately 28,000 vpd south of Gale Avenue. Azusa Avenue is grade separated from Valley Boulevard.

Fullerton Road is a north/south arterial with four lanes (within the corridor) and a painted median. No parking is allowed on either side of the roadway. The posted speed limit is 35 MPH.

Nogales Street is a north-south arterial. Within the corridor it is a four lane roadway with a raised median island. No parking is allowed. There is an at-grade railroad crossing north of Gale Avenue. Nogales Street has a posted speed limit of 35 MPH.

Fairway Drive is a north-south arterial. Within the corridor it is a four lane roadway with raised medians and double yellow striped medians. Limited parking is allowed on the street. The posted speed limit is 40 MPH.

Lemon Avenue is a north-south arterial. Within the corridor Lemon Avenue is a four-lane roadway with a raised median island. Lemon Avenue is posted with no parking. The posted speed limit ranges from 40 to 45 MPH.

Brea Canyon Road is a north/south arterial that provides access from SR 60 to Valley Boulevard. It provides two travel lanes in each direction separated by a painted median. Brea Canyon Road has a posted speed limit of 50 MPH and carries an approximate ADT of 21,000 vpd in the vicinity of the study area.

Grand Avenue is a four-lane divided roadway. Grand Avenue has a raised median, and has existing grade separation structures providing crossings over both the Southern Pacific and Union Pacific rail lines. Grand Avenue south of Valley Boulevard currently carries an approximate ADT of 28,000 vpd and has a posted speed limit of 45 MPH north of the SR-60. North of Valley Boulevard the ADT is approximately 30,000 vpd. Grand Avenue carries 32,000 ADT north of Diamond Bar Boulevard. North of Valley Boulevard the speed is posted at 55 MPH.

2.2 Existing Traffic Conditions

The study area consists of predominantly industrial/ commercial developments with limited residential uses. **Figure 2** illustrates the existing (2000) average daily traffic (ADT) volumes on the study area arterials and Route 60. The ADT data was obtained from Los Angeles County's "Traffic Volumes 2000," Caltrans' web site, and various traffic impact study reports conducted for:

- Industry East Project, 1999;
- Costco, 2000; and
- Material Recovery Facility, 2000.

In addition to the ADT collected from various sources, as described above, twenty-four hour machine counts were conducted on the three major east-west arterials within the Corridor, in order to determine the directional volumes. **Figure 3** illustrates the 24-hour volumes eastbound and westbound on each of the major potential alternatives to Route 60 within the Corridor. This figure demonstrates the directional split of traffic over an average twenty-four hour period.

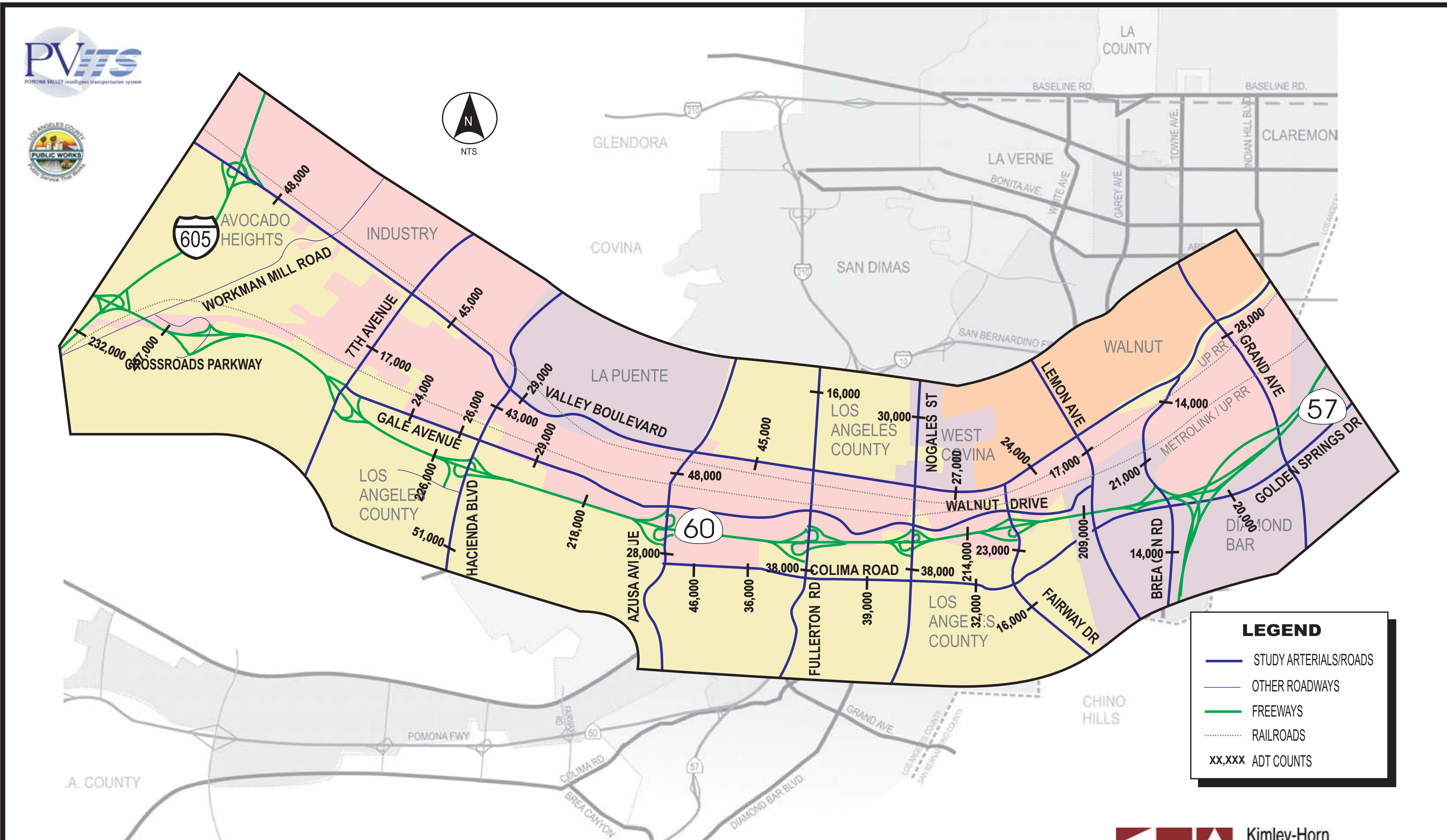

FIGURE 2 - ROUTE 60 AVERAGE DAILY TRAFFIC VOLUMES

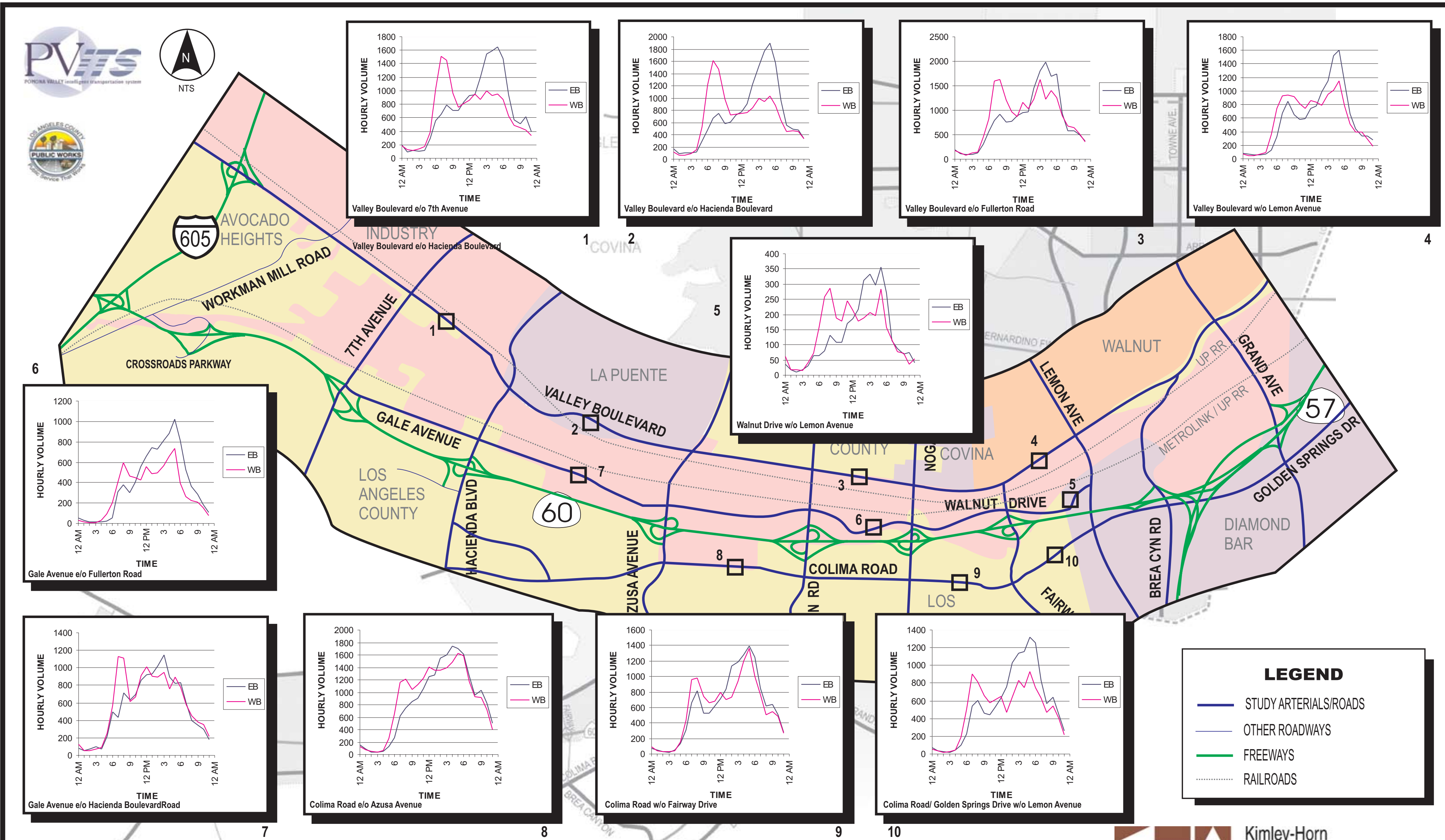

FIGURE 3 - 24 HOURLY TRAFFIC VOLUMES ON ROUTE ALTERNATIVES

Turning movement volumes also were collected at a number of key intersections on the three major alternative routes in the Corridor. These volumes are illustrated on **Figure 4**.

2.3 Planned Projects and Improvements

A number of projects are planned for development in the Corridor area. Short descriptions of the improvements and the estimated impacts on the Corridor area are described here.

Development Projects

Industry East Project in the City of Industry is currently breaking ground. The site will be comprised of over 6,000,000 square feet of Industrial, Warehouse and Commercial buildings. The site, located south of Valley Boulevard and west of Grand Avenue, is expected to generate 46,000 passenger car equivalent trips at full build-out. Primary access to the site will be from Grand Avenue, Valley Boulevard, Brea Canyon Road and Route 60.

Grand Central Recycling and Transfer Station located in the City of Industry north of Railroad Street and east of Azusa Avenue was approved in 2000. It is a municipal solid waste recycling facility. It will generate approximately 1,700 passenger car equivalent trips per day (generated mainly by commercial trash trucks). Main access will be from Azusa Avenue.

New Costco development south of Route 60 on Albatross. The existing Costco on Gale Avenue will be relocated to Albatross, to a location outside of the study area. This is anticipated to reduce congestion on Gale Avenue east of Azusa Avenue.

Business Park is planned for 3900 - 4000 Workman Mill Road (northwest of Workman Mill Road and Mission Mill Road) in Los Angeles County. The project consists of development of a master planned business park of approximately 1,602,507 square feet of warehousing and distribution facility. The traffic analysis for this project was completed in December 2001.

Crossroads Business Park is planned for Crossroads Parkway East in the City of Industry. This 79-acre master plan site is located on both the north and south sides of Route 60 at the intersection of Crossroads Parkway North at Crossroads Parkway South in the City of Industry. The project includes three alternatives of varying square footage of office, commercial, and retail uses. The draft EIR for this project was developed in January of 1999.

An expansion of the **Athens Disposal**, located at 14048 East Valley Boulevard proposes to increase the operating capacity of the existing waste facility in LA County and Industry. The conditional use permit for this study was addressed in April, 1999.

Valley Business Center will replace the former GTE warehouse/ light industrial park site with eight business park buildings at 16500 Valley Boulevard in La Puente. The site consists of a 6.79-acre site with a warehouse/ light industrial business park with a total floor area of 152,000 square feet. The project also proposes the realignment of Old Valley Boulevard, resulting in Old Valley Boulevard intersecting Valley Boulevard at a signalized T-intersection. The notice of intent for this project was submitted in September of 1999.

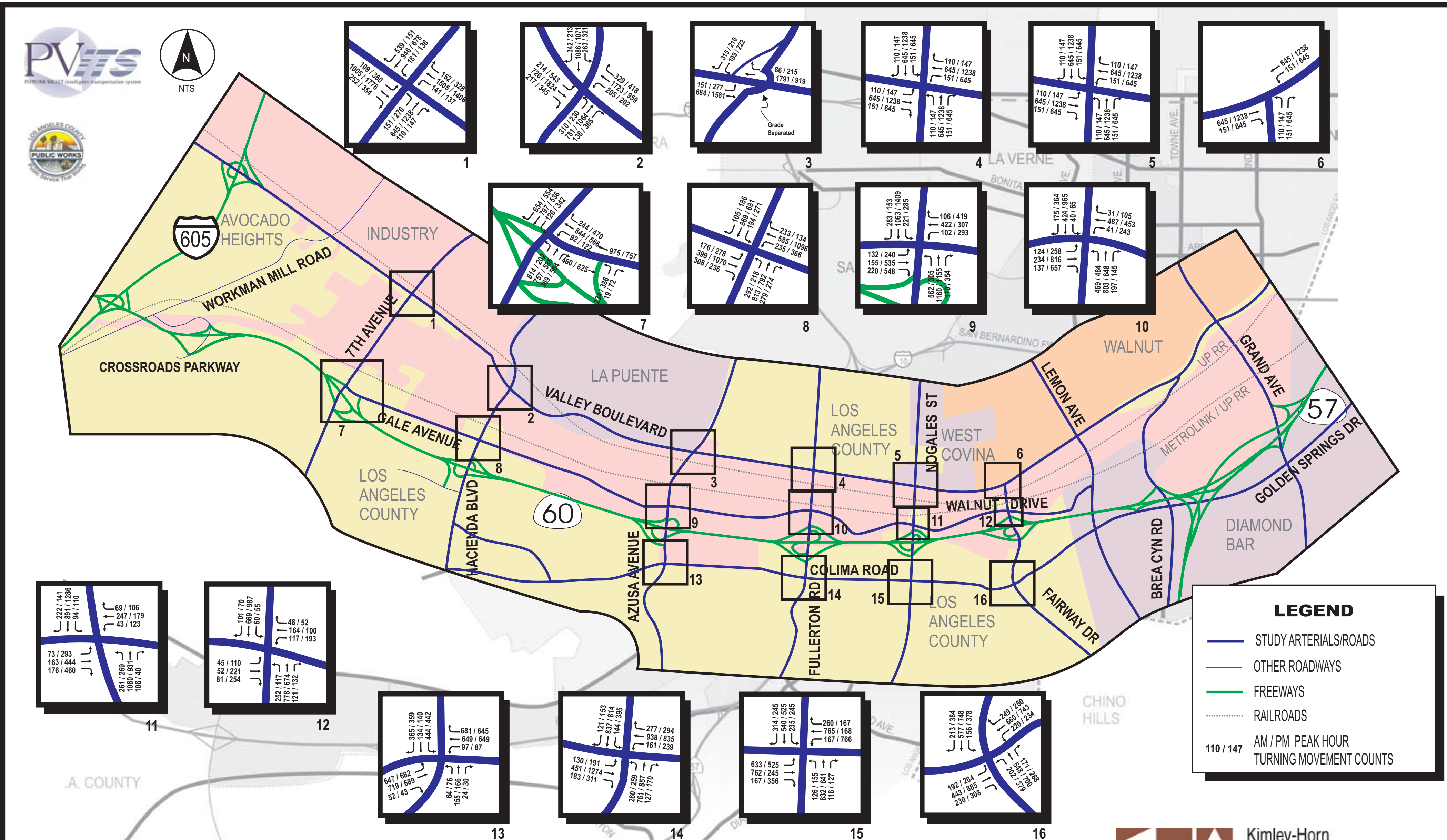

FIGURE 4 - INTERSECTION TURNING MOVEMENT VOLUMES

Lemon Business Center is planned for the vacant 7.2-acre parcel located at the northwest corner of Lemon Avenue and Paseo Del Prado in the City of Walnut. The proposed project involves four lots totaling 7.2 acres with total square footage of over 130,000 square feet. The traffic analysis for this project was completed in February 2001.

Wohl Property Group Industrial Project plans the construction of two one-story industrial buildings with 695 parking spaces. The proposed project would be located southwest of the intersection of Grand Avenue at Valley Boulevard between the two Union Pacific Railroad tracks in the City of Industry. The proposed project consists of two buildings of 592,971 square feet of office/ warehouse/ manufacturing uses. The EIR was reviewed by LA County in January of 1999.

Caltrans Improvements

Route 57 and 60 HOV improvements. Caltrans has plans for HOV lanes on SR 57 from the Lambert Road undercrossing in Orange County to Route 60 at Reservoir Street (near the Los Angeles/San Bernardino County Line). The remaining work to be done as a part of these improvements effects the Grand Avenue and Brea Canyon Road interchanges.

The HOV lanes at these two interchanges have been constructed in the median by widening the outside of the freeway and restriping the existing lanes. The existing structures at Brea Canyon Road and Cold Springs Lane will be widened and the structure at Tonner Canyon will be seismically retrofitted. It is projected that the interchange improvements will be completed sometime in the year 2004. It is projected that these improvements will relieve some of the congestion on Valley Boulevard, Grand Avenue and Golden Springs Road.

Route 60 HOV Improvements are proposed for the addition of one median HOV lane in each direction along Route 60 between Route 605 and Brea Canyon Road. A project report was completed by Caltrans in September of 2000. No project schedule has been made available.

Local Improvements

The Alameda Corridor East (ACE) Construction Authority has transportation safety improvement projects planned at 44 locations throughout the San Gabriel Valley. The Jump Start project, estimated to be completed by winter 2002, includes construction of new medians to prevent motorists from driving around safety gates, construction of new sidewalks, installation of railroad traffic signal, and pedestrian safety measures and road restriping. Jump Start projects are planned at twenty (20) locations within the Route 60 Corridor study area. Additionally, two phases of grade separation projects are planned. Phase I is estimated to start in 2004/ 2005. Phase II projects are estimated to be complete in 2006/ 2007. The projects that are planned, along with the existing grade separated intersections in the study area are illustrated on **Figure 5**.

2.4 Traffic Signal System Infrastructure

Traffic signals in the Corridor area are owned and operated by the City of Industry, LA County, and Caltrans. There is not currently a centralized traffic signal system for the City's or the County's signals. Caltrans has CTNet, a centralized traffic signal system in place for the signals on Azusa Avenue. The remainder of the traffic signals in the study area are running independently using time-of-day plans. Caltrans also has ramp meters at most on-ramps to Route 60. **Figure 6** depicts the location of the traffic signals and ramp meters within the Route 60 Corridor.

The County developed coordinated timing plans for many traffic signals within the study area as a part of the Pomona Valley Forum Traffic Signal Synchronization Project. The County also implemented TSSP and installed WWV at numerous intersections as part of other synchronization projects. Several of Caltrans' signals were included in the coordination as well. In those cases, timing plans were developed for a corridor, and then the plans were handed over to Caltrans to be implemented at Caltrans' signals. The coordinated corridors also are depicted in **Figure 6**. The figure also demonstrates those timing plans that were developed by the County and the agency that maintains the timing at each intersection.

LA County is currently evaluating different traffic signal systems to make a recommendation to the various Forums in the County and for implementation at a planned County TMC from which to monitor County-operated signals. The TMC is being planned to house a new traffic signal system and to provide the County with the ability to monitor and selectively control (in locations where a city has asked for the County to operate) signals and ITS elements throughout the County.

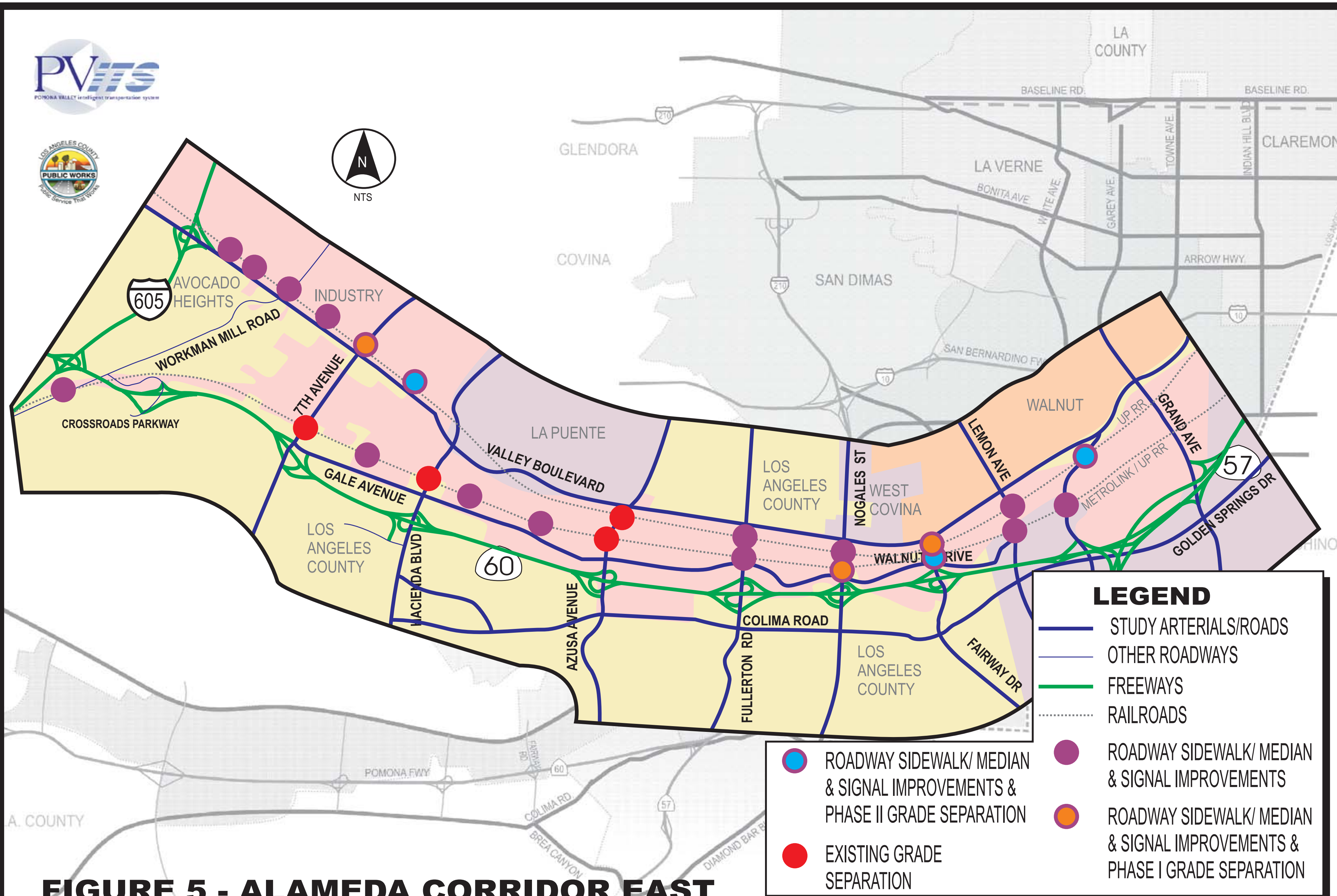

FIGURE 5 - ALAMEDA CORRIDOR EAST PLANNED RAILROAD IMPROVEMENT PROJECTS

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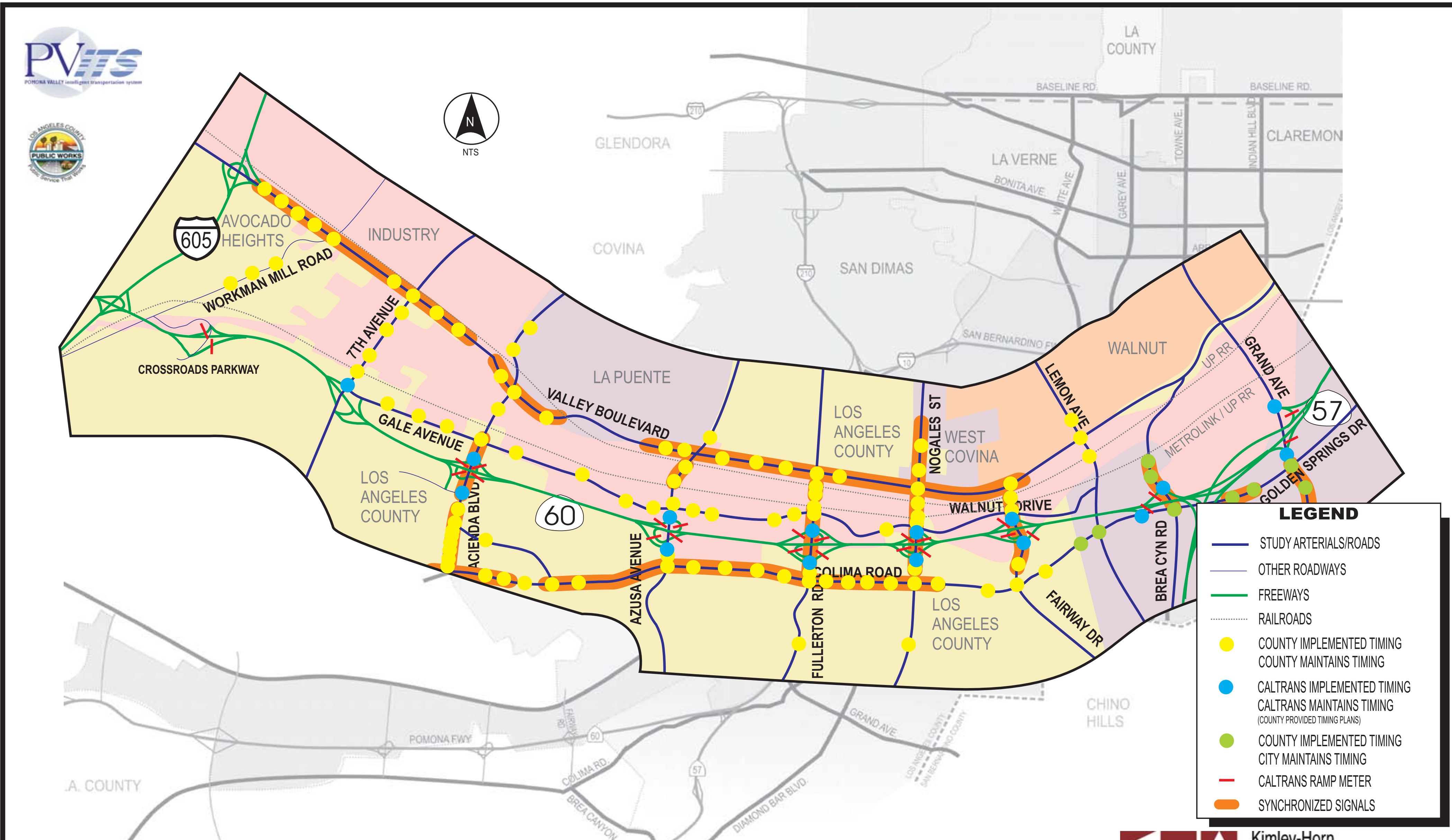

FIGURE 6 - TRAFFIC SIGNAL AND RAMP METER LOCATIONS

2.5 Intelligent Transportation System Components

A construction project is currently underway that is installing numerous ITS devices on Route 60 in Caltrans' jurisdiction. The project includes the installation of closed-circuit television (CCTV) cameras, Dynamic Message Signs (DMS), Traffic Monitoring Stations (TMS) and communications equipment between I-605 and SR-57. The communications is a part of a SONET ring that traverses Route 60, SR-57, I-10, and I-605. The CCTV cameras transmit video images over fiber optic cable to video nodes, which then transmit the video to the hubs via fiber. The data, including the control signals and feedback for the CCTV cameras, is transmitted over twisted wire to data nodes, which then transmit the data to the hubs via fiber. In addition, Caltrans is installing a local communication cabinet that would enable connection of local traffic signal controllers to the mainline fiber backbone. The cabinet is being installed at Route 60/Azusa Avenue (Azusa Avenue is under Caltrans jurisdiction in this location). **Figure 7** depicts the ITS elements that are existing and under construction. Caltrans currently has no additional ITS components programmed (funded) within the study area.

Neither the City nor the County has ITS elements or plans for elements in this region on arterials.

3.0 ANALYSIS OF NEEDS

A primary goal of this report is to determine whether ITS improvements are needed within this corridor to improve traffic flow and enhance freeway capacity. This section describes the capacity analysis of the corridor roadways and includes a discussion of the needs and issues described by the stakeholders related to the Route 60 Corridor.

3.1 Roadway Analysis

The results of the roadway capacity analysis are summarized in **Table 1**. Average daily traffic was used to determine volume-to-capacity (V/C) ratios for each of the roadways. Since LA County does not use V/C to analyze roadway segments, capacity volumes used for the analysis below were the more conservative capacities used by other agencies such as Orange or San Diego Counties.

Table 1 – Roadway Capacity ADT Analysis

Roadway Segment	Lanes/Classification/ Volume at LOS E	Current Volume	V/C	LOS
SR 60	8 lane freeway/ 150,000	220,000	1.47	F
Valley Boulevard	4 lane major/ 37,000	45,000	1.21	F
Colima Road	4 lane major/ 37,000	36,000	0.97	F
Gale Avenue	4 lane secondary/ 34,200	26,000	0.76	C
7th Avenue	4 lane major/ 37,000	17,000	0.46	B
Hacienda Boulevard	6 lane major/ 57,000	43,000	0.75	C
Azusa Avenue	4 lane major/ 37,000	48,000	1.30	F
Fullerton Road	4 lane major/ 37,000	38,000	1.03	F
Nogales Street	4 lane major/ 37,000	38,000	1.03	F
Fairway Drive	4 lane secondary/ 34,200	23,000	0.67	C
Lemon Avenue	4 lane secondary/ 34,200	17,000	0.50	B
Brea Canyon Road	4 lane major/ 37,000	21,000	0.57	B
Grand Avenue	4 lane major/ 37,000	28,000	0.76	C

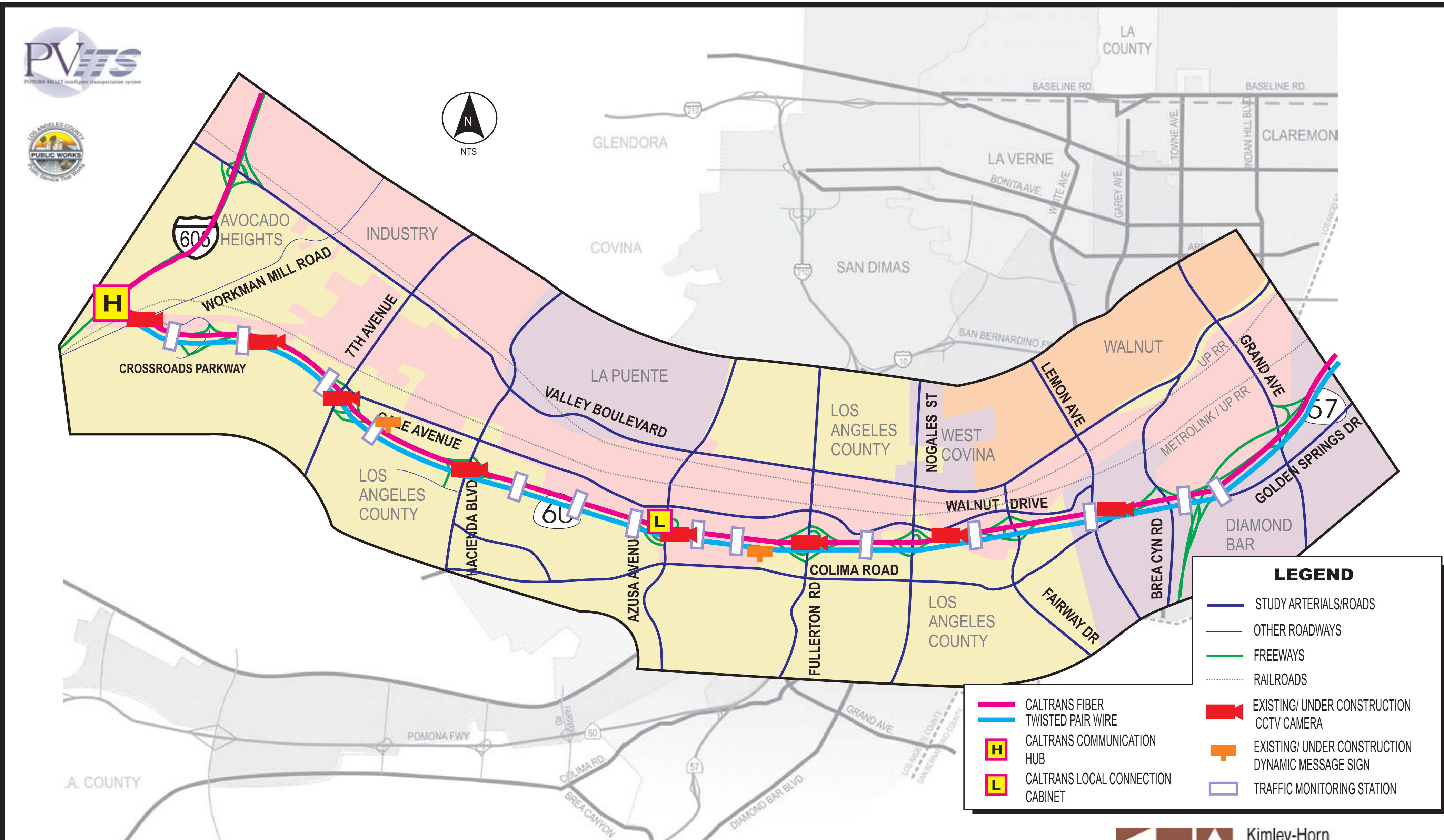

FIGURE 7 - EXISTING ITS FIELD DEVICES AND COMMUNICATION

3.2 Stakeholder Needs

The City of Industry would like to gain the capability of monitoring and operating their signals. They would like to be able to retrieve data from the field and to have the capability of coordinating with other local Pomona Valley agencies for emergency and disaster operations. Interagency communication would be key to managing traffic during major incidents, emergencies and disaster operations. The City would like their signals to be connected to LA County's future signal system.

The City of Industry reports that Gale Avenue is used by travelers as an alternate route to SR 60. They feel that there is a need for congestion management along that route for recurring and non-recurring congestion. The City would particularly like to monitor the signalized intersections along Gale Avenue.

The City of Industry is supportive of ITS in their jurisdiction as a solution to mobility problems. It is understood by the City that traffic is currently using the major east-west streets in addition to Route 60 for travel through the Corridor. Providing improved traffic flow would be welcome.

The County of Los Angeles Department of Public Works is interested in gaining monitoring ability over their traffic signals in the field. The monitoring would help County staff to troubleshoot signal issues and to remotely follow-up on reported problems and timing error reports from travelers.

Caltrans is nearing completion of the construction of ITS field elements and communications in the Route 60 corridor.

3.4 Existing Conditions and Needs Assessment

Based on the needs and issues that have been identified and the existing state of the Corridor in terms of available arterial capacity and existing ITS components, the study team has determined that ITS has the ability to contribute to the improvement of traffic flow in the corridor and provide tools to the stakeholder agencies to better manage traffic.

4.0 POTENTIAL SYSTEM ALTERNATIVES AND STRATEGIES

Potential strategies that would address the needs of the Route 60 corridor related to recurring and non-recurring congestion and improved management tools are listed below. They are organized into four main categories: Traffic Management, En-route Driver Information, Pre-trip Traveler Information, and Management and Procedures. These strategies will be further analyzed and evaluated to determine which will be most beneficial to the Corridor in the short term and which should be classified as mid- and long-term goals.

4.1 Traffic Management

Traffic management components of the Route 60 Corridor are those strategies, technologies or solutions that relate to freeway, arterial, or Corridor-based traffic control and management. The potential solutions range from simple to complex, and the price to implement each would vary greatly as well. The list below is meant to describe potential solutions related to management of traffic through ITS improvements and deployment. Each potential strategy is labeled with an identification based on the category (for example, TM3 is the third potential strategy identified for Traffic Management).

TM1. Completion of the traffic signal interconnect network. There is very little communications in the region for interconnecting traffic signals. Building a field communication network to connect the signals would be beneficial toward providing advanced traffic signal timing strategies.

TM2. Implementation of a Centralized Traffic Signal Control System. The signals in the Pomona Valley area are not linked to a centralized control system that would enable easy implementation of new timing plans or remote monitoring. This could be accomplished by one of several options including, but not limited to:

- a new system that would reside at LA County's new TMC (currently in the design phase) that could cover both LA County signals and Industry signals;
- two systems: one at the City of Industry and one at LA County (for coverage of each agency's signals separately); or
- by a new system resident at the future Pomona Valley sub-regional TMC.

The key to this strategy would be to have the traffic signals operating from a centralized system. The details of which agency controls the signals and the location of the system would be worked out in the design.

The ACE Construction Authority is planning a demonstration project for a system that will link 18 traffic signals in the City of Pomona with real-time guidance signs and train arrival software. If successful, this system may be a front runner when choosing a system for the City of Industry, LA County, as a Corridor-based deployment, or for the whole Pomona Valley region. The IR/RIS project should be monitored in order to coordinate with this Pomona Valley Forum project.

TM3. New traffic signal coordination project for the Corridor. A new project to establish a fully coordinated system that includes primary north/south arterials that carry traffic between the freeway and preferred arterial alternative routes, as well as Caltrans-operated traffic signals at the off-ramps, will ensure that traffic moves more efficiently through the Corridor. This would require coordination among Caltrans, LA County DPW, and the City of Industry. This strategy would be an expansion of the 1995 Signal Synchronization study. The coordination should include Gale/ Walnut, which is not currently coordinated.

TM4. Coordination of traffic signals with ramp meters. Traffic signal to ramp meter coordination should include the ability to adjust ramp metering rate and signal timing to avoid queue spill back onto city streets. This would require coordination among Caltrans, LA County DPW, and the City of Industry.

TM5. Traffic Responsive Signal Timing Plan Selection (TRPS). Traffic responsive timing would implement timing plan changes based on volume thresholds. Multiple, pre-designed timing plans, each designed for specific traffic flow patterns, would allow for smoother coordination on a Corridor-wide basis in the event of major fluctuations in traffic resulting from incidents and special events. The volume thresholds and timing plans would be developed prior to implementation in the field. Following implementation of this strategy, as traffic volumes increase and exceed the pre-defined thresholds, the traffic signal's plan would switch to the timing plan that was defined for that threshold.

TM6. Traffic Adaptive Signal Timing. An adaptive system would adjust signal timing cycle-by-cycle based on current volumes. The changes that are implemented during each cycle are minute. This is an ideal system for volume changes that are seasonal or occur over longer periods of time. The system can remain optimized over the long term. This type of system cannot adjust to major fluctuations in traffic that occur as the result of an incident causing spill over onto parallel arterials. Adaptive signal systems tend to be more difficult to keep coordinated (synchronized) over the long-term, as small, consistent fluctuations in timing can cause the signals to optimize for a single location, and throw off synchronization.

TM7. Implementation of incident scenario response plans. In order to maximize traffic flow during incidents, timing plans can be developed for various incident types and locations for implementation as incidents occur. These timing plans can be selected manually from a central location or by a traffic responsive system based on volume thresholds. The pre-packaged/ pre-timed scenario response plans would ideally involve traffic control and monitoring through the use of signal timing and CCTV cameras; motorist information through Trailblazers and freeway DMS; and accident/incident management. A scaled down version might include only timing plans.

TM8. Upgrade of City of Industry traffic signal system. Upgrade existing traffic signal equipment by providing the City with its own centralized system or a link to a regional centralized system. If the City links to a centralized system for the whole Pomona Valley Forum, it would be able to share the cost of the system with other agencies. This type of shared arrangement also may be useful for staffing, as the subregional TMC could cover the staffing for the City, if the City desires.

TM9. Integration of queue detection. Queue detection for ramp meters and for traffic signals can be used as an aid in timing plan selection from a central location. This strategy could be incorporated with a centralized traffic signal system, especially near the Route 60 ramps, in order to better manage traffic from a queuing perspective.

TM10. Vehicle detectors for traffic flow data. Detection devices should be located at every major intersection and between major intersections along primary alternative arterials within the Corridor area to provide adequate coverage of the arterials (SR-60 detectors [traffic monitoring stations] are already in place). Many different types of detectors are available:

- traditional inductive loop detectors;
- overhead microwave detectors;
- video detectors;
- passive acoustic detectors; and
- active acoustic detectors.

TM11. Vehicle probes for traffic flow data. Vehicle tracking provides Corridor traffic flow data using different technologies. Collecting flow data from vehicle probes can help to depict the current state of the arterial roadways at any given time. This strategy, used in conjunction with or in lieu of, system detection, has the best potential for conveying real-time speeds and delays. When used in conjunction with detectors, the probes can assist in calibrating the detectors. Having two forms of data will help in developing an algorithm that can accurately depict the real-time speeds. Privacy issues should be addressed with these technologies:

- video detection through license plate matching photography – privacy issues can be avoided by recording only the first four digits of the plates;
- cellular phone call tracking – triangulation is used to determine speeds by tracking random cellular phone calls (not made to any particular phone number). Volume data is not provided using this technology;
- vehicle probes – vehicles that travel the Corridor on a regular basis could be outfitted with transponders and speeds could then be determined by tracking these vehicles. This technology would be most effective during peak periods;
  - utilizing regular commuters by equipping vehicles with transponders;
  - utilizing Freeway Service Patrol and transit services by equipping vehicles with transponders; and
  - utilizing FasTrac customers' transponders (toll tags). (In order for this technology to work, an origin-destination study would need to be performed to determine if there is an adequate sampling of traffic, traversing the Route 60 corridor that is outfitted with the transponders.)

TM12. Installation of closed circuit television (CCTV) cameras in city and county jurisdictions. The City of Industry and LA County could install CCTV cameras at key locations within the Corridor to monitor traffic and be able to quickly confirm and respond to incidents on arterials as well as the freeway. CCTV cameras would be useful in retiming signals or implementing pre-determined timing plans for signals as well.

TM13. Development of an Integration Model for strategy development. A model that quickly simulates the effects of an incident on traffic based on estimated inputs about the incident such as length and type of incident, and real-time inputs such as volume and speed data could aid operators in determining which strategies (response techniques) to apply to given scenarios.

TM14. Development of a Trip-Decision Model for predicting travelers' route choices. Research projects are developing trip-decision models which might effectively predict alternate routes which travelers would choose in a given scenario. This type of model could aid operators in choosing response techniques based on advanced, real-time predictions.

4.2 En-Route Driver Information

EI1. Installation of Trailblazer signs on arterials. Smaller, less obtrusive DMS can be used on arterials to help guide traffic that has spilled over onto arterials from the freeway. The signs can be designed to be entirely dynamic (able to be changed remotely, and messages can be created on-the-fly), changeable (allows one or more predefined messages to be displayed, messages are stored in the controller, can be changed remotely), or static. Trailblazers can be designed to contain any combination of these components and most are modular in nature, to enable the signs to be scaled to be large or small, depending on the needs and wants of the jurisdiction.

EI2. Installation of arterial DMS. Smaller, less obtrusive DMS can be installed on arterials for daily traffic management.

EI3. Display of real-time travel speeds. Signs relaying real-time average speeds on Route 60 and on the major east-west arterials in the Corridor would provide travelers with better traffic information to make mode, route, and travel time choices.

4.3 Pre-trip Traveler Information

PI1. Provision of live video feeds to media. Provide the media with access to CCTV information through live video feeds of City and County cameras. Screening may be necessary before video is accessed by the media.

PI2. Development of Community Access Television (CATV) system. CATV is a medium that could broadcast real-time traffic information into every home with access to cable television. If this scenario were chosen for implementation, a system would need to be purchased/ developed that would collect and process traveler information and then broadcast it over a dedicated, free television channel.

PI3. Highway Advisory Telephone (HAT) information. Dedicated phone number (*511) for dial-in access of pre-recorded construction/maintenance schedules within the Corridor also should include computer generated voice messages from the TMC regarding real-time traffic speeds within the Corridor and suggested detour information.

PI4. Internet site for the Corridor. This site should be linked with other Southern California sites that provide similar information. It should provide real-time information throughout the Corridor, construction and maintenance updates, transit and car pool information, Smart Corridor and other ITS information, Pomona Valley sub-regional TMC information, and contact names and phone numbers to ensure positive public opinion. There may be a possibility to utilize an agency's existing site or that of this project (on the County's server) to expand to cover traveler information.

4.4 Management and Procedures

MP1. Development of Coordinated Incident Management Procedures. Develop formal procedures to provide the Caltrans, County, and sub-regional TMC operators with specific steps on the actions to be taken and the responsibilities of each agency during recurring and non-recurring congestion within the corridor.

MP2. Develop cooperative agreements. In order to clarify management issues within the Corridor, written agreements should be drafted pertaining to issues of liability, responsibility, and priority including City of Industry, LA County, Caltrans, and any other party involved.

Caltrans has been included here as a potential partner to include signal-to-ramp meter coordination, in addition to the arterials that the County and the City of Industry will coordinate, and any other potential sharing or overlap in traffic management in the Corridor.

5.0 ANALYSIS OF POTENTIAL STRATEGIES

This section describes the criteria for evaluating potential strategies for the Route 60 Corridor. Following the criteria discussion, two evaluation matrices show the results of the scoring and ranking of the various strategies. Those tables provide a measure of the utility of each of the proposed strategies. A utility to cost ratio presents a comparison of all the strategies and provides a basis for prioritizing them. The utility score is the sum of the scores times the weighting factor assigned to the strategy.

The evaluation criteria may be broadly classified into the following two categories:

- Quantitative Criteria; and
- Qualitative Criteria.

5.1 Descriptions of Criteria

The following is a brief description of each of the evaluation criterion and the weighting system used for determining the contribution of or benefit from each of the proposed strategies:

Quantitative Criteria

Quantitative criteria are those criteria that have been identified to measure immediate tangible benefits, such as delay or accident reduction, air quality improvements and cost, through the operation and implementation of the various strategies. Criterion in this quantitative category are identified by numbers preceded by the letter 'N'; the qualitative numbering scheme begins with the letter 'L' for ease of tracking. Each criterion below includes a description of a rating system that ranges from 0 (low) to 5 (high).

N1. Reduction in Traveler Delay Due to Recurring Congestion

This is a measure of the ability of the strategy to reduce recurring congestion, which occurs in the same location on a regular basis. A score in the evaluation matrix of 0 would represent a low contribution to reducing delays and a score of 5 would represent a large contribution to reducing delays.

N2. Reduction in Traveler Delay Due to Non-recurring Congestion

This is a measure of the ability of the strategy to reduce non-recurring congestion, which includes incident related congestion, congestion due to construction activities, etc. A score in the evaluation matrix of 0 would represent a low contribution to reducing delays and a score of 5 would represent a large contribution to reducing delays.

N3. Queue Reduction

This element is a measure of the ability of the strategy to reduce queue lengths along the corridors. A score of 0 would represent a low contribution to reducing queues and a score of 5 would represent a large contribution to reducing queues.

N4. Accident Reduction

This element is a measure of the ability of the strategy to reduce accident occurrences within the Corridor. A score of 0 would represent a low contribution to reducing accidents and a score of 5 would represent a large contribution to reducing accidents.

N5. Secondary Accident Reduction

This element is a measure of the ability of the strategy to reduce secondary accident occurrences, or those accidents that occur as a result of the congestion from a first incident, within the Corridor. A score in the evaluation matrix of 0 would represent a low contribution to reducing secondary accidents and a score of 5 would represent a large contribution to reducing secondary accidents.

N6. Air Quality Improvements

This element is a measure of the ability of the strategy to provide for air quality improvements due to reduction in vehicle emissions. A score in the evaluation matrix of 0 would represent a low contribution to reducing vehicle emissions and a score of 5 would represent a large contribution to reducing vehicle emissions.

N7. Fuel Consumption Reduction

This element is a measure of the ability of the strategy to provide for fuel consumption reduction. A score in the evaluation matrix of 0 would represent a low contribution to reducing fuel consumption and a score of 5 would represent a large contribution to reducing fuel consumption.

N8. Increase in Peak Hour Travel Speed

This element is a measure of the ability of the strategy to improve peak hour travel speed. A score in the evaluation matrix of 0 would represent a low contribution to increasing peak hour travel speeds and a score of 5 would represent a large contribution to increasing speeds.

N9. Increase in Transit Ridership/ Ridesharing

Since person throughput is an important goal of a Smart Corridor, various transit and multi-modal options should be considered. The evaluation matrix scores each of the strategies between 0 and 5 where 0 would indicate low transit or multi-modal benefit and 5 would indicate high transit or multi-modal benefits.

N10. Reduction in Long-term Cost Resulting from Agency Cooperation

This element measures the reduction in long-term cost resulting from agency cooperation along the major corridors. Cooperation and coordination between agencies can result in long-term cost savings in recurring operations and maintenance costs as well as capital costs for system installation. Some strategies, such as those that involve only data sharing, may have a small impact on reducing long-term costs (scoring 0), while others, such as those that involve sharing of equipment or a central system, can have a major impact as the costs are shared between two or more agencies (scoring 5).

N11. Incident Response Time Reduction

The time taken for clearing an incident plays an important part along major corridors with increased incident length resulting in extended delays and possibly secondary accidents. The evaluation matrix scores each of the strategies between 0 and 5 where 0 indicates no contribution or benefit from that strategy to reduce delays due to incidents and 5 indicates the most benefit from that strategy for incident length reduction.

N12. Low Initial Cost

Low initial cost is an important criterion for immediate implementation of proposed strategies. A score of 0 in the evaluation matrix in this category would indicate a high cost strategy while 5 would indicate a low initial cost.

N13. Low Annual Recurring Cost

Low annual recurring cost is desirable for the proposed strategies. A score of 0 in the evaluation matrix would indicate a high annual recurring cost whereas 5 would indicate a low annual recurring cost.

N14. Efficient Use of Roadway Capacity

This element measures the effectiveness of each strategy to contribute to the efficient use of roadway capacity. A score of 0 would indicate that the strategy makes poor use of available roadway capacity while 5 would indicate that the strategy makes efficient use of roadway capacity.

Qualitative Criteria

Qualitative criteria are those that measure intangible benefits accruing from the proposed Smart Corridor strategies. The qualitative improvements are generally harder to measure and more difficult to quantify. Qualitative criteria aim at measuring factors such as driver frustration, inter-agency cooperation, productivity, aesthetics, agency input, funding availability etc. Each criterion below includes a description of a rating system that ranges from 0 (low) to 5 (high).

L1. Reduction in Driver Frustration

This element measures the impact of the proposed strategies on reducing driver frustration. A strategy receiving a score of 0 in the evaluation matrix would be one that does not contribute to reducing driver frustration while a score of 5 would indicate that the strategy does significantly reduce driver frustration.

L2. Improved Inter-Agency Coordination

This criterion is a key factor in developing a Smart Corridor, as the participation and coordination of several jurisdictions (LA County, Caltrans, and City of Industry) is important to the success of the Corridor. The scoring on the evaluation matrix ranges from 0 to 5 where a score of 0 would indicate that the strategy does not contribute to inter-agency coordination and a 5 would indicate high participation among various jurisdictions.

L3. Improved Productivity of Agency Staff

This criterion measures the effectiveness of a strategy in improving the productivity of agency staff, i.e., to be able to perform other functions. A score of 0 indicates that the strategy does not contribute to any improvement in productivity while 5 represents highly improved productivity of the agency staff due to that strategy.

L4. Reduction in Cross-Jurisdictional Delays

Similar to inter-agency cooperation and coordination, reduction in cross- jurisdictional delays is important for Smart Corridor implementation success. A weighting factor of 0 indicates that the strategy does not contribute to any reduction in cross-jurisdictional delays while 5 indicates that the strategy presents significant reduction in cross-jurisdictional delays.

L5. Availability of Real-time Data to Make Traveler Decisions

This criterion measures the effectiveness of a strategy providing real-time data to enable traveler decision making. A weighting factor of 0 indicates that the strategy does not contribute to providing real-time data while 5 indicates that the strategy contributes significantly to making real-time data available for traveler decisions.

L6. Ease of Maintenance

Maintenance is an important issue and ease of maintenance of various strategies represents a higher score in the evaluation matrix. The evaluation matrix rates ease of maintenance from 0 to 5, with 0 for strategies that do not provide for ease in maintenance.

L7. Ease of Operations

Ease in operations is an important element in the successful implementation of Smart Corridor strategies. The evaluation matrix rates ease of operations from 0 to 5, with 0 for strategies that do not provide for ease in operations.

L8. Amount of Personnel Required for Maintenance

The number of personnel required for maintenance of facilities operating under the proposed strategies is another important factor. A score of 0 in the matrix indicates that a larger than normal number of personnel may be required for maintenance operations while 5 indicates that an increase in normal personnel would not be required.

L9. Ease of Installation/ Implementation

Ease of installation is another important criterion for the strategies. A score of 0 in the matrix represents more effort required in installation of a particular strategy while 5 indicates a significant ease in installation.

L10. Perceived Benefits by Drivers

This criterion measures the perception that drivers have that Smart Corridor strategies provide benefits. A strategy score of 0 indicates poor driver perception of benefits resulting from various strategies whereas 5 indicates a high driver perception of benefits accrued as a result of strategy implementation.

L11. Compatibility with Other ITS Opportunities

This criterion measures the compatibility of each strategy with regards to other ITS opportunities in the area. The compatibility may be technological (between various protocols, hardware or software) or jurisdictional (between agencies). A score of 0 would indicate that the proposed strategy would be incompatible with other potential ITS initiatives in the area while a 5 would indicate a high degree of compatibility between the proposed strategies and other ITS opportunities in the area.

L12. Proven Technology/Strategy

This criterion measures the proven effectiveness of an element or strategy, such as whether or not it is available off the shelf, and has been used successfully elsewhere. A value of 0 in the evaluation matrix represents no proven effectiveness while 5 indicates high proven effectiveness.

L13. Funding Availability

This criterion reflects the funding availability for each of the strategies with regards to some strategies being capable of generating funding for quick implementation in the Corridor. A score of 0 indicates that there is no funding availability for such a strategy while a 5 indicates a high possibility of obtaining funding.

5.3 Evaluation

The evaluation matrices provide measures of utility for all the proposed strategies. Elements cover a range of options in terms of costs, modes and jurisdictions. Selection among the elements should consider other factors such as availability of funds, jurisdictional balance, opportunities presented by related projects, agency input or preference, etc.

The evaluation matrix provides the basis for prioritizing the Route 60 Corridor strategies into two groups: recommendations for short-term implementation/ installation and recommendations for future programs. **Tables 2** and **3** present the results of the evaluation. **Table 2** ranks the various strategies in terms of quantitative evaluation criteria. **Table 3** ranks the various strategies against qualitative evaluation criteria. The total score is the sum of the ranking for each criterion.

This evaluation provides the primary basis of prioritization of the Smart Corridor improvement strategies. Three scores are listed for each of the potential strategies: the score based on the quantitative analysis, the score based on the qualitative analysis, and the sum of those two scores. Final prioritization is based on these analyses combined with a knowledge of the stakeholders and jurisdictions involved in the Corridor.

Table 2 – Quantitative Comparison of Potential Strategies

	SMART CORRIDOR STRATEGIES	QUANTITATIVE EVALUATION CRITERIA														
		N1 Reduction in Delay Due to Recurring Cong.	N2 Reduction in Delay Due to Non-recurring Cong.	N3 Queue Reduction	N4 Accident Reduction	N5 Secondary Accident Reduction	N6 Air Quality Improvements	N7 Fuel Consumption Reduction	N8 Increase in Peak Hour Travel Speed	N9 Increase in Transit Ridership/ Ridesharing	N10 Reduction in O&M Cost due to Cooperation	N11 Incident Length Reduction	N12 Low Initial Cost	N13 Low Annual Recurring Cost	N14 Efficient Use of Roadway Capacity	TOTAL
Traffic Management																
TM1.	Completion of the signal interconnect network	4	4	2	2	2	4	3	4	1	1	1	2	4	5	39
TM2.	Centralized Traffic Signal Control System	5	4	2	3	3	4	3	3	1	3	1	1	2	5	40
TM3.	New signal coordination project for the Corridor	3	2	3	2	2	5	4	4	1	1	1	2	5	5	40
TM4.	Coordination of signals with ramp meters	4	4	4	4	4	3	3	4	1	1	1	4	4	5	46
TM5.	Traffic Responsive Signal Timing Plan Selection	3	5	4	3	3	3	3	3	1	1	1	2	2	5	39
TM6.	Traffic Adaptive Signal Timing	4	2	2	2	2	2	2	4	1	1	1	1	1	5	30
TM7.	Incident scenario response plans	1	5	3	4	4	5	5	1	1	3	4	3	4	5	48
TM8.	Upgrade of City of Industry traffic signal system	5	5	2	3	3	4	3	5	1	3	1	2	2	5	44
TM9.	Integration of queue detection	4	4	5	3	3	3	3	3	1	1	2	2	3	5	42
TM10.	Vehicle detectors to collect traffic flow data.	3	3	4	3	3	3	3	3	2	1	1	2	3	5	39
TM11.	Vehicle tracking to collect traffic flow data	3	3	4	1	2	2	2	2	1	1	1	2	5	5	34
TM12.	CCTV cameras in city/ county jurisdictions	4	4	4	4	4	3	3	3	1	1	4	2	3	5	45
TM13.	Integration Model for strategy development	3	5	3	4	4	4	3	3	1	1	1	2	3	5	42
TM14.	Trip-Decision Model for predicting route choices	3	5	3	3	3	4	4	3	1	1	1	2	3	5	41
En-Route Driver Information																
EI1.	Installation of Trailblazer signs on arterials	4	4	4	3	3	3	4	4	1	1	1	1	1	4	38
EI2.	Installation of DMS	4	4	4	3	3	3	4	4	1	1	1	1	1	4	38
EI3.	Display of real-time travel speeds	5	5	3	3	3	3	4	5	3	1	1	1	1	4	42
Pre-trip Traveler Information																
PI1.	Community Access Television (CATV)	3	2	2	2	2	3	3	3	1	1	1	3	2	4	32
PI2.	Highway Advisory Telephone (HAT)	2	2	2	2	2	3	3	2	1	1	1	3	2	4	30
PI3.	Internet site for the Corridor/Forum	4	4	2	2	2	3	3	4	2	1	1	4	4	4	40
Management and Procedures																
MP1.	Coordinated Incident Management Procedures	2	5	4	4	4	4	4	4	1	4	4	4	4	4	52
MP2.	Cooperative agreements	3	3	4	3	3	3	3	3	1	3	3	5	5	4	46

Table 3 – Qualitative Comparison of Potential Strategies

SMART CORRIDOR STRATEGIES		QUALITATIVE EVALUATION CRITERIA													TOTAL
		L1 Reduction in Driver Frustration	L2 Improved Inter-Agency Coordination	L3 Improved Productivity of Agency Staff	L4 Reduction in Cross-Jurisdictional Delays	L5 Availability of RT Data for Traveler Decisions	L6 Ease of Maintenance	L7 Ease of Operations	L8 No. of Personnel Required for Maintenance	L9 Ease of Installation/ Implementation	L10 Perceived Benefits by Drivers	L11 Compatibility with Other ITS Opportunities	L12 Proven Technology/Strategy	L13 Funding Availability	
Traffic Management															
TM1.	Complete signal interconnect network	4	3	1	4	2	3	4	3	4	3	4	5	4	44
TM2.	Centralized Traffic Signal System	4	3	4	4	4	3	4	3	1	3	4	4	4	45
TM3.	New signal coordination project	5	3	1	4	1	4	4	4	5	4	4	5	4	48
TM4.	Coordination of signals with ramp meters	4	5	2	5	3	3	3	4	4	4	4	5	4	50
TM5.	Traffic Responsive Signal Timing	4	3	1	3	1	2	3	4	1	3	4	4	4	37
TM6.	Traffic Adaptive Signal Timing	4	3	1	3	1	2	3	4	1	3	4	4	4	37
TM7.	Incident scenario response plans	5	4	2	4	1	4	4	4	2	4	3	4	2	43
TM8.	Upgrade of City of Industry traffic signals	4	3	4	4	4	3	4	3	3	3	4	4	4	47
TM9.	Integration of queue detection	3	1	1	2	4	2	3	3	1	2	4	5	4	35
TM10.	Vehicle detectors to collect traffic flow data	3	2	3	3	4	2	3	3	1	2	4	5	4	39
TM11.	Vehicle tracking to collect traffic flow data	3	2	3	3	3	2	3	2	2	2	4	4	3	36
TM12.	CCTV cameras in city/ county jurisdictions	4	4	4	4	3	3	4	2	2	3	5	4	4	46
TM13.	Integration Model for strategy development	3	1	2	2	2	4	4	4	4	1	3	4	2	36
TM14.	Trip-Decision Model	3	1	3	3	3	4	3	4	4	1	2	3	3	37
En-Route Driver Information															
EI1.	Installation of Trailblazer signs on arterials	5	4	4	4	5	3	4	2	3	4	5	4	4	51
EI2.	Installation of DMS on arterials	5	4	4	4	5	3	4	2	3	4	5	4	4	51
EI3.	Display of real-time travel speeds	5	4	4	4	5	3	4	2	3	4	5	4	4	51
Pre-trip Traveler Information															
PI1.	Community Access Television (CATV)	4	2	1	4	4	1	4	4	4	4	3	4	3	42
PI2.	Highway Advisory Telephone (HAT)	3	2	3	4	4	4	4	4	4	3	3	3	4	45
PI3.	Internet site for the Corridor/Forum	3	2	3	3	4	4	4	5	5	3	2	4	3	45
Management and Procedures															
MP1.	Coord. Incident Management Procedures	3	4	3	4	1	5	5	5	1	2	4	3	3	43
MP2.	Cooperative agreements	4	5	5	5	3	4	3	3	1	3	4	3	3	46

5.4 Recommendations

Short-term Recommendations

ID	Strategy	Quant. Score	Qual. Score	Total Score
TM4.	Coordination of signals with ramp meters	46	50	96
MP1.	Coordinated Incident Management Procedures	52	43	95
TM7.	Incident scenario response plans	48	43	91
EI3.	Display of real-time travel speeds	42	51	93
MP2.	Cooperative agreements	46	46	92
TM8.	Upgrade of City of Industry traffic signal system	44	47	91
TM13.	CCTV cameras in city/ county jurisdictions	45	46	91
EI1.	Installation of Trailblazer signs on arterials	38	51	89
EI2.	Installation of DMS	38	51	89
TM3.	New signal coordination project for the Corridor	40	48	88
TM2.	Centralized Traffic Signal Control System	40	45	85
PI3.	Internet site for the Corridor/Forum	40	45	85
TM1.	Completion of the signal interconnect network	39	44	83
TM11.	Vehicle detectors to collect traffic flow data.	39	39	78

Future Recommendations

ID	Strategy	Quant. Score	Qual. Score	Total Score
TM14.	Integration Model for strategy development	42	36	78
TM15.	Trip-Decision Model for predicting route choices	41	37	78
TM10.	Integration of queue detection	42	35	77
TM5.	Traffic Responsive Signal Timing Plan Selection	39	37	76
PI2.	Highway Advisory Telephone (HAT)	30	45	75
PI1.	Community Access Television (CATV)	32	42	74
TM12.	Vehicle tracking to collect traffic flow data	34	36	70
TM6.	Traffic Adaptive Signal Timing	30	37	67

6.0 SUMMARY OF RECOMMENDED IMPROVEMENTS

6.1 Introduction and Methodology

Based on the needs and issues that have been identified and the existing state of the Corridor in terms of available arterial capacity and existing ITS components, the study team has determined that ITS has the ability to contribute to the improvement of traffic flow in the corridor and provide tools to the stakeholder agencies to better manage traffic and perform their jobs more efficiently.

Potential strategies that would address the needs of the Route 60 corridor related to recurring and non-recurring congestion were identified. These potential improvements or strategies were organized into four main categories and strategies were numbered for tracking purposes, based on the abbreviations in parenthesis after each category title: Traffic Management (TM), En-route Driver Information (EI), Pre-trip Traveler Information (PI), and Management and Procedures (MP). These strategies were analyzed and evaluated to determine which would be most beneficial to the Corridor in the short-term and which should be classified as mid- and long-term goals.

The evaluation was based on ranking each strategy based on a list of quantitative and qualitative criteria. The resulting scores for each strategy were then cross-checked against the stakeholder's issues, objectives, and priorities. The quantitative and qualitative scores for each project were combined for a total score. The potential projects were arranged, based on this analysis, into short--term and future implementation horizons. Those recommendations that were categorized as future should be considered for further design and implementation only as funding becomes available. The short-term recommended projects should be taken to the PS&E stage for implementation over the next ten years.

The resulting list of recommendations is summarized below under the four major categories. **Figure 8** demonstrates the concept of how the recommendations would work together to improve travel through and within the Route 60 Corridor.

6.2 Traffic and Incident Management

The Traffic and Incident Management is the largest category for short-term, low-cost solutions to the recurring and non-recurring congestion issues in the Corridor. The recommended short-term projects in this category work together to create a Corridor-based traffic control system. These recommendations will enable the agencies to operate traffic signals and to monitor the Corridor in a coordinated manner. Several of the strategies also help to form the basis for a more advanced signal system that would provide the agencies with better traffic management tools to manage recurring congestion and to coordinate responses to incidents and event traffic.

Short-term:

- TM1. Completion of traffic signal interconnect network
- TM2. Centralized Traffic Signal Control System
- TM3. New signal coordination project for the Corridor
- TM4. Coordination of signals with ramp meters
- TM7. Incident scenario response plans
- TM8. Upgrade of City of Industry traffic signal system
- TM11. Vehicle detectors for traffic flow data
- TM13. CCTV cameras in city/ county jurisdictions

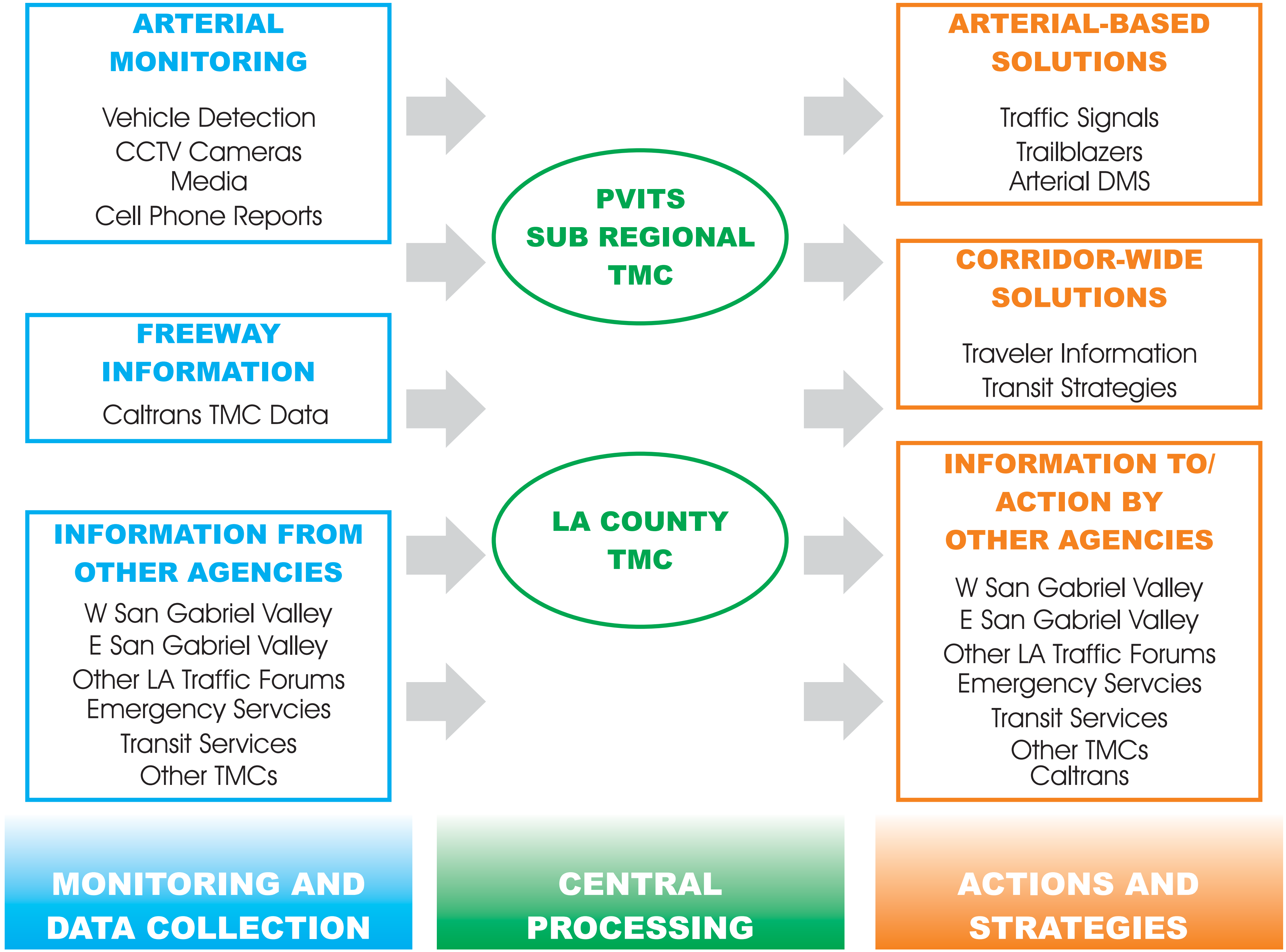

FIGURE 8 - CONCEPTUAL TRAFFIC MANAGEMENT

Kimley-Horn and Associates, Inc.

6.3 En-route Traveler Information

En-route traveler information provides real-time traffic conditions and event routing information to travelers during their trips. Outfitting the arterials with signage that would link to a central system (recommended under the Traffic and Incident Management category), arterial DMS and Trailblazers (a specific type of dynamic message sign used for signing routes) on arterial routes can help to reduce confusion and guide travelers through the Corridor when traffic naturally diverts from Route 60 during incidents or recurring congestion. The signs can also serve the arterial travelers in a day-to-day traffic management fashion by displaying incident or congestion messages related to the major east-west arterials or by displaying real-time travel speeds on arterials or travel times between two fixed points (e.g., "Valley; Nogales to 605; travel time 25 min"). The infrastructure would be required for the travel speeds or times to be displayed.

Short-term:

- EI1. Installation of Trailblazer signs on arterials
- EI2. Installation of DMS on arterials
- EI3. Display of real-time travel speeds

6.4 Pre-trip Traveler Information

Once the infrastructure is in place to collect arterial data and the stakeholders have the ability to process it centrally, information can be distributed to travelers via an internet web site that focuses on the Route 60 Corridor. The web site should graphically depict real-time traffic information for all three major east-west arterials, Route 60 (data from Caltrans, if possible) and the north-south connectors. If possible, streaming video or video capture snapshots would enable travelers to visually confirm the map data. In addition to the web site, it is often desirable for the local television news program to have live video of traffic conditions. It is recommended that discussions with news and other local media should start to gauge interest in linking to the central system for data and video sharing. If there is an interest, discussions should ensue to develop cost-sharing agreements that would enable the media station to hook into the CCTV images from the arterials.

- PI3. Internet site for the Corridor/Forum

6.5 Management and Procedures

The final category for recommended ITS strategies for the Route 60 Corridor covers the management and institutional arrangements required for smooth interjurisdictional traffic management. Development of coordinated incident management procedures would enable Caltrans, LA County, the City of Industry, and CHP to better respond to incidents, and manage traffic utilizing the new ITS tools as recommended in the previous subsections of this report. Cooperative agreements among those agencies help to facilitate cooperation across jurisdictional boundaries to achieve a common goal of improved mobility and traveler safety.

Cooperative procedures and agreements may be challenging to develop and implement, but are critical to optimizing travel through the Corridor. Without the cooperation of the multiple agencies that own and operate transportation facilities in the Corridor, the traffic progression cannot be coordinated effectively.

Short-term:

- MP1. Coordinated Incident Management Procedures
- MP2. Cooperative agreements

7.0 POTENTIAL AIR QUALITY BENEFITS

Predicted Annual Savings Per Year

	PREDICTED ROUTES							Pollution Reduction		Veh. Time,
	Predictions based on completed studies.				Veh. Time	Fuel	Org. Gases	CO	NOx	Veh. Wear
System	Limits	Miles	I/S	A.D.T.	(hrs)	(gal.)	(lbs.)	(lbs.)	(lbs.)	& Gas
Valley Boulevard	I-605 to Fullerton Road	7.50	18	42,000	336,987	408,366	17,757	191,306	5,485	$4,941,720
Valley Boulevard	Fullerton Road to Brea Canyon Road	3.50	4	27,500	83,366	101,063	4,394	47,347	1,358	$1,223,200
Gale Avenue/ Walnut Avenue	7th Avenue to Lemon Avenue	7.00	17	26,000	195,546	236,964	10,304	111,010	3,183	$2,867,540
Colima Road	Azusa Avenue to Brea Canyon Road	5.00	24	38,000	277,134	335,692	14,600	157,252	4,508	$4,061,440
Route 60	I-605 to SR 57	12.00	0	225,000	1,838,700	2,230,200	96,930	1,044,900	29,970	$27,000,000
				Total	2,731,733	3,312,285	143,985	1,551,814	44,503	$40,093,900