Pomona Valley
ITS Project

Project Deliverable 3.6.1

Fairplex Event Management Implementation Plan - Improvement Recommendations and Cost Estimates

Prepared by:

Kimley-Horn and Associates, Inc.

December 19, 2001
099017000.1

Copyright © 2001, Kimley-Horn and Associates, Inc.

TABLE OF CONTENTS

FAIRPLEX EVENT MANAGEMENT
IMPLEMENTATION PLAN RECOMMENDATIONS AND COSTS

PROJECT DESCRIPTION **1**

SUMMARY OF RECOMMENDATIONS **1**

1.0 INTRODUCTION **5**

1.1 Purpose of Report **5**
1.2 Background on the Fairplex Facility **5**

2.0 PHYSICAL ROADWAY IMPROVEMENT RECOMMENDATIONS **11**

2.1 Existing Roadway Operations **11**
2.2 Physical Roadway Improvement Recommendations **13**

3.0 TRANSIT IMPROVEMENT RECOMMENDATIONS **25**

3.1 Existing Transit Services in the Vicinity of Fairplex **25**
3.2 Transit Access Improvement Recommendations **27**

4.0 ITS AND TRAFFIC MANAGEMENT IMPROVEMENT RECOMMENDATIONS **28**

4.1 Existing ITS Elements and Traffic Management **28**
4.1.1 Event Management Efforts *28*
4.1.2 On-Street Traffic Management Efforts *30*
4.1.3 On-Site Parking Management Efforts *36*
4.1.4 Traveler Information & Wayfinding System *39*
4.2 ITS and Traffic Management Improvement Recommendations **42**
4.2.1 Traffic Management Center (TMC) Objectives *43*
4.2.2 Automated Traveler Information System (ATIS) Recommendations *43*
4.2.3 Advanced Traffic Management System (ATMS) Recommendations *45*
4.2.4 Event Management Operation Improvements *46*
4.2.5 Recommended ITS Equipment Locations *48*
4.2.6 Future Implementation Considerations *51*
4.2.7 Component Integration, Control, and Monitoring System *52*

5.0 PLANNING-LEVEL COSTS **53**

5.1 Capital Costs **53**
5.2 Operating Costs **53**

6.0 NEXT STEPS **56**

TABLE OF CONTENTS

FAIRPLEX EVENT MANAGEMENT
IMPLEMENTATION PLAN RECOMMENDATIONS AND COSTS

LIST OF FIGURES

Figure 1: – Aerial View of Fairplex....6
Figure 2: Fairplex Site and Surrounding Areas....8
Figure 3: Fairplex On-Site Exhibit Space Layout....9
Figure 4: Existing Geometry – White Avenue and Eastbound I-10 Ramp....15
Figure 5A: Recommended Improvements, Alternative A - White Avenue at I-10 Eastbound Ramp....16
Figure 5B: Recommended Improvements, Alternative B - White Avenue at I-10 Eastbound Ramp....19
Figure 6: Existing McKinley Avenue Roadway Configurations....19
Figure 7: Recommended McKinley Avenue Operation with Reversible Lane....21
Figure 8: Grade Crossings in Vicinity of Fairplex....23
Figure 9: Existing Transit Services at the Fairplex....26
Figure 10: Current Fairplex Area Traffic Control Locations....31
Figure 11: Temporary Reconfiguration - Fairplex Drive / McKinley Avenue....33
Figure 12: Temporary Reconfiguration - White Avenue / Burdick Drive....35
Figure 13: Current Fairplex Parking Entrance Configurations....37
Figure 14: Travel Routes to Fairplex Site....40
Figure 15: Existing Major Directional Signs in Vicinity of Fairplex....41
Figure 16: Location of recommended ITS Equipment – Routes in Vicinity of Fairplex....49
Figure 17: Location of recommended ITS Equipment – Roadways Surrounding Fairplex....50

LIST OF TABLES

Table 1: Average Daily Traffic Levels In Fairplex Vicinity....11
Table 2: Intersection Level Of Service, Event Conditions....12
Table 3: Comparison Of Event And Non-Event Intersection Impacts....13
Table 4: Planning-Level Capital Costs....54
Table 5: Planning-Level Operations And Maintanence (O&M) Costs....55

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 tools and control systems to assist in daily traffic management and coordination.

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.

Summary of Recommendations

The recommendations presented in this report have been divided into the three major categories – physical roadway improvements, transit improvements, and Intelligent Transportation System and event management. The details of each recommendation listed below are summarized in subsequent sections of this report.

Physical Roadway Improvements (RI)

The details of these improvements are provided in Section 2.0 of this report.

- **RI-1:** The I-10 eastbound off-ramp connection to White Avenue should be improved, in order to provide improved access between the Fairplex and the I-10 freeway via White Avenue.
- **RI-2:** Capacity enhancements, including dynamic lane control, should be implemented on McKinley Avenue from White Avenue to Fairplex Drive. Lane change signs on White Avenue would allow for reconfiguration of the northbound right turn into Gate 14, as needed.
- **RI-3:** Capacity enhancements to intersections at perimeter of Fairplex.
- **RI-4:** The Arrow Highway and Fairplex Drive at-grade railroad crossings at the northwest corner of the Fairplex should be improved with quad (full closure) gates.

Transit Improvements (TI)

The details of these improvements are provided in Section 3.0 of this report.

- **TI-1:** Provide bus pull-outs (loading areas outside of the travel lanes) and a mini transit center with multiple shelters, transit schedule kiosks, and telephones on both the north and south side of McKinley Avenue at Gate 1.
- **TI-2:** Transit schedule and route information should be provided on kiosks at the recommended transit center location. Real-time "next bus" transit information, when available from transit providers, should be included.
- **TI-3**: Information kiosks at the transit center and on-site at the Fairplex should have links to transit schedules and fares on the Los Angeles County MTA and Foothill Transit web sites. Links should also include the Southern California Association of Governments' TransStar transit trip planning site.
- **TI-4:** A crosswalk with safety signage and tactile safety markers should be provided at the unsignalized intersection of McKinley Avenue with the Gate 1 roadway, to provide formal access to both the north and south sides of the transit center location.
- **TI-5:** Lighting, shelters, and signage should be improved at all bus stops adjacent to the Fairplex on McKinley Avenue and White Avenue. Stops on both sides of these streets should be improved.
- **TI-6:** Provide either one of the following improvements during the Los Angeles County Fair for tram service between entrance/exit gates and the Metrolink platform:

  - Exclusive lanes or priority movements at traffic control points within the parking lot.

  - Route the existing shuttle service onto surface streets - with an alternate type of vehicle, if necessary - and provide priority to vehicle at controlled intersections.

ITS and Event Management Improvements (ITSEMI)

The details of these improvements are provided in Section 4.0 of this report.

- **ITSEMI-1:** The Fairplex web site and regional traveler information web sites should have standardized maps with customized directions to certain areas of Fairplex for different types of events.
- **ITSEMI-2:** The Fairplex web site address (www.fairplex.com) should be used on all publications, and event organizers could be required to use the address so that attendees use the customized Fairplex pre-trip information.

- **ITSEMI-3:** Press materials, and current and future HAR systems should utilize customized directions for the sake of consistency.
- **ITSEMI-4:** Traffic routing directions should be provided to all incoming motorists via variable message signs and flip-disc* signs. The first message signs seen by motorists headed for the Fairplex should be placed on freeway or regional arterial routes, and should be located at least three miles from the first major exit or decision point.
- **ITSEMI-5:** Variable message signs at each major decision-making point, or along major corridors, should reaffirm the recommended route to and from the Fairplex.
- **ITSEMI-6:** Displayed information on variable message signs should be verified or modified every five minutes – or more frequently - by Traffic Management Center personnel.
- **ITSEMI-7:** Pole-mounted variable message signs should be placed on existing sign poles, luminaire poles, or traffic signal arms. All signs on White Avenue north of Arrow Highway, and along Foothill Boulevard, should use these smaller signs.
- **ITSEMI-8:** Static signs should remain where dynamic control is not necessary.
- **ITSEMI-9:** The Fairplex monitoring and control site should reside within the current Fairplex Security Office, or at a potential new building to be constructed by Fairplex, east of the Fairplex Drive / McKinley Avenue intersection.
- **ITSEMI-10:** Traffic detectors should include system detectors located at mid-block intervals, and tied to the traffic signal controllers.
- **ITSEMI-11:** CCTV should be utilized for traffic monitoring, including incident verification and detection at parking entrances.
- **ITSEMI-12:** CCTV should be utilized for queue detection at parking entrances.
- **ITSEMI-13:** CCTV cameras should be controlled (via pan/tilt/zoom features) using a CCTV server that will reside at the control site.
- **ITSEMI-14:** Video recording equipment, frame storage devices, additional monitors, quad-splitters, and other ancillary equipment should also be provided.

** The term "flip-disc sign" refers to remote-controlled pole-mounted signs that can display one of two different signs. In the case of flip-disc signs utilized for the Los Angeles County Fair, the signs are used during the duration of the Fair at freeway interchanges and major off-ramps for traffic guidance. An arrow and the word "Fairplex" indicate the preferred route to the site. Currently, these signs can be "flipped" manually which changes the direction of the directional arrow.*

- **ITSEMI-15:** Signals on all routes from local freeways and regional arterials to the Fairplex should be linked into the control system.
- **ITSEMI-16:** Fairplex control site workstations and the sub-regional TMC should coordinate timing plan selection and synchronization of areas signals - via selection of pre-determined event plans. This would be within parameters agreed to by the agencies that own the affected signals. Direct control of traffic signals will not be relinquished by local agencies, as any coordination of signals will be defined in interagency agreements before the start of operations.
- **ITSEMI-17:** Lane control signs and flip-disc signs would need to have separate controllers from the area traffic signals. Direct control would be provided from the monitoring and control site.
- **ITSEMI-18:** Graphic user interfaces on the control site workstation(s) should provide easy user access to remote control of field devices.
- **ITSEMI-19:** There should be limits on authorized users that would have access to signal system modification functions. This should be limited to individuals with the appropriate training and authority.
- **ITSEMI-20:** The control site should automatically link variable message signs, flip-disc signs, and other information devices to the signal timing system when a new pre-determined event plan is selected. This should be done with operator verification. *
- **ITSEMI-21:** Automated field information devices such as lane change signs and flip-disc signs should include an override key switch at the sign controller.

** This type of link between equipment is an important function of an ITS system. For example, if a specific event plan is activated in the control system, dynamic signs would be activated with driver directions. At the same time, singal timing plan and corridor synchronization would be implemented for signals that could be impacted by that change in traffic flow (per interagency agreements).*

Capital costs for the required equipment to fulfill these recommendations are detailed in Section 5.1 of this report. Operating cost implications of the recommendations are discussed in Section 5.2. These cost estimates incorporate equipment procurement and installation, signal and control communication links, and control center establishment.

1.0 Introduction

1.1 Purpose of Report

This report identifies a set of recommendations for traffic management in the vicinity of the Fairplex and its surrounding area. The recommendations will be incorporated into the Fairplex Event Management Implementation Plan. When the Plan is completed, the implementation measures will be incorporated into future project deliverables, in order to provide a groundwork for the conceptual design of the Pomona Valley Intelligent Transportation System (PVITS) system. This system will serve both regional stakeholders such as the Fairplex, as well as other local stakeholders such as Pomona Valley cities.

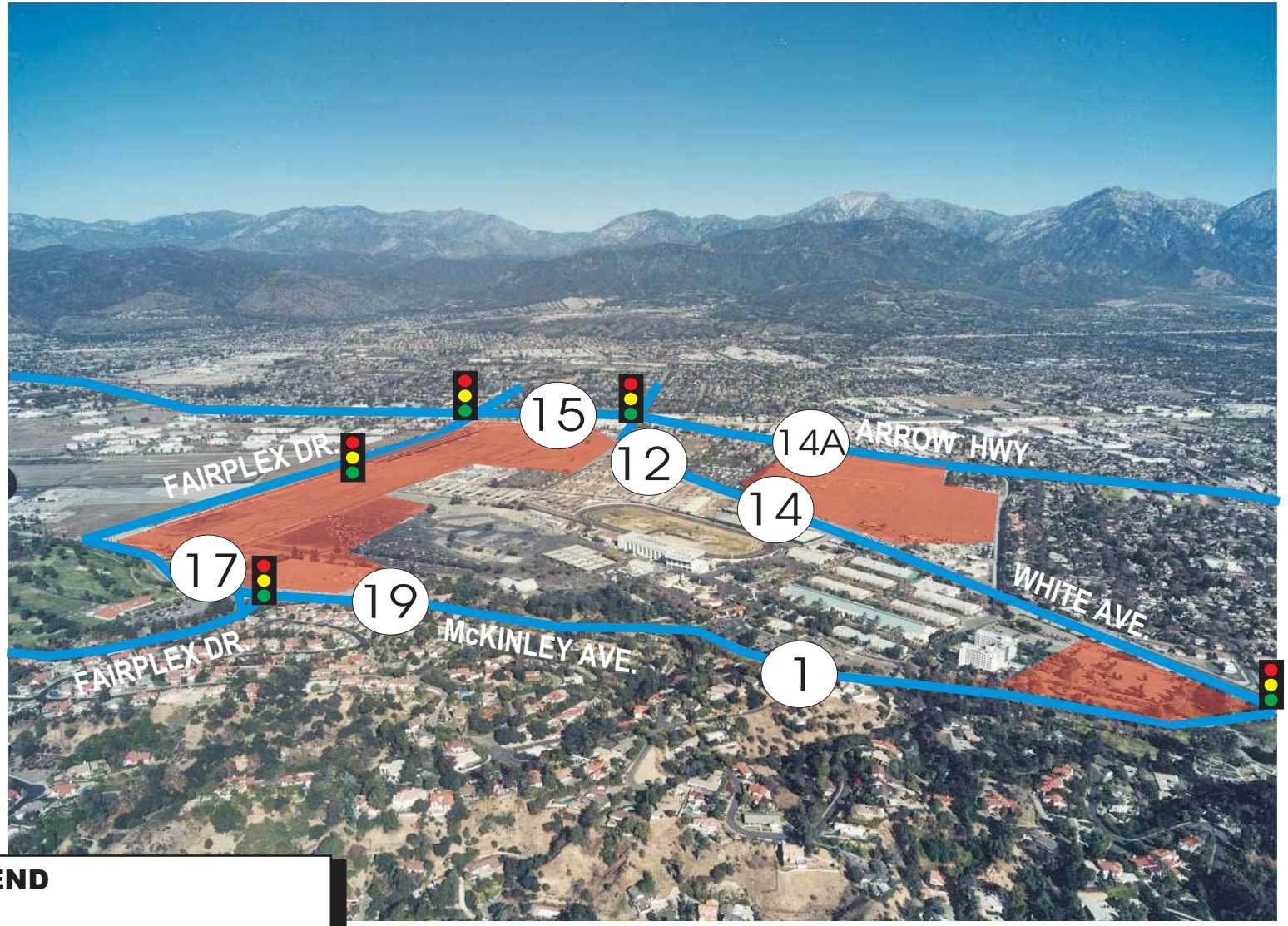
The Fairplex is an important stakeholder in the PVITS project area, due to the facility's considerable trip generation and the significant benefits that could be realized with system coordination between the Fairplex, Los Angeles County, and the cities within the Pomona Valley. Optimal operation of the PVITS system will include coordination with Fairplex systems such as parking management and Advanced Traveler Information Systems (ATIS).

The recommendations in this report incorporate findings from meetings, interviews, studies, fieldwork, and traffic data collection completed as part of this project. Recommendations are divided into three categories and are identified by acronyms that represent these categories: Roadway improvements (RI), transit improvements (TI), and ITS and event management improvements (ITSEMI). Recommendations will be referenced by these numbers within subsequent project deliverables.

Background information in this report is taken from sections in two other project deliverables. Meetings were held with Fairplex administration and neighboring stakeholders, as summarized in the Interviews and Progress Reports document (Deliverable 3.1.1). Data has been compiled in order to inventory traffic control equipment locations, and to document non-event traffic conditions, event impacts, and event traffic control procedures. These efforts are summarized in the Data, Inventory, and Review document (Deliverable 3.3.1).

1.2 Background on the Fairplex Facility

The Fairplex is a non-profit corporation that manages and operates the Fairplex site under a long-term lease from Los Angeles County. The Fairplex site is the host of numerous recurring and special events each year, including the Los Angeles County Fair. A Sheraton hotel has also been built on site, near the intersection of McKinley Avenue / White Avenue. **Figure 1** provides an aerial view of the Fairplex.



LEGEND

- ARTERIALS/ROADS
- PARKING AREAS
- # PARKING GATE NUMBERS
- TRAFFIC SIGNALS

FIGURE 1: AERIAL VIEW OF FAIRPLEX

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

Types of Events

The Fairplex accommodates approximately 200 events on an annual basis. The events can range in size from small craft shows with a few thousand visitors to the annual Los Angeles County Fair. The Fair event attracts over 1,000,000 patrons over the course of a season, which is approximately two and a half weeks in length.

Another major event is the National Hotrod Association (NHRA) event at the Fairplex dragstrip, which occurs an average of three times a year, utilizing a maximum grandstand capacity of approximately 30,000 persons. NHRA Winternationals and other major races typically occur in February, July, and November of each year. NHRA event attendees can normally be accommodated in the 30,000-seat grandstand. Utilizing overflow seating, 45,000 attendees can be accommodated for major NHRA events.

Concurrent smaller events in the exhibit halls on the east side of the Fairplex can draw 40,000 to 50,000 patrons in one day, when multiple events are scheduled. Other recurring events include Immigration and Naturalization Service (INS) citizenship ceremonies that occur about six times a year with an average attendance of 5,000 persons at each ceremony.

Types of events hosted at the Fairplex also change over time. Currently, the Fairplex is planning to begin construction of a new building on the site of Building 8A on the east side of the Fairplex. This building will be utilized for small conferences (300-500 attendees). The total number of events at the Fairplex is estimated to subsequently increase from the current average of 200 events per year to 275 events per year.

Most events at the Fairplex can be accommodated both in terms of the on-site parking capacity and on-site exhibit area capacity. During Fair seasons with record attendance, Fairplex administration has found that the capacity of the Fairplex site is reached at approximately 160,000 persons. Despite these high potential attendance levels at recurring events, the Fairplex has never found it necessary to utilize off-site parking, except for an overflow lot at Brackett Field near the southwest corner of the Fairplex site.

Patrons for large events such as the County Fair live primarily in the San Gabriel and Pomona Valleys. Compared to the size of Los Angeles County, and the greater metropolitan area, the attraction area of the Fairplex is noticeably concentrated in nearby regions. Demographics on Fair attendees collected by Fairplex administration indicate the following:

- 60% of Fair patrons live within a 10-mile radius of the Fairplex
- 80% of Fair patrons live within a 20-mile radius of the Fairplex

Figure 2 provides an illustration of the areas surrounding the Fairplex. **Figure 3** illustrates the on-site layout of the Fairplex exhibit areas.

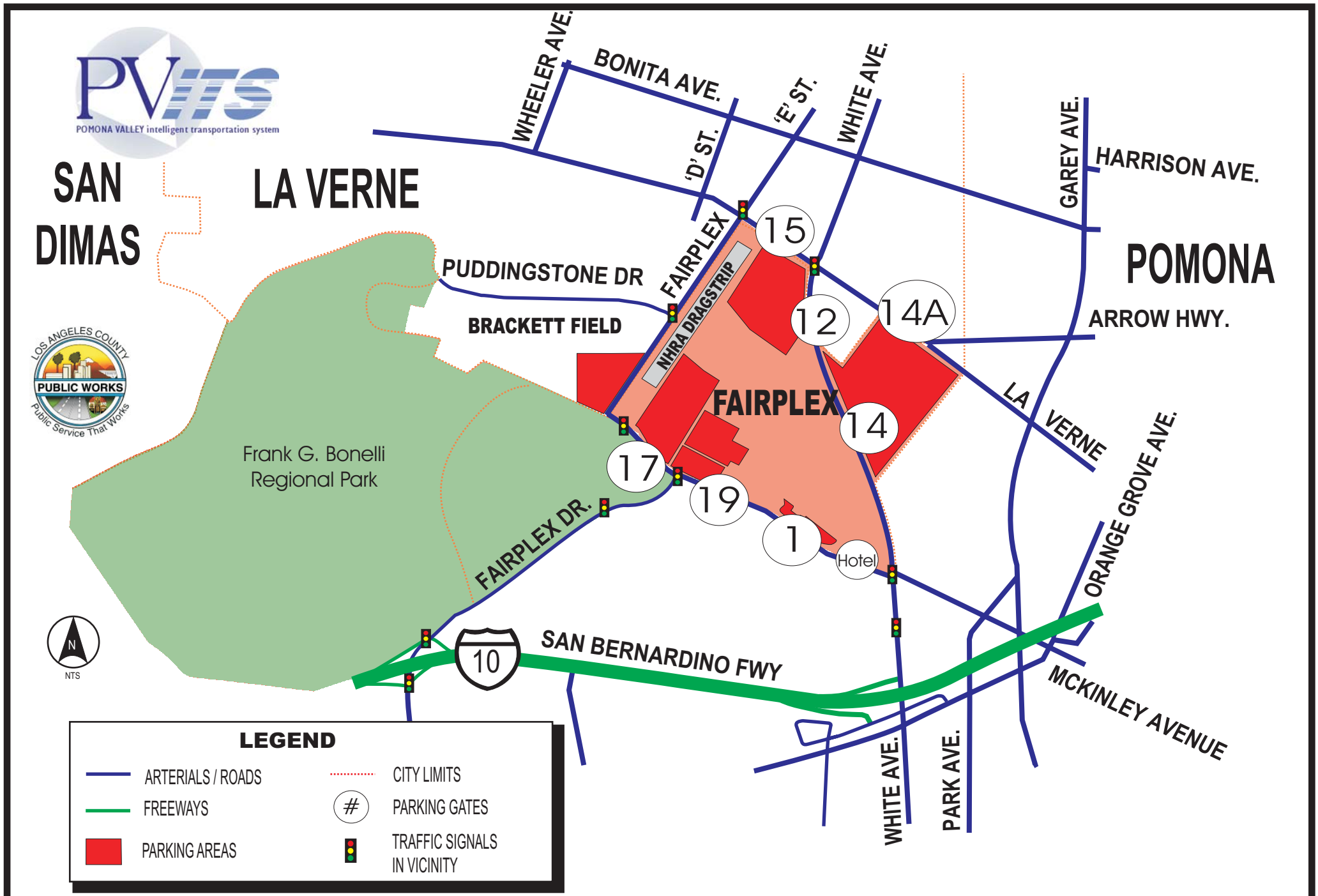
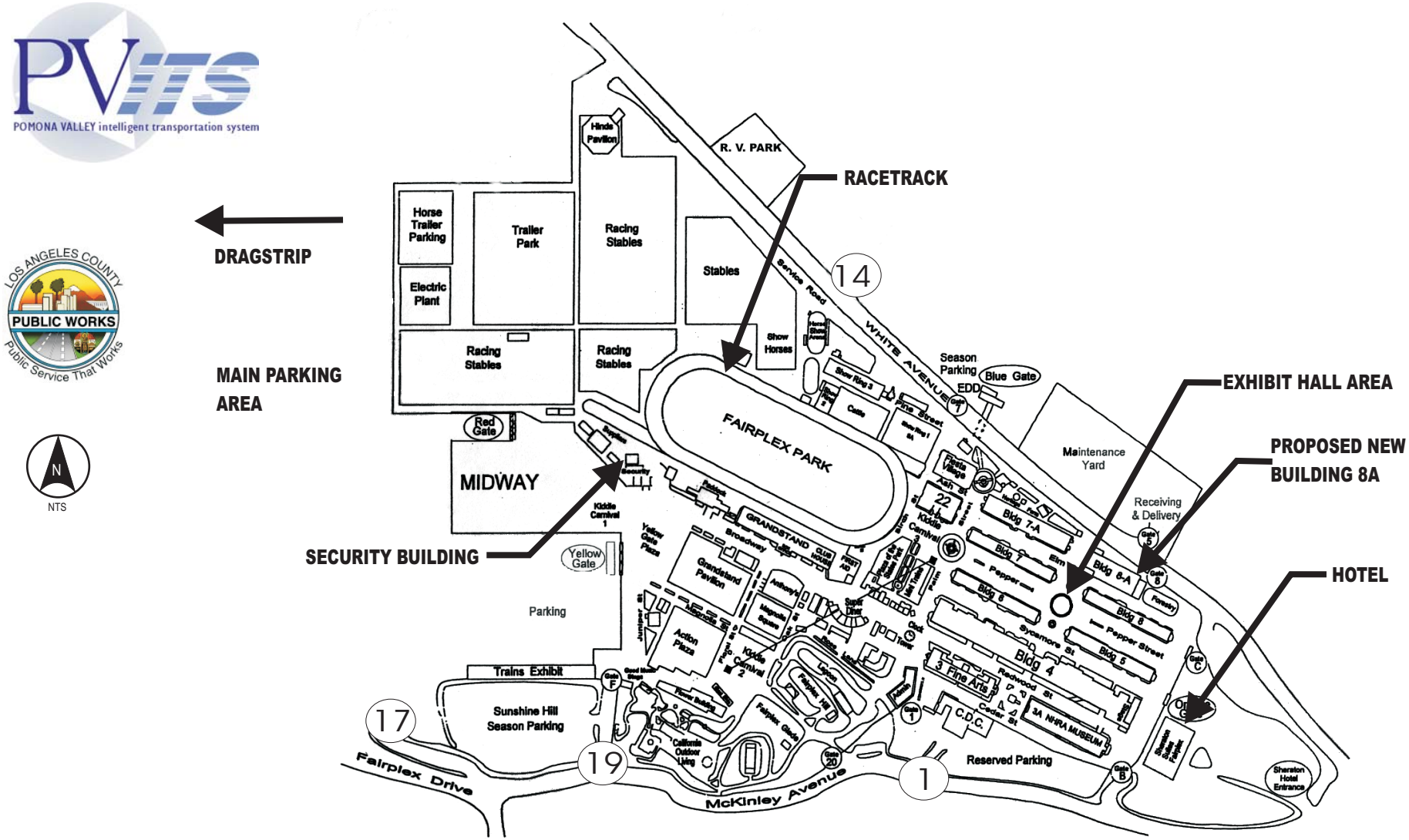


FIGURE 2: FAIRPLEX SITE AND SURROUNDING AREAS

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1



LEGEND

(12) PARKING GATE NUMBERS

FIGURE 3: FAIRPLEX ON-SITE EXHIBIT SPACE LAYOUT

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

Ambient Traffic Issues

Local weekday commute traffic and regional freeway bypass traffic affect the ability of the Fairplex and local police departments to effectively manage event traffic around the Fairplex. The proximity of the Fairplex to the I-210 and I-10 freeways provides excellent access to the site, in terms of the relative proximity of freeway ramps to parking entrances. The close proximity of the freeways also creates bypass traffic impacts in the vicinity of the Fairplex along Arrow Highway. These impacts are most noticeable along Arrow Highway, which is commonly utilized as an alternate route to the I-10 freeway during peak travel periods.

The City of La Verne has specifically expressed the desire that traffic management improvements around the Fairplex would not increase freeway bypass traffic through the area during peak commute periods. Recommendations within this document support the need to minimize impacts of freeway bypass traffic on the Fairplex and nearby residential areas.

The recommendations identified in sections 2.0, 3.0, and 4.0 of this report consider the typical operations of the Fairplex, event types and sizes, and these local traffic issues.

1.3 Definitions of Control System

The Fairplex site lies within the Los Angeles area sub-region of the Pomona Valley, which includes seven local cities and unincorporated County areas. The Pomona Valley ITS system will utilize a sub-regional Traffic Management Center (TMC) to provide regional coordination of ITS units, as agreed to by project stakeholders. Based upon discussions with PVITS stakeholders, this sub-regional TMC could be housed either on the Fairplex Site or at the City of Pomona Transportation Center.

If this sub-regional TMC is not housed at the Fairplex, a “monitoring and control site” will be established at the Fairplex to provide monitoring – and coordination - of ITS units and signals in the immediate area. This control site could be as simple as a single computer workstation, networked into the PVITS system. It could also have a large display for viewing by multiple parties during traffic Switching capabilities will allow the shifting of coordination of Fairplex area ITS systems from the City of Pomona sub-regional TMC to the Fairplex control site. Access to coordination and signal phasing manipulation will only be granted to authorized users.

A likely example of this access control would be the following: Only City of La Verne personnel would be able to directly manipulate the timing selection or phasing of La Verne signals from the control site. Personnel from the City of La Verne would monitor and control their traffic signals directly from their City Hall, and would only do this from the Fairplex control site if they came on-site for the benefit of traffic coordination during a major event. At the same time, City of Pomona Police Department personnel would have access rights to implement pre-determined ITS and traffic signal coordination plans across multiple jurisdictions, depending on the type of event. Pre-determined agreements between agencies would determine the structure of all of these access rights and logistics issues.

For the purposes of this document, the on-site control center for ITS units and signal control systems under this Plan will be referred to as the monitoring and control site.

2.0 Physical Roadway Improvement Recommendations

This section provides a discussion of near-term and long-term physical roadway improvements that are recommended to provide adequate capacity on the roadway network that surrounds the Fairplex.

2.1 Existing Roadway Operations

In order to determine the severity of bottlenecks at intersections in the vicinity of the Fairplex, traffic data was collected during days of the highest attendance at the 2000 Los Angeles County Fair, as well as during days when no major Fairplex events were scheduled. The event data was collected on consecutive days during the 2000 Fair event, beginning on Thursday, September 28th and ending on Sunday, October 1st. This period encompassed the final four days of the 2000 Fair season.

For comparison purposes, baseline counts were also taken in 2001, on the dates of Wednesday, March 7th and Thursday, March 8th, 2001. On these subsequent survey dates, no major events were occurring at the Fairplex.

The intent of this review of roadway operations is to document typical intersection operations during Fairplex events and at selected intersections and compare to non-event conditions. **Table 1** provides a comparison of ADT levels on roadways adjacent to the Fairplex, between weekday non-event conditions and conditions during the Los Angeles County Fair. The average ADT value from each multi-day period was used in the table to provide the comparison.

TABLE 1: AVERAGE DAILY TRAFFIC LEVELS IN FAIRPLEX VICINITY

Roadway Location	Average Non-Event ADT	Average ADT During 2000 Fair	Change in ADT during 2000 Fair
I-10 & Fairplex Dr. - Westbound On-Ramp	4,710	12,827	+172%
Fairplex Dr., North of I-10 Ramps and Gillette Road (Park & Ride)	13,266	36,428	+175%
I-10 & Orange Grove/Garey - Eastbound On-Ramp	12,806	14,456	+13%
I-10 & Towne Avenue - Eastbound On-Ramp	9,204	7,640	-17%
I-10 & Towne Avenue - Westbound Off-Ramp	8,042	8,115	+1%
Towne Avenue, North of I-10, South of La Verne Avenue	27,650	24,045	-13%
McKinley Avenue, West of Midvale Drive	5,983	16,635	+178%
White Avenue, North of McKinley Avenue	16,695	32,853	+97%
White Avenue, South of Arrow Highway	16,551	29,807	+80%
White Avenue, South of Bonita Avenue	16,224	16,104	-1%
Arrow Highway, West of 'D' Street	27,380	29,274	+7%
*Fairplex Drive, South of Puddingstone Drive	11,702	-	-
*Arrow Highway, East of White Avenue	26,605	-	-

Source: Kimley-Horn and Associates, Inc., September 28 - October 1, 2000 & March 7-8, 2001
** Non-event ADT from supplemental (June 2001) count data, Kimley-Horn and Associates*

Table 1 indicates that roadways adjacent to the Fairplex such as Fairplex Drive, White Avenue and McKinley Avenue experience an increase in traffic during major events that is more than twice the level of average weekday traffic. Those roadway segments located further away from the Fairplex exhibit smaller increases, or in some instances, reductions in traffic levels during the Fair. This can be partially attributed to the tendency for drivers with knowledge of the special event (the Fair) to choose alternative routes, and/or the difference between weekday commuter traffic and weekend non-commute event traffic.

Table 2 indicates the Levels of Service (LOS) of Fairplex area intersections under major event conditions at the Fairplex. Unacceptable LOS values of E or F are indicated in bold text. Two intersections operate at unacceptable LOS during the weekday p.m. peak, while two intersections operate at unacceptable LOS during the weekend peak. The intersection of White Avenue & Arrow Highway operates at unacceptable LOS during both the weekday and weekend peak periods.

TABLE 2: INTERSECTION LEVEL OF SERVICE, EVENT CONDITIONS

INTERSECTION LOCATION	WEEKDAY PM PEAK LOS	WEEKEND MID-DAY PEAK LOS
Fairplex Drive & I-10 Freeway Westbound Ramps	A	A
Fairplex Drive & I-10 Freeway Eastbound Ramps	A	B
Fairplex Drive & Arrow Highway *	D	A
Fairplex Drive & Fairplex Drive West/ McKinley Avenue	A	A
Fairplex Drive & McKinley Avenue	B	B
White Avenue & Bonita Avenue *	**F**	D
White Avenue & Arrow Highway *	**E**	**F**
White Avenue & Gate 14 *	A	**F**
White Avenue & McKinley Avenue	A	B
White Avenue & I-10 Freeway Westbound On-Ramp	A	C
White Avenue & Burdick Drive/Kenoak Place	A	B
White Avenue & Orange Grove Avenue	A	B
I-10 Freeway Eastbound Off-Ramp & Burdick Drive	A	A
Arrow Highway & La Verne Avenue	A	A
Garey Avenue & La Verne Avenue *	D	D
Garey Avenue & McKinley Avenue	A	B
Garey Avenue & Orange Grove Avenue	C	A
North Orange Grove Avenue & I-10 Freeway Westbound Off-Ramp/Artesia Street	A	A
North Orange Grove Avenue & McKinley Avenue/ I-10 Freeway Westbound On-Ramp	D	A

Source: Traffic Impact Study for the Paradise Park Project, LLG, July 1998
LOS values in **bold** font indicate unacceptable Levels of Service.

* These intersections have been analyzed with little or no event traffic for comparison purposes in Table 3.

A review of traffic operations at selected intersections under both event and non-event conditions indicates a return to acceptable LOS during minimal event activity at Fairplex. **Table 3** provides additional 2001 count data for non-event conditions that was obtained for selected major intersections on roadways at the perimeter of the Fairplex.

TABLE 3: EVENT IMPACTS AT SELECTED FAIRPLEX PERIMETER INTERSECTION		
INTERSECTION LOCATION	**WEEKDAY PM PEAK LOS - MAJOR EVENT**	**WEEKDAY PM PEAK LOS - MINIMAL EVENT ***
Fairplex Drive & Arrow Highway	D	B
White Avenue & Bonita Avenue	F	B
White Avenue & Arrow Highway	E	C
** Based upon supplemental intersection turn movement counts of March 7, 2001.* *"Major event" LOS values are carried over from Table 2 of this report.*		

The "minimal event" LOS values in the far-right column of Table 3 indicate that these intersections in the vicinity of Fairplex return to normal operating conditions during minimal event activity at the Fairplex. The addition of physical capacity to selected Fairplex area intersections would remove the most significant traffic bottlenecks to major event traffic. This would allow the ITS and signal coordination system to operate without these major impedances to traffic flow.

2.2 Physical Roadway Improvement Recommendations

This section presents recommendations to improve the physical capacity of roadways in the vicinity of the Fairplex. If a system has inherent bottlenecks, managing inbound and outbound traffic flows becomes difficult. Significant restrictions to traffic flow on major routes of approach and departure will cause drivers to utilize alternate routes. When the frequent use of bypass routes becomes a perceived necessity for drivers, traffic will overflow from the intended corridors onto alternate roadways, including residential streets unintended for through traffic from Fairplex events.

The current physical constraints on existing routes to and from the Fairplex have the potential to cause this type of unwanted overflow from the desired travel routes. With the installation and operation of an ITS system, such overflow would defeat the impact of financial outlays for capital equipment as well as the daily operations of the system. In order to assure that such a system is effective, the following three improvements are recommended for implementation or further study:

- **RI-1:** The I-10 eastbound off-ramp connection to White Avenue should be improved, in order to provide improved access between the Fairplex and the I-10 freeway via White Avenue.
- **RI-2:** Capacity enhancements, including dynamic lane control, should be implemented on McKinley Avenue from White Avenue to Fairplex Drive.
- **RI-3:** The Arrow Highway and Fairplex Drive SCRRA railroad crossings near the northwest corner of Fairplex should have median improvements.

These recommended physical roadway improvements are discussed in more detail in the following text:

I-10 Eastbound Off-Ramp Reconstruction at White Avenue (RI-1)

White Avenue provides a direct route between the east side of the Fairplex and the I-10 freeway. From White Avenue, access is available to the main east parking lot via Gate 14, as well as the parking area at the Sheraton Suites hotel. Traffic should be oriented to this side of the Fairplex from the I-10 in an efficient manner during a variety of events. The current sub-standard configuration of the eastbound I-10 off-ramp at White Avenue represents a physical constraint that prohibits optimal traffic flow. **Figure 4** indicates the current configuration of the off-ramp. An eastbound vehicle exiting the I-10 at White Avenue comes to a stop sign at the bottom of the ramp, where a left turn must be completed onto Burdick Drive. From Burdick Drive, the vehicle then approaches an intersection with White Avenue, where a left turn must be completed while crossing two to three lanes of uncontrolled traffic to reach northbound White Avenue and the Fairplex site.

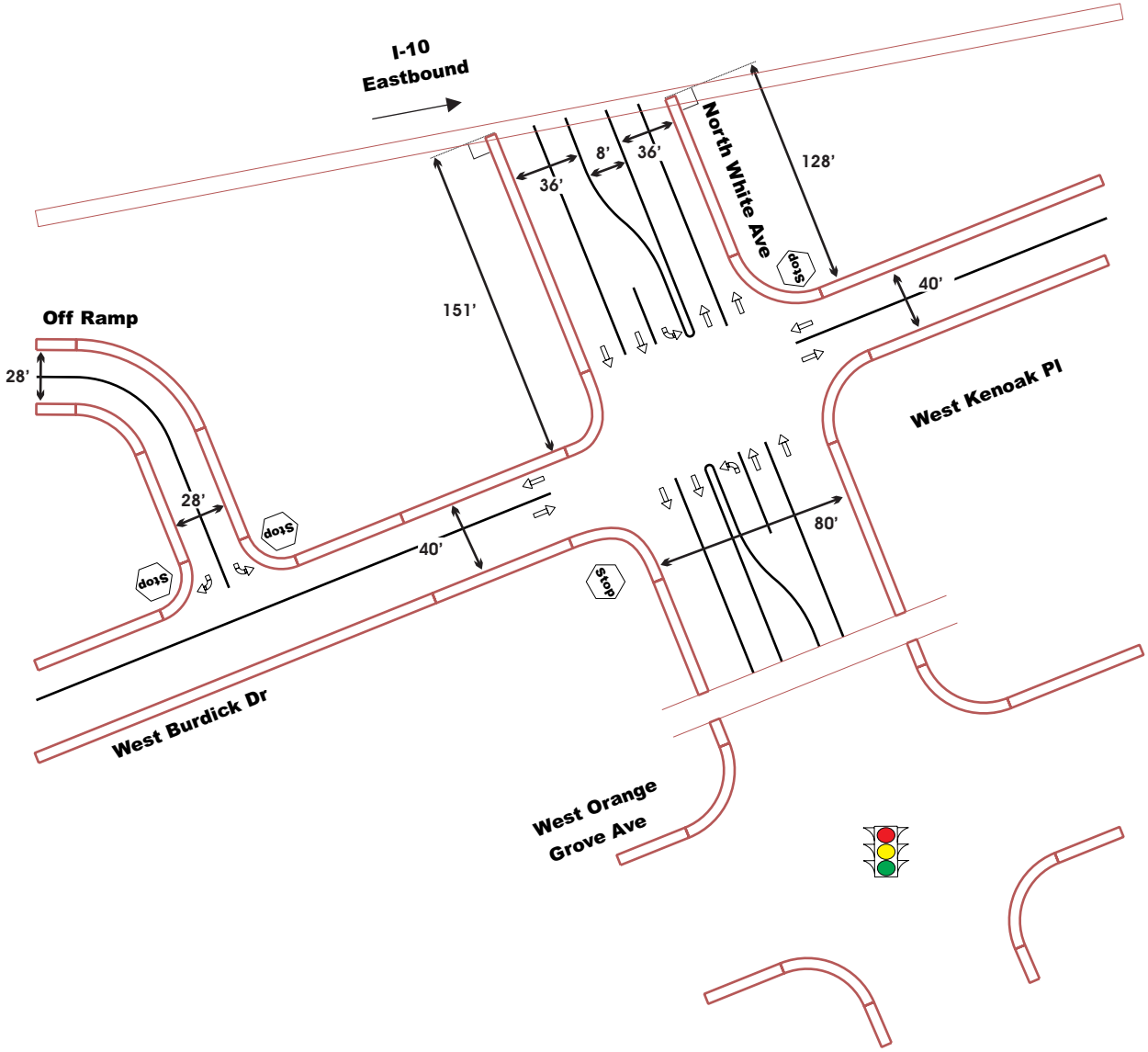
The recommended physical improvement at this location would include a reconfiguration of the existing off-ramp and a new traffic signal at the intersection of White Avenue / Burdick Drive. The benefit of the improvements would be a direct roadway link to White Avenue from the off-ramp. The installation of a traffic signal would remove the inherent delay incurred by passing through two consecutive stop sign-controlled intersections. Reducing this delay could encourage drivers traveling eastbound on the I-10 to utilize White Avenue to reach the east side of the Fairplex. Under current roadway configurations, drivers that need to reach either the west or east side of the Fairplex tend to exit on Fairplex Drive, causing unnecessary traffic volumes on McKinley Avenue.

The intersection meets Caltrans signal warrant #11 for peak traffic volumes. The intersection would most likely meet Caltrans warrant #1 (Minimum Vehicular Volume) or Caltrans warrant #2 (Interruption of Continuous Traffic). These warrants require Average Daily Traffic (ADT) volumes on the minor and major intersection approaches as inputs. Traffic volumes collected for existing conditions do not provide such data, however. Caltrans 1998 count data for the eastbound off-ramp indicate an ADT value of 3,900 cars.

Two intersection improvement alternatives are illustrated in **Figures 5A** and **5B**:

Alternative A allows for the direct routing from the off-ramp alignment to White Avenue, but requires a new intersection that would be further north from the current Burdick Avenue / White Avenue intersection. Traffic signals would be installed at the new I-10 eastbound off-ramp intersection with White Avenue, and the reconfigured intersection at the current Burdick Avenue alignment. Both signals would be integrated to operate as a split intersection.

Alternative B preserves a four-way approach intersection at White Avenue / Burdick Street and the simple signalization scheme. Both alternatives require the full or partial closure of access to Burdick Street from White Avenue. However, both alternatives would remove traffic delays at the White Avenue / Burdick Drive intersection during major events. Delays to general traffic flows and transit vehicles, which are created by two sets of stop signs at this location, would be eliminated.



NTS

LEGEND

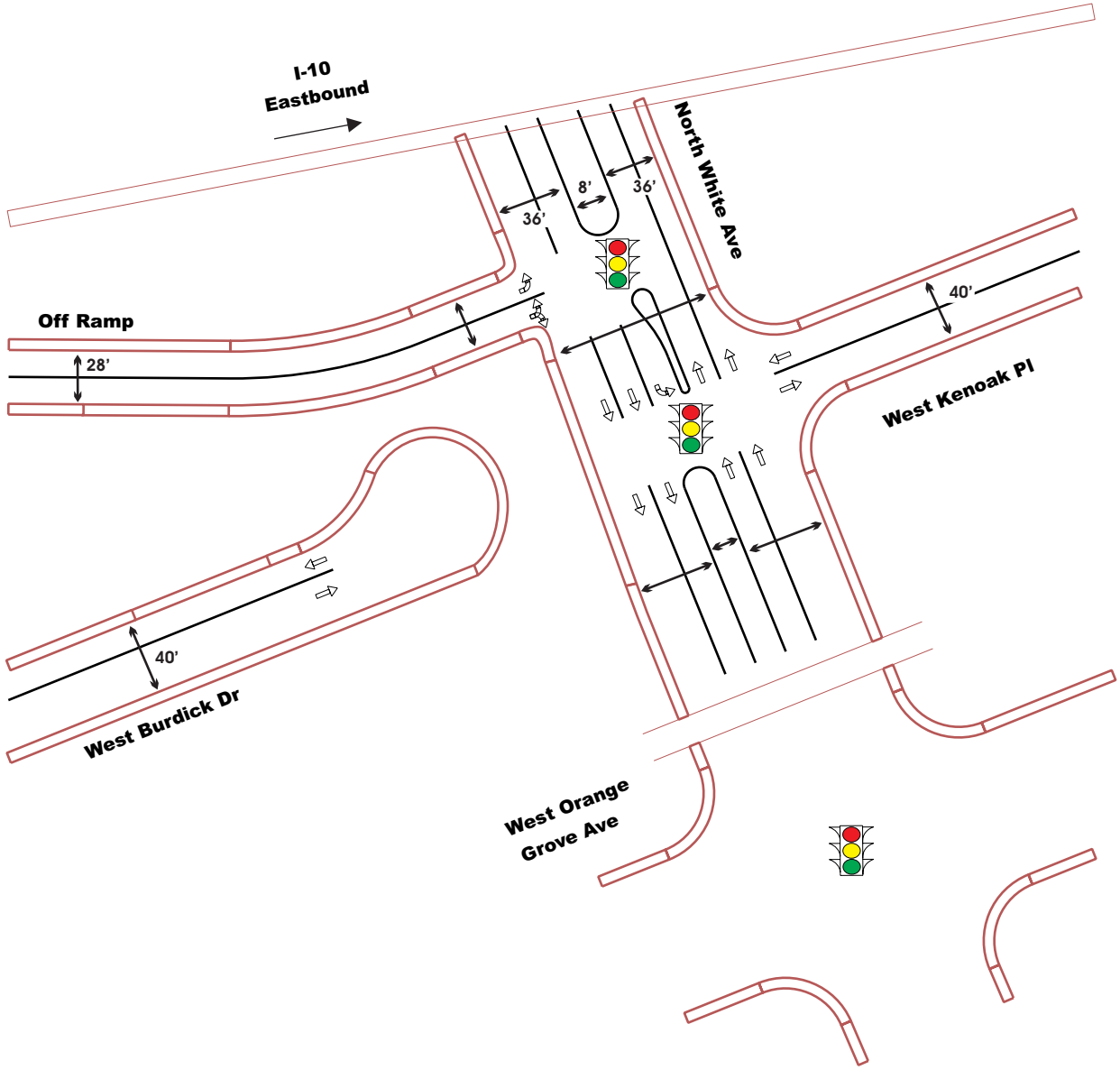
TRAFFIC SIGNAL

STOP SIGN

FIGURE 4: EXISTING GEOMETRY - WHITE AVENUE AND EASTBOUND I-10 RAMP

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1



NTS

LEGEND

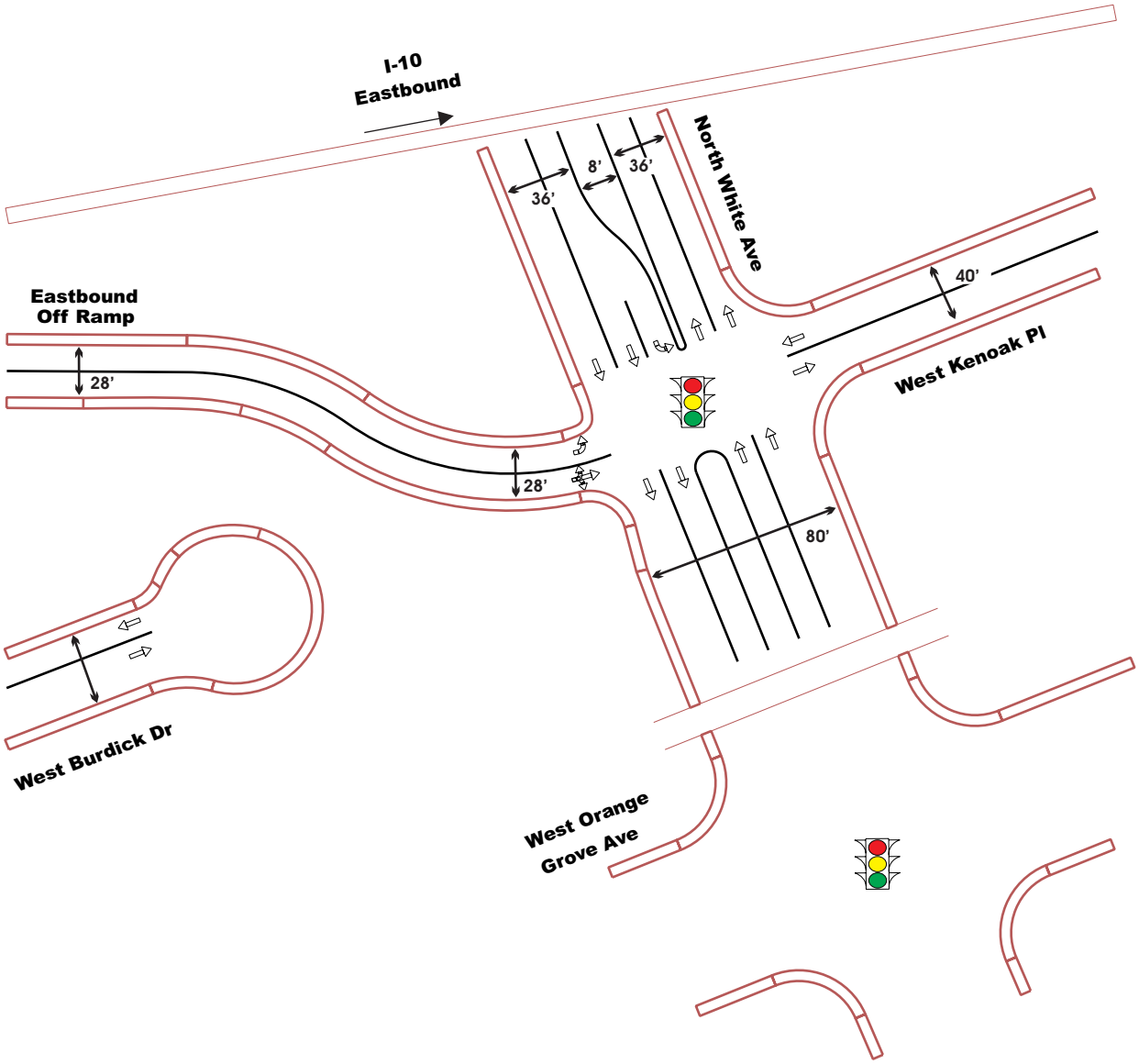
TRAFFIC SIGNAL

STOP SIGN

FIGURE 5A: RECOMMENDED IMPROVEMENTS, ALTERNATIVE A - WHITE AVENUE AT I-10 EASTBOUND RAMP

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1



NTS

LEGEND

TRAFFIC SIGNAL

STOP SIGN

FIGURE 5B: RECOMMENDED IMPROVEMENTS, ALTERNATIVE B - WHITE AVENUE AT I-10 EASTBOUND RAMP

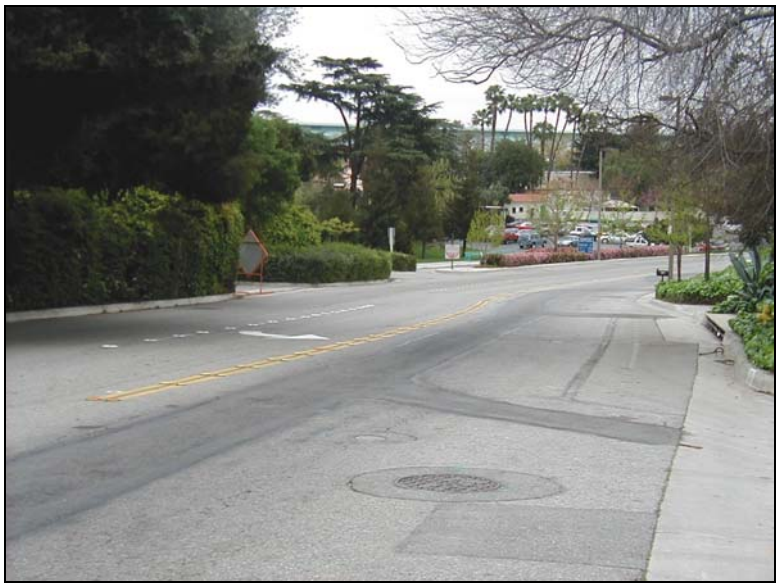
Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

Evaluation of Dynamic Lane Control on McKinley Avenue (RI-2)

McKinley Avenue defines the southern boundary of the Fairplex site, and serves as the main southern connector between Fairplex Drive and White Avenue. As Arrow Highway serves as the main northern access around the Fairplex, McKinley Avenue serves the same function as a southern access around the Fairplex. The roadway also continues east of the Fairplex and connects with Garey Avenue. Within the proximity of the Fairplex site, it provides traffic routing between Fairplex Drive and Gate 17 at the southwest corner of the site, to White Avenue and Gate 14 on the east side of the site. Within the vicinity of the Fairplex site, the south side of the roadway fronts on an established single-family residential area.

Despite the role of McKinley Avenue as a main access road around the Fairplex site, the road is narrow and has many curves and elevation changes with hindered sight distance. The roadway provides a major route around the Fairplex, but it is not designed to handle such high traffic volumes. The use of dynamic lanes could allow for an additional lane – where the current striped median and left turn pockets lie - to be configured for temporary use to better accommodate directional traffic flows during major events.



McKinley Avenue Off-Peak Conditions
Facing eastward toward Gate 1

In its narrowest portions, the roadway has two travel lanes with a striped median and left turn pockets. This narrow and curvy roadway configuration cause traffic to move more slowly than on straight, four-lane streets such as White Avenue. **Figure 6** illustrates the location of McKinley Avenue in relation to the Fairplex site.

PVITS
POMONA VALLEY intelligent transportation system

NTS

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

LEGEND

- ARTERIALS / ROADS
- 4-5 LANE WIDTH
- 3-LANE WIDTH
- DIAGRAM OF SELECTED ROADWAY PORTION
- AREA OF DIAGRAM
- PARKING AREAS
- # PARKING GATES
- TRAFFIC SIGNALS IN VICINITY

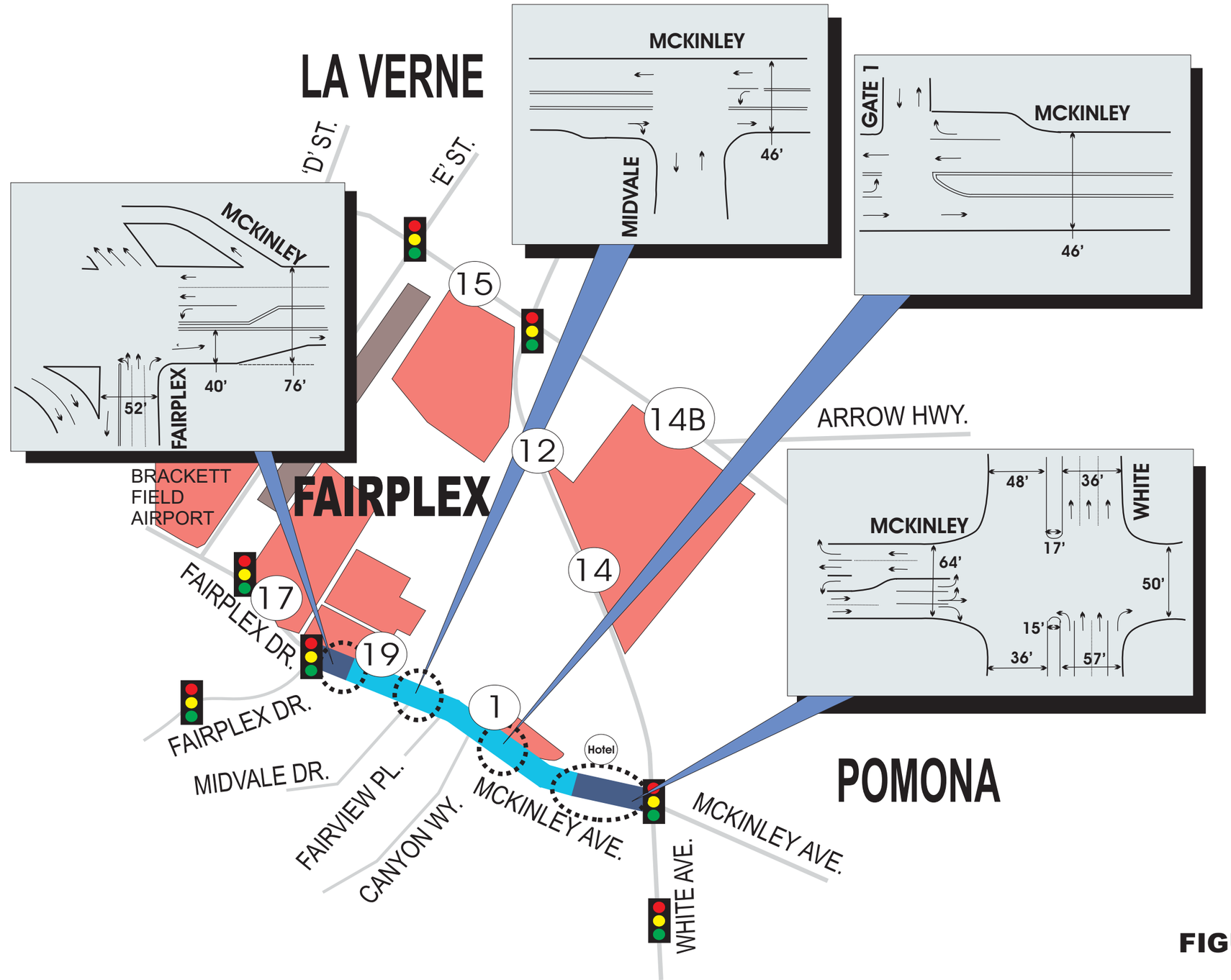


FIGURE 6

EXISTING MCKINLEY AVENUE ROADWAY CONFIGURATIONS

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

Such a reconfiguration could be accomplished via temporary use of traffic cones, but would require extensive monitoring efforts and safety signage if implemented in such a manner. The recommended permanent improvement to McKinley Avenue would require extensive public outreach in order to be successful. The improvement could potentially hinder access to residential areas to the south of McKinley Avenue, as it would restrict the use of left turn movements at existing intersections with residential roadways and driveways. However, if properly implemented, this improvement would ease congestion on a roadway that becomes gridlocked during most events at the Fairplex. The recommended ITS equipment locations included in Section 4.0 of this report provide limited enhancements to McKinley Avenue.

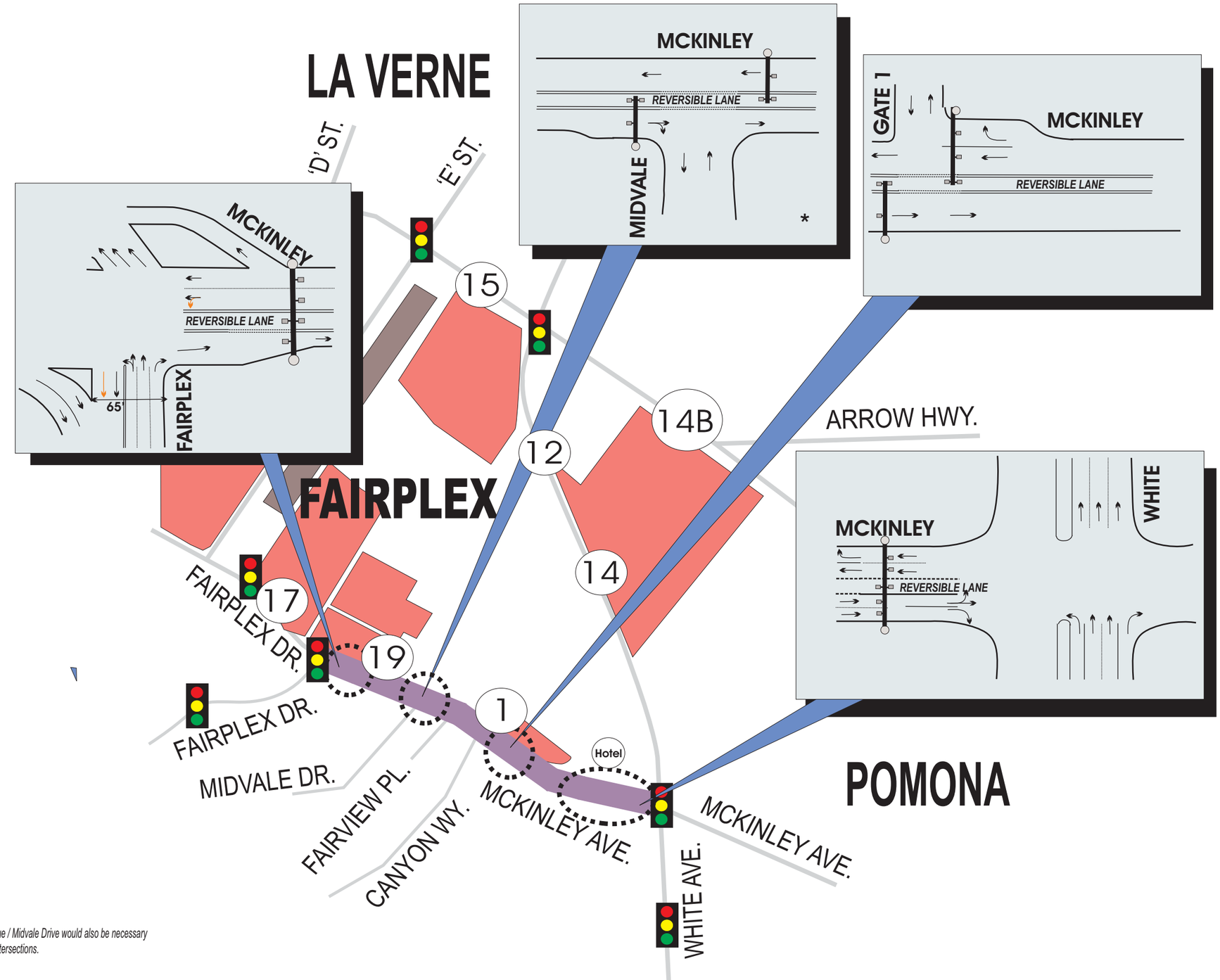
The recommended physical improvements to McKinley Avenue would involve lane restriping and roadway reconfigurations, as indicated in **Figure 7**. The improvements would allow for two lanes of priority directional traffic flow (in an easterly or westerly direction) as needed during events. Two lanes of traffic flow with a continuous left-turn center lane could be provided when specialized operation is not needed. The improvements would include striping for changeable transitions at the ends of the corridor: both at the intersection with Fairplex Drive and at the intersection with White Avenue. These two intersections would need to be reconfigured slightly to allow for double left turns and other configurations that may be necessary for the configurable one-way approach of McKinley Avenue. Near-term recommended ITS improvements that provide an initial framework for lane control are provided in Section 4.2.

It is estimated that these improvements would not require roadway widening or purchase of additional right-of-way along McKinley Avenue, minus a slight reconfiguration of its intersection with Fairplex Drive. This reconfiguration and modified roadway width - at the southwest corner of the McKinley Avenue / Fairplex Drive intersection - is noted in Figure 8. The modification would allow for an additional receiving lane for traffic headed southbound on Fairplex Drive from the McKinley Avenue westbound left turn lane. This modification would reduce the size of the traffic island that separates the channelized eastbound right turn lane on Fairplex Drive.

This improvement would provide additional capacity on McKinley Avenue, providing improved throughput of traffic. A secondary but very important benefit would be a potential reduction in the use of residential areas in the Ganesha Hills (south of the Fairplex site) as bypass routes to the McKinley corridor. The green time of signals at both ends of this McKinley Avenue corridor would help to clear congestion quickly, in order to make this a preferable corridor for travel along the south side of the Fairplex.

Lane Control on White Avenue

Recommendations for ITS units include lane change signs (LCS) on northbound White Avenue, between Gate 14 and McKinley Avenue. These units would direct traffic into the proper configuration for northbound right turns from White Avenue into Gate 14. This configuration could be changed (two right turn lanes, one right turn lane, one shared right/thru lane and one right turn lane, etc.) as necessary, depending on ingress volumes at Gate 14.



LEGEND

- ARTERIALS / ROADS
- EXTENT OF REVERSIBLE LANE
- LANE CONFIGURATION CHANGE
- LANE CHANGE SIGN
- DIAGRAM OF SELECTED ROADWAY PORTION
- AREA OF DIAGRAM
- PARKING AREAS
- # PARKING GATES
- TRAFFIC SIGNALS IN VICINITY

** A similiar configuration to that indicated for the intersection of McKinley Avenue / Midvale Drive would also be necessary at the McKinley Avenue / Fairview Place and McKinley Avenue/Canyon Way intersections.*

FIGURE 7

RECOMMENDED MCKINLEY AVENUE OPERATION WITH REVERSIBLE LANE

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

Capacity improvements at intersection on Fairplex perimeter (RI-3)

Intersection improvements to key intersections on the Fairplex perimeter would eliminate bottlenecks at intersection approaches, easing traffic flow and providing better operability of the recommended ITS components. The following intersection improvements were recommended in the 1998 traffic impact study for the Paradise Park Project at the Fairplex. This study was produced by Linscott Law & Greenspan. This Paradise Park Project represents an intensification of use of the site, and would generate new traffic levels that approximate the traffic patterns of most current major events at the Fairplex.

The intersection reconfigurations can be accomplished within the current roadway, except where noted.

- Fairplex Drive / Arrow Highway: An additional northbound left turn lane
- White Avenue / Arrow Highway: Additional northbound and southbound left turn lanes
- White Avenue / Bonita Avenue: Additional northbound through lane
- White Avenue / Gate 14: An additional southbound left turn lane *

* This improvement would require the reconfiguration of the roadway median, and widening of White Avenue.

Evaluation of grade crossing improvements (RI-4)

A railroad line runs along the northwest corner of the Fairplex site. Formerly owned by Southern Pacific, the line is now owned by the Southern California Regional Rail Authority (SCRAA), operator of the Metrolink San Bernardino Line commuter trains. The line makes an "S"-curve as it crosses Arrow Highway, and at the bottom side of this curve the Fairplex has constructed a passenger platform that is utilized during weekends of the Fair event.

At the grade crossings on both Arrow Highway and Fairplex Drive, there is potential conflict between trains and vehicular gridlock during major Fairplex events:

- The track is laid out on a curve at this point; Therefore, visibility between oncoming trains and crossing vehicles is poor.
- Traffic queues form across the Arrow Highway grade crossing during Fairplex events. This type of queue also forms during p.m. commute periods on most weekdays, when regional traffic flows and I-10 freeway bypass flows are noticeably high.
- The Fairplex Drive grade crossing lies approximately 500 feet south of the Fairplex Drive / Arrow Highway intersection. During major Fairplex events, and NHRA events at the nearby dragstrip, traffic often queues over this crossing.

Figure 8 indicates the location of the seasonal Fairplex Metrolink passenger platform, as well as the two grade crossings next to the Fairplex site.

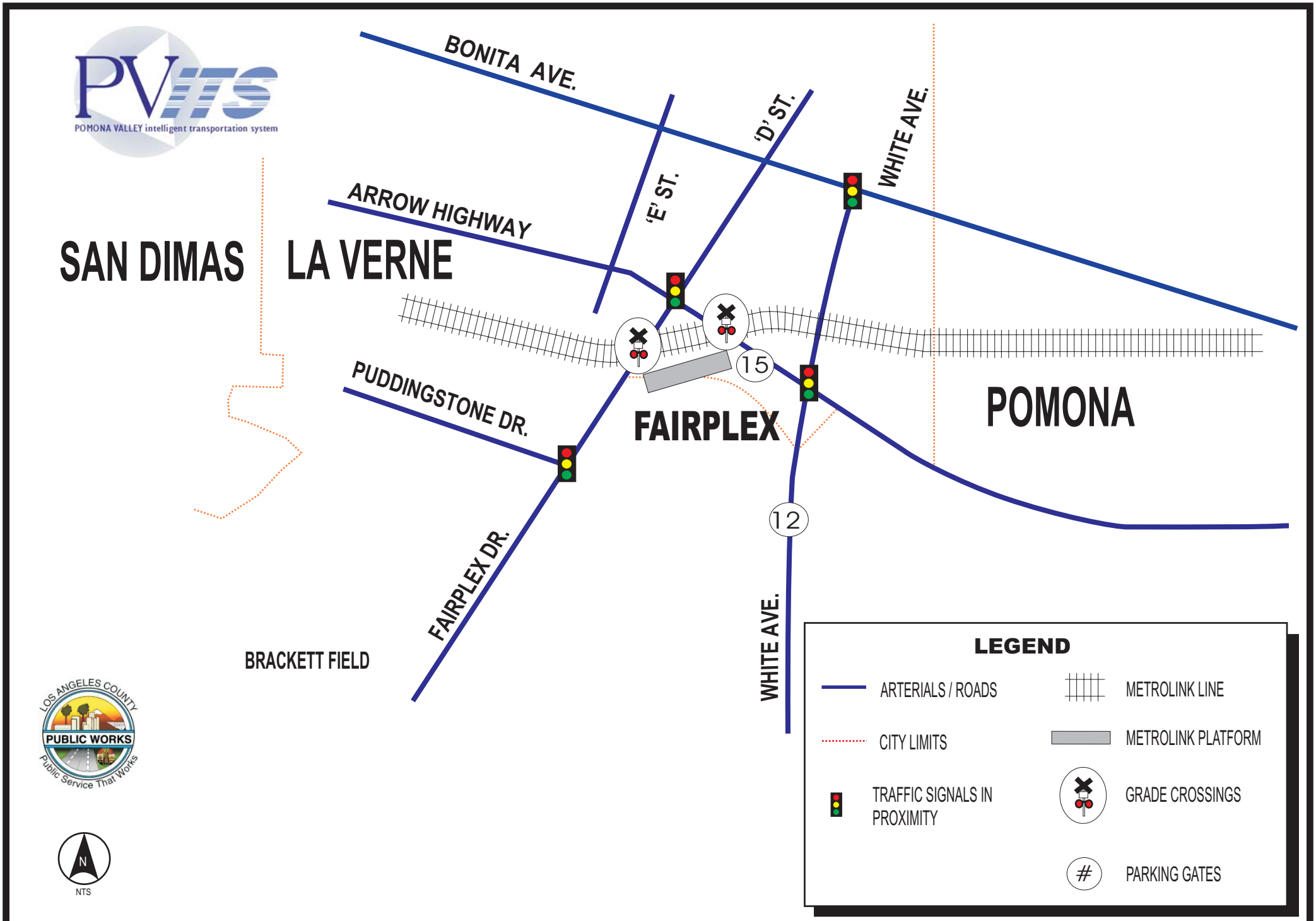


FIGURE 8: GRADE CROSSINGS IN VICINITY OF FAIRPLEX

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

Full grade separation of the at-grade crossings on Arrow Highway and Fairplex Drive were considered, through elevation of the existing tracks, or undergrounding of the tracks under the existing roadways. As a complete but major remedy, both crossings could be undergrounded, with the rail line running in an underpass under both crossings. This would compromise access and operations of the Fairplex Metrolink stop, however, as the portion of the rail line that serves the station would also need to be undergrounded. This particular issue would involve additional construction costs, modifications to Fairplex site design, and complications for access (elevators, ramps, etc.). Due to the prohibitive costs of such an improvement, this grade-separation alternative will not be considered for implementation.

The Alameda Corridor East Construction Authority is improving Union Pacific corridors to the south that will be accommodating increases in freight rail traffic from the Alameda Corridor rail improvement project in Los Angeles. These Union Pacific lines are receiving improvements at crossings with major arterials and truck routes. The Authority will not be improving this rail corridor near the Fairplex, however, as the corridor will not be affected directly by the Alameda Corridor project. Freight traffic is light on the SCRRA line near the Fairplex site, as it is used primarily for the daily Metrolink service.

The recommended improvement at the two SCRRA grade-crossings is the construction of median barriers that will help to prohibit incursions at these crossings by vehicles attempting to bypass safety gates. Traffic queues that may form over these crossings during major events could be monitored via the CCTV unit positioned at the Fairplex Drive / Arrow Highway intersection.

3.0 Transit Improvement Recommendations

Transit has the potential for lessening demand for parking as the buildable area of the Fairplex is expanded within the current constraints of the site. There is no significant need for off-site parking, but more building area will be added to the Fairplex site during future site expansions. These expansions will eliminate parking areas in the process. The expansion of the NHRA dragstrip and grandstands and the addition of the Sheraton hotel are recent examples of this growth.

The Fairplex has exceeded the on-site parking demand only under rare occasions in the past, but future expansion of on-site uses could decrease the supply of parking to such an extent that alternative forms of transportation – such as buses or regional rail - will need to be encouraged. The recommendations within this section are intended to improve access to existing public transit, therefore assisting the Fairplex in continuing to provide adequate access to the site. Providing this improved access would be a incentive for increased transit use, and would need to be tied into active promotion of transit services by both the operators of the service and Fairplex.

3.1 Existing Transit Services in the Vicinity of Fairplex

Foothill Transit runs a special express route as an alternate to Line 480 (Los Angeles-El Monte-West Covina-Pomona-Montclair) during the Los Angeles County Fair. Heading eastward from Los Angeles, the Line diverts from its regular route before Pomona, and terminates at the Fairplex. The service is operated on weekends of the Fair, and schedules are tailored to the operating hours of the Fair. This line enters the Fairplex via a service driveway east of Gate 17, and exits via a parking exit gate west of Gate 17.

Line 479 (Cal Poly-Pomona-Montclair) runs its regular route along Fairplex Drive, McKinley Avenue, White Avenue, and Arrow Highway during all Fairplex events, but is operated at a higher frequency during certain evenings and weekends of the Fair. The primary access point for this line to the Fairplex is at marked bus stops near Gate 1 on McKinley Avenue. Other stops on this line that serve the Fairplex site are on McKinley Avenue east of Fairplex Drive, and along White Avenue at multiple locations between McKinley Avenue and Gate 12.

Metrolink service provides commuter rail service to the Fairplex during the Fair event on both weekends and weekdays. Service is provided via the San Bernardino Line, which stops at a number of stations between San Bernardino, Rancho Cucamonga, Pomona, Covina, El Monte, and Los Angeles. The line runs its regular weekday and weekend schedule during Fair days, but stops at the seasonal Metrolink platform on the Fairplex site. Metrolink provides service for an average of 500 Fair patrons for each day of service.

Figure 9 illustrates the relationship of local transit lines and the Metrolink commuter rail line to the Fairplex site. The general route of the Fairplex-provided shuttle to the Metrolink platform is also shown.

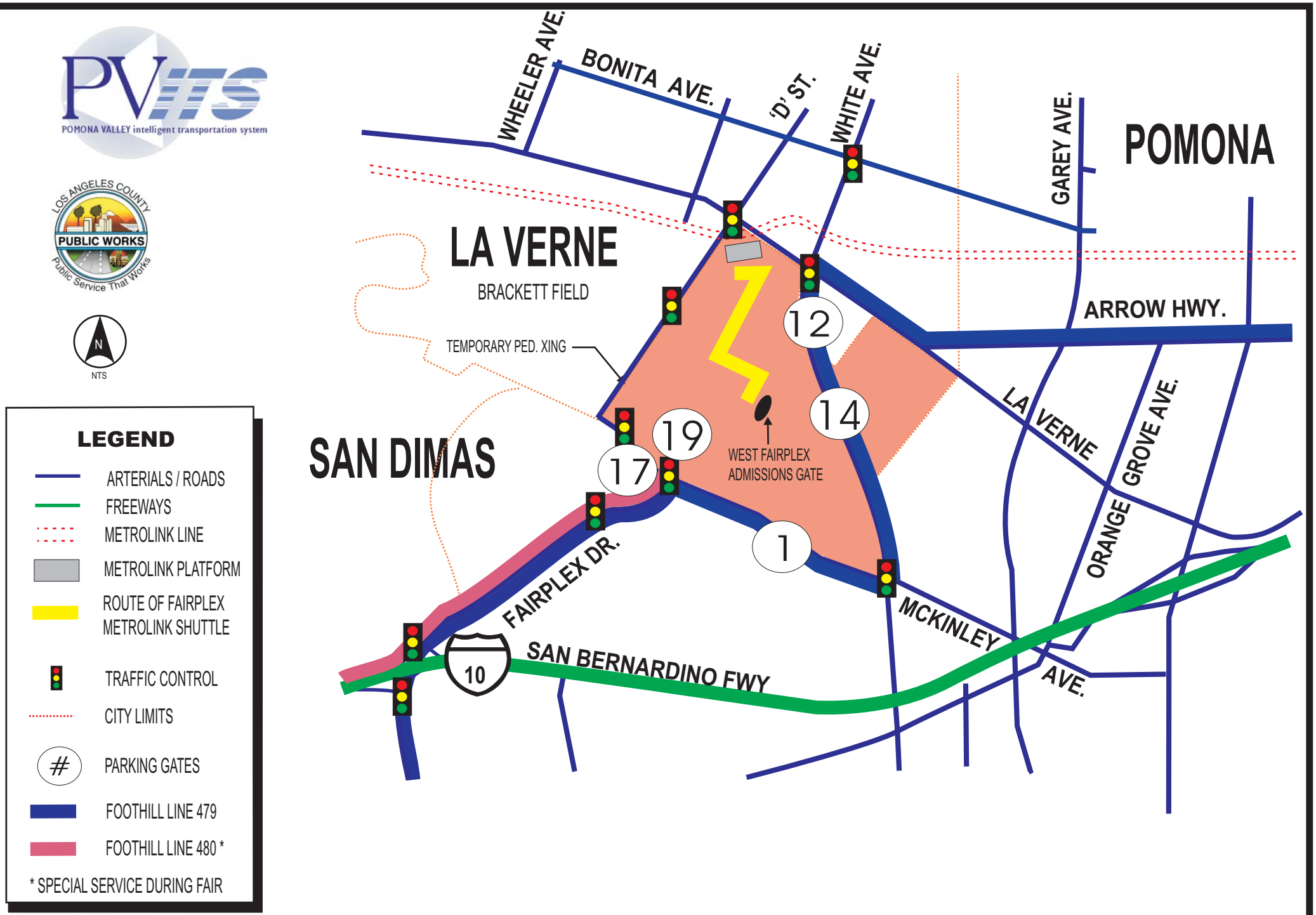


FIGURE 9: EXISTING TRANSIT SERVICES AT THE FAIRPLEX

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

3.2 Transit Access Improvement Recommendations

Adjacent bus stops to the Fairplex should be improved to increase safety and accessibility for pedestrians. This will allow for greater capacity and passenger comfort at each stop through improved sidewalk areas and amenities. The improvements will also provide incentives for discretionary riders to try the alternative mode of service.

- **TI-1**: Provide bus pull-outs (loading areas outside of the travel lanes) and a mini transit center with multiple shelters, transit schedule kiosks, and telephones on both the north and south side of McKinley Avenue at Gate 1.
- **TI-2:** Transit schedule and route information should be provided on kiosks at the recommended transit center location. Real-time "next bus" transit information, when available from transit providers, should be included.
- **TI-3**: Information kiosks at the transit center and on-site at the Fairplex should have links to transit schedules and fares on the Los Angeles County MTA and Foothill Transit web sites. Links should also include the Southern California Association of Governments' TransStar transit trip planning site.
- **TI-4:** A crosswalk with safety signage and tactile safety markers should be provided at the intersection of McKinley Avenue with the Gate 1 driveway, to provide formal access to both the north and south sides of the transit center location.
- **TI-5:** Lighting, shelters, and signage should be improved at all bus stops adjacent to the Fairplex on McKinley Avenue and White Avenue. Stops on both sides of these streets should be improved.
- **TI-6:** Provide one of the following improvements during the Los Angeles County Fair for tram service between entrance/exit gates and the Metrolink platform:

  1. Exclusive lanes or priority movements at traffic control points within the parking lot.

  2. Route the existing shuttle service onto surface streets - with an alternate type of vehicle, if necessary - and provide priority to vehicle at controlled intersections.

Access between the Fairplex ticket gates and the Metrolink platform is provided by the Fairplex via a scheduled tram. Tram vehicles utilize roadways within the main parking lot (the lot that is accessed via Gate 17). These roadways often become congested in the evening hours due to large traffic queues within the parking lot. Connections to departing Metrolink trains are often missed during both the weekday and weekend evenings of the Fair event, due to this parking lot congestion. Recommended improvements to this situation are as follows:

- **TI-6:** Consider the provision of exclusive lanes or priority at traffic control points within the parking lot for trams destined for the Metrolink platform.
- **TI-7:** Consider routing the existing shuttle service onto surface streets to reach the Metrolink platform on Arrow Highway from one of the major ticket gates. The service should be allowed priority movement at controlled intersections.

4.0 ITS and Traffic Management Improvement Recommendations

This section provides technological and operational improvement recommendations for event traffic control on roadways around the Fairplex during events of varying sizes. These improvement recommendations include the management of off-site traffic routing via a traveler information system, and of event congestion via traffic management systems. Issues addressed in these recommendations encompass the automation and centralization of functions that affect multiple local agencies.

4.1 Existing ITS Elements and Traffic Management

4.1.1 Event Management Efforts

The existing strategy utilized by the Fairplex for the management of parking and on-site traffic changes for each event, and is dynamic once the event is underway. Existing on-site and off-site traffic management efforts are documented within this section. The expected attendance and duration of an event helps staff to determine the strategy, along with the observed changes in traffic patterns throughout the course of a particular event. At times, the on-site supply of parking is modified during an event, as when NHRA events necessitate a new location for parking payment at Gate 17. When the recommended ITS components are implemented, the system will have to be extremely flexible to accommodate the dynamically changing traffic flows that are generated by a wide range of events, as well as the fluctuations in ambient traffic levels.

Some regional ITS-related components exist on area freeways near the Fairplex. As a vehicle destined for the Fairplex approaches the Pomona area, variable message signs (VMS) on nearby freeways provide information on traffic incidents and potential alternate routes. All major ITS and traffic

control components on roadways in the vicinity of the Fairplex are also documented within this section.

For the annual Fair event, Fairplex administration coordinates with Caltrans for the installation of temporary "flip-disc" signs that provide motorists with a recommended route to the Fairplex. These signs are placed at major decision-making points on major routes to the Fairplex, such as nearby freeway interchanges and off-ramps. The flip-disc design allows the pole to display two different signs, as needed. This "flipping" of the sign changes the direction of the directional arrow to an alternate route.

Interjurisdictional Cooperation

Three cities border the Fairplex site. The current management of traffic and control systems in the vicinity of the Fairplex involves coordination among these three agencies, as well as other local and regional agencies:

- The City of San Dimas borders the Fairplex on the west.
- The City of Pomona encompasses the Fairplex site, and borders it on the south and east.
- The City of La Verne borders the Fairplex on the north.

The City of Pomona is the most active city in terms of staffing commitment and frequency of involvement in events around the Fairplex through its Police Department and Department of Public Works. Pomona Police Department staff meets each morning with Fairplex staff during the annual Fair event in September. Business band radio is also used during most events for communications between Fairplex staff and the Pomona Police Department

Three to four times each month, the Pomona Police Department provides traffic control in the vicinity of the Fairplex. Three sergeants on different shifts manage the Police Department personnel. The largest commitment by Police Department staff occurs during weekends of the Los Angeles County Fair in September, when 12 officers are assigned for traffic management in the vicinity of the Fairplex during Fair weekends. In comparison, four officers are assigned to the area during Fair weekdays.

The other two bordering cities are less active in traffic management around the Fairplex. The City of San Dimas is only affected by major Fairplex event traffic on Puddingstone Drive and on Arrow Highway to the west of the Fairplex. Puddingstone Drive is not a major route to the Fairplex, and the event traffic on the segment of Arrow Highway within San Dimas can be managed via seasonal signal timing changes.

The City of La Verne is mainly affected by Fairplex traffic on Arrow Highway on the north side of the Fairplex, along White Avenue between Foothill Boulevard and the Fairplex, and along Foothill Boulevard between the junction with the SR-30 freeway and White Avenue. Traffic control by La Verne Police Department personnel is usually administered only at the two Arrow Highway intersections that front on the Fairplex (Fairplex Drive/ 'E' Street and White Avenue). These manual traffic control efforts are made by the City of La Verne only during peak traffic conditions, generated by the Fair and NHRA events.

Management of the Fairplex site requires additional coordination with other agencies. Emergency fire and paramedic services for the site are provided by the Los Angeles County Fire Department, while some ambulance services are also provided by private entities. A seasonal fire station is established on the Fairplex site, for use only during the Fair. Additional coordination may soon be required with the Los Angeles County Sheriffs Department, because the Fairplex is currently studying the feasibility of providing on-site security via the Sheriffs Department. If this is implemented, it would replace the current security efforts provided through privately-contracted services.

Video Monitoring

The Fairplex currently has a video surveillance system consisting of eight cameras. These cameras are located in and around the Administration building and Gate 1. The video images are transmitted to a desktop computer in the Administration building where they are stored. The images are only viewed if playback is necessary and are erased within two days of capture. Conduit has been installed, connecting the security building and Gates 14 and 17, which would allow for future remote camera access at these gates, where no cameras are currently provided.

4.1.2 On-Street Traffic Management Efforts

One of the goals of current traffic management in the Fairplex area is the diversion of traffic away from residential areas and onto major arterials. Fairplex staff believes that a good effort has been made to keep traffic out of residential neighborhoods. This has been accomplished via event promotions (via print media and the Fairplex web site) that provide recommended routes via major arterials between the Fairplex and nearby freeways. Also, a residential parking permit program is being administered by the City of Pomona, which prohibits overflow parking in nearby residential areas to the south and southeast of the Fairplex site.

Efforts at traffic management also have the goal of mitigating traffic congestion along constricted roadways and high-activity intersections. Arrow Highway intersections at White Avenue and Fairplex Drive are under the jurisdiction of the City of La Verne. Manual intersection control is necessary at these intersections, but not as often as intersections within the City of Pomona's jurisdiction on White Avenue and Fairplex Drive.

Figure 10 indicates all of the locations near the Fairplex where police officers are positioned to perform manual traffic control during major Fairplex events. The text beyond Figure 11 summarizes traffic control issues at the major intersections surrounding the Fairplex. Typical control actions for recurring events are also discussed.

Traffic control locations include the temporary pedestrian crossing on Fairplex Drive, near the southwest corner of the Fairplex site. This location is staffed with Pomona Police Department personnel during the Fair event to control traffic flow at this mid-block crossing. The crossing, which provides pedestrian access to the overflow parking lot at Brackett Field, is usually put into use one day during each Fair season.

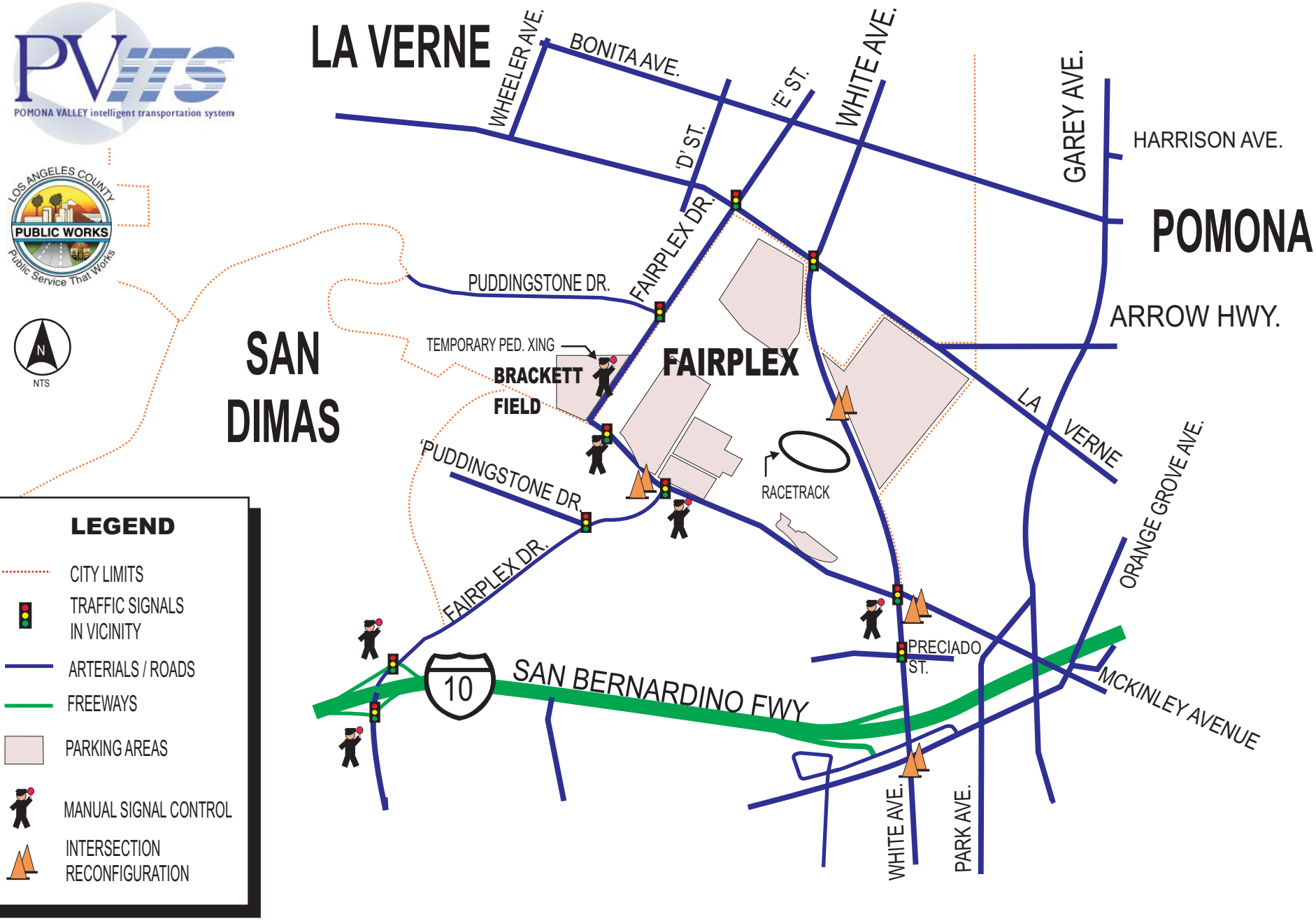


FIGURE 10: CURRENT FAIRPLEX AREA TRAFFIC CONTROL LOCATIONS

Kimley-Horn and Associates, Inc.

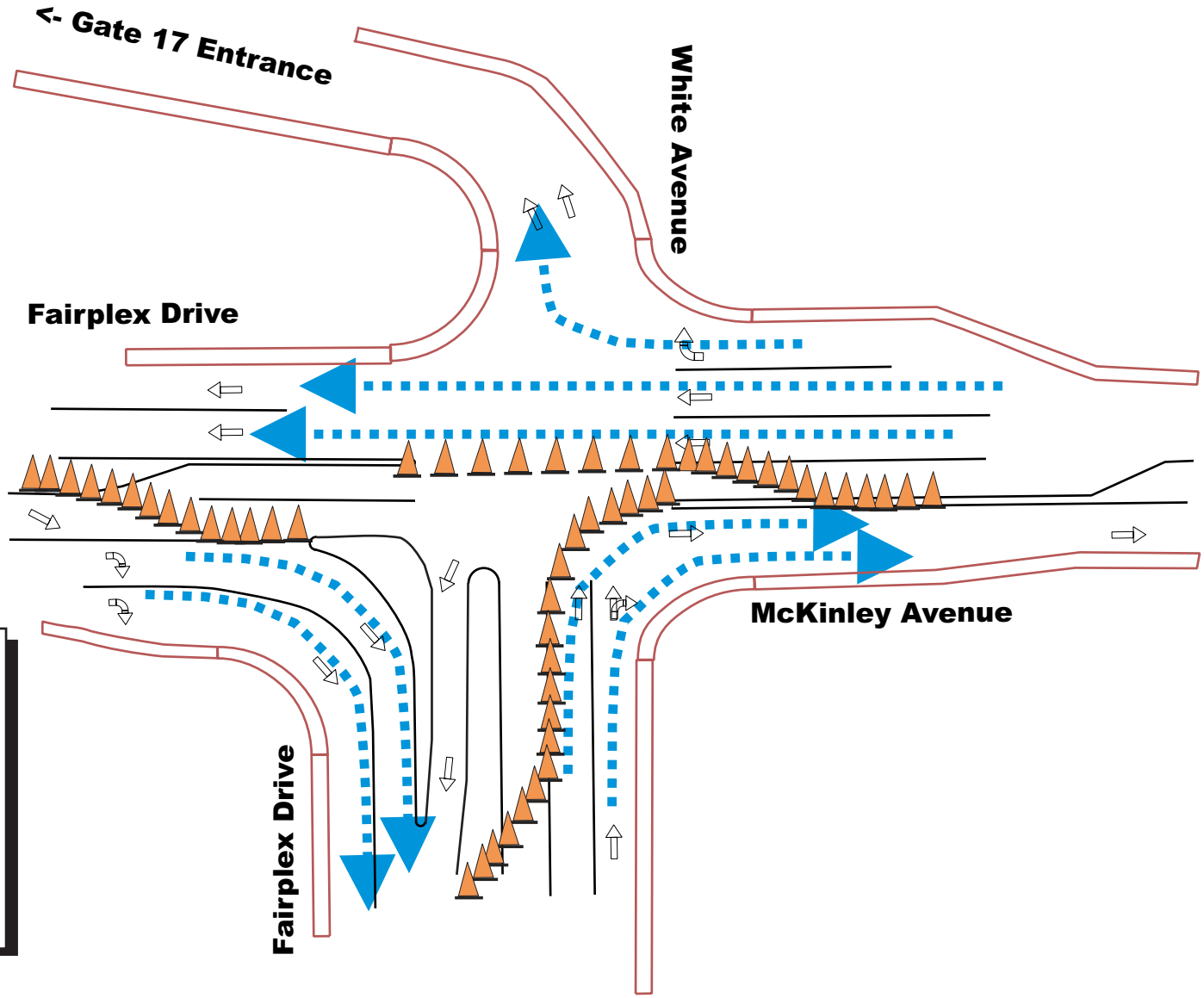
DELIVERABLE 3.6.1

Fairplex Drive / McKinley Avenue

- The westbound approach of this intersection often has long queues during major events.
- The intersection is manually controlled (via the signal controller) during INS citizenship ceremonies. and NHRA events.
- The one-way entrance to Gate 17 – the north entrance leg of this intersection - becomes gridlocked during NHRA event peak ingress periods.
- During the Fair, the traffic signal is set to emergency flash, and traffic control is performed by two to three Pomona police officers in the intersection.
- The intersection is also reconfigured during the Fair with traffic cones, so that eastbound traffic is guided south to the I-10 from the Fairgrounds, and northbound traffic from the I-10 is sent east on McKinley Avenue towards White Avenue. This configuration, viewed from the west in the picture below, is used during the afternoons of weekend Fair days.
- The reconfiguration of the intersection prohibits through and left-turn movements at the northbound, westbound, and eastbound intersection approaches.

Fairplex Drive Event Traffic
Looking eastward toward McKinley Avenue intersection

Figure 11 indicates the typical reconfiguration that is temporarily implemented with traffic cones during major Fairplex events at the Fairplex Drive / McKinley Avenue intersection.



LEGEND

- ARTERIALS / ROADS
- FREEWAYS
- TRAFFIC SIGNAL
- REGULAR TRAFFIC FLOW
- ALLOWED MOVEMENT

FIGURE 11: TEMPORARY RECONFIGURATION - FAIRPLEX DRIVE / MCKINLEY AVENUE (GATE 17 ENTRANCE)

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

White Avenue / McKinley Avenue

- During the INS, NHRA, and Fair events, the intersection is reconfigured with traffic cones to prohibit northbound left turn movements from White Avenue onto westbound McKinley Avenue.
- The intersection is manually controlled (via the signal controller) by Pomona Police Department personnel during most major events.

I-10 / Fairplex Drive Ramp Intersections

- Signals are staffed with Pomona Police Department personnel during Fair events.
- The California Highway Patrol contacts the Pomona Police Department if ramp queue lengths are approaching the mainline I-10 flow.
- The Fairplex is then contacted to change flip-disc signs to the west and south of the SR-57 / I-10 / I-210 to direct traffic flows north to the Arrow Highway corridor, if necessary.

White Avenue / Burdick Drive (I-10 eastbound White Avenue off-ramp access)

- This intersection is reconfigured with traffic cones during the Fair. This usually takes place on the first Thursday (opening day), all Fridays, and all weekends of the Fair.
- The reconfiguration enables eastbound traffic on Burdick Drive (eastbound I-10 ramp exit) to take a left onto northbound White Avenue directly into the inside lane.
- Two through lanes on northbound White Avenue are tapered into a merge directed at the outside through lane, to allow for the reconfiguration. This is shown in the photo below.

White Avenue Temporary Reconfiguration
Looking north towards underpass at I-10 freeway

Figure 12 indicates the typical reconfiguration that is temporarily implemented with traffic cones during major Fairplex events at the White Avenue / Burdick Drive intersection.

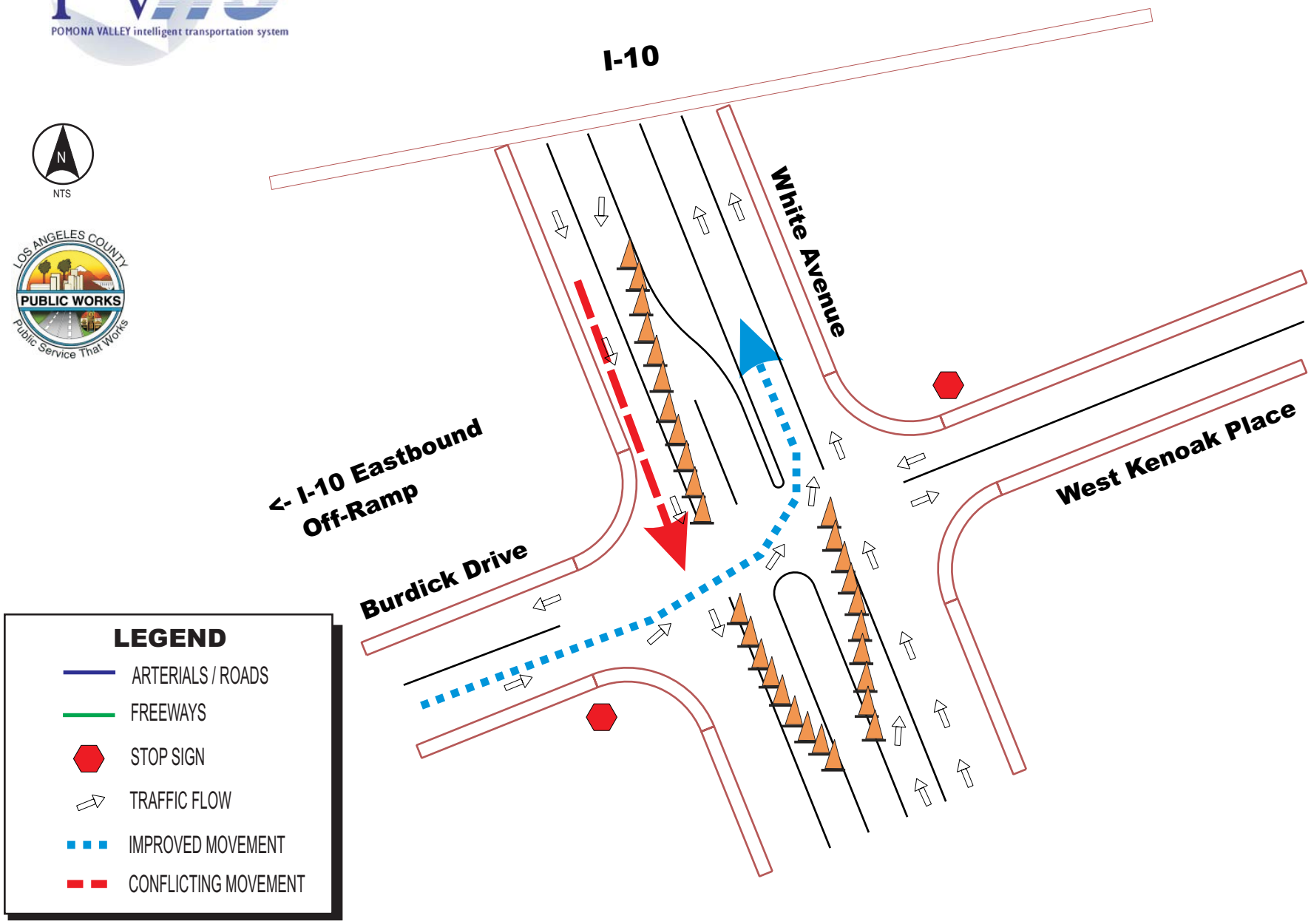


FIGURE 12: TEMPORARY RECONFIGURATION - BURDICK DRIVE / WHITE AVENUE (EASTBOUND I-10 OFF-RAMP)

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

Fairplex Drive / Puddingstone Drive

- Signal control exists at this location, in-line with a closed Fairplex access gate on the east side of the intersection.
- The gate may be used as a future exit-only point for the Fair event, although the NHRA dragstrip barriers would need to be modified temporarily to achieve this purpose.

4.1.3 On-Site Parking Management Efforts

All off-site event traffic control is handled by local police departments. Fairplex staff control on-site traffic flows, as operators of the parking lots and exhibit areas. The on-site parking supply does not often reach capacity. The key efforts of Fairplex are directed at managing the supply, and directing vehicles to the proper lots for various sizes and types of events. The following list describes the general characteristics of parking management for specific events. **Figure 13** indicates the typical parking entrance ticketing capacities and optional configurations at each parking payment gate. The indicated configurations within the figure represent maximum number of parking payment lanes utilized during major events.

Parking Payment Lanes by Gate

- Gate 17, at the Fairplex Drive / McKinley Avenue intersection, has as many as 14 lanes.
- Gate 14, at the northeast parking lot, has as many as 8 lanes. Season parking is provided near this Gate, as the area is closest to the exhibition halls.
- Gate 15, near the Arrow Highway / Fairplex Drive intersection, is only open during Fair weekends, when 3-5 lanes can be used.
- The Sheraton hotel parking lot gate – not given a gate number by the Fairplex – has three lanes.

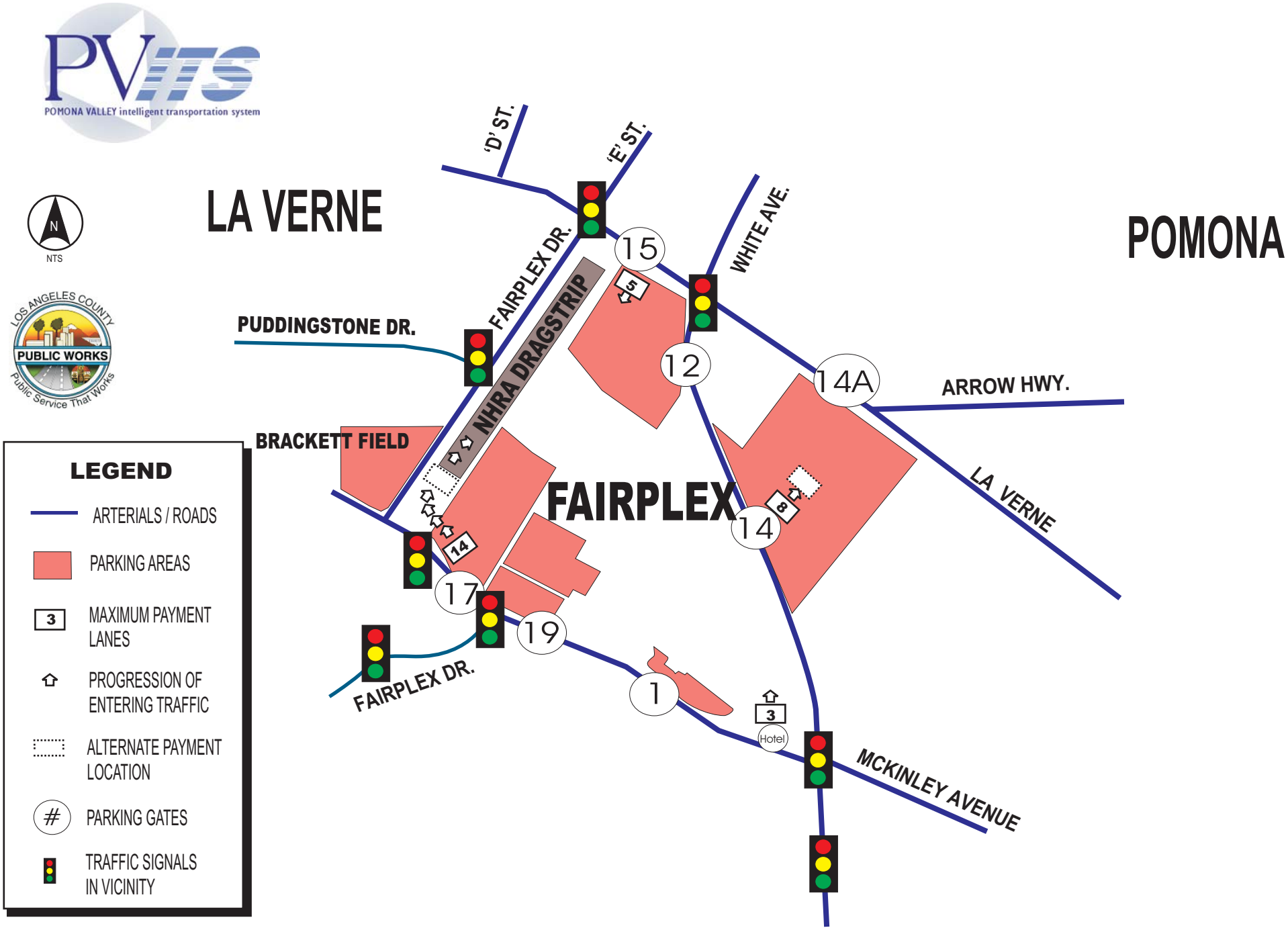


FIGURE 13: CURRENT FAIRPLEX PARKING ENTRANCE CONFIGURATIONS

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

Other Parking Management Issues

- Gate 12, at the equestrian center on White Avenue, south of Arrow Highway, is used occasionally for exit-only movements during Fair.
- Gate 14A, near the intersection of Arrow Highway / La Verne Avenue, is only open when Fairplex attendance exceeds 100,000 persons. The gate may be closed permanently by Fairplex.
- Patrons of the horse racetrack are encouraged to enter the site through Gate 17.
- Gate 15 on Arrow Highway is used as an access point for service vehicles during NHRA events.

On-site staff, serving as "parkers", are used during major events to guide vehicles to the proper sections of the parking lots. The on-site parking capacity of the Fairplex is supplemented by the overflow dirt lot at Brackett Field, where 1,400 spaces can be provided. Parking and gate configurations are affected by event locations, and especially by NHRA dragstrip events, as the parking area off of Gate 17 is partially on the dragstrip. When NHRA events are in progress, this parking lot is reconfigured to allow space for the NHRA event.

Automated Parking Management Concepts

The Fairplex estimates that approximately 95% of major event attendees utilize Gates 14 and 17 to enter the parking areas. These gates provide the main access to the two largest parking areas at the Fairplex. A major benefit of a fully-implemented ITS system in the vicinity of Fairplex will be its ability to guide vehicles to the proper route from nearby freeways and regional arterials, and then guide vehicle to the proper parking lot. This would be based on the location of major Fairplex events, via pre-determined event management plans activated from the control site. Data on volumes entering and exiting the main parking lots would be relayed to the control site from data collected from parking management equipment.

The recommended parking management system consists of additional variable message signs (VMS). These VMS units would provide directions to drivers near the main parking entrance gates. The parking management system would monitor the number of cars within each parking lot and compare those numbers to parking lot capacities. With this data supplied in real-time, automatic system responses (with operator verification) would include the modification of VMS, flip-disc, and LCS, and signal timing to assist motorists in reaching the parking lot with the most capacity, with minimized travel time.

The recommended ITS components will include video detection units that will provide for the counting of vehicles, as part of a basic Automatic Parking Management system. The CCTV units recommended for placement at major entrance and exit would provide supplemental information to control site personnel, for response to parking lot entrance queues. This would be accomplished by computerized analysis of traffic queues, utilizing video detection data captured at the parking gates.

The Fairplex is currently considering upgrades to its parking payment and management system. Currently, portable counters are used by each parking cashier/attendant to monitor capacity. Running totals of entering vehicles can be viewed by each attendant and relayed by radio to an operations

manager. The Fairplex assembles the ticketing equipment in-house, and also writes its own control software.

Coordination should take place with the Fairplex to assure for proper future integration with this planned parking management system, when it its implemented. Fairplex administration is currently undertaking a study, being performed by the firm of SeaReach, that would redefine parking gate numbers, as well as refine the wayfinding signage program along arterial routes in Fairplex. Parking gate numbers are being redefined to show a hierarchy of gates (such as naming the main gates Gate 1, Gate 2, etc.), and to indicate a logical transition as visitors drive around the Fairplex site.

4.1.4 Traveler Information & Wayfinding System

As a vehicle destined for the Fairplex approaches the Pomona area, Variable Message Sign (VMS) units on nearby freeways provide information on traffic incidents, but are not utilized specifically to indicate potential alternate routes to the Fairplex site. In this respect, these freeway VMS units operate as a regional but limited traveler information system. These signs are Caltrans-operated, as part of a County-wide incident management program for the freeway system. The system is not automatic, but rather relies on an operator to call-up preset messages, or to create custom messages, that are then activated at specific signs on the network.

The operator relies on data from a computer system that is processing traffic data from vehicle detectors that are located on most freeway corridors in the region. California Highway Patrol (CHP) officers also report incidents and information about the response to the operators. Another source of data is closed-circuit television (CCTV) video from pole-mounted and sign-mounted cameras. Caltrans has over four hundred of these cameras monitoring key freeway locations throughout the state.

A Highway Advisory Radio (HAR) system is currently in use within the I-10 freeway corridor, to the south of the Fairplex site. The system is advertised on the Fairplex electronic billboard near the I-10 freeway and Dudley Avenue. A pre-recorded message is transmitted over the HAR frequency that provides details on current events and recommended parking locations. The system operates on the AM radio band at the 1570 frequency. The AM transmitter is attached to the Fairplex electronic billboard, and has a designed range of 3 miles over flat topography.

A system of flip-disc signs and fixed signs currently provides direction to the Fairplex site from nearby freeway and arterial corridors. The flip-disc signs are temporary, and are used by the Fairplex (with special permission from Caltrans) during the County Fair event to direct incoming traffic to the proper interchanges and ramps. Small fixed signs have also been installed on existing poles along recommended primary routes to the Fairplex site. These flip-disc and fixed directional signs are currently utilized along the primary and secondary travel routes to the Fairplex.

This existing array of signage defines travel corridors to and from the site. These corridors are also defined by print and electronic media used by Fairplex administration. The current Fairplex web site - www.fairplex.com - provides directions from seven different regions in Los Angeles and Orange Counties. Print media utilized to advertise individual events use these same general directions to direct patrons to the Fairplex. **Figure 14** illustrates the primary and secondary travel routes between the Fairplex site and regional arterial and freeway corridors. The location of temporary freestanding freeway signs and permanent variable message signs are illustrated in **Figure 15**.

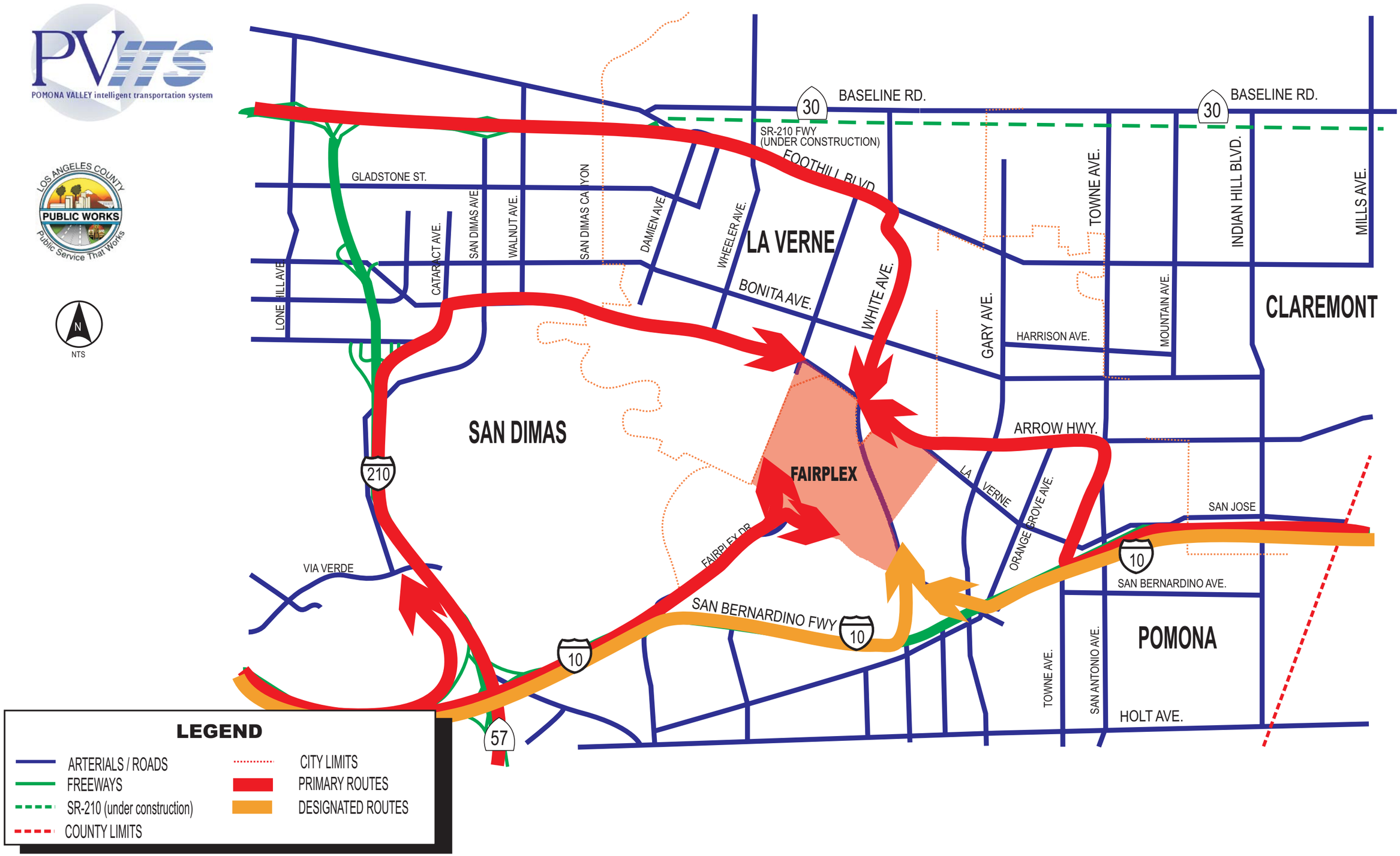


FIGURE 14: TRAVEL ROUTES TO FAIRPLEX SITE

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

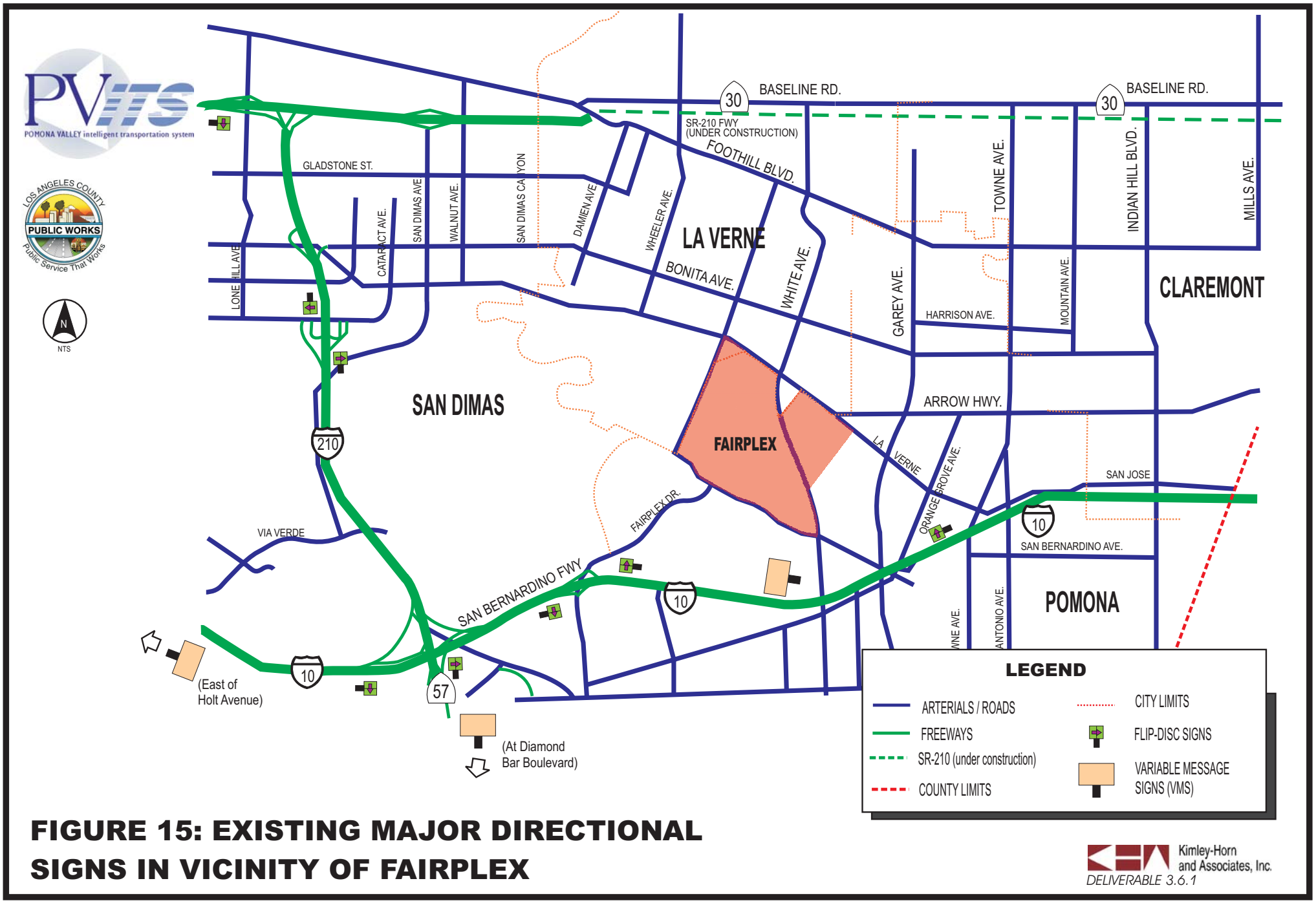


FIGURE 15: EXISTING MAJOR DIRECTIONAL SIGNS IN VICINITY OF FAIRPLEX

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

4.2 ITS and Traffic Management Improvement Recommendations

This section provides recommendations on potential monitoring and control site locations, traffic management operations under an ITS-based system, and ITS equipment locations. The recommended system is envisioned to comprise the following:

- An arterial monitoring and management component;
- A parking status/availability component;
- A traveler information collection and dissemination component;
- Interfaces to other agencies and/or systems;
- An event scheduling component;

Not all of the above components may be implemented in the initial phase of the system but it is expected that as the Fairplex expands and matures, some elements, such as advanced incident management and advanced parking management, will become more beneficial. The phasing and prioritization of recommendations will be included in the Fairplex Traffic Management Implementation Plan document, which is Deliverable 3.7.1 under the PVITS project.

The primary goal of the recommendations in this section is to improve the execution of traffic management during special events. Flip-disc signs, freeway and on-street variable message signs (VMS), and lane control signals (LCS) will lessen the need to utilize barricades and temporary signs. These components, along with closed circuit television (CCTV) cameras integrated with the Fairplex monitoring and control site, will allow system operators to observe event traffic data and video in real-time at a central command station, supplemented by possible mobile command posts. Event traffic management decisions can then be made quickly, based upon reliable information.

Installation of video detection units that can automatically monitor parking lot entrances would lessen the need for voice communications between parking staff and the control site, and will lay the groundwork that is necessary for integration with Fairplex parking management systems. The Fairplex Traffic Management Plan, as a whole, will allow police and City staff to concentrate on other functions besides manual intersection control. Police staff could then perform other function such as monitoring of general traffic flows in the area, and communicating with the control site on conditions of roadway segments that may not be directly monitored by ITS equipment. Police response time to traffic incidents could be improved through coordination with the control site, assisted by real-time information from CCTV units, video detection units, and traffic loop sensors.

4.2.1 Fairplex Control Site and Sub-Regional Traffic Management Center (TMC) Objectives

There is interest among PVITS Forum stakeholders in hosting a sub-regional TMC either in the City of Pomona or on the Fairplex site. The City site is a good candidate for a centralized control point, as it could be integrated with an emergency management center or existing remote signal monitoring and timing equipment. The possibilities of centralized coordination among police personnel, city staff, and operators at a sub-regional TMC at the Fairplex, however, could add much value to the recommended system.

There is currently no event traffic management center at the Fairplex. The on-site Security Office, south of the racetrack, is used as a jail and police station during the Fair event. This location is a good candidate for a possible Fairplex-based control site. An alternate location for the control site is a new building planned by the Fairplex that could include traffic monitoring and security functions. This site is located to the east the Fairplex Drive / McKinley Avenue intersection, and could provide improved access to nearby roadways than the centralized Security Office.

The control site location could combine emergency management, Police Department control, and security monitoring and coordination. A mobile command post could also be established for the Pomona Police Department's use, into which CCTV, signal phasing, and timing control information could be linked. This command post would be located in a location that is most convenient for coordination of police personnel.

4.2.2 Automated Traveler Information System (ATIS) Recommendations

The following are recommendations for pre-trip information to be included in the system:

- **ITSEMI-1:** The Fairplex web site and regional traveler information web sites should have standardized maps with customized directions to certain areas of Fairplex for different types of events.
- **ITSEMI-2:** The Fairplex web site address (www.fairplex.com) should be used on all publications, and event organizers could be required to use the address so that attendees use the customized Fairplex pre-trip information.
- **ITSEMI-3:** Press materials, and current and future HAR systems should utilize customized directions for the sake of consistency.

The following are recommendations for variable and static sign systems:

- **ITSEMI-4:** Traffic routing directions should be provided to all incoming motorists via variable message signs and flip-disc* signs. The first message signs seen by motorists headed for the Fairplex should be placed on freeway or regional arterial routes, and should be located at least three miles from the first major exit or decision point.
- **ITSEMI-5:** Variable message signs at each major decision-making point, or along major corridors, should reaffirm the recommended route to and from the Fairplex.
- **ITSEMI-6:** Displayed information on variable message signs should be verified or modified every five minutes – or more frequently - by Traffic Management Center personnel.
- **ITSEMI-7:** Pole-mounted variable message signs should be placed on existing sign poles, luminaire poles, or traffic signal arms. All signs on White Avenue north of Arrow Highway, and along Foothill Boulevard, should use these smaller signs.
- **ITSEMI-8:** Static signs should remain where dynamic control is not necessary.

** The term "flip-disc sign" refers to remote-controlled pole-mounted signs that can display one of two different signs. In the case of flip-disc signs utilized for the Los Angeles County Fair, the signs are used during the duration of the Fair at freeway interchanges and major off-ramps for traffic guidance. An arrow and the word "Fairplex" indicate the preferred route to the site. Currently, these signs can be "flipped" manually which changes the direction of the directional arrow.*

This recommended ATIS functionality would require CCTV hardware. The system should provide live views of traffic conditions for use by system operators to determine appropriate travel routes. These CCTV units would be installed at key intersections and would be supplemented by traffic volume detectors along key corridors for the area-wide monitoring of flows, queues, and incidents. Traveler information dissemination equipment would include the following:

- Variable message signs and lane change signs;
- Radio and TV feed interface(s); and
- Hardware in support of automated, telephone and/or internet-based, traffic information system
- Integration with existing Fairplex Highway Advisory Radio (HAR).

4.2.3 Advanced Traffic Management System (ATMS) Recommendations

The recommended system will achieve centralized coordination of signals through interconnect of existing signal controllers. This will enable the management of signal cycle lengths and corridor flow control via green times and synchronization. The final Implementation Plan will indicate proposed coordinated signal locations and interconnect locations and type needed for project operation.

The recommended ATMS improvements will improve traffic movement up to the Fairplex parking entrances. CCTV cameras are recommended for the monitoring of traffic levels and queue lengths at all parking payment locations. Section 4.2.6 of this report discusses the potential for on-site parking management functions. These functions are recommended for phase-in, after implementation of ITS elements recommended in this document, and the implementation of an electronic parking management system currently being planned by the Fairplex.

The following are recommendations for field equipment for traffic detection and monitoring to be included in the system:

- **ITSEMI-9:** The monitoring and control site should reside within the current Fairplex Security Office, or at a potential new building (if constructed by Fairplex in time for implementation) east of the Fairplex Drive / McKinley Avenue intersection. Switching of control to a local City of Pomona control site should be possible, for use of system during non-event conditions.
- **ITSEMI-10:** Traffic detectors should include vehicle detectors located at mid-block intervals, and tied to the traffic signal controllers.
- **ITSEMI-11:** CCTV should be utilized for traffic monitoring, including incident verification and detection at parking entrances.
- **ITSEMI-12:** CCTV should be utilized for queue detection at parking entrances.
- **ITSEMI-13:** CCTV cameras should be controlled (via pan/tilt/zoom features) using a CCTV server that will reside at the control site.
- **ITSEMI-14:** Video recording equipment, frame storage devices, additional monitors, quad-splitters, and other ancillary equipment should also be provided. This will allow for the temporary storage of traffic flow information, for use in planning purposes by the local engineering or police departments.

The following are recommendations for traffic control equipment to be included in the system:

- **ITSEMI-15:** Signals on all routes from local freeways and regional arterials to the Fairplex within the City of Pomona should be linked into the control system at the recommended control site.
- **ITSEMI-16:** TMC workstations should coordinate the timing and synchronization of areas signals, but within parameters agreed to by the agency that owns each signal.
- **ITSEMI-17:** Lane control signs and flip-disc signs should utilize separate communication lines and should not be controlled by the traffic signal controllers, so that direct control can be provided from the control site.
- **ITSEMI-18:** Graphic user interfaces on the control site workstations should provide easy user access to control these devices remotely.
- **ITSEMI-19:** There should be limits on authorized users that would have access to signal system modification functions. This should be limited to individuals with the appropriate training and authority.
- **ITSEMI-20:** The control site should automatically link variable message signs, flip-disc signs, and other information devices to the signal timing system when event modes are changed. This should be done with operator verification. *
- **ITSEMI-21**: For emergency override capabilities, automated field information devices such as lane change signs and flip-disc signs should include an override key switch at the sign controller.

** This type of link between equipment is an important function of an ITS system. For example, if a specific event plan is activated in the control system, dynamic signs would be activated with driver directions. At the same time, a customized timing and synchronization plan would be implemented for signals that could be impacted by that change in traffic flow.*

4.2.4 Event Management Operation Improvements

Systems operators should be able to monitor traffic conditions on the roadway network through CCTV images and traffic sensor data. Based on this information, congestion locations and incidents will be quickly identified and pre-planned response strategies would then be initiated. The response plan will include directing traffic to parking facilities during high ingress periods and to the freeway system during high egress periods by changing the flow of traffic through the use of lane control devices, dispatching the appropriate emergency agencies, displaying messages on VMS units, providing the media with timely information, and adjusting signal timing. These processes have been successfully

implemented in various areas throughout the United States and have resulted in significant benefits in terms of reduced travel times, improved safety, and staff responsiveness.

As envisioned, the system will provide the public with up-to-date traffic and parking information and will, through its various subsystems, provide for the more efficient and cost-effective management of event traffic in the area. This will be accomplished through pre-event information, ingress traffic information, and egress traffic control. These three aspects of traffic management are discussed below.

Pre-Event Information

Through the media and Internet resources such as the Fairplex and regional traveler information sites, the public will have access to information on event venues and schedules, specific street closures or, recommended travel routes and parking locations for specific event venues. This information will be presented both generically and as event-specific information

The Fairplex should, through agreements with event organizers, require that specific maps for their event and the Fairplex web site address prominently be displayed in all advertising and publications/advertising. The Fairplex web site should have typical maps and route descriptions for events and the web site should provide hyperlinks from the events list to a appropriate map and route description for the event on the web site.

Ingress Traffic Information

Patrons approaching the Fairplex area on area freeways will be given directions via freeway-based dynamic signs and Fairplex HAR for recommended routes, based on current traffic conditions and availability of parking. Once a motorist exits the freeway at the advised location, they will be given en-route traffic and parking information via on-street dynamic and static signs. At some intersections along McKinley Road, overhead lane closure signs and flip-disc signs will help provide direction to the appropriate parking area.

System arterial volume detection will be used to recommend event plans to the system operator. The implemented plan would then program standard dynamic sign messages, modify flip-disc signs, and change traffic signal timing accordingly. System operators can then identify and recommend locations where police could provide the most valuable assistance. The goal of ingress traffic information will be to get patrons off the street system and into a parking stall in the most expedient way possible.

Egress Traffic Control

During major event egress periods, the system will modify signal timing to expeditiously empty the exit queues and modify dynamic signage to provide routing information to the closest freeway or regional arterial access point. Police Department personnel would receive specific directions from the control site operator, as needed.

4.2.5 Recommended ITS Equipment Locations

Figure 16 illustrates the recommended locations of ITS equipment on routes from local freeways and arterials to the Fairplex site. **Figure 17** illustrates the recommended locations of ITS equipment on roadways at the perimeter of the Fairplex site. Detailed information on the individual location of each ITS unit will be provided within the Implementation Plan.

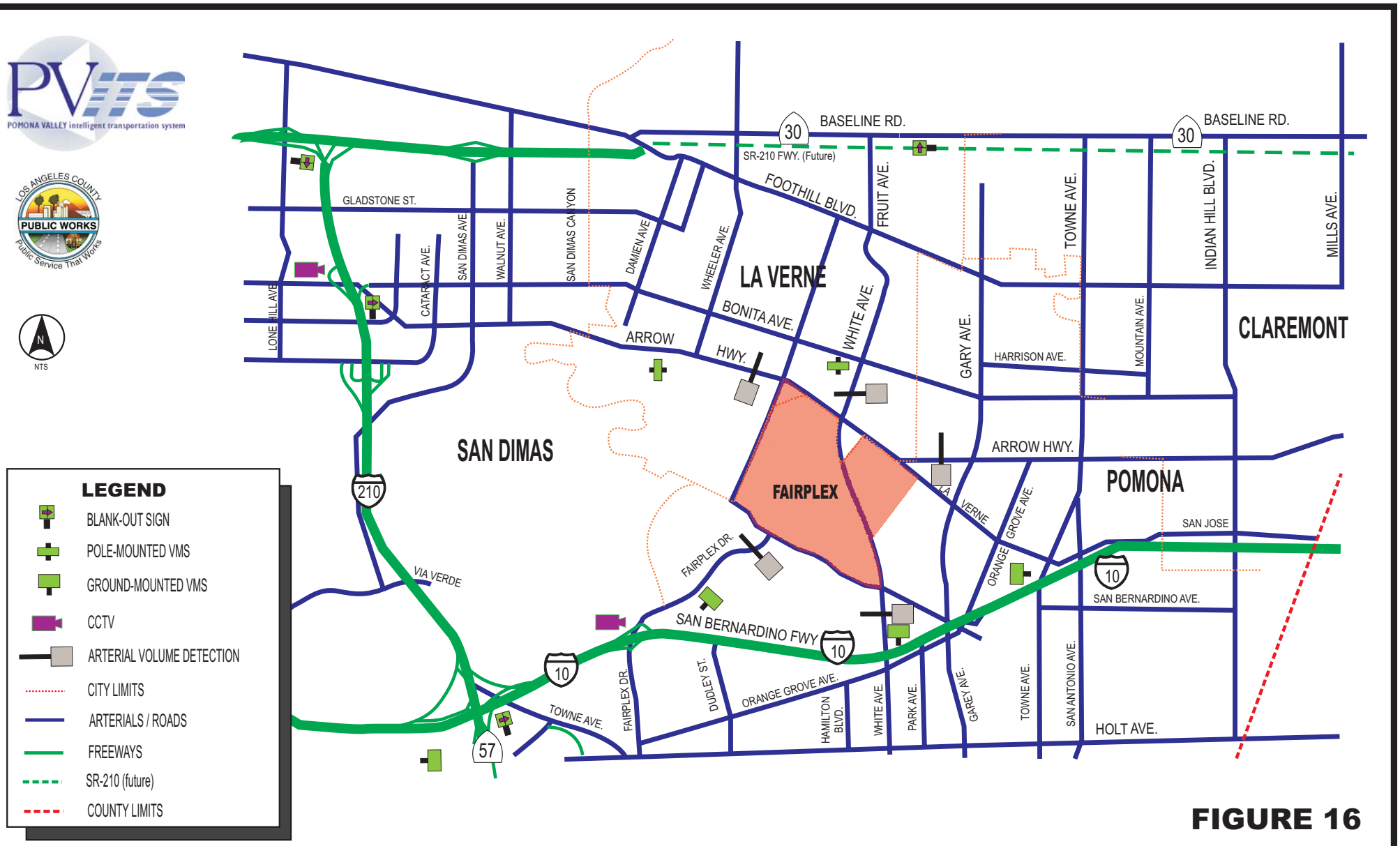


FIGURE 16

FIGURE 16: LOCATION OF RECOMMENDED ITS EQUIPMENT - ROUTES IN VICINITY OF FAIRPLEX

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

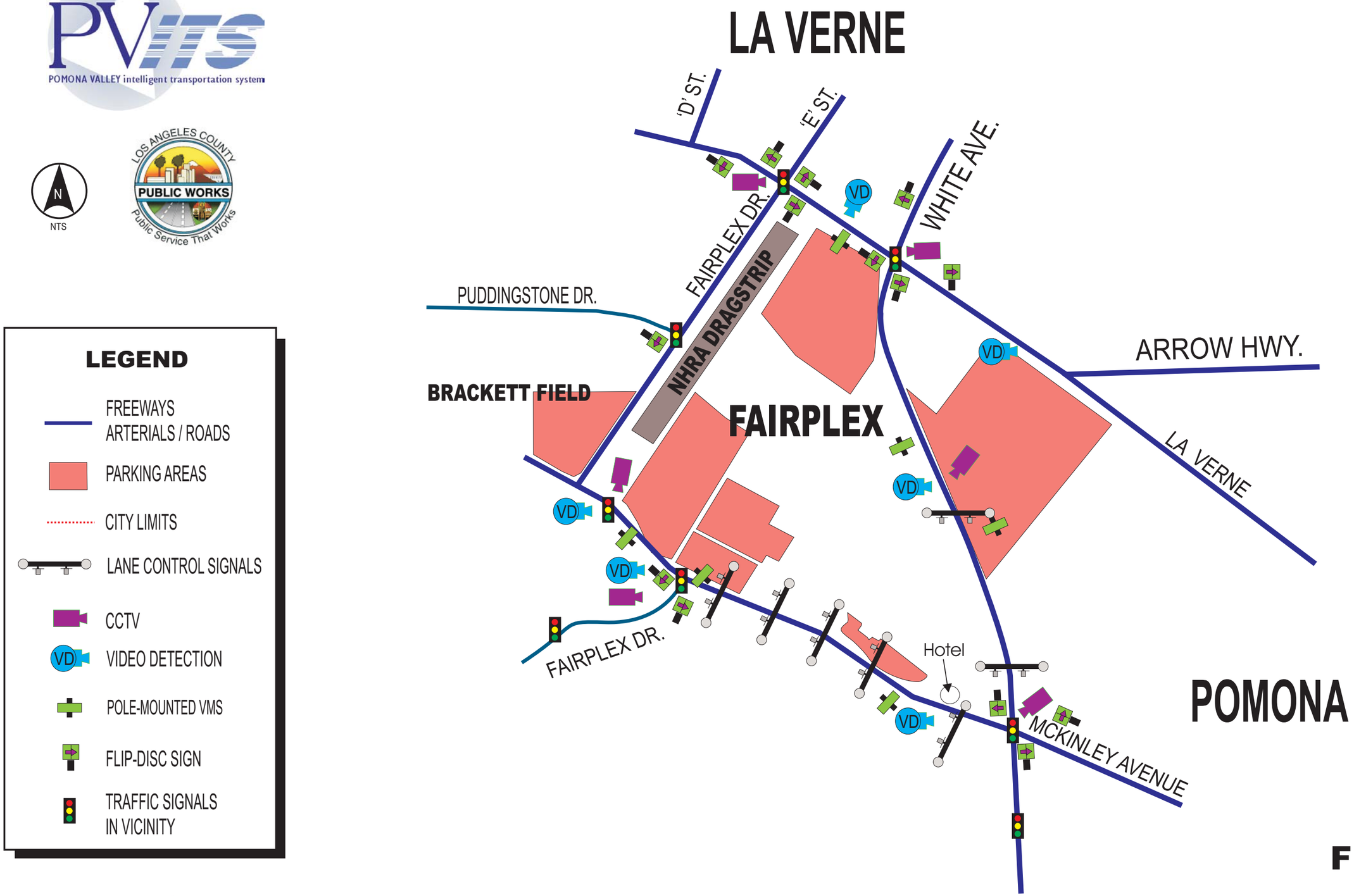


FIGURE 17

FIGURE 17: LOCATION OF RECOMMENDED ITS EQUIPMENT - ROADWAYS SURROUNDING FAIRPLEX

Kimley-Horn and Associates, Inc.

DELIVERABLE 3.6.1

4.2.6 Future Implementation Considerations

In addition to the local video monitoring system at the Fairplex Administration Building and Gate 1, the Fairplex is planning to install cameras at the hotel parking gate, and at Gates 1, 14, 15 and 17. These cameras are to be installed by January, 2002 and are to serve as an audit and security function for admission ticket sales at the existing Fairplex customer entrance gates. Efforts should be made to share video data between system CCTV units and the on-site cameras of the Fairplex. Video information at parking payment gates will be valuable information for the control site to utilize for traffic queue analysis. There would be no recording of video for any auditing purposes – this would remain a Fairplex function.

The Fairplex is planning for new automated functions at its parking payment gates. Payment attendants would possibly use hand-held electronic devices (similar to Personal Data Assistant units) to keep track of inbound vehicles and print tickets via belt-attached printers. This future availability of real-time, electronic parking information through these units would help lay the framework for integration with the Automated Parking Management System currently being planned by Fairplex administration.

No specific recommendations are being made for a detailed on-site Parking Management System, but considerations should be made for future integration with Fairplex equipment. Information on gate volumes and queues would be part of the initial system, to assist with the determination for proper traffic routing during major events. This would be accomplished via the recommended CCTV system.

An Automated Parking Management System could provide the following functionality:

- Centralized management of the Fairplex on-site parking lots.
- Information on entering vehicles would be based on automated manual parking ticket sales.
- Exit traffic could be tabulated via tube or video detection camera
- When a particular parking lot is near capacity based upon ingress and egress totals of the parking counting system, lane change signs, variable message signs and signal timing could adjust to orient traffic to alternate parking lots.
- Parking display signs near the entrances to each parking lot would indicate spaces available in each sector of a particular parking lot.
- Parking display signs could also integrate with dynamic sign units to guide all incoming vehicles to the appropriate parking lots.
- The Fairplex could also consider the use of on-site display signs that would guide all vehicles traveling to spaces in each parking lot to the appropriate parking sector of the particular lot. These signs could be placed at major decision points within each parking lot.

Before the 2002 Los Angeles County Fair begins, the Fairplex is planning to have implemented an automated parking and admission ticketing system. Detailed planning and budgeting for this system

could be complete as early as spring of 2002. Information from this admission ticketing system could also be a valuable input to the recommended system, by providing supplementary real-time information on total attendance during event operation.

4.2.7 Component Integration, Control, and Monitoring System

This section covers the basic hardware and software issues that will need to be considered to implement the recommended system functions.

Operator Workstations

The control site operator workstation will be set up to operate the signal system control software separately from the system software, in order to provide uninterrupted monitoring and control of area signals. The system operator interface will include the operator workstation and a police scanner, and would provide direct control to CCTV and VMS units, with pre-programmed access to other devices. Overrides of this pre-programmed control will also be provided for certain authorized users.

The systems Graphic User Interface (GUI) will provide an area map that shows signal status and mid block traffic volumes (color status will represent a range of traffic volume) in real time. Locations of CCTV, VMS, Lane Control Signals (LCS), and Blank-out Signs (BOS) will also be depicted on the map. To access the status of one of these elements or to control one of these elements individually, the operator will be allowed to click the icon on the map that represents an individual unit and the appropriate status/control window will appear. The system will analyze conflicting information with other units, and provide warning messages and/or recommendations to modify a traffic plan to match the desired change.

Software Requirements

Software would be developed and furnished during system implementation. The following will be considered as a part of the system software development and implementation processes:

- Minimization of custom software development;
- Compliance with open system architecture requirements;
- Compliance with the National ITS Architecture and national standards (i.e., NTCIP);
- Provision of modular and scalable system architecture;
- Provision of adequate development standards, configuration management, and documentation.

Data collection, processing, and storage will be performed by the following hardware items:

- Field controllers;
- Central computers with redundant hard disk storage;
- A central read/write CD backup system.

5.0 Planning-Level Costs

The improvements recommended in this document include physical roadway improvements, ITS components, and traffic management improvements. Planning-level capital and operating costs for ITS components have been compiled from the ITS Cost Data Repository, administered by the United States Department of Transportation's Joint Program Office for Intelligent Transportation Systems. These represent estimated costs and are based upon national standards and Kimley-Horn experience.

5.1 Capital Costs

Table 5 provides a summary of the capital costs for the recommended improvements. The column entitled "IMPR #" references the number given to the improvement within this document for which the capital outlay is targeted. Costs for traffic signal interconnect assume hardwiring of all area traffic signals and ITS units into the Fairplex monitoring and control site.

Wireless connections will be considered within the Implementation Plan, but capacity issues inherent with wireless technology will need to be considered. Wireless connections that utilize cellular frequencies could become slowed or blocked during peak cellular phone use. When such peak use occurs, some or all of the ITS units under a wireless system could be rendered useless until communications capacity is available. Pager networks could also be utilized for communications, but such a system could only be utilized for simple remote operation (on/off functions, or switching of flip-disc signs).

5.2 Operating Costs

Compared to more traditional infrastructure improvements, ITS improvements typically incur a greater proportion of their costs as continuing operations and maintenance (O&M) costs, as opposed to up-front capital costs. Generally, these improvements also have a shorter useable lifespan than traditional improvements such as roadway widening. **Table 6** provides detail on the estimated O&M costs of the equipment that would be required to implement the recommendations in this report, assuming a 15-year lifespan of the average component.

TABLE 4: PLANNING-LEVEL CAPITAL COSTS					
ITEM	**IMPR # ***	**UNIT**	**QUANTITY**	**UNIT COST**	**TOTAL**
White Avenue Off-Ramp Improvements	RI-1	Lump Sum	-	-	$500,000
McKinley Avenue Mini Transit Center	TI-1	Lump Sum	-	-	$50,000
Lane Control Signal	ITSEMI-15 ITSEMI-16	Each	25	$3,000	$75,000
Lane Control Signal Structure		Each	7	$25,000	$175,000
Variable Message Sign, Pole Mount	ITSEMI-4 ITSEMI-5	Each	10	$45,000	$450,000
Variable Message Sign, Overhead Mount		Each	2	$200,000	$400,000
Flip-Disc Sign Pole Mount	ITSEMI-4 ITSEMI-5	Each	18	$8,000	$144,000
CCTV and Pole	ITSEMI-11 ITSEMI-13	Each	9	$20,000	$180,000
Arterial Detection	ITSEMI-10	Each	4	$8,000	$32,000
Parking Monitoring System – Video Detection Units	ITSEMI-12	Each	5	$29,000	$145,000
Traffic Signal and ITS unit Interconnect *	ITSEMI-17 ITSEMI-20	Lump Sum	-	-	$150,000
Fairplex Monitoring and Control Site	ITSEMI-9, ITSEMI-18 thru ITSEMI-21	Lump Sum	-	-	$75,000
Subtotal					**$2,376,000**
Contingency				30%	$712,800
Total					**$3,088,800**

Capital costs have been estimated from the ITS Cost Data Repository, administered by the United States Department of Transportation's Joint Program Office for ITS, as well as Kimley-Horn experience. .

** Assumes hardwire interconnect, in order to avoid peak-period capacity issues inherent with wireless connections.*

TABLE 5: PLANNING-LEVEL OPERATIONS AND MAINTANENCE (O&M) COSTS				
ITEM	**QUANTITY**	**ANNUAL O&M COST PER-UNIT**	**TOTAL ANNUAL O&M COST**	**TOTAL LIFESPAN O&M COST ***
Lane Control Signal	25	$800	$20,000	$300,000
Lane Control Signal Structure	7	$2,500	$17,500	$262,500
Variable Message Sign Pole Mount	10	$3,000	$30,000	$450,000
Variable Message Sign Overhead Mount	2	$4,000	$8,000	$120,000
Flip-Disc Sign Pole Mount	18	$2,500	$45,000	$675,000
CCTV and Pole	9	$100	$900	$13,500
Arterial Detection	4	$700	$2,800	$42,000
Parking Monitoring System – Video Detection Units	5	$400	$2,000	$30,000
Traffic Signal Interconnect	Lump Sum	-	$9,000	$135,000
Traffic Management Center	Lump Sum	-	$400,000	$6,000,000
Total			**$535,200**	**$8,028,000**

** Average lifespan of system components is assumed to be 15 years.*

Operational costs have been estimated from the ITS Cost Data Repository, administered by the United States Department of Transportation's Joint Program Office for ITS.

6.0 Next Steps

The final recommendations that will result from this document will be utilized to develop the Fairplex Event Management Implementation Plan (Deliverable 3.7.1). The final Plan will assist the Fairplex and local stakeholders in utilizing ATMS, ATIS, and ITS technologies to better manage off-site event traffic conditions and disseminate information to travelers bound for or departing the Fairplex site.

Implementation of the Fairplex Area Traffic Management Plan will address the principal needs and problems identified for the Fairplex facility, including:

- **Technical issues**: network management; communication topology; data collection; data processing; and integration of parking management systems.
- **Functional issues**: hardware compatibility (open standards vs. proprietary); utilities; design for expansion; and aesthetics.
- **Logistical issues**: policies; procedures; staffing; budget; maintenance; operations; protocol, and information overload.

The Implementation Plan will also address the coordination efforts between the Fairplex and local and regional agencies. To implement the recommendations in this report, there will be a need for Memorandums of Understanding (MOUs) to be developed between local cities and police departments that would be involved in controlling and monitoring the implemented equipment and related sub-systems. Standard Operating Procedures (SOPs) would also need to be implemented, under the guidance and approval of these local agencies.

The Implementation Plan will become a part of the larger Conceptual Design for the PVITS project. Upon completion, the Plan will be integrated with deliverables under the User Requirement and Conceptual design tasks of the PVITS project.