



Pomona Valley ITS Project

Project Deliverable 7.3.2 **Subregional TMC Analysis Report**

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TABLE OF CONTENTS

Subregional TMC Analysis Report

PROJECT DESCRIPTION.....1

1.0 BACKGROUND.....2

 1.1 PURPOSE OF REPORT2

 1.2 METHODOLOGY3

 1.3 REPORT ORGANIZATION.....3

2.0 SUBREGIONAL TMC LOCATION OPTIONS.....3

 2.1 CITY OF POMONA TRANSIT CENTER.....5

 2.2 CITY OF DIAMOND BAR9

 2.3 FAIRPLEX (IN THE CITY OF POMONA).....13

 2.4 COUNTY OF LA FUTURE TMC (IN THE CITY OF ALHAMBRA)18

3.0 EVALUATION.....22

 3.1 COST COMPARISON22

4.0 RECOMMENDATION AND SUMMARY.....24

LIST OF ACRONYMS25



LIST OF FIGURES

Figure 2.1 – Proposed Subregional TMC Locations 4

Figure 2.2 – Proposed Subregional TMC Layout at the City of Pomona 8

Figure 2.3 – Proposed Interim Subregional TMC Layout at the City of Diamond Bar 12

Figure 2.4 – Proposed Subregional TMC Layouts at Fairplex..... 17

Figure 2.5 – Potential Layout for the Phase 1 Control Room of LA County’s TMC in Alhambra 21



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 ITS Feasibility Study completed by the LACMTA in 1995. The ultimate objectives of the Project are to:

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

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



1.0 BACKGROUND

1.1 Purpose of Report

This report identifies and evaluates possible options for location of the subregional TMC for the Pomona Valley Forum. Options have been identified by the primary stakeholder agencies for the Pomona Valley. The subregional TMC is the location where the Forum's centralized traffic management components will be located. The subregional TMC will house the Information Exchange Network (IEN) corridor server for the Pomona Valley forum that allows all of the individual agencies in the subregion to connect to the county-wide communication network for sharing of data within and outside of the Forum.

The subregional TMC is the location where the subregional system monitoring, and subregional sharing of information will take place. If it is located in a city, local management and local system access will also take place there. The subregional TMC may also serve subregional traffic management and control roles in the future. For example, in the future, during a major event outside of operating hours for an LCC, the subregional TMC may have the ability to implement pre-agreed-upon timing plan changes to signals in the subregion that are not necessarily in that city's jurisdiction. While this function will not be implemented initially, it may be implemented in the future upon approval by each individual member agency.

The IEN server for the Pomona Valley will allow the various agencies within the Pomona Valley to share information and potentially share control of devices within the subregion, as well as share information (monitoring) with agencies and stakeholders in other areas of LA County. This server is a part of a county-wide network that was defined and designed as a part of the San Gabriel Valley Forum Pilot Project. The purpose of the network is to provide a standard means of communicating among different agencies' signal systems within LA County. Each Forum, or subregion, of LA County will have its own IEN server that will enable the communication to occur within that Forum and from that Forum to other Forums/ agencies within the County. The IEN supports second-by-second data sharing for intersection data.

It is estimated that 700 - 1000 square feet will be necessary for the subregional TMC. This space should include:

- Control Room (3 – 5 operator workstations in the ultimate build-out);
- Video Wall (including ample room for maintenance access);
- Equipment and communication room (for storage of several racks for servers described above and with access to external communication feeds from the field); and
- The space should also accommodate or provide access to a conference room, break room and rest rooms (these could be provided by an adjacent facility and not compete for space within the square footage recommended). Space is not considered to be needed for staff offices since no new staff is proposed for the subregional TMC.

It is recommended that the subregional TMC be staffed during peak periods at a minimum if possible. If not regularly staffed, the TMC should be easily accessible by traffic engineering staff throughout the day to utilize the tools provided for signal maintenance and traffic management.



1.2 Methodology

Following the completion of the subregional TMC requirements (Deliverable 5.3.2 Subregional TMC Report), individual meetings were held with several of the agencies/stakeholders to discuss options (including spatial availability) for the subregional TMC. Each option was evaluated against a set of basic criteria to develop a final recommendation for the subregional TMC location. A sample conceptual sketch of the subregional TMC that would fit in the recommended location has also been included.

1.3 Report Organization

The information in this report is presented in the following sections:

- Section 1.0 – Introduction
- Section 2.0 – Subregional TMC Location Options
- Section 3.0 – Evaluation
- Section 4.0 – Recommendation

2.0 SUBREGIONAL TMC LOCATION OPTIONS

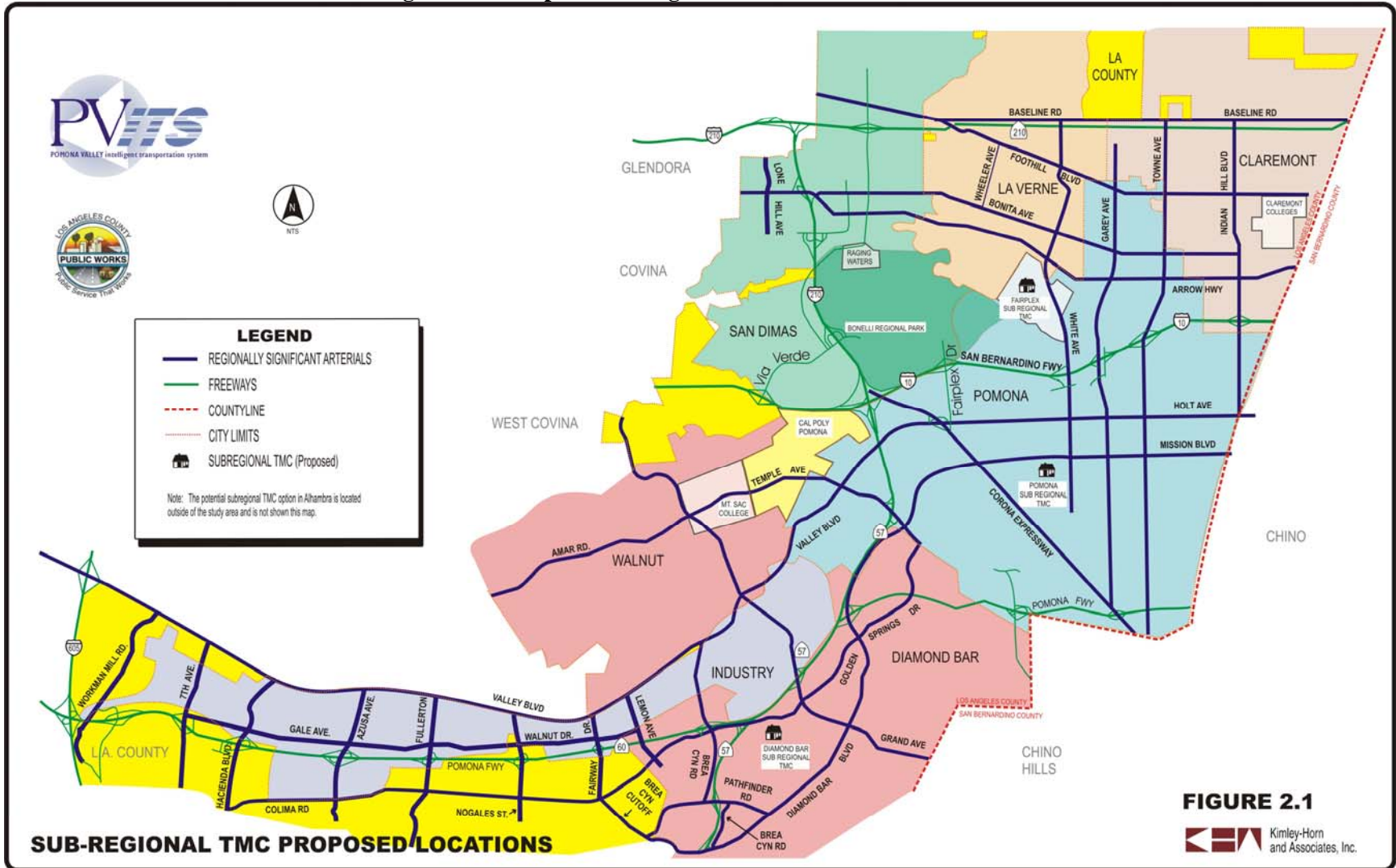
Four locations, listed below, have been selected as possible locations for the subregional TMC. One location (the County of LA TMC) is located outside of the Forum area. The remaining three locations are indicated in **Figure 2.1**.

- City of Pomona Transit Center;
- City of Diamond Bar City Hall (AQMD Building);
- Fairplex; and
- LA County Department of Public Works (Alhambra).

These locations are each evaluated in terms of the requirements for the subregional TMC in the following sections.



Figure 2.1 – Proposed Subregional TMC Locations





2.1 City of Pomona Transit Center

The City of Pomona is planning to develop an LCC at the City Transit Center located at 1460 East Holt Avenue and has indicated this facility should be considered as one of the proposed locations for the subregional TMC. The Transit Center is a facility that provides both bus (Foothill Transit) and rail (Metrolink) access and is located in the eastern part of the Pomona Valley ITS project area.

Proximity to Other Jurisdictions

There are no existing TMCs or LCCs within the Pomona Valley subregion. The City of Pomona has a traffic signal system that is not in operation that currently resides at City Hall. The City has stated that the City Hall is not an option for the location of the subregional TMC (or the City's LCC that is discussed in Deliverable 7.5.2). This project outlines plans for LCCs at each member agency. A subregional TMC located in Pomona at the Transit Center would be centrally located within the subregion to the partner agencies. This central location could prove to reduce the lease cost of communications to link each of the agencies with the subregional TMC (versus a subregional TMC located outside of the subregion). A preliminary communications cost estimate, however, determined that the cost savings of having a centrally located subregional TMC versus a subregional TMC in Alhambra, would be minimal.

Available space

A single office space of approximately 200 square feet, as indicated in **Figure 2.2**, is available at the Transit Center which is not sufficient for the subregional TMC (required size, as stated previously, is approximately 700 - 1000 square feet). The Alameda Corridor East Construction Authority (ACE) has already placed equipment in this TMC space for testing of a grade crossing project. The City of Pomona will operate this equipment; no ACE staff will be present in the TMC. The facility also contains a second floor that has approximately 86 square feet available for placing traffic-related equipment. The City of Pomona Police Department currently occupies approximately 1500 square feet of office space at the Transit Center, however they are seeking another place to locate these offices. If they relocate from this space, this area would be adequate to develop a subregional TMC, including a conference room. The funding has not yet been secured for this transition. The estimated timeframe for the potential relocation is five (5) years.

Adherence to Functional Requirements

The following list summarizes the results of an evaluation of the City of Pomona Transit Center in terms of the functional requirements previously developed for a subregional TMC.



Requirement		Analysis Results
Spatial requirements	700-1000 s.f. (total)	<ul style="list-style-type: none"> ▪ Insufficient space for control room ▪ Space available only in the future if Pomona Police Dept. staff relocate ▪ Suitable area for equipment room upstairs
Line of sight for operators	Ample space to install a small (67") video display wall and adequate line of sight for operators (no obstructions)	Line of sight to the video wall would be adequate for one operator workstation arranged facing a front projection system (there is not enough space to install a rear projection or cube technology video wall)
Adequate workstations according to industry standards	3-5 operator workstations in control room (at least 2 workstations in interim)	Only one operator workstation can be accommodated in the identified room.
Adequate size to accommodate computer system and related equipment	Space needed for 2 -3 standard 19" equipment racks	There is ample space upstairs for any necessary equipment and communications
Security and protection from unauthorized access	Ability to secure control room and equipment from unauthorized access if desired	Both the equipment areas upstairs and the currently identified space could be secured. The equipment areas upstairs would require improvements in order to secure (a wall and lockable door would need to be built).
Access to allow equipment to be moved	Some access issues include building access, door width, elevator if necessary	The currently identified space is on the ground floor and has direct access to the outside. Equipment to be moved into the equipment room upstairs would have to be carried up the stairs (there is no elevator access to this space).
ADA requirements	ADA requirements need to be met	Not ADA compliant. The space identified for the control room is ADA compliant. Access to the equipment room upstairs is only via stairs – there is no elevator access.
Conference facility	Conference room can be dedicated or shared; should fit 4 or more people for occasional use	There is a conference room in the building (in the Police Department space) that the TMC could share.
Future expansion possibilities	If an interim TMC is established, it needs to be expandable to accommodate the build-out in the future. It is also ideal to have future expansion capabilities beyond build-out.	The currently identified space is not expandable. If the Police Department relocates, there would be room to expand the facility into existing space.
Upgrading of power supply	Adequate power is necessary for the video wall and equipment. Most facilities can accommodate equipment with minor modifications	The electrical service to the space can be upgraded to accommodate the additional power requirements of the video wall, and computer equipment.
Upgrading of lighting	Control rooms are best served by dimmable, incandescent lighting.	The lighting in the space currently identified for the control room can be changed to incandescent, dimmable lighting that would serve the control room setting. Task lighting can be supplied at the workstations.
Heating, ventilation, air conditioning (HVAC) and fire suppression systems	HVAC should especially address necessary cooling for added computer equipment. Fire suppression should consider both staff and equipment.	The HVAC and fire suppression in place in the current space is adequate to accommodate new equipment. If equipment is located in currently unused space upstairs, HVAC and fire suppression will need to be designed (not existing).



Expandability

The currently identified space is not expandable. If the Police Department relocates, there would be room to expand the facility into existing space.

Construction, Modifications, and Leasing

No major construction would be possible. The currently available space is not adequate for a subregional TMC. The existing space could possibly be used as an interim TMC, though it is recommended that an interim TMC include two workstations, and the current space is only large enough to accommodate one. Also, as an interim TMC, direct access by existing staff is critical to the use and success of the tools available for traffic operations and maintenance at the TMC. It is not currently planned to have the Pomona Transit Center staffed on a regular basis or during peak periods.

The existing space would need slight modifications and remodeling for the equipment room upstairs. If the equipment for the subregional TMC is to be housed here, the equipment room would require a wall and door to be built and air-conditioning and fire suppression to be installed.

Since the building is already owned by the City of Pomona, there would not be any lease costs to utilize this space.

Recommended Equipment

The Pomona Valley subregional TMC is proposed to house the Pomona Valley IEN server, the subregional ATIS server, 3 – 5 operator workstation consoles (each accommodating an integrated ATMS/IEN workstation) and a small dedicated video wall (projection) for CCTV monitoring. Limited space will allow only for a projection display and not a projection cube. Two new 19-inch racks would be placed in the equipment room upstairs to contain traffic signal and CCTV camera controller and communication equipment.

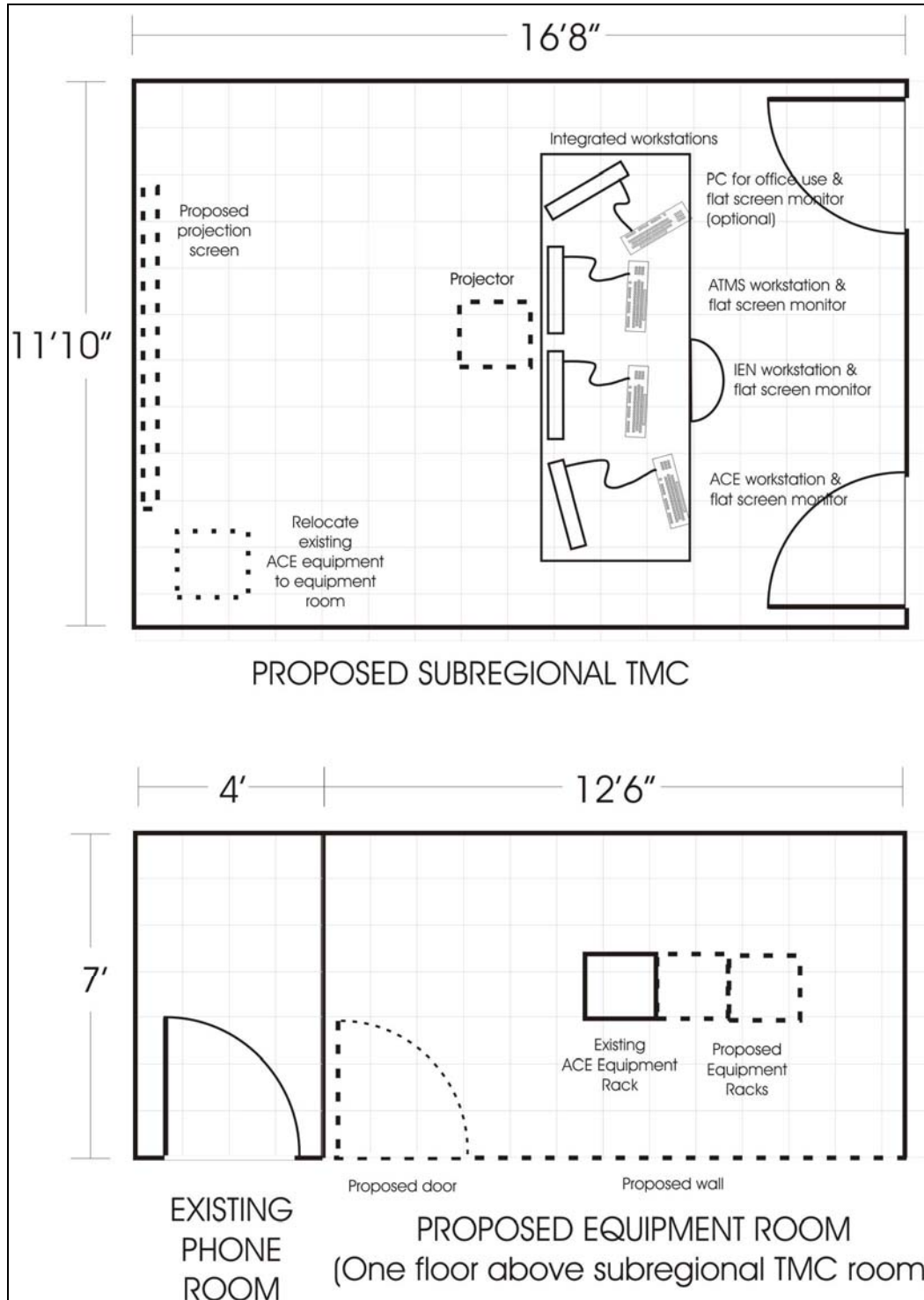
Operations and Management (O&M)

O&M will be addressed in detail in Deliverable 10.1 – O&M Plan Report. It is recommended that the subregional TMC be staffed during peak periods if possible. Staffing would consist of three - five operators or traffic engineering staff to monitor and manage traffic and signal operations from the subregional TMC. It is possible that an interim Subregional TMC could consist of one to two regular operators during peak periods. Space should be provided in the control room for a minimum of two workstations. If not regularly staffed, the TMC should be easily accessible by traffic engineering staff throughout the day to utilize the tools provided for signal maintenance and traffic management. The City of Pomona does not intend to staff the LCC (and hence, the subregional TMC) on a regular basis. The traffic engineering staff offices are located at the City Hall, which is not directly accessible from the proposed subregional TMC location (it is located down the street at a different address).

Figure 2.2 depicts a potential layout of the space if the subregional TMC were to be located at the City of Pomona Transit Center.



Figure 2.2 – Proposed Subregional TMC Layout at the City of Pomona





2.2 City of Diamond Bar

The City of Diamond Bar City Hall is located at 21825 East Copley Drive in the Air Quality Management District (AQMD) building. The City recently entered into a ten-year lease (with an option to purchase the space) with AQMD. Additional space is available in the AQMD building directly adjacent to the City Hall. The new space could be added to the City's current lease agreement or a separate agreement could be signed to lease this additional space.

Proximity to Other Jurisdictions

There are no existing TMCs or LCCs within the Pomona Valley subregion. The City of Pomona has a traffic signal system that is not in operation that currently resides at City Hall. The City has stated that the City Hall is not an option for the location of the subregional TMC (or the City's LCC that is discussed in Deliverable 7.5.2). This project outlines plans for LCCs at each member agency. A subregional TMC located in Diamond Bar would be centrally located within the subregion to the partner agencies. This central location could prove to reduce the lease cost of communications to link each of the agencies with the subregional TMC (versus a subregional TMC located outside of the subregion). A preliminary cost estimate, however, determined that the cost savings of having a centrally located subregional TMC versus a subregional TMC in Alhambra, would be minimal. It was estimated that locating the subregional TMC outside of the study area (in Alhambra) would add approximately \$ 0.1 million to the estimated \$16.2 million life cycle (ten year) cost of leasing the communications for the project.

Available Space

The room available for the proposed subregional TMC site is adjacent to the City Hall space. While it was originally suggested by AQMD that the space could be portioned to provide 700-1000 square feet as desired, it is now the direction of AQMD that no less than 1500 square feet can be leased. The City of Diamond bar may consider taking on the lease of the additional space required by the lease but not needed by the TMC. Space is also available within the existing City Hall that could accommodate an interim TMC with two operator workstations. This space is adjacent to the existing City Hall communication and equipment room. **Figure 2.3** depicts a sample layout of a potential interim subregional TMC in the current office space.

Adherence to Functional Requirements

The following list summarizes the results of an evaluation of the Diamond Bar AQMD in terms of the functional requirements previously developed for a subregional TMC.



Requirement		Analysis Results
Spatial requirements	700-1000 s.f. (total)	Space is adequate for the subregional TMC (1500 square feet can be leased from the AQMD); space is currently available within the City Hall for an interim TMC with 2 workstations (with no associated Lease cost)
Line of sight for operators	Ample space to install a small (67") video display wall and adequate line of sight for operators (no obstructions)	Space is adequate: line of sight to the video wall would be adequate in the new space, and in the identified potential interim space. A small, dedicated video wall can be built into the wall separating the potential interim space from the equipment room, which would make cabling and connections easy to establish and maintain.
Adequate workstations according to industry standards	3-5 operator workstations in control room (at least 2 workstations in interim)	Space is adequate in both identified locations.
Adequate size to accommodate computer system and related equipment	Space needed for 2 -3 standard 19" equipment racks	Space is adequate: There is ample space in the existing equipment room for any necessary equipment and communications
Security and protection from unauthorized access	Ability to secure control room and equipment from unauthorized access if desired	Space is securable: the potential new space, the potential interim space and the existing equipment room are all securable by locking doors.
Access to allow equipment to be moved	Some access issues include building access, door width, elevator if necessary	All currently identified space is on the ground floor.
ADA requirements	ADA requirements need to be met	The building was constructed in 1996, and so is ADA compliant
Conference facility	Conference room can be dedicated or shared; should fit 4 or more people for occasional use	There is a conference room in the existing City Hall that the TMC could share.
Future expansion possibilities	If an interim TMC is established, it needs to be expandable to accommodate the build-out in the future. It is also ideal to have future expansion capabilities beyond build-out.	There is currently ample room for expansion in the AQMD building adjacent to the City Hall and in other locations on the property.
Upgrading of power supply	Adequate power is necessary for the video wall and equipment. Most facilities can accommodate equipment with minor modifications	The electrical service to the space can be upgraded to accommodate the additional power requirements of the video wall and computer equipment.
Upgrading of lighting	Control rooms are best served by dimmable, incandescent lighting.	The lighting can be designed to meet the needs of the TMC.
Heating, ventilation, air conditioning (HVAC) and fire suppression systems	HVAC should especially address necessary cooling for added computer equipment. Fire suppression should take into account both staff and equipment.	The HVAC and fire suppression in place in the current space is adequate to accommodate new equipment.



Expandability

There is currently ample room for expansion in the AQMD building adjacent to the City Hall and in other locations on the property.

Construction, Modifications, and Leasing

Modifications to develop the interim subregional TMC at the City of Diamond Bar would be minor. Modifications would relate primarily to the installation of the equipment racks in the available space in the IS/communications room and purchase and installation of associated equipment (including the video wall) and furniture in the TMC. This space is already being leased by the City of Diamond Bar and would not require additional lease costs.

AQMD would require the Forum to lease 1500 square feet in order to acquire the use of new space adjacent to the Diamond bar City hall. Lease costs are estimated at \$2 per square foot, equating to an estimated \$36,000 per year. The City of Diamond Bar may consider taking some of the excess space for different use. This space would require full construction/ modification of a new TMC (within an existing building), including such items as cabling and potential electrical service upgrade. The required construction would be similar in magnitude (and cost) to development of a subregional TMC at the Fairplex in Pomona.

Recommended Equipment

The Pomona Valley subregional TMC is proposed to house the Pomona Valley IEN server, the subregional ATIS server, three – five operator workstation consoles (each accommodating an integrated ATMS/IEN workstation) and a small dedicated video wall (67” Digital Light Processing™ [DLP™]) for CCTV monitoring. Two new 19-inch racks would be placed in the subregional TMC to contain traffic signal and CCTV camera controller and communication equipment.

O&M

O&M will be addressed in detail in Deliverable 10.1 – O&M Plan Report. It is recommended that the subregional TMC be staffed during peak periods if possible. Staffing would consist of three - five operators or traffic engineering staff to monitor and manage traffic and signal operations from the subregional TMC. It is possible that an interim Subregional TMC could consist of one to two regular operators during peak periods. Space should be provided in the control room for a minimum of two workstations. If not regularly staffed, the TMC should be easily accessible by traffic engineering staff throughout the day to utilize the tools provided for signal maintenance and traffic management. The City of Diamond Bar’s engineering staff is located at the City Hall, in immediate proximity to the proposed interim and build-out subregional TMC locations.



2.3 Fairplex (in the City of Pomona)

Fairplex is located at 1101 W. McKinley Avenue in the City of Pomona.

Proximity to Other Jurisdictions

There are no existing TMCs or LCCs within the Pomona Valley subregion. The City of Pomona has a traffic signal system that is not in operation that currently resides at City Hall. The City has stated that the City Hall is not an option for the location of the subregional TMC (or the City's LCC that is discussed in Deliverable 7.5.2). This project outlines plans for LCCs at each member agency. A subregional TMC located in Diamond Bar would be centrally located within the subregion to the partner agencies. This central location could prove to reduce the lease cost of communications to link each of the agencies with the subregional TMC (versus a subregional TMC located outside of the subregion). A preliminary cost estimate, however, determined that the cost savings of having a centrally located subregional TMC versus a subregional TMC in Alhambra, would be negligible. It was estimated that locating the subregional TMC outside of the study area (in Alhambra) would add approximately \$ 0.1 million to the estimated \$16.2 million life cycle (ten year) cost of leasing the communications for the project.

Available Space

Approximately 1,900 square feet of office space is available in the main grand stand on the second floor. The space is currently vacant. The Fairplex property is owned by LA County. Use of space at this location would be free of lease costs. **Figure 2.4** indicates two possible layouts for the subregional TMC located at Fairplex. Access to the space would be via a staircase from the parking area to the east of the grand stand south just off the First Aid offices. The access door to the staircase and the office space would have to be remodeled to the final design specifications of the subregional TMC.

Adherence to Functional Requirements

The following list summarizes the results of an evaluation of the Fairplex in terms of the functional requirements previously developed for a subregional TMC.



Requirement		Analysis Results
Spatial requirements	700-1000 s.f. (total)	Space is adequate for the subregional TMC (1900 square feet currently available)
Line of sight for operators	Ample space to install a small (67") video display wall and adequate line of sight for operators (no obstructions)	Space is adequate
Adequate workstations according to industry standards	3-5 operator workstations in control room (at least 2 workstations in interim)	Space is adequate to accommodate new workstations
Adequate size to accommodate computer system and related equipment	Space needed for 2 -3 standard 19" equipment racks	Space is adequate
Security and protection from unauthorized access	Ability to secure control room and equipment from unauthorized access if desired	Space is securable: the proposed TMC can be designed with security and protection from unauthorized access.
Access to allow equipment to be moved	Some access issues include building access, door width, elevator if necessary	The building is on the second floor and there is no elevator to provide access.
ADA requirements	ADA requirements need to be met	The building is on the second floor and there is no elevator to provide access.
Conference facility	Conference room can be dedicated or shared; should fit 4 or more people for occasional use	There is adequate space to include a conference room.
Future expansion possibilities	If an interim TMC is established, it needs to be expandable to accommodate the build-out in the future. It is also ideal to have future expansion capabilities beyond build-out.	There is not currently additional space, however, the requirement is for 700 – 1000 square feet, and 1900 square feet is currently available. Therefore, there is ample room for expansion within this available space.
Upgrading of power supply	Adequate power is necessary for the video wall and equipment. Most facilities can accommodate equipment with minor modifications	The electrical service to the space can be upgraded to accommodate the additional power requirements of the video wall and computer equipment.
Upgrading of lighting	Control rooms are best served by dimmable, incandescent lighting.	The lighting can be designed to meet the needs of the TMC.
Heating, ventilation, air conditioning (HVAC) and fire suppression systems	HVAC should especially address necessary cooling for added computer equipment. Fire suppression should take into account both staff and equipment.	The HVAC and fire suppression in place in the current space is adequate to accommodate new equipment.



Expandability

There is sufficient space for expanding the TMC (1,900 square feet is provided).

Construction, Modifications, and Leasing

Locating the subregional TMC at the Fairplex, would require full construction/ modification of a new TMC (within an existing building), including such items as cabling and potential electrical service upgrade. The required construction would be similar in magnitude (and cost) to development of a subregional TMC at the City of Diamond Bar AQMD.

Recommended Equipment

The Pomona Valley subregional TMC is proposed to house the Pomona Valley IEN server, the subregional ATIS server, 3 – 5 operator workstation consoles (each accommodating an integrated ATMS/IEN workstation) and a small dedicated video wall (67” DLP) for CCTV monitoring. Two new 19-inch racks would be placed in the subregional TMC to contain traffic signal and CCTV camera controller and communication equipment.

O&M

O&M will be addressed in detail in Deliverable 10.1 – O&M Plan Report. It is recommended that the subregional TMC be staffed during peak periods if possible. Staffing would consist of three - five operators or traffic engineering staff to monitor and manage traffic and signal operations from the subregional TMC. It is possible that an interim Subregional TMC could consist of one to two regular operators during peak periods. Space should be provided in the control room for a minimum of two workstations. If not regularly staffed, the TMC should be easily accessible by traffic engineering staff throughout the day to utilize the tools provided for signal maintenance and traffic management. Location of the subregional TMC at the Fairplex would require operations staff to be dedicated to the TMC as the location is not directly accessible or in close proximity to local traffic engineering staff. This inaccessibility of this site is the primary reason for not recommending the Fairplex as the site for the subregional TMC.

Vacant Office Space at Fairplex





Eastern View of Fairplex Grand Stand Offices

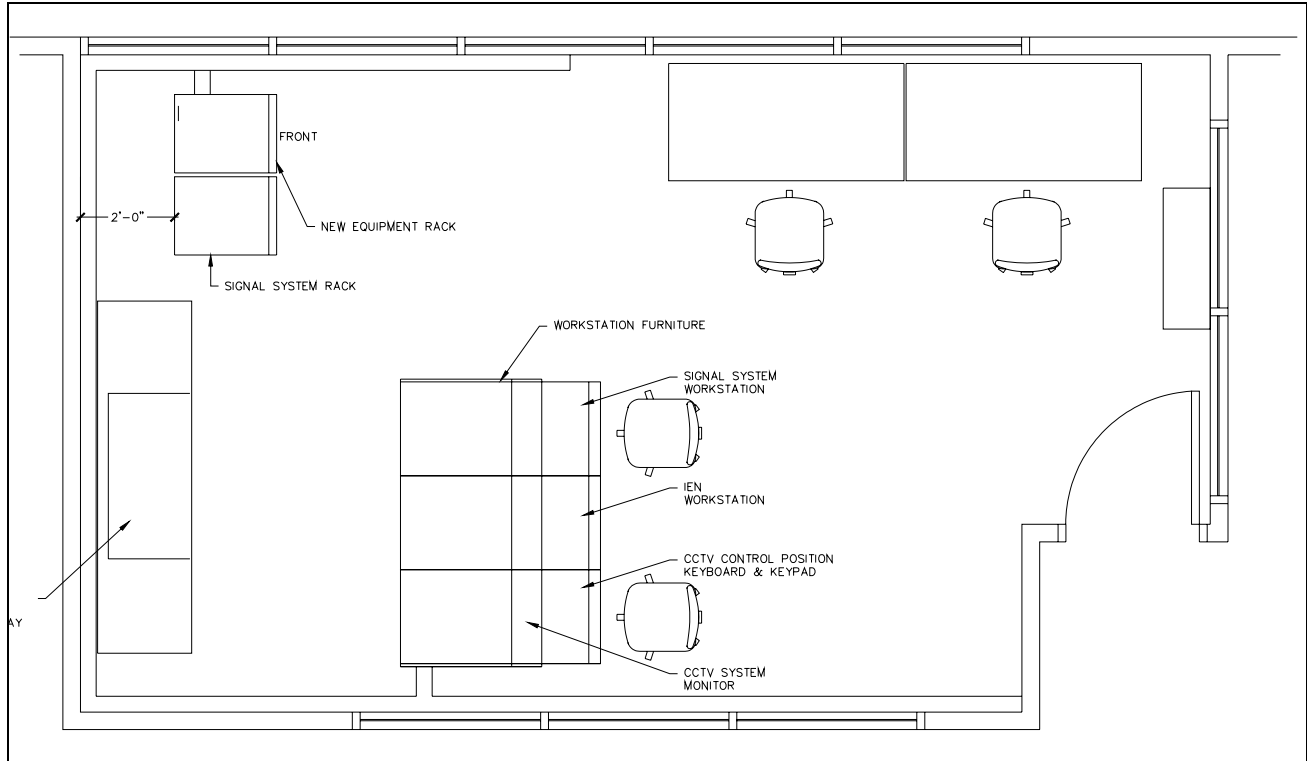


The following conceptual layouts could be used for the Fairplex alternative and would have to be customized to fit into the available space.

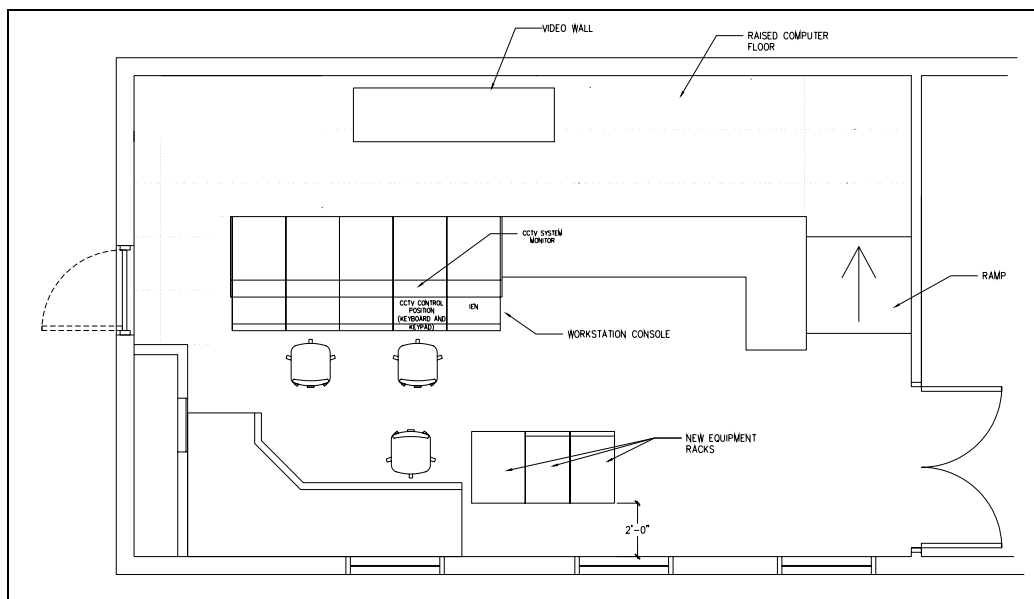


Figure 2.4 – Proposed Subregional TMC Layouts at Fairplex

Alternative 1



Alternative 2





2.4 County of LA Future TMC (in the City of Alhambra)

LA County Department of Public Works is currently finalizing the plans for an approximately 8,000 square foot facility in an existing County building in Alhambra, which is approximately 20 miles from the Pomona Valley Forum.

Proximity to Other Jurisdictions

A subregional TMC located in Alhambra would be approximately 20 miles from the subregion. This location could prove to increase the lease cost of communications to link each of the agencies with the subregional TMC (versus a subregional TMC located centrally within the subregion). A preliminary cost estimate, however, determined that the cost savings of having a centrally located subregional TMC versus a subregional TMC in Alhambra, would be minimal. It was estimated that locating the subregional TMC outside of the study area (in Alhambra) would add approximately \$ 0.1 million to the estimated \$16.2 million life cycle (ten year) cost of leasing the communications for the project.

Available Space

Figure 2.5 shows a draft sample of a potential layout for LA County’s TMC in Alhambra that is currently in the design stage. The figure was developed to depict potential layouts of operator workstations in relation to the video wall labeled as “display wall location.” The figure depicts only the control room portion of the TMC (which represents approximately 2,000 of the 8,000 square foot facility).

The LA County DPW TMC is being designed for fifteen workstations. The data center, where the servers and related equipment will be located, would be able to accommodate the additional equipment necessary to establish the Pomona Valley subregional TMC at the Alhambra location.

Adherence to Functional Requirements

The following list summarizes the results of an evaluation of the County of Los Angeles DPW TMC in terms of the functional requirements previously developed for a subregional TMC.



Requirement		Analysis Results
Spatial requirements	700-1000 s.f. (total)	Space is adequate for the subregional TMC within the current plans of LA County DPW
Line of sight for operators	Ample space to install a small (67") video display wall and adequate line of sight for operators (no obstructions)	Space is adequate within the current design.
Adequate workstations according to industry standards	3-5 operator workstations in control room (at least 2 workstations in interim)	Space is adequate within the current design.
Adequate size to accommodate computer system and related equipment	Space needed for 2 -3 standard 19" equipment racks	Space is adequate within the current design.
Security and protection from unauthorized access	Ability to secure control room and equipment from unauthorized access if desired	The current design will secure the TMC at the entrance.
Access to allow equipment to be moved	Some access issues include building access, door width, elevator if necessary	All space is on the first floor and access has been taken into consideration in the design.
ADA requirements	ADA requirements need to be met	The TMC is being designed within ADA guidelines.
Conference facility	Conference room can be dedicated or shared; should fit 4 or more people for occasional use	A conference room is being designed in the current plans.
Future expansion possibilities	If an interim TMC is established, it needs to be expandable to accommodate the build-out in the future. It is also ideal to have future expansion capabilities beyond build-out.	The TMC design has taken into account potential future growth (by accommodating 15 operator workstations, where initially six are estimated to be used for operations). There is adequate space in the data center for additional equipment in the future.
Upgrading of power supply	Adequate power is necessary for the video wall and equipment. Most facilities can accommodate equipment with minor modifications	Designed in the current plans.
Upgrading of lighting	Control rooms are best served by dimmable, incandescent lighting.	Designed in the current plans.
Heating, ventilation, air conditioning (HVAC) and fire suppressions systems	HVAC should especially address necessary cooling for added computer equipment. Fire suppression should take into account both staff and equipment.	Adequate HVAC and fire suppression are being designed into the current plans.



Expandability and Flexibility

The TMC design has taken into account potential future growth (by accommodating 15 operator workstations, where initially six are estimated to be used for operations).

Construction, Modifications, and Leases

No additional modifications or space would be necessary to add the functionality of acting as the Pomona Valley subregional TMC to the other plans of LA County DPW at their Alhambra facility.

Recommended Equipment

The Pomona Valley subregional TMC is proposed to house the Pomona Valley IEN server, the subregional ATIS server, 3 – 5 operator workstation consoles (each accommodating an integrated ATMS/IEN workstation) and a small dedicated video wall (67” DLP) for CCTV monitoring. Two new 19-inch racks would be placed in the equipment room upstairs to contain traffic signal and CCTV camera controller and communication equipment.

O&M

O&M will be addressed in detail in Deliverable 10.1 – O&M Plan Report. It is recommended that the subregional TMC be staffed during peak periods if possible. Staffing would consist of three - five operators or traffic engineering staff to monitor and manage traffic and signal operations from the subregional TMC. LA County plans to staff the TMC during initially business hours. The additional responsibilities associated with acting as the subregional TMC for the Pomona Valley subregion may require additional staffing. The additional staffing would likely be less expensive than establishment of the TMC at a location where no staff exists (such as at the Fairplex or at the Pomona Transit Center).



Figure 2.5 – Potential Layout for the Phase 1 Control Room of LA County’s TMC in Alhambra





3.0 EVALUATION

While each of the previous sections outlines a number of important criteria that were evaluated for each of the four TMC location options, the critical criteria are availability of space and accessibility to staff. The following table summarizes the evaluation in terms of the previously presented criteria.

Table 3.1 Evaluation of the Subregional TMC Locations

Generic Requirement Item	Location			
	Pomona	Diamond Bar	Fairplex	Alhambra
Proximity to Other Jurisdictions	Within PVITS area	Within PVITS area	Within PVITS area	Outside PVITS area
Available Space	Inadequate	Adequate	Adequate	Existing TMC can accommodate functionality of PV subregional TMC
Equipment, office and conference room space	No office space, available conference room for shared use, equipment room space available	Would share City offices, conference room, space available in existing equipment room	Space available for offices, conference room, and equipment room	All included in current plans
Expandability	Must stay within existing building; may be future space available if police dept. relocates	Expandable within existing building	Expandable within existing building	Expandability designed into current plans (within existing building)
Construction, modifications, and leasing	Remodeling costs only; no lease costs	Lease and remodeling costs	Remodeling costs only; no lease costs	None (all accommodated in current plans)
O&M (staffing and accessibility for staff)	Not directly accessible (traffic engineering and maintenance staff are down the street at City Hall); City does not plan to staff	Direct accessibility by existing staff; City willing to consider staffing during peak periods	Not directly accessible	TMC will be staffed during business hours

3.1 Cost Comparison

Development of a subregional TMC at Diamond Bar, Pomona, or Fairplex would require modification of a new TMC in existing space. The LA County DWP TMC in Alhambra will be existing (or under construction) at the time that this Forum’s TMC gets implemented.

The Pomona Transit Center site is not adequate in size to accommodate the Pomona Valley subregional TMC. The required construction at Diamond Bar and Fairplex would be similar in magnitude (and cost). The Fairplex site may be slightly higher in order to accommodate minimal staff space (cubicles) and conference room and to bring the space up to ADA requirements. No



incremental capital or construction costs would be incurred in order to establish the Pomona Valley Forum subregional TMC at the LA County DPW TMC.

1500 square feet of space would need to be leased at the Diamond Bar location at approximately \$2 per square foot for the build-out subregional TMC (an interim TMC would fit well within existing space, requiring no additional lease costs). Discussions were held between LA County and AQMD as a part of this analysis to discuss options for potentially reduced rent as a contribution by AQMD towards the improvement of air quality as a result of the implementation of the Pomona Valley ITS program. There is not currently a potential to reduce the lease cost further as a result of those discussions. The City of Diamond Bar may consider taking on some of the excess lease (only 700 - 1000 square feet is required to establish the TMC) for other uses. The Pomona, Fairplex and LA County (Alhambra) locations would not have lease costs associated with them.

Construction Item	Cost Comparison			
	Pomona	Diamond Bar	Fairplex	Alhambra
Facility lease	\$ 0	\$36,000 build-out; \$0 interim	\$ 0	\$ 0
Construction of TMC suite/equipment room in existing space	N/A (space not adequate)	\$ 100,000	\$ 100,000	\$ 0 (existing)
Communications lease cost (over ten years)	\$ 16.2 M	\$ 16.2 M	\$ 16.2 M	\$ 16.3 M
Operator workstation consoles (four)	N/A (space not adequate)	\$ 40,000	\$ 40,000	\$ 0 (existing)
Video wall (approximately 67")	Projection \$ 60,000	DLP \$ 70,000	DLP \$ 70,000	Existing (DLP) \$ 0



4.0 RECOMMENDATION AND SUMMARY

A brief summary of the critical criteria related to each site is as follows:

- Pomona Transit Center – Currently identified space is insufficient; space is not directly accessible by traffic engineering and maintenance staff; Pomona does not plan to staff
- Diamond Bar – Space is adequate; ideal interim space identified within currently leased space; directly accessible by traffic engineering and maintenance staff; Lease costs estimated at \$36,000 per year; the City of Diamond Bar would consider staffing the TMC during peak periods.
- Fairplex (Pomona) – Space is adequate; second floor location is not ADA compliant and inaccessible for equipment delivery; not staffed and not directly accessible by any local City’s traffic engineering or maintenance staff.
- LA County DPW (Alhambra) – Existing space/design is adequate; costs would be negligible, due to the accommodation in the current design plans of additional operator and equipment space; LA County plans to staff during business hours, additional responsibility of subregional TMC for Pomona Valley could possibly be covered by currently planned operators, if not, the incremental cost would be smaller than hiring dedicated operations staff; not within or in close proximity to the subregion.

It is recommended that a subregional TMC be established for the Pomona Valley Forum in the City of Diamond Bar. Initially, an interim site can be established in the existing space adjacent to the equipment room, with two workstations. A larger TMC can be designed for the future with four workstations; potentially an expanded video wall, and access to the City of Diamond Bar City Hall for use of conference room, break room and other facilities.

If funding is unavailable or the City of Diamond Bar is not able to participate at the required level for a TMC to be successfully operated (sharing common staff areas, commitment to staffing during peak periods, access by traffic engineering staff), the second option is to establish the TMC at the LA County DPW TMC, due to the cost savings of this location.



LIST OF ACRONYMS

ACE	Alameda Corridor East Construction Authority
ATIS	Advanced Traveler Information System
ATMS	Advanced Traffic Management System
Caltrans	California Department of Transportation
CAMS/IEN	Los Angeles County Countywide Arterial Management System/Information Exchange Network
CCTV	Closed Circuit Television
DMS	Dynamic Message Sign
ITS	Intelligent Transportation System
LA	Los Angeles
LACDPW	Los Angeles County Department of Public Works
LACMTA	Los Angeles County Metropolitan Transportation Authority
MOU	Memorandum Of Understanding
NTCIP	National Transportation Communications for ITS Protocol
O&M	Operations and Maintenance
PC	Personal Computer
PTZ	Pan, Tilt and Zoom
PVITS	Pomona Valley Intelligent Transportation System
TMC	Traffic Management Center
TOD	Time-of-Day
UFR	User Functional Requirements
UIR	User Interjurisdictional Requirements
UOR	User Operational Requirements
USR	User Supplementary Requirements
WWV	National Institute of Standards and Technology Time & Frequency shortwave radio station that broadcast accurate real time
XML	Extensible Mark-up Language