

Transportation Systems Management and Operations



Transportation Systems Management and Operations is a useful tool for analyzing regional transportation as an interconnected set of services and systems to effectively improve system performance and improved mobility through better management and use of the transportation network.

Some elements of M&O that are currently being deployed by member agencies within the MPO include:

- ▶ Intelligent Transportation Systems (ITS)
- ▶ Traffic Management Centers, local and joint use
- ▶ Coordinated Signal Deployments for transit and general purpose auto
- ▶ Arterial Management Systems
- ▶ Incident Detection and Response
- ▶ Traveler Information Dissemination
- ▶ Courtesy patrols
- ▶ Incident Management
- ▶ Special Event Traffic Management
- ▶ Roadway Access Control
- ▶ Managed Lanes/HOV

Successful implementation of M&O strategies requires close coordination among the member agencies having ownership responsibilities on the transportation system. The MPO has a role in supporting the development and deployment of these systems by providing the forum for interagency project planning and development, as well as through prioritized project programming through the coordinating efforts of the TIP and MTP.



A. Intelligent Transportation Systems (ITS)

The 2030 MTP continues to explore new and innovative strategies to increase the efficiency of the transportation system. Included in those strategies is the promotion and deployment of Intelligent Transportation Systems (ITS). A major purpose of ITS is to enhance and coordinate the collection and dissemination of roadway and traveler information such as congestion levels, travel times, incident reporting, weather, etc., among agencies and private entities and to promote the sharing and dissemination of this information to the traveling public. This increased knowledge of roadway conditions for the users of the system has proven to reduce travel delays, increase safety on the roadway, and to promote the use of multi-modes of travel.

In order to promote ITS development within the AMPA, the ITS Subcommittee has been established within the MPO committee structure with representation from MRCOG member agencies. Examples of ITS deployments include:

- ▶ Freeway and arterial management systems that employ coordinated signals, real time video monitoring of roadway conditions and incidents, and other roadway conditions
- ▶ Driver information systems that provide real time traveler information on congestion, crashes, and other roadway conditions made available through roadside dynamic message signs, internet, and the media
- ▶ Joint use traffic operations centers that allow agencies to monitor roadway conditions and interagency communication and coordination

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- ▶ Signal preemption and automatic vehicle location to facilitate swifter transit operations and transit schedule and arrival information
- ▶ Improved incident detection and response for emergency and safety crews

Every agency within the AMPA that owns or maintains significant elements of the roadway and transportation infrastructure is developing and/or deploying ITS. At the time of the previous MTP document, the AMPA had yet to develop a plan for ITS deployment. Since then, however, the region's ITS Deployment and Implementation Plan has been completed by the Mid-Region Council of Governments and approved by the Metropolitan Transportation Board (MTB) in June, 2004 (R-04-18).

This plan presents corridor-specific and systemwide analysis of ITS strategies for the AMPA. It is intended to provide "CIP"-type guidance for ITS programming in the TIP and MTP, as well as provide input for local agency ITS projects. Analysis included in the plan demonstrates that the implementation of ITS in the Albuquerque area now could provide approximately \$100 million in benefits to travelers over the next five years.

The plan includes a system map and a benefits-costs report by project/corridor with a detailed assessment of the ITS components and costs of each ITS subset. Further, it positions the Albuquerque area to move ahead with implementation of an ITS system that will enhance public safety, reduce congestion, improve access to travel and transit information, improve cost savings to motor carriers, transit operators, and government agencies, and reduce fuel consumption and emissions. In addition to traffic management, ITS can assist with WIPP transport notifications, Homeland Security, general information about regional programs, Amber alerts, and so forth.

Key ITS elements/projects were identified in the plan as having significant benefit and have been given priority in agency project development and project programming. These include:

- ▶ Joint operation center for coordinated ITS deployment and data sharing
- ▶ Incident management
- ▶ Traffic signal synchronization
- ▶ Traveler information
- ▶ "Mainstreaming" of ITS components into other construction projects
- ▶ Region-wide deployment of ITS to maximize benefits
- ▶ High priority projects for maximum benefits
- ▶ Freeway management, ramp metering
- ▶ Key arterials and commuting corridors, ie, Coors Blvd, Alameda, Paseo del Norte

The primary emphasis of the Plan is to provide an integrated ITS with the backbone on the Federal Interstate system, and complementary implementation on the major arterial system. Each member agency with traffic operations responsibilities within the AMPA participated in the development of the Plan. Additional federal monies are being requested to supplement current programming levels.

Map 9-1 shows an update of the AMPA's ITS Implementation Plan. Tables 9-1 and 9-2 identify the Stage I and Stage II deployments options, respectively. Table 9-3 shows ITS projects in the MTP.

In an effort to meet the requirement included in 23 CFR Part 940, ITS Architecture and Standards, the AMPA ITS Regional Architecture was completed and approved by the FHWA and FTA during the development of this document. The architecture will ensure the coordinated and integrated deployment of ITS within the AMPA to maximize the benefit to the users of the system.

B. Access Management

1. Limited access

Roadways access management is another method of System Management and Operations that can benefit the throughput and function of the transportation system. Member agencies within the Mid-Region MPO have agreed that certain facilities be designated

Map 9-1 ► ITS Implementation Plan for the AMPA

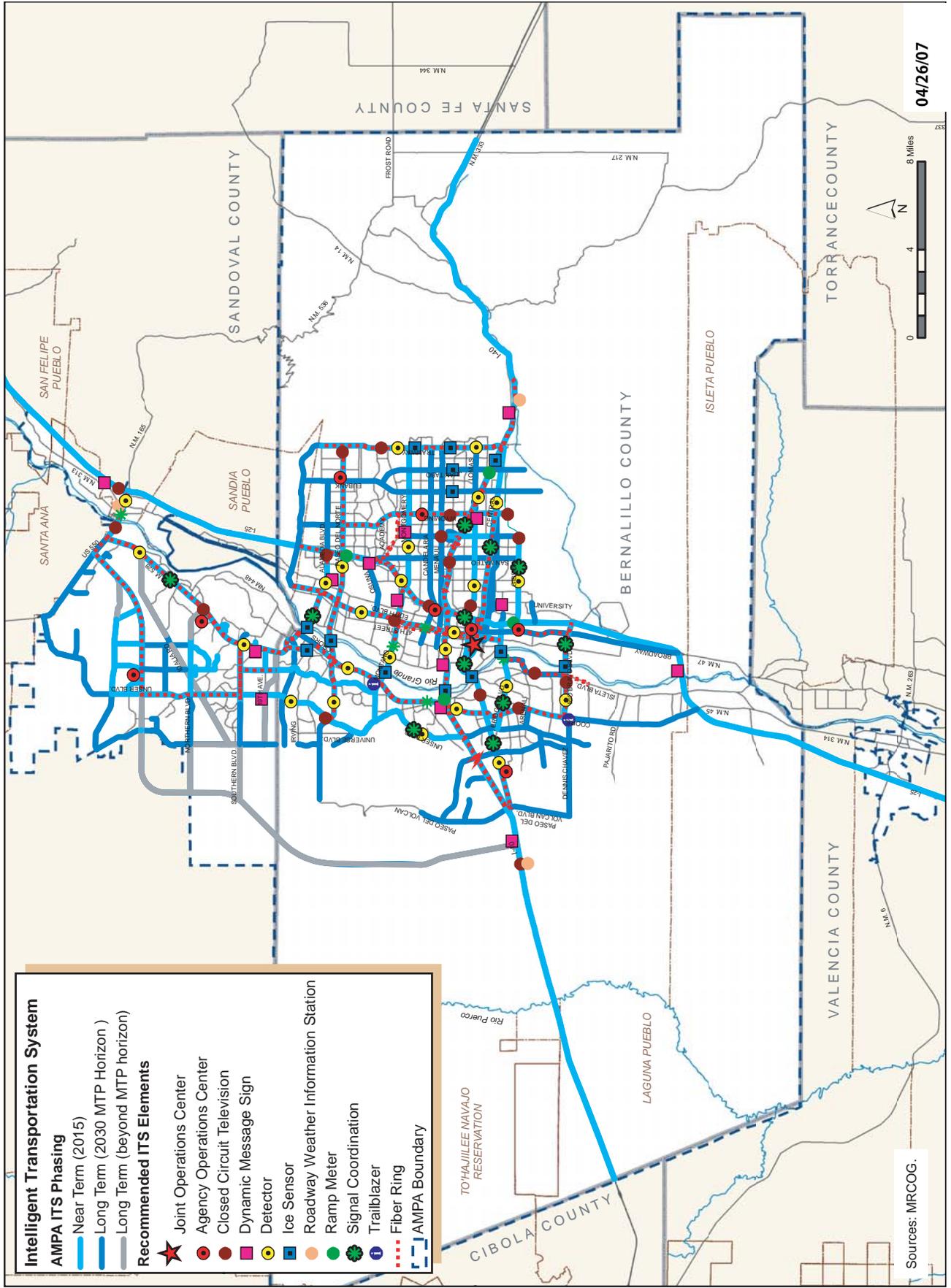


Table 9-1 ► ITS Implementation Plan, Stage I Deployment

ITS Option Packaging in IDAS	Corridor(s)		ITS Elements Included in Option Package
ITS Option 1	Coors/ Alameda/ NM 528	Stage 1	Coors-7 CCTV Cameras 14.5 Miles Fiber Optic Cable 1 Pavement Sensor 6 Remote Traffic Monitoring Stations 15 Trailblazer Signs (Arterial-based changeable message signs) Alameda/528-1 CCTV Camera 1 Pavement Sensor 4 Remote Traffic Monitoring Stations 15 Traffic Signal Controller Upgrades Traffic Signal Coordination
ITS Option 2	2 nd Street	Stage 1	4 CCTV Cameras 8 Miles Fiber Optic Cable 6 Remote Traffic Monitoring Stations 17 Traffic Signal Controller Upgrades Traffic Signal Coordination
ITS Option 3	Gibson/Central/ Louisiana/Lomas	Stage 1	Gibson-4 CCTV Cameras; Central-2 CCTV Cameras 1 Pavement Sensor; Louisiana-1 CCTV Camera; Lomas-2 CCTV Cameras
ITS Option 4	Montano	Stage 1	1 CCTV Camera 1 Pavement Sensor 5 Remote Traffic Monitoring Stations
ITS Option 5	Paseo del Norte	Stage 1	Paseo Del Norte 9.5 Miles Fiber Optic Cable 1 Pavement Sensor 3 Remote Traffic Monitoring Stations
ITS Option 6	Bridge/Rio Bravo	Stage 1	Bridge 1 Pavement Sensor Rio Bravo 1 Pavement Sensor
ITS Option 7	US 550	Stage 1	1 CCTV Camera 1 Road Weather Information System
ITS Option 8	Tramway	Stage 1	1 CCTV Camera 7.5 Miles Fiber Optic Cable 1 Road Weather Information Systems 5 Pavement Sensor 16 Traffic Signal Controllers Upgrade
ITS Option 9	Urban Interstates	Stage 1	CCTV Cameras Dynamic Message Signs 75 Remote Traffic Monitoring Stations 2 Pavement Sensors 33 Traffic Signal Controllers/Cabinets Upgrade (Frontage Roads) Traffic Signal Coordination (Frontage Roads)
ITS Option 10	Extended Area Interstates	Stage 1	2 CCTV Cameras 2 Road Weather Information Systems 1 Remote Traffic Monitoring Stations

as “limited access roadways” with prescribed access limitations intended to increase roadway throughput, primarily for auto traffic (Map 9-2).

Recommendations within this policy are to be supported by local and state agency street standards

and policies. In order for any limited access designation to be effective, it is critical that local land use and access decisions be coordinated within the context of the limited access roadway. Therefore, it is intended that each member agency represented on the MTB with jurisdiction over these roadways and/or

Table 9-2 ▶ ITS Implementation Plan, Stage 2 Deployment

ITS Option Packaging in IDAS	Corridor(s)		ITS Elements Included in Option Package
ITS Option 1	Coors	Stage 2	27 Traffic Signal Controller Upgrades Traffic Signal Coordination 3 Arterial DMS 3 Trailblazer Signs
ITS Option 2	Alameda/ NM 528	Stage 2	3 CCTV Cameras 2 Remote Traffic Monitoring Stations 15 Traffic Signal Controller Upgrades Traffic Signal Coordination 1 Arterial DMS
ITS Option 3	Gibson	Stage 2	3 Remote Traffic Monitoring Stations 10 Traffic Signal Controller Upgrades Traffic Signal Coordination 2 Arterial DMS
ITS Option 6	Montano/Paseo del Norte	Stage 2	Montano-2 Arterial DMS Paseo Del Norte-1 Arterial DMS
ITS Option 7	Bridge	Stage 2	2 Remote Traffic Monitoring Stations 10 Traffic Signal Controller Upgrades Traffic Signal Coordination
ITS Option 4	Central	Stage 2	5 CCTV 10 Remote Traffic Monitoring Stations 50 Traffic Signal Controller Upgrades Traffic Signal Coordination
ITS Option 5	Lomas	Stage 2	2 CCTV Cameras 7 Remote Traffic Monitoring Stations 26 Traffic Signal Controller Upgrades Traffic Signal Coordination 1 Arterial DMS
ITS Option 8	Rio Bravo	Stage 2	1 CCTV Camera 4 Remote Traffic Monitoring Stations 6 Traffic Signal Controller Upgrades Traffic Signal Coordination 2.7 miles of fiber optic cable and conduit to Complete fiber from Coors Boulevard to I-25 (2 segments)
ITS Option 9	Louisiana	Stage 2	1 Remote Traffic Monitoring Stations Wyoming 1 CCTV Camera
ITS Option 10	Unser	Stage 2	5 CCTV Cameras Traffic Signal Coordination 5 Remote Traffic Monitoring Stations 9 TS Controllers Upgrade 1 Arterial DMS
ITS Option 11	US 550	Stage 2	1 Remote Traffic Monitoring Stations
ITS Option 12	Tramway	Stage 2	6 Remote Traffic Monitoring Stations
ITS Option 13	Urban Interstates	Stage 2	54 Ramp Meters
ITS Option 14	Extended Area Interstates	Stage 2	1 CCTV Camera 7 Freeway DMS

Table 9-3 ► ITS-Specific Projects Submitted for Inclusion in the MTP

PIN	Project Title	Project Description	Termini	Lead Agency
563.0	TSM - Incident Management System	Implement system to manage highway incidents	AMPA Wide	NMDOT
568.0	TSM - Motorist Assistance Courtesy Patrols	Expand courtesy patrols (H.E.L.P. vehicles)	AMPA Wide	NMDOT
40.0	ITS - Albuquerque Traffic Management System	Replace traffic signal controllers, communications, camera monitoring, other ITS	City of Albuquerque	City of Albuquerque
384.0	Transportation Surveillance Program	Traffic Data Collection for NM Traf. Mon. Sys., HPMS-Hwy. Perf. Mon. Sys., GIS, Traf. Flow data & model devel.	AMPA Wide	MRCOG
48.0	ITS - District 3 ITS Deployment	Implement ITS Improvements as per ITS Implementation Plan	AMPA Wide	NMDOT
Misc.	Project Level ITS Deployment	Deploy ITS components on project level as per ITS Implementation Plan	City of Rio Rancho	City of Rio Rancho

adjacent land should coordinate access to lands along that facility consistent with these policies. For example, roadways designated as limited access limit the number and frequency of driveways such that access to the adjacent lands must be coordinated in a planned manner such that access can be facilitated with adjacent roadways, frontage road systems, etc. Corridor studies, and/or other planning efforts are the typical mechanism to identify and plan for these corridors. The MPO has established the Roadway Access Policies as a guide to be used by local agencies within their planning and development review activities to promote coordination and ensure consistency with this policy.

2. Managed Lanes/High Occupancy Vehicles (HOV)

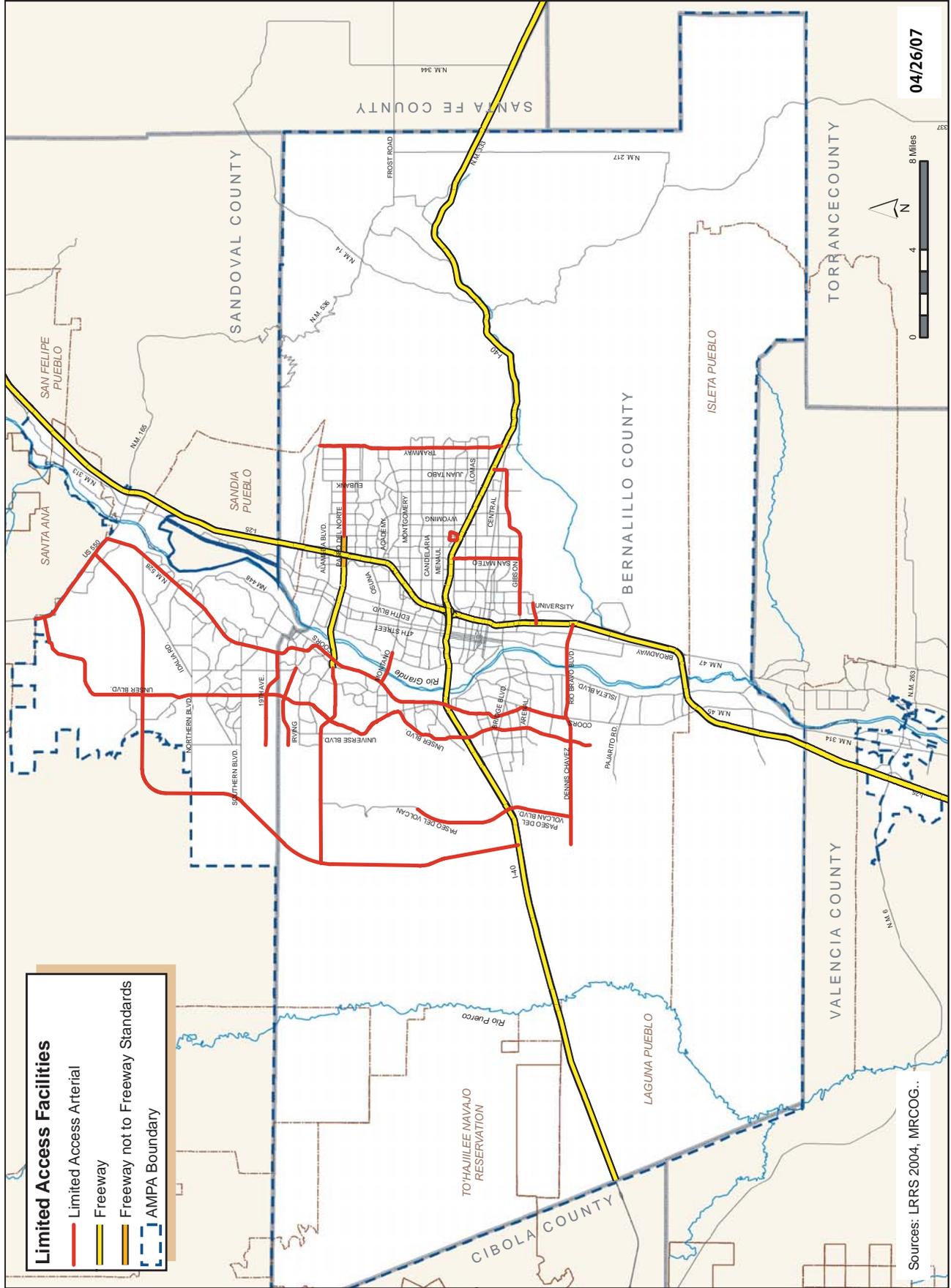
Managed lanes and facilities dedicated to HOV or truck-only traffic can be effective in mitigating congestion, increasing traffic safety, and encouraging increased carpooling and transit use. The Middle Rio Grande Connections study, conducted by the NMDOT and MRCOG in coordination with member

agencies and the FHWA, reviewed the performance of the AMPA’s entire roadway transportation system .

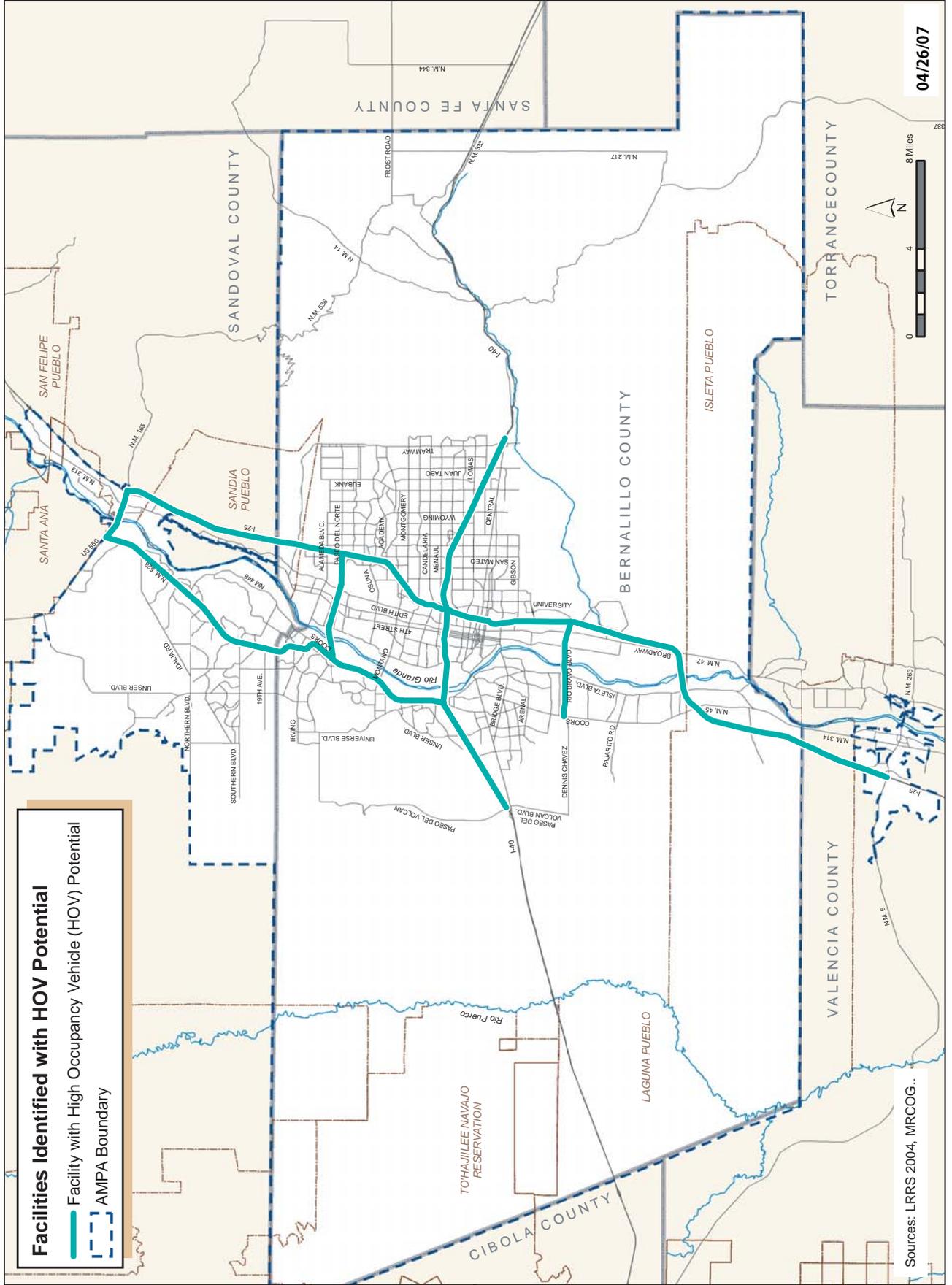
One of the key recommendations of this study was the identification of facilities with high potential for HOV implementation (see Map 9-3). The managed lanes/ HOV element of the AMPA roadway system will work hand in hand with the ITS Implementation Plan, with ITS deployments providing full support for their implementation. The City of Albuquerque has identified as part of its near-term ITS deployment strategy implementation of ITS elements on river crossings within its jurisdictional boundaries.

Other river crossings are being deployed with ITS consistent with the ITS Implementation Plan such as the NMDOT’s fiber interconnect across the US 550 at the northern boundary of the AMPA. A Managed Lanes/HOV study is identified in the TIP and MTP that will further refine the concept and identify specific project scope(s), agency responsibilities, and timing for prioritized programming and implementation.

Map 9-2 ▶ Limited Access Arterials for the AMPA



Map 9-3 ▶ Limited Access Arterials for the AMPA — HOV Potential



Facilities Identified with HOV Potential
 Facility with High Occupancy Vehicle (HOV) Potential
 AMPA Boundary

Sources: LRRS 2004, MRCOG...

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Again, the MPO has a role in supporting the development and deployment of these systems by providing a forum for interagency project planning and development, as well as through prioritized project programming through the coordinating efforts of the TIP and MTP.

3. Paseo del Norte Managed Lane/HOV Preliminary Analysis

As part of the development of this MTP document, the Policy Board has expressed interest in the possibility of implementing managed lanes and/or HOV across at least one of major river crossing within the AMPA (FY2008 UPWP 5.5f). MPO staff in coordination with member agencies within the AMPA are considering a River Crossings Corridor Study which will explore, as a formal corridor study, the feasibility of deploying HOV/Managed Lanes on a major river crossing within the AMPA. In anticipation of this effort, MPO staff has performed preliminary analysis to assess initial feasibility of such a strategy.

The analysis focused on the 2030 PM commute within the Paseo del Norte corridor between I-25 and Coors Blvd. This facility was chosen primarily because it is a limited access/urban freeway type facility serving a major commute within the AMPA. Three scenarios were evaluated as HOV/Carpool/Transit (Rapid Ride) per a reversible managed lane of different configurations and were then compared to the base (no improvements).

Alternatives were evaluated as follows:

- ▶ Base conditions, no improvements
- ▶ Alternative 2 – Reversible General Purpose Lane
- ▶ Alternative 3 – Reversible Lane/Managed
- ▶ Alternative 4 – Managed Lanes Convert From Existing

The analysis used MRCOG's Travel Demand Model and the TRAM Accessibility Model to identify key travel times and travel markets for each alternative. The roadway network was coded to represent the changes in general purpose lanes resulting from the addition/conversion of general purpose lanes to reversible and/or managed lanes. Congested roadway

speeds were then used in the TRAM model to identify the resulting travel time contours between a representative origin/destination pair within the commuter travel shed. The speed assumed for the managed lane for both the auto "diamond" and transit-only was coded as 45 mile per hour.

The two representative origin/destination points identified were:

- ▶ Uptown Employment Center with Rapid Ride Station, and,
- ▶ Park and Ride lot at the vicinity of Paseo del Norte and Unser Blvd

The Rapid Ride was coded with 6 stations along the route including the Rail Runner Commuter Rail Station at El Pueblo and 2nd St. Separate analysis was performed for auto travel with general purpose lanes and Managed/HOV, and Managed lanes with Rapid Ride transit on Paseo del Norte (see graphic).

Preliminary results show that there are positive travel time benefits possible with each of the evaluation scenarios in varying degree. With a managed, or "Diamond" lane, restrictions are placed on its use such as for vehicle occupancy (carpool), and/or vehicle type (transit). This designation can be varied by time of day, ie, "Peak Period HOV Lanes."

As capacity is most limited and delay most severe at intersections with other roadways, it would be recommended that in addition to implementing an HOV lane along the corridor, exclusive lanes and/or priority be given at intersections entering the corridor. This way, the benefits in travel time and priority would be offered for a larger portion of the total trip. Plus, HOV incentives will result in fewer cars on the system, thus reducing the demand on roadway infrastructure. Preliminary results of the analysis are presented in Table 9-4.

Maps 9-4 through 9-10 depict the information included in Table 9-4 in a graphical manner. The differences between the scenarios are most apparent for the targeted Southeast-to-Northwest travel corridor that Paseo del Norte serves; particularly, northwest Albuquerque and Rio Rancho. Alternative

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2, Reversible General Purpose Lane shows a marginal benefit to auto travel times, although not as significant when compared to any of the “managed” scenarios. For example, the travel time savings over the Base for Alternative 2 is approximately 10%. By comparison, the travel time savings increase with Alternatives 3 and 4 with “Managed Lanes” is 16% and 54% respectively. What this shows is that by providing a “Managed/HOV”-type option within this corridor, travel times can be reduced. It is interesting to note that in Alternative 2, Reversible General Purpose Lane, though an additional general purpose lane is added as a reversible lane, the actual travel time savings are marginal. This is due to the latent demand that exists within the corridor and on river crossings within the AMPA in general that tends to have an “overwhelming” effect on any additional general purpose capacity added.

The results clearly demonstrate that there are travel time benefits to implementing a reversible/managed lane across the Paseo del Norte River Crossing. This preliminary analysis is based on a general assessment of the potential benefit of such a strategy from a demand and travel time perspective using the MRCOG modeling tools. It did not consider such conditions as the design and engineering considerations of the alternatives.

However, given the limited possibilities for addressing river crossing travel demand, (i.e., environmental impacts, limited right of way, and limited agency support for any new crossings in this corridor), the potential benefits of this new approach strongly support further consideration.

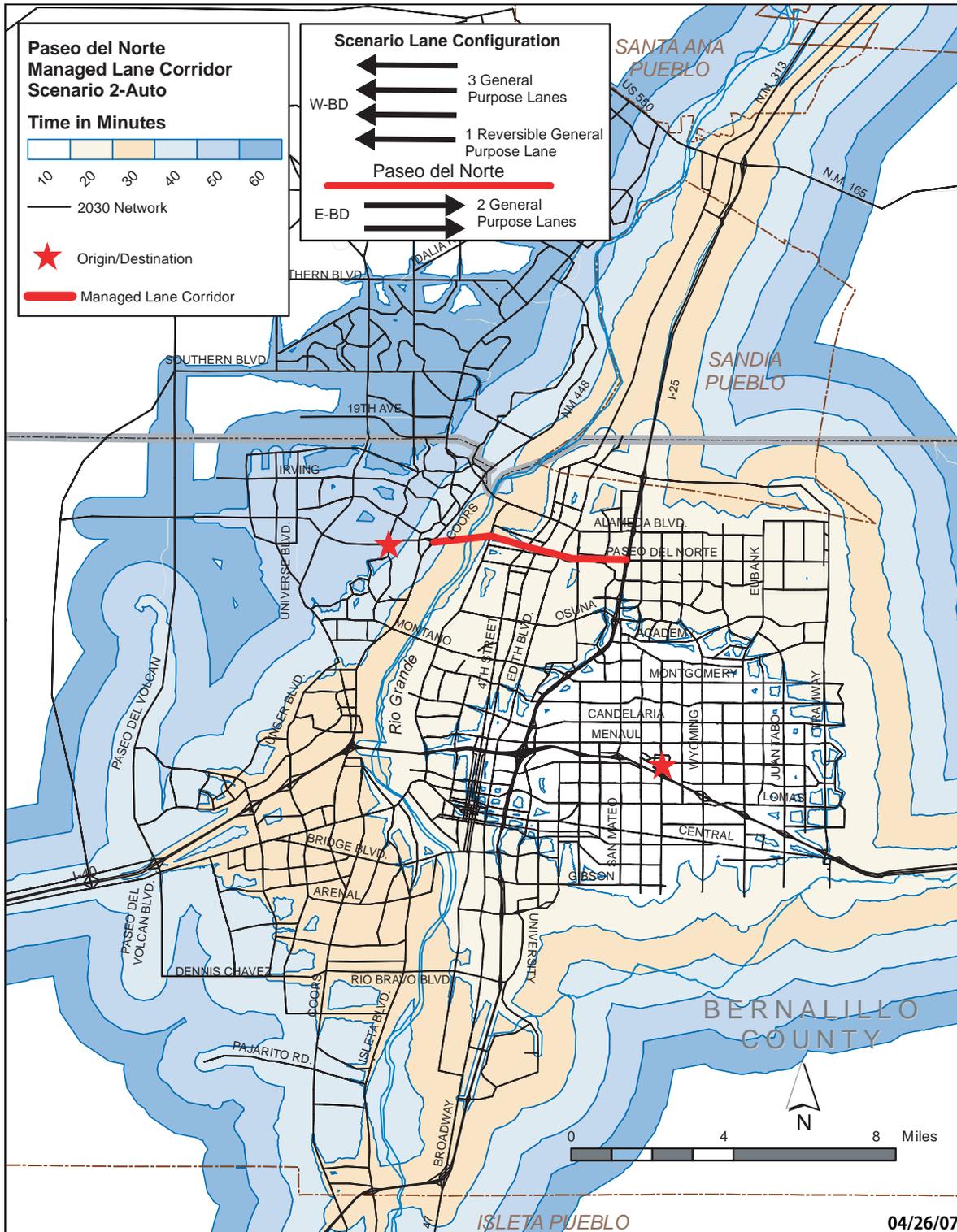
Table 9-4 ► Paseo del Norte HOV/Managed Lanes Preliminary Analysis Results for the Key Commute Identified in the Analysis

Scenario:	Description:	General Purpose Lanes Configuration*:	Managed Lanes Configuration**	Key Commute Auto Travel Times (minutes):	Key Commute Transit Travel Times (minutes):
Base Alternative 1 No Changes to Existing Facility	Three general purpose lanes coded per direction	3 eb/3 wb	0	57 minutes	Outside of 60-minute Contour
Alternative 2 Reversible General Purpose Lane*	Four westbound and two eastbound lanes coded as general purpose (one westbound lane is reversible)	2 eb/4 wb	0	52 minutes	Outside of 60-minute Contour
Alternative 3 Reversible General Purpose Lane is Managed Lane*	Reversible lane is converted from general purpose to the managed lane. Opposite direction is coded as two lanes	2 eb/3 wb	1 wb	49 minutes	Outside of 60-minute Contour
Alternative 4 Managed Lanes, Existing General Purpose Lane Converted	Existing General Purpose lane is converted to managed lane	2 eb/2 wb	1 eb 1 wb	37 minutes	51 minutes

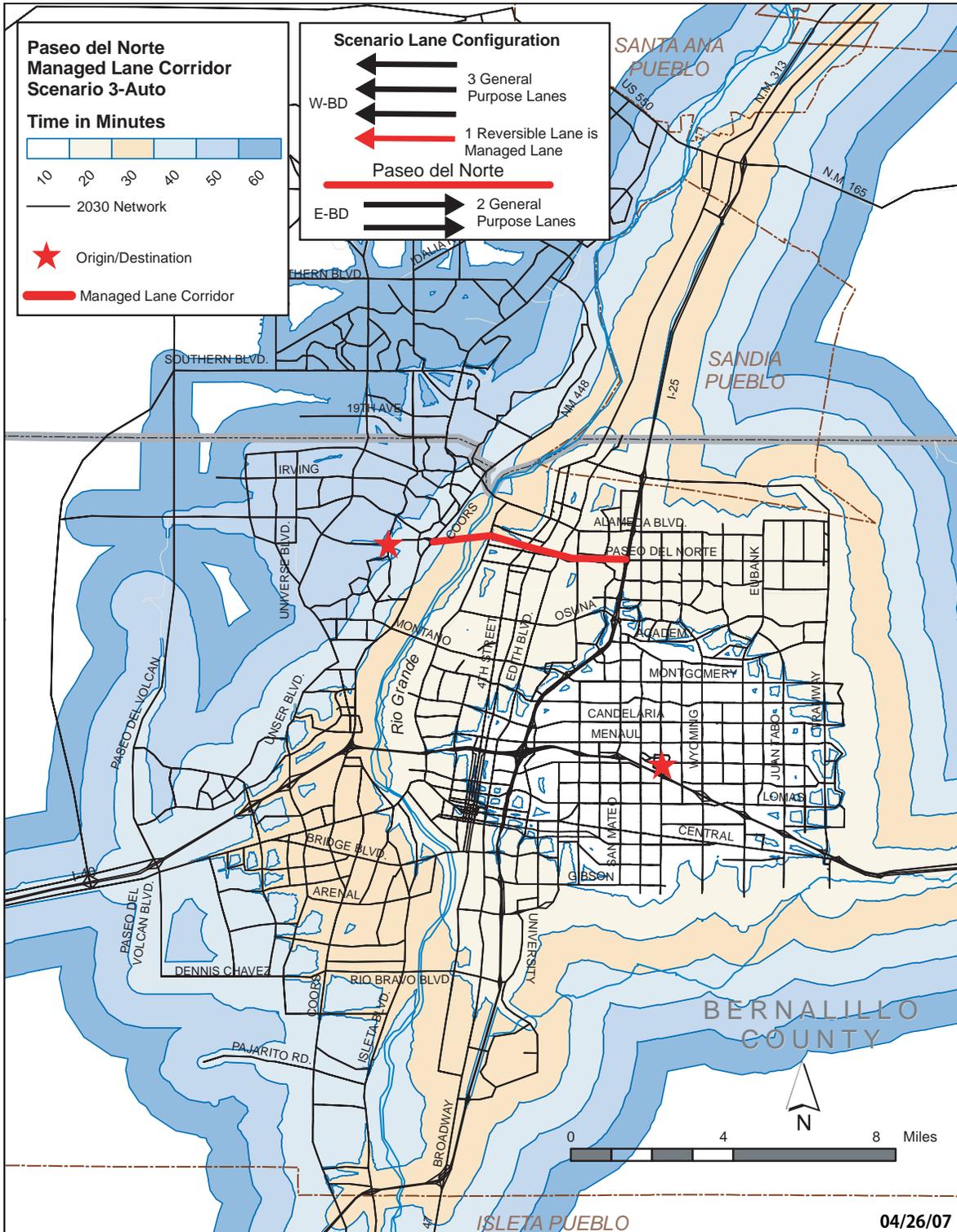
*Reversible lanes alternate for the AM/PM, eastbound and westbound, respectively. Pm Period lane configuration shown.

** Managed lane represents HOV

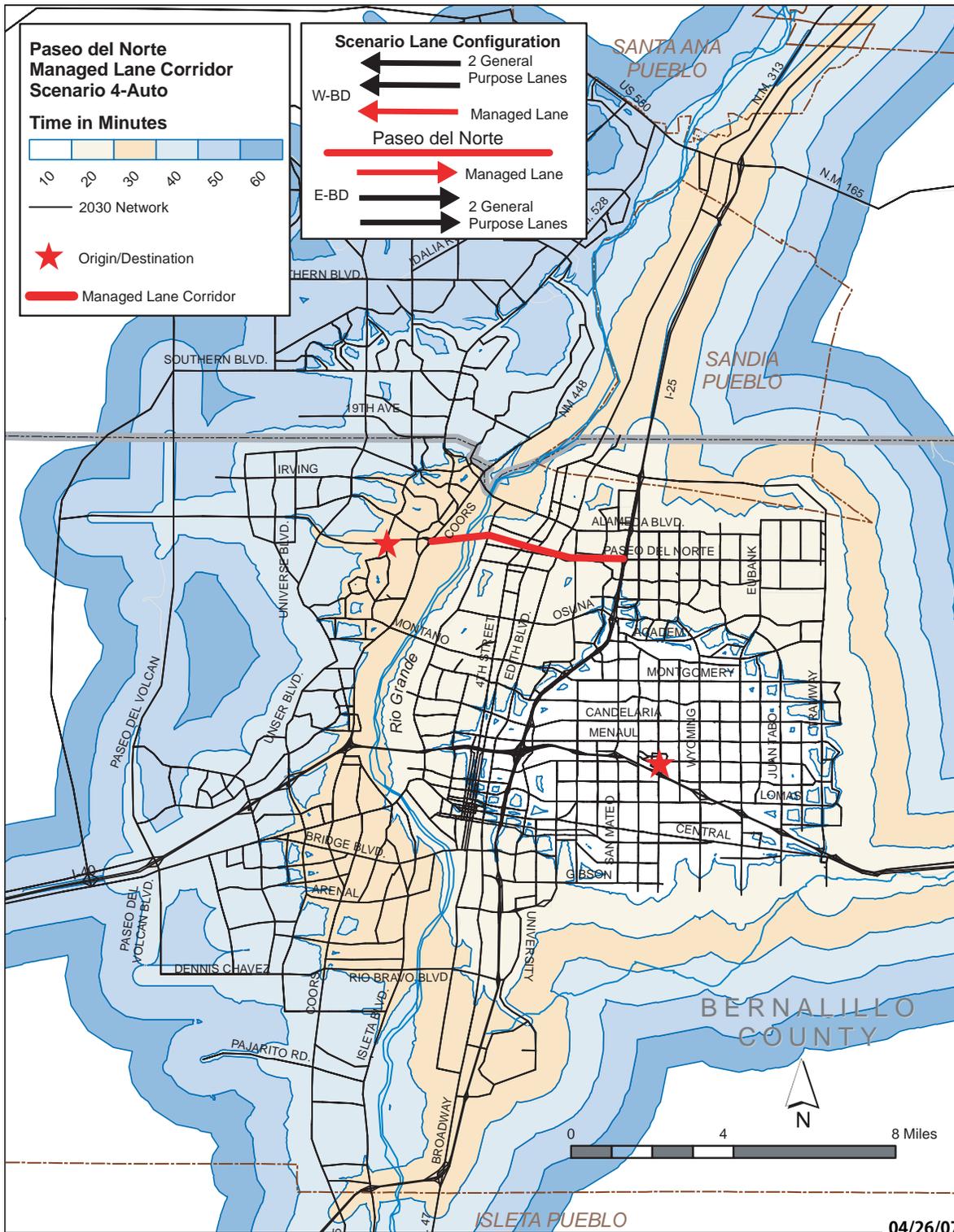
Map 9-5 ▶ Auto Travel Times for Scenario 2, Reversible General Purpose Lane



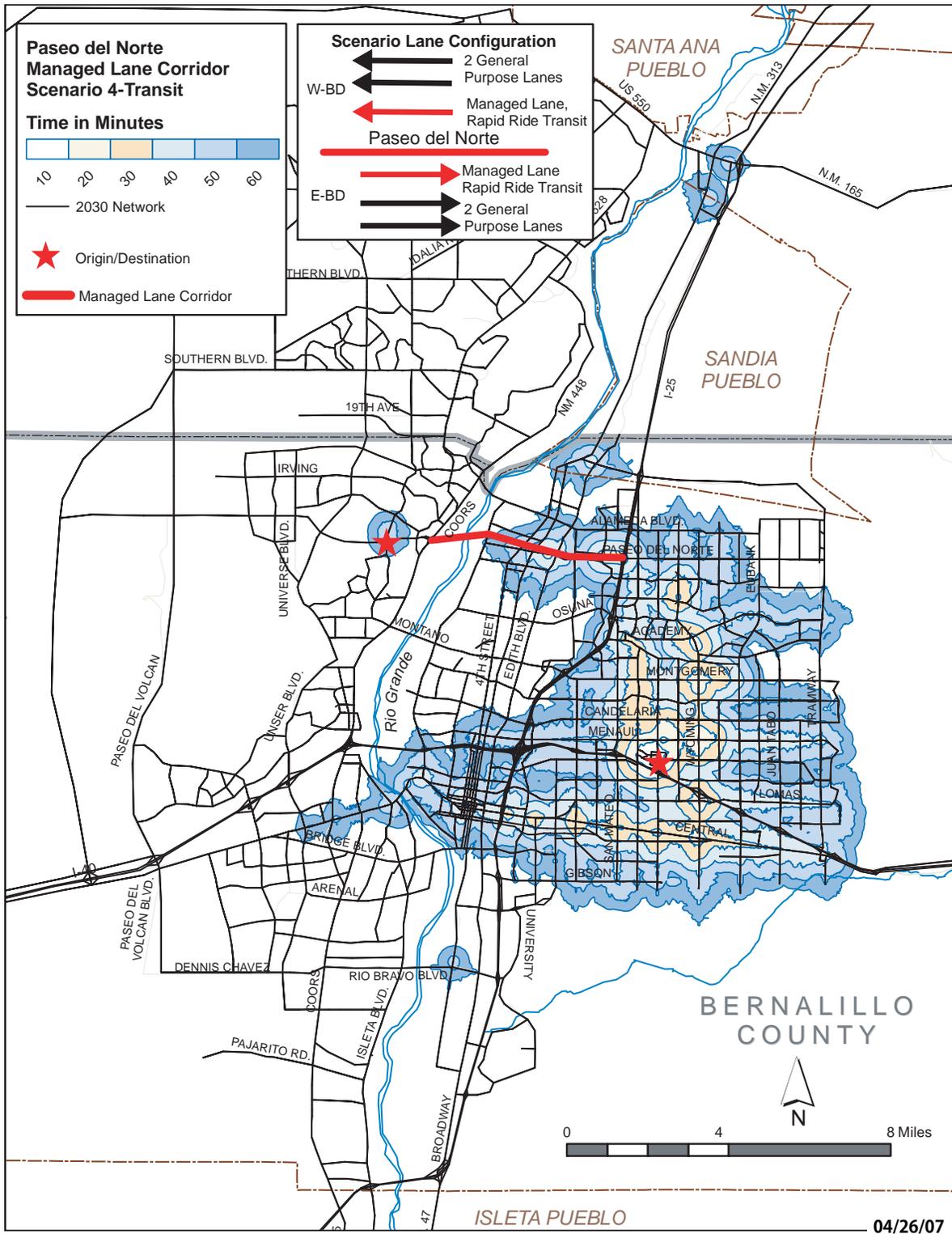
Map 9-6 ▶ Auto Travel Times for Scenario 3, Reversible Lane as the Managed Lane



Map 9-7 ▶ Auto Travel Times for Scenario 4, Existing General Purpose Lane is the Managed Lane



Map 9-10 ► Transit Travel Times for Scenario 4, Existing General Purpose Lane is Managed Lane, Rapid Ride Transit



C. Incident Management

Traffic congestion is a daily concern in many medium sized cities through the United States. National statistics have shown that as much as 60% of all traffic delays are related to traffic accidents; and that for every minute that an accident remains in a traffic lane, traffic is delayed up to an additional five minutes. In response to these issues, a Freeway Courtesy Patrol (FCP) program was implemented in 1998. The original program was established to assist in the traffic management of the construction work zone for the reconstruction of the Big I project. This program has evolved into a resource that enhances motorist safety and security while reducing traffic congestion.

In a continued effort to support incident management initiatives in the MPO, data has been collected and analyzed for the operations of the Freeway Courtesy Patrol for 2005. The four major objectives for the FCP drivers are to assist stranded motorists; assisting local law enforcement agencies in traffic control around traffic crashes; detect, mark, and report unoccupied vehicles; and move or assist in moving debris off the roadways. Since its inception in 1998, FCP drivers have responded to thousands of calls for assistance ranging from saving lost dogs trapped on the freeway to full interstate closures.

Currently, the program has five vehicles patrolling from 6:00 a.m. to 7:00 p.m., Monday through Friday. The patrol also operates on special-event days and some holidays.

The highest used service that is offered by our FCP is assisting stranded motorists. The typical types of calls that are responded to are:

- ▶ changing tires
- ▶ providing gas and other fluids to motorists,
- ▶ providing minor mechanical assistance to motorists
- ▶ offering motorists transportation to the nearest freeway exit

Current assessment of the effectiveness of this program shows that average delay from freeway incidents has been reduced by 17 to 30 minutes, depending on the type of lane closure.

The City of Albuquerque Police Department (APD) in coordination with the Mayor's office and the City of Albuquerque Department of Municipal Development (DMD) has developed a regional Incident Traffic Management Plan. Upon full deployment of the NMDOT's centralized Traffic Management Center, it is anticipated that further integration of the AMPA's incident management procedures for all ITS Stakeholders will be realized.

D. Special Event Traffic Management

In addition to Incident Management activities, the importance of coordinated Special Event Traffic Management is recognized within the AMPA as being critical to ensuring that many of the special event activities held annually within the AMPA go as smoothly and safely as possible. Specific special event traffic management plans for such events as the International Balloon Fiesta, the New Mexico State Fair, large sporting events and concerts, etc., are being used to promote improved delivery of visitors and patrons to these events. Shuttle busses, reversible lanes, and parking management strategies are among those used for this purpose.