



1. ROADWAY

INTRODUCTION

The roadway network is the backbone of the region's transportation system. While Destino 2045 strives to establish a multi-modal transportation system, the roadway network is still a focal point as it supports the majority of travel in the region on a day-to-day basis. An efficient roadway system can provide better mobility, which leads to better accessibility to goods and services and improved quality of life.

The following section details the roadway analysis findings for the El Paso Metropolitan Planning Organization (MPO) region. The analysis utilizes historic trend data, the 2045 El Paso Travel Demand Model (TDM), and detailed stakeholder input to reveal estimated current and future roadway performance. The analysis focuses on the roadway network at several different levels: major highways (e.g. IH 10, Loop 375, and US 54), emphasis corridors, and the overall regional network. The findings from this analysis serve to indicate how the roadway system performs today and how it is expected to perform in the future, and identifies roadway deficiencies in terms of congestion throughout the region. The roadway deficiencies analysis also provides an existing baseline and future "no-build" scenario performance measurement for several of the performance measures identified for Destino 2045 that will be used to compare against alternative transportation investment scenarios later in the planning process.

METHODS

2045 El Paso Travel Demand Model

A TDM is a tool that forecasts travel patterns throughout a network based on roadway characteristics and transportation demand, which is determined by land use and demographic information. Destino 2045 employs the 2045 El Paso TDM which was developed for the El Paso MPO region as a part of this MTP update process. For the needs assessment, the TDM was executed for 2012 and 2045. The 2012 model results provide a base year comparison for roadway performance using the network and estimated demographics for that year. The 2045 model results, which use the existing plus committed roadway network – i.e. the existing roadway network including any projects that are currently under construction or scheduled to be let by 2019 – and 2045 demographics, show how the roadway system would perform if no further transportation improvements were constructed by 2045. The TDM is also used throughout the other portions of the Needs Assessment, providing performance indicators for the measures established for Destino 2045.

Roadway Performance Measures

The 2045 El Paso TDM and Texas Transportation Institute's (TTI) Urban Mobility Scorecard produce the following roadway performance measures, among others, that Destino 2045 uses to analyze and project travel trends for the region:

- *Vehicle Miles Traveled (VMT)* - roadway miles traveled by vehicles within a specified segment for a specified period of time
 - > *Provides a sense of the overall level of vehicular traffic in the region and on individual roadways*
- *Vehicle Hours of Delay* - additional hours spent in traffic due to congestion on the roadway network
 - > *Indicates the amount of extra time it takes travelers to reach destinations compared to free-flow conditions*
- *Volume Capacity (V/C) Ratio* - ratio of traffic flow to maximum allowable traffic flow on a road segment, where a ratio of 1 represents a segment at full capacity and higher values indicate more severe congestion
 - > *Used to isolate specific locations where vehicular demand outstrips capacity of a roadway section*
- *Speed Index* - ratio of peak hour speed and free-flow speed for a given roadway segment illustrating how fast traffic is moving on average in relation to how fast traffic would move with no congestion, where lower ratio values (i.e. less than 0.7) represent severe congestion.



For VMT and vehicle hours of delay, TTI provided historic trend data up to 2014. Using a methodology similar to the one used in the development of the TTI scorecard, future estimates of these two measures were calculated using the TDM outputs to show how these measures are anticipated to change between now and 2045. The TDM also provided the necessary outputs to calculate the other two congestion measures—V/C ratio and speed index. Note that these measures represent level of congestion during the worst traffic conditions throughout an average day (i.e. peak period). Both measures were calculated and converted to a value on a 1-5 scale, with 1 representing ideal traffic flow and 5 representing extreme levels of congestion, for each roadway segment. The scaling was based on known congestion metrics from TTI and DOT literature/case studies. The congestion index values for the two measures were then averaged together to create a combined congestion index.

Throughout the needs assessment, 2012 and 2045 TDM results provide the outputs that are used to calculate other performance measures included in Destino 2045. The following lists the different Destino 2045 performance measures which utilize outputs from the 2045 El Paso TDM:

- *Crashes per VMT*
- *Speed Index*
- *Annual hours of delay*
- *% of jobs, key destinations, and population within ½ mile of high-quality, rapid transit*
- *Commute times from Environmental Justice zones*
- *% non-SOV trips*
- *Average trip costs*
- *Average wait times by mode at Ports of Entry (POEs)*
- *Estimated emissions*
- *Total VMT & VMT per capita*
- *Annual hours of delay along major freight corridors*

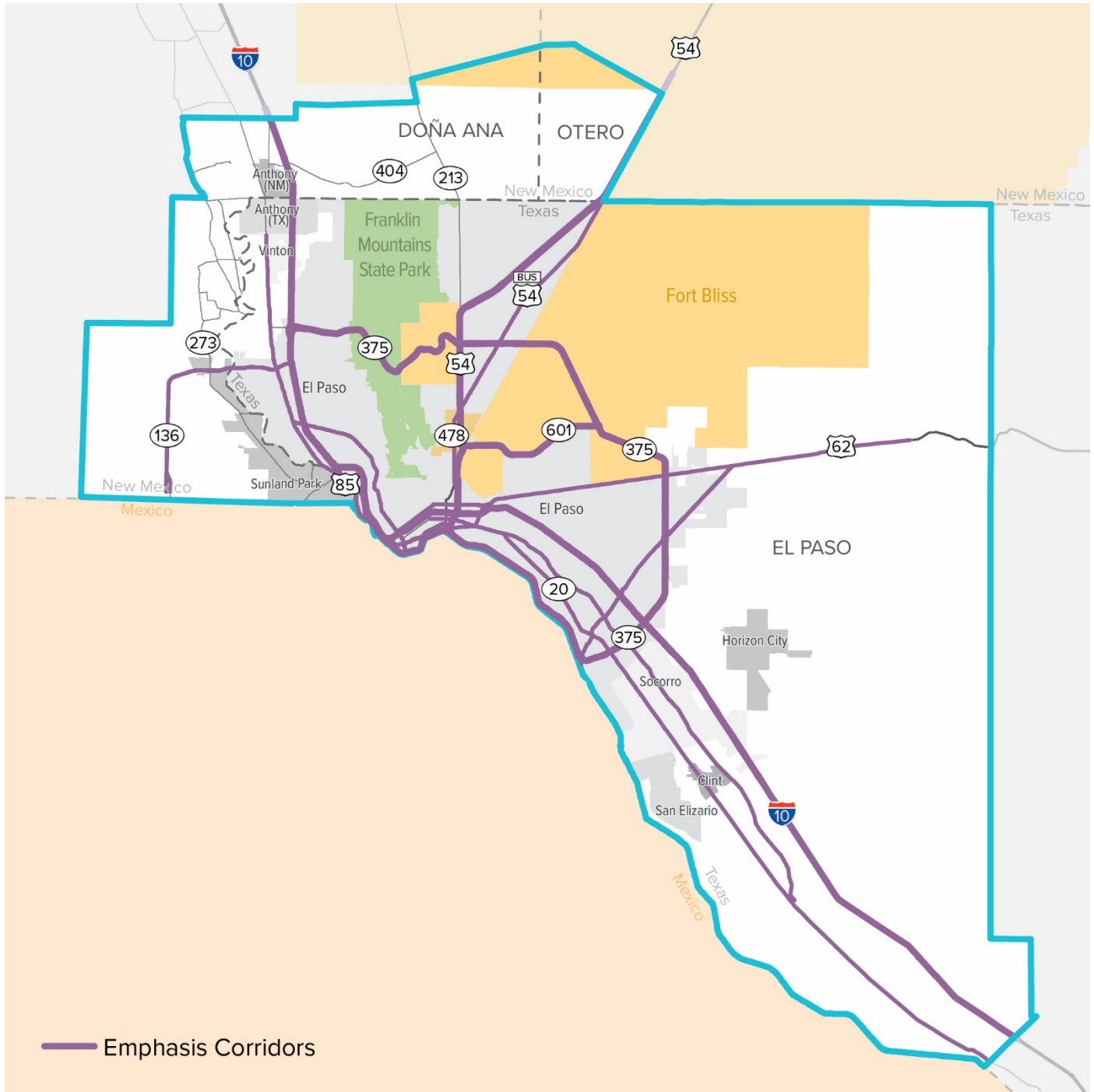
Emphasis Corridors

Much of the growth in the El Paso region has followed the paths of the major transportation corridors that connect the region to the rest of the world. These “emphasis corridors” carry the vast majority of the region’s automobile travelers, freight traffic, and transit users and form the backbone of the region’s multimodal transportation system. Some of these roads are major regional connectors (Montana Ave.) and others provide access to the region’s ports of entry (Zaragoza Rd. and Pete Domenici Memorial Highway). Destino 2045 classifies the following roadways as emphasis corridors (Figure 1.1):

- | | |
|---------------------------------------|---|
| → IH 10 | → N. Mesa St. (TX SH 20) |
| → US 54 – Patriot Freeway | → Montana Ave. (US 62) |
| → Loop 375 | → N. Loop Dr. (FM 76) |
| → Spur 601 – Liberty Expressway | → Paisano Dr. (US 62) |
| → Alameda Ave. (TX SH 20) | → Pete Domenici Memorial Highway/Artcraft Rd (NM 136/TX SH 178) |
| → Doniphan Dr. (TX SH 20) | → Zaragoza Rd. (FM 659) |
| → Dyer St. (US 54 Business/TX LP 478) | |



FIGURE 1.1: EMPHASIS CORRIDORS





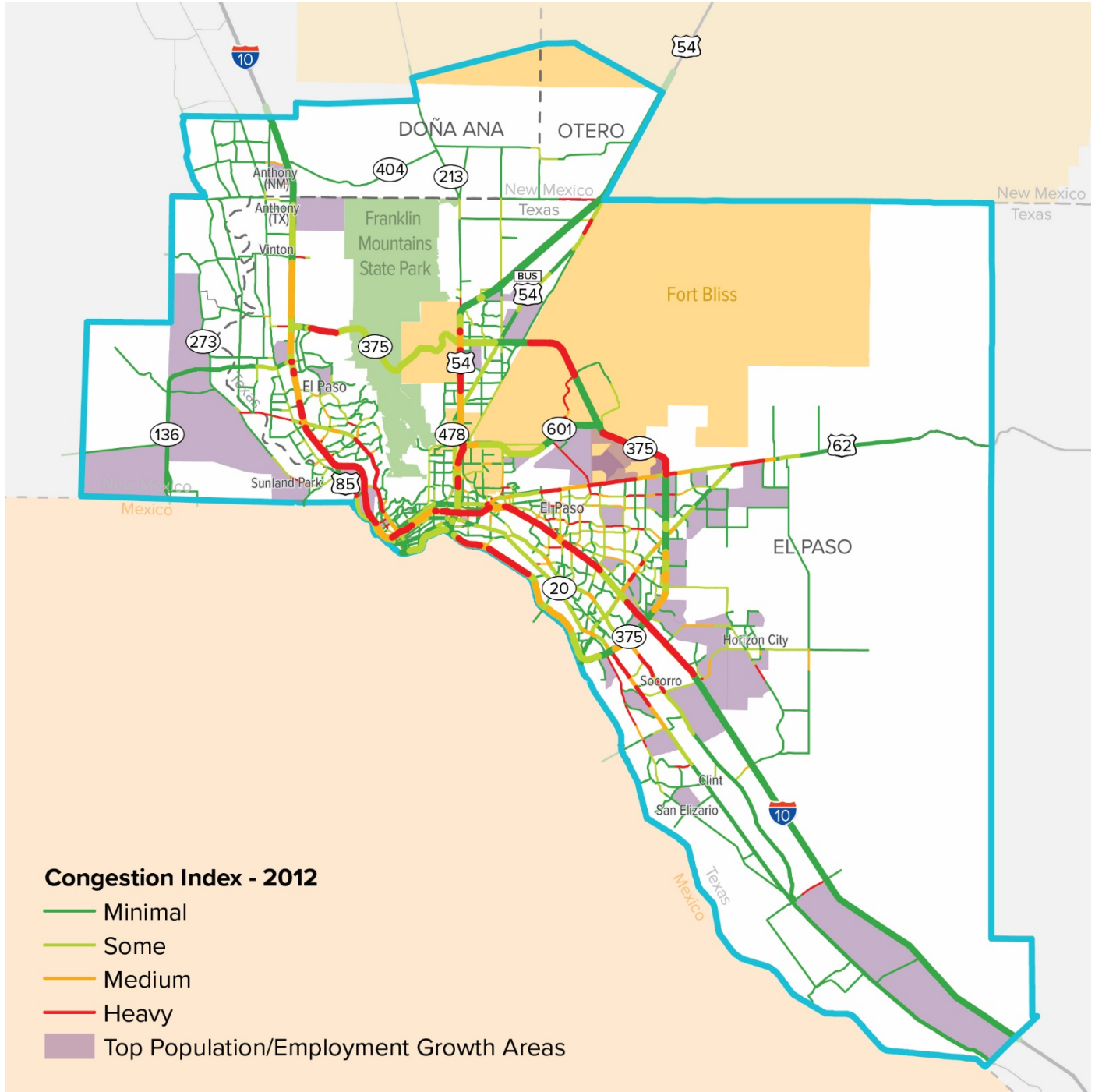
CURRENT NETWORK CONDITIONS & PERFORMANCE

The 2012 roadway network shows congestion primarily occurring on major highways and regional connectors (Figure 1.2). IH 10 displays medium to heavy congestion along the majority of the network from Socorro to Vinton. Loop 375 shows medium to heavy congestion along the United States-Mexico border and in portions cutting through Fort Bliss. Other noteworthy roadways displaying medium to heavy congestion include the following:

- US 54
- N. Mesa St./Country Club Rd.
- Montana Ave. (particularly west of Loop 375)
- Alameda Ave.
- Socorro Rd.
- North Loop Dr.
- Global Reach Dr.
- Fabens St.
- Montwood Dr.



FIGURE 1.2: CONGESTION INDEX; 2012

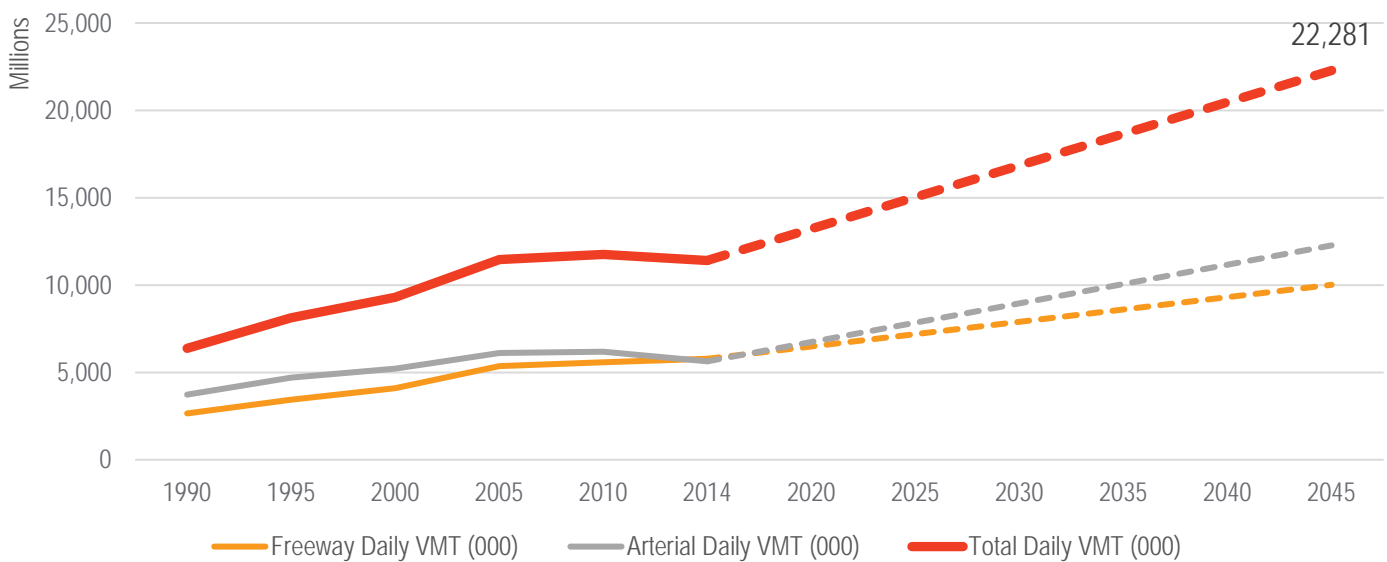




FUTURE NETWORK CONDITIONS & PERFORMANCE

2045 TDM outputs show anticipated roadway performance if no additional transportation improvements were made beyond the existing and committed network. In general, these outputs indicate a significant increase in the amount of moderate to severe congestion—spurred by a rise in traffic—throughout the network. Figure 1.3 shows estimated average daily VMT growth between 1990 and 2045, where VMT is extrapolated from 2014 TTI estimates. Total daily VMT is estimated to reach roughly 22-million miles by 2045, with arterial network daily VMT surpassing freeway daily VMT by roughly 2-million miles. On a per capita basis, daily VMT per person is expected to increase from 13.9 to 16.2 between 2014 and 2045. This moderate increase (17%) in VMT per person indicates that the total amount of vehicle travel in the region is expected to increase by more than the increase in number of potential people traveling. This suggests that the region’s population will be traveling further distances or taking more vehicle trips on the roadway network in a given day in order to reach destinations if no further changes are made to the system by 2045.

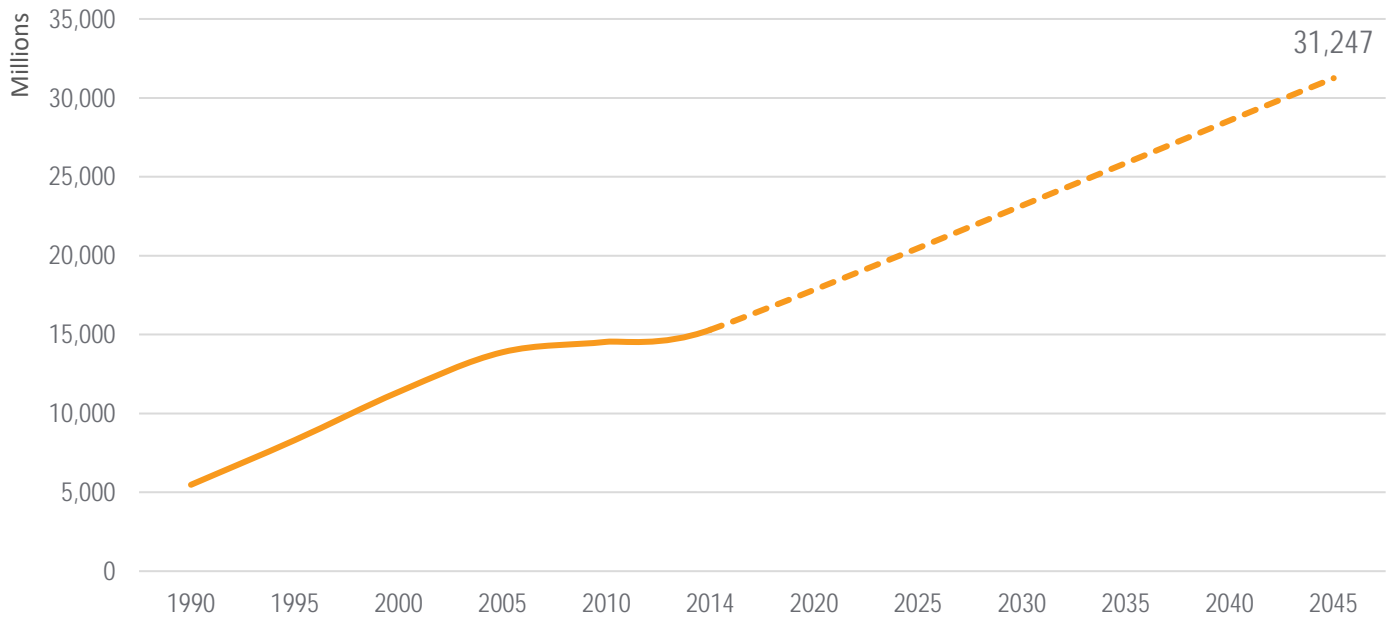
FIGURE 1.3: AVERAGE DAILY VEHICLE MILES TRAVELLED; 1990-2045





Due to the increase in VMT and relatively stable vehicular capacity of the roadway network, congestion is forecasted to increase by 2045 if no other changes are made to the roadway network. Figure 1.4 reflects the forecasted increase in delay by 2045, highlighting that congestion is anticipated to be much worse by the horizon year 2045. In fact, the forecast estimates that travelers in the region will experience over 31 million annual vehicle hours of delay by 2045—a 115% increase from 2014.

FIGURE 1.4: ANNUAL WEEKDAY VEHICLE HOURS OF DELAY; 1990-2045

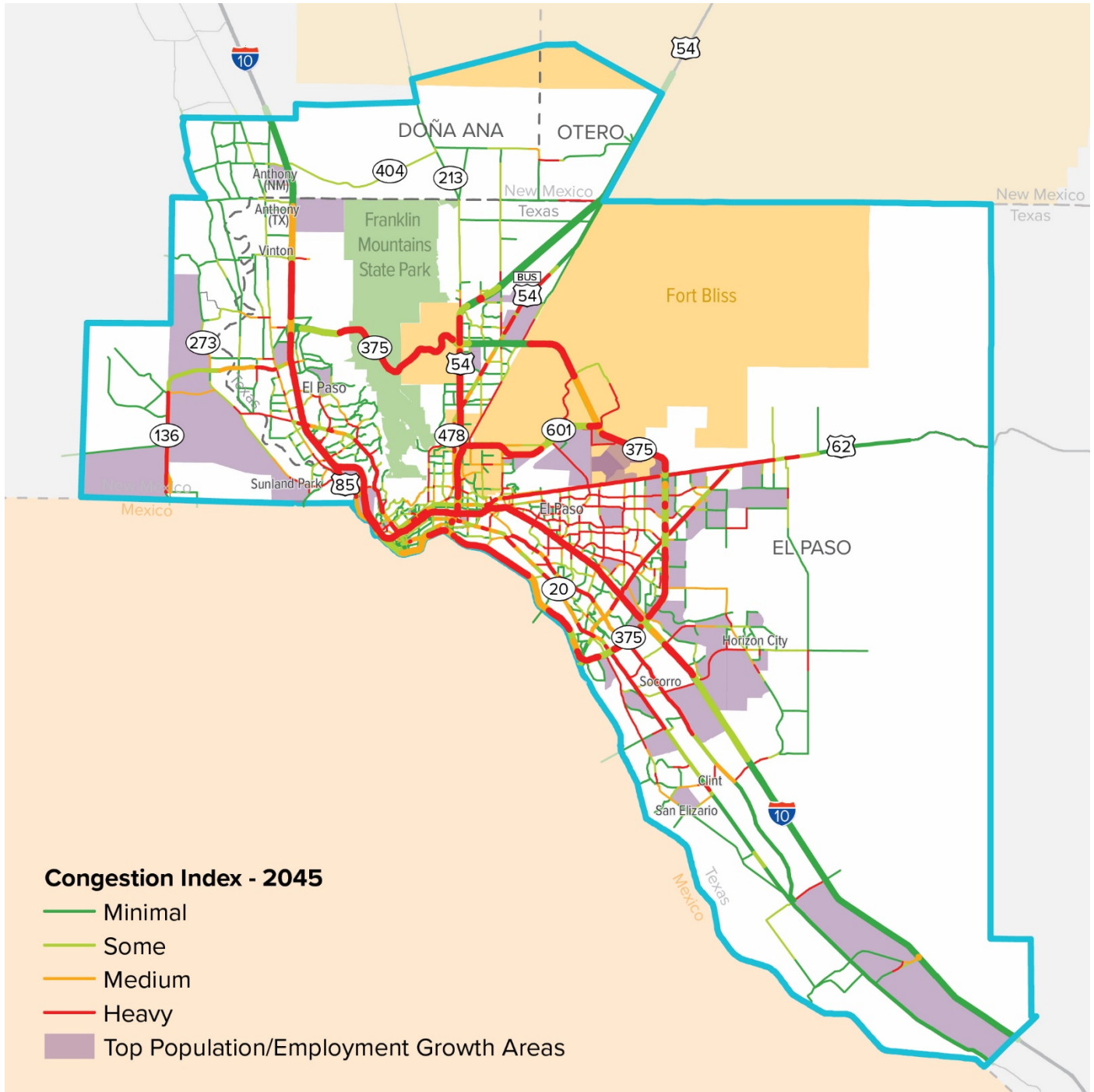


Congestion Index

In general, forecasted increases in congestion along the network are particularly prevalent along major highways and the emphasis corridors but also in the Mission Valley region near Socorro and in Central-East El Paso (just south of US 62 and West of Loop 375). The most notable changes in level of congestion in 2045 occur along the IH 10 corridor and Loop 375. IH 10 shows heavy congestion from roughly Horizon Boulevard in the southeast to Vinton Road in the northwest portion of the region, with the most congested segments near the El Paso central business district. US 54 is projected to experience increased congestion from the IH 10 junction (central to the region) northward to the Transmountain Drive intersection. Figure 1.5 shows the congestion index calculated from the El Paso TDM using the existing and committed network and 2045 demographics, as well as high population and employment growth areas. The high growth areas are meant to show how population and employment changes affect congestion by generating more trips to/from these areas. For the most part, roadways in the network adjacent to high growth areas show significant increases in congestion between 2012 and 2045.



FIGURE 1.5: CONGESTION INDEX; 2045





Delay

Table 1.1 shows the percentage of 2045 delay and VMT of each major highway and emphasis corridor compared the to the entire network. Again, this table shows the importance of IH 10 as a major transportation corridor for the region, as 32% of all VMT occurs along IH 10. Comparatively, the other roadways included in this table only make up 41% of all VMT on the network. Alameda Ave. and Loop 375 both make up higher percentages of total network delay compared to VMT, indicating that these roadways generate more delay relative to their usage. IH 10, US 54, and Montana Ave., on the other hand, have lower percentages of total network delay compared to total network VMT. This indicates that, while these roadways are expected to generate large amounts of delay annually, they produce less delay than would be expected based on usage.

TABLE 1.1: MAJOR HIGHWAY AND EMPHASIS CORRIDOR DELAY CHANGES; 2045

CORRIDOR	2045 DAILY VMT	% OF TOTAL NETWORK VMT	ANNUAL DELAY (VEHICLE HOURS)	% OF TOTAL NETWORK DELAY
Alameda Ave.	529,826	2%	829,355	3%
Doniphan Dr.	227,199	1%	240,962	1%
Dyer St.	290,550	1%	377,523	1%
N. Mesa St.	381,855	2%	712,966	2%
Montana Ave.	1,683,658	8%	1,870,205	6%
N. Loop Dr.	390,745	2%	644,918	2%
Paisano Dr.	194,383	1%	214,332	1%
P. Domenici Memorial Hwy	165,689	1%	201,073	1%
Zaragoza Rd.	365,158	2%	662,901	2%
Spur 601	272,249	1%	457,117	1%
Loop 375	3,224,437	14%	5,019,525	16%
IH 10	7,097,223	32%	8,112,238	26%
US 54	1,637,025	7%	1,860,092	6%
<i>Total Network</i>	<i>22,281,000</i>	<i>-</i>	<i>31,247,000</i>	<i>-</i>

All major highways and emphasis corridors are expected to experience percentage increases in annual delay that are higher than the percentage increase in delay for the entire network, with the exception of IH 10. In other words, when compared to the rest of the network, the emphasis corridors and major highways are anticipated to experience greater changes in congestion compared to the rest of the network if no improvements are made. The biggest increases in delay between the 2012 base year and 2045 forecast year occur along Doniphan Dr., Pete Domenici Memorial Highway, and Montana Ave., Dyer St., and Zaragoza Rd. Figure 1.5 above shows that these increases in congestion appear to be logical as some of the highest population and employment growth is expected to occur around these corridors. For example, there are several high employment and population growth areas immediately north of Montana Ave., just west of Loop 375. Sunland Park and the southern portions of Dona Ana County, adjacent to Pete Domenici Memorial Highway and west of Doniphan Dr., are also forecasted to experience significant population and employment growth. This growth will generate much more traffic along these roadways, and if no improvements are made beyond existing and committed projects, these roadways are anticipated to experience major increases in traffic congestion. Figures 1.6 and 1.7 below show the change in annual vehicles hours of delay between 2012 and 2045 for all major highways and emphasis corridors.



FIGURE 1.6: MAJOR HIGHWAY ANNUAL VEHICLE HOURS OF DELAY; 2012-2045

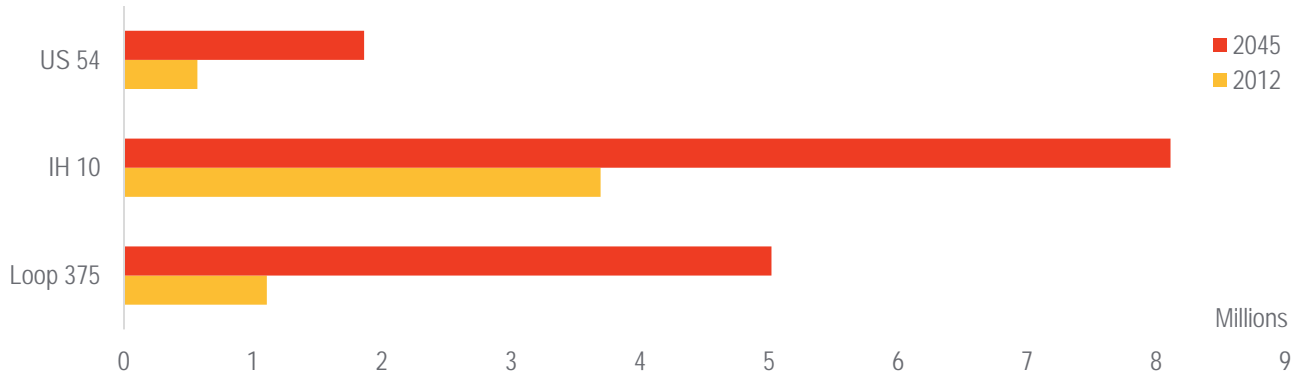
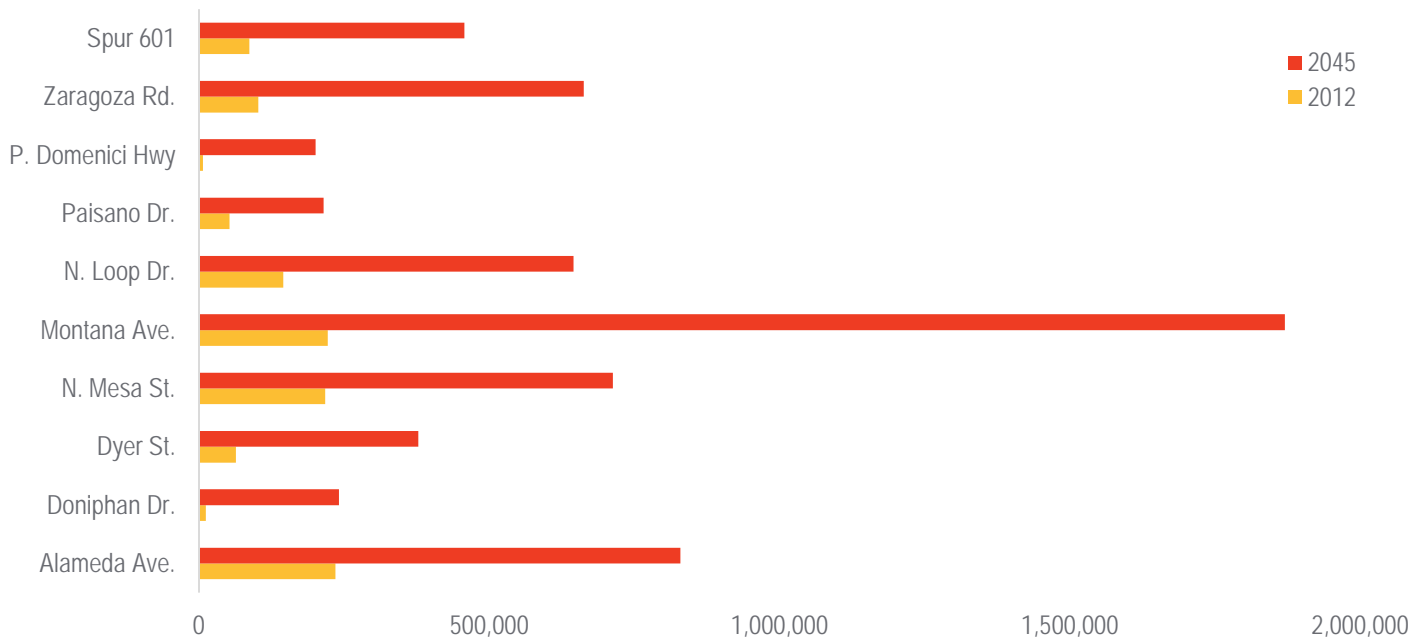


FIGURE 1.7: EMPHASIS CORRIDOR ANNUAL VEHICLE HOURS OF DELAY; 2012-2045





Congestion Hotspots

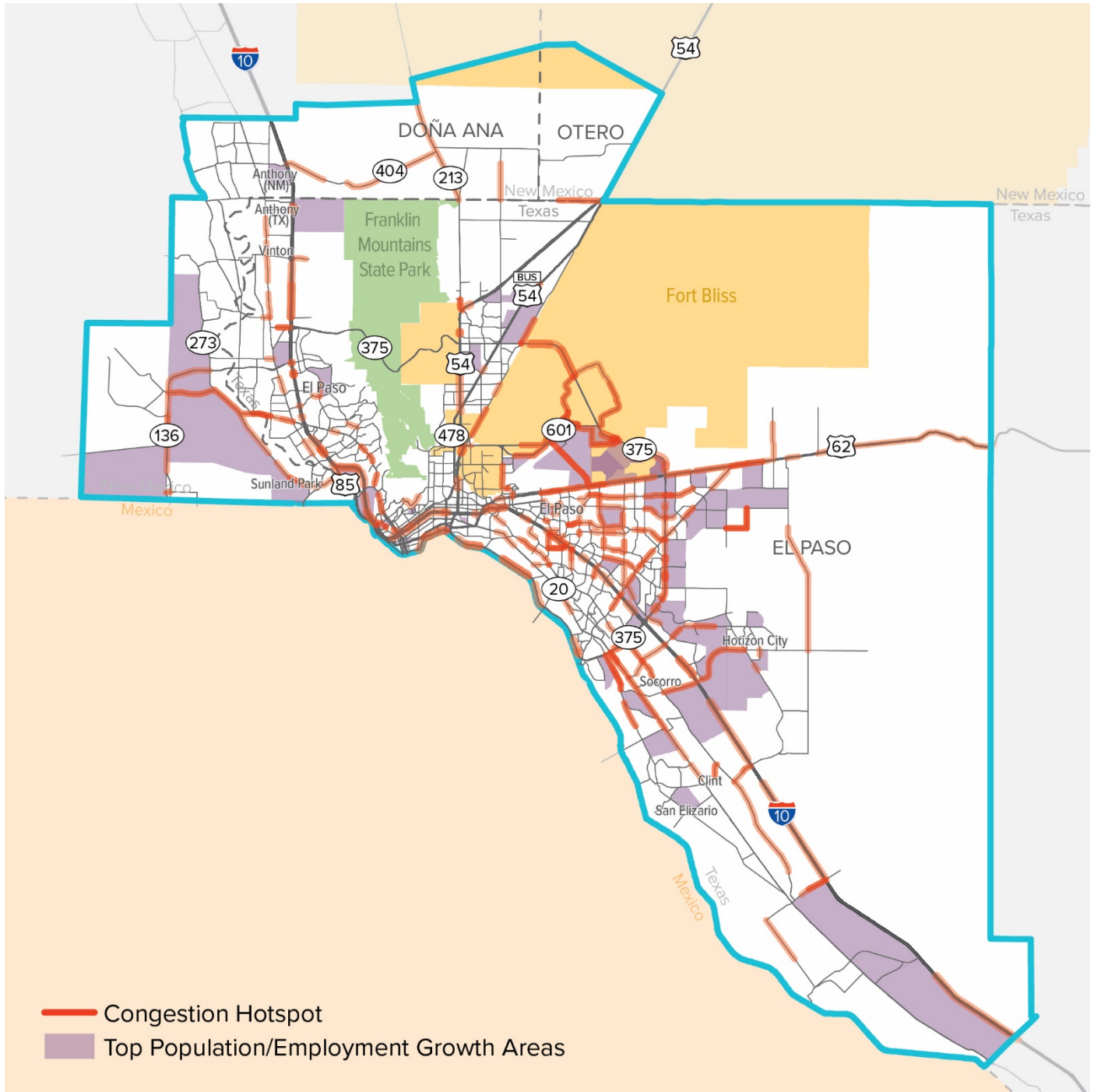
Analysis of TDM outputs and trends helps to set a baseline for performance and to determine which roadway facilities are anticipated to experience the largest increases in congestion. However, to further determine potential roadway needs, Destino 2045 combines the roadway performance measures with overlay analysis to pinpoint specific segments throughout the network that are expected to become major issues if they are not addressed by 2045. To identify these segments, the analysis identifies segments along the existing plus committed roadway network with the highest amount of delay, highest peak period V/C ratio, most VMT, and lowest speed index. The analysis first identifies segment in the top (or bottom in the case of speed index) 5% for each of these measures. Once this base set of segments was identified, overlay analysis was used to determine where segments that performed poorly for a given performance measure overlapped. Segments where there was overlap for multiple performance measures that were adjacent to each other were aggregated to form larger segments that were easier to define. This process was done separately for major highways and the remainder of the network. The result identifies the location of segments throughout the network that are anticipated to experience significant traffic, heavy congestion and slow speeds during peak periods, and/or many hours of delay compared to the rest of the region's network by 2045. Table 1.2 lists the top congestion hotspots for major highways and for the rest of the El Paso TDM existing plus committed network and summarizes roadway performance measures for each identified segment; Figure 1.8 shows the results of the performance measure overlay analysis.

TABLE 1.1: MAJOR HIGHWAY AND EMPHASIS CORRIDOR DELAY CHANGES; 2045

ROADWAY NAME	SEGMENT LIMITS	LENGTH	DAILY VMT	ANNUAL DELAY (VEHICLE HOURS)	AVERAGE MAX V/C RATIO	SPEED INDEX
Loop 375	Railroad Dr. - Sergeant Major Blvd.	6.9	143,753	568,120	1.29	0.52
Loop 375	Fonseca Dr. - S. Park St.	7.3	230,037	1,035,443	1.03	0.69
IH 10	Viscount Blvd. - Yarbrough Dr.	3.2	292,480	567,178	1.05	0.45
Loop 375	Spur 601 - Montana Ave.	8.7	193,075	533,232	1.02	0.45
US 54	Spur 601 Interchange	1.7	104,579	343,681	0.85	0.58
IH 10	Resler Dr. – 1 mi. east of IH 10	5.8	352,092	578,621	0.91	0.57
Loop 375	Alameda Ave. - N. Zaragoza Rd.	2.9	190,163	656,279	1.02	0.44
ARTERIALS AND OTHER ROADWAYS						
Montana Avenue	Hawkins Blvd. - Krag St.	11.5	494,786	1,517,444	1.3	0.5
Global Reach Drive	Montana Ave. - Sergeant Major Blvd.	3.5	192,174	732,927	1.5	0.4
Socorro Road	Loop 375 - Buford Rd.	1.9	39,375	157,007	1.7	0.4
Edgemere Boulevard	Yarbrough Dr. - Rich Beem Blvd.	5.2	179,045	517,692	1.3	0.5
Alameda Avenue	Loop 375 - Passmore Rd.	4.6	162,239	442,772	1.2	0.5
Sargeant Major Boulevard	Old Ironsides Dr. - North of Constitution Dr.	1.3	68,768	573,918	2.2	0.3
Country Club Road	McNutt Rd. - Doniphan Dr.	2.6	67,906	286,052	1.4	0.4



FIGURE 1.8: TOP CONGESTION HOTSPOTS; 2045





STAKEHOLDER FEEDBACK

Congestion in the region was also evaluated through Destino 2045 public visioning workshops, stakeholder outreach sessions, and an online survey. The following provides information gathered from these activities regarding the outlook on congestion and roadway performance.

- *Population Growth*: Accelerated growth in downtown El Paso and fringe areas (Sunland Park, Horizon City) is putting stress on current facilities.
- *Highway Accessibility & Mobility*: Highway infrastructure (namely IH 10, US 54, and Loop 375) currently provide inadequate access ramps and emergency lanes; accidents overwhelm the system and cause extreme levels of congestion. Congestion from accidents and peak hour traffic leads to spillover traffic on adjacent roadways.
- *Emphasis Corridors*: Stakeholders noted that congestion was generally the result of poor system connectivity, truck freight thru-traffic, and stress provided by downtown growth and University of Texas El Paso's (UTEP) population presence. Stakeholders representing cities/villages outside of the El Paso city limits (Socorro, Vinton) noted that the increase in housing and car ownership has put stress on local farm roads, resulting in longer commute times. Feedback consistently noted congestion issues on the following roadways:
 - > Mesa Street
 - > IH 10 ramps/interchanges
 - > Doniphan Drive
 - > Paisano Drive
 - > Stanton Street
 - > Zaragoza Road
 - > Vinton Road

Survey Results: The majority of visioning survey respondents (71%) believed that congestion needs were a top priority region wide; the Central El Paso (74%) and West Valley (71%) sub-regions had the highest respondent rates prioritizing congestion needs. Most respondents (86%) agreed with maps of forecasted V/C ratios provided during the public visioning workshops. Furthermore, 61% of respondents believed that automobiles in the El Paso study area would be inadequately served in the next 28 years.

CONCLUSIONS

Analysis shows the El Paso MPO region is currently experiencing moderate congestion along major highways. The region is unique in that its roadway network is constrained by geographic and jurisdictional barriers, such as the Franklin Mountains, Fort Bliss, and the international border with Mexico. The region will continue to experience traffic pressure from a growing central population, developing fringe area, and a substantial population located across the border in Ciudad Juarez. Overall, if nothing is done to improve the region's roadway network, the traffic generated from population growth, particularly growth outside of the City of El Paso, will inevitably cause significant congestion throughout the network, leading to millions of hours of additional time wasted in traffic.