

## Existing LBJ Traffic Conditions and Motorist Travel Characteristics

This Chapter summarizes data collected pertaining to existing traffic counts and travel characteristics in the proposed LBJ Managed Lanes Corridor. This included a comprehensive traffic count program, extensive route reconnaissance investigations and conduct of vehicle occupancy counts along the LBJ Corridor. A summary of motorists travel pattern and trip characteristic surveys conducted specifically for the LBJ managed lanes analysis is also presented in this chapter. This data was used as key inputs to the model calibration process so that more reasonable estimates of the proposed facility's traffic and revenue potential could be developed.

### LBJ Traffic Data Collection Plan

To develop the traffic volume data needed for this study, an extensive set of traffic count locations was identified at critical locations in the LBJ Corridor, these included:

- All Ramps to the LBJ general purpose (GP) lanes;
- Access points for the LBJ HOV lanes;
- Frontage Road locations; and
- Parallel facilities that represent competing corridors.

Specific classes and numbers of traffic counting sites selected for inclusion in the study are listed below:

- 90 ramp and frontage road locations for 48-hour continuous counts;
- 26 ramp and frontage road locations for seven-day continuous counts;
- 60 intersections for manual counts between 6:00 to 9:00 a.m. and 5:00 to 7:00 p.m.; and
- 4 main lane locations for manual counts between 5:00 a.m. to 9:00 p.m.

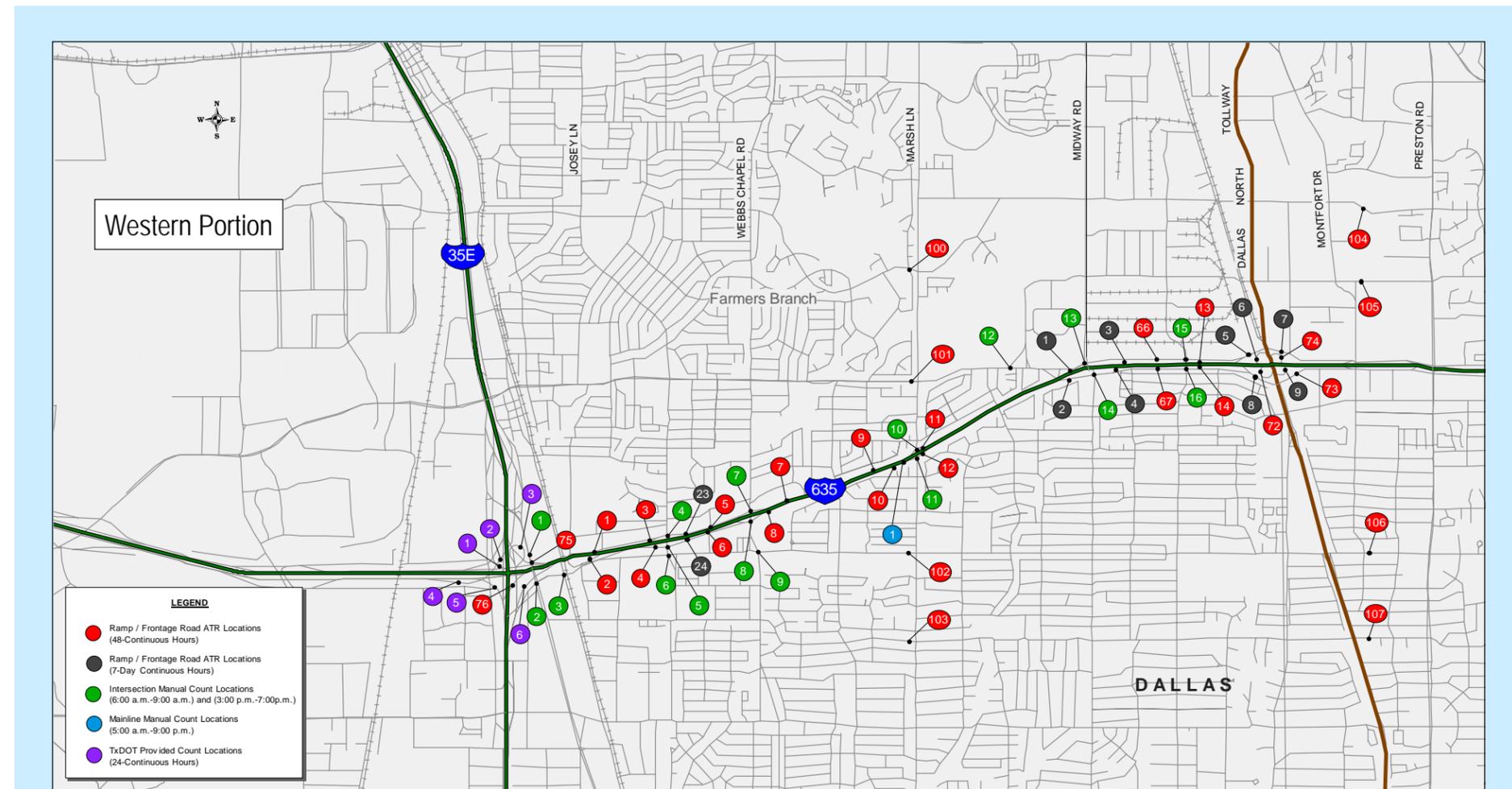
Figure 2-1, Traffic Count Locations, identifies the locations of all the traffic count sites by type of data collected:

- 48-hour, continuous;
- 7-day, continuous;
- Intersection, manual, peak period;
- GP lanes, manual, 5:00 a.m. – 9:00 p.m.; and
- TxDOT data, 24-hour, continuous.

Traffic counts were compiled during the months of October and November 2000. The count sites represent all exit and entrance ramps along the study segment. Counts were also collected at the intersections of several parallel arterial streets. Frontage road sites as well as sites in the GP lanes of the LBJ Freeway were also included in the data collection effort. Additional counts were obtained from TxDOT on seven exit and entrance ramps at IH-35E, three GP lane locations, and one exit ramp to U. S. 75.

### LBJ Traffic Profile

During the conduct of this comprehensive study, construction was underway on the Dallas High Five project (US 75 Interchange) which impacted travel along the existing LBJ Freeway. Thus it was not appropriate to conduct updated 2003 traffic counts



TRAFFIC COUNT LOCATIONS

Figure 2-1

on the LBJ.

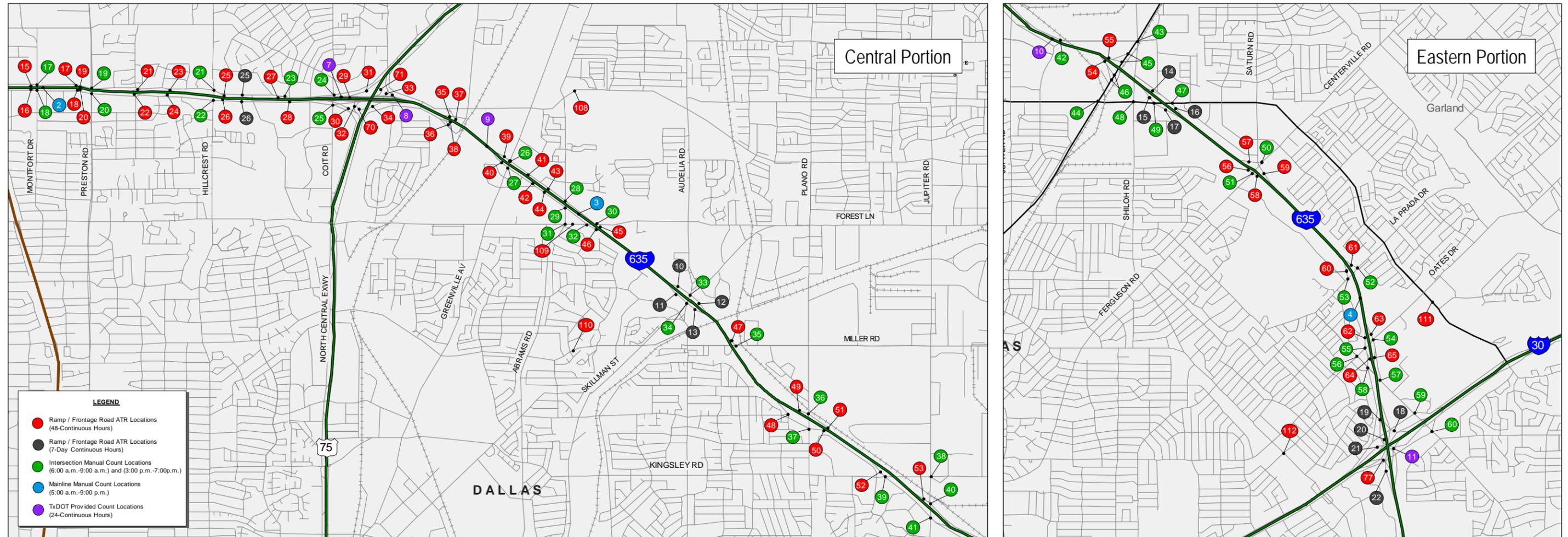
Utilizing the 2000 traffic count data described above, an updated 2003 traffic volume profile was developed for the existing LBJ. Employing the latest NCTCOG Mobility 2025 models, 2000 and 2003 trip tables were developed. Traffic assignments were run using these two trip tables on the latest 2003 network in order to calculate levels of growth along the existing LBJ. These updated levels of growth were then applied to the original 2000 LBJ traffic volume profile to calculate an updated 2003 LBJ traffic volume profile.

Figures 2-2 and 2-3 provide a summary on the balanced weekday average hourly traffic by period for each respective travel direction. The average hourly volume is obtained by averaging the total counts by the number of hours represented in each

period. The travel periods are defined as covering the hours of:

- A.M. (6:00 – 9:00 a.m.);
- Midday (9:00 a.m. – 3:00 p.m.);
- P.M. (3:00 – 7:00 p.m.); and
- Nighttime (7:00 p.m. – 6:00 a.m.).

The highest traffic volumes are recorded between IH-35E and US 75 for both eastbound and westbound travel in all four travel periods. In the eastbound direction, a sharp increase in travel occurs on the LBJ Freeway after the IH-35 Interchange. There is similar travel behavior in the westbound direction where heavy traffic volumes concentrate between US 75 and IH-35E. West of IH-35E, on the westbound side, there is a substantial decrease in travel on the LBJ Freeway at the point be-



**SURVEY STATION LOCATION MAP**

**Figure 2-1 (Cont'd)**

tween the respective exits and entrances as a result of traffic exiting onto IH-35E.

As one might expect, there are similar declines in traffic at the exits, which lead to the major interchanges for the Dallas North Tollway (DNT) and US 75. Correspondingly, there is a sharp increase in traffic registered in traffic volumes on the entrances from these facilities onto the LBJ Freeway.

As Figure 2-2 shows in the P.M. peak period eastbound direction, traffic volumes remain relatively high all along the LBJ Freeway study segment. In the eastbound direction, in the vicinity of Luna to Preston Roads, hourly volumes of A.M., Midday, and P.M. time periods are generally within a 1,000 vehicles per hour difference. However, in the P.M. peak period eastbound direction, after the interchange at US 75, the traffic volumes remain high, averaging between 6,000 to 8,000 vehicles per hour. A.M. and midday average hourly traffic flow lowers to between 3,000 and 4,000 vehicles per hour. Nighttime period traffic volumes remain low and steady in both directions.

In the westbound direction A. M. peak travel volumes are shown to vary widely between 4,000 and 9,000 vehicles per hour over the entire length as indicated in Figure 2-3. The midday and P.M. traffic volume flow shows a similar level but are separated by approximately 1,000 vehicles per hour. The P.M. peak traffic varies from 4,000 vehicles per hour in the vicinity of Town East to a high of 8,000 vehicles per hour near I-35. Midday volumes follow similar patterns. Nighttime period volumes are relatively flat at about 2,000 vehicles per hour throughout the LBJ Freeway.

A summary of these 2003 LBJ mainline traffic volumes is presented graphically in Figure 2-4. Mainline traffic volumes are depicted for the AM Peak, Midday, PM Peak and nighttime periods as well as for total weekday for both eastbound and westbound travel directions.

**Current LBJ Freeway Travel Speeds**

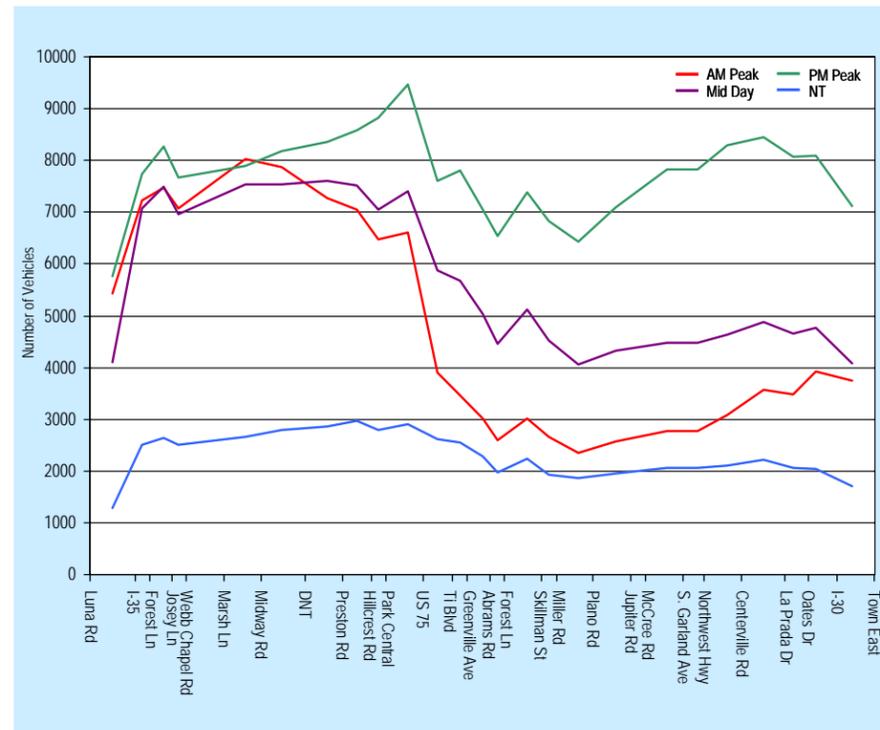
Speed and delay runs were conducted along the LBJ study area segment during the A.M. period from 6:00 until 10:00 a.m. In the P.M. period, data was collected from

2:00 through 7:00 p.m. This data was collected October 25 and 26, 2000. Again it must be noted that due to the High Five construction, updated speed/delay runs were not conducted as part of the comprehensive work program. However, recognizing the maturity of the LBJ facility, travel speed information gathered in 2000 would provide similar results as those expected in 2003, in the absence of construction.

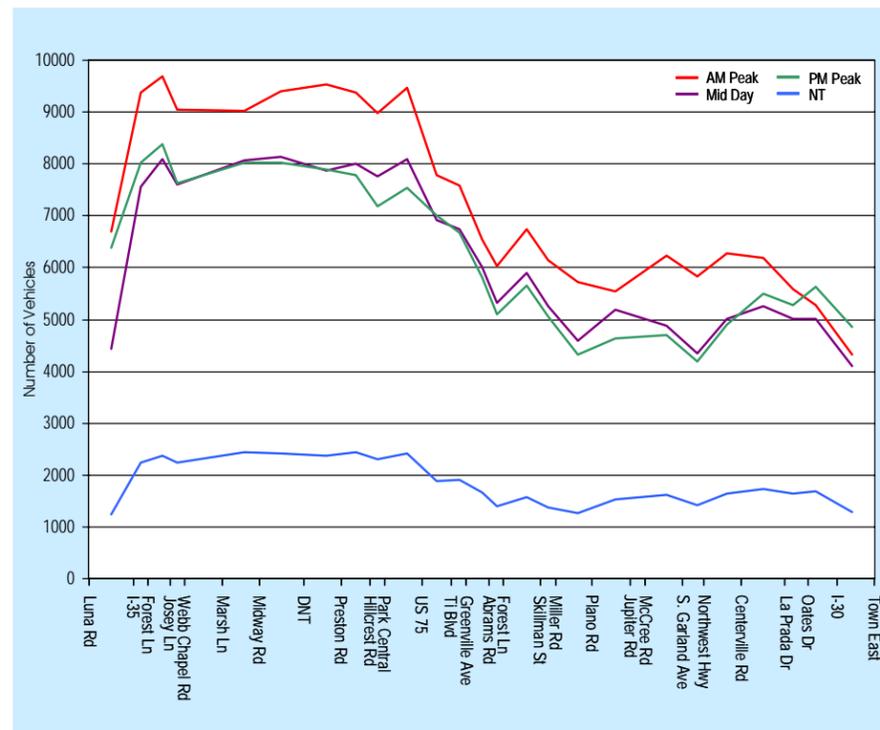
Speed and delay runs on six competing parallel arterials were also carried out during the A.M and P.M periods on October 13, October 16-19, and November 6-8, 2000.

Figures 2-5 to 2-8 illustrate the data collected on the speed/delay runs by direction and period. It is compiled as travel speed versus distance on the LBJ general purpose lanes in the A.M. and P.M. travel periods in both directions. The runs shown in Figures 2-5 through 2-8 were selected from total data collected to best represent a typical weekday condition.

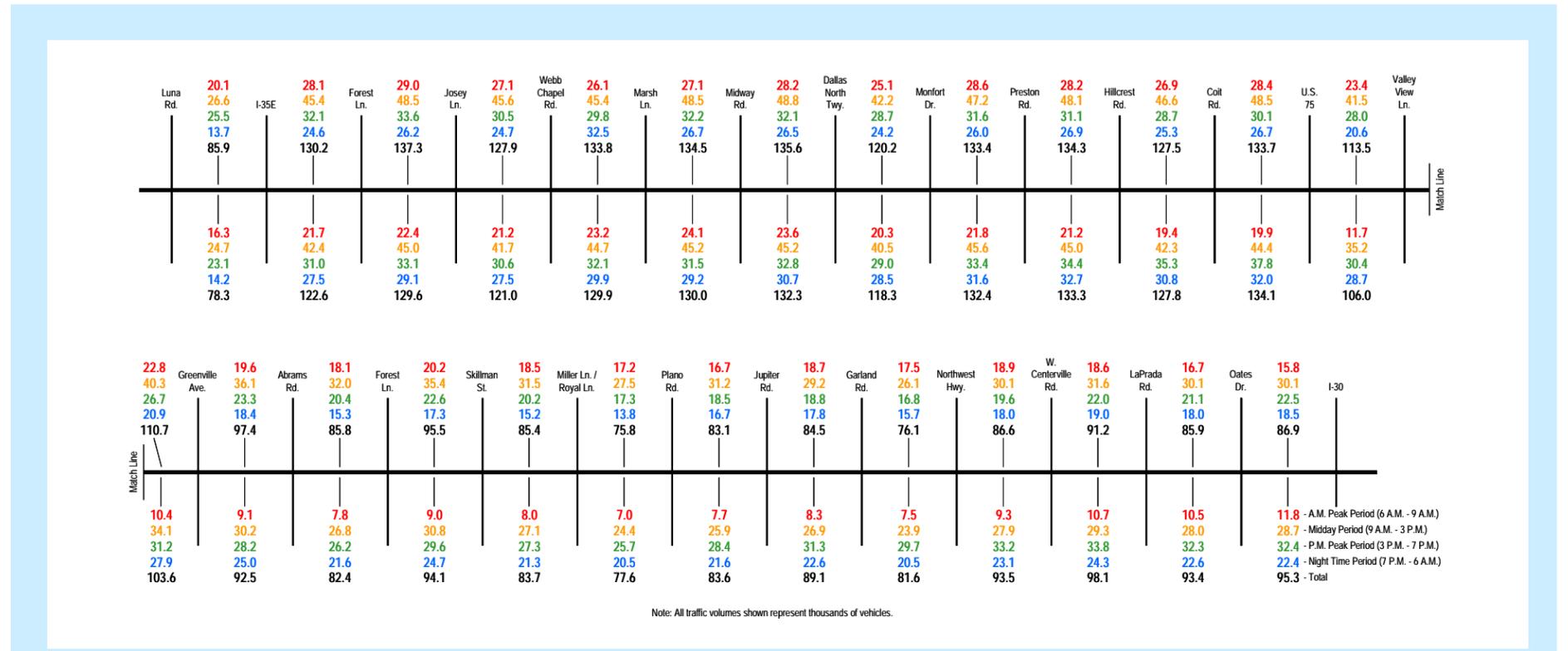
In the eastbound A.M. period, travel speed along IH-35 DNT is relatively low, i.e.,



LBJ EB WEEKDAY HOURLY TRAFFIC BY PERIOD Figure 2-2



LBJ WB WEEKDAY HOURLY TRAFFIC BY PERIOD Figure 2-3



2003 LBJ AVERAGE WEEKDAY TRAFFIC VOLUMES BY PERIOD Figure 2-4

between 13 to 50 mph. After the DNT Interchange, speed increases to 50 to 70 mph, and then there is a slight drop in speed in the vicinity of Interchange US 75 to 45 mph. Over the balance of the corridor, speed is maintained between 50 to 70 mph.

In the eastbound P.M. peak, the travel speed is much lower than the A.M. peak period. Between IH-35 and US 75, the travel speed is between 10 to 45 mph. After US 75, there is a gradual increase in travel speed to 70 mph. Traffic slows to 15 to 40 mph between Abrams Road and Northwest Highway. Then the speed levels out to between 50 to 60 mph through the end of the study segment. Overall, the eastbound p.m. peak displays a more congested traffic pattern and a lower travel speed than the eastbound a.m. peak period.

In the westbound direction, the A.M. peak period has a much slower travel speed than the P.M. peak period. At many of the interchanges, e.g., I.H.-30, Abrams Road, US 75 and Webb Chapel Road, the travel speed drops to as low as 10 mph. There are several short sections where travel speeds of more than 50 mph are experienced, e.g., between Josey Road and Plano Road, Hillcrest Road and Midway Road, and after IH-35.

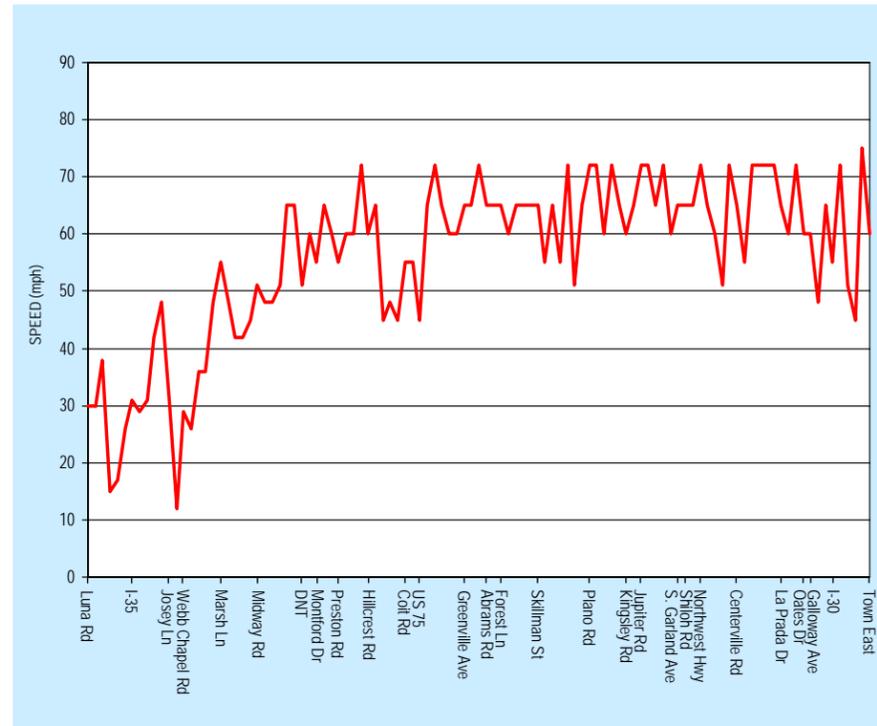
In the P.M. peak period, the speed is relatively steady. Between I.H. 30 to Dallas North Tollway (DNT), the typical speed is between 50 to 70 mph. Between the DNT

and IH 35, speed decreases to between 15 to 50 mph. After the IH-35 Interchange, travel speed returns to approximately 60 mph.

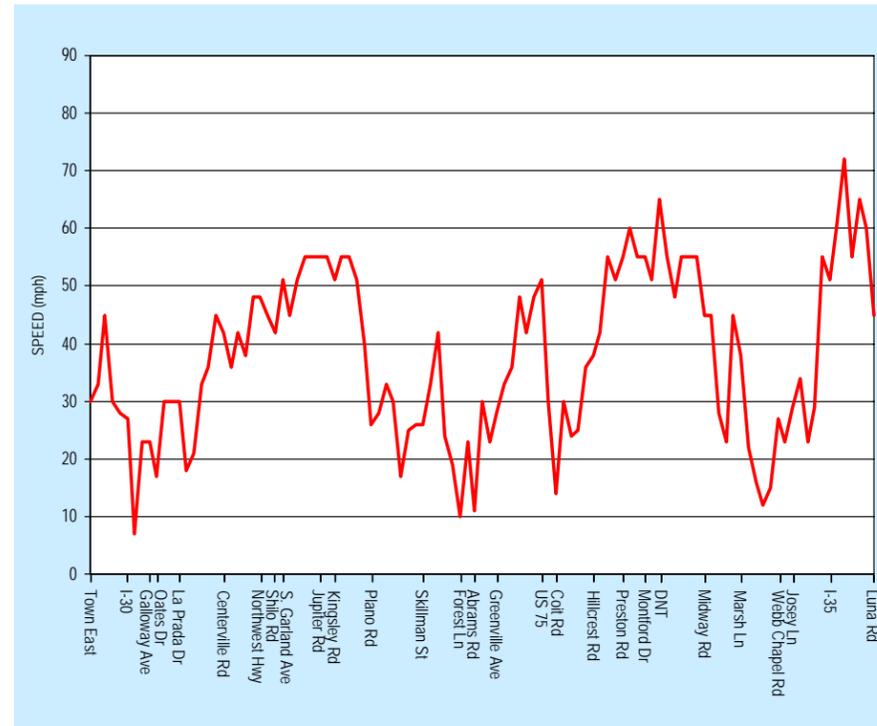
Figures 2-9 to 2-12 illustrate the speed and delay runs in a time versus distance relationship. The runs shown were selected to represent the typical characteristics of the A.M. and P.M. travel periods. The A.M. westbound and P.M. eastbound direction require a travel time between 20 to 54 minutes to travel between Luna Road to Town East Boulevard. Yet during the A.M. eastbound and P.M. westbound directions, the average travel time is between 19 to 33 minutes.

In the westbound direction during the A.M. time period, there is a substantial jump in travel times for both the 6:50 and the 7:50 a.m. runs, although the 7:50 a.m. run shows the highest increase in travel times in this section of the LBJ. With the exception of the run made at 9:43 a.m., all the runs show a strong increase in travel times after the Northwest Highway over the balance of the corridor, with a second marked increase in the vicinity of Midway.

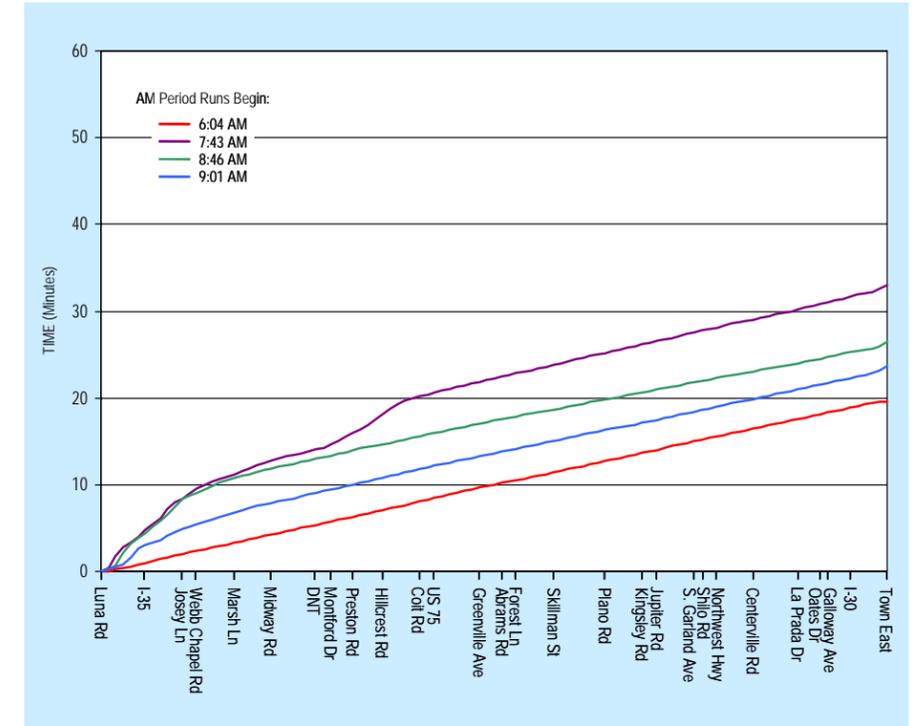
In the eastbound direction the runs shown began over a period running from 2:00 through 5:55 p.m. The 2:00 p.m. run shows a steady rate of travel time increase over the entire length, in proportion to distance traveled, indicating that the P.M. "rush hour" traffic has yet to begin. The full eastbound trip from Luna Road to Town East



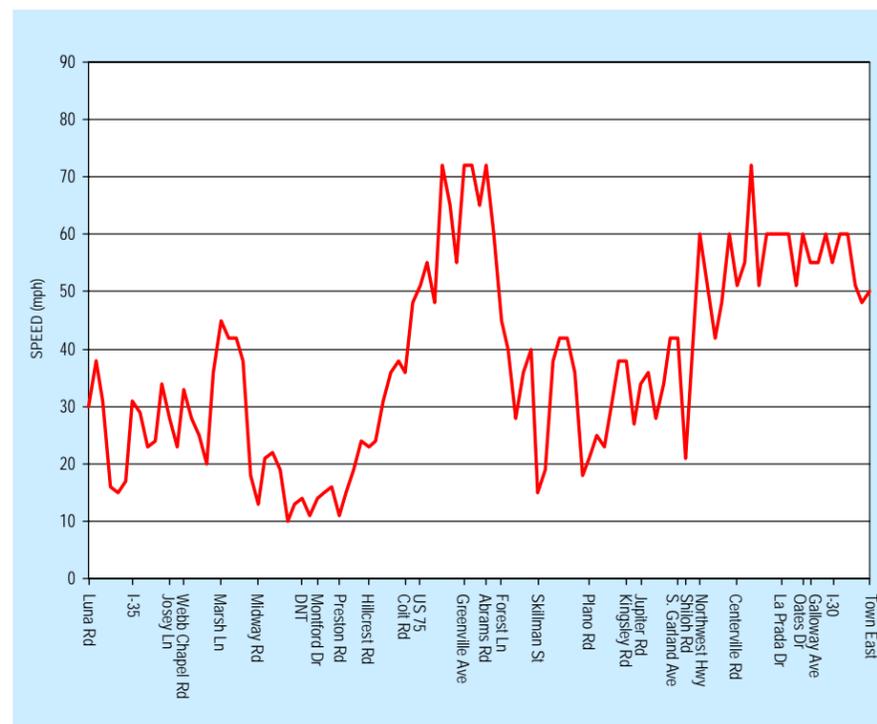
LBJ TRAVEL SPEEDS - A.M. Peak Period Eastbound Figure 2-5



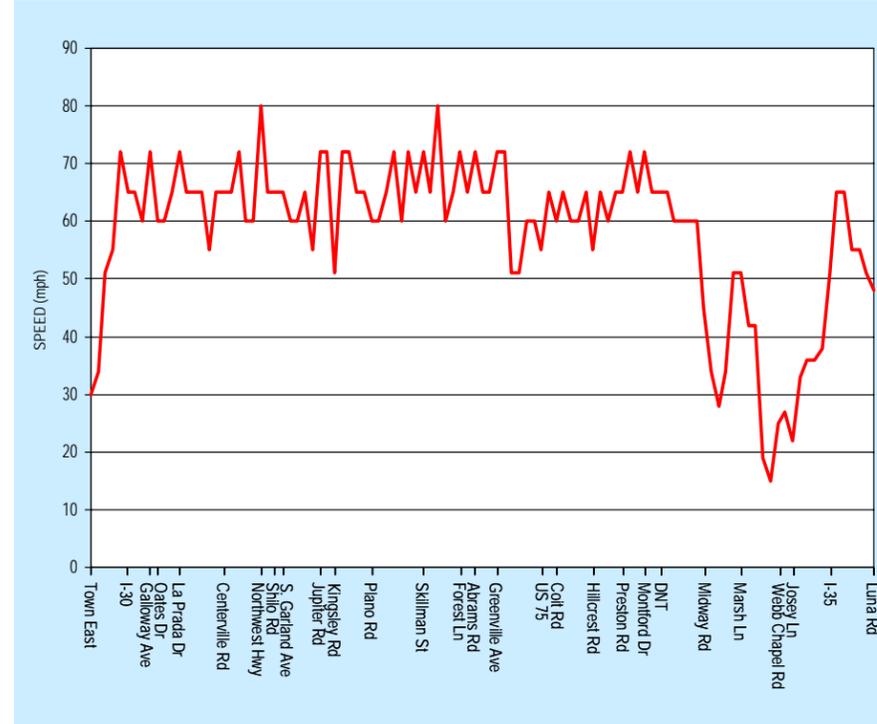
LBJ TRAVEL SPEEDS - A.M. Peak Period Westbound Figure 2-7



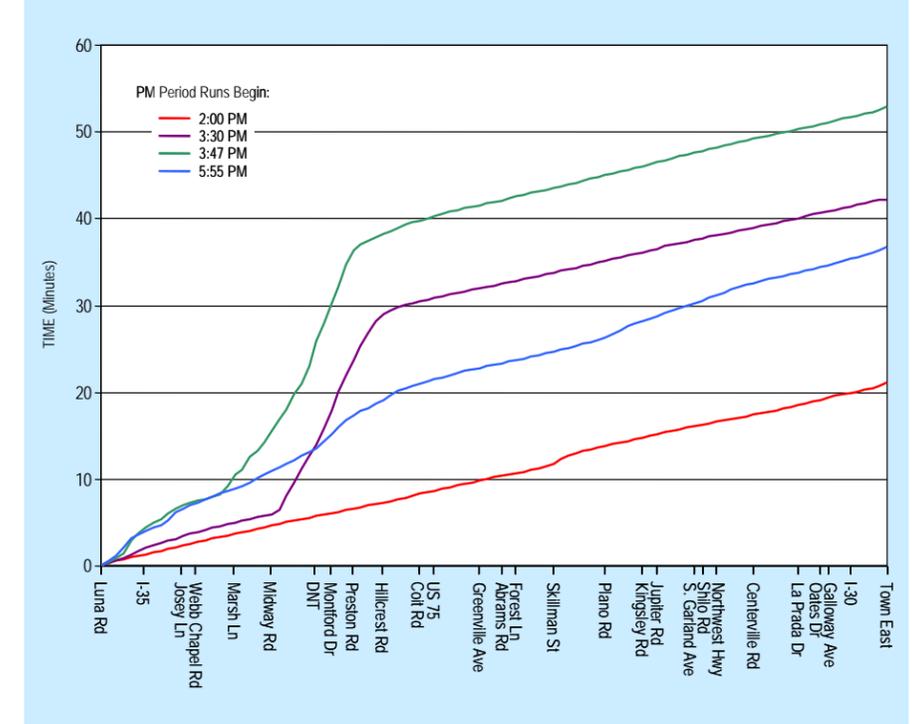
LBJ TRAVEL TIMES - A.M. Eastbound Figure 2-9



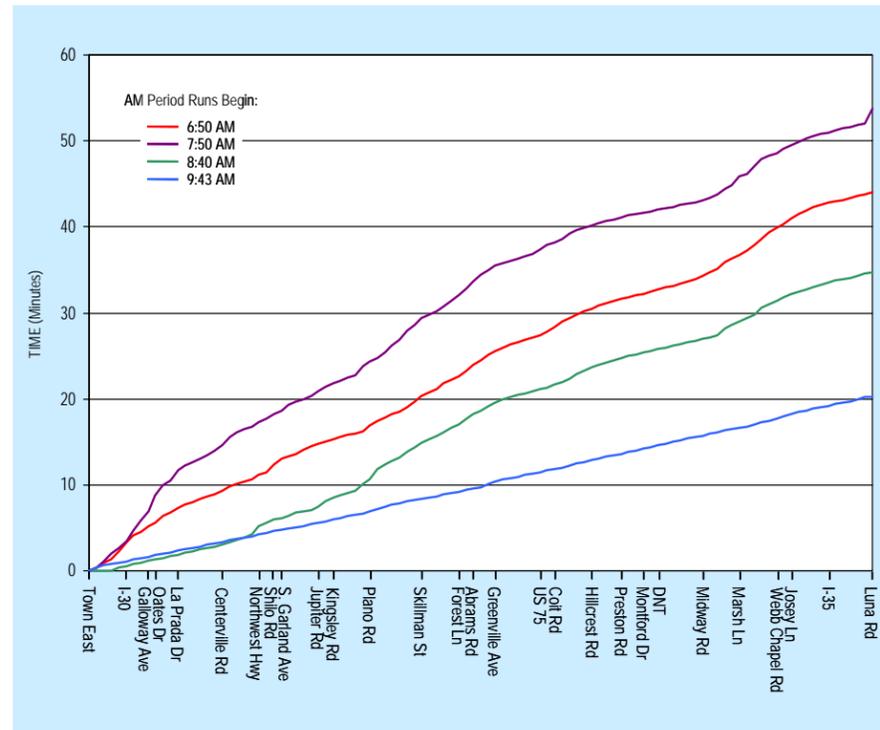
LBJ TRAVEL SPEEDS - P.M. Peak Period Eastbound Figure 2-6



LBJ TRAVEL SPEEDS - P.M. Peak Period Westbound Figure 2-8

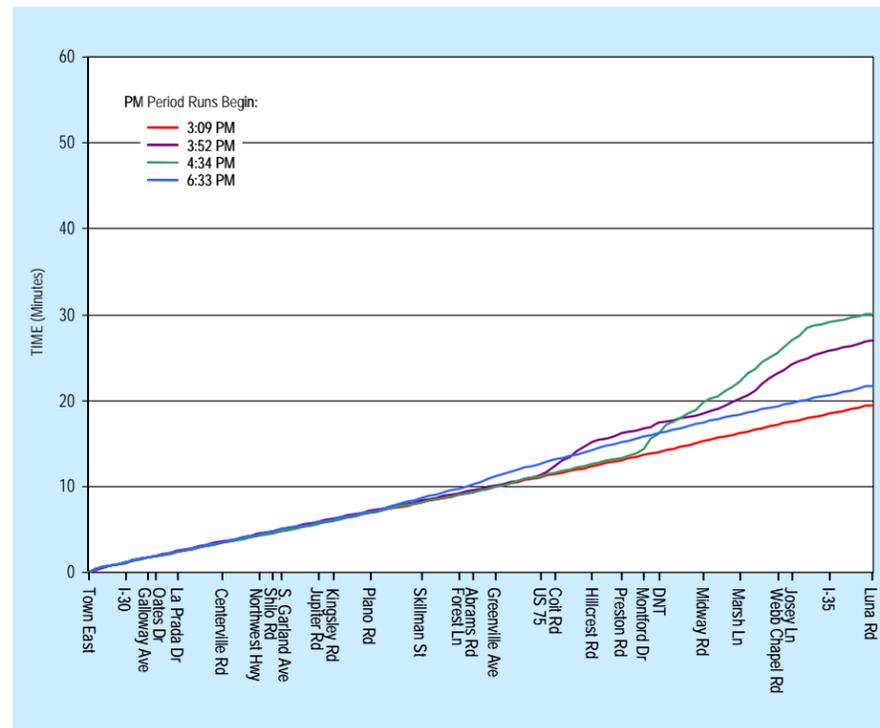


LBJ TRAVEL TIMES - P.M. Eastbound Figure 2-10



LBJ TRAVEL TIMES - A.M. Westbound

Figure 2-11



LBJ TRAVEL TIMES - P.M. Westbound

Figure 2-12

took about 21 minutes. The three later runs show a jump in travel time in the vicinity of the DNT and then show a steady rise in travel times thereafter.

These three runs took between 37 and 53 minutes. This means that had the managed lanes been in place, a user could have saved between 16 and 33 minutes for a full length trip; as compared to the general purpose lanes. In fact, most of this savings would occur in the western half of the trip.

In the westbound direction during the P.M. period, a selection of the travel runs that were made are shown in Figure 2-12. The runs made began at times running from 3:09 through 6:33 p.m. The run initiated at 3:09 p.m. shows relatively steady increase in travel time over the entire length of the study segment. The run stated at 6:33 p.m. shows a small increase in travel time in the vicinity of Abrams Road, but otherwise shows a relatively steady rate increase.

The two remaining intermediate runs made at 3:52 and 4:34 p.m. show the effects of rush hour travel by indicating sharp increases in travel time at US 75 and Marsh Lane for the 3:52 p.m. run and at the DNT and Marsh Lane for the 4:34 p.m. run.

#### Vehicle Occupancy Distribution

A vehicle occupancy survey was undertaken along existing LBJ. Occupancy counts were conducted in the vicinity of Rosser and LBJ by WSA in October 2003. Occupancy counts were conducted between the hours of 7:00 and 10:00 a.m., 11:00 a.m. and 1:00 p.m. and 3:00 and 7:00 p.m. on an average weekday.

Figure 2-13 presents a summary of vehicle occupancy distributions for the a.m., mid-day and p.m. peak periods of travel. As shown in Figure 2-13 single occupant vehicles are the overwhelming majority in all periods, representing 81, 78 and 80 percent, respectively, in the eastbound direction and 79, 82 and 76 percent, respectively, in the westbound direction.

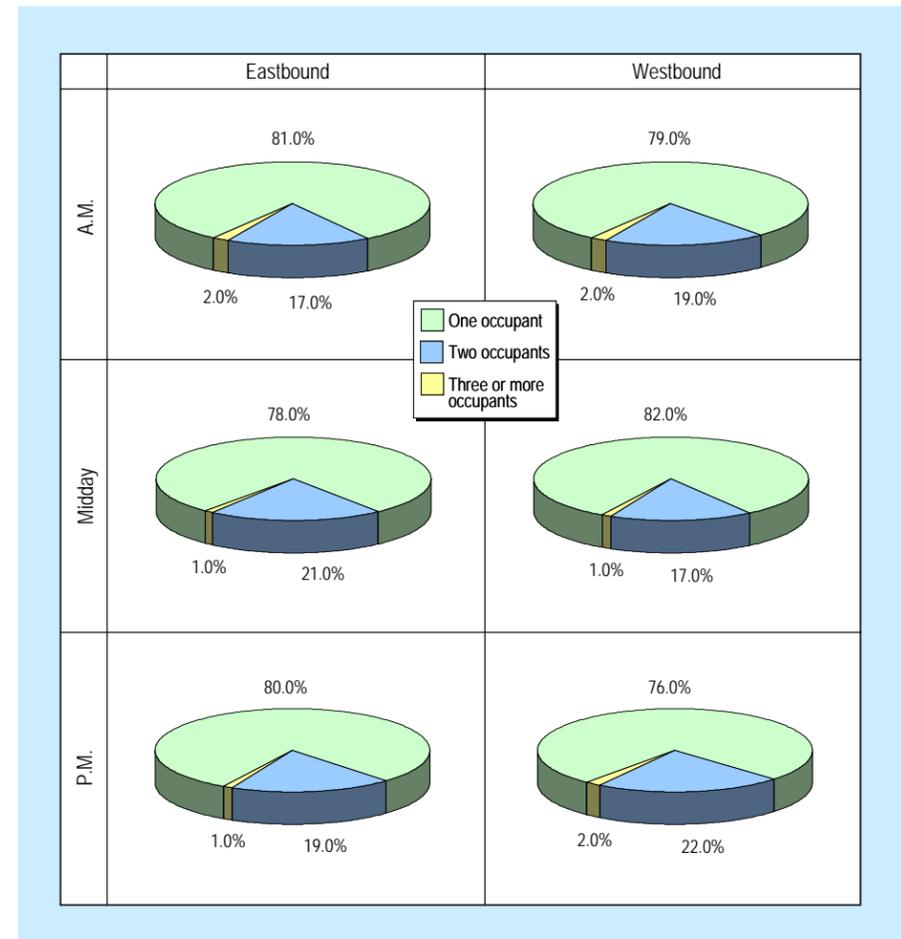
Vehicles with two occupants equated between 17 and 21 percent eastbound and 17 and 22 percent westbound. Vehicles with three or more occupants represent between 1 and 2 percent of total vehicles during all travel periods.

#### Motorist Travel Pattern and Trip Characteristic Survey

The conduct of detailed motorist travel pattern and trip characteristic survey's (O/D's) is the first step in the development of the requisite data base needed to assist in the detailed modeling analysis. In order to obtain the pertinent O/D information required in the proposed LBJ Corridor, WSA set out to conduct operations at 10 survey sites. These locations were strategically identified for their relevance to the specific project corridor in which it was being conducted. The locations are represented graphically on Figure 2-14 showing the individual locations.

#### O/D Survey Methodology

Two origin and destination survey formats were employed to obtain the necessary data. The first was a license plate capture approach designed to intercept motorist



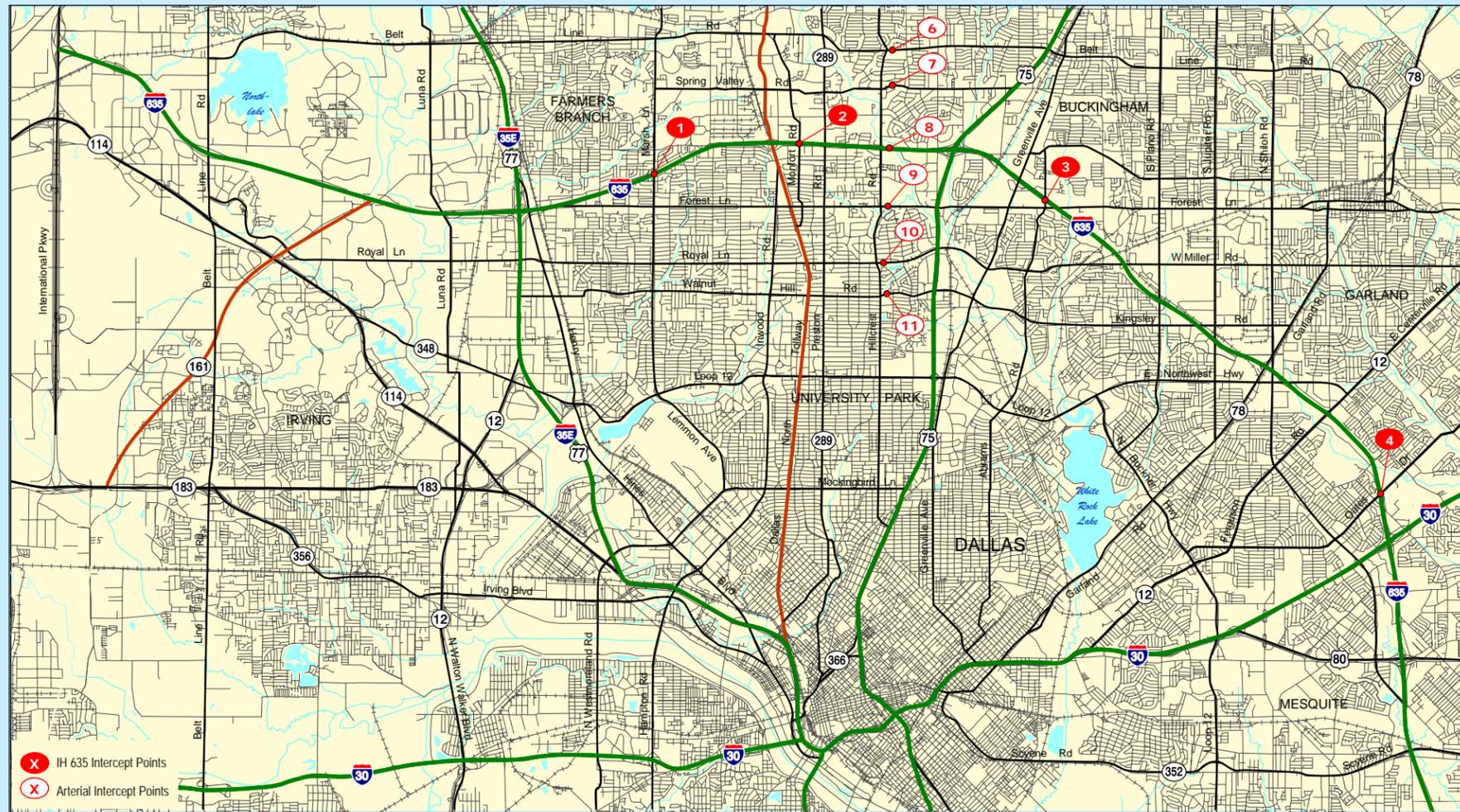
VEHICLE OCCUPANCY DISTRIBUTION

Figure 2-13

traveling along the mainlanes of the LBJ Freeway between IH 35E and IH 30. This approach was utilized to minimize impacts on mobility along this heavily traveled interstate highway. The second was a mailback handout format that was employed at arterial survey locations. Under this mailback handout approach survey questionnaires were distributed to motorists during the red cycles of signals at selected intersections along the study corridor. The following is a detailed description of the survey methodology which was employed for these two traffic components.

**LBJ Freeway Mainlane Locations** - A video license plate capture survey format was used at these locations. Video cameras were positioned on overpasses at the locations shown in Figure 2-14. Individual video cameras would be trained on each of the mainlanes passing the LBJ segments. At Stations 1 and 4 license plates were captured in both travel directions, at Station 2 eastbound only and Station 3 westbound only. The captured license plate information was entered into data files and forwarded to WSA.

WSA then removed any "duplicate" plates from the raw data base file of observed



**SURVEY STATION LOCATION MAP**

**Figure 2-14**

license plates. This final data base of license plates was then forwarded to TTD, who then matched the observed license plates with a Department of Public Safety (DPS) data base of vehicle owners. The names and addresses of vehicle owners were added to the file provided by WSA and forwarded to a qualified mailing house who then forwarded postage-paid, pre-addressed mailback survey questionnaires to motorists. Motorists were asked to complete the form and return it via mail as soon as possible.

**Existing Arterial Locations** - At these locations a mailback survey approach was employed. Under this approach, survey sites would be set up at the selected intersection locations shown in Figure 2-14. Traffic Survey Ahead warning signs were positioned along the approach to the intersections advising motorists of the survey operation ahead. When the traffic signal turned red survey personnel passed among

the stopped vehicles and distributed postage-paid, pre-addressed mailback survey questionnaires. When the traffic signal turned green survey personnel exited the intersections and motorists passed unimpeded. They were requested to complete the form and return it via mail as soon as possible. At these six locations vehicles were intercepted in the westbound direction only east of Hillcrest Road.

Under both survey approaches the survey questionnaires were setup so that the survey remained anonymous with no linkage between the motorist and the questionnaire. Motorists were queried as to their trip origin and destination. In addition, information regarding trip purpose, trip frequency and vehicle occupancy was obtained. The hour, day and direction of each survey was also indicated on the survey questionnaire. Surveys were conducted on weekdays only from 7:00 a.m. to 7:00 p.m. The two specific survey instruments used to sample these two components of the

7	Dear Motorist: The Texas Turnpike Division and the Dallas District of the Texas Department of Transportation (TxDOT) is embarking on important transportation initiatives aimed at improving mobility along the IH 635 travel corridor. To accomplish this, TxDOT is undertaking this important travel pattern and trip characteristic survey. TxDOT is soliciting your assistance by requesting information regarding today's one-way trip. Please complete the questionnaire below and drop it in the mail at your earliest convenience. Postage is pre-paid. Please help make this survey a success by completing and returning the form today. Thank you for your participation.									
8										
9	A. Where did you start this trip (in this direction) today? Please be as specific as possible. (If you do not know the street address please identify the nearest intersection, airport, shopping center, etc.)									
10	Street address or Nearest Intersection _____									
10	City or Town _____		County (if known) _____		State _____		Zip Code (if known) _____			
11	B. Where did you end this trip (in this direction) today? Please be as specific as possible. (If you do not know the street address please identify the nearest intersection, airport, shopping center, etc.) <u>This should not be the same as answer to Question A.</u>									
12	Street address or Nearest Intersection _____									
12	City or Town _____		County (if known) _____		State _____		Zip Code (if known) _____			
13	C. What was the purpose of this particular trip? (Circle one)									
13	1. To / From Work		3. Personal Business		5. Shopping		7. Social			
13	2. Company Business		4. School		6. Recreation		8. Other			
14	D. How many times per week do you make this trip in this direction? (Circle one)									
14	Less than 1		1		2		3		4 5 6 or more	
15	E. Including yourself, how many people were in your vehicle? Please include children (Circle one)									
15	1		2		3		4		5 6 or more	
16	F. Please identify the type of vehicle you were driving. (Circle one)									
16	1. Passenger Car or Motorcycle			3. Three-axle Truck or Bus			5. Truck with Five or More Axles			
16	2. Two-axle Truck or Bus			4. Four-axle Truck						
17	G. Do you, or others in your family, currently have a TollTag transponder? (Circle one)									
17	1. Yes		2. No							
17	H. Before construction began on the IH 635 / US 75 interchange did you previously use IH 635 to make this same trip? (Circle one)									
17	1. Yes		2. No							
18	0	6	4							
18	STA.	DAY	DIR.	HR.	C	D	E	F	G	H

**ARTERIAL SURVEY FORM**

**Figure 2-15**

traveling public are presented in Figures 2-15 and 2-16.

**Survey Sample Size**

The locations of the survey stations, as well as the passing and interviewed traffic totals, by date of survey operation are presented in Table 2-1. Surveys distributed



gories.

**Trip Frequency Distribution** - Motorists making their trip five or more times per week equated 57.6 percent of all those responding at the LBJ survey locations during the peak periods. At the arterial survey sites respondents making their trip five or more times per week equated 69.6. This relates closely to the high percentage of work trips mentioned above. During off-peak periods trip frequency rates dropped dramatically with 5 or more times per week reaching only 18.1 and 36.5 percent at the LBJ and arterial sites, respectively.

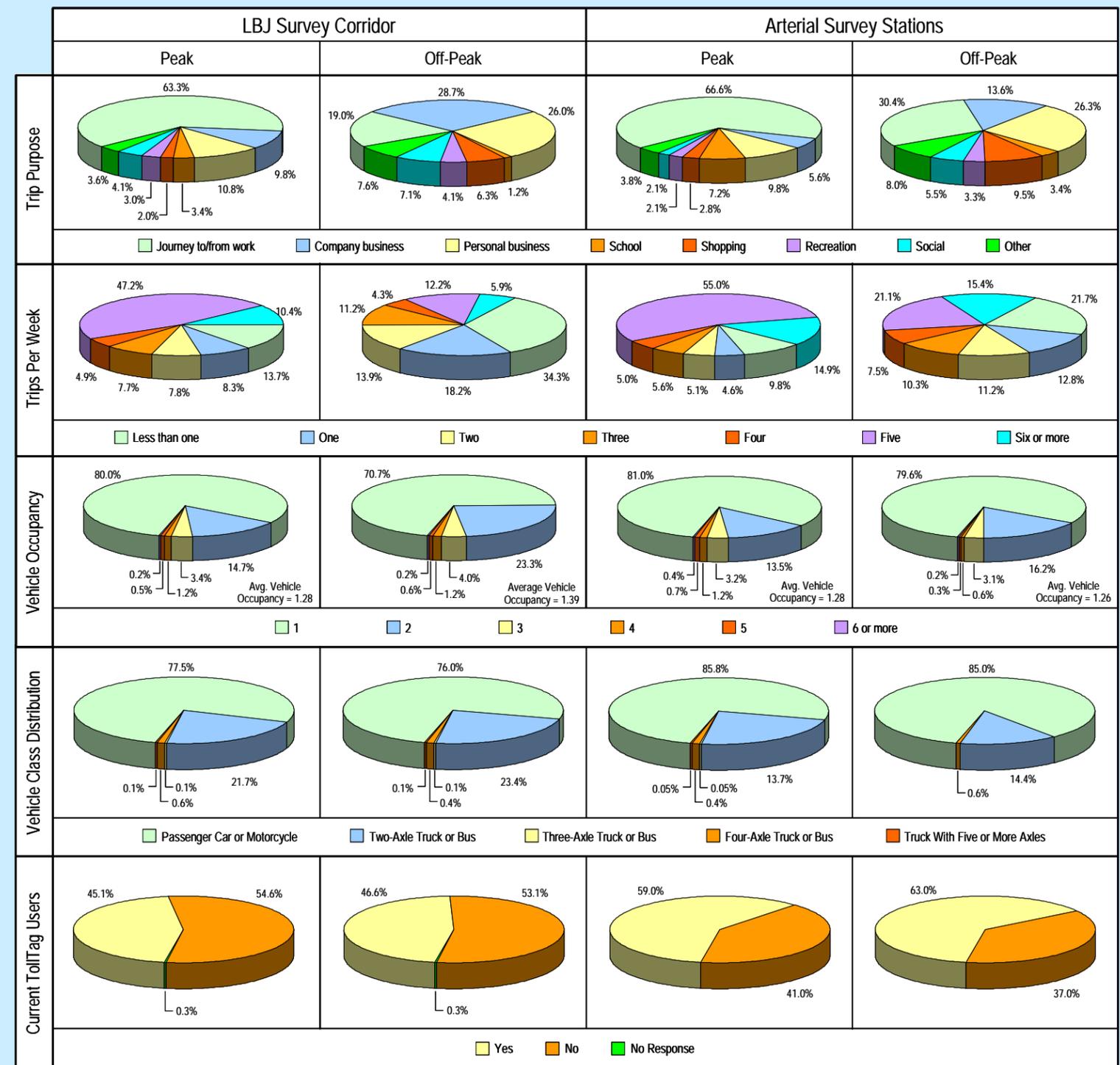
**Vehicle Occupancy Distribution** - Figure 2-17 indicates potential LBJ managed lanes patrons like to drive alone. An overwhelming majority, 80 percent of LBJ and 81 percent of arterial survey site respondents have only one occupant during peak travel periods and 70.7 and 79.6 percent during off-peak periods. This translates to an average vehicle occupancy of 1.28 at all locations during peak period and 1.39 and 1.26 during off-peak periods at the LBJ and arterial survey locations, respectively.

Additional trip characteristic information regarding vehicle class distribution of respondents and current TollTag users was also obtained as part of the survey effort and are also presented graphically in Figure 2-17.

As shown in Figure 2-17 of all survey respondents traveling along the LBJ corridor locations between 76 and 78 percent were traveling by passenger car. The low levels of commercial vehicle responses can be attributed to the fact that it is almost impossible to obtain license plate information for commercial vehicles, therefore, limiting the ability to distribute survey questionnaires to these classes of vehicles.

Between 85 and 86 percent of arterial site respondents were traveling in cars as indicated in Figure 2-17. An additional 13.7 and 14.4 percent drove in two-axle trucks or buses, respectively.

Current TollTag users comprised between 45 and 47 percent of all respondents at LBJ intercept points as shown in Figure 2-17. Between 59 and 63 percent of all arterial responses indicated they were current TollTag users.



TRIP CHARACTERISTICS SUMMARY

Figure 2-17