Technical Note

Transportation Inputs to MOBILE4.1 for El Paso County

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VMT AND SPEED METHODOLOGY FOR EL PASO COUNTY

This part of the report describes the data and procedures used in developing the vehicle miles of travel (VMT) estimates, speed estimates, and VMT mix estimates for El Paso County.

The first section defines terms that may not be familiar to all readers. The second section describes the data base used to develop the desired estimates. The third section provides a step-by-step description of the process used. Attachments A and B provide the VMT and speed estimates for El Paso County.

TERMS

Center line miles

The length of a roadway facility is normally measured along the center of the roadway. Hence, the measure of the length of a roadway is often described in terms of its "center line miles."

Base year capacity restraint assignment

Capacity restraint assignment models are one of the model sets used to develop urban travel forecasts. The results of a capacity restraint assignment are the estimated volumes on the various segments of the roadway system and are often referred to as a "capacity restraint assignment." Capacity restraint assignment models are actually one of several types of assignment models. They are called "capacity restraint assignment" models because they consider the capacities of the various segments of the roadway system in the assignment process and attempt to restrain the volumes from exceeding a roadway's design capacity by encouraging traffic diversion from congested segments of the roadway system.

In Texas, the common practice is to calibrate and validate a set of travel demand models for a region for a "base year" for which there is "observed data" to verify that the models are able to reasonably replicate the observed travel on the roadway system. The base year for the El Paso models was 1987. Hence, the "base year capacity restraint assignment" is the 1987 capacity restraint model results.

1990 household travel survey

There were a number of household travel surveys performed for various urban areas in Texas in 1990. These household travel surveys are sample surveys used to collect data on the weekday travel characteristics of the residents of the households within an urban area. For each household selected in the sample, a complete inventory is collected of all the trips made by each resident of the household for a weekday. Information collected for each trip includes where the trip began, the destination of the trip, the start time of the trip, the arrival time of the trip, the trip purpose, and the mode of travel. Household travel

survey data are used extensively in the development of the urban travel forecasting models.

Delay

The term "delay" (as used in the discussion of the speed estimation methodology) refers to the difference in the freeflow travel times versus the estimated travel time which a driver would be expected to experience during a given time period after accounting for congestion impacts.

Volume-to-capacity ratio

One of the basic measures of the level of congestion used by traffic engineers is the volume-to-capacity (V/C) ratio. This ratio is computed by simply dividing the traffic volume on a roadway by the roadway's traffic handling capacity.

Hourly capacity

Hourly capacity is an estimate of the vehicular traffic volumes which a roadway facility can reasonably accommodate in a one-hour period.

Hourly capacity VMT

This is another measure of the traffic handling capability of a segment of roadway or a collection of roadway segments. "VMT" is an abbreviation for "vehicle miles of travel." An "hourly capacity VMT" for a segment of roadway can be computed by simply multiplying the hourly capacity of that segment of roadway by the length of the segment of roadway.

CBD

"CBD" is basically an abbreviation for "central business district" which is one of the area types used to stratify the roadway system. From a speed perspective, the non-freeway roadways within a CBD generally have the lowest freeflow speeds due to the relative close intersection spacing and signal spacing.

CBD fringe

The "CBD fringe" is another area type used to stratify the roadway system. Generally located adjacent to a CBD, this area type is typically less densely developed than the CBD but is more densely developed than typical urban residential. From a roadway speed perspective, the non-freeway facilities are generally faster than CBD streets but slower than comparable urban residential streets due to the differences in intersection and signal spacing.

Urban residential

The "urban residential" is another area type used to stratify the roadway system. Generally located near the CBD, this area type is typically less densely developed than the CBD fringe but is more densely developed than typical suburban residential. From a roadway speed perspective, the non-freeway facilities are generally faster than CBD fringe streets but slower than comparable suburban residential streets due to the differences in intersection and signal spacing.

Suburban residential

The "suburban residential" is another area type used to stratify the roadway system. This area type is typically less densely developed than urban residential areas but is more densely developed than rural areas. From a roadway speed perspective, the non-freeway facilities are generally faster than urban residential streets but slower than comparable rural facilities due to the differences in intersection and signal spacing.

DATA BASE

The 1990 HPMS data were processed to obtain the estimated AADT VMT and center line miles by functional class. Table 1 summarizes the 1990 AADT VMT by functional classification obtained from the HPMS data. Table 2 summarizes the 1990 center line miles for El Paso County by functional classification obtained from the HPMS data. These results were used as 1990 control totals.

The Texas Department of Transportation's Roadway Inventory Traffic Logs were processed to develop estimates of the typical lane miles per center line mile for urban and rural facilities by roadway type for 1990. The data in these files represent a key data base used in the development of the HPMS data for Texas.

Adjustment of AADT to Seasonal AAWT (Winter CO Season)

(Source: 1990 Annual Report Permanent Automatic Traffic Recorders, TxDOT)

Adjustment of 1990 AADT (annual average daily traffic) to November and December 1989 and January 1990 AAWT (annual average weekday (Monday through Friday) traffic.

There are four permanently located automatic traffic recorders (ATRs) in El Paso County. Two of these are in the urban area, one is located just outside the urban boundary and one is located in the rural area.

The locations and adjustment factors are as follows:

S070	FM-258	2.3 miles west of FM-1110, Ysleta	96.1 rural
S123	IH-10	1.2 miles south of Loop 375, El Paso boundary	98.8 rural
S162	IH-10	0.6 miles west of US-54, El Paso	108.6 urban
S189	US-54	0.3 miles north of IH-10, El Paso	103.9 urban

The rural and urban HPMS AADT was adjusted using 97.5 and 106.3 respectively calculated by taking the average of the rural and urban adjustment factors.

Adjustment of AADT to Seasonal AAWT (Summer Ozone Season) El Paso:

Adjustment of 1990 AADT (annual average daily traffic) to June, July and August 1990 AAWT (annual average weekday (Monday through Friday) traffic.

The locations and adjustment factors are as follows:

S070	FM-258	2.3 miles west of FM-1110, Ysleta	101.1 rural
S123	IH-10	1.2 miles south of Loop 375, El Paso boundary	103.0 rural
S162	IH-10	0.6 miles west of US-54, El Paso	110.4 urban
S189	US-54	0.3 miles north of IH-10, El Paso	106.6 urban

The rural and urban HPMS AADT was adjusted using 102.1 and 108.5 respectively calculated by taking the average of the rural and urban adjustment factors.

Local Street VMT

The procedure used by TxDOT to estimate rural local VMT is to multiply the counted or estimated segment ADT by the segment length and sum for all local segments. The procedure used by the TxDOT to estimate local street VMT is to multiply local street center line miles by an ADT estimate that varies by city population. The ADT estimates are shown below:

Population Incorporated Town	Average Local ADT
Under 5,000	225
5,000 - 9,999	401
10,000 - 24,999	619
25,000 - 49,999	869
50,000 - 99,999	1,197
100,000 - 199,999	1,356
200,000 - 299,999	1,373
300,000 - over	1,407

TABLE 1
EL PASO COUNTY 1990 HPMS AADT VMT ESTIMATES

	VEHICLE MILES OF TRAVEL
RURAL	
Interstate	475,476.5
Other Principal Arterial	138,924.1
Minor Arterial	.0
Major Collector	338,594.6
Minor Collector	53,693.2
Local	83,573.8
RURAL SUBTOTAL	1,090,262.2
RURAL NON-LOCAL	1,006,688.4
URBAN	
Interstate	2,104,847.5
Other Freeways and Expressways	707,968.1
Other Principal Arterial	2,587,737.1
Minor Arterial	1,012,682.5
Collector	448,875.5
Local	2,261,447.7
URBAN SUBTOTAL	9,123,558.6
URBAN NON-LOCAL	6,862,110.8
NON-LOCAL TOTAL	7,868,799.2
TOTAL	10,213,820.8

TABLE 2
EL PASO COUNTY 1990 HPMS CENTER LINE MILE ESTIMATES

	CENTER LINE MILES
RURAL	
Interstate	35.5
Other Principal Arterial	26.8
Minor Arterial	.0
Major Collector	138.0
Minor Collector	6.2
Local	383.3
RURAL SUBTOTAL	589.9
RURAL NON-LOCAL	206.6
URBAN	
Interstate	27.2
Other Freeways and Expressways	21.0
Other Principal Arterial	169.5
Minor Arterial	134.8
Collector	94.8
Local	1,672.2
URBAN SUBTOTAL	2,119.5
URBAN NON-LOCAL	447.2
NON-LOCAL TOTAL	653.8
TOTAL	2,709.4

The base year capacity restrained assignment results for El Paso County were obtained from the TxDOT. The assignments were performed for the 1987 base year. The assignment results provide the basis for disaggregating the 1990 HPMS estimates by area type. The 1990 household travel survey data for three study areas (i.e., San Antonio, Amarillo, and Brownsville) were used to develop the estimated portions of travel by time of day.

Finally, data from the **1990 Annual Report, Permanent Traffic Recorders**, (published by TxDOT) were used. Count data from each of the subject regions was used to estimate the regional specific factors needed to convert the AADT estimates from HPMS to seasonal AAWT.

STEP-BY-STEP PROCEDURE

This section outlines the step-by-step procedure which was used to estimate the 1990 AAWT VMT and speeds using the 1990 HPMS AADT VMT and center line miles as the primary data base. Step 1 describes the basic procedure used to stratify by area type the 1990 HPMS AADT VMT by facility type and to convert it to seasonal AAWT VMT. Steps 2 through 6 describes the speed estimation process.

The Dallas-Fort Worth speed models (developed by the North Central Texas Council of Governments (NCTCOG) for estimating operational speeds in the D-FW Region) were selected for these applications. The models estimate the average minutes of delay per mile based on the V/C ratio. These delays are added to the freeflow travel times per mile to get the congested travel times which are then converted to average speeds. To be consistent with these models, the NCTCOG hourly capacity estimates per lane mile were used to estimate the hourly capacity VMT by functional class and area type by county. These data, along with the AAWT VMT by time period, were used to estimate the average V/C ratio by functional class and area type for each of the five time periods. The models were applied to estimate the operational speeds by area type and functional class. Steps 2 through 6 focus on the procedures used to apply these models to estimate the average speeds.

A limited amount of speed data was available for El Paso County. Most of these data were "spot speed" radar observations collected to support speed limit studies. A limited amount of travel time study data collected using an instrumented vehicle and the "floating car" methodology was available for El Paso County. Evaluation of all speed study data for El Paso County leads to the conclusion that there was not sufficient data on which to develop a speed model based on observed speed data. At some future time, the travel time study data for El Paso may assist in developing a peak hour travel model for this region. Presently, there is not a peak hour travel model available.

The use of the NCTCOG speed model was considered the best alternative available for developing speed estimates for El Paso County. The NCTCOG speed model and associated capacity logic has been validated against observed speeds in the D-FW Region. The assumption is made that the relationship between V/C ratios and observed speeds is similar for all Texas cities.

Step 1: Estimation of Seasonal AAWT VMT by Area Type

As previously noted, the 1990 AADT VMT estimates by facility type were obtained from the 1990 HPMS data (and were previously summarized in Table 1). As may be noted, HPMS already stratifies the VMT data into two area types (i.e., urban and rural). The urban portion was subsequently stratified into four area types: CBD, CBD Fringe, Urban Residential, and Suburban Residential. Results from the base year travel models were used to estimate the percentages by facility type. For each urban facility type, the percentage of assigned VMT for the four urban area types were computed from the base year capacity restrained assignment VMT results for El Paso County. These percentages for a given facility type were applied to the HPMS VMT total for that urban facility type to estimate the VMT by area type for the urban facility type.

Adjustment factors for converting the 1990 AADT VMT to seasonal AAWT were computed for each region using data from the permanent count stations in El Paso County. The factors used were:

Application Area	3-Month Season	Factor
El Paso County - Urban	Nov. - Jan.	1.063
El Paso County - Rural	Nov. - Jan.	0.975
El Paso County - Urban	June - Aug.	1.085
El Paso County - Rural	June - Aug.	1.021

Step 2: Stratification of Center Line Miles by Area Type

The 1990 center line mile estimates by facility type for El Paso County were also obtained from the 1990 HPMS data (and were previously summarized in Table 2). The HPMS already stratifies the center line miles data into two area types (i.e., urban and rural). The urban portion was subsequently stratified into four area types (CBD, CBD Fringe, Urban Residential, and Suburban Residential) using much the same process used for the stratification of the VMT estimates. For each urban facility type, the percentage of link miles in each of the four urban area types was computed from the base year network data for El Paso County. These percentages for a given facility type were applied to the HPMS center line mile total for that urban facility type to estimate the center line miles by area type for the subject urban facility type.

Step 3: Estimation of Average Lane Miles per Center Line Mile

To estimate the average hourly capacity VMT for each facility type by area type, an estimate of the average lane miles per center line mile is needed. The data from the TxDOT Roadway Inventory Traffic Log for 1990 provides the best source for such estimates. The Roadway Inventory Traffic Log is a primary data source for the development of the HPMS data for Texas. The vast majority of the roadway sections in this inventory records not only the center line miles but also the lane miles for the section. When processing the data for a subject county, the center line miles and the lane miles (for sections with both data entries) were accumulated by urban and rural roadway type corresponding to the HPMS categories. The average lane miles per center line mile were estimated by subsequently dividing the accumulated lane miles by the accumulated center line miles for each roadway type. Because of the limited data for rural local streets and urban local streets, the local streets were assumed to be two lane miles per

center line mile. The estimated lane miles per center line mile was multiplied by the estimated center line miles from the HPMS data to estimate the lane-miles of system by urban and rural facility type.

The next task was to stratify the urban lane-mile estimates into four area types (CBD, CBD Fringe, Urban Residential, and Suburban Residential). Steps 1 and 2 were used to estimate the percentage stratification by urban area type (i.e., essentially the same process used for the stratification of the VMT estimates and center line estimates in Steps 1 and 2). For each facility type in each area type, the 24-hour capacity VMT from the assignment model network was divided by the 24-hour capacity per lane mile used to compute the link capacities. The lane miles for each facility type within each area type were divided by the number of center line miles from the network data to obtain the estimate of the average number of lane miles per center line mile for each facility type within each area type. Local streets are represented in the assignment networks by centroid connectors and are not assigned link capacities. Since local streets are typically two-lane streets, they were assumed to have an average of two lane miles per center line mile. These network-based estimates of lane miles per center line mile were then applied to the stratified center line miles from HPMS to develop the network based estimate of lane miles. The network-based estimates formed the bases for stratifying the lane mile estimate developed from the Roadway Inventory data for 1990.

Step 4: Estimation of Average Hourly Capacity VMT

The objective of this step is to develop the estimated hourly capacity VMT by facility type and area type (for use in Step 5 to estimate the average V/C ratios). To be consistent with the speed methodology, the D-FW hourly capacities per lane were used to estimate the average hourly capacity for the facility types used in these analyses. Since the D-FW non-freeway facility types are stratified by divided and undivided facilities, their averages were used for this study. Table 3 summarizes the hourly capacity per lane mile used in this study. The capacity VMT for a given facility type and area type was computed by simply multiplying the center line miles times the average lane miles per center line mile times the average hourly capacity per lane mile.

Step 5: Estimation of Average Speeds by Time Period

The speed model estimates the average delay based on the V/C ratio. The V/C ratios, of course, vary by time-of-day. To compute a better estimate of the speeds, the seasonal AAWT VMT estimates by facility type and area type were further stratified by five time periods. The V/C ratios by time period were used to estimate the operational speeds by time period. The following describes the method used to stratify the 1990 AAWT VMT estimates by time period, the estimation of the V/C ratios by time period, and the model used to estimate the speed for the time period.

Stratification by Time Period

The 1990 household travel survey data for three study areas (San Antonio, Amarillo, and Brownsville) were processed to develop the estimated portions of travel by time of day. Table 4 summarizes the results obtained from the three studies and the averages used in this study. These average percentages were applied to estimate the 1990 AAWT VMT by the five time periods.

TABLE 3
HOURLY CAPACITIES USED

HPMS FACILITY TYPES	ESTIMATED CAPACITY/LANE MILE*				
	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL
RURAL					
Interstate					2,000
Other Principal Arterial					725
Minor Arterial					700
Major Collector					625
Minor Collector					550
Local					550
URBAN					
Interstate	1,800	1,850	1,875	1,950	
Other Freeway & Expressways	1,800	1,850	1,875	1,950	
Other Principal Arterial	525	575	625	700	
Minor Arterial	525	575	600	650	
Collector	425	450	475	525	
Local	425	450	475	525	

* Estimates based on the hourly capacities used in the Dallas-Fort Worth Regional Travel Models

TABLE 4
PORTIONS OF TRAVEL BY TIME PERIODS

	SAN ANTONIO	AMARILLO	BROWNSVILLE	AVERAGE
Midnight to 7:15 am	8.95%	6.10%	5.95%	7.00%
7:15 am to 8:15 am	10.88%	10.84%	10.34%	10.69%
8:15 am to 4:45 pm	48.13%	51.17%	51.71%	50.34%
4:45 pm to 5:45 pm	10.34%	10.78%	9.41%	10.18%
5:45 pm to Midnight	21.71%	21.11%	22.59%	21.80%
TOTALS	100.0%	100.0%	100.0%	100.0%
Number of Vehicle Trips in the Sample	15,466	20,844	9,567	n/a

Computation of the V/C Ratio by Time Period

The hourly capacity VMT (developed in Step 4) was used in estimating the average V/C ratios by facility type and area type for each time period. The capacity VMT for a time period was computed by multiplying the hourly capacity VMT by the number of hours in the time period. The 1990 AAWT VMT for a given period was divided by the capacity VMT for the time period to compute the average VMT for the time period.

Freeflow Speed Estimates

The speed model also requires the estimated freeflow speed for estimating the congested speed for a time period. The freeflow speed estimates for freeways and rural roadways are the typical freeflow speeds and reflect a tendency for the traveling public to exceed the posted speed limit. The freeflow speed estimates for non-freeway facilities are based on the average 24-hour speeds from the region's assignment networks adjusted upward to approximate freeflow conditions. Table 5 lists the freeflow speeds used for El Paso County.

TABLE 5
Freeflow Speeds for El Paso County

	FREEFLOW SPEED ESTIMATES				
HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL
RURAL					
Interstate					68.00
Other Prin Arterials					60.00
Minor Arterials					55.00
Major Collectors					55.00
Minor Collectors					40.00
Local					35.00
URBAN					
Interstate	55.00	55.00	57.00	57.00	
Other Freeway & Expressway	55.00	55.00	57.00	57.00	
Other Principal Arterial	11.88	25.38	32.67	36.36	
Minor Arterial	11.88	19.98	27.54	31.32	
Collector	11.88	19.44	24.12	29.97	
Local	11.88	19.44	24.12	29.97	

D-FW Speed Model Description

In the D-FW speed model, the V/C ratio is used to estimate the volume delay per mile. The volume delay is added to the freeflow travel time to estimate the congested travel time. This congested travel time is then used to compute the congested average speed. The following briefly describes the volume-delay equations employed in the D-FW speed model.

The D-FW model uses two volume-delay equations for operational speeds: one for high-capacity facilities and the other for low-capacity facilities. The distinction is made based on the capacity. High-capacity facilities (usually freeways) are defined as those exceeding 1,700 vehicles per hour per lane (one way).

The following is the general form of the D-FW volume-delay equation:

$$\text{Delay} = \text{Min} \left[\left(A\, e^{B(V/C)} \right), M \right]$$

where:

Delay	=	Minutes of delay per mile. (Note: This value is subsequently added to the freeflow travel time per mile to compute the congested speed.)
V/C	=	Volume-to-capacity ratio
A & B	=	Coefficients
M	=	Maximum minutes of delay per mile

The A, B and M parameters vary by capacity type. Table 6 lists the D-FW calibrated parameters for estimating operational speeds.

TABLE 6
D-FW VOLUME-DELAY EQUATION PARAMETERS

High-Capacity Facilities	Low-Capacity Facilities
A = 0.015 B = 4.0 C = 5.0	A = 0.050 B = 4.0 C = 10.0

This model was applied to estimate the average operational speed for each facility type by area type for each time period. A weighted average speed for each facility type (for all area types) was computed for each time period. The 1990 AAWT VMT by area type (for the subject time period) was used as weights for computing the weighted average.

Step 6: Computation of the 24-hour Weighted Average Speeds

The 24-hour speeds were determined by computing the weighted average of the speeds from the five time periods. The 1990 AAWT VMT by time period was used as weights for computing the 24-hour weighted averages.

VMT AND SPEED METHODOLOGY FOR HUDSPETH COUNTY

In this section the data and procedures used in developing the vehicle miles of travel (VMT) estimates and speed estimates are described. Also, terms that may not be familiar to all readers are defined, the data base used to develop the desired estimates is described and a step-by-step description of the process used to estimate VMT and speeds is provided. VMT and speed estimates for Hudspeth county are provided in Attachments C and D.

TERMS

Center line miles

The length of a roadway facility is normally measured along the center of the roadway. Hence, the measure of the length of a roadway is often described in terms of its "center line miles."

1990 household travel survey

There were a number of household travel surveys performed for various urban areas in Texas in 1990. These household travel surveys are sample surveys used to collect data on the weekday travel characteristics of the residents of the households within an urban area. For each household selected in the sample, a complete inventory is collected of all the trips made by each resident of the household for a weekday. Information collected for each trip includes where the trip began, the destination of the trip, the start time of the trip, the arrival time of the trip, the trip purpose, and the mode of travel. Household travel survey data are used extensively in the development of the urban travel forecasting models.

Delay

The term "delay" (as used in the discussion of the speed estimation methodology) refers to the difference in the freeflow travel times versus the estimated travel time which a driver would be expected to experience during a given time period after accounting for congestion impacts.

Volume-to-capacity ratio

One of the basic measures of the level of congestion used by traffic engineers is the volume-to-capacity (V/C) ratio. This ratio is computed by simply dividing the traffic volume on a roadway by the roadway's traffic handling capacity.

Hourly capacity

Hourly capacity is an estimate of the vehicular traffic volumes which a roadway facility can reasonably accommodate in a one-hour period.

Hourly capacity VMT

This is another measure of the traffic handling capability of a segment of roadway or a collection of roadway segments. "VMT" is an abbreviation for "vehicle miles of travel." An "hourly capacity VMT" for a segment of roadway can be computed by simply multiplying the hourly capacity of that segment of roadway by the length of the segment of roadway.

DATA BASE

The 1990 HPMS data were processed to obtain the estimated AADT VMT and center line miles by functional class for the perimeter counties. The six rural functional classifications are: Interstate Highways, Other Principal Arterials, Minor Arterials, Major Collectors, Minor Collectors, and Locals. The six urban functional classifications are: Interstate Freeways, Other Freeways & Expressways, Other Principal Arterials, Minor Arterials, Collectors, and Locals. In essence, the HPMS data is stratified by two area types: urban and rural.

The Texas Department of Transportation's Roadway Inventory Traffic Logs were processed to develop estimates of the typical lane miles per center line mile for urban and rural facilities by roadway type for 1990. The data in these files are one of the principal data sources for the development of the HPMS data for Texas.

Finally, data from the **1990 Annual Report, Permanent Traffic Recorders,** (published by TxDOT) were used. Count data from each of the subject regions was used to estimate the regional specific factors needed to convert the AADT estimates from HPMS to seasonal AAWT.

SEASONAL ADJUSTMENT FACTORS

Data from Permanent Automatic Traffic Recorder (ATR) Number S152 were used to calculate the Seasonal Adjustment Factor[1]. The ATR is located in Hudspeth County on IH-10, 10.3 miles west of SH 54 near Van Horn. The Hudspeth County Seasonal Adjusted Factor was 0.972 for November, December, and January and was calculated by dividing the average of the Monday through Friday volumes by the total Sunday through Saturday Average Day Volume. The Seasonal Adjusted Factor was 0.993 for June, July, and August.

STEP-BY-STEP PROCEDURE

The purpose of this section is to outline the step-by-step procedure which was used to estimate the 1990 AAWT VMT and speeds using the 1990 HPMS AADT VMT and center line miles as the primary data base. The six step procedure used for the perimeter counties is very similar to the procedures described above for Hudspeth County.

The Dallas-Fort Worth speed models (developed by the North Central Texas Council of Governments (NCTCOG) for estimating operational speeds in the D-FW Region) were selected for these applications. The models estimate the average minutes of delay per mile based on the V/C ratio. These delays are added to the

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[1] 1990 Annual Report: Permanent Automatic Traffic Recorders; conducted by the Texas Department of Transportation, Transportation Planning Division in cooperation with the U.S. Department of Transportation, Federal Highway Administration.

freeflow travel times per mile to get the congested travel times which are then converted to average speeds. To be consistent with these models, the NCTCOG hourly capacity estimates per lane mile were used to estimate the hourly capacity VMT by functional class and area type by county. These data, along with the AAWT VMT by time period, were used to estimate the average V/C ratio by functional class for each of the five time periods. The models were applied to estimate the operational speeds by functional class. Steps 2 through 6 focus on the procedures used to apply these models to estimate the average speeds.

The use of the NCTCOG speed model was considered the best alternative available for developing speed estimates for the perimeter counties. The assumption is made that the relationship between V/C ratios and observed speeds is similar for all Texas cities.

Step 1: Estimation of Seasonal AAWT VMT

As previously noted, the 1990 AADT VMT estimates by facility type for each of the subject counties were obtained from the 1990 HPMS data . As previously noted, HPMS stratifies the VMT data by six functional classifications for each of two area types (i.e., urban and rural). The 1990 AADT VMT by functional classification from HPMS is included in the tabular summaries for each county.

Adjustment factors for converting the 1990 AADT VMT to seasonal AAWT were computed for each region using data from the permanent count stations in the subject regions. These factors were applied to the 1990 AADT VMT estimates to get the seasonally adjusted estimate of the 1990 AAWT. The resulting estimates the 1990 seasonally adjusted AAWT VMT by functional classification is included in the tabular summaries for each county.

Step 2: Obtain Center Line Miles from HPMS

The 1990 center line mile estimates by facility type for each of the subject counties were also obtained from the 1990 HPMS data. These center line miles from the 1990 HPMS files are included in the tabular summaries for each county.

Step 3: Estimation of Average Lane Miles per Center Line Mile

To estimate the average hourly capacity VMT for each facility type by area type, an estimate of the average lane miles per center line mile is needed. The data from the TxDOT Roadway Inventory Traffic Log for 1990 provides the best source for such estimates. The Roadway Inventory Traffic Log is a primary data source for the development of the HPMS data for Texas. The vast majority of the roadway sections in this inventory records not only the center line miles but also the lane miles for the section. When processing the data for a subject county, the center line miles and the lane miles (for sections with both data entries) were accumulated by urban and rural roadway type corresponding to the HPMS categories. The average lane miles per center line mile were estimated by subsequently dividing the accumulated lane miles by the accumulated center line miles for each roadway type. Because of the limited data for rural local streets and urban local streets, the local streets were assumed to be two lane miles per center line mile. The estimated lane miles per center line mile by functional classification are included in the tabular summaries for each county.

Step 4: Average Hourly Capacity Estimates

The objective of this step is to obtain hourly capacity by facility type and area type (for use in Step 5 to estimate the average V/C ratios). To be consistent with the speed methodology, the D-FW hourly capacities per lane were used to estimate the average hourly capacity for the facility types used in these analyses. Since the D-FW non-freeway facility types are stratified by divided and undivided facilities, their averages were used for this study. The D-FW suburban capacities were used for the urban facilities in the perimeter counties. Table 7 summarizes the hourly capacity per lane mile used in this study. These capacities are also included in the tabular summaries for each county.

Step 5: Estimation of VMT and Average Speeds by Time Period

The speed model estimates the average delay based on the V/C ratio. The V/C ratios, of course, vary by time-of-day. To compute a better estimate of the speeds, the seasonal AAWT VMT estimates by facility type and area type were further stratified by five time periods. The V/C ratios by time period were used to estimate the operational speeds by time period. The following describes the method used to stratify the 1990 AAWT VMT estimates by time period, the estimation of the V/C ratios by time period, and the model used to estimate the speed for the time period.

Freeflow Speed Estimates

The application of the D-FW speed model also requires the estimated freeflow speed for estimating the congested speed for a time period. The freeflow speed estimates for freeways and rural roadways are the typical freeflow speeds and reflect some tendency for the traveling public to exceed the posted speed limit. The freeflow speed estimates are included in the tabular summaries for each county.

Stratification of VMT by Time Period

The 1990 household travel survey data for three study areas (San Antonio, Amarillo, and Brownsville) were processed to develop the estimated portions of travel by time of day. Table 8 summarizes the results obtained from the three studies and the averages used in this study. These average percentages were applied to estimate the 1990 AAWT VMT by the five time periods. The estimated VMT by functional classification for each of the five time periods are included in the tabular summaries for each county.

TABLE 7
HOURLY CAPACITIES USED

HPMS FACILITY TYPES	ESTIMATED CAPACITY/LANE MILE*
RURAL	
Interstate	2,000
Other Principal Arterial	725
Minor Arterial	700
Major Collector	625
Minor Collector	550
Local	550
URBAN	
Interstate	1,950
Other Freeway & Expressways	1,950
Other Principal Arterial	700
Minor Arterial	650
Collector	525
Local	525

* Estimates based on the hourly capacities used in the Dallas-Fort Worth Regional Travel Models

TABLE 8
PORTIONS OF TRAVEL BY TIME PERIODS

	SAN ANTONIO	AMARILLO	BROWNSVILLE	AVERAGE
Midnight to 7:15 am	8.95%	6.10%	5.95%	7.00%
7:15 am to 8:15 am	10.88%	10.84%	10.34%	10.69%
8:15 am to 4:45 pm	48.13%	51.17%	51.71%	50.34%
4:45 pm to 5:45 pm	10.34%	10.78%	9.41%	10.18%
5:45 pm to Midnight	21.71%	21.11%	22.59%	21.80%
TOTALS	100.0%	100.0%	100.0%	100.0%
Number of Vehicle Trips in the Sample	15,466	20,844	9,567	n/a

Computation of the V/C Ratio by Time Period

To apply the speed model for a given time period and facility type requires an estimate of the V/C ratio. The capacity VMT for a given time period and facility type was computed by multiplying the hourly capacity VMT by the number of hours in the time period times the center line miles. The estimated V/C ratio for a given time period and facility type was computed by dividing the 1990 AAWT VMT for the subject time period and facility type by the capacity VMT for the for the subject time period and facility type.

D-FW Speed Model Description

In the D-FW speed model, the V/C ratio is used to estimate the volume delay per mile. The volume delay is added to the freeflow travel time to estimate the congested travel time. This congested travel time is then used to compute the congested average speed. The following briefly describes the volume-delay equations employed in the D-FW Speed Model.

The D-FW model uses two volume-delay equations for operational speeds: one for high-capacity facilities and the other for low-capacity facilities. The distinction is made based on the capacity. High-capacity facilities (usually freeways) are defined as those exceeding 1,700 vehicles per hour per lane (one way).

The following is the general form of the D-FW volume-delay equation:

$$\text{Delay} = \text{Min} \left[\left(A\, e^{B(V/C)} \right), M \right]$$

where:

Delay	=	Minutes of delay per mile. (Note: This value is subsequently added to the freeflow travel time per mile to compute the congested speed.)
V/C	=	Volume-to-capacity ratio
A & B	=	Coefficients
M	=	Maximum minutes of delay per mile

The A, B and M parameters vary by capacity type. Table 9 lists the D-FW calibrated parameters for estimating operational speeds.

TABLE 9
D-FW VOLUME-DELAY EQUATION PARAMETERS

High-Capacity Facilities	Low-Capacity Facilities
A = 0.015 B = 4.0 C = 5.0	A = 0.050 B = 4.0 C = 10.0

This model was applied to estimate the average operational speed for each facility type by area type for each time period. A weighted average speed for each facility type was computed for each time period. The 1990 AAWT VMT by area type (for the subject time period) was used as weights for computing the weighted average.

Step 6: Computation of the 24-hour Weighted Average Speeds

The 24-hour speeds were determined by computing the weighted average of the speeds from the five time periods. The 1990 AAWT VMT by time period was used as weights for computing the 24-hour weighted averages.

ANALYSIS OF VMT MIX

The method used to calculate the VMT mix for El Paso County is described in this section. The method is based on classification counts conducted by the TxDOT from 1985 to 1990. The results are compared with the MOBILE4.1 default values. Attachment F provides the vehicle classification data.

Truck Registration Apportionment Factor Method

Calculation of LDV, LDGV, and LDDV VMT:

LDV VMT/day = (HVMT - VT - PR) x HH

where:

HVMT= household vehicle miles traveled (41.4 miles/household/day)
VT= vacation miles traveled (0.414 miles/household/day)
PR= pleasure miles traveled (1.242 miles/household/day)
HH= 1990 households (178,366 households) (El Paso)

(Source: 1990 Nationwide Personal Transportation Study (NPTS))

LDV VMT/day = (41.4 - .414 - 1.242) x 178,366 = 7,088,978 miles per day

LDGV VMT = 0.98 x 7,088,978 = 6,947,198

LDDV VMT = 0.02 x 7,088,978 = 141,780

Estimation of Texas truck VMT:

1990 El Paso County truck registrations

Type	# Vehicles	Distribution
LDT1	64,517	0.8851
LDGT2	4,819	0.0661
HDGV	2,728	0.0374
HDDV	823	0.0112
Total	72,887	1.0000

(Source : September 1, 1990 TxDOT Vehicle Registration Data)

Apportionment Factor (AF): Ratio of El Paso County trucks to Texas trucks

AF = 72,887 / 3,418,143 = 0.021

Calculation of LDT1, LDGT1, LDDT, LDGT2, HDGV, and HDDV VMT:

VMT Vehicle Type = Texas Truck VMT x AF x El Paso County Truck Distribution / 365 days

LDT1 VMT = 46,758,386,000 x .021 x 0.8851 / 365 = 2,381,083

LDGT1 VMT = 0.97 x 2,381,083 = 2,309,651

LDDT VMT = 0.03 x 2,381,083 = 71,432

LDGT2 VMT = 46,758,386,000 x 0.021 x 0.0661 / 365 = 177,821

HDGV VMT = 46,758,386,000 x 0.021 x 0.0374 / 365 = 100,613

HDDV VMT = 46,758,386,000 x 0.021 x 0.0112 / 365 = 30,130

Calculation of MC VMT:

El Paso County Motorcycle Registrations: 3,367

MC VMT = number of motorcycles x annual VMT per motorcycle / 365

MC VMT = 3,367 x 2399 / 365 = 22,130

VMT Mix

Type	VMT	Distribution
LDGV	6,947,198	0.709
LDGT1	2,309,651	0.236
LDGT2	177,822	0.018
HDGV	100,613	0.010
LDDV	141,780	0.015
LDDT	71,433	0.007
HDDV	30,130	0.003
MC	22,130	0.002
Total	9,800,755	1.000

Population Apportionment Factor Method

Apportionment Factor (AF) = El Paso County population / Texas population
AF = 596,610 / 16,986,510 = 0.035

Calculation of LDT1, LDGT1, LDDT, LDGT2, HDGV, and HDDV VMT:

VMT Vehicle Type = Texas Truck VMT x AF x El Paso County Truck Distribution / 365 days

LDT1 VMT = 46,758,386,000 x 0.035 x 0.8851 / 365 = 3,968,506

LDGT1 VMT = 0.97 x 3,968,506 = 3,849,450

LDDT VMT = 0.03 x 3,968,506 = 119,055

LDGT2 VMT = 46,758,386,000 x 0.035 x 0.0661 / 365 = 296,371

HDGV VMT = 46,758,386,000 x 0.035 x 0.0374 / 365 = 167,689

HDDV VMT = 46,758,386,000 x 0.035 x 0.0112 / 365 = 50,217

VMT MIX

Type	VMT	Distribution
LDGV	6,947,198	0.600
LDGT1	3,849,450	0.332
LDGT2	296,371	0.026
HDGV	167,689	0.014
LDDV	141,780	0.012
LDDT	119,055	0.010
HDDV	50,217	0.004
MC	22,130	0.002
Total	11,593,890	1.000

The third method is based on an analysis of TxDOT vehicle classification counts. A total of 22 vehicle classification counts were available for five different functional classifications (1984, six counts; 1986, four counts; 1989, six counts; and 1990, six counts). For the functional classification, urban principal arterial, there were 11 counts. For the other four functional classifications there was one or two counts for each functional classification. Examination of the annual count data indicated that the distribution of classification count data was stable over time. Therefore, the counts were aggregated by functional classifications for all years. The data were also aggregated across all functional classifications and all years to provide an overall VMT mix estimate.

The vehicle classification counts were made using 19 vehicle groups. These 19 vehicle groups were first aggregated into five vehicle groups LDV, LDT1, LDGT2, HDV, and MC. These five groups were then disaggregated into the eight MOBILE4.1 vehicle groups using the MOBILE4.1 default values to separate LDV into LDGV and LDDV, LDT1 into LDGT1 and LDDT, and El Paso County HDGV and HDDV vehicle registration data to separate HDV into HDGV and HDDV. The procedure used to group the classification counts are shown.

LDV 100% Passenger Cars from TxDOT vehicle classification counts
LDGV 98% LDV (MOBILE4.1 default)
LDDV 2% LDV (MOBILE4.1 default)
LDT1 80% Panel and Pickup Trucks from TxDOT vehicle classification counts
LDGT1 97% LDT1 (MOBILE4.1 default)
LDDT 3% LDT1 (MOBILE4.1 default)
LDGT2 20% Panel and Pickup Trucks from TxDOT vehicle classification counts
20% Other 2-axle from TxDOT vehicle classification counts
HDV 80% Other 2-axle, plus remaining truck classifications
HDGV 76.8% HDV (September 1, 1990 El Paso county Vehicle Registration data)
HDDV 23.2% HDV (September 1, 1990 El Paso County Vehicle Registration data)
MC 100% Motorcycles and Motor Scooters from vehicle classification counts

Note: The distribution of panel and pickup trucks between LDT1 and LDGT2 and other 2-axle trucks between LDGT2 and HDV is based on the professional judgment of TxDOT traffic data collection staff. TxDOT vehicle classification count procedures do not distinguish between gas and diesel trucks.

The vehicle classification count data was coded on a spreadsheet and the VMT mixes calculated. The results are provided. Weighted totals are provided by functional classification by year, by functional classification for all years, and by all functional classifications for all years.

Comparison of VMT Mix Analysis:

The results of the four methods used to calculate VMT mix are shown in the table below:

TABLE 10
COMPARISON OF VMT MIX ANALYSIS METHODS, EL PASO

Vehicle Class	MOBILE4.1 Default 1990	Truck Registration Apportionment Factor	Population Apportionment Factor	All Vehicle Classification Counts
LDGV	0.651	0.709	0.600	0.675
LDGT1	0.150	0.236	0.332	0.191
LDGT2	0.071	0.018	0.026	0.053
HDGV	0.035	0.010	0.014	0.045
LDDV	0.018	0.015	0.012	0.014
LDDT	0.005	0.007	0.004	0.006
HDDV	0.061	0.003	0.004	0.014
MC	0.009	0.002	0.002	0.003

TABLE 11
COMPARISON OF VMT MIX BY FUNCTIONAL CLASSIFICATION, EL PASO

Vehicle Class	MOBILE4.1 Default 1990	Functional Classification Urban Principal Arterial (11 counts)	Functional Classification Rural Interstate Highway (2 counts)	All Vehicle Classification Counts (22 counts)
LDGV	0.651	0.669	0.609	0.675
LDGT1	0.150	0.212	0.147	0.191
LDGT2	0.071	0.059	0.043	0.053
HDGV	0.035	0.026	0.140	0.045
LDDV	0.018	0.014	0.012	0.014
LDDT	0.005	0.007	0.005	0.006
HDDV	0.061	0.008	0.042	0.014
MC	0.009	0.005	0.002	0.003

Recommendation: The vehicle mix estimate for the functional classification urban principal arterial is considered a reasonable estimate. The vehicle mix estimates for the other functional classifications being based on only one estimate for each functional classification are not considered to be reasonable

estimates. It is recommended that the VMT mix estimate for urban principal arterials be used in MOBILE4.1 for calculating emission rates and emissions for urban principal arterials. It is recommended that the VMT mix based on all vehicle classification counts be used for all other functional classifications.

VEHICLE REGISTRATION DISTRIBUTION PROJECTIONS

The projection of vehicle registrations for use in EPA's MOBILE model program was done using a modified version of the methodology discussed in EPA's "Procedures for Preparing Emissions Projections" (pages 32 through 39). The methodology suggested by EPA uses average growth rates for projecting estimates of new vehicles registrations and survival rates for estimating the number of older vehicles that will be registered in future years. The methodology used in this report is similar in that estimates of the number of older vehicles registered in future years is based on the use of scrappage rates which are also the basis for estimating survival rates. The primary difference in the methodology used in this report and that suggested by EPA is the method of estimating the number of new vehicle registrations for future years. The input data and the methodology are discussed in the following sections.

INPUT DATA

The input data consisted of the number of registered vehicles by age and type of vehicle (i.e., model year) and survival or scrappage rates by age and type of vehicle. The registration data for each county came from the Texas Department of Transportation (TxDOT), Motor Vehicle Registration Division. This historical information was used to develop estimates of new vehicle registrations (by county) and estimates of the percentage of registered vehicles by type of vehicle and model year.

The data used in this analysis were the 1989 through 1992 vehicle registrations by model year for each of the counties being analyzed. The registration data for each of these years were data as of September 1 for each respective year. The 1992 registered vehicles were used as the base year from which subsequent projections were made.

Local data on survival/scrappage rates were not available. Data from the "Study of Vehicle Scrappage Rates," Oak Ridge National Laboratory, August 1990, were used for automobiles, light duty trucks, and heavy duty trucks. Scrappage rates were estimated for motorcycles using data from the "1991 Motorcycle Statistical Annual", Motorcycle Industry Council, Inc.

METHODOLOGY

The first step was to estimate the total new vehicle registrations in 1992 for each county since the registration data available for 1992 were data as of September 1, 1992. An estimate of the average growth rate in new vehicle registrations between the years 1986 through 1991 was first developed. Since registration data were available for vehicles by type and model year only for 1989 through 1992, new vehicle registrations for 1986, 1987, and 1988 were estimated using scrappage rates applied to the vehicle registration data for 1989. For example, in Harris County, there were 138,384 1988 model automobiles registered in 1989. Using the scrappage rate of 0.00441 for vehicles aged one year, the number of 1988 automobiles registered in 1988 was estimated by dividing 138384 by 1 - 0.00441. The result was an estimate of 138,997 1988 automobiles registered in 1988. Using the same method with scrappage rates for vehicles aged two and three years, estimates of new vehicle registrations were developed for 1987 and 1986. These estimates were then used to develop average growth rates in new vehicle registrations for the five years prior to 1992. The average growth rate was then used to estimate the number of 1992 vehicles registered in 1992.

Using the number of new vehicles registered as of September 1 each year and the number which were registered as of the end of each year (from the next year's registration data), the percentage of new vehicles registered as of September 1 was computed for years 1989, 1990, and 1991. A second estimate of the number of 1992 vehicles that would be registered in 1992 was developed based on the average percentage of new vehicles registered as of September 1 applied to the number of 1992 vehicles registered as of September 1, 1992. The final estimate used for 1992 was the average of the two estimates. In estimating vehicle registrations, each type of vehicle was estimated individually. The methodology was the same for each and for purposes of brevity, the discussion of the methodology will be non-specific with regard to the type of vehicle.

Using the vehicle registration data and population estimates from the Texas Office of the Comptroller for 1990, 1991, and 1992, the ratio of vehicles per person (total vehicles registred divided by the total population) and the percentage of vehicles by type of vehicle was computed for each county. The assumption was then made that the ratio of vehicles per person would remain stable over time. This was the basis for estimating the total number of registered vehicles for each county in future years. The percentage of vehicles by type of vehicle was estimated using the total number of vehicles remaining within a county after applying the scrappage rates. Thus, if scrappage rates were higher for one type of vehicle versus other types, the number of those vehicles as a percentage of the total would tend to decline over time. This was consistent with the historical information available. Data for 1990 were subsequently not used due to inconsistent trends as compared to the other years. For example, in one small county, the number of registered vehicles per person in 1990 was 0.96 as compared to 0.81 and 0.85 for the other years. This value was considered atypical; and with a limited amount of historical data available, such values would tend to bias the results. The decision was made not to use it in computing the average vehicles per person for individual counties.

The vehicle registration data from 1989 to 1992 was analyzed to develop estimates of the percentage of vehicle change between years which could be attributed to new vehicle registrations and the percentage which could be attributed to additions/deletions of older vehicles in the vehicle population. A regression analysis was performed on the percentage which could be attributed to new vehicles as a function of population change for each county. The resulting coefficients were applied to the projected population change in each county to estimate the percentage of vehicular growth (by type of vehicle) expected to be due to new vehicle registrations. In addition, a regression analysis was performed relating the growth in new vehicle registrations with the population change for the period 1989 through 1992.

Beginning with the vehicles registered in 1992 by model year, the scrappage rates were applied to estimate the number of vehicles which would be expected to be in operation (and therefore registered) in 1993. Specific rates were used for automobiles, motorcycles, light duty trucks, and heavy duty trucks. The result was estimates of the number of 1968 through 1992 model year vehicles expected to be registered in each county in 1993. Summing these estimates, the percentage of vehicles by type of vehicle was computed. These percentages were applied to the total vehicle registrations estimated for the county to develop estimates of the total number of vehicle by type of vehicle.

Using the estimated population for each county and multiplying by the number of vehicles per person, an estimate of the total vehicles expected to be registered in each county was developed. The number of vehicles by type was then estimated using the average percentage of vehicles by type computed from the vehicles estimated to survive from the prior year. The absolute change in the

total number of vehicles (by type) expected to be registered in each county was then estimated by summing the number of 1968 through 1992 vehicles estimated to still be in operation in 1993 and subtracting the total from the estimated number of vehicles expected to be registered in the county in 1993 (based on the average vehicles per person, the projected population and the percent distribution of vehicles by type). The result was an estimate of the number of new and older vehicles which would be registered in the county. The percentage of those vehicles which would be new vehicles was estimated using the regression coefficients computed earlier applied to the projected population change from the prior year. Using the regression results which related the change in new vehicle registrations with the population change, a second estimate of the number of new vehicle registrations was computed. For automobiles, motorcycles, and light duty gas trucks type one, the larger of the two estimates of new vehicle registrations was used. For light duty gas trucks type two, heavy duty gas trucks, and heavy duty diesel trucks, the two estimates were averaged. These seemed to produce the most realistic results in analyzing the final projections. The remaining older vehicles were distributed in the same proportion as the vehicles which had survived from the prior year. The final step was the conversion of the vehicles into percentages for input to EPA's MOBILE model.

Estimates for 1994 through 2007 were developed using the same methodology applied to each year in a sequential manner. The estimates were then converted to percentages by model year and placed in computer files for input to EPA's MOBILE model. Attachment E provides the final vehicle registration distribution projections for El Paso County.

VMT PROJECTIONS

The method used to forecast VMT for El Paso CO and was growth factors applied to HPMS data. The growth factors were developed from the El Paso travel demand models. This method is described in the EPA document, "Section 187 VMT Forecasting and Tracking Guidance, January 1992" (page 20). The method is based on the equation shown. Because a 1990 travel demand model was not available, the procedure was modified slightly.

$$Forecasted\ VMT_{future_i} = Actual\ VMT_{HPMS_{1990}} \bullet \frac{Travel\ Demand\ Model\ VMT_{future_i}}{Travel\ Demand\ Model\ VMT_{1990}}$$

Travel demand models for the years 1987, 1996, 1999, and 2010 were used as a basis for developing the growth factors to apply to 1990 HPMS VMT to obtain future year projected VMT.

The model for the El Paso area was validated against ground counts for 1987. This is in accordance with EPA guidelines requiring network-based models to be validated at least as recently as 1985.

The El Paso network-based model used prepared demographic and land use estimates for the intermediate years 1996 and 1999. The 1999 forecast was done using a 1999 trip table and a network developed from the area Transportation Improvement Program for the year 1998.

The method used to factor the 1990 HPMS VMT involved three steps:

1) Develop an average annual increase in Travel Demand Model (TDM) VMT using the formula:

$$Average\ Annual\ VMT\ Increase = \frac{VMT_{TDM_i} - VMT_{TDM_0}}{YEAR_i - YEAR_0}$$

2) Using the Average Annual VMT Increase, calculate a Projected Travel Demand Model VMT:

$$Projected\ VMT_{TDM_i} = VMT_{TDM_0} + (Average\ Annual\ Increase\ x\ NumberofYears\ (TDM_i - TDM_o))$$

3) The Annual VMT Factor was then developed by taking the ratio of the

Projected Travel Demand Model VMT from one year to the next:

$$Annual\ VMT\ Factor_{(i-1)} = \frac{Projected\ VMT_{TDM_i}}{Projected\ VMT_{TDM_{i-1}}}$$

The Annual VMT Factor was applied to the HPMS 1990 VMT by road type for each year from 1990 through 1999. The Travel Demand Model VMT used to develop the factors were as follows:

Factoring Period	Travel Demand Model Boundary Years
1990 through 1994	1987 and 1995
1997 through 1998	1996 and 1999

Attachment G provides the VMT projections for Hardin, Jefferson, and Orange Counties.

TXDOT HPMS DOCUMENTATION

Documentation of the Texas HPMS procedures is provided in Attachment H.

ATTACHMENT A

EL PASO COUNTY VMT AND SPEED ESTIMATES (1989-1990 CO SEASON)

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(MIDNIGHT TO 7:15 AM) NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	32,451.3	32,451.3
Other Prin Art	.0	.0	.0	.0	9,481.6	9,481.6
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	23,109.1	23,109.1
Minor Coll	.0	.0	.0	.0	3,664.6	3,664.6
Local	.0	.0	.0	.0	5,703.9	5,703.9
RURAL SUBTOTAL	.0	.0	.0	.0	74,410.4	74,410.4
RURAL NON-LOCAL	.0	.0	.0	.0	68,706.5	68,706.5
URBAN						
Interstate	3,597.9	62,053.7	42,573.9	48,396.2	.0	156,621.7
Other Freeway & Exp	1,210.2	20,871.8	14,319.8	16,278.1	.0	52,679.9
Other Principal Art	2,036.9	41,486.3	59,553.6	89,476.7	.0	192,553.5
Minor Art	2,375.0	14,867.6	20,004.3	38,106.8	.0	75,353.7
Coll	669.5	7,221.6	6,920.7	18,589.1	.0	33,400.8
Local	1,541.1	23,520.7	36,372.4	106,840.2	.0	168,274.3
URBAN SUBTOTAL	11,430.5	170,021.7	179,744.7	317,687.0	.0	678,883.9
URBAN NON-LOCAL	9,889.5	146,501.0	143,372.3	210,846.8	.0	510,609.6
NON-LOCAL TOTAL	9,889.5	146,501.0	143,372.3	210,846.8	68,706.5	579,316.1
TOTAL	11,430.5	170,021.7	179,744.7	317,687.0	74,410.4	753,294.3

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (MIDNIGHT TO 7:15 AM) AVG WEEKDAY NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	66.79	66.79
Other Prin Art	.00	.00	.00	.00	56.90	56.90
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	52.44	52.44
Minor Coll	.00	.00	.00	.00	38.31	38.31
Local	.00	.00	.00	.00	34.00	34.00
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	54.04	53.99	55.92	56.02	.00	55.15
Other Freeway & Exp	54.11	54.09	56.02	56.08	.00	55.23
Other Principal Art	11.73	24.70	31.55	35.02	.00	31.48
Minor Art	11.74	19.58	26.79	30.38	.00	26.71
Coll	11.73	19.05	23.55	29.12	.00	25.44
Local	11.76	19.11	23.62	29.20	.00	26.42
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(7:15 AM to 8:15 AM) NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	49,557.7	49,557.7
Other Prin Art	.0	.0	.0	.0	14,479.7	14,479.7
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	35,290.9	35,290.9
Minor Coll	.0	.0	.0	.0	5,596.3	5,596.3
Local	.0	.0	.0	.0	8,710.7	8,710.7
RURAL SUBTOTAL	.0	.0	.0	.0	113,635.3	113,635.3
RURAL NON-LOCAL	.0	.0	.0	.0	104,924.6	104,924.6
URBAN						
Interstate	5,494.5	94,764.9	65,016.5	73,907.8	.0	239,183.7
Other Freeway & Exp	1,848.1	31,874.3	21,868.4	24,859.0	.0	80,449.7
Other Principal Art	3,110.6	63,355.5	90,946.9	136,643.7	.0	294,056.7
Minor Art	3,626.9	22,705.0	30,549.4	58,194.5	.0	115,075.9
Coll	1,022.5	11,028.3	10,568.8	28,388.1	.0	51,007.8
Local	2,353.4	35,919.4	55,545.8	163,160.2	.0	256,978.9
URBAN SUBTOTAL	17,456.1	259,647.5	274,495.8	485,153.4	.0	1,036,752.7
URBAN NON-LOCAL	15,102.6	223,728.0	218,950.0	321,993.2	.0	779,773.8
NON-LOCAL TOTAL	15,102.6	223,728.0	218,950.0	321,993.2	104,924.6	884,698.4
TOTAL	17,456.1	259,647.5	274,495.8	485,153.4	113,635.3	1,150,388.0

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (7:15 AM to 8:15 AM) AVG WEEKDAY NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	65.75	65.75
Other Prin Art	.00	.00	.00	.00	53.02	53.02
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	50.37	50.37
Minor Coll	.00	.00	.00	.00	22.73	22.73
Local	.00	.00	.00	.00	33.93	33.93
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	44.11	39.20	40.66	50.17	.00	43.10
Other Freeway & Exp	50.26	48.64	50.35	53.56	.00	50.66
Other Principal Art	10.49	18.60	21.72	26.11	.00	22.97
Minor Art	10.82	17.49	23.06	26.73	.00	23.43
Coll	10.42	15.98	20.95	26.39	.00	22.69
Local	11.69	18.81	23.23	28.69	.00	25.97
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(8:15 AM to 4:45 PM) NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	233,371.0	233,371.0
Other Prin Art	.0	.0	.0	.0	68,186.0	68,186.0
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	166,187.3	166,187.3
Minor Coll	.0	.0	.0	.0	26,353.4	26,353.4
Local	.0	.0	.0	.0	41,019.2	41,019.2
RURAL SUBTOTAL	.0	.0	.0	.0	535,116.9	535,116.9
RURAL NON-LOCAL	.0	.0	.0	.0	494,097.6	494,097.6
URBAN						
Interstate	25,874.0	446,254.8	306,167.4	348,037.5	.0	1,126,333.7
Other Freeway & Exp	8,702.7	150,098.3	102,979.8	117,062.9	.0	378,843.7
Other Principal Art	14,648.2	298,346.0	428,275.5	643,465.2	.0	1,384,734.8
Minor Art	17,079.5	106,919.4	143,859.4	274,042.4	.0	541,900.7
Coll	4,815.0	51,933.3	49,769.4	133,681.8	.0	240,199.5
Local	11,082.5	169,147.2	261,569.4	768,333.6	.0	1,210,132.7
URBAN SUBTOTAL	82,201.9	1,222,699.0	1,292,620.9	2,284,623.4	.0	4,882,145.2
URBAN NON-LOCAL	71,119.4	1,053,551.8	1,031,051.5	1,516,289.7	.0	3,672,012.4
NON-LOCAL TOTAL	71,119.4	1,053,551.8	1,031,051.5	1,516,289.7	494,097.6	4,166,110.1
TOTAL	82,201.9	1,222,699.0	1,292,620.9	2,284,623.4	535,116.9	5,417,262.0

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (8:15 AM to 4:45 PM) AVG WEEKDAY NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	66.34	66.34
Other Prin Art	.00	.00	.00	.00	55.27	55.27
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	51.53	51.53
Minor Coll	.00	.00	.00	.00	33.66	33.66
Local	.00	.00	.00	.00	33.96	33.96
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	51.49	50.49	52.26	54.30	.00	52.17
Other Freeway & Exp	52.89	52.49	54.34	55.19	.00	53.84
Other Principal Art	11.40	23.02	28.73	32.31	.00	28.98
Minor Art	11.47	18.94	25.62	29.16	.00	25.65
Coll	11.39	18.20	22.72	28.17	.00	24.55
Local	11.73	18.98	23.45	28.97	.00	26.22
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(4:45 PM to 5:45 PM) NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	47,193.4	47,193.4
Other Prin Art	.0	.0	.0	.0	13,788.9	13,788.9
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	33,607.2	33,607.2
Minor Coll	.0	.0	.0	.0	5,329.3	5,329.3
Local	.0	.0	.0	.0	8,295.1	8,295.1
RURAL SUBTOTAL	.0	.0	.0	.0	108,213.9	108,213.9
RURAL NON-LOCAL	.0	.0	.0	.0	99,918.8	99,918.8
URBAN						
Interstate	5,232.4	90,243.8	61,914.7	70,381.8	.0	227,772.7
Other Freeway & Exp	1,759.9	30,353.6	20,825.1	23,673.0	.0	76,611.6
Other Principal Art	2,962.2	60,333.0	86,608.0	130,124.7	.0	280,027.8
Minor Art	3,453.9	21,621.8	29,091.9	55,418.2	.0	109,585.8
Coll	973.7	10,502.2	10,064.6	27,033.8	.0	48,574.3
Local	2,241.2	34,205.8	52,895.8	155,376.2	.0	244,718.9
URBAN SUBTOTAL	16,623.3	247,260.2	261,400.1	462,007.7	.0	987,291.2
URBAN NON-LOCAL	14,382.1	213,054.4	208,504.3	306,631.5	.0	742,572.2
NON-LOCAL TOTAL	14,382.1	213,054.4	208,504.3	306,631.5	99,918.8	842,491.1
TOTAL	16,623.3	247,260.2	261,400.1	462,007.7	108,213.9	1,095,505.1

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO AVG WEE
(4:45 PM to 5:45 PM) NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	65.82	65.82
Other Prin Art	.00	.00	.00	.00	53.30	53.30
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	50.50	50.50
Minor Coll	.00	.00	.00	.00	24.18	24.18
Local	.00	.00	.00	.00	33.93	33.93
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	45.27	40.95	42.45	50.79	.00	44.50
Other Freeway & Exp	50.65	49.22	50.95	53.79	.00	51.14
Other Principal Art	10.63	19.26	22.71	26.99	.00	23.83
Minor Art	10.92	17.70	23.43	27.07	.00	23.75
Coll	10.57	16.32	21.21	26.63	.00	22.96
Local	11.69	18.83	23.26	28.72	.00	26.00
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(5:45 PM to MIDNIGHT) NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	101,062.5	101,062.5
Other Prin Art	.0	.0	.0	.0	29,528.3	29,528.3
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	71,968.3	71,968.3
Minor Coll	.0	.0	.0	.0	11,412.5	11,412.5
Local	.0	.0	.0	.0	17,763.6	17,763.6
RURAL SUBTOTAL	.0	.0	.0	.0	231,735.2	231,735.2
RURAL NON-LOCAL	.0	.0	.0	.0	213,971.6	213,971.6
URBAN						
Interstate	11,204.9	193,253.0	132,587.4	150,719.5	.0	487,764.7
Other Freeway & Exp	3,768.8	65,000.9	44,595.9	50,694.7	.0	164,060.2
Other Principal Art	6,343.5	129,200.3	185,466.9	278,655.9	.0	599,666.6
Minor Art	7,396.4	46,302.0	62,299.1	118,675.5	.0	234,672.9
Coll	2,085.1	22,490.0	21,552.9	57,891.6	.0	104,019.7
Local	4,799.3	73,250.1	113,274.0	332,730.9	.0	524,054.3
URBAN SUBTOTAL	35,598.0	529,496.2	559,776.2	989,368.1	.0	2,114,238.5
URBAN NON-LOCAL	30,798.6	456,246.1	446,502.2	656,637.2	.0	1,590,184.2
NON-LOCAL TOTAL	30,798.6	456,246.1	446,502.2	656,637.2	213,971.6	1,804,155.7
TOTAL	35,598.0	529,496.2	559,776.2	989,368.1	231,735.2	2,345,973.6

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO AVG WEE
(5:45 PM to MIDNIGHT) NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	66.58	66.58
Other Prin Art	.00	.00	.00	.00	56.15	56.15
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	52.01	52.01
Minor Coll	.00	.00	.00	.00	36.62	36.62
Local	.00	.00	.00	.00	33.98	33.98
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	53.13	52.81	54.68	55.35	.00	54.11
Other Freeway & Exp	53.62	53.47	55.37	55.70	.00	54.68
Other Principal Art	11.61	24.09	30.52	33.99	.00	30.54
Minor Art	11.64	19.33	26.33	29.88	.00	26.28
Coll	11.61	18.73	23.22	28.72	.00	25.08
Local	11.74	19.05	23.54	29.09	.00	26.33
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(24 HOURS) NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	463,635.9	463,635.9
Other Prin Art	.0	.0	.0	.0	135,464.4	135,464.4
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	330,162.7	330,162.7
Minor Coll	.0	.0	.0	.0	52,356.0	52,356.0
Local	.0	.0	.0	.0	81,492.5	81,492.5
RURAL SUBTOTAL	.0	.0	.0	.0	1,063,111.6	1,063,111.6
RURAL NON-LOCAL	.0	.0	.0	.0	981,619.1	981,619.1
URBAN						
Interstate	51,403.6	886,570.1	608,259.9	691,442.8	.0	2,237,676.5
Other Freeway & Exp	17,289.6	298,198.9	204,589.0	232,567.7	.0	752,645.2
Other Principal Art	29,101.4	592,721.1	850,850.9	1,278,366.1	.0	2,751,039.5
Minor Art	33,931.7	212,415.8	285,804.1	544,437.3	.0	1,076,588.9
Coll	9,565.9	103,175.4	98,876.4	265,584.5	.0	477,202.1
Local	22,017.5	336,043.2	519,657.4	1,526,441.1	.0	2,404,159.2
URBAN SUBTOTAL	163,309.7	2,429,124.6	2,568,037.6	4,538,839.5	.0	9,699,311.4
URBAN NON-LOCAL	141,292.2	2,093,081.4	2,048,380.2	3,012,398.4	.0	7,295,152.2
NON-LOCAL TOTAL	141,292.2	2,093,081.4	2,048,380.2	3,012,398.4	981,619.1	8,276,771.3
TOTAL	163,309.7	2,429,124.6	2,568,037.6	4,538,839.5	1,063,111.6	10,762,423.0

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (24 HOURS) AVG WEEI NOV-JAN

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	66.31	66.31
Other Prin Art	.00	.00	.00	.00	55.14	55.14
Minor Art	.00	.00	.00	.00	.00	.00
Major Coll	.00	.00	.00	.00	51.47	51.47
Minor Coll	.00	.00	.00	.00	32.50	32.50
Local	.00	.00	.00	.00	33.96	33.96
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	50.60	49.06	50.81	53.85	.00	51.05
Other Freeway & Exp	52.62	52.07	53.91	55.05	.00	53.50
Other Principal Art	11.30	22.52	27.95	31.66	.00	28.33
Minor Art	11.40	18.79	25.36	28.93	.00	25.43
Coll	11.27	17.95	22.55	28.01	.00	24.37
Local	11.72	18.97	23.44	28.96	.00	26.21
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

STRATIFICATION OF 1990 HPMS MILAGE BY AREA TYPE

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	35.5	35.5
Other Prin Art	.0	.0	.0	.0	26.8	26.8
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	138.0	138.0
Minor Coll	.0	.0	.0	.0	6.2	6.2
Local	.0	.0	.0	.0	383.3	383.3
RURAL SUBTOTAL	.0	.0	.0	.0	589.8	589.8
RURAL NON-LOCAL	.0	.0	.0	.0	206.5	206.5
URBAN						
Interstate	.6	7.4	7.0	12.1	.0	27.2
Other Freeway & Exp	.5	5.7	5.4	9.4	.0	21.0
Other Principal Art	2.1	35.5	49.6	82.4	.0	169.5
Minor Art	3.4	27.6	35.3	68.6	.0	134.8
Coll	1.6	17.2	17.8	58.2	.0	94.8
Local	21.7	218.7	363.5	1,068.3	.0	1,672.2
URBAN SUBTOTAL	29.8	312.2	478.6	1,298.9	.0	2,119.5
URBAN NON-LOCAL	8.1	93.5	115.1	230.6	.0	447.3
NON-LOCAL TOTAL	8.1	93.5	115.1	230.6	206.5	653.8
TOTAL	29.8	312.2	478.6	1,298.9	589.8	2,709.3

10/21/1992

EL PASO 1990

ESTIMATED AVERAGE LANE MILES PER CENTER LINE MILE

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	4.00	
Other Prin Art	.0	.0	.0	.0	3.08	
Minor Art	.0	.0	.0	.0	.00	
Major Coll	.0	.0	.0	.0	2.35	
Minor Coll	.0	.0	.0	.0	2.10	
Local	.0	.0	.0	.0	2.00	
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	7.08	8.14	5.92	5.53	.00	
Other Freeway & Exp	4.63	5.32	3.87	3.62	.00	
Other Principal Art	4.33	4.37	4.02	3.70	.00	
Minor Art	3.58	2.67	2.70	2.77	.00	
Coll	2.27	2.19	2.48	2.20	.00	
Local	2.00	2.00	2.00	2.00	.00	
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

ATTACHMENT B

EL PASO COUNTY VMT AND SPEED ESTIMATES (1990 03 SEASON)

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(MIDNIGHT TO 7:15 AM) JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	33,982.3	33,982.3
Other Prin Art	.0	.0	.0	.0	9,928.9	9,928.9
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	24,199.4	24,199.4
Minor Coll	.0	.0	.0	.0	3,837.4	3,837.4
Local	.0	.0	.0	.0	5,973.0	5,973.0
RURAL SUBTOTAL	.0	.0	.0	.0	77,921.0	77,921.0
RURAL NON-LOCAL	.0	.0	.0	.0	71,948.0	71,948.0
URBAN						
Interstate	3,672.4	63,338.0	43,455.1	49,397.8	.0	159,863.2
Other Freeway & Exp	1,235.2	21,303.8	14,616.2	16,615.0	.0	53,770.2
Other Principal Art	2,079.1	42,344.9	60,786.1	91,328.5	.0	196,538.6
Minor Art	2,424.1	15,175.3	20,418.3	38,895.5	.0	76,913.2
Coll	683.4	7,371.0	7,063.9	18,973.8	.0	34,092.1
Local	1,573.0	24,007.5	37,125.1	109,051.4	.0	171,756.9
URBAN SUBTOTAL	11,667.1	173,540.5	183,464.7	324,261.9	.0	692,934.2
URBAN NON-LOCAL	10,094.1	149,533.1	146,339.5	215,210.5	.0	521,177.2
NON-LOCAL TOTAL	10,094.1	149,533.1	146,339.5	215,210.5	71,948.0	593,125.3
TOTAL	11,667.1	173,540.5	183,464.7	324,261.9	77,921.0	770,855.2

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (MIDNIGHT TO 7:15 AM) AVG WEEKDAY JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	66.79	66.79
Other Prin Art	.00	.00	.00	.00	56.88	56.88
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	52.43	52.43
Minor Coll	.00	.00	.00	.00	38.28	38.28
Local	.00	.00	.00	.00	34.00	34.00
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	54.03	53.99	55.92	56.02	.00	55.14
Other Freeway & Exp	54.11	54.08	56.02	56.08	.00	55.23
Other Principal Art	11.73	24.70	31.55	35.02	.00	31.47
Minor Art	11.74	19.58	26.79	30.38	.00	26.71
Coll	11.73	19.05	23.55	29.12	.00	25.44
Local	11.76	19.11	23.62	29.20	.00	26.42
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(7:15 AM to 8:15 AM) JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	51,895.8	51,895.8
Other Prin Art	.0	.0	.0	.0	15,162.9	15,162.9
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	36,955.9	36,955.9
Minor Coll	.0	.0	.0	.0	5,860.3	5,860.3
Local	.0	.0	.0	.0	9,121.6	9,121.6
RURAL SUBTOTAL	.0	.0	.0	.0	118,996.5	118,996.5
RURAL NON-LOCAL	.0	.0	.0	.0	109,874.9	109,874.9
URBAN						
Interstate	5,608.2	96,726.1	66,362.1	75,437.4	.0	244,133.9
Other Freeway & Exp	1,886.3	32,534.0	22,321.0	25,373.5	.0	82,114.7
Other Principal Art	3,175.0	64,666.8	92,829.1	139,471.7	.0	300,142.6
Minor Art	3,702.0	23,174.9	31,181.7	59,398.9	.0	117,457.5
Coll	1,043.7	11,256.6	10,787.6	28,975.7	.0	52,063.5
Local	2,402.1	36,662.8	56,695.4	166,537.0	.0	262,297.4
URBAN SUBTOTAL	17,817.3	265,021.2	280,176.8	495,194.2	.0	1,058,209.5
URBAN NON-LOCAL	15,415.2	228,358.3	223,481.4	328,657.2	.0	795,912.1
NON-LOCAL TOTAL	15,415.2	228,358.3	223,481.4	328,657.2	109,874.9	905,787.0
TOTAL	17,817.3	265,021.2	280,176.8	495,194.2	118,996.5	1,177,206.0

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (7:15 AM to 8:15 AM) AVG WEEI JUNE-AUI

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	65.68	65.68
Other Prin Art	.00	.00	.00	.00	52.73	52.73
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	50.22	50.22
Minor Coll	.00	.00	.00	.00	21.28	21.28
Local	.00	.00	.00	.00	33.92	33.92
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	43.58	38.40	39.84	49.88	.00	42.46
Other Freeway & Exp	50.09	48.37	50.08	53.46	.00	50.45
Other Principal Art	10.42	18.31	21.27	25.72	.00	22.59
Minor Art	10.77	17.39	22.90	26.58	.00	23.29
Coll	10.35	15.82	20.84	26.28	.00	22.57
Local	11.69	18.80	23.22	28.67	.00	25.96
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(8:15 AM to 4:45 PM) JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	244,381.3	244,381.3
Other Prin Art	.0	.0	.0	.0	71,403.0	71,403.0
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	174,027.9	174,027.9
Minor Coll	.0	.0	.0	.0	27,596.7	27,596.7
Local	.0	.0	.0	.0	42,954.5	42,954.5
RURAL SUBTOTAL	.0	.0	.0	.0	560,363.5	560,363.5
RURAL NON-LOCAL	.0	.0	.0	.0	517,409.0	517,409.0
URBAN						
Interstate	26,409.5	455,490.5	312,503.9	355,240.5	.0	1,149,644.4
Other Freeway & Exp	8,882.8	153,204.8	105,111.1	119,485.6	.0	386,684.3
Other Principal Art	14,951.4	304,520.6	437,139.1	656,782.4	.0	1,413,393.5
Minor Art	17,432.9	109,132.3	146,836.7	279,714.0	.0	553,115.9
Coll	4,914.6	53,008.2	50,799.5	136,448.5	.0	245,170.8
Local	11,311.9	172,647.9	266,982.8	784,235.2	.0	1,235,177.8
URBAN SUBTOTAL	83,903.1	1,248,004.3	1,319,373.1	2,331,906.2	.0	4,983,186.7
URBAN NON-LOCAL	72,591.3	1,075,356.3	1,052,390.3	1,547,671.0	.0	3,748,008.9
NON-LOCAL TOTAL	72,591.3	1,075,356.3	1,052,390.3	1,547,671.0	517,409.0	4,265,417.9
TOTAL	83,903.1	1,248,004.3	1,319,373.1	2,331,906.2	560,363.5	5,543,550.2

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (8:15 AM to 4:45 PM) AVG WEEKDAY JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	66.31	66.31
Other Prin Art	.00	.00	.00	.00	55.16	55.16
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	51.47	51.47
Minor Coll	.00	.00	.00	.00	33.21	33.21
Local	.00	.00	.00	.00	33.96	33.96
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	51.38	50.33	52.09	54.23	.00	52.04
Other Freeway & Exp	52.84	52.42	54.28	55.16	.00	53.78
Other Principal Art	11.39	22.95	28.61	32.21	.00	28.88
Minor Art	11.46	18.92	25.58	29.12	.00	25.61
Coll	11.38	18.16	22.69	28.14	.00	24.52
Local	11.73	18.98	23.44	28.96	.00	26.22
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(4:45 PM to 5:45 PM) JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	49,420.0	49,420.0
Other Prin Art	.0	.0	.0	.0	14,439.5	14,439.5
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	35,192.8	35,192.8
Minor Coll	.0	.0	.0	.0	5,580.7	5,580.7
Local	.0	.0	.0	.0	8,686.5	8,686.5
RURAL SUBTOTAL	.0	.0	.0	.0	113,319.4	113,319.4
RURAL NON-LOCAL	.0	.0	.0	.0	104,633.0	104,633.0
URBAN						
Interstate	5,340.7	92,111.5	63,196.1	71,838.5	.0	232,486.7
Other Freeway & Exp	1,796.3	30,981.8	21,256.1	24,163.0	.0	78,197.2
Other Principal Art	3,023.5	61,581.6	88,400.4	132,817.7	.0	285,823.3
Minor Art	3,525.4	22,069.3	29,694.0	56,565.1	.0	111,853.8
Coll	993.9	10,719.6	10,272.9	27,593.3	.0	49,579.6
Local	2,287.5	34,913.7	53,990.6	158,591.9	.0	249,783.7
URBAN SUBTOTAL	16,967.3	252,377.5	266,810.1	471,569.4	.0	1,007,724.3
URBAN NON-LOCAL	14,679.8	217,463.8	212,819.5	312,977.6	.0	757,940.6
NON-LOCAL TOTAL	14,679.8	217,463.8	212,819.5	312,977.6	104,633.0	862,573.6
TOTAL	16,967.3	252,377.5	266,810.1	471,569.4	113,319.4	1,121,043.7

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (4:45 PM to 5:45 PM) AVG WEEKDAY JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	65.76	65.76
Other Prin Art	.00	.00	.00	.00	53.04	53.04
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	50.37	50.37
Minor Coll	.00	.00	.00	.00	22.82	22.82
Local	.00	.00	.00	.00	33.93	33.93
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	44.80	40.24	41.73	50.54	.00	43.93
Other Freeway & Exp	50.49	48.99	50.71	53.70	.00	50.95
Other Principal Art	10.58	18.99	22.31	26.63	.00	23.48
Minor Art	10.88	17.61	23.28	26.94	.00	23.62
Coll	10.51	16.18	21.10	26.53	.00	22.85
Local	11.69	18.82	23.25	28.71	.00	25.99
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(5:45 PM to MIDNIGHT) JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	105,830.6	105,830.6
Other Prin Art	.0	.0	.0	.0	30,921.4	30,921.4
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	75,363.7	75,363.7
Minor Coll	.0	.0	.0	.0	11,950.9	11,950.9
Local	.0	.0	.0	.0	18,601.7	18,601.7
RURAL SUBTOTAL	.0	.0	.0	.0	242,668.3	242,668.3
RURAL NON-LOCAL	.0	.0	.0	.0	224,066.7	224,066.7
URBAN						
Interstate	11,436.8	197,252.5	135,331.5	153,838.8	.0	497,859.5
Other Freeway & Exp	3,846.8	66,346.1	45,518.9	51,743.8	.0	167,455.7
Other Principal Art	6,474.8	131,874.2	189,305.4	284,423.1	.0	612,077.4
Minor Art	7,549.4	47,260.3	63,588.4	121,131.6	.0	239,529.7
Coll	2,128.3	22,955.5	21,999.0	59,089.8	.0	106,172.5
Local	4,898.7	74,766.1	115,618.3	339,617.1	.0	534,900.2
URBAN SUBTOTAL	36,334.7	540,454.8	571,361.4	1,009,844.1	.0	2,157,995.0
URBAN NON-LOCAL	31,436.0	465,688.7	455,743.1	670,227.0	.0	1,623,094.8
NON-LOCAL TOTAL	31,436.0	465,688.7	455,743.1	670,227.0	224,066.7	1,847,161.5
TOTAL	36,334.7	540,454.8	571,361.4	1,009,844.1	242,668.3	2,400,663.4

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (5:45 PM to MIDNIGHT) AVG WEEKDAY JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	66.56	66.56
Other Prin Art	.00	.00	.00	.00	56.10	56.10
Minor Art	.00	.00	.00	.00	52.59	52.59
Major Coll	.00	.00	.00	.00	51.98	51.98
Minor Coll	.00	.00	.00	.00	36.46	36.46
Local	.00	.00	.00	.00	33.98	33.98
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	53.09	52.76	54.63	55.33	.00	54.07
Other Freeway & Exp	53.60	53.44	55.34	55.69	.00	54.66
Other Principal Art	11.61	24.07	30.48	33.95	.00	30.51
Minor Art	11.63	19.32	26.31	29.86	.00	26.26
Coll	11.60	18.72	23.21	28.71	.00	25.07
Local	11.74	19.05	23.53	29.09	.00	26.33
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

ESTIMATED 1990 HPMS VMT BY AREA TYPE FOR AVG WEEKDAY
(24 HOURS) JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	485,510.0	485,510.0
Other Prin Art	.0	.0	.0	.0	141,855.7	141,855.7
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	345,739.6	345,739.6
Minor Coll	.0	.0	.0	.0	54,826.2	54,826.2
Local	.0	.0	.0	.0	85,337.3	85,337.3
RURAL SUBTOTAL	.0	.0	.0	.0	1,113,268.8	1,113,268.8
RURAL NON-LOCAL	.0	.0	.0	.0	1,027,931.5	1,027,931.5
URBAN						
Interstate	52,467.4	904,918.7	620,848.6	705,753.0	.0	2,283,987.7
Other Freeway & Exp	17,647.5	304,370.5	208,823.2	237,380.8	.0	768,222.0
Other Principal Art	29,703.8	604,988.1	868,460.1	1,304,823.4	.0	2,807,975.4
Minor Art	34,633.9	216,812.1	291,719.2	555,705.1	.0	1,098,870.2
Coll	9,763.9	105,310.8	100,922.8	271,081.0	.0	487,078.5
Local	22,473.1	342,998.0	530,412.2	1,558,032.6	.0	2,453,916.0
URBAN SUBTOTAL	166,689.6	2,479,398.2	2,621,186.1	4,632,775.8	.0	9,900,049.7
URBAN NON-LOCAL	144,216.4	2,136,400.2	2,090,773.9	3,074,743.2	.0	7,446,133.7
NON-LOCAL TOTAL	144,216.4	2,136,400.2	2,090,773.9	3,074,743.2	1,027,931.5	8,474,065.2
TOTAL	166,689.6	2,479,398.2	2,621,186.1	4,632,775.8	1,113,268.8	11,013,318.5

10/21/1992

EL PASO 1990 ESTIMATED SPEED BASED ON V/C RATIO (24 HOURS) AVG WEEKDAY JUNE-AUG

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	ALL AREA TYPES
RURAL						
Interstate	.00	.00	.00	.00	66.28	66.28
Other Prin Art	.00	.00	.00	.00	55.01	55.01
Minor Art	.00	.00	.00	.00	.00	.00
Major Coll	.00	.00	.00	.00	51.40	51.40
Minor Coll	.00	.00	.00	.00	31.94	31.94
Local	.00	.00	.00	.00	33.96	33.96
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	50.44	48.81	50.55	53.75	.00	50.85
Other Freeway & Exp	52.56	51.98	53.82	55.01	.00	53.43
Other Principal Art	11.28	22.42	27.80	31.52	.00	28.19
Minor Art	11.39	18.76	25.30	28.87	.00	25.38
Coll	11.25	17.90	22.50	27.97	.00	24.32
Local	11.72	18.97	23.43	28.95	.00	26.20
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

EL PASO 1990

STRATIFICATION OF 1990 HPMS MILAGE BY AREA TYPE

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	35.5	35.5
Other Prin Art	.0	.0	.0	.0	26.8	26.8
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	.0	.0	.0	.0	138.0	138.0
Minor Coll	.0	.0	.0	.0	6.2	6.2
Local	.0	.0	.0	.0	383.3	383.3
RURAL SUBTOTAL	.0	.0	.0	.0	589.8	589.8
RURAL NON-LOCAL	.0	.0	.0	.0	206.5	206.5
URBAN						
Interstate	.6	7.4	7.0	12.1	.0	27.2
Other Freeway & Exp	.5	5.7	5.4	9.4	.0	21.0
Other Principal Art	2.1	35.5	49.6	82.4	.0	169.5
Minor Art	3.4	27.6	35.3	68.6	.0	134.8
Coll	1.6	17.2	17.8	58.2	.0	94.8
Local	21.7	218.7	363.5	1,068.3	.0	1,672.2
URBAN SUBTOTAL	29.8	312.2	478.6	1,298.9	.0	2,119.5
URBAN NON-LOCAL	8.1	93.5	115.1	230.6	.0	447.3
NON-LOCAL TOTAL	8.1	93.5	115.1	230.6	206.5	653.8
TOTAL	29.8	312.2	478.6	1,298.9	589.8	2,709.3

10/21/1992

EL PASO 1990

ESTIMATED AVERAGE LANE MILES PER CENTER LINE MILE

HPMS FACILITY TYPES	CBD	CBD FRINGE	URBAN RES	SUBURBAN	RURAL	TOTAL
RURAL						
Interstate	.0	.0	.0	.0	4.00	
Other Prin Art	.0	.0	.0	.0	3.08	
Minor Art	.0	.0	.0	.0	.00	
Major Coll	.0	.0	.0	.0	2.35	
Minor Coll	.0	.0	.0	.0	2.10	
Local	.0	.0	.0	.0	2.00	
RURAL SUBTOTAL						
RURAL NON-LOCAL						
URBAN						
Interstate	7.08	8.14	5.92	5.53	.00	
Other Freeway & Exp	4.63	5.32	3.87	3.62	.00	
Other Principal Art	4.33	4.37	4.02	3.70	.00	
Minor Art	3.58	2.67	2.70	2.77	.00	
Coll	2.27	2.19	2.48	2.20	.00	
Local	2.00	2.00	2.00	2.00	.00	
URBAN SUBTOTAL						
URBAN NON-LOCAL						
NON-LOCAL TOTAL						
TOTAL						

10/21/1992

ATTACHMENT C

HUDSPETH COUNTY VMT AND SPEED ESTIMATES, SUMMER

HUDSPETH 1990

1990 DATA FOR THE NOVEMBER - JANUARY SEASON

HPMS FACILITY TYPES	1990 HPMS AADT VMT	1990 SEASONAL ADJUSTED AAWT VMT	1990 HPMS CENTER LINE MILES	ESTIMATED 1990 LANE MILES/ CENTER LINE MILE	TYPICAL HOURLY CAPACITY PER LANE	TYPICAL FREE FLOW SPEEDS
RURAL						
Interstate	595,434.9	578,762.7	73.6	4.00	2,000.0	68.0
Other Prin Art	86,141.7	83,729.7	65.6	2.00	725.0	55.0
Minor Art	.0	.0	.0	.00	700.0	50.0
Major Coll	22,345.2	21,719.5	135.8	2.00	625.0	50.0
Minor Coll	6,835.6	6,644.2	60.4	2.00	550.0	45.0
Local	9,251.2	8,992.2	446.5	2.00	550.0	35.0
RURAL SUBTOTAL	720,008.6	699,848.4	781.9	--	--	--
RURAL NON-LOCAL	710,757.4	690,856.2	335.4	--	--	--
URBAN						
Interstate	.0	.0	.0	.00	1,950.0	57.0
Other Freeway & Exp	.0	.0	.0	.00	1,950.0	57.0
Other Principal Art	.0	.0	.0	.00	700.0	37.5
Minor Art	.0	.0	.0	.00	650.0	32.5
Coll	.0	.0	.0	.00	525.0	30.0
Local	.0	.0	.0	.00	525.0	25.0
URBAN SUBTOTAL	.0	.0	.0	--	--	--
URBAN NON-LOCAL	.0	.0	.0	--	--	--
NON-LOCAL TOTAL	710,757.4	690,856.2	335.4	--	--	--
TOTAL	720,008.6	699,848.4	781.9	--	--	--

10/26/1992

HUDSPETH 1990

ESTIMATED 1990 HPMS VMT BY TIME PERIOD FOR
AVERAGE WEEKDAYS IN NOVEMBER - JANUARY

HPMS FACILITY TYPES	Midnight to 7:15 am	7:15 am to 8:15 am	8:15 am to 4:45 pm	4:45 pm to 5:45 pm	5:45 pm to Midnight	24-Hour
RURAL						
Interstate	40,513.4	61,869.7	291,349.2	58,918.0	126,112.4	578,762.7
Other Prin Art	5,861.1	8,950.7	42,149.5	8,523.7	18,244.7	83,729.7
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	1,520.4	2,321.8	10,933.6	2,211.0	4,732.7	21,719.5
Minor Coll	465.1	710.3	3,344.7	676.4	1,447.8	6,644.2
Local	629.5	961.3	4,526.7	915.4	1,959.4	8,992.2
RURAL SUBTOTAL	48,989.4	74,813.8	352,303.7	71,244.6	152,497.0	699,848.4
RURAL NON-LOCAL	48,359.9	73,852.5	347,777.0	70,329.2	150,537.6	690,856.2
URBAN						
Interstate	.0	.0	.0	.0	.0	.0
Other Freeway & Exp	.0	.0	.0	.0	.0	.0
Other Principal Art	.0	.0	.0	.0	.0	.0
Minor Art	.0	.0	.0	.0	.0	.0
Coll	.0	.0	.0	.0	.0	.0
Local	.0	.0	.0	.0	.0	.0
URBAN SUBTOTAL	.0	.0	.0	.0	.0	.0
URBAN NON-LOCAL	.0	.0	.0	.0	.0	.0
NON-LOCAL TOTAL	48,359.9	73,852.5	347,777.0	70,329.2	150,537.6	690,856.2
TOTAL	48,989.4	74,813.8	352,303.7	71,244.6	152,497.0	699,848.4

10/26/1992

HUDSPETH 1990

ESTIMATED SPEEDS BY TIME PER
BASED ON V/C RATIO FOR
AVERAGE WEEKDAYS IN NOVEMBER - JANUARY

HPMS FACILITY TYPES	Midnight to 7:15 am	7:15 am to 8:15 am	8:15 am to 4:45 pm	4:45 pm to 5:45 pm	5:45 pm to Midnight	24-Hour
RURAL						
Interstate	66.82	66.28	66.57	66.32	66.70	66.56
Other Prin Art	52.51	51.56	52.06	51.61	52.29	52.04
Minor Art	.00	.00	.00	.00	.00	.00
Major Coll	47.99	47.89	47.94	47.90	47.97	47.94
Minor Coll	43.37	43.31	43.34	43.31	43.35	43.34
Local	34.01	34.00	34.00	34.00	34.01	34.00
RURAL SUBTOTAL	62.90	62.34	62.64	62.37	62.77	62.63
RURAL NON-LOCAL	63.60	63.02	63.33	63.06	63.47	63.32
URBAN						
Interstate	.00	.00	.00	.00	.00	.00
Other Freeway & Exp	.00	.00	.00	.00	.00	.00
Other Principal Art	.00	.00	.00	.00	.00	.00
Minor Art	.00	.00	.00	.00	.00	.00
Coll	.00	.00	.00	.00	.00	.00
Local	.00	.00	.00	.00	.00	.00
URBAN SUBTOTAL	.00	.00	.00	.00	.00	.00
URBAN NON-LOCAL	.00	.00	.00	.00	.00	.00
NON-LOCAL TOTAL	63.60	63.02	63.33	63.06	63.47	63.32
TOTAL	62.90	62.34	62.64	62.37	62.77	62.63

10/26/1992

ATTACHMENT D

HUDSPETH COUNTY VMT AND SPEED ESTIMATES, WINTER

HUDSPETH 1990

1990 DATA FOR THE JUNE - AUGUST SEASON

HPMS FACILITY TYPES	1990 HPMS AADT VMT	1990 SEASONAL ADJUSTED AAWT VMT	1990 HPMS CENTER LINE MILES	ESTIMATED 1990 LANE MILES/ CENTER LINE MILE	TYPICAL HOURLY CAPACITY PER LANE	TYPICAL FREE FLOW SPEEDS
RURAL						
Interstate	595,434.9	591,266.9	73.6	4.00	2,000.0	68.0
Other Prin Art	86,141.7	85,538.7	65.6	2.00	725.0	55.0
Minor Art	.0	.0	.0	.00	700.0	50.0
Major Coll	22,345.2	22,188.8	135.8	2.00	625.0	50.0
Minor Coll	6,835.6	6,787.8	60.4	2.00	550.0	45.0
Local	9,251.2	9,186.4	446.5	2.00	550.0	35.0
RURAL SUBTOTAL	720,008.6	714,968.5	781.9	--	--	--
RURAL NON-LOCAL	710,757.4	705,782.1	335.4	--	--	--
URBAN						
Interstate	.0	.0	.0	.00	1,950.0	57.0
Other Freeway & Exp	.0	.0	.0	.00	1,950.0	57.0
Other Principal Art	.0	.0	.0	.00	700.0	37.5
Minor Art	.0	.0	.0	.00	650.0	32.5
Coll	.0	.0	.0	.00	525.0	30.0
Local	.0	.0	.0	.00	525.0	25.0
URBAN SUBTOTAL	.0	.0	.0	--	--	--
URBAN NON-LOCAL	.0	.0	.0	--	--	--
NON-LOCAL TOTAL	710,757.4	705,782.1	335.4	--	--	--
TOTAL	720,008.6	714,968.5	781.9	--	--	--

10/23/1992

HUDSPETH 1990

ESTIMATED 1990 HPMS VMT BY TIME PERIOD FOR
AVERAGE WEEKDAYS IN JUNE - AUGUST

HPMS FACILITY TYPES	Midnight to 7:15 am	7:15 am to 8:15 am	8:15 am to 4:45 pm	4:45 pm to 5:45 pm	5:45 pm to Midnight	24-Hour
RURAL						
Interstate	41,388.7	63,206.4	297,643.7	60,191.0	128,837.0	591,266.9
Other Prin Art	5,987.7	9,144.1	43,060.2	8,707.8	18,638.9	85,538.7
Minor Art	.0	.0	.0	.0	.0	.0
Major Coll	1,553.2	2,372.0	11,169.8	2,258.8	4,834.9	22,188.8
Minor Coll	475.1	725.6	3,417.0	691.0	1,479.1	6,787.8
Local	643.1	982.0	4,624.5	935.2	2,001.7	9,186.4
RURAL SUBTOTAL	50,047.8	76,430.1	359,915.2	72,783.8	155,791.6	714,968.5
RURAL NON-LOCAL	49,404.7	75,448.1	355,290.7	71,848.6	153,789.9	705,782.1
URBAN						
Interstate	.0	.0	.0	.0	.0	.0
Other Freeway & Exp	.0	.0	.0	.0	.0	.0
Other Principal Art	.0	.0	.0	.0	.0	.0
Minor Art	.0	.0	.0	.0	.0	.0
Coll	.0	.0	.0	.0	.0	.0
Local	.0	.0	.0	.0	.0	.0
URBAN SUBTOTAL	.0	.0	.0	.0	.0	.0
URBAN NON-LOCAL	.0	.0	.0	.0	.0	.0
NON-LOCAL TOTAL	49,404.7	75,448.1	355,290.7	71,848.6	153,789.9	705,782.1
TOTAL	50,047.8	76,430.1	359,915.2	72,783.8	155,791.6	714,968.5

10/23/1992

HUDSPETH 1990

ESTIMATED SPEEDS BY TIME PERI(
BASED ON V/C RATIO FOR
AVERAGE WEEKDAYS IN JUNE - AUGUST

HPMS FACILITY TYPES	Midnight to 7:15 am	7:15 am to 8:15 am	8:15 am to 4:45 pm	4:45 pm to 5:45 pm	5:45 pm to Midnight	24-Hour
RURAL						
Interstate	66.82	66.27	66.56	66.30	66.70	66.55
Other Prin Art	52.51	51.53	52.05	51.59	52.28	52.03
Minor Art	.00	.00	.00	.00	.00	.00
Major Coll	47.99	47.89	47.94	47.90	47.96	47.94
Minor Coll	43.37	43.30	43.34	43.31	43.35	43.33
Local	34.01	34.00	34.00	34.00	34.01	34.00
RURAL SUBTOTAL	62.90	62.32	62.63	62.36	62.77	62.62
RURAL NON-LOCAL	63.60	63.00	63.32	63.04	63.47	63.31
URBAN						
Interstate	.00	.00	.00	.00	.00	.00
Other Freeway & Exp	.00	.00	.00	.00	.00	.00
Other Principal Art	.00	.00	.00	.00	.00	.00
Minor Art	.00	.00	.00	.00	.00	.00
Coll	.00	.00	.00	.00	.00	.00
Local	.00	.00	.00	.00	.00	.00
URBAN SUBTOTAL	.00	.00	.00	.00	.00	.00
URBAN NON-LOCAL	.00	.00	.00	.00	.00	.00
NON-LOCAL TOTAL	63.60	63.00	63.32	63.04	63.47	63.31
TOTAL	62.90	62.32	62.63	62.36	62.77	62.62

10/23/1992

ATTACHMENT E

EL PASO COUNTY VEHICLE CLASSIFICATION DATA

El Paso County

Vehicle Registration		
HDGV	2,728	76.8%
HDDV	823	23.2%

Location	SC-15			SC-16			SC-17		
Date	Summer 1984			Summer 1984			Summer 1984		
Functional Classification	14 - Urban - Oth. Principal Arterial			17 - Urban - Collector			14 - Urban - Oth. Principal Arterial		
Count Data:									
Passenger Cars	27,466			1,367			4,504		
Panel & Pickup Trucks	6,592			456			2,637		
Other 2-axle Trucks	385			16			288		
Ramaining Trucks	245			26			151		
Motorcycles & Scooters	277			16			41		
	34,965			1,881			7,621		
Output									
LDV	27,466			1,367			4,504		
LDGV		26,917	76.98%		1,340	71.24%		4,414	57.92%
LDDV		549	1.57%		27	1.44%		90	1.18%
LDT1	5,274			365			2,110		
LDGT1		5,116	14.63%		354	18.82%		2,047	26.86%
LDDT		158	0.45%		11	0.58%		63	0.83%
LDGT2	1,318			91			527		
	77			3			58		
LDGT2 Total		1,395	3.99%		94	5.00%		585	7.68%
HDV	308			13			230		
	245			26			151		
HDVTotal	553			39			381		
HDGV		425	1.22%		30	1.59%		293	3.84%
HDDV		128	0.37%		9	0.48%		88	1.15%
MC		277	0.79%		16	0.85%		41	0.54%
Total		34,965	100.00%		1,881	100.00%		7,621	100.00%

Location	SC-18			SC-19			SC-20		
Date	Summer 1984			Summer 1984			Summer 1984		
Functional Classification	14 - Urban - Oth. Principal Arterial			14 - Urban - Oth. Principal Arterial			14 - Urban - Oth. Principal Arterial		
Count Data:									
Passenger Cars	11,687			20,606			10,658		
Panel & Pickup Trucks	5,066			6,924			5,273		
Other 2-axle Trucks	398			487			653		
Ramaining Trucks	272			274			669		
Motorcycles & Scooters	164			317			137		
	17,587			28,608			17,390		
Output									
LDV	11,687			20,606			10,658		
LDGV		11,453	65.12%		20,194	70.59%		10,445	60.06%
LDDV		234	1.33%		412	1.44%		213	1.22%
LDT1	4,053			5,539			4,218		
LDGT1		3,931	22.35%		5,373	18.78%		4,091	23.53%
LDDT		122	0.69%		166	0.58%		127	0.73%
LDGT2	1,013			1,385			1,055		
	80			97			131		
LDGT2 Total		1,093	6.21%		1,482	5.18%		1,186	6.82%
HDV	318			390			522		
	272			274			669		
HDVTotal	590			664			1,191		
HDGV		453	2.58%		510	1.78%		915	5.26%
HDDV		137	0.78%		154	0.54%		276	1.59%
MC		164	0.93%		317	1.11%		137	0.79%
Total		17,587	99.99%		28,608	100.00%		17,390	100.00%

El Paso County

Vehicle Registration		
HDGV	2,728	76.8%
HDDV	823	23.2%

Location	Total			Total		
Date	Summer 1984			Summer 1984		
Functional Classification	14 - Urban - Oth. Principal Arterial			ALL		
Count Data:						
Passenger Cars	74,921			76,288		
Panel & Pickup Trucks	26,492			26,948		
Other 2-axle Trucks	2,211			2,227		
Ramaining Trucks	1,611			1,637		
Motorcycles & Scooters	936			952		
	106,171			108,052		
Output						
LDV	74,921			76,288		
LDGV		73,423	69.16%		74,762	69.19%
LDDV		1,498	1.41%		1,526	1.41%
LDT1	21,194			21,558		
LDGT1		20,558	19.36%		20,911	19.35%
LDDT		636	0.60%		647	0.60%
LDGT2	5,298			5,390		
	442			445		
LDGT2 Total		5,740	5.41%		5,835	5.40%
HDV	1,769			1,782		
	1,611			1,637		
HDV Total	3,380			3,419		
HDGV		2,597	2.45%		2,627	2.43%
HDDV		783	0.74%		792	0.73%
MC		936	0.88%		952	0.88%
Total		106,171	100.01%		108,052	99.99%

El Paso County

Vehicle Registration		
HDGV	2,728	76.8%
HDDV	823	23.2%

Location	SC-6134			SC-6135			SC-6136		
Date	Summer 1986			Summer 1986			Summer 1986		
Functional Classification	14 - Urban - Oth. Principal Arterial			14 - Urban - Oth. Principal Arterial			14 - Urban - Oth. Principal Arterial		
Count Data:									
Passenger Cars	19,874			14,221			21,490		
Panel & Pickup Trucks	8,352			6,406			9,274		
Other 2-axle Trucks	440			310			512		
Ramaining Trucks	348			184			466		
Motorcycles & Scooters	146			145			406		
	29,160			21,266			32,148		
Output									
LDV	19,874			14,221			21,490		
LDGV		19,477	66.79%		13,937	65.54%		21,060	65.51%
LDDV		397	1.36%		284	1.34%		430	1.34%
LDT1	6,682			5,125			7,419		
LDGT1		6,482	22.23%		4,971	23.38%		7,196	22.38%
LDDT		200	0.69%		154	0.72%		223	0.69%
LDGT2	1,670			1,281			1,855		
	88			62			102		
LDGT2 Total		1,758	6.03%		1,343	6.32%		1,957	6.09%
HDV	352			248			410		
	348			184			466		
HDV Total	700			432			876		
HDGV		538	1.84%		332	1.56%		673	2.09%
HDDV		162	0.56%		100	0.47%		203	0.63%
MC		146	0.50%		145	0.68%		406	1.26%
Total		29,160	100.00%		21,266	100.01%		32,148	99.99%

Location	SC-6137			Total		
Date	Summer 1986			Summer 1986		
Functional Classification	14 - Urban - Oth. Principal Arterial			14 - Urban - Oth. Principal Arterial		
Count Data:						
Passenger Cars	12,766			68,351		
Panel & Pickup Trucks	5,804			29,836		
Other 2-axle Trucks	279			1,541		
Ramaining Trucks	244			1,242		
Motorcycles & Scooters	155			852		
	19,248			101,822		
Output						
LDV	12,766			68,351		
LDGV		12,511	65.00%		66,984	65.79%
LDDV		255	1.32%		1,367	1.34%
LDT1	4,643			23,869		
LDGT1		4,504	23.40%		23,153	22.74%
LDDT		139	0.72%		716	0.70%
LDGT2	1,161			5,967		
	56			308		
LDGT2 Total		1,217	6.32%		6,275	6.16%
HDV	223			1,233		
	244			1,242		
HDV Total	467			2,475		
HDGV		359	1.87%		1,901	1.87%
HDDV		108	0.56%		574	0.56%
MC		155	0.81%		852	0.84%
Total		19,248	100.00%		101,822	100.00%

El Paso County

Vehicle Registration		
HDGV	2,728	76.8%
HDDV	823	23.2%

Location	M-1168			MS-123			LW-510		
Date	Summer 1989			Summer 1989			Summer 1989		
Functional Classification	07 - Rural - Major Collector			11 - Urban - Principal Arterial IH			01 - Rural - Principal Arterial IH		
Count Data:									
Passenger Cars	2,647			14,898			12,626		
Panel & Pickup Trucks	1,402			7,847			6,358		
Other 2-axle Trucks	148			838			710		
Ramaining Trucks	430			3,849			4,632		
Motorcycles & Scooters	39			72			69		
	4,666			27,504			24,395		
Output									
LDV	2,647			14,898			12,626		
LDGV		2,594	55.59%		14,600	53.08%		12,373	50.72%
LDDV		53	1.14%		298	1.08%		253	1.04%
LDT1	1,122			6,278			5,086		
LDGT1		1,088	23.32%		6,090	22.14%		4,933	20.22%
LDDT		34	0.73%		188	0.68%		153	0.63%
LDGT2	280			1,569			1,272		
	30			168			142		
LDGT2 Total		310	6.64%		1,737	6.32%		1,414	5.80%
HDV	118			670			568		
	430			3,849			4,632		
HDV Total	548			4,519			5,200		
HDGV		421	9.02%		3,472	12.62%		3,995	16.38%
HDDV		127	2.72%		1,047	3.81%		1,205	4.94%
MC		39	0.84%		72	0.26%		69	0.28%
Total		4,666	100.00%		27,504	99.99%		24,395	100.01%

Location	M-10			M-1300			MS-162		
Date	Summer 1989			Summer 1989			Summer 1989		
Functional Classification	14 - Urban - Oth. Principal Arterial			14 - Urban - Oth. Principal Arterial			11 - Urban - Principal Arterial IH		
Count Data:									
Passenger Cars	6,483			1,057			97,984		
Panel & Pickup Trucks	4,541			904			32,651		
Other 2-axle Trucks	354			118			1,624		
Ramaining Trucks	262			415			6,109		
Motorcycles & Scooters	61			5			0		
	11,701			2,499			138,368		
Output									
LDV	6,483			1,057			97,984		
LDGV		6,353	54.29%		1,036	41.46%		96,024	69.40%
LDDV		130	1.11%		21	0.84%		1,960	1.42%
LDT1	3,633			723			26,121		
LDGT1		3,524	30.12%		701	28.05%		25,337	18.31%
LDDT		109	0.93%		22	0.88%		784	0.57%
LDGT2	908			181			6,530		
	71			24			325		
LDGT2 Total		979	8.37%		205	8.20%		6,855	4.95%
HDV	283			94			1,299		
	262			415			6,109		
HDV Total	545			509			7,408		
HDGV		419	3.58%		391	15.65%		5,691	4.11%
HDDV		126	1.08%		118	4.72%		1,717	1.24%
MC		61	0.52%		5	0.20%		0	0.00%
Total		11,701	100.00%		2,499	100.00%		138,368	100.00%

El Paso County

Vehicle Registration

HDGV	2,728	76.8%
HDDV	823	23.2%

Location	Total			Total			Total		
Date	Summer 1989			Summer 1989			Summer 1989		
Functional Classification	11 - Urban - Principal Arterial IH			14 - Urban - Oth. Principal Arterial			ALL		
Count Data:									
Passenger Cars	112,882			7,540			135,695		
Panel & Pickup Trucks	40,498			5,445			53,703		
Other 2-axle Trucks	2,462			472			3,792		
Ramaining Trucks	9,958			677			15,697		
Motorcycles & Scooters	72			66			246		
	165,872			14,200			209,133		
Output									
LDV	112,882			7,540			135,695		
LDGV		110,624	66.69%		7,389	52.04%		132,981	63.59%
LDDV		2,258	1.36%		151	1.06%		2,714	1.30%
LDT1	32,398			4,356			42,962		
LDGT1		31,426	18.95%		4,225	29.75%		41,673	19.93%
LDDT		972	0.59%		131	0.92%		1,289	0.62%
LDGT2	8,100			1,089			10,741		
	492			94			758		
LDGT2 Total		8,592	5.18%		1,183	8.33%		11,499	5.50%
HDV	1,970			378			3,034		
	9,958			677			15,697		
HDV Total	11,928			1,055			18,731		
HDGV		9,163	5.52%		810	5.70%		14,390	6.88%
HDDV		2,765	1.67%		245	1.73%		4,341	2.08%
MC		72	0.04%		66	0.46%		246	0.12%
Total		165,872	100.00%		14,200	99.99%		209,133	100.02%

El Paso County

Vehicle Registration		
HDGV	2,728	76.8%
HDDV	823	23.2%

Location	LW-510			M-1168			M-10		
Date	Summer 1990			Summer 1990			Summer 1990		
Functional Classification	01 - Rural - Principal Arterial IH			07 - Rural - Major Collector			14 - Urban - Oth. Principal Arterial		
Count Data:									
Passenger Cars	16,274			3,364			8,226		
Panel & Pickup Trucks	2,486			537			1,949		
Other 2-axle Trucks	527			121			256		
Ramaining Trucks	2,863			398			214		
Motorcycles & Scooters	0			0			0		
	22,150			4,420			10,645		
Output									
LDV	16,274			3,364			8,226		
LDGV		15,949	72.00%		3,297	74.59%		8,061	75.73%
LDDV		325	1.47%		67	1.52%		165	1.55%
LDT1	1,989			430			1,559		
LDGT1		1,929	8.71%		417	9.43%		1,512	14.20%
LDDT		60	0.27%		13	0.29%		47	0.44%
LDGT2	497			107			390		
	105			24			51		
LDGT2 Total		602	2.72%		131	2.96%		441	4.14%
HDV	422			97			205		
	2,863			398			214		
HDV Total	3,285			495			419		
HDGV		2,524	11.40%		380	8.60%		322	3.02%
HDDV		761	3.44%		115	2.60%		97	0.91%
MC		0	0.00%		0	0.00%		0	0.00%
Total		22,150	100.01%		4,420	99.99%		10,645	99.99%

Location	M-1167-A			M-1300			MS-162		
Date	Summer 1990			Summer 1990			Summer 1990		
Functional Classification	16 - Urban - Minor Arterial			14 - Urban - Oth. Principal Arterial			11 - Urban - Principal Arterial IH		
Count Data:									
Passenger Cars	8,743			1,346			102,428		
Panel & Pickup Trucks	1,775			402			32,348		
Other 2-axle Trucks	142			102			1,796		
Ramaining Trucks	172			396			5,060		
Motorcycles & Scooters	0			0			0		
	10,832			2,246			141,632		
Output									
LDV	8,743			1,346			102,428		
LDGV		8,568	79.10%		1,319	58.73%		100,379	70.87%
LDDV		175	1.62%		27	1.20%		2,049	1.45%
LDT1	1,420			322			25,878		
LDGT1		1,377	12.71%		312	13.89%		25,102	17.72%
LDDT		43	0.40%		10	0.45%		776	0.55%
LDGT2	355			80			6,470		
	28			20			359		
LDGT2 Total		383	3.54%		100	4.45%		6,829	4.82%
HDV	114			82			1,437		
	172			396			5,060		
HDV Total	286			478			6,497		
HDGV		220	2.03%		367	16.34%		4,991	3.52%
HDDV		66	0.61%		111	4.94%		1,506	1.06%
MC		0	0.00%		0	0.00%		0	0.00%
Total		10,832	100.01%		2,246	100.00%		141,632	99.99%

El Paso County

Vehicle Registration							
HDGV		2,728	76.8%				
HDDV		823	23.2%				
Location		Total			Total		
Date		Summer 1990			Summer 1990		
Functional Classification		14 - Urban - Oth. Principal Art.			ALL		
Count Data:							
Passenger Cars		9,572			140,381		
Panel & Pickup Trucks		2,351			39,497		
Other 2-axle Trucks		358			2,944		
Ramaining Trucks		610			9,103		
Motorcycles & Scooters		0			0		
		12,891			191,925		
Output							
LDV		9,572			140,381		
	LDGV		9,381	72.77%		137,573	71.68%
	LDDV		191	1.48%		2,808	1.46%
LDT1		1,881			31,598		
	LDGT1		1,825	14.16%		30,650	15.97%
	LDDT		56	0.43%		948	0.49%
	LDGT2	470			7,899		
		72			589		
	LDGT2 Total		542	4.20%		8,488	4.42%
HDV		286			2,355		
		610			9,103		
	HDV Total	896			11,458		
	HDGV		688	5.34%		8,802	4.59%
	HDDV		208	1.61%		2,656	1.38%
	MC		0	0.00%		0	0.00%
Total			12,891	99.99%		191,925	99.99%

El Paso County

Vehicle Registration		
HDGV	2,728	76.8%
HDDV	823	23.2%

Location	All Sites			All Sites			All Sites		
Date	All Years			All Years			All Years		
Functional Classification	01 - Rural - Principal Arterial IH			07 - Rural - Major Collector			11 - Urban - Principal Arterial IH		
Count Data:									
Passenger Cars	28,900			6,011			215,310		
Panel & Pickup Trucks	8,844			1,939			72,846		
Other 2-axle Trucks	1,237			269			4,258		
Ramaining Trucks	7,495			828			15,018		
Motorcycles & Scooters	69			39			72		
	46,545			9,086			307,504		
Output									
LDV	28,900			6,011			215,310		
LDGV		28,322	60.85%		5,891	64.84%		211,004	68.62%
LDDV		578	1.24%		120	1.32%		4,306	1.40%
LDT1	7,075			1,551			58,277		
LDGT1		6,863	14.74%		1,504	16.55%		56,529	18.38%
LDDT		212	0.46%		47	0.52%		1,748	0.57%
LDGT2	1,769			388			14,569		
	247			54			852		
LDGT2 Total		2,016	4.33%		442	4.86%		15,421	5.01%
HDV	990			215			3,406		
	7,495			828			15,018		
HDV Total	8,485			1,043			18,424		
HDGV		6,518	14.00%		801	8.82%		14,154	4.60%
HDDV		1,967	4.23%		242	2.66%		4,270	1.39%
MC		69	0.15%		39	0.43%		72	0.02%
Total		46,545	100.00%		9,086	100.00%		307,504	99.99%

Location	All Sites			All Sites			All Sites		
Date	All Years			All Years			All Years		
Functional Classification	14 - Urban - Oth. Principal Art.			16 - Urban - Minor Arterial			17 - Urban - Collector		
Count Data:									
Passenger Cars	160,384			8743			1,367		
Panel & Pickup Trucks	64,124			1775			456		
Other 2-axle Trucks	4,582			142			16		
Ramaining Trucks	4,140			172			26		
Motorcycles & Scooters	1,854			0			16		
	235,084			10,832			1,881		
Output									
LDV	160,384			8,743			1,367		
LDGV		157,176	66.86%		8,568	79.10%		1,340	71.24%
LDDV		3,208	1.36%		175	1.62%		27	1.44%
LDT1	51,299			1,420			365		
LDGT1		49,760	21.17%		1,377	12.71%		354	18.82%
LDDT		1,539	0.65%		43	0.40%		11	0.58%
LDGT2	12,825			355			91		
	916			28			3		
LDGT2 Total		13,741	5.85%		383	3.54%		94	5.00%
HDV	3,666			114			13		
	4,140			172			26		
HDV Total	7,806			286			39		
HDGV		5,997	2.55%		220	2.03%		30	1.59%
HDDV		1,809	0.77%		66	0.61%		9	0.48%
MC		1,854	0.79%		0	0.00%		16	0.85%
Total		235,084	100.00%		10,832	100.01%		1,881	100.00%

El Paso County				
Vehicle Registration				
	HDGV	2,728	76.8%	
	HDDV	823	23.2%	
Location		All Sites		
Date		All Years		
Functional Classification		All Classes		
Count Data:				
Passenger Cars		420,715		
Panel & Pickup Trucks		149,984		
Other 2-axle Trucks		10,504		
Ramaining Trucks		27,679		
Motorcycles & Scooters		2,050		
		610,932		
Output				
LDV		420,715		
	LDGV		412,301	67.49%
	LDDV		8,414	1.38%
LDT1		119,987		
	LDGT1		116,387	19.05%
	LDDT		3,600	0.59%
	LDGT2	29,997		
		2,101		
	LDGT2 Total		32,098	5.25%
HDV		8,403		
		27,679		
	HDV Total	36,082		
	HDGV		27,719	4.54%
	HDDV		8,363	1.37%
	MC		2,050	0.34%
Total			610,932	100.01%

ATTACHMENT F

EL PASO COUNTY VEHICLE REGISTRATION DISTRIBUTION

JULY 1996 VEHICLE REGISTRATIONS (PCT)

FOR EL PASO COUNTY

VEHICLE TYPE

MODEL	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1996	4.5	5.5	6.4	4.2	4.5	5.5	4.7	2.6
1995	6.3	7.1	8.2	5.6	6.3	7.1	6.2	4.2
1994	6.6	6.9	7.9	5.7	6.6	6.9	6.2	4.9
1993	6.9	6.8	7.7	5.8	6.9	6.8	6.2	5.4
1992	7.1	4.7	4.6	3.7	7.1	4.7	1.7	6.0
1991	6.7	4.7	3.7	3.9	6.7	4.7	2.9	4.1
1990	5.8	4.6	4.2	3.5	5.8	4.6	3.9	4.5
1989	7.3	5.6	5.0	3.1	7.3	5.6	3.0	4.4
1988	7.1	6.4	4.7	2.9	7.1	6.4	3.5	3.0
1987	6.3	5.4	3.1	3.4	6.3	5.4	5.2	3.2
1986	5.6	6.2	4.8	4.9	5.6	6.2	5.9	6.1
1985	5.3	5.1	3.7	5.4	5.3	5.1	6.7	51.5
1984	4.8	4.6	3.7	4.4	4.8	4.6	5.3	.0
1983	3.0	3.1	2.7	2.7	3.0	3.1	3.6	.0
1982	2.8	3.0	3.1	3.5	2.8	3.0	3.9	.0
1981	2.5	2.9	2.4	3.0	2.5	2.9	5.5	.0
1980	2.1	2.2	2.0	4.4	2.1	2.2	6.2	.0
1979	2.2	2.7	4.2	5.0	2.2	2.7	3.6	.0
1978	1.9	2.5	3.5	4.1	1.9	2.5	3.5	.0
1977	1.3	2.1	3.2	3.3	1.3	2.1	2.7	.0
1976	.9	1.7	2.7	2.3	.9	1.7	1.4	.0
1975	.6	1.1	2.3	3.3	.6	1.1	1.6	.0
1974	.6	1.3	2.1	3.0	.6	1.3	1.6	.0
1973	.6	1.2	1.7	2.7	.6	1.2	2.0	.0
1972	1.3	2.7	2.3	6.1	1.3	2.7	3.0	.0

JULY 1999 VEHICLE REGISTRATIONS (PCT)

FOR EL PASO COUNTY

VEHICLE TYPE

MODEL	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1999	4.4	5.5	6.5	4.2	4.4	5.5	4.7	1.7
1998	6.1	7.2	8.3	5.7	6.1	7.2	6.3	2.9
1997	6.3	7.0	7.9	5.7	6.3	7.0	6.3	3.7
1996	6.6	6.7	7.4	5.7	6.6	6.7	6.1	4.3
1995	6.8	6.4	7.1	5.8	6.8	6.4	6.1	5.0
1994	7.0	6.2	6.8	5.8	7.0	6.2	6.0	5.3
1993	7.1	6.0	6.6	5.8	7.1	6.0	5.9	5.5
1992	7.1	4.1	3.8	3.6	7.1	4.1	1.6	5.1
1991	6.4	4.0	3.0	3.7	6.4	4.0	2.7	3.5
1990	5.2	3.8	3.3	3.2	5.2	3.8	3.5	3.7
1989	6.2	4.5	3.9	2.8	6.2	4.5	2.6	4.0
1988	5.6	5.0	3.5	2.6	5.6	5.0	3.0	55.3
1987	4.5	4.1	2.2	2.9	4.5	4.1	4.2	.0
1986	3.8	4.6	3.4	4.1	3.8	4.6	4.7	.0
1985	3.4	3.7	2.6	4.4	3.4	3.7	5.2	.0
1984	2.9	3.3	2.6	3.5	2.9	3.3	4.1	.0
1983	1.7	2.2	1.8	2.1	1.7	2.2	2.7	.0
1982	1.6	2.2	2.1	2.8	1.6	2.2	2.9	.0
1981	1.4	2.1	1.6	2.4	1.4	2.1	4.1	.0
1980	1.1	1.5	1.3	3.4	1.1	1.5	4.6	.0
1979	1.2	1.9	2.9	3.9	1.2	1.9	2.6	.0
1978	1.0	1.7	2.4	3.2	1.0	1.7	2.6	.0
1977	.7	1.4	2.2	2.6	.7	1.4	2.0	.0
1976	.5	1.2	1.8	1.8	.5	1.2	1.0	.0
1975	1.5	3.6	4.8	8.3	1.5	3.6	4.3	.0

JULY 2007 VEHICLE REGISTRATIONS (PCT)

FOR EL PASO COUNTY

VEHICLE TYPE

MODEL	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
2007	4.2	5.2	6.1	4.0	4.2	5.2	4.5	.6
2006	5.9	6.9	7.9	5.5	5.9	6.9	6.0	1.1
2005	6.1	6.7	7.6	5.5	6.1	6.7	6.1	1.6
2004	6.4	6.6	7.3	5.6	6.4	6.6	6.0	2.0
2003	6.5	6.4	7.0	5.6	6.5	6.4	6.0	2.6
2002	6.7	6.2	6.7	5.6	6.7	6.2	5.9	3.1
2001	6.7	6.0	6.4	5.6	6.7	6.0	5.8	3.6
2000	6.7	5.7	6.0	5.5	6.7	5.7	5.7	3.7
1999	6.5	5.4	5.6	5.4	6.5	5.4	5.5	4.2
1998	6.2	5.1	5.2	5.3	6.2	5.1	5.3	4.6
1997	5.8	4.7	4.7	5.1	5.8	4.7	5.0	5.2
1996	5.3	4.2	4.1	4.8	5.3	4.2	4.6	67.8
1995	4.7	3.8	3.7	4.5	4.7	3.8	4.3	.0
1994	4.1	3.4	3.3	4.2	4.1	3.4	3.9	.0
1993	3.5	3.1	3.0	3.9	3.5	3.1	3.6	.0
1992	2.9	2.0	1.6	2.3	2.9	2.0	.9	.0
1991	2.3	1.8	1.2	2.2	2.3	1.8	1.5	.0
1990	1.6	1.7	1.3	1.9	1.6	1.7	1.8	.0
1989	1.7	1.9	1.5	1.6	1.7	1.9	1.3	.0
1988	1.4	2.1	1.3	1.4	1.4	2.1	1.4	.0
1987	1.0	1.7	.8	1.5	1.0	1.7	2.0	.0
1986	.8	1.9	1.2	2.1	.8	1.9	2.2	.0
1985	.7	1.5	.9	2.2	.7	1.5	2.4	.0
1984	.6	1.3	.9	1.8	.6	1.3	1.8	.0
1983	1.8	4.5	4.7	6.9	1.8	4.5	6.5	.0

ATTACHMENT G

EL PASO COUNTY VMT PROJECTIONS

Projected HPMS VMT by Road Type

El Paso County: November - January

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
URAL											
	Interstates	463,635.9	476,093.3	488,550.7	501,008.2	513,465.6	525,923.0	538,380.4	555,617.9	572,855.3	590,092.7
	Other Prin Art	135,464.4	139,104.2	142,744.0	146,383.8	150,023.6	153,663.3	157,303.1	162,339.5	167,375.9	172,412.4
	Minor Art	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Major coll	330,162.7	339,033.8	347,905.0	356,776.1	365,647.2	374,518.4	383,389.5	395,664.6	407,939.6	420,214.7
	Minor Coll	52,356.0	53,762.8	55,169.5	56,576.3	57,983.0	59,389.8	60,796.5	62,743.0	64,689.6	66,636.1
	Local	81,492.5	83,682.1	85,871.7	88,061.4	90,251.0	92,440.6	94,630.2	97,660.0	100,689.8	103,719.6
URAL SUBTOTAL		1,063,111.6	1,091,676.3	1,120,241.0	1,148,805.7	1,177,370.5	1,205,935.2	1,234,499.9	1,274,025.1	1,313,550.4	1,353,075.6
URAL NON-LOCAL		981,619.1	1,007,994.2	1,034,369.3	1,060,744.4	1,087,119.5	1,113,494.6	1,139,869.7	1,176,365.1	1,212,860.6	1,249,356.0
RBAN											
	Interstates	2,237,676.5	2,297,800.6	2,357,924.6	2,418,048.7	2,478,172.8	2,538,296.8	2,598,420.9	2,681,615.1	2,764,809.3	2,848,003.4
	Other Freeway & Exp	752,645.2	772,868.0	793,090.8	813,313.6	833,536.4	853,759.2	873,982.0	901,964.5	929,946.9	957,929.4
	Other Prin Art	2,751,039.5	2,824,957.1	2,898,874.7	2,972,792.3	3,046,709.9	3,120,627.5	3,194,545.1	3,296,825.5	3,399,105.9	3,501,386.4
	Minor Art	1,076,588.9	1,105,515.7	1,134,442.6	1,163,369.4	1,192,296.2	1,221,223.1	1,250,149.9	1,290,176.2	1,330,202.5	1,370,228.8
	Coll	477,202.1	490,024.0	502,846.0	515,667.9	528,489.8	541,311.7	554,133.7	571,875.5	589,617.3	607,359.1
	Local	2,404,159.2	2,468,756.5	2,533,353.8	2,597,951.1	2,662,548.3	2,727,145.6	2,791,742.9	2,881,126.7	2,970,510.5	3,059,894.3
RBAN SUBTOTAL		9,699,311.4	9,959,921.9	10,220,532.4	10,481,143.0	10,741,753.5	11,002,364.0	11,262,974.5	11,623,583.5	11,984,192.5	12,344,801.5
RBAN NON-LOCAL		7,295,152.2	7,491,165.4	7,687,178.7	7,883,191.9	8,079,205.1	8,275,218.4	8,471,231.6	8,742,456.8	9,013,682.0	9,284,907.2
ON-LOCAL TOTAL		8,276,771.3	8,499,159.6	8,721,548.0	8,943,936.3	9,166,324.6	9,388,712.9	9,611,101.3	9,918,821.9	10,226,542.5	10,534,263.2
OTAL		10,762,423.0	11,051,598.2	11,340,773.5	11,629,948.7	11,919,123.9	12,208,299.2	12,497,474.4	12,897,608.6	13,297,742.9	13,697,877.1

Projected HPMS VMT by Road Type

El Paso County: June - August

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
URAL											
	Interstates	485,510.0	498,555.2	511,600.3	524,645.5	537,690.6	550,735.8	563,780.9	581,831.6	599,882.3	617,933.0
	Other Prin Art	141,855.7	145,667.2	149,478.7	153,290.3	157,101.8	160,913.3	164,724.8	169,998.8	175,272.9	180,546.9
	Minor Art	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Major coll	345,739.6	355,029.3	364,318.9	373,608.6	382,898.3	392,187.9	401,477.6	414,331.8	427,186.0	440,040.2
	Minor Coll	54,826.2	56,299.3	57,772.4	59,245.6	60,718.7	62,191.8	63,664.9	65,703.3	67,741.7	69,780.1
	Local	85,337.3	87,630.2	89,923.2	92,216.1	94,509.0	96,801.9	99,094.9	102,267.6	105,440.3	108,613.1
URAL SUBTOTAL		1,113,268.8	1,143,181.2	1,173,093.6	1,203,006.0	1,232,918.3	1,262,830.7	1,292,743.1	1,334,133.1	1,375,523.2	1,416,913.2
URAL NON-LOCAL		1,027,931.5	1,055,551.0	1,083,170.4	1,110,789.9	1,138,409.3	1,166,028.8	1,193,648.3	1,231,865.6	1,270,082.8	1,308,300.1
RBAN											
	Interstates	2,283,987.7	2,345,356.1	2,406,724.5	2,468,092.9	2,529,461.3	2,590,829.7	2,652,198.1	2,737,114.1	2,822,030.1	2,906,946.0
	Other Freeway & Exp	768,222.0	788,863.3	809,504.7	830,146.0	850,787.3	871,428.7	892,070.0	920,631.6	949,193.2	977,754.8
	Other Prin Art	2,807,975.4	2,883,422.8	2,958,870.2	3,034,317.6	3,109,765.0	3,185,212.4	3,260,659.9	3,365,057.1	3,469,454.3	3,573,851.5
	Minor Art	1,098,870.2	1,128,395.7	1,157,921.2	1,187,446.7	1,216,972.2	1,246,497.8	1,276,023.3	1,316,878.0	1,357,732.7	1,398,587.4
	Coll	487,078.5	500,165.8	513,253.1	526,340.4	539,427.7	552,515.0	565,602.3	583,711.3	601,820.3	619,929.3
	Local	2,453,916.0	2,519,850.2	2,585,784.4	2,651,718.6	2,717,652.8	2,783,587.0	2,849,521.2	2,940,754.9	3,031,988.6	3,123,222.3
RBAN SUBTOTAL		9,900,049.7	10,166,053.8	10,432,058.0	10,698,062.1	10,964,066.3	11,230,070.4	11,496,074.6	11,864,146.8	12,232,219.0	12,600,291.2
RBAN NON-LOCAL		7,446,133.7	7,646,203.7	7,846,273.6	8,046,343.6	8,246,413.5	8,446,483.5	8,646,553.4	8,923,391.9	9,200,230.4	9,477,068.9
ON-LOCAL TOTAL		8,474,065.2	8,701,754.6	8,929,444.0	9,157,133.4	9,384,822.9	9,612,512.3	9,840,201.7	10,155,257.5	10,470,313.2	10,785,369.0
OTAL		11,013,318.5	11,309,235.0	11,605,151.6	11,901,068.1	12,196,984.6	12,492,901.2	12,788,817.7	13,198,280.0	13,607,742.2	14,017,204.4

ATTACHMENT H

TXDOT HPMS DOCUMENTATION

Texas Department of Transportation (TxDOT) HPMS Procedures: Questions and Answers

Appendix C of the report "Quality Review Guidelines for 1990 Base Year Emission Inventories," EPA-450/4-91-022, September 1991 provides an On-Road Mobile Sources Review Checklist. Questions 2-13 relate to documentation of state HPMS practice. The Appendix C HPMS questions cannot not be answered in the affirmative without additional explanation because the HPMS procedures used by the TxDOT with respect to VMT estimation differ from the procedures described in the report "Highway Performance Monitoring System Field Manual," FHWA Order M 5600.1A, December 1987. The Appendix C questions are based on the assumption that states use the HPMS Field Manual procedures without deviation.

The Quality Review Guidelines Appendix C questions, answers, and explanations are provided in this section. The remainder of the attachment provides a detailed explanation of TxDOT HPMS procedures for developing VMT estimates.

Question 2: Which of the following methods was chosen to estimate base year (1990) VMT?
Answer: HPMS
Explanation: The VMT estimates were developed from the 1990 HPMS data tape prepared by TxDOT and submitted to FHWA. Although the procedures used by TxDOT to develop VMT differ from the procedures contained in the HPMS Field Manual, the procedures used have been approved and accepted by FHWA and are, in fact, the Texas HPMS procedures.

Question 3: Is the base year (1990) VMT estimate identical to that provided in the annual VMT report required under Section 187 of the CAAA of 1990?
Answer: Not applicable at this time.

Question 4: Are urban areas in the state sampled separately under HPMS?
Answer: Not technically but another reasonable method was used.
Explanation: The HPMS Field Manual specifies a different sampling procedure for urban areas than for rural areas to develop VMT estimates. The question basically asks if the HPMS urban sampling procedures are being followed. TxDOT makes traffic counts on all segments of all on-system roadways urban and rural. In effect, TxDOT VMT estimates are based on counts made on a 100 percent sample or census of roadways, rather than on a sample of roadways. As a result, VMT is estimated with the same degree of accuracy for urban and rural on-system roadways.

Question 5: If urban areas are sampled separately, does the HPMS-based SIP estimate include VMT on all the following?

a. Each volume group within all sampled functional systems within the FAUA; (interstates, other freeways and expressways, other principal arterials, minor arterials, collectors)
Answer: Yes.
Explanation: HPMS VMT estimates are provided for each of the

functional systems listed.

b. The local functional system within the FAUA;
   Answer: Yes.
   Explanation: HPMS VMT estimates are made for the local functional system within the FAUA.

c. If the inventory area is larger than the FAUA, VMT on functional systems outside the FAUA but within the inventory area.
   Answer: Yes.
   Explanation: HPMS VMT estimates are made for all functional systems outside the FAUA but within the inventory area using the same estimation procedures used for the inventory area that is within the FAUA.

Question 6: Are the methodology and calculations used to estimate VMT on the local functional systems documented in the SIP?
Answer: Yes.

Question 7: Is the inventory area larger than the FAUA? If so, how was VMT on roads outside the FAUA but inside the inventory area estimated.
Answer: Yes.
Explanation: The method used to estimate VMT was identical to the method used to estimate VMT inside the FAUA.

Question 8: Are the actual ground counts for each HPMS sample segment listed in the SIP, or is a reference given for the data?
Answer: Yes.
Explanation: The actual counts are not provided. An example county (Hardin County) from the TxDOT computer data file (ACR Master File) that contains the actual ground counts is provided.

Question 9: Are the dates of those counts and the number of hours over which they were made listed in the SIP, or is a reference given for the data?
Answer: Yes
Explanation: An example county (Hardin County) from the TxDOT computer data file (ACR Master File) that contains the actual dates on which the counts were made is provided. All counts are 24-hour counts.

Question 10: Are the number of road miles within the FAUA by facility class/volume group listed in the SIP, or is a reference given for the data?
Answer: No.
Explanation: The number of road miles within the FAUA by facility class but not by volume group is provided. As explained in Question 4, volume groups are not used since all on-system roadway segments are counted.

Question 11: Are the factors used to expand the HPMS segment data into FAUA VMT estimates by facility class/volume group listed in the SIP, or is a reference given for the data.
Answer: No.
Explanation: Question is not applicable since facility class/volume groups are not used.

Question 12: Are the methods and factors used to adjust counts on sample segments for month, day-of-week, and/or hour-of-day documented in the SIP?
Answer: Yes.
Explanation: Methods used to develop and apply axle factors and month-of-year factors to 24-hour counts are provided. Methods to apply day-of-week and hour-of-day factors are not applicable.

Question 13: Are the methods and factors used to adjust counts on sample segments not actually counted in a given year documented in the SIP?
Answer: No.
Explanation: The question does not apply. All 24-hour counts are made annually. TxDOT practice differs in this regard from HPMS Field Manual guidance which calls for one 48-hour count once every three years.

TxDOT HPMS Documentation

1. Introduction

This appendix documents the procedures used by the Texas Department of Transportation (TxDOT) to develop the 1990 Highway Performance Monitoring System (HPMS) center line miles and daily vehicle miles of travel (DVMT) by functional classification by county.

The documentation applies to all Texas nonattainment areas; and, where applicable, information is provided for each nonattainment area.

The procedures employed by TxDOT are based on historical practice and guidelines provided in the FHWA HPMS Field Manual, the Texas Supplement to the HPMS Field Manual, and the FHWA Traffic Monitoring Guide (TMG).

The documentation is divided into the sections shown and presented in the order listed:

Continuous Counts
Coverage Counts
ACR Master File and AADT
Center Line Miles
Relationship Between RI LOG and HPMS File
Example Counts and AADT Calculations

2. Continuous Counts

The continuous Automatic Traffic Recorder (ATR) program is used to develop seasonal factors to expand short-term counts to annual average daily traffic (AADT). Texas uses seven ATR groups as contrasted with five ATR groups suggested in the TMG. The TMG recommends five to eight ATR locations per TMG group. The number of Texas ATR locations per group exceeds the number of groups recommended by the TMG. The Texas and TMG groups and the distribution of ATR sites by group are shown.

a. ATR Geographic Groups

ATR locations are arranged in seven groups with similar seasonality patterns:

i. Large Urban
ii. North Zone - Rural
iii. Midstate Group - Rural
iv. Southern Group - Rural
v. Recreational (Seasonal)
vi. Recreational (Intercity)
vii. Rio Grande Valley (Urban)

b. TMG Geographic Groups

The TMG recommends a minimum of five ATR groups:

i. Interstate Rural (I/R)
ii. Other Rural (O/R)
iii. Interstate Urban (I/U)
iv. Other Urban (O/U)
v. Recreational (REC)

c. Distribution of ATR Locations by Geographic Group

The distribution of ATR locations by Texas Group and TMG Group is as follows:

Texas ATR Group	TOTAL	I/R	O/R	I/U	O/U
Large Urban	41	-	-	26	15
North Zone - Rural	13	1	11	1	-
Midstate Group - Rural	73	11	56	5	1
Southern Group - Rural	14	5	9	-	-
Recreational (Seasonal)	1	-	1	-	-
Recreational (Intercity)	5	5	-	-	-
Rio Grande Valley (Urban)	8	-	4	-	4
Total	155	22	81	32	20

d. Distribution of ATR Locations by Functional Classification

The distribution of ATR locations by functional classification is as follows:

Functional Classification	Total ATR Sites	ATR Sites on HPMS Sections
Rural		
Interstate	22	11
Other Principal	38	10
Minor Arterial	18	1
Major Collector	22	2
Minor Collector	3	0
Local	0	0
Rural Total	103	24
Urban		
Interstate	32	25
Other Freeway/ Expressway	7	5
Other Principal Arterial	11	4
Collector	0	0
Minor Arterial	2	1
Local	0	0
Urban Total	52	35
TOTAL	155	59

e. HPMS Continuous Count Location Requirements

In addition to TMG guidelines, ATR locations must meet the HPMS Field Manual Appendix K guidelines listed. Texas ATR locations meet these guidelines.

i. At least one ATR site on each one- or two-digit numbered route on the interstate system
ii. At least three ATR sites on rural interstate highways
iii. At least three ATR sites on urban interstate highways
iv. At least three ATR sites on rural non-interstate highways
v. At least three ATR sites on urban non-interstate highways
vi. At least 14 full consecutive days of data collected each month for the ATR site to be used
vii. There were 155 ATR sites in operation in 1990 and they were in operation continuously. The equipment is Streeter-Richardson Model 505. They operate with inductance loops and are polled each night at midnight by computer. The equipment is maintained so as to assure a machine error of less than 2 percent.

f. Calculation of AADT

AADT values are calculated for each ATR site as the 365-day average of the traffic volume observed at the site.

Mean monthly adjustment factors are calculated for each ATR site for each month as the 365-day traffic volume average to the average

weekday for each individual ATR. The group monthly adjustment factors are then computed as the mean of the individual monthly adjustment factors for the ATR locations assigned to the group.

3. Coverage Counts

Coverage counts are short-term counts as contrasted to ATR counts that are continuous 365-day counts. TxDOT collects traffic volume counts on every HPMS section for one 24-hour session in each year, at almost exactly the same time. The counts are taken only for Monday through Thursday. The TMG recommends conducting short-term traffic volume counts for 48 continuous hours on each HPMS section once every three years. TMG procedure allows better estimates of the traffic volumes on the year the count is made. The Texas practice of three 24-hour counts per three year cycle provides more data on which to base growth factors.

All Texas HPMS sample sections are counted annually regardless of whether the sample location is on- or off-system.

a. 1990 Distribution of Coverage Counts by Functional Classification

Functional Classification	Number of Coverage Sites
Rural	
Interstate	620
Other Principal	3,167
Minor Arterial	2,671
Major Collector	13,212
Minor Collector	5,653
Local	176
Rural Total	25,499
Urban	
Interstate	535
Other Freeway and Expressway	495
Other Principal Arterial	3,103
Collector	173
Minor Arterial	2,154
Local	26
Urban Total	6,486
TOTAL	31,985

b. Expansion of Short-Term Counts

Short-term counts are expanded to AADT by applying the appropriate axle factor and monthly adjustment factor for the group of ATR locations in the region of the state in which the HPMS sample location is located.

c. Equipment

The equipment used to collect these data is Streeter-Richardson Model 163 and pneumatic tubing recording 24-hour periods. The equipment is maintained to assure a machine error of less than 10 percent and is certified by TxDOT to be 5%.

d. Interstate Universe Procedures

Appendix K of the HPMS Field Manual specifies that each section of interstate highway between interchanges that is not an HPMS sample section must be monitored at least once every six years. Texas collects traffic volume data on every section of interstate highway every year, providing a greater level of precision than is required by the manual.

e. Frontage Road Volumes

Frontage road volumes for interstate highways are counted separately from main lane volumes.

Frontage road volumes for other freeways and expressways are counted and reported as part of the mainlane volumes.

4. ACR Master File and AADT

a. Accumulative Count Recorder (ACR) Master File

The ACR Master File contains the information listed for each location where an ACR count was made. The primary sort is by TxDOT district and county.

i. TxDOT District Number
ii. County Number
iii. County Name
iv. Station Number Prefix Letter

H	Highway count station	AT	ATR station
T	Town count station	E	External station
SP	SPR station	S	Screenline station

(SPR = semi-pneumatic recorder)

v. Station Number
vi. Date the count was made
vii. Route Number
viii. Count Number
ix. Control Number
x. Section Number
xi. Beginning Mile-Point
xii. Ending Mile-Point
xiii. Mile-Point Date
xiv. ACR Machine Number
xv. Axles Counted
xvi. Axle Factor
xvii. Raw Vehicle Count (axles times axle factor)

xviii. Monthly Factor

1	urban	used throughout the state
2	north	rural
3	mid	rural
4	south	rural
5	seasonal	Gulf Coast recreational
6	weekend	higher weekend ADT
7	Valley	urban with higher winter ADT
8	ungrouped	not recommended

xix. Current ADT

xx. Type of Count (E = estimate, A = actual) When the office analysis indicates that the field count is in error, an estimate is made or the count redone. If an estimate is made, an E is coded in the column labeled Type. The axle count field is not changed.

xxi. Select (used to indicate which count to select if more than one count)

xxii. Last ADT

xxiii. Weather Code

0	Clear	5	Snow
1	Cloudy	6	Sleet
2	Showers	7	Icy
3	Rain	8	Hail
4	Fog	9	Dust

xxiv. Remark Codes

xxv. ULA (not used)

b. Axle Factor

The ACR measures the number of axles passing over the tube. This must be converted to the number of vehicles to calculate an AADT.

i. Axle Factors
Axle factor is the number of vehicles divided by the number of axles

ii. Determining Axle Factors
Axle factors are calculated from classification counts. Axle factors are developed for IH, U.S. and S.H. highways, and FM roads separately, and averaged for each district.

iii. Example Axle Factors

		IH	US SH	FM
(1)	District 2	41	42	47
	IH-35 W	41		
	IH-20	42		
	IH-635	48		
	US-81/287		35	
	SH-114		38	
(2)	District 12	46	46	48
	IH-45 Galveston N.		48	
	IH-10	39		

(3)	District 18	44	43	48
	IH-20	39		
	IH-35	40		
	IH-35 E/W	42		
(4)	District 20	38	44	47
(5)	District 24	28	44	47
	IH-10 N. of El Paso	40		

iv. District locations:
   (1) District 2 includes Tarrant County.
   (2) District 12 includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties.
   (3) District 18 includes Collin, Dallas, and Denton Counties.
   (4) District 20 includes Hardin, Jefferson, and Orange Counties.
   (5) District 24 includes El Paso County.

c. Monthly Factor

The monthly factor concept is based on the assumption that traffic volume varies with time of year, but is fairly constant during any one month. Furthermore, the number of vehicles per day on rural and urban roads is fairly constant Monday through Thursday.

Monthly factor is the current 12-month ADT divided by the current month (Monday - Thursday) ADT. ACR counts are samples only from Monday to Thursday.

i. Monthly Factor Groups

The selection of the appropriate monthly factor is a function of the monthly factor group and the TxDOT District. The monthly groups were developed by examining monthly factors for ATR sites with site locations. Plots of monthly factors versus month for the urban ATR locations indicated that there is little variation in the monthly factors between urban ATR locations. Therefore urban ATR sites form one group. It was also apparent that geographic differences existed for ATR sites located in rural areas. It also indicated that some ATR locations could not be grouped for the purpose of developing monthly factors. Eight monthly factor groups were established. The groups were further divided by highway district. Most district have two monthly factor groups (urban and rural) but some district have as many as four groups.

ii. Monthly Factor Group Numbers

(1)	urban	throughout the state
(2)	north	rural
(3)	mid	rural
(4)	south	rural
(5)	seasonal	Gulf Coast Recreational

(6)	weekend	higher weekend ADT
(7)	Valley	urban with higher winter ADT
(8)	ungrouped	not recommended

iii. Example Monthly Factors

DISTRICT 02

GROUP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	100	097	096	094	095	091	093	093	097	097	097	101
3	111	113	109	107	108	095	101	101	110	112	099	103

DISTRICT 12

1	096	093	091	090	092	089	094	091	096	094	094	095
3	109	105	100	099	098	093	093	095	105	106	103	101
5	147	125	095	103	101	097	083	097	123	132	136	161
6	109	105	100	099	098	111	105	110	124	138	108	094

DISTRICT 18

1	099	096	096	094	094	092	094	092	097	096	094	098
3	110	104	106	098	101	098	100	098	101	101	100	103
6	123	126	117	114	108	103	096	095	105	109	106	106

DISTRICT 20

1	099	096	096	093	096	093	094	092	097	098	095	098
3	113	110	101	103	103	098	100	103	100	106	103	105
5	147	125	095	103	101	097	083	097	123	132	136	161

DISTRICT 24

1	094	089	089	086	092	090	092	094	092	091	090	093
3	104	105	103	103	104	102	100	102	106	105	103	098

d. AADT

The current year AADT is the product of the following equation:

AADT = axle factor x monthly factor x number of axles during a 24-hour count

e. AADT Rounding

The calculated AADT volumes are rounded as shown:

Volume Range	Round to Nearest
10 - 1,000	10
1,000 - 2,000	50
2,000 - 20,000	100
20,000 and over	1,000

5. Center Line Miles

a. Roadway Inventory Log (RI LOG)

All on-system roadways are in the RI LOG. On-system roadways are in what is referred to as the RI-2 LOG. Off-system roadways are in what is referred to as the RI-6 LOG.

The RI LOG is the master statistical data file for all the highway mileage in Texas. Traffic characteristics are one of the basic fields of the RI. The RI has the following identification keys: District Number, County Number, Control Section Number, Beginning Mile-Points, Ending Mile-Points, Highway System, and Highway Number. The ACR Master File has the same universal identification keys as the RI LOG. Annually, upon completion, the AADT from the ACR Master File is merged with the RI LOG.

b. On-System Roadways

The center line miles for all on-system roadways are known with a high degree of accuracy. Each roadway control section has a beginning and ending mile-point number. Mile-points are measured with a high degree of accuracy. Changes to center line miles resulting from construction are identified from construction plan sheets. Additions or deletions of on-system roadways require District approval and all are routed through the Division 10 Data Management Section. These as well as changes resulting from construction are identified by the Division 10 Data Management Section on a continuing basis. Consequently center line miles for all on-system roadways are always known.

c. On-System Frontage Roads

Frontage road center line miles are broken out from mainlane center line miles for interstate highways only. Frontage road center line

miles for other freeways are not broken out separately.

d. On-System Ramps

Ramp center line miles are not recorded. Therefore, DVMT accumulated on ramps are not included in the Roadway Inventory File or HPMS DVMT estimates.

e. Off-System Functionally Classified Urban Roadways

Center line miles for off-system functionally classified urban roadways were inventoried and measured with distance measuring equipment following the 1980 census. Subsequent additions, deletions, and corrections to functionally classified urban roadways are submitted by TxDOT District Offices through TxDOT D-10 to FHWA for approval. Upon approval, changes are made to the RI LOG. Federal Aid Urban (FAU) routes are inventoried separately from functionally classified urban roadways that are not FAU. Consequently, the number of center line miles for off-system functionally classified urban roadways are known, and the inventory is updated as changes occur.

f. Off-System Functionally Classified Rural Roadways

As a practical matter, there are almost no functionally classified rural roadways that are not on-system. Consequently, the number of center line miles for roadways in this classification is not an issue.

g. Off-System Local Roadways

The discussion in this section refers to roadways that are off-system and are not functionally classified within an incorporated city. HPMS reports the center line miles for these streets as rural local or urban local.

The center line miles for local streets and roadways are estimated periodically through field surveys. As a part of the field work, all local streets and roadways are first identified from maps (county maps, subdivision maps, city maps, etc.). All local streets are then driven in the field, and the maps are color coded by surface type (PCC, HMAC, caliche, etc.). Any streets or roadways missing from the maps are added. When the field inventory is complete the center line miles are scaled from the corrected maps and recorded in the RI-6 LOG.

Due to staff reductions in the mid-1970's, TxDOT reduced their field data collection activity and local center line mile inventories; and local counts were either discontinued or reduced. There is no program to update the off-system local center line mile inventory on a continuous basis as is the case for on-system center line miles and for functionally classified urban roadways. Consequently,

center line miles for local roadways may or may not be known accurately depending on the date of the last inventory and the county growth rate.

Urban local and rural local center line miles may change as a result of changes in the city limit boundaries.

From 1980 to 1990 urban local street center line miles were factored up by 5 percent each year for 75 counties with above average growth rates. All of the nonattainment counties were included in this group. By 1990, this procedure resulted in an over-estimation of the urban local street center line miles for the factored counties. A second 1990 HPMS tape was provided to FHWA to correct for this error. The result was that statewide urban local center line miles were reduced by about 13,000 miles.

i. Local Street and Roadway Field Inventory Dates

Center line miles for off-system roadways were inventoried in the following years:

(1)	District 2		
	(a)	Tarrant County	1990
(2)	District 12		
	(a)	Brazoria County	1978
	(b)	Chambers County	1971
	(c)	Fort Bend County	1978
	(d)	Galveston County	1978
	(e)	Harris County	1987
	(f)	Liberty County	1971
	(g)	Montgomery County	1979
	(h)	Waller County	1979
(3)	District 18		
	(a)	Collin County	1982
	(b)	Dallas County	1981
	(c)	Denton County	1983
(4)	District 20		
	(a)	Hardin County	1971
	(b)	Jefferson County	1988
	(c)	Orange County	1989
(5)	District 24		
	(a)	El Paso County	1980

El Paso County was updated in 1989 using aerial photography, and the City of El Paso supplied information on lane miles. A field survey was not done. The base maps were updated using aerial photography, and the local streets were scaled from the revised base maps. This information was compared with the City of El Paso information, and the two estimates were reasonably close. The revised local street center line milage estimate was used to correct the HPMS file for El Paso County and was included in the 1990 revised HPMS tape.

6. Relationship Between RI LOG and HPMS File

Volume counts and center line mile data elements are transferred from the RI LOG to the HPMS file. HPMS samples are identified in the RI LOG by a 12-character identification code. Each HPMS sample is associated with at least one, but generally several, RI LOG records.

The procedures used to develop on-system and off-system roadway center line miles are discussed in 5 above.

The procedures used to perform ACR counts in the field and to calculate AADT are discussed in 3 and 4 above.

a. 100 Percent RI-2 File Counted

For purposes of HPMS sampling, roadways are divided into volume groups by functional classification; and samples are drawn from each volume functional classification group according to the HPMS guidance. The various HPMS roadway characteristics are collected for each sample with the exception of volume counts and center line miles. For these two characteristics, Texas practice is to transfer from the RI LOG to the HPMS File an inventory of center line miles with 100 percent counts. The RI-2 LOG contains center line miles and volume counts for all segments of on-system roadways. All of these segments and counts are transferred to the HPMS File. Thus, there is a census of center line miles and counts for on-system roadways instead of HPMS samples with expansion factors.

b. ACR Counts

ACR counts for all on-system roadways are performed annually.

ACR counts for functionally classified urban off-system roadways are performed on about a five-year cycle. The years of the most recent functionally classified urban off-system counts are shown. If an off-system roadway is an HPMS sample, it is counted annually. However, as discussed above, the HPMS sample counts are not used to expand volume groups by functional classification.

i. Beaumont - counted in 1987, next count in 1992
ii. Dallas-Fort Worth - counted in 1977, next count in 1994
iii. El Paso - counted in 1987, next count in 1992
iv. Houston - counted in 1990, next count in 1996

c. Center Line Miles

All on-system center line miles contained in the RI LOG are transferred to the HPMS file. Thus, there is no question of the accuracy for HPMS center line miles for any on-system roadways.

Center line miles for off-system functionally classified urban roadways are also transferred from the RI LOG to the HPMS file as a census.

The discussion of center line miles in 5g above for local off-system roadways applies to the HPMS urban and rural off-system center line miles as well.

d. Federal Aid Urban Boundaries

The procedure described in 6a above applies to all on-system roadways regardless of whether the roadway is or is not within an FAU. For this reason, there is no decrease in the accuracy of HPMS center line miles, volume counts, or DVMT estimates for on-system roadways outside of the FAU boundaries.

e. DVMT

It is likely that one HPMS file record will be composed of more than one RI LOG record, each with its own coverage (ACR) count. When this occurs, the HPMS file DVMT is the sum of the products of the counts times the center line miles weighted by the proportion of the total HPMS center line miles associated with each RI LOG record. This procedure results in a more accurate HPMS DVMT estimate than would be the case if there were only one count associated with each HPMS sample record.

The DVMT estimate developed from HPMS is based on all the coverage counts contained in the RI LOG, not just the counts associated with the HPMS samples. In 1990 TxDOT performed approximately 55,000 ACR counts plus 155 ATR counts. All of these counts were used to develop the 1990 HPMS DVMT estimates.

f. DVMT Local Streets and Roadways

VMT for local streets and roadways is calculated by multiplying the aggregate center line miles by the estimated ADT. The ADT estimates vary by population for incorporated towns according to the following table. For unincorporated (rural) areas the ADT is assumed to be 225 vehicles per day.

Average Local ADT

Population Incorporated Towns	ADT
0 - 4,999	225
5,000 - 9,999	401
10,000 - 24,999	619
25,000 - 49,999	869
50,000 - 99,999	1,197
100,000 - 199,999	1,356
200,000 - 299,999	1,373
300,000 - over	1,407

g. Summary

The HPMS DVMT is considered very accurate for all functionally classified urban and rural on-system roadways. The HPMS DVMT is considered accurate for all functionally classified urban off-system roadways with the exception of Dallas-Fort Worth. (Dallas-Fort Worth was last counted in 1976.) There are almost no functionally classified rural off-system roadways, so the accuracy of roadways with this classification is not an issue. The HPMS DVMT for local urban and rural roadways is the least accurate but probably adequate considering that these two classifications compose approximately 15 percent of the annual VMT.

7. Example Counts and Calculations

In this section data are provided on the number of ACR counts performed for each nonattainment county or county within a 25 mile radius of a nonattainment county in 1990. The 25-mile radius counties are within the model domain for application of the Urban Airshed Model (UAM). Also provided, as an example, is an inventory of the 1990 ACR counts made in Hardin County. Hardin County is in the Beaumont nonattainment area. Similar information for 1990 for any other nonattainment county can be obtained by contacting Mr. Alvin R. Luedecke, Jr., Director of Transportation Planning, TxDOT, P.O. Box 5051, Austin, TX 78763-5051.

a. Number of 1990 ACR Counts by County

COUNTY	ON SYSTEM	OFF SYSTEM	# COUNTS
Brazoria	213	174	387
Chambers	100	14	114
Collin	262	18	280
Dallas	242	219	461
Denton	212	28	240
El Paso	186	131	317
Fort Bend	193	730	923
Galveston	156	141	297
Hardin	107	37	144
Harris	387	5,258	5,645
Jefferson	120	209	329
Liberty	152	53	205
Montgomery	187	77	264
Orange	123	163	286
Tarrant	287	390	677
Waller	102	25	127

b. ACR Master File Data for Hardin County (example data)

See Section 4a for explanation of column headings and codes.

District 20 County 101 - Hardin

Run-Date 06/24/91

STA NO	DATE	ROUTE-NO	CS NO	CONT	ST	MILE POINTS BEGIN	MILE POINTS END	MP DATE	MACH	AXLES	AXLE FAC	RAW VEHC	GRP NO-	MO FAC	CURRENT ADT	SYSTEM TYP	SYSTEM LOC	LAST ADT	WEA	REMARK	UNLA
H 0018	11/08/90	BU 0096	#1	65	14	23145	23567	9012	1	3360	0.44	1478	G003	1.03	4700	E	Y	4800	3		N
H 0016	11/08/90	BU 0096	#1	65	14	23567	24905	9012	1	23890	0.44	10511	G003	1.03	1850	E	Y	1800	3	25	N
T 0009	11/08/90	BU 0096	#1	65	14	24905	25147	9012	1	3910	0.44	1720	G003	1.03	1750	A	Y	1700	3		N
T 0007	11/12/90	BU 0096	#1	65	14	25147	25649	9012	1	31240	0.44	13745	G003	1.03	14200	A	Y	13900	0		N
T 0012	11/12/90	BU 0096	#1	65	14	25649	26345	9012	1	20360	0.44	8958	G003	1.03	13800	E	Y	13000	0		N
H 0025	11/12/90	BU 0096	#1	65	14	26345	28368	9012	1	23790	0.44	10467	G003	1.03	10800	A	Y	10800	0		N
H 0012	11/19/90	FM 0092	#1	703	2	3	4461	8112	1	6340	0.47	2979	G003	1.03	3100	A	Y	3100	1		N
SP0086	11/19/90	FM 0092	#1	703	2	4461	7132	8112	1	9240	0.47	4342	G003	1.03	4500	E	Y	4400	1		N
H 0010	11/12/90	FM 0092	#1	703	2	7132	8863	8112	1	14510	0.47	6819	G003	1.03	7000	A	Y	7200	0		N
H 0008	11/12/90	FM 0092	#1	703	2	8863	10233	8112	1	21820	0.47	10255	G003	1.03	10600	A	Y	10600	0		N
H 0007	11/12/90	FM 0092	#1	703	2	10233	11588	8112	1	25060	0.47	117788	G003	1.03	12100	A	Y	12000	0		N
T 0008	11/12/90	FM 0092	#1	703	2	11588	12288	8112	1	28090	0.47	13202	G003	1.03	13600	A	Y	13600	0		N
H 0001	11/19/90	FM 0418	#1	200	12	0	2075	8112	1	7260	0.47	3412	G003	1.03	3500	A	Y	3300	1		N
H 0002	11/19/90	FM 0418	#1	784	1	2075	5985	8112	1	6380	0.47	2998	G003	1.03	3800	E	Y	3600	1		N
H 0005	11/19/90	FM 0418	#1	784	1	5985	7102	8112	1	9190	0.47	4319	G003	1.03	4400	A	Y	3900	1		N
H 0006	11/19/90	FM 0418	#1	784	1	7102	8859	8112	1	9810	0.47	4610	G003	1.03	4700	A	Y	5000	1		N
T 0008 A	11/19/90	FM 0418	#1	784	1	8859	10411	8112	1	11140	0.47	5235	G003	1.03	5400	A	Y	5400	1		N
T 0009 A	11/19/90	FM 0418	#1	784	1	10411	10800	8112	1	9010	0.47	4234	G003	1.03	4400	A	Y	4400	1		N
H 0017	11/19/90	FM 0418	#1	784	1	10800	12106	8112	1	8980	0.47	4220	G003	1.03	4300	A	Y	4600	1		N
H 0072	11/19/90	FM 0420	#1	811	1	0	3853	8112	1	490	0.47	230	G003	1.03	240	A	Y	220	1		N
H 0040	11/14/90	FM 0421	#1	813	3	1000	2362	8112	1	1670	0.47	784	G003	1.03	810	A	Y	920	0		N
H 0041	11/14/90	FM 0421	#1	813	3	2362	5710	8112	1	1130	0.47	531	G003	1.03	550	A	Y	530	0		N
E 0016 B	11/14/90	FM 0421	#1	813	3	5710	9513	8112	1	1380	0.47	648	G003	1.03	670	A	Y	600	0		N
H 0031	11/14/90	FM 0421	#1	813	3	9513	13370	8112	1	2470	0.47	1160	G003	1.03	1200	A	Y	1100	0		N
H 0027	11/14/90	FM 0421	#1	813	3	13370	14139	8112	1	4660	0.47	2190	G003	1.03	2300	A	Y	2200	0		N
H 0063	11/14/90	FM 0770	#1	1096	1	25	4510	9006	1	2910	0.47	1367	G003	1.03	1400	A	Y	1250	0		N

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H 0062	11/14/90	FM 0770	#1	1096	1	4510	8060	8112	1	2930	0.47	1377	G003	1.03	1400	A	Y	1300	0		N
T 0020	11/14/90	FM 0770	#1	1096	1	8060	11973	8112	1	4990	0.47	2345	G003	1.03	2400	A	Y	2100	0		N
H 0051	11/14/90	FM 0770	#1	1096	1	11973	12611	8112	1	5630	0.47	2646	G003	1.03	2700	A	Y	2400	0		N
H 0050	11/14/90	FM 0070	#1	1096	1	12611	15061	8403	1	5070	0.47	2382	G003	1.03	2500	A	Y	2900	0		N
T 0019	11/14/90	FM 0770	#1	1096	1	17946	18311	8112	1	5240	0.47	2462	G003	1.03	2800	E	Y	2900	0		N
H 0048	11/14/90	FM 0770	#1	1096	1	18311	22202	8112	1	5250	0.47	2467	G003	1.03	2500	A	Y	2800	0		N
H 0054	11/19/90	FM 0787	#1	813	2	0	2645	8112	1	65690	0.47	30874	G003	1.03	1750	E	Y	1600	1	25	N
T 0023	11/19/90	FM 0787	#1	813	2	2645	5736	8112	1	3750	0.47	1762	G003	1.03	1800	A	Y	1650	1		N
H 0053	11/19/90	FM 0787	#1	813	2	5736	9484	8112	1	1900	0.47	893	G003	1.03	920	A	Y	900	1		N
H 0052	11/19/90	FM 0787	#1	813	2	9484	15519	8112	1	2020	0.47	949	G003	1.03	980	A	Y	900	1		N
T 0022	11/19/90	FM 0787	#1	813	2	15519	16162	8112	1	2580	0.47	1212	G003	1.03	1250	A	Y	1200	1		N
H 0068	11/19/90	FM 0943	#1	1194	2	0	8200	8112	1	590	0.47	277	G003	1.03	290	A	Y	250	1		N
H 0067	11/19/90	FM 0943	#1	1194	2	8200	12073	8112	1	1440	0.47	676	G003	1.03	700	A	Y	650	1		N
H 0074	11/19/90	FM 1003	#1	811	2	0	1828	8112	1	2860	0.47	1344	G003	1.03	1400	A	Y	1100	1		N
H 0066	11/19/90	FM 1003	#1	811	2	1828	4805	8112	1	1790	0.47	841	G003	1.03	870	A	Y	820	1		N
H 0060	11/19/90	FM 1003	#1	811	2	4960	5211	8112	1	1130	0.47	531	G003	1.03	550	A	Y	510	1		N
T 0025	11/19/90	FM 1003	#1	811	2	5211	7237	8112	1	1040	0.47	488	G003	1.03	500	A	Y	580	1		N
H 0061	11/19/90	FM 1003	#1	811	2	7237	9684	8112	1	920	0.47	432	G003	1.03	440	A	Y	370	1		N
H 0004	11/19/90	FM 1122	#1	1581	1	0	1405	8112	1	3490	0.47	1640	G003	1.03	1700	A	Y	1650	1		N
H 0009	11/19/90	FM 1122	#1	1581	1	1405	3047	8112	1	6240	0.47	2932	G003	1.03	3000	A	Y	2900	1		N
H 0057	11/19/90	FM 1293	#1	1947	1	10000	11547	8112	1	2920	0.47	1372	G003	1.03	1400	A	Y	1300	1		N
H 0058	11/19/90	FM 1293	#1	1947	1	11547	15192	8112	1	2700	0.47	1269	G003	1.03	1300	A	Y	1150	1		N
H 0059	11/19/90	FM 1293	#1	1947	1	15192	22372	8112	1	0	0.47	0	G003	1.03	1400	E	Y	1400	1	25	N
T 0025 A	11/19/90	FM 1293	#1	1947	1	22372	23059	8410	1	1870	0.47	878	G003	1.03	1500	E	Y	1400	1	25	N
H 0065	11/19/90	FM 1293	#1	1947	2	28	4034	8112	1	2820	0.47	1325	G003	1.03	1350	A	Y	1150	1		N
H 0064	11/19/90	FM 1293	#1	1947	2	4034	6486	8112	1	5430	0.47	2552	G003	1.03	2600	A	Y	1450	1		N

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T 0005 A	11/19/90	FM 1293	#1	1947	2	6486	7442	8112	1	4380	0.47	2058	G003	1.03	2100	A	Y	2900	1	24	N
H 0056	11/19/90	FM 2798	#1	2778	3	0	2425	8112	1	300	0.47	141	G003	1.03	150	A	Y	120	1		N
H 0055	11/19/90	FM 2798	#1	2778	3	2425	4337	8112	1	750	0.47	352	G003	1.03	360	A	Y	350	1		N
H 0013	11/19/90	FM 2937	#1	2952	1	0	3139	8112	1	840	0.47	394	G003	1.03	410	A	Y	410	1		N
H 0014	11/19/90	FM 2937	#1	2952	1	3139	4508	8112	1	560	0.47	263	G003	1.03	270	A	Y	210	1		N
H 0015	11/19/90	FM 2937	#1	2952	1	4508	5803	8112	1	770	0.47	361	G003	1.03	370	A	Y	330	1		N
H 0069	11/19/90	FM 3063	#1	2757	1	10000	12056	8112	1	2380	0.47	1118	G003	1.03	1150	A	Y	1150	1		N
D 5000	11/19/90	FM 3513	#1	65	15	50000	53200	9104	1	0	0.47	0	G003	1.03	50	E					N
H 0046	11/14/90	SH 0105	#1	339	3	262	6686	8112	1	5420	0.44	2384	G003	1.03	2500	A	Y	2900	0		N
H 0045	11/14/90	SH 0105	#1	339	3	6686	12961	8112	1	5940	0.44	2613	G003	1.03	2700	A	Y	3100	0		N
T 0016	11/14/90	SH 0105	#1	339	3	12961	13312	8112	1	11400	0.44	5016	G003	1.03	5200	A	Y	5600	0		N
			#2	339	4	0	478	8112	1												
H 0043	11/14/90	SH 0105	#1	339	4	478	1480	8112	1	44800	0.44	19712	G003	1.03	5300	E	Y	5500	0	24	N
E 0016 A	11/14/90	SH 0105	#1	339	4	1480	5838	8112	1	10250	0.44	4510	G003	1.03	4600	A	Y	4800	0		N
H 0043 A	11/14/90	SH 0105	#1	339	4	5838	7953	8112	1	12770	0.44	5618	G003	1.03	5800	A	Y	5800	0		N
H 0049	11/14/90	SH 0105	#1	951	2	0	2366	8410	1	5480	0.44	2411	G003	1.03	2900	E	Y	3000	0		N
T 0018	11/14/90	SH 0105	#1	1096	1	22366	22812	8403	1	7590	0.44	3339	G003	1.03	4400	E	Y	4600	0		N
H 0047	11/14/90	SH 0105	#1	1096	1	22812	25252	8403	1	8950	0.44	3938	G003	1.03	4100	A	Y	4300	0		N
T 0005	11/14/90	SH 0326	#1	601	1	0	204	8112	1	14190	0.44	6243	G003	1.03	6400	A	Y	5000	0		N
H 0036	11/14/90	SH 0326	#1	601	1	204	464	8112	1	10560	0.44	4646	G003	1.03	4800	A	Y	4700	0		N
H 0037	11/14/90	SH 0326	#1	601	1	464	2769	8112	1	5740	0.44	2525	G003	1.03	2900	E	Y	2700	0		N
H 0038	11/14/90	SH 0326	#1	601	1	2769	9370	8112	1	2690	0.44	1183	G003	1.03	1200	A	Y	1100	0		N
H 0039	11/14/90	SH 0326	#1	601	1	9370	13120	8112	1	3080	0.44	1355	G003	1.03	1400	A	Y	1100	0		N
H 0042	11/14/90	SH 0326	#1	601	1	13120	17228	8112	1	5440	0.44	2393	G003	1.03	2500	A	Y	2400	0		N
T 0015	11/14/90	SH 0326	#1	601	1	17228	17879	8112	1	9380	0.44	4127	G003	1.03	4300	A	Y	3900	0		N
H 0044	11/14/90	SH 0326	#1	601	1	17879	20105	8909	1	6230	0.44	2741	G003	1.03	2800	A	Y	2700	0		N

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H 0033	11/12/90	SH 0327	#1	602	1	1137	4928	8112	1	7490	0.44	3295	G003	1.03	3400	A	Y	2600	0		N
H 0034	11/08/90	SH 0327	#1	602	1	4928	6019	8112	1	9580	0.44	4215	G003	1.03	4300	A	Y	4400	3		N
T 0011	11/08/90	SH 0327	#1	602	1	6019	7216	8112	1	20510	0.44	9024	G003	1.03	9300	A	Y	8600	3		N
T 0010	11/08/90	SH 0327	#1	602	1	7216	8357	8112	1	79090	0.44	34799	G003	1.03	7100	E	Y	6900	3	25	N
H 0022	11/08/90	SH 0327	#1	602	1	8357	9143	8112	1	7130	0.44	3137	G003	1.03	3200	A	Y	3200	3		N
T 0013	11/12/90	US 0069	#1	65	6	0	2199	8905	1	68720	0.44	30236	G003	1.03	31000	A	Y	32000	0		N
			#2	200	10	12571	12790	8905													
H 0029	11/12/90	US 0069	#1	65	6	2199	2878	8905	1	68960	0.44	30342	G003	1.03	31000	A	Y	32000	0		N
H 0070	11/19/90	US 0069	#1	200	9	0	1367	8112	1	13050	0.44	5742	G003	1.03	5900	A	Y	5300	1		N
H 0071	11/19/90	US 0069	#1	200	9	1367	2222	8112	1	14000	0.44	6160	G003	1.03	6300	A	Y	5600	1		N
T 0027	11/19/90	US 0069	#1	200	9	2222	4867	8112	1	13840	0.44	6089	G003	1.03	6200	E	Y	5500	1		N
H 0073	11/19/90	US 0069	#1	200	9	4867	7120	8112	1	14650	0.44	6446	G003	1.03	6600	A	Y	5800	1		N
H 0073 A	11/19/90	US 0069	#1	200	9	7120	8903	8112	1	15740	0.44	6925	G003	1.03	7100	A	Y	6300	1		N
H 0075 A	11/19/90	US 0069	#1	200	9	8903	11034	8112	1	17700	0.44	7788	G003	1.03	7900	E	Y	6900	1		N
T 0003 A	11/19/90	US 0069	#1	200	9	11034	11822	8112	1	23010	0.44	10124	G003	1.03	10300	E	Y	10100	1		N
T 0001 A	11/19/90	US 0069	#1	200	9	11822	12502	8112	1	25668	0.44	11293	G003	1.03	11500	E	Y	10200	1		N
			#2	200	10	0	37	8112													
T 0004	11/19/90	US 0069	#1	200	10	37	601	8112	1	24220	0.44	10656	G003	1.03	11000	A	Y	10800	1		N
H 0035	11/12/90	US 0069	#1	200	10	601	2682	8112	1	21440	0.44	9433	G003	1.03	9700	A	Y	9200	0		N
H 0032	11/12/90	US 0069	#1	200	10	2682	7091	8112	1	15270	0.44	6718	G003	1.03	6900	A	Y	7300	0		N
E 0001 B	11/12/90	US 0069	#1	200	10	7091	8674	9012	1	20320	0.44	8940	G003	1.03	9200	A	Y	9400	0		N
H 0030 A	11/12/90	US 0069	#1	200	10	8674	10948	8112	1	20750	0.44	9130	G003	1.03	9400	A	Y	10000	0		N
H 0030	11/12/90	US 0069	#1	200	10	10948	12571	8112	1	20460	0.44	9002	G003	1.03	9300	A	Y	9500	0		N
H 0020	11/08/90	US 0096	#1	65	5	1131	2029	8112	1	24410	0.44	10740	G003	1.03	11100	A	Y	10800	3		N
H 0019	11/08/90	US 0096	#1	65	5	2029	4285	8112	1	21540	0.44	9477	G003	1.03	9800	A	Y	8900	3		N
H 0021	11/08/90	US 0096	#1	65	5	4285	4990	8112	1	18210	0.44	8012	G003	1.03	8300	A	Y	8000	3		N

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H 0023	11/12/90	US 0096	#1	65	5	4990	5917	8112	1	12760	0.44	5614	G003	1.03	5800	A	Y	5800	0		N
H 0024	11/12/90	US 0096	#1	65	5	5917	8098	8112	1	12540	0.44	5517	G003	1.03	5700	A	Y	5700	0		N
E 0002 B	11/12/90	US 0096	#1	65	5	8098	10917	9012	1	19990	0.44	8795	G003	1.03	15500	E	Y	15400	0	25	N
H 0026 A	11/12/90	US 0096	#1	65	5	10917	11414	9012	1	37370	0.44	16442	G003	1.03	16900	A	Y	16800	0		N
T 0013 A	11/12/90	US 0096	#1	65	5	11414	12255	8112	1	48780	0.44	21463	G003	1.03	20000	E	Y	19900	0		N
H 0028 A	11/12/90	US 0096	#1	65	5	12255	13019	8112	1	50990	0.44	22435	G003	1.03	23000	A	Y	23000	0		N
H 0028	11/12/90	US 0096	#1	65	5	13019	14633	8905	1	48250	0.44	21230	G003	1.03	22000	A	Y	21000	0		N