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16. Abstract  <p>This report documents the methodology used to develop the Jefferson, Orange, and Hardin Counties gridded mobile source emissions inventories. Included in the report are an overview of the emission estimation methodology and the 24-hour traffic assignments used in the analyses; the methods used to estimate the seasonally adjusted time-of-day vehicle miles of travel and associated operating speeds; the estimation of the emission rates using the EPA's MOBILE5a program; and an outline of the method used to develop the emission estimates using the MOBILE5a emission rates. The appendices (available by request on diskette in WordPerfect 6.1 format) present the emissions developed for the emissions inventory.</p> <p>These emission inventories were developed in support of the Coastal Oxidant Assessment of Southeast Texas Project (COAST); a large-scale study of ozone formation being conducted by the Texas Natural Resource Conservation Commission (TNRCC).</p>			
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**DEVELOPMENT OF GRIDDED MOBILE SOURCE  
EMISSION ESTIMATES  
FOR JEFFERSON, ORANGE, AND HARDIN COUNTIES  
FY93, FY96 AND FY99 IN SUPPORT OF THE COAST PROJECT**

by

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The Texas A&M University System  
College Station, Texas 77843-3135



## IMPLEMENTATION STATEMENT

This report documents the procedures used by the Texas Transportation Institute in developing Jefferson, Orange, and Hardin Counties Mobile Source Emissions Inventories for FY93, FY96, and FY99. The emissions inventories are submitted in support of the Coastal Oxidant Assessment for Southeast Texas (COAST) Project. COAST is a large-scale study conducted by the Texas Natural Resource Conservation Commission to model the formation of ozone in the Houston-Galveston and Beaumont-Port Arthur air quality nonattainment areas.

The software used for these procedures is described in Research Report 1279-9, *Texas Mobile Source Emissions Software Version 2.0: User's Manual*. No further implementation of the materials in this report is needed.

The purpose of this report is primarily to document procedures supporting State Implementation Plan submittals produced for and in cooperation with the Texas Natural Resource Conservation Commission. The State Implementation Plan-related materials being submitted to the Environmental Protection Agency by the Texas Natural Resource Conservation Commission are prepared in English units. Because this report is primarily to document procedures supporting State Implementation Plan submittals, English units have been used to maintain consistency.



## **DISCLAIMER**

The contents of this report reflect the views of the authors who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation. This report does not constitute a standard, specification, or regulation. Additionally, this report is not intended for construction, bidding, or permit purposes. George B. Dresser, Ph.D., is Principal Investigator for this project.





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## SUMMARY

### REPORT OBJECTIVE

The purpose of this report was to prepare the 1993, 1996, and 1999 gridded mobile source emission inventories for the three-county Jefferson Orange Hardin Regional Transportation Study (JOHRTS) for a subject summer Tuesday through Saturday (August 17-21, 1993, 1996, and 1999). These tasks were completed and the JOHRTS gridded emissions for August 17-21, 1996 and 1999, were electronically transmitted to TNRCC in August 1995. The 1993 gridded emissions were electronically transmitted in August 1994.

### OVERVIEW OF EMISSION ESTIMATION METHODOLOGY

The methodology used to develop the gridded emission estimates consists of three components. First, the VMT and speed estimates were calculated by link for each of the 24 one-hour periods. Second, the emission rates for each of the 24 one-hour periods and 24-hour diurnal rates were calculated. Finally, the emissions per link for each of the 24 one-hour time periods were calculated by multiplying the link emission rates by the link VMT. The link emissions were then disaggregated into grids.

A series of programs which facilitate the application of EPA's MOBILE5a program in estimating mobile source emissions was used to estimate the emissions for JOHRTS. The three programs used for computing the mobile source emissions for JOHRTS analyses are:

**PREPIN** The PREPIN program was developed for use in urban areas (such as JOHRTS) which do not have time-of-day assignments and speeds available for air quality analyses. The program inputs a 24-hour assignment and applies the needed seasonal adjustment factors. The time-of-day factors are applied to the seasonally adjusted 24-hour assignment results to estimate the directional time-of-day travel. The Dallas-Fort Worth speed models are used to estimate the operational time-of-day speeds by direction on the links. Special intrazonal links are defined, and the VMT and speeds for intrazonal trips are estimated. These VMT and speeds by link are subsequently input to the IMPSUM program for the application of MOBILE5a emission rates.

**POLFAC5B** The POLFAC5B program is used to apply the EPA's MOBILE5a program to obtain the emission FACTORS (rates). The MOBILE5a emission rates are obtained for eight vehicle types and 63 speeds (i.e., 3 mph through 65 mph) for each vehicle type. Hence, there are 504 factors (i.e.,  $8 \times 63 = 504$ ) for each pollution type for each county. Three pollution types are computed: VOC, CO, and NOx. The VOC emissions are broken down further into six components: exhaust hydrocarbons, running loss hydrocarbons, resting loss hydrocarbons, crank case hydrocarbons, hot soak, and diurnal emissions. Hence, for each county and each time period there are 4,536 emission rates. These emission rates are output to an ASCII file for subsequent input to the IMPSUM program. The POLFAC5B program is applied for each time-of-day time period being used. These time-of-day emission rates are applied using the IMPSUM program to time-of-day VMT estimates by link.

**IMPSUM** The IMPSUM program applies the emission rates (obtained from POLFAC5B) and VMT mixes to the time-of-day VMT and speed estimates to estimate the emissions. The basic inputs to IMPSUM are:

1. Data specifying the number of counties in the region and their names.
2. The names of the roadway types used in the study. These roadway types are used to summarize the emission results.
3. VMT mix by county and roadway type.
4. MOBILE5a emission rates developed using POLFAC5B by county.
5. Specification of the units for reporting emissions.
6. Abbreviated assignment results by link input for the subject time period. PREPIN allows the user to estimate the VMT and speed on each link by time period. For each link, the following information is input to IMPSUM: county number, roadway type number, VMT on link, operational speed estimate, and link distance.

Using these input data, the VMT for each link is stratified by the eight vehicle types; and the MOBILE5a emission factors are applied to estimate the mobile source emissions for that link. The emissions for each county and emission type are reported by both roadway type and vehicle type (i.e., cross-classified by

roadway type and vehicle type).

Using the PREPIN software, JOHRTS 1993, 1996 and 1999 24-hour assignments were used to develop seasonally adjusted time-of-day VMT and speed estimates for 24 one-hour time-of-day periods. Separate time-of-day VMT and speed estimates were developed for the August weekday, Friday, and Saturday gridded emission estimates.

The POLFAC5B program was applied to develop the emission factors for each time-of-day period for each specified event day. The average temperature for the subject day and subject time-of-day period was an input to the POLFAC5B application of the MOBILE5a model. A separate 24-hour application of MOBILE5a was used to develop the diurnal emission rates.

Finally, the IMPSUM program was applied to estimate the emissions for each of the 24 one-hour time-of-day periods. The 24-hour diurnal estimates were computed using the 24-hour diurnal rates. The emission estimates for each of the 24 one-hour time-of-day periods and the diurnal estimates were summed to develop the final emission estimates.





# I. INTRODUCTION

## OVERVIEW OF EMISSION ESTIMATION METHODOLOGY

The methodology used to develop the gridded emission estimates consists of three components. First, the VMT and speed estimates were calculated by link for each of the 24 one-hour periods. Second, the emission rates for each of the 24 one-hour periods and 24-hour diurnal rates were calculated. Finally, the emissions per link for each of the 24 one-hour time periods were calculated by multiplying the link emission rates by the link VMT. The link emissions were then disaggregated into grids.

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are 4,536 emission rates. These emission rates are output to an ASCII file for subsequent input to the IMPSUM program. The POLFAC5B program is applied for each time-of-day time period being used. These time-of-day emission rates are applied using the IMPSUM program to time-of-day VMT estimates by link.

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The basic inputs to IMPSUM are:

1. Data specifying the number of counties in the region and their names.
2. The names of the roadway types used in the study. These roadway types are used to summarize the emission results.
3. VMT mix by county and roadway type.
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5. Specification of the units for reporting emissions.
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Using these input data, the VMT for each link is stratified by the eight vehicle types; and the MOBILE5a emission factors are applied to estimate the mobile source emissions for that link. The emissions for each county and emission type are reported by both roadway type and vehicle type (i.e., cross-classified by roadway type and vehicle type).

Using the PREPIN software, the JOHRTS 1993, 1996 and 1999 24-hour assignments were used to develop seasonally adjusted time-of-day VMT and speed estimates for 24 one-hour time-of-day periods. Separate time-of-day VMT and speed estimates were developed for the August weekday, Friday, and Saturday gridded emission estimates.

The POLFAC5B program was applied to develop the emission factors for each time-of-day period for each specified event day. The average temperature for the subject day and subject time-of-day period was an input to the POLFAC5B application of the MOBILE5a model. A separate

24-hour application of MOBILE5a was used to develop the diurnal emission rates.

Finally, the IMPSUM program was applied to estimate the emissions for each of the 24 one-hour time-of-day periods. The 24-hour diurnal estimates were computed using the 24-hour diurnal rates. The emission estimates for each of the 24 one-hour time-of-day periods and the diurnal estimates were summed to develop the final emission estimates.

## **24-HOUR TRAFFIC ASSIGNMENTS**

TxDOT supplied the trip tables and networks for each analysis year. Table 1 shows the associated trip table and network by analysis year. The 1993 base network represents the street and highway system as it existed in 1993. The 1996 and 1999 action networks represent the proposed street and highway systems, assuming that the projects identified in the 2016 Metropolitan Transportation Plan adopted October 6, 1995, are implemented in accordance with the scheduled in the MTP.

**Table 1**  
**JOHRTS 24-Hour Traffic Assignments**

<b>Year</b>	<b>Trip Table</b>	<b>Network</b>
1993	1993	1993 Base
1996	1996 Action	1996 Action
1999	1999 Action	1999 Action



## II. ESTIMATION OF TIME-OF-DAY VMT AND SPEEDS

The time-of-day VMT and speed estimates for JOHRTS were developed using the PREPIN program. The PREPIN program is one of a series of programs developed by the Texas Transportation Institute to facilitate the application of EPA's MOBILE5a program in the estimation of mobile source emissions. The PREPIN program was developed for use in urban areas which do not have time-of-day assignments and speeds available for air quality analyses. The program inputs a 24-hour assignment and applies the needed seasonal adjustment factors. The time-of-day factors are applied to the seasonally adjusted 24-hour assignment results to estimate the directional time-of-day travel. The Dallas-Fort Worth speed models are used to estimate the operational time-of-day speeds by direction on the links. Special intrazonal links are defined, and the VMT and speeds for intrazonal trips are estimated. These VMT and speeds by link are subsequently input to the IMPSUM program for the application of MOBILE5a emission rates.

For the development of gridded emissions, a 24-hour assignment was performed for the JOHRTS region for 1993, 1996, and 1999. For a given application, 24 applications of PREPIN are run to estimate the directional VMT and speeds for each of the 24 one-hour time periods comprising the 24-hour period. Three PREPIN applications were performed to estimate gridded emissions for JOHRTS. These three applications include a typical weekday (Monday through Thursday, Friday, and Saturday).

The PREPIN applications were used to develop VMT and speed estimates for the weekday, Friday, and Saturday subject days. The weekday PREPIN applications are used in conjunction with the Tuesday, Wednesday, and Thursday POLFAC5B application to develop gridded emission estimates for the respective subject day. The Friday and Saturday PREPIN applications are used in conjunction with the respective Friday and Saturday POLFAC5B applications.

For a given application of the PREPIN program for the JOHRTS analyses, the following parameters and data were input to PREPIN:

- County table of equals
- Area type table of equals
- Seasonal adjustment factor
- Time-of-day factor
- Directional split estimates

- Time-of-day capacity factors
- Freeflow speed factors
- Coefficients for the Dallas-Fort Worth Speed Estimation Model
- HPMS factor
- VMT factor
- Assignment trip table
- Zonal radii data
- Capacity restrained assignment results

The remainder of this section discusses these key input data used in the JOHRTS area PREPIN applications to prepare the time-of-day VMT and speed estimates. The primary output of PREPIN is a data set for the subject time period containing two records for each link (i.e., one record specifying the estimated time-of-day VMT and speed in the peak, or principal direction, and the second record specifying the estimated VMT and speed in the opposite direction). This data set is subsequently input to the IMPSUM program which applies the MOBILE5a emission rates (developed using the POLFAC5B program) to estimate the mobile source emissions for each link. VMTSUM calculates the VMT by time period for input into IMPSUM to incorporate the diurnal emissions into the appropriate time period. Finally, the SUMALL program combines the time-of-day emission estimates to obtain 24-hour gridded emissions.

## **COUNTY SPECIFICATIONS**

The PREPIN program provides for the processing of an assignment comprised of up to eight counties. Various summaries are produced by county and for the entire region. For a given application, the counties are numbered sequentially starting with 1. The county table of equals data input to PREPIN specifies the zone numbers contained in each county. In the case of JOHRTS, the region is comprised of three counties (i.e., Jefferson, Orange, and Hardin Counties). The zone-to-county table of equals was provided by TxDOT for the gridded emission estimate applications.

Each link in the network is assigned an associated zone number. Using the link's associated zone number, the county within which the link is located is determined using these input data. The county number is included in the link record output data set produced by PREPIN. The specification of the county number in these data allow the IMPSUM program to accumulate and report the mobile source emission estimates by county.

## AREA TYPE SPECIFICATIONS

The PREPIN program allows various factors to be specified by area type number and functional classification number. The JOHRTS regional models use 14 area types for trip generation. These 14 area types were aggregated into six area types for the network. Table 2 shows the six network area types and their corresponding 14 trip generation area types.

**Table 2**  
**Table of Equals**

<b>Network Area Types</b>	<b>Corresponding Trip Generation Area Types</b>
1. Central Business District (CBD)	1. Beaumont CBD
2. CBD Fringe	2. Beaumont CBD Fringe 14. Beaumont Inner-urban
3. Urban	3. Beaumont Urban 8. Port Neches/Nederland/Orange Urban 12. Port Arthur/Groves Urban
4. Suburban	4. Beaumont Suburban 9. Port Neches/Nederland/Orange Suburban 13. Port Arthur/Groves Suburban
5. Suburban Fringe	5. Beaumont Suburban Fringe 10. Other Suburban Fringe
6. Rural	6. Beaumont Rural 7. Northwest Rural (Nome and China) 11. Other Rural

A table of equals was prepared which specifies the zones contained in each of the six area types. Using the link's associated zone number, which is determined by a program, the area type within which the link is located is determined.

## HPMS-BASED VMT

The 1993 HPMS-based VMT estimates were developed from 1992 HPMS data. The 1992 HPMS data were obtained from TxDOT and projected to 1993. At the time the 1993 emission inventories were prepared, the 1993 HPMS data were not available. The 1993 non-local functional classification VMT was projected using an average annual growth factor based on each county's

network model traffic assignments. The 1993 local VMT was projected using 1992 VMT per capita (1992 HPMS VMT/1992 county population) and the 1993 county population estimate. The sum of the non-local and local VMT was used as the 1993 HPMS VMT estimate. The 1993 HPMS-based VMT estimates are shown in Table 3. The actual 1993 HPMS VMT is also shown in Table 3.

The 1996 and 1999 HPMS-based VMT estimates were developed from VMT growth rates developed by TTI in 1992 for applications to the 1996 Rate of Progress State Implementation Plan. In the 1992 application, travel model growth rates were applied to the 1990 seasonally adjusted (summer) HPMS-based VMT estimates to develop HPMS-based seasonally adjusted (summer) control totals for 1996 and 1999. For the COAST application, the growth rate developed for the 1992 application was applied to the actual 1993 HPMS VMT estimates to develop the projected 1996 and 1999 VMT estimates. The 1996 and 1999 HPMS-based VMT estimates are shown in Table 3.

### **HPMS VMT SCALE FACTORS**

Because there are differences between the HPMS-based VMT estimates and the modeled VMT from the traffic assignment, an HPMS VMT scale factor is used to convert modeled VMT to the HPMS-based VMT estimates. To scale modeled VMT to the HPMS-based VMT estimate, an initial PREPIN run is executed to obtain the modeled VMT. A scale factor is computed as the ratio of the HPMS-based VMT estimate and the modeled VMT. This VMT scale factor is then used by PREPIN to scale the modeled VMT to the desired VMT. For 1993, the scale factor for Hardin County was calculated by averaging the 1993 scale factors for Jefferson and Orange Counties. At the time the 1993 analysis was performed, only a portion of Hardin County had been modeled; so it was not possible to directly develop a scale factor for Hardin County. For 1996 and 1999 the VMT scale factor for Hardin County was developed using the procedure described, as all of Hardin County was modeled for these years. In the application of PREPIN the HPMS VMT scale factors and the month and day-of-week adjustment factors are input to the program and the scaling is done by the program. The HPMS VMT scale factors are shown in Table 4.

### **VMT AUGUST AND DAY-OF-WEEK ADJUSTMENT FACTORS**

Using data from TxDOT's "Permanent Automatic recorders 1992 Report," seasonal adjustment factors were developed for converting the HPMS-based estimates (AADT) to seasonally adjusted (August) average annual weekday, average annual Friday, and average annual Saturday



daily traffic (ADT) estimates. The automatic traffic recorder (ATR) stations used are shown below. The adjustment applied to the 1993, 1996, and 1999 HPMS-based VMT estimates are shown in Table 5.

There are two permanently located ATRs in Jefferson County, both on IH-10 in the Beaumont urban area. One ATR is located in the rural area of Hardin County. The locations are:

S086 FM-92, 7.0 miles north of US-96, Silsbee

S117 IH-10, East end Neches River Bridge, Beaumont

S205 IH-10, South of Calder Street overpass, Beaumont

(S205 was out of service in 1990 and 1992 due to construction)

The adjustment from ATR S086 was applied to Hardin County, the adjustment for ATR S117 was applied to Jefferson County, and an adjustment based on ATRs S086 and S117 was applied to Orange County.

#### **VMT BY COUNTY BY DAY OF WEEK**

The VMT totals resulting from the application of the HPMS VMT scaling factors (Table 4) and the VMT adjustment factors (Table 5) to the 1993, 1996, and 1999 HPMS-based VMT estimates (Table 3) to develop the August 17-19, August 20, and August 21, 1993, 1996, and 1999 VMT totals are shown in Table 6.

**Table 3  
HPMS-Based VMT**

<b>County</b>	<b>1993 HPMS Actual</b>	<b>1993 HPMS Estimated</b>	<b>1996 HPMS Projected</b>	<b>1999 HPMS Projected</b>
Jefferson	6,261,577	6,287,876	6,699,566	7,137,155
Orange	2,283,123	2,378,770	2,427,922	2,572,722
Hardin	1,113,966	1,147,799	1,157,004	1,200,042

Sources: 1993 actual HPMS, TxDOT; 1993 estimated, TTI, 1996 and 1999 projected, TTI.

**Table 4  
HPMS VMT Scale Factors**

<b>County</b>	<b>1993</b>	<b>1996</b>	<b>1999</b>
Jefferson	1.028941	0.97051496	0.983998305
Orange	0.991679	0.85258452	0.856300082
Hardin	1.018437	0.75448823	0.741776398

Source: TTI calculations.

**Table 5  
August and Day-of-Week VMT Adjustment Factors**

<b>County</b>	<b>August</b>	<b>Weekday</b>	<b>Friday</b>	<b>Saturday</b>
Jefferson	1.02279	1.07804	1.17822	0.94139
Orange	1.02230	1.07044	1.17106	0.94840
Hardin	1.01678	0.98503	1.09060	1.02726

Source: 1992 Annual Report Permanent Automatic Traffic Recorders (published by TxDOT).

**Table 6**  
**VMT by County by Day by Year**

<b>County</b>	<b>Day of Week</b>	<b>1993 VMT Control</b>	<b>1996 VMT Control</b>	<b>1999 VMT Control</b>
Jefferson	Aug 17-19 (Tue-Thu)	6,933,067	7,386,998	7,869,927
	Aug 20 (Fri)	7,577,343	8,073,455	8,601,264
	Aug 21 (Sat)	6,054,247	6,450,637	6,872,352
Orange	Aug 17-19 (Tue-Thu)	2,603,112	2,656,901	2,815,357
	Aug 20 (Fri)	2,847,803	2,906,645	3,079,998
	Aug 21 (Sat)	2,306,335	2,353,990	2,494,381
Hardin	Aug 17-19 (Tue-Thu)	1,149,587 280,079	1,158,808	1,201,913
	Aug 20 (Fri)	1,272,794 310,097	1,283,002	1,330,727
	Aug 21 (Sat)	1,198,873 292,087	1,208,487	1,253,441

Source: Appendix A.

NOTE: The 1993 VMT shown for Hardin County is the 1993 control total and the VMT actually used. When the 1993 emission estimates were prepared, only a portion of the Hardin County network was available. The entire Hardin County network was available and was used for preparation of the 1996 and 1999 emission estimates.

### **TIME-OF-DAY TRAVEL FACTORS**

Data developed from field traffic counts were used to produce factors for each hour of the day using the time-of-day volume factors by area type and functional class. GET\_PER, a FORTRAN program developed specifically to compile the data developed, was used to obtain 24 sets of PERFAC records, for each hour of the day, for input into PREPIN. This program was run for the weekday, Friday, and Saturday applications. The time-of-day travel factors are shown in Tables 7 through 24.

**Table 7**  
**Time-of-Day Factors by Period for Area Type 1 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.004767005	.011193011	.006792014	.006792014	.006792014	.006792014	.006792014	.004767005	.006792014	.006792014
2	.003533004	.008626009	.004420009	.004420009	.004420009	.004420009	.004420009	.003533004	.004420009	.004420009
3	.001660002	.007702008	.003143006	.003143006	.003143006	.003143006	.003143006	.001660002	.003143006	.003143006
4	.001702002	.006902007	.002808006	.002808006	.002808006	.002808006	.002808006	.001702002	.002808006	.002808006
5	.006597007	.009941010	.004857010	.004857010	.004857010	.004857010	.004857010	.006597007	.004857010	.004857010
6	.020302020	.026108026	.014532029	.014532029	.014532029	.014532029	.014532029	.020302020	.014532029	.014532029
7	.061205061	.054340054	.038829078	.038829078	.038829078	.038829078	.038829078	.061205061	.038829078	.038829078
8	.062864063	.065373065	.062860126	.062860126	.062860126	.062860126	.062860126	.062864063	.062860126	.062860126
9	.051075051	.049667050	.057143114	.057143114	.057143114	.057143114	.057143114	.051075051	.057143114	.057143114
10	.056182056	.047393047	.052742105	.052742105	.052742105	.052742105	.052742105	.056182056	.052742105	.052742105
11	.054565055	.050360050	.058585117	.058585117	.058585117	.058585117	.058585117	.054565055	.058585117	.058585117
12	.054948055	.052759053	.064251129	.064251129	.064251129	.064251129	.064251129	.054948055	.064251129	.064251129
13	.051202051	.053860054	.065503131	.065503131	.065503131	.065503131	.065503131	.051202051	.065503131	.065503131
14	.065205065	.055699056	.056169112	.056169112	.056169112	.056169112	.056169112	.065205065	.056169112	.056169112
15	.092701092	.059617060	.070771142	.070771142	.070771142	.070771142	.070771142	.092701092	.070771142	.070771142
16	.074441074	.068207068	.081478161	.081478161	.081478161	.081478161	.081478161	.074441074	.081478161	.081478161
17	.080911081	.077277077	.073396147	.073396147	.073396147	.073396147	.073396147	.080911081	.073396147	.073396147
18	.072654073	.082776082	.073288147	.073288147	.073288147	.073288147	.073288147	.072654073	.073288147	.073288147
19	.063290063	.058009058	.062936126	.062936126	.062936126	.062936126	.062936126	.063290063	.062936126	.062936126
20	.048095048	.043067043	.048922098	.048922098	.048922098	.048922098	.048922098	.048095048	.048922098	.048922098
21	.028857029	.035942036	.038544077	.038544077	.038544077	.038544077	.038544077	.028857029	.038544077	.038544077
22	.020387020	.031643032	.027440055	.027440055	.027440055	.027440055	.027440055	.020387020	.027440055	.027440055
23	.015110015	.024696025	.018864038	.018864038	.018864038	.018864038	.018864038	.015110015	.018864038	.018864038
24	.007746008	.018842019	.011725023	.011725023	.011725023	.011725023	.011725023	.007746008	.011725023	.011725023

**Table 8**  
**Time-of-Day Factors by Period for Area Type 2 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.004767005	.011193011	.006792014	.006792014	.006792014	.006792014	.006792014	.004767005	.006792014	.006792014
2	.003533004	.008626009	.004420009	.004420009	.004420009	.004420009	.004420009	.003533004	.004420009	.004420009
3	.001660002	.007702008	.003143006	.003143006	.003143006	.003143006	.003143006	.001660002	.003143006	.003143006
4	.001702002	.006902007	.002808006	.002808006	.002808006	.002808006	.002808006	.001702002	.002808006	.002808006
5	.006597007	.009941010	.004857010	.004857010	.004857010	.004857010	.004857010	.006597007	.004857010	.004857010
6	.020302020	.026108026	.014532029	.014532029	.014532029	.014532029	.014532029	.020302020	.014532029	.014532029
7	.061205061	.054340054	.038829078	.038829078	.038829078	.038829078	.038829078	.061205061	.038829078	.038829078
8	.062864063	.065373065	.062860126	.062860126	.062860126	.062860126	.062860126	.062864063	.062860126	.062860126
9	.051075051	.049667050	.057143114	.057143114	.057143114	.057143114	.057143114	.051075051	.057143114	.057143114
10	.056182056	.047393047	.052742105	.052742105	.052742105	.052742105	.052742105	.056182056	.052742105	.052742105
11	.054565055	.050360050	.058585117	.058585117	.058585117	.058585117	.058585117	.054565055	.058585117	.058585117
12	.054948055	.052759053	.064251129	.064251129	.064251129	.064251129	.064251129	.054948055	.064251129	.064251129
13	.051202051	.053860054	.065503131	.065503131	.065503131	.065503131	.065503131	.051202051	.065503131	.065503131
14	.065205065	.055699056	.056169112	.056169112	.056169112	.056169112	.056169112	.065205065	.056169112	.056169112
15	.092701092	.059617060	.070771142	.070771142	.070771142	.070771142	.070771142	.092701092	.070771142	.070771142
16	.074441074	.068207068	.081478161	.081478161	.081478161	.081478161	.081478161	.074441074	.081478161	.081478161
17	.080911081	.077277077	.073396147	.073396147	.073396147	.073396147	.073396147	.080911081	.073396147	.073396147
18	.072654073	.082776082	.073288147	.073288147	.073288147	.073288147	.073288147	.072654073	.073288147	.073288147
19	.063290063	.058009058	.062936126	.062936126	.062936126	.062936126	.062936126	.063290063	.062936126	.062936126
20	.048095048	.043067043	.048922098	.048922098	.048922098	.048922098	.048922098	.048095048	.048922098	.048922098
21	.028857029	.035942036	.038544077	.038544077	.038544077	.038544077	.038544077	.028857029	.038544077	.038544077
22	.020387020	.031643032	.027440055	.027440055	.027440055	.027440055	.027440055	.020387020	.027440055	.027440055
23	.015110015	.024696025	.018864038	.018864038	.018864038	.018864038	.018864038	.015110015	.018864038	.018864038
24	.007746008	.018842019	.011725023	.011725023	.011725023	.011725023	.011725023	.007746008	.011725023	.011725023

**Table 9**  
**Time-of-Day Factors by Period for Area Type 3 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.004767005	.011193011	.006792014	.006792014	.006792014	.006792014	.006792014	.004767005	.006792014	.006792014
2	.003533004	.008626009	.004420009	.004420009	.004420009	.004420009	.004420009	.003533004	.004420009	.004420009
3	.001660002	.007702008	.003143006	.003143006	.003143006	.003143006	.003143006	.001660002	.003143006	.003143006
4	.001702002	.006902007	.002808006	.002808006	.002808006	.002808006	.002808006	.001702002	.002808006	.002808006
5	.006597007	.009941010	.004857010	.004857010	.004857010	.004857010	.004857010	.006597007	.004857010	.004857010
6	.020302020	.026108026	.014532029	.014532029	.014532029	.014532029	.014532029	.020302020	.014532029	.014532029
7	.061205061	.054340054	.038829078	.038829078	.038829078	.038829078	.038829078	.061205061	.038829078	.038829078
8	.062864063	.065373065	.062860126	.062860126	.062860126	.062860126	.062860126	.062864063	.062860126	.062860126
9	.051075051	.049667050	.057143114	.057143114	.057143114	.057143114	.057143114	.051075051	.057143114	.057143114
10	.056182056	.047393047	.052742105	.052742105	.052742105	.052742105	.052742105	.056182056	.052742105	.052742105
11	.054565055	.050360050	.058585117	.058585117	.058585117	.058585117	.058585117	.054565055	.058585117	.058585117
12	.054948055	.052759053	.064251129	.064251129	.064251129	.064251129	.064251129	.054948055	.064251129	.064251129
13	.051202051	.053860054	.065503131	.065503131	.065503131	.065503131	.065503131	.051202051	.065503131	.065503131
14	.065205065	.055699056	.056169112	.056169112	.056169112	.056169112	.056169112	.065205065	.056169112	.056169112
15	.092701092	.059617060	.070771142	.070771142	.070771142	.070771142	.070771142	.092701092	.070771142	.070771142
16	.074441074	.068207068	.081478161	.081478161	.081478161	.081478161	.081478161	.074441074	.081478161	.081478161
17	.080911081	.077277077	.073396147	.073396147	.073396147	.073396147	.073396147	.080911081	.073396147	.073396147
18	.072654073	.082776082	.073288147	.073288147	.073288147	.073288147	.073288147	.072654073	.073288147	.073288147
19	.063290063	.058009058	.062936126	.062936126	.062936126	.062936126	.062936126	.063290063	.062936126	.062936126
20	.048095048	.043067043	.048922098	.048922098	.048922098	.048922098	.048922098	.048095048	.048922098	.048922098
21	.028857029	.035942036	.038544077	.038544077	.038544077	.038544077	.038544077	.028857029	.038544077	.038544077
22	.020387020	.031643032	.027440055	.027440055	.027440055	.027440055	.027440055	.020387020	.027440055	.027440055
23	.015110015	.024696025	.018864038	.018864038	.018864038	.018864038	.018864038	.015110015	.018864038	.018864038
24	.007746008	.018842019	.011725023	.011725023	.011725023	.011725023	.011725023	.007746008	.011725023	.011725023

**Table 10  
Time-of-Day Factors by Period for Area Type 4 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.004767005	.011193011	.006792014	.006792014	.006792014	.006792014	.006792014	.004767005	.006792014	.006792014
2	.003533004	.008626009	.004420009	.004420009	.004420009	.004420009	.004420009	.003533004	.004420009	.004420009
3	.001660002	.007702008	.003143006	.003143006	.003143006	.003143006	.003143006	.001660002	.003143006	.003143006
4	.001702002	.006902007	.002808006	.002808006	.002808006	.002808006	.002808006	.001702002	.002808006	.002808006
5	.006597007	.009941010	.004857010	.004857010	.004857010	.004857010	.004857010	.006597007	.004857010	.004857010
6	.020302020	.026108026	.014532029	.014532029	.014532029	.014532029	.014532029	.020302020	.014532029	.014532029
7	.061205061	.054340054	.038829078	.038829078	.038829078	.038829078	.038829078	.061205061	.038829078	.038829078
8	.062864063	.065373065	.062860126	.062860126	.062860126	.062860126	.062860126	.062864063	.062860126	.062860126
9	.051075051	.049667050	.057143114	.057143114	.057143114	.057143114	.057143114	.051075051	.057143114	.057143114
10	.056182056	.047393047	.052742105	.052742105	.052742105	.052742105	.052742105	.056182056	.052742105	.052742105
11	.054565055	.050360050	.058585117	.058585117	.058585117	.058585117	.058585117	.054565055	.058585117	.058585117
12	.054948055	.052759053	.064251129	.064251129	.064251129	.064251129	.064251129	.054948055	.064251129	.064251129
13	.051202051	.053860054	.065503131	.065503131	.065503131	.065503131	.065503131	.051202051	.065503131	.065503131
14	.065205065	.055699056	.056169112	.056169112	.056169112	.056169112	.056169112	.065205065	.056169112	.056169112
15	.092701092	.059617060	.070771142	.070771142	.070771142	.070771142	.070771142	.092701092	.070771142	.070771142
16	.074441074	.068207068	.081478161	.081478161	.081478161	.081478161	.081478161	.074441074	.081478161	.081478161
17	.080911081	.077277077	.073396147	.073396147	.073396147	.073396147	.073396147	.080911081	.073396147	.073396147
18	.072654073	.082776082	.073288147	.073288147	.073288147	.073288147	.073288147	.072654073	.073288147	.073288147
19	.063290063	.058009058	.062936126	.062936126	.062936126	.062936126	.062936126	.063290063	.062936126	.062936126
20	.048095048	.043067043	.048922098	.048922098	.048922098	.048922098	.048922098	.048095048	.048922098	.048922098
21	.028857029	.035942036	.038544077	.038544077	.038544077	.038544077	.038544077	.028857029	.038544077	.038544077
22	.020387020	.031643032	.027440055	.027440055	.027440055	.027440055	.027440055	.020387020	.027440055	.027440055
23	.015110015	.024696025	.018864038	.018864038	.018864038	.018864038	.018864038	.015110015	.018864038	.018864038
24	.007746008	.018842019	.011725023	.011725023	.011725023	.011725023	.011725023	.007746008	.011725023	.011725023

**Table 11**  
**Time-of-Day Factors by Period for Area Type 5 (Weekdays)**

Time Period	IH 10 & Locals	Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.004767005	.011193011	.006792014	.006792014	.006792014	.006792014	.006792014	.004767005	.006792014	.006792014
2	.003533004	.008626009	.004420009	.004420009	.004420009	.004420009	.004420009	.003533004	.004420009	.004420009
3	.001660002	.007702008	.003143006	.003143006	.003143006	.003143006	.003143006	.001660002	.003143006	.003143006
4	.001702002	.006902007	.002808006	.002808006	.002808006	.002808006	.002808006	.001702002	.002808006	.002808006
5	.006597007	.009941010	.004857010	.004857010	.004857010	.004857010	.004857010	.006597007	.004857010	.004857010
6	.020302020	.026108026	.014532029	.014532029	.014532029	.014532029	.014532029	.020302020	.014532029	.014532029
7	.061205061	.054340054	.038829078	.038829078	.038829078	.038829078	.038829078	.061205061	.038829078	.038829078
8	.062864063	.065373065	.062860126	.062860126	.062860126	.062860126	.062860126	.062864063	.062860126	.062860126
9	.051075051	.049667050	.057143114	.057143114	.057143114	.057143114	.057143114	.051075051	.057143114	.057143114
10	.056182056	.047393047	.052742105	.052742105	.052742105	.052742105	.052742105	.056182056	.052742105	.052742105
11	.054565055	.050360050	.058585117	.058585117	.058585117	.058585117	.058585117	.054565055	.058585117	.058585117
12	.054948055	.052759053	.064251129	.064251129	.064251129	.064251129	.064251129	.054948055	.064251129	.064251129
13	.051202051	.053860054	.065503131	.065503131	.065503131	.065503131	.065503131	.051202051	.065503131	.065503131
14	.065205065	.055699056	.056169112	.056169112	.056169112	.056169112	.056169112	.065205065	.056169112	.056169112
15	.092701092	.059617060	.070771142	.070771142	.070771142	.070771142	.070771142	.092701092	.070771142	.070771142
16	.074441074	.068207068	.081478161	.081478161	.081478161	.081478161	.081478161	.074441074	.081478161	.081478161
17	.080911081	.077277077	.073396147	.073396147	.073396147	.073396147	.073396147	.080911081	.073396147	.073396147
18	.072654073	.082776082	.073288147	.073288147	.073288147	.073288147	.073288147	.072654073	.073288147	.073288147
19	.063290063	.058009058	.062936126	.062936126	.062936126	.062936126	.062936126	.063290063	.062936126	.062936126
20	.048095048	.043067043	.048922098	.048922098	.048922098	.048922098	.048922098	.048095048	.048922098	.048922098
21	.028857029	.035942036	.038544077	.038544077	.038544077	.038544077	.038544077	.028857029	.038544077	.038544077
22	.020387020	.031643032	.027440055	.027440055	.027440055	.027440055	.027440055	.020387020	.027440055	.027440055
23	.015110015	.024696025	.018864038	.018864038	.018864038	.018864038	.018864038	.015110015	.018864038	.018864038
24	.007746008	.018842019	.011725023	.011725023	.011725023	.011725023	.011725023	.007746008	.011725023	.011725023



**Table 12**  
**Time-of-Day Factors by Period for Area Type 6 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.006529993	.011193011	.006529993	.006529993	.006529993	.006529993	.006529993	.006529993	.006529993	.006529993
2	.004305996	.008626009	.004305996	.004305996	.004305996	.004305996	.004305996	.004305996	.004305996	.004305996
3	.002950997	.007702008	.002950997	.002950997	.002950997	.002950997	.002950997	.002950997	.002950997	.002950997
4	.002664997	.006902007	.002664997	.002664997	.002664997	.002664997	.002664997	.002664997	.002664997	.002664997
5	.005081995	.009941010	.005081995	.005081995	.005081995	.005081995	.005081995	.005081995	.005081995	.005081995
6	.015278985	.026108026	.015278985	.015278985	.015278985	.015278985	.015278985	.015278985	.015278985	.015278985
7	.041723958	.054340054	.041723958	.041723958	.041723958	.041723958	.041723958	.041723958	.041723958	.041723958
8	.062860937	.065373065	.062860937	.062860937	.062860937	.062860937	.062860937	.062860937	.062860937	.062860937
9	.056357944	.049667050	.056357944	.056357944	.056357944	.056357944	.056357944	.056357944	.056357944	.056357944
10	.053186947	.047393047	.053186947	.053186947	.053186947	.053186947	.053186947	.053186947	.053186947	.053186947
11	.058064942	.050360050	.058064942	.058064942	.058064942	.058064942	.058064942	.058064942	.058064942	.058064942
12	.063047937	.052759053	.063047937	.063047937	.063047937	.063047937	.063047937	.063047937	.063047937	.063047937
13	.063652936	.053860054	.063652936	.063652936	.063652936	.063652936	.063652936	.063652936	.063652936	.063652936
14	.057337943	.055699056	.057337943	.057337943	.057337943	.057337943	.057337943	.057337943	.057337943	.057337943
15	.073607926	.059617060	.073607926	.073607926	.073607926	.073607926	.073607926	.073607926	.073607926	.073607926
16	.080567919	.068207068	.080567919	.080567919	.080567919	.080567919	.080567919	.080567919	.080567919	.080567919
17	.074367926	.077277077	.074367926	.074367926	.074367926	.074367926	.074367926	.074367926	.074367926	.074367926
18	.073205927	.082776082	.073205927	.073205927	.073205927	.073205927	.073205927	.073205927	.073205927	.073205927
19	.062981937	.058009058	.062981937	.062981937	.062981937	.062981937	.062981937	.062981937	.062981937	.062981937
20	.048814951	.043067043	.048814951	.048814951	.048814951	.048814951	.048814951	.048814951	.048814951	.048814951
21	.037290963	.035942036	.037290963	.037290963	.037290963	.037290963	.037290963	.037290963	.037290963	.037290963
22	.026526973	.031643032	.026526973	.026526973	.026526973	.026526973	.026526973	.026526973	.026526973	.026526973
23	.018378982	.024696025	.018378982	.018378982	.018378982	.018378982	.018378982	.018378982	.018378982	.018378982
24	.011209989	.018842019	.011209989	.011209989	.011209989	.011209989	.011209989	.011209989	.011209989	.011209989

**Table 13**  
**Time-of-Day Factors by Period for Area Type 1 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.008464992	.011164978	.007988032	.007988032	.007988032	.007988032	.007988032	.008464992	.007988032	.007988032
2	.002503997	.008315983	.004776019	.004776019	.004776019	.004776019	.004776019	.002503997	.004776019	.004776019
3	.002145998	.007511985	.003535014	.003535014	.003535014	.003535014	.003535014	.002145998	.003535014	.003535014
4	.002145998	.006843986	.002702011	.002702011	.002702011	.002702011	.002702011	.002145998	.002702011	.002702011
5	.007153993	.009238982	.004657019	.004657019	.004657019	.004657019	.004657019	.007153993	.004657019	.004657019
6	.015261985	.020618959	.013359053	.013359053	.013359053	.013359053	.013359053	.015261985	.013359053	.013359053
7	.059377941	.044770910	.034741139	.034741139	.034741139	.034741139	.034741139	.059377941	.034741139	.034741139
8	.055442945	.056054888	.059505238	.059505238	.059505238	.059505238	.059505238	.055442945	.059505238	.059505238
9	.039226961	.044619911	.054780219	.054780219	.054780219	.054780219	.054780219	.039226961	.054780219	.054780219
10	.050911949	.045725909	.047965192	.047965192	.047965192	.047965192	.047965192	.050911949	.047965192	.047965192
11	.056515943	.050356899	.057092228	.057092228	.057092228	.057092228	.057092228	.056515943	.057092228	.057092228
12	.059973940	.054447891	.062956252	.062956252	.062956252	.062956252	.062956252	.059973940	.062956252	.062956252
13	.052938947	.056102888	.061698247	.061698247	.061698247	.061698247	.061698247	.052938947	.061698247	.061698247
14	.060450940	.058831882	.059607238	.059607238	.059607238	.059607238	.059607238	.060450940	.059607238	.059607238
15	.102419895	.061641877	.062089248	.062089248	.062089248	.062089248	.062089248	.102419895	.062089248	.062089248
16	.081435919	.069646861	.079629319	.079629319	.079629319	.079629319	.079629319	.081435919	.079629319	.079629319
17	.077738922	.075750848	.080105321	.080105321	.080105321	.080105321	.080105321	.077738922	.080105321	.080105321
18	.067365933	.077445844	.069873279	.069873279	.069873279	.069873279	.069873279	.067365933	.069873279	.069873279
19	.064623935	.061975876	.061001244	.061001244	.061001244	.061001244	.061001244	.064623935	.061001244	.061001244
20	.038869961	.049704901	.049902200	.049902200	.049902200	.049902200	.049902200	.038869961	.049902200	.049902200
21	.026469974	.041483917	.039024156	.039024156	.039024156	.039024156	.039024156	.026469974	.039024156	.039024156
22	.024919975	.036088928	.033093132	.033093132	.033093132	.033093132	.033093132	.024919975	.033093132	.033093132
23	.024322976	.028568943	.026379106	.026379106	.026379106	.026379106	.026379106	.024322976	.026379106	.026379106
24	.019315981	.023085954	.023540094	.023540094	.023540094	.023540094	.023540094	.019315981	.023540094	.023540094

**Table 14**  
**Time-of-Day Factors by Period for Area Type 2 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.008464992	.011164978	.007988032	.007988032	.007988032	.007988032	.007988032	.008464992	.007988032	.007988032
2	.002503997	.008315983	.004776019	.004776019	.004776019	.004776019	.004776019	.002503997	.004776019	.004776019
3	.002145998	.007511985	.003535014	.003535014	.003535014	.003535014	.003535014	.002145998	.003535014	.003535014
4	.002145998	.006843986	.002702011	.002702011	.002702011	.002702011	.002702011	.002145998	.002702011	.002702011
5	.007153993	.009238982	.004657019	.004657019	.004657019	.004657019	.004657019	.007153993	.004657019	.004657019
6	.015261985	.020618959	.013359053	.013359053	.013359053	.013359053	.013359053	.015261985	.013359053	.013359053
7	.059377941	.044770910	.034741139	.034741139	.034741139	.034741139	.034741139	.059377941	.034741139	.034741139
8	.055442945	.056054888	.059505238	.059505238	.059505238	.059505238	.059505238	.055442945	.059505238	.059505238
9	.039226961	.044619911	.054780219	.054780219	.054780219	.054780219	.054780219	.039226961	.054780219	.054780219
10	.050911949	.045725909	.047965192	.047965192	.047965192	.047965192	.047965192	.050911949	.047965192	.047965192
11	.056515943	.050356899	.057092228	.057092228	.057092228	.057092228	.057092228	.056515943	.057092228	.057092228
12	.059973940	.054447891	.062956252	.062956252	.062956252	.062956252	.062956252	.059973940	.062956252	.062956252
13	.052938947	.056102888	.061698247	.061698247	.061698247	.061698247	.061698247	.052938947	.061698247	.061698247
14	.060450940	.058831882	.059607238	.059607238	.059607238	.059607238	.059607238	.060450940	.059607238	.059607238
15	.102419895	.061641877	.062089248	.062089248	.062089248	.062089248	.062089248	.102419895	.062089248	.062089248
16	.081435919	.069646861	.079629319	.079629319	.079629319	.079629319	.079629319	.081435919	.079629319	.079629319
17	.077738922	.075750848	.080105321	.080105321	.080105321	.080105321	.080105321	.077738922	.080105321	.080105321
18	.067365933	.077445844	.069873279	.069873279	.069873279	.069873279	.069873279	.067365933	.069873279	.069873279
19	.064623935	.061975876	.061001244	.061001244	.061001244	.061001244	.061001244	.064623935	.061001244	.061001244
20	.038869961	.049704901	.049902200	.049902200	.049902200	.049902200	.049902200	.038869961	.049902200	.049902200
21	.026469974	.041483917	.039024156	.039024156	.039024156	.039024156	.039024156	.026469974	.039024156	.039024156
22	.024919975	.036088928	.033093132	.033093132	.033093132	.033093132	.033093132	.024919975	.033093132	.033093132
23	.024322976	.028568943	.026379106	.026379106	.026379106	.026379106	.026379106	.024322976	.026379106	.026379106
24	.019315981	.023085954	.023540094	.023540094	.023540094	.023540094	.023540094	.019315981	.023540094	.023540094

**Table 15**  
**Time-of-Day Factors by Period for Area Type 3 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.008464992	.011164978	.007988032	.007988032	.007988032	.007988032	.007988032	.008464992	.007988032	.007988032
2	.002503997	.008315983	.004776019	.004776019	.004776019	.004776019	.004776019	.002503997	.004776019	.004776019
3	.002145998	.007511985	.003535014	.003535014	.003535014	.003535014	.003535014	.002145998	.003535014	.003535014
4	.002145998	.006843986	.002702011	.002702011	.002702011	.002702011	.002702011	.002145998	.002702011	.002702011
5	.007153993	.009238982	.004657019	.004657019	.004657019	.004657019	.004657019	.007153993	.004657019	.004657019
6	.015261985	.020618959	.013359053	.013359053	.013359053	.013359053	.013359053	.015261985	.013359053	.013359053
7	.059377941	.044770910	.034741139	.034741139	.034741139	.034741139	.034741139	.059377941	.034741139	.034741139
8	.055442945	.056054888	.059505238	.059505238	.059505238	.059505238	.059505238	.055442945	.059505238	.059505238
9	.039226961	.044619911	.054780219	.054780219	.054780219	.054780219	.054780219	.039226961	.054780219	.054780219
10	.050911949	.045725909	.047965192	.047965192	.047965192	.047965192	.047965192	.050911949	.047965192	.047965192
11	.056515943	.050356899	.057092228	.057092228	.057092228	.057092228	.057092228	.056515943	.057092228	.057092228
12	.059973940	.054447891	.062956252	.062956252	.062956252	.062956252	.062956252	.059973940	.062956252	.062956252
13	.052938947	.056102888	.061698247	.061698247	.061698247	.061698247	.061698247	.052938947	.061698247	.061698247
14	.060450940	.058831882	.059607238	.059607238	.059607238	.059607238	.059607238	.060450940	.059607238	.059607238
15	.102419895	.061641877	.062089248	.062089248	.062089248	.062089248	.062089248	.102419895	.062089248	.062089248
16	.081435919	.069646861	.079629319	.079629319	.079629319	.079629319	.079629319	.081435919	.079629319	.079629319
17	.077738922	.075750848	.080105321	.080105321	.080105321	.080105321	.080105321	.077738922	.080105321	.080105321
18	.067365933	.077445844	.069873279	.069873279	.069873279	.069873279	.069873279	.067365933	.069873279	.069873279
19	.064623935	.061975876	.061001244	.061001244	.061001244	.061001244	.061001244	.064623935	.061001244	.061001244
20	.038869961	.049704901	.049902200	.049902200	.049902200	.049902200	.049902200	.038869961	.049902200	.049902200
21	.026469974	.041483917	.039024156	.039024156	.039024156	.039024156	.039024156	.026469974	.039024156	.039024156
22	.024919975	.036088928	.033093132	.033093132	.033093132	.033093132	.033093132	.024919975	.033093132	.033093132
23	.024322976	.028568943	.026379106	.026379106	.026379106	.026379106	.026379106	.024322976	.026379106	.026379106
24	.019315981	.023085954	.023540094	.023540094	.023540094	.023540094	.023540094	.019315981	.023540094	.023540094

**Table 16**  
**Time-of-Day Factors by Period for Area Type 4 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.008464992	.011164978	.007988032	.007988032	.007988032	.007988032	.007988032	.008464992	.007988032	.007988032
2	.002503997	.008315983	.004776019	.004776019	.004776019	.004776019	.004776019	.002503997	.004776019	.004776019
3	.002145998	.007511985	.003535014	.003535014	.003535014	.003535014	.003535014	.002145998	.003535014	.003535014
4	.002145998	.006843986	.002702011	.002702011	.002702011	.002702011	.002702011	.002145998	.002702011	.002702011
5	.007153993	.009238982	.004657019	.004657019	.004657019	.004657019	.004657019	.007153993	.004657019	.004657019
6	.015261985	.020618959	.013359053	.013359053	.013359053	.013359053	.013359053	.015261985	.013359053	.013359053
7	.059377941	.044770910	.034741139	.034741139	.034741139	.034741139	.034741139	.059377941	.034741139	.034741139
8	.055442945	.056054888	.059505238	.059505238	.059505238	.059505238	.059505238	.055442945	.059505238	.059505238
9	.039226961	.044619911	.054780219	.054780219	.054780219	.054780219	.054780219	.039226961	.054780219	.054780219
10	.050911949	.045725909	.047965192	.047965192	.047965192	.047965192	.047965192	.050911949	.047965192	.047965192
11	.056515943	.050356899	.057092228	.057092228	.057092228	.057092228	.057092228	.056515943	.057092228	.057092228
12	.059973940	.054447891	.062956252	.062956252	.062956252	.062956252	.062956252	.059973940	.062956252	.062956252
13	.052938947	.056102888	.061698247	.061698247	.061698247	.061698247	.061698247	.052938947	.061698247	.061698247
14	.060450940	.058831882	.059607238	.059607238	.059607238	.059607238	.059607238	.060450940	.059607238	.059607238
15	.102419895	.061641877	.062089248	.062089248	.062089248	.062089248	.062089248	.102419895	.062089248	.062089248
16	.081435919	.069646861	.079629319	.079629319	.079629319	.079629319	.079629319	.081435919	.079629319	.079629319
17	.077738922	.075750848	.080105321	.080105321	.080105321	.080105321	.080105321	.077738922	.080105321	.080105321
18	.067365933	.077445844	.069873279	.069873279	.069873279	.069873279	.069873279	.067365933	.069873279	.069873279
19	.064623935	.061975876	.061001244	.061001244	.061001244	.061001244	.061001244	.064623935	.061001244	.061001244
20	.038869961	.049704901	.049902200	.049902200	.049902200	.049902200	.049902200	.038869961	.049902200	.049902200
21	.026469974	.041483917	.039024156	.039024156	.039024156	.039024156	.039024156	.026469974	.039024156	.039024156
22	.024919975	.036088928	.033093132	.033093132	.033093132	.033093132	.033093132	.024919975	.033093132	.033093132
23	.024322976	.028568943	.026379106	.026379106	.026379106	.026379106	.026379106	.024322976	.026379106	.026379106
24	.019315981	.023085954	.023540094	.023540094	.023540094	.023540094	.023540094	.019315981	.023540094	.023540094

**Table 17**  
**Time-of-Day Factors by Period for Area Type 5 (Fridays)**

Time Period	Locals	IN 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.008464992	.011164978	.007988032	.007988032	.007988032	.007988032	.007988032	.008464992	.007988032	.007988032
2	.002503997	.008315983	.004776019	.004776019	.004776019	.004776019	.004776019	.002503997	.004776019	.004776019
3	.002145998	.007511985	.003535014	.003535014	.003535014	.003535014	.003535014	.002145998	.003535014	.003535014
4	.002145998	.006843986	.002702011	.002702011	.002702011	.002702011	.002702011	.002145998	.002702011	.002702011
5	.007153993	.009238982	.004657019	.004657019	.004657019	.004657019	.004657019	.007153993	.004657019	.004657019
6	.015261985	.020618959	.013359053	.013359053	.013359053	.013359053	.013359053	.015261985	.013359053	.013359053
7	.059377941	.044770910	.034741139	.034741139	.034741139	.034741139	.034741139	.059377941	.034741139	.034741139
8	.055442945	.056054888	.059505238	.059505238	.059505238	.059505238	.059505238	.055442945	.059505238	.059505238
9	.039226961	.044619911	.054780219	.054780219	.054780219	.054780219	.054780219	.039226961	.054780219	.054780219
10	.050911949	.045725909	.047965192	.047965192	.047965192	.047965192	.047965192	.050911949	.047965192	.047965192
11	.056515943	.050356899	.057092228	.057092228	.057092228	.057092228	.057092228	.056515943	.057092228	.057092228
12	.059973940	.054447891	.062956252	.062956252	.062956252	.062956252	.062956252	.059973940	.062956252	.062956252
13	.052938947	.056102888	.061698247	.061698247	.061698247	.061698247	.061698247	.052938947	.061698247	.061698247
14	.060450940	.058831882	.059607238	.059607238	.059607238	.059607238	.059607238	.060450940	.059607238	.059607238
15	.102419895	.061641877	.062089248	.062089248	.062089248	.062089248	.062089248	.102419895	.062089248	.062089248
16	.081435919	.069646861	.079629319	.079629319	.079629319	.079629319	.079629319	.081435919	.079629319	.079629319
17	.077738922	.075750848	.080105321	.080105321	.080105321	.080105321	.080105321	.077738922	.080105321	.080105321
18	.067365933	.077445844	.069873279	.069873279	.069873279	.069873279	.069873279	.067365933	.069873279	.069873279
19	.064623935	.061975876	.061001244	.061001244	.061001244	.061001244	.061001244	.064623935	.061001244	.061001244
20	.038869961	.049704901	.049902200	.049902200	.049902200	.049902200	.049902200	.038869961	.049902200	.049902200
21	.026469974	.041483917	.039024156	.039024156	.039024156	.039024156	.039024156	.026469974	.039024156	.039024156
22	.024919975	.036088928	.033093132	.033093132	.033093132	.033093132	.033093132	.024919975	.033093132	.033093132
23	.024322976	.028568943	.026379106	.026379106	.026379106	.026379106	.026379106	.024322976	.026379106	.026379106
24	.019315981	.023085954	.023540094	.023540094	.023540094	.023540094	.023540094	.019315981	.023540094	.023540094

**Table 18**  
**Time-of-Day Factors by Period for Area Type 6 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.008047984	.011164978	.008047984	.008047984	.008047984	.008047984	.008047984	.008047984	.008047984	.008047984
2	.004492991	.008315983	.004492991	.004492991	.004492991	.004492991	.004492991	.004492991	.004492991	.004492991
3	.003361993	.007511985	.003361993	.003361993	.003361993	.003361993	.003361993	.003361993	.003361993	.003361993
4	.002632995	.006843986	.002632995	.002632995	.002632995	.002632995	.002632995	.002632995	.002632995	.002632995
5	.004968990	.009238982	.004968990	.004968990	.004968990	.004968990	.004968990	.004968990	.004968990	.004968990
6	.013596973	.020618959	.013596973	.013596973	.013596973	.013596973	.013596973	.013596973	.013596973	.013596973
7	.037814924	.044770910	.037814924	.037814924	.037814924	.037814924	.037814924	.037814924	.037814924	.037814924
8	.058998882	.056054888	.058998882	.058998882	.058998882	.058998882	.058998882	.058998882	.058998882	.058998882
9	.052839894	.044619911	.052839894	.052839894	.052839894	.052839894	.052839894	.052839894	.052839894	.052839894
10	.048331903	.045725909	.048331903	.048331903	.048331903	.048331903	.048331903	.048331903	.048331903	.048331903
11	.057019886	.050356899	.057019886	.057019886	.057019886	.057019886	.057019886	.057019886	.057019886	.057019886
12	.062583875	.054447891	.062583875	.062583875	.062583875	.062583875	.062583875	.062583875	.062583875	.062583875
13	.060604879	.056102888	.060604879	.060604879	.060604879	.060604879	.060604879	.060604879	.060604879	.060604879
14	.059712881	.058831882	.059712881	.059712881	.059712881	.059712881	.059712881	.059712881	.059712881	.059712881
15	.067120866	.061641877	.067120866	.067120866	.067120866	.067120866	.067120866	.067120866	.067120866	.067120866
16	.079854840	.069646861	.079854840	.079854840	.079854840	.079854840	.079854840	.079854840	.079854840	.079854840
17	.079809840	.075750848	.079809840	.079809840	.079809840	.079809840	.079809840	.079809840	.079809840	.079809840
18	.069560861	.077445844	.069560861	.069560861	.069560861	.069560861	.069560861	.069560861	.069560861	.069560861
19	.061452877	.061975876	.061452877	.061452877	.061452877	.061452877	.061452877	.061452877	.061452877	.061452877
20	.048525903	.049704901	.048525903	.048525903	.048525903	.048525903	.048525903	.048525903	.048525903	.048525903
21	.037457925	.041483917	.037457925	.037457925	.037457925	.037457925	.037457925	.037457925	.037457925	.037457925
22	.032072936	.036088928	.032072936	.032072936	.032072936	.032072936	.032072936	.032072936	.032072936	.032072936
23	.026121948	.028568943	.026121948	.026121948	.026121948	.026121948	.026121948	.026121948	.026121948	.026121948
24	.023012954	.023085954	.023012954	.023012954	.023012954	.023012954	.023012954	.023012954	.023012954	.023012954

**Table 19**  
**Time-of-Day Factors by Period for Area Type 1 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.014154	.019992980	0.023873	0.023873	0.023873	0.023873	0.023873	0.014154	0.023873	0.023873
2	0.015787	.014478986	0.012428	0.012428	0.012428	0.012428	0.012428	0.015787	0.012428	0.012428
3	0.005035	.012281988	0.009520	0.009520	0.009520	0.009520	0.009520	0.005035	0.009520	0.009520
4	0.003130	.009182991	0.005252	0.005252	0.005252	0.005252	0.005252	0.003130	0.005252	0.005252
5	0.004355	.010612989	0.005189	0.005189	0.005189	0.005189	0.005189	0.004355	0.005189	0.005189
6	0.008574	.018054982	0.009687	0.009687	0.009687	0.009687	0.009687	0.008574	0.009687	0.009687
7	0.019597	.028926971	0.018935	0.018935	0.018935	0.018935	0.018935	0.019597	0.018935	0.018935
8	0.033070	.034989965	0.028016	0.028016	0.028016	0.028016	0.028016	0.033070	0.028016	0.028016
9	0.044094	.043249957	0.042474	0.042474	0.042474	0.042474	0.042474	0.044094	0.042474	0.042474
10	0.066685	.052867947	0.055446	0.055446	0.055446	0.055446	0.055446	0.066685	0.055446	0.055446
11	0.066685	.060858939	0.060907	0.060907	0.060907	0.060907	0.060907	0.066685	0.060907	0.060907
12	0.072401	.064786934	0.067561	0.067561	0.067561	0.067561	0.067561	0.072401	0.067561	0.067561
13	0.065188	.064745935	0.064757	0.064757	0.064757	0.064757	0.064757	0.065188	0.064757	0.064757
14	0.072945	.062268938	0.059882	0.059882	0.059882	0.059882	0.059882	0.072945	0.059882	0.059882
15	0.071176	.064693935	0.061640	0.061640	0.061640	0.061640	0.061640	0.071176	0.061640	0.061640
16	0.071720	.064164936	0.061723	0.061723	0.061723	0.061723	0.061723	0.071720	0.061723	0.061723
17	0.074714	.063429937	0.065134	0.065134	0.065134	0.065134	0.065134	0.074714	0.065134	0.065134
18	0.066821	.064040936	0.066808	0.066808	0.066808	0.066808	0.066808	0.066821	0.066808	0.066808
19	0.073489	.058661941	0.065699	0.065699	0.065699	0.065699	0.065699	0.073489	0.065699	0.065699
20	0.054437	.048514951	0.061702	0.061702	0.061702	0.061702	0.061702	0.054437	0.061702	0.061702
21	0.030348	.041394959	0.048563	0.048563	0.048563	0.048563	0.048563	0.030348	0.048563	0.048563
22	0.028715	.039446961	0.039022	0.039022	0.039022	0.039022	0.039022	0.028715	0.039022	0.039022
23	0.022863	.032014968	0.035967	0.035967	0.035967	0.035967	0.035967	0.022863	0.035967	0.035967
24	0.014017	.026335974	0.029815	0.029815	0.029815	0.029815	0.029815	0.014017	0.029815	0.029815



**Table 20**  
**Time-of-Day Factors by Period for Area Type 2 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.014154	.019992980	0.023873	0.023873	0.023873	0.023873	0.023873	0.014154	0.023873	0.023873
2	0.015787	.014478986	0.012428	0.012428	0.012428	0.012428	0.012428	0.015787	0.012428	0.012428
3	0.005035	.012281988	0.009520	0.009520	0.009520	0.009520	0.009520	0.005035	0.009520	0.009520
4	0.003130	.009182991	0.005252	0.005252	0.005252	0.005252	0.005252	0.003130	0.005252	0.005252
5	0.004355	.010612989	0.005189	0.005189	0.005189	0.005189	0.005189	0.004355	0.005189	0.005189
6	0.008574	.018054982	0.009687	0.009687	0.009687	0.009687	0.009687	0.008574	0.009687	0.009687
7	0.019597	.028926971	0.018935	0.018935	0.018935	0.018935	0.018935	0.019597	0.018935	0.018935
8	0.033070	.034989965	0.028016	0.028016	0.028016	0.028016	0.028016	0.033070	0.028016	0.028016
9	0.044094	.043249957	0.042474	0.042474	0.042474	0.042474	0.042474	0.044094	0.042474	0.042474
10	0.066685	.052867947	0.055446	0.055446	0.055446	0.055446	0.055446	0.066685	0.055446	0.055446
11	0.066685	.060858939	0.060907	0.060907	0.060907	0.060907	0.060907	0.066685	0.060907	0.060907
12	0.072401	.064786934	0.067561	0.067561	0.067561	0.067561	0.067561	0.072401	0.067561	0.067561
13	0.065188	.064745935	0.064757	0.064757	0.064757	0.064757	0.064757	0.065188	0.064757	0.064757
14	0.072945	.062268938	0.059882	0.059882	0.059882	0.059882	0.059882	0.072945	0.059882	0.059882
15	0.071176	.064693935	0.061640	0.061640	0.061640	0.061640	0.061640	0.071176	0.061640	0.061640
16	0.071720	.064164936	0.061723	0.061723	0.061723	0.061723	0.061723	0.071720	0.061723	0.061723
17	0.074714	.063429937	0.065134	0.065134	0.065134	0.065134	0.065134	0.074714	0.065134	0.065134
18	0.066821	.064040936	0.066808	0.066808	0.066808	0.066808	0.066808	0.066821	0.066808	0.066808
19	0.073489	.058661941	0.065699	0.065699	0.065699	0.065699	0.065699	0.073489	0.065699	0.065699
20	0.054437	.048514951	0.061702	0.061702	0.061702	0.061702	0.061702	0.054437	0.061702	0.061702
21	0.030348	.041394959	0.048563	0.048563	0.048563	0.048563	0.048563	0.030348	0.048563	0.048563
22	0.028715	.039446961	0.039022	0.039022	0.039022	0.039022	0.039022	0.028715	0.039022	0.039022
23	0.022863	.032014968	0.035967	0.035967	0.035967	0.035967	0.035967	0.022863	0.035967	0.035967
24	0.014017	.026335974	0.029815	0.029815	0.029815	0.029815	0.029815	0.014017	0.029815	0.029815

**Table 21**  
**Time-of-Day Factors by Period for Area Type 3 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.014154	.019992980	0.023873	0.023873	0.023873	0.023873	0.023873	0.014154	0.023873	0.023873
2	0.015787	.014478986	0.012428	0.012428	0.012428	0.012428	0.012428	0.015787	0.012428	0.012428
3	0.005035	.012281988	0.009520	0.009520	0.009520	0.009520	0.009520	0.005035	0.009520	0.009520
4	0.003130	.009182991	0.005252	0.005252	0.005252	0.005252	0.005252	0.003130	0.005252	0.005252
5	0.004355	.010612989	0.005189	0.005189	0.005189	0.005189	0.005189	0.004355	0.005189	0.005189
6	0.008574	.018054982	0.009687	0.009687	0.009687	0.009687	0.009687	0.008574	0.009687	0.009687
7	0.019597	.028926971	0.018935	0.018935	0.018935	0.018935	0.018935	0.019597	0.018935	0.018935
8	0.033070	.034989965	0.028016	0.028016	0.028016	0.028016	0.028016	0.033070	0.028016	0.028016
9	0.044094	.043249957	0.042474	0.042474	0.042474	0.042474	0.042474	0.044094	0.042474	0.042474
10	0.066685	.052867947	0.055446	0.055446	0.055446	0.055446	0.055446	0.066685	0.055446	0.055446
11	0.066685	.060858939	0.060907	0.060907	0.060907	0.060907	0.060907	0.066685	0.060907	0.060907
12	0.072401	.064786934	0.067561	0.067561	0.067561	0.067561	0.067561	0.072401	0.067561	0.067561
13	0.065188	.064745935	0.064757	0.064757	0.064757	0.064757	0.064757	0.065188	0.064757	0.064757
14	0.072945	.062268938	0.059882	0.059882	0.059882	0.059882	0.059882	0.072945	0.059882	0.059882
15	0.071176	.064693935	0.061640	0.061640	0.061640	0.061640	0.061640	0.071176	0.061640	0.061640
16	0.071720	.064164936	0.061723	0.061723	0.061723	0.061723	0.061723	0.071720	0.061723	0.061723
17	0.074714	.063429937	0.065134	0.065134	0.065134	0.065134	0.065134	0.074714	0.065134	0.065134
18	0.066821	.064040936	0.066808	0.066808	0.066808	0.066808	0.066808	0.066821	0.066808	0.066808
19	0.073489	.058661941	0.065699	0.065699	0.065699	0.065699	0.065699	0.073489	0.065699	0.065699
20	0.054437	.048514951	0.061702	0.061702	0.061702	0.061702	0.061702	0.054437	0.061702	0.061702
21	0.030348	.041394959	0.048563	0.048563	0.048563	0.048563	0.048563	0.030348	0.048563	0.048563
22	0.028715	.039446961	0.039022	0.039022	0.039022	0.039022	0.039022	0.028715	0.039022	0.039022
23	0.022863	.032014968	0.035967	0.035967	0.035967	0.035967	0.035967	0.022863	0.035967	0.035967
24	0.014017	.026335974	0.029815	0.029815	0.029815	0.029815	0.029815	0.014017	0.029815	0.029815

**Table 22**  
**Time-of-Day Factors by Period for Area Type 4 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.014154	.019992980	0.023873	0.023873	0.023873	0.023873	0.023873	0.014154	0.023873	0.023873
2	0.015787	.014478986	0.012428	0.012428	0.012428	0.012428	0.012428	0.015787	0.012428	0.012428
3	0.005035	.012281988	0.009520	0.009520	0.009520	0.009520	0.009520	0.005035	0.009520	0.009520
4	0.003130	.009182991	0.005252	0.005252	0.005252	0.005252	0.005252	0.003130	0.005252	0.005252
5	0.004355	.010612989	0.005189	0.005189	0.005189	0.005189	0.005189	0.004355	0.005189	0.005189
6	0.008574	.018054982	0.009687	0.009687	0.009687	0.009687	0.009687	0.008574	0.009687	0.009687
7	0.019597	.028926971	0.018935	0.018935	0.018935	0.018935	0.018935	0.019597	0.018935	0.018935
8	0.033070	.034989965	0.028016	0.028016	0.028016	0.028016	0.028016	0.033070	0.028016	0.028016
9	0.044094	.043249957	0.042474	0.042474	0.042474	0.042474	0.042474	0.044094	0.042474	0.042474
10	0.066685	.052867947	0.055446	0.055446	0.055446	0.055446	0.055446	0.066685	0.055446	0.055446
11	0.066685	.060858939	0.060907	0.060907	0.060907	0.060907	0.060907	0.066685	0.060907	0.060907
12	0.072401	.064786934	0.067561	0.067561	0.067561	0.067561	0.067561	0.072401	0.067561	0.067561
13	0.065188	.064745935	0.064757	0.064757	0.064757	0.064757	0.064757	0.065188	0.064757	0.064757
14	0.072945	.062268938	0.059882	0.059882	0.059882	0.059882	0.059882	0.072945	0.059882	0.059882
15	0.071176	.064693935	0.061640	0.061640	0.061640	0.061640	0.061640	0.071176	0.061640	0.061640
16	0.071720	.064164936	0.061723	0.061723	0.061723	0.061723	0.061723	0.071720	0.061723	0.061723
17	0.074714	.063429937	0.065134	0.065134	0.065134	0.065134	0.065134	0.074714	0.065134	0.065134
18	0.066821	.064040936	0.066808	0.066808	0.066808	0.066808	0.066808	0.066821	0.066808	0.066808
19	0.073489	.058661941	0.065699	0.065699	0.065699	0.065699	0.065699	0.073489	0.065699	0.065699
20	0.054437	.048514951	0.061702	0.061702	0.061702	0.061702	0.061702	0.054437	0.061702	0.061702
21	0.030348	.041394959	0.048563	0.048563	0.048563	0.048563	0.048563	0.030348	0.048563	0.048563
22	0.028715	.039446961	0.039022	0.039022	0.039022	0.039022	0.039022	0.028715	0.039022	0.039022
23	0.022863	.032014968	0.035967	0.035967	0.035967	0.035967	0.035967	0.022863	0.035967	0.035967
24	0.014017	.026335974	0.029815	0.029815	0.029815	0.029815	0.029815	0.014017	0.029815	0.029815

**Table 23**  
**Time-of-Day Factors by Period for Area Type 5 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.014154	.019992980	0.023873	0.023873	0.023873	0.023873	0.023873	0.014154	0.023873	0.023873
2	0.015787	.014478986	0.012428	0.012428	0.012428	0.012428	0.012428	0.015787	0.012428	0.012428
3	0.005035	.012281988	0.009520	0.009520	0.009520	0.009520	0.009520	0.005035	0.009520	0.009520
4	0.003130	.009182991	0.005252	0.005252	0.005252	0.005252	0.005252	0.003130	0.005252	0.005252
5	0.004355	.010612989	0.005189	0.005189	0.005189	0.005189	0.005189	0.004355	0.005189	0.005189
6	0.008574	.018054982	0.009687	0.009687	0.009687	0.009687	0.009687	0.008574	0.009687	0.009687
7	0.019597	.028926971	0.018935	0.018935	0.018935	0.018935	0.018935	0.019597	0.018935	0.018935
8	0.033070	.034989965	0.028016	0.028016	0.028016	0.028016	0.028016	0.033070	0.028016	0.028016
9	0.044094	.043249957	0.042474	0.042474	0.042474	0.042474	0.042474	0.044094	0.042474	0.042474
10	0.066685	.052867947	0.055446	0.055446	0.055446	0.055446	0.055446	0.066685	0.055446	0.055446
11	0.066685	.060858939	0.060907	0.060907	0.060907	0.060907	0.060907	0.066685	0.060907	0.060907
12	0.072401	.064786934	0.067561	0.067561	0.067561	0.067561	0.067561	0.072401	0.067561	0.067561
13	0.065188	.064745935	0.064757	0.064757	0.064757	0.064757	0.064757	0.065188	0.064757	0.064757
14	0.072945	.062268938	0.059882	0.059882	0.059882	0.059882	0.059882	0.072945	0.059882	0.059882
15	0.071176	.064693935	0.061640	0.061640	0.061640	0.061640	0.061640	0.071176	0.061640	0.061640
16	0.071720	.064164936	0.061723	0.061723	0.061723	0.061723	0.061723	0.071720	0.061723	0.061723
17	0.074714	.063429937	0.065134	0.065134	0.065134	0.065134	0.065134	0.074714	0.065134	0.065134
18	0.066821	.064040936	0.066808	0.066808	0.066808	0.066808	0.066808	0.066821	0.066808	0.066808
19	0.073489	.058661941	0.065699	0.065699	0.065699	0.065699	0.065699	0.073489	0.065699	0.065699
20	0.054437	.048514951	0.061702	0.061702	0.061702	0.061702	0.061702	0.054437	0.061702	0.061702
21	0.030348	.041394959	0.048563	0.048563	0.048563	0.048563	0.048563	0.030348	0.048563	0.048563
22	0.028715	.039446961	0.039022	0.039022	0.039022	0.039022	0.039022	0.028715	0.039022	0.039022
23	0.022863	.032014968	0.035967	0.035967	0.035967	0.035967	0.035967	0.022863	0.035967	0.035967
24	0.014017	.026335974	0.029815	0.029815	0.029815	0.029815	0.029815	0.014017	0.029815	0.029815

**Table 24**  
**Time-of-Day Factors by Period for Area Type 6 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	.022578023	.019992980	.022578023	.022578023	.022578023	.022578023	.022578023	.022578023	.022578023	.022578023
2	.012876013	.014478986	.012876013	.012876013	.012876013	.012876013	.012876013	.012876013	.012876013	.012876013
3	.008922009	.012281988	.008922009	.008922009	.008922009	.008922009	.008922009	.008922009	.008922009	.008922009
4	.004969005	.009182991	.004969005	.004969005	.004969005	.004969005	.004969005	.004969005	.004969005	.004969005
5	.005078005	.010612989	.005078005	.005078005	.005078005	.005078005	.005078005	.005078005	.005078005	.005078005
6	.009539010	.018054982	.009539010	.009539010	.009539010	.009539010	.009539010	.009539010	.009539010	.009539010
7	.019024019	.028926971	.019024019	.019024019	.019024019	.019024019	.019024019	.019024019	.019024019	.019024019
8	.028690029	.034989965	.028690029	.028690029	.028690029	.028690029	.028690029	.028690029	.028690029	.028690029
9	.042690043	.043249957	.042690043	.042690043	.042690043	.042690043	.042690043	.042690043	.042690043	.042690043
10	.056944057	.052867947	.056944057	.056944057	.056944057	.056944057	.056944057	.056944057	.056944057	.056944057
11	.061677062	.060858939	.061677062	.061677062	.061677062	.061677062	.061677062	.061677062	.061677062	.061677062
12	.068206065	.064786934	.068206065	.068206065	.068206065	.068206065	.068206065	.068206065	.068206065	.068206065
13	.064814065	.064745935	.064814065	.064814065	.064814065	.064814065	.064814065	.064814065	.064814065	.064814065
14	.061623062	.062268938	.061623062	.061623062	.061623062	.061623062	.061623062	.061623062	.061623062	.061623062
15	.062910063	.064693935	.062910063	.062910063	.062910063	.062910063	.062910063	.062910063	.062910063	.062910063
16	.063055063	.064164936	.063055063	.063055063	.063055063	.063055063	.063055063	.063055063	.063055063	.063055063
17	.066410066	.063429937	.066410066	.066410066	.066410066	.066410066	.066410066	.066410066	.066410066	.066410066
18	.066809067	.064040936	.066809067	.066809067	.066809067	.066809067	.066809067	.066809067	.066809067	.066809067
19	.066737067	.058661941	.066737067	.066737067	.066737067	.066737067	.066737067	.066737067	.066737067	.066737067
20	.060734061	.048514951	.060734061	.060734061	.060734061	.060734061	.060734061	.060734061	.060734061	.060734061
21	.046135046	.041394959	.046135046	.046135046	.046135046	.046135046	.046135046	.046135046	.046135046	.046135046
22	.037648038	.039446961	.037648038	.037648038	.037648038	.037648038	.037648038	.037648038	.037648038	.037648038
23	.034221034	.032014968	.034221034	.034221034	.034221034	.034221034	.034221034	.034221034	.034221034	.034221034
24	.027710028	.026335974	.027710028	.027710028	.027710028	.027710028	.027710028	.027710028	.027710028	.027710028

## **TIME-OF-DAY DIRECTIONAL SPLIT ESTIMATES**

The 24-hour link assignment volumes are nondirectional volumes (i.e., the sum of the volumes in the two directions on a link). The VMT adjustment factors and time-of-day travel factor are applied to estimate the seasonally and day-of-week adjusted time-of-day volume on a link. The PREPIN program provides for the application of directional splits to estimate the portion of the travel expected to occur in each direction. These directional volume estimates are used to estimate the directional speeds. The PREPIN program outputs two link records for a link: A link record containing the estimated VMT and speed in the peak (or dominant) direction, and a link record containing the estimated VMT and speed in the off-peak (or opposite) direction. This allows the IMPSUM program to apply the MOBILE5a emission rates directionally by speed.

Data developed from field traffic counts were used to obtain time-of-day directional split estimates by area type and functional class. GET\_SPLT, the FORTRAN program developed by TTI, was run to obtain 24 sets of these factors which were prepared for the PREPIN applications (i.e., a set for each of the 24 one-hour periods). These results were entered into SPLIT records for input to PREPIN. The directional split factors used are shown in Tables 25 through 42.

**Table 25**  
**Directional Split Factors by Period for Area Type 1 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.625840	0.596455	0.680510	0.680510	0.680510	0.680510	0.680510	0.625840	0.680510	0.680510
2	0.563198	0.570147	0.661986	0.661986	0.661986	0.661986	0.661986	0.563198	0.661986	0.661986
3	0.667239	0.557821	0.699956	0.699956	0.699956	0.699956	0.699956	0.667239	0.699956	0.699956
4	0.699206	0.539345	0.679804	0.679804	0.679804	0.679804	0.679804	0.699206	0.679804	0.679804
5	0.567668	0.571400	0.671240	0.671240	0.671240	0.671240	0.671240	0.567668	0.671240	0.671240
6	0.605781	0.682720	0.707090	0.707090	0.707090	0.707090	0.707090	0.605781	0.707090	0.707090
7	0.592370	0.672349	0.725392	0.725392	0.725392	0.725392	0.725392	0.592370	0.725392	0.725392
8	0.584909	0.710037	0.674609	0.674609	0.674609	0.674609	0.674609	0.584909	0.674609	0.674609
9	0.580268	0.609206	0.604728	0.604728	0.604728	0.604728	0.604728	0.580268	0.604728	0.604728
10	0.560457	0.560226	0.605518	0.605518	0.605518	0.605518	0.605518	0.560457	0.605518	0.605518
11	0.550883	0.525633	0.613765	0.613765	0.613765	0.613765	0.613765	0.550883	0.613765	0.613765
12	0.558161	0.516750	0.621812	0.621812	0.621812	0.621812	0.621812	0.558161	0.621812	0.621812
13	0.557121	0.517115	0.629997	0.629997	0.629997	0.629997	0.629997	0.557121	0.629997	0.629997
14	0.542789	0.517551	0.608709	0.608709	0.608709	0.608709	0.608709	0.542789	0.608709	0.608709
15	0.573482	0.530710	0.620454	0.620454	0.620454	0.620454	0.620454	0.573482	0.620454	0.620454
16	0.544252	0.565092	0.638326	0.638326	0.638326	0.638326	0.638326	0.544252	0.638326	0.638326
17	0.536769	0.597632	0.657833	0.657833	0.657833	0.657833	0.657833	0.536769	0.657833	0.657833
18	0.554092	0.642984	0.657323	0.657323	0.657323	0.657323	0.657323	0.554092	0.657323	0.657323
19	0.563033	0.553839	0.660953	0.660953	0.660953	0.660953	0.660953	0.563033	0.660953	0.660953
20	0.566861	0.553738	0.649131	0.649131	0.649131	0.649131	0.649131	0.566861	0.649131	0.649131
21	0.559064	0.578369	0.665283	0.665283	0.665283	0.665283	0.665283	0.559064	0.665283	0.665283
22	0.564487	0.601378	0.683807	0.683807	0.683807	0.683807	0.683807	0.564487	0.683807	0.683807
23	0.558386	0.550045	0.706984	0.706984	0.706984	0.706984	0.706984	0.558386	0.706984	0.706984
24	0.611164	0.538833	0.682477	0.682477	0.682477	0.682477	0.682477	0.611164	0.682477	0.682477

**Table 26**  
**Directional Split Factors by Period for Area Type 2 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.625840	0.596455	0.680510	0.680510	0.680510	0.680510	0.680510	0.625840	0.680510	0.680510
2	0.563198	0.570147	0.661986	0.661986	0.661986	0.661986	0.661986	0.563198	0.661986	0.661986
3	0.667239	0.557821	0.699956	0.699956	0.699956	0.699956	0.699956	0.667239	0.699956	0.699956
4	0.699206	0.539345	0.679804	0.679804	0.679804	0.679804	0.679804	0.699206	0.679804	0.679804
5	0.567668	0.571400	0.671240	0.671240	0.671240	0.671240	0.671240	0.567668	0.671240	0.671240
6	0.605781	0.682720	0.707090	0.707090	0.707090	0.707090	0.707090	0.605781	0.707090	0.707090
7	0.592370	0.672349	0.725392	0.725392	0.725392	0.725392	0.725392	0.592370	0.725392	0.725392
8	0.584909	0.710037	0.674609	0.674609	0.674609	0.674609	0.674609	0.584909	0.674609	0.674609
9	0.580268	0.609206	0.604728	0.604728	0.604728	0.604728	0.604728	0.580268	0.604728	0.604728
10	0.560457	0.560226	0.605518	0.605518	0.605518	0.605518	0.605518	0.560457	0.605518	0.605518
11	0.550883	0.525633	0.613765	0.613765	0.613765	0.613765	0.613765	0.550883	0.613765	0.613765
12	0.558161	0.516750	0.621812	0.621812	0.621812	0.621812	0.621812	0.558161	0.621812	0.621812
13	0.557121	0.517115	0.629997	0.629997	0.629997	0.629997	0.629997	0.557121	0.629997	0.629997
14	0.542789	0.517551	0.608709	0.608709	0.608709	0.608709	0.608709	0.542789	0.608709	0.608709
15	0.573482	0.530710	0.620454	0.620454	0.620454	0.620454	0.620454	0.573482	0.620454	0.620454
16	0.544252	0.565092	0.638326	0.638326	0.638326	0.638326	0.638326	0.544252	0.638326	0.638326
17	0.536769	0.597632	0.657833	0.657833	0.657833	0.657833	0.657833	0.536769	0.657833	0.657833
18	0.554092	0.642984	0.657323	0.657323	0.657323	0.657323	0.657323	0.554092	0.657323	0.657323
19	0.563033	0.553839	0.660953	0.660953	0.660953	0.660953	0.660953	0.563033	0.660953	0.660953
20	0.566861	0.553738	0.649131	0.649131	0.649131	0.649131	0.649131	0.566861	0.649131	0.649131
21	0.559064	0.578369	0.665283	0.665283	0.665283	0.665283	0.665283	0.559064	0.665283	0.665283
22	0.564487	0.601378	0.683807	0.683807	0.683807	0.683807	0.683807	0.564487	0.683807	0.683807
23	0.558386	0.550045	0.706984	0.706984	0.706984	0.706984	0.706984	0.558386	0.706984	0.706984
24	0.611164	0.538833	0.682477	0.682477	0.682477	0.682477	0.682477	0.611164	0.682477	0.682477



**Table 27**  
**Directional Split Factors by Period for Area Type 3 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.625840	0.596455	0.680510	0.680510	0.680510	0.680510	0.680510	0.625840	0.680510	0.680510
2	0.563198	0.570147	0.661986	0.661986	0.661986	0.661986	0.661986	0.563198	0.661986	0.661986
3	0.667239	0.557821	0.699956	0.699956	0.699956	0.699956	0.699956	0.667239	0.699956	0.699956
4	0.699206	0.539345	0.679804	0.679804	0.679804	0.679804	0.679804	0.699206	0.679804	0.679804
5	0.567668	0.571400	0.671240	0.671240	0.671240	0.671240	0.671240	0.567668	0.671240	0.671240
6	0.605781	0.682720	0.707090	0.707090	0.707090	0.707090	0.707090	0.605781	0.707090	0.707090
7	0.592370	0.672349	0.725392	0.725392	0.725392	0.725392	0.725392	0.592370	0.725392	0.725392
8	0.584909	0.710037	0.674609	0.674609	0.674609	0.674609	0.674609	0.584909	0.674609	0.674609
9	0.580268	0.609206	0.604728	0.604728	0.604728	0.604728	0.604728	0.580268	0.604728	0.604728
10	0.560457	0.560226	0.605518	0.605518	0.605518	0.605518	0.605518	0.560457	0.605518	0.605518
11	0.550883	0.525633	0.613765	0.613765	0.613765	0.613765	0.613765	0.550883	0.613765	0.613765
12	0.558161	0.516750	0.621812	0.621812	0.621812	0.621812	0.621812	0.558161	0.621812	0.621812
13	0.557121	0.517115	0.629997	0.629997	0.629997	0.629997	0.629997	0.557121	0.629997	0.629997
14	0.542789	0.517551	0.608709	0.608709	0.608709	0.608709	0.608709	0.542789	0.608709	0.608709
15	0.573482	0.530710	0.620454	0.620454	0.620454	0.620454	0.620454	0.573482	0.620454	0.620454
16	0.544252	0.565092	0.638326	0.638326	0.638326	0.638326	0.638326	0.544252	0.638326	0.638326
17	0.536769	0.597632	0.657833	0.657833	0.657833	0.657833	0.657833	0.536769	0.657833	0.657833
18	0.554092	0.642984	0.657323	0.657323	0.657323	0.657323	0.657323	0.554092	0.657323	0.657323
19	0.563033	0.553839	0.660953	0.660953	0.660953	0.660953	0.660953	0.563033	0.660953	0.660953
20	0.566861	0.553738	0.649131	0.649131	0.649131	0.649131	0.649131	0.566861	0.649131	0.649131
21	0.559064	0.578369	0.665283	0.665283	0.665283	0.665283	0.665283	0.559064	0.665283	0.665283
22	0.564487	0.601378	0.683807	0.683807	0.683807	0.683807	0.683807	0.564487	0.683807	0.683807
23	0.558386	0.550045	0.706984	0.706984	0.706984	0.706984	0.706984	0.558386	0.706984	0.706984
24	0.611164	0.538833	0.682477	0.682477	0.682477	0.682477	0.682477	0.611164	0.682477	0.682477

**Table 28**  
**Directional Split Factors by Period for Area Type 4 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.625840	0.596455	0.680510	0.680510	0.680510	0.680510	0.680510	0.625840	0.680510	0.680510
2	0.563198	0.570147	0.661986	0.661986	0.661986	0.661986	0.661986	0.563198	0.661986	0.661986
3	0.667239	0.557821	0.699956	0.699956	0.699956	0.699956	0.699956	0.667239	0.699956	0.699956
4	0.699206	0.539345	0.679804	0.679804	0.679804	0.679804	0.679804	0.699206	0.679804	0.679804
5	0.567668	0.571400	0.671240	0.671240	0.671240	0.671240	0.671240	0.567668	0.671240	0.671240
6	0.605781	0.682720	0.707090	0.707090	0.707090	0.707090	0.707090	0.605781	0.707090	0.707090
7	0.592370	0.672349	0.725392	0.725392	0.725392	0.725392	0.725392	0.592370	0.725392	0.725392
8	0.584909	0.710037	0.674609	0.674609	0.674609	0.674609	0.674609	0.584909	0.674609	0.674609
9	0.580268	0.609206	0.604728	0.604728	0.604728	0.604728	0.604728	0.580268	0.604728	0.604728
10	0.560457	0.560226	0.605518	0.605518	0.605518	0.605518	0.605518	0.560457	0.605518	0.605518
11	0.550883	0.525633	0.613765	0.613765	0.613765	0.613765	0.613765	0.550883	0.613765	0.613765
12	0.558161	0.516750	0.621812	0.621812	0.621812	0.621812	0.621812	0.558161	0.621812	0.621812
13	0.557121	0.517115	0.629997	0.629997	0.629997	0.629997	0.629997	0.557121	0.629997	0.629997
14	0.542789	0.517551	0.608709	0.608709	0.608709	0.608709	0.608709	0.542789	0.608709	0.608709
15	0.573482	0.530710	0.620454	0.620454	0.620454	0.620454	0.620454	0.573482	0.620454	0.620454
16	0.544252	0.565092	0.638326	0.638326	0.638326	0.638326	0.638326	0.544252	0.638326	0.638326
17	0.536769	0.597632	0.657833	0.657833	0.657833	0.657833	0.657833	0.536769	0.657833	0.657833
18	0.554092	0.642984	0.657323	0.657323	0.657323	0.657323	0.657323	0.554092	0.657323	0.657323
19	0.563033	0.553839	0.660953	0.660953	0.660953	0.660953	0.660953	0.563033	0.660953	0.660953
20	0.566861	0.553738	0.649131	0.649131	0.649131	0.649131	0.649131	0.566861	0.649131	0.649131
21	0.559064	0.578369	0.665283	0.665283	0.665283	0.665283	0.665283	0.559064	0.665283	0.665283
22	0.564487	0.601378	0.683807	0.683807	0.683807	0.683807	0.683807	0.564487	0.683807	0.683807
23	0.558386	0.550045	0.706984	0.706984	0.706984	0.706984	0.706984	0.558386	0.706984	0.706984
24	0.611164	0.538833	0.682477	0.682477	0.682477	0.682477	0.682477	0.611164	0.682477	0.682477

**Table 29**  
**Directional Split Factors by Period for Area Type 5 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.625840	0.596455	0.680510	0.680510	0.680510	0.680510	0.680510	0.625840	0.680510	0.680510
2	0.563198	0.570147	0.661986	0.661986	0.661986	0.661986	0.661986	0.563198	0.661986	0.661986
3	0.667239	0.557821	0.699956	0.699956	0.699956	0.699956	0.699956	0.667239	0.699956	0.699956
4	0.699206	0.539345	0.679804	0.679804	0.679804	0.679804	0.679804	0.699206	0.679804	0.679804
5	0.567668	0.571400	0.671240	0.671240	0.671240	0.671240	0.671240	0.567668	0.671240	0.671240
6	0.605781	0.682720	0.707090	0.707090	0.707090	0.707090	0.707090	0.605781	0.707090	0.707090
7	0.592370	0.672349	0.725392	0.725392	0.725392	0.725392	0.725392	0.592370	0.725392	0.725392
8	0.584909	0.710037	0.674609	0.674609	0.674609	0.674609	0.674609	0.584909	0.674609	0.674609
9	0.580268	0.609206	0.604728	0.604728	0.604728	0.604728	0.604728	0.580268	0.604728	0.604728
10	0.560457	0.560226	0.605518	0.605518	0.605518	0.605518	0.605518	0.560457	0.605518	0.605518
11	0.550883	0.525633	0.613765	0.613765	0.613765	0.613765	0.613765	0.550883	0.613765	0.613765
12	0.558161	0.516750	0.621812	0.621812	0.621812	0.621812	0.621812	0.558161	0.621812	0.621812
13	0.557121	0.517115	0.629997	0.629997	0.629997	0.629997	0.629997	0.557121	0.629997	0.629997
14	0.542789	0.517551	0.608709	0.608709	0.608709	0.608709	0.608709	0.542789	0.608709	0.608709
15	0.573482	0.530710	0.620454	0.620454	0.620454	0.620454	0.620454	0.573482	0.620454	0.620454
16	0.544252	0.565092	0.638326	0.638326	0.638326	0.638326	0.638326	0.544252	0.638326	0.638326
17	0.536769	0.597632	0.657833	0.657833	0.657833	0.657833	0.657833	0.536769	0.657833	0.657833
18	0.554092	0.642984	0.657323	0.657323	0.657323	0.657323	0.657323	0.554092	0.657323	0.657323
19	0.563033	0.553839	0.660953	0.660953	0.660953	0.660953	0.660953	0.563033	0.660953	0.660953
20	0.566861	0.553738	0.649131	0.649131	0.649131	0.649131	0.649131	0.566861	0.649131	0.649131
21	0.559064	0.578369	0.665283	0.665283	0.665283	0.665283	0.665283	0.559064	0.665283	0.665283
22	0.564487	0.601378	0.683807	0.683807	0.683807	0.683807	0.683807	0.564487	0.683807	0.683807
23	0.558386	0.550045	0.706984	0.706984	0.706984	0.706984	0.706984	0.558386	0.706984	0.706984
24	0.611164	0.538833	0.682477	0.682477	0.682477	0.682477	0.682477	0.611164	0.682477	0.682477

**Table 30**  
**Directional Split Factors by Period for Area Type 6 (Weekdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.664430	0.596455	0.664430	0.664430	0.664430	0.664430	0.664430	0.664430	0.664430	0.664430
2	0.631115	0.570147	0.631115	0.631115	0.631115	0.631115	0.631115	0.631115	0.631115	0.631115
3	0.691232	0.557821	0.691232	0.691232	0.691232	0.691232	0.691232	0.691232	0.691232	0.691232
4	0.687080	0.539345	0.687080	0.687080	0.687080	0.687080	0.687080	0.687080	0.687080	0.687080
5	0.636716	0.571400	0.636716	0.636716	0.636716	0.636716	0.636716	0.636716	0.636716	0.636716
6	0.673320	0.682720	0.673320	0.673320	0.673320	0.673320	0.673320	0.673320	0.673320	0.673320
7	0.681052	0.672349	0.681052	0.681052	0.681052	0.681052	0.681052	0.681052	0.681052	0.681052
8	0.644709	0.710037	0.644709	0.644709	0.644709	0.644709	0.644709	0.644709	0.644709	0.644709
9	0.596575	0.609206	0.596575	0.596575	0.596575	0.596575	0.596575	0.596575	0.596575	0.596575
10	0.590497	0.560226	0.590497	0.590497	0.590497	0.590497	0.590497	0.590497	0.590497	0.590497
11	0.591571	0.525633	0.591571	0.591571	0.591571	0.591571	0.591571	0.591571	0.591571	0.591571
12	0.600595	0.516750	0.600595	0.600595	0.600595	0.600595	0.600595	0.600595	0.600595	0.600595
13	0.605705	0.517115	0.605705	0.605705	0.605705	0.605705	0.605705	0.605705	0.605705	0.605705
14	0.585443	0.517551	0.585443	0.585443	0.585443	0.585443	0.585443	0.585443	0.585443	0.585443
15	0.605621	0.530710	0.605621	0.605621	0.605621	0.605621	0.605621	0.605621	0.605621	0.605621
16	0.606968	0.565092	0.606968	0.606968	0.606968	0.606968	0.606968	0.606968	0.606968	0.606968
17	0.615104	0.597632	0.615104	0.615104	0.615104	0.615104	0.615104	0.615104	0.615104	0.615104
18	0.622912	0.642984	0.622912	0.622912	0.622912	0.622912	0.622912	0.622912	0.622912	0.622912
19	0.628313	0.553839	0.628313	0.628313	0.628313	0.628313	0.628313	0.628313	0.628313	0.628313
20	0.621707	0.553738	0.621707	0.621707	0.621707	0.621707	0.621707	0.621707	0.621707	0.621707
21	0.629877	0.578369	0.629877	0.629877	0.629877	0.629877	0.629877	0.629877	0.629877	0.629877
22	0.644034	0.601378	0.644034	0.644034	0.644034	0.644034	0.644034	0.644034	0.644034	0.644034
23	0.663279	0.550045	0.663279	0.663279	0.663279	0.663279	0.663279	0.663279	0.663279	0.663279
24	0.658706	0.538833	0.658706	0.658706	0.658706	0.658706	0.658706	0.658706	0.658706	0.658706

**Table 31**  
**Directional Split Factors by Period for Area Type 1 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.557660	0.596659	0.718553	0.718553	0.718553	0.718553	0.718553	0.557660	0.718553	0.718553
2	0.694444	0.552902	0.680373	0.680373	0.680373	0.680373	0.680373	0.694444	0.680373	0.680373
3	0.633333	0.537167	0.775356	0.775356	0.775356	0.775356	0.775356	0.633333	0.775356	0.775356
4	0.558442	0.554723	0.684921	0.684921	0.684921	0.684921	0.684921	0.558442	0.684921	0.684921
5	0.584288	0.581594	0.682317	0.682317	0.682317	0.682317	0.682317	0.584288	0.682317	0.682317
6	0.623571	0.655199	0.740889	0.740889	0.740889	0.740889	0.740889	0.623571	0.740889	0.740889
7	0.611097	0.653506	0.738801	0.738801	0.738801	0.738801	0.738801	0.611097	0.738801	0.738801
8	0.593870	0.697244	0.686944	0.686944	0.686944	0.686944	0.686944	0.593870	0.686944	0.686944
9	0.568480	0.614669	0.673450	0.673450	0.673450	0.673450	0.673450	0.568480	0.673450	0.673450
10	0.554206	0.571776	0.634138	0.634138	0.634138	0.634138	0.634138	0.554206	0.634138	0.634138
11	0.553353	0.533617	0.634327	0.634327	0.634327	0.634327	0.634327	0.553353	0.634327	0.634327
12	0.544501	0.516480	0.645048	0.645048	0.645048	0.645048	0.645048	0.544501	0.645048	0.645048
13	0.545004	0.519853	0.669225	0.669225	0.669225	0.669225	0.669225	0.545004	0.669225	0.669225
14	0.538817	0.524590	0.651444	0.651444	0.651444	0.651444	0.651444	0.538817	0.651444	0.651444
15	0.557227	0.539663	0.639778	0.639778	0.639778	0.639778	0.639778	0.557227	0.639778	0.639778
16	0.538257	0.564756	0.669546	0.669546	0.669546	0.669546	0.669546	0.538257	0.669546	0.669546
17	0.544964	0.599976	0.665132	0.665132	0.665132	0.665132	0.665132	0.544964	0.665132	0.665132
18	0.549053	0.618446	0.710728	0.710728	0.710728	0.710728	0.710728	0.549053	0.710728	0.710728
19	0.549738	0.540226	0.733917	0.733917	0.733917	0.733917	0.733917	0.549738	0.733917	0.733917
20	0.561178	0.528143	0.698363	0.698363	0.698363	0.698363	0.698363	0.561178	0.698363	0.698363
21	0.570701	0.559164	0.699105	0.699105	0.699105	0.699105	0.699105	0.570701	0.699105	0.699105
22	0.576623	0.582413	0.679103	0.679103	0.679103	0.679103	0.679103	0.576623	0.679103	0.679103
23	0.552811	0.556553	0.708430	0.708430	0.708430	0.708430	0.708430	0.552811	0.708430	0.708430
24	0.595287	0.549178	0.669083	0.669083	0.669083	0.669083	0.669083	0.595287	0.669083	0.669083

**Table 32**  
**Directional Split Factors by Period for Area Type 2 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.557660	0.596659	0.718553	0.718553	0.718553	0.718553	0.718553	0.557660	0.718553	0.718553
2	0.694444	0.552902	0.680373	0.680373	0.680373	0.680373	0.680373	0.694444	0.680373	0.680373
3	0.633333	0.537167	0.775356	0.775356	0.775356	0.775356	0.775356	0.633333	0.775356	0.775356
4	0.558442	0.554723	0.684921	0.684921	0.684921	0.684921	0.684921	0.558442	0.684921	0.684921
5	0.584288	0.581594	0.682317	0.682317	0.682317	0.682317	0.682317	0.584288	0.682317	0.682317
6	0.623571	0.655199	0.740889	0.740889	0.740889	0.740889	0.740889	0.623571	0.740889	0.740889
7	0.611097	0.653506	0.738801	0.738801	0.738801	0.738801	0.738801	0.611097	0.738801	0.738801
8	0.593870	0.697244	0.686944	0.686944	0.686944	0.686944	0.686944	0.593870	0.686944	0.686944
9	0.568480	0.614669	0.673450	0.673450	0.673450	0.673450	0.673450	0.568480	0.673450	0.673450
10	0.554206	0.571776	0.634138	0.634138	0.634138	0.634138	0.634138	0.554206	0.634138	0.634138
11	0.553353	0.533617	0.634327	0.634327	0.634327	0.634327	0.634327	0.553353	0.634327	0.634327
12	0.544501	0.516480	0.645048	0.645048	0.645048	0.645048	0.645048	0.544501	0.645048	0.645048
13	0.545004	0.519853	0.669225	0.669225	0.669225	0.669225	0.669225	0.545004	0.669225	0.669225
14	0.538817	0.524590	0.651444	0.651444	0.651444	0.651444	0.651444	0.538817	0.651444	0.651444
15	0.557227	0.539663	0.639778	0.639778	0.639778	0.639778	0.639778	0.557227	0.639778	0.639778
16	0.538257	0.564756	0.669546	0.669546	0.669546	0.669546	0.669546	0.538257	0.669546	0.669546
17	0.544964	0.599976	0.665132	0.665132	0.665132	0.665132	0.665132	0.544964	0.665132	0.665132
18	0.549053	0.618446	0.710728	0.710728	0.710728	0.710728	0.710728	0.549053	0.710728	0.710728
19	0.549738	0.540226	0.733917	0.733917	0.733917	0.733917	0.733917	0.549738	0.733917	0.733917
20	0.561178	0.528143	0.698363	0.698363	0.698363	0.698363	0.698363	0.561178	0.698363	0.698363
21	0.570701	0.559164	0.699105	0.699105	0.699105	0.699105	0.699105	0.570701	0.699105	0.699105
22	0.576623	0.582413	0.679103	0.679103	0.679103	0.679103	0.679103	0.576623	0.679103	0.679103
23	0.552811	0.556553	0.708430	0.708430	0.708430	0.708430	0.708430	0.552811	0.708430	0.708430
24	0.595287	0.549178	0.669083	0.669083	0.669083	0.669083	0.669083	0.595287	0.669083	0.669083

**Table 33**  
**Directional Split Factors by Period for Area Type 3 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.557660	0.596659	0.718553	0.718553	0.718553	0.718553	0.718553	0.557660	0.718553	0.718553
2	0.694444	0.552902	0.680373	0.680373	0.680373	0.680373	0.680373	0.694444	0.680373	0.680373
3	0.633333	0.537167	0.775356	0.775356	0.775356	0.775356	0.775356	0.633333	0.775356	0.775356
4	0.558442	0.554723	0.684921	0.684921	0.684921	0.684921	0.684921	0.558442	0.684921	0.684921
5	0.584288	0.581594	0.682317	0.682317	0.682317	0.682317	0.682317	0.584288	0.682317	0.682317
6	0.623571	0.655199	0.740889	0.740889	0.740889	0.740889	0.740889	0.623571	0.740889	0.740889
7	0.611097	0.653506	0.738801	0.738801	0.738801	0.738801	0.738801	0.611097	0.738801	0.738801
8	0.593870	0.697244	0.686944	0.686944	0.686944	0.686944	0.686944	0.593870	0.686944	0.686944
9	0.568480	0.614669	0.673450	0.673450	0.673450	0.673450	0.673450	0.568480	0.673450	0.673450
10	0.554206	0.571776	0.634138	0.634138	0.634138	0.634138	0.634138	0.554206	0.634138	0.634138
11	0.553353	0.533617	0.634327	0.634327	0.634327	0.634327	0.634327	0.553353	0.634327	0.634327
12	0.544501	0.516480	0.645048	0.645048	0.645048	0.645048	0.645048	0.544501	0.645048	0.645048
13	0.545004	0.519853	0.669225	0.669225	0.669225	0.669225	0.669225	0.545004	0.669225	0.669225
14	0.538817	0.524590	0.651444	0.651444	0.651444	0.651444	0.651444	0.538817	0.651444	0.651444
15	0.557227	0.539663	0.639778	0.639778	0.639778	0.639778	0.639778	0.557227	0.639778	0.639778
16	0.538257	0.564756	0.669546	0.669546	0.669546	0.669546	0.669546	0.538257	0.669546	0.669546
17	0.544964	0.599976	0.665132	0.665132	0.665132	0.665132	0.665132	0.544964	0.665132	0.665132
18	0.549053	0.618446	0.710728	0.710728	0.710728	0.710728	0.710728	0.549053	0.710728	0.710728
19	0.549738	0.540226	0.733917	0.733917	0.733917	0.733917	0.733917	0.549738	0.733917	0.733917
20	0.561178	0.528143	0.698363	0.698363	0.698363	0.698363	0.698363	0.561178	0.698363	0.698363
21	0.570701	0.559164	0.699105	0.699105	0.699105	0.699105	0.699105	0.570701	0.699105	0.699105
22	0.576623	0.582413	0.679103	0.679103	0.679103	0.679103	0.679103	0.576623	0.679103	0.679103
23	0.552811	0.556553	0.708430	0.708430	0.708430	0.708430	0.708430	0.552811	0.708430	0.708430
24	0.595287	0.549178	0.669083	0.669083	0.669083	0.669083	0.669083	0.595287	0.669083	0.669083

**Table 34**  
**Directional Split Factors by Period for Area Type 4 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.557660	0.596659	0.718553	0.718553	0.718553	0.718553	0.718553	0.557660	0.718553	0.718553
2	0.694444	0.552902	0.680373	0.680373	0.680373	0.680373	0.680373	0.694444	0.680373	0.680373
3	0.633333	0.537167	0.775356	0.775356	0.775356	0.775356	0.775356	0.633333	0.775356	0.775356
4	0.558442	0.554723	0.684921	0.684921	0.684921	0.684921	0.684921	0.558442	0.684921	0.684921
5	0.584288	0.581594	0.682317	0.682317	0.682317	0.682317	0.682317	0.584288	0.682317	0.682317
6	0.623571	0.655199	0.740889	0.740889	0.740889	0.740889	0.740889	0.623571	0.740889	0.740889
7	0.611097	0.653506	0.738801	0.738801	0.738801	0.738801	0.738801	0.611097	0.738801	0.738801
8	0.593870	0.697244	0.686944	0.686944	0.686944	0.686944	0.686944	0.593870	0.686944	0.686944
9	0.568480	0.614669	0.673450	0.673450	0.673450	0.673450	0.673450	0.568480	0.673450	0.673450
10	0.554206	0.571776	0.634138	0.634138	0.634138	0.634138	0.634138	0.554206	0.634138	0.634138
11	0.553353	0.533617	0.634327	0.634327	0.634327	0.634327	0.634327	0.553353	0.634327	0.634327
12	0.544501	0.516480	0.645048	0.645048	0.645048	0.645048	0.645048	0.544501	0.645048	0.645048
13	0.545004	0.519853	0.669225	0.669225	0.669225	0.669225	0.669225	0.545004	0.669225	0.669225
14	0.538817	0.524590	0.651444	0.651444	0.651444	0.651444	0.651444	0.538817	0.651444	0.651444
15	0.557227	0.539663	0.639778	0.639778	0.639778	0.639778	0.639778	0.557227	0.639778	0.639778
16	0.538257	0.564756	0.669546	0.669546	0.669546	0.669546	0.669546	0.538257	0.669546	0.669546
17	0.544964	0.599976	0.665132	0.665132	0.665132	0.665132	0.665132	0.544964	0.665132	0.665132
18	0.549053	0.618446	0.710728	0.710728	0.710728	0.710728	0.710728	0.549053	0.710728	0.710728
19	0.549738	0.540226	0.733917	0.733917	0.733917	0.733917	0.733917	0.549738	0.733917	0.733917
20	0.561178	0.528143	0.698363	0.698363	0.698363	0.698363	0.698363	0.561178	0.698363	0.698363
21	0.570701	0.559164	0.699105	0.699105	0.699105	0.699105	0.699105	0.570701	0.699105	0.699105
22	0.576623	0.582413	0.679103	0.679103	0.679103	0.679103	0.679103	0.576623	0.679103	0.679103
23	0.552811	0.556553	0.708430	0.708430	0.708430	0.708430	0.708430	0.552811	0.708430	0.708430
24	0.595287	0.549178	0.669083	0.669083	0.669083	0.669083	0.669083	0.595287	0.669083	0.669083



**Table 35**  
**Directional Split Factors by Period for Area Type 5 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.557660	0.596659	0.718553	0.718553	0.718553	0.718553	0.718553	0.557660	0.718553	0.718553
2	0.694444	0.552902	0.680373	0.680373	0.680373	0.680373	0.680373	0.694444	0.680373	0.680373
3	0.633333	0.537167	0.775356	0.775356	0.775356	0.775356	0.775356	0.633333	0.775356	0.775356
4	0.558442	0.554723	0.684921	0.684921	0.684921	0.684921	0.684921	0.558442	0.684921	0.684921
5	0.584288	0.581594	0.682317	0.682317	0.682317	0.682317	0.682317	0.584288	0.682317	0.682317
6	0.623571	0.655199	0.740889	0.740889	0.740889	0.740889	0.740889	0.623571	0.740889	0.740889
7	0.611097	0.653506	0.738801	0.738801	0.738801	0.738801	0.738801	0.611097	0.738801	0.738801
8	0.593870	0.697244	0.686944	0.686944	0.686944	0.686944	0.686944	0.593870	0.686944	0.686944
9	0.568480	0.614669	0.673450	0.673450	0.673450	0.673450	0.673450	0.568480	0.673450	0.673450
10	0.554206	0.571776	0.634138	0.634138	0.634138	0.634138	0.634138	0.554206	0.634138	0.634138
11	0.553353	0.533617	0.634327	0.634327	0.634327	0.634327	0.634327	0.553353	0.634327	0.634327
12	0.544501	0.516480	0.645048	0.645048	0.645048	0.645048	0.645048	0.544501	0.645048	0.645048
13	0.545004	0.519853	0.669225	0.669225	0.669225	0.669225	0.669225	0.545004	0.669225	0.669225
14	0.538817	0.524590	0.651444	0.651444	0.651444	0.651444	0.651444	0.538817	0.651444	0.651444
15	0.557227	0.539663	0.639778	0.639778	0.639778	0.639778	0.639778	0.557227	0.639778	0.639778
16	0.538257	0.564756	0.669546	0.669546	0.669546	0.669546	0.669546	0.538257	0.669546	0.669546
17	0.544964	0.599976	0.665132	0.665132	0.665132	0.665132	0.665132	0.544964	0.665132	0.665132
18	0.549053	0.618446	0.710728	0.710728	0.710728	0.710728	0.710728	0.549053	0.710728	0.710728
19	0.549738	0.540226	0.733917	0.733917	0.733917	0.733917	0.733917	0.549738	0.733917	0.733917
20	0.561178	0.528143	0.698363	0.698363	0.698363	0.698363	0.698363	0.561178	0.698363	0.698363
21	0.570701	0.559164	0.699105	0.699105	0.699105	0.699105	0.699105	0.570701	0.699105	0.699105
22	0.576623	0.582413	0.679103	0.679103	0.679103	0.679103	0.679103	0.576623	0.679103	0.679103
23	0.552811	0.556553	0.708430	0.708430	0.708430	0.708430	0.708430	0.552811	0.708430	0.708430
24	0.595287	0.549178	0.669083	0.669083	0.669083	0.669083	0.669083	0.595287	0.669083	0.669083

**Table 36**  
**Directional Split Factors by Period for Area Type 6 (Fridays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.664922	0.596659	0.664922	0.664922	0.664922	0.664922	0.664922	0.664922	0.664922	0.664922
2	0.685064	0.552902	0.685064	0.685064	0.685064	0.685064	0.685064	0.685064	0.685064	0.685064
3	0.718547	0.537167	0.718547	0.718547	0.718547	0.718547	0.718547	0.718547	0.718547	0.718547
4	0.642761	0.554723	0.642761	0.642761	0.642761	0.642761	0.642761	0.642761	0.642761	0.642761
5	0.649641	0.581594	0.649641	0.649641	0.649641	0.649641	0.649641	0.649641	0.649641	0.649641
6	0.701783	0.655199	0.701783	0.701783	0.701783	0.701783	0.701783	0.701783	0.701783	0.701783
7	0.696233	0.653506	0.696233	0.696233	0.696233	0.696233	0.696233	0.696233	0.696233	0.696233
8	0.655919	0.697244	0.655919	0.655919	0.655919	0.655919	0.655919	0.655919	0.655919	0.655919
9	0.638460	0.614669	0.638460	0.638460	0.638460	0.638460	0.638460	0.638460	0.638460	0.638460
10	0.607494	0.571776	0.607494	0.607494	0.607494	0.607494	0.607494	0.607494	0.607494	0.607494
11	0.607335	0.533617	0.607335	0.607335	0.607335	0.607335	0.607335	0.607335	0.607335	0.607335
12	0.611532	0.516480	0.611532	0.611532	0.611532	0.611532	0.611532	0.611532	0.611532	0.611532
13	0.627818	0.519853	0.627818	0.627818	0.627818	0.627818	0.627818	0.627818	0.627818	0.627818
14	0.613902	0.524590	0.613902	0.613902	0.613902	0.613902	0.613902	0.613902	0.613902	0.613902
15	0.612261	0.539663	0.612261	0.612261	0.612261	0.612261	0.612261	0.612261	0.612261	0.612261
16	0.625783	0.564756	0.625783	0.625783	0.625783	0.625783	0.625783	0.625783	0.625783	0.625783
17	0.625076	0.599976	0.625076	0.625076	0.625076	0.625076	0.625076	0.625076	0.625076	0.625076
18	0.656836	0.618446	0.656836	0.656836	0.656836	0.656836	0.656836	0.656836	0.656836	0.656836
19	0.672524	0.540226	0.672524	0.672524	0.672524	0.672524	0.672524	0.672524	0.672524	0.672524
20	0.652635	0.528143	0.652635	0.652635	0.652635	0.652635	0.652635	0.652635	0.652635	0.652635
21	0.656303	0.559164	0.656303	0.656303	0.656303	0.656303	0.656303	0.656303	0.656303	0.656303
22	0.644943	0.582413	0.644943	0.644943	0.644943	0.644943	0.644943	0.644943	0.644943	0.644943
23	0.656557	0.556553	0.656557	0.656557	0.656557	0.656557	0.656557	0.656557	0.656557	0.656557
24	0.644484	0.549178	0.644484	0.644484	0.644484	0.644484	0.644484	0.644484	0.644484	0.644484

**Table 37**  
**Directional Split Factors by Period for Area Type 1 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.575569	0.610253	0.673042	0.673042	0.673042	0.673042	0.673042	0.575569	0.673042	0.673042
2	0.630986	0.595031	0.700152	0.700152	0.700152	0.700152	0.700152	0.630986	0.700152	0.700152
3	0.577778	0.598182	0.746839	0.746839	0.746839	0.746839	0.746839	0.577778	0.746839	0.746839
4	0.633333	0.534877	0.670424	0.670424	0.670424	0.670424	0.670424	0.633333	0.670424	0.670424
5	0.565714	0.536695	0.671335	0.671335	0.671335	0.671335	0.671335	0.565714	0.671335	0.671335
6	0.578947	0.578063	0.674962	0.674962	0.674962	0.674962	0.674962	0.578947	0.674962	0.674962
7	0.583945	0.552630	0.648408	0.648408	0.648408	0.648408	0.648408	0.583945	0.648408	0.648408
8	0.576833	0.560117	0.641352	0.641352	0.641352	0.641352	0.641352	0.576833	0.641352	0.641352
9	0.561696	0.565242	0.618170	0.618170	0.618170	0.618170	0.618170	0.561696	0.618170	0.618170
10	0.577978	0.557414	0.614752	0.614752	0.614752	0.614752	0.614752	0.577978	0.614752	0.614752
11	0.561176	0.532844	0.619975	0.619975	0.619975	0.619975	0.619975	0.561176	0.619975	0.619975
12	0.551740	0.519432	0.633283	0.633283	0.633283	0.633283	0.633283	0.551740	0.633283	0.633283
13	0.553873	0.513835	0.640984	0.640984	0.640984	0.640984	0.640984	0.553873	0.640984	0.640984
14	0.536826	0.513549	0.681756	0.681756	0.681756	0.681756	0.681756	0.536826	0.681756	0.681756
15	0.516362	0.523873	0.684541	0.684541	0.684541	0.684541	0.684541	0.516362	0.684541	0.684541
16	0.585531	0.538630	0.677560	0.677560	0.677560	0.677560	0.677560	0.585531	0.677560	0.677560
17	0.547610	0.538116	0.652837	0.652837	0.652837	0.652837	0.652837	0.547610	0.652837	0.652837
18	0.568346	0.540451	0.667133	0.667133	0.667133	0.667133	0.667133	0.568346	0.667133	0.667133
19	0.561086	0.516856	0.673252	0.673252	0.673252	0.673252	0.673252	0.561086	0.673252	0.673252
20	0.570250	0.520688	0.658811	0.658811	0.658811	0.658811	0.658811	0.570250	0.658811	0.658811
21	0.570362	0.526087	0.663625	0.663625	0.663625	0.663625	0.663625	0.570362	0.663625	0.663625
22	0.571391	0.566769	0.657822	0.657822	0.657822	0.657822	0.657822	0.571391	0.657822	0.657822
23	0.589246	0.552025	0.702095	0.702095	0.702095	0.702095	0.702095	0.589246	0.702095	0.702095
24	0.577973	0.524287	0.699039	0.699039	0.699039	0.699039	0.699039	0.577973	0.699039	0.699039

**Table 38**  
**Directional Split Factors by Period for Area Type 2 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.575569	0.610253	0.673042	0.673042	0.673042	0.673042	0.673042	0.575569	0.673042	0.673042
2	0.630986	0.595031	0.700152	0.700152	0.700152	0.700152	0.700152	0.630986	0.700152	0.700152
3	0.577778	0.598182	0.746839	0.746839	0.746839	0.746839	0.746839	0.577778	0.746839	0.746839
4	0.633333	0.534877	0.670424	0.670424	0.670424	0.670424	0.670424	0.633333	0.670424	0.670424
5	0.565714	0.536695	0.671335	0.671335	0.671335	0.671335	0.671335	0.565714	0.671335	0.671335
6	0.578947	0.578063	0.674962	0.674962	0.674962	0.674962	0.674962	0.578947	0.674962	0.674962
7	0.583945	0.552630	0.648408	0.648408	0.648408	0.648408	0.648408	0.583945	0.648408	0.648408
8	0.576833	0.560117	0.641352	0.641352	0.641352	0.641352	0.641352	0.576833	0.641352	0.641352
9	0.561696	0.565242	0.618170	0.618170	0.618170	0.618170	0.618170	0.561696	0.618170	0.618170
10	0.577978	0.557414	0.614752	0.614752	0.614752	0.614752	0.614752	0.577978	0.614752	0.614752
11	0.561176	0.532844	0.619975	0.619975	0.619975	0.619975	0.619975	0.561176	0.619975	0.619975
12	0.551740	0.519432	0.633283	0.633283	0.633283	0.633283	0.633283	0.551740	0.633283	0.633283
13	0.553873	0.513835	0.640984	0.640984	0.640984	0.640984	0.640984	0.553873	0.640984	0.640984
14	0.536826	0.513549	0.681756	0.681756	0.681756	0.681756	0.681756	0.536826	0.681756	0.681756
15	0.516362	0.523873	0.684541	0.684541	0.684541	0.684541	0.684541	0.516362	0.684541	0.684541
16	0.585531	0.538630	0.677560	0.677560	0.677560	0.677560	0.677560	0.585531	0.677560	0.677560
17	0.547610	0.538116	0.652837	0.652837	0.652837	0.652837	0.652837	0.547610	0.652837	0.652837
18	0.568346	0.540451	0.667133	0.667133	0.667133	0.667133	0.667133	0.568346	0.667133	0.667133
19	0.561086	0.516856	0.673252	0.673252	0.673252	0.673252	0.673252	0.561086	0.673252	0.673252
20	0.570250	0.520688	0.658811	0.658811	0.658811	0.658811	0.658811	0.570250	0.658811	0.658811
21	0.570362	0.526087	0.663625	0.663625	0.663625	0.663625	0.663625	0.570362	0.663625	0.663625
22	0.571391	0.566769	0.657822	0.657822	0.657822	0.657822	0.657822	0.571391	0.657822	0.657822
23	0.589246	0.552025	0.702095	0.702095	0.702095	0.702095	0.702095	0.589246	0.702095	0.702095
24	0.577973	0.524287	0.699039	0.699039	0.699039	0.699039	0.699039	0.577973	0.699039	0.699039

**Table 39**  
**Directional Split Factors by Period for Area Type 3 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.575569	0.610253	0.673042	0.673042	0.673042	0.673042	0.673042	0.575569	0.673042	0.673042
2	0.630986	0.595031	0.700152	0.700152	0.700152	0.700152	0.700152	0.630986	0.700152	0.700152
3	0.577778	0.598182	0.746839	0.746839	0.746839	0.746839	0.746839	0.577778	0.746839	0.746839
4	0.633333	0.534877	0.670424	0.670424	0.670424	0.670424	0.670424	0.633333	0.670424	0.670424
5	0.565714	0.536695	0.671335	0.671335	0.671335	0.671335	0.671335	0.565714	0.671335	0.671335
6	0.578947	0.578063	0.674962	0.674962	0.674962	0.674962	0.674962	0.578947	0.674962	0.674962
7	0.583945	0.552630	0.648408	0.648408	0.648408	0.648408	0.648408	0.583945	0.648408	0.648408
8	0.576833	0.560117	0.641352	0.641352	0.641352	0.641352	0.641352	0.576833	0.641352	0.641352
9	0.561696	0.565242	0.618170	0.618170	0.618170	0.618170	0.618170	0.561696	0.618170	0.618170
10	0.577978	0.557414	0.614752	0.614752	0.614752	0.614752	0.614752	0.577978	0.614752	0.614752
11	0.561176	0.532844	0.619975	0.619975	0.619975	0.619975	0.619975	0.561176	0.619975	0.619975
12	0.551740	0.519432	0.633283	0.633283	0.633283	0.633283	0.633283	0.551740	0.633283	0.633283
13	0.553873	0.513835	0.640984	0.640984	0.640984	0.640984	0.640984	0.553873	0.640984	0.640984
14	0.536826	0.513549	0.681756	0.681756	0.681756	0.681756	0.681756	0.536826	0.681756	0.681756
15	0.516362	0.523873	0.684541	0.684541	0.684541	0.684541	0.684541	0.516362	0.684541	0.684541
16	0.585531	0.538630	0.677560	0.677560	0.677560	0.677560	0.677560	0.585531	0.677560	0.677560
17	0.547610	0.538116	0.652837	0.652837	0.652837	0.652837	0.652837	0.547610	0.652837	0.652837
18	0.568346	0.540451	0.667133	0.667133	0.667133	0.667133	0.667133	0.568346	0.667133	0.667133
19	0.561086	0.516856	0.673252	0.673252	0.673252	0.673252	0.673252	0.561086	0.673252	0.673252
20	0.570250	0.520688	0.658811	0.658811	0.658811	0.658811	0.658811	0.570250	0.658811	0.658811
21	0.570362	0.526087	0.663625	0.663625	0.663625	0.663625	0.663625	0.570362	0.663625	0.663625
22	0.571391	0.566769	0.657822	0.657822	0.657822	0.657822	0.657822	0.571391	0.657822	0.657822
23	0.589246	0.552025	0.702095	0.702095	0.702095	0.702095	0.702095	0.589246	0.702095	0.702095
24	0.577973	0.524287	0.699039	0.699039	0.699039	0.699039	0.699039	0.577973	0.699039	0.699039

**Table 40**  
**Directional Split Factors by Period for Area Type 4 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.575569	0.610253	0.673042	0.673042	0.673042	0.673042	0.673042	0.575569	0.673042	0.673042
2	0.630986	0.595031	0.700152	0.700152	0.700152	0.700152	0.700152	0.630986	0.700152	0.700152
3	0.577778	0.598182	0.746839	0.746839	0.746839	0.746839	0.746839	0.577778	0.746839	0.746839
4	0.633333	0.534877	0.670424	0.670424	0.670424	0.670424	0.670424	0.633333	0.670424	0.670424
5	0.565714	0.536695	0.671335	0.671335	0.671335	0.671335	0.671335	0.565714	0.671335	0.671335
6	0.578947	0.578063	0.674962	0.674962	0.674962	0.674962	0.674962	0.578947	0.674962	0.674962
7	0.583945	0.552630	0.648408	0.648408	0.648408	0.648408	0.648408	0.583945	0.648408	0.648408
8	0.576833	0.560117	0.641352	0.641352	0.641352	0.641352	0.641352	0.576833	0.641352	0.641352
9	0.561696	0.565242	0.618170	0.618170	0.618170	0.618170	0.618170	0.561696	0.618170	0.618170
10	0.577978	0.557414	0.614752	0.614752	0.614752	0.614752	0.614752	0.577978	0.614752	0.614752
11	0.561176	0.532844	0.619975	0.619975	0.619975	0.619975	0.619975	0.561176	0.619975	0.619975
12	0.551740	0.519432	0.633283	0.633283	0.633283	0.633283	0.633283	0.551740	0.633283	0.633283
13	0.553873	0.513835	0.640984	0.640984	0.640984	0.640984	0.640984	0.553873	0.640984	0.640984
14	0.536826	0.513549	0.681756	0.681756	0.681756	0.681756	0.681756	0.536826	0.681756	0.681756
15	0.516362	0.523873	0.684541	0.684541	0.684541	0.684541	0.684541	0.516362	0.684541	0.684541
16	0.585531	0.538630	0.677560	0.677560	0.677560	0.677560	0.677560	0.585531	0.677560	0.677560
17	0.547610	0.538116	0.652837	0.652837	0.652837	0.652837	0.652837	0.547610	0.652837	0.652837
18	0.568346	0.540451	0.667133	0.667133	0.667133	0.667133	0.667133	0.568346	0.667133	0.667133
19	0.561086	0.516856	0.673252	0.673252	0.673252	0.673252	0.673252	0.561086	0.673252	0.673252
20	0.570250	0.520688	0.658811	0.658811	0.658811	0.658811	0.658811	0.570250	0.658811	0.658811
21	0.570362	0.526087	0.663625	0.663625	0.663625	0.663625	0.663625	0.570362	0.663625	0.663625
22	0.571391	0.566769	0.657822	0.657822	0.657822	0.657822	0.657822	0.571391	0.657822	0.657822
23	0.589246	0.552025	0.702095	0.702095	0.702095	0.702095	0.702095	0.589246	0.702095	0.702095
24	0.577973	0.524287	0.699039	0.699039	0.699039	0.699039	0.699039	0.577973	0.699039	0.699039

**Table 41**  
**Directional Split Factors by Period for Area Type 5 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.575569	0.610253	0.673042	0.673042	0.673042	0.673042	0.673042	0.575569	0.673042	0.673042
2	0.630986	0.595031	0.700152	0.700152	0.700152	0.700152	0.700152	0.630986	0.700152	0.700152
3	0.577778	0.598182	0.746839	0.746839	0.746839	0.746839	0.746839	0.577778	0.746839	0.746839
4	0.633333	0.534877	0.670424	0.670424	0.670424	0.670424	0.670424	0.633333	0.670424	0.670424
5	0.565714	0.536695	0.671335	0.671335	0.671335	0.671335	0.671335	0.565714	0.671335	0.671335
6	0.578947	0.578063	0.674962	0.674962	0.674962	0.674962	0.674962	0.578947	0.674962	0.674962
7	0.583945	0.552630	0.648408	0.648408	0.648408	0.648408	0.648408	0.583945	0.648408	0.648408
8	0.576833	0.560117	0.641352	0.641352	0.641352	0.641352	0.641352	0.576833	0.641352	0.641352
9	0.561696	0.565242	0.618170	0.618170	0.618170	0.618170	0.618170	0.561696	0.618170	0.618170
10	0.577978	0.557414	0.614752	0.614752	0.614752	0.614752	0.614752	0.577978	0.614752	0.614752
11	0.561176	0.532844	0.619975	0.619975	0.619975	0.619975	0.619975	0.561176	0.619975	0.619975
12	0.551740	0.519432	0.633283	0.633283	0.633283	0.633283	0.633283	0.551740	0.633283	0.633283
13	0.553873	0.513835	0.640984	0.640984	0.640984	0.640984	0.640984	0.553873	0.640984	0.640984
14	0.536826	0.513549	0.681756	0.681756	0.681756	0.681756	0.681756	0.536826	0.681756	0.681756
15	0.516362	0.523873	0.684541	0.684541	0.684541	0.684541	0.684541	0.516362	0.684541	0.684541
16	0.585531	0.538630	0.677560	0.677560	0.677560	0.677560	0.677560	0.585531	0.677560	0.677560
17	0.547610	0.538116	0.652837	0.652837	0.652837	0.652837	0.652837	0.547610	0.652837	0.652837
18	0.568346	0.540451	0.667133	0.667133	0.667133	0.667133	0.667133	0.568346	0.667133	0.667133
19	0.561086	0.516856	0.673252	0.673252	0.673252	0.673252	0.673252	0.561086	0.673252	0.673252
20	0.570250	0.520688	0.658811	0.658811	0.658811	0.658811	0.658811	0.570250	0.658811	0.658811
21	0.570362	0.526087	0.663625	0.663625	0.663625	0.663625	0.663625	0.570362	0.663625	0.663625
22	0.571391	0.566769	0.657822	0.657822	0.657822	0.657822	0.657822	0.571391	0.657822	0.657822
23	0.589246	0.552025	0.702095	0.702095	0.702095	0.702095	0.702095	0.589246	0.702095	0.702095
24	0.577973	0.524287	0.699039	0.699039	0.699039	0.699039	0.699039	0.577973	0.699039	0.699039

**Table 42**  
**Directional Split Factors by Period for Area Type 6 (Saturdays)**

Time Period	Locals	IH 10 & Freeway	Multi-lane Highway	Arterial Divided	Arterial Undivided	Arterial Divided	Arterial Undivided	Collector	Frontage Road	Ramps
1	0.640551	0.610253	0.640551	0.640551	0.640551	0.640551	0.640551	0.640551	0.640551	0.640551
2	0.677097	0.595031	0.677097	0.677097	0.677097	0.677097	0.677097	0.677097	0.677097	0.677097
3	0.690485	0.598182	0.690485	0.690485	0.690485	0.690485	0.690485	0.690485	0.690485	0.690485
4	0.658060	0.534877	0.658060	0.658060	0.658060	0.658060	0.658060	0.658060	0.658060	0.658060
5	0.636128	0.536695	0.636128	0.636128	0.636128	0.636128	0.636128	0.636128	0.636128	0.636128
6	0.655759	0.578063	0.655759	0.655759	0.655759	0.655759	0.655759	0.655759	0.655759	0.655759
7	0.626920	0.552630	0.626920	0.626920	0.626920	0.626920	0.626920	0.626920	0.626920	0.626920
8	0.619846	0.560117	0.619846	0.619846	0.619846	0.619846	0.619846	0.619846	0.619846	0.619846
9	0.599346	0.565242	0.599346	0.599346	0.599346	0.599346	0.599346	0.599346	0.599346	0.599346
10	0.602494	0.557414	0.602494	0.602494	0.602494	0.602494	0.602494	0.602494	0.602494	0.602494
11	0.600376	0.532844	0.600376	0.600376	0.600376	0.600376	0.600376	0.600376	0.600376	0.600376
12	0.606102	0.519432	0.606102	0.606102	0.606102	0.606102	0.606102	0.606102	0.606102	0.606102
13	0.611947	0.513835	0.611947	0.611947	0.611947	0.611947	0.611947	0.611947	0.611947	0.611947
14	0.633446	0.513549	0.633446	0.633446	0.633446	0.633446	0.633446	0.633446	0.633446	0.633446
15	0.628481	0.523873	0.628481	0.628481	0.628481	0.628481	0.628481	0.628481	0.628481	0.628481
16	0.646884	0.538630	0.646884	0.646884	0.646884	0.646884	0.646884	0.646884	0.646884	0.646884
17	0.617761	0.538116	0.617761	0.617761	0.617761	0.617761	0.617761	0.617761	0.617761	0.617761
18	0.634204	0.540451	0.634204	0.634204	0.634204	0.634204	0.634204	0.634204	0.634204	0.634204
19	0.635864	0.516856	0.635864	0.635864	0.635864	0.635864	0.635864	0.635864	0.635864	0.635864
20	0.629290	0.520688	0.629290	0.629290	0.629290	0.629290	0.629290	0.629290	0.629290	0.629290
21	0.632537	0.526087	0.632537	0.632537	0.632537	0.632537	0.632537	0.632537	0.632537	0.632537
22	0.629012	0.566769	0.629012	0.629012	0.629012	0.629012	0.629012	0.629012	0.629012	0.629012
23	0.664478	0.552025	0.664478	0.664478	0.664478	0.664478	0.664478	0.664478	0.664478	0.664478
24	0.658683	0.524287	0.658683	0.658683	0.658683	0.658683	0.658683	0.658683	0.658683	0.658683



## **TIME-OF-DAY CAPACITY FACTORS**

The 24-hour capacity restraint assignments are performed using nondirectional 24-hour capacities. The nondirectional capacities are included in the assignment data set which are input to PREPIN. User supplied time-of-day capacity factors are applied to the nondirectional capacity (or service volume) for the subject time period. In computing the directional V/C ratio for estimating the directional speeds, PREPIN assumes the directional split for capacity to be 50-50.

Table 43 summarizes the typical 24-hour capacities per lane used in the JOHRTS highway networks. Table 44 summarizes the estimated hourly capacities per lane used in developing the capacity factors. These capacities were developed to be consistent with the hourly capacities used in the Dallas-Fort Worth region for the application of their speed models. The capacity factors for a given time period are computed as follows:

$$\text{Capacity Factor} = \frac{(\text{Hourly Capacity per Lane})(\text{Length of the Time Period})}{24\text{-hour Capacity per Lane}}$$

The length of the time period is specified in hours. Capacity factors (stratified by area type and functional class) were computed for each of the 24 time periods.

## **FREEFLOW SPEED FACTORS**

The application of the Dallas-Fort Worth speed models requires an estimate of the freeflow speed on the link. These freeflow speed estimates are computed using the 24-hour speeds input on the link data. The freeflow speed factors (stratified by area type and functional class) are applied to the 24-hour nondirectional link speeds to estimate the freeflow speed. The freeflow speed is assumed to be the same in each direction.

Table 45 summarizes the typical 24-hour speeds used in the 1993, 1996, and 1999 JOHRTS highway networks. Table 46 summarizes the typical freeflow speed estimates used in estimating the freeflow speed factors. These freeflow speed estimates were developed to be consistent with those used in the 1990 JOHRTS emission inventories. The freeflow speed factor for a given functional class and area type is computed by dividing the freeflow speed by the 24-hour speed. These user-estimated factors are input to the PREPIN program using SPDFAC records.

**Table 43: Typical 24-Hour Capacities per Lane for the JOHRTS Network**

AREA TYPES	FUNCTIONAL CLASSES									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	-	19,893.58	17,033.33	8,538.40	6,450.00	3,600.00	5,150.97	4,704.58	8,538.40	6,300.00
2 CBD Fringe	-	19,893.58	17,033.33	7,966.38	5,800.00	6,229.17	4,728.09	4,049.87	7,966.38	6,300.00
3 Urban	-	15,762.01	15,854.44	7,516.84	5,504.44	5,490.65	4,440.21	3,923.80	8,541.48	6,300.00
4 Suburban	-	17,636.57	4,250.00	7,105.01	5,484.15	4,329.89	3,385.55	2,833.07	6,235.72	5,700.00
5 Suburban Fringe	-	12,850.00	4,100.00	6,690.3	4,950.00	3,868.26	2,923.92	2,050.00	5,050.76	5,100.00
6 Rural	-	11,412.88	3,482.00	5,943.28	4,173.26	3,395.49	2,451.15	1,840.65	4,598.58	4,500.00

**Table 44: Estimated Typical Hourly Capacities per Lane for JOHRTS Network**

AREA TYPES	FUNCTIONAL CLASSES									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	-	1,800.00	550.00	550.00	500.00	550.0	500.00	425.0	550.0	1,100.0
2 CBD Fringe	-	1,850.00	600.00	600.00	550.00	600.0	550.00	450.0	600.0	1,200.0
3 Urban	-	1,875.00	650.00	650.00	600.00	625.0	575.00	475.0	625.0	1,250.0
4 Suburban	-	1,950.00	725.00	725.00	675.00	700.0	625.00	525.0	700.0	1,400.0
5 Suburban Fringe	-	1,950.00	725.00	725.00	675.00	700.0	625.00	525.0	700.0	1,400.0
6 Rural	-	2,000.00	800.00	800.00	725.00	750.0	675.00	550.0	750.0	1,500.0

**Table 45: Average 24-Hour Speeds for the JOHRTS Network**

AREA TYPES	FUNCTIONAL CLASSES									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	10.0	38.0	37.0	19.5	15.0	14.0	14.0	14.0	33.0	34.0
2 CBD Fringe	13.3	38.0	37.3	23.2	23.0	21.5	21.5	18.9	33.0	34.0
3 Urban	15.1	39.4	38.0	24.8	23.5	24.2	22.2	21.3	33.4	34.6
4 Suburban	20.1	43.8	45.9	29.5	28.6	29.0	24.4	23.0	36.5	37.3
5 Suburban Fringe	24.2	53.5	54.2	34.5	30.5	29.7	29.7	26.8	41.1	41.6
6 Rural	29.0	55.4	54.6	37.4	33.3	32.6	32.6	30.1	44.4	46.3

**Table 46: Estimated Typical Freeflow Speeds for the JOHRTS Network**

AREA TYPES	FUNCTIONAL CLASSES									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	10.00	55.00	17.29	17.29	17.29	15.48	15.48	15.38	17.29	36.15
2 CBD Fringe	13.30	55.00	27.67	27.67	27.67	23.12	23.12	22.42	27.67	41.34
3 Urban	15.10	57.00	29.31	29.31	29.31	24.45	24.45	23.38	29.31	43.16
4 Suburban	19.90	57.00	38.10	38.10	38.10	32.35	32.35	29.87	38.10	47.55
5 Suburban Fringe	23.90	57.00	38.10	38.10	38.10	32.35	32.35	29.87	38.10	47.55
6 Rural	29.10	68.00	60.00	60.00	60.00	55.00	55.00	50.00	60.00	64.00

## SPEED MODEL PARAMETERS

In the Dallas-Fort Worth speed model implemented in the PREPIN program, the directional delay (in minutes per mile) due to congestion is computed using a volume-delay equation. The following is the general form of the volume-delay equation used in the model:

$$Delay = Min [A e^{B(\frac{V}{C})}, M]$$

where:

- Delay = Congestion delay (in minutes/mile)
- A & B = Volume-Delay Equation Coefficients (input via DELAY records into the PREPIN program)
- M = Maximum minutes of delay per mile, read from the DELAY cards
- V/C = Time-of-day directional v/c ratio

Two sets of coefficients and constraints were developed by the NCTCOG for the D-FW model: One for high-capacity facilities and one for low-capacity facilities. High-capacity facilities (usually freeways) are defined as those having a capacity exceeding 3,400 vehicles per hour (one way). The volume-delay equation parameters which were developed by the NCTCOG in late 1992 for use in the D-FW air quality analyses are presented in Table 47.

**Table 47**  
**Volume-Delay Equation Parameters**

Parameters	Parameter Values	
	High-capacity Facilities	Low-capacity Facilities
A	0.015	0.050
B	3.5	3.0
M	5.0	10.0

Because the functional classification codes used in the link data may vary from study area to study area, PREPIN requires that the user specify the desired delay equation parameters by county and functional class. For the JOHRTS gridded emission estimate applications, the high-capacity facilities parameter values in Table 47 were used for functional classes 1 and 2 (i.e., Interstate Highway 10 & Freeways and Multi-lane Highways). The low-capacity facilities parameter values in Table 47 were used for all other functional classes. The speed models are not applied to centroid connectors. Since centroid connectors represent local streets which generally relatively uncongested, it is assumed the 24-hour speed is representative of both the peak and off-peak speeds on these facilities.

Given the estimated directional delay (in minutes/mile) and the estimated freeflow speed, the directional congested speed is computed as follows:

$$\text{Congested speed} = \frac{60}{\frac{60}{\text{Freeflow speed}} + \text{Delay}}$$

These congested directional speed estimates for each link are included in the link records produced by PREPIN for subsequent input to the IMPSUM program to estimate the mobile emissions for the traffic moving at this estimated speed.

## OTHER DATA INPUTS

The remaining data inputs to the PREPIN program are:

- The 24-hour Assignment Data Set: This is the network data set produced by the Texas Assignment Package which contains the capacity restraint assignment results. The PREPIN program uses this data set to obtain the following information for each link: the link's A-node and B-node numbers, the link's functional class, link distance, the input link data speed, and the final nondirectional capacity restrained assignment volume.
- The Assignment Trip Table: This is the packed 24-hour assignment trip table data set used to produce the subject assignment. The PREPIN program uses this data set to obtain the 24-hour intrazonal trips for each zone.

- The Zonal Radii Data: These data are the zonal radii estimates used as input to the trip distribution model applications for the JOHRTS area. These zonal radii estimates are used by PREPIN to estimate the average trip length of intrazonal trips.

These data sets were developed by TxDOT for use in the JOHRTS gridded emission estimates.

### **III. ESTIMATION OF EMISSION RATES USING MOBILE5a**

The MOBILE5a program was used to compute the mobile source emission rates (or factors) for the JOHRTS gridded emission estimates. The MOBILE5a program was used directly for the computation of 24-hour diurnal emission rates. The MOBILE5a program was applied using the POLFAC5B program to estimate the emission rates by speed for each of the 24 one-hour time-of-day time periods.

The POLFAC5B program is one of a series of programs developed by the Texas Transportation Institute to facilitate the computation of mobile source emissions. The POLFAC5B program is used to apply MOBILE5a to obtain emission rates. The emission rates are obtained for eight vehicle types and 63 speeds (i.e., 3 mph through 65 mph) for each vehicle type. Hence, for each time period, there are 504 factors (i.e.,  $8 \times 63 = 504$ ) for each pollution type and county. There are three pollution types being computed: VOC, CO, and NO<sub>x</sub>. The VOC emissions are broken down further into six components: exhaust hydrocarbons, running loss hydrocarbons, resting loss hydrocarbons, crank case hydrocarbons, hot soak, and diurnal emissions. Hence, for each county and each time period there are 4,536 emission rates. These emission rates are output to an ASCII file for subsequent input to the IMPSUM program. For JOHRTS, the POLFAC5B program was applied for each of the 24 one-hour time periods for a given subject day. The emission rates from POLFAC5B are applied using the IMPSUM program to estimate emissions.

#### **ESTIMATION OF TEMPERATURES BY TIME PERIOD**

The TNRCC provided the 24-hour temperature data for the JOHRTS area. The temperatures for each of the 24 one-hour periods were computed using these data. Using these temperatures, minimum and maximum temperatures were identified to calculate diurnal emissions. Diurnal rates were computed using a separate application of MOBILE5a. Each application of MOBILE5a requires three temperature inputs: the low temperature, the high temperature and the ambient temperature. To avoid the computation of diurnals for the 24 one-hour time periods, the same temperature was input for the low, high, and ambient temperatures. Table 48 lists the temperature inputs for each of the 24 one-hour time periods and the 24-hour diurnal applications for each of the subject days. These temperatures were used for all analysis years (i.e., 1993, 1996, and 1999).

The PREPIN applications were used to develop VMT and speed estimates for the weekday,

Friday, and Saturday subject days. The weekday PREPIN applications are used in conjunction with the Tuesday, Wednesday, and Thursday POLFAC5B application to develop gridded emission estimates for the respective subject day. The Friday and Saturday PREPIN applications are used in conjunction with the respective Friday and Saturday POLFAC5B applications.



**Table 48: MOBILE5a Temperature Inputs Used for JOHRTS Gridded Emission Applications**

	MOBILE5a Temperature Inputs														
	Tuesday, 8/17/93			Wednesday, 8/18/93			Thursday, 8/19/93			Friday, 8/20/93			Saturday, 8/21/93		
	Low	High	Ambient	Low	High	Ambient	Low	High	Ambient	Low	High	Ambient	Low	High	Ambient
Time Period 1	77.6	77.6	77.6	79.4	79.4	79.4	77.7	77.7	77.7	78.0	78.0	78.0	76.0	76.0	76.0
Time Period 2	78.0	78.0	78.0	78.3	78.3	78.3	76.7	76.7	76.7	78.0	78.0	78.0	76.0	76.0	76.0
Time Period 3	77.3	77.3	77.3	78.7	78.7	78.7	76.0	76.0	76.0	77.3	77.3	77.3	76.7	76.7	76.7
Time Period 4	77.7	77.7	77.7	78.3	78.3	78.3	76.0	76.0	76.0	77.0	77.0	77.0	77.0	77.0	77.0
Time Period 5	77.3	77.3	77.3	77.3	77.3	77.3	76.0	76.0	76.0	77.0	77.0	77.0	77.0	77.0	77.0
Time Period 6	76.3	76.3	76.3	76.3	76.3	76.3	76.0	76.0	76.0	76.3	76.3	76.3	77.6	77.6	77.6
Time Period 7	78.6	78.6	78.6	77.9	77.9	77.9	78.7	78.7	78.7	78.5	78.5	78.5	79.3	79.3	79.3
Time Period 8	82.0	82.0	82.0	81.6	81.6	81.6	82.0	82.0	82.0	81.9	81.9	81.9	82.0	82.0	82.0
Time Period 9	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.6	85.6	85.6	84.3	84.3	84.3
Time Period 10	88.0	88.0	88.0	88.0	88.0	88.0	88.0	88.0	88.0	89.0	89.0	89.0	86.3	86.3	86.3
Time Period 11	90.3	90.3	90.3	91.0	91.0	91.0	90.9	90.9	90.9	91.3	91.3	91.3	87.0	87.0	87.0
Time Period 12	92.3	92.3	92.3	93.3	93.3	93.3	93.3	93.3	93.3	93.3	93.3	93.3	88.3	88.3	88.3
Time Period 13	74.3	74.3	74.3	95.3	95.3	95.3	95.3	95.3	95.3	96.0	96.0	96.0	91.0	91.0	91.0
Time Period 14	95.7	95.7	95.7	96.7	96.7	96.7	96.7	96.7	96.7	95.7	95.7	95.7	91.4	91.4	91.4
Time Period 15	96.7	96.7	96.7	97.6	97.6	97.6	97.0	97.0	97.0	93.1	93.1	93.1	87.1	87.1	87.1
Time Period 16	97.0	97.0	97.0	96.1	96.1	96.1	95.7	95.7	95.7	91.4	91.4	91.4	84.4	84.4	84.4
Time Period 17	94.4	94.4	94.4	93.7	93.7	93.7	93.0	93.0	93.0	89.8	89.8	89.8	84.6	84.6	84.6
Time Period 18	91.1	91.1	91.1	90.4	90.4	90.4	90.7	90.7	90.7	88.4	88.4	88.4	90.1	90.1	90.1
Time Period 19	87.4	87.4	87.4	86.4	86.4	86.4	86.7	86.7	86.7	86.1	86.1	86.1	85.8	85.8	85.8
Time Period 20	84.0	84.0	84.0	82.3	82.3	82.3	83.7	83.7	83.7	79.9	79.9	79.9	80.0	80.0	80.0
Time Period 21	81.7	81.7	81.7	79.7	79.7	79.7	81.1	81.1	81.1	75.0	75.0	75.0	77.0	77.0	77.0
Time Period 22	80.4	80.4	80.4	79.0	79.0	79.0	79.3	79.3	79.3	74.7	74.7	74.7	76.0	76.0	76.0
Time Period 23	80.0	80.0	80.0	78.3	78.3	78.3	79.0	79.0	79.0	75.7	75.7	75.7	76.0	76.0	76.0
Time Period 24	80.0	80.0	80.0	77.3	77.3	77.3	78.4	78.4	78.4	76.0	76.0	76.0	75.3	75.3	75.3
24-hour Diurnal	76.0	97.0	85.6	76.0	98.0	85.6	76.0	97.0	85.6	74.0	97.0	85.6	75.0	93.0	85.6

## **MOBILE5a SETUPS**

Tables 49 through 51 are the basic 1993 subject day MOBILE5a setups for Hardin County, Jefferson County, and Orange County and are shown as representative samples. Each county setup was modified for each subject day, time period, and year of analysis.

## **TEMPERATURE INPUTS**

Subject day temperature and header data were applied for each time and diurnal application. These setups were used to develop the 1993, 1996, and 1999 subject day emission rates for each of the three counties. Twenty-five applications of POLFAC5B were run for each subject day, county, and year of analysis. The three temperature inputs, the headers, and the year of analysis were the only changes made to the setups for each of the 25 applications. The three temperature inputs in each setup are highlighted in the last two lines of the input data (see Tables 49 through 51). The three different temperatures are denoted by **Lo**, **Hi**, and **Amb** to delineate between the respective low, high, and ambient temperatures input into the MOBILE5a setups. The date difference in the MOBILE5a setups are delineated by **DD**. The temperatures and header dates were the only changes made in the setups to develop the emission rates for the different time periods and the 24-hour diurnal. Temperature and header date changes are shaded in the MOBILE5a setups shown in Tables 49 through 51. The temperature inputs used for the other time periods are listed Table 48.

## **VEHICLE REGISTRATION DISTRIBUTION INPUTS**

The 1993 vehicle registration data for Hardin County, Jefferson County, and Orange County subject days were obtained from TNRCC. The same vehicle registration distribution was used for 1996 and 1999 with the exception of changing the year, either 1993, 1996, or 1999. The vehicle registration data used were the total automobiles, total motorcycles, LDGT1, LDGT2, HDGT, and HDDT vehicle types by year. The vehicle registration data for 1969 and older vehicles were summed and used as the 25 year. The percentage vehicle distributions by model year were then obtained by dividing the vehicle registration for a given year by the total vehicle registrations. The percentage vehicle distribution data were then rounded to four significant digits and summed. Residual rounding resulted in the sum of the percentage vehicle distribution being slightly smaller or greater than one. The difference between the sum and 1.0 was then added to the largest value to adjust the total percent vehicle distribution data of the rounded values to 1.0000. The distributions for total

automobiles were used for both LDGV and LDDV vehicle types. The distributions for LDGT1 were also used for the LDDV vehicle type. For motorcycles, the vehicles registered which were older than 12 years were added to the 12-year-old vehicles. This was done because MOBILE5a has zero mileage for motorcycles older than 12 years.

## **TRIP LENGTH DISTRIBUTION**

The MOBILE5a default trip length distribution was used for all analysis years.

## **VMT MIX**

The distribution of VMT by vehicle type (VMT mix) was developed from field classification counts conducted by TTI in the summer of 1993. The VMT mix varies by roadway functional classification and by weekday, Friday, and Saturday. The VMT distribution by vehicle type estimates are shown in Tables 52 through 54. The mixes were developed for 1993 and were kept constant for 1996 and 1999 with the exception that the gasoline diesel splits were adjusted separately for 1993, 1996 and 1999 based on the default gasoline diesel fractions obtained from MOBILE5a. The IMPSUM program selects the appropriate VMT distribution for each link based on the coded functional classification of the link prior to calculation of the link emissions. (A complete discussion of the derivation of the VMT mix estimates is provided in the document *Vehicle Miles Traveled Mix for Eight Vehicle Types*, TTI, October 1993.) The VMT mix estimates in the example MOBILE5a setups, Tables 49 through 50, are typically used to estimate the composite emission rates. For this analysis, these estimates are not used; and, instead, the VMT mix estimates are applied by the IMPSUM program on a link basis.

**Table 49  
Hardin County MOBILE5a Setup**

1	PROMPT		
1	Hardin County	Ozone Season 1993	Sample Flag Settings 8/DD/93
1	TAMFLG	- Default: Tampering Rates	
1	SPDFLG	- User input: one speed for all vehicle types	
3	VMFLAG	- User input: single VMT mix for all scenario	
3	MYMRFG	- User input: Reg. Distributions	
1	NEWFLG	- Basic exhaust emission rates	
1	IMFLAG	- no I/M	
1	ALHFLG	- No additional correction factors	
1	ATPFLG	- no atp	
5	RLFLAG	- Zero-out refueling emissions	
2	LOCFLG	- User input: one LAP record for all scenarios	
1	TEMFLG	- MOBILE5A calculates exhaust temperatures	
4	OUTFMT	- 80-column descriptive format	
4	PRTFLG	- Print all three pollutant emission factors	
1	IDLFLG	- No idle emissions calculated or printed	
3	NMHFLG	- Print HC = volatile organic compounds (VOC)	
1	HCFLAG	- Print total HC	
	.598.346.030.010.008.004.003.001	1990 VMT Mix	
	.0491.0828.0843.0818.0829.0728.0650.0670.0697.0645	LDGV	HARDIN 93
	.0439.0398.0375.0296.0333.0271.0198.0111.0063.0048	LDGV	
	.0041.0036.0030.0027.0137	LDGV	
	.0724.0876.0896.0765.0870.0709.0490.0563.0523.0590	LDGT1	
	.0361.0404.0389.0264.0311.0308.0216.0155.0082.0067	LDGT1	
	.0059.0069.0050.0038.0223	LDGT1	
	.1254.1231.0861.0837.0648.0443.0205.0525.0525.0689	LDGT2	
	.0361.0410.0213.0254.0295.0353.0238.0172.0115.0107	LDGT2	
	.0074.0041.0049.0016.0082	LDGT2	
	.0246.0467.0565.0418.0442.0541.0319.0221.0467.0541	HDGV	
	.0246.0713.0713.0516.0765.0639.0319.0246.0197.0147	HDGV	
	.0270.0197.0074.0098.0639	HDGV	
	.0491.0828.0843.0818.0829.0728.0650.0670.0697.0645	LDDV	
	.0439.0398.0375.0296.0333.0271.0198.0111.0063.0048	LDDV	
	.0041.0036.0030.0027.0137	LDDV	
	.0724.0876.0896.0765.0870.0709.0490.0563.0523.0590	LDDT	
	.0361.0404.0389.0264.0311.0308.0216.0155.0082.0067	LDDT	
	.0059.0069.0050.0038.0223	LDDT	
	.0000.0000.0450.0270.0180.0450.0090.0360.0991.0721	HDDV	
	.0541.0450.0541.0991.0721.1530.0270.0270.0090.0450	HDDV	
	.0090.0270.0000.0180.0090	HDDV	
	.0274.0445.0240.0205.0822.0342.0308.0719.0719.0411	MC	
	.0719.4794.0000.0000.0000.0000.0000.0000.0000.0000	MC	
	.0000.0000.0000.0000.0000	MC	
	Hardin 8/DD/93	LO. HI. 8.0 7.1 92	LAP rec: 1993 TEMPS
	1 93 XXXX AMB 20.6 27.3 20.6 7		SCN rec: 1993 AMB TEMP

**Table 50**  
**Jefferson County MOBILE5a Setup**

1	PROMPT	
1	JEFFERSON COUNTY Ozone Season 1993	Sample Flag Settings 8/DD/93
1	TAMFLG	- Default: Tampering Rates
1	SPDFLG	- User input: one speed for all vehicle types
3	VMFLAG	- User input: single VMT mix for all scenario
3	MYMRFG	- User input: Reg. Distributions
1	NEWFLG	- Basic exhaust emission rates
1	IMFLAG	- no I/M
1	ALHFLG	- No additional correction factors
1	ATPFLG	- no atp
5	RLFLAG	- Zero-out refueling emissions
2	LOCFLG	- User input: one LAP record for all scenarios
1	TEMFLG	- MOBILE5A calculates exhaust temperatures
4	OUTFMT	- 80-column descriptive format
4	PRTFLG	- Print all three pollutant emission factors
1	IDLFLG	- No idle emissions calculated or printed
3	NMHFLG	- Print HC = volatile organic compounds (VOC)
1	HCFLAG	- Print total HC
	.584.237.065.036.008.004.063.003	1990 VMT Mix
	.0588.0746.0809.0760.0781.0736.0680.0654.0674.0657	LDGV JEFFERSON 93
	.0432.0399.0377.0306.0340.0285.0222.0120.0066.0057	LDGV
	.0056.0044.0032.0032.0147	LDGV
	.0640.0834.0872.0764.0827.0689.0551.0594.0577.0594	LDGT1
	.0370.0440.0384.0252.0314.0282.0235.0161.0072.0088	LDGT1
	.0074.0068.0054.0051.0213	LDGT1
	.0908.1100.0776.0664.0776.0614.0294.0572.0654.0664	LDGT2
	.0418.0415.0316.0231.0368.0281.0286.0211.0122.0080	LDGT2
	.0080.0042.0017.0027.0080	LDGT2
	.0607.0675.0616.0607.0546.0529.0334.0373.0525.0542	HDGV
	.0334.0473.0468.0382.0516.0490.0356.0156.0299.0243	HDGV
	.0195.0134.0095.0104.0399	HDGV
	.0588.0746.0809.0760.0781.0736.0680.0654.0674.0657	LDDV
	.0432.0399.0377.0306.0340.0285.0222.0120.0066.0057	LDDV
	.0056.0044.0032.0032.0147	LDDV
	.0640.0834.0872.0764.0827.0689.0551.0594.0577.0594	LDDT
	.0370.0440.0384.0252.0314.0282.0235.0161.0072.0088	LDDT
	.0074.0068.0054.0051.0213	LDDT
	.0119.0227.0811.0584.0346.0514.0643.0554.0752.0653	HDDV
	.0396.0534.0832.0603.0663.0406.0287.0119.0227.0198	HDDV
	.0168.0089.0069.0099.0109	HDDV
	.0311.0502.0300.0290.0559.0492.0394.0849.0808.0466	MC
	.0751.4278.0000.0000.0000.0000.0000.0000.0000.0000	MC
	.0000.0000.0000.0000.0000	MC
	Jefferson 8/DD/93	Lb. Hi. 08.0 07.1 92 LAP rec: 1993 TEMPS
	1 93 XXXX Am.b 20.6 27.3 20.6 7	SCN rec: 1993 AMB TEMP

**Table 51  
Orange County MOBILE5a Setup**

1	PROMPT		
1	Orange County	Ozone Season 1993	Sample Flag Settings 8/DD/93
1	TAMFLG	- Default: Tampering Rates	
1	SPDFLG	- User input: one speed for all vehicle types	
3	VMFLAG	- User input: single VMT mix for all scenario	
3	MYMRFG	- User input: Reg. Distributions	
1	NEWFLG	- Basic exhaust emission rates	
1	IMFLAG	- no I/M	
1	ALHFLG	- No additional correction factors	
1	ATPFLG	- no atp	
5	RLFLAG	- Zero-out refueling emissions	
2	LOCFLG	- User input: one LAP record for all scenarios	
1	TEMFLG	- MOBILE5A calculates exhaust temperatures	
4	OUTFMT	- 80-column descriptive format	
4	PRTFLG	- Print all three pollutant emission factors	
1	IDLFLG	- No idle emissions calculated or printed	
3	NMHFLG	- Print HC = volatile organic compounds (VOC)	
1	HCFLAG	- Print total HC	
	.584.237.065.036.008.004.063.003		1990 VMT Mix
	.0418.0717.0791.0755.0781.0778.0637.0691.0673.0691	LDGV	ORANGE 93
	.0457.0412.0404.0339.0376.0293.0225.0131.0070.0052	LDGV	
	.0053.0042.0030.0024.0162	LDGV	
	.0434.0742.0820.0755.0759.0652.0515.0588.0618.0595	LDGT1	
	.0407.0475.0439.0281.0399.0356.0267.0191.0097.0088	LDGT1	
	.0069.0077.0058.0060.0258	LDGT1	
	.0802.0961.0751.0630.0837.0521.0298.0682.0716.0648	LDGT2	
	.0418.0481.0287.0201.0401.0292.0298.0298.0120.0097	LDGT2	
	.0097.0052.0017.0011.0080	LDGT2	
	.0185.0253.0489.0405.0523.0371.0169.0506.0506.0676	HDGV	
	.0354.0388.0641.0624.0641.0590.0438.0354.0388.0270	HDGV	
	.0185.0135.0152.0253.0506	HDGV	
	.0418.0717.0791.0755.0781.0778.0637.0691.0673.0691	LDDV	
	.0457.0412.0404.0339.0376.0293.0225.0131.0070.0052	LDDV	
	.0053.0042.0030.0024.0162	LDDV	
	.0434.0742.0820.0755.0759.0652.0515.0588.0618.0595	LDDT	
	.0407.0475.0439.0281.0399.0356.0267.0191.0097.0088	LDDT	
	.0069.0077.0058.0060.0258	LDDT	
	.0043.0170.0298.0638.0170.0170.0128.0426.1021.0809	HDDV	
	.0255.0340.1490.0809.0809.0851.0340.0298.0043.0128	HDDV	
	.0255.0255.0043.0170.0043	HDDV	
	.0391.0265.0321.0349.0433.0391.0531.0894.0642.0489	MC	
	.0461.4831.0000.0000.0000.0000.0000.0000.0000.0000	MC	
	.0000.0000.0000.0000.0000	MC	
	Orange 8/DD/93	LO: HI: 08.0 07.1 92	LAP rec: 1993 TEMPS
	1 93 XXXX AM: B 20.6 27.3 20.6 7		SCN rec: 1993 AMB TEMP

**Table 52**  
**JOHRTS 1993 Weekday VMT MIX**

Roadway Type	Vehicle Type							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Local	0.566	0.251	0.082	0.036	0.004	0.004	0.056	0.001
Interstate Hwy/Fwy	0.543	0.185	0.069	0.076	0.004	0.003	0.119	0.001
Multilane Highways	0.566	0.251	0.082	0.036	0.004	0.004	0.056	0.001
Principal Div. Art.	0.514	0.289	0.075	0.044	0.004	0.004	0.069	0.001
Prin. Undiv. Art.	0.514	0.289	0.075	0.044	0.004	0.004	0.069	0.001
Minor Div. Art.	0.514	0.289	0.075	0.044	0.004	0.004	0.069	0.001
Minor Undiv. Art.	0.514	0.289	0.075	0.044	0.004	0.004	0.069	0.001
Collectors	0.514	0.289	0.075	0.044	0.004	0.004	0.069	0.001
Frontage Roads	0.514	0.289	0.075	0.044	0.004	0.004	0.069	0.001
Ramps	0.514	0.289	0.075	0.044	0.004	0.004	0.069	0.001
Intrazonal	0.566	0.251	0.082	0.036	0.004	0.004	0.056	0.001

**Table 53**  
**JOHRTS 1993 Friday VMT MIX**

Roadway Type	Vehicle Type							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Local	0.561	0.268	0.082	0.031	0.004	0.004	0.049	0.001
Interstate Hwy/ Fwy	0.504	0.172	0.074	0.095	0.004	0.002	0.148	0.001
Multilane Highways	0.526	0.296	0.077	0.036	0.004	0.004	0.056	0.001
Principal Div. Art.	0.526	0.296	0.077	0.036	0.004	0.004	0.056	0.001
Prin. Undiv. Art.	0.526	0.296	0.077	0.036	0.004	0.004	0.056	0.001
Minor Div. Art.	0.526	0.296	0.077	0.036	0.004	0.004	0.056	0.001
Minor Undiv. Art.	0.526	0.296	0.077	0.036	0.004	0.004	0.056	0.001
Collectors	0.561	0.268	0.082	0.031	0.004	0.004	0.049	0.001
Frontage Roads	0.526	0.296	0.077	0.036	0.004	0.004	0.056	0.001
Ramps	0.526	0.296	0.077	0.036	0.004	0.004	0.056	0.001
Intrazonal	0.561	0.268	0.082	0.031	0.004	0.004	0.049	0.001

**Table 54**  
**JOHRTS 1993 Saturday VMT MIX**

Roadway Type	Vehicle Type							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Local	0.574	0.273	0.080	0.025	0.004	0.004	0.039	0.001
Interstate Hwy/Fwy	0.559	0.191	0.066	0.069	0.004	0.003	0.107	0.001
Multilane Highways	0.553	0.311	0.080	0.018	0.004	0.004	0.029	0.001
Principal Div. Art.	0.553	0.311	0.080	0.018	0.004	0.004	0.029	0.001
Prin. Undiv. Art.	0.553	0.311	0.080	0.018	0.004	0.004	0.029	0.001
Minor Div. Art.	0.553	0.311	0.080	0.018	0.004	0.004	0.029	0.001
Minor Undiv. Art.	0.553	0.311	0.080	0.018	0.004	0.004	0.029	0.001
Collectors	0.574	0.273	0.080	0.025	0.004	0.004	0.039	0.001
Frontage Roads	0.553	0.311	0.080	0.018	0.004	0.004	0.029	0.001
Ramps	0.553	0.311	0.080	0.018	0.004	0.004	0.029	0.001
Intrazonal	0.574	0.273	0.080	0.025	0.004	0.004	0.039	0.001

**Table 55**  
**JOHRTS 1996 Weekday VMT MIX**

Roadway Type	Vehicle Type							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Local	0.568	0.253	0.082	0.036	0.002	0.002	0.056	0.001
Interstate Hwy/Fwy	0.546	0.186	0.069	0.076	0.002	0.001	0.119	0.001
Multilane Highways	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Principal Div. Art.	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Prin. Undiv. Art.	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Minor Div. Art.	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Minor Undiv. Art.	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Collectors	0.568	0.253	0.082	0.036	0.002	0.002	0.056	0.001
Frontage Roads	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Ramps	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Intrazonal	0.568	0.253	0.082	0.036	0.002	0.002	0.056	0.001



**Table 56**  
**JOHRTS 1996 Friday VMT MIX**

Roadway Type	Vehicle Type							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Local	0.563	0.270	0.082	0.031	0.002	0.002	0.049	0.001
Interstate Hwy/Fwy	0.506	0.173	0.074	0.095	0.002	0.001	0.148	0.001
Multilane Highways	0.528	0.298	0.077	0.036	0.002	0.002	0.056	0.001
Principal Div. Art.	0.528	0.298	0.077	0.036	0.002	0.002	0.056	0.001
Prin. Undiv. Art.	0.528	0.298	0.077	0.036	0.002	0.002	0.056	0.001
Minor Div. Art.	0.528	0.298	0.077	0.036	0.002	0.002	0.056	0.001
Minor Undiv. Art.	0.528	0.298	0.077	0.036	0.002	0.002	0.056	0.001
Collectors	0.563	0.270	0.082	0.031	0.002	0.002	0.049	0.001
Frontage Roads	0.528	0.298	0.077	0.036	0.002	0.002	0.056	0.001
Ramps	0.528	0.298	0.077	0.036	0.002	0.002	0.056	0.001
Intrazonal	0.563	0.270	0.082	0.031	0.002	0.002	0.049	0.001

**Table 57**  
**JOHRTS 1996 Saturday VMT MIX**

Roadway Type	Vehicle Type							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Local	0.576	0.275	0.080	0.025	0.002	0.002	0.039	0.001
Interstate Hwy/Fwy	0.562	0.192	0.066	0.069	0.002	0.001	0.107	0.001
Multilane Highways	0.555	0.313	0.080	0.018	0.002	0.002	0.029	0.001
Principal Div. Art.	0.555	0.313	0.080	0.018	0.002	0.002	0.029	0.001
Prin. Undiv. Art.	0.555	0.313	0.080	0.018	0.002	0.002	0.029	0.001
Minor Div. Art.	0.555	0.313	0.080	0.018	0.002	0.002	0.029	0.001
Minor Undiv. Art.	0.555	0.313	0.080	0.018	0.002	0.002	0.029	0.001
Collectors	0.576	0.275	0.080	0.025	0.002	0.002	0.039	0.001
Frontage Roads	0.555	0.313	0.080	0.018	0.002	0.002	0.029	0.001
Ramps	0.555	0.313	0.080	0.018	0.002	0.002	0.029	0.001
Intrazonal	0.576	0.275	0.080	0.025	0.002	0.002	0.039	0.001

**Table 58**  
**JOHRTS 1999 Weekday VMT MIX**

Roadway Type	Vehicle Type							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Local	0.568	0.253	0.082	0.036	0.002	0.002	0.056	0.001
Interstate Hwy/Fwy	0.546	0.186	0.069	0.076	0.002	0.001	0.119	0.001
Multilane Highways	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Principal Div. Art.	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Prin. Undiv. Art.	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Minor Div. Art.	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Minor Undiv. Art.	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Collectors	0.568	0.253	0.082	0.036	0.002	0.002	0.056	0.001
Frontage Roads	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Ramps	0.516	0.291	0.075	0.044	0.002	0.002	0.069	0.001
Intrazonal	0.568	0.253	0.082	0.036	0.002	0.002	0.056	0.001

**Table 59**  
**JOHRTS 1999 Friday VMT MIX**

Roadway Type	Vehicle Type							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Local	0.564	0.270	0.082	0.031	0.001	0.002	0.049	0.001
Interstate Hwy/Fwy	0.507	0.173	0.074	0.095	0.001	0.001	0.148	0.001
Multilane Highways	0.529	0.298	0.077	0.036	0.001	0.002	0.056	0.001
Principal Div. Art.	0.529	0.298	0.077	0.036	0.001	0.002	0.056	0.001
Prin. Undiv. Art.	0.529	0.298	0.077	0.036	0.001	0.002	0.056	0.001
Minor Div. Art.	0.529	0.298	0.077	0.036	0.001	0.002	0.056	0.001
Minor Undiv. Art.	0.529	0.298	0.077	0.036	0.001	0.002	0.056	0.001
Collectors	0.564	0.270	0.082	0.031	0.001	0.002	0.049	0.001
Frontage Roads	0.529	0.298	0.077	0.036	0.001	0.002	0.056	0.001
Ramps	0.529	0.298	0.077	0.036	0.001	0.002	0.056	0.001
Intrazonal	0.564	0.270	0.082	0.031	0.001	0.002	0.049	0.001

**Table 60**  
**JOHRTS 1999 Saturday VMT MIX**

Roadway Type	Vehicle Type							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Local	0.577	0.275	0.080	0.025	0.001	0.002	0.039	0.001
Interstate Hwy/Fwy	0.563	0.192	0.066	0.069	0.001	0.001	0.107	0.001
Multilane Highways	0.556	0.313	0.080	0.018	0.001	0.002	0.029	0.001
Principal Div. Art.	0.556	0.313	0.080	0.018	0.001	0.002	0.029	0.001
Prin. Undiv. Art.	0.556	0.313	0.080	0.018	0.001	0.002	0.029	0.001
Minor Div. Art.	0.556	0.313	0.080	0.018	0.001	0.002	0.029	0.001
Minor Undiv. Art.	0.556	0.313	0.080	0.018	0.001	0.002	0.029	0.001
Collectors	0.577	0.275	0.080	0.025	0.001	0.002	0.039	0.001
Frontage Roads	0.556	0.313	0.080	0.018	0.001	0.002	0.029	0.001
Ramps	0.556	0.313	0.080	0.018	0.001	0.002	0.029	0.001
Intrazonal	0.577	0.275	0.080	0.025	0.001	0.002	0.039	0.001



## IV. EMISSION ESTIMATES

The PREPIN applications were used to develop VMT and speed estimates for the weekday, Friday, and Saturday subject days for each subject year. The weekday VMT and speed estimates were used in conjunction with the Tuesday, Wednesday, and Thursday emission rates, developed with the POLFAC5B application, to develop gridded emission estimates for the respective subject day. The Friday and Saturday VMT and speed estimates were used in conjunction with the respective Friday and Saturday emission rates, developed with the POLFAC5B application, to develop gridded emission estimates for the respective subject day. VMTSUM outputs the VMT by time period for each of the counties. The VMT by time period for each of the counties is used by IMPSUM to incorporate diurnal emissions into the gridded emission estimates. IMPSUM applies the emission rates, developed using POLFAC5B, on a link-by-link basis to obtain the gridded emission estimates by time period. SUMALL was used to sum all of the 24 one-hour gridded emission estimates to calculate a 24-hour gridded emission estimate. The following provides a more detailed discussion of the method used to estimate the time-of-day emissions and the method used to develop the 24-hour emission estimates.

### ESTIMATION OF GRIDDED TIME-OF-DAY EMISSIONS

For a given subject day, the gridded mobile source emissions for each of the 24 one-hour time periods were computed using the IMPSUM program. The IMPSUM program is one of a series of programs developed by the Texas Transportation Institute to facilitate the computation of emissions. The IMPSUM program uses emission factors obtained from POLFAC5B, the user-estimated VMT mixes, and the VMT/speed estimates to compute the emissions by county. The software used for these procedures is described in Research Report 1279-9, *Texas Mobile Source Emissions Software Version 2.0: User's Manual*.

The basic inputs for the gridded emission applications of IMPSUM for JOHRTS were:

1. Data specifying the number of counties in the region and their names.
2. The names of the road types used in the study. These road types are used to summarize the emission results. The roadway types used in the gridded emission estimates are the functional classes used in the networks.
3. VMT mix by county used in the MOBILE5a setups.

4. Emission factors from POLFAC5B by county.
5. Specification of the units for reporting emissions (grams, pounds or tons).
6. Link records providing the estimated VMT and speeds. For each link record, the following information must be provided: county number, road type number, VMT estimate, operational speed estimate, and center line miles. These data were prepared using the PREPIN program.
7. Coordinates for nodes and zones, for calculation of gridded emission.

The emission rates produced using MOBILE5a are stratified by eight vehicle types. To apply the emission rates, VMT for a link record is disaggregated by the eight vehicle types applying the user-supplied VMT mixes. The software allows the user to input the VMT mix data by county and by roadway type.

The user-supplied VMT mixes were developed from field data collected during the summer of 1993. VMT mixes were developed by functional classes by the respective subject emission day. Similarities in VMT mix between functional classes (such as between principal arterials and other arterials or between locals and collectors) allowed the VMT mix data to be aggregated across functional classes to make the best use of the available data. Using the same logic, similarities in VMT mix between counties allowed the VMT mix data to be aggregated across counties. The aggregated functional classes consist of freeway, principal arterials and other arterials, and collector/locals. Tables 62 through 64 present the VMT mixes by aggregated functional class and subject emission day.

**Table 61**  
**VMT Mix for Freeways**

Subject Emission Day	Vehicle Types							
	LDGV	LDGT1	LDGT2	HDTV	LDDV	LDDT	HDDV	MC
Weekday	0.559	0.191	0.066	0.069	0.004	0.003	0.107	0.001
Friday	0.585	0.200	0.068	0.054	0.004	0.003	0.085	0.001
Saturday	0.543	0.185	0.069	0.076	0.004	0.003	0.119	0.001
Sunday	0.504	0.172	0.074	0.095	0.004	0.002	0.148	0.001

**Table 62**  
**VMT Mix for Arterials, Principal and Other**

Subject Emission Day	Vehicle Types							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Weekday	0.514	0.289	0.075	0.044	0.004	0.004	0.069	0.001
Friday	0.526	0.296	0.077	0.036	0.004	0.004	0.056	0.001
Saturday	0.553	0.311	0.080	0.018	0.004	0.004	0.029	0.001
Sunday	0.559	0.314	0.080	0.015	0.004	0.004	0.023	0.001

**Table 63**  
**VMT Mix for Collectors/Locals**

Subject Emission Day	Vehicle Types							
	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
Weekday	0.566	0.251	0.082	0.036	0.004	0.004	0.056	0.001
Friday	0.561	0.268	0.082	0.031	0.004	0.004	0.049	0.001
Saturday	0.574	0.273	0.080	0.025	0.004	0.004	0.039	0.001
Sunday	0.582	0.277	0.079	0.021	0.004	0.004	0.032	0.001

The aggregated VMT mixes were applied in the IMPSUM model using the respective network functional classes shown in Table 65.

**Table 64**  
**VMT Mix Functional Classification Equivalences**

Aggregated Functional Classes	Network Functional Classes
1. Freeways	1. Interstate Highways & Freeways
2. Arterials, Principal and Other	2. Multi-lane Highways 3. Principal Divided Arterials 4. Principal Undivided Arterials 5. Minor Divided Arterials 6. Minor Undivided Arterials 8. Frontage Roads 9. Ramps
3. Collectors/Locals	0. Locals 7. Collectors 16. Intrazonals

The emission estimates are computed for each link by multiplying the appropriate emission factors corresponding to the link's roadway type and the link's estimated speed. For non-integer speed estimates, the emission factors are computed by interpolating between the emission factors for the integer speeds on either side of the subject speed. The interpolation is performed using the reciprocals of the corresponding speeds rather than the speeds themselves. The emission results are accumulated for each county by vehicle type and roadway type.

The 24-hour diurnal emission rates were scaled to the one-hour time periods in which diurnal emissions occurred. Diurnal emissions occur due to temperature rises. However, there is a two-hour lag between when the temperature rise occurs and when the resulting diurnal occurs. The one-hour time periods in which diurnals occur were identified when the temperature data were processed for input into POLFAC5B. To appropriately scale the 24-hour diurnal emission rates, it was necessary to calculate the VMT occurring in each of the 24 one-hour time periods for each county. VMTSUM calculated the VMT by time period for each of the counties. The VMT by time period for each of the counties and the relative temperature rise was used by IMPSUM to scale the 24-hour diurnal emission rates and combine the diurnal emission rates into the VOC emission rates for the respective county and one-hour time period.



The gridded emission estimates by each of the 24 one-hour time periods and the five subject days were completed using IMPSUM. The gridded emission estimates for each of the 24 one-hour time periods for August 17-21, 1993, were included in the transmittal to TNRCC on Friday, August 19, 1994. The 1996 and 1999 gridded emission estimates were transmitted to TNRCC in August 1995. Gridded emission estimates were provided for VOC, CO, NO<sub>x</sub>, exhaust hydrocarbons, running loss hydrocarbons, resting loss hydrocarbons, crank case hydrocarbons, hot soak, and diurnal emissions.

### **ESTIMATION OF 24-HOUR GRIDDED EMISSIONS**

For JOHRTS applications, the PREPIN, POLFAC5B, and IMPSUM programs were applied to estimate the gridded mobile source emissions for each of the 24 one-hour time periods for each subject day. Twenty-four hour diurnal emission rates for each of the subject days and counties were computed using the individual applications of MOBILE5a. IMPSUM was executed to produce gridded emission estimates for each one-hour time period for each of the five subject days. SUMALL was executed to produce gridded emission estimates for each one-hour time period for August 17-21, 1993.

The SUMALL program is a utility program used to compute the 24-hour gridded emission estimates for JOHRTS. The SUMALL program is a utility program designed to sum the results from two or more IMPSUM applications (i.e., the time-of-day applications). The SUMALL program also provides the option of calculating the 24-hour diurnal emission estimates. The diurnal estimates can be combined with the time-of-day estimates (which exclude diurnals) to obtain the 24-hour emission estimates using SUMALL. The 24-hour tabular summaries produced by the SUMALL program are essentially the same as those produced for the individual time-of-day time periods by IMPSUM program.

MOBILE5a is not structured to compute diurnal emissions for less than a 24-hour time period; therefore, a separate run of POLFAC5B was made to calculate the diurnal emissions for each application year and season. Diurnal emissions are produced by LDGV, LDGT1, LDGT, HDGV, and MC vehicle types. Diesel vehicle types do not produce diurnal emissions. Multiple diurnal emissions are produced by LDGV, LDGT1, LDGT2, and HDGV. POLFAC5B produces diurnal emission rates on a vehicles per mile basis by vehicle type.

The 24-hour gridded emission estimates for the five subject days were completed using SUMALL. The VOC, CO, and NOx emissions for each of the three JOHRTS counties are summarized for each of the subject days in Table 66, Table 67, and Table 68 for the years 1993, 1996, and 1999, respectively. The gridded emission estimates for each of the 24 one-hour time periods for August 17-21, 1993 were included in the transmittal to TNRCC on Friday, August 19, 1994; and the 1996 and 1999 gridded emission estimates were electronically transmitted to TNRCC in August 1995. Gridded emission estimates were provided for VOC, CO, NOx, exhaust hydrocarbons, running loss hydrocarbons, resting loss hydrocarbons, crank case hydrocarbons, hot soak, and diurnal emissions.

**Table 65**  
**Summary of 1993 Emissions by Subject Day (Pounds)**

	Jefferson			Orange			Hardin		
	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Aug. 17, 1993	31,786	369,783	60,326	12,253	155,354	25,490	1,084	13,383	2,574
Aug. 18, 1993	34,409	369,301	60,350	13,345	155,120	25,501	1,191	13,366	2,575
Aug. 19, 1993	34,336	369,155	60,342	13,317	155,066	25,498	1,188	13,362	2,574
Aug. 20, 1993	37,237	399,290	68,015	14,372	166,741	28,889	1,281	14,329	2,776
Aug. 21, 1993	27,423	300,709	47,098	10,769	128,079	20,101	1,128	12,865	2,226

**Table 66**  
**Summary of 1996 Emissions by Subject Day (Pounds)**

	Jefferson			Orange			Hardin		
	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Aug. 17, 1996	29,172	286,517	54,547	10,451	117,328	24,382	3,970	39,093	8,655
Aug. 18, 1996	29,210	286,272	54,554	10,463	117,205	24,386	3,978	39,063	8,656
Aug. 19, 1996	29,123	286,197	54,551	10,432	117,181	24,385	3,964	39,056	8,656
Aug. 20, 1996	31,950	315,131	59,590	11,315	126,923	26,631	4,341	42,750	9,557
Aug. 21, 1996	23,414	237,265	48,009	8,691	101,256	21,857	3,888	39,583	9,052

**Table 67**  
**Summary of 1999 Emissions by Subject Day (Pounds)**

	Jefferson			Orange			Hardin		
	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Aug. 17, 1999	27,467	258,078	50,971	9,575	98,497	22,278	3,559	32,588.8	7,818
Aug. 18, 1999	27,519	257,939	50,969	9,594	98,431	22,278	3,568	32,573	7,818
Aug. 19, 1999	27,786	257,885	50,969	9,709	98,412	22,278	3,611	32,568	7,718
Aug. 20, 1999	30,606	285,883	55,638	10,573	107,304	24,305	3,967	35,858	8,620
Aug. 21, 1999	22,033	214,571	44,731	7,972	85,587	19,937	3,497	33,378	8,157

**APPENDICES**

Appendices A, B, and C include the SUMALL runs for the JORHTS analysis for 1993, 1996, and 1999. Due to the large size of the appendices, they are provided on computer disk in WordPerfect 6.1 format. The SUMALL runs include VMT, vehicle hours, average operational speed, pounds of VOC, pounds of CO, and pounds of NOx for 24-hour periods by day of analysis (i.e., Tuesday through Saturday), county, roadway classification, vehicle type and year. All county SUMALL runs are also included.



**APPENDIX A:**  
**JOHRTS 1993 SUMALL RUNS**



Appendix A includes the SUMALL runs for the JORHTS analysis for 1993. Due to the large size of the appendix, it is available on computer disk in WordPerfect 6.1 format. The SUMALL runs include VMT, vehicle hours, average operational speed, pounds of VOC, pounds of CO, and pounds of NOx for 24-hour periods by day of analysis (i.e., Tuesday through Saturday), county, roadway classification, vehicle type and year. All county SUMALL runs are also included.





**APPENDIX B:**  
**JOHRTS 1996 SUMALL RUNS**



Appendix B includes the SUMALL runs for the JORHTS analysis for 1996. Due to the large size of the appendix, it is available on computer disk in WordPerfect 6.1 format. The SUMALL runs include VMT, vehicle hours, average operational speed, pounds of VOC, pounds of CO, and pounds of NOx for 24-hour periods by day of analysis (i.e., Tuesday through Saturday), county, roadway classification, vehicle type and year. All county SUMALL runs are also included.



**APPENDIX C:**  
**JOHRTS 1999 SUMALL RUNS**



Appendix C includes the SUMALL runs for the JORHTS analysis for 1999. Due to the large size of the appendix, it is available on computer disk in WordPerfect 6.1 format. The SUMALL runs include VMT, vehicle hours, average operational speed, pounds of VOC, pounds of CO, and pounds of NOx for 24-hour periods by day of analysis (i.e., Tuesday through Saturday), county, roadway classification, vehicle type and year. All county SUMALL runs are also included.

