

Report FY 2009-4

2008 Vehicle Occupancy Report

A report of the 2008 Vehicle Occupancy Survey's results.

Des Moines Area Metropolitan Planning Organization
February 19, 2009

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1 Introduction

1.1 PURPOSE

A vehicle occupancy survey's purpose is to determine the average number of persons per vehicle. Vehicle occupancy data offers a quantifiable performance measure to the Des Moines Area Metropolitan Planning Organization's Congestion Management System (CMS). The CMS is a management system required by the Federal Highway Administration (FHWA) for Transportation Management Areas, metropolitan areas with a population exceeding 200,000 persons¹.

Numerous governmental regulations support the need for vehicle occupancy information, including the joint FHWA and Federal Transit Administration (FTA) guidance on the CMP², Title 23 of the U.S. Code of Federal Regulations³, and the Clean Air Act Amendments of 1990. Transportation planners use vehicle occupancy data for planning and for evaluating travel demand management programs. Increasing vehicle occupancy during peak travel periods offers a potentially low-cost solution to a number of transportation problems, including traffic congestion, energy consumption, and air pollution. Increased vehicle occupancy through carpooling, vanpooling, and transit usage may reduce the need for capital-intensive roadway system improvements by increasing the number of people who can travel on the existing transportation system. Increased vehicle occupancy also may result in economic benefits to commuters and to employers, and may improve air quality throughout the metropolitan area⁴.

The *2008 Vehicle Occupancy Report* will review the methodology of the 2008 Vehicle Occupancy Survey, will analyze and summarize the 2008 Vehicle Occupancy Survey results, and will compare the 2008 Vehicle Occupancy Survey data to vehicle occupancy data collected in previous years.

¹ National Archives and Records Administration, *Code of Federal Regulations*, Title 23: Highways, Part 450: Congestion Management and Operating Systems.

² U.S. Department of Transportation, *An Interim Guidebook on the Congestion Management Process in Metropolitan Transportation Planning*, February 2008.

³ National Archives and Records Administration, *Code of Federal Regulations*, Title 23: Highways, Part 500: Management and Operating Systems.

⁴ Sisinnio Concas and Philop Winteres, *Impact of Carpooling on Trip-Chaining Behavior and Emission Reductions*, 2007.

1.2 BACKGROUND

The DMAMPO conducted the 2008 Vehicle Occupancy Survey between October 14, 2008, and October 29, 2008. The DMAMPO conducted its first vehicle occupancy survey in October 2007. Historic vehicle occupancy data for the Des Moines metropolitan area is available from the U.S. Department of Transportation's 2001 National Household Travel Survey (NHTS) DMAMPO Add-on Program.

2 Data Collection

2.1 METHODOLOGY

The DMAMPO staff used a roadside windshield survey to collect data for the survey. The DMAMPO staff's research found the roadside windshield survey to be the most common, simplest, and most reliable method for collecting vehicle occupancy data⁵. The roadside windshield survey consists of stationing an observer(s) at a defined point on the roadside to count and to record the number of vehicles and the number of vehicle occupants passing the observation point. The roadside windshield survey does not require any special, expensive, or high-technology equipment, and a high sampling percentage can normally be obtained.

The DMAMPO staff served as the survey's observers. Observers used preprinted forms, a writing utensil, and a watch for counting and for recording all vehicles and vehicle occupants passing the observer during the designated AM and PM peak times. Appendix A contains a sample form used by DMAMPO staff to record vehicle occupancy data.

For each of the count locations, observers collected vehicle occupancy and vehicle classification data (passenger car, truck, and bus) for one direction of travel in fifteen-minute increments for one-hour. Observers used the following parameters in collecting and in tabulating data:

- Placed count locations along major travel routes such as principal or minor arterial;
- Focused on occupancy rates for work trips, performing the survey during the AM (7:15-8:15) and the PM (4:15-5:15) peak periods when most people commute to and from work;
- Conducted surveys on Tuesdays, Wednesdays, and Thursdays. The 2001 NHTS DMAMPO Add-on Program data indicated these three days represented "typical" traveling days of Des Moines metropolitan area

⁵ Office of Highway Information Management, Federal Highway Administration, *Improved Vehicle Occupancy Data Collection Methods*, April 1997.

households. According to the NHTS data, Tuesday had the highest percentage of vehicle trips per day (17%); Wednesday fell in the middle of all days in the week for percentage of vehicle trips per day (13%); and Thursday had the lowest percentage of vehicle trips per day (12%). The NHTS data indicated October had the second-highest percentage of vehicle trips (10 %). With this NHTS finding, the DMAMPO determined October to be a highly suitable month for conducting a vehicle occupancy survey⁶.

- Classified vehicle types by passenger car, truck, and bus, and also documented pedestrians and bicyclists to better understand travel characteristics;
- Counted trucks and buses, but not the number of occupants in those trucks and buses; and,
- Calculated vehicle occupancy rates only for passenger cars.

The DMAMPO staff did a literature review for vehicle occupancy survey design. The literature review indicated that, for a metropolitan/regional survey, the number of roadway sites sampled should be a function of data collection costs, of the total number of roadway segments in the metropolitan area's transportation system, and of the desired confidence level for the calculated average vehicle occupancy (AVO)⁷.

2.2 SURVEY LOCATIONS

The DMAMPO staff conducted vehicle occupancy studies at 12 locations within the Des Moines metropolitan area. These locations include the 10 location used in the 2007 Vehicle Occupancy Survey, as well as two additional locations (Ashworth Road and Martin Luther King, Jr. Parkway). Table 2.1 and Table 2.2 summarize details about the locations, and Figures 2.1 – 2.4 provide additional information about each location's relationship to the metropolitan area.

⁶ 2001 National Household Travel Survey Add-On Program: Des Moines Metropolitan Planning Organization Final Report and Data Codebook

⁷ Office of Highway Information Management, Federal Highway Administration, *Improved Vehicle Occupancy Data Collection Methods*, April 1997.

TABLE 2.1 Vehicle Occupancy Survey Locations

No.	Location	City	Lanes ⁸	Date Surveyed	Day Surveyed	Travel Direction Surveyed	Time	
							AM ⁹	PM ¹⁰
1	North of Euclid Avenue on 2 nd Avenue	Des Moines	2	Oct. 14, 15, & 19	Tue. & Wed.	SB	√	
						NB		√
2	North of Euclid Avenue on Northeast 14 th Street	Des Moines	3	Oct. 16, 21 & 23	Thur., Tue., & Thur.	SB	√	
						NB		√
3	South of Grand Avenue on 63 rd Street	Des Moines	2	Oct. 16 & 23	Thur. & Thur.	NB	√	
						SB		√
4	East of 63 rd Street on Grand Avenue	West Des Moines	2	Oct. 14 & 15	Tue. & Wed.	EB	√	
						WB		√
5	West of 86 th Street on Hickman Road	Clive	2	Oct. 15 & 23	Wed. & Thur.	EB	√	
						WB		√
6	North of Ashworth Road on Jordan Creek Pkwy.	West Des Moines	3	Oct. 22 & 23	Wed. & Thur.	NB	√	
						SB		√
7	South of Crocker Street on Keo Way	Des Moines	3	Oct. 14 & 15	Tue. & Wed.	SB	√	
						NB		√
8	South of Aurora Avenue on Merle Hay Road	Urbandale	2	Oct. 14 & 15	Tue. & Wed.	SB	√	
						NB		√
9	South of Tuttle Street on 3 rd Street	Des Moines	2	Oct. 21 & 22	Tue. & Wed.	NB	√	
						SB		√
10	East of 42 nd Street on University Avenue	Des Moines	2	Oct. 21 & 22	Tue. & Wed.	EB	√	
						WB		√
11	West of 11 th Street on Martin Luther King, Jr. Parkway	Des Moines	3	Oct. 21 & 22	Tue. & Wed.	EB	√	
						WB		√
12	East of 60 th Street on Ashworth Road	West Des Moines	2	Oct. 21, 22, & 23	Tue., Wed., & Thur.	EB	√	
						WB		√

Source: Des Moines Area Metropolitan Planning Organization

⁸ One direction

⁹ AM peak hour is 7:15 a.m. to 8:15 a.m.

¹⁰ PM peak hour is 4:15 p.m. to 5:15 p.m.

TABLE 2.2 Characteristics of Vehicle Occupancy Survey Locations

No.	Location	Description of the Commuting Corridor Containing Survey Location	Land Uses Near Location	Transit Near Location
1	2 nd Avenue	Ankeny/Northern Des Moines to/from Downtown Des Moines	- Low Density Residential and some Commercial - North of North High School - Northwest of Harding Junior High School - Adjacent to Grocery Stores	DART Fixed Route
2	Northeast 14 th Street	Ankeny/Northern Des Moines to/from Downtown Des Moines	- Low Density Commercial and some Residential - North of Grand View College - Adjacent to Grocery Stores	DART Fixed Route
3	63 rd Street	Eastern West Des Moines /Western Des Moines to/from Grand Avenue/Interstate 235 corridors	- Commercial and Residential - North of Valley Junction	DART Fixed Route
4	Grand Avenue	Eastern West Des Moines /Western Des Moines to/from Downtown Des Moines	- Commercial and Residential - Northeast of Valley Junction	DART Fixed Route
5	Hickman Road	Western Suburbs to/from Central and Downtown Des Moines	- Commercial and Multi-Family Residential - Adjacent to Grocery Store	DART Express Route
6	Jordan Creek Pkwy.	Western West Des Moines /Jordan Creek Towncenter to/from Interstate 80, Western Suburbs, and greater metropolitan area	- Commercial - North of Jordan Creek Towncenter and Wells Fargo Campus	DART Express Route
7	Keo Way	Western Suburbs and Northern /Northwestern Des Moines to/from Downtown Des Moines	- Commercial - Within Central Business District - North of Iowa Lutheran Hospital	DART Express Route
8	Merle Hay Road	Urbandale/Johnston/ Northwest Des Moines to /from Western Des Moines and Windsor Heights	- Commercial - Adjacent to Merle Hay Mall - Near Grocery Store	DART Fixed Route
9	3 rd Street	Southern and Southeaster Des Moines to/from Downtown Des Moines	- Commercial - Within Central Business District	DART Fixed Route
10	University Avenue	Windsor Heights/Western Des Moines to/from Downtown Des Moines	- Small cluster of Commercial surrounded by Residential - West of Drake University	DART Fixed Route
11	Martin Luther King, Jr. Parkway	Southern/Western Des Moines to/from Downtown Des Moines	- Commercial - Within Central Business District	DART Martin Luther King, Jr. Parkway Shuttle
12	Ashworth Road	Western West Des Moines to/from Eastern West Des Moines/Western Des Moines	- Small cluster of Commercial surrounded by Residential	None

Source: Des Moines Area Metropolitan Planning Organization

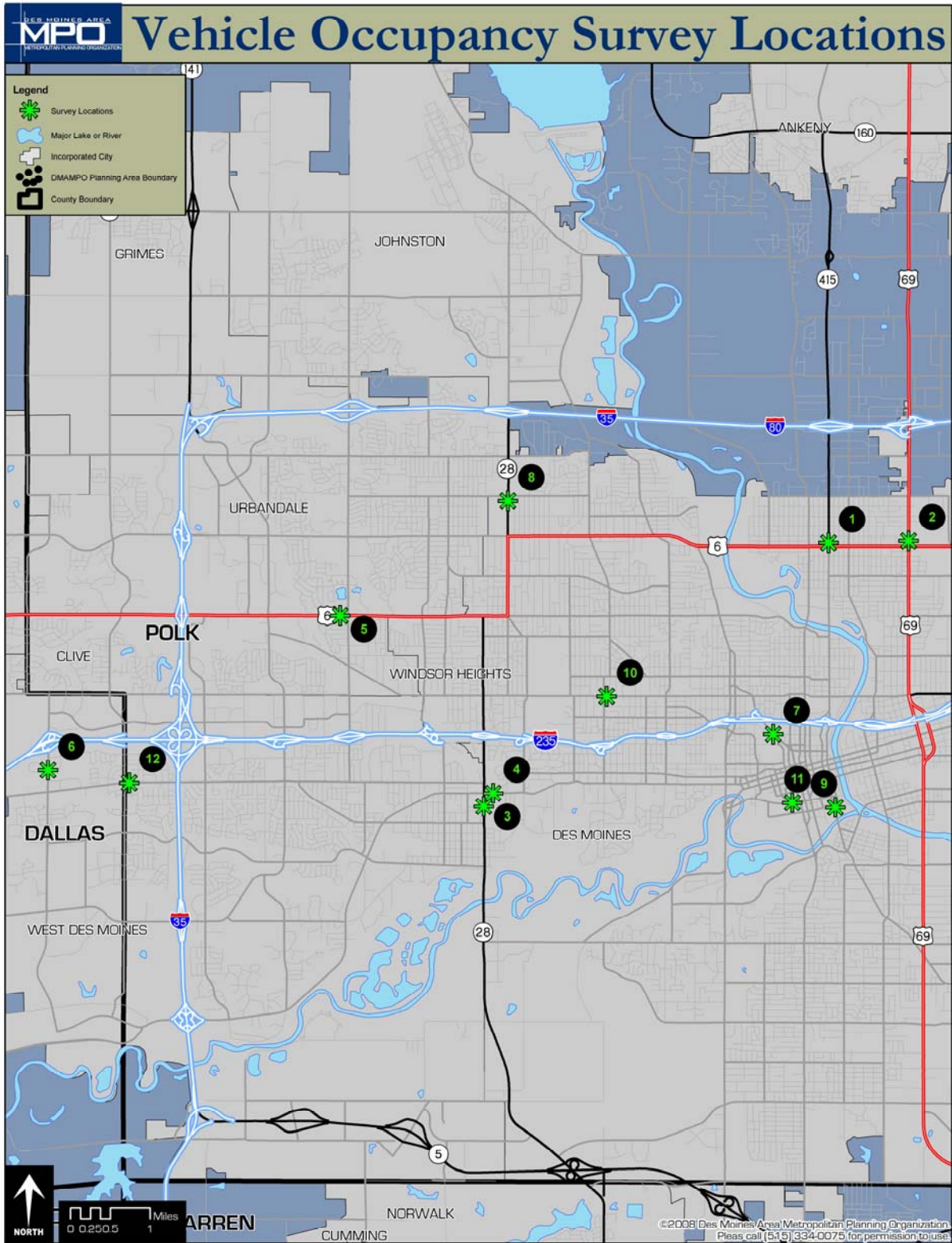


FIGURE 2.1 Vehicle occupancy survey locations.
 Source: Des Moines Area Metropolitan Planning Organization

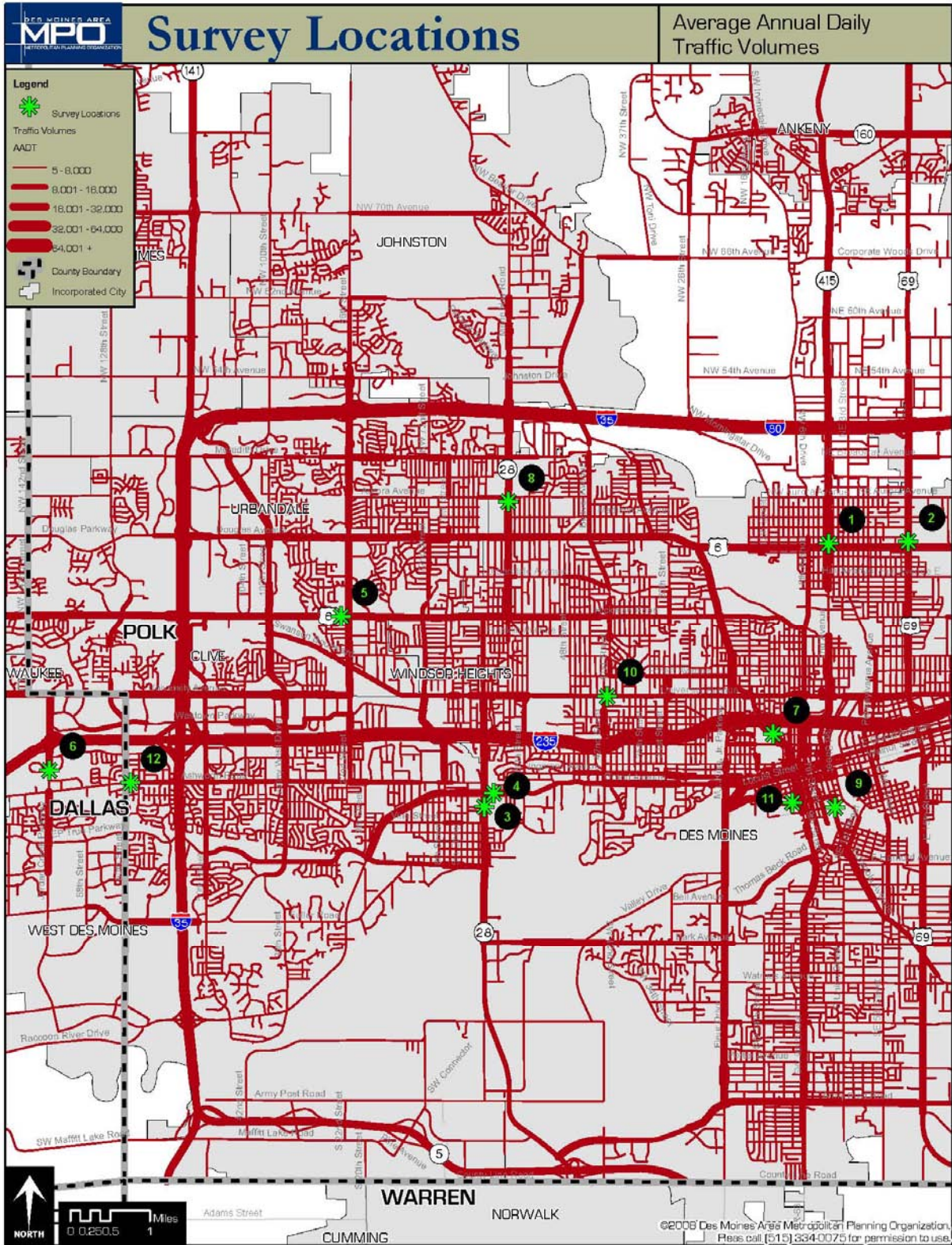


FIGURE 2.2 Vehicle occupancy survey locations vs. average annual daily traffic volumes.

Source: Des Moines Area Metropolitan Planning Organization

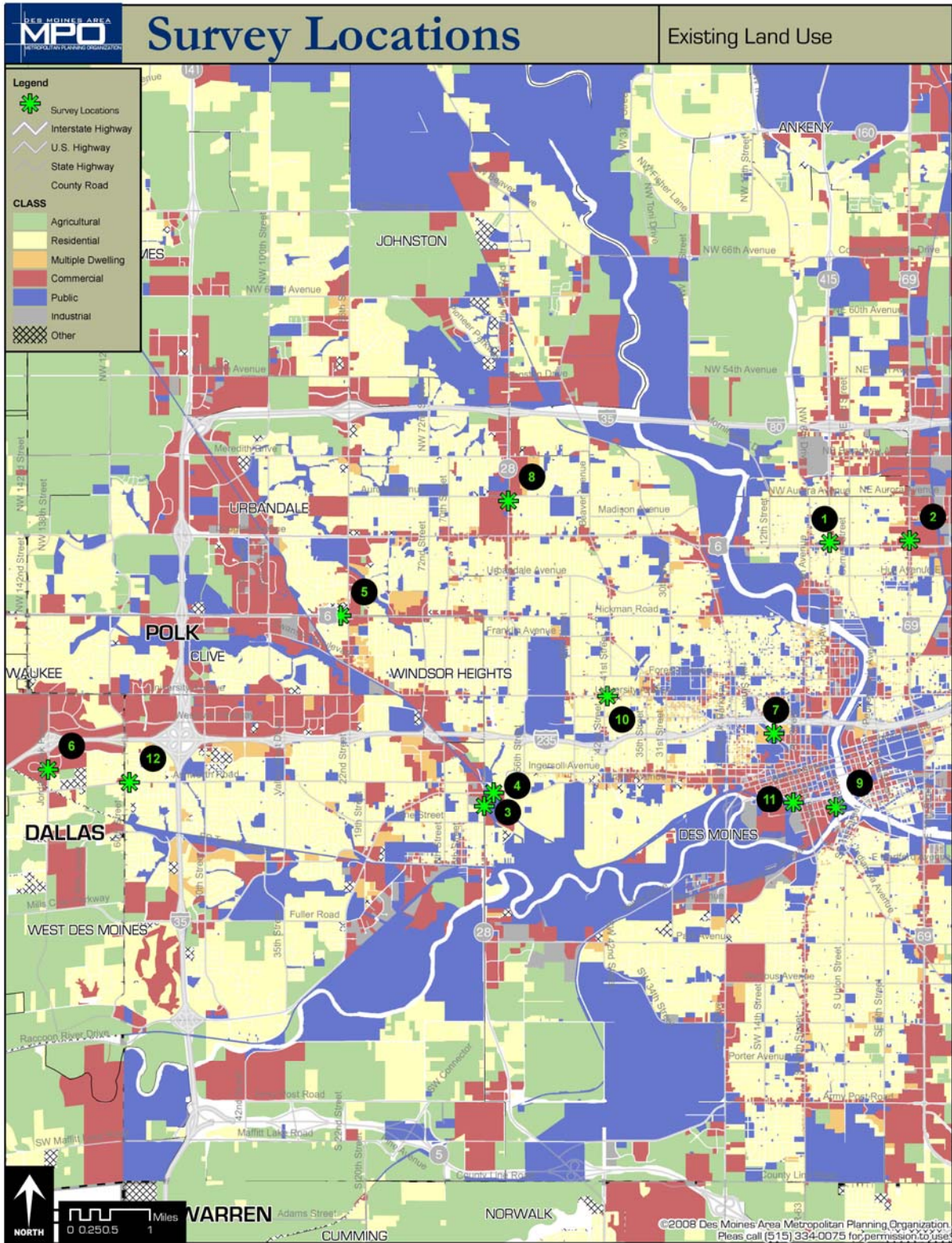


FIGURE 2.3 Vehicle occupancy survey locations vs. existing land use.
 Source: Des Moines Area Metropolitan Planning Organization

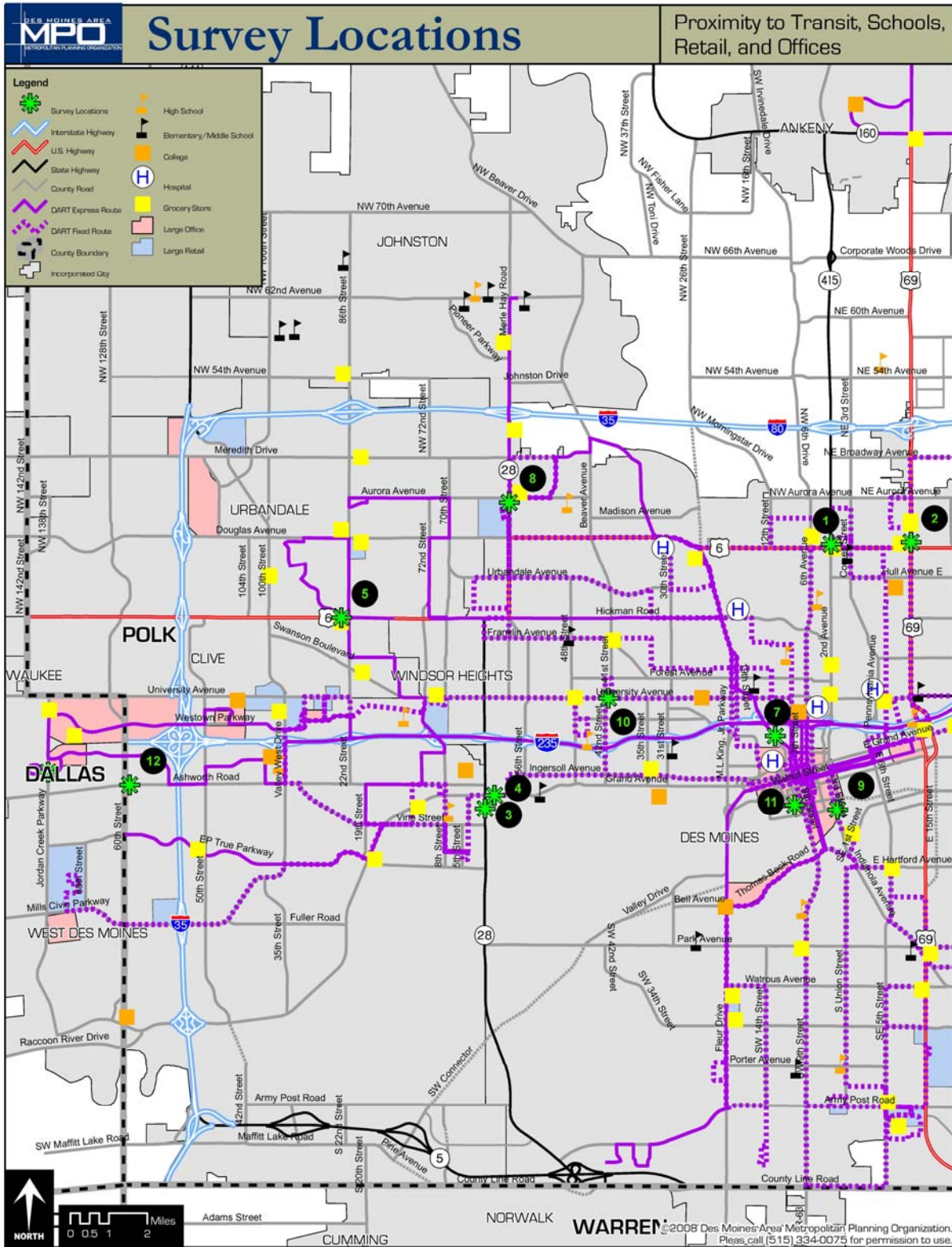


FIGURE 2.4 Vehicle occupancy survey locations vs. proximity to transit, schools, retail, and office uses.

Source: Des Moines Area Metropolitan Planning Organization

2.3 SAMPLE SIZE

A vehicle occupancy survey needs the right sample size to obtain a reasonable AVO estimate for a metropolitan area. The definition of a link-day, the windshield method's sampling unit, is a particular sampling period on a particular link. Calculating the link-day sample size is as follows¹¹:

$$M = \left(\frac{Z_{1-\alpha/2} \sigma_d}{B} \right)^2$$

M = Number of link-days of data collection required;

$Z_{1-\alpha/2}$ = Upper $1 - \alpha/2$ percentile of the standard normal distribution;

σ_d = Standard deviation of AVO across locations; and,

B = Tolerance level between the estimated average occupancy and the true value.

The sample size (M) is dependent on the level of tolerance (B), on confidence ($Z_{1-\alpha/2}$) to estimate AVO, and on standard deviation (σ_d). Standard deviation is a statistical measure of the spread of the individual occupancy rates and is calculated using the following equation.

$$\sigma_d = \left[\frac{N \times \sum_i^N (P_i - AVO \times V_i)^2}{\left(\sum_i^N V_i \right)^2} \right]^{\frac{1}{2}}$$

N = Number of locations (= 24);

P_i = Number of occupants counted at location i ;

AVO = Total AVO; and,

V_i = Number of passenger cars counted at location i ;

This computation may be performed for each time period as well as for the combined time periods.

¹¹ Office of Highway Information Management, Federal Highway Administration, *Improved Vehicle Occupancy Data Collection Methods*, April 1997

AM Peak:

$$\sigma_d = \left[\frac{24 \times 64723.02}{(24208)^2} \right]^{\frac{1}{2}} = 0.051 \text{ Occupants/vehicle}$$

PM Peak:

$$\sigma_d = \left[\frac{24 \times 127093.57}{(25342)^2} \right]^{\frac{1}{2}} = 0.069 \text{ Occupants/vehicle}$$

Combined:

$$\sigma_d = \left[\frac{24 \times 174091.82}{(49550)^2} \right]^{\frac{1}{2}} = 0.04 \text{ Occupants/vehicle}$$

The standard deviation of the occupancy rates across this survey is 0.04. Therefore, the minimum sample size within 0.03 tolerance of the true AVO with 95% confidence would be calculated as:

$$M = \left(\frac{1.96 \times 0.04}{0.03} \right)^2 = 6.8 \cong 7 \text{ Link-day}$$

Table 2.2 presents the minimum sample size required for a standard deviation of 0.04 and for a range or tolerance and confidence levels. For the Des Moines metropolitan area, the total number of collection link-days, 24, is statistically significant to estimate AVO with 0.02 tolerance at 95 % confidence level.

TABLE 2.2 Sample Size by Tolerance and Confidence Level

Tolerance	Confidence Level (99%)	Sample size	Confidence Level (95%)	Sample size	Confidence Level (90%)	Sample size
±0.02	2.575	27	1.96	16	1.645	11
±0.03	2.575	12	1.96	7	1.645	5
±0.04	2.575	7	1.96	4	1.645	3
±0.05	2.575	5	1.96	3	1.645	2

Source: Des Moines Area Metropolitan Planning Organization

3 Analysis of Data Collected

The DMAMPO staff, as observers, counted 49,550 passenger cars and 57,066 vehicle passengers during the survey period. The staff calculated the survey's AVO rates by dividing vehicle passengers by vehicles classified as passenger cars.

Table 3.1 presents the resulting AVO for the AM, the PM, and the combined AM/PM periods.

TABLE 3.1 Vehicle Occupancy Rate

Time Period	Total Passenger Cars Counted	Total Passengers Counted	AVO
AM	24,208	26,904	1.11
PM	25,342	30,162	1.19
Total	49,550	57,066	1.15

Source: Des Moines Area Metropolitan Planning Organization

Table 3.2 and Figure 3.1 compare the percentage of automobiles surveyed by the number of occupants observed during the AM and the PM peak periods.

TABLE 3.2 Percent of Passenger Cars Observed by Number of Passengers

Occupants per Passenger Car (Percent)								
AM			PM			Total		
1	2	3+	1	2	3+	1	2	3+
89%	10%	1%	83%	16%	2%	86%	13%	1%

Source: Des Moines Area Metropolitan Planning Organization

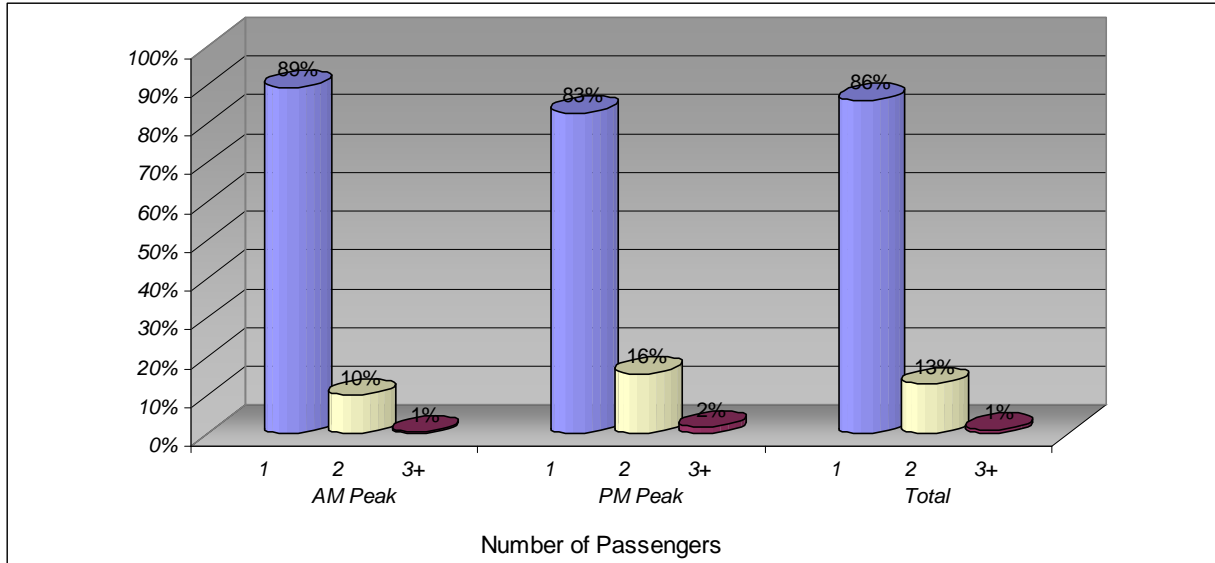


FIGURE 3.1 Percent of passenger cars observed by number of passengers.

Source: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey

3.1 COMPARISON WITH FUNCTIONAL CLASSIFICATION

Table 3.3 summarizes vehicle occupancy by the federal functional classification (FFC).

TABLE 3.3 Vehicle Occupancy by Functional Classification

FFC	Occupants per Passenger Car (Percent)						AVO		
	AM			PM			AM	PM	Total
	1	2	3+	1	2	3+			
Principal Arterial (7) ¹²	89%	10%	1%	81%	17%	2%	1.11	1.21	1.17
Minor Arterial (5) ¹¹	90%	10%	0%	85%	14%	1%	1.11	1.16	1.13
Total	89%	10%	1%	83%	16%	2%	1.11	1.19	1.15

Source: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey

3.2 COMPARISON WITH LOCATIONS

Table 3.4 and Figure 3.2 summarizes average occupancies and percentages of passenger cars by number of occupants for each location.

¹² Number of locations

TABLE 3.4 Percent of Passenger Cars by Vehicle Occupancy and Location

Location	Occupants per Passenger Car (Percent)						AVO		
	AM			PM			AM	PM	Total
	1	2	3+	1	2	3+			
Northeast 14 th Street	85%	12%	2%	72%	23%	5%	1.17	1.34	1.27
Grand Avenue	88%	12%	0%	81%	17%	2%	1.13	1.21	1.17
Hickman Road	89%	11%	0%	82%	17%	1%	1.12	1.19	1.16
Jordan Creek Parkway	93%	7%	0%	79%	19%	1%	1.07	1.22	1.16
Keo Way	89%	10%	0%	88%	12%	1%	1.11	1.13	1.12
Merle Hay Road	88%	12%	1%	77%	20%	3%	1.13	1.27	1.21
University Avenue	90%	9%	0%	78%	19%	3%	1.10	1.27	1.19
2 nd Avenue	90%	9%	1%	85%	13%	2%	1.11	1.18	1.14
3 rd Street	90%	10%	0%	88%	11%	1%	1.11	1.13	1.12
63 rd Street	87%	12%	1%	83%	16%	2%	1.15	1.19	1.17
Martin Luther King, Jr. Parkway	93%	7%	0%	88%	11%	1%	1.07	1.12	1.10
Ashworth Road	93%	7%	0%	85%	14%	1%	1.08	1.16	1.12
Total	89%	10%	1%	83%	16%	2%	1.11	1.19	1.15

Source: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey

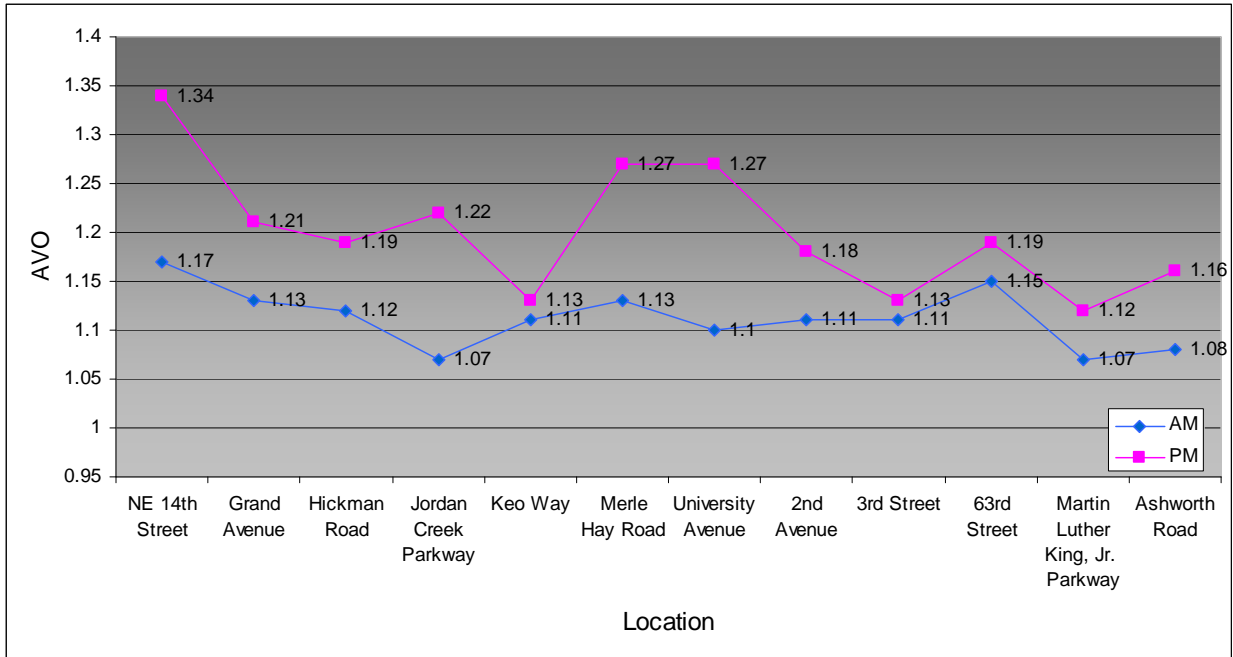


FIGURE 3.2 Average vehicle occupancy by location.

Source: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey

3.3 COMPARISON WITH TIME OF DAY

Table 3.5 and Figure 3.3 compare vehicle occupancy rates and average vehicle counts by fifteen-minute observation periods.

TABLE 3.5 Vehicles Occupancy and Vehicle Counts by Time of Day

Time	Occupants per Passenger Car (Percent)			AVO	Average Passenger Cars per Day	Average Buses per Day	Average Trucks per Day
	1	2	3+				
7:15 AM	89%	11%	0%	1.12	2,853	21	44
7:30 AM	90%	10%	0%	1.11	3,171	15	43
7:45 AM	90%	9%	0%	1.10	3,377	13	39
8:00 AM	89%	10%	1%	1.12	2,704	22	46
Total AM	89%	10%	1%	1.11	12,104	71	172
4:15 PM	82%	16%	2%	1.20	2,880	18	36
4:30 PM	85%	14%	2%	1.17	3,240	13	24
4:45 PM	82%	16%	2%	1.20	3,112	12	21
5:00 PM	83%	16%	1%	1.19	3,440	13	24
Total PM	83%	16%	2%	1.19	12,671	55	104
Total AM and PM	86%	13%	1%	1.15	24,775	125	276

Source: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey

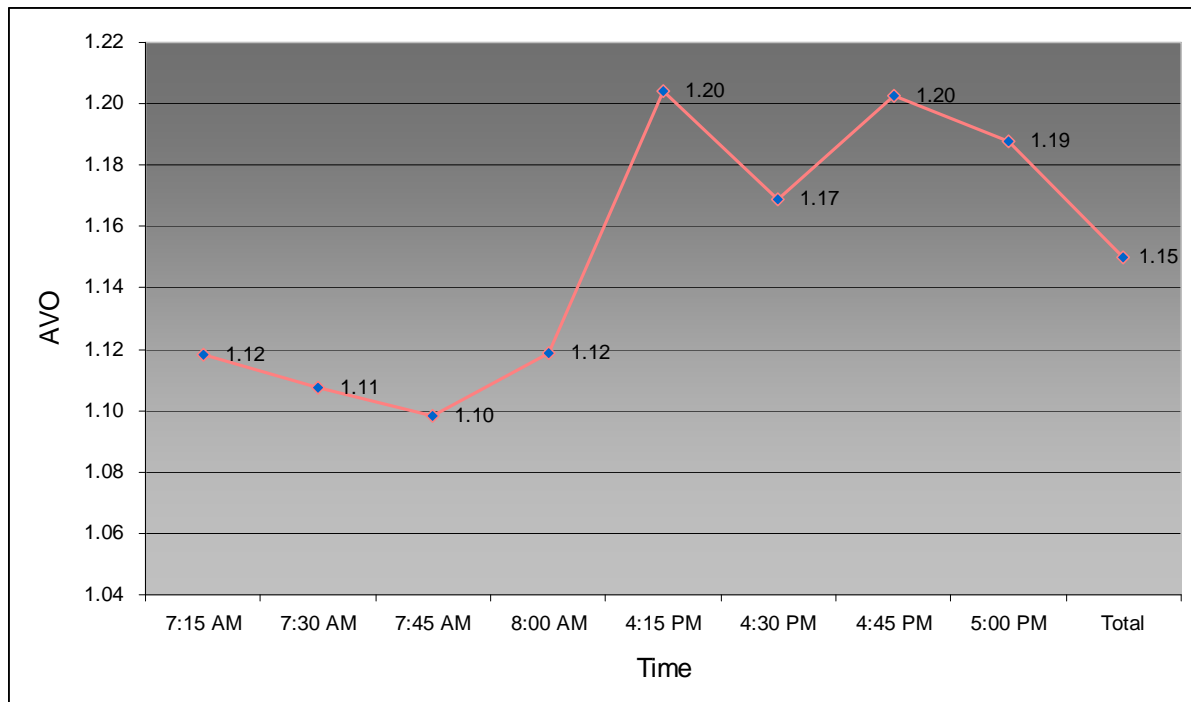


FIGURE 3.3 Average vehicle occupancy by time of day.

Source: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey

3.4 VEHICLE DISTRIBUTION

Observers counted 50,351 total vehicles in the survey. The DMAMPO staff classified vehicles into one of the following three categories:

1. Passenger car – 1, 2, and 3 or more occupants (includes vans and pick-up trucks);
2. Truck – 1, 2, 3, and 4 axle single units; or,
3. Bus - transit buses (Des Moines Area Regional Transit Authority (DART)) and school buses.

Table 3.6 and Figure 3.4 provide the vehicle distribution by classification: passenger car, truck, or bus.

TABLE 3.6 Vehicle Distribution

Time Period	Average Passenger Cars per Day	Average Buses per Day	Average Trucks per Day
AM	12,104	71	172
PM	12,671	55	104
Total	24,775	126	276

Source: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey

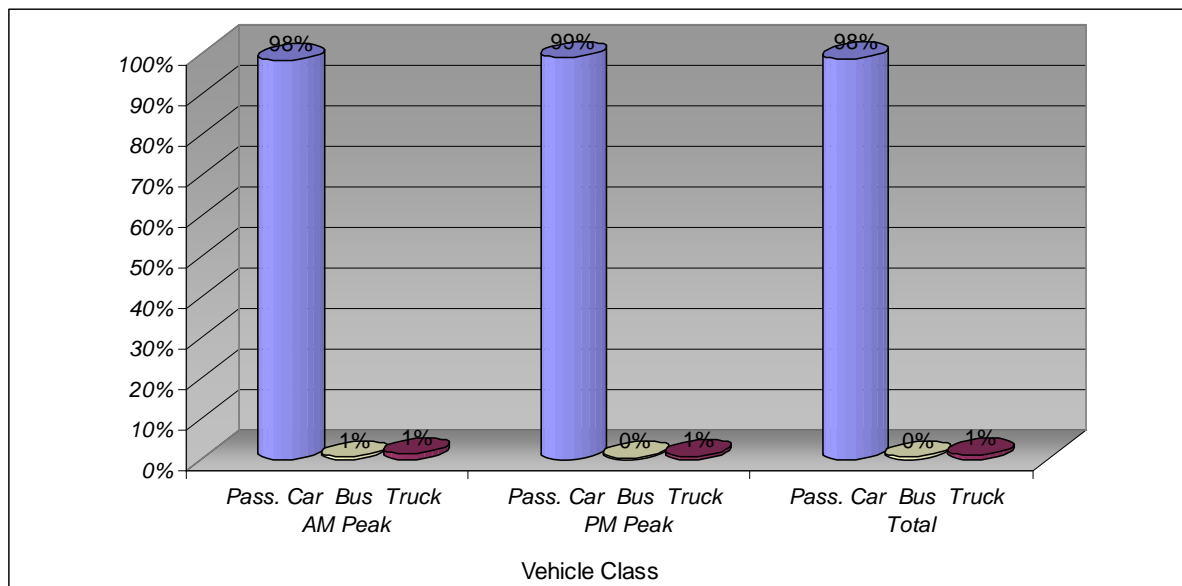


FIGURE 3.4 Vehicle distribution.

Source: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey

3.5 COMPARISON WITH NHTS DATA

The U.S. Department of Transportation's NHTS is a national survey of daily and long-distance travel. The NHTS provides demographic characteristics of households, people, vehicles, and detailed information on daily and longer-distance travel for all purposes by all modes. The NHTS assists transportation planners and policy makers who need comprehensive data on travel and transportation patterns in the United States. The 2001 NHTS updated information gathered in prior Nationwide Personal Transportation Surveys (NPTS) conducted in 1969, 1977, 1983, 1990, and 1995, and the American Travel Survey (ATS) conducted in 1977 and 1995. The NHTS reports on AVO by trip purpose.¹³ The DMAMPO participated in the 2001 NHTS Add-on Program to collect more detailed travel information for the Des Moines metropolitan area.

Figure 3.5 compares AVO rates from the DMAMPO's 2008 Vehicle Occupancy Survey to AVO rates derived from the 2001 NHTS DMAMPO Add-on Program. The 2001 NHTS collected AVO rates for a variety of trip purposes (social, errand, work, and total) throughout the entire day. However, the 2008 Vehicle Occupancy Survey focused only on vehicle occupancy rates for work trips during AM and PM peak commute periods. To compare results from the 2001 NHTS DMAMPO Add-on Program to the 2008 Vehicle Occupancy Survey, one must assume that nearly all vehicle occupants observed for the 2008 Vehicle Occupancy Survey were traveling to/from work.

¹³ <http://nhts.ornl.gov>

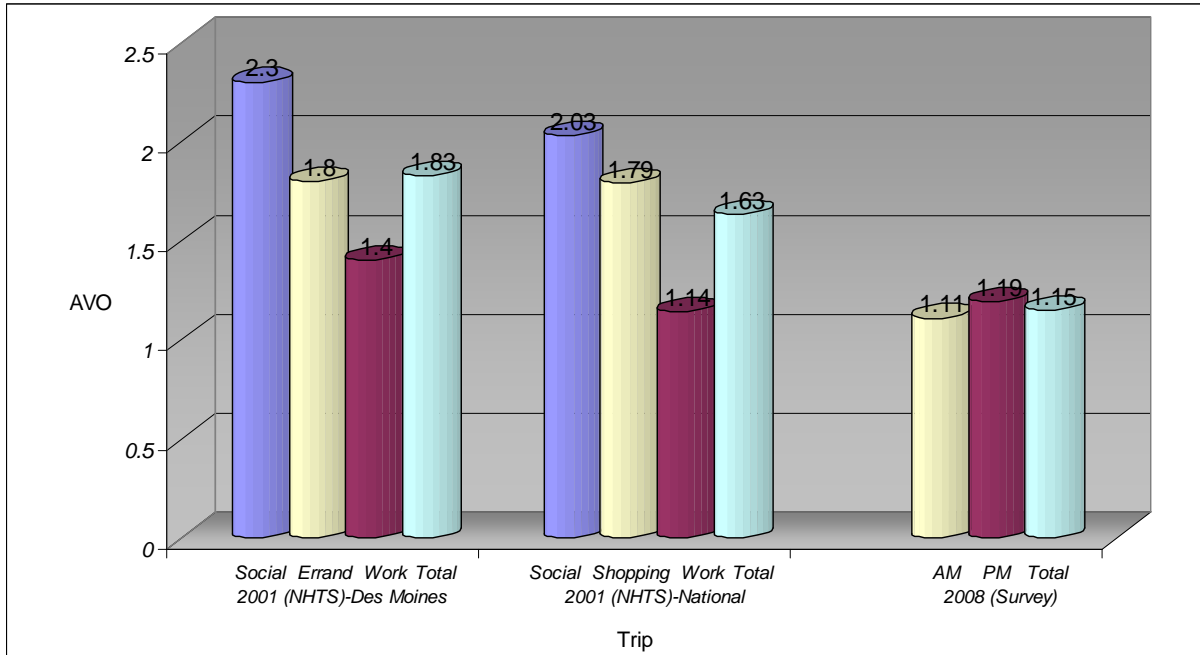


FIGURE 3.5 2001 NHTS DMAMPO Add-on Program and 2008 Vehicle Occupancy Survey.

Sources: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey; US Department of Transportation 2001 National Household Travel Survey and 2001 National Household Travel Survey Des Moines Area Metropolitan Planning Organization Add-on Program

3.6 COMPARISON WITH PAST VEHICLE OCCUPANCY SURVEY DATA

The DMAMPO conducted its first vehicle occupancy survey in 2007. The 2008 survey used the same locations used in the 2007 survey, plus two additional locations¹⁴, providing an opportunity to compare data between years. Table 3.7 compares AVO rates and vehicle observations from the 2007 and 2008 surveys for each survey location.

¹⁴ Martin Luther King, Jr. Parkway and Ashworth Road locations added for the 2008 Vehicle Occupancy Survey

TABLE 3.7 2007 Vehicle Occupancy Data vs. 2008 Vehicle Occupancy Data

Location	AVO - 2007			AVO - 2008			% Change from 2007		
	AM	PM	Total	AM	PM	Total	AM	PM	Total
Northeast 14 th Street	1.14	1.26	1.20	1.17	1.34	1.27	3%	6%	6%
Grand Avenue	1.18	1.19	1.18	1.13	1.21	1.17	-4%	2%	-1%
Hickman Road	1.18	1.20	1.19	1.12	1.19	1.16	-5%	-1%	-3%
Jordan Creek Parkway	1.08	1.24	1.17	1.07	1.22	1.16	-1%	-2%	-1%
Keo Way	1.11	1.14	1.12	1.11	1.13	1.12	0%	-1%	0%
Merle Hay Road	1.11	1.21	1.16	1.13	1.27	1.21	2%	5%	4%
University Avenue	1.12	1.24	1.18	1.1	1.27	1.19	-2%	2%	1%
2 nd Avenue	1.10	1.17	1.13	1.11	1.18	1.14	1%	1%	1%
3 rd Street	1.15	1.19	1.16	1.11	1.13	1.12	-3%	-5%	-3%
63 rd Street	1.16	1.19	1.18	1.15	1.19	1.17	-1%	0%	-1%
Martin Luther King, Jr. Parkway	NA ¹⁵	NA	NA	1.07	1.12	1.1	NA	NA	NA
Ashworth Road	NA	NA	NA	1.08	1.16	1.12	NA	NA	NA
Total for 2007 Survey Locations	1.13	1.2	1.16	1.11	1.2	1.16	-2%	0%	0%
Total for 2008 Survey Locations	1.13	1.20	1.16	1.11	1.19	1.15	-2%	-1%	-1%

Source: Des Moines Area Metropolitan Planning Organization 2008 Vehicle Occupancy Survey and 2007 Vehicle Occupancy Survey

¹⁵ Not Applicable – survey locations not used for the 2007 Vehicle Occupancy Survey

4 Conclusions

The 2008 Vehicle Occupancy Survey produced a collection of information about vehicle occupancies in the Des Moines metropolitan area; this report presents vehicle occupancies by roadway classification, by time of day, and by location. The 2008 Vehicle Occupancy Survey reflects an AVO of 1.11 during the AM peak period and an AVO of 1.19 during the PM peak period.

An analysis of vehicle occupancy data collected during this survey shows that vehicle occupancy rates vary by time of day, by roadway facility type, and by geographic area. This report offers the following conclusions:

1. Comparing the 2008 survey with the 2007 survey shows that total AVO remained unchanged when considering the ten survey locations used in both the 2008 and 2007 surveys; total AVO decreased by nearly 1% from 1.16 in 2007 to 1.15 in 2008 when including the two locations added for the 2008 survey;
2. Comparing the 2008 survey with the 2001 NHTS DMAMPO Add-on Program data, and assuming all vehicles observed for the 2008 survey were work trips, one can infer that fewer people shared rides to work in 2008, as AVO dropped from 1.4 (work trip AVO from the 2001 NHTS DMAMPO Add-on Program) to 1.15 (total AVO from the 2008 Vehicle Occupancy Survey);
3. The variation of vehicle occupancy among link-days (0.04) is so small that one can infer that the AVO of survey locations represents a Des Moines metropolitan area AVO, suggesting that similar travel patterns exist across Des Moines metropolitan area;
4. The lowest vehicle occupancy rate (1.10) occurred during the AM peak period (7:45 AM); the highest vehicle occupancy rate (1.20) occurred during the PM peak period (4:15 to 4:30 PM and 4:45 to 5:00 PM);

5. The lowest vehicle occupancy rate occurred at Jordan Creek Parkway during the AM peak period (1.08); the highest vehicle occupancy rate occurred at Northeast 14th Street during the PM peak period (1.34);
6. Vehicles traveling on minor arterials (1.13) had lower occupancy rates than vehicles traveling on principal arterials (1.17);
7. Approximately 90% of vehicles in the AM peak were single occupant (driver only); approximately 83% of vehicles in the PM peak period of the day were single occupant;
8. Similarly, approximately 11% of vehicles during the AM peak transported two or more persons; approximately 14% of vehicles during the PM peak period transported two or more persons; and,
9. The Des Moines metropolitan area's 2008 Vehicle Occupancy Survey indicated that the highest vehicle occupancies occurred on higher volume roads during the PM peak period.

The 2008 Vehicle Occupancy Survey's results provide quantifiable performance measures for monitoring the DMAMPO's CMS. The survey's results also assist the Transportation Management Association (TMA) to develop strategies to promote alternative transportation choices in the metropolitan area's daily travel activities. The DMAMPO and the TMA will use the survey's results to determine progress towards satisfying the DMAMPO's Travel Demand Management (TDM)-10 commitment made to the Iowa Transportation Commission in exchange for the Iowa Department of Transportation's agreement to reconstruct Interstate 235 at a less-than-full-build capacity in deference to and with respect for Des Moines metropolitan area neighborhoods.