

WORKING PAPER NUMBER 88-07

AUTO OCCUPANCY FOR AREAS OUTSIDE THE  
CHICAGO CENTRAL BUSINESS DISTRICT

By

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## I. INTRODUCTION AND PURPOSE

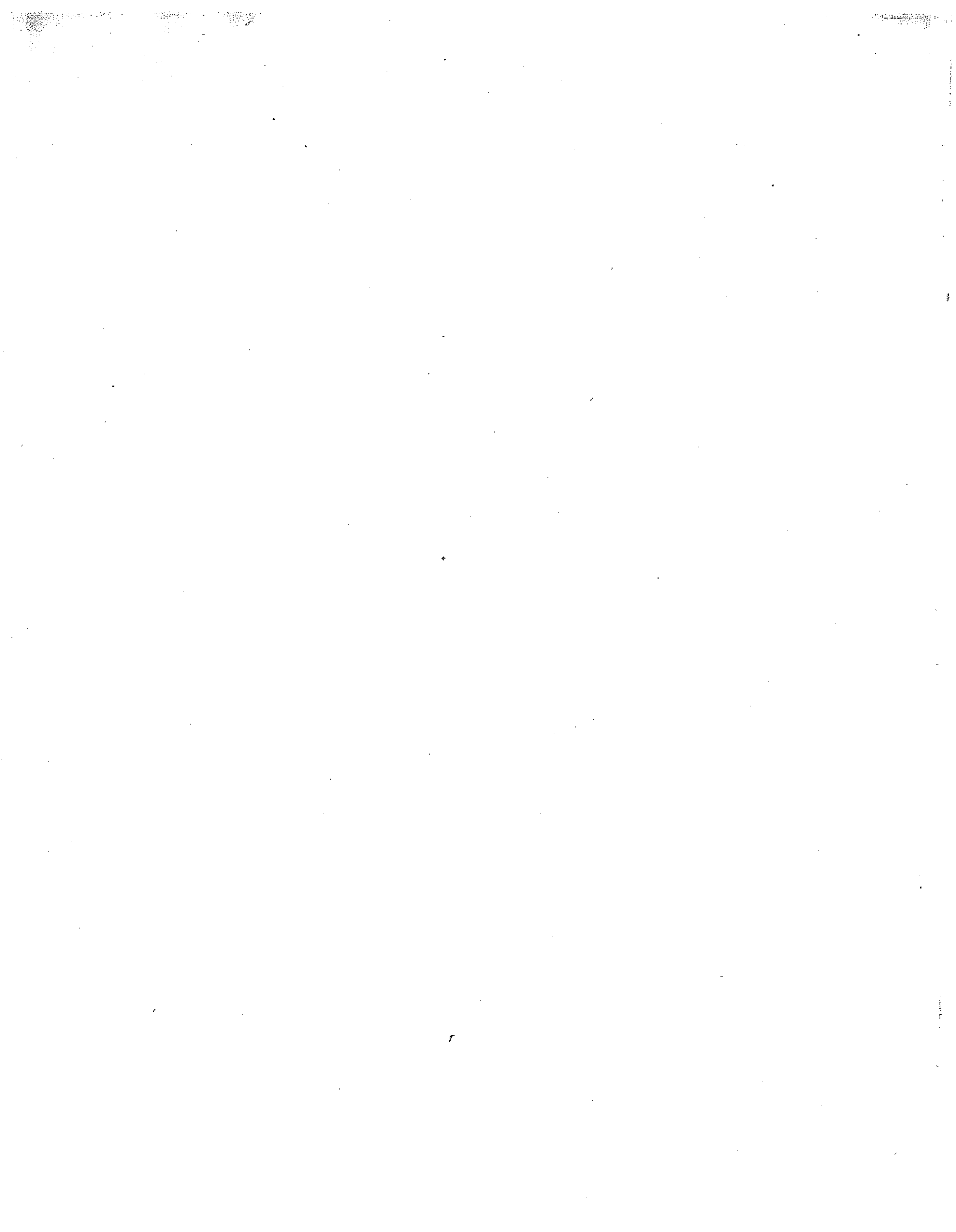
Travel characteristics such as auto occupancy rates are important indicators of changes in travel patterns. Auto occupancy rates are affected by numerous factors. These factors include changes in household, social and economic characteristics such as: location, family size, age composition, auto ownership and income. Other factors influencing occupancy rates are the accessibility of employment, shopping and recreation sites. Finally occupancy rates can be influenced by travel characteristics such as: trip origin and destination, travel time and trip purpose.

In 1980, the Chicago Area Transportation Study (CATS) conducted a study to determine auto occupancy rates on a regionwide basis. The count stations were located on concentric rings 10, 20 and 30 miles from the Chicago Central Business District (CBD). During the fall of 1987, CATS conducted a survey to reexamine the auto occupancy rates calculated in the 1980 study and determine any changes that have occurred.

## II. METHODOLOGY

The 1980 study sites were chosen to coincide with the various Illinois Department of Transportation (IDOT) continuous count stations. Most of these count stations are located 30 to 35 miles from the Chicago CBD. As a result, few occupancy counts were completed in the more densely populated area of the region on the two (10 and 20 mile) inner rings.

The current study included a more balanced geographic sample of count stations. There were four count stations on the 10 mile ring and six count stations on the 20 and 30 mile rings. In selecting the count stations for the current study it was decided to include sites from the previous survey as well as new locations. This was done so that current results could be compared to past work and so the new sites could eliminate the geographical bias that existed in the 1980 effort.



The survey periods were the same in both studies. They consisted of four one hour counts beginning at 7:30 AM, 10:30 AM, 12:30 PM, and 2:30 PM. Due to staff constraints evening counts will be conducted at a later date. During each counting period all passenger vehicles were classified by the number of occupants by direction. At the end of each counting period the number of occupants and vehicles were totaled and the occupancy rate was calculated. An occupancy rate was also calculated for each site based on the total number of occupants and vehicles tallied during the four time periods.

During the 1980 study the survey sites included three expressway occupancy count locations. These sites were not included in the current study because of safety considerations. The locations of all the study sites from both surveys are listed in Table 1 and shown in Figure 1.



Table 1

## SURVEY LOCATIONS

<u>Station Number</u>	<u>Location</u>	<u>Distance from CBD (Miles)</u>	<u>Years Studied</u>	
			<u>1980</u>	<u>1987</u>
1	US 45 south of IL 173	30	X	
2	IL 59 south of IL 134	30	X	X
3	US 20 northwest of I-90	30	X	
4	US 14 @ Lake-McHenry Line	30	X	X
5	IL 72 west of I-90	30	X	
6	IL 59 south of US 20	30	X	
7	IL 64 west of St. Charles	30	X	
8	IL 31 north of Mooseheart	30	X	X
9	US 30 east of IL 47	30	X	
10	IL 53 @ IL 7	30		X
12	US 45 north of US 30	30		X
14	IL 1 south of Steger Rd.	30	X	
15	IL 60 east of IL 21	20		X
16	IL 21 southeast of US 45	20	X	
17	IL 64 east of IL 53	20	X	X
18	IL 53 south of 75th St.	20		X
20	IL 171 @ IL 83	20	X	X
21	US 6 east of IL 43	20		X
22	Crawford Ave. south of US 6	20		X
23	Torrence Ave. south of US 6	20	X	
24	US 41 south of Foster Ave.	10		X
25	IL 64 west of IL 43	10	X	X
26	IL 50 south of 63rd St.	10		X
27	US 41 @ 87th St.	10		X
	<u>Expressways</u>			
11	I-80 west of Cedar Rd.	30	X	
13	I-57 @ Steger Rd.	30	X	
19	I-55 @ Will/DuPage Line	20	X	

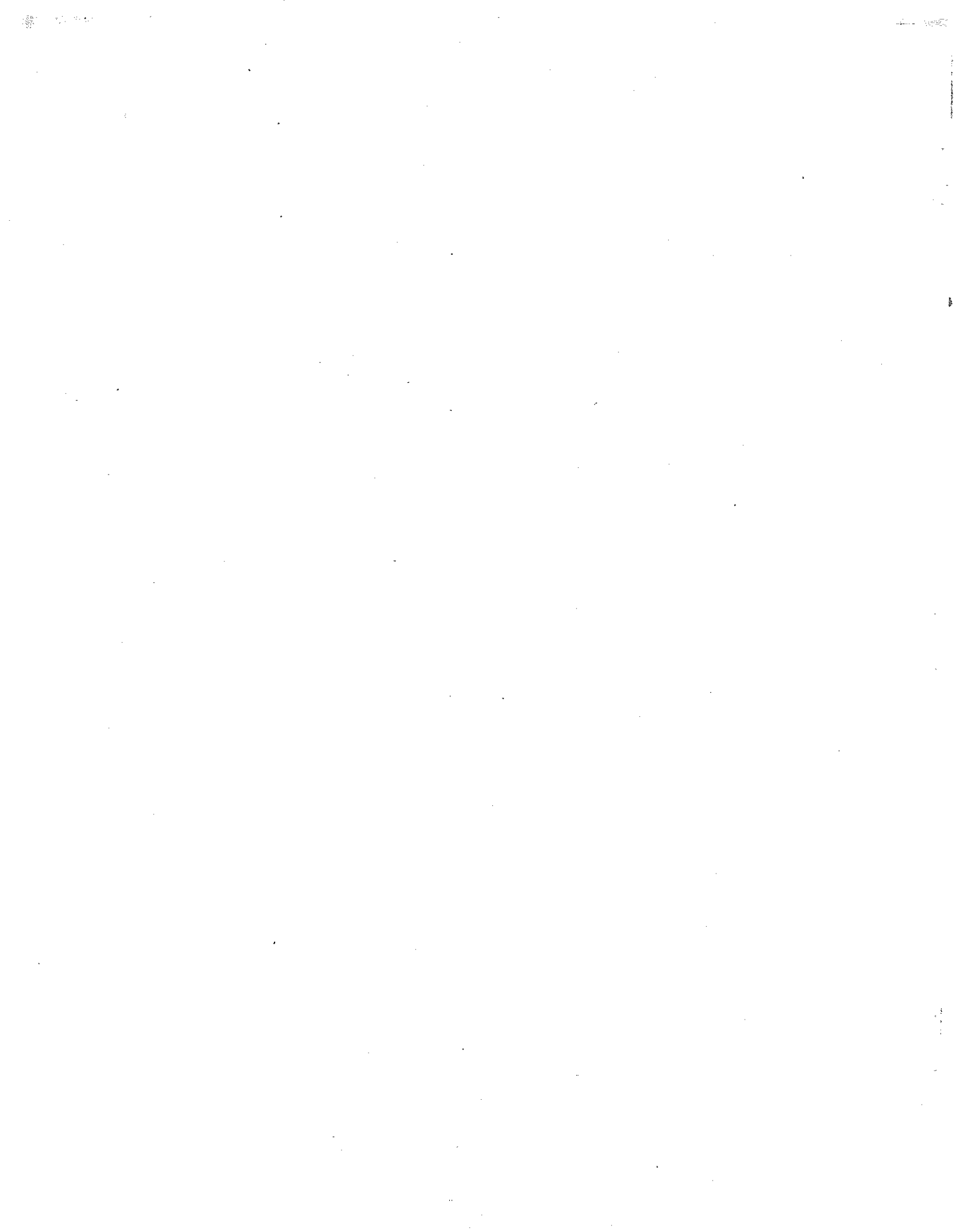
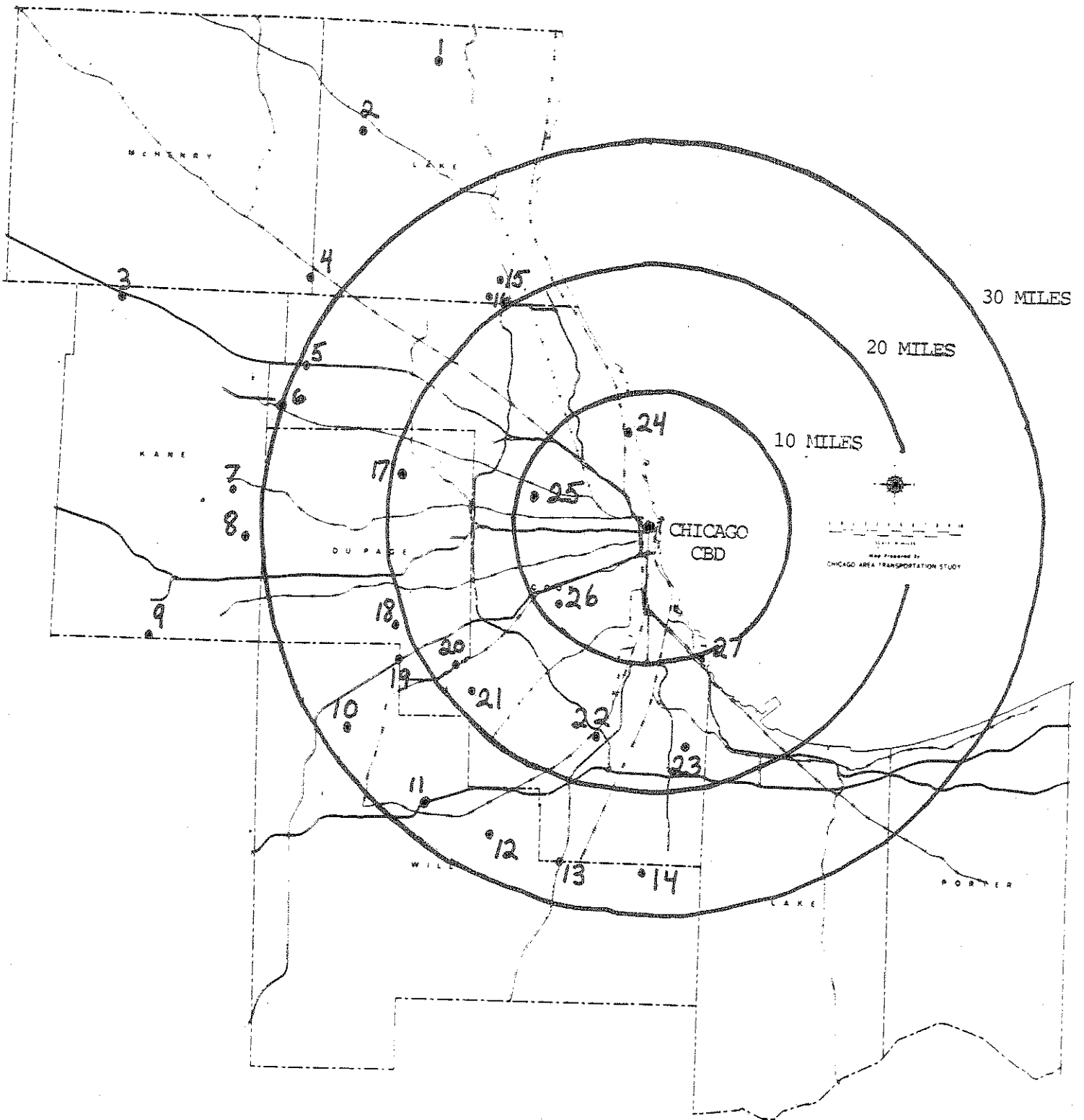




FIGURE 1 SURVEY LOCATIONS





### III. RESULTS

A total of 128 directional occupancy counts were completed during the four weekday time periods. For each of the 16 sites, the number of passenger cars and occupants was totaled by hour for all four counting periods. The total numbers of vehicles and occupants were then used to calculate occupancy rates for each of the four time periods and a daily average for the site. Table 2 shows the bidirectional occupancy rates for each site. Appendix A gives a complete breakdown of the number of autos and occupants for each site by time period and direction.

Table 2

#### BIDIRECTIONAL AUTO OCCUPANCY RATE BY TIME OF DAY

Location	Distance from CBD (Miles)	7:30	10:30	12:30	2:30	Average
		AM	AM	PM	PM	
US 45 south of IL 173	30	1.24	1.49	1.37	1.38	1.36
US 20 northwest of I-90	30	1.21	1.46	1.36	1.43	1.36
IL 64 west of St. Charles	30	1.12	1.21	1.25	1.28	1.21
US 30 east of IL 47	30	1.19	1.29	1.28	1.26	1.25
IL 53 @ IL 7	30	1.18	1.28	1.37	1.29	1.27
IL 1 south of Steger Rd.	30	1.17	1.33	1.34	1.40	1.31
IL 21 southeast of US 45	20	1.08	1.21	1.28	1.23	1.20
IL 64 east of IL 53	20	1.08	1.19	1.22	1.17	1.16
IL 53 south of 75th St.	20	1.11	1.24	1.33	1.31	1.23
IL 171 at IL 83	20	1.11	1.31	1.27	1.23	1.22
US 6 east of IL 43	20	1.23	1.31	1.34	1.27	1.29
Torrence Av. so. of US 6	20	1.18	1.37	1.43	1.47	1.39
US 41 south of Foster Av.	10	1.24	1.25	1.28	1.29	1.27
IL 64 west of IL 43	10	1.21	1.28	1.30	1.31	1.28
IL 50 south of 63rd St.	10	1.22	1.30	1.35	1.30	1.28
US 41 at 87th St.	10	1.25	1.45	1.48	1.38	1.37

The data for the sites on each of the three rings were averaged for each of the four count periods as shown in Table 3. This was done to allow comparisons of the occupancy rates by time period and by distance from the CBD. Table 4 lists the average auto occupancy by counting period.

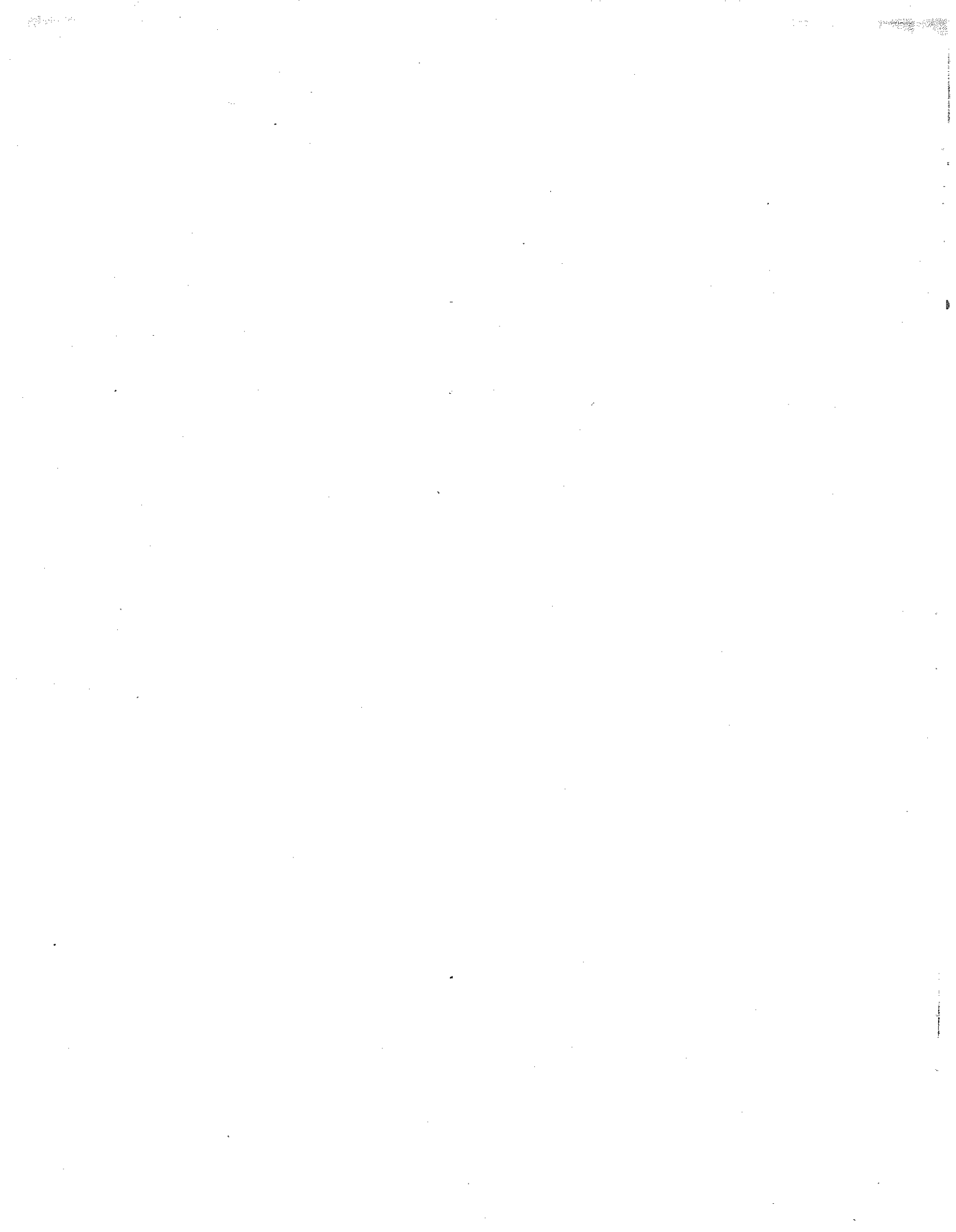


Table 3

BIDIRECTIONAL AUTO OCCUPANCY RATES BY TIME OF DAY AND ZONE

Distance from Chicago CBD

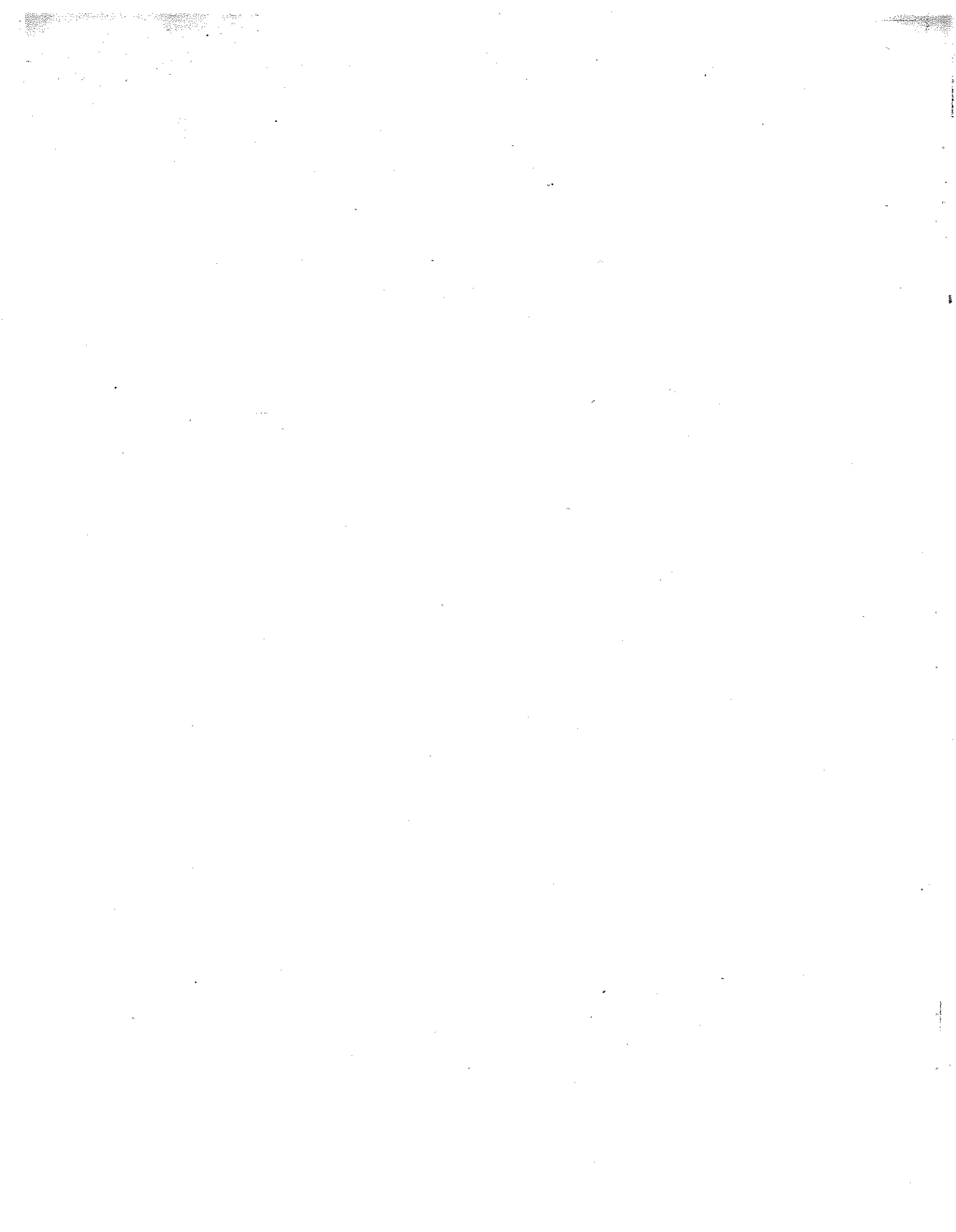
<u>Time</u>	<u>10 miles</u>	<u>20 miles</u>	<u>30 miles</u>
7:30 AM	1.23	1.13	1.19
10:30 AM	1.32	1.27	1.34
12:30 PM	1.35	1.31	1.33
2:30 PM	1.32	1.28	1.34
Average	1.30	1.25	1.29

Note: For a complete summary by direction see Appendix A.

Table 4

BIDIRECTIONAL AUTO OCCUPANCY RATES BY TIME OF DAY

<u>Time</u>	<u>Occupancy Rate</u>
7:30 AM	1.18
10:30 AM	1.31
12:30 PM	1.33
2:30 PM	1.31



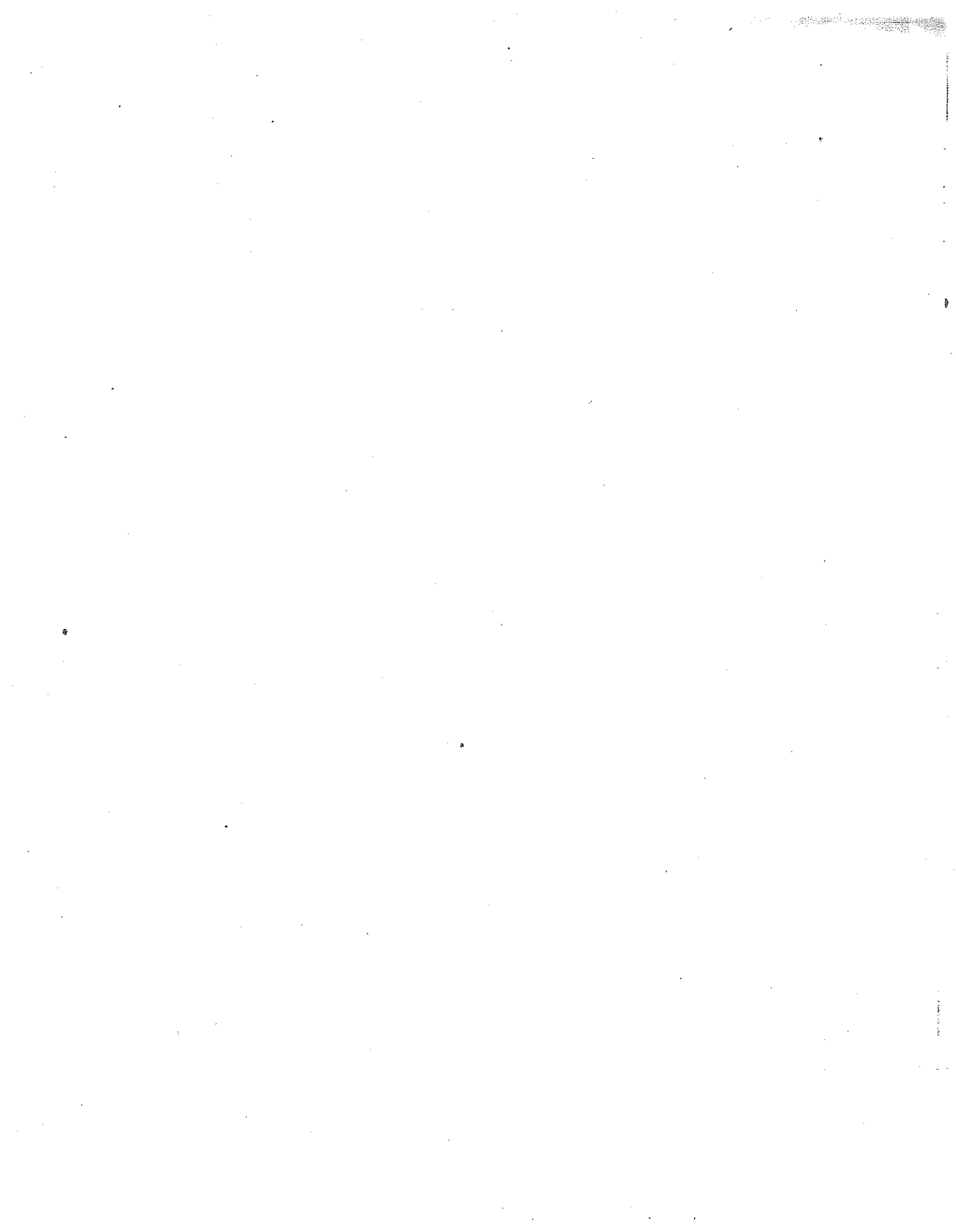
IV. SUMMARY

The comparison of auto occupancy rates reveals that no significant changes of rates have taken place between 1980 and 1987 (see Table 5). In fact, the greatest change took place in the hour beginning at 12:30 PM when occupancy rates decreased 3.6% from 1980 to 1987. This comparison would suggest that occupancy rates have remained at levels which are equal to or slightly lower than 1980 rates.

Table 5  
COMPARISON OF AUTO OCCUPANCY RATES  
FROM 1980 TO 1987

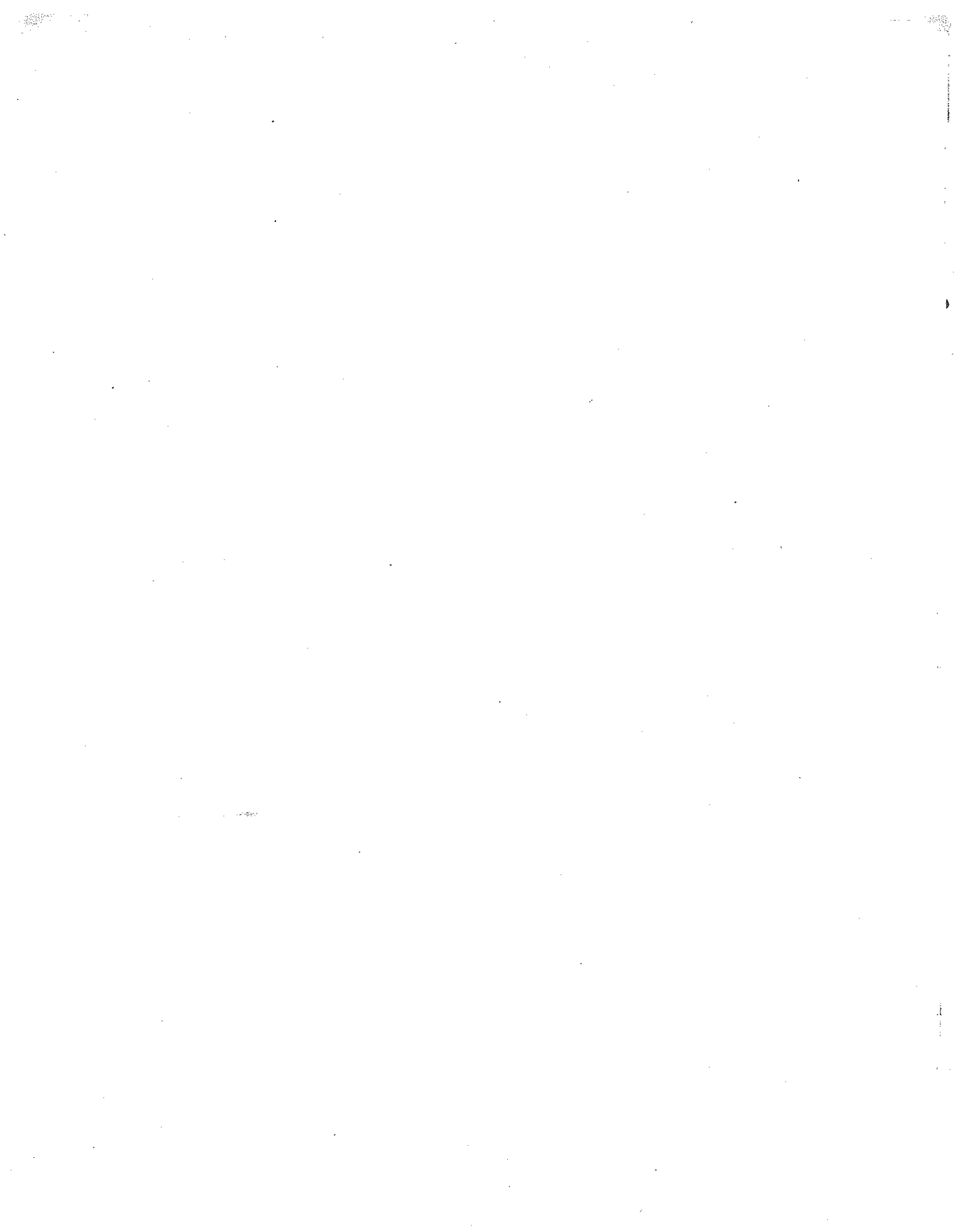
<u>Time</u>	Occupancy Rate		<u>Percent Change</u>
	<u>1980</u>	<u>1987</u>	
7:30 AM	1.18	1.18	0.0
10:30 AM	1.34	1.31	-2.2
12:30 PM	1.38	1.33	-3.6
2:30 PM	1.30	1.31	+0.8

0129L:





APPENDIX A



INTERSECTION: US 45 & ILLINOIS 173

NORTHBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	33	6	0	0	0	39	45	1.15
1030-1130	32	14	2	0	1	49	71	1.45
1230-1330	34	20	2	2	0	58	88	1.52
1430-1530	36	15	3	0	0	54	75	1.39
TOTALS	135	55	7	2	1	200	279	1.40

SOUTHBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	90	16	7	0	0	113	143	1.27
1030-1130	42	22	4	2	0	70	106	1.51
1230-1330	40	10	0	0	0	50	50	1.20
1430-1530	46	22	2	0	0	70	96	1.37
TOTALS	218	70	13	2	0	303	405	1.34

INTERSECTION: US 20 & INTERSTATE 90

EASTBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	71	14	1	0	0	86	102	1.19
1030-1130	44	9	3	2	1	59	84	1.42
1230-1330	53	18	3	2	0	76	106	1.39
1430-1530	53	18	1	2	0	74	100	1.35
TOTALS	221	59	8	6	1	295	392	1.33

WESTBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	38	11	1	0	0	50	63	1.26
1030-1130	32	21	2	1	0	56	84	1.50
1230-1330	50	16	3	0	0	69	91	1.32
1430-1530	41	29	4	0	0	74	111	1.50
TOTALS	161	77	10	1	0	249	349	1.40

INTERSECTION: ILLINOIS 64 & ILLINOIS 31

EASTBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	767	67	4	1	0	839	917	1.09
1030-1130	421	84	8	2	0	515	621	1.21
1230-1330	426	120	10	4	1	561	717	1.28
1430-1530	411	129	17	3	1	561	737	1.31
TOTALS	2025	400	39	10	2	2476	2992	1.21

WESTBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	477	64	9	2	1	553	645	1.17
1030-1130	546	109	10	3	0	668	806	1.21
1230-1330	587	131	9	3	3	733	903	1.23
1430-1530	629	154	8	9	1	801	1002	1.25
TOTALS	2239	458	36	17	5	2755	3356	1.22

INTERSECTION: US 30 & ILLINOIS 47

EASTBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	64	11	2	2	0	79	100	1.27
1030-1130	37	15	0	0	0	52	67	1.29
1230-1330	52	7	2	0	0	61	72	1.18
1430-1530	66	12	3	0	0	83	101	1.22
TOTALS	221	45	7	2	0	275	340	1.24

WESTBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	77	8	1	0	0	86	96	1.12
1030-1130	37	10	2	0	0	49	63	1.29
1230-1330	36	16	1	1	0	54	75	1.39
1430-1530	140	31	7	2	0	180	231	1.28
TOTALS	290	65	11	3	0	369	465	1.26

INTERSECTION: ILLINOIS 53 & ILLINOIS 7

NORTHBOUND

TIME	PERSONS IN VEHICLE				TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4			
0730-0830	520	68	14	5	607	718	1.18
1030-1130	204	62	2	2	270	342	1.27
1230-1330	234	83	9	3	329	439	1.33
1430-1530	382	111	16	6	516	681	1.32
TOTALS	1340	324	41	16	1722	2180	1.27

SOUTHBOUND

TIME	PERSONS IN VEHICLE				TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4			
0730-0830	347	52	5	2	406	474	1.17
1030-1130	224	59	11	1	296	384	1.30
1230-1330	211	86	20	1	319	452	1.42
1430-1530	401	89	14	4	508	637	1.25
TOTALS	1183	286	50	8	1529	1947	1.27

INTERSECTION: HALSTED & STEGER

NORTHBOUND

TIME	PERSONS IN VEHICLE				5 VEHICLES	TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4				
0730-0830	292	37	1	0	0	330	369	1.12
1030-1130	204	69	12	0	1	286	383	1.34
1230-1330	197	75	10	2	0	284	385	1.36
1430-1530	186	79	8	3	0	276	380	1.38
TOTALS	879	260	31	5	1	1176	1517	1.29

SOUTHBOUND

TIME	PERSONS IN VEHICLE				5	6 VEHICLES	TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4					
0730-0830	188	36	7	3	0	0	234	293	1.25
1030-1130	209	82	4	1	0	1	297	395	1.33
1230-1330	215	70	10	2	0	0	297	393	1.32
1430-1530	251	90	16	4	4	0	365	515	1.41
TOTALS	863	278	37	10	4	1	1193	1536	1.34



INTERSECTION: ILLINOIS 21 & US 45

NORTHBOUND

TIME	PERSONS IN VEHICLE				TOTAL VEHICLE	TOTAL PERSONS	OCCUPANCY RATE
	1	2	3	4			
0730-0830	614	40	0	1	655	698	1.07
1030-1130	392	88	7	4	491	605	1.23
1230-1330	528	148	14	6	696	890	1.28
1430-1530	491	96	3	3	593	704	1.19
TOTALS	2025	372	24	14	2435	2897	1.19

SOUTHBOUND

TIME	PERSONS IN VEHICLE				TOTAL VEHICLE	TOTAL PERSONS	OCCUPANCY RATE
	1	2	3	4			
0730-0830	897	77	4	2	980	1071	1.09
1030-1130	395	90	3	0	488	584	1.20
1230-1330	570	135	16	13	734	940	1.28
1430-1530	584	157	10	7	760	966	1.27
TOTALS	2446	459	33	22	2962	3561	1.20

INTERSECTION: ILLINOIS 64 & ILLINOIS 53

EASTBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	1274	71	4	0	0	1349	1428	1.06
1030-1130	596	122	7	3	0	728	873	1.20
1230-1330	636	175	3	1	0	815	999	1.23
1430-1530	569	76	4	0	0	649	733	1.13
TOTALS	3075	444	18	4	0	3541	4033	1.14

WESTBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	881	65	13	4	1	964	1071	1.11
1030-1130	592	113	7	2	0	714	847	1.19
1230-1330	664	134	17	5	0	820	1003	1.22
1430-1530	619	144	9	0	1	773	939	1.21
TOTALS	2756	456	46	11	2	3271	3860	1.18

INTERSECTION: ILLINOIS 53 & 75th STREET

NORTHBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	821	81	3	2	1	908	1005	1.11
1030-1130	247	81	12	3	0	343	457	1.33
1230-1330	356	119	14	6	0	495	660	1.33
1430-1530	419	99	23	6	1	548	715	1.30
TOTALS	1843	380	52	17	2	2294	2837	1.24

SOUTHBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	455	37	5	2	0	499	552	1.11
1030-1130	240	33	2	0	0	275	312	1.13
1230-1330	352	117	6	8	0	483	636	1.32
1430-1530	453	110	18	7	4	592	775	1.31
TOTALS	1500	297	31	17	4	1849	2275	1.23

INTERSECTION: ILLINOIS 171 & ILLINOIS 83

NORTHBOUND

TIME	PERSONS IN VEHICLES				5 VEHICLES	TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4				
0730-0830	599	40	3	0	0	642	688	1.07
1030-1130	256	88	10	5	0	359	482	1.34
1230-1330	293	76	5	2	0	376	468	1.24
1430-1530	453	82	14	5	3	557	694	1.25
TOTALS	1601	286	32	12	3	1934	2332	1.21

SOUTHBOUND

TIME	PERSONS IN VEHICLES				5	6 VEHICLES	TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4					
0730-0830	418	44	11	4	0	0	477	555	1.16
1030-1130	259	78	8	2	0	0	347	447	1.29
1230-1330	266	79	14	1	0	0	360	470	1.31
1430-1530	655	133	5	8	0	1	802	974	1.21
TOTALS	1598	334	38	15	0	1	1986	2446	1.23

INTERSECTION: US 6 & ILLINOIS 43

EASTBOUND

TIME	PERSONS IN VEHICLES							TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5	6	7			
0730-0830	597	114	26	8	6	1	0	753	979	1.30
1030-1130	560	175	9	4	1	0	0	750	960	1.28
1230-1330	679	261	25	4	0	1	0	969	1298	1.34
1430-1530	628	116	23	2	2	0	0	771	947	1.23
TOTALS	2464	667	83	18	9	2	0	3243	4184	1.29

WESTBOUND

TIME	PERSONS IN VEHICLES							TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5	6	7			
0730-0830	628	82	14	2	1	0	0	727	847	1.17
1030-1130	614	227	26	1	2	1	0	870	1160	1.33
1230-1330	608	251	15	5	1	0	0	880	1180	1.34
1430-1530	655	202	23	6	3	0	0	889	1167	1.31
TOTALS	2505	762	78	14	7	1	0	3366	4354	1.29

INTERSECTION: TORRENCE AVE. & US 6

TIME	PERSONS IN VEHICLE					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	289	36	4	2	0	331	381	1.15
1030-1130	411	169	12	3	0	595	797	1.34
1230-1330	478	268	34	9	1	790	1157	1.46
1430-1530	560	302	36	17	6	921	1370	1.49
TOTALS	1738	775	86	31	7	2637	3705	1.41

TIME	PERSONS IN VEHICLE					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	361	68	6	2	0	437	523	1.20
1030-1130	519	262	15	6	0	802	1112	1.39
1230-1330	604	287	28	8	1	928	1299	1.40
1430-1530	519	252	34	14	3	822	1196	1.45
TOTALS	2003	869	83	30	4	2989	4130	1.38

INTERSECTION: US 41 & FOSTER AVENUE

NORTHBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	401	90	4	1	0	496	597	1.20
1030-1130	303	71	6	1	0	381	467	1.23
1230-1330	291	104	6	3	0	404	529	1.31
1430-1530	357	86	16	0	0	459	577	1.26
TOTALS	1352	351	32	5	0	1740	2170	1.25

SOUTHBOUND

TIME	PERSONS IN VEHICLES					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	146	11	15	6	1	179	242	1.35
1030-1130	476	123	13	5	0	617	781	1.27
1230-1330	455	119	14	1	0	589	739	1.25
1430-1530	508	165	20	5	0	698	918	1.32
TOTALS	1585	418	62	17	1	2083	2680	1.29

INTERSECTION: ILLINOIS 64 & ILLINOIS 43

EASTBOUND

TIME	PERSONS IN VEHICLES				TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4			
0730-0830	810	196	4	1	1011	1218	1.20
1030-1130	588	161	12	1	762	950	1.25
1230-1330	590	200	10	3	803	1032	1.29
1430-1530	789	238	18	10	1055	1359	1.29
TOTALS	2777	795	44	15	3631	4559	1.26

WESTBOUND

TIME	PERSONS IN VEHICLES				TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4			
0730-0830	673	114	10	6	807	975	1.21
1030-1130	688	203	24	8	924	1203	1.30
1230-1330	609	203	17	4	838	1107	1.32
1430-1530	903	288	31	14	1243	1663	1.34
TOTALS	2873	808	82	32	3812	4948	1.30



INTERSECTION: ILLINOIS 50 & 63RD STREET

NORTHBOUND

TIME	PERSONS IN VEHICLE					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	1776	290	36	14	3	2119	2535	1.20
1030-1130	613	192	21	3	1	830	1077	1.30
1230-1330	589	236	26	6	1	858	1168	1.36
1430-1530	657	148	39	3	3	850	1097	1.29
TOTALS	3635	866	122	26	8	4657	5877	1.26

SOUTHBOUND

TIME	PERSONS IN VEHICLE					TOTAL VEHICLES	TOTAL PERSONS	TOTAL OCCUPANCY RATE
	1	2	3	4	5			
0730-0830	642	152	21	7	2	824	1047	1.27
1030-1130	587	217	13	3	1	821	1077	1.31
1230-1330	649	221	17	13	2	902	1204	1.33
1430-1530	950	284	14	19	3	1270	1651	1.30
TOTALS	2828	874	65	42	8	3817	4979	1.30

INTERSECTION: US 41 & 87TH STREET

NORTHBOUND

TIME	PERSONS IN VEHICLE					TOTAL OCCUPANCY RATE	
	1	2	3	4	5	TOTAL VEHICLES	TOTAL PERSONS
0730-0830	341	22	10	8	0	381	447
1030-1130	117	54	7	2	2	182	264
1230-1330	113	46	6	5	2	170	245
1430-1530	155	54	6	4	1	220	302
TOTALS	726	176	29	17	5	953	1258

SOUTHBOUND

TIME	PERSONS IN VEHICLE					TOTAL OCCUPANCY RATE	
	1	2	3	4	5	TOTAL VEHICLES	TOTAL PERSONS
0730-0830	105	22	8	6	1	0	143
1030-1130	107	43	10	0	0	1	167
1230-1330	110	60	11	0	3	0	186
1430-1530	262	60	21	2	1	2	355
TOTALS	584	199	50	8	5	3	851



