REPORT

PARKING STUDY FOR THE CENTRAL BUSINESS DISTRICT CITY OF AMES IOWA

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INTRODUCTION

A PARKING SPACE OR SOME OTHER TYPE OF TERMINAL FACILITY IS ONE OF THE ESSENTIAL ELEMENTS WITHOUT WHICH NO MEDIUM OF TRANSPORTATION CAN OPERATE EFFECTIVELY. THE VALUE OF RAIL, WATER AND AIR TRANSPORTATION SYSTEMS WOULD BE SEVERELY DIMINISHED WITHOUT SUCH TERMINAL ACCOMMODATIONS AS STATIONS, HARBOR FACILITIES AND AIRPORTS. SIMILARLY, THE WORTH OF THE MOTOR VEHICLE WOULD BE GREATLY REDUCED WITHOUT A PLACE TO PARK AT THE END OF A TRIP.

TODAY THE SUPPLY OF CONVENIENT PARKING SPACE IS INADEQUATE IN MOST CENTRAL BUSINESS AREAS. THIS SITUATION MUST BE REMEDIED IF THE SPEED, ECONOMY AND CONVENIENCE OF COMPLETE TRANSPORTATION SERVICE FROM ORIGIN TO DESTINATION IS EVER TO BE FULLY REALIZED. UNLESS A DRIVER CAN FIND A PARKING SPACE FOR HIS VEHICLE FAIRLY CLOSE TO HIS DESTINATION, THE MOST IMPORTANT ASSET OF THE AUTOMOBILE, CONVENIENCE, IS NEGATED. BUT, DUE TO THE NATURE OF DOWNTOWN BUSINESS AREAS, THE PROVISION OF ADDITIONAL SPACE FOR CONVENIENT PARKING IS DIFFICULT TO ACHIEVE. THIS IS THE CRUX OF THE PARKING PROBLEM.

THIS PROBLEM IS OF VITAL CONCERN NOT ONLY TO THE MOTORIST BUT TO THE BUSINESSMAN AND THE CITY OFFICIAL AS WELL. THE BUSINESSMAN DEPENDS UPON HIS CUSTOMERS FOR HIS LIVELIHOOD. SINCE THE PEOPLE WHO HOLD THE PURCHASING POWER TRAVEL TO THE BUSINESS DISTRICT IN THEIR AUTOMOBILES, THE PROSPERITY OF EACH BUSINESSMAN DEPENDS UPON THE CAPACITY OF THE BUSINESS AREA TO ABSORB MOTOR VEHICLES DESIRING PARKING THEREIN. THE CITY OFFICIAL IS CERTAINLY CONCERNED WITH ANY PROBLEM AFFECTING THE WELFARE OF THE CITIZENS HE SERVES.

To avoid compounding existing parking problems, communities must determine the facts relative to the present parking situation in the central business area and, based upon an analysis of these facts, formulate and enact a plan for the future provision of adequate parking facilities. An adequate supply of conveniently located parking space is a must for the preservation of the central business district as an effective area in which to conduct business and provide shopping facilities. The lack of sufficient convenient parking will result in severe congestion which can choke and stagnate a compact business area. This is one of the principal reasons for the growth of outlying shopping centers where people can find plenty of easily accessible free parking while satisfying their shopping and business needs.

A detailed survey of the parking situation in the central business district of Ames was made in 1956. The analysis of the data accumulated dealt with the volume and character of parking needs, the function and operation of parking facilities and the parking habits, patterns and behavior of motorists in the area. This survey provided the basis for the development of parking programs and policies to better serve the downtown parking needs.

Since the 1956 survey, there have been several changes in the parking operation within the Ames business area. The shortening of the legal parking duration in some locations, more strict enforcement of legal parking limits and the provision of more off-street parking space are but a few of the changes. However, the parking problem has not been completely solved. More parking space, conveniently located with respect to the major

PARKING GENERATORS IN THE CENTRAL BUSINESS DISTRICT, IS STILL NEEDED.

In addition to the aforementioned changes in the parking operation, there have been other changes which have modified the downtown transportation pattern since the previous survey. The increased number of motor vehicle registrations and the greater usage of the automobile in transacting everyday business are two important factors which have influenced this pattern. Such changes as the relocation of existing businesses and the inception and cessation of others have also affected this pattern. In view of the above, and since the 1956 parking survey could accurately reveal only the parking conditions and demands existing at that time, it seems advisable to make a current reappraisal of the downtown parking situation.

Even though this study is an insight into just a few characteristics of the downtown parking situation, nevertheless, it is a valuable tool in the solution of the Ames parking problem. The information presented can be used as a guide in determining the location, size, type and regulation of new parking facilities to serve the central business district most effectively. It can also be used as a basis for the modification and improvement of present parking policies.

PURPOSE AND SCOPE

The purpose of this study is the collection and compilation of data from which an evaluation of the adequacy of the parking operation in the central business district can be made. Such an evaluation furnishes a basis for the adjustment of present parking policies and serves as a guide in the formulation of future programs of parking facility expansion and development.

The specific aspects of the parking operation considered by this study are the volume, character and pattern of the generated parking demand and the quantity, type and hourly occupancy of the existing parking facilities in the business area. In order that the investigation of each of these aspects may be organized, the study was divided into the following phases:

1. Cordon interview of all vehicles coming into the downtown area.
2. Survey of actual parking occupancy in the downtown area and fringe areas.
3. Complete parking space inventory of the downtown area and fringe areas.

The section of the City of Ames included in the study area is shown in Figure 1. This area encompasses the central business district and certain adjacent areas which will no doubt experience increased commercial development in the near future. An inner area where the land occupancy is most dense and parking demand is the greatest has been designated in Figure 1 as the core area.

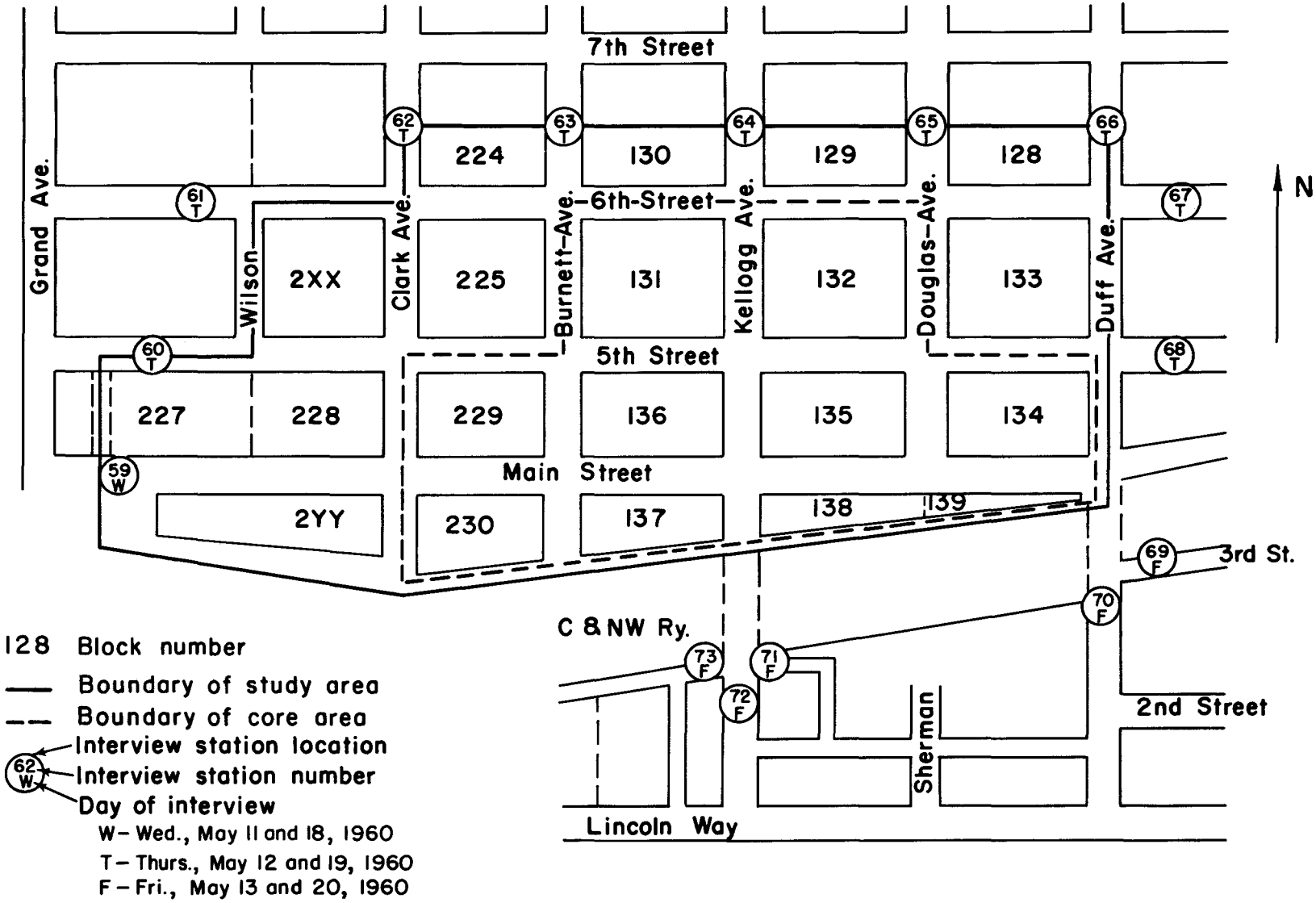

Figure 1. Area of study.

PROCEDURE

In May, 1960, the Iowa State Highway Commission made an origin and destination survey of Ames. A phase of this survey was the operation of fifteen interview stations on an inner cordon line surrounding the central business area. Since interview data taken as a part of this survey could also be used to determine certain characteristics of the parking demand generated by the business district without too much additional effort, it was decided to coordinate a parking study of the downtown area with the Commission's survey.

In addition to the interview of all incoming motorists, other data was to be ascertained in conjunction with this parking study. Other phases of the parking study were an occupancy count of all vehicles parked in the study area and an inventory of all parking spaces whether public or private, free or metered, on-street or off-street located in the study area and adjacent fringe areas.

Therefore, it was essential that all phases of the study be coordinated so that the data accumulated could be readily and accurately compiled for analysis. To this end the study area was designated in single block units according to the City Ward Plot block numbering system shown in Figure 1. This system was supplemented by assigning a number to each block face; 1 for the south side, 2 for the east side, 3 for the north side and 4 for the west side. Thus the north side of Main Street between Burnett and Kellogg Avenues, which is the south face of Block 136, was designated Face 1. All data was collected with reference to the identification system.

Accordingly, the times and dates of the parking study were set to coincide with the operation of the inner cordon interview stations by personnel of the Iowa State Highway Commission. These times were 2 P.M. to 10 P.M. on Wednesday, Thursday and Friday, May 11, 12 and 13, 1960 and 6 A.M. to 2 P.M. on Wednesday, Thursday and Friday, May 18, 19 and 20, 1960.

However, these dates and times do have some inherent limitations. The study period did not include Saturday when the peak parking demand is generated by the heavy influx of shoppers nor did it include Monday when business hours are 12 Noon to 9 P.M. and the parking demand by people seeking entertainment is imposed upon the heavy evening shopper demand. It is recognized also that the study dates were very near the end of the Spring Quarter at Iowa State University and consequently, student activities in the business area were probably somewhat curtailed. For these reasons, the results of this study do not reflect the most critical parking conditions that could occur in the central business district.

Cordon Interview of Incoming Vehicles

As was previously mentioned, the data for this phase of the study was obtained in conjunction with the origin and destination survey conducted by the Iowa State Highway Commission. An interview station was established on each street entering the downtown area at or near the point where it crossed the boundary of the study area. Generally, these stations were located in such a manner as to cause the least disruption to the normal flow of traffic. The location, designation and days of operation of each interview station are shown in Figure 1.

The interviews were made over a period of sixteen hours from 6 A.M. to 10 P.M. but this period was not continuous. At each station the data was taken during two eight-hour shifts one week apart. Interviews were taken at Station 39 on Friday, May 20, 1960 from 6 A.M. to 2 P.M. and on Friday, May 13, 1960 from 2 P.M. to 10 P.M. All other stations north of the railroad tracks, which includes Stations 60 through 68, were operated on Wednesday, May 18, 1960 from 6 A.M. to 11:30 A.M. and on Wednesday, May 11, 1960 from 2 P.M. to 10 P.M. Interview stations south of the railroad tracks were operated on Thursday, May 19, 1960 from 6 A.M. to 2 P.M. and on Thursday, May 12, 1960 from 2 P.M. to 10 P.M.

On Wednesday, May 18, 1960 there were no interviews made at Stations 60 through 68 from 11:30 A.M. to 2 P.M. because of rain. At most of these stations there were very few interviews made after 10 A.M. due to the inclement weather. Rain also stopped interviewing at Stations 71 and 72 on May 19, 1960 from approximately 7:30 A.M. to 7:45 A.M. However, during these periods, a manual count of all vehicles passing the interview stations was made.

Each station was manned by a team of interviewers. All vehicles were stopped as they approached the station and the driver was asked a battery of questions. The two questions pertaining to this study were:

1. What is the trip destination?
2. What is the trip purpose?

In regard to these questions, only trips having a destination in the study area were considered by this report. Answers to the questions give an indication of the volume, nature and location of the parking demands

GENERATED WITHIN THE STUDY AREA.

IN MOST CASES THE REPLY TO QUESTION 1 WAS RECORDED AS A SPECIFIC ADDRESS OR A BUILDING NAME. REPLIES TO QUESTION 2 WERE RECORDED IN ONE OF THE FOLLOWING CATEGORIES:

WORK	RECREATION, SOCIAL OR CULTURAL
TRANSACT BUSINESS	EAT
DURING WORK	SHOP
MEDICAL OR DENTAL	SERVE PASSENGERS
SCHOOL	HOME

AT THE END OF EACH EIGHT-HOUR SURVEY PERIOD, THE INTERVIEW FORMS WERE COLLECTED AND ARRANGED CHRONOLOGICALLY FOR EACH STATION. UPON CONCLUSION OF THE SURVEY, THE INTERVIEW DATA WAS READY FOR COMPILATION.

THERE ARE CERTAIN CONDITIONS WHICH LIMIT THE COMPLETENESS OF THE DATA OBTAINED DURING THIS PHASE OF THE STUDY. ONE SUCH CONDITION IS THE RAIN WHICH HALTED ALL INTERVIEWING AT NINE STATIONS FOR ALMOST FOUR HOURS AND AT TWO OTHERS FOR APPROXIMATELY FIFTEEN MINUTES DURING THE MORNING RUSH HOUR. AS A RESULT, THERE ARE NO INTERVIEWS FOR MORE THAN 2500 INCOMING VEHICLES. AT LEAST HALF OF THIS NUMBER PROBABLY HAD A DESTINATION IN THE STUDY AREA. IN ADDITION, THE NUMBER OF TRIPS TAKEN WAS NO DOUBT BELOW THE VOLUME WHICH WOULD HAVE BEEN TAKEN UNDER NORMAL WEATHER CONDITIONS.

ANOTHER LIMITING CONDITION STEMS FROM THE FACT THAT INTERVIEW STATIONS WERE NOT OPERATED CONCURRENTLY. AS WAS MENTIONED PREVIOUSLY, INTERVIEWS WERE TAKEN AT STATION 59 ON FRIDAYS, INTERVIEWS AT OTHER STATIONS NORTH OF THE RAILROAD TRACKS WERE MADE ON WEDNESDAYS AND THE STATIONS SOUTH OF THE TRACKS WERE OPERATED ON THURSDAYS. THIS SITUATION MADE IT POSSIBLE FOR ANY MOTORIST TO CHANGE HIS ROUTE TO AND/OR FROM THE STUDY AREA AND THEREBY AVOID PASSING THROUGH AN ACTIVE INTERVIEW STATION. SINCE THE TOTAL VOLUME OF INCOMING VEHICLES THROUGH THE INTERVIEW STATIONS EXCEEDS THE TOTAL

VOLUME OF OUTGOING VEHICLES BY SLIGHTLY MORE THAN 1000 VEHICLES AND SINCE IT IS HIGHLY IMPROBABLE THAT THIS NUMBER OF VEHICLES WAS PARKED IN THE STUDY AREA AFTER 10 P.M., IT MAY BE PRESUMED THAT A CERTAIN AMOUNT OF AVOIDANCE ACTUALLY OCCURRED.

VOID INTERVIEWS IMPOSE STILL ANOTHER LIMITATION UPON THE DATA. FOR ONE REASON OR ANOTHER, A FEW OF THE INCOMING MOTORISTS WERE UNWILLING TO ANSWER SOME OR ALL OF THE INTERVIEW QUESTIONS. IN SOME INSTANCES, INTERVIEW DATA WAS IMPROPERLY OR INACCURATELY RECORDED. SUCH CIRCUMSTANCES RESULTED IN NEARLY 3000 VOID INTERVIEWS DURING THE ENTIRE STUDY PERIOD.

EACH OF THESE THREE CONDITIONS IMPAIR THE COMPLETENESS OF THE STUDY DATA. THEREFORE, IT SEEMS REASONABLE TO STATE THAT THE INFORMATION ASCERTAINED DURING THIS PHASE OF THE STUDY IS DEFINITELY CONSERVATIVE.

Parking Occupancy Survey

THIS PHASE OF THE STUDY WAS CONDUCTED BY PART-TIME PERSONNEL UNDER THE DIRECTION OF THE PUBLIC WORKS DEPARTMENT. THE DATA WAS TAKEN ON WEDNESDAY, MAY 11 AND 18, 1960 FROM 2 P.M. TO 10 P.M. AND FROM 6 A.M. TO 2 P.M. RESPECTIVELY, AND ON THURSDAY, MAY 12 AND 19, 1960 FROM 2 P.M. TO 10 P.M. AND FROM 6 A.M. TO 2 P.M. RESPECTIVELY.

ON WEDNESDAYS, SURVEY TEAMS COUNTED THE NUMBER OF VEHICLES PARKED IN ON-STREET SPACES IN AN AREA BOUNDED BY GRAND AVENUE, THE SOUTH EDGE OF EIGHTH STREET, DUFF AVENUE AND THE RAILROAD TRACKS. ON THIS SAME DAY, ALL VEHICLES PARKED IN OFF-STREET SPACES WERE COUNTED IN AN AREA BOUNDED BY CLARK AVENUE, SIXTH STREET, DUFF AVENUE AND THE RAILROAD TRACKS. THE LIBRARY PARKING LOT WAS ALSO INCLUDED IN THIS OFF-STREET COUNT. ON THURSDAYS, ON-STREET AND OFF-STREET COUNTS WERE MADE IN AN AREA BOUNDED BY THE

RAILROAD TRACKS, DUFF AVENUE, LINCOLN WAY AND WALNUT AVENUE.

PATROL ROUTES WERE SET UP TO COMPLETELY COVER ALL ON-STREET AND OFF-STREET PARKING IN THE ABOVE AREAS. THERE WERE FOUR ON-STREET ROUTES AND ONE OFF-STREET ROUTE SET UP IN THE PARKING STUDY AREA. ON THE DATES AND TIMES NOTED ABOVE, A TEAM, CONSISTING OF A DRIVER AND A RECORDER, USING A PATROL VEHICLE, TRAVERSED AN ASSIGNED ROUTE ONCE EACH HOUR. ALL PARKED VEHICLES ON EACH BLOCK FACE OR IN AN OFF-STREET AREA, AS THE CASE MAY BE, WERE PROPERLY RECORDED ON A MAP. A DIFFERENT MAP WAS USED FOR EACH HOUR IN THE STUDY PERIOD. THE DATA OBTAINED GIVES AN INDICATION OF PARKING SPACE USAGE FOR EACH BLOCK IN THE STUDY AREA AND SURROUNDING FRINGE AREAS.

PARKING SPACE INVENTORY

THIS PHASE OF THE STUDY WAS CONDUCTED AFTER THE PRECEDING TWO PHASES BUT WAS ADJUSTED TO ACCURATELY REFLECT THE PARKING SPACE CONDITIONS PRESENT DURING MAY, 1960. THROUGH THE USE OF MAPS FURNISHED BY THE PUBLIC WORKS DEPARTMENT, AN INVENTORY WAS MADE OF ALL CITY-OWNED OR POLICED OFF-STREET PARKING LOTS AND ALL MARKED ON-STREET PARKING STALLS LOCATED IN THE STUDY AREA AND ADJACENT FRINGE AREAS. STREETS HAVING NO MARKED PARKING STALLS WERE SURVEYED AND AN APPROXIMATION WAS MADE OF THE PARKING CAPACITY ALONG EACH BLOCK FACE. FINALLY, ALL PRIVATE PARKING AREAS WERE CANVASSED FOR THE PURPOSE OF OBTAINING AN ESTIMATE OF THE PARKING CAPACITY OF EACH LOT.

THIS INVENTORY LOCATED, TALLIED AND DETERMINED THE CHARACTERISTICS OF ALL TYPES OF PARKING SPACES AVAILABLE WITHIN THE STUDY AREA AND ADJACENT FRINGE AREAS.

COMPILATION OF DATA

After the operations of collecting the study data were completed, the mass of accumulated information for each phase was compiled and organized. In the compilation, pertinent data was calculated, refined and coordinated in tables and on maps for purposes of easy analysis.

Cordon Interview of Incoming Vehicles

The purpose of this phase of the study was to ascertain the volume and nature of all trips generated by each block face within the study area. To obtain this information, the data was compiled from the origin and destination interview sheets.

To simplify the compilation, various trip purposes were consolidated into four groups. Group A includes trips to work or to school; Group B includes trips to transact business, during work or to medical or dental services; Group C includes trips to shop; Group D includes trips to recreation, to social or cultural activities, to eat, to serve passengers, or to home. Group A encompasses most motorists requiring long-time or all-day parking. Those in the other three groups require intermediate or short-time parking and therefore, are termed short-time parkers for purposes of this study.

The trips coming to each block face in the study area for a particular purpose during each hour of the study period were tabulated from the interview sheets. The data was then arranged and compiled to point up certain relevant characteristics of the parking demand in the central business area.

Table 1 shows the sixteen-hour total incoming parking demand by trip purpose for each block, the entire study area and the core area. The hourly parking demand by trip purpose for the study area is tabulated in Table 2. Similar information for the core area is presented in Table 3. The total, short-time and cumulative incoming hourly parking demand on each block in the study area is compiled in Tables 4, 5 and 6 respectively. The data shown in these tables has been plotted for each block, Figures 6 to 25, Appendix. The hourly incoming parking demand by trip purpose and the sixteen-hour cumulative parking demand for each block face in the study area are presented in Tables 10 through 28, Appendix. These tables are arranged numerically block by block.

Other data has been compiled on maps showing the designated blocks in the core and study areas. The total incoming parking demand and the maximum incoming parking demand on each block are shown along with the total parking space available on each block in Figures 2 and 3 respectively. Figure 4 shows the maximum incoming hourly demand on each block face and the total on-street parking space available on the corresponding block face.

Parking Occupancy Survey

The objective of this phase of the study was to determine the hourly occupancy for each block in the study area. The required information was compiled from the maps on which the raw data was recorded. The number of vehicles parked on each block in the core area and the study area during each hour of the study period is shown in Table 7. The data in this table was also plotted in Figures 6 to 25, Appendix.

Parking Space Inventory

In this phase of the survey, the number, location and type of parking spaces in the study area and adjacent fringe areas were ascertained. Compilation of the data was made in Tables 8 and 9 and Figure 5.

Table 8 shows the number of on-street and off-street public parking spaces and the total number of public and private spaces available in the entire study area and the core area. This table also shows the number of public and private twenty-four-hour stalls in both the areas. The quantity of various types of on-street and off-street parking spaces available on each block is shown in Table 9. From this table, the quantity of space open to public parking and the total of all parking space available on each block has been determined and the data is plotted in Figures 6 to 25, Appendix. Figure 5 shows the location, designation and legal parking limit of all on-street and off-street metered parking stalls in the core area.

TABLE 1. TOTAL INCOMING PARKING DEMAND BY TRIP PURPOSE FOR EACH BLOCK IN THE STUDY AREA

BLOCK	TRIP PURPOSE A[A]	B[B]	C[C]	D[D]	TOTAL
128	5	36	1	23	65
129	16	18	0	38	72
130	2	5	0	19	26
131C[E]	196	902	6	94	1198
132C	109	155	297	153	714
133	20	79	9	68	176
134C	77	125	21	424	647
135C	198	373	97	71	739
136C	137	283	562	139	1121
137C	92	128	401	26	647
138C AND 139C	97	106	75	115	393
224	4	6	0	27	37
225	31	4	0	58	93
2XX	257	44	0	145	446
227 AND 228	115	221	7	71	414
229C	32	37	19	147	235
230C	41	133	61	125	360
2YY	22	47	9	3	81
TOTAL FOR STUDY AREA	1451	2702	1565	1746	7464
TOTAL FOR CORE AREA	979	2242	1539	1294	6054

[A]PURPOSE OF TRIP WAS TO WORK OR TO SCHOOL.

[B]PURPOSE OF TRIP WAS TO TRANSACT BUSINESS, TO MEDICAL OR DENTAL SERVICES, OR DURING WORK.

[C]PURPOSE OF TRIP WAS TO SHOP.

[D]PURPOSE OF TRIP WAS TO RECREATION, TO SOCIAL OR CULTURAL ACTIVITIES, TO EAT, TO SERVE PASSENGERS, OR TO HOME.

[E]"C" DENOTES BLOCKS IN THE CORE AREA.

TABLE 2. TOTAL INCOMING HOURLY PARKING DEMAND BY TRIP PURPOSE FOR THE STUDY AREA

HOUR	TRIP PURPOSE A[A]	B[B]	C[C]	D[D]	TOTAL
6	79	15	0	17	111
7	377	103	10	97	587
8	421	253	41	115	830
9	72	302	161	30	565
10	46	218	133	25	422
11	26	106	71	72	275
NOON	64	95	74	67	300
1	28	124	90	28	270
2	48	302	162	43	555
3	57	289	172	85	603
4	68	339	239	155	801
5	58	164	178	212	611
6	35	108	78	204	426
7	45	127	81	256	509
8	16	106	67	172	361
9	11	51	8	168	238
TOTAL FOR STUDY AREA	1451	2702	1565	1746	7464

[A]PURPOSE OF TRIP WAS TO WORK OR TO SCHOOL.

[B]PURPOSE OF TRIP WAS TO TRANSACT BUSINESS, TO MEDICAL OR DENTAL SERVICES, OR DURING WORK.

[C]PURPOSE OF TRIP WAS TO SHOP.

[D]PURPOSE OF TRIP WAS TO RECREATION, TO SOCIAL OR CULTURAL ACTIVITIES, TO EAT, TO SERVE PASSENGERS, OR TO HOME.

TABLE 3. TOTAL INCOMING HOURLY PARKING DEMAND BY TRIP PURPOSE FOR THE CORE AREA

HOUR	TRIP PURPOSE A[A]	B[B]	C[C]	D[D]	TOTAL
6	52	10	0	16	78
7	243	83	9	42	377
8	267	213	40	34	554
9	62	256	158	20	496
10	34	189	131	20	374
11	17	90	70	57	234
NOON	37	82	72	50	241
1	23	107	88	22	240
2	38	238	160	35	471
3	47	218	169	53	487
4	44	279	234	107	664
5	37	135	176	156	504
6	22	95	77	172	366
7	35	105	81	211	432
8	10	97	67	152	326
9	11	45	7	147	210
TOTAL FOR CORE AREA	979	2242	1539	1294	6054

[A]PURPOSE OF TRIP WAS TO WORK OR TO SCHOOL.

[B]PURPOSE OF TRIP WAS TO TRANSACT BUSINESS, TO MEDICAL OR DENTAL SERVICES, OR DURING WORK.

[C]PURPOSE OF TRIP WAS TO SHOP.

[D]PURPOSE OF TRIP WAS TO RECREATION, TO SOCIAL OR CULTURAL ACTIVITIES, TO EAT, TO SERVE PASSENGERS, OR TO HOME.

TABLE 4. TOTAL INCOMING HOURLY PARKING DEMAND ON EACH BLOCK IN THE STUDY AREA

HOUR	128	129	130	131	132	133	134	135	136	137	138 AND 139	224	225	2XX	227 AND 228	229	230	2YY	TOTAL FOR STUDY AREA	TOTAL FOR CORE AREA
6	0	3	0	18	2	4	5	15	9	4	13	1	1	3	10	5	7	11	111	78
7	0	8	1	88	42	6	29	87	41	19	26	1	29	105	53	5	40	7	587	377
8	4	6	1	157	48	6	35	84	93	51	50	0	33	172	50	8	28	3	830	554
9	4	1	0	129	50	12	19	59	100	81	23	2	0	8	35	7	28	7	565	496
10	7	4	1	77	31	4	23	61	97	47	16	0	2	8	19	6	16	3	422	374
11	5	3	0	27	15	5	34	26	50	46	21	1	1	8	15	3	12	3	275	234
NOON	1	1	0	29	15	6	29	25	67	40	17	0	2	29	16	2	17	4	300	241
1	1	1	0	24	22	12	11	33	72	36	21	0	2	2	9	3	18	3	270	240
2	4	1	2	89	36	18	26	69	115	79	32	1	2	14	35	9	16	7	555	471
3	6	1	1	97	47	20	43	65	88	70	37	0	7	33	39	15	25	9	603	487
4	9	8	2	124	80	32	66	85	126	93	43	3	6	27	44	9	38	6	801	664
5	10	12	6	83	75	13	67	47	106	60	36	10	2	17	30	13	17	7	611	504
6	3	4	3	64	83	8	60	22	54	5	20	7	5	3	22	26	32	5	426	366
7	2	18	7	75	96	12	52	33	44	10	17	8	0	7	19	75	30	4	509	432
8	4	1	2	72	65	11	60	18	40	4	10	2	1	4	9	28	29	1	361	326
9	4	0	0	45	7	7	88	10	19	2	11	1	0	6	9	21	7	1	238	210
TOTAL	65	72	26	1198	714	176	647	739	1121	647	393	37	93	446	414	235	360	81	7464	6054

TABLE 5. SHORT-TIME[A] INCOMING HOURLY PARKING DEMAND ON EACH BLOCK IN THE STUDY AREA

HOUR	128	129	130	131	132	133	134	135	136	137	138 AND 139	224	225	2XX	227 AND 228	229	230	2YY	TOTAL FOR STUDY AREA	TOTAL FOR CORE AREA
6	0	1	0	5	1	2	1	2	3	1	9	1	0	0	1	0	4	1	32	26
7	0	3	0	37	11	1	9	20	13	7	9	0	20	33	17	2	26	2	210	134
8	4	3	1	103	27	3	18	32	44	23	17	0	19	62	29	5	18	1	409	287
9	4	1	0	112	46	11	17	46	95	68	19	1	0	7	28	5	26	7	493	434
10	7	2	0	70	28	4	22	51	92	47	10	0	2	2	16	4	16	3	376	340
11	5	2	0	25	15	4	28	24	50	43	17	1	1	5	11	3	12	3	249	217
NOON	1	1	0	27	11	5	26	21	58	37	11	0	2	8	13	0	13	2	236	204
1	1	1	0	24	21	11	10	28	64	31	19	0	1	1	7	2	18	3	242	217
2	4	1	2	80	31	17	24	64	111	72	30	1	2	7	33	7	14	7	507	433
3	6	1	1	86	42	20	34	59	84	69	33	0	5	26	39	10	23	8	546	440
4	8	8	2	115	72	30	62	80	116	89	42	3	5	16	35	7	37	6	733	620
5	8	10	6	76	69	13	65	41	103	56	31	9	2	5	26	10	16	7	553	467
6	2	3	3	59	78	7	58	19	52	4	17	6	3	1	18	25	32	4	391	344
7	2	18	7	71	86	10	49	28	44	5	11	8	0	6	13	74	29	3	464	397
8	4	1	2	72	61	11	60	17	37	3	10	2	0	4	4	28	28	1	345	316
9	4	0	0	40	6	7	87	9	18	0	11	1	0	6	9	21	7	1	227	199
TOTAL	60	56	24	1002	605	156	570	541	984	555	296	33	62	189	299	203	319	59	6013	5075

[A] INCLUDES ALL INCOMING TRIPS EXCEPT THOSE TO WORK OR TO SCHOOL.

TABLE 6. CUMULATIVE INCOMING HOURLY PARKING DEMAND ON EACH BLOCK IN THE STUDY AREA

HOUR	128	129	130	131	132	133	134	135	136	137	138 AND 139	224	225	2XX	227 AND 228	229	230	2YY	TOTAL FOR STUDY AREA	TOTAL FOR CORE AREA
6	0	3	0	18	2	4	5	15	9	4	13	1	1	3	10	5	7	11	111	78
7	0	11	1	106	44	10	34	102	50	23	39	2	30	108	63	10	47	18	698	455
8	5	17	2	263	92	16	69	186	143	74	89	2	63	280	113	18	75	21	1528	1009
9	9	18	2	392	142	28	88	245	243	155	112	4	63	288	148	25	103	28	2093	1505
10	16	22	3	469	173	32	111	306	340	202	128	4	65	296	167	31	119	31	2515	1879
11	21	25	3	496	188	37	145	332	390	248	149	5	66	304	182	34	131	34	2790	2113
NOON	22	26	3	525	203	43	174	357	457	288	166	5	68	333	198	36	148	38	3090	2354
1	23	27	3	549	225	55	185	390	529	324	187	5	70	335	207	39	166	41	3360	2594
2	27	28	5	638	261	73	211	459	644	403	219	6	72	349	242	48	182	48	3915	3065
3	33	29	6	735	308	93	254	524	732	473	256	6	79	382	281	63	207	57	4518	3552
4	42	37	8	859	388	125	320	609	858	566	299	9	85	409	325	72	245	63	5319	4216
5	52	49	14	942	463	138	387	656	964	626	335	19	87	426	355	85	262	70	5930	4720
6	55	53	17	1006	546	146	447	678	1018	631	355	26	92	429	377	111	294	75	6356	5086
7	57	71	24	1081	642	158	499	711	1062	641	372	34	92	436	396	186	324	79	6865	5518
8	61	72	26	1153	707	169	559	729	1102	645	382	36	93	440	405	214	353	80	7226	5844
9	65	72	26	1198	714	176	647	739	1121	647	393	37	93	446	414	235	360	81	7464	6054

TABLE 7. TOTAL HOURLY OCCUPANCY ON EACH BLOCK IN THE STUDY AREA

HOUR	128	129	130	131	132	133	134	135	136	137	138 AND 139	224	225	2XX	227 AND 228	229	230	2YY	TOTAL FOR STUDY AREA	TOTAL FOR CORE AREA
6	0	16	13	13	5	11	14	12	20	14	16	6	0	2	10	6	8	13	179	108
7	0	31	19	19	8	11	15	18	27	17	14	7	2	4	11	9	9	15	236	136
8	1	104	17	36	19	12	19	32	24	30	18	6	4	21	15	9	19	53	439	206
9	5	109	14	60	35	14	35	52	34	44	38	10	9	28	24	20	26	90	647	344
10	4	110	20	66	60	22	41	54	56	56	48	11	26	22	13	33	31	102	775	445
11	2	107	17	66	55	23	43	44	47	54	45	10	17	24	29	35	30	100	748	419
NOON	5	94	12	33	42	33	52	45	47	54	52	6	7	17	17	31	25	76	648	381
1	4	108	15	48	50	39	42	53	39	48	56	9	8	28	24	32	23	91	717	391
2	8	114	20	54	52	25	52	55	48	57	58	11	17	27	24	37	31	115	805	444
3	9	114	20	67	54	33	54	56	42	64	53	12	18	23	20	37	24	77	777	451
4	9	121	18	59	56	33	51	51	53	66	60	8	9	21	29	44	32	58	778	472
5	10	80	10	42	58	36	72	51	55	71	60	9	8	9	26	33	40	48	718	482
6	3	47	5	26	24	20	80	17	26	18	50	8	3	5	22	9	11	24	398	261
7	2	42	5	30	39	22	62	25	39	13	42	6	1	8	31	15	23	25	430	288
8	3	42	8	39	48	24	73	34	50	27	59	8	3	12	30	20	29	42	551	379
9	2	28	7	21	30	21	79	21	43	31	48	7	1	9	29	18	31	40	466	322
TOTAL	67	1267	220	679	635	379	784	620	650	664	717	134	135	260	354	388	392	969	9312	5529

TABLE 8. PARKING SPACE INVENTORY FOR THE STUDY AREA AND THE CORE AREA

		STUDY AREA	CORE AREA
ON-STREET PUBLIC PARKING SPACES			
NUMBER OF METERED STALLS		434	338
NUMBER OF UNMETERED STALLS		141	7
	TOTAL	575	345
OFF-STREET PUBLIC PARKING SPACES			
NUMBER OF STALLS IN LIBRARY LOT		99	0
NUMBER OF STALLS IN RAILROAD LOT		224	0
NUMBER OF STALLS IN FAREWAY LOT		50	50
NUMBER OF STALLS IN FIFTH STREET LOT		28	28
	TOTAL	401	78
TOTAL PUBLIC SPACES AVAILABLE		976	423
TOTAL PRIVATE SPACES AVAILABLE		370	251
	TOTAL	1346	674
TOTAL STALLS AVAILABLE FOR 24-HOUR PARKING			
PUBLIC		356	0
PRIVATE		370	251
	TOTAL	726	251

TABLE 9. ON-STREET AND OFF-STREET PARKING SPACE AVAILABLE ON EACH BLOCK IN THE STUDY AREA

BLOCK	ON-STREET PARKING		OFF-STREET PARKING		TOTAL
	METERED	UNMETERED	PUBLIC	PRIVATE	
128	11	0	0	3	14
129	10	13	99	12	134
130	12	9	0	15	36
131C[A]	18	0	0	81	99
132C	28	0	50	9	87
133	29	0	0	29	58
134C	42	0	28	25	95
135C	52	0	0	24	76
136C	44	0	0	17	61
137C	42	0	0	30	72
138C AND 139C	62	0	0	12	74
224	10	11	0	0	21
225	24	11	0	0	35
2XX	0	9	0	20	29
227 AND 228	0	59	0	40	99
229C	23	7	0	27	57
230C	27	0	0	26	53
2YY	0	22	224	0	246
TOTAL FOR STUDY AREA	434	141	401	370	1346
TOTAL FOR CORE AREA	338	7	78	251	674

[A]"C" DENOTES BLOCKS IN THE CORE AREA.

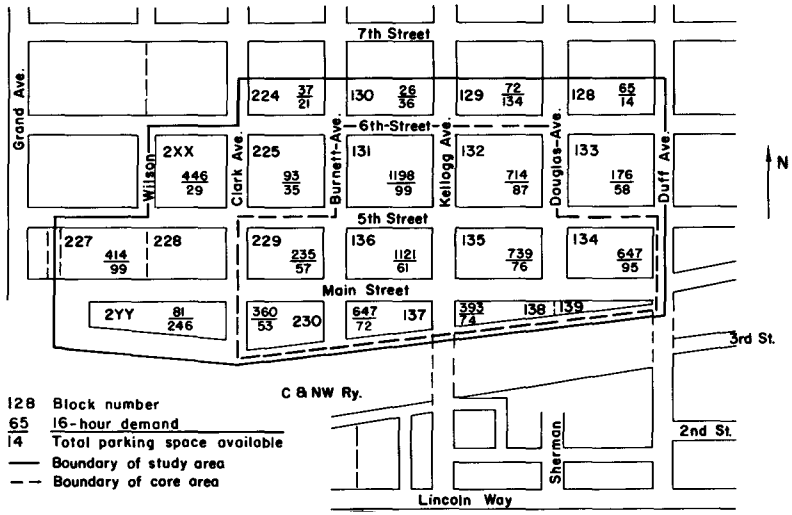

Figure 2. Total incoming demand vs. total parking space available on each block.

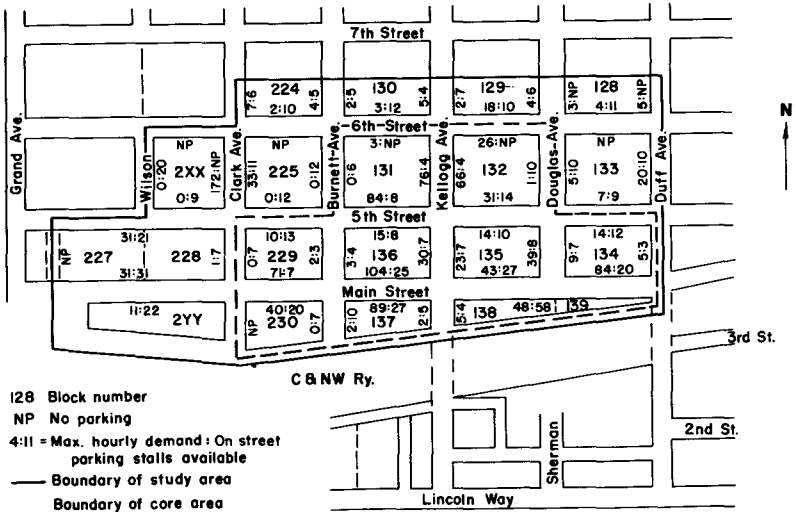

Figure 4. Maximum incoming hourly demand vs. on-street parking space available on each block face.

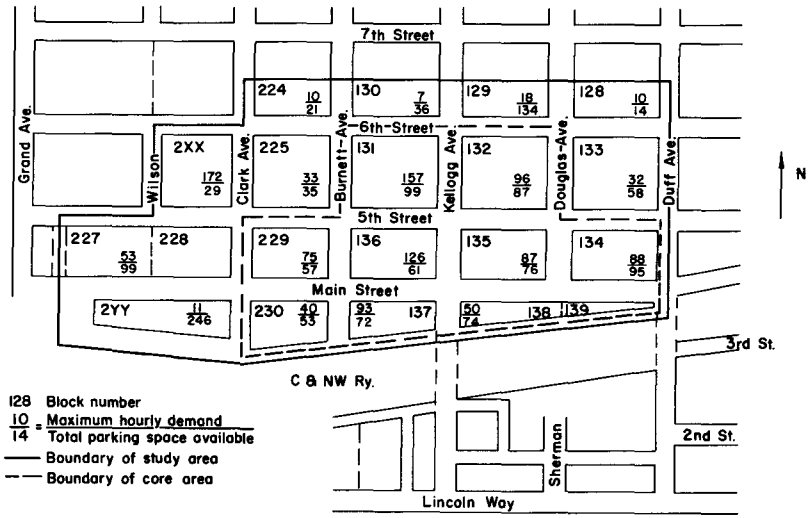

Figure 3. Maximum incoming hourly demand vs. total parking space available on each block.

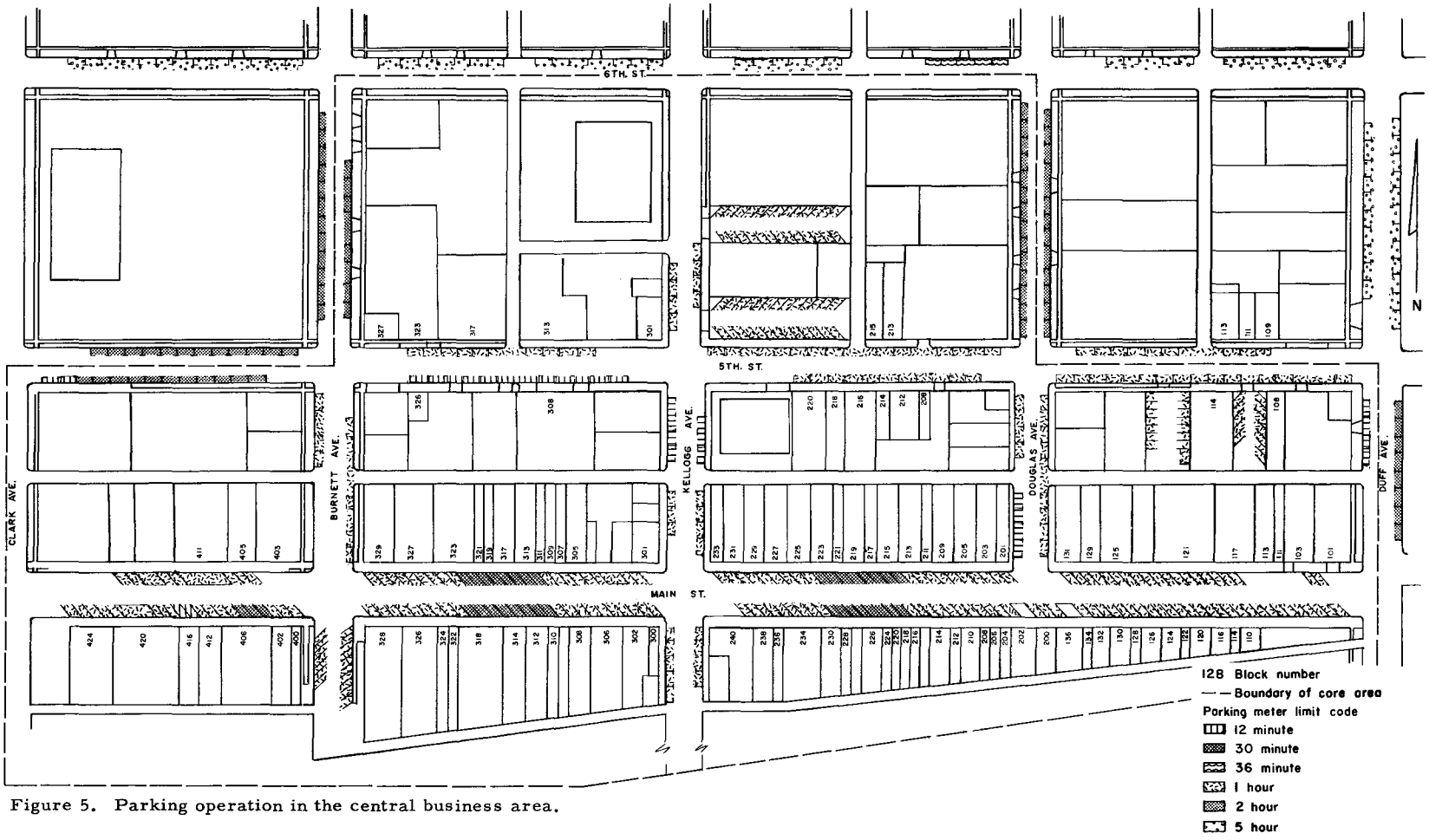

Figure 5. Parking operation in the central business area.

ANALYSIS OF DATA

It was mentioned earlier that the purpose of this study is to make an evaluation of the parking operation in the business district which can be used as a basis for adjusting present parking policies and serve as a guide in the formulation of future programs of parking facility expansion and development. Accordingly, the analysis of the large mass of data compiled in each of the various phases is developed to achieve this end.

In order to clarify the analysis, it is organized under the following headings which will be discussed separately:

1. General Parking Pattern
2. Existing Parking Situation

General Parking Pattern

The parking pattern exhibited by motorists coming into the study area varies quite markedly throughout the day. This variation is primarily dependent upon the trip purpose which influences not only the destination of the trip but also dictates the parking time required to fulfill the trip. In turn, the duration of parking time necessary to accomplish the trip objective is a major factor in determining where a motorist parks his vehicle. Generally, the longer the required parking time, the farther one must park from his destination. This is the underlying determinant of the parking pattern.

People coming into the business area to work usually desire long-time or all-day parking. The actual duration of parking required by these

PEOPLE, WHO HAVE BEEN CATEGORIZED IN GROUP A, RANGES FROM TWO TO THREE HOURS UP TO EIGHT OR NINE HOURS DEPENDING UPON INDIVIDUAL CIRCUMSTANCES. TRIPS IN THIS GROUP CONSTITUTE 16 PERCENT OF ALL TRIPS INBOUND TO THE CORE AREA AND 22 PERCENT OF ALL TRIPS INBOUND TO THE STUDY AREA. GROUP A TRIPS TO THE BUSINESS ESTABLISHMENTS IN BLOCKS 227 AND 228 AND TO THE JUNIOR AND SENIOR HIGH SCHOOLS ACCOUNT FOR MOST OF THE DIFFERENCE BETWEEN THE TWO PERCENTAGES.

TABLES 2 AND 3 SHOW THAT THERE WERE 979 GROUP A TRIPS TO THE CORE AREA AND 1451 GROUP A TRIPS TO THE STUDY AREA DURING THE STUDY PERIOD. USING THESE TABLES, IT CAN BE CALCULATED THAT BY 9 A.M. THERE WERE 562 GROUP A TRIPS TO THE CORE AREA AND 947 SIMILAR TRIPS TO THE STUDY AREA. CONSEQUENTLY, THE LONG-TIME PARKING SPACES, THE MAJORITY OF WHICH ARE LOCATED OUTSIDE THE CORE AREA, TABLE 8, ARE OCCUPIED BEFORE 9 A.M. AND REMAIN SO THROUGHOUT THE DURATION OF THE BUSINESS DAY.

OTHER MOTORISTS WHO HAVE BEEN CLASSIFIED IN GROUPS B, C OR D GENERALLY REQUIRE PARKING ACCOMMODATIONS FOR PERIODS UP TO TWO HOURS. HERE AGAIN, THE ACTUAL LENGTH OF PARKING TIME DEPENDS PRIMARILY UPON THE INDIVIDUAL SITUATION. A MOTORIST COMING INTO THE DOWNTOWN AREA TO SERVE PASSENGERS MAY NOT PARK AT ALL WHILE A PERSON WHOSE TRIP PURPOSE IS TO TRANSACT BUSINESS MAY NEED STORAGE SPACE FOR HIS VEHICLE FOR THREE HOURS OR LONGER. AS HAS BEEN PREVIOUSLY STATED, PEOPLE IN THESE THREE GROUPS HAVE BEEN CONSIDERED AS SHORT-TIME PARKERS.

THE ARRIVAL PATTERN OF EACH OF THESE THREE GROUPS OF PARKERS MAY BE ASCERTAINED FROM TABLES 2 AND 3. DURING THE SIXTEEN-HOUR STUDY PERIOD, GROUP B TRIPS TOTALED 2242 FOR THE CORE AREA AND 2702 FOR THE STUDY AREA.

THE HOURLY DISTRIBUTION OF THESE TRIPS SHOWS THAT ABOUT 62 PERCENT OF THESE TRIPS ARRIVED IN THE DOWNTOWN AREA BETWEEN THE HOURS OF 8 A.M. TO 11 A.M. AND 2 P.M. TO 5 P.M.

IN GROUP C, THERE WERE 1539 TRIPS TO THE CORE AREA AND 1565 TRIPS TO THE STUDY AREA. THE HOURLY TRIP DISTRIBUTION FOR THIS GROUP SHOWS THAT PEAK CONCENTRATIONS OCCURRED BETWEEN THE HOURS OF 9 A.M. TO 11 A.M. AND 2 P.M. TO 5 P.M. WHEN MORE THAN 60 PERCENT OF ALL SHOPPERS ARRIVED IN THE BUSINESS AREA.

MOTORISTS IN GROUP D ACCOUNTED FOR 1294 TRIPS TO THE CORE AREA AND 1746 TRIPS TO THE STUDY AREA. THE INCOMING PATTERN FOR THIS GROUP OF PARKERS IS QUITE DIFFERENT THAN FOR GROUPS B AND C. TABLES 2 AND 3 SHOW SIMILAR TRIP DISTRIBUTION PATTERNS FOR THE CORE AND STUDY AREAS WITH THE EXCEPTION OF THE PEAK FROM 8 A.M. TO 9 A.M. FOR THE STUDY AREA. THIS PEAK IS DUE TO TRIPS TO SERVE PASSENGERS DESTINED FOR THE JUNIOR AND SENIOR HIGH SCHOOLS. THE MOST SIGNIFICANT CONCENTRATION OCCURRED BETWEEN THE HOURS OF 4 P.M. TO 10 P.M. WHEN APPROXIMATELY 73 PERCENT AND 67 PERCENT OF ALL GROUP D TRIPS ARRIVED IN THE CORE AND STUDY AREAS RESPECTIVELY.

NATURALLY, THESE SHORT-TIME PARKERS DESIRE PARKING SPACE AS CLOSE TO THEIR DESTINATIONS AS POSSIBLE. IN GENERAL, THEY OCCUPY THE MOST CONVENIENT SPACES IN THE CORE AREA FIRST AND, AS THE PEAK CONCENTRATIONS ARE REACHED, THEY ARE FORCED TO PARK ON SURROUNDING BLOCKS OF THE STUDY AREA OR IN ADJACENT FRINGE AREAS. BECAUSE OF SIMILAR ARRIVAL PATTERNS, MOTORISTS IN GROUPS B AND C ARE MORE LIKELY TO EXPERIENCE GREATER DIFFICULTY FINDING A PARKING SPACE REASONABLY CLOSE TO THEIR RESPECTIVE DESTINATIONS THAN MOTORISTS IN GROUP D. SINCE THE MAJORITY OF GROUP D PARKERS ARRIVE

AFTER THOSE IN GROUPS A, B AND C HAVE DEPARTED, EXCEPT ON MONDAYS WHEN MOST BUSINESSES STAY OPEN UNTIL 9 P.M., THEY GENERALLY HAVE A BETTER OPPORTUNITY TO OBTAIN A CONVENIENT PARKING SPACE.

ANOTHER WAY TO DIAGNOSE THE PARKING PATTERN IN THE DOWNTOWN AREA, IS TO CONSIDER THE HOURLY OCCUPANCY FOR THE CORE AND STUDY AREAS AS SHOWN IN TABLE 7. NOTE THAT BETWEEN THE HOURS OF 7 A.M. TO 8 A.M. OCCUPANCY IN THE STUDY AREA INCREASED BY 233 VEHICLES WHILE OCCUPANCY IN THE CORE AREA INCREASED BY 70 VEHICLES. THE DIFFERENCE BETWEEN THESE VALUES, 163, IS THE NUMBER OF VEHICLES THAT PARKED WITHIN THE STUDY AREA BUT OUTSIDE THE CORE AREA. SINCE THE MAJORITY OF INCOMING PARKERS AT THIS HOUR REQUIRE LONG-TIME PARKING, TABLE 2, AND SINCE MOST LONG-TIME PARKING SPACES ARE LOCATED OUTSIDE OF THE CORE AREA, TABLE 8, THIS TENDS TO CORROBORATE THE PREVIOUS STATEMENT AS TO WHERE AND WHEN GROUP A MOTORISTS PARK.

EXISTING PARKING SITUATION

FOR REASONS PREVIOUSLY MENTIONED, THE PARKING DEMAND DISCLOSED BY THIS STUDY IS THOUGHT TO BE MODERATELY CONSERVATIVE. NEVERTHELESS, FROM THE INFORMATION COMPILED IN THIS STUDY, ONE CAN ASCERTAIN SOME VERY USEFUL RELATIONSHIPS BETWEEN PARKING DEMAND AND SPACE AVAILABILITY IN THE BUSINESS AREA. THIS SECTION WILL DISCUSS RELATIONSHIPS BETWEEN THE TYPE, LOCATION AND AMOUNT OF DEMAND AND THE TYPE, LOCATION AND AMOUNT OF PARKING SPACE AVAILABLE IN THE CORE AND STUDY AREAS AND ON CERTAIN BLOCKS OF ESPECIAL INTEREST.

DURING THE STUDY PERIOD, THERE WERE 6054 INBOUND TRIPS TO THE CORE AREA AS SHOWN BY TABLE 3. TABLE 3 GIVES AN HOUR BY HOUR BREAKDOWN BY TRIP

PURPOSE AND TOTAL OF INCOMING TRIPS TO THE CORE AREA. TABLE 6 INDICATES AN HOURLY CUMULATION OF ALL TRIPS TO THE CORE AREA. OF THE TOTAL INCOMING TRIPS, THERE WERE 16.2 PERCENT GROUP A TRIPS, 37.0 PERCENT GROUP B TRIPS, 25.4 PERCENT GROUP C TRIPS AND 21.4 PERCENT GROUP D TRIPS.

TABLE 4 SHOWS THAT THE PEAK INCOMING DEMAND IN THE CORE AREA OF 664 VEHICLES OCCURRED BETWEEN 4 P.M. AND 5 P.M. AND TABLE 5 INDICATES THAT 620 VEHICLES OR MORE THAN 93 PERCENT OF THE PEAK DEMAND WERE SHORT-TIME PARKERS. THERE ARE 674 PARKING SPACES AVAILABLE IN THE CORE AREA AS SHOWN BY TABLE 8. ALL THIS DATA, WITH THE EXCEPTION OF THE TRIP PURPOSE BREAKDOWN HAS BEEN PLOTTED IN FIGURE 24, APPENDIX.

AT FIRST GLANCE, THE NUMBER OF PARKING SPACES APPEARS TO BE SUFFICIENT TO ACCOMMODATE THE PEAK DEMAND. HOWEVER, ANOTHER LOOK MAY RAISE SUSPICIONS. ONLY 423 OF THE TOTAL SPACES ARE AVAILABLE TO THE PUBLIC. THE OTHER 251 SPACES ARE RESTRICTED FOR PRIVATE OFF-STREET PARKING. A FURTHER BREAKDOWN OF THE PUBLIC SPACES IN TABLE 8 REVEALS 338 ON-STREET METERED SPACES, 7 ON-STREET UNMETERED SPACES AND 78 OFF-STREET METERED SPACES. THE LEGAL PARKING LIMIT OF ALL METERED SPACES IN THE CENTRAL BUSINESS AREA, WHICH INCLUDES THE CORE AREA, IS SHOWN IN FIGURE 5.

SINCE 620 OF THE TOTAL PEAK DEMAND VEHICLES WERE SHORT-TIME PARKERS, THEY WERE PROBABLY NOT ELIGIBLE TO PARK IN PRIVATE STALLS. ASSUMING THAT THERE WERE NO HOLD-OVER PARKERS FROM THE PREVIOUS HOUR, A TURNOVER OF APPROXIMATELY 1.47 VEHICLES PER HOUR WOULD BE REQUIRED TO ACCOMMODATE THE PEAK DEMAND. IN OTHER WORDS, THE AVERAGE PARKING DURATION FOR THE SHORT-TIME PARKERS WOULD HAVE TO BE ABOUT FORTY MINUTES IF THE SPACES IN THE CORE AREA WERE TO SATISFY THE PEAK DEMAND.

[illegible] AVAILABILITY WAS MOST LIKELY OFFSET BY SOME MOTORISTS WHO PARKED FOR A VERY SHORT PERIOD AND BY OTHERS WHO UTILIZED SHORT-TIME SPACES ADJACENT TO THE CORE AREA. GENERALLY THEN, THE SPACE IN THE CORE AREA WAS PROBABLY ADEQUATE TO SERVE THIS PEAK DEMAND. HOWEVER, IT MUST BE REMEMBERED THAT THE DATA PRESENTED HEREIN IS DEFINITELY CONSERVATIVE. THERE ARE CERTAINLY TIMES WHEN THE SUPPLY OF CORE AREA PARKING SPACE IS COMPLETELY INADEQUATE TO SATISFY THE DEMAND BY SHORT-TIME PARKERS WHO DESIRE TO PARK WITHIN A REASONABLE WALKING DISTANCE OF THEIR DESTINATION.

INCOMING PARKING DEMAND IN THE STUDY AREA TOTALED 7464 VEHICLES DURING THE STUDY PERIOD AS SHOWN BY TABLE 2. A BREAKDOWN OF THIS TOTAL BY TRIP PURPOSE SHOWS 19.4 PERCENT GROUP A TRIPS, 36.2 PERCENT GROUP B TRIPS, 21.0 PERCENT GROUP C TRIPS AND 23.4 PERCENT GROUP D TRIPS. NOTE THAT THE PERCENTAGE OF GROUP A AND D TRIPS IS SLIGHTLY HIGHER FOR THE STUDY AREA THAN FOR THE CORE AREA WHILE THE PERCENTAGE OF GROUP B AND C TRIPS IS LOWER.

THE SIXTEEN-HOUR DEMAND AND OCCUPANCY PATTERN IN THE STUDY AREA IS SHOWN IN FIGURE 25. PEAK DEMAND IN THE STUDY AREA OCCURRED BETWEEN 8 A.M. AND 9 A.M. WHEN 830 VEHICLES ARRIVED. OF THE TOTAL, THERE WERE 421 MOTORISTS WHO, BY VIRTUE OF THEIR TRIP PURPOSE, INDICATED A NEED FOR LONG-TIME PARKING. THE REMAINING 409 MOTORISTS WERE CLASSED AS SHORT-TIME PARKERS.

IN THE STUDY AREA, THERE ARE 1346 PARKING SPACES AS SHOWN IN TABLE 8. A BREAKDOWN OF THE AVAILABLE SPACES SHOWS THAT THERE ARE 726 LONG-TIME SPACES IN THE STUDY AREA. THERE ARE ALSO ADDITIONAL LONG-TIME PARKING

SPACES IN THE FRINGE AREAS ADJACENT TO THE STUDY AREA. ACCORDINGLY, THERE APPEARS TO BE AN ADEQUATE SUPPLY OF LONG-TIME SPACE TO ACCOMMODATE THE CORRESPONDING DEMAND IF THIS GROUP OF PARKERS IS WILLING TO WALK UP TO THREE OR FOUR BLOCKS TO REACH THEIR RESPECTIVE DESTINATIONS.

THERE ARE CERTAIN BLOCKS IN THE BUSINESS AREA ON WHICH THE INCOMING HOURLY PARKING DEMAND EXCEEDS THE TOTAL SPACE AVAILABLE FOR THREE HOURS OR MORE DURING THE STUDY PERIOD. SUCH A SITUATION OCCURRED ON BLOCKS 2XX, 131, 135, 136 AND 137 AS CAN BE ASCERTAINED FROM FIGURES 6 TO 23, APPENDIX. A COMPARISON OF THE TOTAL PARKING SPACE AVAILABLE AND THE TOTAL AND MAXIMUM INCOMING DEMAND CAN EASILY BE OBTAINED FROM FIGURES 2 AND 3 FOR EACH BLOCK IN THE STUDY AREA. FIGURE 4, WHICH COMPARES THE MAXIMUM INCOMING HOURLY DEMAND AND THE ON-STREET PARKING SPACE AVAILABLE ON EACH BLOCK FACE, CAN ALSO BE USED TO LOCATE AREAS HAVING AN INADEQUATE SUPPLY OF PARKING.

ON BLOCK 2XX THERE ARE 29 PARKING SPACES. A BREAKDOWN OF THIS TOTAL SHOWS 9 ON-STREET PUBLIC SPACES AND 20 OFF-STREET PRIVATE SPACES, TABLE 9. FROM TABLE 4, IT CAN BE SEEN THAT AT 7 A.M., 8 A.M. AND 3 P.M. THE INCOMING DEMAND EXCEEDED THE QUANTITY OF PARKING SPACE AVAILABLE. TABLE 23, APPENDIX, SHOWS THAT BETWEEN 7 A.M. AND 9 A.M. THERE WERE 182 GROUP A PARKERS, 7 GROUP B PARKERS AND 88 GROUP D PARKERS. THIS TABLE ALSO SHOWS THAT BETWEEN 3 P.M. AND 4 P.M. THE MAJORITY OF INCOMING PARKERS WERE IN THE GROUP D CATEGORY.

THE SUPPLY OF LONG-TIME SPACES AVAILABLE IN THE RAILROAD LOT AND ADJACENT FRINGE AREAS SEEMS TO BE ADEQUATE TO MEET THE NEEDS OF THE GROUP A PARKERS PROVIDING THEY WERE WILLING TO WALK TWO OR THREE BLOCKS. SINCE THE

TRIP PURPOSE OF MOST GROUP D PARKERS WAS TO SERVE PASSENGERS, THEY PROBABLY DID NOT EXPERIENCE ANY PARKING DIFFICULTIES. GENERALLY, THE SUPPLY OF PARKING SPACE IS ADEQUATE TO MEET THE INCOMING DEMAND ON BLOCK 2XX.

ON BLOCK 131 THERE ARE 99 PARKING SPACES AVAILABLE OF WHICH 18 ARE ON-STREET PUBLIC SPACES AND 81 ARE OFF-STREET PRIVATE SPACES, TABLE 9. FIGURE 9, APPENDIX, SHOWS THAT THE TOTAL AND SHORT-TIME INCOMING PARKING DEMAND EXCEEDED THE TOTAL SPACE AVAILABLE AT 8 A.M., 9 A.M. AND 4 P.M. AND ALSO THAT THE SHORT-TIME DEMAND EXCEEDED THE PUBLIC SPACE AVAILABLE FROM 7 A.M. TO 10 P.M. IT CAN BE ASCERTAINED FROM TABLE 13, APPENDIX, THAT BETWEEN 7 A.M. AND 10 A.M. THERE WERE 122 LONG-TIME PARKERS AND 235 SHORT-TIME PARKERS. THE MAXIMUM DEMAND ON BLOCK FACE 1 OCCURRED FROM 9 A.M. TO 10 A.M. WHEN 84 VEHICLES ARRIVED. MAXIMUM DEMAND ON BLOCK FACE 2 WAS 74 INCOMING TRIPS BETWEEN 8 A.M. AND 9 A.M.

THE SUPPLY OF OFF-STREET PRIVATE SPACES ON BLOCK 131 WAS SUFFICIENT TO ACCOMMODATE APPROXIMATELY TWO-THIRDS OF THE LONG-TIME PARKERS ARRIVING BETWEEN 7 A.M. AND 10 A.M. THE REMAINING ONE-THIRD WERE PROBABLY ABLE TO FIND SUITABLE SPACE IN THE LIBRARY LOT OR ON ADJACENT BLOCKS IN THE FRINGE AREAS. IN ORDER FOR THE ON-STREET PUBLIC SPACES TO ADEQUATELY SERVE THE SHORT-TIME PARKERS, THE AVERAGE LENGTH OF PARKING BETWEEN 7 A.M. AND 10 A.M. COULD NOT EXCEED APPROXIMATELY FOURTEEN MINUTES. NO DOUBT THERE WERE MANY SHORT-TIME PARKERS WHO WERE UNABLE TO FIND SPACE ON BLOCK 131. SOME OF THESE MOTORISTS PROBABLY WERE ABLE TO PARK IN THE FAREWAY LOT OR IN METERED STALLS ON ADJACENT BLOCKS. OTHERS MAY HAVE HAD TO PARK ON FRINGE AREA BLOCKS TO THE NORTH OF THE STUDY AREA AND WALK TWO OR THREE BLOCKS OR

MORE TO REACH THEIR DESTINATION.

FIGURE 9, APPENDIX, SHOWS THAT FROM 2 P.M. TO 10 P.M. THE SHORT-TIME DEMAND WAS NOTABLY GREATER THAN THE QUANTITY OF SHORT-TIME PARKING SPACES. THE AVERAGE DEMAND DURING THIS PERIOD WAS 75 VEHICLES PER HOUR WHILE THE MAXIMUM AND MINIMUM DEMANDS WERE 115 AND 40 RESPECTIVELY, TABLE 5. IN ORDER FOR THE AVERAGE AND MAXIMUM DEMANDS TO BE ACCOMMODATED IN THE 18 PUBLIC SPACES AVAILABLE ON BLOCK 131, TURNOVER RATES OF ABOUT 4.2 VEHICLES PER HOUR AND 6.4 VEHICLES PER HOUR RESPECTIVELY, WOULD HAVE TO BE ACHIEVED. SINCE THE DURATION OF THE LEGAL PARKING LIMIT FOR THESE SPACES IS EITHER ONE OR TWO HOURS, FIGURE 5, IT IS DOUBTFUL THAT THE TURNOVER RATE WAS THIS HIGH.

THERE WERE ADDITIONAL SHORT-TIME SPACES AVAILABLE ON SURROUNDING BLOCKS BUT MOST OF THESE BLOCKS WERE ALSO EXPERIENCING A HEAVY SHORT-TIME DEMAND OF THEIR OWN. AS A RESULT, SOME SHORT-TIME PARKERS NO DOUBT HAD TO WALK FARTHER THAN SHOULD REASONABLY BE EXPECTED TO REACH THEIR DESTINATIONS WHILE OTHERS CONTINUED TO DRIVE IN SEARCH FOR A MORE CONVENIENT PARKING SPACE. FEW PARKERS IN THIS CATEGORY ARE WILLING TO WALK MORE THAN 500 FEET TO REACH THEIR TRIP DESTINATION.

IN GENERAL, THE PARKING SITUATION ON BLOCK 131 IS NOT AS CRITICAL AS IT MAY APPEAR. NUMEROUS SHORT-TIME PARKERS INDICATED THE POST OFFICE AS THEIR DESTINATION AND, DUE TO THE NATURE OF THESE TRIPS, THESE MOTORISTS PARKED FOR VERY SHORT PERIODS IN SPACE ESPECIALLY RESERVED FOR SUCH PATRONS. THEREFORE, THESE TRIPS CAN REASONABLY BE DISREGARDED WHEN CONSIDERING THE SHORT-TIME PARKING DEMAND ON THIS BLOCK. THIS CONSIDERATION DEFINITELY REDUCES THE TURNOVER RATE NECESSARY TO ACCOMMODATE ALL SHORT-TIME PARKERS

on Block 131. In the future, the relocation of the McFarland Clinic will further reduce the actual short-time parking demand on this block.

Blocks 135, 136 and 137 will be discussed together since the incoming demand pattern is approximately the same for each block. On these three blocks, there are 209 parking spaces available of which 138 are on-street public spaces and 71 are off-street private spaces, Table 9. By comparing Tables 4 and 5, it can be calculated that between 7 A.M. and 9 A.M. 236 long-time parkers indicated a destination in these three blocks and between 2 P.M. and 5 P.M. 744 short-time parkers arrived. These are the times of peak incoming demand by each of these two groups of parkers as shown by Figures 13, 14 and 15, Appendix.

There is a shortage of long-time spaces on these three blocks. Approximately 165 all-day parkers were forced to park in long-time spaces on other blocks. Many of these probably found parking in the Railroad Lot, the Library Lot, the Purviance Lot or on fringe area blocks. Space was available for the long-time parkers if they were willing to walk three or four blocks to reach their destination.

There is a definite deficiency of short-time parking space on these three blocks. During the three afternoon peak hours, there was an incoming short-time demand of 744 vehicles on 138 parking spaces. The maximum short-time demand of 285 incoming trips occurred at 4 P.M., Table 4. The most critical parking situation on each of these three blocks occurred at 4 P.M. on the block face which abuts Main Street, Tables 17, 18 and 19, Appendix. From Figure 4, one can ascertain the ratio between the peak block face demand and the space available on the corresponding block face.

THE RATIOS FOR THE CRITICAL BLOCK FACES DURING THE PEAK INCOMING HOURLY DEMAND ON BLOCKS 135, 136 AND 137 ARE ABOUT 1.6 VEHICLES PER SPACE, 4.2 VEHICLES PER SPACE AND 3.3 VEHICLES PER SPACE RESPECTIVELY.

FROM THIS INFORMATION, IT CAN EASILY BE SEEN THAT MANY MOTORISTS DESIRING SHORT-TIME PARKING ON ONE OF THESE THREE BLOCKS DURING THE PEAK PERIOD WERE UNABLE TO OBTAIN SUCH SPACE. COMPLICATING THE SITUATION FURTHER, WAS THE FACT THAT THE CONCURRENT SHORT-TIME DEMAND ON ADJACENT BLOCKS WAS ALSO AT ITS MAXIMUM FOR THE STUDY PERIOD, TABLE 3. AS A RESULT, MANY SHORT-TIME PARKERS WERE UNABLE TO FIND A PARKING SPACE WITHIN A REASONABLE WALKING DISTANCE OF THEIR DESTINATION. IN ADDITION, THESE MOTORISTS UNDOUBTEDLY CONTRIBUTED UNNECESSARILY TO THE TRAFFIC CONGESTION ON DOWNTOWN STREETS WHILE THEY WERE SEARCHING FOR A SUITABLE PLACE TO PARK.

CONSIDERING THE CONSERVATIVENESS OF THE DATA, AND THAT THIS SITUATION OCCURS IN THE HEART OF THE BUSINESS AREA, THERE IS A SERIOUS SHORTAGE OF SHORT-TIME SPACE ON BLOCKS 135, 136 AND 137.

CONCLUSIONS AND RECOMMENDATIONS

It was previously mentioned that the data gathered in making this parking study of the business district of Ames was definitely conservative due to certain uncontrollable conditions. However, sufficient data was accumulated, compiled and analyzed to permit the inference of the following conclusions and recommendations which are relevant to the <u>present</u> parking situation in the downtown area. Future growth of the business district will further increase the need for parking space to satisfactorily handle the generated parking demand.

1. The quantity of all-day parking space available in the study area is inadequate to meet the long-time parking demand. However, if the long-time parkers will utilize the Purviance Lot, the west portion of the Railroad Lot and on-street spaces to the north of the business area, this group of parkers should have no difficulty finding a place to park. Utilization of these parking areas requires that all-day parkers must be willing to walk up to 1500 feet and, in the case of the Purviance Lot, pay a small parking fee.

2. At certain times, the quantity of short-time parking space available in the core area is inadequate to meet the corresponding demand.

3. There is an immediate need for a minimum of 120 additional short-time parking spaces to serve Blocks 135, 136 and 137 in the heart of the business district. Such space should be within a reasonable walking distance of about 300 feet from these blocks.

4. Continuing examinations of the downtown parking situation should be made periodically and, based upon the results of such examinations,

PARKING POLICIES SHOULD BE FORMULATED AND ENACTED TO INSURE THAT AN ADEQUATE SUPPLY OF PARKING SPACE IS AVAILABLE TO SATISFACTORILY MEET THE PARKING DEMAND GENERATED BY THE BUSINESS DISTRICT.

APPENDIX

TABLE 10. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 128[A*]

HOUR	BLOCK FACE 1[B] TRIP PURPOSE A[C]	B[D]	C[E]	D[F]	CUMULATIVE	BLOCK FACE 2 TRIP PURPOSE A	B	C	D	CUMULATIVE	BLOCK FACE 4 TRIP PURPOSE A	B	C	D	CUMULATIVE
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	4	0	0	4	0	0	0	0	0	1	0	0	0	1
9	0	1	0	0	5	0	2	0	0	2	0	0	0	1	2
10	0	4	0	0	9	0	0	0	0	2	0	0	0	3	5
11	0	2	0	0	11	0	0	0	1	3	0	1	0	1	7
NOON	0	1	0	0	12	0	0	0	0	3	0	0	0	0	7
1	0	0	0	0	12	0	1	0	0	4	0	0	0	0	7
2	0	3	0	0	15	0	0	0	0	4	0	1	0	0	8
3	0	2	1	0	18	0	0	0	1	5	0	1	0	1	10
4	0	2	0	2	22	1	0	0	3	9	0	1	0	0	11
5	1	2	0	1	26	1	0	0	4	14	0	1	0	0	12
6	0	0	0	0	26	1	0	0	0	15	0	1	0	1	14
7	0	1	0	0	27	0	0	0	0	15	0	0	0	1	15
8	0	3	0	0	30	0	0	0	1	16	0	0	0	0	15
9	0	2	0	0	32	0	0	0	1	17	0	0	0	1	16

[*] THESE FOOTNOTES APPLY TO THIS TABLE AND TO ALL OTHER TABLES IN THE APPENDIX.

[A] BLOCK FACES HAVING NO INCOMING PARKING DEMAND ARE NOT SHOWN.

[B] NUMBERING BEGINS AT SOUTH BLOCK FACE AND PROCEEDS COUNTER-CLOCKWISE AROUND THE BLOCK. THUS "1" DENOTES THE SOUTH BLOCK FACE, "2" THE EAST FACE, "3" THE NORTH FACE AND "4" THE WEST FACE.

[C] PURPOSE OF TRIP WAS TO WORK OR TO SCHOOL.

[D] PURPOSE OF TRIP WAS TO TRANSACT BUSINESS, TO MEDICAL OR DENTAL SERVICES, OR DURING WORK.

[E] PURPOSE OF TRIP WAS TO SHOP.

[F] PURPOSE OF TRIP WAS TO RECREATION, TO SOCIAL OR CULTURAL ACTIVITIES, TO EAT, TO SERVE PASSENGERS, OR TO HOME.

TABLE 11. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 129[A*]

	BLOCK FACE 1[B]					BLOCK FACE 2					BLOCK FACE 4				
	TRIP PURPOSE					TRIP PURPOSE					TRIP PURPOSE				
HOUR	A[C]	B[D]	C[E]	D[F]	CUMULATIVE	A	B	C	D	CUMULATIVE	A	B	C	D	CUMULATIVE
6	2	0	0	1	3	0	0	0	0	0	0	0	0	0	0
7	4	3	0	0	10	0	0	0	0	0	1	0	0	0	1
8	3	1	0	1	15	0	1	0	0	1	0	0	0	0	1
9	0	0	0	0	15	0	0	0	0	1	0	0	0	1	2
10	2	2	0	0	19	0	0	0	0	1	0	0	0	0	2
11	1	0	0	0	20	0	0	0	1	2	0	0	0	1	3
NOON	0	0	0	1	21	0	0	0	0	2	0	0	0	0	3
1	0	0	0	0	21	0	1	0	0	3	0	0	0	0	3
2	0	1	0	0	22	0	0	0	0	3	0	0	0	0	3
3	0	1	0	0	23	0	0	0	0	3	0	0	0	0	3
4	0	2	0	5	30	0	0	0	1	4	0	0	0	0	3
5	1	2	0	3	36	1	0	0	3	8	0	0	0	2	5
6	1	2	0	1	40	0	0	0	0	8	0	0	0	0	5
7	0	2	0	16	58	0	0	0	0	8	0	0	0	0	5
8	0	0	0	1	59	0	0	0	0	8	0	0	0	0	5
9	0	0	0	0	59	0	0	0	0	8	0	0	0	0	5

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 12. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 130A*

	BLOCK FACE 1[B]					BLOCK FACE 2					BLOCK FACE 4				
	TRIP PURPOSE					TRIP PURPOSE					TRIP PURPOSE				
HOUR	A[C]	B[D]	C[E]	D[F]	CUMULATIVE	A	B	C	D	CUMULATIVE	A	B	C	D	CUMULATIVE
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
9	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
10	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
11	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
NOON	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
2	0	0	0	0	0	0	1	0	1	3	0	0	0	0	2
3	0	0	0	0	0	0	1	0	0	4	0	0	0	0	2
4	0	0	0	0	0	0	0	0	2	6	0	0	0	0	2
5	0	0	0	3	3	0	0	0	1	7	0	1	0	1	4
6	0	0	0	1	4	0	0	0	2	9	0	0	0	0	4
7	0	0	0	1	5	0	1	0	4	14	0	1	0	0	5
8	0	0	0	0	5	0	0	0	2	16	0	0	0	0	5
9	0	0	0	0	5	0	0	0	0	16	0	0	0	0	5

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 13. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 131[A*]

HOUR	BLOCK FACE 1[B] TRIP PURPOSE A[C]	B[D]	C[E]	D[F]	CUMULATIVE	BLOCK FACE 2 TRIP PURPOSE A	B	C	D	CUMULATIVE	BLOCK FACE 3 TRIP PURPOSE A	B	C	D	CUMULATIVE
6	3	0	0	2	5	9	3	0	0	12	1	0	0	0	1
7	36	8	0	1	50	13	25	0	0	50	2	0	0	1	4
8	39	31	0	10	130	14	62	0	0	126	1	0	0	0	5
9	9	72	0	3	214	8	36	0	0	170	0	1	0	0	6
10	7	47	0	4	272	0	18	0	1	189	0	0	0	0	6
11	1	6	0	4	283	1	13	0	1	204	0	0	0	1	7
Noon	2	13	0	7	305	0	7	0	0	211	0	0	0	0	7
1	0	11	0	1	317	0	10	0	0	221	0	2	0	0	9
2	5	45	0	1	368	4	34	0	0	259	0	0	0	0	9
3	5	48	1	5	427	6	30	1	0	296	0	0	0	1	10
4	5	58	1	6	497	4	50	0	0	350	0	0	0	0	10
5	6	24	3	11	541	1	38	0	0	389	0	0	0	0	10
6	4	7	0	14	566	1	38	0	0	428	0	0	0	0	10
7	3	22	0	4	595	1	44	0	1	474	0	0	0	0	10
8	0	4	0	7	606	0	59	0	0	533	0	0	0	2	12
9	4	3	0	4	617	1	33	0	0	567	0	0	0	0	12

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 14. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 132[A*]

	Block Face 1[B]					Block Face 2					Block Face 3					Block Face 4				
	Trip Purpose					Trip Purpose					Trip Purpose					Trip Purpose				
Hour	A[C]	B[D]	C[E]	D[F]	Cumulative	A	B	C	D	Cumulative	A	B	C	D	Cumulative	A	B	C	D	Cumulative
6	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
7	21	3	0	0	25	0	1	0	0	1	0	1	0	0	1	10	3	3	0	17
8	17	13	0	1	56	0	0	0	0	1	0	1	0	1	3	4	3	8	0	32
9	2	11	1	2	72	0	0	0	0	1	1	1	0	2	7	1	6	22	1	62
10	3	4	0	0	79	0	0	0	0	1	0	0	0	2	9	0	4	15	3	84
11	0	5	0	0	84	0	0	0	0	1	0	1	0	1	11	0	2	4	2	92
Noon	2	2	0	1	89	0	0	0	0	1	1	0	0	1	13	1	3	3	1	100
1	1	5	0	1	96	0	0	0	1	2	0	0	0	0	13	0	2	12	0	114
2	2	10	1	0	109	0	1	0	0	3	1	0	0	0	14	2	3	14	2	135
3	3	14	1	1	128	0	0	0	0	3	1	0	0	3	18	1	3	19	1	159
4	2	11	1	2	144	0	1	0	0	4	3	3	0	10	34	3	2	35	7	206
5	0	11	1	3	159	0	0	0	0	4	1	4	0	0	39	5	3	42	5	261
6	0	1	0	2	162	0	0	0	0	4	3	2	0	13	57	2	2	42	16	323
7	3	1	0	0	166	0	0	0	0	4	7	2	0	17	83	0	2	40	24	389
8	0	0	0	4	170	0	0	0	0	4	4	5	0	9	101	0	1	32	10	432
9	0	1	0	1	172	0	0	0	0	4	1	0	0	1	103	0	0	1	2	435

*See Table 10 for footnotes.

TABLE 15. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 133[A*]

HOUR	BLOCK FACE 1[B] TRIP PURPOSE A[C]	B[D]	C[E]	D[F]	CUMULATIVE	BLOCK FACE 2 TRIP PURPOSE A	B	C	D	CUMULATIVE	BLOCK FACE 4 TRIP PURPOSE A	B	C	D	CUMULATIVE
6	2	0	0	0	2	0	0	0	0	0	0	2	0	0	2
7	1	0	0	0	3	2	1	0	0	3	2	0	0	0	4
8	1	0	0	0	4	2	3	0	0	8	0	0	0	0	4
9	0	1	0	1	6	0	5	0	1	14	1	3	0	0	8
10	0	0	0	0	6	0	2	0	0	16	0	1	0	1	10
11	0	0	0	1	7	0	0	0	0	16	1	0	0	3	14
NOON	0	0	0	1	8	0	0	0	0	16	1	1	0	3	19
1	0	0	0	1	9	1	6	0	1	24	0	0	0	3	22
2	0	2	0	1	12	0	9	1	0	34	1	3	0	1	27
3	0	2	0	4	18	0	8	0	1	43	0	5	0	0	32
4	1	2	0	4	25	0	12	5	3	63	1	1	0	3	37
5	0	1	1	3	30	0	3	1	2	69	0	2	0	0	39
6	0	0	0	3	33	1	1	1	0	72	0	0	0	2	41
7	0	1	0	5	39	1	1	0	1	75	1	0	0	2	44
8	0	0	0	7	46	0	1	0	1	77	0	0	0	2	46
9	0	0	0	3	49	0	0	0	0	77	0	0	0	4	50

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 16. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 134[A*]

	Block Face 1[B]					Block Face 2					Block Face 3					Block Face 4				
	Trip Purpose					Trip Purpose					Trip Purpose					Trip Purpose				
Hour	A[C]	B[D]	C[E]	D[F]	Cumulative	A	B	C	D	Cumulative	A	B	C	D	Cumulative	A	B	C	D	Cumulative
6	4	0	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	10	1	0	6	22	0	1	0	0	1	2	0	0	0	2	8	1	0	0	9
8	10	9	0	3	44	2	1	0	0	4	0	0	1	0	3	5	4	0	0	18
9	1	10	1	1	57	0	2	0	0	6	1	0	1	0	5	0	2	0	0	20
10	1	8	2	6	74	0	4	0	0	10	0	0	0	0	5	0	2	0	0	22
11	5	7	2	17	105	1	0	0	0	11	0	1	0	0	6	0	1	0	0	23
Noon	2	4	0	20	131	1	2	0	0	14	0	0	0	0	6	0	0	0	0	23
1	1	2	0	4	138	0	3	0	0	17	0	0	0	0	6	0	0	0	1	24
2	0	6	3	8	155	1	2	0	2	22	0	0	1	0	7	1	2	0	0	27
3	7	8	1	16	187	1	3	0	0	26	1	1	0	3	12	0	2	0	0	29
4	3	12	5	32	239	1	3	1	0	31	0	0	0	1	13	0	5	0	3	37
5	1	4	3	44	291	0	1	0	1	33	0	0	0	4	17	1	3	0	5	46
6	2	2	0	38	333	0	0	0	0	33	0	0	0	14	31	0	0	0	4	50
7	2	2	0	41	378	0	1	0	0	34	0	1	0	2	34	1	1	0	1	53
8	0	0	0	59	437	0	0	0	0	34	0	0	0	0	34	0	1	0	0	54
9	1	0	0	83	521	0	0	0	0	34	0	0	0	3	37	0	0	0	1	55

*See Table 10 for footnotes.

TABLE 17. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 153[A]*

	Block Face 1[B]					Block Face 2					Block Face 3					Block Face 4				
	Trip Purpose					Trip Purpose					Trip Purpose					Trip Purpose				
Hour	A[C]	B[D]	C[E]	D[F]	Cumulative	A	B	C	D	Cumulative	A	B	C	D	Cumulative	A	B	C	D	Cumulative
6	3	1	0	0	4	5	1	0	0	6	2	0	0	0	2	3	0	0	0	3
7	[illegible]	5	1	1	25	36	2	0	1	45	11	3	0	0	16	6	6	0	1	16
8	27	13	0	1	66	4	2	0	0	51	11	3	0	0	30	10	13	0	0	39
9	7	22	3	0	98	2	2	0	0	55	1	4	0	0	35	3	14	1	0	57
10	4	21	9	0	132	1	2	0	0	58	1	4	2	0	42	4	13	0	0	74
11	1	8	7	0	148	1	2	0	0	61	0	3	0	1	46	0	3	0	0	77
Noon	2	8	3	0	161	1	5	0	1	68	0	0	0	0	46	1	4	0	0	82
1	1	12	2	0	176	1	3	0	0	72	2	3	0	0	51	1	4	0	4	91
2	2	29	6	1	214	0	4	0	0	76	3	5	2	1	62	0	15	0	1	107
3	2	15	11	0	242	2	4	1	0	83	0	9	1	0	72	2	18	0	0	127
4	3	16	19	5	285	1	9	1	2	96	1	8	0	2	83	0	16	1	1	145
5	4	7	14	9	319	0	0	0	3	99	1	4	0	2	90	1	1	0	1	148
6	2	5	4	3	333	0	0	0	4	103	1	1	0	0	92	0	2	0	0	150
7	1	5	4	8	351	1	1	0	5	110	1	2	1	0	96	2	2	0	0	154
8	0	0	3	8	362	0	1	0	0	111	1	0	0	0	97	0	4	0	1	159
9	1	0	1	2	366	0	0	0	1	112	0	0	0	0	97	0	4	0	1	164

*See Table 10 for footnotes.

TABLE 18. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 136[A*]

HOUR	BLOCK FACE 1[B] TRIP PURPOSE A[C]	B[D]	C[E]	D[F]	CUMULATIVE	BLOCK FACE 2 TRIP PURPOSE A	B	C	D	CUMULATIVE	BLOCK FACE 3 TRIP PURPOSE A	B	C	D	CUMULATIVE	BLOCK FACE 4 TRIP PURPOSE A	B	C	D	CUMULATIVE
6	5	1	0	2	8	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
7	18	5	1	3	35	5	0	0	0	5	5	3	0	1	10	0	0	0	0	0
8	40	13	18	4	110	6	3	0	0	14	1	3	0	2	16	2	1	0	0	3
9	4	21	60	2	197	0	7	3	0	24	1	1	0	1	19	0	0	0	0	3
10	5	12	63	2	279	0	12	0	0	36	0	3	0	0	22	0	0	0	0	3
11	0	9	24	8	320	0	7	0	1	44	0	0	0	1	23	0	0	0	0	3
NOON	6	6	35	8	375	2	8	0	0	54	1	1	0	0	25	0	0	0	0	3
1	7	12	42	2	438	1	7	1	0	63	0	0	0	0	25	0	0	0	0	3
2	4	19	55	5	521	0	27	3	0	93	0	1	0	1	27	0	0	0	0	3
3	3	7	60	3	594	0	5	4	1	103	1	1	1	1	31	0	1	0	0	4
4	5	28	59	12	698	2	3	9	0	117	3	1	1	1	37	0	1	0	1	6
5	1	7	42	27	775	0	5	13	1	136	2	4	3	1	47	0	0	0	0	6
6	1	13	2	14	805	0	5	12	0	153	1	1	5	0	54	0	0	0	0	6
7	0	3	1	7	816	0	2	20	1	176	0	1	4	5	64	0	0	0	0	6
8	1	4	2	4	827	0	2	11	0	189	1	4	6	4	79	1	0	0	0	7
9	1	2	0	10	840	0	0	1	1	191	0	1	1	2	83	0	0	0	0	7

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 19. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 137[A]

	BLOCK FACE 2[B]					BLOCK FACE 3					BLOCK FACE 4				
	TRIP PURPOSE					TRIP PURPOSE					TRIP PURPOSE				
HOUR	A[C]	B[D]	C[E]	D[F]	CUMU-LATIVE	A	B	C	D	CUMU-LATIVE	A	B	C	D	CUMU-LATIVE
6	0	0	0	0	0	2	1	0	0	3	1	0	0	0	1
7	0	0	0	1	1	11	3	2	0	19	1	1	0	0	3
8	0	0	0	0	1	28	10	12	0	69	0	1	0	0	4
9	0	0	0	0	1	13	13	55	0	150	0	0	0	0	4
10	0	0	0	0	1	0	8	38	1	197	0	0	0	0	4
11	0	0	0	0	1	3	11	30	1	242	0	1	0	0	5
NOON	0	0	0	0	1	3	11	25	0	281	0	1	0	0	6
1	0	0	0	0	1	5	5	25	0	316	0	1	0	0	7
2	1	0	0	0	2	6	13	58	1	394	0	0	0	0	7
3	0	0	0	1	3	1	12	54	1	462	0	1	0	0	8
4	0	1	0	1	5	4	19	64	2	551	0	2	0	0	10
5	0	0	0	1	6	4	6	38	11	610	0	0	0	0	10
6	0	0	0	0	6	1	1	0	3	615	0	0	0	0	10
7	0	0	0	0	6	5	5	0	0	625	0	0	0	0	10
8	0	0	0	0	6	1	1	0	2	629	0	0	0	0	10
9	0	0	0	0	6	1	0	0	0	630	1	0	0	0	11

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 20. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCKS 138 AND 139A*

	BLOCK FACE 3B					BLOCK FACE 4				
	TRIP PURPOSE					TRIP PURPOSE				
HOUR	AC	BD	CE	DF	CUMULATIVE	A	B	C	D	CUMULATIVE
6	3	1	0	8	12	1	0	0	0	1
7	15	3	2	4	36	2	0	0	0	3
8	31	12	1	4	84	2	0	0	0	5
9	4	11	6	2	107	0	0	0	0	5
10	6	9	0	1	123	0	0	0	0	5
11	4	6	3	8	144	0	0	0	0	5
NOON	6	4	3	4	161	0	0	0	0	5
1	1	10	2	3	177	1	3	0	1	10
2	2	9	12	7	207	0	1	0	1	12
3	4	16	8	9	244	0	0	0	0	12
4	1	10	21	10	286	0	1	0	0	13
5	4	4	10	17	321	1	0	0	0	14
6	3	4	3	10	341	0	0	0	0	14
7	5	0	1	10	357	1	0	0	0	15
8	0	2	2	5	366	0	0	0	1	16
9	0	0	1	10	377	0	0	0	0	16

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 21. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 224[A*]

	BLOCK FACE 1[B]					BLOCK FACE 2					BLOCK FACE 4				
	TRIP PURPOSE					TRIP PURPOSE					TRIP PURPOSE				
HOUR	A[C]	B[D]	C[E]	D[F]	CUMULATIVE	A	B	C	D	CUMULATIVE	A	B	C	D	CUMULATIVE
6	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
7	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0
8	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
9	0	0	0	0	1	0	0	0	1	2	1	0	0	0	1
10	0	0	0	0	1	0	0	0	0	2	0	0	0	0	1
11	0	0	0	0	1	0	0	0	0	2	0	0	0	1	2
NOON	0	0	0	0	1	0	0	0	0	2	0	0	0	0	2
1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	2
2	0	0	0	0	1	0	1	0	0	3	0	0	0	0	2
3	0	0	0	0	1	0	0	0	0	3	0	0	0	0	2
4	0	0	0	1	2	0	0	0	1	4	0	0	0	1	3
5	0	0	0	2	4	0	0	0	1	5	1	0	0	6	10
6	0	0	0	1	5	1	0	0	0	6	0	2	0	3	15
7	0	2	0	0	7	0	0	0	4	10	0	0	0	2	17
8	0	0	0	1	8	0	0	0	0	10	0	0	0	1	18
9	0	0	0	1	9	0	0	0	0	10	0	0	0	0	18

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 22. INCOMING PARKING DEMAND BY TRIP PURPOSE ON BLOCK 225[A*]

BLOCK FACE 4[B]

HOUR	TRIP PURPOSE A[C]	B[D]	C[E]	D[F]	CUMULATIVE
6	1	0	0	0	1
7	9	0	0	20	30
8	14	1	0	18	63
9	0	0	0	0	63
10	0	1	0	1	65
11	0	0	0	1	66
NOON	0	0	0	2	68
1	1	0	0	1	70
2	0	1	0	1	72
3	2	0	0	5	79
4	1	1	0	4	85
5	0	0	0	2	87
6	2	0	0	3	92
7	0	0	0	0	92
8	1	0	0	0	93
9	0	0	0	0	93

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 23. INCOMING PARKING DEMAND BY TRIP PURPOSE ON BLOCK 2XX[A*]

BLOCK FACE 2[B]

HOUR	TRIP PURPOSE A[C]	B[D]	C[E]	D[F]	CUMULATIVE
6	3	0	0	0	3
7	72	1	0	32	108
8	110	6	0	56	280
9	1	6	0	1	288
10	6	2	0	0	296
11	3	1	0	4	304
NOON	21	0	0	8	333
1	1	1	0	0	335
2	7	7	0	0	349
3	7	10	0	16	382
4	11	4	0	12	409
5	12	0	0	5	426
6	2	1	0	0	429
7	1	3	0	3	436
8	0	1	0	3	440
9	0	1	0	5	446

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 24. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCKS 227 AND 228[A*]

HOUR	BLOCK FACE 1[B] TRIP PURPOSE A[C]	B[D]	C[E]	D[F]	CUMULATIVE	BLOCK FACE 2 TRIP PURPOSE A	B	C	D	CUMULATIVE	BLOCK FACE 3 TRIP PURPOSE A	B	C	D	CUMULATIVE
6	4	1	0	0	5	0	0	0	0	0	5	0	0	0	5
7	12	7	1	1	26	1	0	0	0	1	23	6	0	2	36
8	12	18	0	4	60	0	0	0	0	1	9	6	0	1	52
9	6	16	0	3	85	0	0	0	0	1	1	9	0	0	62
10	2	8	1	0	96	0	0	0	0	1	1	7	0	0	70
11	1	8	0	0	105	0	0	0	0	1	3	2	0	1	76
NOON	2	6	1	2	116	0	0	0	0	1	1	4	0	0	81
1	2	3	1	0	122	0	0	0	0	1	0	2	1	0	84
2	1	19	0	3	145	0	0	0	0	1	1	9	1	1	96
3	0	21	0	3	169	0	0	0	0	1	0	13	1	1	111
4	3	14	0	4	190	0	0	0	0	1	6	16	0	1	134
5	1	6	0	14	211	0	0	0	0	1	3	4	0	2	143
6	2	2	0	11	226	0	0	0	1	2	2	1	0	3	149
7	3	4	0	4	237	0	0	0	0	2	3	3	0	2	157
8	3	3	0	1	244	0	0	0	0	2	2	0	0	0	159
9	0	1	0	3	248	0	0	0	0	2	0	2	0	3	164

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 25. INCOMING PARKING DEMAND BY TRIP PURPOSE ON EACH BLOCK FACE OF BLOCK 229[A*]

	BLOCK FACE 1[B]					BLOCK FACE 2					BLOCK FACE 3				
	TRIP PURPOSE					TRIP PURPOSE					TRIP PURPOSE				
HOUR	A[C]	B[D]	C[E]	D[F]	CUMULATIVE	A	B	C	D	CUMULATIVE	A	B	C	D	CUMULATIVE
6	3	0	0	0	3	0	0	0	0	0	2	0	0	0	2
7	2	0	0	2	7	0	0	0	0	0	1	0	0	0	3
8	3	3	0	0	13	0	2	0	0	2	0	0	0	0	3
9	0	4	0	0	17	0	0	0	0	2	2	1	0	0	6
10	1	0	0	0	18	0	0	0	0	2	1	4	0	0	11
11	0	0	0	1	19	0	0	0	0	2	0	0	0	2	13
NOON	0	0	0	0	19	0	0	0	0	2	2	0	0	0	15
1	0	1	0	0	20	0	0	0	0	2	1	0	1	0	17
2	0	1	0	2	23	0	1	0	0	3	2	2	1	0	22
3	3	3	0	0	29	0	0	0	0	3	2	3	3	1	31
4	0	2	0	0	31	1	0	0	0	4	1	1	2	2	37
5	1	0	1	1	34	0	0	0	0	4	2	5	2	1	47
6	1	0	1	18	54	0	0	0	0	4	0	0	5	1	53
7	1	1	0	69	125	0	0	0	0	4	0	0	1	3	57
8	0	0	0	23	148	0	0	0	0	4	0	2	2	1	62
9	0	1	0	19	168	0	0	0	0	4	0	0	0	1	63

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 26. INCOMING PARKING DEMAND BY TRIP PURPOSE ON BLOCK 230[A*]

BLOCK FACE 3[B]

HOUR	TRIP PURPOSE A[C]	B[D]	C[E]	D[F]	CUMULATIVE
6	3	1	0	3	7
7	14	8	0	18	47
8	10	10	0	8	75
9	2	15	5	6	103
10	0	14	2	0	119
11	0	4	0	8	131
NOON	4	3	3	7	148
1	0	11	3	4	166
2	2	8	4	2	182
3	2	14	3	6	207
4	1	16	14	7	245
5	1	4	4	8	262
6	0	11	3	18	294
7	1	7	9	13	324
8	1	7	9	12	353
9	0	0	2	5	360

*SEE TABLE 10 FOR FOOTNOTES.

TABLE 27. INCOMING PARKING DEMAND BY TRIP PURPOSE ON BLOCK 2YY[A*]

BLOCK FACE 3[B]

HOUR	TRIP PURPOSE A[C]	B[D]	C[E]	D[F]	CUMULATIVE
6	10	1	0	0	11
7	5	2	0	0	18
8	2	0	1	0	21
9	0	3	3	1	28
10	0	2	1	0	31
11	0	2	1	0	34
NOON	2	1	1	0	38
1	0	3	0	0	41
2	0	7	0	0	48
3	1	7	1	0	57
4	0	5	0	1	63
5	0	7	0	0	70
6	1	3	0	1	75
7	1	3	0	0	79
8	0	1	0	0	80
9	0	0	1	0	81

*SEE TABLE 10 FOR FOOTNOTES.

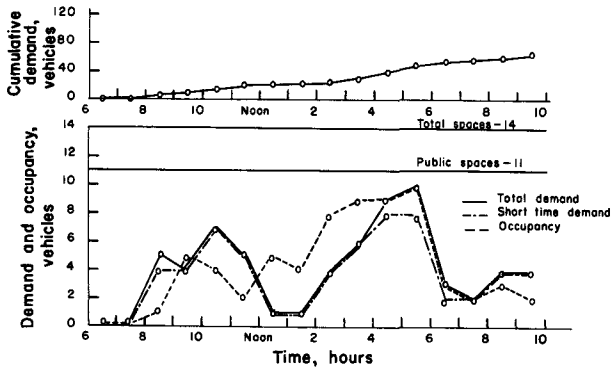

Figure 6. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 128.

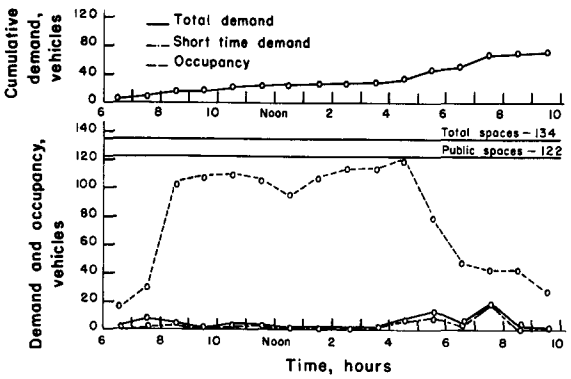

Figure 7. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 129.

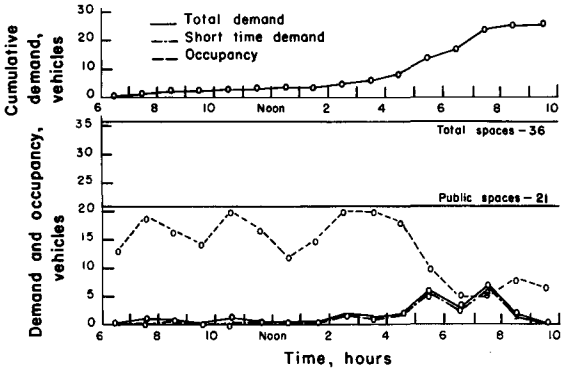

Figure 8. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 130.

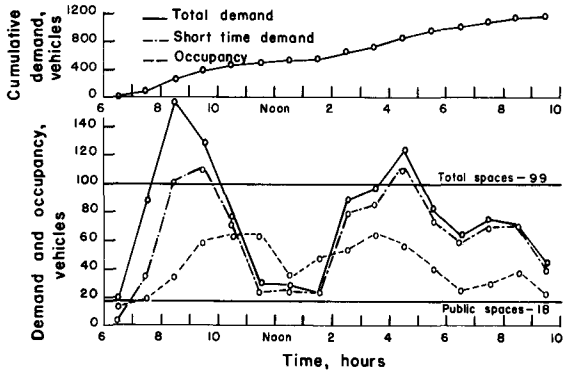

Figure 9. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 131.

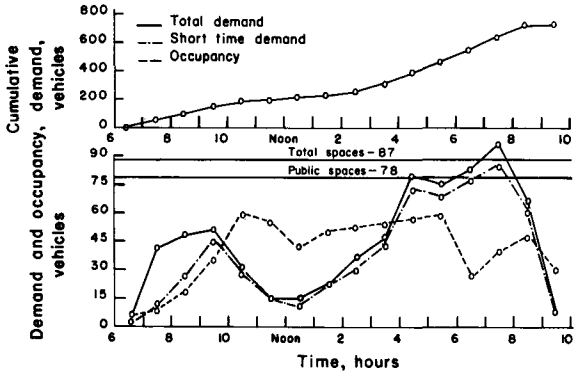

Figure 10. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 132.

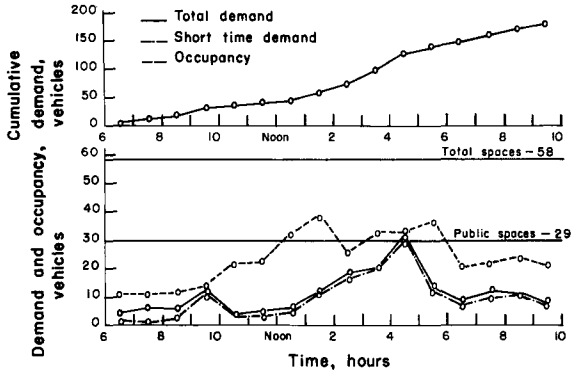

Figure 11. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 133.

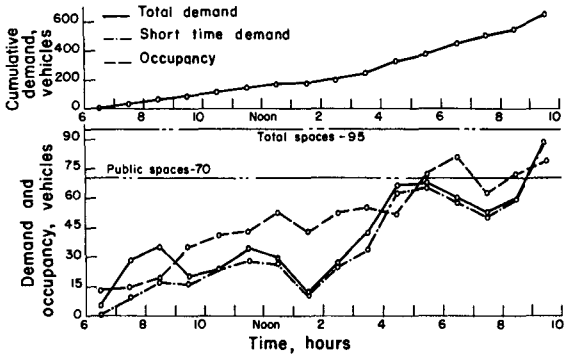

Figure 12. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 134.

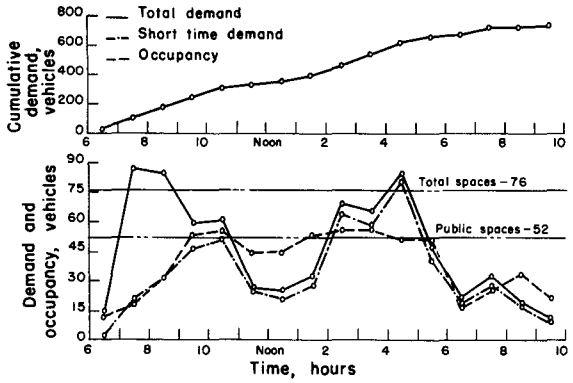

Figure 13. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 135.

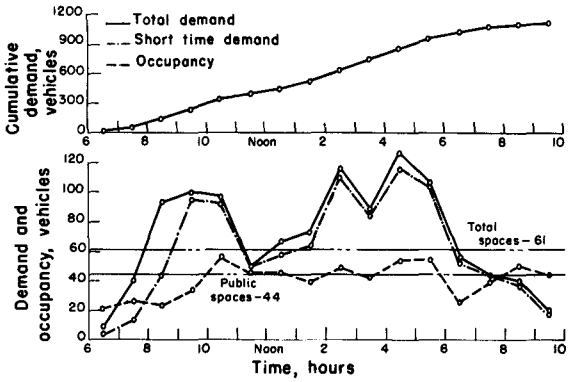

Figure 14. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 136.

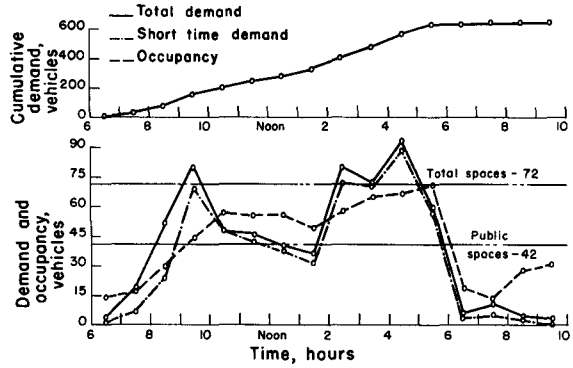

Figure 15. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 137.

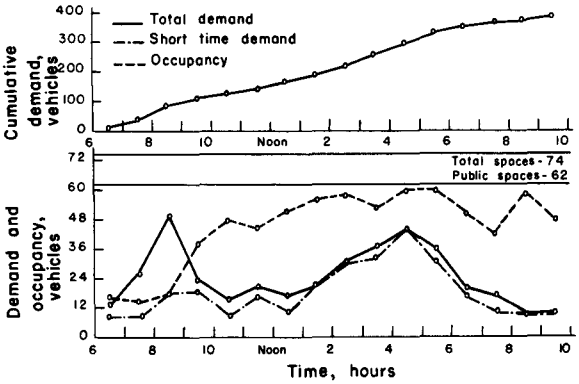

Figure 16. Total, short time and cumulative incoming parking demand and parking space occupancy on Blocks 138 and 139.

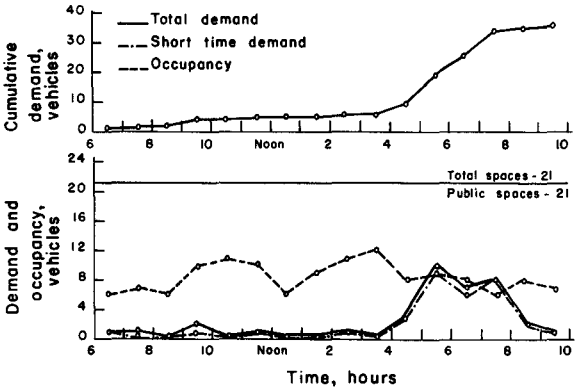

Figure 17. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 224.

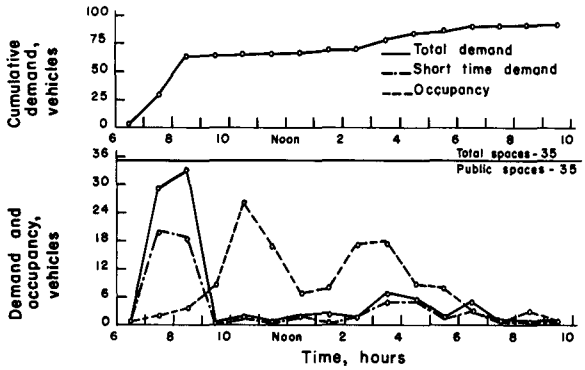

Figure 18. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 225.

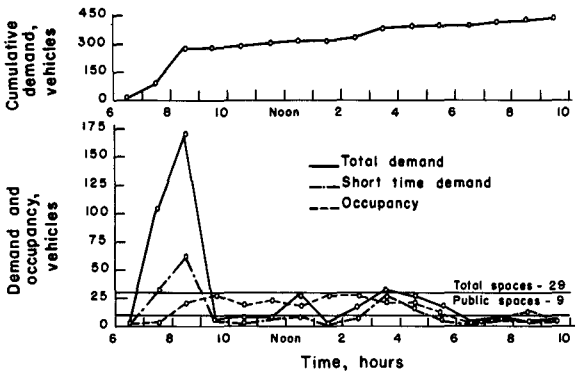

Figure 19. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 2XX.

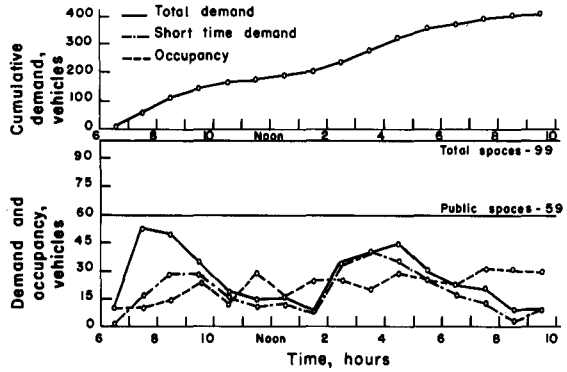

Figure 20. Total, short time and cumulative incoming parking demand and parking space occupancy on Blocks 227 and 228.

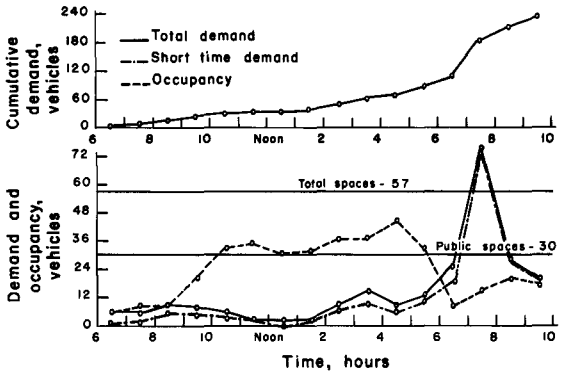

Figure 21. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 229.

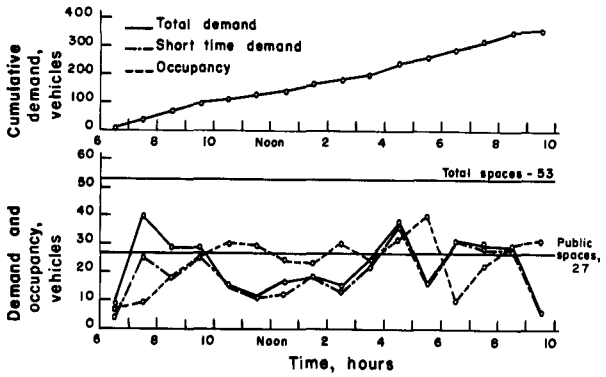

Figure 22. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 230.

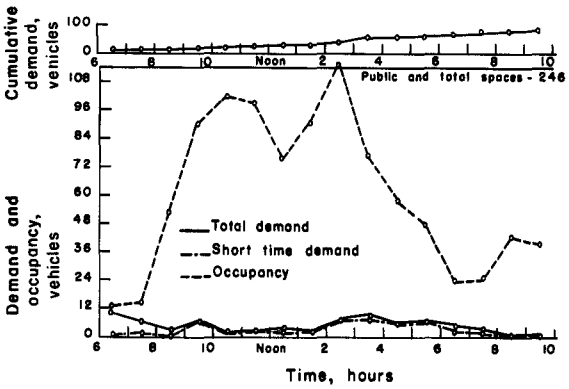

Figure 23. Total, short time and cumulative incoming parking demand and parking space occupancy on Block 2YY.

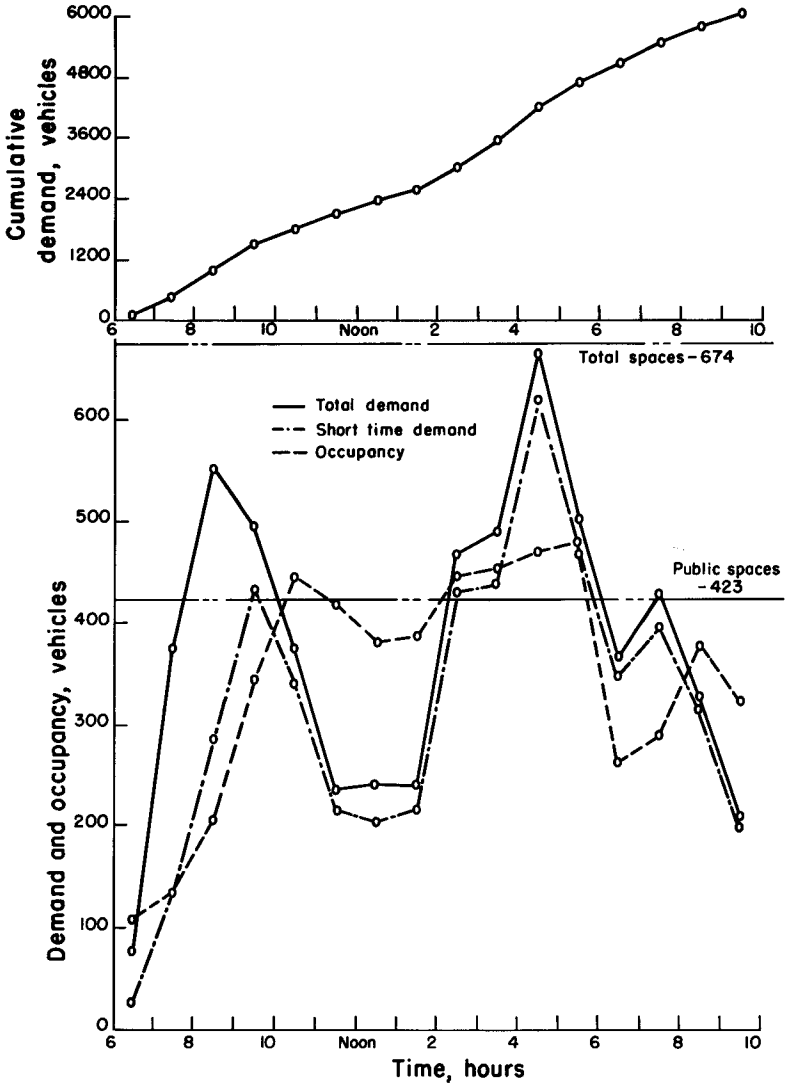

Figure 24. Total, short time and cumulative incoming parking demand and parking space occupancy in the core area.

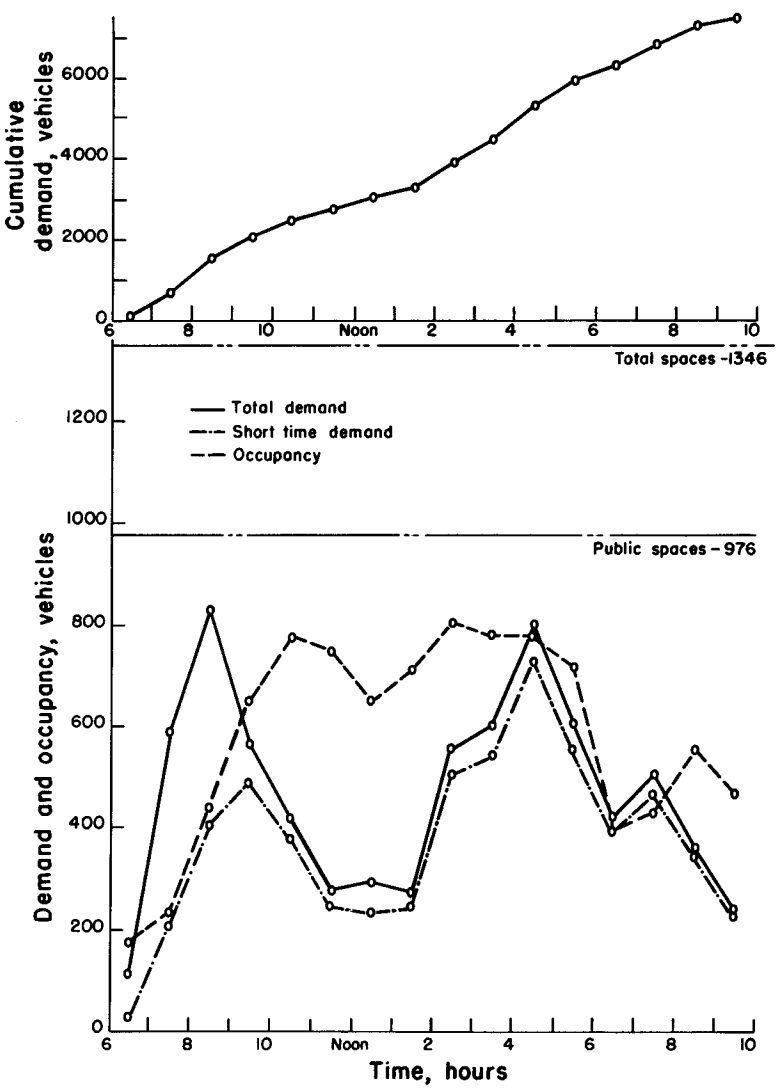

Figure 25. Total, short time and cumulative incoming parking demand and parking space occupancy in the study area.