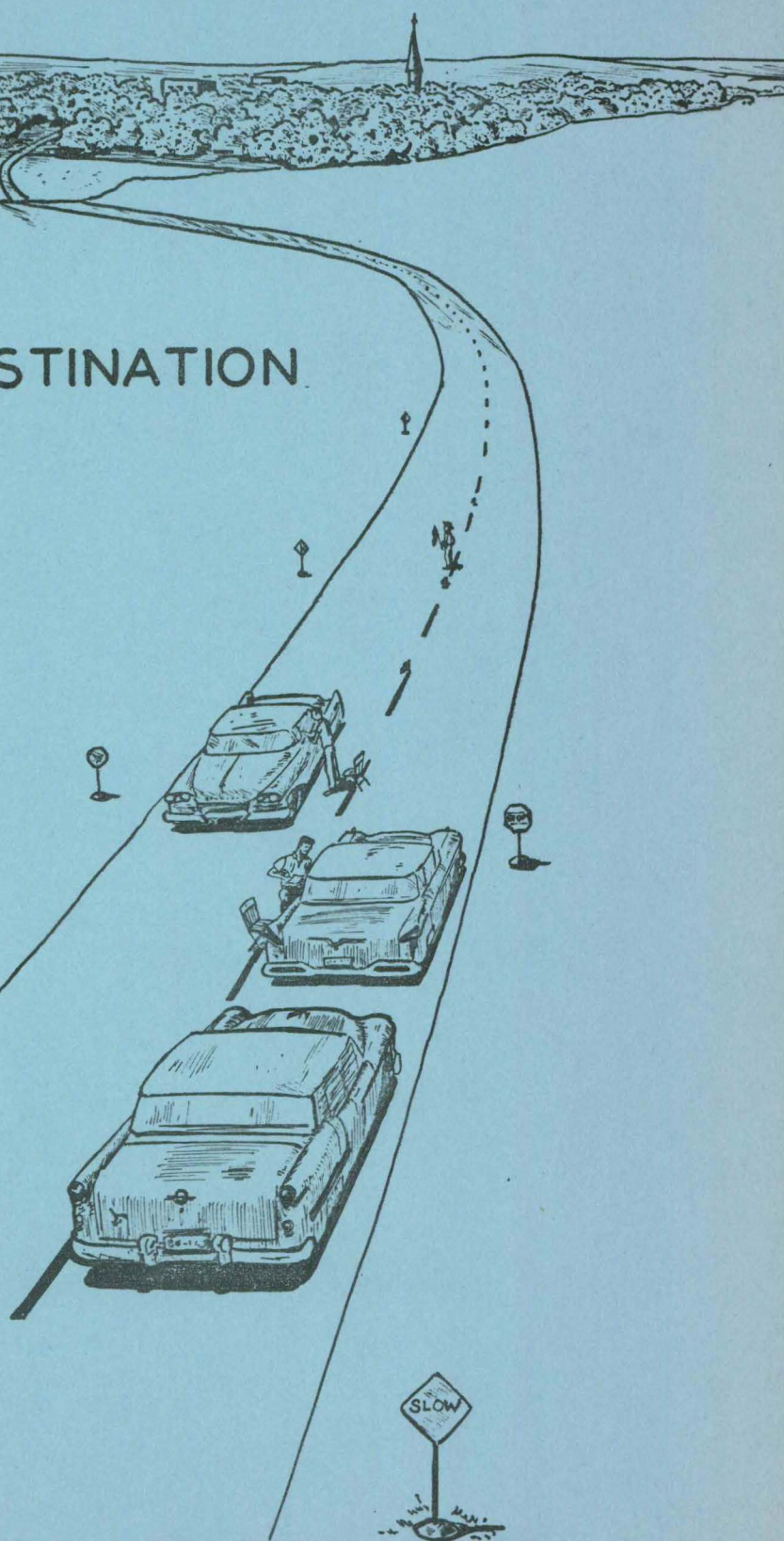


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# KNOXVILLE

## ORIGIN AND DESTINATION STUDY

INTERVIEW  
STATION



Knoxville Urban Area  
Origin and Destination  
Traffic Survey

April 1959

Prepared By  
Highway Planning Section  
Safety and Traffic Department  
Iowa State Highway Commission  
In Cooperation With the  
United States Bureau of Public Roads



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## DEFINITIONS

### Urban Area

An area including and adjacent to a municipality or other urban place of 5,000 or more population as shown by the latest available census.

### Corporation Line

A hypothetical line delimiting the municipal area and often called the City Limits.

### Urban or Corporate Area Traffic Survey

A survey of highway travel designed to collect detailed information concerning trip origins and destinations within a selected urban or corporate area.

### External Survey

A study in which trip data is obtained by interviewing motor vehicle operators intercepted at external stations.

### External Station

An interview point located on a principal rural highway which crosses the corporation or urban area line. It is always set up outside of the urban or corporate area, but as close as is practical and possible to the line delimiting this area.

### Tract

One of the several homogeneous sections into which the study area is divided.

### Central Business District (CBD)

The section containing the concentrated commercial and retail business center, in most cases, tract 001.



Trip

A one-way journey between a point of origin and a point of destination.

Origin

The stated beginning point of a single trip.

Destination

The stated terminating point of a single trip.

External Local Trip

A trip with either the point of origin or the point of destination located within the corporate limits, the performance of which trip involves travel through an external interview station.

External Through Trip

A trip with both points of origin and destination located outside the corporate limits, the performance of which trip involves travel through an external interview station and into, through, and out of the corporate or urban area.

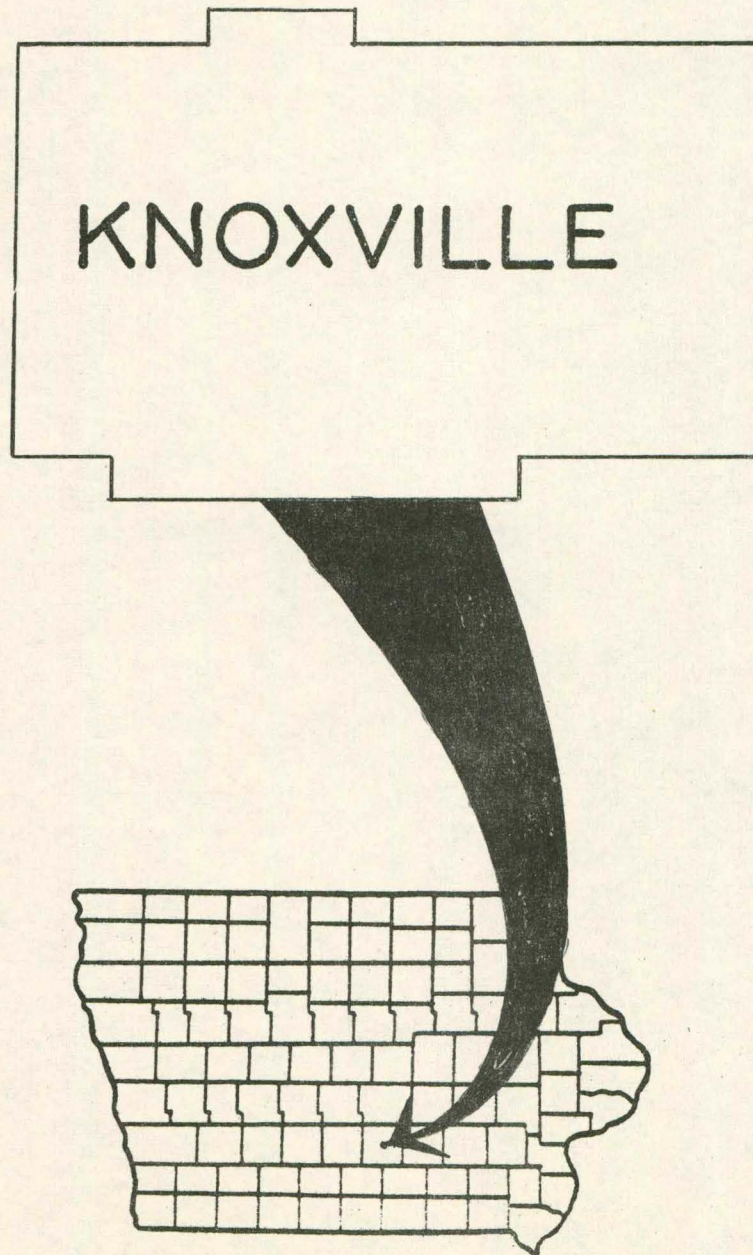
Duplicated Through Trips (Duplicates)

Trips traveling completely across the urban or corporate area, and thereby passing through two interview stations.

Average Weekday

This includes Monday through Friday inclusive.

PART I  
SUMMARY





This report of the Knoxville Urban Area Traffic Survey describes briefly the characteristics of the urban area pertinent to the local problem of highway transportation and presents and analyzes the data gathered in the survey. All trip data obtained in the survey are presented in terms of the number of trips per day. They are classified by the origins and destinations of these trips and by the areas within the city, to which and from which they were made. The only information obtained was from those trips crossing the city limits, and this was done by maintaining roadside interview stations at the entrances of the principal rural highways into the city. These trips, for which the data were obtained, may be defined as "rural trips." Knowledge of the number of "urban trips" or "intra-city trips" is not available in this external type survey.

For this particular study, information was gathered by interviewing 88.31 per cent of the average weekday traffic. After the expansion of this information it was found that for an average weekday in July 1958, a total of 9,953 trips crossed the Knoxville city limits. Out of this total, 33.06 per cent were classified as external through trips. These were divided into two groups. External through trips which passed via the central business district accounted for 25.01 per cent. The remaining 8.05 per cent, which were also external through trips, traveled without passing via the central business district.

Of all trips passing through the interview stations 22.95 per cent had termini in the central business district. However, another 20.22 per cent of the total had termini in the residential and intermediate



areas between the station and the central business district. In addition to this, 16.76 per cent of the total trips passing through the interview stations had routes via and termini beyond the central business district. The final consideration is given to the 698 trips, or 7.01 per cent of the total number of trips which passed through the stations, with routes not via but termini beyond the central business district.







A. HISTORY

In 1845 Joseph Robinson, Scott County Commissioner, and James Montgomery, Wapello County Commissioner, selected the site for the town of Knoxville, and named it in honor of General Henry Knox of Revolutionary War fame. It was chosen as County seat of Marion County by these two prominent men, for whom two of Knoxville's main streets were named. The first survey of Knoxville was made by Issac C. Rowers, county surveyor, who platted part of the town shortly after it was selected in September 1845. The first sale of lots was on October 21, 1845 and the best sites sold for \$15.00 to \$65.00 apiece.

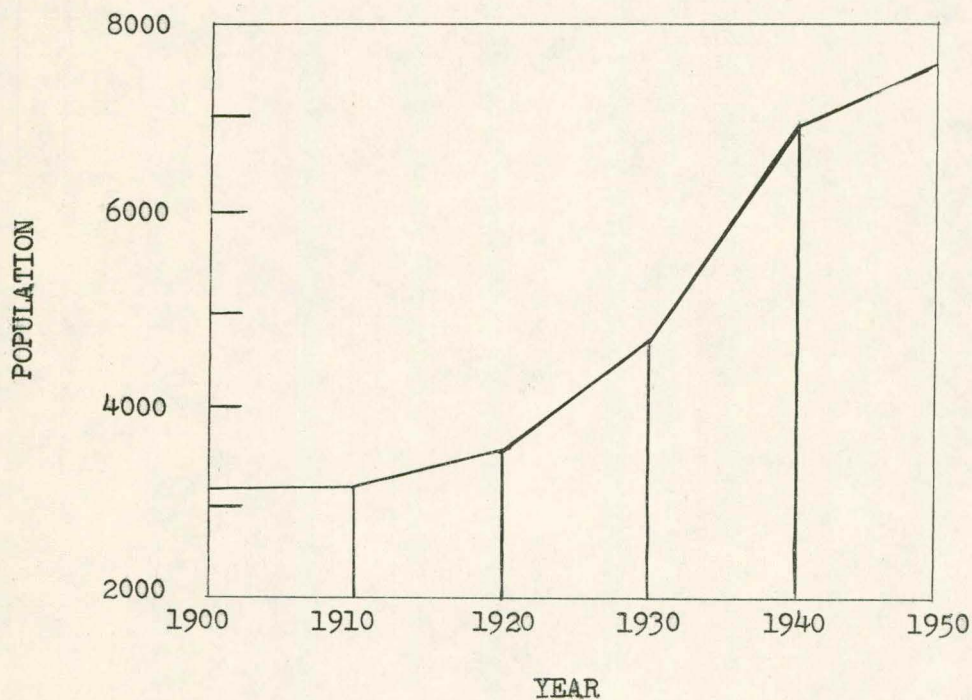
A fourth-class postoffice was established March 2, 1846 with L. W. Babbitt as postmaster. That same year the first Marion County Court House, costing approximately \$80,000.00 was erected on a lot originally owned by L. C. Covney. The building was constructed by contractor Lewis M. Pearch. Claiborne Hall platted some additional municipal property during the winter of 1846-1847. Other surveys were made in 1849 and 1852, and Knoxville drifted along as an unincorporated village until 1853 when a movement for incorporation was started. An election was held with 64 votes being cast in favor of the movement and 4 against. The town was then incorporated in 1854.

Prior to 1869, when the first Knoxville bank was established, the banking business was conducted entirely by brokers. In 1874 a 50 member bucket-brigade was formed to combat fires. An earlier volunteer fire company organized in 1865 had been unsuccessful. In 1887 the Knoxville Electric Light and Power Company was organized. Its only power plant was severely damaged by a fire in 1894. Knoxville's first public library had its



origin in 1909 in a room in the court house. It was here that the first library association had a small collection of books assembled for lending purposes. It was made a city institution in 1911. The present library of brick construction was dedicated July 1, 1912, and was made possible through the contributions of Andrew Carnegie. The population growth of Knoxville, since 1900, is illustrated below.

KNOXVILLE POPULATION TRENDS



B. CHARACTERISTICS

Knoxville is the county seat of Marion County, located in the south central part of Iowa. It is in the fifth county west of the Mississippi River and the third tier of counties north of the Iowa-Missouri border.



The rectangular-shaped city is situated in hilly terrain and covers an area about two miles long and one and three-quarter miles wide. The longer axis lies in an east-west direction.

The central business district is located in the middle of the urban area. Products manufactured in the city include automobile mufflers, concrete blocks, clothing, farm disc transports, gun cabinets, guy wire guards, livestock feed, and window platforms.

The 1540-bed U.S. Veterans Administration Hospital is situated on a 400 acre tract in the west part of Knoxville. It consists of 81 buildings of fireproof brick construction, with slate roofs, and connected by corridors. Approximately 920 people are employed on a full-time basis at the hospital.

Transportation facilities serving the city include the Chicago, Burlington, and Quincy Railroad, which cuts digonally across Knoxville in a northwest-southeast direction. There are four primary highway entrances to the city with combined Ia. 60 and Ia. 92 passing through the middle of the central business district. The north-south route of Ia. 14 splits the west half of the city into nearly equal areas.







A. INTRODUCTION

Part III of this report describes briefly the purposes and objectives, procedures, and findings of the Knoxville Urban Area Traffic Survey. Summaries and illustrations of the significant data classifications are included. All information was collected during the period of July 15 to 18, 1958, inclusive. It is reported in terms of the number of trips daily on an average July weekday in 1958 and classified by trip origins and destinations.

B. PURPOSES AND OBJECTIVES

The purposes of this survey were to determine the origin, destination, and number of daily trips into, out of, and through the urban area. Ultimate objectives were to assemble and present, as clearly as possible, the traffic patterns and volumes as they exist. This presentation reveals the amount of street congestion which may be attributed to through highway travelers, and the exact routes by which these travelers enter and exit the urban area. It will also assist city officials and highway administrators in determining the location and type of street or highway improvements necessary to alleviate particular traffic problems.

C. PROCEDURES

The data for the determination of the origin and destination of all trips were gathered through roadside interviews of motor vehicle operators. These interviews were obtained at the external stations located on each rural road entrance to the city. All vehicles were stopped as they passed through the station and the motor vehicle



operator was asked the purpose, origin, and destination of this particular trip. The interviewers also recorded for each vehicle, from visual inspection, other data such as the type, the place of registration, and the number of passengers.

Each interview station was operated for 16 hours starting at 6 AM and ending at 10 PM. This scheme of operation provided for coverage of all but a small portion of the trips passing through each station in the twenty-four hour day. This small portion of traffic was accounted for by portable automatic traffic recorders which were operated continuously at each station for the entire period of the survey. Factors obtained by using these recorder tapes provided means for converting all of the data to average twenty-four hour weekday values. The information gathered was then coded and punched on I.B.M. cards to expedite tabulation.

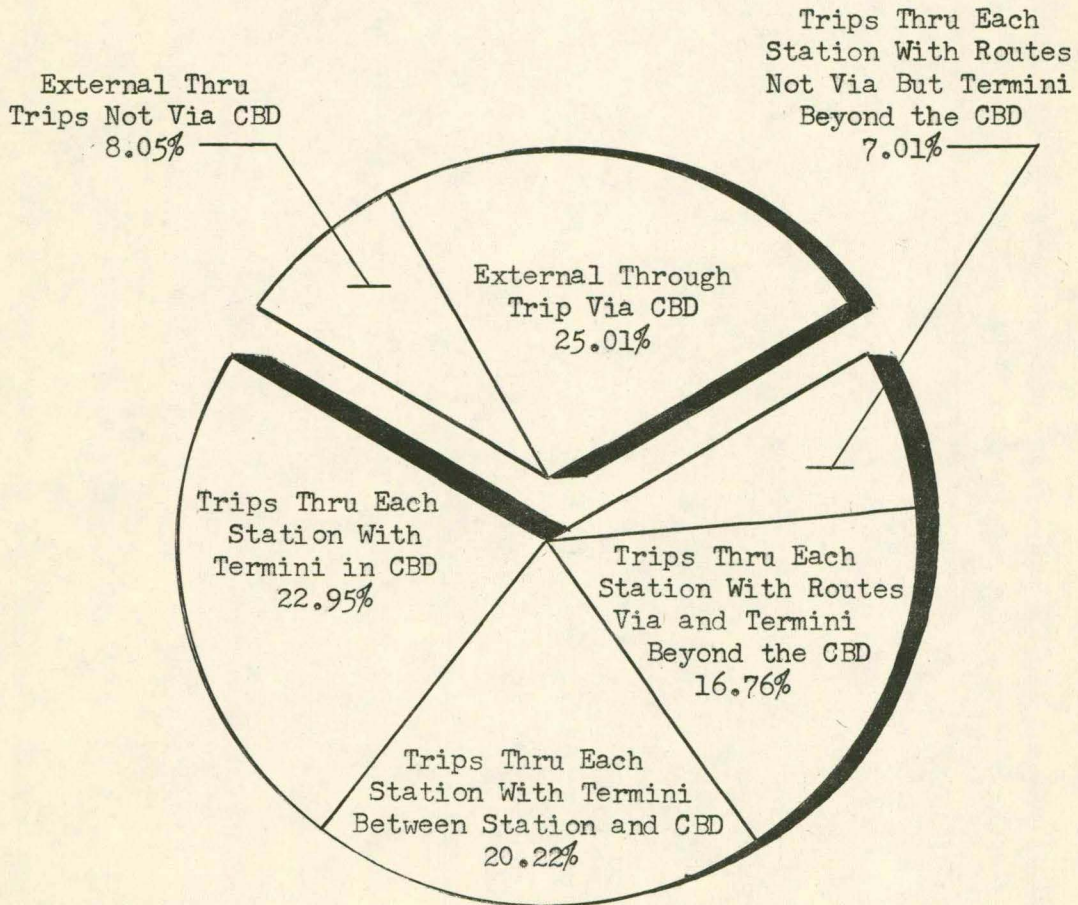
#### D. FINDINGS

Most of the significant findings of this survey have been summarized in the ensuing tables and charts. Any other combinations of related material may be found by referring to the trip tabulation sheet in the appendix.

Three traffic flow diagrams will be found in appropriate locations throughout the presentation of the findings. The first one encountered merely gives a pictorial view of the entire traffic pattern within the area. A traffic flow map depicting all external through trips will be found next, immediately following the external through trip tables. The third and final flow diagram is found following the group of tables relating all of the external local trips to their termini.



The following illustration represents a net total trip summarization and percentage distribution of the termini for all trips passing through the external interview stations on an average weekday in July 1958. It should be noted that the few external through trips having termini on non-primary rural roads, as listed on the trip tabulation sheet in the appendix, are all included with the external local trips.



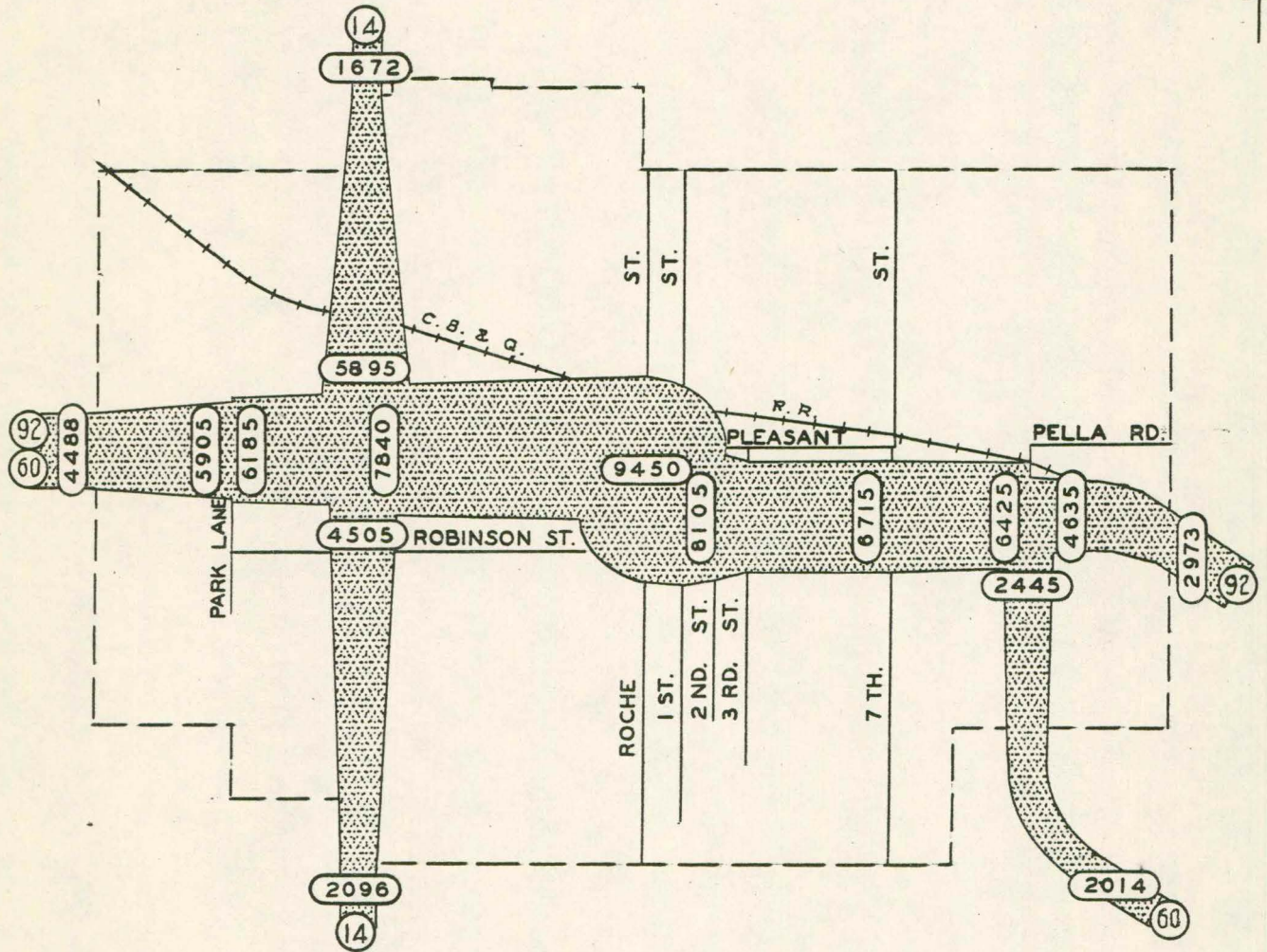
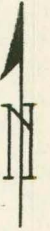


1. Traffic and Interview Summary:

By using the previously explained procedures, the information in the following table was obtained. The external stations are listed with the total traffic passing each station, the total number of interviews taken at each station, and the per cent that this interview figure is of the total traffic figure. This information is all based on the flow of traffic for an average weekday in July 1958.

External Station Location	Average Weekday Traffic-July 1958				No. of Interviews Taken	Per Cent Interviewed
	Passenger Cars and Pick-Ups	Single Unit Trucks	Truck Combinations	Total		
Ia 92 E	2,611	207	155	2,973	2,695	90.65
Ia 60 S	1,815	143	56	2,014	1,810	89.87
Ia 14 S	1,835	154	107	2,096	1,699	81.06
Ia 92 & 60W	4,006	315	167	4,488	4,092	91.18
Ia 14 N	1,530	76	66	1,672	1,399	83.67
Total	11,797	895	551	13,243	11,695	88.31





TRAFFIC FLOW MAP  
CITY OF KNOXVILLE  
MARION COUNTY  
AVERAGE WEEK DAY TRAFFIC JULY-1958



2. External Through Trips Via  
the Central Business District:

Table 2 presents a very good comparison between the total trips passing through each external station and the number or per cent of these trips which pass directly through the urban area via the central business district. This same relationship is again presented both numerically and on a percentage basis for the summation of all trips through all stations. From this presentation it is shown in the following table that 2,489 trips, or 25.01 per cent of the total trips passing through all external stations, were external through trips traveling via the central business district.

Table 2 External Through Trips Via the Central Business District on an Average Weekday in July 1958			
External Station Location	Total Trips Through Station	Through Trips Via the CBD	
		Number	Per Cent of Total
Ia 92 E	2,973	1,618	54.42
Ia 60 S	2,014	871	43.25
Ia 14 S	2,096	314	14.98
Ia 92 & 60 W	4,488	1,983	44.18
Ia 14 N	1,672	192	11.48
Less Duplicates	3,290	2,489	75.65
Total	9,953	2,489	25.01



3. External Through Trips Not  
Via the Central Business District:

The following table reveals the exact relationship between all trips passing through each external station and the percentage of these trips which pass directly on through and out of the urban area, but not via the central business district. This same comparison is also presented for the total of all external through trips passing through all external stations. From Table 3 it is then noted that this figure is 8.05 per cent.

Table 3 External Through Trips Not Via the Central Business District on an Average Weekday in July 1958			
External Station Location	Total Trips Through Station	Through Trips Not Via the CBD	
		Number	Per Cent of Total
Ia 92 E	2,973	30	1.01
Ia 60 S	2,014	30	1.49
Ia 14 S	2,096	641	30.58
Ia 92 & 60 W	4,488	447	9.96
Ia 14 N	1,672	454	27.15
Less Duplicates	3,290	801	24.35
Total	9,953	801	8.05



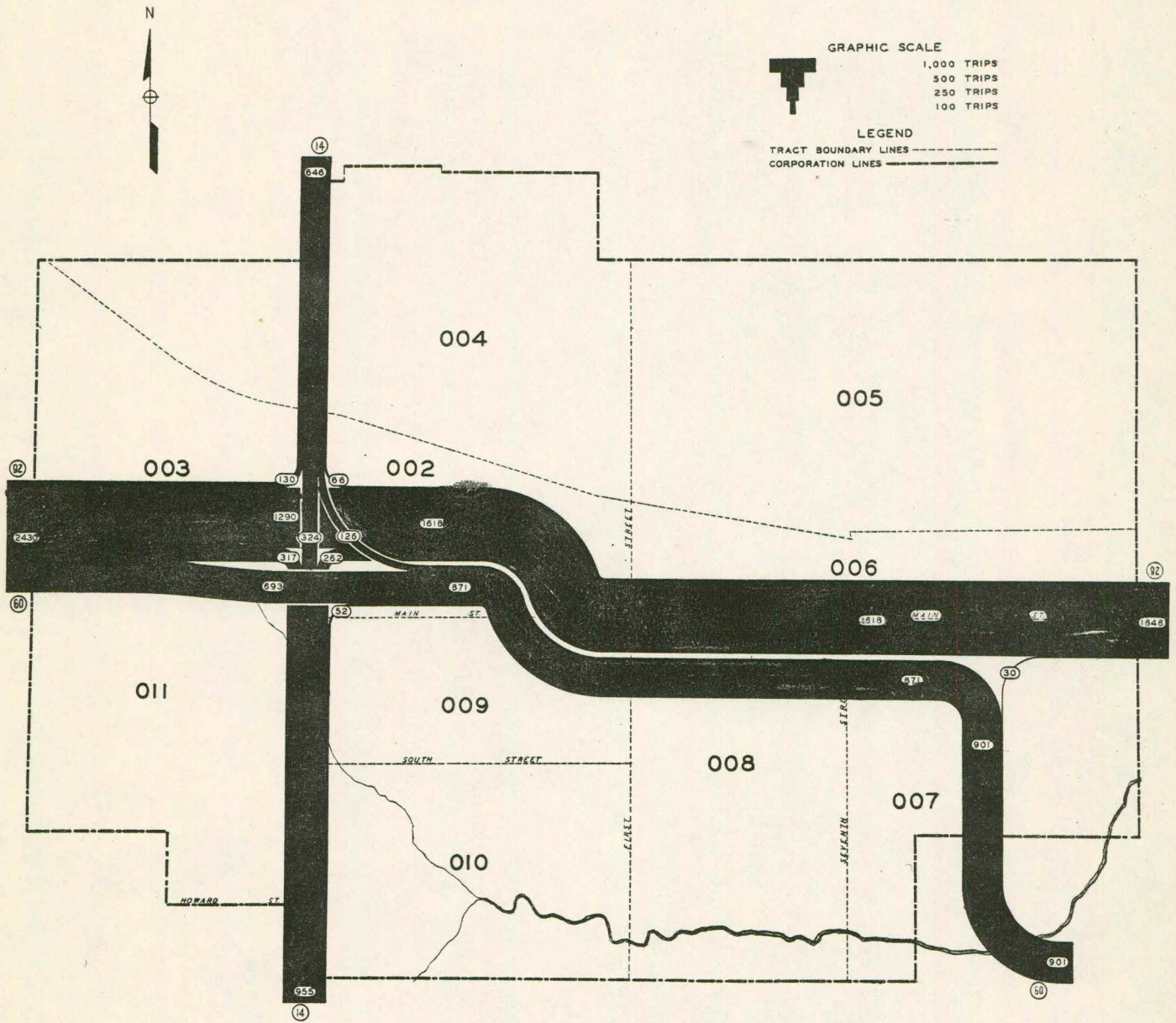


CHART NO. 1  
 ORIGIN OR DESTINATION OF TRIPS  
 BETWEEN PRIMARY ROAD ENTRANCES  
 IN THE URBAN AREA  
 OF  
 KNOXVILLE

JULY AVERAGE WEEKDAY TRAFFIC 1958



4. Trips Through Each Station With  
Termini in the Central Business District:

Table 4 compares the total trips passing through each station with the percentage of these respective trips having termini in the central business district. It also relates the total of all trips passing through all of the stations to the number of these same trips having termini in the central business district. On this comparative basis 22.95 per cent of the total trips passing through all external stations fall into the above explained category.

Table 4 Trips Through Each Station With Termini in the Central Business District on an Average Weekday in July 1958			
External Station Location	Total Trips Through Station	Termini in the CBD	
		Number	Per Cent of Total
Ia 92 E	2,973	452	15.20
Ia 60 S	2,014	362	17.97
Ia 14 S	2,096	412	19.66
Ia 92 & 60 W	4,488	730	16.27
Ia 14 N	1,672	328	19.62
Less Duplicates	3,290	---	---
Total	9,953	2,284	22.95



5. Trips Through Each Station With Termini  
Between the Station and the Central Business District:

The information contained in Table 5 reveals a comparison of the total trips passing through each station and the percentage of these trips having termini in the residential and intermediate areas between that station and the central business district. In addition to this, the summation of the total trips passing through all of the external stations is compared to the percentage of these total trips having termini as explained above. These comparisons are pointed out both numerically and on a percentage basis. As can be seen from the table, 2,013 trips, or 20.22 per cent of the total trips passing through all of the external stations, had termini in the residential and intermediate areas between the stations and the central business district.

Table 5 Trips Through Each Station With Termini Between The Station and the Central Business District on an Average Weekday in July 1958			
External Station Location	Total Trips Through Station	Termini Between Station and CBD	
		Number	Per Cent of Total
Ia 92 E	2,973	247	8.31
Ia 60 S	2,014	202	10.03
Ia 14 S	2,096	130	6.20
Ia 92 & 60 W	4,488	1,019	22.70
Ia 14 N	1,672	415	24.82
Less Duplicates	3,290	---	-----
Total	9,953	2,013	20.22



6. Trips Through Each Station With Routes Via  
and Termini Beyond the Central Business District:

In Table 6 a comparison is made between the total trips passing through each external station, and the number and percentage of these trips which pass directly via and have their termini beyond the central business district. It can also be seen from the following table that 1,668 trips, or 16.76 per cent of all trips passing through all stations, travel directly via the central business district and have their termini beyond it. These comparisons are made both numerically and on a percentage basis for all of the routes listed.

External Station Location	Total Trips Through Station	Route Via-Termini Beyond CBD	
		Number	Per Cent of Total
Ia 92 E	2,973	626	21.06
Ia 60 S	2,014	508	25.22
Ia 14 S	2,096	95	4.53
Ia 92 & 60 W	4,488	309	6.89
Ia 14 N	1,672	130	7.78
Less Duplicates	3,290		
Total	9,953	1,668	16.76



7. Trips Through Each Station With Routes Not  
Via but Termini Beyond the Central Business District:

The following table reveals the exact relationship between all trips passing through all external stations, and the percentage of these trips which had termini beyond but routes not via the central business district. As can be seen below, 698 trips, or 7.01 per cent of the total trips passing through all of the external stations, fall into the above category. This same comparison for each individual station is also clearly presented in the table.

Table 7 Trips Through Each Station With Routes Not Via But Termini Beyond the Central Business District on an Average Weekday in July 1958			
External Station Location	Total Trips Through Station	Route Not Via-Termini Beyond CBD	
		Number	Per Cent of Total
Ia 92 E	2,973	---	---
Ia 60 S	2,014	41	2.04
Ia 14 S	2,096	504	24.05
Ia 92 & 60 W	4,488	---	---
Ia 14 N	1,672	153	9.15
Less Duplicates	3,290	---	---
Total	9,953	698	7.01



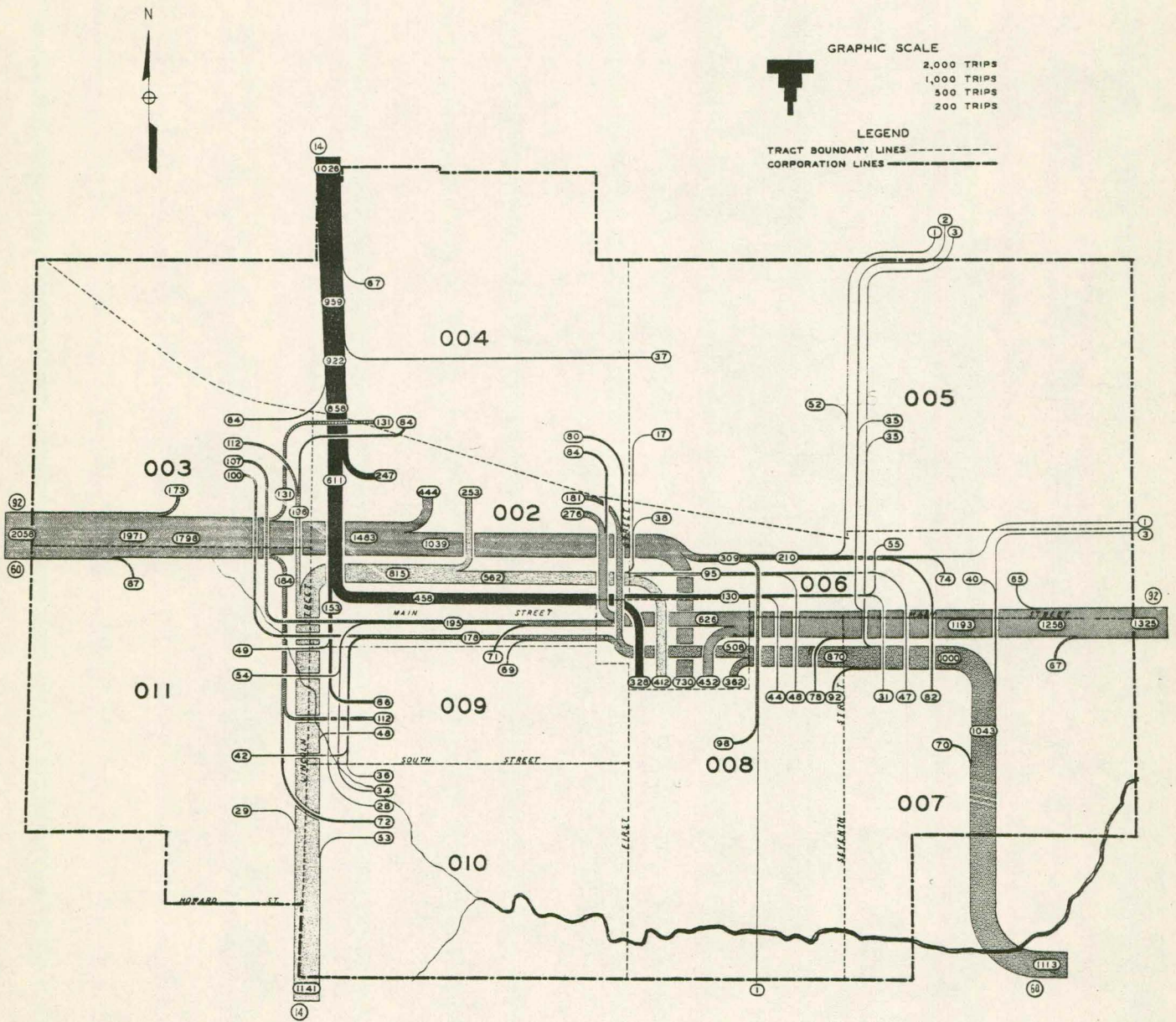


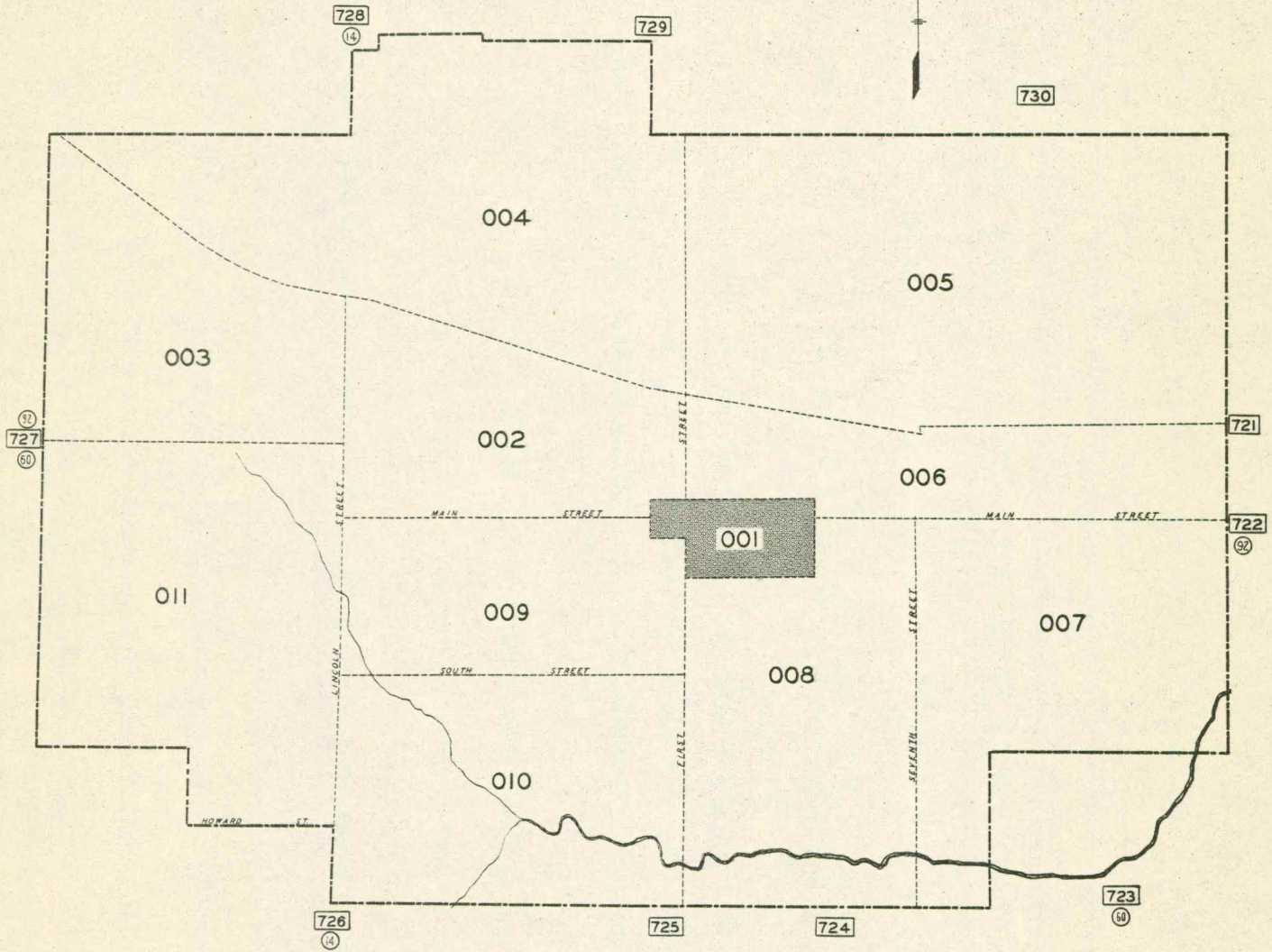
CHART NO. 2  
 ORIGIN OR DESTINATION OF TRIPS  
 BETWEEN PRIMARY ROAD ENTRANCES  
 AND  
 ALL TRACTS WITHIN THE URBAN AREA  
 OF  
 KNOXVILLE  
 JULY AVERAGE WEEKDAY TRAFFIC 1958



A P P E N D I X



LEGEND  
 TRACT BOUNDARY LINES - - - - -  
 CORPORATION LINES - - - - -  
 EXTERNAL STATIONS - [721]  
 CENTRAL BUSINESS DISTRICT - [shaded box]



TRACT MAP  
 OF  
 KNOXVILLE URBAN AREA  
 WITH  
 EXTERNAL STATIONS



Knoxville Origin and Destination  
 Trips Through Stations Located on  
 14 S., Ia. 92 and Ia. 60 W., Ia. 14 N., and F.A.S. 634  
 Average Weekday Traffic in July

Knoxville Origin		Area					Knoxville Total	External Area										External Total	GRAND TOTAL
		007 Southeast	008 South	009 South Central	010 South - Southwest	011 Southwest		722 Ia. 92 E.	723 Ia. 60 S.	726 Ia. 14 S.	727 Ia. 92 and Ia. 60 W.	728 Ia. 14 N.	721 Loc. Rd. E.	724 Local Road South	725 Local Rd. S.	729 F.A.S. 634	730 Local Road North		
001 Central Business District	001						213	176	205	341	153							1088	1088
002 West Central	002						140	97	123	210	125							695	695
003 Northwest	003						50	48	56	86	25							265	265
004 North	004						48	45	39	62	36							230	230
005 Northeast	005						18	18	11	30	19							96	96
006 East	006						35	20	20	37	26							138	138
007 Southeast	007						30	34	23	46	12							145	145
008 South	008						39	47	20	53	27							186	186
009 South Central	009						37	34	26	59	36							192	192
010 South - Southwest	010						14	17	21	35	14							101	101
011 Southwest	011						29	22	14	43	23							131	131
Knoxville Total							653	558	558	1002	496							3267	3267
Ia. 92 E.	722	37	39	34	20	25	670	16	109	621	32						1	779	1449
Ia. 60 S.	723	36	45	35	19	20	549	14	24	320	70	1					2	431	980
Ia. 14 S.	726	24	28	22	32	15	583	153	28	134	170							485	1068
Ia. 92 and Ia. 60 W.	727	36	45	53	37	44	1053	669	373	183	76		1					1302	2355
Ia. 14 N.	728	19	17	40	14	26	530	34	56	154	54							298	828
Local Road East	721							2		1								3	3
Local Road South	724																		
Local Road South	725																		
F.A.S. 634	729																		
Local Road North	730																		
External Total		152	174	184	122	130	3385	871	476	470	1131	348	1	1			3	3301	6686
GRAND TOTAL		152	174	184	122	130	3385	1524	1034	1028	2133	844	1	1			3	6568	9953



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