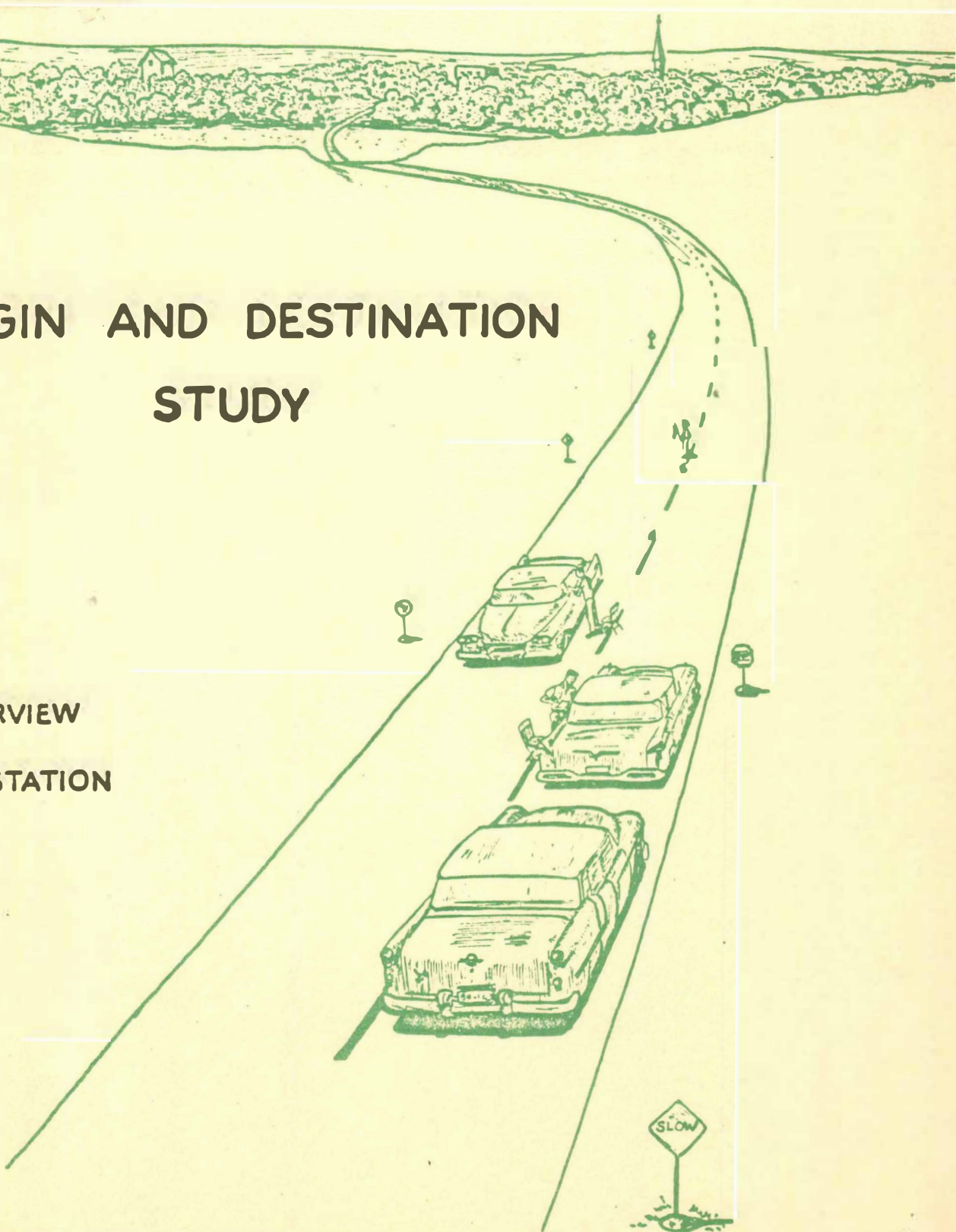


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DENISON

ORIGIN AND DESTINATION STUDY

INTERVIEW
STATION



Denison Corporate 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)

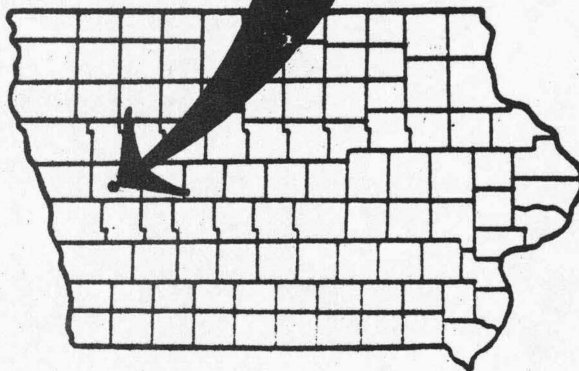
Trips traveling completely across the urban or corporate area, and thereby passing through two interview stations.

Average Weekday

This includes Monday through Friday inclusive.

PART I
SUMMARY

DENISON



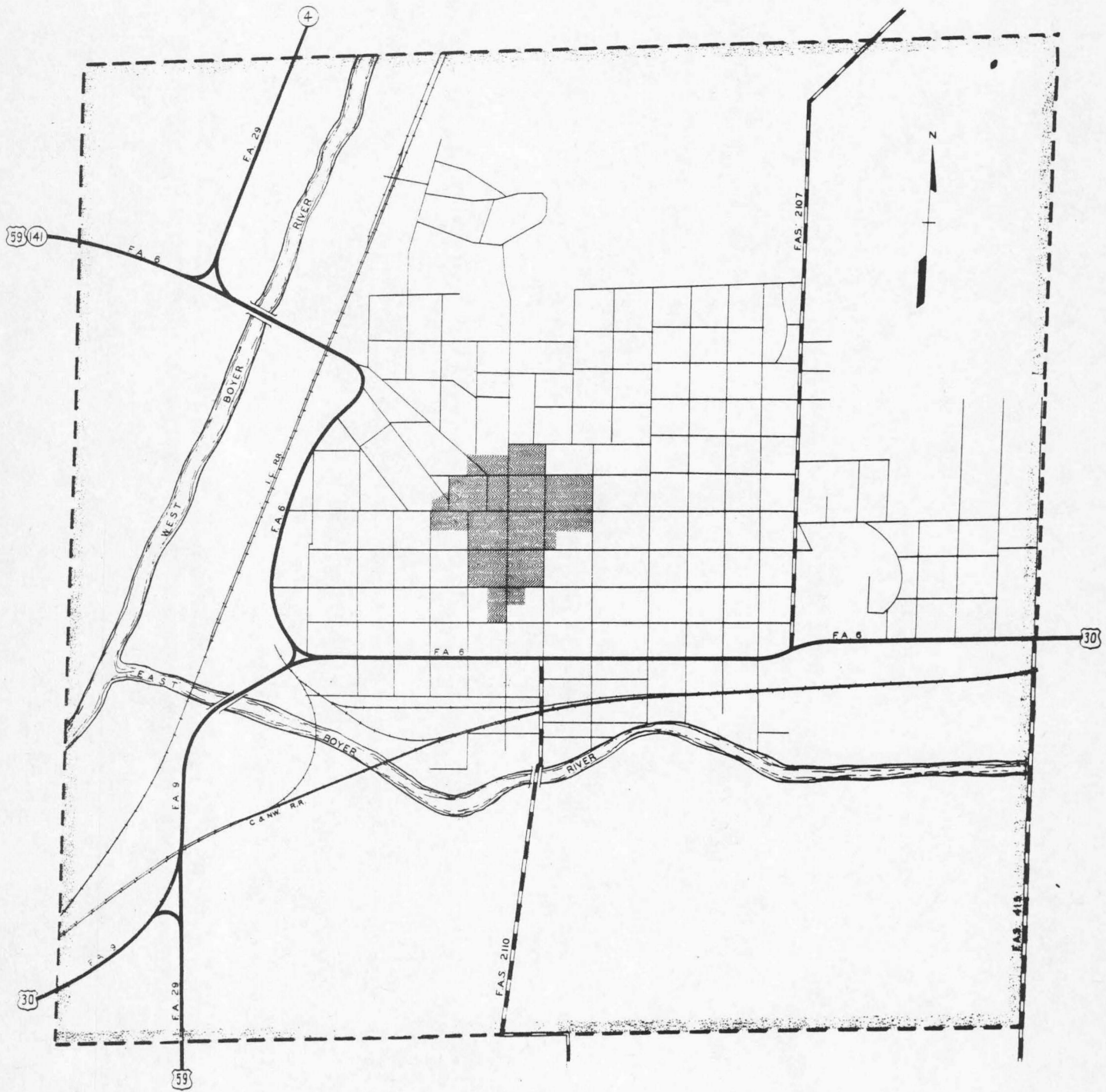
This report of the Denison Corporate Area Traffic Survey describes briefly the characteristics of the corporate area pertinent to the local problem of highway transportation and presents and analyzes the data gathered in the survey. All trip data obtained in the survey are presented in terms of the number 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 the external type survey.

For this particular study, information was gathered by interviewing 92.80 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 8,296 trips crossed the Denison city limits. Out of this total 46.35 per cent were classified as external through trips which traveled without passing via the central business district.

Of all trips passing through the interview stations 24.48 per cent had termini in the central business district. However, another 14.83 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 4.13 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 847 trips, or 10.21 per cent of the total number of trips which passed through the stations, with routes not via but termini beyond the central business district.

PART II
HISTORY AND CHARACTERISTICS
CITY OF DENISON



A. HISTORY

Denison was named for its founder, J. W. Denison. He came to Crawford County in 1855, where he worked as a land agent and school promoter. He helped bring settlers into the county and was instrumental in establishing Denison as the county seat of Crawford County.

The first store was established by H. C. Laub in 1855. He is regarded as one of the most active business intellects ever to come to Crawford County. His enterprises included building construction, bridge erection, and the construction of the first telegraph line from Boone to Council Bluffs.

J. W. Denison established a church and the town's religious growth started in 1858. It has expanded with the population until at the present time there are nine churches in the community. The first newspaper, called the Boyer Valley Record, was started by Issac Allen with its first edition appearing in 1861.

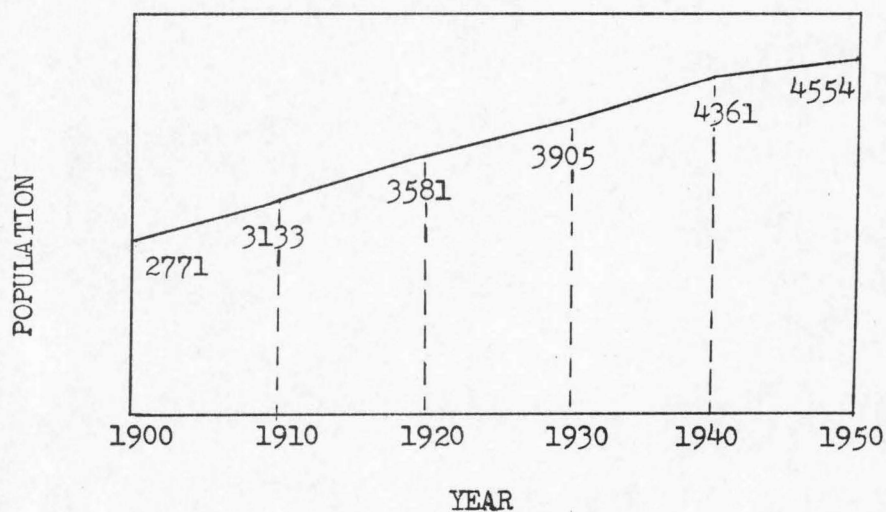
The railroad reached Denison in 1866 with the depot located about one mile east of the town. Later the station was moved into Denison. The coming of the railroad opened many new trade areas to the community's manufacturers. The town's population and exports began to grow and among the early shipments were soap, cheese, brick, and agricultural implements, all made in Denison.

In 1869 Morris McHenry and his brother established the Denison Saving Bank with a capital of \$3,000.00. The name was soon changed to McHenry Brothers Bank and Land Office, with the real estate office doing the larger portion of the business

Denison was incorporated as a town in 1875 with A. F. Bond being

elected its first mayor. Nine years later, on Easter Sunday in 1884, a cyclone struck, killing several persons and destroying the homes of a dozen settlers. This terrific storm had been shortly preceded by a disastrous flood, which had cut off communications for days. The water rose so suddenly that a number of farmers were cut off from their homes and several people perished. However, the community survived these two disasters and continued its rapid growth. The purchase of an electric light plant in 1894 at a cost of \$15,000.00 was an example of the town's early progress. At the turn of the century 2,771 persons resided in Denison. The community's population increased to an estimated 5,200 people in 1958. The following figure illustrates the city's population growth since 1900.

DENISON POPULATION TRENDS



B. CHARACTERISTICS

Denison is located in the west central part of Iowa in Crawford County. It is situated in hilly terrain approximately 50 miles east

of the Missouri River and 100 miles north of the Iowa-Missouri border. The West Boyer River enters the city about one-half mile east of the northwest corner of the corporate limits and flows to an exit point about three-quarters of a mile north of the southwest corner of the corporate area. The East Boyer River flows westerly across the middle of the south half of the municipality and joins the West Boyer near the west corporate line.

The corporation limits of Denison compose an area about 2 miles square with the business district located in the middle of these boundaries. Principal industries located in Denison or the adjacent area include the Crawford County Packing Company in the northwest part of the city, and the Corn Belt Packing Company, and Iowa Plastic Fabricators just south of Denison.

Two railroads serve the municipality. The Illinois Central crosses the north corporation line about one-quarter of a mile east of the West Boyer River and roughly parallels the river across the city. The Chicago and Northwestern crosses the east corporation line approximately three-quarters of a mile north of the southeast corner of the city and runs westerly to an exit point near the southwest corner of Denison.

There are five arterial highway entrances to Denison. The northeast quarter of the city is the only area that does not contain a primary highway. The exact location of these routes may be seen by referring to the urban area map of Denison.

A. INTRODUCTION

Part III of this report describes briefly the purposes and objectives, procedures, and findings of the Denison Corporate Area Traffic Survey. Summaries and illustrations of the significant data classifications are included. All information was collected during the period of July 7 to 11, 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 corporate 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 corporate 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.

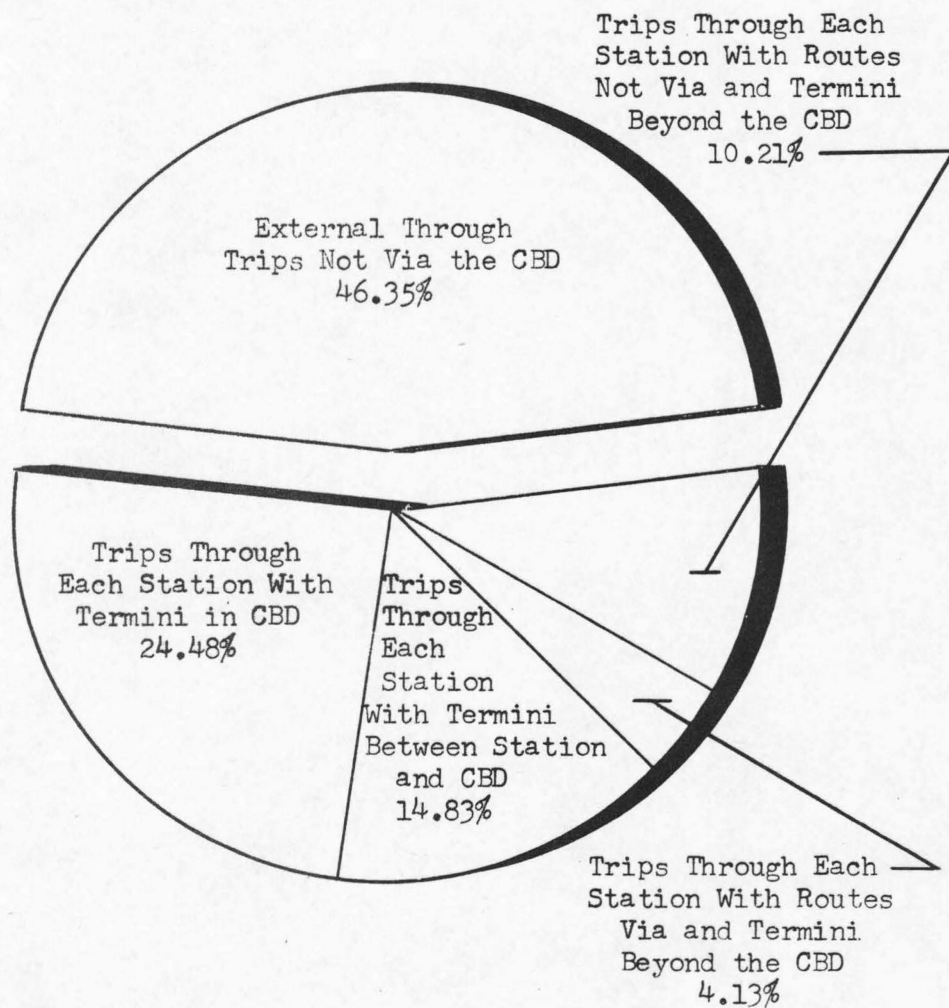
Each interview station was operated for 16 hours starting at 6 AM and ending at 10 PM. This scheme of operation provided for coverage of all but a small portion of the trips passing through each station in the twenty-four hour day. This small portion of traffic was accounted for by portable automatic 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 table. The third and final flow diagram is found following the group of tables relating all of the external local trips to their termini.

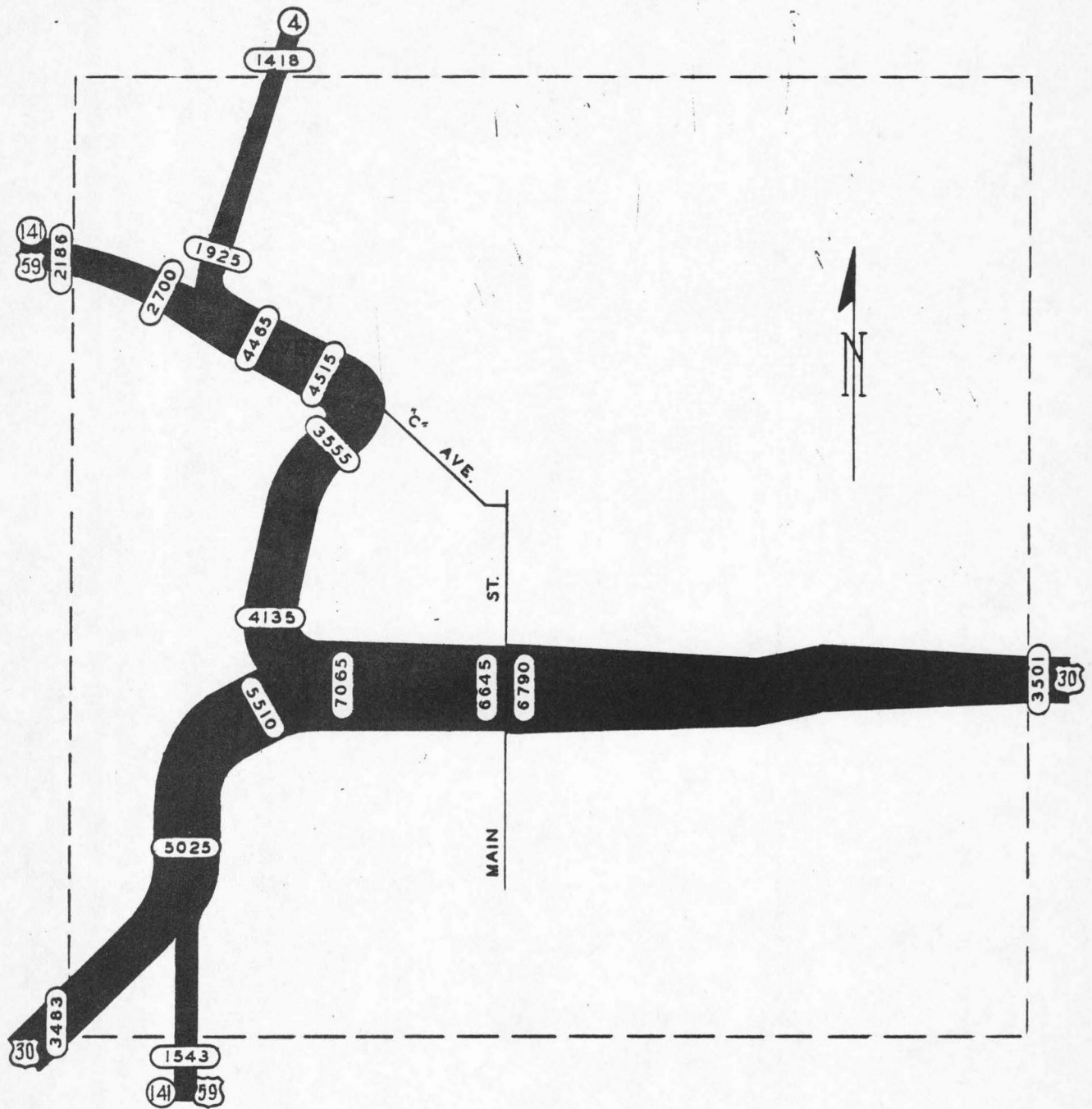
The following illustration represents a net total trip summarization and percentage distribution of the termini for all trips passing through the external interview stations on an average weekday in July 1958. It should be noted that the few external through trips having termini on non-primary rural 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 Locations	Average Weekday Traffic-July 1958				No. of Inter- views Taken	Per Cent Inter- viewed
	Passenger Cars and Pick-Ups	Single Unit Trucks	Truck Combi- nations	Total		
US 30 E	2,897	181	423	3,501	2,876	82.15
US 30 W	2,968	164	361	3,493	3,265	93.47
US59-Ia141 NW	1,873	149	164	2,186	2,089	95.56
Ia 4 N	1,269	86	63	1,418	1,613	113.75
US 59 S	1,305	117	121	1,543	1,424	92.29
Total	10,312	697	1,132	12,141	11,267	92.80



CITY OF DENISON
 CRAWFORD COUNTY
 AVERAGE WEEK DAY TRAFFIC-JULY-1958

2. 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 corporate 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 2 it is then noted that this figure is 46.35 per cent.

Table 2 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
US 30 E	3,501	2,548	72.78
US 30 W	3,493	2,659	76.12
US 59-Ia 141 NW	2,186	1,040	47.58
Ia 4 N	1,418	709	50.00
US 59 S	1,543	734	47.57
Less Duplicates	3,845	3,845	100.00
Total	8,296	3,845	46.35

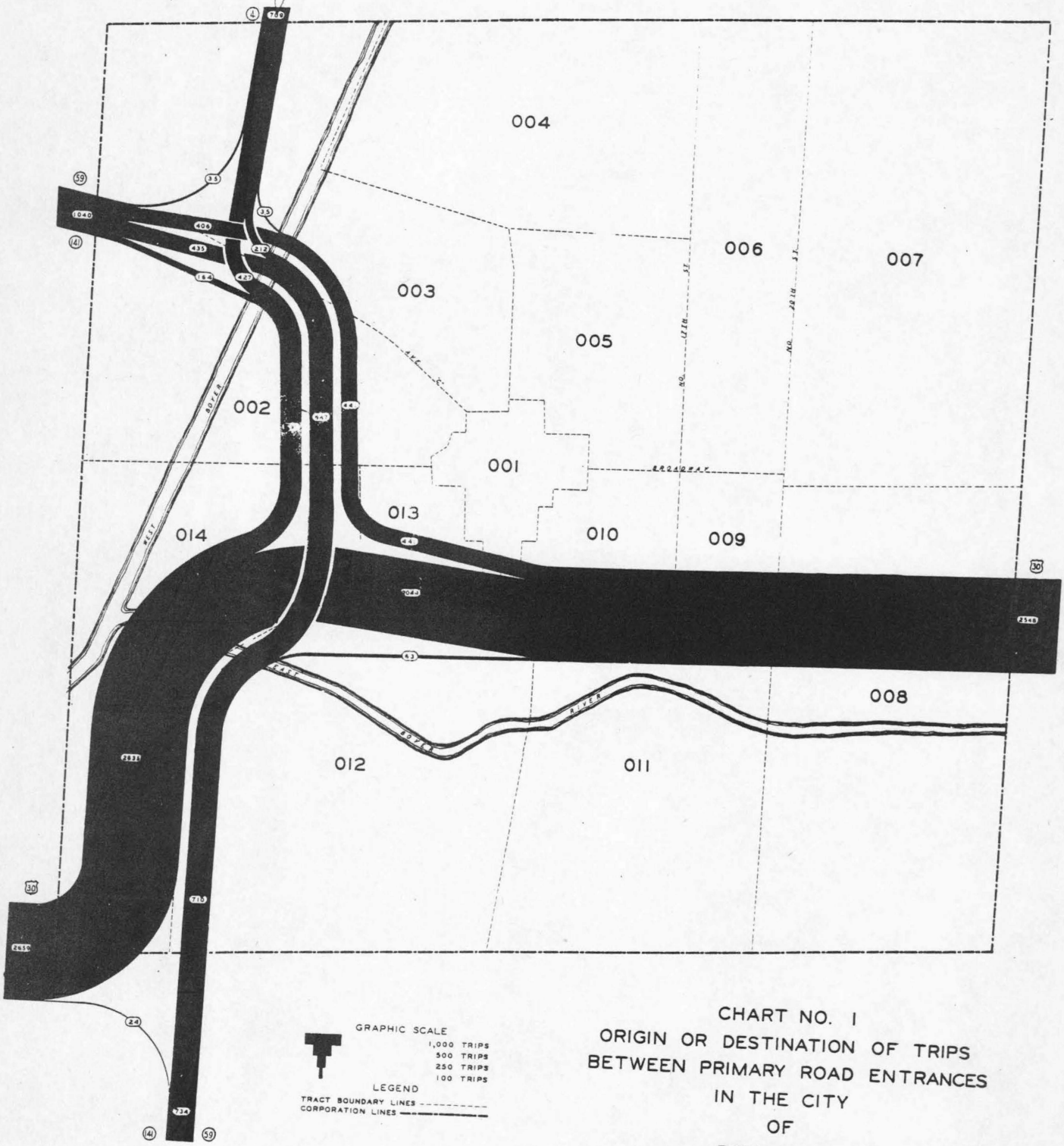


CHART NO. 1
 ORIGIN OR DESTINATION OF TRIPS
 BETWEEN PRIMARY ROAD ENTRANCES
 IN THE CITY
 OF
 DENISON
 JULY AVERAGE WEEKDAY TRAFFIC 1958

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

Table 3 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 24.48 per cent of the total trips passing through all external stations fall into the above explained category.

Table 3 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 CBD	
		Number	Per Cent of Total
US 30 E	3,501	363	10.37
US 30 W	3,493	384	10.99
US 59-Ia 141 NW	2,186	531	24.29
Ia 4 N	1,418	349	24.61
US 59 S	1,543	404	26.18
-----	-----	-----	-----
Less Duplicates	3,845	---	-----
Total	8,296	2,031	24.48

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

The information contained in Table 4 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, 1,230 trips, or 14.83 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 4 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
US 30 E	3,501	253	7.23
US 30 W	3,493	226	6.47
US 59-Ia 141 NW	2,186	321	14.68
Ia 4 N	1,418	211	14.88
US 59 S	1,543	219	14.19
Less Duplicates	3,845	---	-----
Total	8,296	1,230	14.83

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

In Table 5 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 343 trips, or 4.13 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.

Table 5 Trips Through Each Station With Routes Via and Termini Beyond the Central Business District on an Average Weekday in July 1958			
External Station Location	Total Trips Through Station	Route Via-Termini Beyond CBD	
		Number	Per Cent of Total
US 30 E	3,501	104	2.97
US 30 W	3,493	55	1.58
US 59-Ia 141 NW	2,186	72	3.29
Ia 4 N	1,418	63	4.44
US 59 S	1,543	49	3.18
Less Duplicates	3,845	---	-----
Total	8,296	343	4.13

6. 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, 847 trips, or 10.21 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.

External Station Location	Total Trips Through Station	Route Not Via-Termini Beyond CBD	
		Number	Per Cent of Total
US 30 E	3,501	233	6.65
US 30 W	3,493	169	4.84
US 59-Ia 141 NW	2,186	222	10.16
Ia 4 N	1,418	86	6.07
US 59 S	1,543	137	8.88
Less Duplicates	3,845	---	-----
Total	8,296	847	10.21

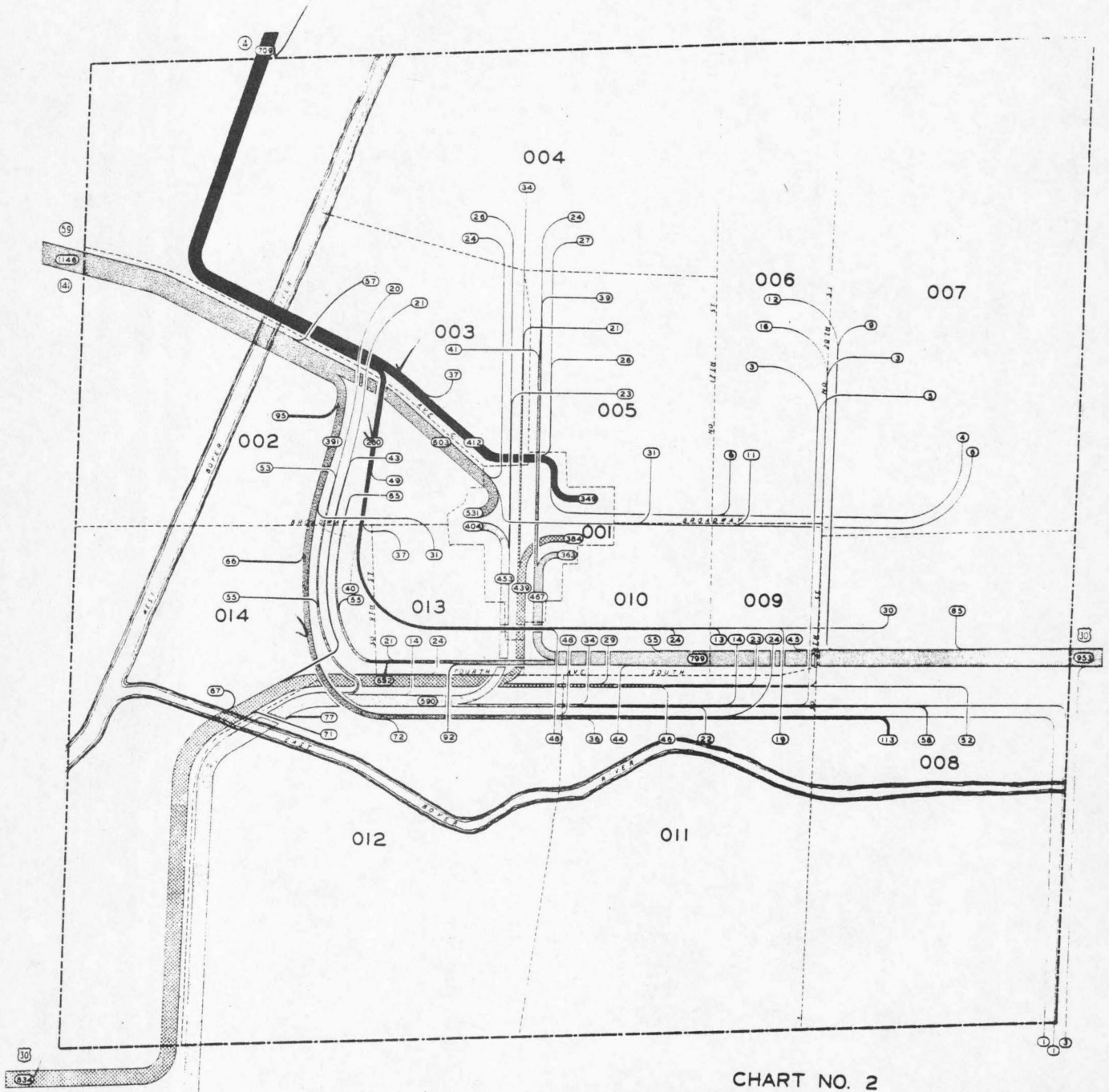
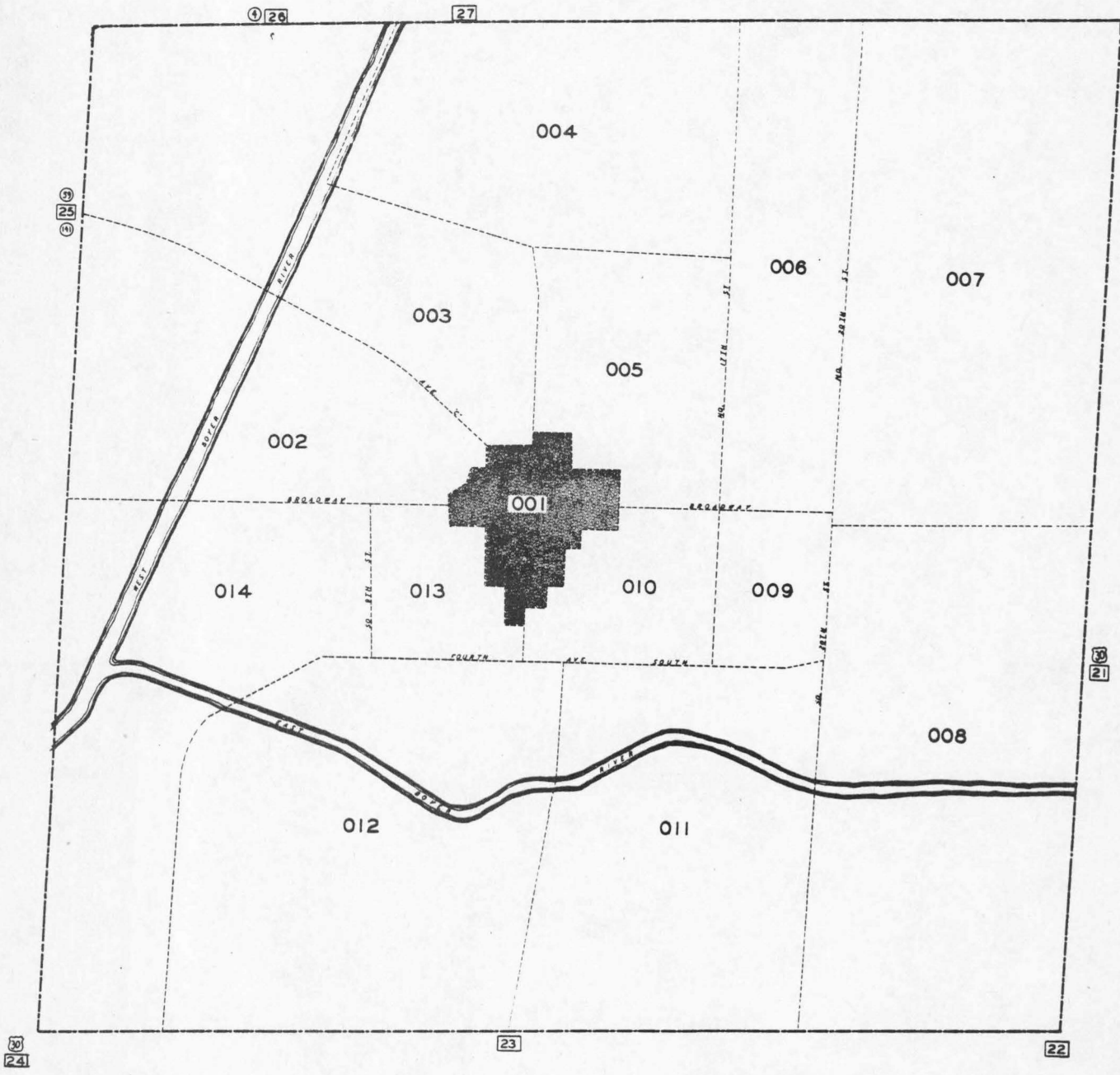


CHART NO. 2
 ORIGIN OR DESTINATION OF TRIPS
 BETWEEN PRIMARY ROAD ENTRANCES
 AND
 ALL TRACTS WITHIN THE CITY
 OF
 DENISON
 JULY AVERAGE WEEKDAY TRAFFIC 1958

GRAPHIC SCALE
 2,000 TRIPS
 1,000 TRIPS
 300 TRIPS
 250 TRIPS

LEGEND
 TRACT BOUNDARY LINES
 CORPORATION LINES

A P P E N D I X



TRACT MAP
OF
CITY OF DENISON
WITH
EXTERNAL STATIONS

LEGEND
TRACT BOUNDARY LINES - - - - -
CORPORATION LINES - - - - -
EXTERNAL STATIONS - - - - -
CENTRAL BUSINESS DISTRICT - - - - -

⑩ 23 ⑩

1958 Denison Origin and Destination
 Total Trips Through Stations Located on
 U.S. 30 E., U.S. 30 W., U.S. 59 S., U.S. 59 and Iowa 141 N.W., and Iowa 4 N,
 Average Weekday Traffic in July

		Denison Urban Area														Denison Total	External Area							External Total	GRAND TOTAL			
		Central Business District	West and North	Northwest	North	North Central	Northeast	East and North	East and South	Southeast Central	South Central	Southeast	Southwest	Southwest Central	West and South		U.S. 30 E.	U.S. 30 W.	U.S. 59 and Iowa 141 NW	Ia. 4 No.	U.S. 59 S.	F.A.S. 415 S.	F.A.S. 2110 South			Local Road No.		
		001	002	003	004	005	006	007	008	009	010	011	012	013	014		721	724	725	726	728	722	723			727		
Denison Urban Area	Tract	Trip Origin														Trip Destination							External Total	GRAND TOTAL				
	001	Central Business District															164	186	242	169	175						936	936
	002	West and North															34	22	50	31	24						161	161
	003	Northwest															20	14	26	16	10						86	86
	004	North															14	13	12	13	21						73	73
	005	North Central															21	12	15	15	12						75	75
	006	Northeast															7	10	6	3	3						29	29
	007	East and North															6	00	3	2	3						14	14
	008	East and South															37	25	59	12	29						162	162
	009	Southeast Central															25	11	12	8	8						64	64
	010	South Central															26	13	20	16	16						91	91
	011	Southeast															23	21	19	10	8						81	81
	012	Southwest															46	33	28	27	43						177	177
	013	Southwest Central															13	12	17	18	8						68	68
	014	West and South															30	32	37	19	30						148	148
	Denison Total															466	404	546	359	390				2165	2165			
External Area	721	U.S. 30 E.	199	31	21	10	18	5	3	48	20	29	21	46	8	25	484		1112	211	16	33	1			1373	1857	
	724	U.S. 30 W.	198	21	7	21	9	6	3	27	12	16	25	38	12	35	430	932		53	225	14			1224	1654		
	725	U.S. 59 and Iowa 141 N.W.	289	45	31	12	16	5	3	54	12	28	17	44	14	29	599	195	111		17	211			534	1133		
	726	Ia. 4 No.	180	18	21	14	11	3	2	18	5	8	9	21	19	21	350	19	202	18		95			334	684		
	728	U.S. 59 S.	229	29	10	5	11	0	2	29	6	18	14	34	6	25	418	30	10	224	117		1		382	800		
	722	F.A.S. 415 S.																								3	3	
	723	F.A.S. 2110 S.																										
	727	Local Road No.																										
	External Total	1095	144	90	62	65	19	13	176	55	99	86	183	59	135	2281	1178	1435	507	375	353	2			3850	6131		
	GRAND TOTAL	1095	144	90	62	65	19	13	176	55	99	86	183	59	135	2281	1644	1839	1053	734	743	2			6015	8296		

