IOWA STATE HIGHWAY COMMISSION

WITH THE COOPERATION OF THE

UNITED STATES BUREAU OF PUBLIC ROADS

Report of
Urban Area Traffic Survey in Ottumwa

Prepared by
Highway Planning Survey Division
Safety and Traffic Department
Iowa State Highway Commission

Ames, Iowa
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Part I

Synopsis

1. Introduction

The data obtained in the Ottumwa urban area traffic survey are difficult to view and to comprehend in a body. Part of the difficulty may be solved through analysis of separable portions of the data and the condensation of the data for each of these portions. In the end, however, it becomes necessary to combine these summaries for a knowledge of the inter-relationships of the several groups of the data. It is the function of Part I of this report to accomplish that purpose. This will be done through reviews of the salient features of the report. As a consequence, a general view of the whole report may be had from a perusal of this part of the report.

2. Characteristics of the urban area

The characteristics of the Ottumwa urban area of greatest concern to highway transport are the nature of the topography of the area, the location of the central business district, the location of major industries, the location of the Des Moines River and the location of the entrances of the principal rural highways and of their extensions into the city. Much of the topography in the Ottumwa urban area is unfavorable to road building, in a closely built-up area. The central business district is inaccessible to about 40.0 percent of the intra-city traffic without crossing the river, the railroads and the belt of major industries lying along the river and the railroads. Of the three, the river and the railroads offer the greatest handicap to highway construction, the first because of the expensive bridge projects involved in crossing it and the second, because of the necessity of grade separation projects where large volumes of highway traffic are involved.

3. Purpose and objectives of the survey

The purpose of the Ottumwa urban area traffic survey was to determine the volumes of traffic into, out of, through and within that area and to determine the origins and destinations of the trips that constitute the traffic streams on the principal highways and streets of the city.

The ultimate objective of the survey was the determination of the needs of the principal arteries of traffic for highway improvements which will permit greater efficiency, comfort and safety of highway usage than available in the existing streets and highways in the current condition.

All data for origins and destinations of trips were obtained through interviews. For the trips crossing the city limits, the interviews were taken on the principal rural road entrances to the city at the city limits. The data for trips lying wholly within the city were taken in home interviews.

All data were reported in terms of the number of trips daily and in terms of the origins and destinations of trips.

4. Trips crossing the city limits

At the time the survey was made, there was a total of 11,987 trips crossing the city limits of Ottumwa daily. Of this total 9,096 were passenger car trips and 2,891 were truck trips. In other words, 76.0 percent of these trips were car trips and 24.0 percent were truck trips.

When the data obtained in the interviews at the city limits were classified on the basis of the areas within the city to and from which the trips were made it was found:

(a) That 24.7 percent of the total trips were to and from points within the city between the city limits and the central business district, that is, to areas adjacent to the entrance to the city through which the trip was made.

(b) That 38.9 percent of the total trips were to and from the central business district.

(c) That 20.2 percent of the total trips were to and from points within the city beyond the central business district from the entrance to the city through which the trips were made, and

(d) That 16.2 percent of the total trips were to and from other entrances to the city, that is, through the city.

There was a considerable variation among the entrances to the city in the proportion of the trips found in each of these classifications particularly in the first, that shown as (a) in the above list but in all cases, the combination of the first two groups, (a) and (b) contained more than 57.8 percent of the total trips through the entrance. In other words, more than one half the trips crossing the city limits were included in two groups of trips, those to and from points within the city adjacent to the entrance and those to and from the central business district.

The analysis of these data as given in Tables No. 1 to 7 inclusive in Part IV of this report show concisely the relationships between the several trip classifications for the trips crossing the city limits at each rural road entrance to the city.

5. Trips lying wholly within the city

At the time the survey was made, there was a total of 25,038 trips made daily wholly within the city. Of this total 17,561 were passenger car trips and 7,477 were truck trips. From these data, it is shown that 70.1 percent of the trips lying wholly within the city were car trips and 29.9 percent were truck trips.

The data for these intra-city trips were classified in a manner similar to that adopted for analyzing the data for the trips crossing the city limits but in somewhat greater detail to define the areas of the city between which trips were made.

From these data it was found that 41.3 percent of the intra-city trips were to and from the central business district.

Further, from these data it was found that 14,357 of the intra-city trips made daily in the city were trips through the central business district. These constitute 57.3 percent of the intra-city trips made daily in Ottumwa.

Attention is direction to the fact that 98.6 percent of the intra-city trips made daily in the city involved some contact with the central business district. At least one of the causes of congestion in traffic on the streets in that district is found in this fact. Relief could be had by diversion of the major portion of the trips through the district along by-pass streets in the vicinity of the central business district.

6. All trips in Ottumwa urban area

At the time the survey was made there was a total of 37025 trips daily by motor vehicles into, out of, through and within the Ottumwa urban area. Of this total 72.0 percent were passenger car trips and 28.0 percent were truck trips.

Further, it was found that 32.4 percent of the total were trips crossing the city limits and 67.6 percent were trips lying wholly within the city. The traffic on the streets of this city is therefore predominantly the result of intra-city trips.

Further examination of the data for all trips in the Ottumwa urban area revealed that there was a total of 15,000 trips daily to and from the central business district. Of this total, 31.0 percent was in trips crossing the city limits and 69.0 percent in trips lying within the city.

Yet further examination of these data revealed a total of 16,934 trips daily through the central business district. Of this total 0.9 percent was in trips through the city, 14.3 percent in other trips crossing the city limits and 84.8 percent in trips lying wholly within the city. Attention is directed to the fact the 31,934 trips daily, contacted the central business district in some part either in entering, leaving or passing through it.

7. Desired lines of travel

The center of traffic interest was determined for each area within the city and the number of trips between each pair of these centers

tabulated in Tables No. 1 and 2 in Part VII of this report. Lines drawn between the centers of traffic interest show the location of a highway for maximum efficiency of travel for all of the trips made between each pair of areas whose centers of are so connected. These are the desired lines of travel. They are shown for the Ottumwa urban area in Charts No. 2 to 6 inclusive in Part VII of this report. Charts 4, 5 and 6 show the major desired lines of travel.

8. Major desired lines of travel

The major desired lines of travel for the trips crossing the city limits generally passed through or near the central business district. A few were found to other points of major interest such as the meat packing district and the entrance for another rural highway. The direction of these lines is controlled by the number of trips between the points of traffic interest connected by them and the location of the points of traffic interest.

Table No. 3 in Part IV of this report shows that 24.7 percent of all trips crossing the city limits were to and from points within the city between the entrance to the city and the central business district. Since the average location for these points between a given entrance to the city and the central business district was is most cases either on or near a straight line between the entrance to the city and the central business district, this group of trips had considerable influence in the location of the desired line of travel for the trips through each entrance to the city.

Turning again to Table No. 3 of Part IV it is found that 38.9 percent of all trips crossing the city limits were to and from the central business district. This group of trips combined with that just discussed, constituted 59.5 percent of all trips crossing the city limits. There was a considerable variation among the entrances in the proportion

of trips in the combination of these two groups. The smallest portion of the total trips for this combination was found at the entrance for U.S. 34 at the east city limits where 57.7 percent of the total were in this combination of the two groups and the largest portion was at County Road "B" at the southwest city limits where 87.9 percent of the total was found for this combination. In the case of U.S. 34 at the southwest city limits the desired line of travel for the points adjacent to the entrance is far to the right of the line to the central business district and as a consequence it forms a separate desired line of travel. For all other entrances, the desired lines of travel for the two groups just discussed fall either on or near each other and largely control the location of the major desired lines of travel through these entrances.

In Table No. 3 of Part IV it will also be noted that a substantial portion of all trips crossing the city limits were found in the group of trips passing between the entrance and points in areas within the city beyond the central business district from the entrance to the city. For traffic to and from most of the entrances this means passing through the central business district. As the average location of the points in areas beyond that district from the entrance was generally near a line through the entrance and the central business district, the influence of this group upon the alignment of the desired line of travel through that district was added to that of the two previously discussed. These three groups of trips combined constituted 83.8 percent of the trips crossing the city limits and as a consequence controlled the direction of the desired lines of travel through all of the entrances excepting those for U.S. 34 where the through traffic was of sufficient importance to generate a separate major desired line of travel.

For most of the entrances, the portion of the total trips through the entrance in the group including trips through the city was small but

for the entrances for U.S. 34 it was considerably larger than the average, that is, 16.2 percent, found for the entrances as a group. On U.S. 34 at the east city limits the trips in through traffic were 20.6 percent of the total and on U.S. 34 at the west city limits such trips were 27.9 percent of the total trips through that entrance. These and the interchange trips between U.S. 63 at the north city limits and U.S. 34 at the east city limits were the only significant numbers of trips that had a desired line of travel passing through the city at an appreciable distance from the central business district.

Examination of the relationships between the locations of the major lines of travel and the locations of principal streets and highways in the urban area and its near vicinity reveals a considerable divergence between the location of the routes desired and needed by the major traffic streams and those found in the area for these traffic streams.

9. Intra-city trips

It was found that 41.1 percent of the total for all intra-city traffic were in trips to and from the central business district and 57.4 percent of that total were in trips through the central business district. Only a small percentage of the intra-city trips, 1.5 percent, failed to involve the central business district in some way. This offers a suggestion, at the least, for a major contributor to the congestion of traffic in the central business district.

Movement of intra-city traffic from one area to another within the city except to adjacent areas is impossible without traversing the central business district in some part of the district, even though it be such a small part as the intersection of Jefferson and Main Streets.

It is found that 41.1 percent of the intra-city traffic was in trips between the central business district and points south of the Des Moines River. This added to other groups having a need for a river crossing

reveals the importance of the river crossings in the area.

A comprehensive as well as a detailed view of the intra-city trips is most readily made available through an examination of the data in Tables No. 1 and 2 and in Charts No. 4, 5 and 6 in Part VII of this report. A review of these data in words must be extensive at the best. The charts especially provide an efficient substitute for many words.

10. Major Desired Lines of travel

The major desired lines of travel indicate the locations for highways in the area that will provide for the maximum efficiency in traffic movements on the basis of mimimum distance of travel between the principal points of traffic interest in the area. The locations of the major desired lines of travel for the Ottumwa urban area are shown in Charts No. 4, 5 and 6, particularly the latter. If it were possible, construction of highways in these locations would provide for the maximum efficiency of travel in the area for the major portion of the traffic movements of the area. It is the usual experience however, that one or more characteristics of the urban area make this impossible for some lines of travel and impractical for others. A sound compromise is to adhere as closely as may be possible or practical to the location of the major desired lines of travel and to combine these lines where they may run in the same general direction.

Proceeding in this manner it has been found that the relatively large number of major desired lines of travel may be reduced to a small number which will serve the area without greatly impairing the efficiency of travel that would be provided by the network formed by the large number of individual lines.

The several south-north major desired lines of travel may be resolved into one general south-north line. When this is done the resultant line points almost due north from the entrance of U.S. 63 at the south city limits, passes through the heart of the city and connects with the entrance

for U.S. 63 at the north city limits.

The west-east major desired line of travel extends almost due east across the southern part of the city from the entrance for U.S. 34 at the west city limits to the entrance for U.S. 34 at the east city limits.

The northwest-southeast major desired line of travel crosses the city limits at the entrance for Ia. 15 at the northwestern corner of the city and extends southeasterly across the city to the heart of the city and from there on the same alignment to the center of traffic interest in the packing house area.

The southwest-northeast major desired line of travel extends from the center of traffic interest of the north half of the southwest area of the city to the west edge of the central business district.

The south-north desired line of travel has two companion lines of travel, one extending from the entrance for U.S. 63 at the south city limits to the packing house area and to the entrance for U.S. 34 at the east city limits, and the other extending from the entrance for U.S. 63 at the north city limits to the same area and entrance for U.S. 34.

The west-east major desired line of travel has three companion lines, one from the entrance for U.S. 34 at the west city limits to the central business district, one from the entrance for U.S. 34 at the east city limits to the central business district and one from the southwest area of the city to the area southeast of the central business district.

The northwest-southeast major desired line of travel has a companion line lying parallel to it through the central business district and about two blocks north of that desired line of travel.

11. Recommendations

A list of recommendations for highway improvements for the greatest efficiency of traffic circulation and movement within and near the Ottumwa urban area is given in Part VI of this report. These recommendations are

based on as close an adherence to the major desired lines of travel as the characteristics of the urban area will permit for practical construction of the improvements indicated as being required to adequately serve the area.

12. Conclusions

The following list of conclusions were derived from the analysis of the data obtained in the survey. These data indicate:

(a) That the major desired lines of travel for the principal traffic streams in the Ottumwa urban area form a radial pattern with the central business district as the center.

(b) That the major desired lines of travel for intra-city trips circumferential to that district were few, there being only two for which by-pass on major streets or roadways were needed. One of these is along Fourth Street and the other for the through traffic on U.S. 34 and cross town traffic south of the business district.

(c) That there is an excessive divergence between the location of the major desired lines of travel and the location of the highways now available for the principal traffic streams.

(d) That elimination of the discrepancy between the alignment desired and needed for greater efficiency, comfort and safety of traffic movement in the principal traffic streams and that available on existing highways can be made in most cases to a satisfactory degree without resort to unusual designs or construction projects.

(e) That for a major portion of the trips crossing the city limits as well as for a large portion of the intra-city trips the early improvement of the extensions of U.S. 63 is urgently needed.

(f) That for a major portion of the intra-city trips two projects are urgently needed, one the development and improvement of Fourth

Street from Wapello Street to Jefferson Street and if possible to Burch Street and the other project, the development and improvement of a new major street from the intersection of Willard and Church Street, via Wapello to the intersection of Wapello and Fourth Streets.

(g) That off street parking facilities should be made available in the vicinity of the County Buildings, the Post Office and the City Hall.

Part II

Introduction

The report of the urban area traffic survey in Ottumwa presents a description of the procedure, summary tabulations, charts containing graphical analyses of the data, conclusions derived from the data and recommendations for highway improvements derived from the analysis of the data.

Part I contains a review of the report and a series of conclusions drawn from the data.

Part III contains a brief description of each of the characteristics of the urban area pertinent to highway transport in the area.

Part IV contains a series of summary tabulations of the data and explanations of these tabulations.

Part V offers interpretations of the data and bases for the practical applications of the data obtained in the survey.

Part VI offers a series of recommendations for highway improvements indicated by the conclusions drawn from the data in the survey.

Part VII contains the basic tabulations of the data obtained in the survey showing the number of trips and origins and destinations of trips to and from each point of traffic interest. Graphical presentations of the data appear in Charts 2 to 27 inclusive.

A map showing the existing streets and highways of the urban area is attached.

Part III

This part of this report presents a brief description of each of the several physical characteristics of the Ottumwa urban area that may be in some way involved in the highway transport problems of that area. Such characteristics as the geographic location of the city, the shape of the urban area, population of the area, location of prominent features of topography, location of major industries, location of principal rural road entrances to the city and location of the central business district in the urban area contribute, each in its own particular way, to those problems and through their relationship to and with one another may either aid or impede in the solution of these problems.

These descriptions of the several pertinent characteristics of the Ottumwa urban area are given here to make them readily available when required in the sections of this report dealing with the analysis and interpretation of the traffic survey data and to provide a general knowledge of the nature of the area in which the survey was made.

Ottumwa is located on the Des Moines River in the southeastern part of Iowa approximately seventy-five miles from the eastern and thirty miles from the southern borders of the state. It is located near the eastern edge of that portion of the state underlain with workable coal deposits and is at almost the exact center of Wapello County of which it is the county seat.

The shape of the incorporated area is roughly rectangular. This area is approximately three miles in width and five miles in length with the longer axis pointing northward. The width is greater at the southern end than at the northern due to rectangular additions at each side of the area near this end of the area.

In the census of 1940, Ottumwa was found to have a population of 31,570.

It is the largest city in this part of the state having only one close rival and this one seventy-five miles to the east on that border of the state.

Table No. 1

Population in Ottumwa

Year	Population	Change	Percent change
1940	31,570	+3,495	+ 12.4
1930	28,075	+5,072	+ 22.0
1920	23,003	+ 991	+ 4.5
1910	22,012	+3,815	+ 21.0
1900	18,197	+4,196	+ 30.0
1890	14,001	+4,997	+ 55.5
1880	9,004	+3,790	+ 72.7
1870	5,214	+3,532	+219.5
1860	1,632	---	---

A large portion of the population of the city is either engaged in or dependent upon the industrial activities of the area. The coal mining of the rural area and the manufacturing and food processing of the urban area provide employment and a livlihood for the major portion of the population of the city.

As may be expected, at least in parts of a region in which mining is a major industry, the terrain within the city has in places greater relief than is general for the State as a whole. For some reason, now unknown, Ottumwa was settled in one of the rougher portions of the county in which it is situated. The Des Moines River runs diagonally entirely across the city from an entrance near the northwest corner to an exit near the southeast corner of the city. The portion of the city north of the river is rough and hilly. Numerous short steep valleys intrude into the residential areas from a larger valley, one to the west and one to the east of this part of the city. As a consequence, the ridge within the city between these valleys is thickly populated and the rugged slopes and valleys less fully occupied. This ridge, extending southward from the prairie of the rural areas north of the city, broadens suddenly when near the river and

forms itself into another ridge roughly parallel to the course of the stream thrcugh the city. A considerable portion of the northern part of the city lies on this ridge and its slopes and on the top and the rather steep slopes of the ridge facing the Des Moines River Valley. The portion of the city south of the river is on bottom land and a considerable portion of this area is subject to flooding from the river. This portion of the city is growing rapidly south and west. A large portion of the population is now found in this part of the city in spite of the flood hazard of the lowlands and the isolation of the higher areas from the northern part of the city when floods occur.

As may be expected in the topographic situation encountered in this area the railroads with one exception, follow the river and lie along its north bank entirely across the city. There are four railway lines represented, two of them with major operations. One of these has all of its mainline in the western part of the city, which it enters and leaves without penetrating far into the city.

Located along the railroads across the city are the heavy industries, in the western half of the city on the north side of the tracks, and in the eastern half of the city, crowded by the steep slope of the encroaching ridge to the south sides of the tracks. These industries include a considerable variety of tool manufacturers, a railroad round house, gas plant, lawn mower works, oil blending plants, farm machinery and equipment plants and a large meat packing plant.

Immediately to the north and near the center of this band of major industries which extends entirely across the city and lies principally along the north side of the river, the central business district is crowded into a small area six to eight blocks long and a few blocks in width lying between the industrial band and the ridge parallel to the river and partly on the slope of the ridge. Near the center of the north side of the central

business district and on a steeper portion of the slope of the ridge, the county seat buildings and the entrance of one of the major streets to the central business district are found.

Two major highways intersect in Ottumwa. The north-south highway enters the city near the center of the north and south sides of the incorporated area and lies in the near vicinity of the north-south axis of the city entirely across the city. The west--east highway enters and leaves the city in the south portion of the city and near the south side of the city. This route follows a generally west-east line across the city. Another highway of increasing importance enters the city near the northwest corner of the city and proceeds directly to the central business district where it terminates upon intersection with the north-south highway at the east edge of that district.

In the routing for each of these highways into and through the city there are a number of defects each of which contributes to inefficiencies in traffic movements and to inconvenience, discomfort and sometimes hazard to the users of the highway. Sometimes the defect may be due to the effect of some characteristic of the urban area and sometimes to a combination of several of them. The traffic survey provides the data to show the extent to which the defects inconvenience traffic and to indicate to what degree removal of the defects may be justified.

Part IV

Ottumwa Urban Area Traffic Survey

1. Introduction

Part IV of this report describes briefly the purposes, objectives and procedures of the Ottumwa urban area traffic survey and presents summaries of the significant classifications of the data obtained in the survey.

The data were collected during the period October 15 to December 12, 1945, inclusive. They are reported in terms of the number of trips per day and classified by origins and destinations of trips. The number of trips has increased since the data were taken but the indications are that the relationships between the classifications of trips have undergone little change except for special groups of trips such as that for the trips between Ottumwa and the Naval Air Base which was in operation when the survey was made but which has closed since that time. There are fluctuations throughout the year in the size of the groups which are associated with some seasonal activity but the engagement in other activities in the same areas produced compensations which tend to preserve the relationships between groups as found in the survey.

2. Purpose of the survey

The purpose of the survey was to determine the number of trips daily into, out of, through and within the Ottumwa urban area and to determine the origins and destinations of these trips.

3. Objectives of the survey

The ultimate objective of the survey was the determination of the needs of the principal highways for improvements either within or in the vicinity of the urban area, the determination of the nature and extent of such improvements, and the determination of the causes of congestion of traffic on the streets of the central business district.

4. Procedure

Data collected during the survey were obtained in two independent operations, roadside interviews for information required for trips crossing the city limits and home interviews for knowledge of the trips lying wholly within the city as well as those from urban residences to points outside of the city and return.

The roadside interviews were taken at the principal rural road entrances to the city. All traffic entering or leaving the city was stopped at these points and the motor vehicle operator interviewed. This interview consisted of a few simple questions regarding location of origin and destination of the trip in which the operator was at that time engaged and regarding the purpose of trip, and nature of the commodity carried unless the latter information was obtainable through visual inspection. The interviewers also recorded during each interview the type of vehicle, place of registration and the other pertinent data regarding the vehicle required for the purposes of the survey.

Each interview station was operated for eight hours at two different periods and on different days. One period covered the portion of the twenty-four hour day from 6 A.M. to 2 P.M. and the other, the period from 2 P.M. to 10 P.M. The schedule of operations provided coverage for all but a small portion of the total number of trips passing through each entrance to the city in a typical twenty-four hour day.

Knowledge of the total number of trips for each station for the twenty-four hour day was obtained through the operation of portable automatic traffic recorders at each station for the entire period required for taking the roadside interview at all stations. Factors obtained in the automatic traffic recorder operation provided factors for computing all data to average values for a twenty-four hour day.

The data for trips lying wholly within the city was obtained through home interviews of a representative sample of the residents of the city. The sample was taken by selecting every seventh dwelling place in the city area. The trips for all residents over five years of age for the week day preceding the interview were obtained in the interview. This sample of trips was expanded to provide for the total trips by residents of the city for a typical week day and trips by trucks and taxis were obtained through a similar procedure.

5. Significant Classifications of the Data

The procedure of the survey facilitated the assembly of the data into two general groups based on the nature of the survey operations themselves.

1. Trips crossing the city limits

2. Trips lying wholly within the city

The data assembled under each of these classifications is sub-classified by origin and destination of trips. To provide basis for this work, the area within the city was divided into a number of small areas. Then, the number of trips between each pair of these areas and between these areas and points outside of the city were tabulated. These data are shown in detail in Table No. 1 and 2 in Part VII of this report. They are also shown graphically in Charts No. 7 to 20, inclusive. These charts all have the same base which shows the small areas into which the incorporated area of Ottumwa was divided for the analysis of the data.

It is difficult to fully realize the significance of the several groups of the data in these forms. Each serves primarily the purposes of presenting the data in a compact, concise and comprehensive form and in this form offers a general view of the situation as a whole. Summaries of the data for each of several significant groupings of the data indicating general nature of trips are required for a thorough knowledge of the nature of the trips.

6. Total number of trips

There were 11,987 trips per day crossing the city limits and 25,038 trips per day lying wholly within the city of Ottumwa at the time the survey was made. Recent traffic operations in other city areas indicate that the number of trips in each classification, particularly those of the intra-city group, has increased considerably since the survey was made but that the distribution among origin and destination classifications has undergone little if any change since that time.

7. Classification of trips crossing the city limits

The data in Table No. 1 show the number of trips between the city limits and significant areas of traffic interest in the city. Here, it may be observed that 42.0 percent of all car trips, 28.9 percent of all truck trips and 38.9 percent of all trips crossing the city limits were to and from the central business district.

Attention is directed to the small portion of the trips that passed through the city. The data reveal that 17.8 percent of the car trips, 11.4 percent of the truck trips and 16.2 percent of all trips crossing the city limits were in this classification. Special attention is directed to the small portion of this through traffic that passes through the central business district. The trips in this classification are charged to Primary Road No. Ia. 15 which enters the city near the northwest corner of the incorporated area and continues diagonally southeastward through the city to an intersection with U.S. 63 at the east edge of the central business district.

The data in Tables No. 2 to 7 inclusive present detailed classifications of the data given in Table No. 1. The detailed treatment in this series of tables allows for the analysis of the data for trips crossing the city limits at each rural road entrance of the city. Tables No. 2 and 3 deal

with all trips; Tables No. 4 and 5 deal with car trips and Table No. 6 and 7 with truck trips. The same data are presented graphically in somewhat greater detail in Charts No. 7 to 20 inclusive. The desired lines of travel for the distribution of the traffic at each rural road entrance are also shown graphically in Charts No. 2 to 6 inclusive.

8. Classifications of trips at each rural road entrance to the city.

Since there is a considerable variation among the entrances to the city in the classification of trips, it has seemed advisable to show the classification of trips for each entrance to the city separately in addition to the general presentation of these classifications of data as given in Table No. 1. This has been accomplished by the preparation of a series of summary tables which appear on the following pages. For the more detailed examination of the significant classifications of these data, reference is made to Tables No. 2 to 7 and Charts No. 7 to 20 inclusive.

These tables and charts are self-explanatory. They present in a brief space a complete analysis of the data which are summarized in them. They are presented on the following pages as the report upon the trips crossing the city limits.

Attention is directed to the large portion of the total number of trips crossing the city limits at each entrance to the city that is in trips to and from the central business district. The percentage of the total number of trips in this classification varies from station to station but for all excepting one of the principal rural road entrances it is the largest single group of trips. The portions of the total traffic in trips to and from points between the city and the central business district and in trips to and from points beyond the central business district from the entrance are about equal. Except for U.S. 34 the portion of trips in through the city traffic is small. This exception constitutes a special case which will be discussed more fully in Part V of this report.

Table No. 1

Classification of all trips crossing city limits

Origin or Destination of Trip	Number of trips for each type of vehicle			Percent of total trips for each type of vehicle		
	Car	Truck	Total	Car	Truck	Total
Point between the city limits and the central business district	2077	884	2961	22.8	30.6	24.7
Points within the central business district	3824	836	4660	42.0	28.9	38.9
Points beyond the central business district from point of crossing the city limits	1579	842	2421	17.4	29.1	20.2
Sub-Total	7480	2562	10042	82.2	88.6	83.8
Both outside of city						
(a) Through central business district	45	33	78	0.5	1.1	0.6
(b) Through other part of the city	1571	296	1867	17.3	10.3	15.6
Sub-Total	1616	329	1945	17.8	11.4	16.2
TOTAL	9096	2891	11987	100.0	100.0	100.0

Table No. 2

Classification of all trips crossing the city limits at each of the principal rural road entrances to the city

Origin or Destination of trip	Number of trips						
	US 63 North	US 34 East	US 63 South	Co. "B" S. W.	US 34 West	Ia. 15 N.W.	Total
Points between the city limits and the central business district	751	453	633	380	535	209	2961
Points within the central business district	1472	1397	633	232	505	421	4660
Points beyond the central business district from point of crossing city limits	913	693	253	69	144	349	2421
Sub-Total	3136	2543	1519	681	1184	979	10042
Both outside of city (a) Through the central business district	---	---	---	---	----	78	78
(b) Through other parts of the city	384	658	318	48	459	---	1867
Sub-Total	384	658	318	48	459	78	1945
TOTAL	3520	3201	1837	729	1643	1057	11987

Table No. 3

Percentage Distribution of all trips crossing the city limits at each of the principal rural road entrances to the city

Origin or Destination of trip	Percentage of Total Number of trips						
	US 63 North	US 34 East	US 63 South	Co. "B" S.W.	US 34 West	Ia. 15 N.W.	Total
Points between the city limits and the central business district	21.3	14.2	34.5	52.1	32.6	19.8	24.7
Points within the central business district	41.9	43.6	34.5	31.8	30.7	39.8	38.9
Points beyond the central business district from point of crossing city limits	25.9	21.6	13.7	9.5	8.8	33.0	20.2
Sub-Total	89.1	79.4	82.7	93.4	72.1	92.6	83.8
Both outside of city (a) Through the central business district	---	---	---	---	---	7.4	0.6
(b) Through other parts of city	10.9	20.6	17.3	6.6	27.9	---	15.6
Sub-Total	10.9	20.6	17.3	6.6	27.9	7.4	16.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table No. 4

Classification of car trips crossing the city limits at each of the principal rural road entrances to the city

Origin or Destination of trip	Number of Trips						
	US 63 North	US 34 East	US 63 South	Co. "B" S.W.	US 34 West	Ia. 15 N.W.	Total
Point between the city limits and the central business district	550	313	448	245	373	148	2077
Points within the central business district	1190	1227	514	188	407	298	3824
Points beyond the central business district from point of crossing city limits	613	495	137	40	108	186	1579
Sub-Total	2353	2035	1099	473	888	632	7480
Both outside of city							
(a) Through central business district	---	---	---	---	---	45	45
(b) Through other parts of the city	315	568	251	28	409	---	1571
Sub-Total	315	568	251	28	409	45	1616
TOTAL	2668	2603	1350	501	1297	677	9096

2668
85%
3570

Table No. 5

Percentage distribution of passenger car trips crossing the city limits at each of the principal rural road entrances to the city

Origin or Destination of trip	Percentage of Total number of trips						
	US 63 North	US 34 East	US 63 South	Co. "E" S.W.	US 34 West	Ia. 15 N.W.	Total
Point between the city limits and the central business district	20.6	12.0	33.2	48.9	28.8	21.9	22.8
Points within the central business district	44.6	47.1	38.1	37.5	31.4	44.0	42.0
Points beyond the central business district from point of crossing city limits	23.0	19.0	10.1	8.0	8.3	27.5	17.4
Sub-Total	88.2	78.1	81.4	94.4	68.5	93.4	82.2
Both outside of city							
(a) Through central business district	---	---	---	---	---	6.6	0.5
(b) Through other parts of the city	11.8	21.9	18.6	5.6	31.5	---	17.3
Sub-Total	11.8	21.9	18.6	5.6	31.5	6.6	17.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table No, 6

Classification of truck trips crossing the city limits at each of the principal rural road entrances to the city.

Origin or Destination of trip	Number of Trips						
	US 63 North	US 34 East	US 63 South	Co. "B" S.W.	US 34 West	Ia. 15 N.W.	Total
Points between the city limits and the central business district	201	140	185	135	162	61	884
Points within the central business district	282	170	119	44	98	123	836
Points beyond the central business district from point of crossing city limits	300	198	116	29	36	163	842
Sub-Total	783	508	420	208	296	347	2562
Both outside of city							
(a) Through central business district	---	---	---	---	---	33	33
(b) Through other parts of the city	69	90	67	20	50	---	296
Sub-Total	69	90	67	20	50	33	329
TOTAL	852	598	487	228	346	380	2891

Table No. 7

Percentage Distribution of truck trips crossing the city limits at each of the rural road entrances to the city

Origin or Destination of trip	Percentage of Total Number of Trips						
	US 63 North	US 34 East	US 63 South	Co. "B" S.W.	US 34 West	Ia. 15 N.W.	Total
Points between the city limits and the central business district	23.6	23.4	38.0	59.2	46.8	16.1	30.6
Points within the central business district	33.1	28.4	24.4	19.3	28.3	32.4	28.9
Points beyond the central business district from point of crossing city limits	35.2	33.1	23.8	12.7	10.4	42.8	29.1
Sub-Total	91.9	84.9	86.2	91.2	85.5	91.3	88.6
Both outside of city							
(a) Through central business district	---	---	---	---	---	8.7	1.2
(b) Through other parts of the city	8.1	15.1	13.8	8.8	14.5	---	10.2
Sub-Total	8.1	15.1	13.8	8.8	14.5	8.7	11.4
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

9. Classification of intra-city trips

Table No. 8 contains a summary tabulation of the data collected for intra-city trips, that is, trips lying wholly within the city. The data in Table No. 8 are arranged to show the number of trips originating in each part of the city. It is of particular interest to note that only slightly less trips originate south of the river than are found for the portion of the city north of the river. This fact emphasizes the importance of the river crossings in the Ottumwa urban area.

Table No. 8

Classification of trips lying wholly within the city

Origin of trips Part of City	Number of trips for each type of vehicle			Percent of total trips for each type of vehicle.		
	Car	Truck	Total	Car	Truck	Total
East of North Court Street	1,530	564	2,094	8.7	7.5	8.4
West of North Court Street	2,523	1,072	3,595	14.3	14.3	14.3
Southeast of central business district	2,459	1,172	3,631	14.0	15.7	14.5
South of Des Moines River and east of Davis Street	2,469	1,165	3,634	14.0	15.6	14.5
South of Des Moines River and west of Davis Street	3,549	1,288	4,837	20.4	17.2	14.5
Tracts adjacent to central business district	2,032	963	2,995	11.6	12.9	12.0
Central business district	2,999	1,253	4,252	17.0	16.8	17.0
TOTAL--All Trips	17,561	7,477	25,038	100.0	100.0	100.0

10. Intra-city trips to and from the central business district

The data summarized in Table No. 9 show the intra-city trips to and from the central business district. The data are arranged here to show the portion of this classification of trips for each part of the city outside of the central business district. Here, it may be noted that 41.1 percent of the intra-city traffic to and from the central business district is between that district and points within the city south of the river. Attention is directed to the fact that the central business district is on the north side of the river.

Table No. 9

Intra-city trips to and from the central business district

Origin or Destination of Trip	Number of trips for each type of vehicle			Percent of total trips to and from central business district for each type of vehicle		
	Car	Truck	Total	Car	Truck	Total
East of North Court Street	1,145	346	1,491	14.9	13.0	14.4
West of North Court Street	1,904	719	2,623	24.8	27.1	25.4
Southeast of central business district	1,174	803	1,977	15.3	30.3	19.1
South of Des Moines River and east of Davis Street	1,378	246	1,624	17.9	9.3	15.7
South of Des Moines River and west of Davis Street	2,086	539	2,625	27.1	20.3	25.4
TOTAL-All Trips	7,687	2,653	10,340	100.0	100.0	100.0

11. Intra-city trips through the central business district.

Data summarized from Appendix Tables No. 1 and 2 reveal that 10,892 intra-city car trips, 3,465 intra-city truck trips and a total of 14,357 intra-city trips pass through the central business district daily in traveling from one part of the city to another. These figures represent 62.0 percent of the intra-city car trips, 46.4 percent of the intra-city truck trips and 57.4 percent of the total number of intra-city trips made daily in the Ottumwa urban area.

12. All trips into, out of, through and within the Ottumwa urban area daily.

The data in Table No. 10 summarize the number of trips into, out of, through and within the Ottumwa urban area.

Table No. 10

All trips in Ottumwa urban area

Type of Trip	Number of Trips			Percent of total trips for each type of vehicle		
	Car	Truck	Total	Car	Truck	Total
Trips crossing the city limits	9,096	2,891	11,987	34.0	27.9	32.4
Trips lying wholly within the city	17,561	7,477	25,038	66.0	72.1	67.6
TOTAL- All Trips	26,657	10,368	37,025	100.0	100.0	100.0

13. All trips to and from central business district

The data in Table No. 11 show the total number of trips of all trips of all types to and from the central business district.

Table No. 11

All trips to and from central business district

Type of Trip	Number of Trips			Percent of total trips for each type of vehicle		
	Car	Truck	Total	Car	Truck	Total
Trips crossing city limits	3824	836	4660	33.2	24.0	31.0
Trips lying wholly within the city	7687	2653	10340	66.8	76.0	69.0
TOTAL-All Trips	11501	3489	15000	100.0	100.0	100.0
Percent of total trips in urban area for each type of vehicle	43.2	33.7	40.5	---	---	---

14. All trips through the central business district

The data in Table No. 12 show the total number of trips through the central business district.

Table No. 12

All trips through the central business district

Type of Trip	Number of Trips			Percent of total trips for each type of vehicle		
	Car	Truck	Total	Car	Truck	Total
Trips crossing city limits						
(a) Through the city	90	66	156	0.7	1.5	0.9
(b) To and from parts of city beyond central business district	1,579	842	2,421	12.6	19.3	14.3
Sub-Total	1,669	908	2,577	13.3	20.8	15.2
Trips lying wholly within the city	10,892	3,465	14,357	86.7	79.2	84.8
TOTAL--all Trips	12,561	4,373	16,934	100.0	100.0	100.0
Percent of total trips in urban area for each type of vehicle	47.2	42.2	46.0	----	----	----

Part V

Interpretation and Application of Data

1. Introduction

Part V of this report presents a series of interpretations of the data and explains the significance of the different classifications of trips into, out of, through and within the urban area insofar as the nature of the trip has bearing upon the highway transport problems of the urban area.

2. Classification of trips crossing the city limits

For the purpose of analysis the data for the trips crossing the city limits were classified into groups determined by the region within the city to and from which trips were made. These regions were selected on the basis of the nature of use and of their position with respect to a given entrance to the city and to the central business district. The classifications derived in this manner are:

(a) Areas within the city between an entrance to the city and the central business district,

(b) Area within the central business district

(c) Areas within the city beyond the central business district from an entrance to the city, and

(d) Areas outside of the city

The data for trips crossing the city limits were first classified by origins and destinations of trips. For the purpose of analysis, the data were further condensed by the classification of the origins and destinations themselves in the several groups given here. Tables No. 1 to 6 inclusive in Part IV of this report were prepared in this manner.

This procedure provides for a description of the general nature of the trips on the basis of the areas of the city to and from which they are made and through which they pass. From these data in this form

knowledge may be had of the number of trips which can be made directly and of the portions of the city through which they pass. For example, trips to and from areas adjacent to the entrance to the city may be made directly and without passing through any other part of the city. Trips between the central business district and the entrances to the city must pass through the areas of the city adjacent to the entrances for the central business district is located near the center of the incorporated area. Trips between an entrance to the city and areas within the city beyond the central business district from the entrance may of necessity pass through that district in some cases or they may pass by it either directly or indirectly in other cases.

Study of the data classified in this manner in conjunction with an examination of a map of the streets of the city provides a means for the determination of the present situation with respect to passage into, out of and through the city for trips through each entrance to the city. Such a study reveals the necessity for and the possibility of relocation of certain routes to avoid trips through certain areas, particularly the central business district, and permits a determination of the number of trips that may be assigned to a more efficient routing.

3. Classification of trips lying wholly within the city

In a similar manner the data for trips lying wholly within the city were also first classified by origins and destinations of trips. For the analysis of these data, they were further condensed by a classification of the origins and destinations of trips in groups including the origin and destination classifications for general areas of the city based on the location in the city. These areas are:

(a) Area in city east of North Court Street and north of Stellar Avenue

(b) Area in city west of North Court Street and north of the Des Moines River.

(c) Area in city east of North Jefferson Street, south of Stellar Avenue and north of the Des Moines River.

(d) Area south of the Des Moines River and east of Davis Street

(e) Area south of the Des Moines River and west of Davis Street, and

(f) Areas in the central business district which lie principally south of Fifth Street, west of North Jefferson Street, north of the Des Moines River and east of Wapello Street.

4. Desired lines of travel

In the analysis procedure discussed to this point only the means of classifying the data by origins and destinations of trips has been covered. From these data knowledge is had of the areas between which trips were made and of the number of trips made between these areas.

For the next step in the analysis it is necessary to determine the center of traffic interest of each area. This is a point within an area that represents the average of the locations constituting the origins anddestinations of trips to and from the area. The center of traffic interest corresponds to the center of gravity in mechanics and the center of population in statistical studies of population distribution. The centers of traffic interest for the small areas into which the city was divided for analysis of thedata are shown in Chart No. 1 in the Appendix that is, Part VII of this report. Beside each center of traffic interest is the area or tract number. The number of trips between tracts are tabulated in Tables No. 1 and 2. The number of trips from a given tract to each other tract may be read horizontally along the line identified by the given tract number. The number of trips to any given tract from all other tracts may be read vertically downwards in the column headed by the given tract number. The number of trips between a given pair of tracts may be obtained by adding the numbers of trips from each to the other.

For the next step in the analysis of the data the centers of traffic interest were connected by straight lines. These lines represent the desired lines of travel between each pair of points which they connect. Each of these is the line along which all of the trips between two areas considered collectively could move with the greatest efficiency. A highway laid on this alignment would serve the traffic between the two areas so connected with maximum efficiency.

In Charts No. 2 and 3 the centers of traffic interest have been connected wherever the data in Tables No. 1 and 2 revealed that trips were made between any pair of tracts. Each of these lines represents the line of greatest efficiency of movement between the points connected by it. Each represents the desired line of travel between a given pair of tracts for the traffic between them. Each indicates the location for a highway for the greatest efficiency of movement of traffic between the pair of tracts so joined. Thus is accomplished the purpose of this step in the analysis, the determination of the directions which traffic wishes to move to reach and to leave the places between which it desires to travel.

Obviously, it is impossible to provide a highway for each desired line of travel. Further analysis of the data offers a way out of this difficulty. All desired lines of travel regardless of number of trips involved in each were shown in Charts No. 1 and 2. In Charts No. 4, 5 and 6 only those lines having a substantial number of trips were shown. The confusion of Charts 2 and 3 disappears as a result of this selection of the data and a pattern appears which indicates the paths of the major traffic movements within the area. The lines of these charts are called the major desired lines of travel. These lines represent the locations for highways along which major traffic movements may be expected.

An examination of Charts No. 4, 5 and 6, particularly the latter, reveals the location of or the major highways within the city from each

rural road entrance to the city and between the principal centers of traffic interest in the city.

In these charts it may be observed that the south-north major desired line of travel points almost due north from the entrance of U.S.63 at the south city limits, passes through the heart of the city and connects with the entrance for U.S. 63 at the north city limits.

The west-east major desired line of travel extends almost due east from the entrance for US 34 at the west city limits across the south part of the city in an easterly direction to the entrance for US 34 at the east city limits.

The northwest-southeast major desired line of travel crosses the city limits at the entrance for Ia. 15 at the northwestern corner of the city and extends in a southeasterly direction through the heart of the city to a point southeast of the central business district.

The southwest-northeast major desired lines of travel extends from the center of traffic interest of the north half of the southwest area of the city to the west edge of the central business district. This line has a companion line extending from the southeast part of the southwest area of the city to the central business district.

The south-north major desired line of travel also has a companion line extending from the entrance for U.S. 34 at the east city limits to the entrance for U.S. 63 at the north city limits. This derived from about equal numbers of trips between the entrances for US 63 and US 34 and between US 63 and the packing house area. The first of these groups is composed of interchange traffic between US 34 east and US 63 north. This is the largest group of interchange traffic found between primary roads in this area.

The west-east major desired line of travel has three companion lines, one from the entrance for US 34 at the west city limits to the central

business district, one from the entrance for US 34 at the east city limits to the central business district and one from the southwest area of the city to the area southeast of the business district.

The northwest-southeast major desired line of travel has a companion line lying parallel to it through the central business district and about two blocks north of that line of travel through that district.

Each of these major desired lines of travel indicates the ideal location for a major street or highway for the most efficient movement of traffic between the areas whose centers of traffic interest are connected by these lines. Practical considerations require modifications of these alignments where some one or more of the characteristics of the urban area and the nature of land usage along the ideal alignment make actual construction of a highway in that location inadvisable even for the large volumes of traffic to be served by a highway on that location. Some compromise with the desired line of travel must be made that will result in the selection of the nearest approach to that line that the local conditions will permit. In these compromises, each group of trips determined by the nature of the trips included in it will be affected to some extent by departure from the desired alignment but with careful application of the knowledge gained in the urban area traffic survey each group may be provided with an alignment for a highway which is practical for construction and which is more efficient for traffic movement than the existing routes except where such routes now lie along a major desired line of travel.

Study of the data for classification of trips in Tables No. 2 to 7 inclusive in Part IV, and an examination of the locations of the major desired lines of travel in Charts No. 4, 5 and 6 superimposed upon a map of the streets of Ottumwa and of the principal highways in the vicinity of that city, permits a comparison of the locations of the

desired lines of travel with those of the existing streets and highways and a determination of the extent to which these locations meet the requirements of the desired lines of travel and to what extent each classification of traffic may be benefited by any proposed new alignment.

Application of this procedure reveals that the major portions of the trips through the entrance for U.S. 63 at the north city limits would be greatly benefited by a relocation of U.S. 63 to follow an alignment due south from the point of crossing the city limits to the intersection of Fourth and Market Streets. As this in part is impractical because of unfavorable terrain and nature of the land use, the relocation should be made only to the extent that may be practicable. The groups of trips having need and gaining benefit from the relocation should have as much the desired line of travel made available to them as can be provided. On this basis, a more reasonable proposal would be the relocation of U.S. 63 from the point of crossing the north city limits to the intersection of Mistletoe Avenue and North Court Street, along North Court Street to a point as near the central business district as will allow a connection from North Court Street to North Jefferson Street to intersect the latter slightly south of Ogden Street or at the intersection of the extension of Burch Street with North Jefferson Street and along the extension of Burch Street and the existing Burch Street to the intersection of that street with Main Street.

This relocation would provide for greater efficiency of traffic movements for all groups of trips now made on U.S. 63 between the north city limits and Main Street and for all groups of trips between that point and areas beyond the central business district, and for all groups of trips beyond Main Street, particularly packing plant traffic, and for all groups passing along Main Street to the eastward of Burch Street. As the interchange traffic between U.S. 63 at the north city

limits and U.S. 34 at the east city limits is insufficient in volume to justify the construction of a highway primarily for its use, the proposed relocation for U.S. 63 north of Main Street must also serve as the most efficient solution at this time practicable for that traffic. This class of trips will benefit appreciably even though to a lesser degree than the other groups of trips on this portion of U.S. 63.

Continuing the examination of the south-north desired line of travel, it is found that the desired alignment falls on a straight line drawn between the entrance for U.S. 63 at the south city limits and the intersection of Fourth and Market Streets. The nearest practicable approach to this alignment lies in following the present route from the south city limits to Williams Street, proceed from that point due north to a point on a line with Hobson Street and from that point directly to the intersection of Burch and Main Streets to join the relocation of U.S. 63 from the north city limits.

This relocation of the portion of U.S. 63 south of Main Street benefits all groups of trips now made on this section of U.S. 63 excepting that group including trips between the south city limits and the central business district. This group will have the same service as provided by the present routing of U.S. 63.

Application of the foregoing procedure to data for the west-east desired line of travel reveals two solutions for the section of U.S. 34 extending from the west city limits to the intersection with the proposed relocation with U.S. 63 and one solution for the section of this route between that point and the east city limits. One of the solutions for the section of Ia. 34 extending from the west city limits to the proposed relocation with U.S. 63 may be considered as appropriate for the near future and the other for the most distant future as an element of a long range program for highway improvements in the Ottumwa urban area.

In the first of these solutions only the portion of U.S. 34 extending into the urban area is involved. In the second both the extension within the city and a portion of the route for some distance west of the city are involved. As some data additional to that available from this survey will be required for the second of these solutions only the first will be discussed in this report.

In this solution, the extension of U.S. 34 in the urban area from the west city limits to the intersection with the proposed relocation of U.S. 63 is continued on the present route to Church Street and from that point via Church and Vine Streets and an extension of Hobson Street to the proposed relocation of U.S. 63.

All groups of trips on this section of U.S. 34 would have the same service as on the present routing excepting the group including trips through the city. This latter group will greatly benefit by the relocation of U.S. 34 from Church Street to the proposed relocation of U.S. 63 through reduction in distance of travel through the city and through the avoidance of congestion on the Jefferson Street viaduct in the intersection of Jefferson and Main Street and on Main Street east of Jefferson Street. This through traffic group included 27.9 percent of the trips crossing the city limits at the west entrance to Ottumwa at the time the survey was made and was the largest through traffic group both in percentage of the total trips and in numbers of trips found for any route through the urban area. As such, it commands special consideration of its needs for great efficiency in movements through that area.

Examination of the data for the trips developing the southwest-northeast desired line of travel and its companion line of travel reveals that the needs of these groups may be efficiently and practically met by a route extending from the intersection of Willard and Church Streets, to an intersection with Wapello Street one block south of Columbus Street

and from that point along Wapello Street at least to Fourth Street but preferably to a junction with North Court Street at either Ottumwa or Maple Street. The groups of trips crossing the west city limits at the entrance for U.S. 34 that include the trips between the entrance and the central business district and between that entrance and points beyond the central business district would benefit greatly from this new intra-city route as well as the groups of trips between the southwest areas of the city and the same areas. This route would also provide for a better distribution of traffic to, from and within the central business district.

One solution was proposed for the efficiency of travel for the groups of trips crossing the east city limits at the east entrance for U.S. 34 to the urban area. This solution may in fact be either of two. One may be the improvement of the existing routes both within and outside of the city between the city limits and the proposed relocation of U.S. 63 where it intersects Main Street at Burch Street and from the city limits to Agency. The other may be the relocation of U.S. 34 from Agency west to an intersection with the proposed relocation of U.S. 63 near Mill Street. This is the preferred version of this solution as it would provide for better access to the packing plant area and provide much better service for the large number of trips in the through traffic groups found at the east city limits of the urban area that passes through the city on U.S. 34 and that interchange between U.S. 34 at the east city limits and U.S. 63 at the south city limits. Movement of through traffic along Main Street through the built up area of Ottumwa east of Burch Street would be eliminated by this relocation. This relocation of U.S. 34 provides the groups of trips between the east city limits and the central business district, those between that entrence on U.S. 34 and areas beyond the central business district and interchanging

between that entrance and U.S. 63 at the north city limits the same service as is available from present routing except that gained from a better alignment from Agency to the intersection with the proposed relocation of U.S. 63 near Mill Street.

Study of the data for trips crossing the city limits at the entrance of Ia. 15 at the northwest corner of the urban area reveals that for the immediate future all groups of these trips can be efficiently served by the existing route from the entrance to Wapello, Marion or Washington Street, from either of these intersections to Fourth Street and along Fourth Street to at least Jefferson Street but if possible to Burch Street to intersect with the proposed relocation of U.S. 63. A better solution but one which requires additional data, particularly data regarding the effectiveness of proposed flood control works would be to use the existing route from the west city limits to Benton Street, from that point to Quinlan Avenue and from Quinlan Avenue southeasterly to an intersection with the proposed relocation of U.S. 34 near River Street. This routing would remove the traffic between the northwest city limits and the packing plant area and would allow direct access to the central business district. This routing would in addition provide for better distribution to the central business district for trips between that district and U.S. 34 at the southeast city limits and between that district and U.S. 63 at the south city limits.

The companion desired line of travel developed by intra-city traffic lies parallel to the northwest-southeast desired line of travel and two blocks north of it from Wapello Street to Burch Street and from there continues with a slight change in direction to the center of traffic interest for the packing plant area.

This traffic can be most efficiently served by the development and improvement of Fourth Avenue from Wapello Street to at least Jefferson

Street but to Burch Street if possible. This would facilitate distribution of traffic to the central business district from the areas north of that district, reduce traffic through the central business district and provide access to off-street parking areas that should be provided in the vicinity of the county buildings, the post office, the city hall and the high school. Parking area in the vicinity of all of these points of traffic interest except the latter would relieve the load on the present excellent municipal parking lot on Market Street, provide for a more efficient distribution of the street parking and reduce congestion of traffic in the central business district.

Part VI

Recommendations

If it be assumed that the traffic which develops the major desired lines of travel should have reasonably direct routes along which it may travel with greater freedom, comfort and safety than upon the streets and highways of the Ottumwa urban area in their current conditions of location and improvement, the traffic data of this survey indicate that consideration should be given to the following items of street and highway improvement in and near the urban area. It is therefore recommended:

(1) That the urban extensions of U.S. 63 be relocated to decrease the travel distance into and through the city and to provide a more direct route between the city limits and the principal points of traffic interest within the city for the major portion of the traffic having use for this route,

(2) That the urban extensions of U.S. 34 be relocated to decrease the travel distance into and through the city, to provide for less distance of travel through built-up areas of the city, to provide more direct service to the packing house area and to provide a better service for the significant group in the through traffic trips on this route,

(3) That the urban extension of Ia. 15 be relocated so as to avoid passage through the central business district for the considerably portion of the traffic on that route that passes through that district to reach other parts of the city,

(4) That each of the rural road extensions and major streets be improved in such manner as to permit the uninterrupted flow of traffic where traffic volumes are large except in the central business district. To accomplish this, grade separations should

be constructed at the Jefferson and Main Street intersection and at the Wapello Street crossing of the railroad tracks.

(5) That Fourth Street be developed and improved as a major street from Wapello to Jefferson Street and if possible to Burch Street as a distributor to the central business district and as a by-pass for that district.

(6) That a new street be provided from the intersection of Church and Willard Streets via Wapello Street to the intersection of Fourth and Wapello.

(7) That a major street system be developed to serve as a feeder to the basic system proposed in the foregoing recommendations. For this purpose, either all or the greater portions of Finley Avenue, Mary Street, Millner Street, Stellar Street, Pennsylvania Avenue, Vista Avenue, Sheridan Avenue and Quincy Avenue should be developed and improved as major traffic ways.

(8) That off-street parking areas should be provided along Fourth Street near the principal centers of traffic interest on that street in or near the central business district.

The detailed analysis of the data upon which these recommendations are based is given in Part V of this report. In this analysis, detailed descriptions of relocations and improvements recommended above are given. For the sake of brevity, they are omitted here. In the detailed selection of the proposed relocations and improvements, the major desired lines of travel were followed as closely as seemed practical for the conditions encountered along each major desired line of travel.

In some cases, the proposed relocation and improvement may be dependent upon other factors than traffic and feasibility of construction. For example, the proposed new street from the Willard and Church Street

intersection to the Fourth and Wapello Street intersection may have to await the solution of the flood problem in the Ottumwa urban area. A portion of the relocations for Ia. 15, U.S. 34 and U.S. 63 are involved in this same problem to some extent, U.S. 34 to a greater extent than the others. The flood problem affects the nature of the improvements to be made on these relocations but does not necessarily affect the relocation itself.

The system of rural road extensions and major streets proposed in these recommendations would provide for the greatest freedom, safety, comfort and efficiency of traffic movement within the city that may be practicable for the conditons of topography, land usage and volumes of traffic found in Ottumwa and would continue to so accommodate the present and greatly increased volumes of traffic due to expansion of the built-up areas, and the further development of the city area. In other words, the proposed system of streets and highways will serve the area for many years as the basic framework for its highway transport system.

Part VII

Appendix

1. Introduction

Part VII has been prepared for the presentation of the summary tabulation of the data obtained in the survey and the presentation of the charts and graphs prepared from these data.

2. Tables No. 1 and 2

Table No. 1 contains a summary tabulation of the data obtained for passenger car trips and Table No. 2 contains a similar tabulation of the data obtained for truck trips.

3. Charts No. 1 to 6 inclusive

Charts No. 1 shows the areas and area or tract numbers within the urban area.

Charts No. 2 and 3 show all of the desired lines of travel found in the urban area and Charts No. 4, 5 and 6 show the major desired lines of travel which indicate the locations for major highways and streets. Practical modifications of the locations of the major desired lines of traffic are shown in Charts No. 21 and 22.

4. Charts No. 7 to 20 inclusive.

Charts No. 7 to 18 show the distribution of trips passing through the entrances for the principal rural highways to the city. Charts No. 19 and 20 show the distribution of trips to and from the central business district.

TABLE NO. 1 AVERAGE ANNUAL 24 HOUR WEEK-DAY (1941) NUMBER OF TRIPS IN, INTO AND THROUGH THE OTTUMWA METROPOLITAN AREA MADE BY PASSENGER CARS FOR ALL PURPOSES.

OTTUMWA INTERNAL TRACTS

OTTUMWA INTERNAL TRACTS	1	20	30	41	42	43	51	52	53	61	62	63	70	82	83	92	93	10	11	12	13	14	15	16	17	18	19	Total Internal	EXTERNAL TRACTS 71	72	73	74	75	76	Total External	Total
1	118	91	66	7	48	41	50	15	39	93	26	9	28	82	8	66	9	58	115	167	158	110	52					1456	68	117	60	21	45	29	340	1796
20	77	119	33	7	7	14	30	29	54	170			35	48		7		30	81	46	107	55	29					978	38	59	27	2	40	15	181	1159
30	75	24		14		16	16		16	45	24							19	26	15		7			8			305	23	10		6	9	6	54	359
41	7	7	7			16			21	21	23		9	16		7		9	14	19	26	69						271	30	34	14	2	12		92	363
42	48	9	14	7	21		14		35	53				28		10		14	16	7			7					283	46	8	4	2	7	6	73	356
43	48	30	10	16	37		7	26	51	30				9		7			21	42	130	41	21	7	6	7		546	40	34	25	17	14	14	144	690
51	41	23	24		7	23	7	7	25		30		54	39		58		47	69	30	79	76	30		8			677	32	39	18	9	12	6	116	793
52	8	16				35	7		13	103			6	42					20	6	21		22					299	32	5	7		2	2	48	347
53	34	63	26	7	49	53	60	7	117	28	42	6		66		37		26	69	53	89	48	14					894	98	137	31	21	26	35	348	1242
61	79	174	45	14	53	30	21	102	35	55	53	22	84	184		89		93	167	158	259	149	139		19			2024	256	324	163	38	120	78	979	3003
62	25		24	23			30		28	47		14	23	42		7			7	14	16	7	9					314	30	26	9	4	7	2	78	392
63	9		7						7	15	7	49		59							14		26					193	19	10			2		31	224
70	46	25		9			40	7	7	77	23		14	9		23	9		14	7	20	7			16			353	46	10	3		2	4	65	418
82	82	55		25	28	9	39	41	53	182	35	43	9	23				7	67	67	51	55	75		18			964	68	31	18	2	28	25	172	1136
83	8																											8		3		2			5	13
92	73	7		7	10	7	52		44	82	21		16			68		58	28	14	94	39	25		26			671	23	16	14	6	5	14	78	749
93	9												9															18	1	8	2				11	29
10	67	30	26	18	14	7	39		25	86	7			16		54		49	18	14	9	7	9	7	19		7	528	12	10	4	4	2	22	54	582
11	121	71	33	30	16	14	62	6	55	143	7	7		46		52		18	72	179	131	183	86		17	7		1356	41	28	34	22	26	18	169	1525
12	169	70	7	18	7	42	23	6	60	201	14		14	58		14		7	158	74	68	81	37		9			1137	36	26	67	19	21	10	179	1316
13	157	84		26	7	142	95	22	86	264	7	20	9	81		107		9	117	65	397	186	44	7	39			1971	53	36	36	39	63	16	243	2214
14	112	53		68		48	71	7	39	165				50		39		21	167	97	195	193	16		31			1372	47	21	33	23	21	20	165	1537
15	66	40			14	21	30	13	34	151	9	20		59		19		9	70	30	41	16	55		9			706	103	13	16	4	9	2	147	853
16						7												7										14	9	3	4			2	18	32
17			7			6	7			19			16			26		18	17	9	30	29	18					202		3	2	2	9	4	20	222
18						7																7						14		3		2			5	19
19																		7										7		3				2	5	12
Total Internal	1479	991	329	296	318	538	700	288	842	2030	328	190	326	957	8	690	18	506	1333	1113	1935	1365	714	21	225	14	7	17561	1151	1017	591	247	482	332	3820	21381
71	51	36	23	46	35	42	32	15	129	346	28	9	42	30		22		13	59	49	54	35	103	3				1202		93	124	7	22	13	259	1461
72	52	62	5	21	13	36	73		104	355	23	10	10	31		16	3	8	67	23	41	23	21	8	8		5	1018	167		54	4	273	26	524	1542
73	29	20	5	9	5	24	20	4	33	152	7		4	22		9		2	36	62	22	20	23					508	176	70		2	33	10	291	799
74	13	7	4	2	2	11	8		15	55	4			4			2	2	19	13	38	21	4		2	2		226		10	4			16	30	256
75	21	10	5	10	7	24	19		26	118	5	2	5	14		9			42	19	35	14	14		5	2		406	28	433	22	4		4	491	897
76	8	12	2	2	8	20	6		25	96	2		2	23		14	2	24	12	8	12	12	4	8				300	1	5	7	8			21	321
Total External	174	147	44	90	68	157	156	19	332	1122	69	21	63	124		70	7	49	235	174	202	125	169	19	15	4	5	3660	372	611	211	25	328	69	1616	5276
Total	1653	1138	373	386	386	695	856	307	1174	3152	397	211	389	1081	8	760	25	555	1568	1287	2137	1490	883	40	240	18	12	21221	1523	1628	802	272	810	401	5436	26657

OTTUMWA INTERNAL TRACTS

EXTERNAL TRACTS

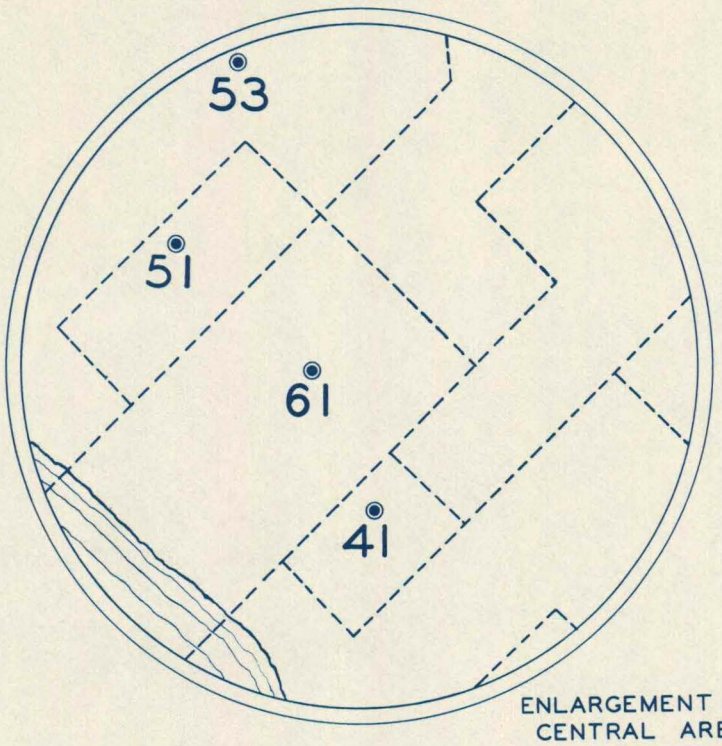
TABLE NO. 2 AVERAGE ANNUAL 24 HOUR WEEK-DAY (1941) NUMBER OF TRIPS IN, INTO AND THROUGH THE OTTUMWA METROPOLITAN AREA MADE BY TRUCKS AND BUSSES FOR ALL PURPOSES.

OTTUMWA INTERNAL TRACTS	1	20	30	41	42	43	51	52	53	61	62	63	70	82	83	92	93	10	11	12	13	14	15	16	17	18	19	Total Internal	EXTERNAL TRACTS 71	72	73	74	75	76	Total External	Total
1	32	57		21	11		21		32	55				32		11		21	44	11	11	21	21					401	41	33	45	13	25	32	189	590
20	54	107	20	21	11	58		21	110	32	11			45		32		11	165	21	21	21	11					772	50	32	6	12	13	21	134	906
30						11				32				54					32		21							150	3	2	2				7	157
41	21	11		21	11	20	11	20	33		21			11		11		37	11	21	33	11	32					336		1	6		2	1	10	346
42	11	11	11	11						10									10	11								75	3	1		2			6	81
43		55		21		21			21	21				55		11			11			21						237	14	9	15	8	23	37	106	343
51	33	11				11			31	58			10	21		21			11	21		11						239	14	10	4		9	6	43	282
52		20		32						11			11								33							107	2		2		2		6	113
53	42	110		34		21	11		100	42	11	11	11	42		21		34		11	42	11	34					588	36	42	12	6	6	4	106	694
61	42	41	21	11	20	21	34	11	58	166				66				11	11	21	132	21	11					698	65	22	18	4	15	8	132	830
62	21	11		11			32																					75						2	2	77
63									11																			11	2	1	1				4	15
70		11	11				10	11	11											10	12		10	21				107	5	3	1			2	11	118
82	34	34	34	21		58	11		42	42			11	42		68		20	21		42		21	21			11	533	58	25	37	4	4	10	138	671
83																												—	2						2	2
92		41		11			33		21	11	11		20	37				21			11					11		228	15	3	3	2	2	7	32	260
93																						11						11	6	28	9		4	3	50	61
10	33	11		21			21	10	11	11				10				11			32							171		3	6		2	9	20	191
11	42	175	32	21	11					32				11		11			110	55	97	284	11					892	34	20	13	14	4	4	89	981
12	21			11	11		10	11		11			11	21					78	34	21	32						272	11	7	17	2	11	8	56	328
13		34	21	22			21	34	42	97			11	21		11		42	68	21	110	76	42			11		684	3	7	9	18	21	5	63	747
14	11			11			11		11	42				20			11		294	42	34	68	11					566	3		6	10	8	7	34	600
15	11			21		11			34	11			11	10		19		11	11		43		33	11				237	12		1	2	2	4	21	258
16											21			21		12												54	5	3	2			1	11	65
17																												—		2					2	2
18																11			11									22							—	22
19														11														11							—	11
Total Internal	408	740	150	322	75	232	226	118	568	684	75	11	96	530	—	239	11	219	888	279	695	588	237	53	—	22	11	7477	384	254	215	97	153	171	1274	8751
71	65	42	2	5	2	5	18		39	78	3		9	57	2	7	7		27	12	3	4	6	6				399		35	47		5		87	486
72	45	27	1	4	3	10	4		41	23		1		28		1	20	3	20	3	10	4	2	2	2			254	13		10	3	39	12	77	331
73	52	5	1	3	2	24	7	2	10	18		2		31	2		6	6	15	10	4	3	1	1				205	26	17		2	4	1	50	255
74	8	12			2	4	4		10	4			2	17			2		4	6	20	16						111	4	8			6	10	28	139
75	25	10	2	2	2	17	13		4	5			2	5		7	2	2	10	6	23	6						143	4	27	11	2			44	187
76	35	21	2		3	41	6	3	7	7	1	1		9		1	2	7	7	6	1	13	1	1	1			176	4	16	15	5	3		43	219
Total External	230	117	8	14	14	101	52	5	111	135	4	4	13	147	4	16	39	18	83	43	61	46	10	10	3	—	—	1288	51	103	83	12	57	23	329	1617
Total	638	857	158	336	89	333	278	123	679	819	79	15	109	677	4	255	50	237	971	322	756	634	247	63	3	22	11	8765	435	357	298	109	210	194	1603	10368

OTTUMWA INTERNAL TRACTS

EXTERNAL TRACTS

CHART NO. 1
TRACT BOUNDARY LINES AND CENTER OF POPULATION IN OTTUMWA



ENLARGEMENT OF CENTRAL AREA

LEGEND

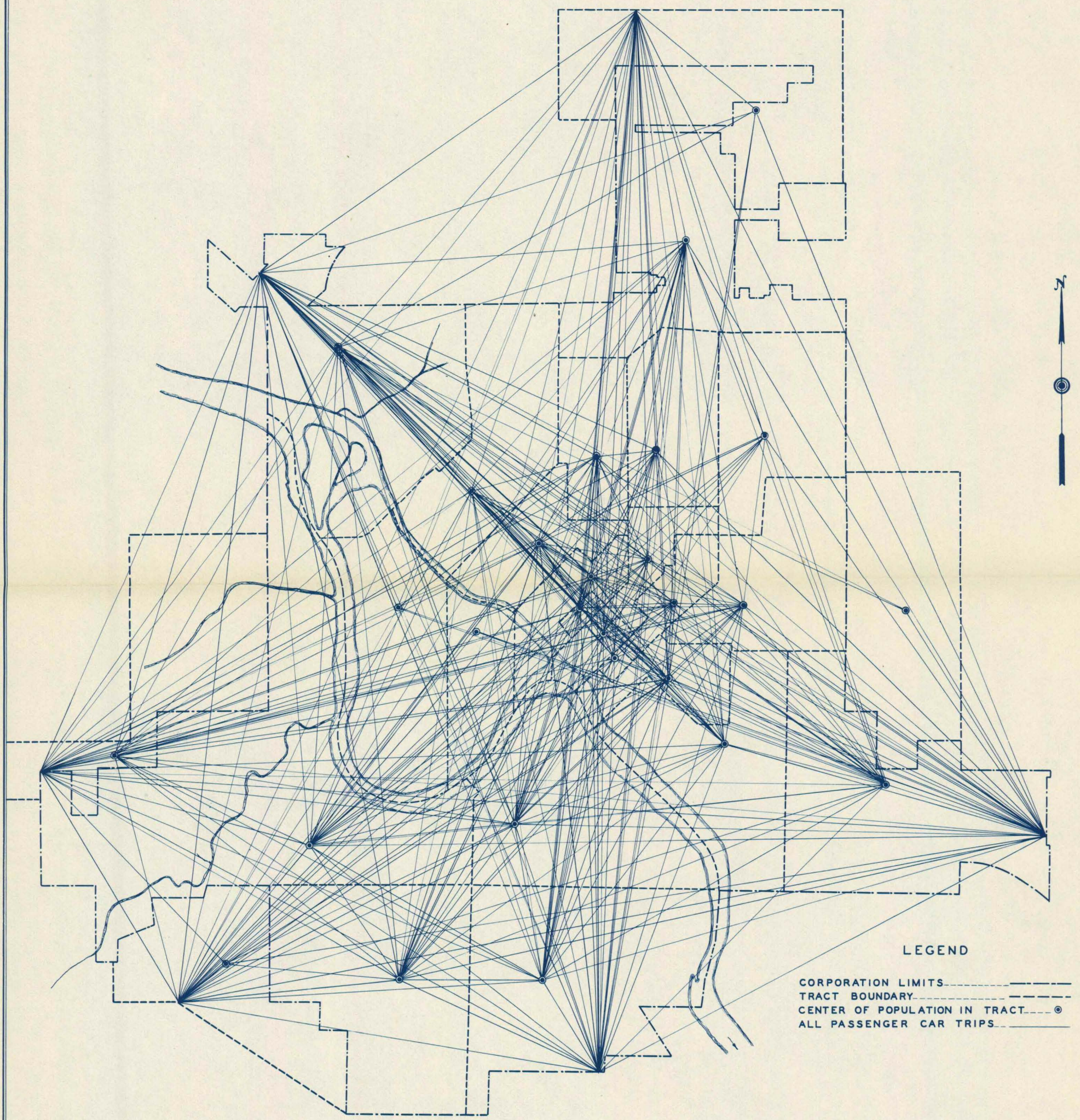
CORPORATION LIMITS _____

TRACT BOUNDARY _____

CENTER OF POPULATION IN TRACT ◉

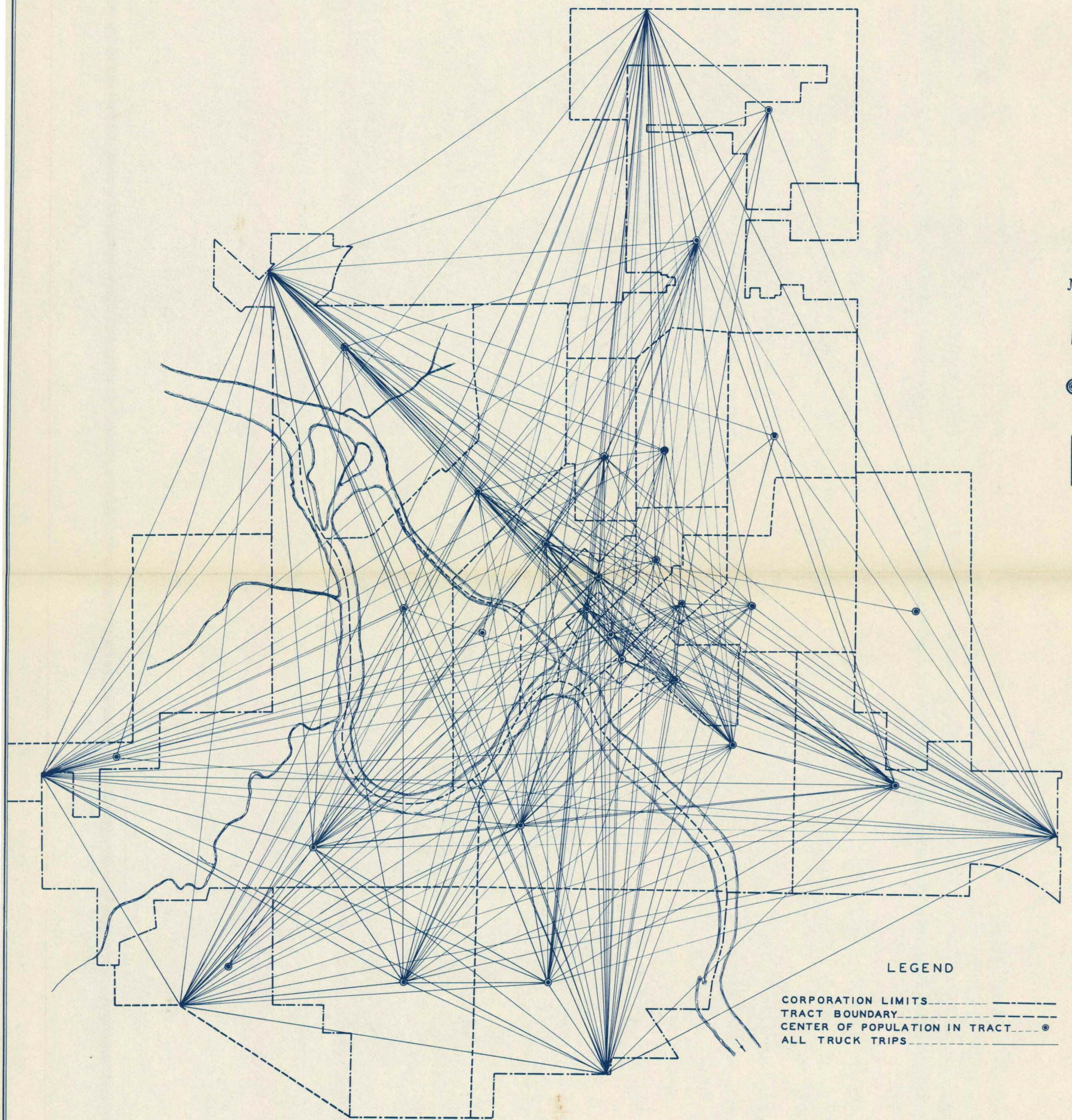
OTTUMWA - IOWA

CHART NO. 2
DESIRED LINES OF TRAVEL
FOR ALL
PASSENGER CAR TRIPS
IN OTTUMWA



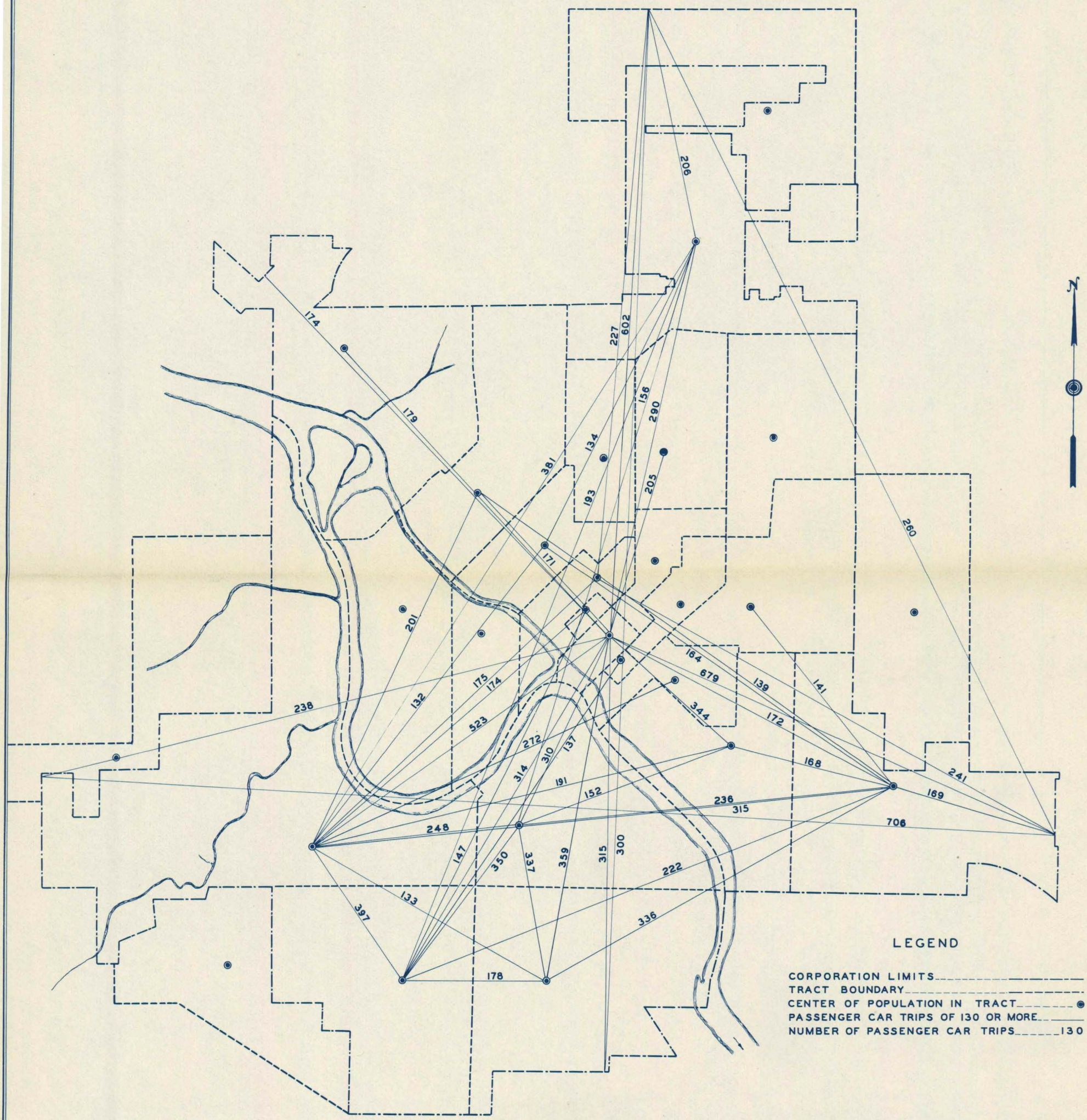
OTTUMWA - IOWA

CHART NO. 3
DESIRED LINES OF TRAVEL
FOR ALL
TRUCK TRIPS
IN OTTUMWA



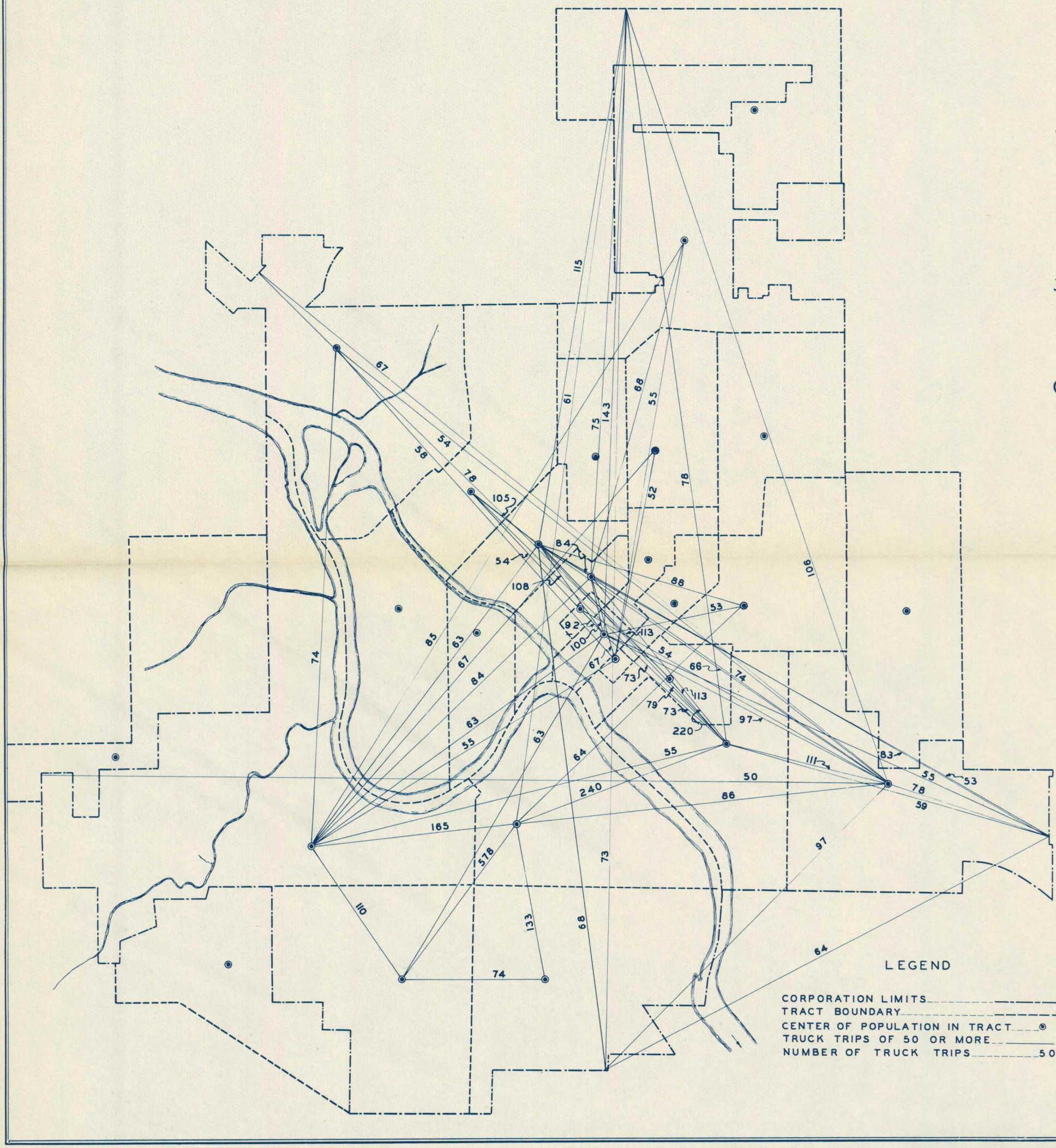
OTTUMWA - IOWA

CHART NO. 4
MAJOR DESIRED LINES OF TRAVEL
FOR
PASSENGER CAR TRIPS
IN OTTUMWA



OTTUMWA - IOWA

CHART NO. 5
MAJOR DESIRED LINES OF TRAVEL
FOR
TRUCK TRIPS
IN OTTUMWA



OTTUMWA = IOWA

CHART NO. 6
MAJOR DESIRED LINES OF TRAVEL
FOR
PASSENGER CAR AND TRUCK TRIPS
IN OTTUMWA

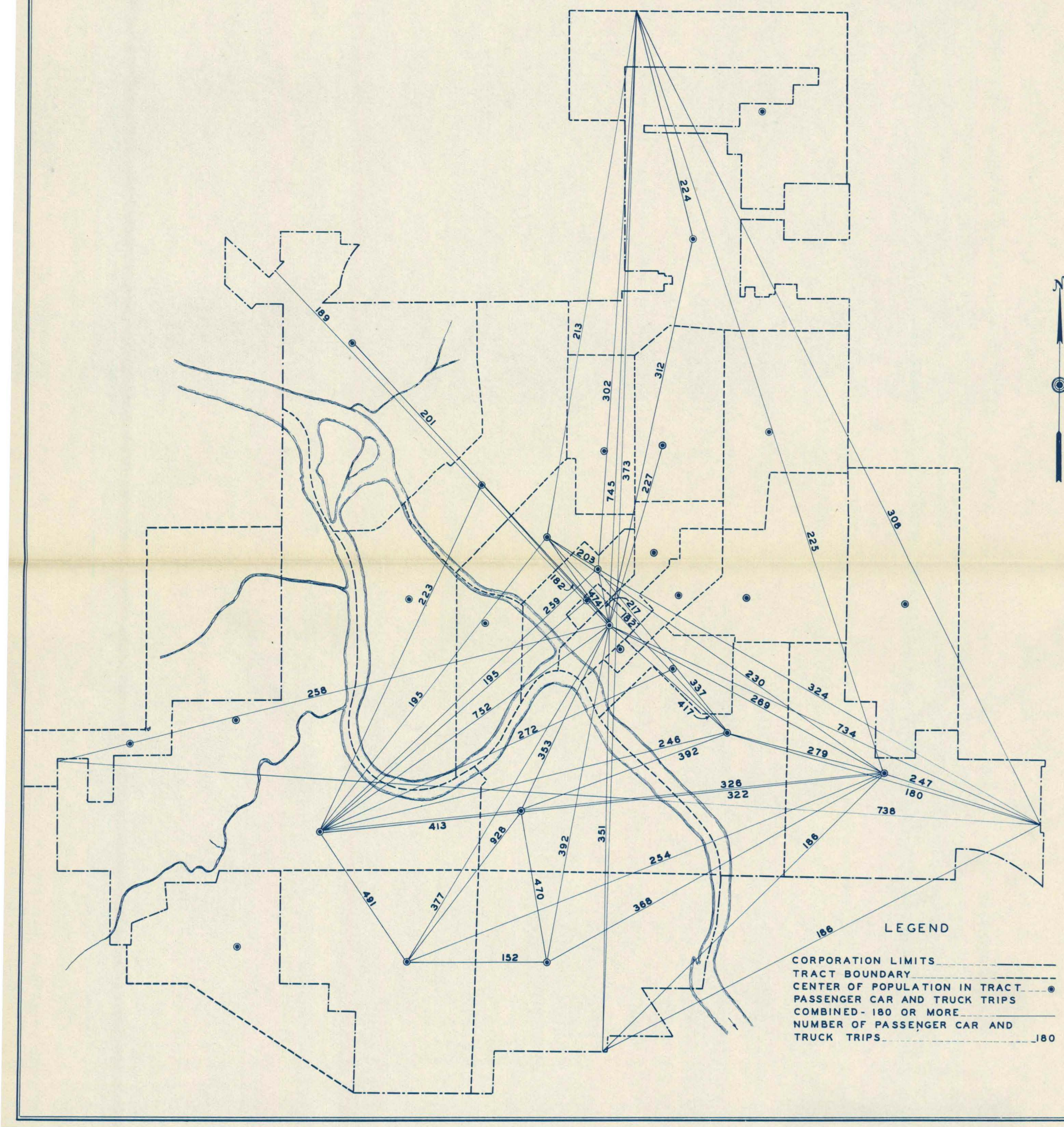


CHART NO. 7
PASSENGER CAR
TRIPS TO AND FROM
NORTH ENTRANCE OF PRIMARY ROAD
U. S. 63 TO OTTUMWA

Table 6 + Table 4 =
Table 2 = 3520

2984
921
5905

ENLARGEMENT OF
CENTRAL AREA

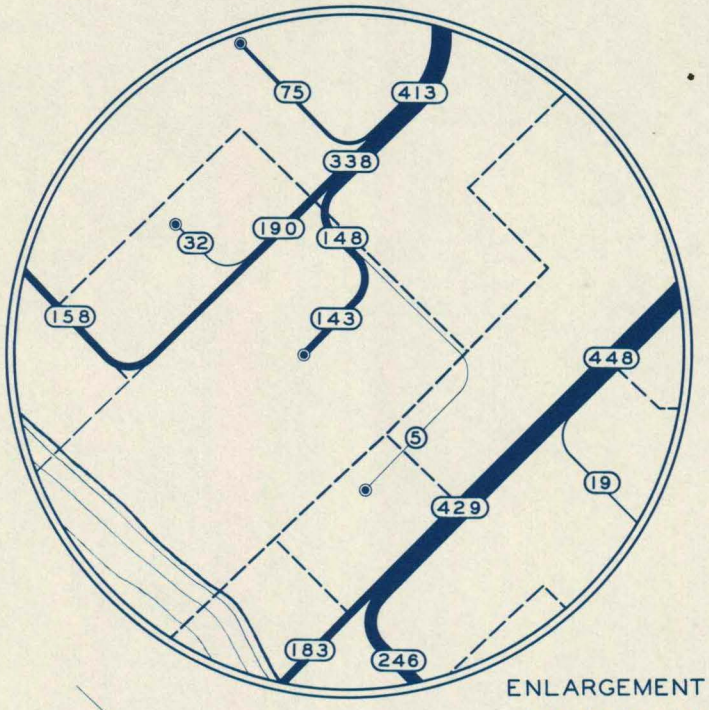
GRAPHIC SCALE

2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

LEGEND

CORPORATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 8
TRUCK
TRIPS TO AND FROM
NORTH ENTRANCE OF PRIMARY ROAD
U. S. 63 TO OTTUMWA



ENLARGEMENT OF
CENTRAL AREA

GRAPHIC SCALE

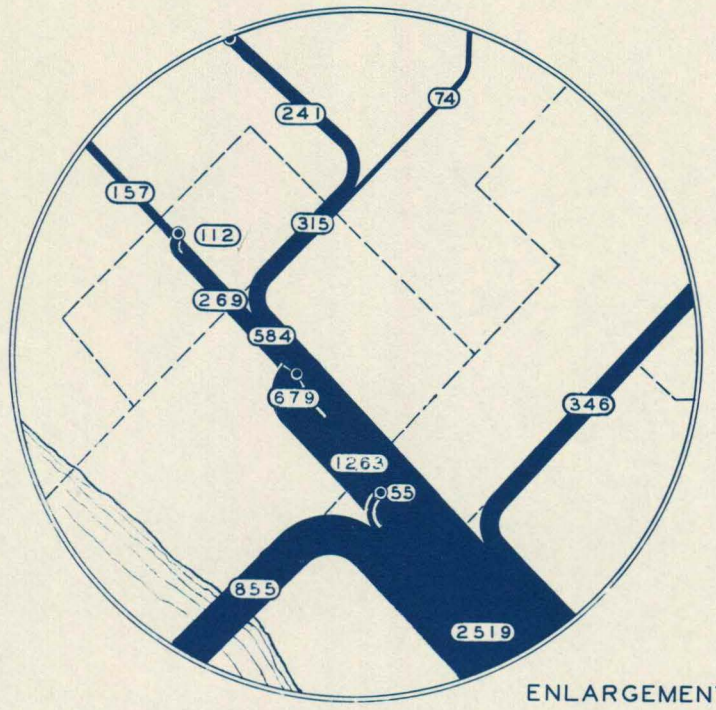
2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

N

LEGEND

CORPORATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 9
PASSENGER CAR TRIPS TO AND FROM EAST ENTRANCE OF PRIMARY ROAD U.S. 34 TO OTTUMWA



ENLARGEMENT OF CENTRAL AREA

GRAPHIC SCALE

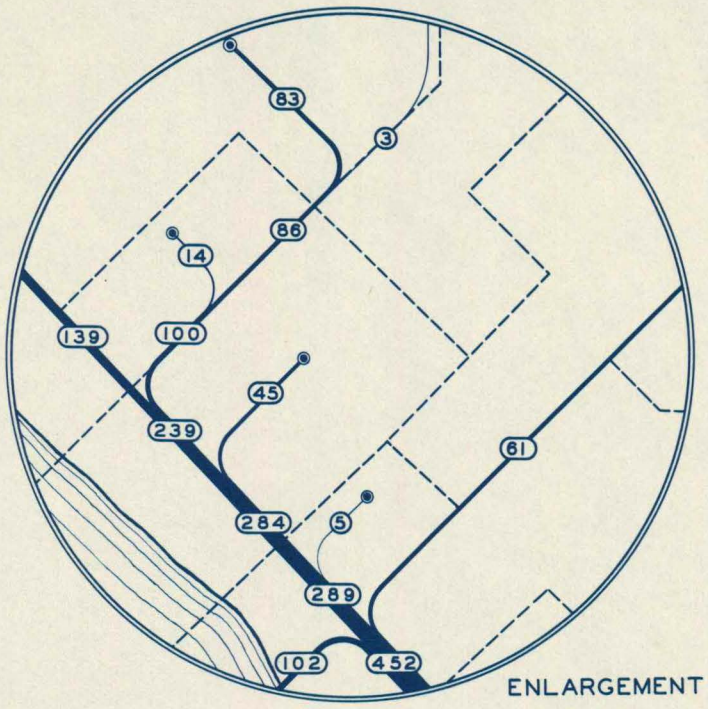
2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

N

LEGEND

CORPORATION LIMITS _____
TRACT BOUNDARY _____
CENTER OF POPULATION IN TRACT ◉

CHART NO. 10
TRUCK
TRIPS TO AND FROM
EAST ENTRANCE OF PRIMARY ROAD
U. S. 34 TO OTTUMWA



ENLARGEMENT OF CENTRAL AREA

GRAPHIC SCALE

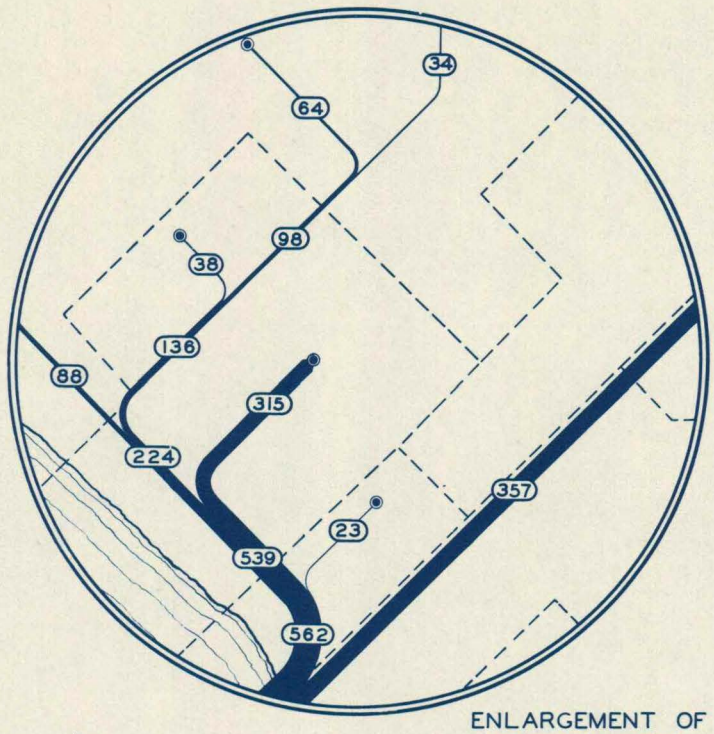
2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

N

LEGEND

CORPORATION LIMITS _____
TRACT BOUNDARY _____
CENTER OF POPULATION IN TRACT ___ ◉

CHART NO. 11
PASSENGER CAR
TRIPS TO AND FROM
SOUTH ENTRANCE OF PRIMARY ROAD
U. S. 63 TO OTTUMWA



ENLARGEMENT OF CENTRAL AREA

GRAPHIC SCALE

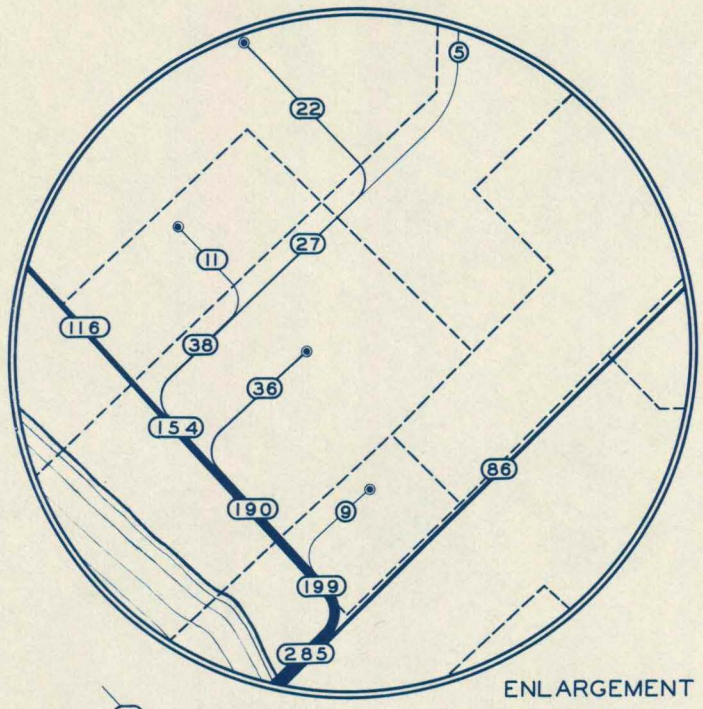
2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

N

LEGEND

CORPORATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 12
TRUCK
TRIPS TO AND FROM
SOUTH ENTRANCE OF PRIMARY ROAD
U. S. 63 TO OTTUMWA



ENLARGEMENT OF
CENTRAL AREA

GRAPHIC SCALE

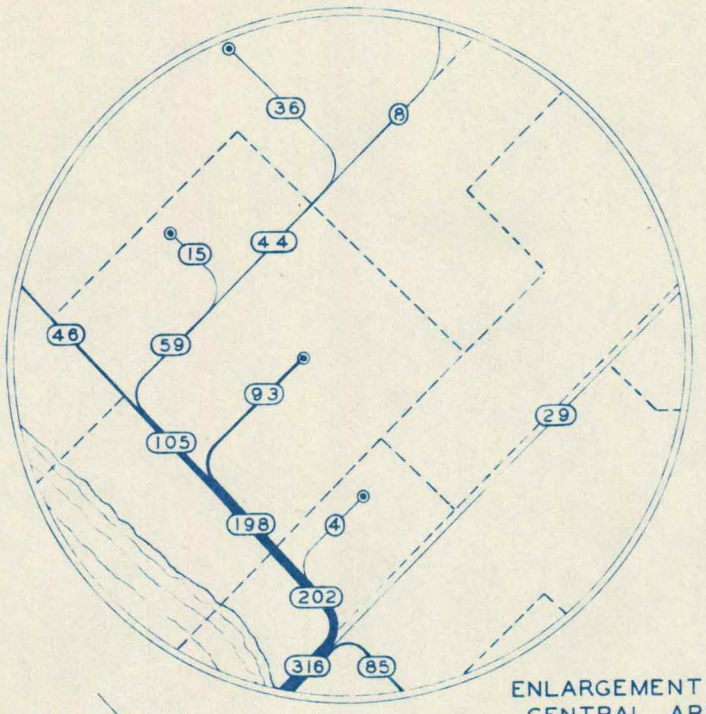
2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

N

LEGEND

CORPORATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 13
PASSENGER CAR TRIPS TO AND FROM SOUTHWEST ENTRANCE OF COUNTY TRUNK ROADS B AND C TO OTTUMWA



ENLARGEMENT OF CENTRAL AREA

GRAPHIC SCALE

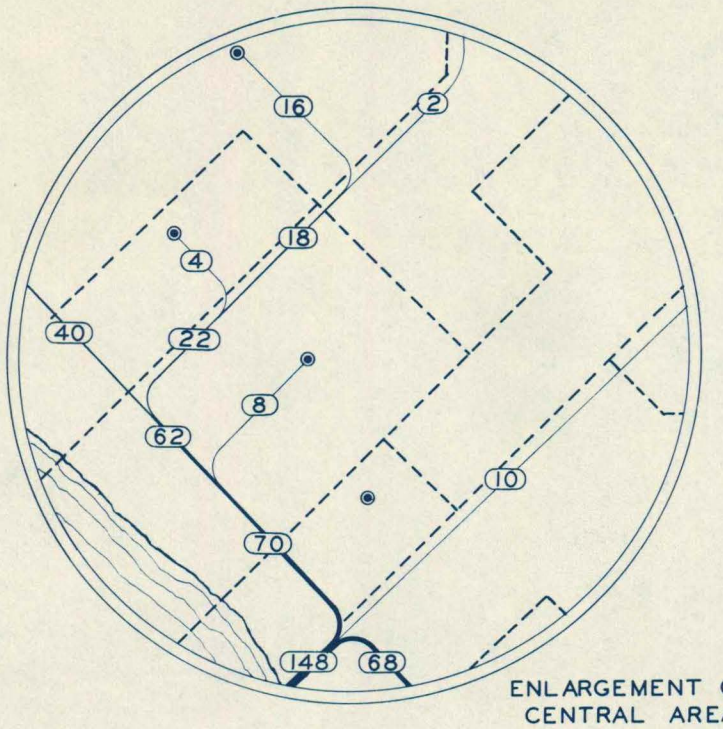
2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

N

LEGEND

CORPORATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 14
TRUCK
TRIPS TO AND FROM SOUTHWEST ENTRANCE OF COUNTY TRUNK ROADS B AND C TO OTTUMWA



ENLARGEMENT OF CENTRAL AREA

GRAPHIC SCALE

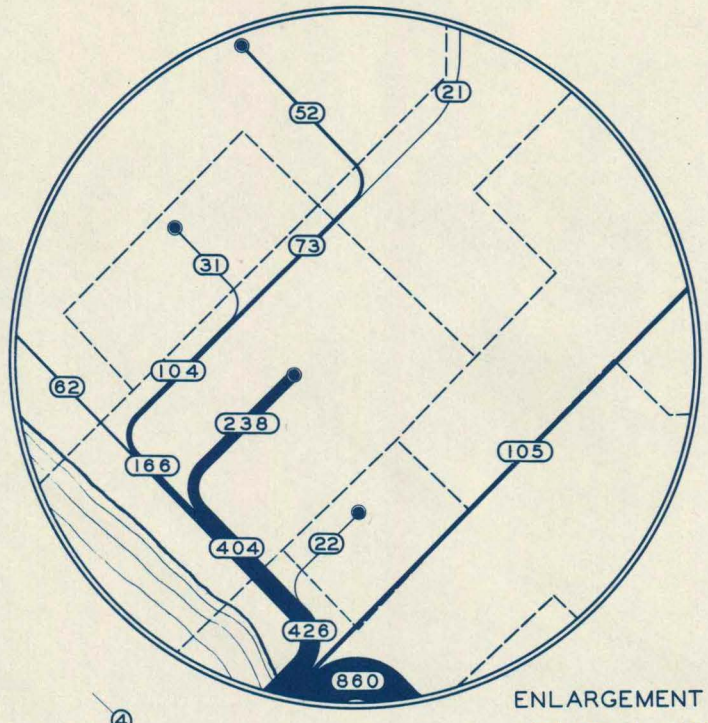
2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

N

LEGEND

CORPORATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 15
PASSENGER CAR TRIPS TO AND FROM WEST ENTRANCE OF PRIMARY ROAD U.S. 34 TO OTTUMWA



ENLARGEMENT OF CENTRAL AREA

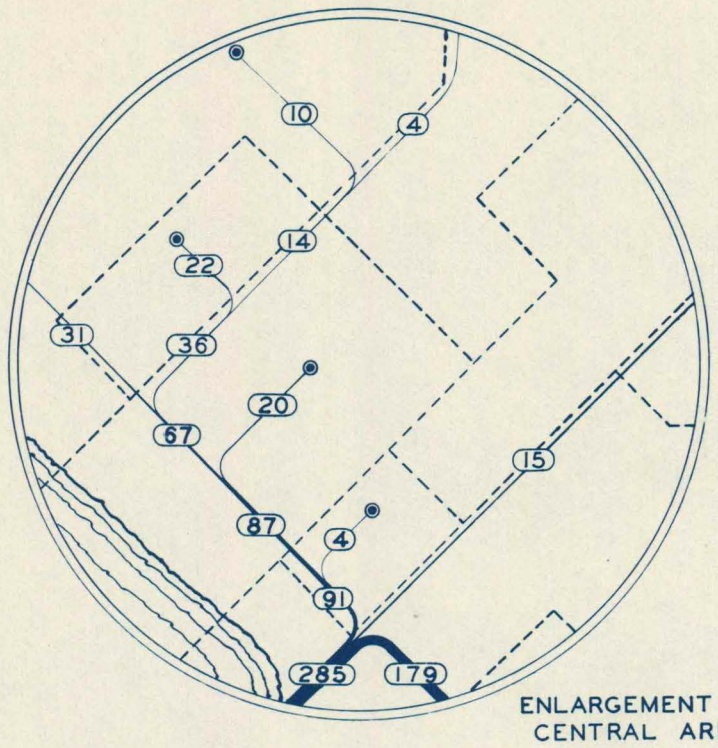
GRAPHIC SCALE

2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

LEGEND

CORPORATION LIMITS _____
TRACT BOUNDARY _____
CENTER OF POPULATION IN TRACT ●

CHART NO. 16
TRUCK
TRIPS TO AND FROM
WEST ENTRANCE OF PRIMARY ROAD
U.S. 34 TO OTTUMWA



ENLARGEMENT OF CENTRAL AREA

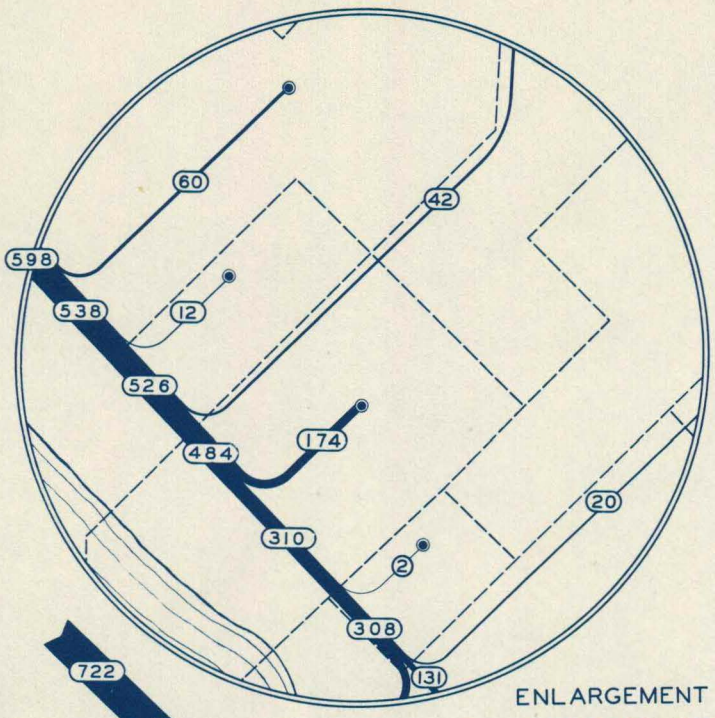
GRAPHIC SCALE

2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

LEGEND

CORPORATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 17
PASSENGER CAR TRIPS TO AND FROM NORTHWEST ENTRANCE OF PRIMARY ROAD IOWA 15 TO OTTUMWA



ENLARGEMENT OF CENTRAL AREA

GRAPHIC SCALE

2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

N

LEGEND

CORPORATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 18
TRUCK
TRIPS TO AND FROM
NORTHWEST ENTRANCE OF PRIMARY ROAD
IOWA 15 TO OTTUMWA

ENLARGEMENT OF CENTRAL AREA

GRAPHIC SCALE

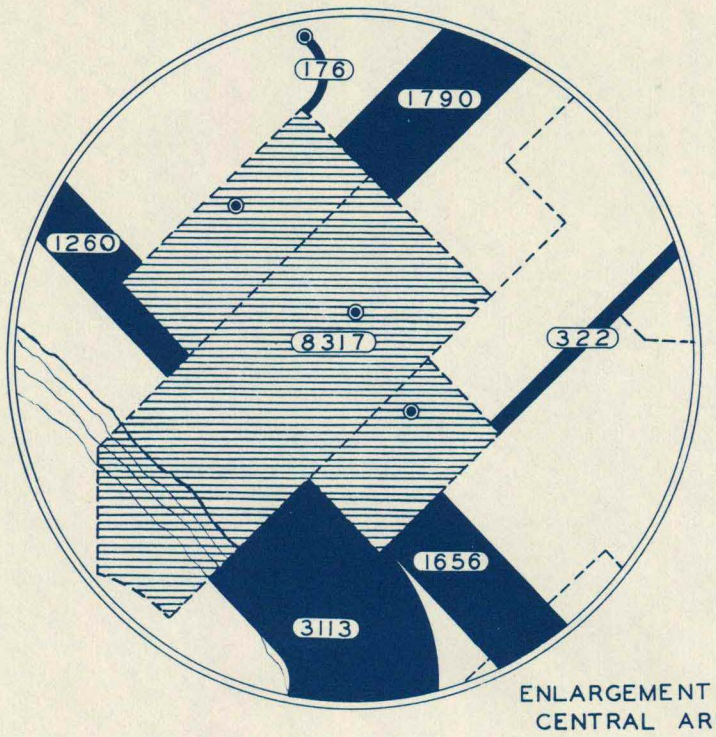
2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

N

LEGEND

CORPOPATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 19
PASSENGER CAR TRIPS TO AND FROM CENTRAL BUSINESS DISTRICT OF OTTUMWA



ENLARGEMENT OF CENTRAL AREA

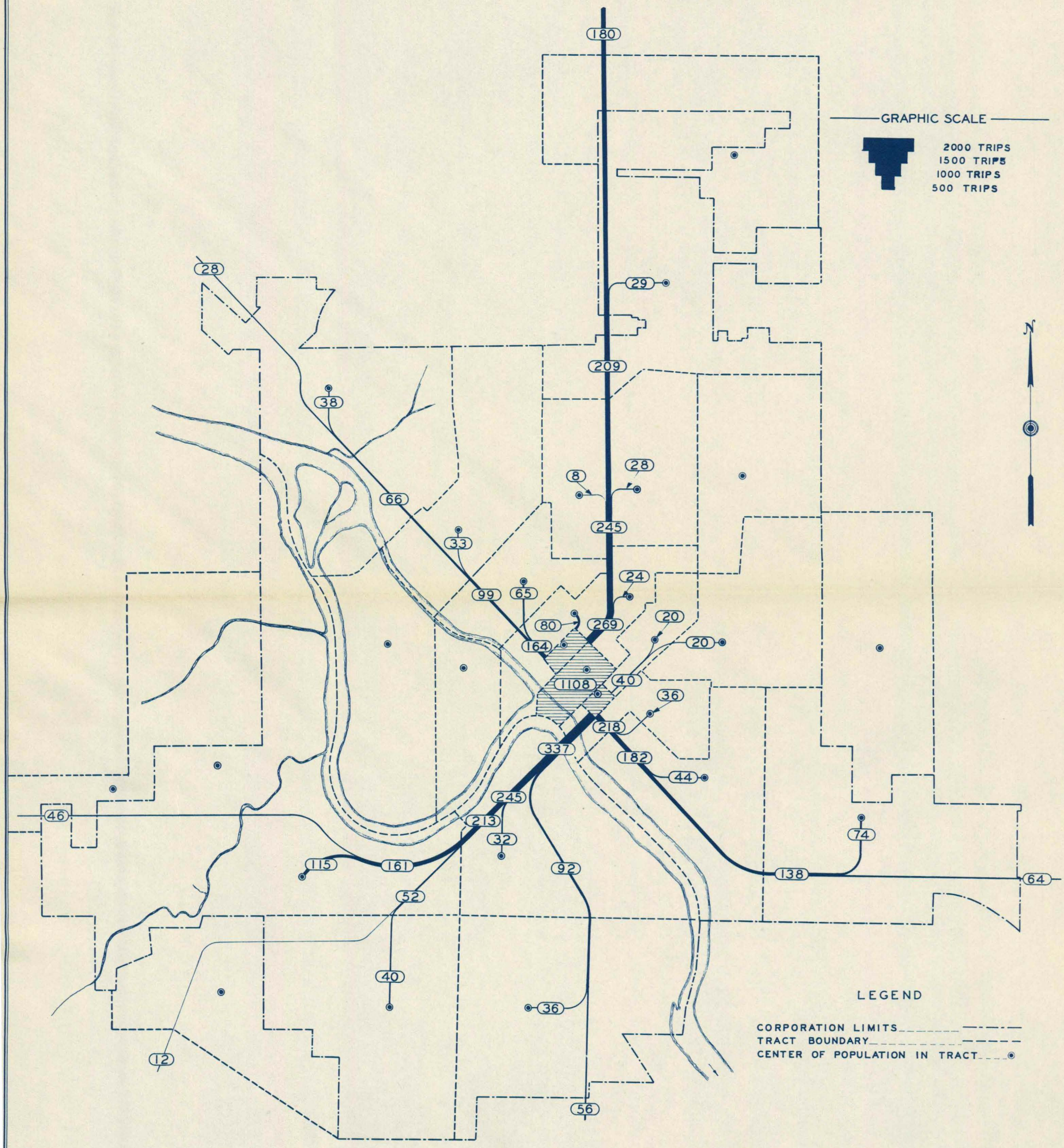
GRAPHIC SCALE

2000 TRIPS
1500 TRIPS
1000 TRIPS
500 TRIPS

LEGEND

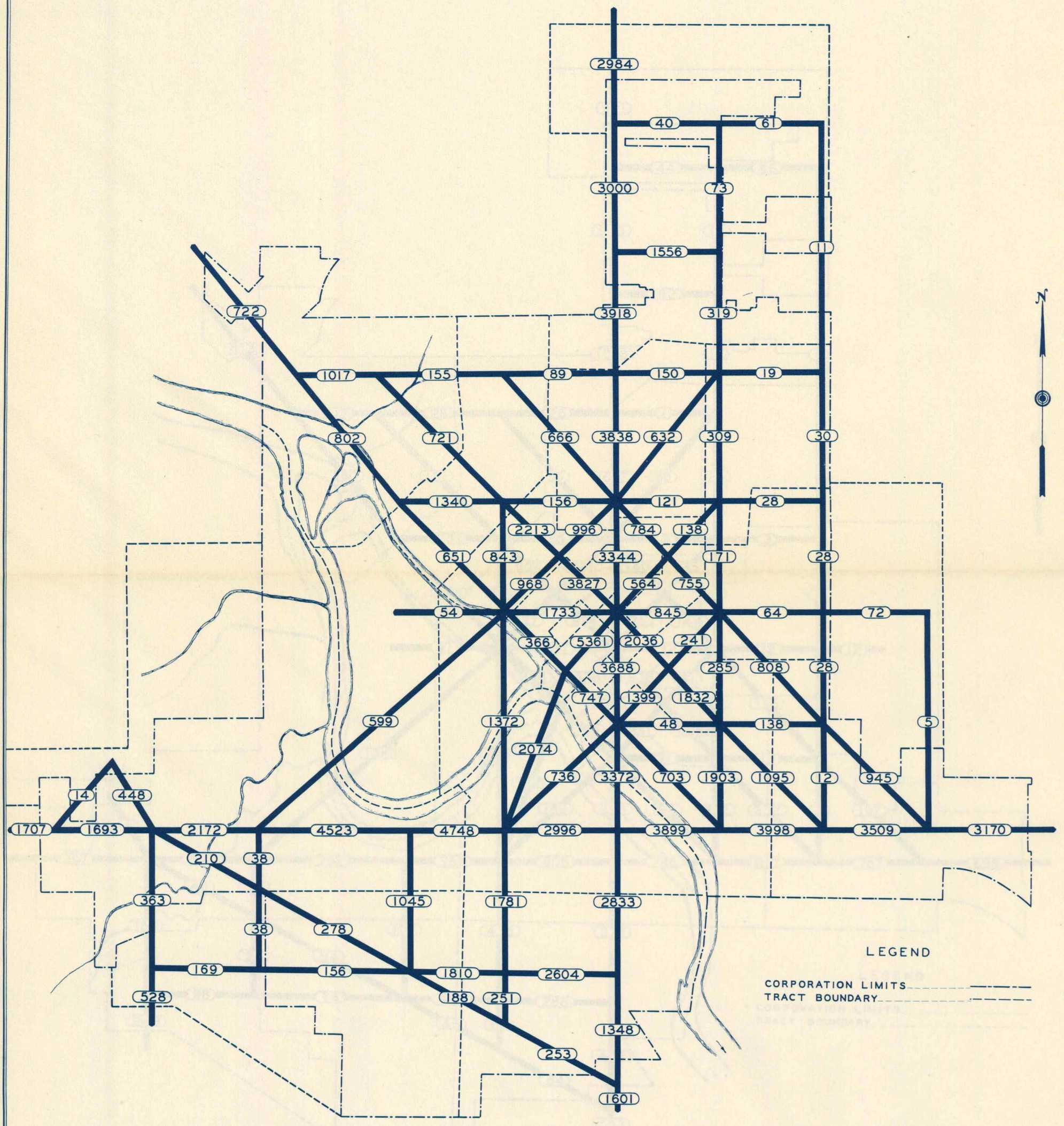
CORPORATION LIMITS
TRACT BOUNDARY
CENTER OF POPULATION IN TRACT

CHART NO. 20
TRUCK
TRIPS TO AND FROM
CENTRAL BUSINESS DISTRICT
OF OTTUMWA



OTTUMWA - IOWA

CHART NO. 21
PASSENGER CAR MOVEMENTS CONSOLIDATED ALONG LINES OF MAJOR DESIRE IN OTTUMWA



CITY OF OTTUMWA IOWA

N

TO COUNTY HOME

MEMORIAL LAWN CEMETERY

OLD AIRPORT-MUNICIPAL

10¼ MILES TO CEDAR RAPIDS

333 Mi. TO MINNEAPOLIS & TWIN CITIES

127 Mi. TO DAVENPORT

MUNICIPAL AIRPORT

RUTLEDGE

TO DES MOINES

CITY LIMITS

OTTUMWA HEIGHTS COLLEGE

OTTUMWA COUNTRY CLUB

TO DAHLONEGA

ST. JOSEPH HOSPITAL

OTTUMWA CEMETERY

MEMORIAL PARK

TO BLADENSBURG

To LOCH BURNS

CATHOLIC CEMETERY

HIGH SCHOOL ATHLETIC FIELD

SUNNYSLOPE SANATORIUM

TO BURLINGTON

To CHICAGO 299 Mi.

JOHN MORRELL & Co.

FOSTER PARK

JOHN DEERE OTTUMWA WORKS

DES MOINES RIVER

DIVERSION CHANNEL

HYDRO ELECTRIC PLANT

MUNICIPAL POWER & LIGHT

ARMORY

OTTUMWA BRICK & TILE CO.

OTTUMWA SAND CO.

TERMINAL C.M.St.P.&P.Ry.

TURKEY ISLAND

CALDWELL PARK

WILDWOOD PARK

SHAUL CEMETERY

TO ROCK BLUFF PARK

TO EDDYVILLE

TO KANSAS CITY 225 Mi.

TO OMAHA 208 Mi.

TO ALBIA No. 34

TO BLAKESBURG

TO LAKE WAPELLO

TO ST. LOUIS

TO ST. LOUIS 257 Mi.

DRAINAGE DITCH

Y.M.C.A. ATHLETIC FIELD

SWIMMING POOL

JEFFERSON PARK

C.B.&Q. YARDS

C.B.&Q. R.R.

C.M.St.P.&P.R.R.

C.R.I.&P.R.R.

No. 34

No. 15