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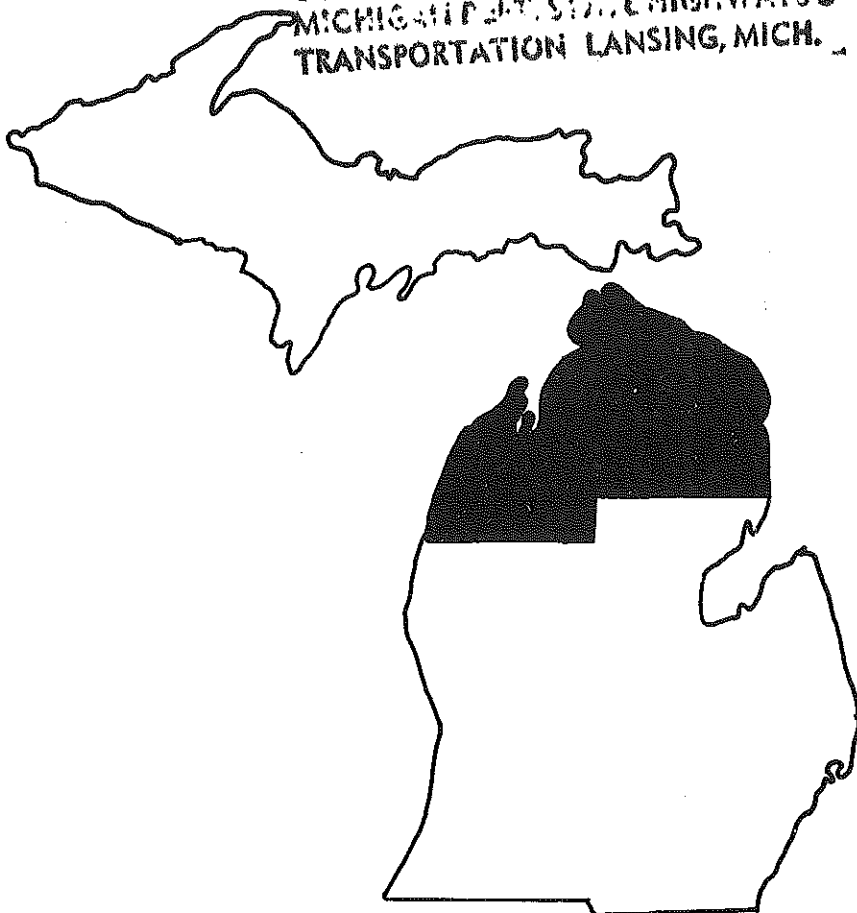
MICHIGAN DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

FRANKFORT-ELBERTA

EXTERNAL
ORIGIN DESTINATION
SURVEY

FACTUAL DATA REPORT
1973

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MICHIGAN DEPARTMENT
OF
STATE HIGHWAYS AND TRANSPORTATION

FRANKFORT-ELBERTA

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JOHN P. WOODFORD, DIRECTOR

Weston E. Vivian
Commissioner

May 27, 1976

Mr. Sam F. Cryderman, Deputy Director
Bureau of Transportation Planning

Dear Mr. Cryderman:

The Multi-Regional Planning Division of the Bureau of Transportation Planning has documented the results of the "Frankfort-Elberta External Origin Destination Survey". The purpose of the origin-destination survey, conducted in August and September, 1973, was to determine the traffic patterns in the area in order to provide a sound basis for planning an efficient future transportation system.

This report was jointly prepared by Sam Wallace and Steve Schafer under the direct guidance of Thomas Pickens, Traffic Analyst for the North Region Planning Section.

Sincerely,

Keith E. Bushnell, Administrator
Multi-Regional Planning Division



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STUDY AREA

The City of Frankfort and the Village of Elberta are located in the northwest portion of lower Michigan approximately 250 miles from Detroit and about the same distance from Chicago.

The economy of Frankfort which has a population of 1,900 and Elberta which has a population of over 500, centers around several industries. These include the Frozen Foods Division of Pet Incorporated in Frankfort; the Ann Arbor Railroad Car and Automobile Ferry to Kewaunee, Wisconsin and an oil-storage facility in Elberta. Frankfort is a resort community with many recreational facilities available.

Two state trunk line facilities service the area. M-22 services the area from the north and south. M-115 provides access to the east and connects with US-31.



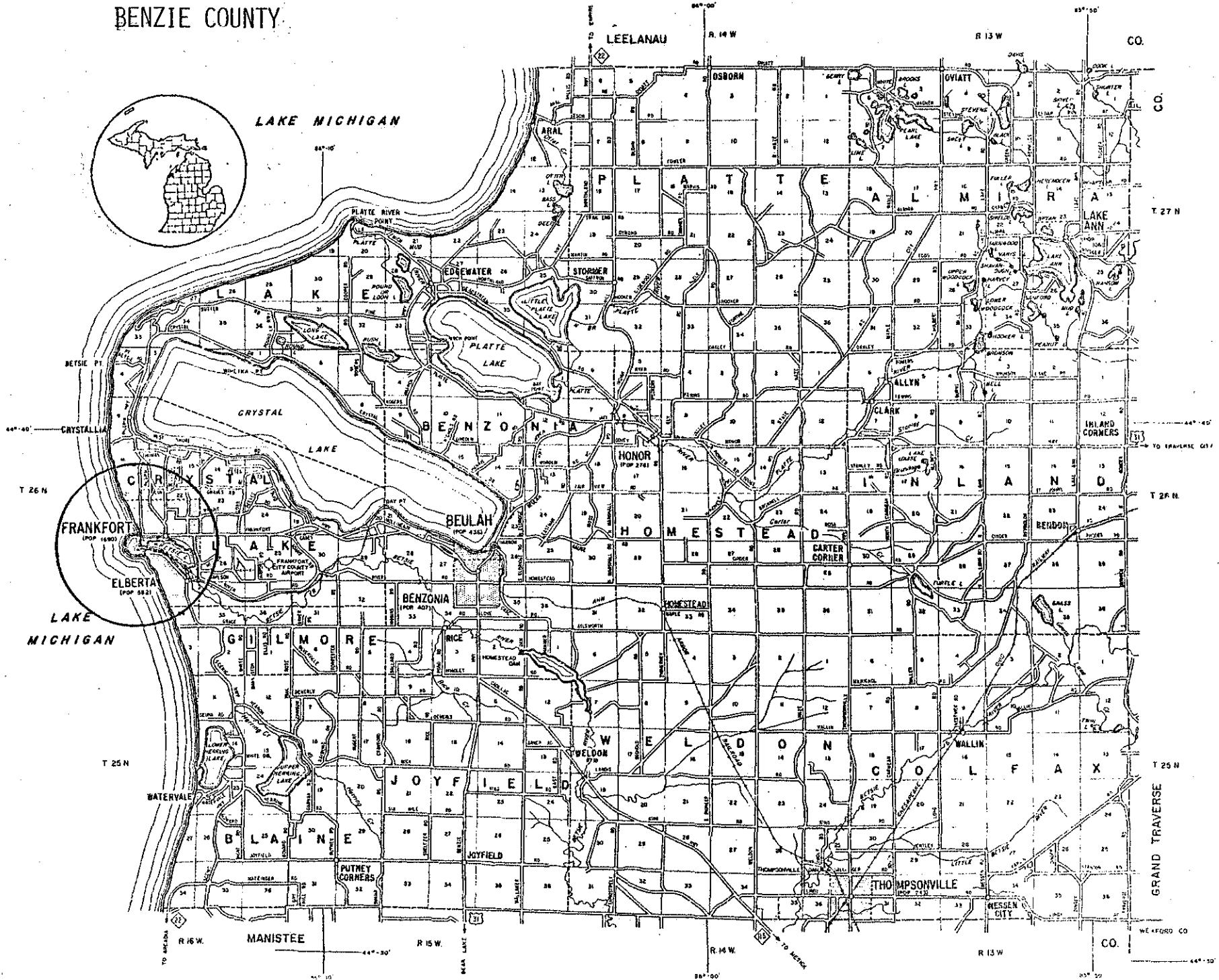
MICHIGAN

FRANKFORT-ELBERTA
EXTERNAL O-D STUDY

BENZIE COUNTY



LAKE MICHIGAN



TERMINOLOGY AND DEFINITIONS

Central Business District (CBD) --- The Zone or zones comprising the concentrated commercial and retail business center of a city.

Classification Counts --- A survey of vehicles in which those passing through the study area are placed in categories (passenger cars, single unit trucks, etc.).

Cordon Line --- An imaginary line around the area under study.

Destination --- The place where a trip ends.

External Station --- A point on a route crossing the cordon line at which the drivers of vehicles are interviewed and classification counts are taken.

Interview Counts --- A survey of vehicles in which those passing through the study area are stopped and drivers interviewed regarding the origin, destination and purpose of the trip.

Origin --- The place where a trip begins.

Origin - Destination Zone --- (Analysis Zone) a basic subdivision of the study area having a single or dominant land use, designed as such for purposes of tabulation and analysis.

Study Area --- The geographical area selected for the origin and destination study.

Terminal Trip --- A trip with one end outside the study area and the other end inside the study area. (Beginning or ending at one of the internal analysis zones).

Through Trip --- A trip passing through the study area. (Both ends of the trip outside the cordon line).

Trip --- One-way travel between an origin and destination.

Trip Ends --- Each trip has two ends; an origin and a destination.

Trip Length-Average --- The value that is determined by summing all of the recorded trip lengths and dividing by the number of trips.

Trip Length-Median ---- The value that is determined by dividing the trip length distribution so that an equal number of trips are on either side of it.

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FIELD PROCEDURE

Field work for the Frankfort-Elberta External Origin-Destination Study was conducted during August and September of 1973. The purpose of the study was to collect data on traffic movement into, out of, and through the Frankfort-Elberta area.

A cordon line was drawn around the Frankfort-Elberta area in order to define the study area. Where the cordon line crossed a road an external interview station was established. Eleven such stations were created for the Frankfort-Elberta area of which three were on state trunk lines. Four of the original eleven external interview stations were not operated since preliminary counts indicated that traffic passing through these stations was negligible when compared to the remaining seven stations.

Each of the seven external stations was operated for fourteen hours. During the hours of operation, vehicles were stopped and drivers interviewed regarding the origin, destination and purpose of the trip. These interviews were made of vehicles traveling in each direction, i.e. inbound and outbound. Manual vehicle classification counts were taken in conjunction with interviews and during the remainder of that twenty-four hour day.

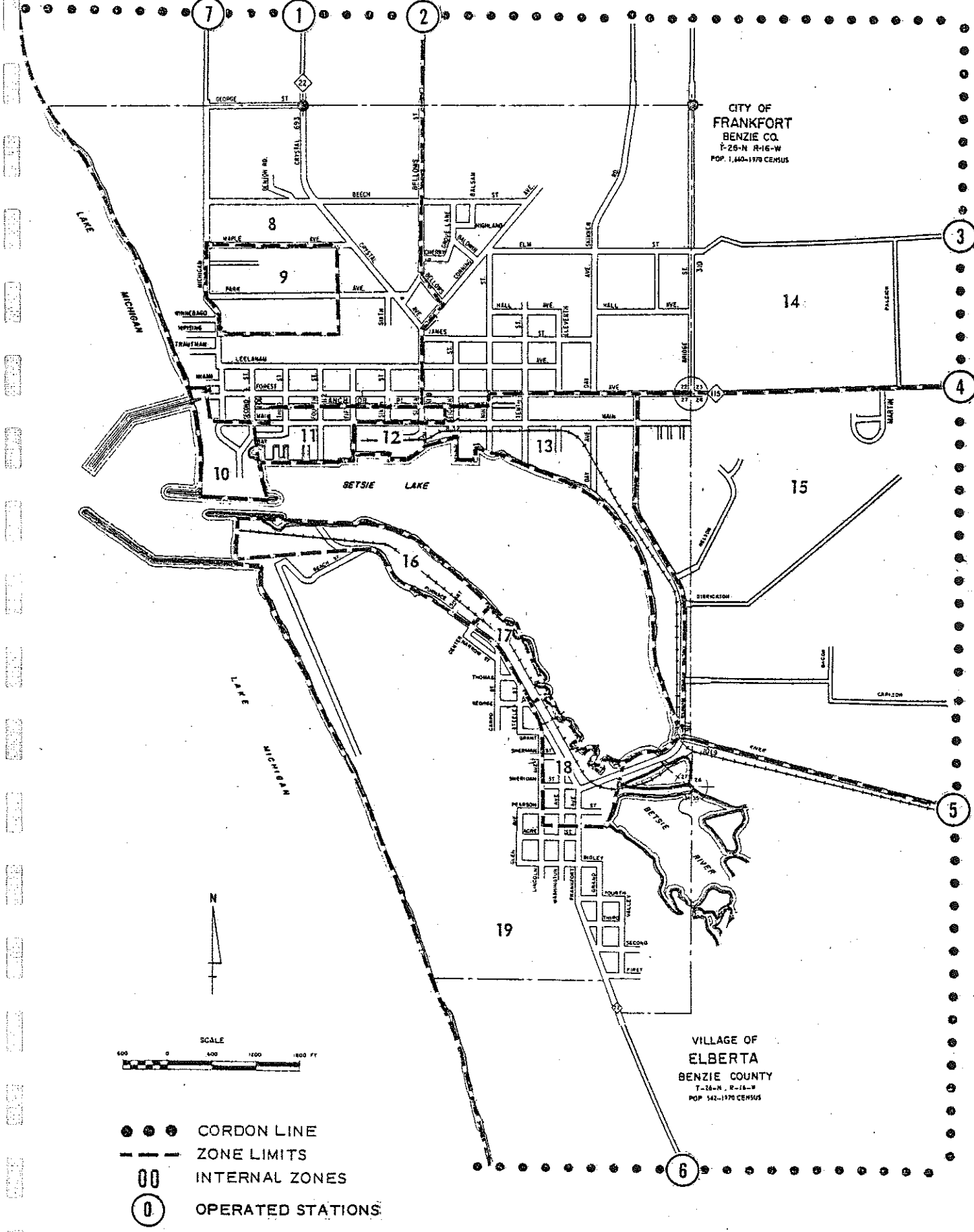
In addition, the study area was sub-divided into analyses zones based generally on homogeneous land uses. Each trip inbound or outbound from these zones was recorded.

Sample interview forms for both interviews and Manual Vehicle Classification Counts appear in the Appendix.

STATION LOCATIONS

<u>Station Number</u>	<u>Route</u>	<u>Location</u>
1	M-22, North	Between the northern city limits of Frankfort and Cox Road
2	Bellows Road	Between the northern city limits of Frankfort and Cox Road
3	Wright Road	.2 Mi. East of Palcich Road
4	M-115	Between Palcich and Airport Road
5	River Road	.5 Mi. East of M-22, South
6	M-22, South	.25 Mi. South of Elberta
7	Michigan Avenue	.1 Mi. South of Cox Road

FRANKFORT-ELBERTA AREA EXTERNAL O-D STUDY



- ● ● CORDON LINE
- - - ZONE LIMITS
- 00 INTERNAL ZONES
- OPERATED STATIONS

All Stations

On an average August or September weekday in 1973, there were 8,528 vehicles which passed through the seven external stations located on the cordon line around the Frankfort-Elberta Study Area. Of the 8,528 vehicles recorded during classification counts, 6,753 (79.2 percent) traveled on the state highways.

There were 5,914 interviews taken for 14-hours at the seven stations. This is 69.3 percent of the 8,528 vehicles counted during the 24-hour period. Station 4 (M-115) had 2,086 interviews taken in the 14-hour period or 62.0 percent of the 24-hour volume of 3,365 vehicles. This is the lowest percentage for any of the seven stations. The highest percentage of 14-hour interviews of 24-hour volume was 79.8 percent at Station 5 (River Road).

Station 4 (M-115) had the highest volume of vehicles (3,365) for a 24-hour period or 39.5 percent of the 8,528 counted vehicles at all stations. Station 3 (Wright Road) had the lowest volume of traffic for a 24-hour period-109 vehicles or 1.3 percent of the total 8,528 vehicles.

Station 3 (Wright Road) had the highest percentage of terminal traffic 94.1 percent or 96 vehicles out of, the 102 total. Station 1 (M-22, North) had the lowest percent of terminal traffic 68.9 percent or 1,190 vehicles out of the 1,727 total.

There were 6,728 terminal trips. These are trips that have one end of the trip inside the study area and the other end outside the area. Zone 11 (Frankfort Central Business District) generated the largest number of terminal trips-1,953 trips or 29.0 percent of the 6,728 total terminal trips. Four zones (8, 11, 13, and 14) accounted for 4,771 terminal trips or 70.9 percent of the total 6,728 terminal trips.

The traffic volume at each station is as follows:

Station	Traffic	% of Grand Total
1 - M-22, North	1763	20.7
2 - Bellows Road	581	6.8
3 - Wright Road	109	1.3
4 - M-115	3365	39.5
5 - River Road	687	8.0
6 - M-22, South	1625	19.0
7 - Michigan Avenue	<u>398</u>	<u>4.7</u>
GRAND TOTAL	8528	100.0

	Traffic	% of Grand Total
Trunk line (Stations 1, 4, and 6)	6753	79.2
Non-Trunk line (Stations 2, 3, 5 and 7)	<u>1775</u>	<u>20.8</u>
GRAND TOTAL	8528	100.0

* The above totals are based on 24-Hour Classification Counts.

FRANKFORT - ELBERTA
TOTAL STATION TRIPS

Station	24-Hour ¹ Traffic Counts	14-Hour Interviews	Percent Interviewed	Vehicle ² Trips	Percent of Total Traffic
1	1763	1259	71.4	1727	20.8
2	581	446	76.8	559	6.7
3	109	69	63.3	102	1.2
4	3365	2086	62.0	3289	39.5
5	687	548	79.8	675	8.1
6	1625	1256	77.3	1597	19.2
7	398	250	62.8	375	4.5
TOTAL	8528	5914	69.3	8324	100.0

Station	Vehicle Trips	Terminal Trips	Percent of Total	Through Trips	Percent of Total
1	1727	1190	68.9	537	31.1
2	559	491	87.8	68	12.2
3	102	96	94.1	6	5.9
4	3289	2821	85.8	468	14.2
5	675	575	85.2	100	14.8
6	1597	1210	75.8	387	24.2
7	375	345	92.0	30	8.0
Vehicle Trips	8324	6728	80.8	1596	19.2
Adjusted Vehicle Total ³	7526	6728	89.4	798	10.6

1 Based on 24-Hour Classification Counts.

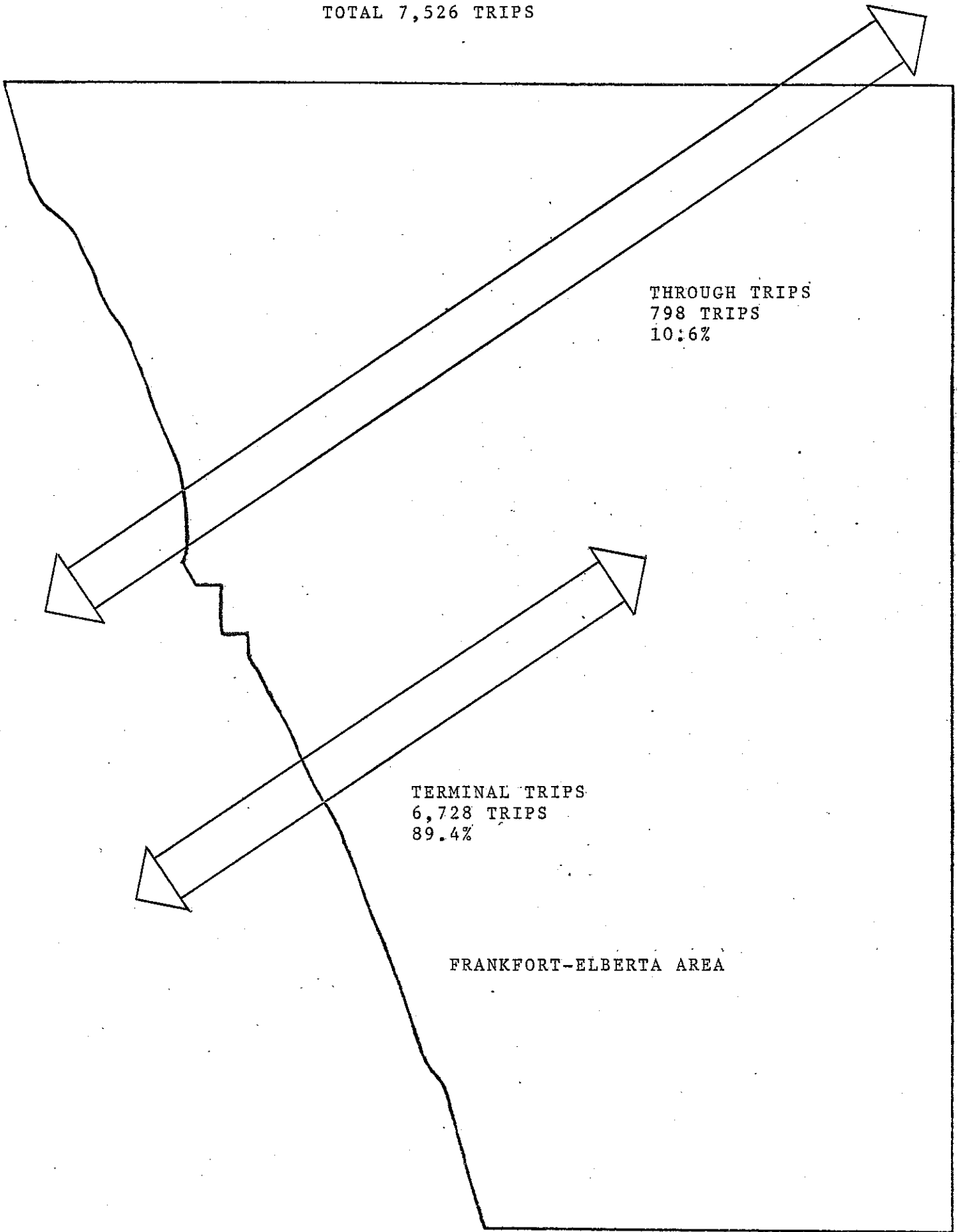
2 Based on 24-Hour Expanded Interview Counts. Expanded Interview Counts do not correspond exactly with Classification Counts due to two factors: (1) Motorcycles and buses, although counted in the Classification Counts, were not interviewed and do not appear in the Expanded Interview Counts. Listed below are the totals of these vehicle types counted at each station.

Station	1	2	3	4	5	6	7	Total
	<u>15</u>	<u>3</u>	<u>3</u>	<u>19</u>	<u>5</u>	<u>18</u>	<u>8</u>	<u>71</u>

(2) Due to the convention of certain computer programs, Expanded Interview Counts may not correspond exactly with 24-Hour Classification Counts.

3. A through trip is counted both at the station of entrance and exit. To adjust for this double counting it was necessary to half-factor through trip records.

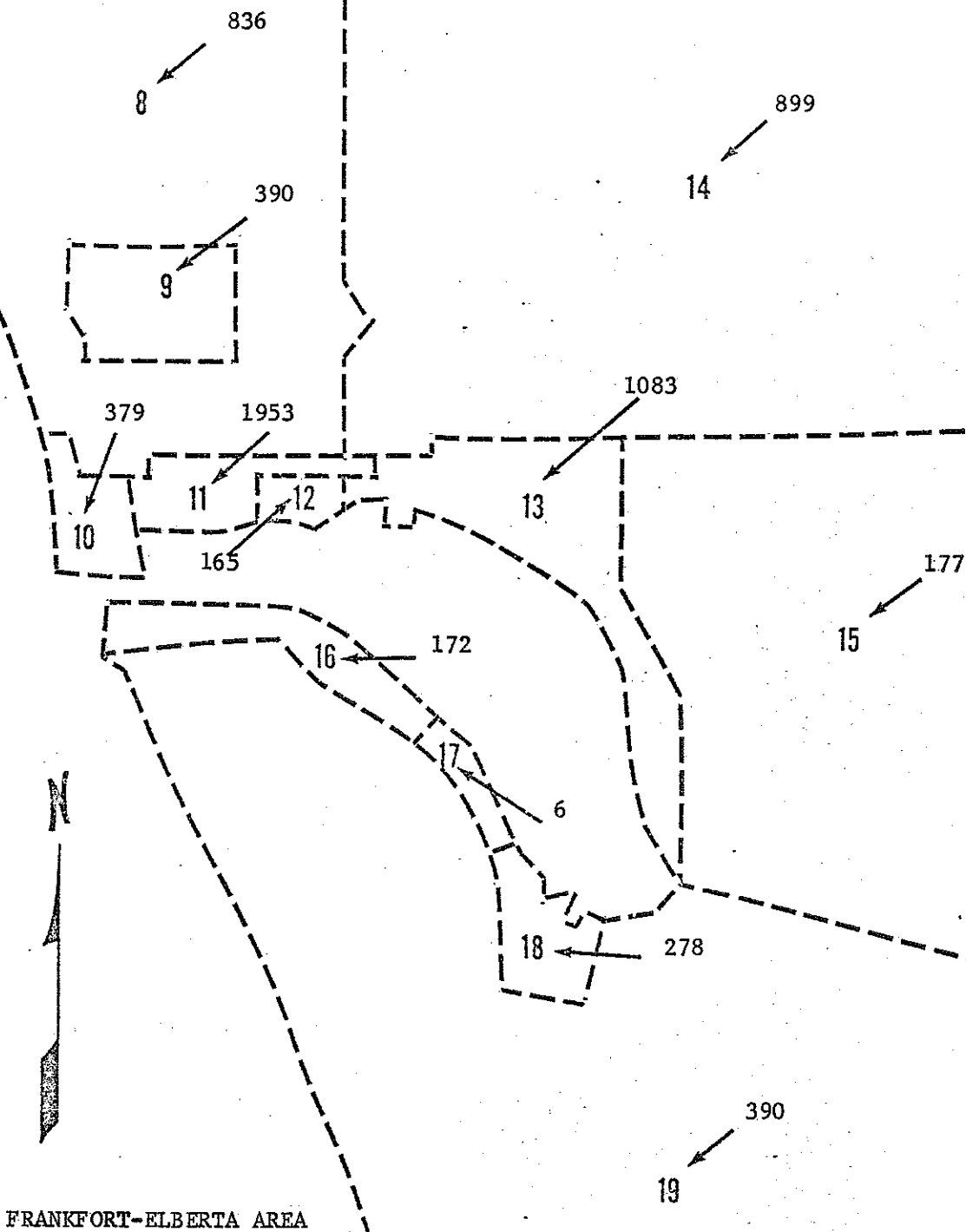
TRIP MOVEMENTS
1973 AUGUST-SEPTEMBER WEEKDAY
TOTAL 7,526 TRIPS



ALL STATIONS COMBINED
 TERMINAL TRIPS TO STUDY ZONES

<u>Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
8	836	12.4
9	390	5.8
10	379	5.6
11	1953	29.0
12	165	2.5
13	1083	16.1
14	899	13.4
15	177	2.6
16	172	2.6
17	6	0.1
18	278	4.1
19	<u>390</u>	<u>5.8</u>
TOTAL	6728	100.0

TERMINAL TRAFFIC BETWEEN
ALL STATIONS AND INTERNAL ZONES
6,728 VEHICLE TRIPS



FRANKFORT-ELBERTA AREA

- ● ● CORDON LINE
- - - ZONE LIMITS
- 00 INTERNAL ZONES

Station 1 (M-22 North)

Station 1 is located between the northern city limits of Frankfort and Cox Road. M-22, North is a state trunk line and services the study area from the north.

A total of 1,727 vehicles were recorded during the expanded interview counts. Tabulations on the following pages give a detailed documentation of this traffic.

Approximately 7 out of every 10 vehicles had a terminal inside the study area. There were 8 out of every 10 vehicles which were autos and 8 out of every 100 vehicles which were panels or pickups irregardless of whether they travelled into or through the area. More than 70 percent of the passenger cars and panels or pickups had a terminal inside the study area.

The largest trip purpose was other social or recreational with 376 trips or 21.8 percent of the 1,727 total trips. All trip purposes except vacation had more than 60 percent terminal traffic. Approximately 3 out every 4 vacation trips were through trips.

Station 4 (M-115) accounted for 270 trips or 50.3 percent of the 537 through trips. Station 4 and 6 accounted for 521 trips or 97.0 percent of the 537 through trips.

Zone 11 (Frankfort Central Business District) accounted for 580 trips or 48.7 percent of the 1,190 terminal trips. Zones 8, 10, 11, 13 and 14 accounted for 1,039 trips or 87.3 percent of the 1,190 terminal trips.

There were 1,157 trips or 67.0 percent of the 1,727 trips that had a trip length of 1-20 minutes. 1,301 trips (75.3 percent) had a trip length of one hour or less.

The origin and destination of all the trips which passed through the station were tabulated by county, and 10 states (see 95 zone system in Appendix). There are two ends for each trip; an origin and a destination. There were 1,727 trips which passed through Station 1, accounting for 3,454 total trip ends.

There were 2,709 trip ends (78.4 percent) in Benzie County. There were 23 trip ends (0.7 percent) in the Upper Peninsula. The Lower Peninsula accounted for 3,372 trip ends (97.6 percent). There were 59 origins and/or destinations (1.7 percent) outstate.

STATION 1, M-22, NORTH

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	1469	85.1	1048	71.3	421	28.7
Passenger Car with Trailer	54	3.1	12	22.2	42	77.8
Panel or Pickup	137	7.9	103	75.2	34	24.8
Panel or Pickup with Trailer	7	0.4	0	0.0	7	100.0
Other Single Unit Trucks	51	3.0	22	43.1	29	56.9
Combinations and Trucks with Trailers	<u>9</u>	<u>0.5</u>	<u>5</u>	55.6	<u>4</u>	44.4
TOTAL	1727	100.0	1190	68.9	537	31.1

<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	307	17.8	225	73.3	82	26.7
Personal Business	163	9.4	152	93.3	11	6.7
Shopping	368	21.3	344	93.5	24	6.5
Vacation	337	19.5	82	24.3	255	75.7
Other Soc. or Rec.	376	21.8	232	61.7	144	38.3
All Other	<u>176</u>	<u>10.2</u>	<u>155</u>	88.1	<u>21</u>	11.9
TOTAL	1727	100.0	1190	68.9	537	31.1

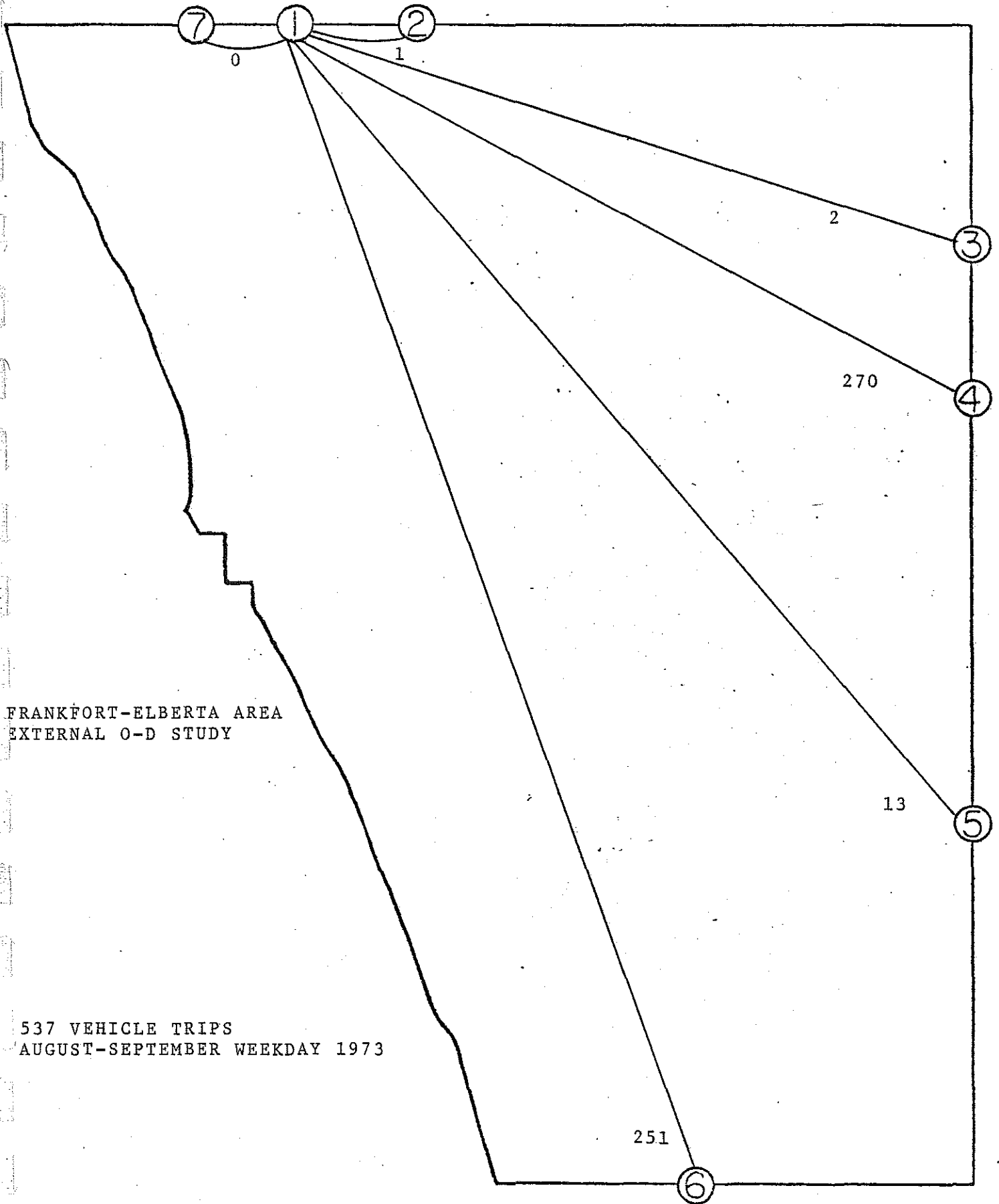
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STATION 1, M-22, NORTH

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
2-Bellows Road	1	0.2
3-Wright Road	2	0.4
4-M-115	270	50.3
5-River Road	13	2.4
6-M-22, South	251	46.7
7-Michigan Avenue	<u>0</u>	<u>0.0</u>
TOTAL	537	100.0

THROUGH TRAFFIC INTERCHANGE
STATION 1, M-22, NORTH



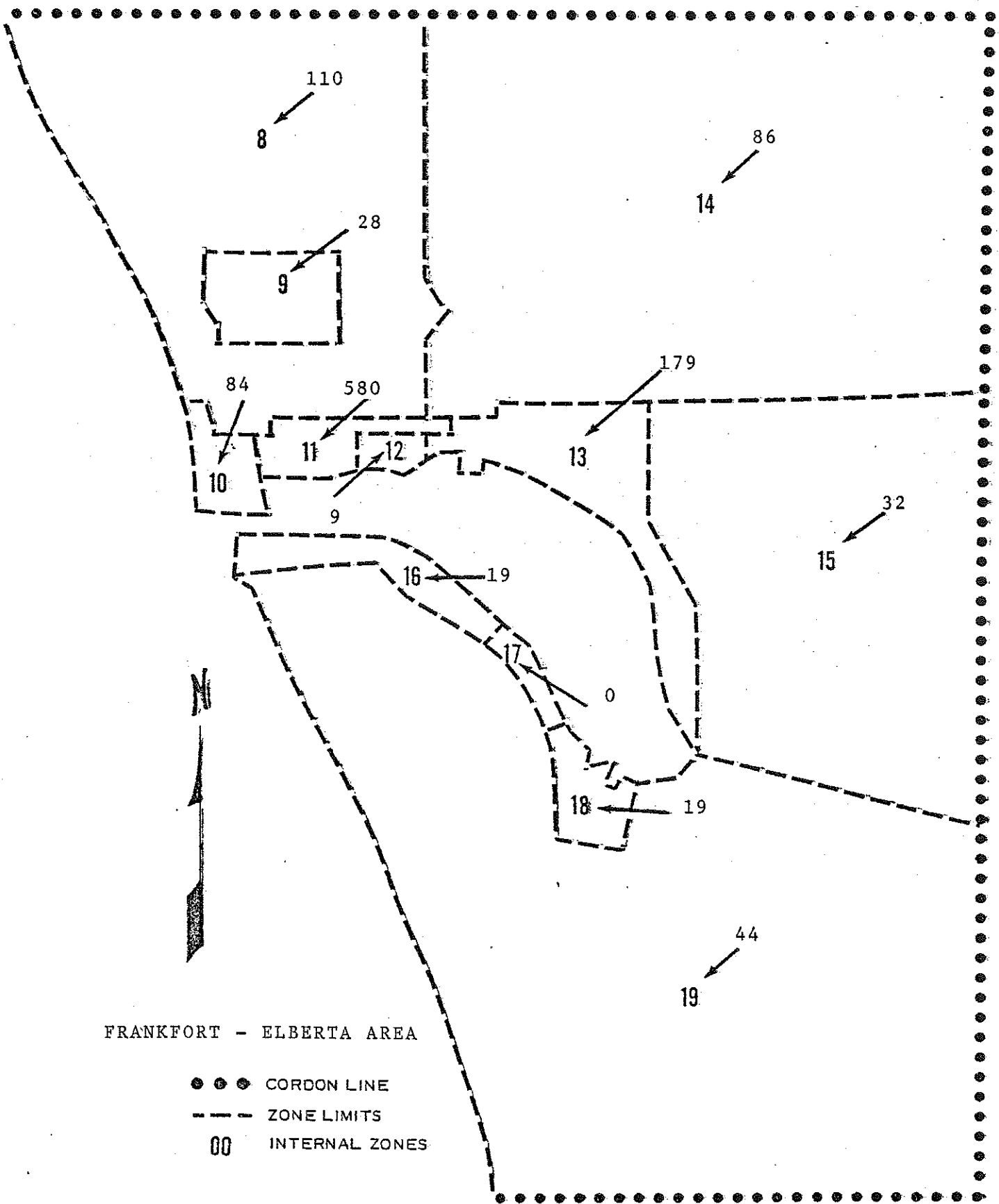
FRANKFORT-ELBERTA AREA
EXTERNAL O-D STUDY

537 VEHICLE TRIPS
AUGUST-SEPTEMBER WEEKDAY 1973

STATION 1, M-22, NORTH
TERMINAL TRIPS TO STUDY ZONES

<u>Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
8	110	9.2
9	28	2.4
10	84	7.1
11	580	48.7
12	9	0.8
13	179	15.0
14	86	7.2
15	32	2.7
16	19	1.6
17	0	0.0
18	19	1.6
19	<u>44</u>	<u>3.7</u>
TOTAL	1190	100.0

TERMINAL TRAFFIC BETWEEN
 STATION 1 (M-22, NORTH) AND INTERNAL ZONES
 1,190 VEHICLE TRIPS



FRANKFORT - ELBERTA AREA

- ● ● CORDON LINE
- - - ZONE LIMITS
- 00 INTERNAL ZONES

STATION 1, M-22, NORTH

<u>TRIP LENGTHS</u>		
<u>Minutes</u>	<u>No. of Trips</u>	<u>Percent of Totals</u>
1-20	1157	67.0
20-40	144	8.3
40-60	76	4.4
60-90	70	4.0
90-120	55	3.2
120-180	45	2.6
180-240	55	3.2
240-300	54	3.1
300-360	21	1.2
360-420	15	0.9
420-480 ^o	14	0.8
480-540	10	0.6
540-600	5	0.3
600-670	1	0.1
670-740	<u>5</u>	<u>0.3</u>
TOTAL	1727	100.0

Longest Trip = 12 Hr. 20 Min. Average Trip Length = 57 Min.
 Median Trip Length = 10 Min.*

* Due to the convention of the computer program, this value can be approximated only in 10 minute intervals.

Station 2 (Bellows Road)

Station 2 is located between the northern city limits of Frankfort and Cox Road.

A total of 559 vehicles were recorded during the expanded interview counts. Tabulations on the following pages give a detailed documentation of this traffic.

Approximately 9 out of every 10 vehicles had a terminal inside the study area. There were 9 out of every 10 vehicles which were autos and 8 out of every 100 vehicles which were panels or pickups irregardless of whether they travelled into or through the area. More than 85 percent of the passenger cars and panels or pickups had a terminal inside the study area.

The largest trip purpose was other social or recreational with 254 trips or 45.4 percent of the 559 total trips. All trip purposes except vacation had more than 85 percent terminal traffic.

Station 4 (M-115) accounted for 36 trips or 53.0 percent of the 68 through trips. Stations 4 and 6 accounted for 63 trips or 92.7 percent of the 68 through trips.

Zone 11 (Frankfort Central Business District) accounted for 167 trips or 34.0 percent of the 491 terminal trips. Zones 8, 11, 13, and 14 accounted for 414 trips or 84.3 percent of the 491 terminal trips.

There were 524 trips or 93.7 percent of the 559 trips that had a trip length of 1-20 minutes. 548 trips (98.0 percent) had a trip length of one hour or less.

The origin and destination of all the trips which passed through the station were tabulated by county, and 2 states (see 95 zone system in Appendix). There are two ends for each trip; an origin and a destination. There were 559 trips which passed through Station 2, accounting for 1,118 total trip ends.

There were 1,091 trip ends (97.6 percent) in Benzie County. There were no trip ends in the Upper Peninsula. The Lower Peninsula accounted for 1,116 trip ends (99.8 percent). There were 2 origins and/or destinations (0.2 percent) outstate.

STATION 2, BELLOWS ROAD

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	504	90.2	441	87.5	63	12.5
Passenger Car with Trailer	1	0.2	1	100.0	0	0.0
Panel or Pickup	46	8.2	42	91.3	4	8.7
Panel or Pickup with Trailer	2	0.3	2	100.0	0	0.0
Other Single Unit Trucks	6	1.1	5	83.3	1	16.7
Combinations and Trucks with Trailers	<u>0</u>	<u>0.0</u>	<u>0</u>	0.0	<u>0</u>	0.0
TOTAL	559	100.0	491	87.8	68	12.2

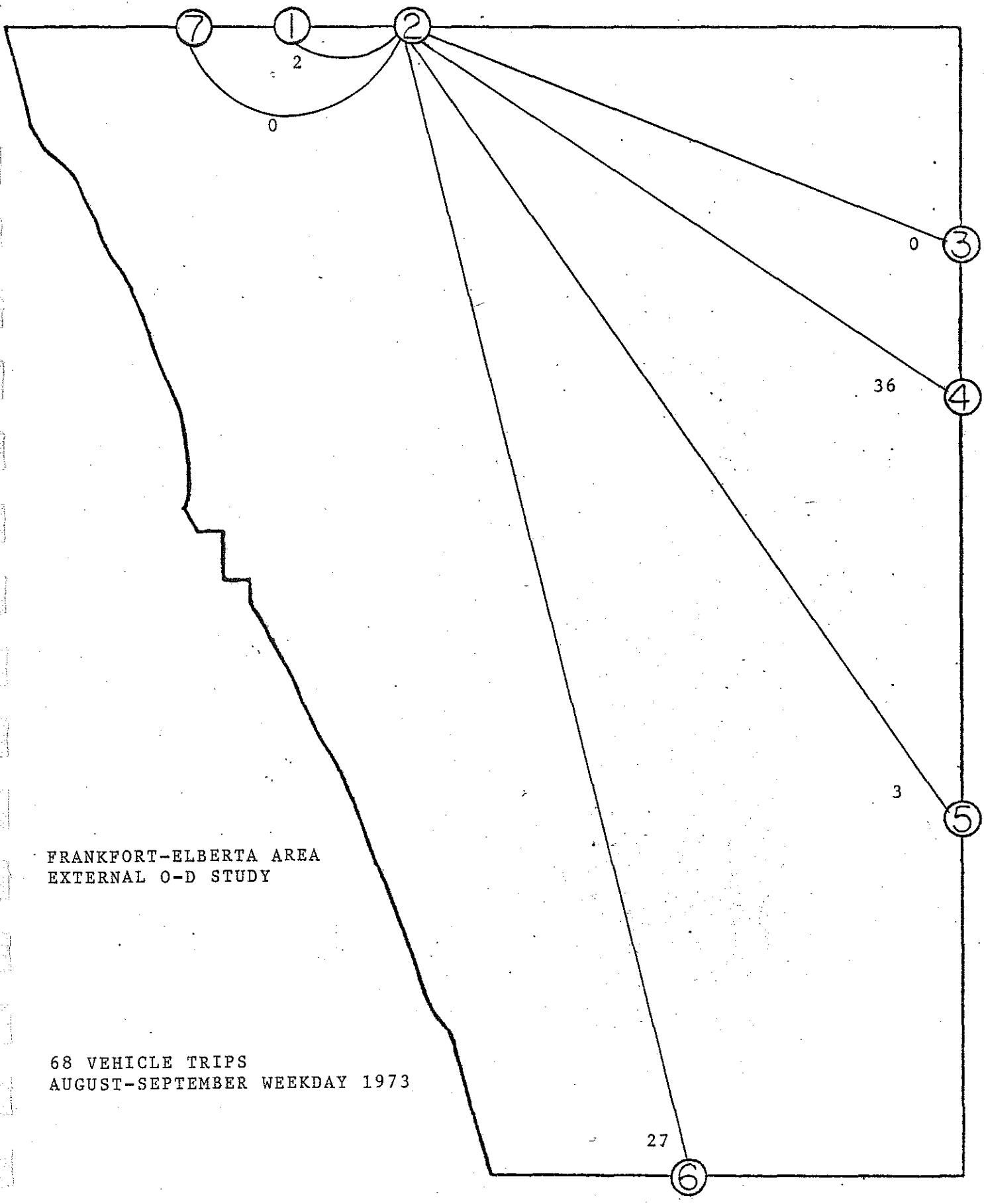
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	51	9.1	44	86.3	7	13.7
Personal Business	49	8.8	42	85.7	7	14.3
Shopping	156	27.9	149	95.5	7	4.5
Vacation	19	3.4	13	68.4	6	31.6
Other Soc. or Rec.	254	45.4	217	85.4	37	14.6
All Other	<u>30</u>	<u>5.4</u>	<u>26</u>	86.7	<u>4</u>	13.3
TOTAL	559	100.0	491	87.8	68	12.2

STATION 2, BELLOWS ROAD

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1-M-22, North	2	2.9
3-Wright Road	0	0.0
4-M-115	36	53.0
5-River Road	3	4.4
6-M-22, South	27	39.7
7-Michigan Avenue	<u>0</u>	<u>0.0</u>
TOTAL	68	100.0

THROUGH TRAFFIC INTERCHANGE
STATION 2, BELLOWS ROAD



FRANKFORT-ELBERTA AREA
EXTERNAL O-D STUDY

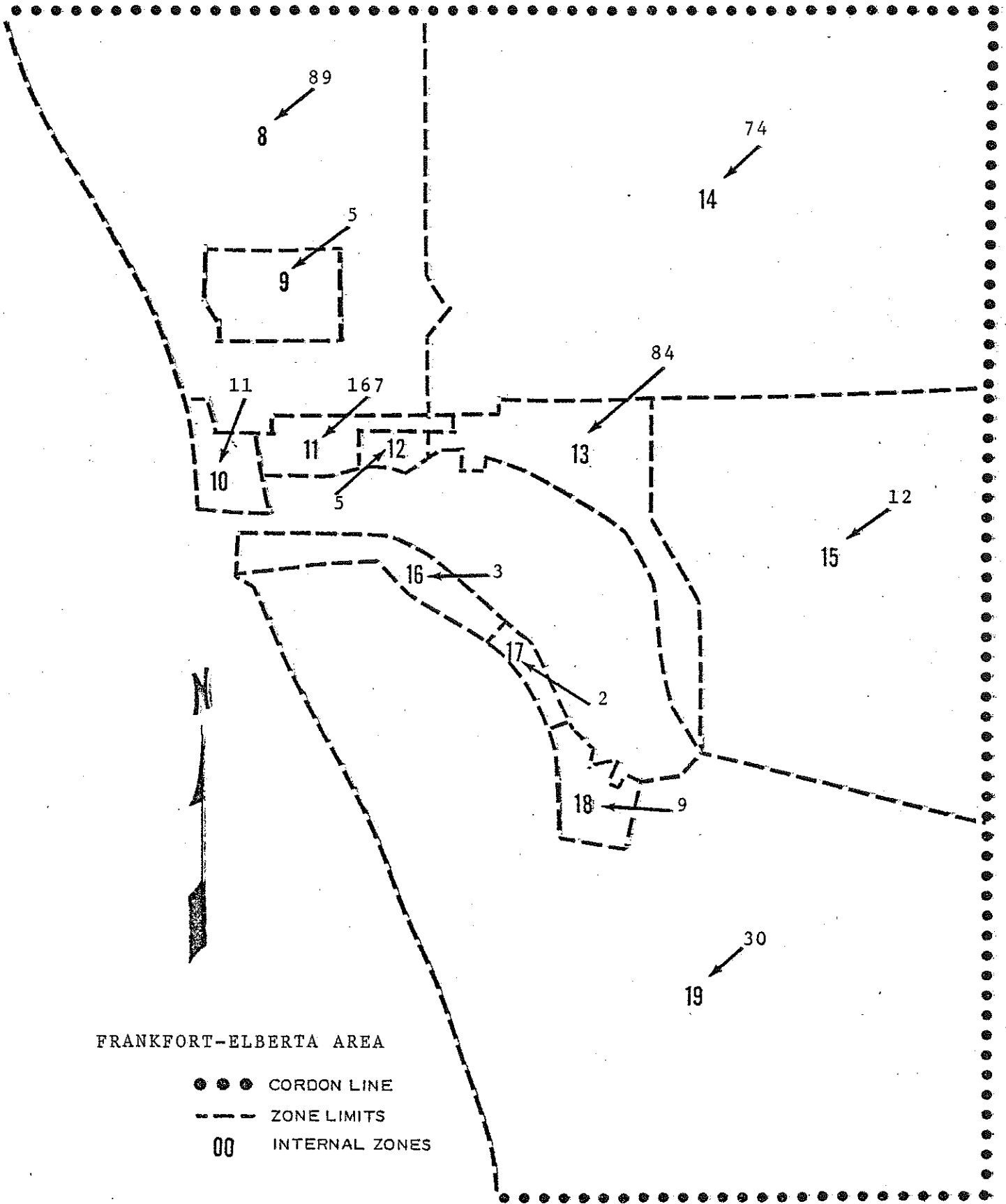
68 VEHICLE TRIPS
AUGUST-SEPTEMBER WEEKDAY 1973

STATION 2, BELLOWS ROAD

TERMINAL TRIPS TO STUDY ZONES

<u>Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
8	89	18.1
9	5	1.0
10	11	2.2
11	167	34.0
12	5	1.0
13	84	17.1
14	74	15.1
15	12	2.5
16	3	0.6
17	2	0.5
18	9	1.8
19	<u>30</u>	<u>6.1</u>
TOTAL	491	100.0

TERMINAL TRAFFIC BETWEEN
 STATION 2 (BELLOWS ROAD) AND INTERNAL ZONES
 491 VEHICLE TRIPS



FRANKFORT-ELBERTA AREA

- ● ● CORDON LINE
- - - ZONE LIMITS
- 00 INTERNAL ZONES

STATION 2, BELLOWS ROAD

<u>Minutes</u>	<u>TRIP LENGTHS</u>	<u>Percent of Totals</u>
	<u>No. of Trips</u>	
1-20	524	93.7
20-40	14	2.5
40-60	10	1.8
60-90	2	0.4
90-120	0	0.0
120-180	3	0.5
180-240	1	0.2
240-300	3	0.5
300-360	0	0.0
360-420	1	0.2
420-480	0	0.0
480-540	0	0.0
540-600	<u>1</u>	<u>0.2</u>
TOTAL	559	100.0

Longest Trip = 9 Hr. 30 Min. Average Trip Length = 16 Min.
 Median Trip Length = 10 Min.*

* Due to the convention of the computer program, this value can be approximated only in 10 minute intervals.

Station 3 (Wright Road)

Station 3 is located .2 miles east of Palcich Road.

A total of 102 vehicles were recorded during the expanded interview counts. Tabulations on the following pages give a detailed documentation of this traffic.

Approximately 9 out of every 10 vehicles had a terminal inside the study area. There were 9 out of every 10 vehicles which were autos and 9 out of every 100 vehicles which were panels or pickups irregardless of whether they traveled into or through the area.

The largest trip purpose was other social or recreational with 35 trips or 34.3 percent of the 102 total trips.

Station 1 (M-22, North) accounted for 100 percent of the 6 through trips.

Zone 14 (a residential area of Frankfort) accounted for 40 trips or 41.7 percent of the 96 terminal trips.

There were 97 trips or 95.1 percent of the 102 trips that had a trip length of 1-20 minutes. 100 percent of the 102 trips had a trip length of one hour or less.

The origin and destination of all the trips which passed through the station were tabulated by county, (see 95 zone system in Appendix). There are two ends for each trip; an origin and a destination. There were 102 trips which passed through Station 3, accounting for 204 total trip ends.

There were 199 trip ends (97.5 percent) in Benzie County. The Lower Peninsula accounted for 204 trip ends (100.0 percent).

STATION 3, WRIGHT ROAD

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	90	88.2	84	93.3	6	6.7
Passenger Car with Trailer	0	0.0	0	0.0	0	0.0
Panel or Pickup	9	8.8	9	100.0	0	0.0
Panel or Pickup with Trailer	0	0.0	0	0.0	0	0.0
Other Single Unit Trucks	3	3.0	3	100.0	0	0.0
Combinations and Trucks with Trailers	<u>0</u>	<u>0.0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>	<u>0.0</u>
TOTAL	102	100.0	96	94.1	6	5.9

<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	29	28.4	27	93.1	2	6.9
Personal Business	20	19.6	17	85.0	3	15.0
Shopping	12	11.8	11	91.7	1	8.3
Vacation	0	0.0	0	0.0	0	0.0
Other Soc. or Rec.	35	34.3	35	100.0	0	0.0
All Other	<u>6</u>	<u>5.9</u>	<u>6</u>	<u>100.0</u>	<u>0</u>	<u>0.0</u>
TOTAL	102	100.0	96	94.1	6	5.9

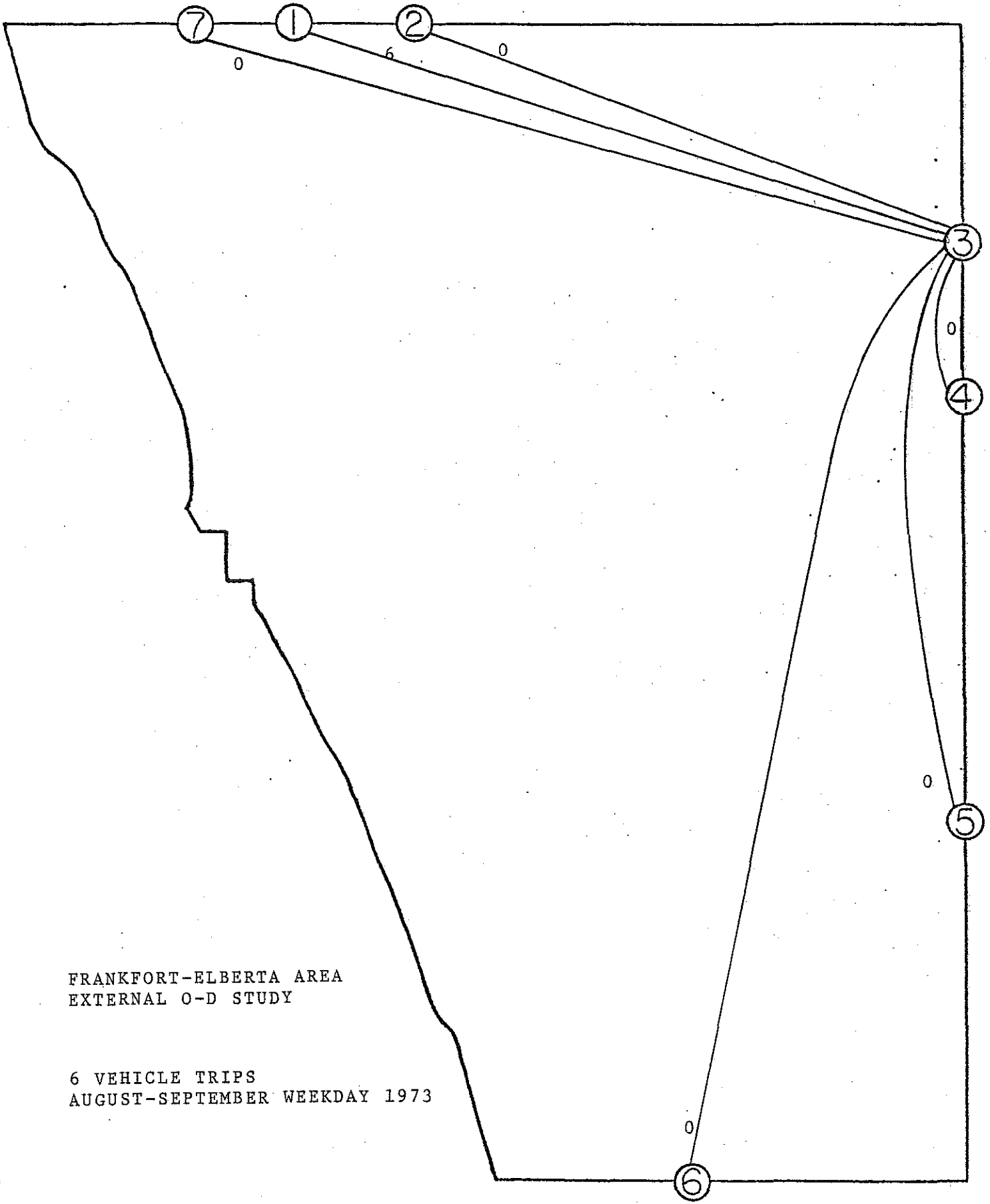
TRANSPORTATION LIBRARY
MICHIGAN DEPT. STATE HIGHWAYS &
TRANSPORTATION LANSING, MICH.

STATION 3, WRIGHT ROAD

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1-M-22, North	6	100.0
2-Bellows Road	0	0.0
4-M-115	0	0.0
5-River Road	0	0.0
6-M-22, South	0	0.0
7-Michigan Avenue	<u>0</u>	<u>0.0</u>
TOTAL	6	100.0

THROUGH TRAFFIC INTERCHANGE
STATION 3, WRIGHT ROAD



FRANKFORT-ELBERTA AREA
EXTERNAL O-D STUDY

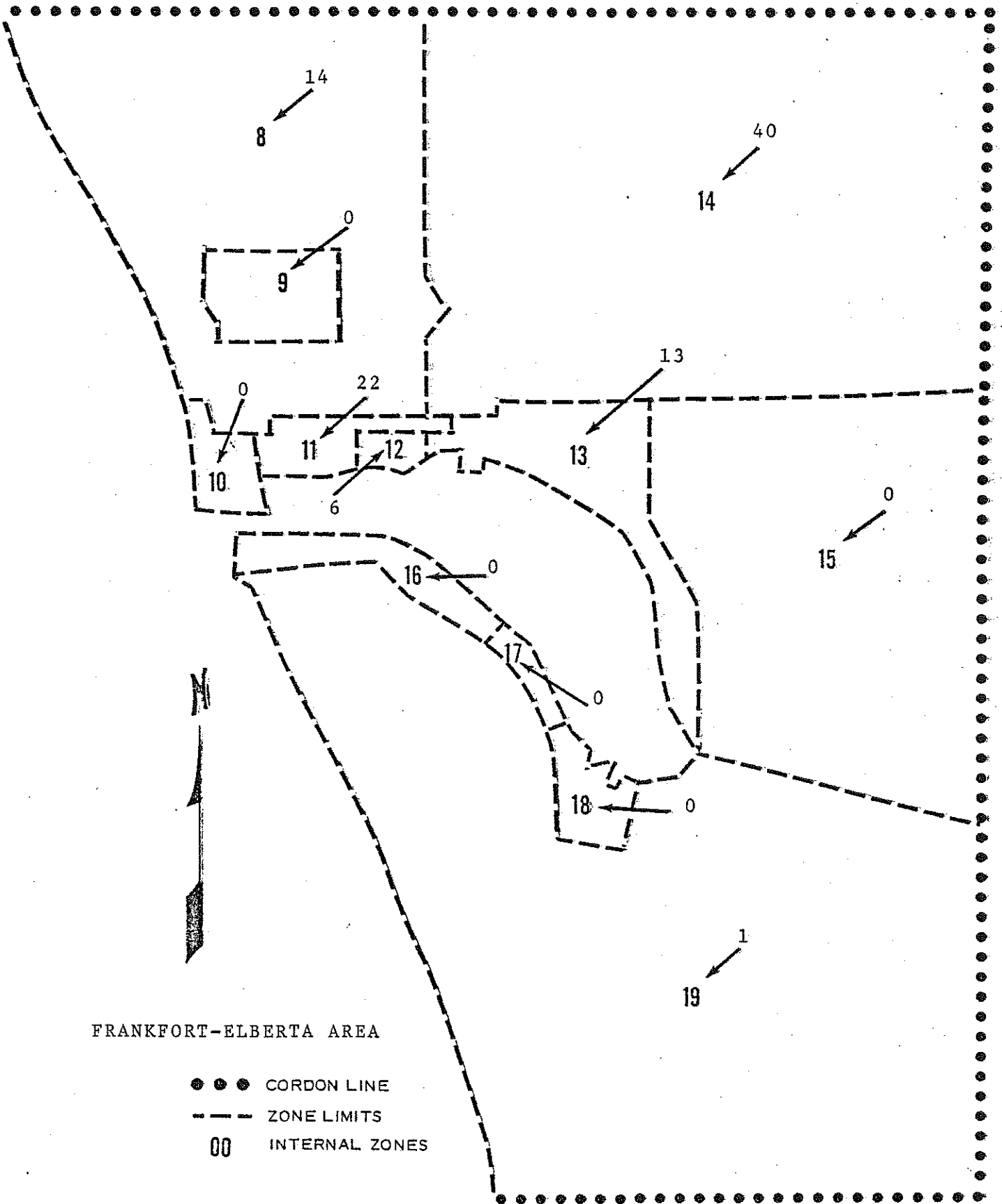
6 VEHICLE TRIPS
AUGUST-SEPTEMBER WEEKDAY 1973

STATION 3, WRIGHT ROAD

TERMINAL TRIPS TO STUDY ZONES

<u>Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
8	14	14.6
9	0	0.0
10	0	0.0
11	22	22.9
12	6	6.3
13	13	13.5
14	40	41.7
15	0	0.0
16	0	0.0
17	0	0.0
18	0	0.0
19	<u>1</u>	<u>1.0</u>
TOTAL	96	100.0

TERMINAL TRAFFIC BETWEEN
 STATION 3 (WRIGHT ROAD) AND INTERNAL ZONES
 96 VEHICLE TRIPS



FRANKFORT-ELBERTA AREA

- ● ● CORDON LINE
- - - ZONE LIMITS
- 00 INTERNAL ZONES

STATION 3, WRIGHT ROAD

<u>TRIP LENGTHS</u>		
<u>Minutes</u>	<u>No. of Trips</u>	<u>Percent of Totals</u>
1-20	97	95.1
20-40	2	2.0
40-60	<u>3</u>	<u>2.9</u>
TOTAL	102	100.0

Longest Trip = 50 Min. Average Trip Length = 13 Min.
 Median Trip Length = 10 Min.*

* Due to the convention of the computer program, this value can be approximated only in 10 minute intervals.

FRANKFORT-ELBERTA EXTERNAL O-D STUDY
 STATION 3
 WRIGHT ROAD

Total: 102 Trips, 204 Trip Ends
 There were 99 trips that had both
 Origins and Destinations in Benzie County.



Station 4 (M-115)

Station 4 is located between Palcich and Airport Road. M-115 is a trunk line and services the study area from the east.

A total of 3,289 vehicles were recorded during the expanded interview counts. Tabulations on the following pages give a detailed documentation of this traffic.

Approximately 8 out of every 10 vehicles had a terminal inside the study area; 8 out of every 10 vehicles were autos and 11 out of 100 vehicles were panels or pickups whether they traveled into or through the area. 85 percent of the passenger cars and panels or pickups had a terminal inside the study area.

The largest trip purpose was work with 1,111 trips or 33.8 percent of the 3,289 total trips. All trip purposes except vacation had 80 percent or more terminal traffic. Over one-half of the vacation trips were through trips.

Station 1 (M-22, North) accounted for 299 trips or 63.9 percent of the 468 through trips. Station 1 and 6 accounted for 425 trips or 90.8 percent of the 468 through trips.

Zone 11 (Frankfort Central Business District) accounted for 702 trips or 24.9 percent of the 2,821 terminal trips. Zones 8, 11, 13, and 14 accounted for 2,015 trips or 71.4 percent of the 2,821 terminal trips.

There were 1,936 trips or 58.9 percent of the 3,289 trips that had a trip length of 1-20 minutes. 2,810 trips (85.5 percent) had a trip length of one hour or less.

The origin and destination of all the trips which passed through the station were tabulated by county, Ontario and 8 states (see 95 zone system in Appendix). There are two ends for each trip; an origin and a destination. There were 3,289 trips which passed through Station 4, accounting for 6,578 total trip ends.

There were 5,372 trip ends (81.7 percent) in Benzie County. There were 24 trip ends (0.4 percent) in the Upper Peninsula. The Lower Peninsula accounted for 6,512 trip ends (99.0 percent). There were 42 origins and/or destinations (0.6 percent) outstate.

STATION 4, M-115

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	2678	81.4	2305	86.1	373	13.9
Passenger Car with Trailer	67	2.0	42	62.7	25	37.3
Panel or Pickup	364	11.1	327	89.8	37	10.2
Panel or Pickup with Trailer	15	0.5	10	66.7	5	33.3
Other Single Unit Trucks	108	3.3	91	84.3	17	15.7
Combinations and Trucks with Trailers	<u>57</u>	<u>1.7</u>	<u>46</u>	80.7	<u>11</u>	19.3
TOTAL	3289	100.0	2821	85.8	468	14.2

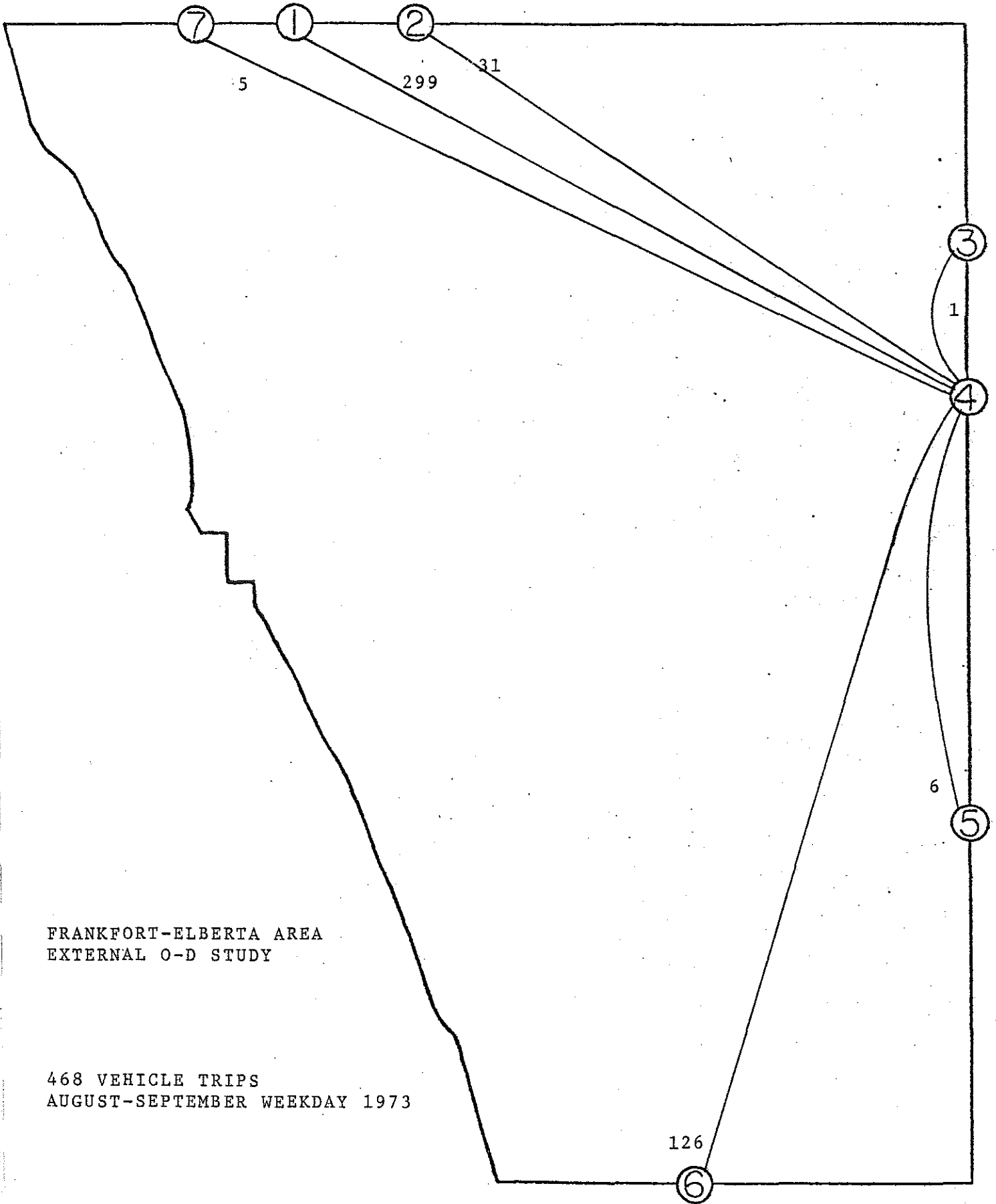
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	1111	33.8	1037	93.3	74	6.7
Personal Business	310	9.4	284	91.6	26	8.4
Shopping	568	17.3	531	93.5	37	6.5
Vacation	340	10.3	163	47.9	177	52.1
Other Soc. or Rec.	627	19.1	500	79.7	127	20.3
All Other	<u>333</u>	<u>10.1</u>	<u>306</u>	91.9	<u>27</u>	8.1
TOTAL	3289	100.0	2821	85.8	468	14.2

STATION 4, M-115

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1-M-22, North	299	63.9
2-Bellows Road	31	6.6
3-Wright Road	1	.2
5-River Road	6	1.3
6-M-22, South	126	26.9
7-Michigan Avenue	<u>5</u>	<u>1.1</u>
TOTAL	468	100.0

THROUGH TRAFFIC INTERCHANGE
STATION 4, M-115



FRANKFORT-ELBERTA AREA
EXTERNAL O-D STUDY

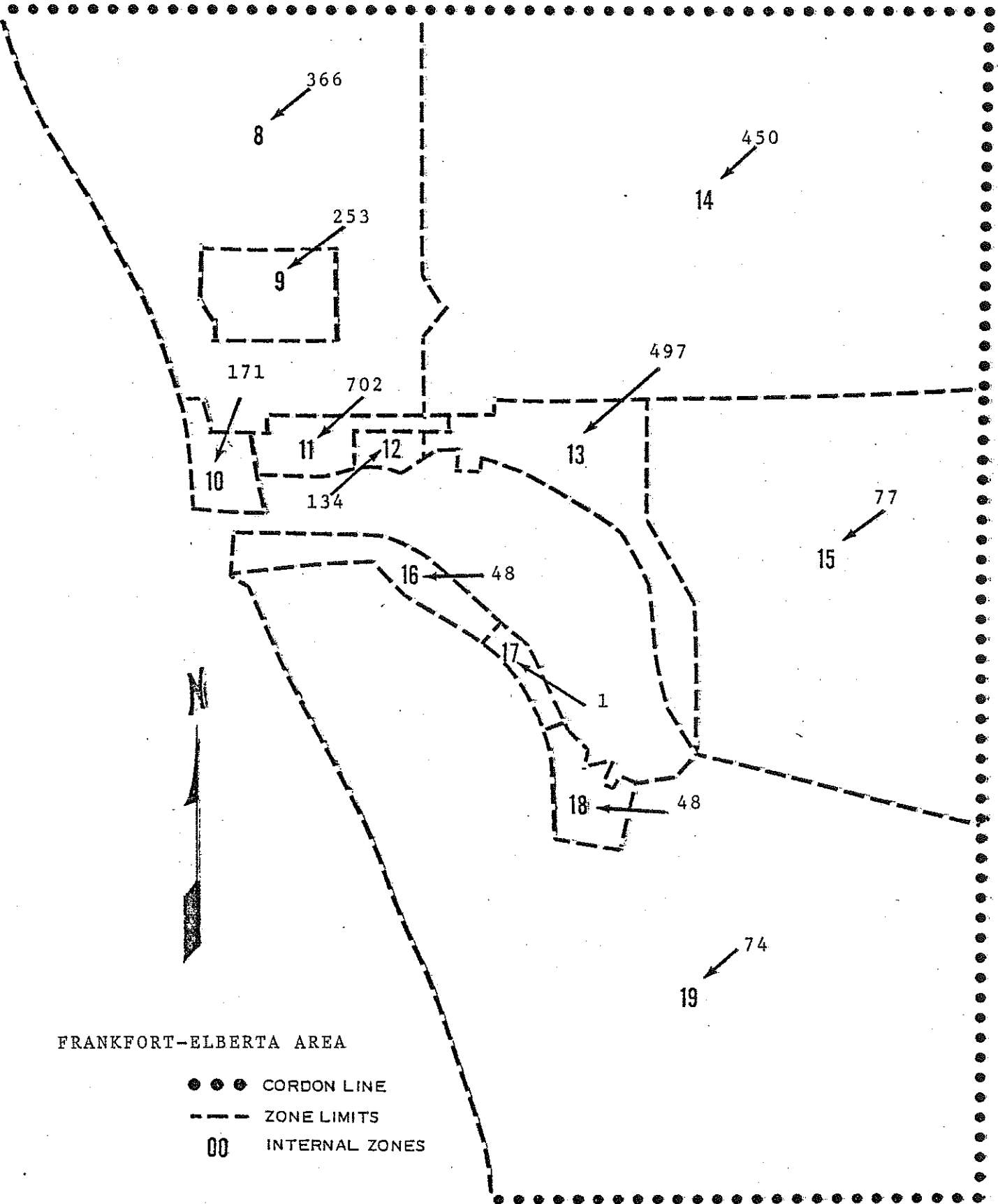
468 VEHICLE TRIPS
AUGUST-SEPTEMBER WEEKDAY 1973

STATION 4, M-115

TERMINAL TRIPS TO STUDY ZONES

<u>Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
8	366	13.0
9	253	9.0
10	171	6.0
11	702	24.9
12	134	4.8
13	497	17.6
14	450	16.0
15	77	2.7
16	48	1.7
17	1	0.0
18	48	1.7
19	<u>74</u>	<u>2.6</u>
TOTAL	2821	100.0

TERMINAL TRAFFIC BETWEEN
 STATION 4 (M-115) AND INTERNAL ZONES
 2,821 VEHICLE TRIPS



FRANKFORT-ELBERTA AREA

- ● ● CORDON LINE
- - - ZONE LIMITS
- 00 INTERNAL ZONES

STATION 4, M-115 .

TRIP LENGTHS

<u>Minutes</u>	<u>No. of Trips</u>	<u>Percent of Totals</u>
1-20	1936	58.9
20-40	461	14.0
40-60	413	12.6
60-90	118	3.6
90-120	52	1.6
120-180	92	2.8
180-240	87	2.6
240-300	68	2.1
300-360	28	0.8
360-420	21	0.6
420-480	2	0.1
480-540	0	0.0
540-600	4	0.1
600-670	2	0.1
670-740	<u>5</u>	<u>0.1</u>
TOTAL	3289	100.0

Longest Trip = 11 Hr. 50 Min. Average Trip Length = 48 Min.
 Median Trip Length = 20 Min.*

* Due to the convention of the computer program, this value can be approximated only in 10 minute intervals.

Station 5 (River Road)

Station 5 is located .5 miles east of M-22, South.

A total of 675 vehicles were recorded during the expanded interview counts. Tabulations on the following pages give a detailed documentation of this traffic.

Approximately 8 out of every 10 vehicles had a terminal inside the study area. There were 7 out of every 10 vehicles which were autos and 20 out of every 100 vehicles which were panels or pickups irregardless of whether they traveled into or through the area. 85 percent of the passenger cars and panels or pickups had a terminal inside the study area.

The largest trip purpose was work with 232 trips or 34.4 percent of the 675 total trips. All trip purposes except vacation had more than 75 percent terminal traffic. Over three-fourths of the vacation trips were through trips.

Station 1 (M-22, North) accounted for 48 trips or 48.0 percent of the 100 through trips.

Zone 19 (a residential area for the Village of Elberta) accounted for 99 trips or 17.2 percent of the 575 terminal trips. Zone 8, 11, 13, 14 and 19 accounted for 405 trips or 70.4 percent of the 575 terminal trips.

There were 547 trips or 81.0 percent of the 675 trips that had a trip length of 1-20 minutes. 645 trips (95.5 percent) had a trip length of one hour or less.

The origin and destination of all the trips which passed through the station were tabulated by county, and 1 state (see 95 zone system in Appendix). There are two ends for each trip; an origin and a destination. There were 675 trips which passed through Station 5, accounting for 1,350 total trip ends.

There were 1,244 trip ends (92.1 percent) in Benzie County. There were 2 trip ends (0.1 percent) in the Upper Peninsula. The Lower Peninsula accounted for 1,347 trip ends (99.8 percent). There was 1 origin and/or destination (0.1 percent) outstate.

STATION 5, RIVER ROAD

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	495	73.3	417	84.2	78	15.8
Passenger Car with Trailer	4	0.6	3	75.0	1	25.0
Panel or Pickup	137	20.4	127	92.7	10	7.3
Panel or Pickup with Trailer	4	0.6	1	25.0	3	75.0
Other Single Unit Trucks	30	4.4	23	76.7	7	23.3
Combinations and Trucks with Trailers	<u>5</u>	<u>0.7</u>	<u>4</u>	80.0	<u>1</u>	20.0
TOTAL	675	100.0	575	85.2	100	14.8

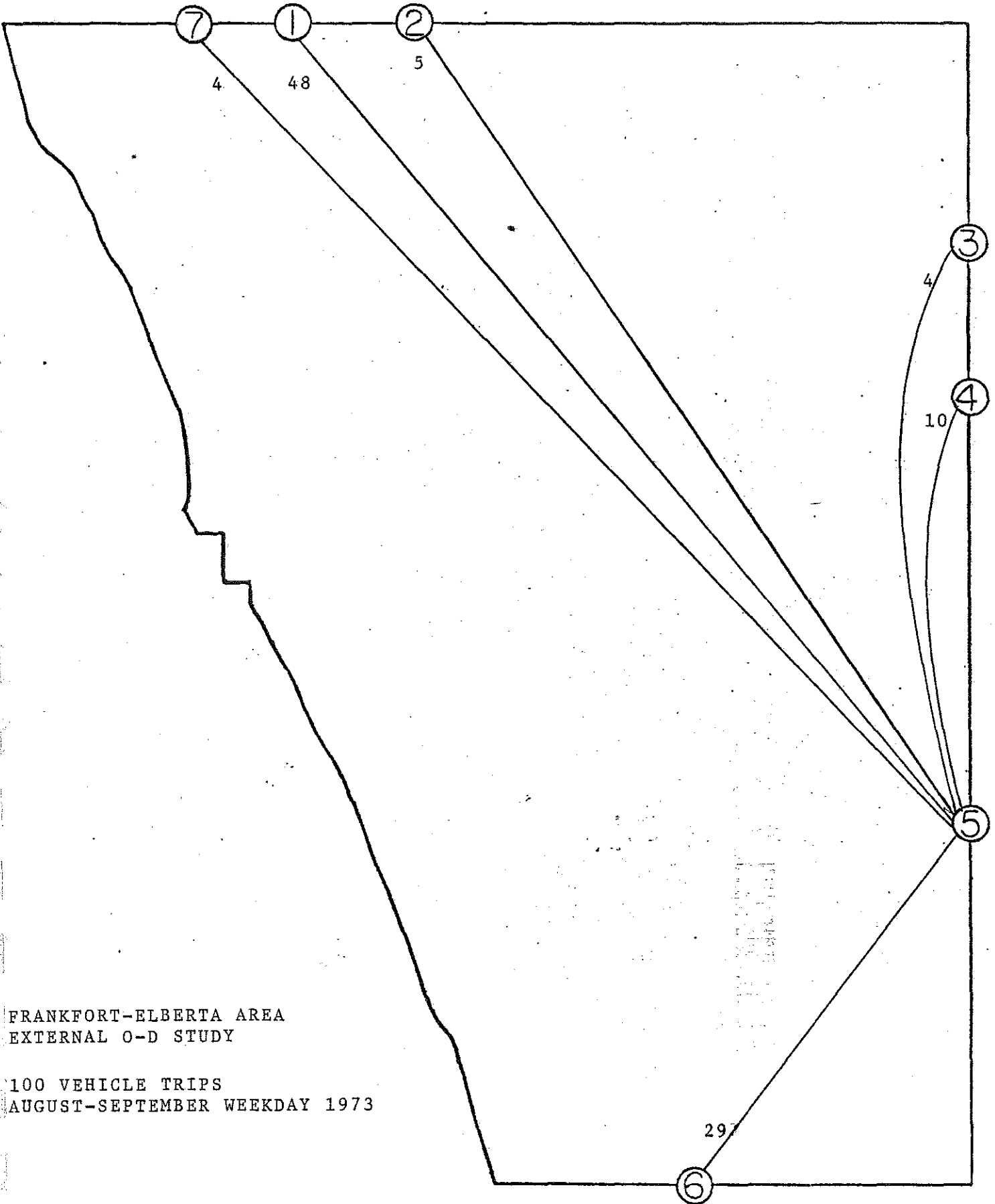
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	232	34.4	211	90.9	21	9.1
Personal Business	64	9.5	63	98.4	1	1.6
Shopping	105	15.5	93	88.6	12	11.4
Vacation	24	3.6	5	20.8	19	79.2
Other Soc. or Rec.	162	24.0	123	75.9	39	24.1
All Other	<u>88</u>	<u>13.0</u>	<u>80</u>	90.9	<u>8</u>	9.1
TOTAL	675	100.0	575	85.2	100	14.8

STATION 5, RIVER ROAD

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1-M-22, North	48	48.0
2-Bellows Road	5	5.0
3-Wright Road	4	4.0
4-M-115	10	10.0
6-M-22, South	29	29.0
7-Michigan Avenue	<u>4</u>	<u>4.0</u>
TOTAL	100	100.0

THROUGH TRAFFIC INTERCHANGE
STATION 5 RIVER ROAD



FRANKFORT-ELBERTA AREA
EXTERNAL O-D STUDY

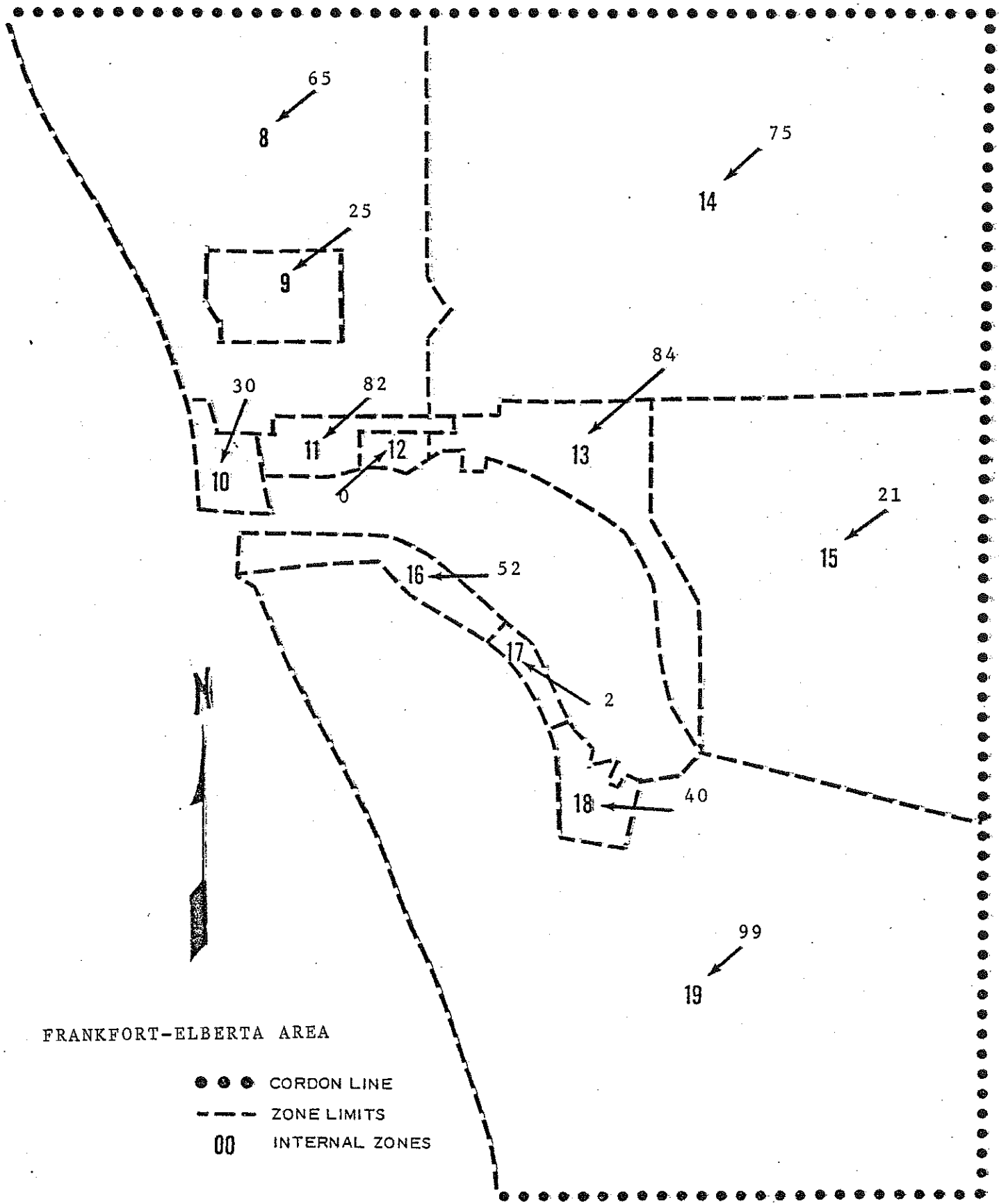
100 VEHICLE TRIPS
AUGUST-SEPTEMBER WEEKDAY 1973

STATION 5, RIVER ROAD

TERMINAL TRIPS TO STUDY ZONES

<u>Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
8	65	11.3
9	25	4.4
10	30	5.2
11	82	14.3
12	0	0.0
13	84	14.6
14	75	13.0
15	21	3.7
16	52	9.0
17	2	0.3
18	40	7.0
19	<u>99</u>	<u>17.2</u>
TOTAL	575	100.0

TERMINAL TRAFFIC BETWEEN
 STATION 5 (RIVER ROAD) AND INTERNAL ZONES
 575 VEHICLE TRIPS



FRANKFORT-ELBERTA AREA

- ● ● CORDON LINE
- - - ZONE LIMITS
- 00 INTERNAL ZONES

STATION 5, RIVER ROAD

<u>TRIP LENGTHS</u>		
<u>Minutes</u>	<u>No. of Trips</u>	<u>Percent of Totals</u>
1-20	547	81.0
20-40	59	8.7
40-60	39	5.8
60-90	13	1.9
90-120	2	0.3
120-180	9	1.3
180-240	1	0.2
240-300	4	0.6
300-360	<u>1</u>	<u>0.2</u>
TOTAL	675	100.0

Longest Trip = 5 Hr. 10 Min. Average Trip Length = 24 Min.
 Median Trip Length = 20 Min.*

* Due to the convention of the computer program, this value can be approximated only in 10 minute intervals.

Station 6 (M-22, South)

Station 6 is located .25 miles south of Elberta. M-22, South is a trunk line and services the study area from the south.

A total of 1,597 vehicles were recorded during the expanded interview counts. Tabulations on the following pages give a detailed documentation of this traffic.

Approximately 7 out of every 10 vehicles had a terminal inside the study area. There were 8 out of every 10 vehicles which were autos and 13 out of every 100 vehicles which were panels or pickups irregardless of whether they traveled into or through the area. More than 75 percent of the passenger cars and panels or pickups had a terminal inside the study area.

The largest trip purpose was work with 445 trips or 27.9 percent of the 1,597 total trips. All trip purposes except vacation had 70 percent or more terminal traffic. Three-fourths of the vacation trips were through trips.

Station 1 (M-22, North) accounted for 214 trips or 55.3 percent of the 387 through trips. Station 1 and 4 accounted for 363 trips or 93.8 percent of the 387 through trips.

Zone 11 (Frankfort Central Business District) accounted for 249 trips or 20.6 percent of the 1,210 terminal trips. Zones 11, 13, 14, and 18 accounted for 772 trips or 63.8 percent of the 1,210 terminal trips.

There were 912 trips or 57.1 percent of the 1,597 trips that had a trip length of 1-20 minutes. 1,321 trips (82.7 percent) had a trip length of one hour or less.

The origin and destination of all the trips which passed through the station were tabulated by county and 4 states (see 95 zone system in Appendix). There are two ends for each trip; an origin and a destination. There were 1,597 trips which passed through Station 6, accounting for 3,194 total trip ends.

There were 2,332 trip ends (73.0 percent) in Benzie County. There were 21 trip ends (0.6 percent) in the Upper Peninsula. The Lower Peninsula accounted for 3,145 trip ends (98.5 percent). There were 28 origins and/or destinations (0.9 percent) outstate.

STATION 6, M-22, SOUTH

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	1278	80.0	965	75.5	313	24.5
Passenger Car with Trailer	28	1.8	13	46.4	15	53.6
Panel or Pickup	216	13.5	183	84.7	33	15.3
Panel or Pickup with Trailer	8	0.5	5	62.5	3	37.5
Other Single Unit Trucks	59	3.7	40	67.8	19	32.2
Combinations and Trucks with Trailers	<u>8</u>	<u>0.5</u>	<u>4</u>	50.0	<u>4</u>	50.0
TOTAL	1597	100.0	1210	75.8	387	24.2

<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	445	27.9	365	82.0	80	18.0
Personal Business	142	8.9	127	89.4	15	10.6
Shopping	256	16.0	251	98.0	5	2.0
Vacation	202	12.7	49	24.3	153	75.7
Other Soc. or Rec.	371	23.2	259	69.8	112	30.2
All Other	<u>181</u>	<u>11.3</u>	<u>159</u>	87.8	<u>22</u>	12.2
TOTAL	1597	100.0	1210	75.8	387	24.2

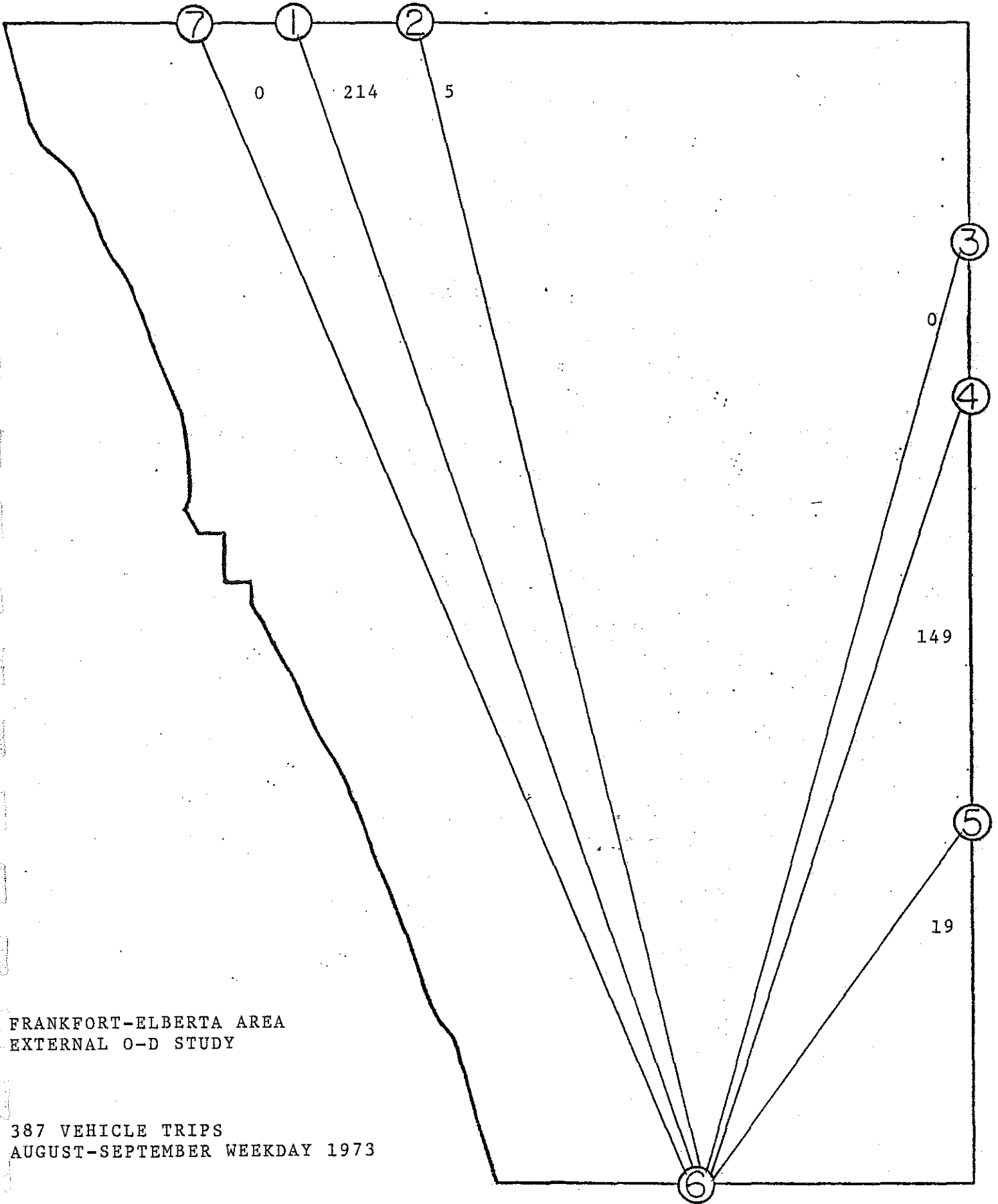
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MICHIGAN DEPT. STATE HIGHWAYS &
TRANSPORTATION LANSING, MICH.

STATION 6, M-22, SOUTH

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1-M-22, North	214	55.3
2-Bellows Road	5	1.3
3-Wright Road	0	0.0
4-M-115	149	38.5
5-River Road	19	4.9
7-Michigan Avenue	<u>0</u>	<u>0.0</u>
TOTAL	387	100.0

THROUGH TRAFFIC INTERCHANGE
STATION 6, M-22, SOUTH



FRANKFORT-ELBERTA AREA
EXTERNAL O-D STUDY

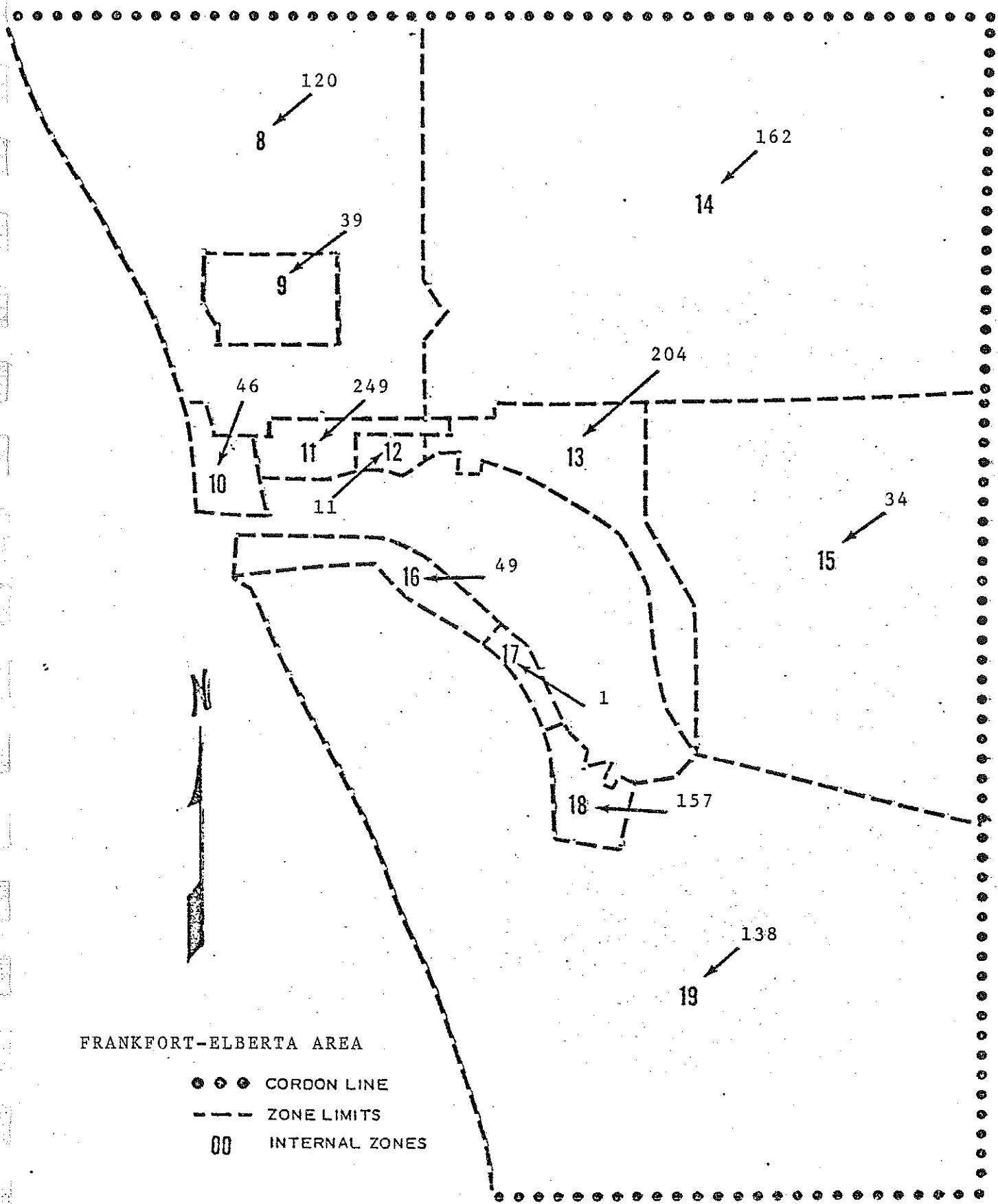
387 VEHICLE TRIPS
AUGUST-SEPTEMBER WEEKDAY 1973

STATION 6, M-22 SOUTH

TERMINAL TRIPS TO STUDY ZONES

<u>Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
8	120	9.9
9	39	3.2
10	46	3.8
11	249	20.6
12	11	0.9
13	204	16.9
14	162	13.4
15	34	2.8
16	49	4.0
17	1	0.1
18	157	13.0
19	<u>138</u>	<u>11.4</u>
TOTAL	1210	100.0

TERMINAL TRAFFIC BETWEEN
 STATION 6 (M-22, SOUTH) AND INTERNAL ZONES
 1,210 VEHICLE TRIPS



FRANKFORT-ELBERTA AREA

- ● ● CORDON LINE
- - - ZONE LIMITS
- 00 INTERNAL ZONES

STATION 6, M-22, SOUTH

TRIP LENGTHS

<u>Minutes</u>	<u>No. of Trips</u>	<u>Percent of Totals</u>
1-20	912	57.1
20-40	297	18.6
40-60	112	7.0
60-90	84	5.2
90-120	39	2.4
120-180	52	3.3
180-240	36	2.2
240-300	29	1.8
300-360	19	1.2
360-420	9	0.6
420-480	3	0.2
480-540	4	0.3
540-600	0	0.0
600-670	0	0.0
670-740	<u>1</u>	<u>0.1</u>
	TOTAL 1597	100.0

Longest Trip = 11 Hr. 30 Min. Average Trip Length = 53 Min.
 Median Trip Length = 20 Min.*

* Due to the convention of the computer program, this value can be approximated only in 10 minute intervals.

Station 7 (Michigan Avenue)

Station 7 is located .1 miles south of Cox Road.

A total of 375 vehicles were recorded during the expanded interview counts. Tabulations on the following pages give a detailed documentation of this traffic.

Approximately 9 out of every 10 vehicles had a terminal inside the study area. There were 9 out of every 10 vehicles which were autos and 7 out of every 100 vehicles which were panels or pickups irregardless of whether they traveled into or through the area. More than 90 percent of the passenger cars and panels or pickups had a terminal inside the study area.

The largest trip purpose was work with 98 trips or 26.1 percent of the 375 total trips. Other social or recreational and shopping trips also generated a significant number of trips.

Station 4 (M-115) accounted for 17 trips or 56.7 percent of the 30 through trips.

Zone 11 (Frankfort Central Business District) accounted for 151 trips or 43.8 percent of the 345 terminal trips. Zones 8 and 11 accounted for 223 trips or 64.6 percent of the 345 terminal trips.

There were 324 trips or 86.4 percent of the 375 trips that had a trip length of 1-20 minutes. 362 trips (96.6 percent) had a trip length of one hour or less.

The origin and destination of all the trips which passed through the station were tabulated by county and 1 state (see 95 zone system in Appendix). There are two ends for each trip; an origin and a destination. There were 375 trips which passed through Station 7, accounting for 750 total trip ends.

There were 715 trip ends (95.3 percent) in Benzie County.
The Lower Peninsula accounted for 748 trip ends (99.7 percent).
There were 2 origins and/or destinations (0.3 percent) outstate.

STATION 7, MICHIGAN AVENUE

<u>Vehicle Type</u>	<u>Vehicles</u>	Percent of <u>Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	341	90.9	315	92.4	26	7.6
Passenger Car with Trailer	2	0.5	2	100.0	0	0.0
Panel or Pickup	25	6.7	24	96.0	1	4.0
Panel or Pickup with Trailer	1	0.3	0	0.0	1	100.0
Other Single Unit Trucks	6	1.6	4	66.7	2	33.3
Combinations and Trucks with Trailers	<u>0</u>	<u>0.0</u>	<u>0</u>	0.0	<u>0</u>	0.0
TOTAL	375	100.0	345	92.0	30	8.0

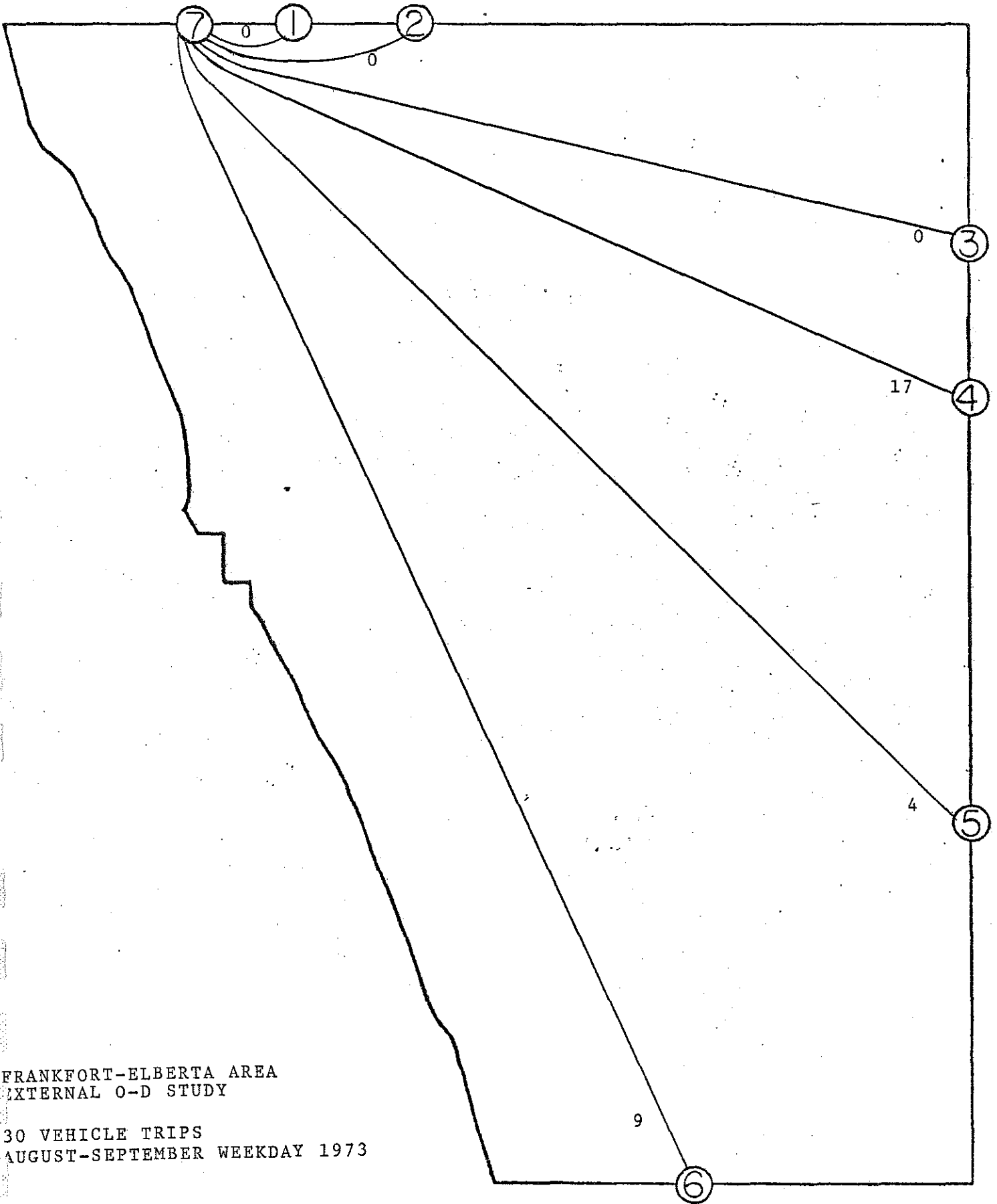
<u>Trip Purpose</u>	<u>Vehicles</u>	Percent of <u>Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	98	26.1	90	91.8	8	8.2
Personal Business	33	8.8	33	100.0	0	0.0
Shopping	91	24.3	91	100.0	0	0.0
Vacation	12	3.2	10	83.3	2	16.7
Other Soc. or Rec.	96	25.6	80	83.3	16	16.7
All Other	<u>45</u>	<u>12.0</u>	<u>41</u>	91.1	<u>4</u>	8.9
TOTAL	375	100.0	345	92.0	30	8.0

STATION 7, MICHIGAN AVENUE

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1-M-22, North	0	0.0
2-Bellows Road	0	0.0
3-Wright Road	0	0.0
4-M-115	17	56.7
5-River Road	4	13.3
6-M-22, South	<u>9</u>	<u>30.0</u>
TOTAL	30	100.0

THROUGH TRAFFIC INTERCHANGE
STATION 7, MICHIGAN AVENUE



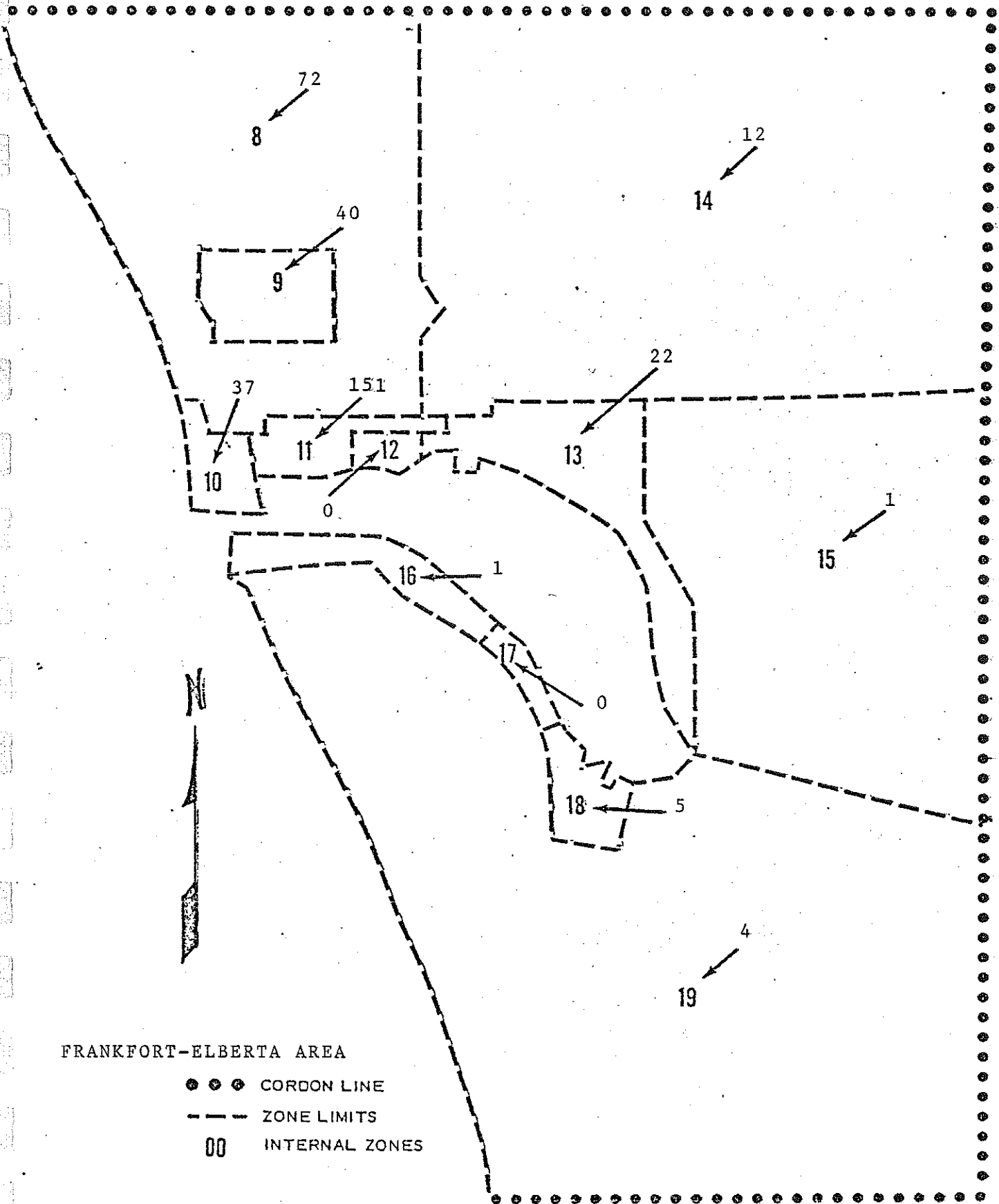
FRANKFORT-ELBERTA AREA
EXTERNAL O-D STUDY
30 VEHICLE TRIPS
AUGUST-SEPTEMBER WEEKDAY 1973

STATION 7, MICHIGAN AVENUE

TERMINAL TRIPS TO STUDY ZONES

<u>Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
8	72	20.9
9	40	11.6
10	37	10.7
11	151	43.8
12	0	0.0
13	22	6.4
14	12	3.5
15	1	0.3
16	1	0.3
17	0	0.0
18	5	1.4
19	<u>4</u>	<u>1.1</u>
TOTAL	345	100.0

TERMINAL TRAFFIC BETWEEN
 STATION 7 (MICHIGAN AVENUE) AND INTERNAL ZONES
 345 VEHICLE TRIPS



FRANKFORT-ELBERTA AREA

- ● ● CORDON LINE
- - - ZONE LIMITS
- 00 INTERNAL ZONES

STATION 7, MICHIGAN AVENUE

TRIP LENGTHS

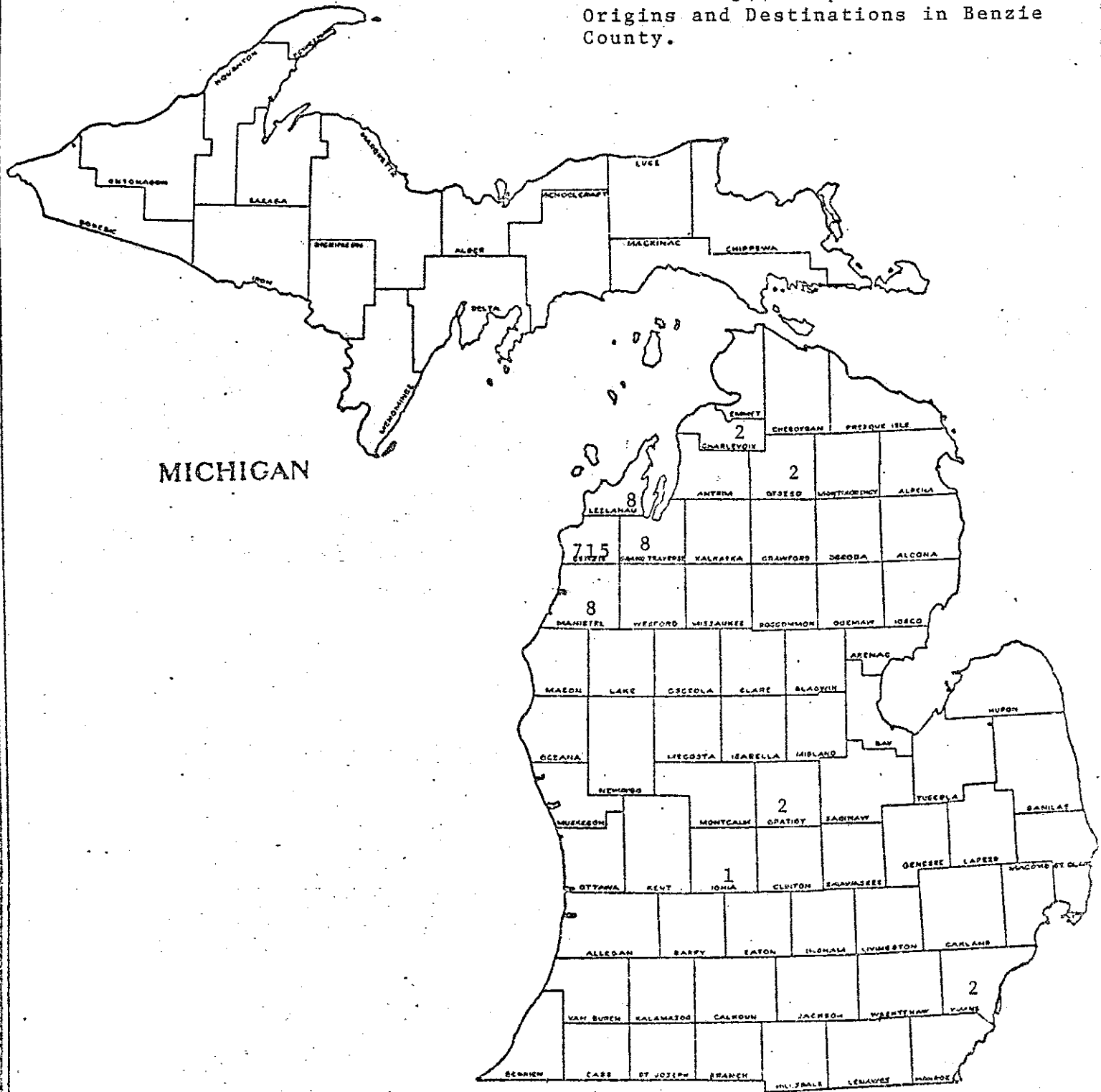
<u>Minutes</u>	<u>No. of Trips</u>	<u>Percent of Totals</u>
1-20	324	86.4
20-40	25	6.7
40-60	13	3.5
60-90	2	0.5
90-120	2	0.5
120-180	4	1.1
180-240	1	0.3
240-300	2	0.5
300-360	<u>2</u>	<u>0.5</u>
TOTAL	375	100.0

Longest Trip = 5 Hr. 10 Min. Average Trip Length = 19 Min.
 Median Trip Length = 10 Min.*

* Due to the convention of the computer program, this value can be approximated only in 10 minute intervals.

FRANKFORT-ELBERTA EXTERNAL O-D STUDY
 STATION 7
 MICHIGAN AVENUE

Total: 375 Trips, 750 Trip Ends
 There were 344 trips that had both
 Origins and Destinations in Benzie
 County.



Indiana 2

APPENDIX

95 ZONE SYSTEM

INSTATE ZONES

ZONE	COUNTY	ZONE	COUNTY
1	ALCONA	43	LAKE
2	ALGER	44	LAPEER
3	ALLEGAN	45	LEELANAU
4	ALPENA	46	LENAWEE
5	ANTRIM	47	LIVINGSTON
6	ARENAC	48	LUCE
7	BARAGA	49	MACKINAC
8	BARRY	50	MACOMB
9	BAY	51	MANISTEE
10	BENZIE	52	MARQUETTE
11	BERRIEN	53	MASON
12	BRANCH	54	MECOSTA
13	CALHOUN	55	MENOMINEE
14	CASS	56	MIDLAND
15	CHARLEVOIX	57	MISSAUKEE
16	CHEBOYGAN	58	MONROE
17	CHIPPEWA	59	MONTCALM
18	CLARE	60	MONTMORENCY
19	CLINTON	61	MUSKEGON
20	CRAWFORD	62	NEWAYGO
21	DELTA	63	OAKLAND
22	DICKINSON	64	OCEANA
23	EATON	65	OGEMAW
24	EMMET	66	ONTONAGON
25	GENESEE	67	OSCEOLA
26	GLADWIN	68	OSCODA
27	GOGEBIC	69	OTSEGO
28	GRAND TRAVERSE	70	OTTAWA
29	GRATIOT	71	PRESQUE ISLE
30	HILLSDALE	72	ROSCOMMON
31	HOUGHTON	73	SAGINAW
32	HURON	74	SANILAC
33	INGHAM	75	SCHOOLCRAFT
34	IONIA	76	SHIAWASSEE
35	IOSCO	77	ST. CLAIR
36	IRON	78	ST. JOSEPH
37	ISABELLA	79	TUSCOLA
38	JACKSON	80	VAN BUREN
39	KALAMAZOO	81	WASHTENAW
40	KALKASKA	82	WAYNE
41	KENT	83	WEXFORD
42	KEWEENAW		

OUTSTATE ZONES

84	ONTARIO	90	KENTUCKY
85	WISCONSIN	91	MISSOURI
86	ILLINOIS	92	IOWA
87	INDIANA	93	MINNESOTA
88	OHIO	94	PENNSYLVANIA
89	WEST VIRGINIA	95	NEW YORK

SINGLE STATION RURAL O-D STUDY

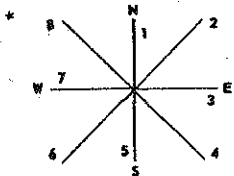
FORM NUMBER	6	COUNTY NUMBER		STATEWIDE NUMBER		HOUR PERIOD ENDING		* DIRECTION		DAY ** OF TRAVEL		MO.		DATE	
	1		2 3		4 5 6 7		8 9		10		11		12 13		14 15

INTERVIEW NUMBER	VEH. TYPE	NO. IN VEH.	ORIGIN Where did this trip begin? Co. or State	DESTINATION Where will this trip end? Co. or State	WHERE IS VEHICLE GARAGED	TRIP PURPOSE	ROUTE OF EXIT OR ENT.
					0 0 0		
					0 0 0		
					0 0 0		
					0 0 0		
					0 0 0		
					0 0 0		
					0 0 0		

-79-

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68

- VEHICLE TYPE**
- 1 PASSENGER CAR WITHOUT A TRAILER
 - 2 PASSENGER CAR WITH A TRAILER
 - 3 PANEL OR PICK-UP WITHOUT A TRAILER
 - 4 PANEL OR PICK-UP WITH A TRAILER
 - 5 OTHER SINGLE UNIT TRUCKS
 - 6 COMBINATIONS & TRUCKS WITH TRAILERS



- DAY OF TRAVEL ****
- SUNDAY 1 THURSDAY 5
 - MONDAY 2 FRIDAY 6
 - TUESDAY 3 SATURDAY 7
 - WEDNESDAY 4

- GARAGED**
- 1 ORIGIN
 - 2 DESTINATION
 - 3 OTHER

- TRIP PURPOSE**
- 1 WORK
 - 2 PERS. BUSINESS
 - 3 SHOPPING
 - 4 VACATION
 - 5 OTHER SOC. OR REC.
 - 6 ALL OTHER

STATE OF MICHIGAN
DEPARTMENT OF STATE HIGHWAYS
AND TRANSPORTATION

MANUAL VEHICLE CLASSIFICATION

Form 1790
O-D 9
(Rev. 10/73)

ROUTE _____ LOCATION DESCRIPTION _____ CITY _____

FORM		COUNTY				STATEWIDE STA. NO.				O-D STA. NO.		YEAR		MONTH		DATE		DAY	O-D CITY TYPE		SEQ
9																					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	

RECORDER _____

DO NOT ACCUMULATE

IN OUT	DIRECT OF TRAVEL			TIME ENDING				PASSENGER CAR					PANEL & PICK-UP (2 AXLE, 4 TIRE)				ALL OTHER SINGLE UNIT TRUCKS WITHOUT TRAILER (5)			ALL TRUCK COMB. AND SINGLE UNIT TRUCK WITH TRAILER (6)			(7) ALL BUSES		(8) MOTOR CYCLE		TOTAL							
	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47		48	49	50	51	52	53	54
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-08-

DAY OF WEEK: Col. 17

STATION TYPE: Col. 20

Sunday	1	Thursday	5	Cordon Line Station	2
Monday	2	Friday	6	Screen Line Station	1
Tuesday	3	Saturday	7	Single Station	3
Wednesday	4			S. W. Winter Class.	4

TRUCK IDENTIFICATION

Panel and Pickup (2 axle, 4 tire)

Light 2-axle, 4-tire trucks of less than one ton rated capacity, including:

- a. Panel and pickups standard type, including mini-vans (Ford Econoline, Volkswagon, etc.)
- b. Pickup trucks carrying a cab high (sleeper style) camper.

All Other Single Unit Trucks

Heavy 2-axes or more (dual tires or super singles) equal to or greater than one ton rated capacity, including:

- a. All multistop or standup delivery trucks (primarily designed for moving rural and urban goods.)
- b. All large 4-tire trucks with flatbed, dump or other heavy cargo bodies.
- c. Pickups and panels, having heavy truck type hubs or axles, or are noticeably larger and longer than the standard type.
- d. Heavy 2-axle trucks with a higher than cab camper body.
- e. Truck tractor without trailer.

Truck Combinations

Truck and/or truck tractor (power unit) pulling semi-trailer or full trailer combinations.

DIRECTION OF TRAVEL: Cols. 23 - 24

Northbound	01	Westbound	07
Northeastbound	02	Northwestbound	08
Eastbound	03	North-South (2-Way)	09
Southeastbound	04	East-West (2-Way)	10
Southbound	05	Northeast-Southwest (2-Way)	11
Southwestbound	06	Northwest-Southeast (2-Way)	12

TIME ENDING: Cols. 25 - 28

TIME	HOUR		MIN.
	Cols. 25 - 26		
	Cols. 27 - 28		
1:05 AM	01	05	
2:13 AM	02	13	
etc.			
12:00 Noon	12	00	
etc.			
3:15 PM	15	15	
etc.			
11:45 PM	23	45	
etc.			