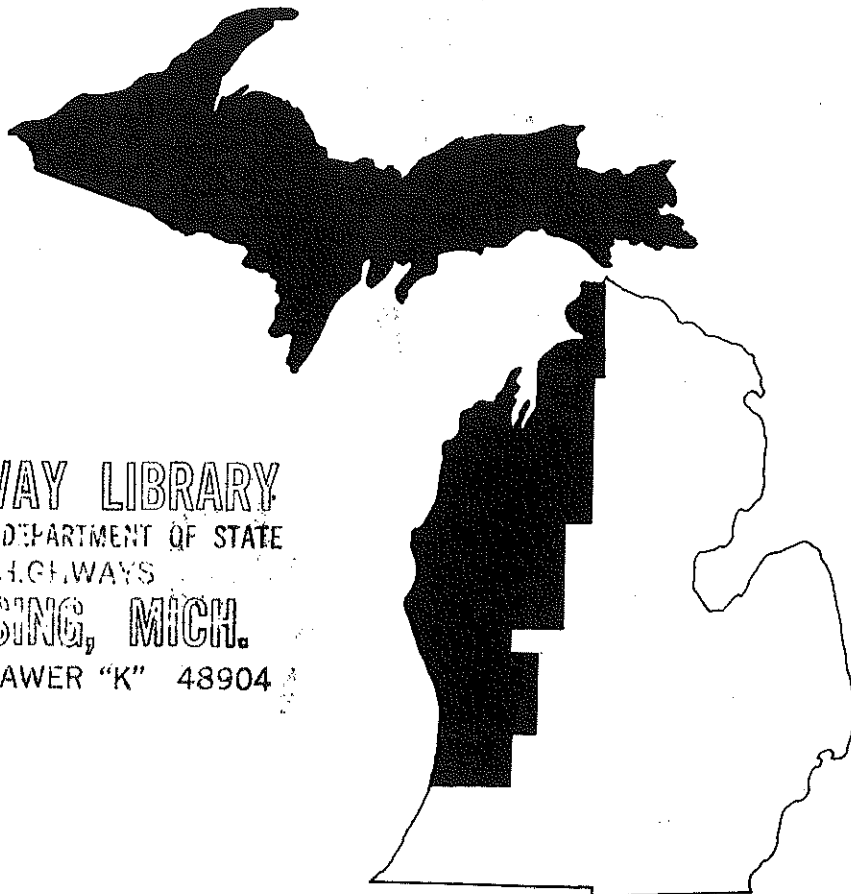


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Ludington Area
Transportation Study
External Survey
December, 1973
Northwest Transportation
Analysis Unit

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JOHN P. WOODFORD, DIRECTOR

December 26, 1973

Sam F. Cryderman
Deputy Director
Bureau of Transportation Planning

Dear Mr. Cryderman:

The Transportation Survey and Analysis Section of the Bureau of Transportation Planning has documented the results of the "Ludington Area Transportation Study External Survey". During the months of July and August, 1972, an external origin and destination survey was conducted at Ludington, Michigan. Its purpose is to determine the traffic patterns in Ludington as a sound basis for planning the efficient traffic arteries needed in the future.

This report was prepared by Phillip Lamb and Ruby Dell Brenner, Transportation Analysts. Their Northwest Analysis Unit Supervisor is Norman Farnum.

Sincerely,

A handwritten signature in cursive script that reads "Keith E. Bushnell".

Keith E. Bushnell, Engineer
Transportation Survey and
Analysis Section



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Terminology and Definitions

The following terms may be mentioned in the context of this report. A brief definition of each should enable a better understanding of the processes and concepts involved in this Origin-Destination Study.

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

Classification Counts: Vehicles are counted and placed in categories (passenger cars, single unit trucks, etc.).

Cordon Line: The imaginary line enclosing the area of study.

Cordon Trip, Terminal Trip: A trip with one end outside of the study area and the other end inside the study area.

Desire Line: A straight imaginary line between stations and/or zones connecting a trip origin and destination. Actual routes of travel are not considered.

Destination: Place where a trip ends.

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

External Survey: One phase of the origin-destination survey. Interviews are conducted at the cordon line.

External Trip: A trip with one or both ends outside the study area.

Origin: Place where a trip begins.

Study Area: The geographical area selected for the origin and destination study. Area enclosed by the cordon line.

Through Trip: A trip through an external station having both ends of the trip outside the study area.

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

Zone: A basic subdivision of the study area having a single or dominant land use, designated for purposes of tabulation and analysis.

FIELD PROCEDURE

Field work on the Ludington External O-D Study was done during July and August, 1972. The purpose of the study was to collect data on the movement of traffic through, in and out of the area.

External interview stations were located on all major roads and on one ferry-dock leading into the area. Of the eight stations, four were located on trunklines. Station 8, a Chesapeake and Ohio Railway car and auto ferry, provides cross-lake service to Manitowac and Milwaukee, Wisconsin. Interviews and classification counts were taken at this station for a period of 10 hours, which covered the two boat departures and arrivals during the day. At all other stations that were operated twenty-four hour manual classification counts and fourteen hours (6AM-8PM) of interviews of drivers were taken.

The drivers were interviewed as to the origin, destination, and purpose of the trip. The answers to the interview questions were recorded on Form OD-1757. Information from each vehicle was recorded on separate lines. Both inbound and outbound traffic was interviewed with a total of 51.7 percent of the twenty-four hour volume. Where traffic was heavy, some vehicles were allowed to go through without being interviewed to prevent too long a back up. A sample copy of the interview form is shown in Appendix "A".

Individual Stations

The station locations were as follows:

Station Number	Route	Location
1	M-116	South of Jagger Road
2	Jebavy Rd.	At Lincoln River Bridge
3	US-10, 31 East	0.1 Mi. E. of Meyers Road
4	Conrad Rd.	0.1 Mi. E. of Meyers Road
5	US-31 South	0.6 Mi. SE of Lenz Road
6	Lenz Rd.	0.5 Mi. SW of US-31
7	Lakeshore Dr.	0.4 Mi. S. of Iris Road
8	US-10	Boat Dock

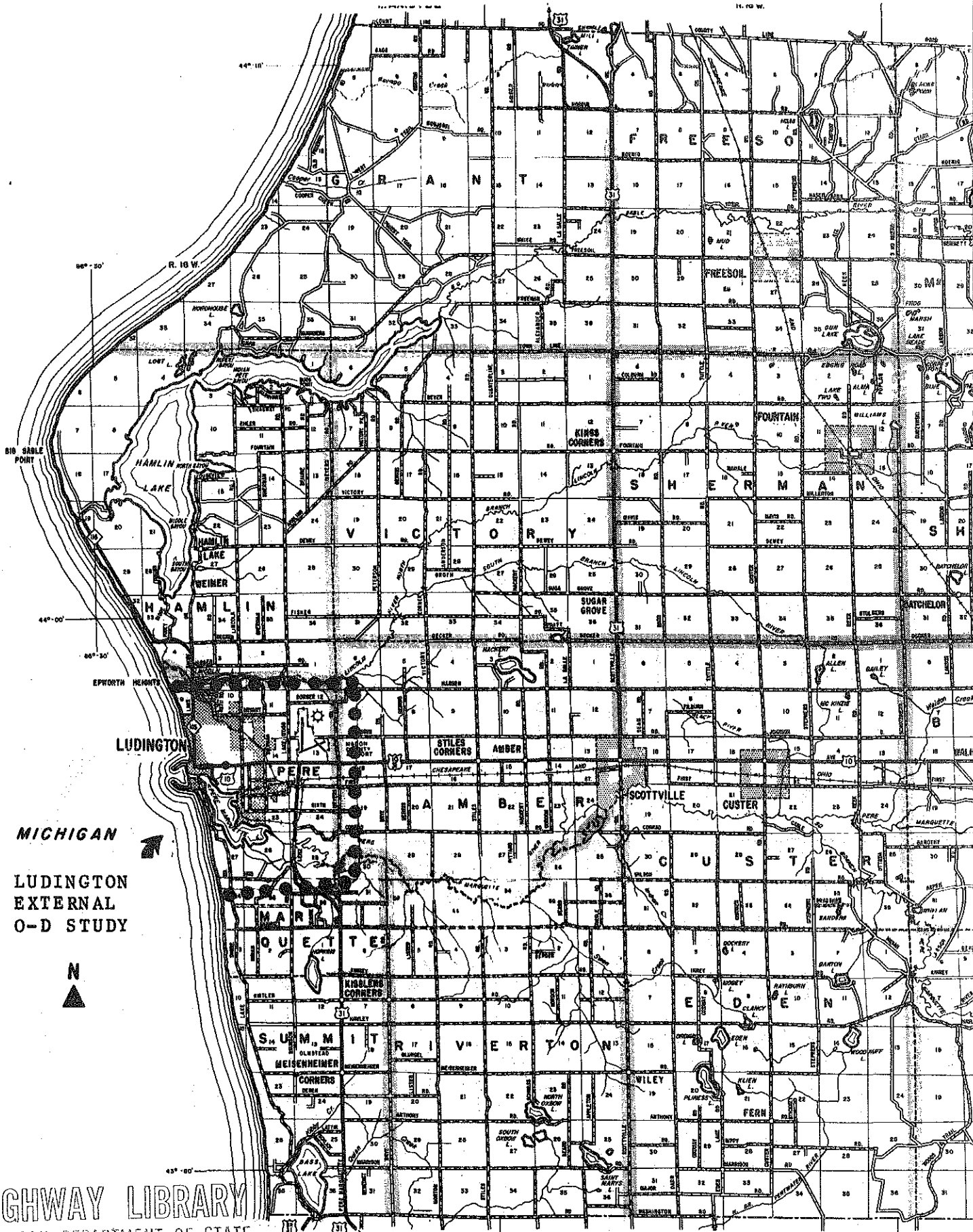
Study Zones

The area within the cordon line was made of 25 zones (15-39). Each zone having a predominant land use, designated for purposes of tabulation of terminal trips.

Study Zones

15 = NWTWP = Northwest Township
16 = NTWP = North Township
17 = SSWC = Straits Steel and Wire Company
18 = NWR = Northwest Residential
19 = GLF = Great Lakes Foundry
20 = LHS = Ludington High School

LAKE



MICHIGAN

LUDINGTON
EXTERNAL
O-D STUDY



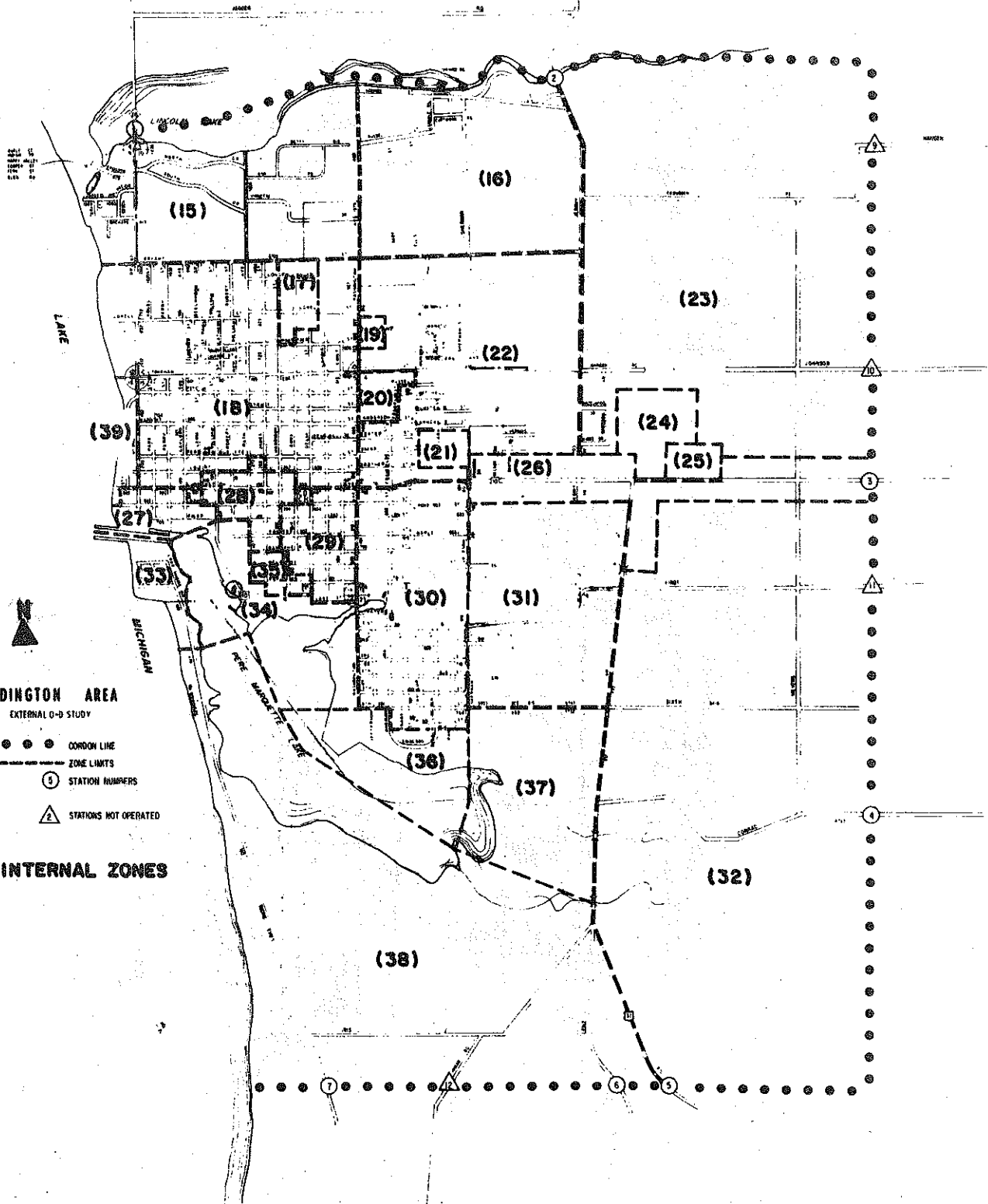
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All Stations

On an average July and August weekday in 1972, there were 30,379 vehicles which passed through the eight interview stations located around the Ludington study area cordon line. Of the 30,379 vehicles, 25,239 (83.1 percent) traveled on the state highways.

There were 15,701 interviews taken for 14-hours at the eight stations. This is 51.7 percent of 30,379 vehicles for the 24-hour period. Station 3 (US-10, 31 E.) had 3,816 interviews taken in the 14-hour period or 36.2 percent of the 24-hour volume of 10,551 vehicles. This is the lowest percentage for any station. The highest percentage of 14-hour interviews of 24-hour volume was 85.9 percent at Station 7 (Lakeshore Dr. S.).

Station 3 (US-10, 31 E., located 0.1 Mi. E. of Meyers Rd.) had the highest volume of 10,551 vehicles for a 24-hour period or 34.7 percent of 30,379 vehicles at all stations.

Station 4 (Conrad Rd.) had the lowest volume of traffic for a 24-hour period (316 vehicles or 1.0 percent of 30,379 vehicles).

Station 1 (M-116) had the highest percent of terminal traffic (82.6 percent or 5,238 vehicles out of 6,340 vehicles).

Station 8 (US-10 Boat Dock) had the lowest percent of terminal traffic (16.6 percent or 111 vehicles out of 667 vehicles).

There were 20,929 terminal trips. These are trips that have one end of the trip inside the study area and the other end outside the area. Zone 28 (Central Business District) had the largest number of terminal trips (4,942 trips or 23.61 percent of

20,929 total terminal trips). The three zones (zones 18, 26 and 28) accounted for 11,647 terminal trips or 55.65 percent of the total 20,929 terminal trips.

The traffic volume at each station is as follows:

Station	Traffic	% of Grand Total
1 - M-116	6,340	20.9
2 - Jebavy Road	3,254	10.7
3 - US-10, 31 E.	10,551	34.7
4 - Conrad Road	316	1.0
5 - US-31 S.	7,681	25.3
6 - Lenz Road	940	3.1
7 - Lakeshore Dr. S.	630	2.1
8 - US-10 (Boat Dock)	<u>667</u>	<u>2.2</u>
Grand Total	30,379	100.0

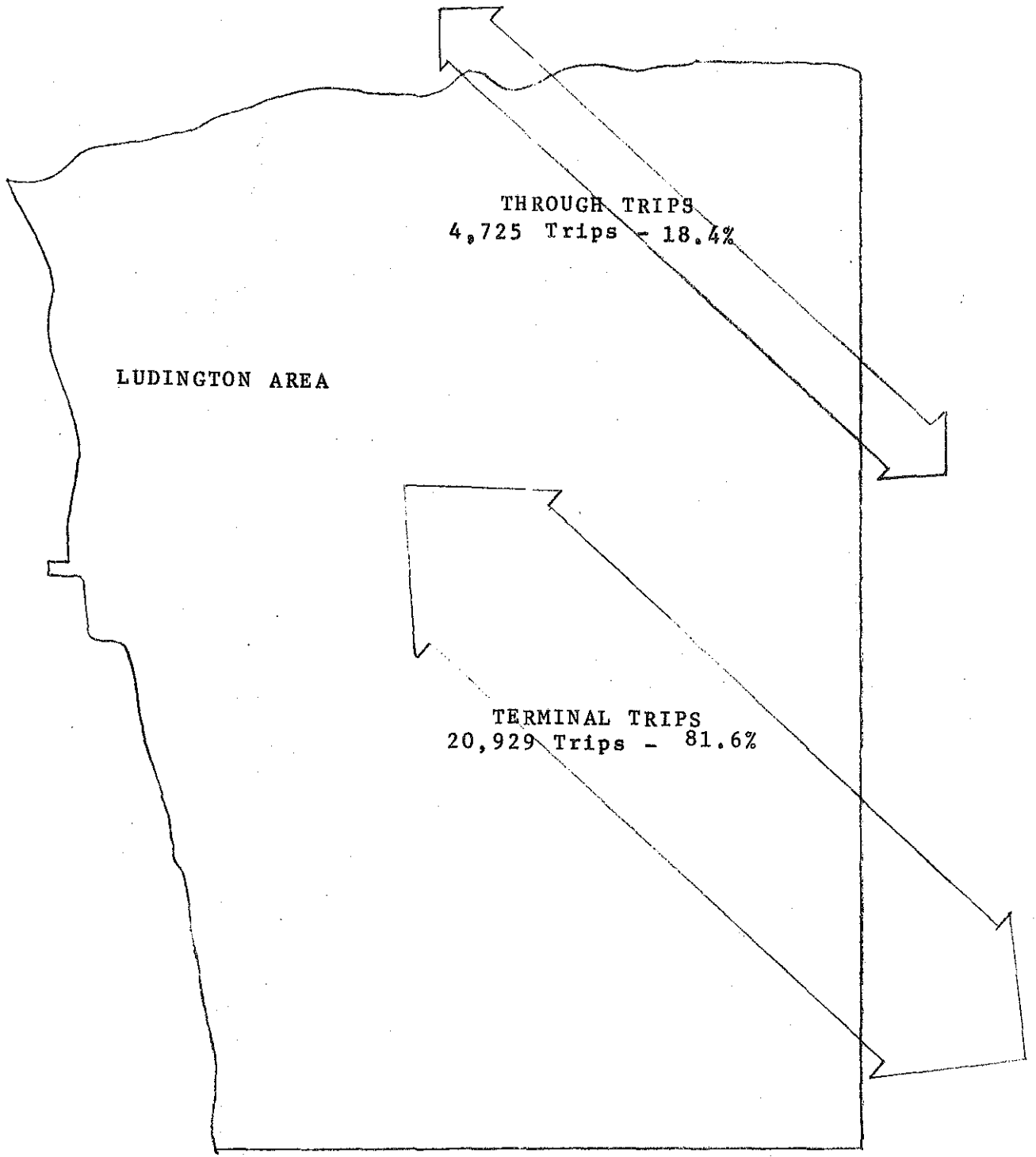
	Traffic	% of Grand Total
Trunkline (Stations 1, 3, 5 and 8)	25,239	83.1
Non-Trunkline (Stations 2, 4, 6 and 7)	<u>5,400</u>	<u>16.9</u>
Grand Total	30,379	100.0

Station	24-Hour Total Traffic	14-Hour (6AM-8PM) Interviews Taken	% Interviewed
1	6,340	3,611	57.0
2	3,254	2,091	64.3
3	10,551	3,816	36.2
4	316	230	72.8
5	7,681	4,205	54.8
6	940	779	82.9
7	630	541	85.9
8	<u>667</u>	<u>428</u>	<u>64.2</u>
Grand Total	30,379	15,701	51.7

Station	Total Traffic	Terminal	% of Total	Through	% of Total
1	6,340	5,238	82.6	1,102	17.4
2	3,254	2,418	74.3	836	25.7
3	10,551	7,087	67.2	3,464	32.8
4	316	176	55.7	140	44.3
5	7,681	4,903	63.8	2,778	36.2
6	940	660	70.2	280	29.8
7	630	336	53.3	294	46.7
8	<u>667</u>	<u>111</u>	<u>16.6</u>	<u>556</u>	<u>83.4</u>
Grand Total	30,379	20,929		9,450 *	
Trips	25,654	20,929	81.6	4,725	18.4

* A through vehicle is counted twice. It is counted at both its entering and departing stations.

Trip Movements
1972 July, August Weekday
Total 25,654 Trips

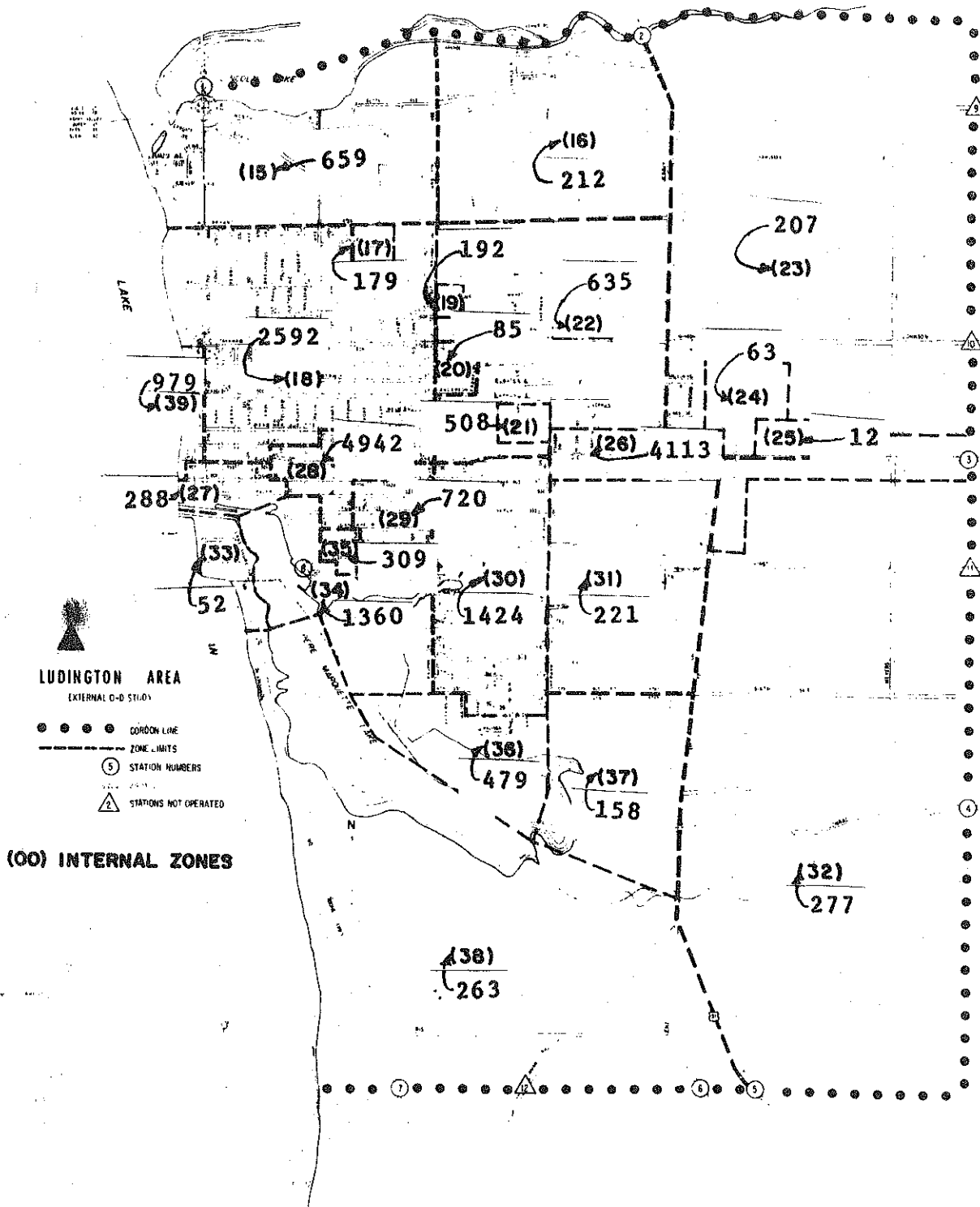


ALL STATIONS COMBINED

Terminal Trips to Study Zones

<u>Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
15	659	3.15
16	212	1.01
17	179	.86
18	2592	12.39
19	192	.92
20	85	.41
21	508	2.43
22	635	3.03
23	207	.99
24	63	.30
25	12	.06
26	4113	19.65
27	288	1.38
28	4942	23.61
29	720	3.44
30	1424	6.80
31	221	1.06
32	277	1.32
33	52	.23
34	1360	6.50
35	309	1.48
36	479	2.29
37	158	.75
38	263	1.26
39	<u>979</u>	<u>4.68</u>
Total	20,929	100.00

000 Terminal Traffic Between
 All Stations and Internal
 Zones of Attraction of
 20,929 Trips



Station 1 (M-116)

Station 1 is located south of Jagger Road at the Lincoln River Bridge. M-116 leads to the State Park which is 7 miles north of Ludington.

A total of 6,340 vehicles passed through this station. Tabulations on the following pages give a detailed analysis of this traffic.

Approximately 8 out of every 10 vehicles had a terminal inside the study area; 9 of every 10 vehicles were autos and 8 out of 100 vehicles were panels or pick-ups whether they traveled into or through the area. More than 80 percent of the passenger cars and panels or pick-ups had a terminal inside the study area. Passenger cars with trailer were nearly equally divided into terminal and through trips.

The largest trip purpose was other soc. or rec. with 2,165 trips or 34.1 percent of the 6,340 total trips. All trip purposes except vacation had more than 80 percent terminal traffic. More than two-thirds of the vacation trips were through trips.

Station 5 (US-31 South) accounted for 560 trips or 50.8 percent of the 1,102 through trips. Stations 3 and 5 accounted for 1,012 trips or 91.8 percent of the 1,102 through trips.

Zone 28 (Central Business District) accounted for 1,801 trips or 34.4 percent of the 5,238 terminal trips. Zones 18, 26 and 28 accounted for 3,158 trips or 60.3 percent of the 5,238 terminal trips.

There were 5,599 trips or 88.30 percent of the 6,340 trips that had a trip length of 20-40 minutes. There were 5,773 trips (91.04 percent) that 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 11 states (see 95 zone system). There are two ends for each trip; an origin and a destination. There were 6,338 trips which passed through Station 1. This total is slightly different from the other tabulations due to rounding. There were 12,676 total trip ends.

There were 5,543 trips (87.5 percent) that had both their origins and destinations in Mason County. There were 11,875 trip ends (93.7 percent) in Mason County. There were 11 trip ends (0.1 percent) in the upper peninsula. The lower peninsula accounted for 12,604 trip ends (99.4 percent). There were 61 origins and/or destinations (0.5 percent) outstate.

Station 1, M-116

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	5,468	86.2	4,630	84.7	838	15.3
Passenger Car with Trailer	210	3.3	97	46.2	113	53.8
Panel or Pickup	504	8.0	407	80.8	97	19.2
Panel or Pickup with Trailer	48	0.8	28	58.3	20	41.7
Other Single Unit Trucks	77	1.2	59	76.6	18	23.4
Combinations and Trucks with Trailers	33	0.5	17	51.5	16	48.5
TOTAL	6,340	100.0	5,238	82.6	1,102	17.4

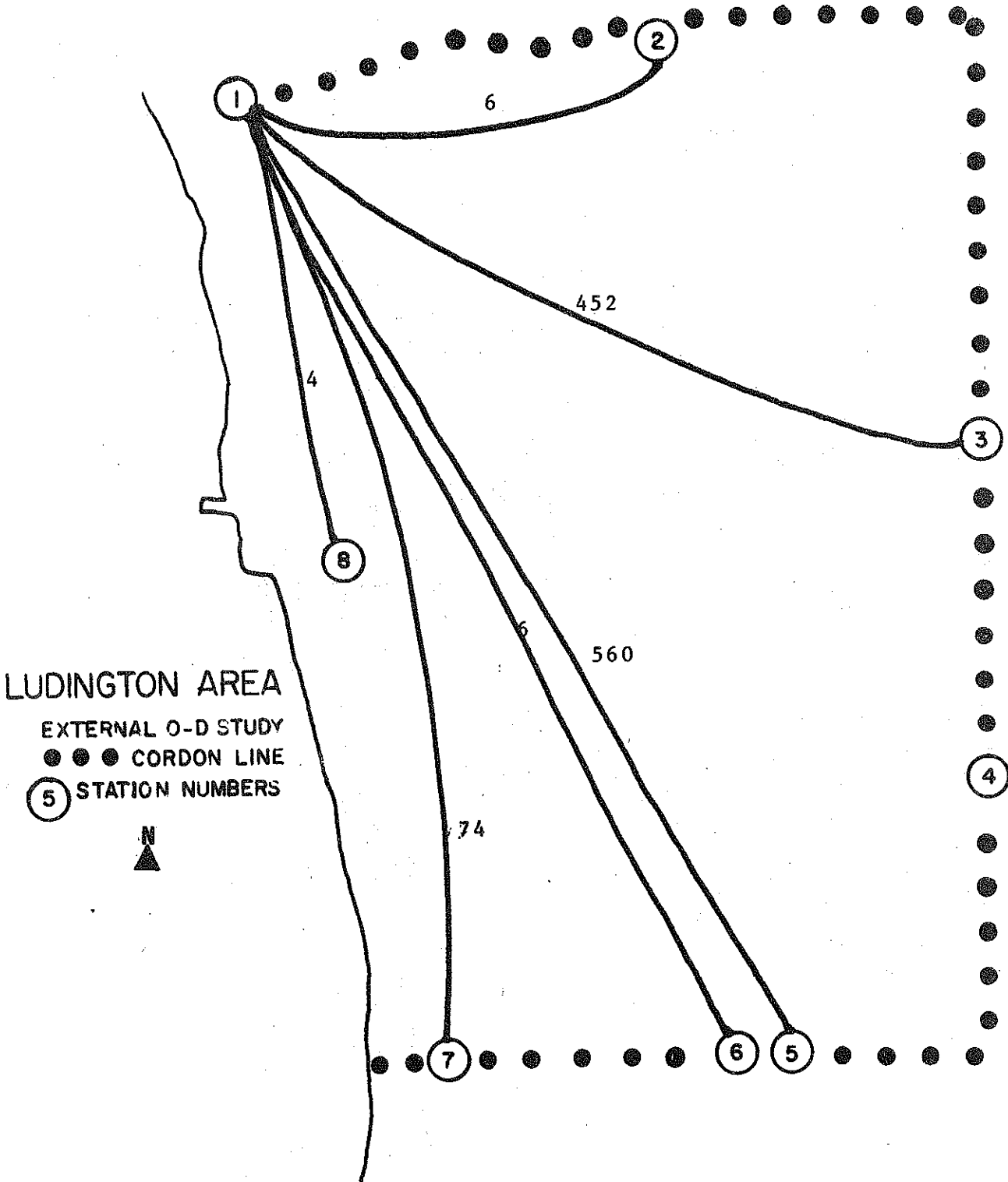
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	1,355	21.4	1,130	83.4	225	16.6
Personal Business	268	4.2	249	92.9	19	7.1
Shopping	1,513	23.9	1,493	98.7	20	1.3
Vacation	658	10.4	206	31.3	452	68.7
Other Soc. or Rec.	2,165	34.1	1,814	83.8	351	16.2
All Other	381	6.0	346	90.8	35	9.2
TOTAL	6,340	100.0	5,238	82.6	1,102	17.4

Station 1, M-116

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
2 - Jebavy Rd.	6	0.5
3 - US-10, 31 East	452	41.0
4 - Conrad Rd.	0	0.0
5 - US-31 South	560	50.8
6 - Lenz Rd.	6	0.5
7 - Lakeshore Dr.	74	6.8
8 - US-10 (Boat Dock)	4	0.4
TOTAL	<u>1,102</u>	<u>100.0</u>

THROUGH TRAFFIC INTERCHANGE
 OF
 STATION 1, M-116
 OF
 1,102 VEHICLE TRIPS
 JULY, AUGUST WEEKDAY 1972



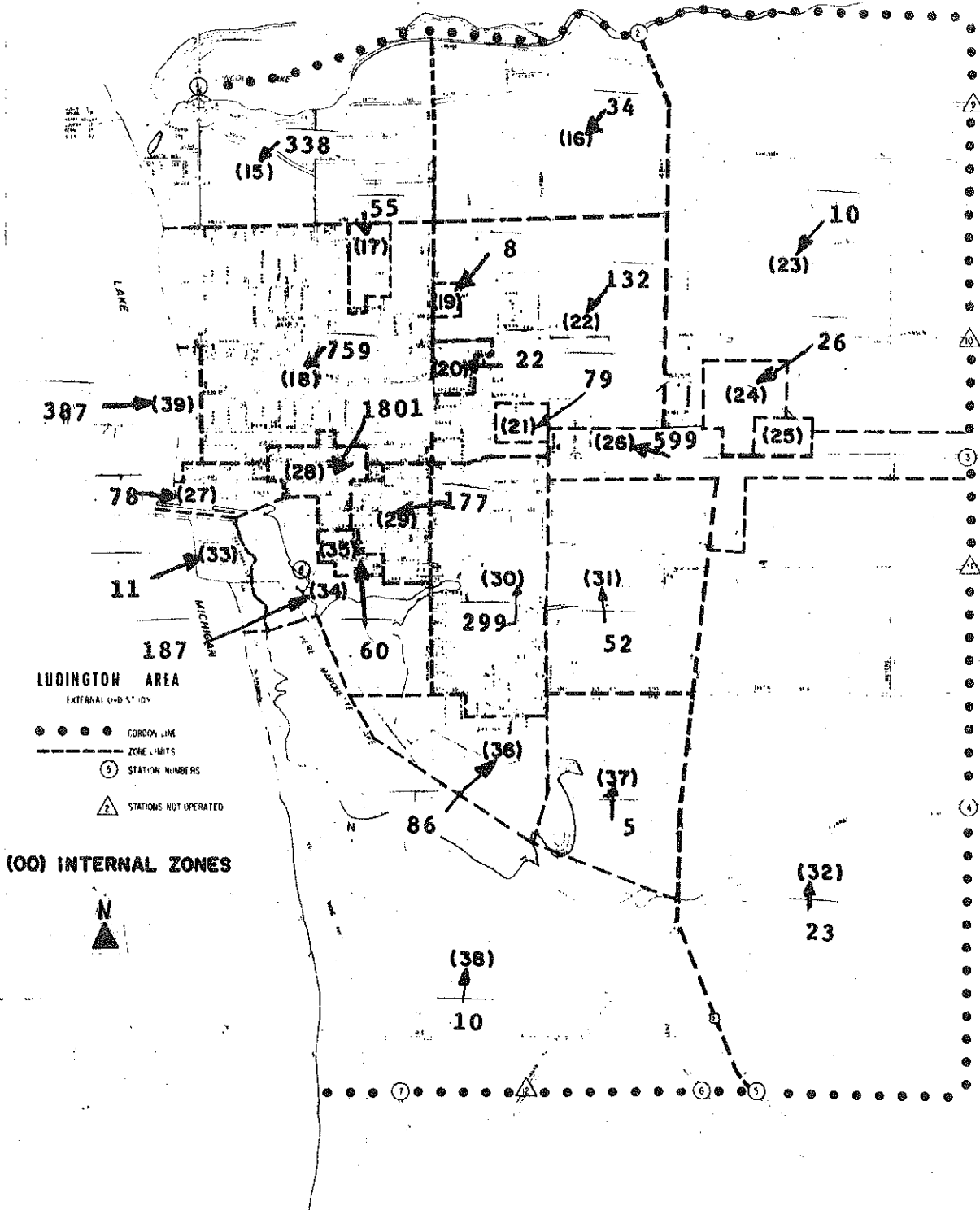
Station 1, M-116

TERMINAL TRIPS TO STUDY ZONES

<u>Internal Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
15	338	6.5
16	34	.7
17	55	1.1
18	759	14.5
19	8	.1
20	22	.4
21	79	1.5
22	132	2.5
23	10	.2
24	26	.5
25	0	.0
26	599	11.4
27	78	1.5
28	1801	34.4
29	177	3.4
30	299	5.7
31	52	1.0
32	23	.4
33	11	.2
34	187	3.6
35	60	1.1
36	86	1.6
37	5	.1
38	10	.2
39	387	7.4
TOTAL	5238	100.0

000 Terminal Traffic Between
 Station 1, M-116, and Internal
 Zones of Attraction of 5,238
 Vehicle Trips

July, August Weekday 1972



Station 1, M-116

<u>Minutes</u>	<u>TRIP LENGTHS</u>	
	<u>No. of Trips</u>	<u>Percent of Totals</u>
1-20	18	.28
20-40	5599	88.30
40-60	156	2.46
60-90	39	.62
90-120	115	1.81
120-180	150	2.37
180-240	104	1.64
240-300	80	1.26
300-820	<u>80</u>	<u>1.26</u>
TOTAL	6340	100.00

Longest trip = 13 Hr. 40 Min.

Average Trip Length = 45 Min.

Station 2 (Jebavy Road)

Station 2 is located south of Jagger Road at the Lincoln River Bridge. Jebavy Road leads to Hamlin Lake.

A total of 3,254 vehicles passed through the station. Tabulations on the following pages give a detailed analysis of this traffic.

Approximately 3 out of every 4 vehicles had a terminal inside the study area; 8 of every 10 vehicles were autos and 17 out of 100 vehicles were panels or pick-ups whether they traveled into or through the area. More than 60 percent of the passenger cars, passenger cars with trailer and panels or pick-ups had a terminal inside the study area.

The largest trip purpose was work with 1,370 trips or 42.1 percent of the 3,254 total trips. All trip purposes except vacation had more than 66 percent terminal traffic. More than half of the vacation trips were through trips.

Station 5 (US-31 South) accounted for 423 trips or 50.6 percent of the 836 through trips. Stations 3 and 5 accounted for 703 trips or 84.1 percent of the 836 through trips.

Zone 26 (East Side Shopping Center) accounted for 619 trips or 25.6 percent of the 2,418 terminal trips. Zones 18, 26 and 28 accounted for 1,408 trips or 58.2 percent of the 2,418 terminal trips.

There were 2,826 trips or 86.9 percent of the 3,254 trips that had a trip length of 20-40 minutes. There were 3,054 trips (93.9 percent) that 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 11 states (see 95 zone system). There are two ends for each trip; an origin and a destination. There were 3,261 trips which passed through Station 2. This total is slightly different from the other tabulations due to rounding. There were 6,522 total trip ends.

There were 2,868 trips (88.0 percent) that had both their origins and destinations in Mason County. There were 6,124 trip ends (93.9 percent) in Mason County. There were 4 trip ends (0.1 percent) in the upper peninsula. The lower peninsula accounted for 6,492 trip ends (99.5 percent). There were 26 origins and/or destinations (0.4 percent) outstate.

Station 2, Jebavy 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	2,647	81.3	2,038	77.0	609	23.0
Passenger Car with Trailer	33	1.0	22	66.7	11	33.3
Panel or Pickup	537	16.5	331	61.6	206	38.4
Panel or Pickup with Trailer	3	0.1	0	0.0	3	100.0
Other Single Unit Trucks	26	0.8	23	88.5	3	11.5
Combinations and Trucks with Trailers	8	0.3	4	50.0	4	50.0
TOTAL	3,254	100.0	2,418	74.3	836	25.7

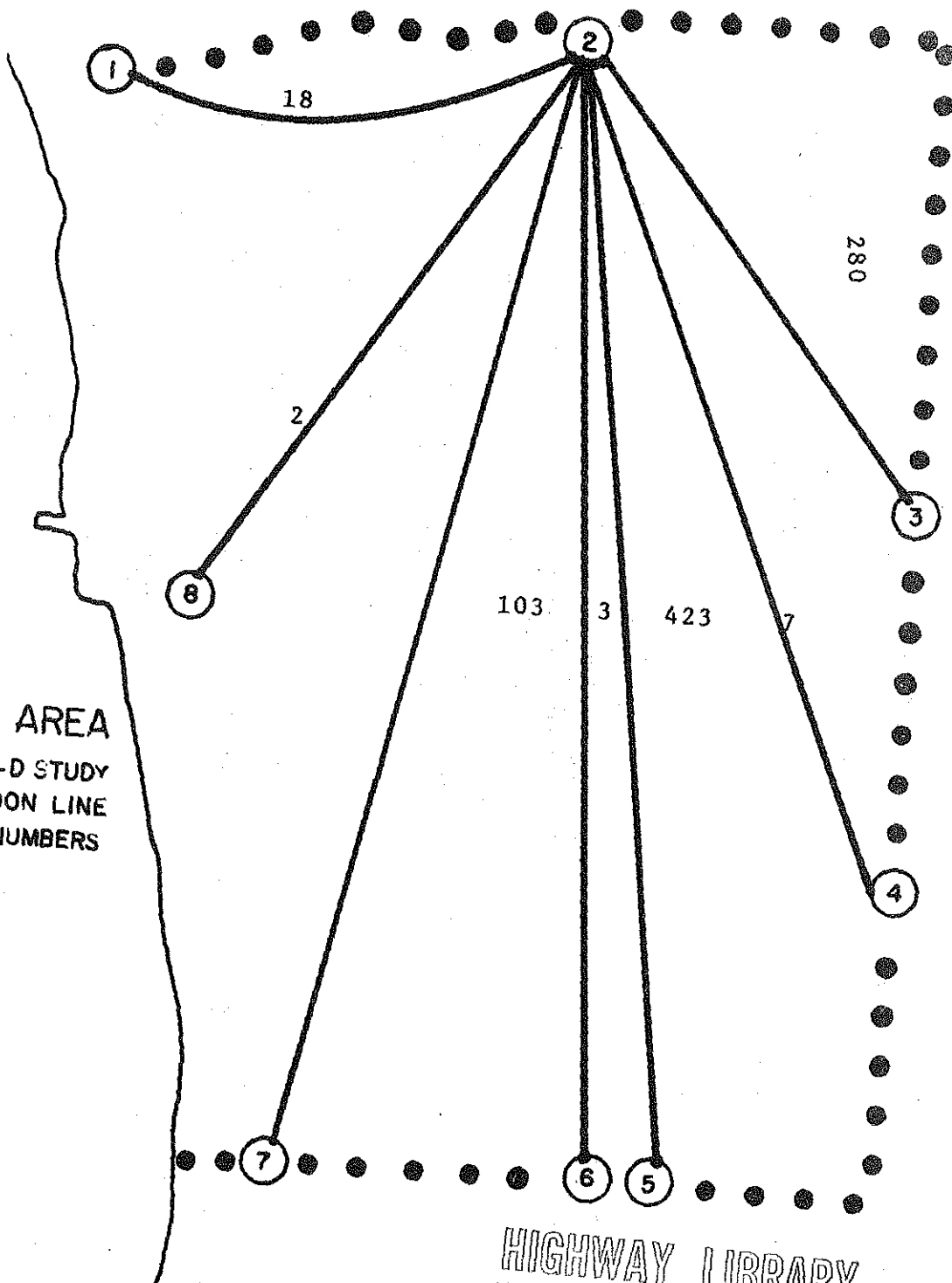
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	1,370	42.1	916	66.9	454	33.1
Personal Business	230	7.0	185	80.4	45	19.6
Shopping	657	20.2	599	91.2	58	9.8
Vacation	103	3.2	44	42.7	59	59.3
Other Soc. or Rec.	594	18.3	433	72.9	161	27.1
All Other	300	9.2	241	80.3	59	19.7
TOTAL	3,254	100.0	2,418	74.3	836	25.7

Station 2, Jebavy Road

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1 - M-116	18	2.2
3 - US-10, 31 East	280	33.5
4 - Conrad Rd.	7	0.8
5 - US-31 South	423	50.6
6 - Lenz Rd.	3	0.4
7 - Lakeshore Dr.	103	12.3
8 - US-10 (Boat Dock)	<u>2</u>	<u>0.2</u>
TOTAL	836	100.0

Through Traffic Interchange
of
Station 2, Jabavy Road
of
836 Vehicle Trips
July, August Weekday 1972



LUDINGTON AREA

EXTERNAL O-D STUDY

● ● ● CORDON LINE

⑤ STATION NUMBERS



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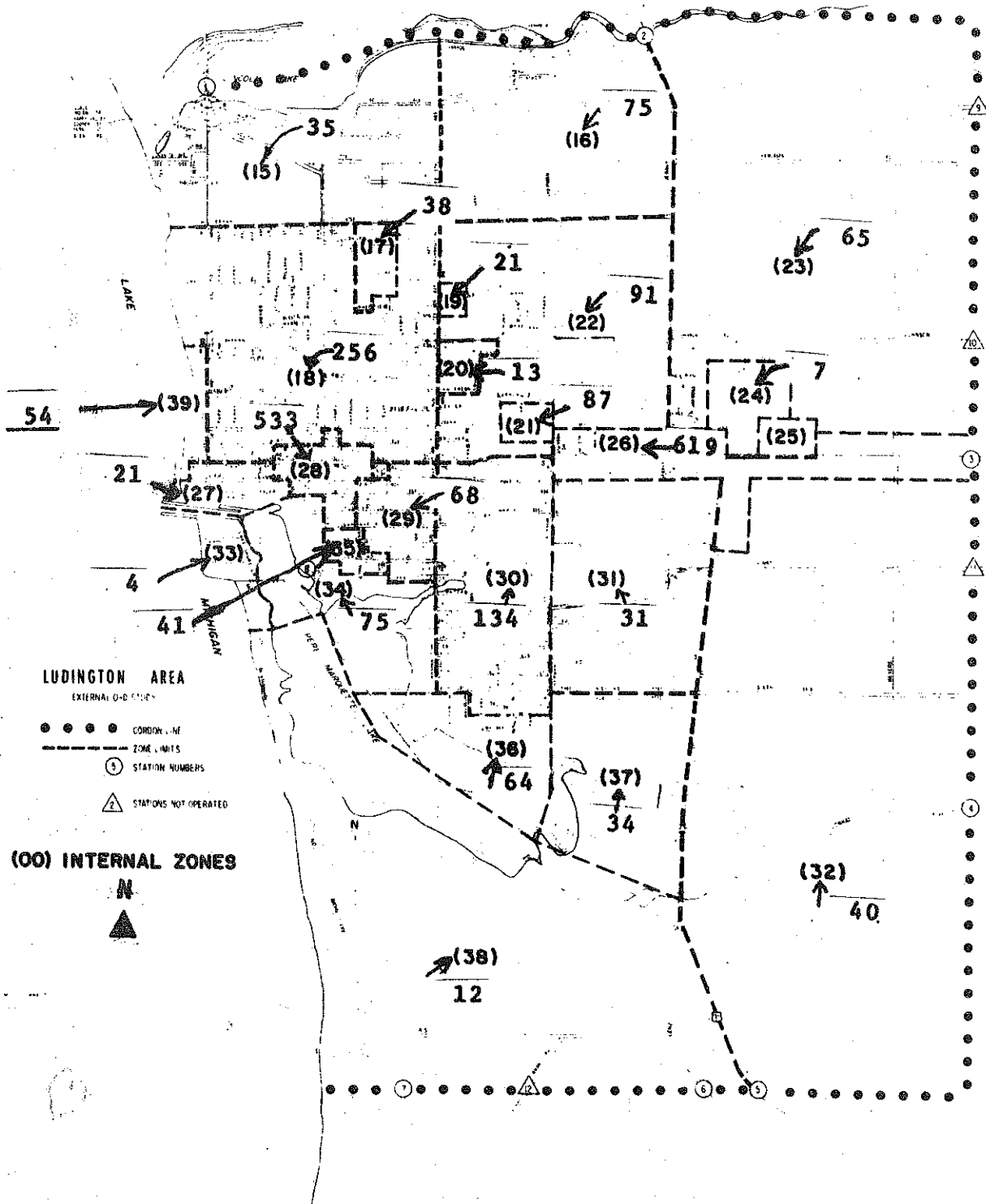
Station 2, Jebavy Road

TERMINAL TRIPS TO STUDY ZONES

<u>Internal Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
15	35	1.5
16	75	3.1
17	38	1.6
18	256	10.6
19	21	.9
20	13	.5
21	87	3.6
22	91	3.8
23	65	2.7
24	7	.3
25	0	.0
26	619	25.6
27	21	.9
28	533	22.0
29	68	2.8
30	134	5.5
31	31	1.3
32	40	1.6
33	4	.2
34	75	3.1
35	41	1.7
36	64	2.6
37	34	1.4
38	12	.5
39	54	2.2
TOTAL	2418	100.0

000 Terminal Traffic Between
 Station 2, Jebavy Road,
 and Internal Zones
 of Attraction of
 2,418 Vehicle Trips

July, August Weekday 1972



Station 2, Jebavy Road

TRIP LENGTHS

<u>Minutes</u>	<u>Number of Trips</u>	<u>Percent of Total</u>
1-20	50	1.5
20-40	2826	86.9
40-60	178	5.5
60-90	38	1.2
90-120	47	1.4
120-180	46	1.4
180-240	22	.7
240-300	14	.4
300-450	<u>33</u>	<u>1.0</u>
TOTAL	3254	100.0

Longest trip = 7 Hr. 30 Min.

Average Trip Length = 39 Min.

Station 3 (US-10, 31E.)

Station 3 is located 0.1 mile east of Meyers Road.

A total of 10,551 vehicles passed through this station. Tabulations on the following pages give a detailed analysis of this traffic.

Approximately 7 out of every 10 vehicles had a terminal inside the study area; 8 of every 10 vehicles were autos and 10 out of 100 vehicles were panels or pick-ups whether they traveled into or through the area. More than 69 percent of the passenger cars and panels or pick-ups had a terminal inside the study area. Two-thirds of the passenger cars with trailer were through trips.

The largest trip purpose was work with 3,684 trips or 34.9 percent of the 10,551 total trips. All trip purposes except vacation had more than 66 percent terminal traffic. Almost two-thirds of the vacation trips were through trips.

Station 5 (US-31 South) accounted for 2,517 trips or 72.7 percent of the 3,464 through trips. Stations 1 and 5 accounted for 3,123 trips or 90.2 percent of the 3,464 through trips.

Zone 26 (East Side Shopping Center) accounted for 1,610 trips or 22.7 percent of the 7,087 terminal trips. Zones 18, 26 and 28 accounted for 3,703 trips or 52.3 percent of the 7,087 terminal trips.

There were 4,261 trips or 40.4 percent of the 10,551 trips that had a trip length of 20-40 minutes. There were 7,070 trips (67.1 percent) that 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 11 states (see 95 zone system). There are two ends for each trip; an origin and a destination. There were 10,545 trips which passed through Station 3. This total is slightly different from the other tabulations due to rounding. There were 21,090 total trip ends.

There were 5,672 trips (26.9 percent) that had both their origins and destinations in Mason County. There were 14,734 trip ends (69.9 percent) in Mason County. There were 195 trip ends (0.9 percent) in the upper peninsula. The lower peninsula accounted for 20,515 trip ends (97.3 percent). There were 380 origins and/or destinations (1.8 percent) outstate.

Station 3, US-10, 31 East

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	8,123	77.0	5,707	70.3	2,416	29.7
Passenger Car with Trailer	348	3.3	114	32.8	234	67.2
Panel or Pickup	1,072	10.2	746	69.6	326	30.4
Panel or Pickup with Trailer	72	0.7	37	51.4	35	48.6
Other Single Unit Trucks	548	5.2	340	62.0	208	38.0
Combinations and Trucks with Trailers	388	3.6	143	37.1	245	62.9
						100.0
TOTAL	10,551	100.0	7,087	67.2	3,464	32.8

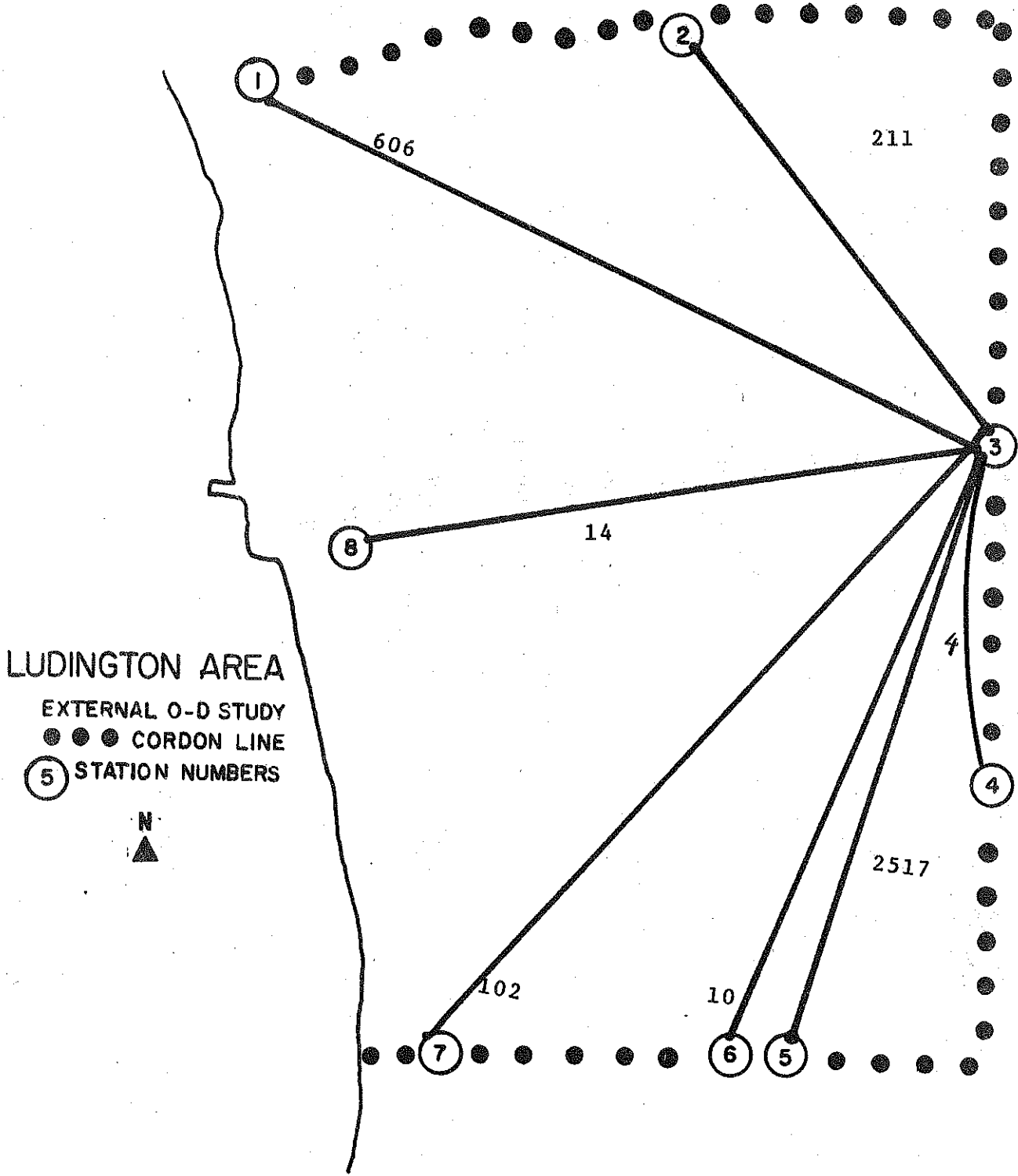
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	3,684	34.9	2,479	67.3	1,205	32.7
Personal Business	399	3.8	327	82.0	72	18.0
Shopping	1,810	17.2	1,609	88.9	201	11.1
Vacation	1,852	17.6	652	35.2	1,200	64.8
Other Soc. or Rec.	1,957	18.5	1,307	66.8	650	33.2
All Other	849	8.0	713	84.0	136	16.0
TOTAL	10,551	100.0	7,087	67.2	3,464	32.8

Station 3, US-10, 31 East

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1 - M-116	606	17.5
2 - Jebavy Rd.	211	6.1
4 - Conrad Rd.	4	0.1
5 - US-31 South	2,517	72.7
6 - Lenz Rd.	10	0.3
7 - Lakeshore Dr.	102	2.9
8 - US-10 (Boat Dock)	<u>14</u>	<u>0.4</u>
TOTAL	3,464	100.0

Through Traffic Interchange
of
Station 3, US-10, 31 East
of
3,464 Vehicle Trips
July, August Weekday 1972



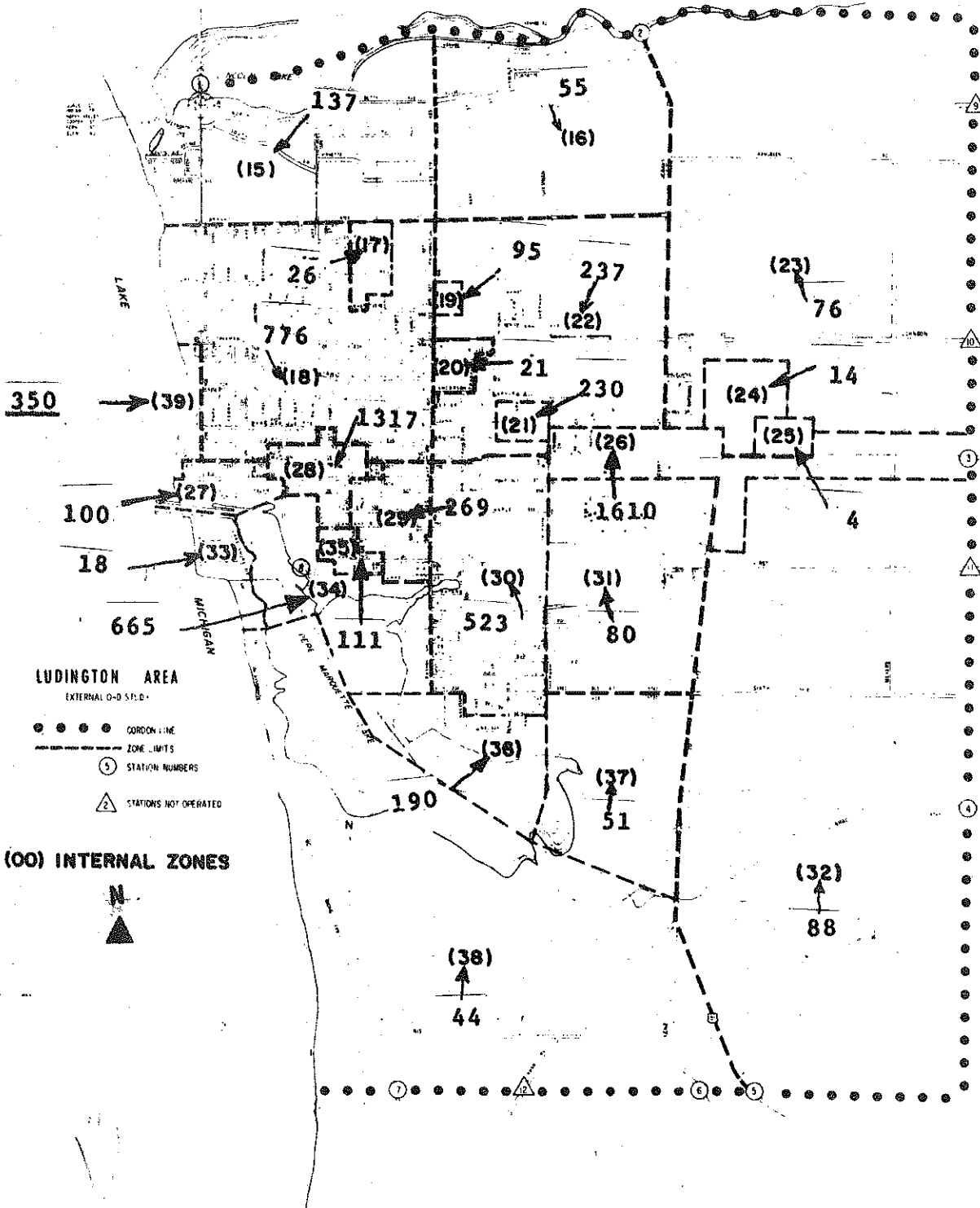
Station 3, US-10, 31 East

TERMINAL TRIPS TO STUDY ZONES

<u>Internal Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
15	137	1.9
16	55	.8
17	26	.4
18	776	11.0
19	95	1.3
20	21	.3
21	230	3.3
22	237	3.3
23	76	1.1
24	14	.2
25	4	.1
26	1610	22.7
27	100	1.4
28	1317	18.6
29	269	3.8
30	523	7.4
31	80	1.1
32	88	1.2
33	18	.2
34	665	9.4
35	111	1.6
36	190	2.7
37	51	.7
38	44	.6
39	<u>350</u>	<u>4.9</u>
TOTAL	7087	100.0

000 Terminal Traffic Between
 Station 3, US-10,31 East,
 and Internal Zones of
 Attraction of
 7,087 Vehicle Trips

July, August Weekday 1972



Station 3, US-10, 31 East

TRIP LENGTHS

<u>Minutes</u>	<u>Number of Trips</u>	<u>Percent of Total</u>
1-20	1588	15.1
20-40	4261	40.4
40-60	1221	11.6
60-90	417	4.0
90-120	532	5.0
120-180	921	8.7
180-240	592	5.6
240-300	386	3.6
300-920	<u>633</u>	<u>6.0</u>
TOTAL	10551	100.0

Longest Trip = 15 Hr. 20 Min.

Average Trip Length = 1 Hr. 30 Min.

Station 4 (Conrad Road)

Station 4 is located 0.1 mile east of Meyers Road.

A total of 316 vehicles passed through this station. Tabulations on the following pages give a detailed analysis of this traffic.

Approximately 6 out of every 10 vehicles had a terminal inside the study area; 3 of every 4 vehicles were autos and 21 out of 100 vehicles were panels or pick-ups whether they traveled into or through the area. More than 58 percent of the passenger cars and panels or pick-ups with trailer had a terminal inside the study area. More than 83 percent of the passenger cars with trailer were through trips.

The largest trip purpose was work with 154 trips or 48.7 percent of the 316 total trips. All trip purposes except work and vacation had more than 64 percent terminal traffic. There were no vacation trips recorded at this station.

Station 5 (US-31 South) accounted for 135 trips or 96.4 percent of the 140 through trips. Stations 2 and 5 accounted for 139 trips or 99.3 percent of the 140 through trips.

Zone 28 (Central Business District) accounted for 31 trips or 17.6 percent of the 176 terminal trips. Zones 18, 26, 28 and 30 accounted for 97 trips or 55.1 percent of the 176 terminal trips.

There were 189 trips, or 60.0 percent of the 316 trips that had a trip length of 1-20 minutes. There were 291 trips (92.2 percent) that 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 11 states (see 95 zone system). There are two ends for each trip; an origin and a destination. There were 316 trips which passed through Station 4. There were 632 total trip ends.

There were 263 trips (41.6 percent) that had both their origins and destinations in Mason County. There were 576 trip ends (91.1 percent) in Mason County. There were no trip ends in the upper peninsula. The lower peninsula accounted for 630 trip ends (99.7 percent). There were 2 origins and/or destinations (0.3 percent) outstate.

Station 4, Conrad 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	238	75.3	140	58.8	92	41.2
Passenger Car with Trailer	6	1.9	1	16.7	5	83.3
Panel or Pickup	65	20.6	27	41.5	38	58.5
Panel or Pickup with Trailer	3	1.0	2	66.7	1	33.3
Other Single Unit Trucks	2	0.6	0	0.0	2	100.0
Combinations and Trucks with Trailers	<u>2</u>	<u>0.6</u>	<u>0</u>	0.0	<u>2</u>	100.0
TOTAL	316	100.0	176	55.7	140	44.3

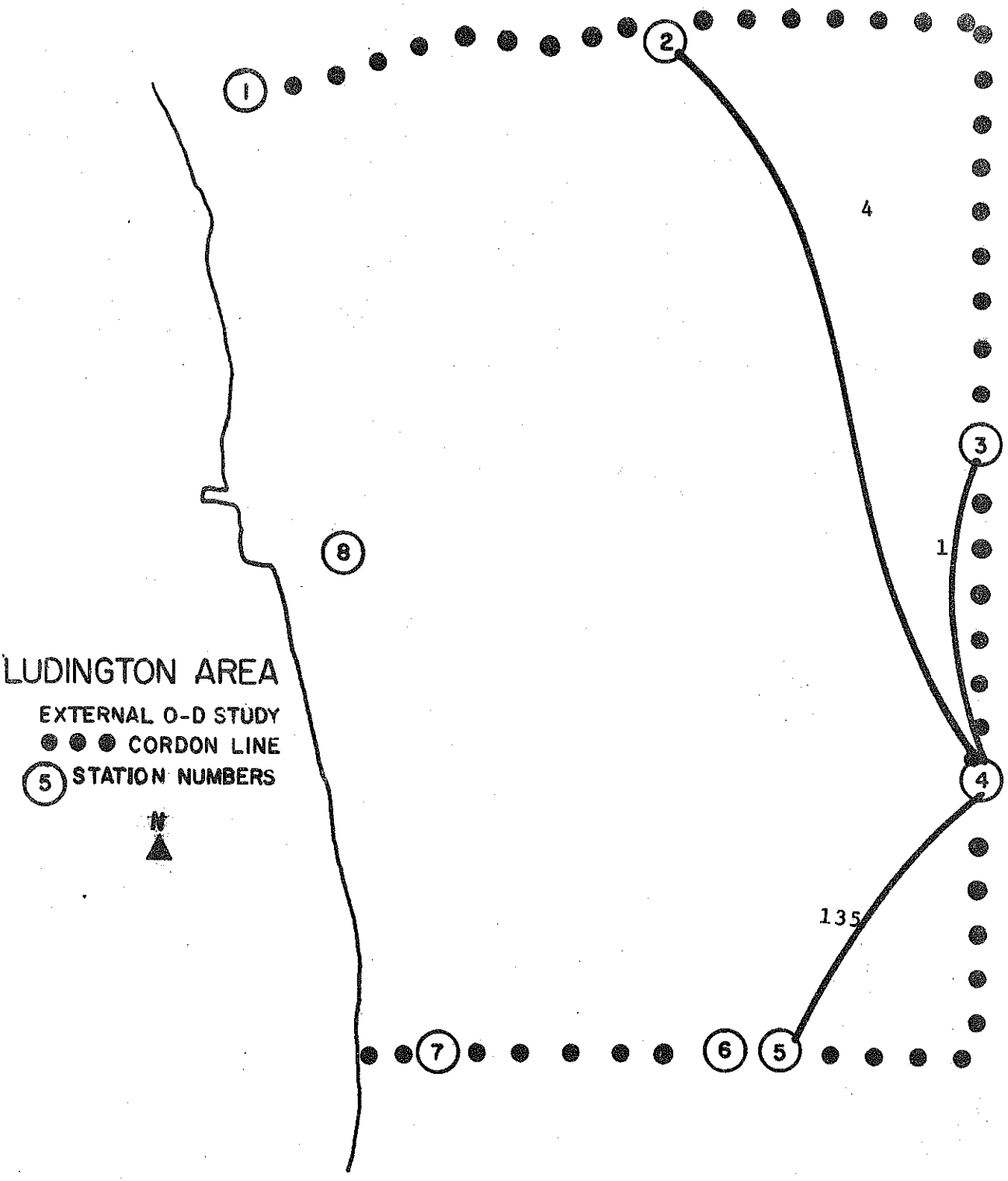
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	154	48.7	58	37.7	96	62.3
Personal Business	5	1.6	5	100.0	0	0.0
Shopping	43	13.6	33	76.7	10	23.3
Vacation	0	0.0	0	0.0	0	0.0
Other Soc. or Rec.	73	23.1	47	64.4	26	35.6
All Other	<u>41</u>	<u>13.0</u>	<u>33</u>	80.5	<u>8</u>	19.5
TOTAL	316	100.0	176	55.7	140	44.3

Station 4, Conrad Road

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1 - M-116	0	0.0
2 - Jebavy Rd.	4	2.9
3 - US-10, 31 East	1	0.7
5 - US-31 South	135	96.4
6 - Lenz Rd.	0	0.0
7 - Lakeshore Dr.	0	0.0
8 - US-10 (Boat Dock)	<u>0</u>	<u>0.0</u>
TOTAL	140	100.0

Through Traffic Interchange
of
Station 4, Conrad Road
of
140 Vehicle Trips
July, August 1972



LUDINGTON AREA
EXTERNAL O-D STUDY
● ● ● CORDON LINE
⑤ STATION NUMBERS

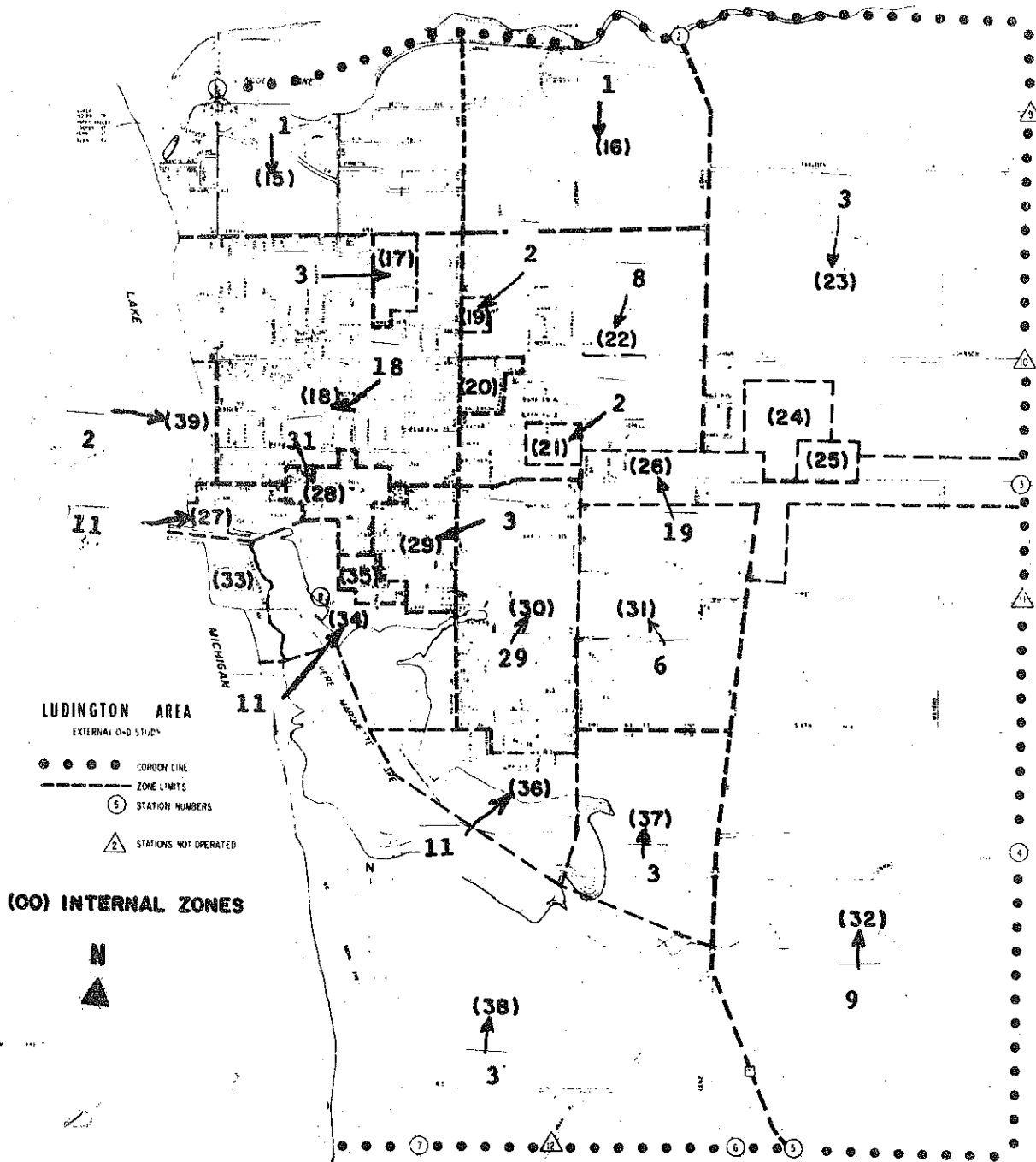
Station 4, Conrad Road

TERMINAL TRIPS TO STUDY ZONES

<u>Internal Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
15	1	.6
16	1	.6
17	3	1.7
18	18	10.2
19	2	1.1
20	0	.0
21	2	1.1
22	8	4.5
23	3	1.7
24	0	.0
25	0	.0
26	19	10.8
27	11	6.3
28	31	17.6
29	3	1.7
30	29	16.5
31	6	3.4
32	9	5.1
33	0	.0
34	11	6.3
35	0	.0
36	11	6.3
37	3	1.7
38	3	1.7
39	<u>2</u>	<u>1.1</u>
TOTAL	176	100.0

000 Terminal Traffic Between
Station 4, Conrad Road,
and Internal Zones of
Attraction of
176 Vehicle Trips

July, August Weekday 1972



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Station 4, Conrad Road

TRIP LENGTHS

<u>Minutes</u>	<u>Number of Trips</u>	<u>Percent of Total</u>
1-20	189	60.0
20-40	80	25.3
40-60	22	6.9
60-90	15	4.7
90-120	7	2.2
120-180	0	.0
180-240	0	.0
240-300	<u>3</u>	<u>.9</u>
TOTAL	316	100.0

Longest Trip = 4 Hr. 50 Min.

Average Trip Length = 27 Min.

Station 5 (US-31 S.)

Station 5 is located 0.6 mile southeast of Lenz Road.

A total of 7,681 vehicles passed through this station. Tabulations on the following pages give a detailed analysis of this traffic.

Approximately 6 out of every 10 vehicles had a terminal inside the study area; 3 of every 4 vehicles were autos and 10 out of 100 vehicles were panels or pick-ups whether they traveled into or through the area. More than two-thirds of the passenger cars and panels or pick-ups had a terminal inside the study area. More than 80 percent of the passenger cars with trailer were through trips.

The largest trip purpose was work with 2,544 trips or 33.1 percent of the 7,681 total trips. All trip purposes except vacation and other soc. or rec. had more than 70 percent terminal traffic. More than 71 percent of the vacation trips were through trips.

Station 3 (US-10, 31 East) accounted for 1,889 trips or 68.0 percent of the 2,778 through trips. Stations 1, 2 and 3 accounted for 2,694 trips or 97.0 percent of the 2,778 through trips.

Zone 26 (East Side Shopping Center) accounted for 1,095 trips or 22.3 percent of the 4,903 terminal trips. Zones 18, 26 and 28 accounted for 2,699 trips or 55.0 percent of the 4,903 terminal trips.

There were 1,907 trips or 24.8 percent of the 7,681 trips that had a trip length of 20-40 minutes. There were 4,118 trips (53.6 percent) that 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 11 states (see 95 zone system). There are two ends for each trip; an origin and a destination. There were 7,701 trips which passed through Station 5. This total is slightly different from the other tabulations due to rounding. There were 15,402 total trip ends.

There were 2,237 trips (14.5 percent) that had both their origins and destinations in Mason County. There were 8,553 trip ends (55.5 percent) in Mason County. There were 143 trip ends (0.9 percent) in the upper peninsula. The lower peninsula accounted for 14,558 trip ends (94.5 percent). There were 701 origins and/or destinations (4.6 percent) outstate.

Station 5, US-31 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	5,752	74.9	3,842	66.8	1,910	33.2
Passenger Car with Trailer	288	3.8	52	18.1	236	81.9
Panel or Pickup	733	9.5	551	75.2	182	24.8
Panel or Pickup with Trailer	35	0.4	12	34.3	23	65.7
Other Single Unit Trucks	523	6.8	295	56.4	228	43.6
Combinations and Trucks with Trailers	<u>350</u>	<u>4.6</u>	<u>151</u>	43.1	<u>199</u>	56.9
TOTAL	7,681	100.0	4,903	63.8	2,778	36.2

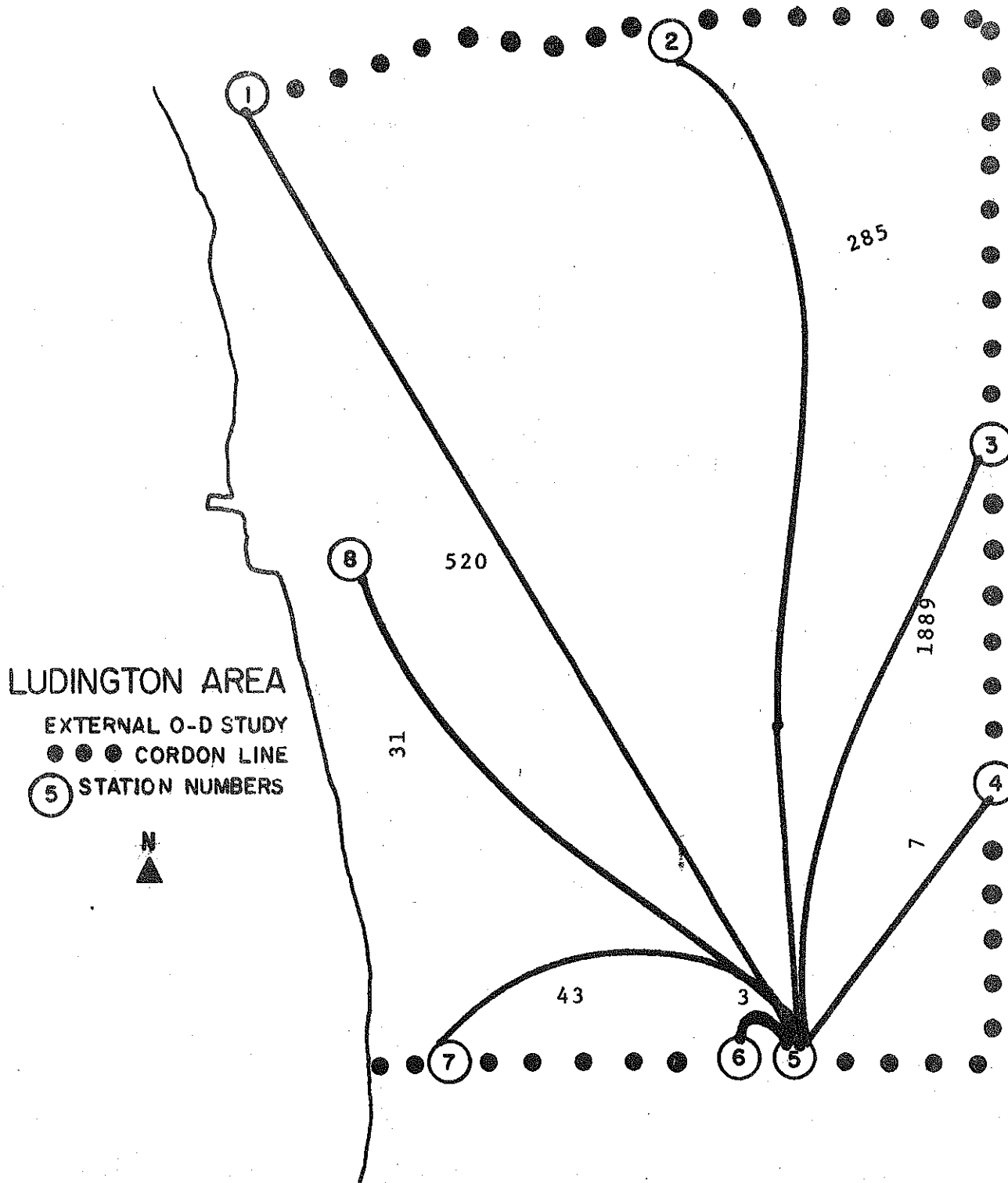
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	2,544	33.1	1,814	71.3	730	28.7
Personal Business	290	3.8	235	81.0	55	19.0
Shopping	1,258	16.4	1,119	89.0	139	11.0
Vacation	1,590	20.7	456	28.7	1,134	71.3
Other Soc. or Rec.	1,497	19.5	891	59.5	606	40.5
All Other	<u>502</u>	<u>6.5</u>	<u>388</u>	77.3	<u>114</u>	22.7
TOTAL	7,681	100.0	4,903	63.8	2,778	36.2

Station 5, US-31 South

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1 - M-116	520	18.7
2 - Jebavy Rd.	285	10.3
3 - US-10, 31 East	1,889	68.0
4 - Conrad Rd.	7	0.3
6 - Lenz Rd.	3	0.1
7 - Lakeshore Dr.	43	1.5
8 - US-10 (Boat Dock)	<u>31</u>	<u>1.1</u>
TOTAL	2,778	100.0

Through Traffic Interchange
of
Station 5, US-31 South
of
2,778 Vehicle Trips
July, August Weekday 1972



Station 5, US-31 South

TERMINAL TRIPS TO STUDY ZONES

<u>Internal Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
15	114	2.3
16	36	.7
17	54	1.1
18	572	11.7
19	63	1.3
20	28	.6
21	105	2.1
22	122	2.5
23	32	.6
24	10	.2
25	8	.2
26	1095	22.3
27	58	1.2
28	1032	21.0
29	155	3.2
30	334	6.8
31	45	.9
32	89	1.8
33	5	.1
34	403	8.2
35	87	1.8
36	120	2.5
37	60	1.2
38	116	2.4
39	160	3.3
TOTAL	4903	100.0

Station 5, US-31 South

TRIP LENGTHS

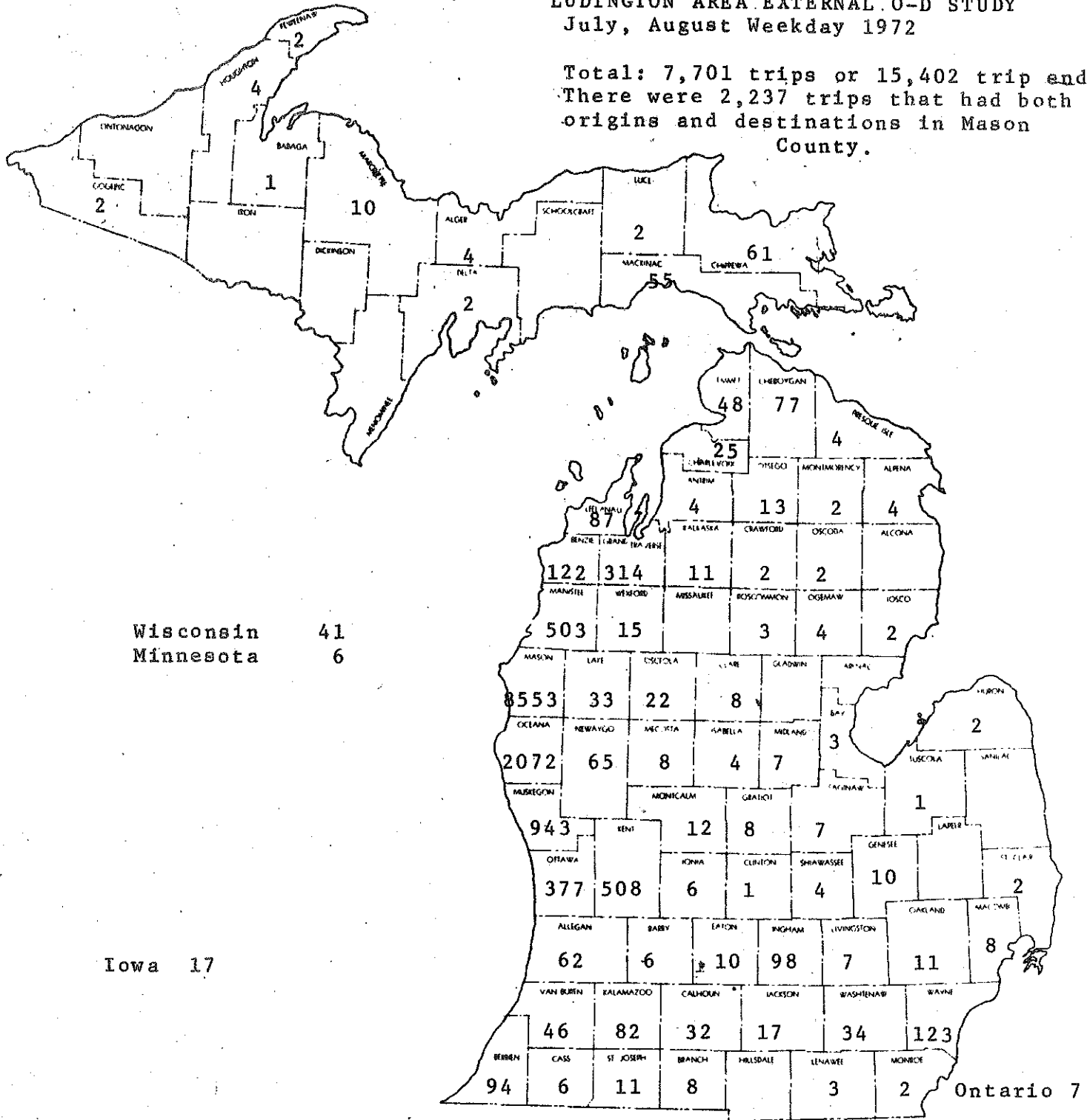
<u>Minutes</u>	<u>Number of Trips</u>	<u>Percent of Total</u>
1-20	1854	24.1
20-40	1907	24.8
40-60	357	4.7
60-90	788	10.3
90-120	591	7.7
120-180	554	7.2
180-240	501	6.5
240-300	342	4.5
300-870	<u>787</u>	<u>10.2</u>
TOTAL	7681	100.0

Longest Trip = 14 Hr. 30 Min.

Average Trip Length = 1 Hr. 53 Min.

Origins and/or Destinations
of Traffic Through
Station 5, US-31 South, 0.6
Mile Southeast of Lenz Road
LUDINGTON AREA EXTERNAL O-D STUDY
July, August Weekday 1972

Total: 7,701 trips or 15,402 trip ends
There were 2,237 trips that had both
origins and destinations in Mason
County.



Illinois 338 Indiana 160 Ohio 64 New York 3
 Pennsylvania 2
 Missouri 33
 Kentucky 25 West Virginia 5

Station 6 (Lenz Road)

Station 6 is located 0.5 mile southwest of US-31.

A total of 940 vehicles passed through this station. Tabulations on the following pages give a detailed analysis of this traffic.

Approximately 7 out of every 10 vehicles had a terminal inside the study area. Approximately two-thirds of the vehicles were autos and one-third were panels or pick-ups whether they traveled into or through the area. More than 60 percent of the passenger cars and panels or pick-ups had a terminal inside the study area. Passenger cars with trailer were equally divided into terminal and through trips.

The largest trip purpose was work with 699 trips or 74.4 percent of the 940 total trips. All trip purposes including vacation had more than 60 percent terminal traffic.

Station 3 (US-10 , 31 East) accounted for 141 trips or 50.4 percent of the 280 through trips. Stations 1, 2 and 3 accounted for 268 trips or 95.7 percent of the 280 through trips.

Zone 18 (Northwest Residential) accounted for 140 trips or 21.2 percent of the 660 terminal trips. Zones 18, 26, 28 and 30 accounted for 430 trips or 65.1 percent of the 660 terminal trips.

There were 683 trips or 72.6 percent of the 940 trips that had a trip length of 1-20 minutes. There were 906 trips (96.4 percent) that 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 11 states (see 95 zone system). There are two ends for each trip; an origin and a destination. There were 934 trips which passed through Station 6. This total is slightly different from the other tabulations due to rounding. There were 1,868 total trip ends.

There were 872 trips (46.7 percent) that had both their origins and destinations in Mason County. There were 1,806 trip ends (96.7 percent) in Mason County. There were 2 trip ends (0.1 percent) in the upper peninsula. The lower peninsula accounted for 1,866 trip ends (99.9 percent). There were no origins and/or destinations outstate.

Station 6, Lenz 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	620	66.0	459	74.0	161	26.0
Passenger Car with Trailer	2	0.2	1	50.0	1	50.0
Panel or Pickup	306	32.6	193	63.1	113	36.9
Panel or Pickup with Trailer	1	0.1	0	0.0	1	100.0
Other Single Unit Trucks	6	0.6	5	83.3	1	16.7
Combinations and Trucks with Trailers	<u>5</u>	<u>0.5</u>	<u>2</u>	40.0	<u>3</u>	60.0
TOTAL	940	100.0	660	70.2	280	29.8

<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	699	74.4	462	66.1	237	33.9
Personal Business	44	4.7	28	63.6	16	36.4
Shopping	56	6.0	52	92.9	4	7.1
Vacation	4	0.4	4	100.0	0	0.0
Other Soc. or Rec.	50	5.3	39	78.0	11	22.0
All Other	<u>87</u>	<u>9.2</u>	<u>75</u>	86.2	<u>12</u>	13.8
TOTAL	940	100.0	660	70.2	280	29.8

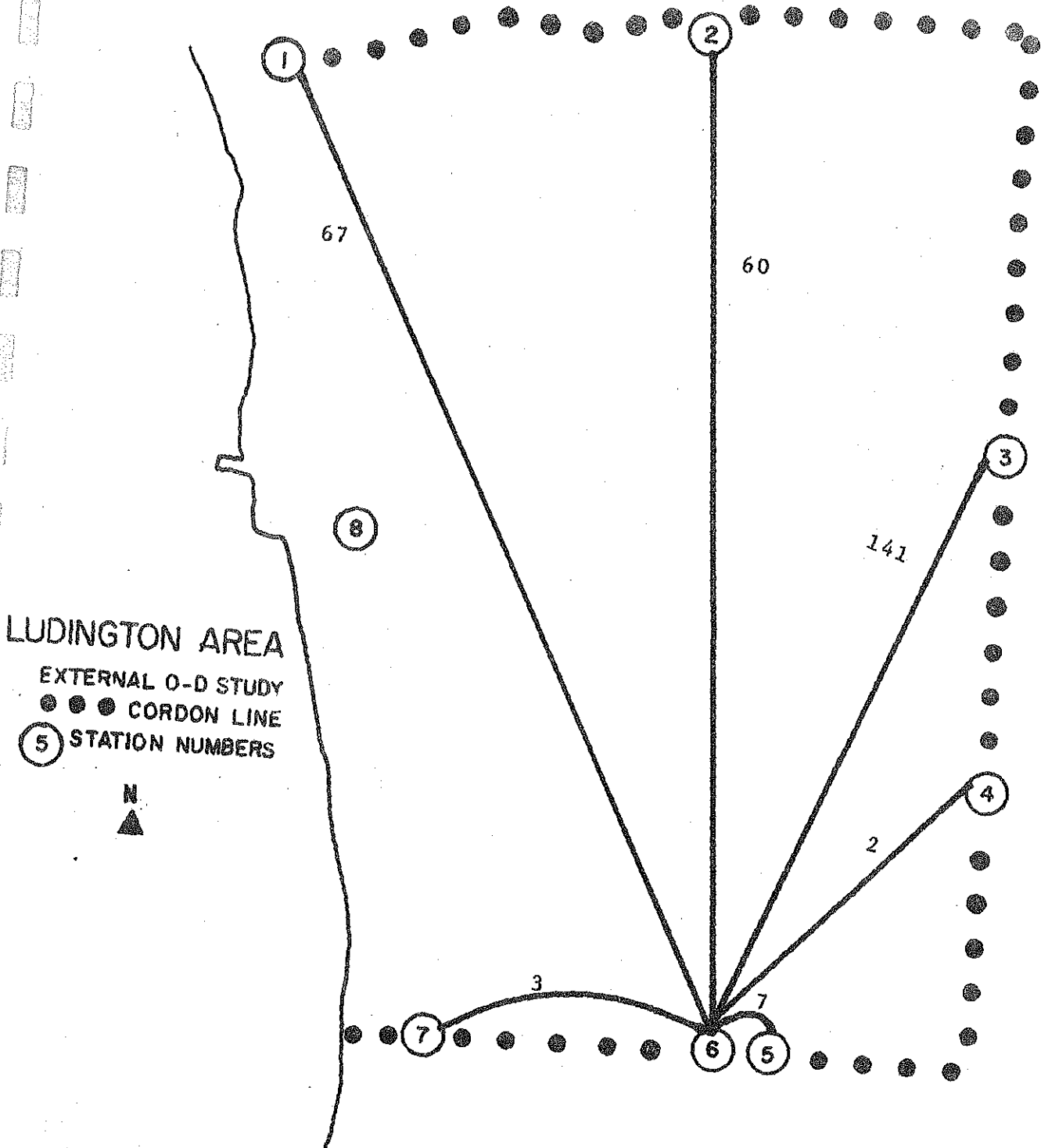
Station 6, Lenz Road

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1 - M-116	67	23.9
2 - Jebavy Rd.	60	21.4
3 - US-10, 31 East	141	50.4
4 - Conrad Rd.	2	0.7
5 - US-31 South	7	2.5
7 - Lakeshore Dr.	3	1.1
8 - US-10 (Boat Dock)	<u>0</u>	<u>0.0</u>
TOTAL	280	100.0

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Through Traffic Interchange
of
Station 6, Lenz Road
of
280 Vehicle Trips
July, August Weekday 1972



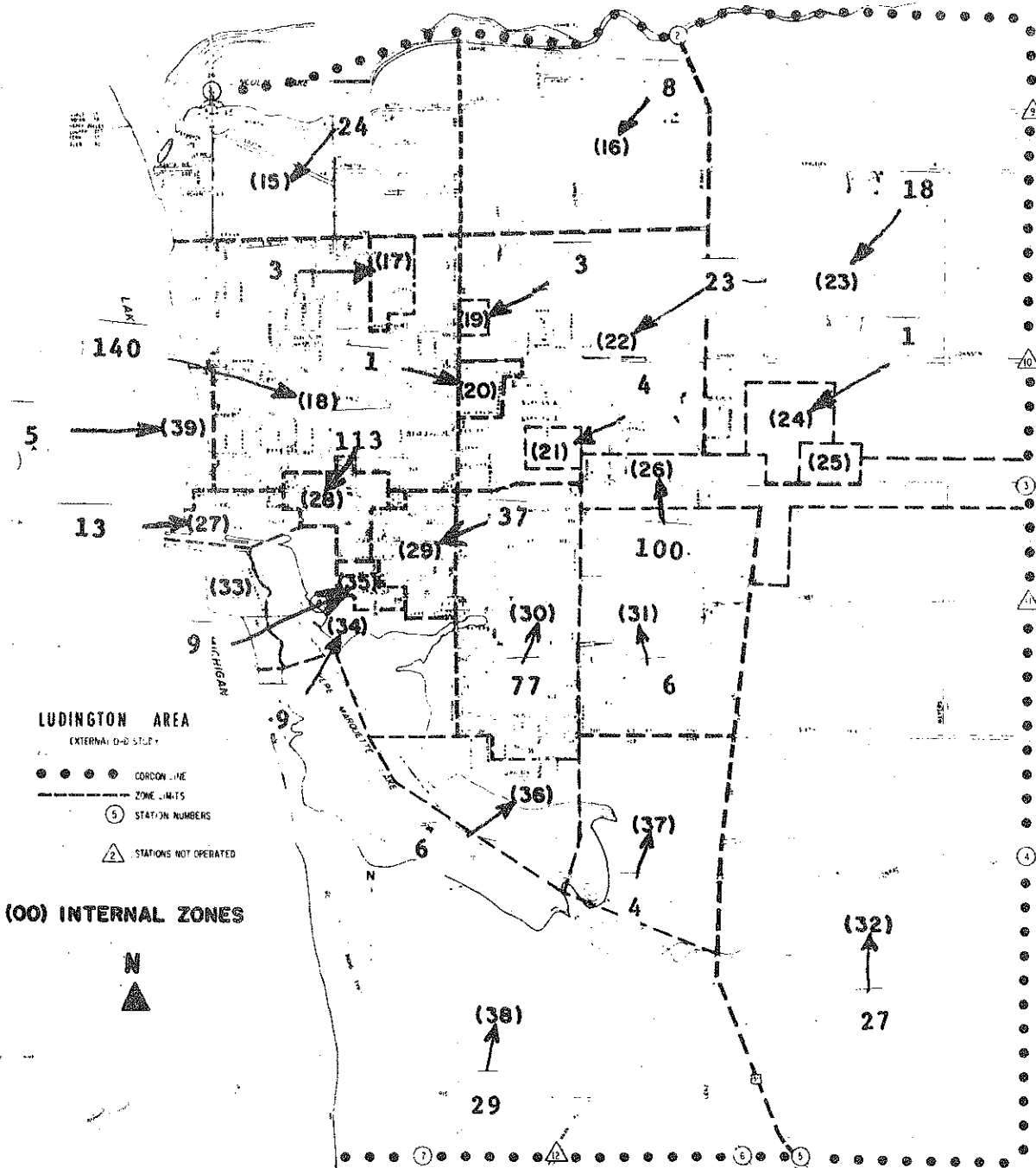
Station 6, Lenz Road

TERMINAL TRIPS TO STUDY ZONES

<u>Internal Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
15	24	3.6
16	8	1.2
17	3	.4
18	140	21.2
19	3	.5
20	1	.1
21	4	.6
22	23	3.5
23	18	2.7
24	1	.1
25	0	.0
26	100	15.1
27	13	2.0
28	113	17.1
29	37	5.6
30	77	11.7
31	6	1.0
32	27	4.1
33	0	.0
34	9	1.4
35	9	1.4
36	6	1.0
37	4	.6
38	29	4.4
39	5	.7
TOTAL	660	100.0

000 Terminal Traffic Between
 Station 6, Lenz Road,
 and Internal Zones of
 Attraction of
 660 Vehicle Trips

July, August Weekday 1972



Station 6, Lenz Road

TRIP LENGTH

<u>Minutes</u>	<u>Number of Trips</u>	<u>Percent of Totals</u>
1-20	683	72.6
20-40	199	21.2
40-60	24	2.6
60-90	15	1.6
90-120	9	1.0
120-180	5	.5
180-240	2	.2
240-300	1	.1
300-355	<u>2</u>	<u>.2</u>
TOTAL	940	100.0

Longest Trip = 5 Hr. 55 Min.

Average Trip Length = 23 Min.

Station 7 (Lakeshore Dr. S.)

Station 7 is located 0.4 mile south of Iris Road.

A total of 630 vehicles passed through this station. Tabulations on the following pages give a detailed analysis of this traffic.

Approximately 5 out of every 10 vehicles had a terminal inside the study area; 9 of every 10 vehicles were autos and 6 out of 100 vehicles were panels or pick-ups whether they traveled into or through the area. More than 50 percent of the passenger cars and panels or pick-ups had a terminal inside the study area. Passenger cars with trailer were nearly equally divided into terminal and through trips.

The largest trip purpose was other soc. or rec. with 292 trips or 46.4 percent of the 630 total trips. All trip purposes except vacation and other soc. or rec. had more than 70 percent terminal traffic. More than two-thirds of the vacation trips were through trips.

Station 5 (US-31 South) accounted for 137 trips or 46.6 percent of the 294 through trips. Stations 3 and 5 accounted for 255 trips or 86.7 percent of the 294 through trips.

Zone 28 (Central Business District) accounted for 74 trips or 22.0 percent of the 336 terminal trips. Zones 18, 26, 28 and 38 accounted for 224 trips or 66.6 percent of the 336 terminal trips.

There were 340 trips or 53.9 percent of the 630 trips that had a trip length of 1-20 minutes. There were 474 trips (75.3 percent) that 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 11 states (see 95 zone system). There are two ends for each trip; an origin and a destination. There were 623 trips which passed through station 7. This total is slightly different from the other tabulations due to rounding. There were 1,246 total trip ends.

There were 394 trips (31.6 percent) that had both their origins and destinations in Mason County. There were 1,014 trip ends (81.4 percent) in Mason County. There were 1 trip end (0.1 percent) in the upper peninsula. The lower peninsula accounted for 1,238 trip ends (99.4 percent). There were 7 origins and/or destinations (0.5 percent) outstate.

Station 7, Lakeshore Drive

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	582	92.4	306	52.6	276	47.4
Passenger Car with Trailer	12	1.9	5	41.7	7	58.3
Panel or Pickup	35	5.5	25	71.4	10	28.6
Panel or Pickup with Trailer	0	0.0	0	0.0	0	0.0
Other Single Unit Trucks	0	0.0	0	0.0	0	0.0
Combinations and Trucks with Trailers	<u>1</u>	<u>0.2</u>	<u>0</u>	0.0	<u>1</u>	100.0
TOTAL	630	100.0	336	53.3	294	46.7

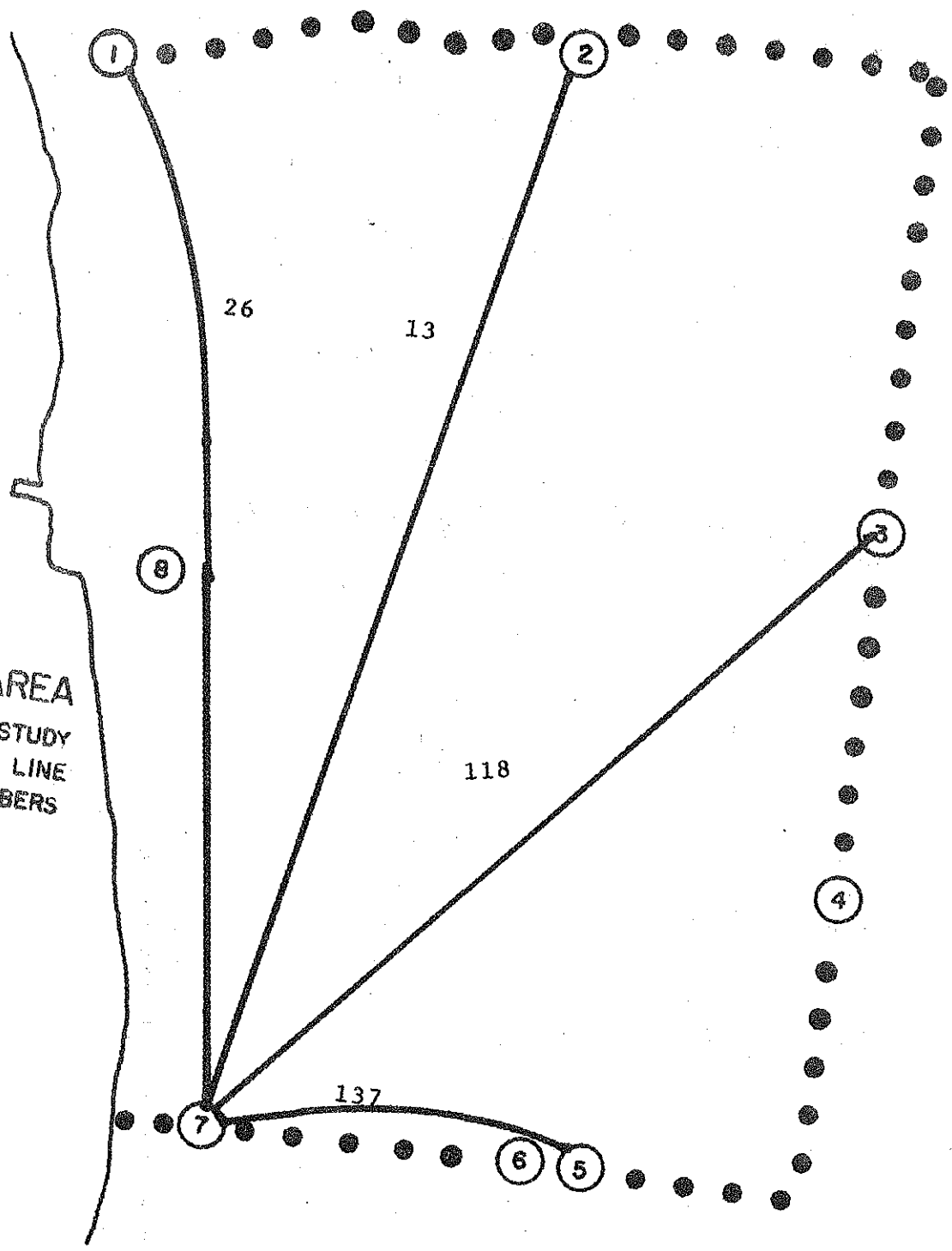
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	97	15.4	76	78.4	21	21.6
Personal Business	21	3.3	16	76.2	5	23.8
Shopping	38	6.0	37	97.4	1	2.6
Vacation	142	22.5	45	31.7	97	68.3
Other Soc. or Rec.	292	46.4	129	44.2	163	55.8
All Other	<u>40</u>	<u>6.4</u>	<u>33</u>	82.5	<u>7</u>	17.5
TOTAL	630	100.0	336	53.3	1,103	46.7

Station 7, Lakeshore Drive

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1 - M-116	26	8.9
2 - Jebavy Rd.	13	4.4
3 - US-10, 31 East	118	40.1
4 - Conrad Rd.	0	0.0
5 - US-31 South	137	46.6
6 - Lenz Rd.	0	0.0
8 - US-10 (Boat Dock)	<u>0</u>	<u>0.0</u>
 TOTAL	294	100.0

Through Traffic Interchange
of
Station 7, Lakeshore Drive
of
294 Vehicle Trips
July, August Weekday 1972



LUDINGTON AREA
EXTERNAL O-D STUDY
● ● ● CORDON LINE
⑤ STATION NUMBERS

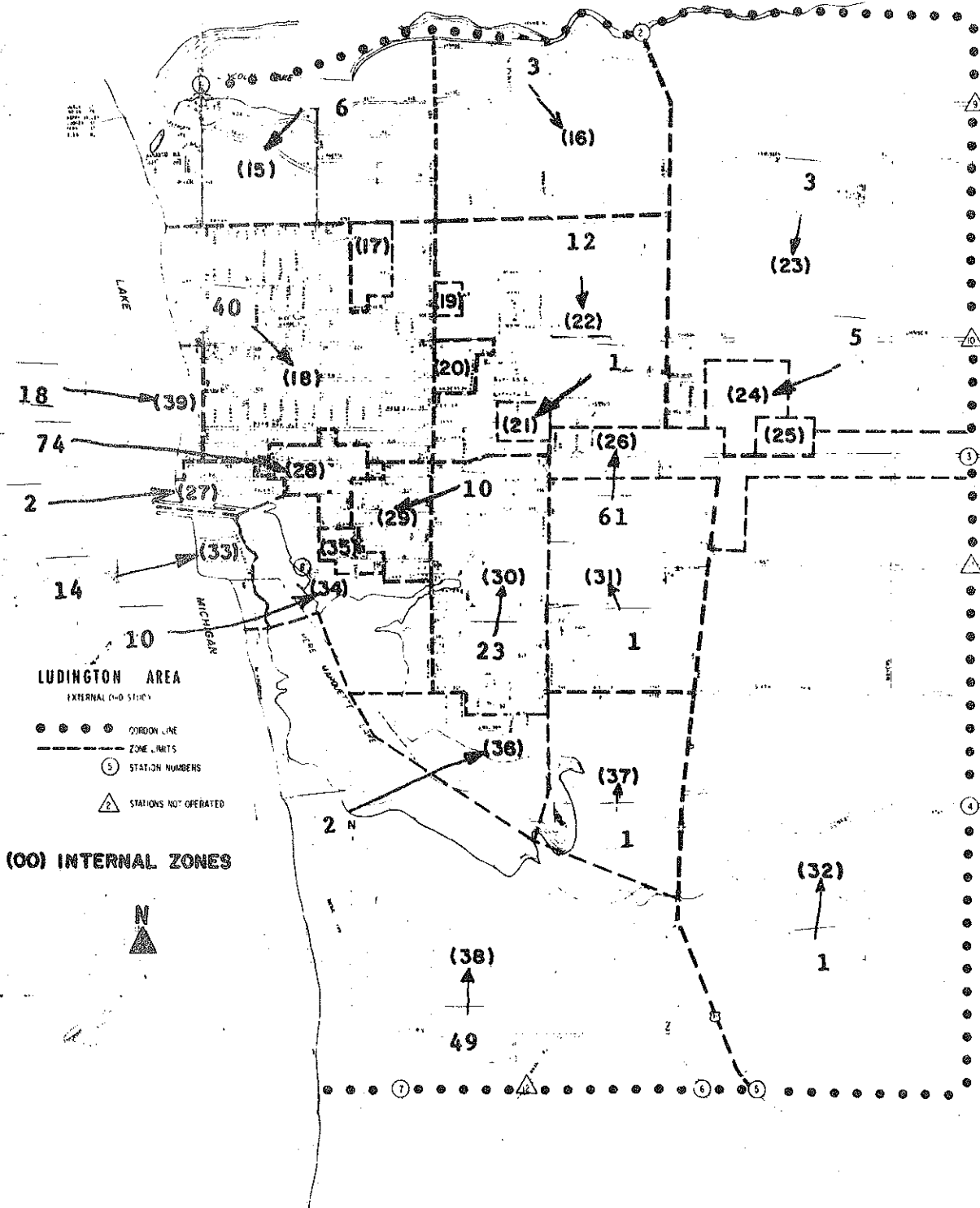


Station 7, Lakeshore Drive

TERMINAL TRIPS TO STUDY ZONES

<u>Internal Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
15	6	1.8
16	3	.9
17	0	0.0
18	40	11.9
19	0	0.0
20	0	0.0
21	1	.3
22	12	3.6
23	3	.9
24	5	1.5
25	0	0.0
26	61	18.1
27	2	.6
28	74	22.0
29	10	3.0
30	23	6.8
31	1	.3
32	1	.3
33	14	4.2
34	10	3.0
35	0	0.0
36	2	.6
37	1	.3
38	49	14.6
39	<u>18</u>	<u>5.3</u>
TOTAL	336	100.0

000 Terminal Traffic Between
 Station 7, Lakeshore Drive,
 and Internal Zones of
 Attraction of
 336 Vehicle Trips
 July, August Weekday 1972



Station 7, Lakeshore Drive

TRIP LENGTHS

<u>Minutes</u>	<u>Number of Trips</u>	<u>Percent of Total</u>
1-20	340	53.9
20-40	102	16.2
40-60	32	5.2
60-90	72	11.4
90-120	43	6.8
120-180	21	3.3
180-240	7	1.1
240-300	8	1.3
300-355	<u>5</u>	<u>.8</u>
TOTAL	630	100.0

Longest Trip = 5 Hr. 55 Min.

Average Trip Length = 46 Min.

Station 8 (US-10, Boat Dock)

Station 8 is located at the boat dock.

A total of 667 vehicles passed through this station. Tabulations on the following pages give a detailed analysis of this traffic.

Approximately 2 out of every 10 vehicles had a terminal inside the study area; 9 of every 10 vehicles were autos and 4 out of 100 vehicles were panels or pick-ups whether they traveled into or through the area. More than 80 percent of the passenger cars, passenger cars with trailer and panels or pick-ups were through trips.

The largest trip purpose was vacation with 524 trips or 78.6 percent of the 667 total trips. All trip purposes except shopping and all other had more than 70 percent through traffic.

Station 3 (US-10, 31 East) accounted for 320 trips or 57.5 percent of the 556 through trips. Stations 3 and 5 accounted for 548 trips or 98.5 percent of the 556 through trips.

Zone 28 (Central Business District) accounted for 41 trips or 37.0 percent of the 111 terminal trips. Zones 18 and 28 accounted for 72 trips or 64.9 percent of the 111 terminal trips.

There were 652 trips or 97.8 percent of the 667 trips that had a trip length of 300-1130 minutes. There were no trips that 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 11 states (see 95 zone system). There are two ends for each trip; an origin and a destination. There were 678 trips which passed through Station 8. This total is slightly different from the other tabulations due to rounding. There were 1,356 total trip ends.

There were no trips that had both their origins and destinations in Mason County. There were 120 trip ends (8.9 percent) in Mason County. There were 28 trip ends (2.1 percent) in the upper peninsula. The lower peninsula accounted for 577 trip ends (42.5 percent). There were 751 origins and/or destinations (55.4 percent) outstate.

Station 8, US-10 (Boat Dock)

<u>Vehicle Type</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Passenger Car	622	93.3	109	17.5	513	82.5
Passenger Car with Trailer	19	2.8	0	0.0	19	100.0
Panel or Pickup	24	3.6	0	0.0	24	100.0
Panel or Pickup with Trailer	2	0.3	2	100.0	0	0.0
Other Single Unit Trucks	0	0.0	0	0.0	0	0.0
Combinations and Trucks with Trailers	<u>0</u>	<u>0.0</u>	<u>0</u>	0.0	<u>0</u>	0.0
TOTAL	667	100.0	111	16.6	556	83.4

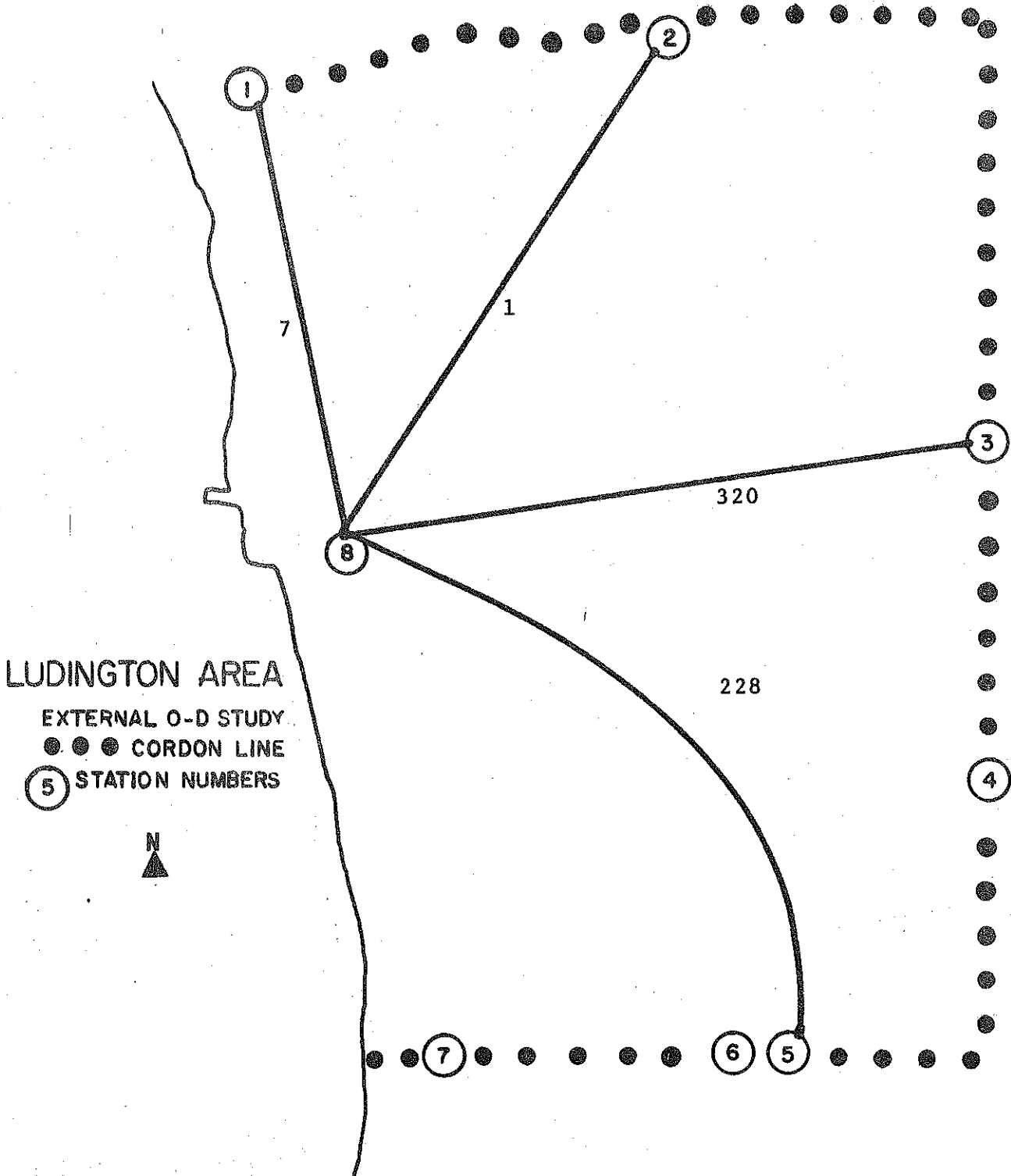
<u>Trip Purpose</u>	<u>Vehicles</u>	<u>Percent of Total</u>	<u>Terminal</u>	<u>%</u>	<u>Through</u>	<u>%</u>
Work	20	3.0	0	0.0	20	100.0
Personal Business	12	1.8	3	25.0	9	75.0
Shopping	1	0.1	1	100.0	0	0.0
Vacation	524	78.6	77	14.7	447	85.3
Other Soc. or Rec.	92	13.8	24	26.1	68	73.9
All Other	<u>18</u>	<u>2.7</u>	<u>6</u>	33.3	<u>12</u>	66.7
TOTAL	667	100.0	111	16.6	556	83.4

Station 8, US-10 (Boat Dock)

THROUGH TRIPS TO EXTERNAL STATIONS

<u>External Station</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
1 - M-116	7	1.3
2 - Jebavy Rd.	1	0.2
3 - US-10, 31 East	320	57.5
4 - Conrad Rd.	0	0.0
5 - US-31 South	228	41.0
6 - Lenz Rd.	0	0.0
7 - Lakeshore Dr.	<u>0</u>	<u>0.0</u>
TOTAL	556	100.0

Through Traffic Interchange
of
Station 8, US-10 (Boat Dock)
of
556 Vehicle Trips
July, August Weekday 1972



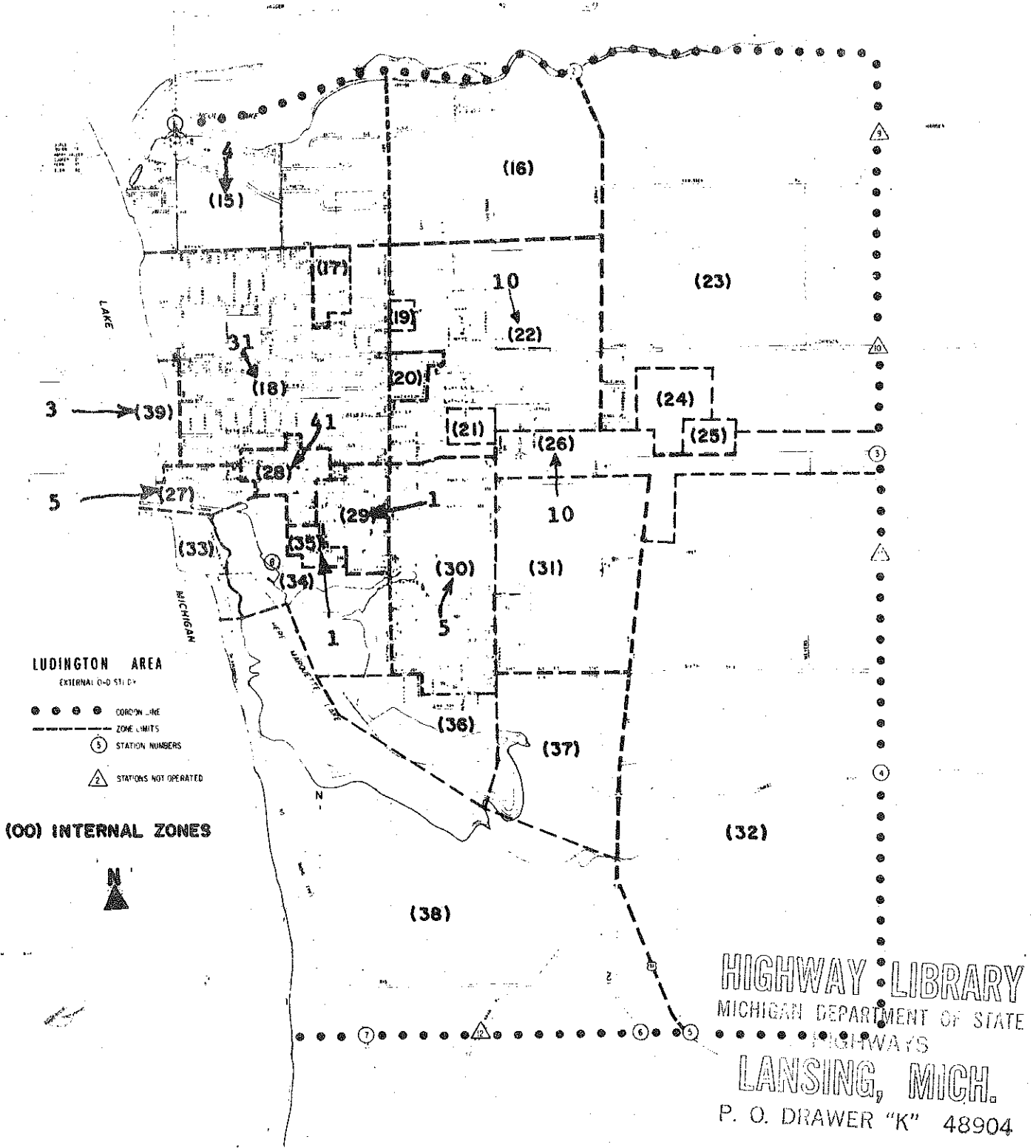
Station 8, US-10 (Boat Dock)

TERMINAL TRIPS TO STUDY ZONES

<u>Internal Zone</u>	<u>Total Vehicles</u>	<u>Percent of Total</u>
15	4	3.6
16	0	0.0
17	0	0.0
18	31	27.9
19	0	0.0
20	0	0.0
21	0	0.0
22	10	9.0
23	0	0.0
24	0	0.0
25	0	0.0
26	10	9.0
27	5	4.5
28	41	37.0
29	1	.9
30	5	4.5
31	0	0.0
32	0	0.0
33	0	0.0
34	0	0.0
35	1	.9
36	0	0.0
37	0	0.0
38	0	0.0
39	<u>3</u>	<u>2.7</u>
TOTAL	111	100.0

000 Terminal Traffic Between
 Station 8, US-10 (Boat Dock),
 and Internal Zones of
 Attraction of
 111 Vehicle Trips

July, August Weekday 1972



Station 8, US-10 (Boat Dock)

TRIP LENGTHS

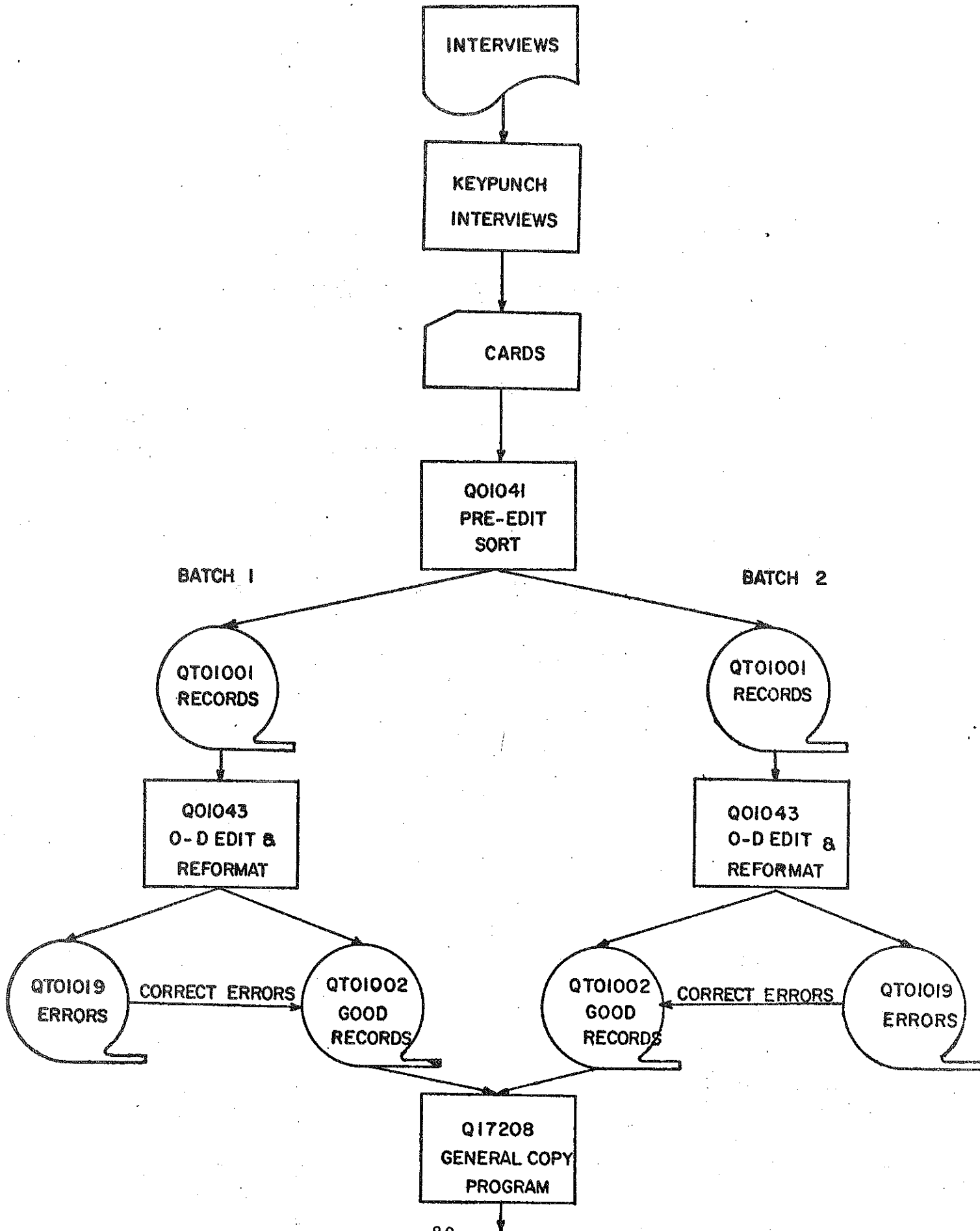
<u>Minutes</u>	<u>Number of Trips</u>	<u>Percent of Total</u>
1-100	0	0.0
100-120	2	.3
120-180	0	0.0
180-240	1	.1
240-300	12	1.8
300-1130	<u>652</u>	<u>97.8</u>
TOTAL	667	100.0

Longest Trip = 18 Hr. 50 Min.

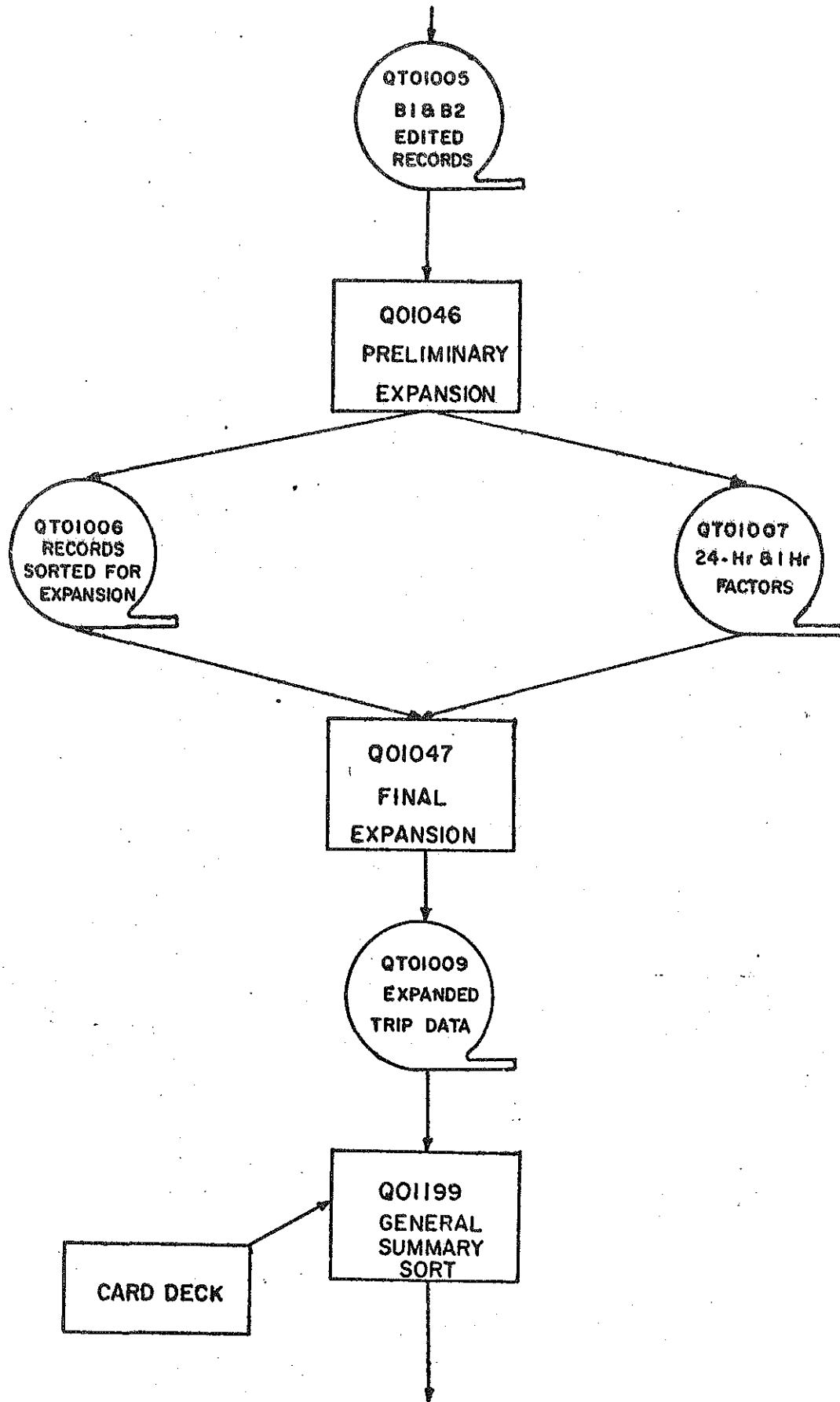
Average Trip Length = 9 Hr. 4 Min.

APPENDIX A

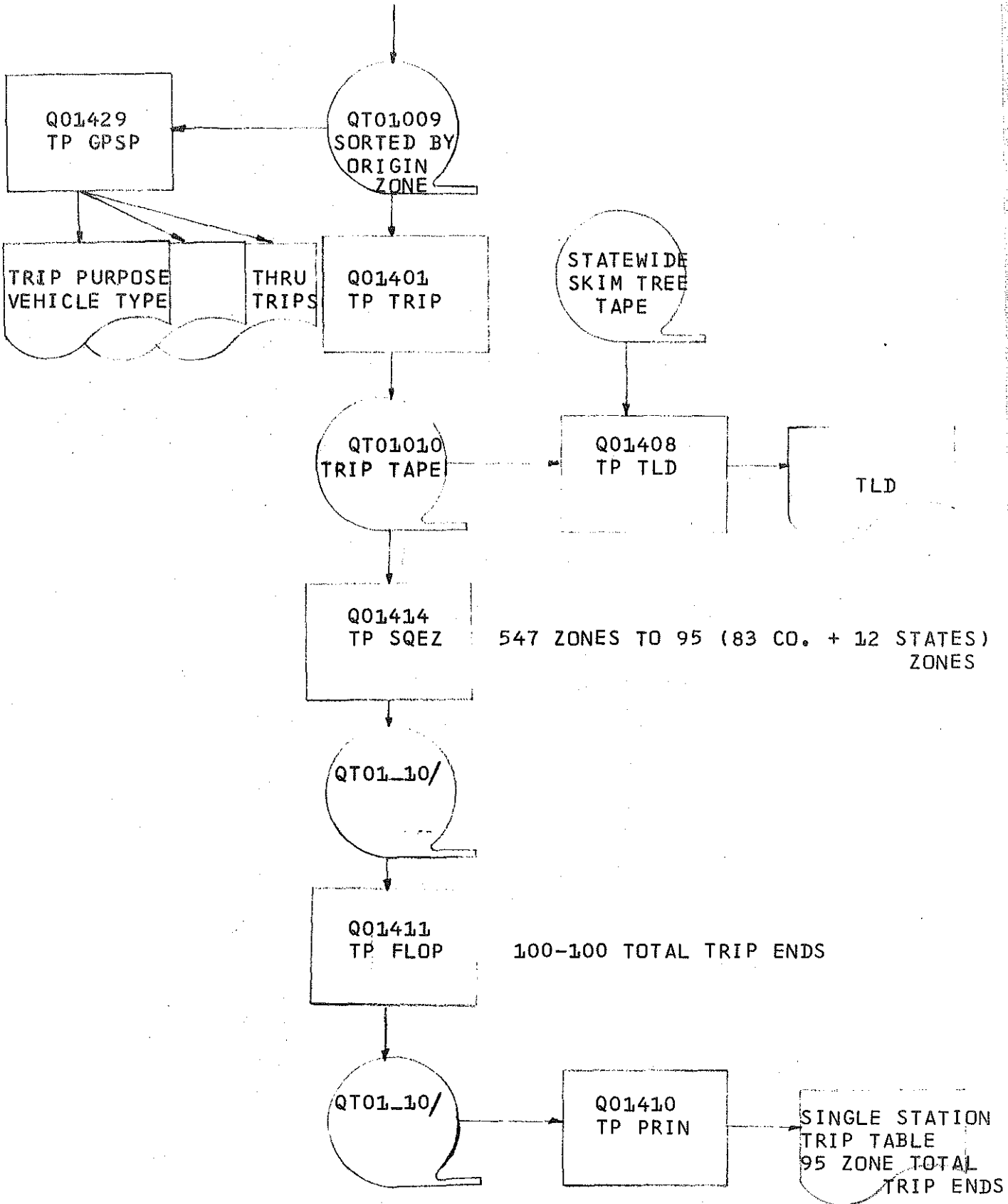
SINGLE STATION PROCESS FLOW CHART



SINGLE STATION PROCESS FLOW CHART



SINGLE STATION PROCESS FLOW CHART



95 ZONE SYSTEM

INSTATE ZONES

ZONE	COUNTY	ZONE	COUNTY
1	ALCONA	43	LAKE
2	ALGER	44	LAPEER
3	ALLEGAN	45	LELANAU
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

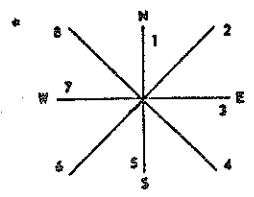
Destroy all previous editions of this form.

FORM NUMBER	6	COUNTY NUMBER	1	2	3	STATEWIDE NUMBER	4	5	6	7	HOUR PERIOD ENDING	8	9	* DIRECTION	10	DAY ** OF TRAVEL	11	MO.	12	13	DATE	14	15
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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	D. U. W. E. S. O. F. L. B.	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		
					0 0 0		

6 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

- 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

