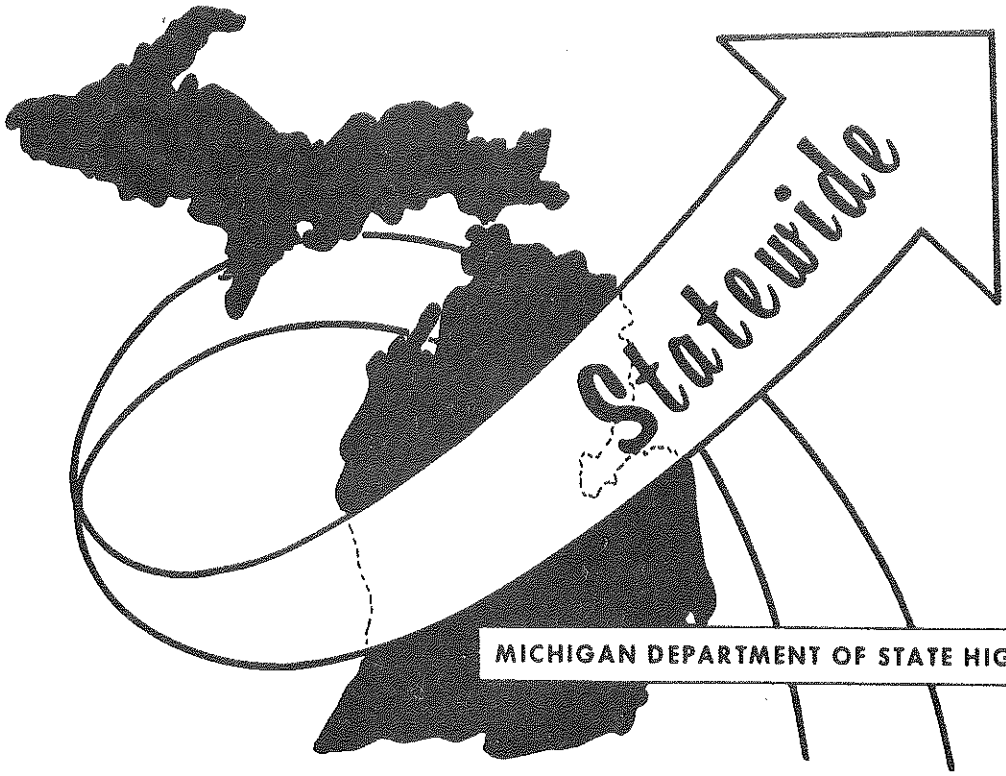
Statewide Transportation Analysis & Research

MICHIGAN'S STATEWIDE TRAVEL
FORECASTING MODEL

US-23 CORRIDOR LOCATION STUDY
PRELIMINARY TRAVEL IMPACT ANALYSI

Report no. 17

JANUARY 28, 1975



MICHIGAN DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

MICHIGAN DEPARTMENT

OF

STATE HIGHWAYS AND TRANSPORTATION

BUREAU OF TRANSPORTATION PLANNING

MICHIGAN'S STATEWIDE TRAVEL
FORECASTING MODEL

US-23 CORRIDOR LOCATION STUDY
PRELIMINARY TRAVEL IMPACT ANALYSIS

Report no. 17

JANUARY 28, 1975

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, GOVERNOR

DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

STATE HIGHWAYS BUILDING - POST OFFICE DRAWER K - LANSING, MICHIGAN 48904

JOHN P. WOODFORD, DIRECTOR

January 28, 1975

Mr. Keith E. Bushnell, Administrator
Multi-Regional Planning Division

Dear Keith:

The following report documents the preliminary traffic impact analysis for the US-23 corridor location study. This report was initiated for several reasons:

(1) to uncover errors prior to alternate transmittal,
(2) to outline the typical output from a standard alternate run,
(3) to discover new applications and analysis techniques which might prove useful in the future and
(4) to act within itself as a medium of data transmittal.

The report was prepared by Mr. Lawrence J. Swick under the supervision of Mr. Richard E. Esch.

Sincerely,

Richard J. Lilly, Administrator
Highway Planning Division

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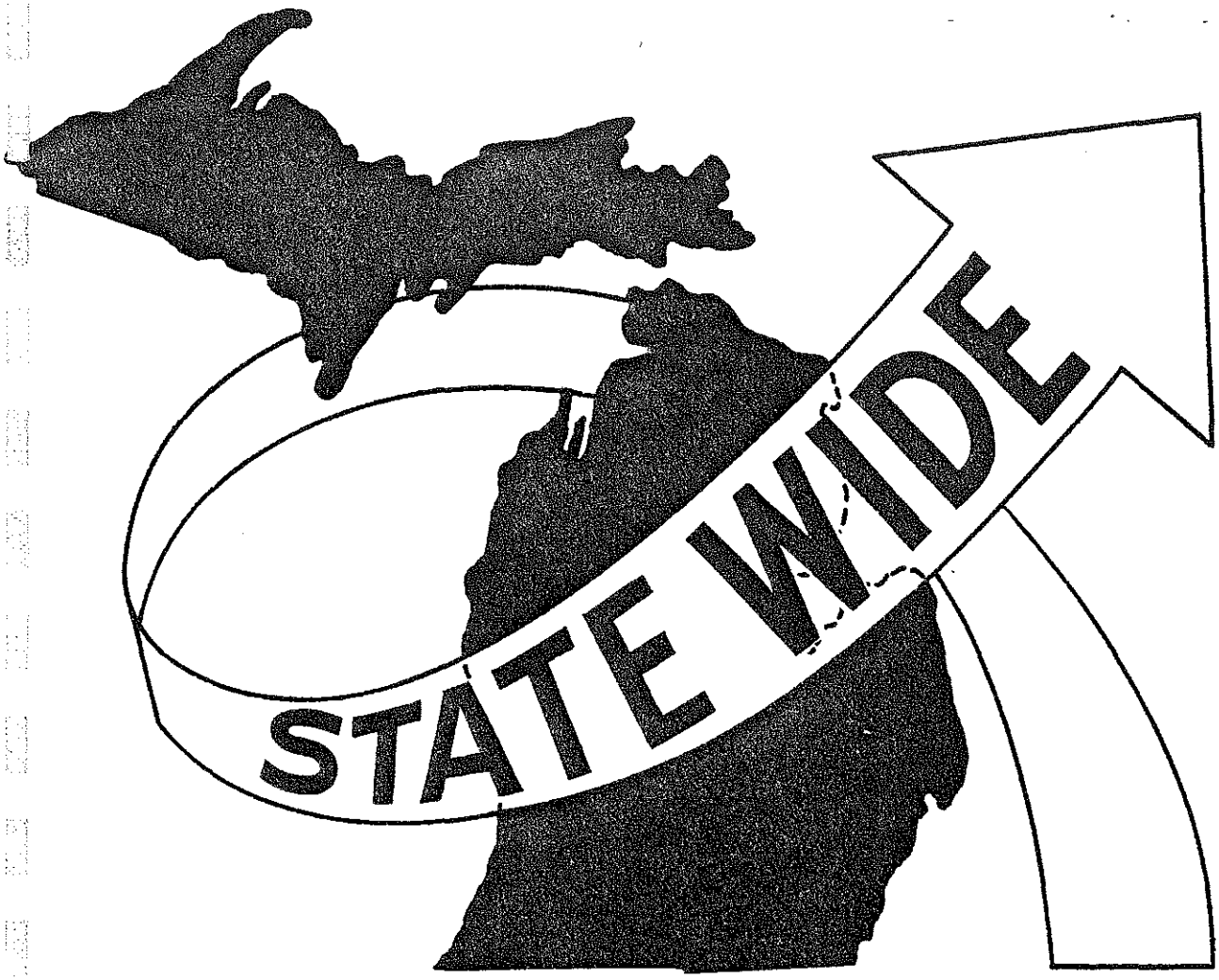
INTRODUCTION



INTRODUCTION

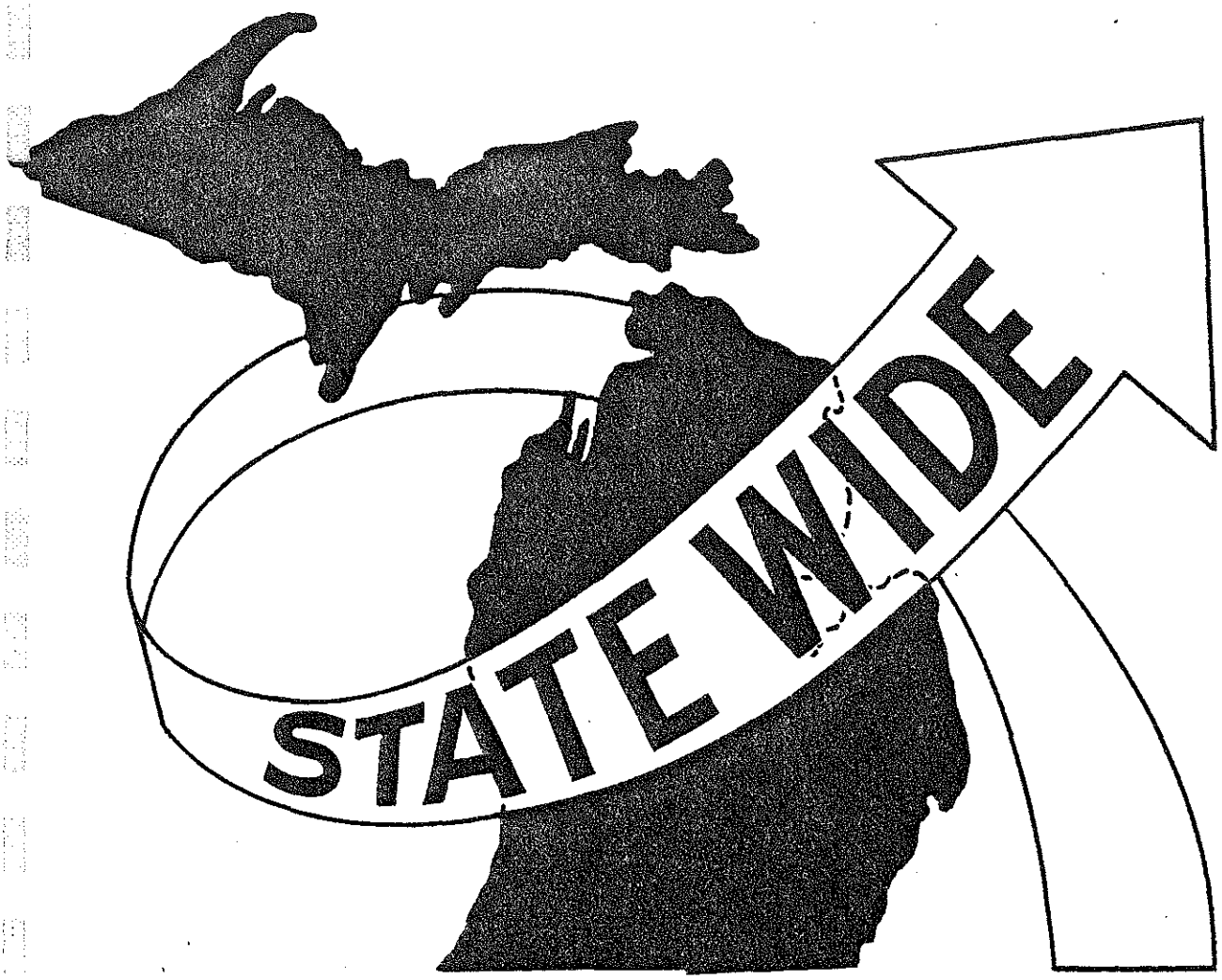
This is the second report in a continuum of reports which are to deal with the preliminary travel impact analysis for corridor study alternates.

The initial analysis deals with the Northeast Region Corridor Study and the grain one impact of various alternates on the traffic congestion problems which are forecast for that area in the year 2000.

All travel impact data used in this report are produced through the application of the Statewide Transportation Modeling System and related analysis tools. Primary data originates through the use of (1) the level of Service program and subsequent bandwidth plots, and (2) the System Impact Summary program.

All of this information can be considered as "standard output" from each alternate application. Other subsequent travel impact data such as effective speed, capacity adequacy, etc. can be supplied for grain two analysis but initial efforts are limited to that data which are immediately available from standard alternate series programs.

ALTERNATE DEFINITION



A BRIEF BACKGROUND

A total of six alternates were assigned for preliminary analysis within the Northeast Region US-23 corridor area. The southern tip of each alternate began as a connection with the US-23, M-76 freeway near Standish and proceeded north through various alignments until they all reached existing US-23 north of Alpena. One of the six alternates was a "do-nothing" or "neutral" alternate in that it contained all of the committed highways assumed to be existing by the year 2000 except for the US-23 route. This was done for two reasons, first: to provide a no-build alternative situation as required by Federal law and, secondly: to create a neutral constant situation from which to compare the relative effects of each alternate upon the total highway system.

Traffic volumes which appear on the alternates are for the design year 2000. The six alternates are numbered beginning at 72 and continuing to 77 with 77 being the neutral assignment. These five alignments and their locations are illustrated on the following pages. The analysis of the six alternates is divided on a three region basis to satisfy different but integrated planning requirements. The counties which appear in these regions are also illustrated in the following pages and are referred to as analysis regions "A", "B", and "C" respectively.

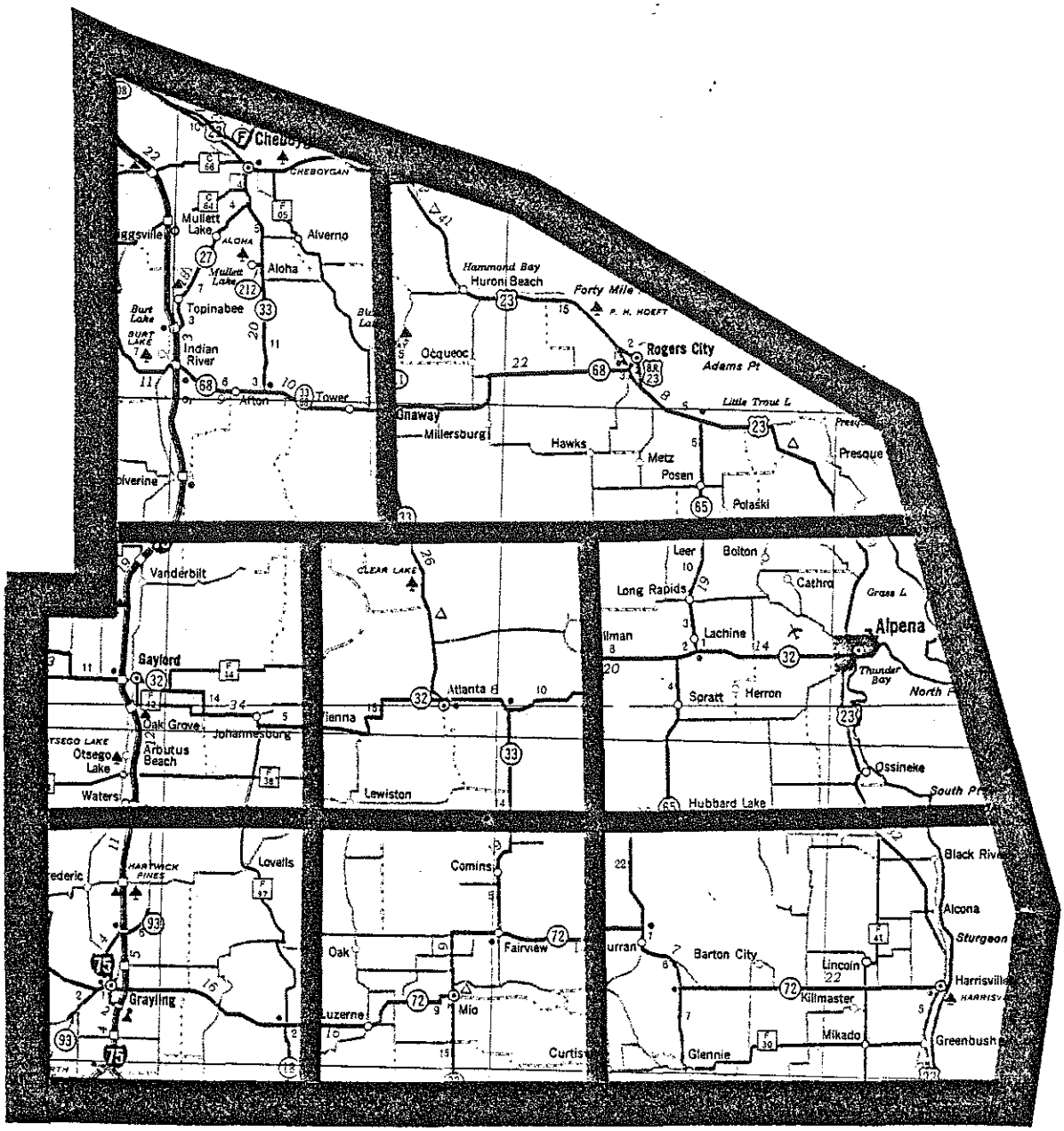
Analysis region "A" contains the following counties and is illustrated below.

(1) ALCONA (4) ALPENA (16) CHEBOYGAN (20) CRAWFORD

(60) MONTMORENCY (68) OSCODA (69) OTSEGO (71) PRESQUE ISLE

ANALYSIS REGION "A"

FIGURE 1

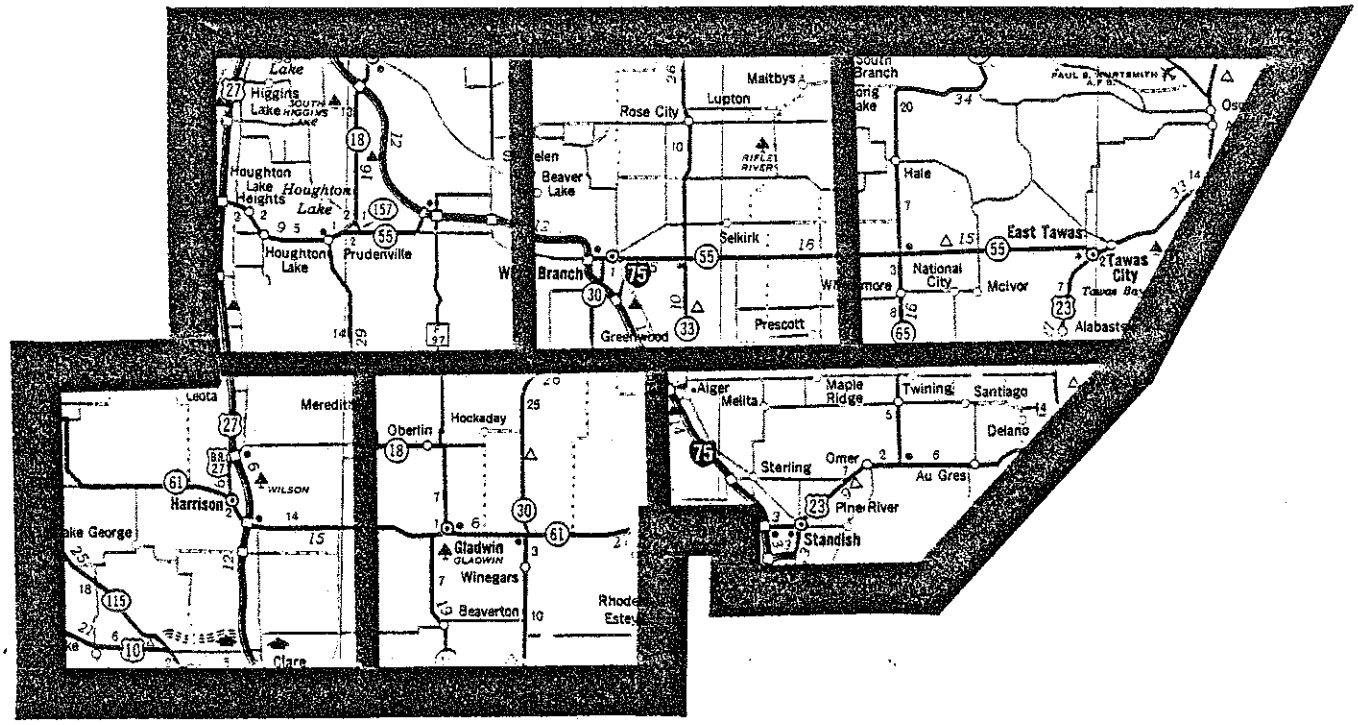


Analysis region "B" contains the following counties

(6) ARENAC	(18) CLARE
(26) GLADWIN	(35) IOSCO
(65) OGEMAW	(72) ROSCOMMON

FIGURE 2

ANALYSIS REGION "B"



Analysis region "C" contains the following counties

(1) ALCONA (4) ALPENA (6) ARENAC (35) IOSCO

ANALYSIS REGION "C"

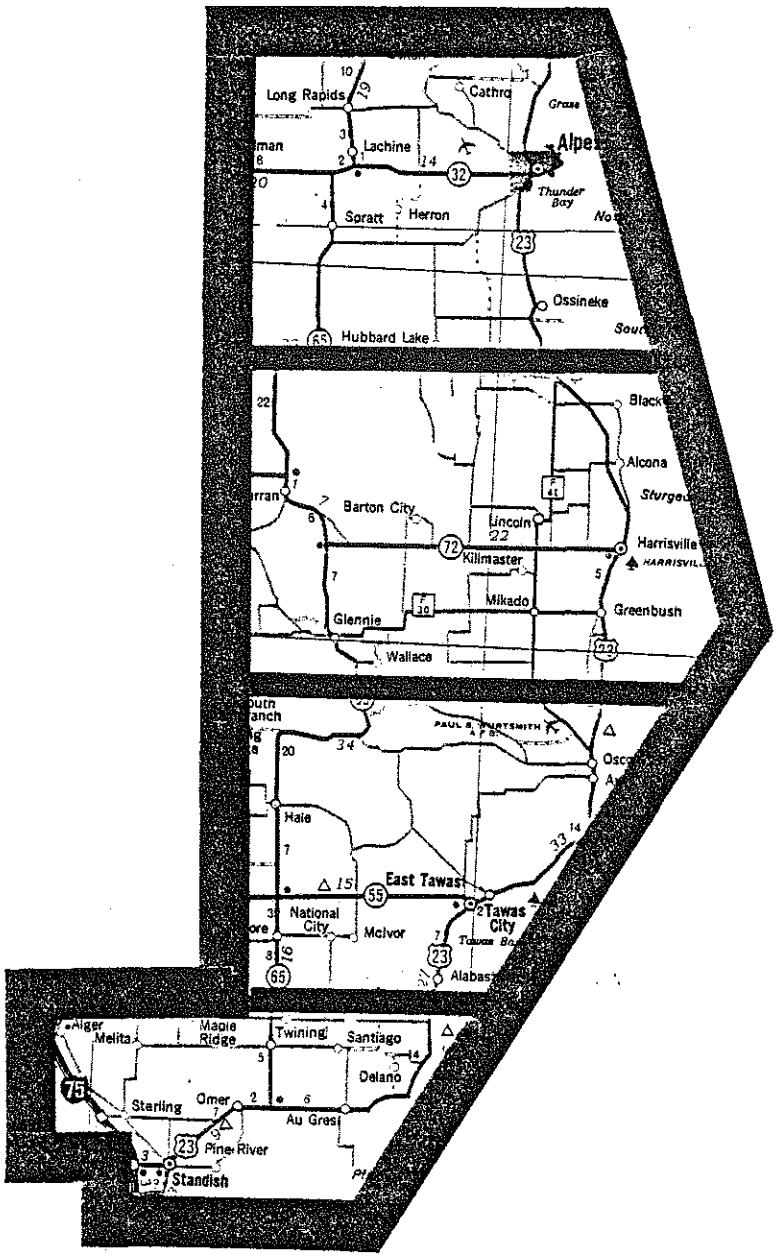


FIGURE 3

The following graphics illustrate the alignment of each proposed alternate beginning with alt 77 which is the neutral or "do-nothing" situation. They then follow with alt 72 and continue to alt 76 which are the five preliminary "build" situations.

ALTERNATE 77

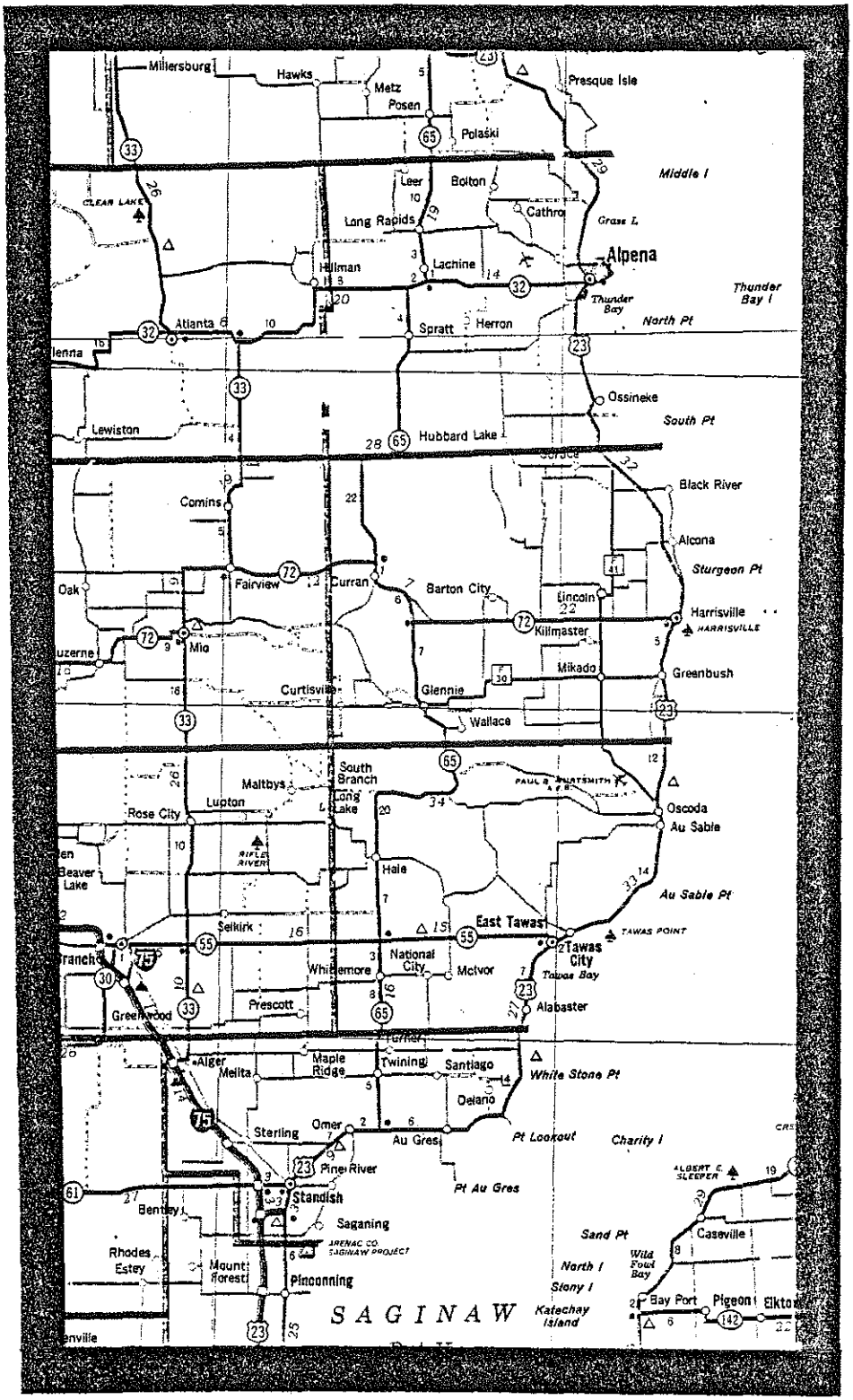
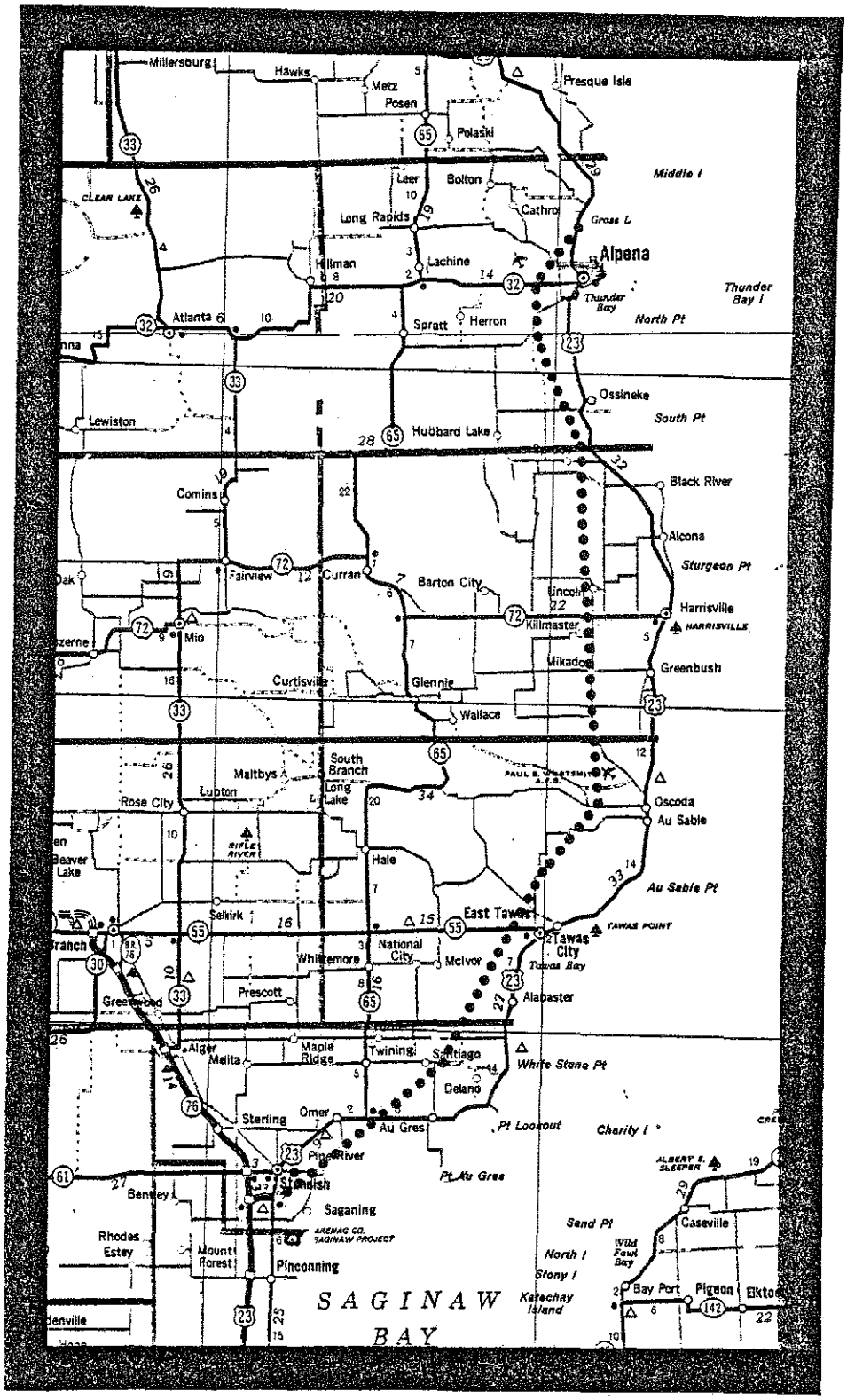


FIGURE 4

FIGURE 5

ALTERNATE 72



ALTERNATE 73

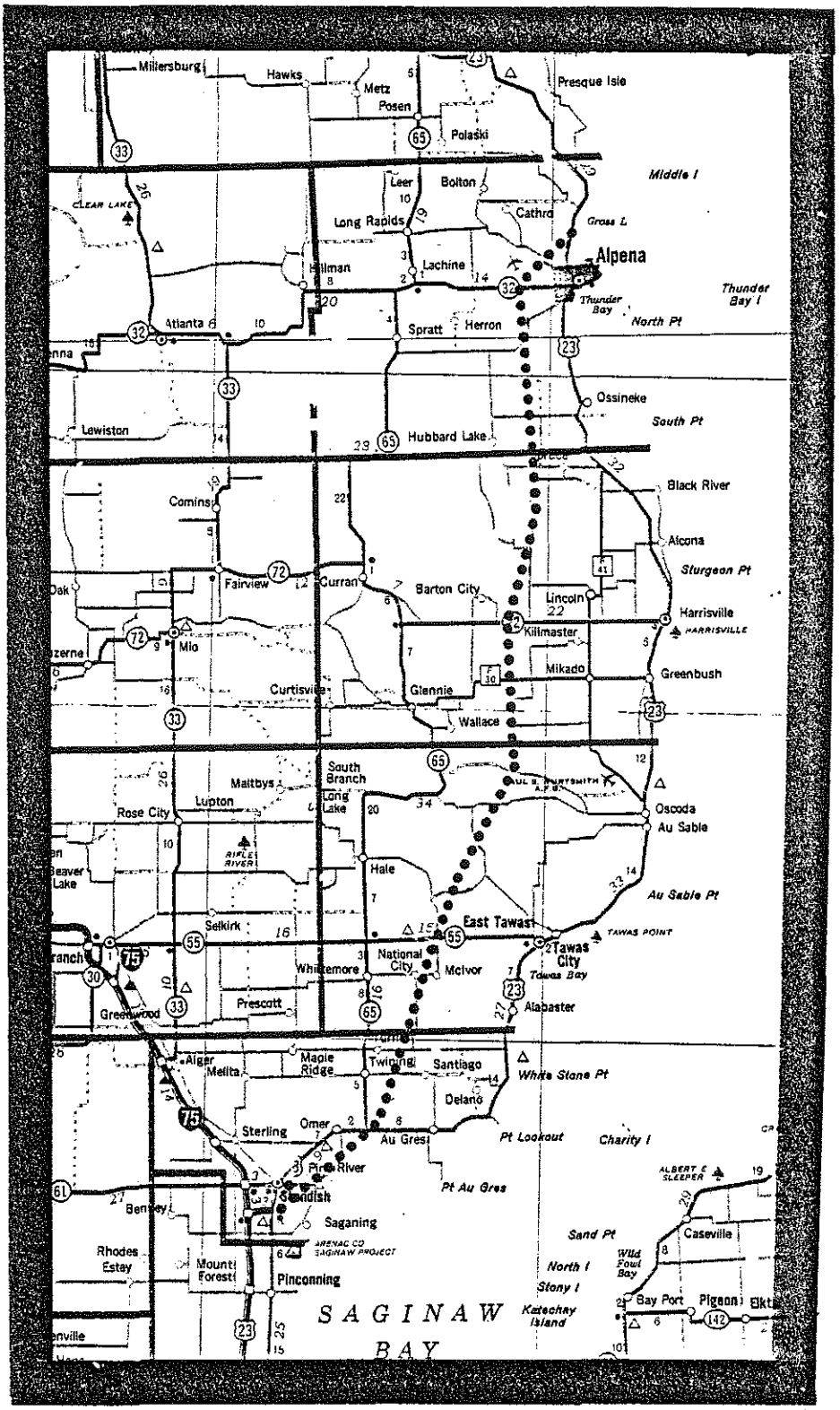


FIGURE 6

ALTERNATE 74

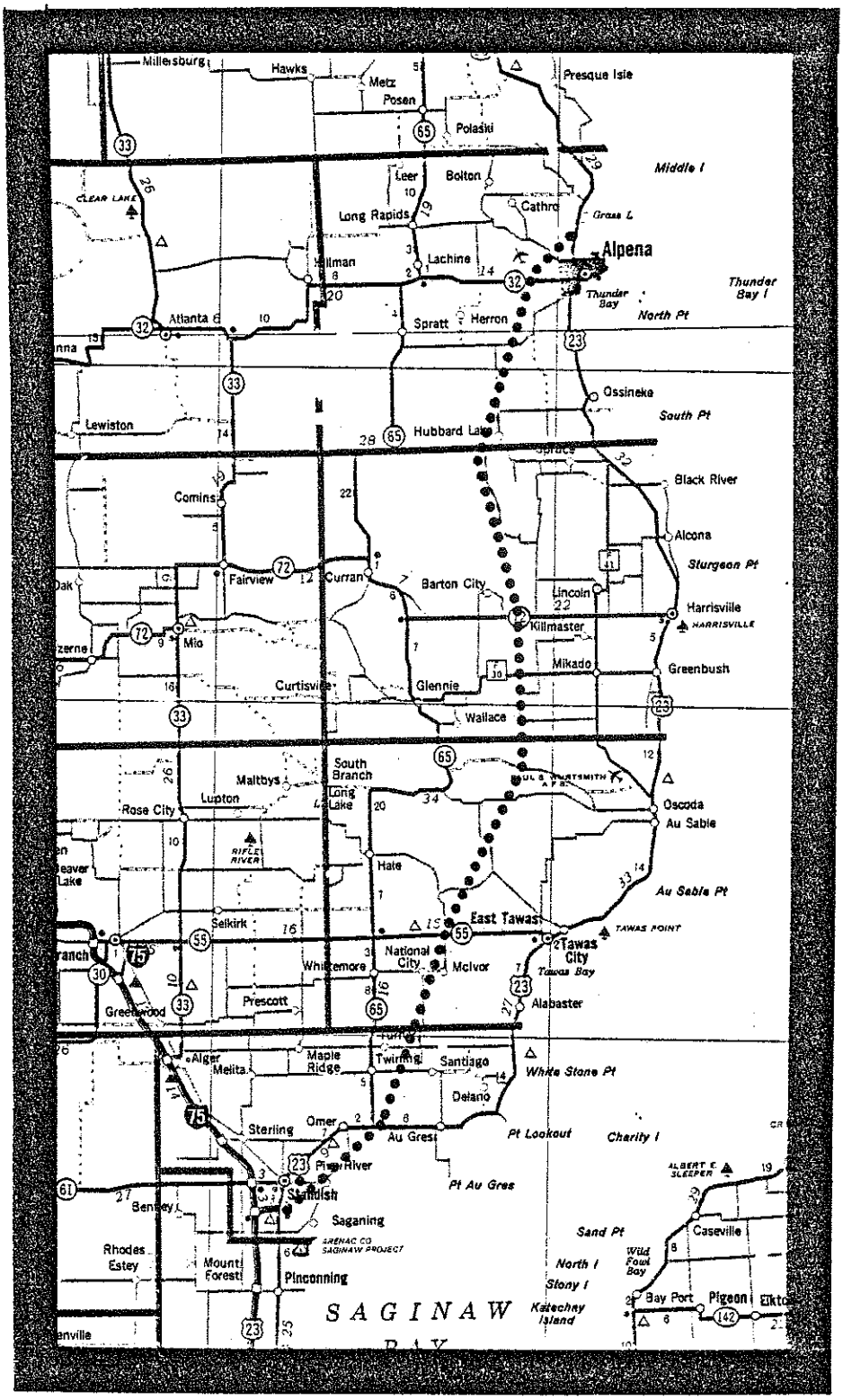


FIGURE 7

ALTERNATE 75

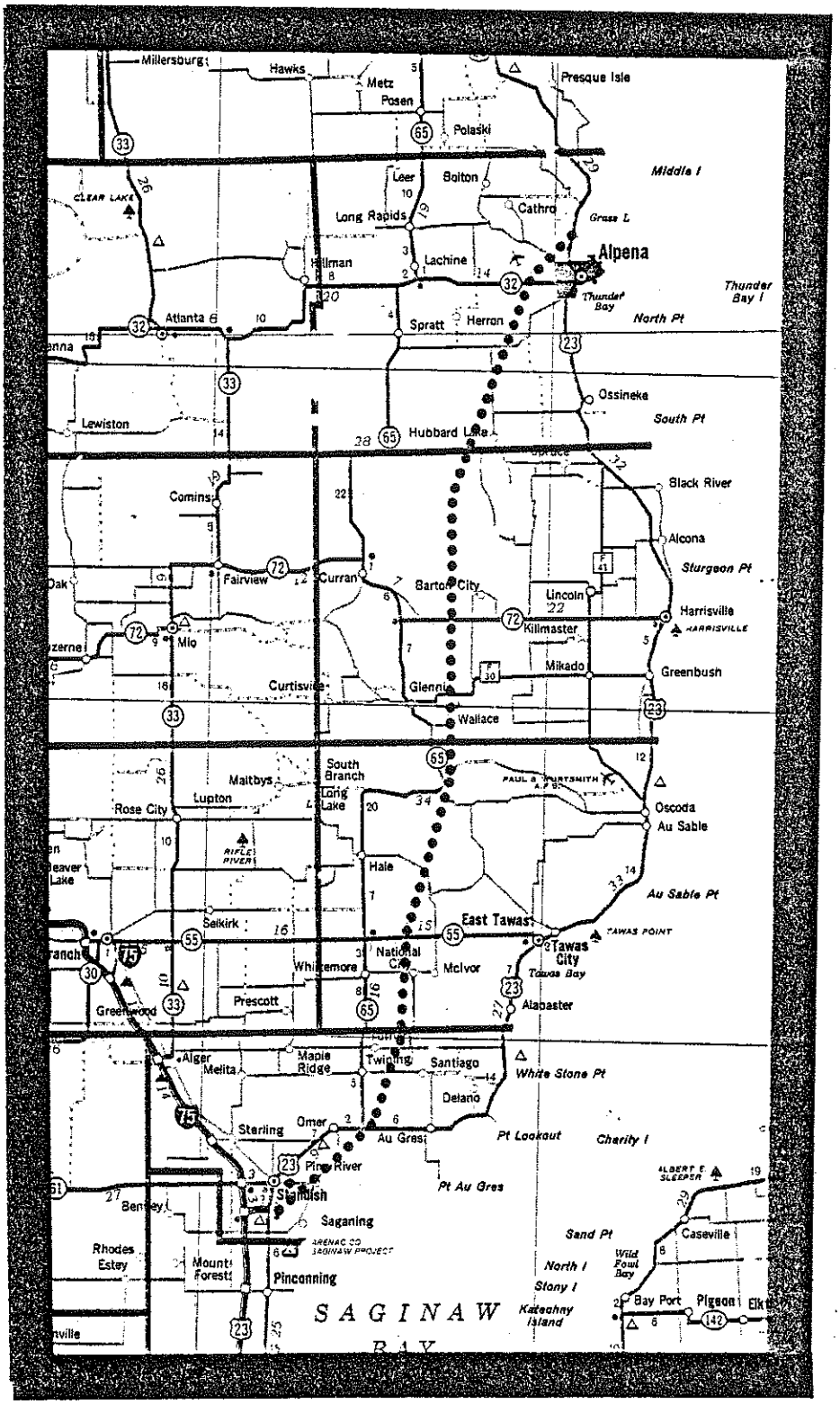


FIGURE 8

ALTERNATE 76

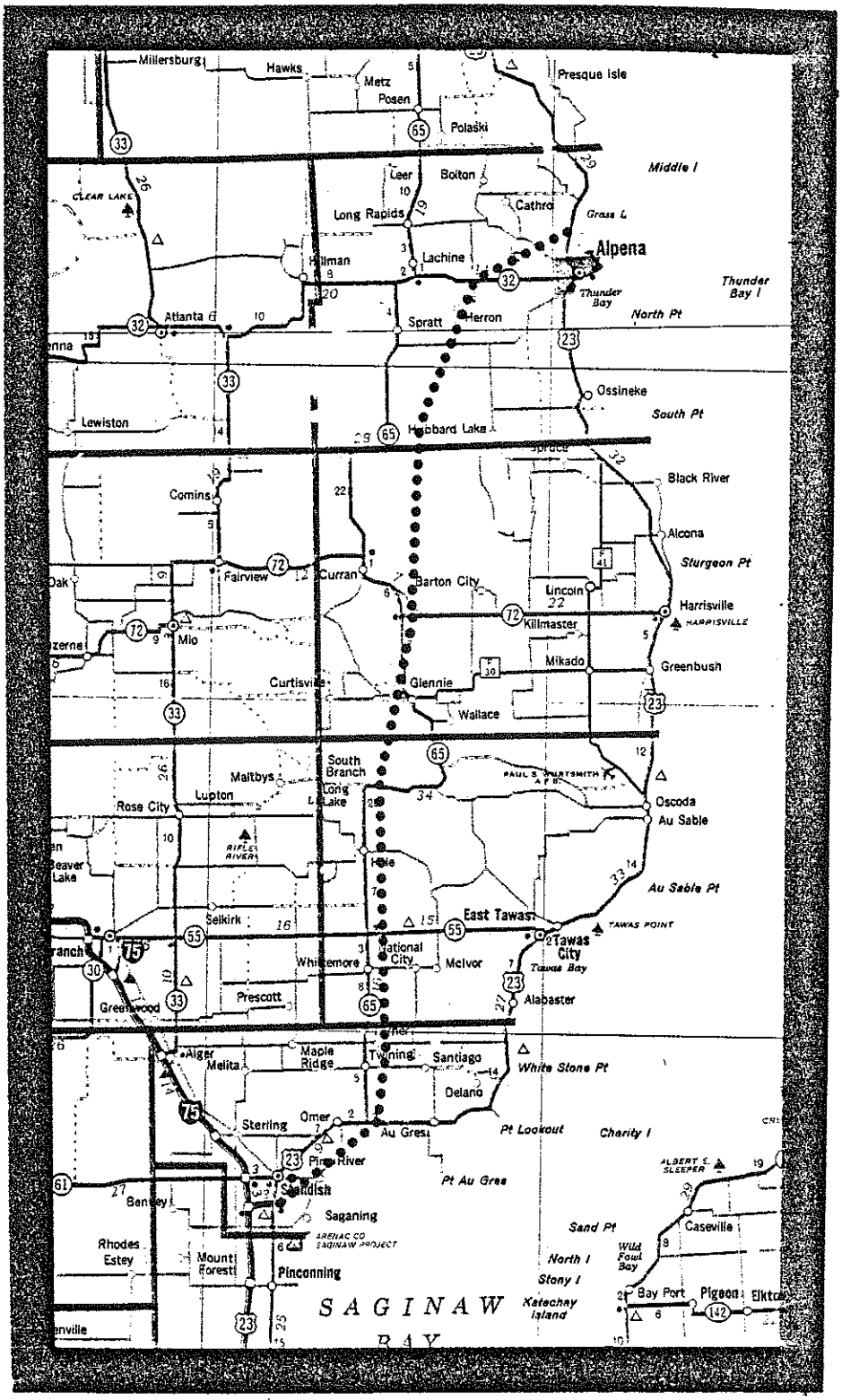
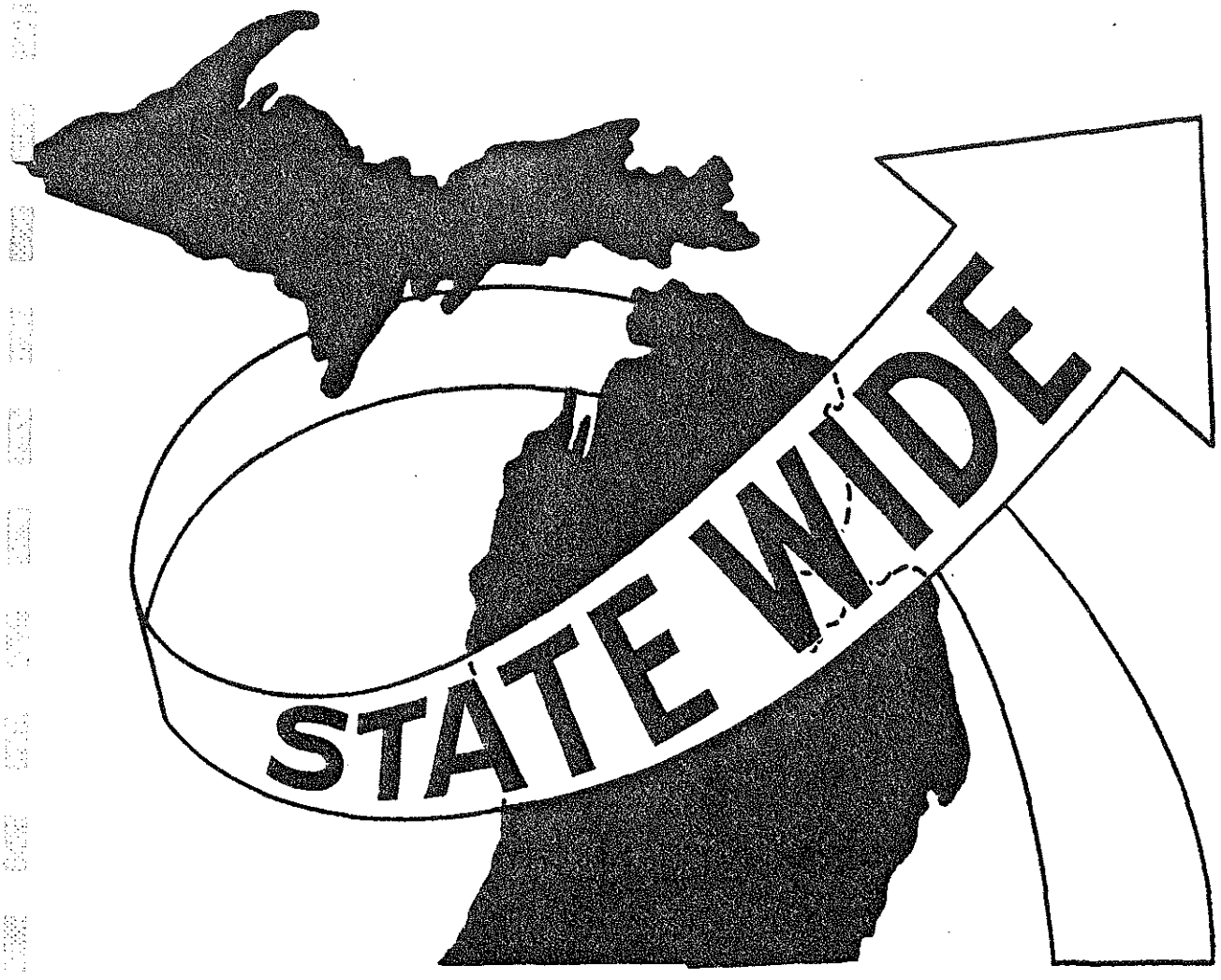


FIGURE 9

LEVEL OF SERVICE



The next set of graphics detail the levels of service for each alternate. The level of service is the measure of adequacy of each highway in terms of its capacity to handle the amount of traffic that is expected to use the facility. With regard to the bandwidth plots which are shown, the wider the bands appear for each route or section of highway, the less adequate the individual road or system is expected to be under that proposed set of circumstances (See Figures 10, 11). In following, the narrower the lines appear, the better the highways are handling the expected traffic burden and in turn, serving the motoring public. For a thorough review of the definition and application of Level of Service, refer to Report Volume 1-H LEVEL OF SERVICE SYSTEMS ANALYSIS MODEL.

Working in conjunction with the graphic bandwidth plots, the system summary program details the exact number of miles of highway experiencing each specific level of service band per designated analysis region plus displaying other relevant travel impact data. By reviewing the bandwidth plots and the summary program data together - valid conclusions regarding travel impact can be made for each alternate consideration. The bandwidth plots are presented on the following pages beginning with the "do-nothing" situation (alternate 77). By comparing this alternate with the five "build" alternates one can draw preliminary conclusions regarding the effectiveness of each proposal relative to its effect on the efficiency of the total system.

FIGURE 10

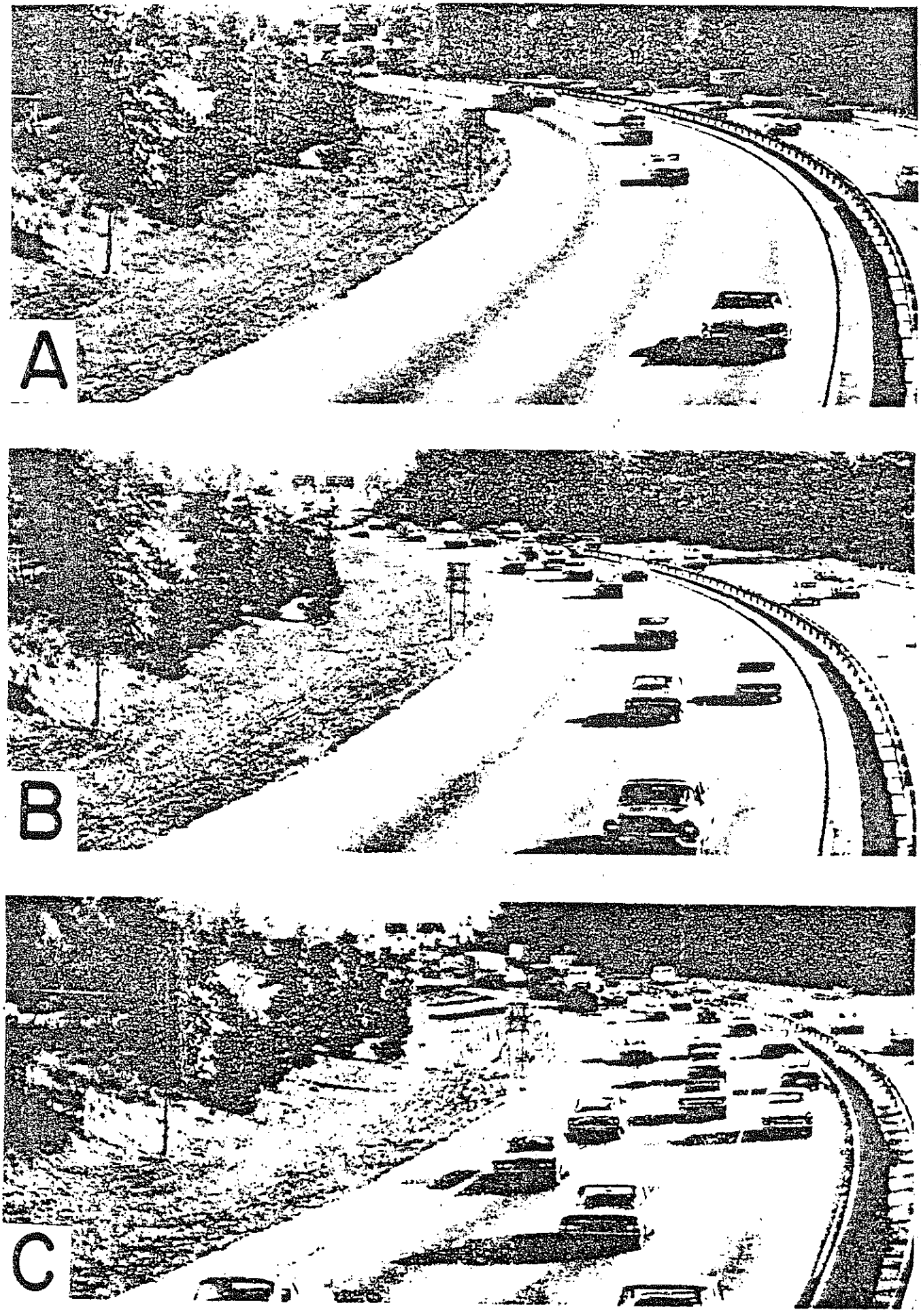
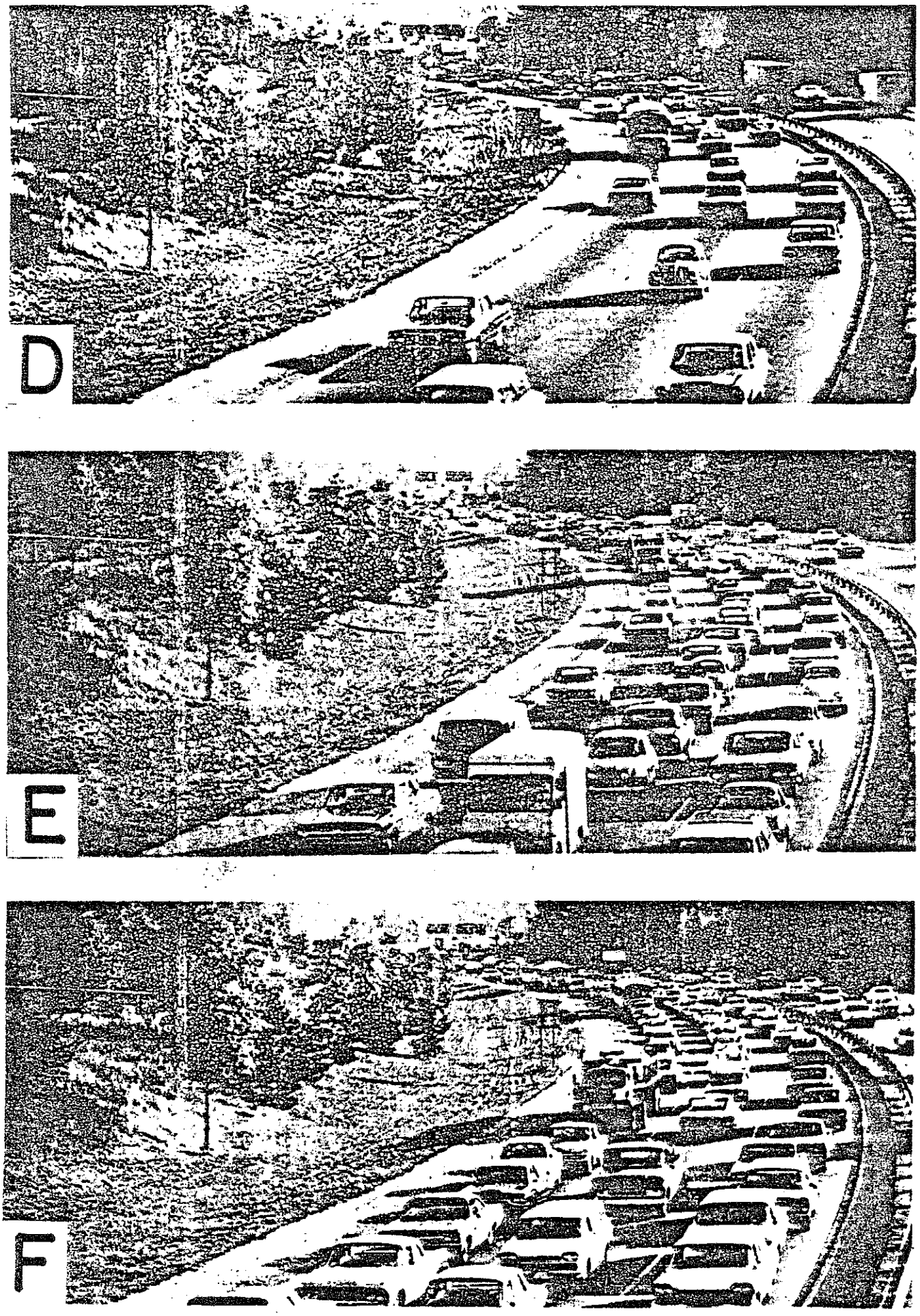


FIGURE 11



PREFACE TO ANALYSIS SECTION

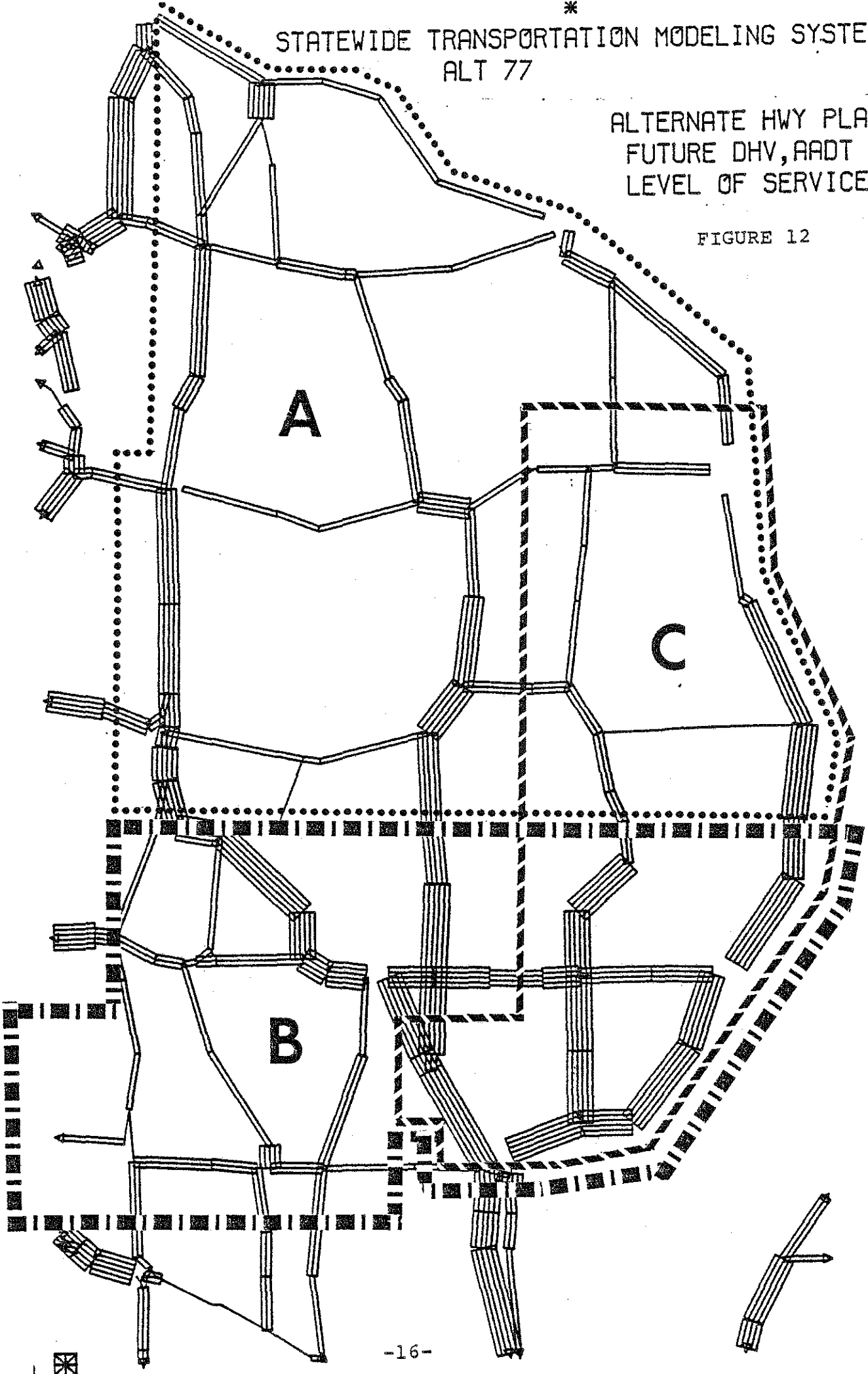
As mentioned in the introduction, this report and the following brief analysis are of a preliminary nature and are not intented to "select" a given alternate as the final choice for construction. The alternate alignments themselves are experimental and are intended only to grasp an overview of the possible solutions to future travel problems within these selected study regions. They were run to produce, if you will, topics for discussion relative to the task at hand of analyzing the merits of new construction within these areas.

The analysis format follows the general pattern in which the travel data are produced from the analysis batteries themselves. Each grouping of data relates to the individual study areas A, B and C with specific categories of information pointing to the impact of each of the six alternates within the region. Reference is made as to one alternate being higher or lower in one capacity as opposed to another but it is done for that purpose only . . . reference. Final conclusions are left to the future and to the people in charge of the responsibility.

STATEWIDE TRANSPORTATION MODELING SYSTEM
ALT 77

ALTERNATE HWY PLAN
FUTURE DHV, AADT
LEVEL OF SERVICE

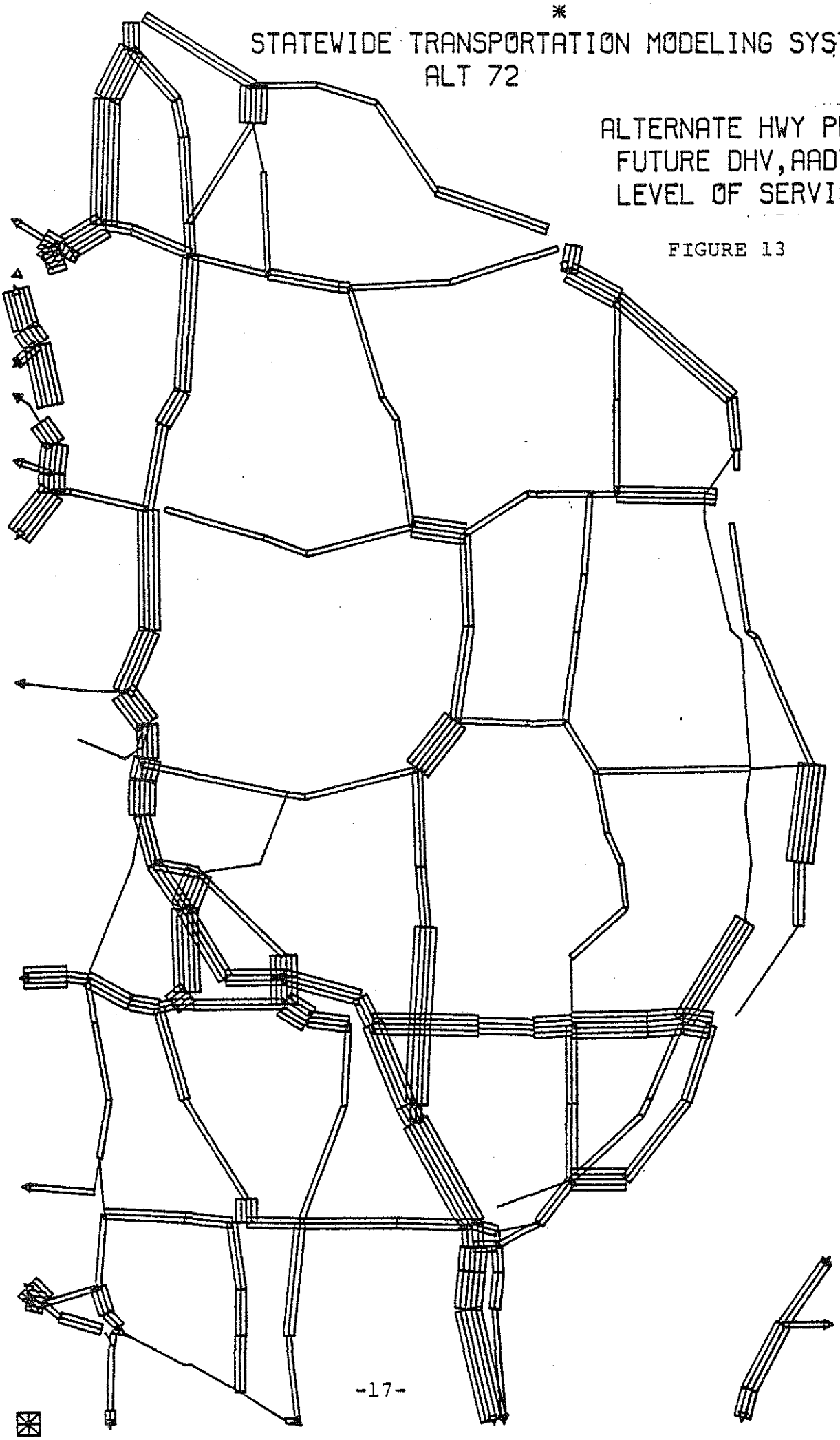
FIGURE 12



STATEWIDE TRANSPORTATION MODELING SYSTEM
ALT 72

ALTERNATE HWY PLAN
FUTURE DHV, AADT
LEVEL OF SERVICE

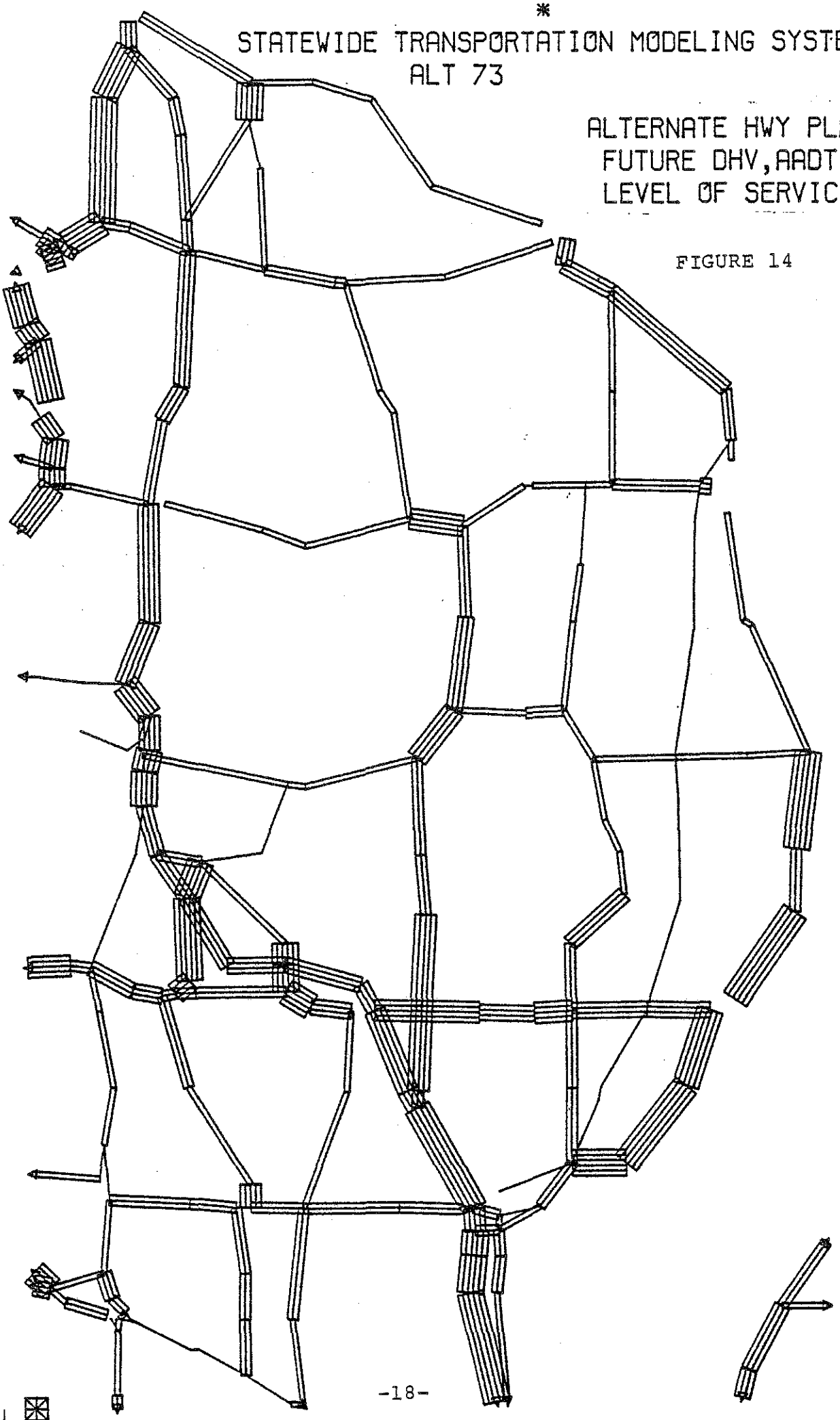
FIGURE 13



STATEWIDE TRANSPORTATION MODELING SYSTEM
ALT 73

ALTERNATE HWY PLAN
FUTURE DHV, AADT
LEVEL OF SERVICE

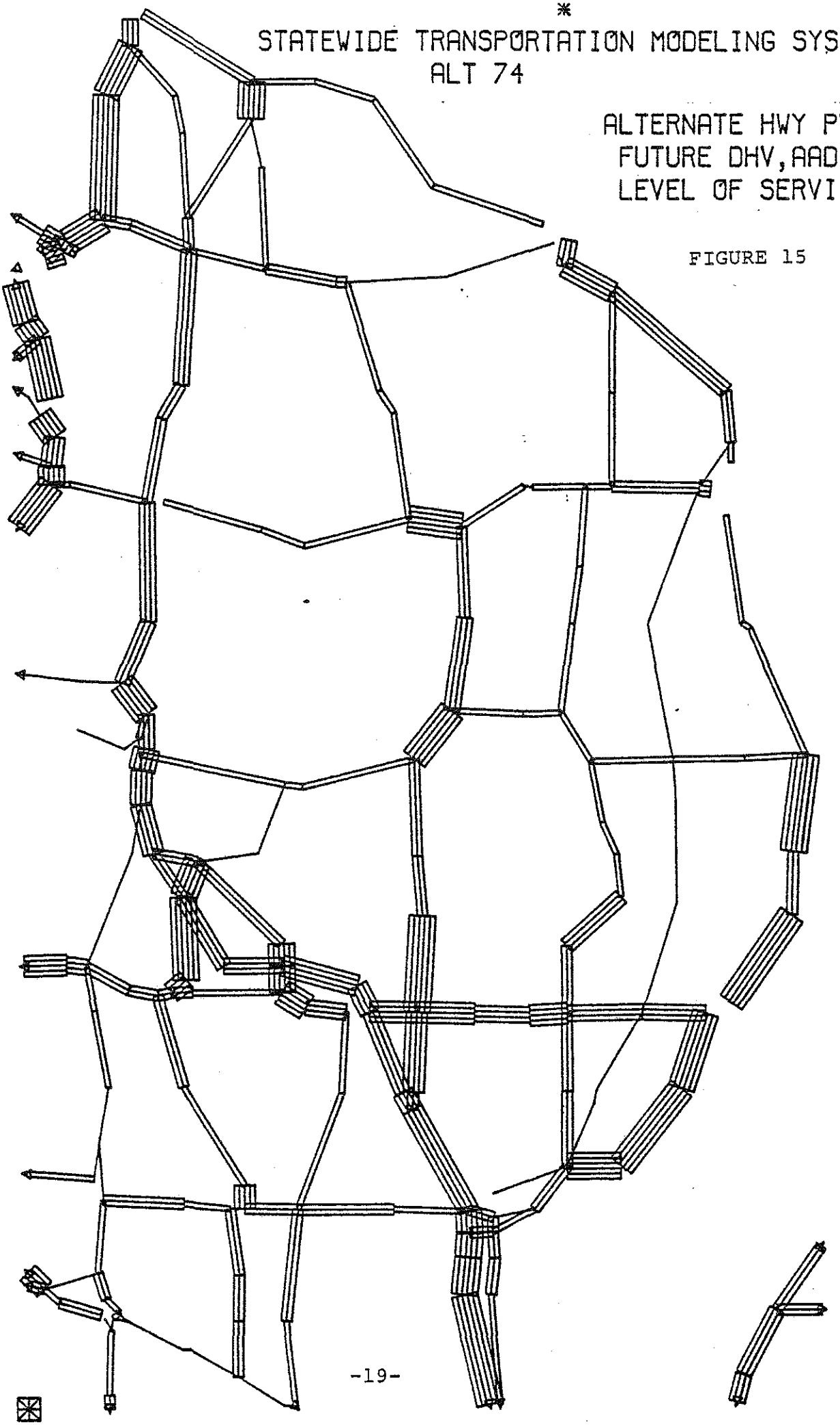
FIGURE 14



STATEWIDE TRANSPORTATION MODELING SYSTEM
ALT 74

ALTERNATE HWY PLAN
FUTURE DHV, AADT
LEVEL OF SERVICE

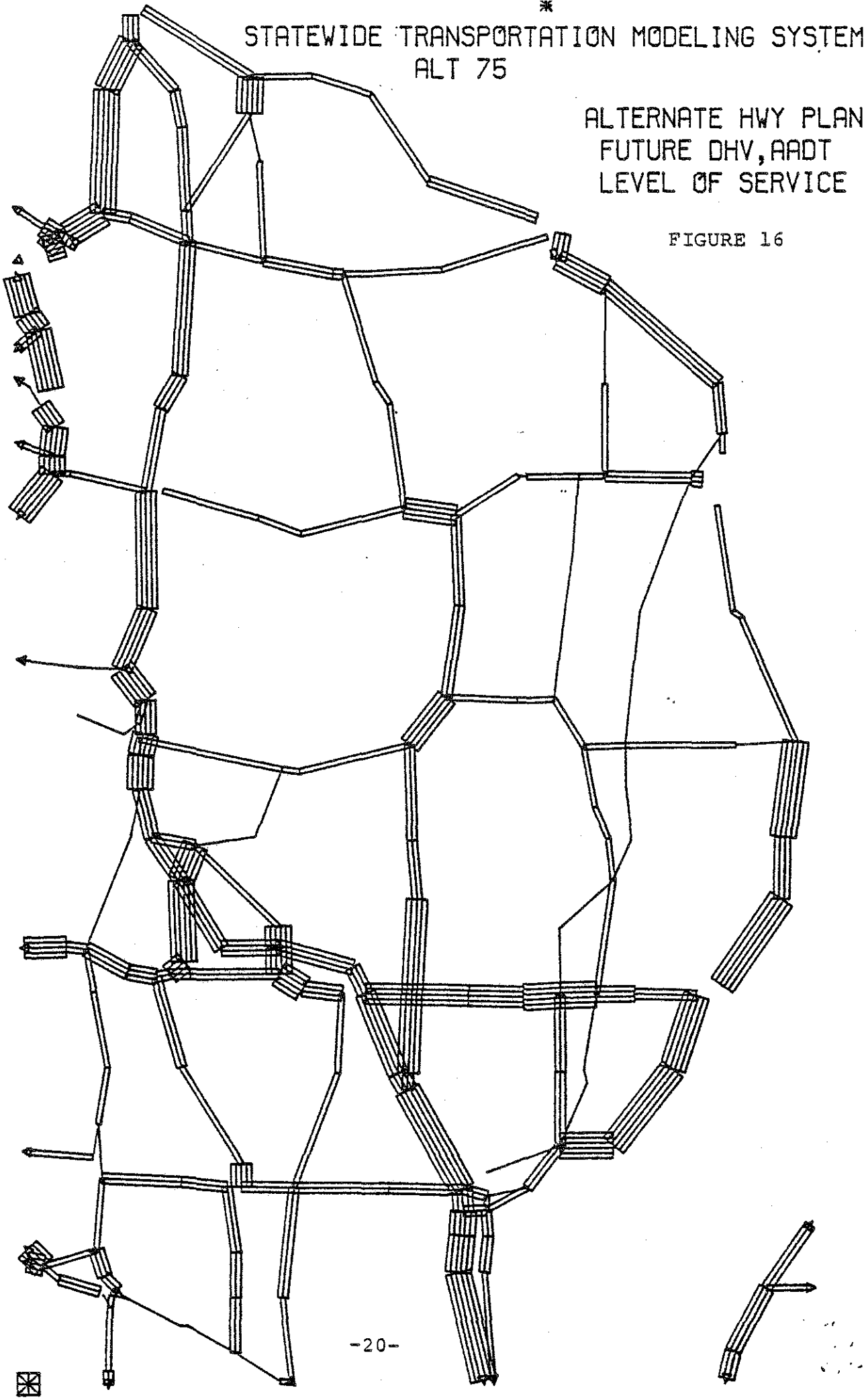
FIGURE 15



STATEWIDE TRANSPORTATION MODELING SYSTEM
ALT 75

ALTERNATE HWY PLAN
FUTURE DHV, AADT
LEVEL OF SERVICE

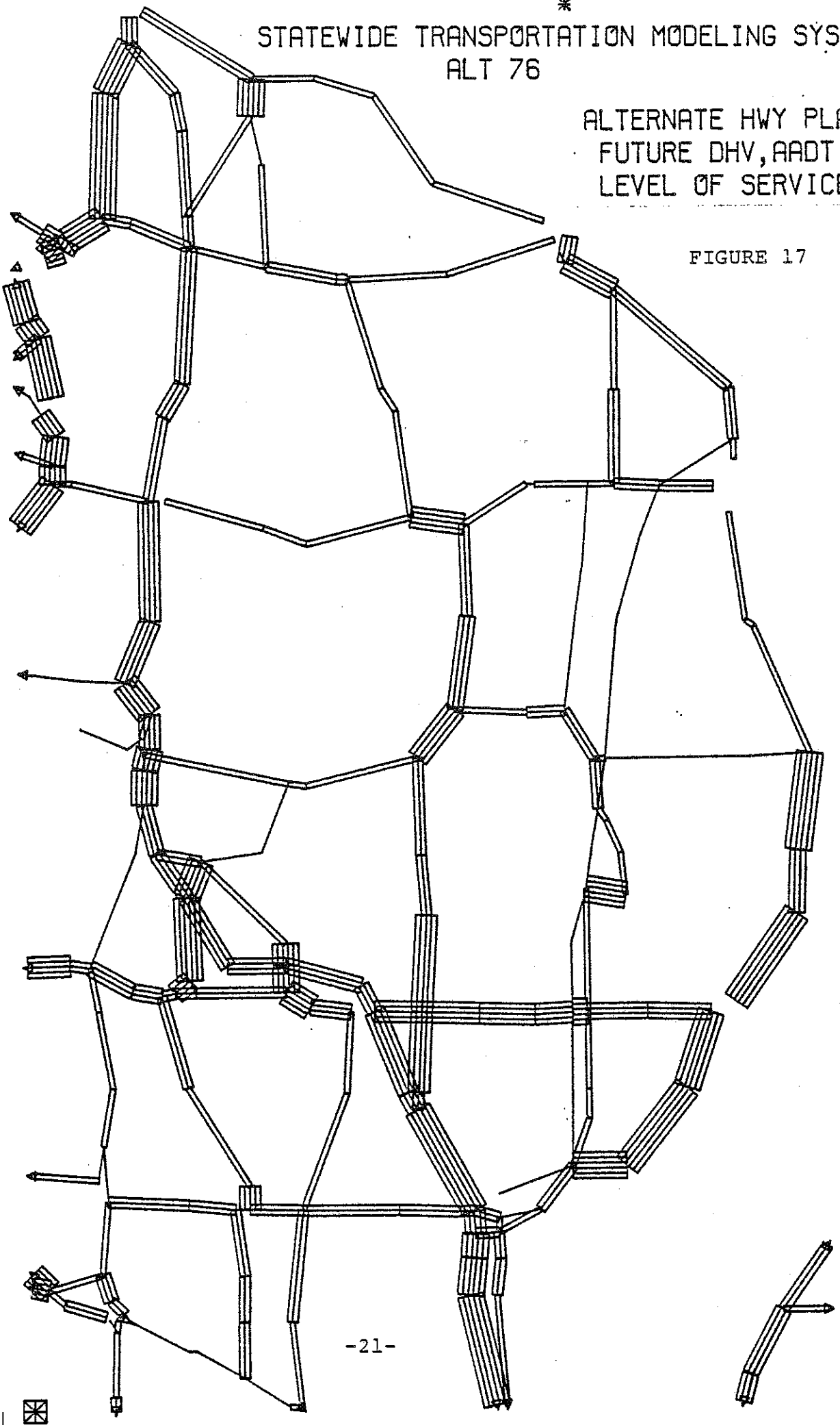
FIGURE 16



STATEWIDE TRANSPORTATION MODELING SYSTEM
ALT 76

ALTERNATE HWY PLAN
FUTURE DHV, AADT
LEVEL OF SERVICE

FIGURE 17



Level of Service Deficiencies:

The three areas of analysis are superimposed over the alt 77 bandwidth plot to give perspective to the plots themselves. (Refer to Figure 12)

To further clarify Level of Service and the individual bandwidths, a one line band represents Level of Service "A" (under capacity) two lines "B" etc. - on up to L.S. - "F" (over capacity). For quick comparison, three lines represent level of service "C" or the point of service where the design hour of the highway matches exactly the one hour capacity of that highway - these capacities vary and are related directly to the type of facility and lanes thereon in order to provide a reliable and realistic comparison.

As evidenced by the neutral bandwidth plot, the north-south movements of traffic from the southern metropolitan areas creates an overloading situation on all four major north-south routes which extend from US-23, M-76 near Standish. These routes include, from west to east, M-76 itself, M-33, M-65 and US-23. Nothing profound could be said of the situation, with the neutral acceptance of the fact that the majority of the trips are recreational in nature and occur on the weekends as motorists in the high density areas head for the retreat of the northern woods. The apparent destinations of their efforts can be seen as the L.S. bands diminish in size as they proceed in a northly direction. The major areas of deficiencies occur within the area south of Alpena.

All four routes display "F" levels of service below this imaginary cutline. Specifically on M-76, levels of Service "F" occur northerly to a point near Grayling. From this point further north they drop to "E" and eventually to "D" and "C". As M-33 departs from M-76, it displays level of service "F" until it reaches the junction of M-72. M-65 appears to be the least effected by the influx as it "bottoms out" as it reaches the Au Sable River - a point nearer the south than any other route - US-23 carries its share of the "F" level burden until it reaches Harrisville and M-72. Aside from the heavy influence of the recreational traffic - other trip purpose categories are partially responsible for the overloading problem on sections of highway which extend between proximal cities such as Oscoda and Tawas City and Harrisville on US-23. This can be seen as alternates are plugged into the system and overloading still occurs sporadically between these areas. The effects of the specific alternates on Level of Service can be reviewed on the remaining bandwidth plots. (See Figures 13, 14, 15, 16, 17).

Alternate 72:

An "F" L.S. on M-76 now only extends to the junction of M-33. M-33 itself drops to an "E" L.S. until it reaches Rose City and proceeds from that point north on a "C" L.S. until the junction of M-72 causes some problems. M-65 seems to be relieved from all of its problems and US-23 only shows capacity difficulties as it separates from the new freeway and on the link south of Harrisville on the junction of M-72. M-55 between M-65 and US-23 appears to be adversely affected by the new freeway as the general east-west movement in that area is intensified.

ALTERNATE 73:

Alternate 73 appears to produce the same results on M-76 and M-33 but the effects on M-65 and US-23 are a little less dramatic. Higher levels of service are now seen on M-65 north of M-55 and F - Levels of Service occur all along US-23 until M-72 is reached near Harrisville. This brings to light the planning idea that building near success brings success. In other words; the present north-south routes serve their purpose by location quite well - as alternates or new highways are moved from a location near the existing facility to a location farther from the facility, the probable success of the new route diminishes. This is not always true but the years of subsequent building along existing north-south routes such as M-33, M-65 and US-23 aid to the self-inherent adequacy of these routes as being located on the path people wish to travel. When these routes become overly "successful" new routes need to be added to either supplement them or replace them. In this case the new freeway will not be built over an existing location due to cost of R.O.W., therefore the degree to which it supplements the existing routes appears to be related to the proximity of the new route to the old. The specific location of the new freeway and the "success" thereof now falls within the definition of the goals set for the new highway. Should the goal of the new freeway be to drastically reduce the traffic on US-23 alone or M-65 alone or some combination of the north-south routes. As review of the alternates continues it will be seen that a healthy compromise is difficult but more likely to succeed as the demands of the more traveled highway are met. This decision too should

be weighted against the overall effects within the individual study areas. This data will be presented in subsequent sections.

Alternate 74

As we proceed through the presentation of the impacts of these alternates , - the alternates themselves are "moving" or being located in a more westerly direction. Alt 72 is located near US-23 and alt 76 is located to the west of M-65. This was pointed out because as the alts are moved to the west - the greater the impact they appear to have on the L.S. of M-76. This is first noticeable with this alt (74). Levels of Service "F" are now entirely diminished along the M-76 corridor although they do still portray an "E" level of service which is still questionably in terms of adequacy. An unusual thing occurs, however, on M-33 - the level of service actually deteriates from an "E" level to an "F" level just north of the intersection with M-55.

M-65 does not change except for a minor decrease in service on the M-76 link south of M-32. US-23 does not appear to be affected by the shift and still remains over-capacity. Another area which demands some attention and has not been mentioned is the US-23 area north of the connection with the proposed freeway. The connection of the freeway to the existing US-23 facility imposes an added burden to the route but not one which presses the road to its absolute limit or "F" level capacity. This can be seen on all alternates which should bring some relief to concern focused on that area.

ALTERNATE 75:

This alternate places a little more pressure on M-76 between M-61 and M-33. This pressure is not entirely negative as the effect on M-76 above M-33 is a slight improvement with several links dropping to a "D" from an "E" L.S. when compared to alt 74. M-33 is still deficient south of Rose City but more consistant with an "E" L.S. compared to an "F" on the neutral as well as the previous alt. M-65 drops dramatically in assignment and appears to be operating at a level far below the intended capacity of the road. US-23 is still operating at an "F" level from M-65 to Harrisville.

Alternate 76:

This alternate paints an almost identical picture to that imposed by alt. 75. M-76 remains the same. M-33 remains the same; M-65, US-23 etc. Only minor differences become evident and at expected small areas of concern.

In total, Alternate 72 appears to have the greatest impact on the Level of Service for existing US-23. Alternate 75 appears to relieve the greatest amount of traffic pressure on M-65 - the tradeoffs of the others are debateable but can be seen from a better perspective as the summary program output is analyzed.

Histograms and Tables which display element unpact are presented now for review. These data are divided by alternate impact by study area (A, B, C) and as will be found, the impact of the alternates can be defined by goals of the areas and should be very helpful in public presentations. The bandwidth plots covered the graphic responsibility of analysis while the summary tables and histograms should cover the statistical aspects of analysis.

The following tables list the pertinent data by alternate by region. These table pages include such information as total miles, annual accidents, number of miles of F.A.P. at level of service "C", etc.

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA77 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 16, 20, 60, 68, 69, 71,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "A"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	88	6	283	223	601
ANNUAL VEHICLE-MILES (THOUSANDS)	645590	25382	408871	174396	1254241
ANNUAL VEHICLE-HOURS (THOUSANDS)	11336	445	8379	3875	24037
ANNUAL ACCIDENTS	801	21	1424	601	2848
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	124	82	348	344	227
ACCIDENTS PER 100 MILLION VEH-HR	7070	4731	16996	15513	11849
MILES LS=1	0	0	3	36	39
MILES LS=2	0	6	144	93	244
MILES LS=3	34	0	85	66	185
MILES LS=4	21	0	25	0	46
MILES LS=5	27	0	5	19	53
MILES LS=6	4	0	19	8	32

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 1

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELLING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA72 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 16, 20, 60, 68, 69, 71,

NORTHEAST REGION CORRIDOR STYDY ALTS 72-77 STUDY AREA "A"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	88	56	277	223	646
ANNUAL VEHICLE-MILES (THOUSANDS)	644082	101514	335464	138075	1219137
ANNUAL VEHICLE-HOURS (THOUSANDS)	11312	1782	6871	3086	23052
ANNUAL ACCIDENTS	861	135	1198	475	2669
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	133	133	357	344	218
ACCIDENTS PER 100 MILLION VEH-HR	7613	7576	17439	15390	11580
MILES LS=1	0	56	8	20	85
MILES LS=2	0	0	161	162	324
MILES LS=3	34	0	54	29	118
MILES LS=4	21	0	26	2	51
MILES LS=5	22	0	11	0	34
MILES LS=6	9	0	14	8	32

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 2

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA73 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 16, 20, 60, 68, 69, 71,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "A"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	88	57	277	223	646
ANNUAL VEHICLE-MILES (THOUSANDS)	645903	97910	335023	152332	1231170
ANNUAL VEHICLE-HOURS (THOUSANDS)	11344	1719	6851	3404	23320
ANNUAL ACCIDENTS	864	129	1186	511	2691
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	133	132	354	335	218
ACCIDENTS PER 100 MILLION VEH-HR	7617	7548	17319	15018	11543
MILES LS=1	0	57	11	21	90
MILES LS=2	0	0	173	156	329
MILES LS=3	34	0	48	23	107
MILES LS=4	21	0	23	12	57
MILES LS=5	22	0	5	8	37
MILES LS=6	9	0	14	0	24

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 3

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA74 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 16, 20, 60, 68, 69, 71,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "A"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	88	57	277	223	646
ANNUAL VEHICLE-MILES (THOUSANDS)	543968	99651	328093	153385	1125098
ANNUAL VEHICLE-HOURS (THOUSANDS)	9553	1750	6700	3429	21434
ANNUAL ACCIDENTS	719	132	1161	517	2530
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	132	133	353	337	224
ACCIDENTS PER 100 MILLION VEH-HR	7528	7592	17327	15092	11807
MILES LS=1	0	57	33	13	105
MILES LS=2	22	0	150	168	341
MILES LS=3	16	0	48	19	84
MILES LS=4	40	0	18	12	70
MILES LS=5	4	0	5	0	10
MILES LS=6	4	0	20	8	33

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 4

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA75 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 16, 20, 60, 68, 69, 71,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "A"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	88	57	277	223	646
ANNUAL VEHICLE-MILES (THOUSANDS)	643875	111019	334094	134022	1223012
ANNUAL VEHICLE-HOURS (THOUSANDS)	11309	1948	6831	2997	23086
ANNUAL ACCIDENTS	861	149	1191	452	2653
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	133	134	356	337	216
ACCIDENTS PER 100 MILLION VEH-HR	7614	7651	17437	15084	11493
MILES LS=1	0	57	9	55	121
MILES LS=2	0	0	160	127	288
MILES LS=3	34	0	63	29	126
MILES LS=4	21	0	18	2	42
MILES LS=5	22	0	11	8	42
MILES LS=6	9	0	14	0	24

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 5

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS , ALTERNATE MEA76 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 16, 20, 60, 68, 69, 71,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "A"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	88	60	279	223	651
ANNUAL VEHICLE-MILES (THOUSANDS)	645279	102661	335823	145721	1229486
ANNUAL VEHICLE-HOURS (THOUSANDS)	11333	1802	6866	3250	23253
ANNUAL ACCIDENTS	863	136	1181	505	2686
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	133	133	351	346	218
ACCIDENTS PER 100 MILLION VEH-HR	7617	7592	17200	15538	11552
MILES LS=1	0	60	11	60	132
MILES LS=2	0	0	173	95	268
MILES LS=3	34	0	68	45	148
MILES LS=4	21	0	0	12	33
MILES LS=5	22	0	11	8	42
MILES LS=6	9	0	14	0	24

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 6

S Y S T E M I M P A C T S U M M A R Y

MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA77 REGION
REGION CONSISTS OF COUNTIES NOS. 6, 18, 26, 35, 65, 72,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "B"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	17	53	236	175	485
ANNUAL VEHICLE-MILES (THOUSANDS)	234489	260563	839194	241417	1575665
ANNUAL VEHICLE-HOURS (THOUSANDS)	4121	4574	17510	5381	31586
ANNUAL ACCIDENTS	276	315	2978	991	4562
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	117	120	354	410	289
ACCIDENTS PER 100 MILLION VEH-HR	6713	6892	17010	18425	14442
MILES LS=1	0	7	0	11	18
MILES LS=2	0	33	27	51	112
MILES LS=3	0	12	47	55	115
MILES LS=4	0	0	23	0	23
MILES LS=5	0	0	23	6	29
MILES LS=6	17	0	116	51	185

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 7

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA72 REGION
REGION CONSISTS OF COUNTIES NOS. 6, 18, 26, 35, 65, 72,

NORTHEAST REGION CORRIDOR STUDY ALST 72-77 STUDY AREA "B"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	64	129	221	163	578
ANNUAL VEHICLE-MILES (THOUSANDS)	585264	566491	369871	156283	1677911
ANNUAL VEHICLE-HOURS (THOUSANDS)	10275	9785	7948	3518	31527
ANNUAL ACCIDENTS	757	874	1450	644	3727
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	129	154	392	412	222
ACCIDENTS PER 100 MILLION VEH-HR	7372	8936	18250	18327	11822
MILES LS=1	0	28	22	18	70
MILES LS=2	0	58	35	59	153
MILES LS=3	0	10	80	65	155
MILES LS=4	35	2	20	0	58
MILES LS=5	13	12	32	19	78
MILES LS=6	15	17	28	0	61

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 8

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE MEA73 REGION
REGION CONSISTS OF COUNTIES NOS. 6, 18, 26, 35, 65, 72,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "B"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	64	126	222	163	576
ANNUAL VEHICLE-MILES (THOUSANDS)	586319	458699	420044	168989	1634053
ANNUAL VEHICLE-HOURS (THOUSANDS)	10294	7693	8759	3800	30746
ANNUAL ACCIDENTS	758	715	1642	698	3815
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	129	156	391	413	233
ACCIDENTS PER 100 MILLION VEH-HR	7372	9069	18751	18372	12409
MILES LS=1	0	57	9	11	78
MILES LS=2	0	38	37	48	123
MILES LS=3	0	10	58	72	140
MILES LS=4	35	2	35	11	84
MILES LS=5	13	0	27	19	60
MILES LS=6	15	17	55	0	88

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 9

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA74 REGION
REGION CONSISTS OF COUNTIES NOS. 6, 18, 26, 35, 65, 72,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "B"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	64	126	222	163	576
ANNUAL VEHICLE-MILES (THOUSANDS)	563800	430339	402064	170109	1566313
ANNUAL VEHICLE-HOURS (THOUSANDS)	9898	7399	8371	3822	29491
ANNUAL ACCIDENTS	725	669	1569	702	3666
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	128	155	390	412	234
ACCIDENTS PER 100 MILLION VEH-HR	7334	9042	18750	18372	12434
MILES LS=1	0	70	9	11	91
MILES LS=2	0	27	31	53	112
MILES LS=3	4	11	79	67	162
MILES LS=4	24	0	29	11	64
MILES LS=5	30	0	30	9	70
MILES LS=6	5	17	42	10	74

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 10

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA75 REGION
REGION CONSISTS OF COUNTIES NOS. 6, 18, 26, 35, 65, 72,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "B"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	64	124	223	163	575
ANNUAL VEHICLE-MILES (THOUSANDS)	586999	469044	438664	153209	1647918
ANNUAL VEHICLE-HOURS (THOUSANDS)	10306	8077	9128	3450	30963
ANNUAL ACCIDENTS	759	731	1720	630	3842
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	129	155	392	411	233
ACCIDENTS PER 100 MILLION VEH-HR	7372	9052	18847	18274	12409
MILES LS=1	0	44	9	29	83
MILES LS=2	0	50	35	48	134
MILES LS=3	0	10	61	65	137
MILES LS=4	35	2	25	0	62
MILES LS=5	13	0	29	19	62
MILES LS=6	15	17	62	0	95

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 11

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA76 REGION
REGION CONSISTS OF COUNTIES NOS. 6, 18, 26, 35, 65, 72,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "B"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	64	123	222	163	573
ANNUAL VEHICLE-MILES (THOUSANDS)	586225	478841	441495	146149	1652711
ANNUAL VEHICLE-HOURS (THOUSANDS)	10292	8246	9178	3293	31011
ANNUAL ACCIDENTS	758	745	1735	608	3848
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	129	155	393	416	232
ACCIDENTS PER 100 MILLION VEH-HR	7372	9042	18907	18470	12409
MILES LS=1	0	26	9	41	77
MILES LS=2	0	66	35	48	151
MILES LS=3	0	10	53	49	113
MILES LS=4	35	2	34	0	71
MILES LS=5	13	0	33	19	66
MILES LS=6	15	17	56	4	93

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 12

S Y S T E M I M P A C T S U M M A R Y

MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS

RURAL HIGHWAYS ALTERNATE MEA77 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 6, 35,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "C"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	17	2	152	120	293
ANNUAL VEHICLE-MILES (THOUSANDS)	234489	14707	466786	133587	849571
ANNUAL VEHICLE-HOURS (THOUSANDS)	4121	258	9115	2961	16456
ANNUAL ACCIDENTS	276	5	1734	500	2517
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	117	36	371	374	296
ACCIDENTS PER 100 MILLION VEH-HR	6713	2108	19032	16887	15296
MILES LS=1	0	0	0	22	22
MILES LS=2	0	0	21	35	56
MILES LS=3	0	2	28	28	59
MILES LS=4	0	0	28	0	28
MILES LS=5	0	0	9	0	9
MILES LS=6	17	0	64	33	116

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 13

S Y S T E M I M P A C T S U M M A R Y
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA72 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 6, 35,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "C"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	17	99	147	120	384
ANNUAL VEHICLE-MILES (THOUSANDS)	194104	359034	262983	60221	876344
ANNUAL VEHICLE-HOURS (THOUSANDS)	3411	6302	5237	1334	16285
ANNUAL ACCIDENTS	229	510	1040	203	1982
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	118	142	395	337	226
ACCIDENTS PER 100 MILLION VEH-HR	6728	8093	19859	15211	12174
MILES LS=1	0	53	22	13	89
MILES LS=2	0	24	40	89	154
MILES LS=3	0	8	40	17	66
MILES LS=4	0	0	9	0	9
MILES LS=5	2	12	9	0	24
MILES LS=6	15	0	24	0	39

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 14

S Y S T E M I M P A C T S U M M A R Y

MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA73 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 6, 35,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "C"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	17	96	148	120	382
ANNUAL VEHICLE-MILES (THOUSANDS)	194445	248332	316048	81445	840272
ANNUAL VEHICLE-HOURS (THOUSANDS)	3417	4359	6096	1811	15685
ANNUAL ACCIDENTS	229	347	1240	269	2087
ACCIDENT RATES ACCIDENTS PER 100 MILLION VEH-MI	118	139	392	330	248
ACCIDENTS PER 100 MILLION VEH-HR	6727	7962	20352	14860	13306
MILES LS=1	0	82	9	7	99
MILES LS=2	0	4	42	72	119
MILES LS=3	0	8	26	28	64
MILES LS=4	0	0	15	11	26
MILES LS=5	2	0	3	0	6
MILES LS=6	15	0	50	0	66

NOTE--COLUMNS OF MILEAGE AND RUNS MAY NOT ADD DUE TO ROUNDING

TABLE 15

S Y S T E M I M P A C T S U M M A R Y

MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS

RURAL HIGHWAYS ALTERNATE NEA74 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 6, 35,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "C"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	17	96	148	120	383
ANNUAL VEHICLE-MILES (THOUSANDS)	178785	257696	315673	81219	833374
ANNUAL VEHICLE-HOURS (THOUSANDS)	3142	4524	6087	1806	15560
ANNUAL ACCIDENTS	206	360	1238	269	2075
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	115	140	392	332	249
ACCIDENTS PER 100 MILLION VEH-HR	6562	7974	20349	14932	13338
MILES LS=1	0	83	9	0	92
MILES LS=2	0	4	39	84	129
MILES LS=3	0	8	29	24	62
MILES LS=4	0	0	15	11	26
MILES LS=5	12	0	3	0	16
MILES LS=6	5	0	50	0	55

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 16

S Y S T E M I M P A C T S U M M A R Y

MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS
RURAL HIGHWAYS ALTERNATE NEA75 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 6, 35,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "C"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	17	94	149	120	382
ANNUAL VEHICLE-MILES (THOUSANDS)	194360	272027	329842	54985	851214
ANNUAL VEHICLE-HOURS (THOUSANDS)	3415	4777	6365	1218	15777
ANNUAL ACCIDENTS	229	381	1304	169	2085
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	118	140	395	308	245
ACCIDENTS PER 100 MILLION VEH-HR	6727	7992	20492	13916	13219
MILES LS=1	0	69	9	49	128
MILES LS=2	0	16	40	52	110
MILES LS=3	0	8	30	17	56
MILES LS=4	0	0	11	0	11
MILES LS=5	2	0	0	0	2
MILES LS=6	15	0	58	0	73

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 17

S Y S T E M I M P A C T S U M M A R Y

MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM
BASIC TRAVEL IMPACTS

RURAL HIGHWAYS ALTERNATE NEA76 REGION
REGION CONSISTS OF COUNTIES NOS. 1, 4, 6, 35,

NORTHEAST REGION CORRIDOR STUDY ALTS 72-77 STUDY AREA "C"

	INTER STATE	FAP FWY	FAP NON-FWY	FAS	TOTAL
TOTAL MILES	17	97	150	120	385
ANNUAL VEHICLE-MILES (THOUSANDS)	194213	273900	342442	51055	861610
ANNUAL VEHICLE-HOURS (THOUSANDS)	3413	4808	6605	1128	15955
ANNUAL ACCIDENTS	229	384	1351	162	2128
ACCIDENT RATES					
ACCIDENTS PER 100 MILLION VEH-MI	118	140	394	317	247
ACCIDENTS PER 100 MILLION VEH-HR	6726	8000	20467	14377	13340
MILES LS=1	0	55	9	76	140
MILES LS=2	0	33	40	11	85
MILES LS=3	0	8	25	28	61
MILES LS=4	0	0	19	0	19
MILES LS=5	2	0	3	0	6
MILES LS=6	15	0	52	4	72

NOTE--COLUMNS OF MILEAGE AND ROWS MAY NOT ADD DUE TO ROUNDING

TABLE 18

LEVEL OF SERVICE IMPACT SUMMARY

Level of Service indicators, to this point, have been referred to by letter A,B,C, etc. On the table output, levels of service are now referenced in numerical form 1,2,3 etc. The 1 represents an "A" level of service, a "2" a "B" level, etc. Now mathematical comparisons can be made which deomonstrate the impact of an alternate on the level of service of individual classes of highways as well as entire systems within the given study areas (A,B,C). This can be done with simple percentages or a weighted average method which proves quite effective as a measure of total area impact. To perform this operation one has to simply multiply the number of miles of highways within each L.S. class by that class L.S. number and add the products together for each group - then divide by the total number of miles in the area system.

This will give the weighted average L.S. for all highways within the study area. By comparing weighted Level of Service Indexes (LSI) for each alternate, rankings can be determined as to the total effect of each alternate upon the area. Not only that, but by dividing the highest alternate LSI into the lowest alternate LSI for each area the percentage impact of improvement of service within that area can be measured. For example, the LSI for each alternate is listed below under the respective study areas.

STUDY AREA

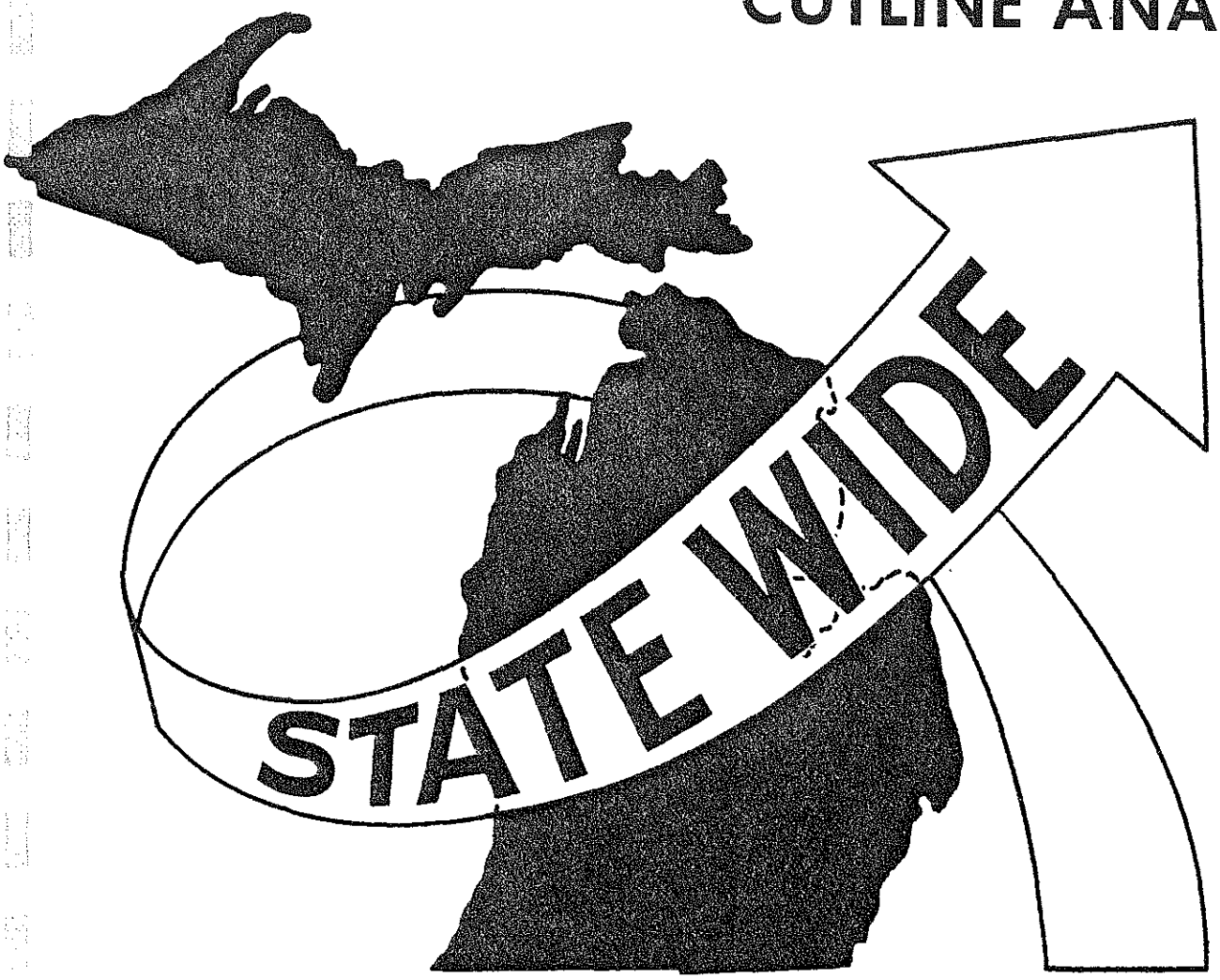
ALTERNATE	A	B	C
77	2.876 High	4.012 High	4.013 High
72	2.566	3.184 Low	2.585 Low
73	2.524	3.329	2.786
74	2.437 Low	3.230	2.763
75	2.483	3.298	2.652
76	2.469	3.309	2.691

$\frac{2.437}{2.876} = 15.27\%$ $\frac{3.184}{4.012} = 20.64\%$ $\frac{2.585}{4.013} = 35.59\%$

For study area "A" alternate 74 brings the L.S.I. down to a low weighted average for the system of 2.437. The neutral do-nothing alternate (77) displays an L.S.I. of 2.876. This shows initially that study area "A", in this year 2000, will apparently not suffer from as great a capacity problem as areas B and C which shows L.S.I.'s for the do-nothing at 4.012 and 4.013 respectively. It also shows that alternate 74 would have the greatest positive effect of reducing what congestion there is within the study area. This impact can be measured as a percentage by dividing 2.437 (Alt. 74 L.S.I.) by 2.876 (Alt. 77 L.S.I.) and arrive at a total L.S. impact effect of 15.27 percent. This could be restated that construction of the proposed alternate 74 would provide an overall reduction of congestion in the area of 15.27%. In study area "B" alternate 72 provides the greatest L.S. impact by displaying a low L.S.I. of 3.184. This is the lowest L.S.I. but an L.S.I. over 3.000 still

represents a minor capacity problem situation. When this figure is divided by the do-nothing (77) L.S.I. of 4.012, the total reduction in congestion can be listed at 20.64%. In study area "C" alternate 72 also provides the greatest margin of congestion relief: 2.585 compared to 4.013 or a total impact relief of 35.59%. By comparing the relative percentages of the best alternate for each area, Region C can be seen to have been more positively affected by freeway construction, with B and A following in that order. In other words, construction of a new facility within the proposed corridor would benefit the residents of area "C" moreso than those of areas A and B. Residents in area A would probably opt for alternate 74 whereas residents in areas B and C would probably opt for alternate 72. This again is based only on Level of Service impact. Other impacts may alter each area feeling for the pros and cons of the respective alternatives. This is now, under law, at the option of the parties involved.

CUTLINE ANALYSIS

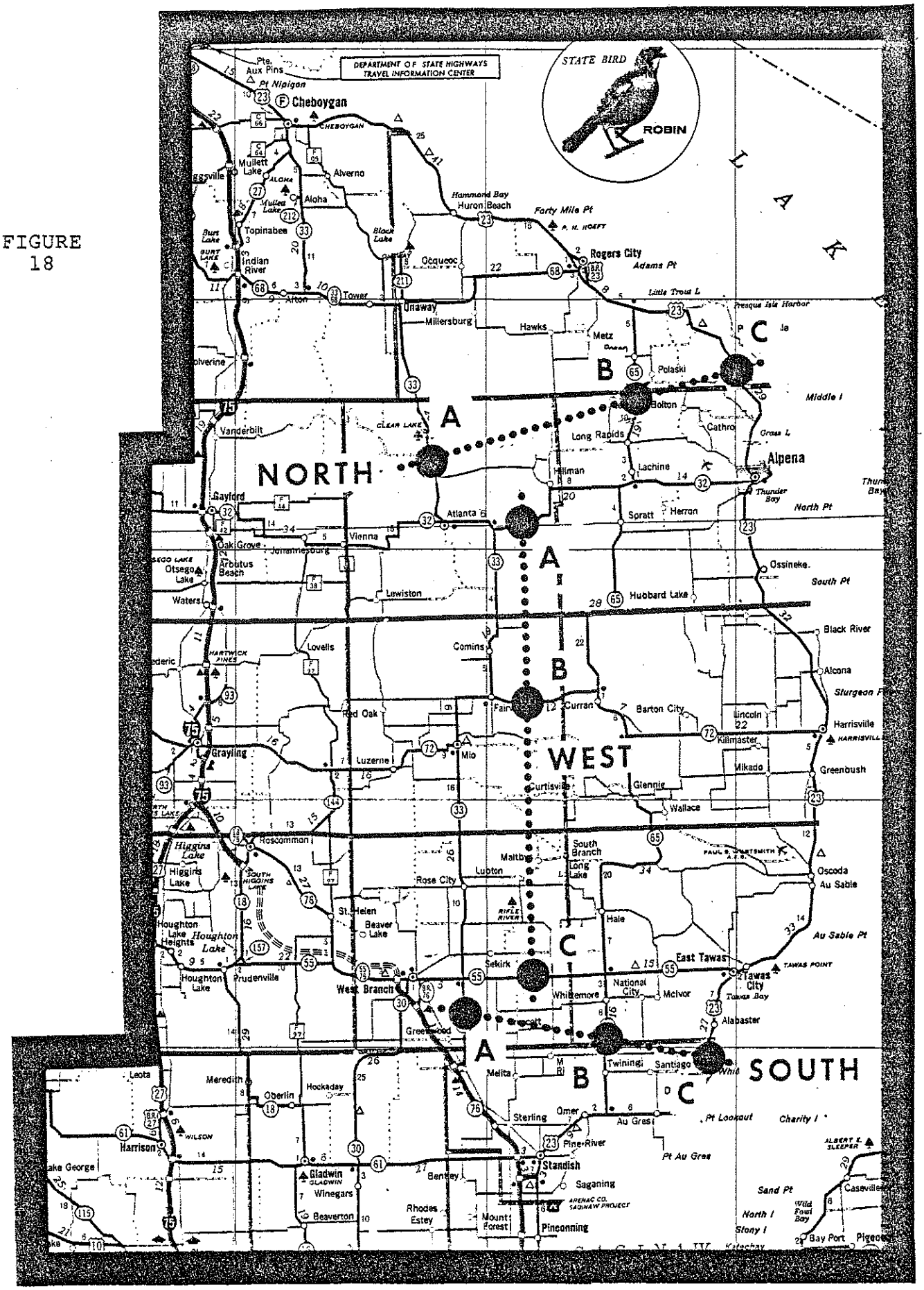


CUTLINE

This a brief summary of the impacts of the various alternates on the traffic volumes of major trunklines surrounding the proposed construction area. This is done through the use of cutlines. On the north, a cutline is extended through M-53, M-65 and US-23. On the west, M-32, M-72 and M-55. On the south by M-33, M-65, the alternate itself and US-23. These cutline locations are pictured in Figure 18. They are also extended along the first AADT plot (Figure 19) to show the principal locations. The remaining AADT plots follow this example. A summary sheet is also included at the end to detail these impact explanations.

CUTLINE LOCATIONS

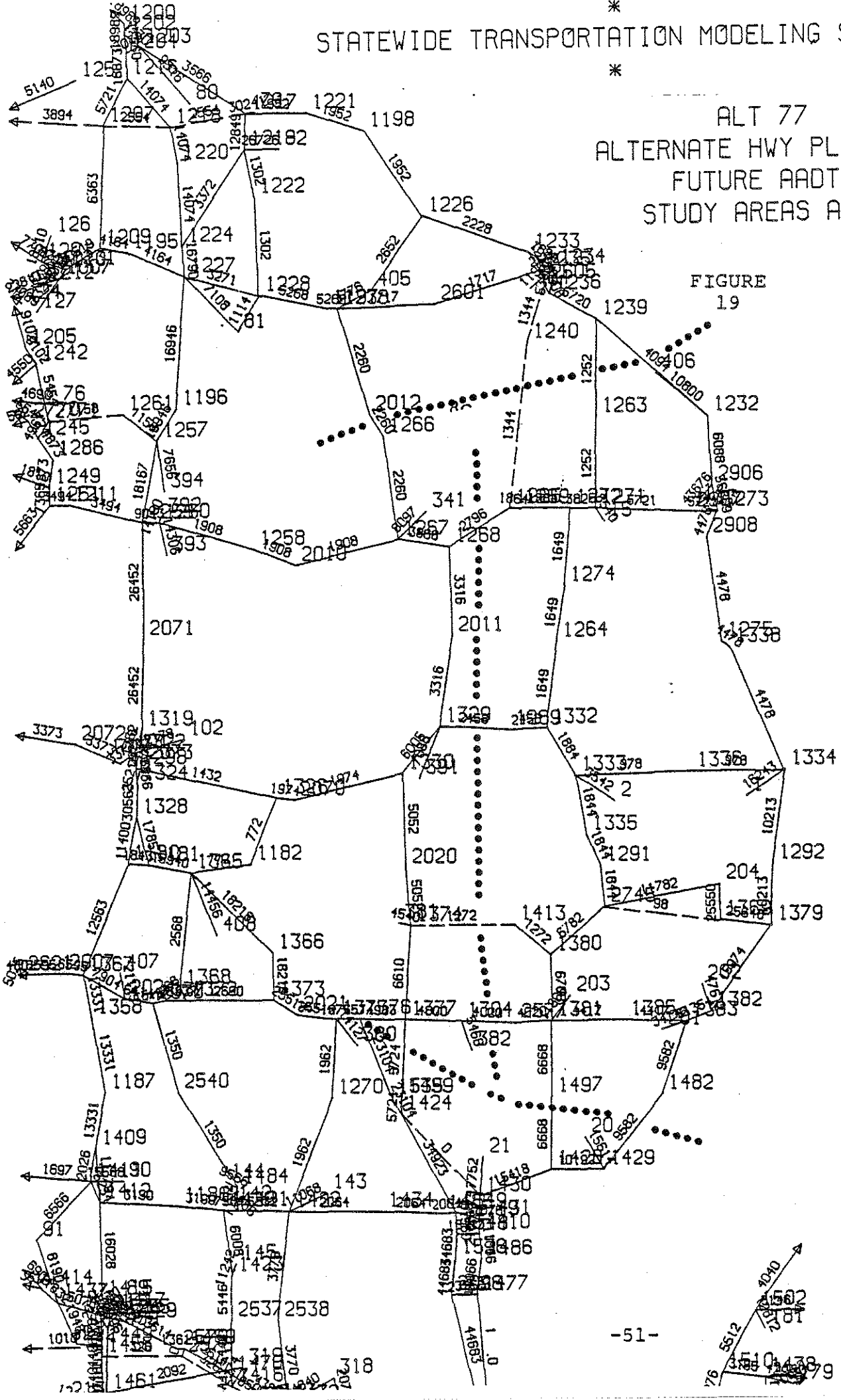
FIGURE
18



STATEWIDE TRANSPORTATION MODELING SYSTEM

ALT 77
ALTERNATE HWY PLAN
FUTURE AADT
STUDY AREAS A,B,C

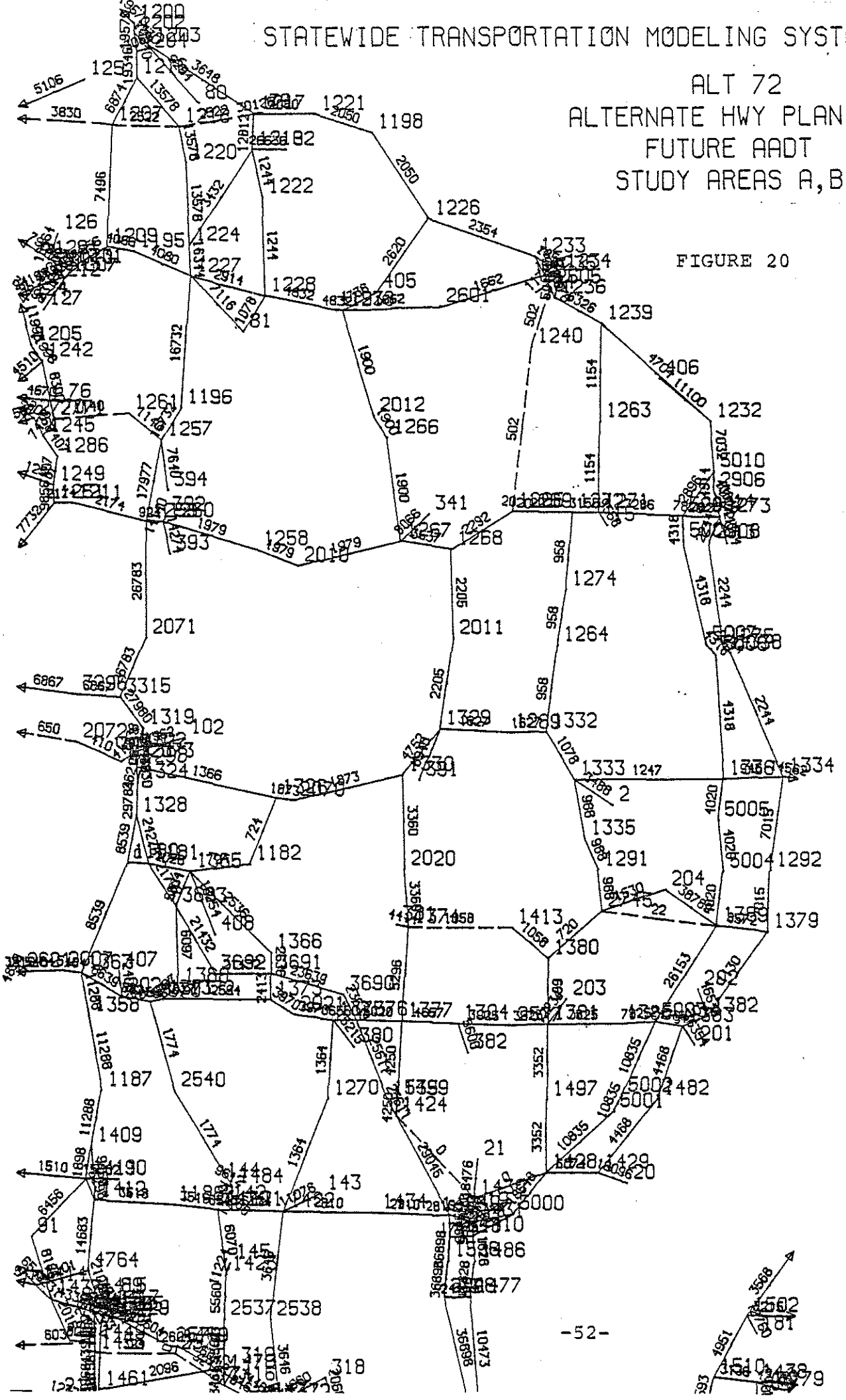
FIGURE
19



STATEWIDE TRANSPORTATION MODELING SYSTEM

ALT 72
ALTERNATE HWY PLAN
FUTURE AADT
STUDY AREAS A,B,C

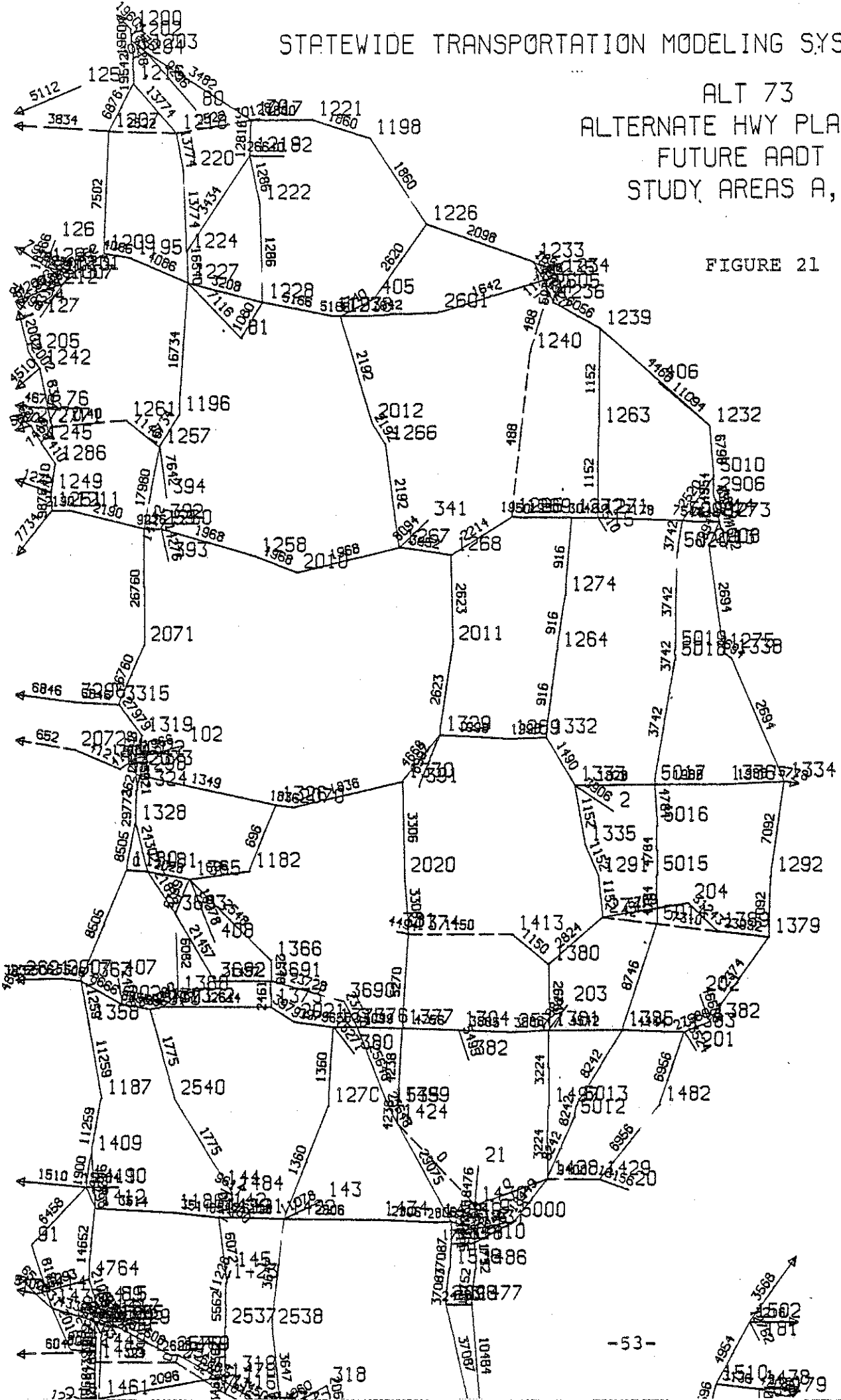
FIGURE 20



STATEWIDE TRANSPORTATION MODELING SYSTEM

ALT 73
ALTERNATE HWY PLAN
FUTURE AADT
STUDY AREAS A, B, C

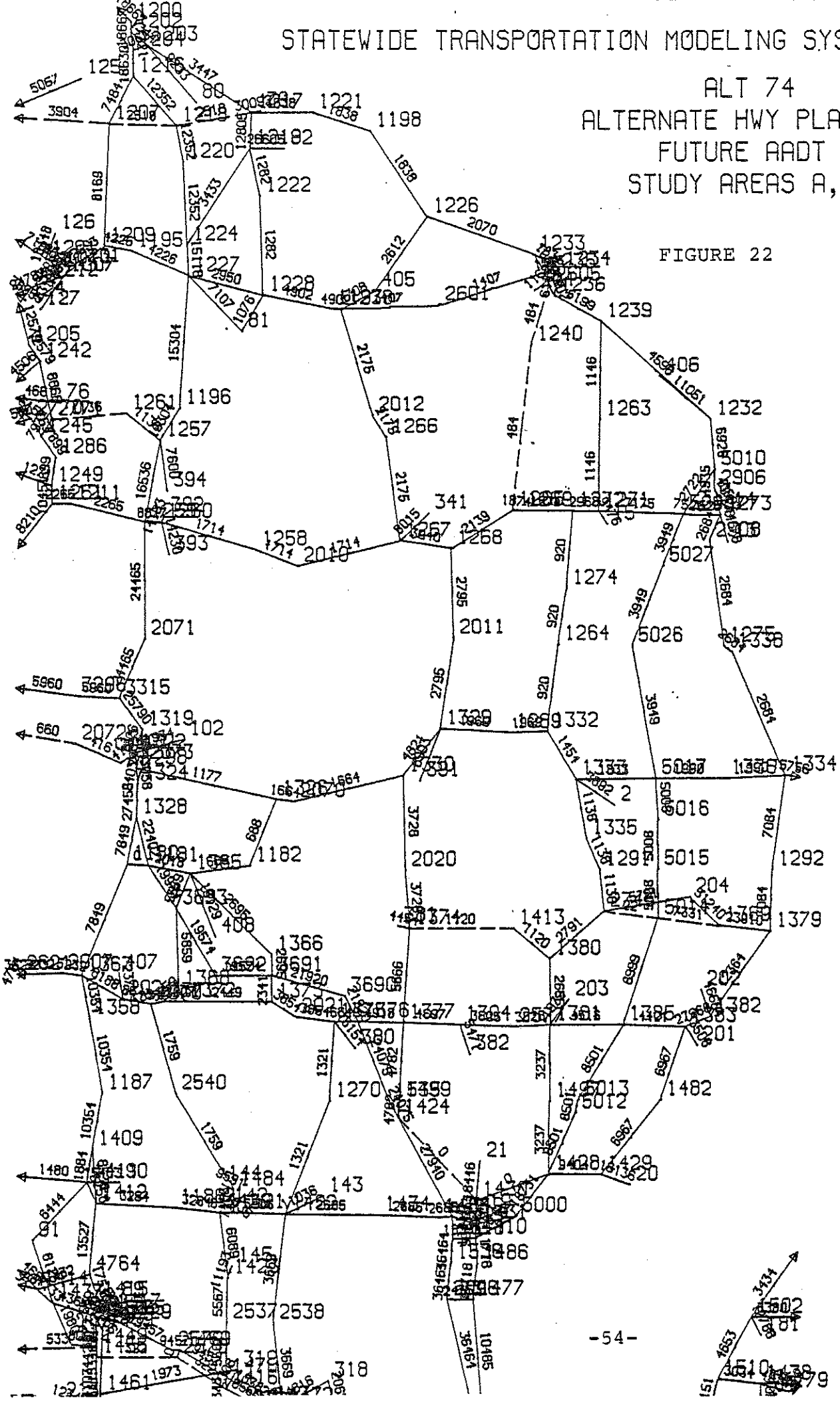
FIGURE 21



STATEWIDE TRANSPORTATION MODELING SYSTEM

ALT 74
ALTERNATE HWY PLAN
FUTURE AADT
STUDY AREAS A,B,C

FIGURE 22

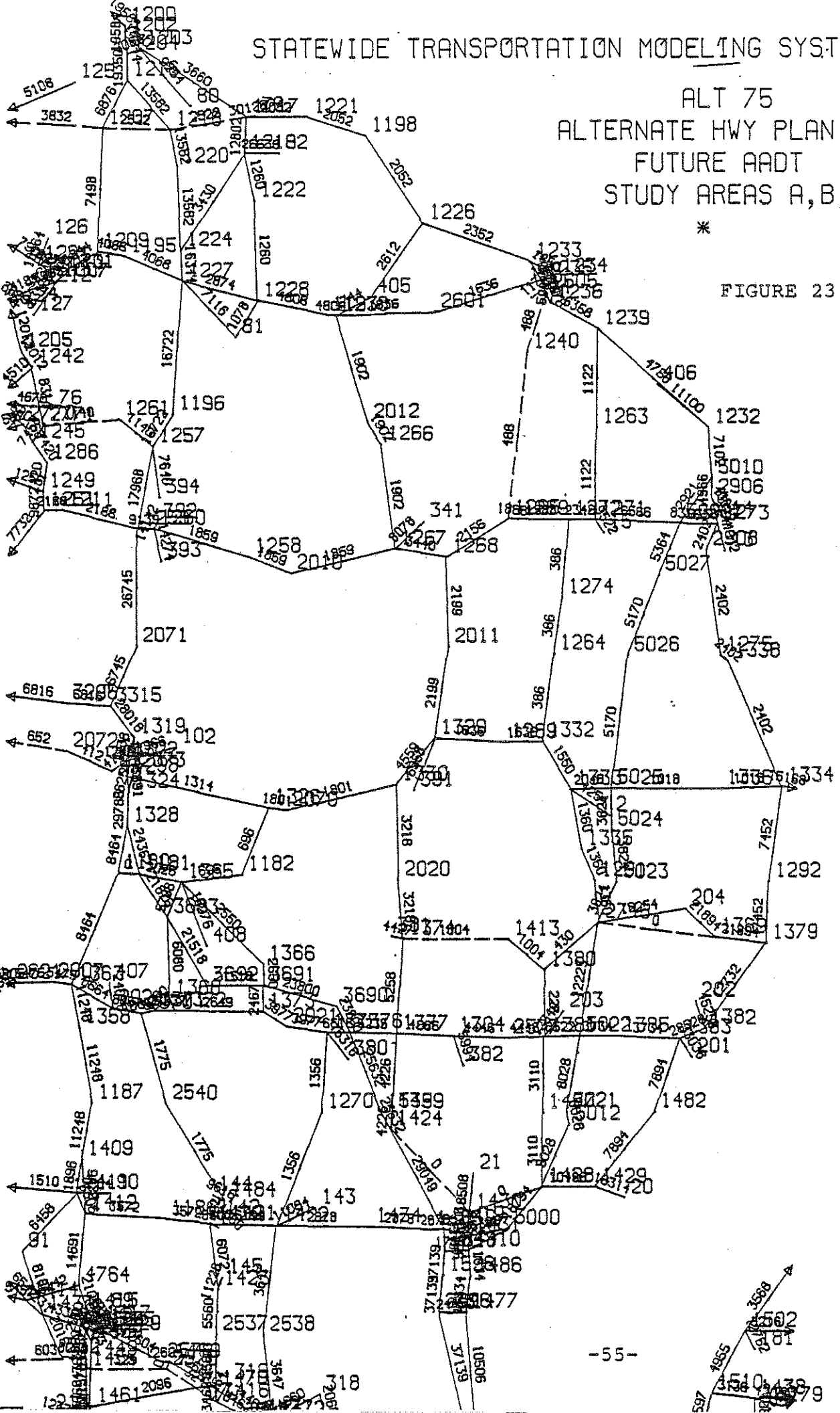


STATEWIDE TRANSPORTATION MODELING SYSTEM

ALT 75
ALTERNATE HWY PLAN
FUTURE AADT
STUDY AREAS A, B, C

*

FIGURE 23



STATEWIDE TRANSPORTATION MODELING SYSTEM

ALT 76
ALTERNATE HWY PLAN
FUTURE AADT
STUDY AREAS A,B,C

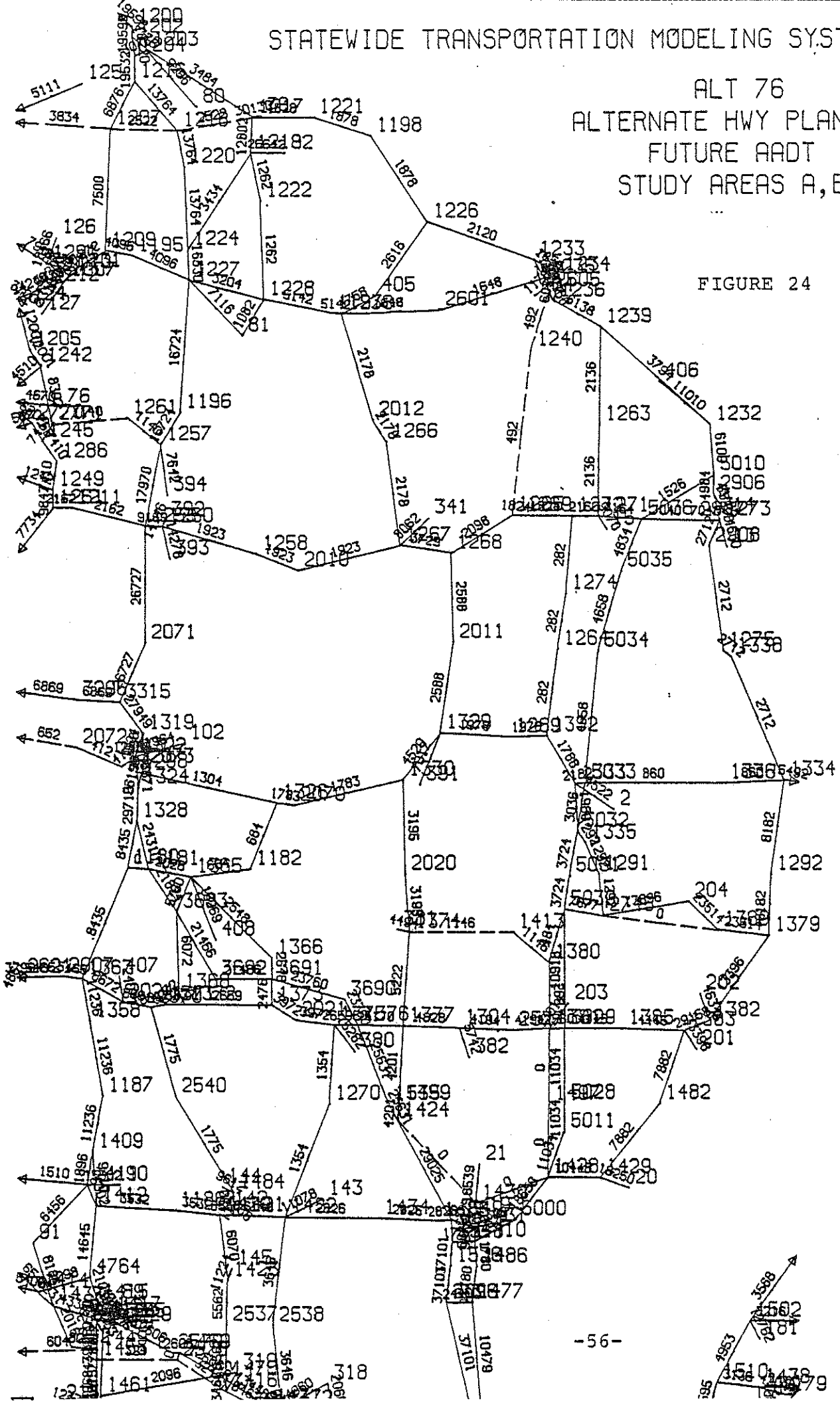


FIGURE 24

NORTHERN BORDER TRAFFIC TOTALS

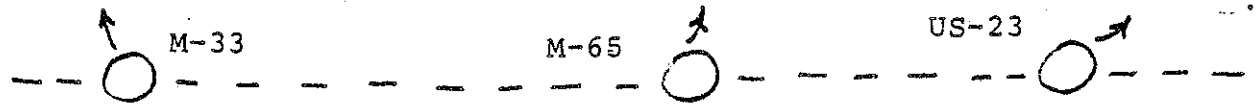
ALT 77	7616	(6)
72	7758	(5)
73	7810	(3)
74	7917	(2)
75	7780	(4)
76	8108	(1)

Figure 25

ALT 77	2260	(1)
72	1900	(6)
73	2192	(2)
74	2175	(4)
75	1902	(5)
76	2178	(3)

ALT 77	1262	(2)
72	1154	(3)
73	1152	(4)
74	1146	(5)
75	1122	(6)
76	2136	(1)

ALT 77	4094	(5)
72	4704	(2)
73	4466	(4)
74	4596	(3)
75	4756	(1)
76	3794	(6)



WESTERN BORDER TRAFFIC TOTALS

ALT 77	9272	(1)
72	7844	(6)
73	7877	(5)
74	7933	(4)
75	8238	(3)
76	8270	(2)

M-32

ALT 77	2796	(1)
72	2292	(2)
73	2214	(3)
74	2139	(5)
75	2156	(4)
76	2098	(6)

M-72

ALT 77	2456	(1)
72	1627	(6)
73	1998	(2)
74	1969	(4)
75	1636	(5)
76	1978	(3)

M-55

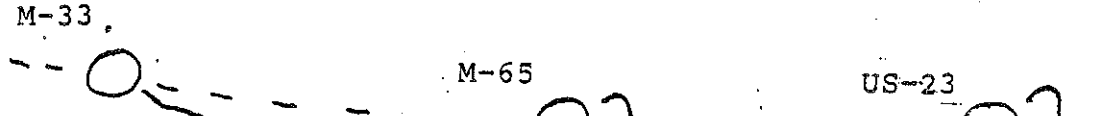
ALT 77	4020	(3)
72	3925	(4)
73	3665	(6)
74	3825	(5)
75	4446	(1)
76	4194	(2)

GRAND TOTALS

ALT 77	38,862	(4)
72	38,507	(5)
73	38,347	(6)
74	39,337	(2)
75	39,276	(3)
76	39,495	(1)

ALT ITSELF

ALT 77	0	(6)
72	10,835	(2)
73	8,242	(4)
74	8,501	(3)
75	8,028	(5)
76	11,034	(1)



SOUTHERN BORDER TRAFFIC TOTALS

ALT 77	21,974	(6)
72	22,905	(4)
73	22,660	(5)
74	23,487	(1)
75	23,258	(2)
76	22,117	(3)

ALT 77	5724	(1)
72	4250	(3)
73	4238	(4)
74	4782	(2)
75	4226	(5)
76	4201	(6)

ALT 77	6668	(1)
72	3352	(2)
73	3224	(4)
74	3237	(3)
75	3110	(5)
76	0	(6)

ALT 77	9582	(1)
72	4468	(6)
73	6956	(5)
74	6967	(4)
75	7894	(2)
76	7882	(3)

NORTHERN BORDER TRAFFIC TOTALS
(M-33, M-65, US-23)

Collectively, the largest southbound movement of traffic occurs under alternate 76 (8108 AADT) and the smallest under alternate 77 (7,616 AADT). Individually M-33 carries the heaviest burden under the do-nothing situation (ALT 77-2260 AADT) and the smallest level of traffic under alternate 72 (1900-AADT). The situation on M-33 could be occurring due to the traffic "draw" of the alternates to an easterly direction. In other words the alternates are located to the east of M-33 and pull traffic in that direction and off M-33 thus leaving the do-nothing with no relative advantage to M-33. Conversely, alt 72 appears to draw more traffic off M-33 than any other alternate and the importance of this fact can be left to the analysts and general public.

M-65 shows the highest AADT under alt 76 (2136 AADT) and the lowest under alt 75 (1122 AADT). This would be due principally to the location of alt 76 relative to M-65 - it is the closest alternate to M-65 and would consequently draw (or disperse) the most traffic to that facility. On US-23, alt 75 raises the traffic level to its highest point (AADT-4756) with alt 75 displaying the lowest AADT (3794). The terms highest and lowest in this case are not as profound as might be anticipated. The actual differences in traffic volumes on this route as well as others may not be statistically significant and the explanation of causal factors should remain vague and assuming so as not to draw undue attention to one alternate over another. Basic highs and lows in some

situations can be explained, others cannot. In this instance, only 52 vehicles separates alt 75 from alt 72. Therefore, weighted decisions as to the impact of one alternate over another should include references to all aspects of impact along with degree of impact. This would normally go without saying, but the data itself and the differences thereof demand a word of caution.

WESTERN BORDER TRAFFIC TOTALS (M-32, M-72, M-55)

This particular situation, above others, lends itself to a logical explanation. In reviewing the westbound totals, the closer the alternate moves to the west, or to the cutline itself, the higher the volumes appear on the cutline. The closer the alternate to the cutline the more traffic is drawn or dispersed within the area over the existing routes. Travel advantages due to tree changes, etc., are known to the reader.

The "clinker" in this ideal situation appears in the alternate 77 high total of 9,272 AADT. If the above explanation holds true alt 77, or the route furtherest to the east, should draw the least amount of traffic. Not true. What appears to be happening is a major shifting of travel needs and scales with the construction of the new facility: especially this north-south facility in terms of east-west movement. Upon review of the AADT plots, what appears to be happening is that the alternates are creating a heavier east-west movement between M-65 and US-23 instead of between the cutline boundaries of M-33 and M-65. The alternates are taking traffic off of M-33 and M-65 and therefore creating a smaller degree of

east-west traffic interchange between the two; whereas alt 77 causes more people to use M-33 and M-65 thus causing the higher cut-line interchange figures. The location of the cutline and the shifting of north-south traffic caused by the alternates appear to suffice as an explanation.

SOUTHERN BORDER TRAFFIC TOTALS (M-33, M-65, ALT, US-23)

Alternate 74 shows the greatest interchange of traffic on the southern border of the construction area (AADT 23,487). Alternate 77 (do-nothing) displays the lowest. (AADT 21,974). Individually on M-33 alt 76 provides the greatest degree of congestion relief with alt 75 a close second. A review of the location of these alternates relative to M-33 will provide the explanation for the relief. On M-65, aside from alt 76 which actually replaces it, alt 75 provides the next to lowest total relief to M-65. Again location provides the answer.

On US-23, congestion relief comes principally in the form of alternate 72 (US-23 AADT 4468). Alts 73 (6956) and 74 (6967) are comparable in terms of impact and so is the grouping of alts 75 (7894) and 76 (7882). The leader in the alternate north-south movement on this border is alternate 76 with 11,034 vehicles on an average day. Alt 75 provides the least amount of traffic (8,028) and alt 72 with 10,835 vehicles provides the second highest choice.

Again, diagnosis of the impact of these proposed facilities must be measured in terms of goals and public purpose.

VEHICLE MILES - VEHICLE HOURS

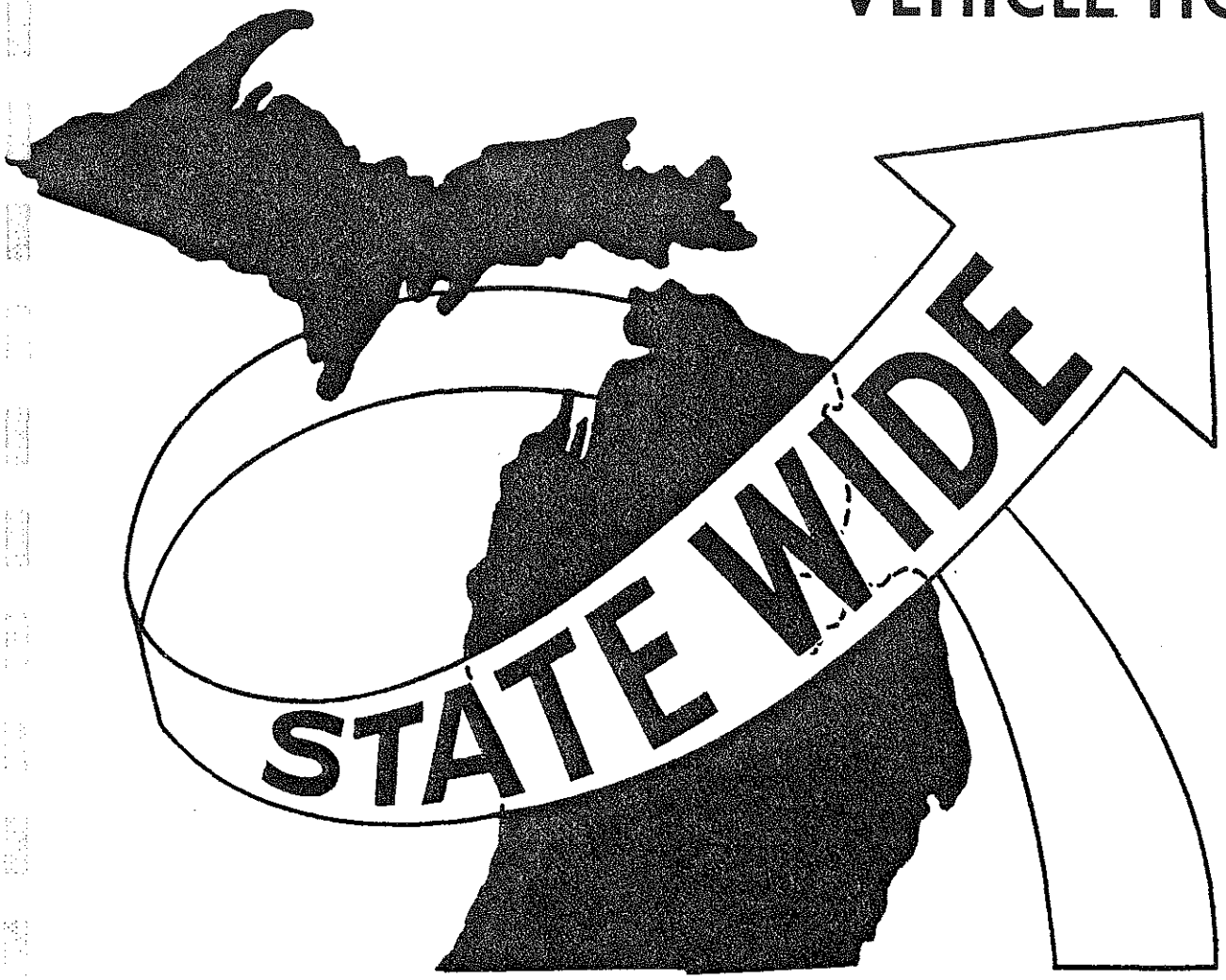
A review of the following histograms will offer a quick visual comparison between alternates in terms of vehicle miles and vehicle hours for each study area (A, B, and C).

Caution is advised, however, when examining these figures due to the presence and influence of fluctuating generated trips or trip tables. This is brought about through the needed combination of different alternate alignments and their respective effects on the Statewide Model trip generation process. Without this standard process, valuable and realistic trip assignment information would be lost.

In order to create the desired situation for alternate efficiency comparison, a constant (identical trip table) can be assigned to each alternate as additional analysis is required.

In this way the trips would be held constant and the only differences to appear in vehicle hours, etc., would be caused, logically, by the configureation and advantage of each alternate. This is the recommended approach to vehicle mile and vehicle hour analysis.

VEHICLE MILES
VEHICLE HOURS



S Y S T E M I M P A C T C O M P A R I S O N
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM

PROJECT NE NORTHEAST REGION CORRIDOR STUDY AREA "A"
REGIONAL SUMMARY FOR INTERSTATE, FAP, AND FAS HIGHWAYS

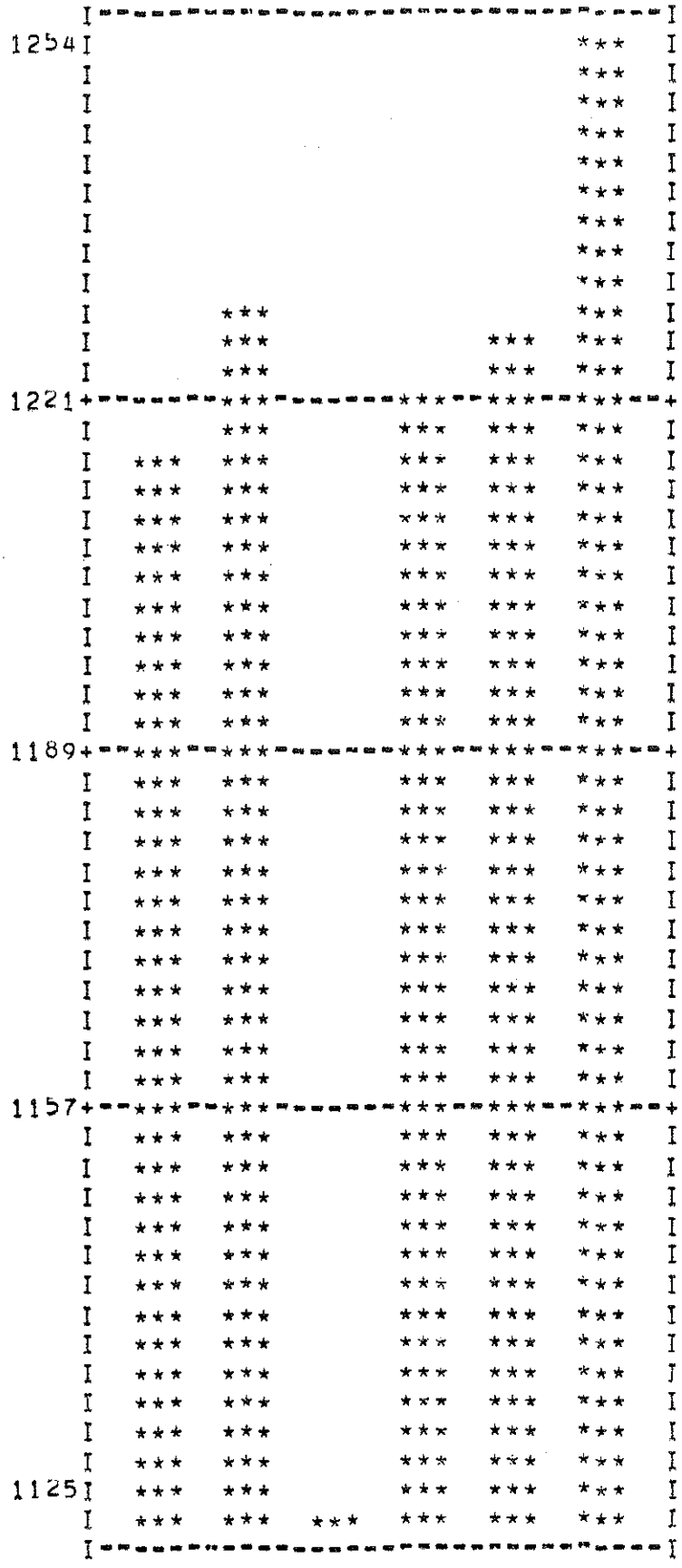


FIGURE 26

ANNUAL VEHICLE-MILES (MILLIONS)

S Y S T E M I M P A C T C O M P A R I S O N
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM

PROJECT NE NORTHEAST REGION CORRIDOR STUDY AREA "A"
REGIONAL SUMMARY FOR INTERSTATE, FAP, AND FAS HIGHWAYS

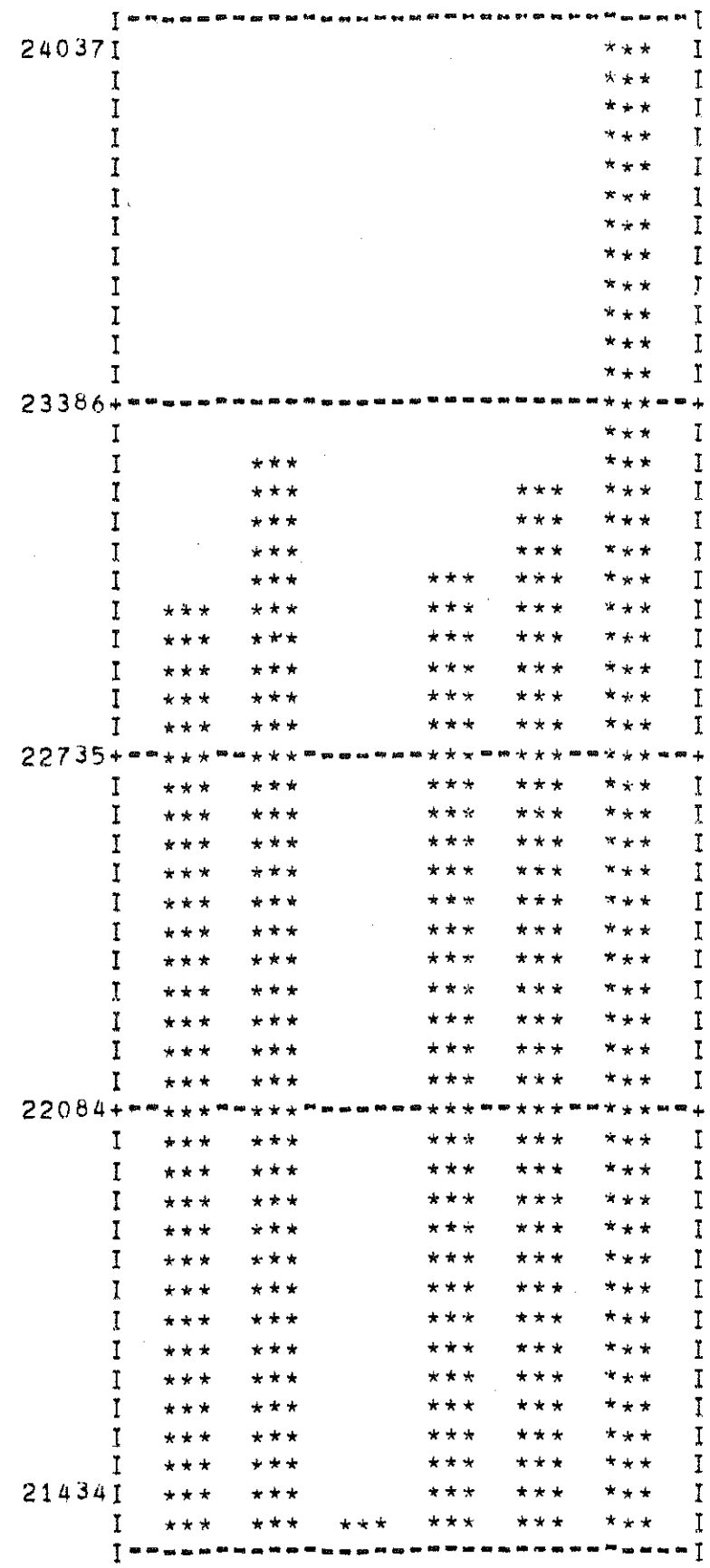


FIGURE 27

SYSTEM IMPACT COMPARISON
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM

PROJECT NE NORTHEAST REGION CORRIDOR STUDY AREA "B"
REGIONAL SUMMARY FOR INTERSTATE, FAP, AND FAS HIGHWAYS

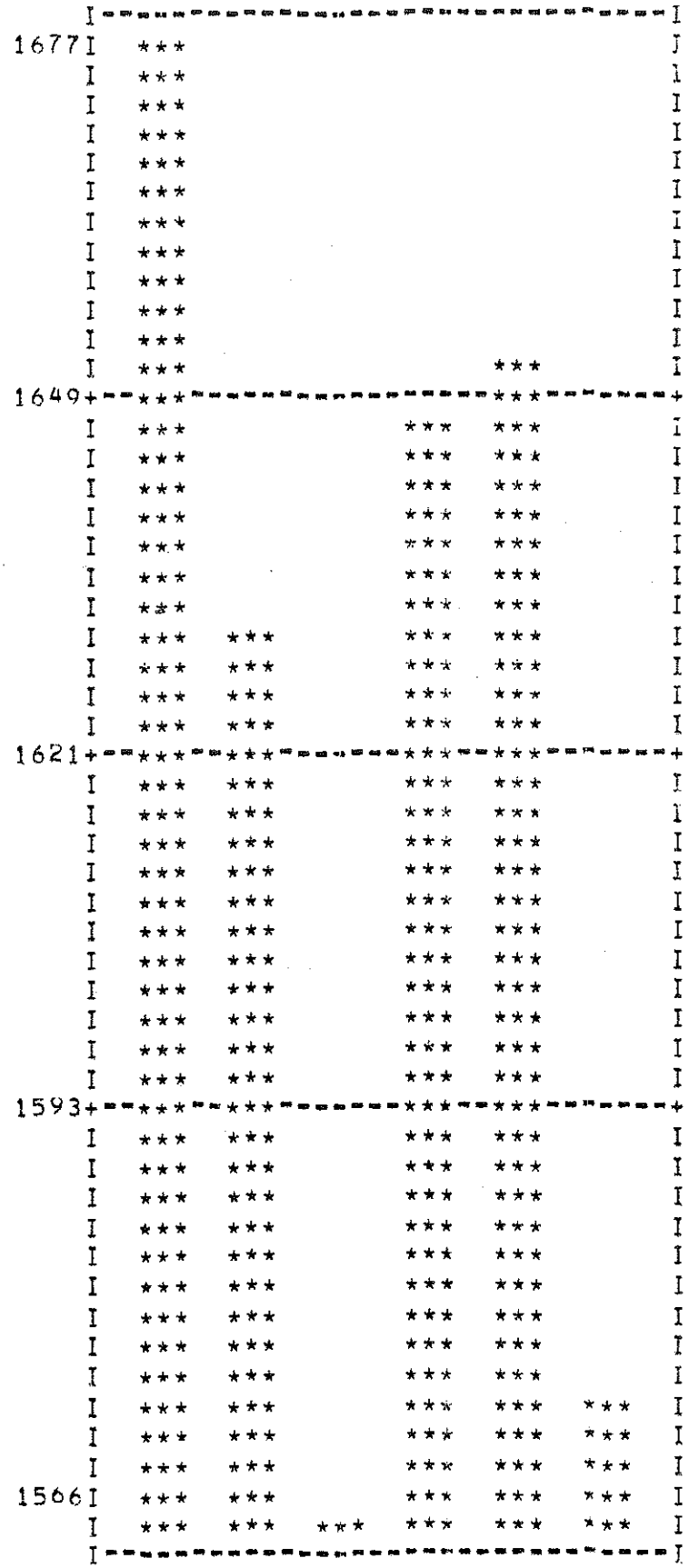


FIGURE 28

ANNUAL VEHICLE-MILES (MILLIONS)

SYSTEM IMPACT COMPARISON
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM

PROJECT NE NORTHEAST REGION CORRIDOR STUDY AREA "B"
REGIONAL SUMMARY FOR INTERSTATE, FAP, AND FAS HIGHWAYS

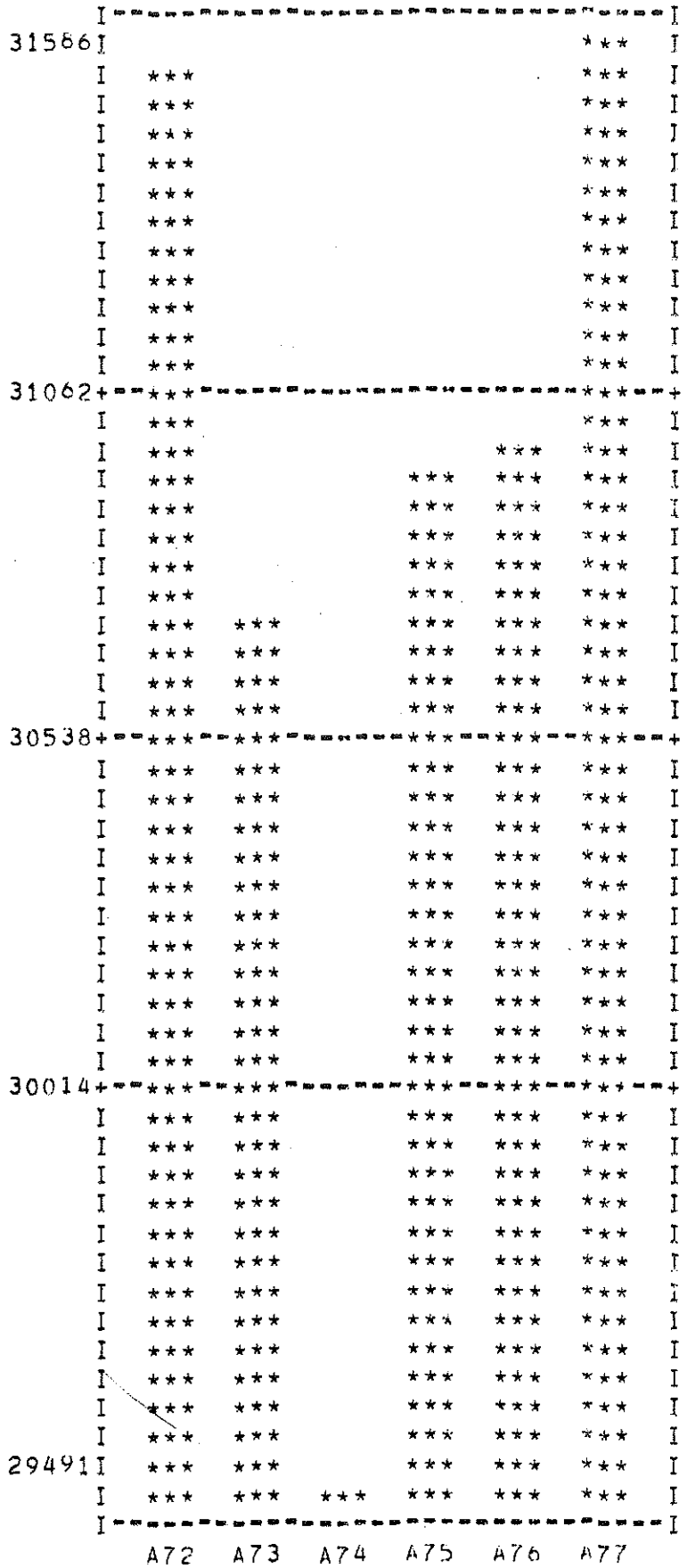


FIGURE 29

S Y S T E M I M P A C T C O M P A R I S O N
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM

PROJECT NE NORTHEAST REGION CORRIDOR STUDY AREA "C"
REGIONAL SUMMARY FOR INTERSTATE, FAP, AND FAS HIGHWAYS

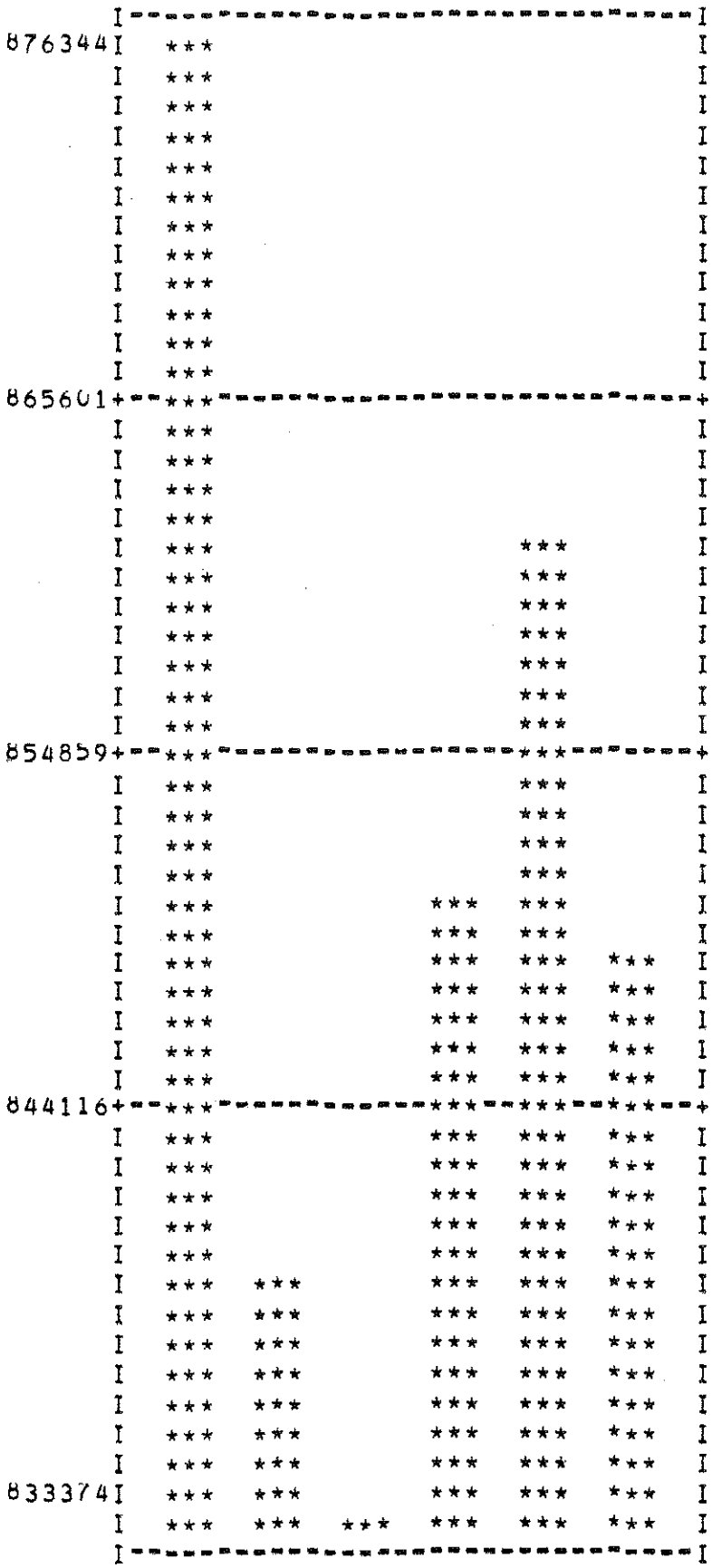


FIGURE 30

ANNUAL VEHICLE-MILES (THOUSANDS)

SYSTEM IMPACT COMPARISON
MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM

PROJECT NE NORTHEAST REGION CORRIDOR STUDY AREA "C"
REGIONAL SUMMARY FOR INTERSTATE, FAP, AND FAS HIGHWAYS

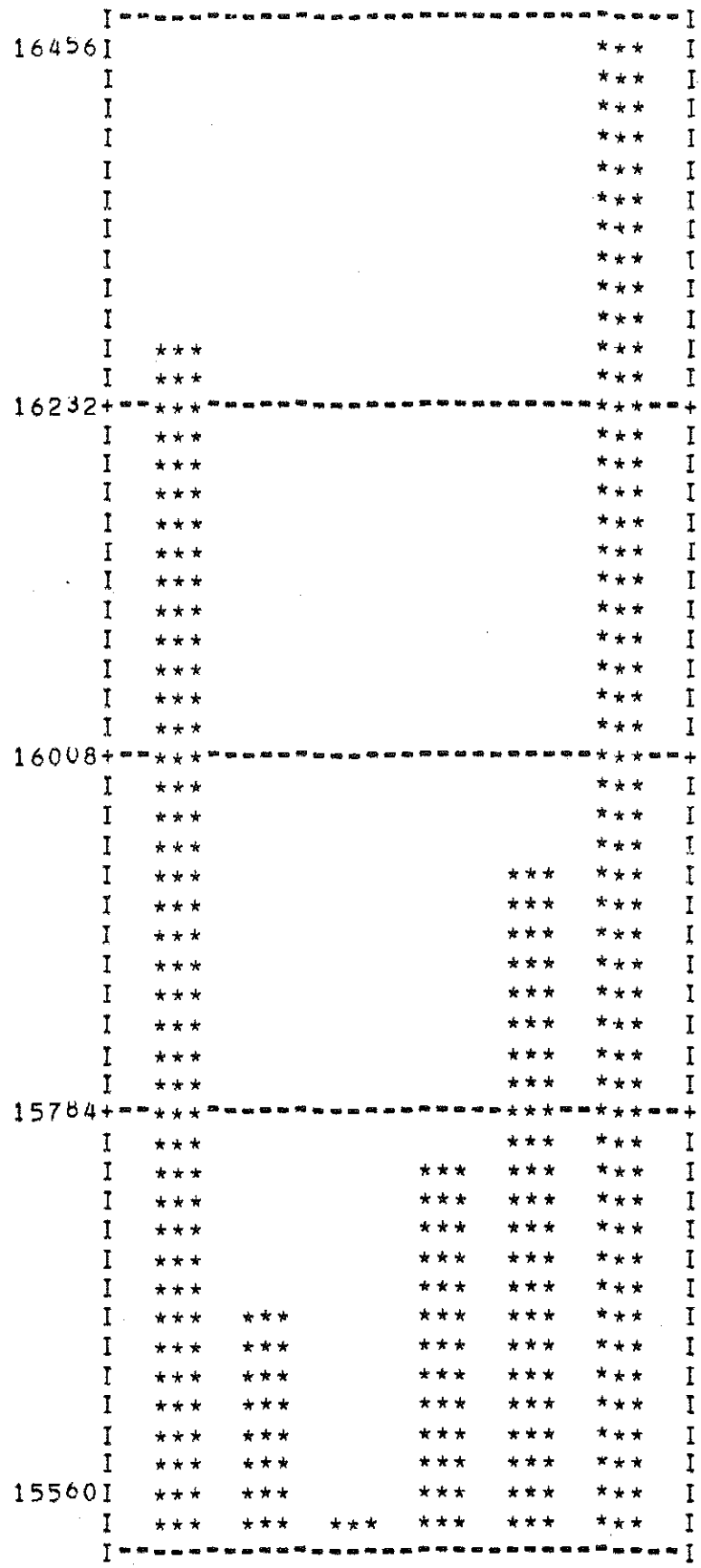


FIGURE 31

ANNUAL VEHICLE-HOURS (THOUSANDS)