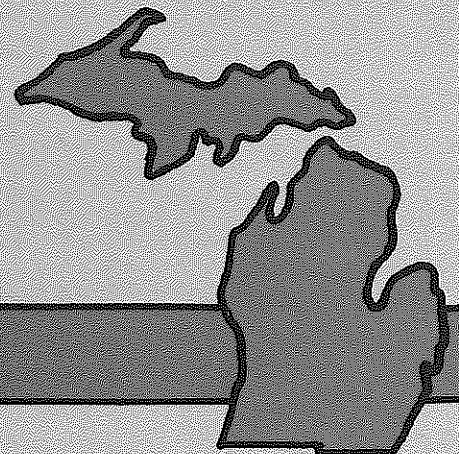


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# MICHIGAN DEPARTMENT OF TRANSPORTATION

US-131, CADILLAC TO MANTON  
WEXFORD COUNTY  
PROJECT JUSTIFICATION REPORT  
January 1989



BUREAU OF TRANSPORTATION PLANNING

MICHIGAN DEPARTMENT OF TRANSPORTATION

In Cooperation With:

U.S. Department of Transportation

Federal Highway Administration

US-131, CADILLAC TO MANTON  
WEXFORD COUNTY

PROJECT JUSTIFICATION REPORT


January 1989

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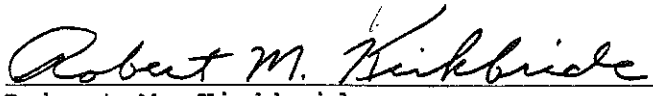
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OF

TRANSPORTATION

US-131, CADILLAC TO MANTON  
WEXFORD COUNTY

PROJECT JUSTIFICATION REPORT

January 1989

This report represents the findings and/or professional opinions of the Michigan Department of Transportation and is not an official opinion of the State Transportation Commission.

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## EXECUTIVE SUMMARY

US-131 is a principal arterial serving north-south traffic in Michigan's lower peninsula. This route serves metropolitan centers in the southern part of the state and recreational areas in the northern part of the state. As one of Michigan's Priority Commercial Network routes it is used extensively for commerce and tourism and is therefore important to the state's economy.

US-131 has been upgraded to a freeway from south of Kalamazoo northerly to south of Cadillac. A number of studies are being undertaken to determine improvements required both north and south of the existing freeway segments. The US-131, Cadillac to Manton study has been initiated to determine the need for improvements north of the existing freeway.

Local citizenry have been in support of improvements to US-131 for many years. Letters and resolutions have been received from cities and villages, townships, county governments, development associations, and area businesses. Most are in support of extending the freeway northerly to Cadillac and beyond to Petoskey. In response to development, increased traffic, and an expressed need for improved transportation service in the area, US-131 from the end of the existing freeway south of Cadillac to Manton was programmed for construction.

The section of US-131 under study extends 20 miles, from south of Cadillac to the Wexford/Grand Traverse County Line. Refer to Exhibit 1. US-131 passes directly through the cities of Cadillac and Manton and serves as their business route. Within the study area, US-131 has both urban and rural sections. The urban section which extends from slightly north to slightly south of the Cadillac city limits varies from four to five lanes with curb and gutter. The rural section, which constitutes most of the study segment is a 2 lane, 24 foot highway with 8 foot shoulders. A number of improvements have been made over the years in order to bring the urban section up to its current design.

There has been relatively steady traffic growth in the study area with some fluctuations with the changes in Michigan's economic conditions. Generally, traffic volumes have increased when the economy is favorable and declined in response to the recessions. Development within the Cadillac area has also resulted in increased traffic volumes. Since 1974, traffic along US-131 has increased between 31.1 percent and 79.1 percent, a 2.2 percent to 6.1 percent annual increase.

The need for improvements to US-131 in Wexford County has been researched and the findings presented in this report. A number of areas were analyzed including existing and future traffic volumes, accidents, capacity and level of service, and existing and future development. As a result of this research, current and expected future deficiencies have been identified. These deficiencies are:

1. US-131 is no longer serving its primary function as a principal arterial highway in Cadillac. Local trips make up an increasingly larger portion of the trips using US-131 in the study area. Travel of this nature can contribute to congestion and safety problems.

2. Projected year 2010 traffic volumes indicate a need for additional capacity on US-131. The current roadway will not be able to adequately handle the additional 23 to 85 percent increase in traffic volumes.
3. Accident rates within the Cadillac downtown area are substantially higher than the District 3 and statewide rate for comparable highways.
4. Capacity analysis utilizing year 2010 traffic projections indicates that if nothing is done to improve capacity, US-131 will operate at an unacceptable level of service for the entire study segment.

#### RECOMMENDATION

Existing and projected future deficiencies indicate a need to improve US-131. Within Cadillac accident rates are high and capacity will be inadequate with projected 2010 traffic volumes. Additional capacity will also be required along the rural section between Cadillac and Manton. It is recommended that US-131 from the existing freeway section south of Cadillac to Manton be expanded and alternatives studied to determine environmental and other impacts of the expansion. At a minimum a bypass of Cadillac is warranted. The transportation improvement that would most effectively serve current and future traffic demands would be a bypass of Cadillac in conjunction with additional capacity provided from north of Cadillac through Manton.

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## I. INTRODUCTION

### Background

The need for improved transportation service along the US-131 corridor has been of concern for many years. US-131 has been upgraded to a freeway from south of Kalamazoo to south of Cadillac. Planning and engineering studies continue to be initiated and improvements implemented north and south of the existing freeway. The US-131, Cadillac to Manton study is one of several studies being conducted to determine transportation needs in the northern part of the state.

In the late 1970's, the Northwest Regional Transportation Study was initiated and a report published. This systems study looked at all modes of transportation identifying current and future deficiencies. The study included generalized recommendations to correct deficiencies. US-131 from Cadillac to Manton was one of several routes identified as deficient in capacity. Also, Cadillac and Manton were identified as areas with high accident rates. Since the systems study, improvements have been made and continue to be scheduled. The most recent improvement is the addition of a left-turn lane from 13th Street to Boon Road. This project is scheduled for completion in 1989. The current study of US-131 from Cadillac to Manton is the next phase in determining more specifically what is needed in the corridor.

Local citizens have been in support of improvements to US-131 from the Michigan/Indiana state line to Petoskey. Over the years the department has received numerous letters and resolutions from cities and villages, townships, county governments, associations, and area businesses. Most are in support of extending the freeway from the Michigan/Indiana state line to Kalamazoo and from south of Cadillac to Petoskey. Their goal is to construct a US-131 freeway the entire length of the lower peninsula. In response to local development and increased recreational travel in northwestern Michigan, US-131 from Cadillac to Manton was programmed for construction. This segment was in the department's 1985-1994 Long Range Program and is in the current 1989-1998 Long Range Program (Core List). An interdisciplinary team has been formed and studies are being conducted to determine deficiencies, alternatives, impacts, and a recommended course of action.

### Purpose of Study

The purpose of this project justification study is to evaluate more specifically the need for improvements to US-131 from south of Cadillac to north of Manton. It is used to guide further studies so they address the problems identified. In order to determine the need for improvements the function and performance of this section of road was investigated, travel characteristics were reviewed, and existing and future traffic volumes were obtained. In addition, existing and future land use characteristics were examined. All of these factors influence the type of facility that should be provided for safe and efficient service to motorists.

## Future Procedures

The project justification study is only one of several studies that must be completed before a project can be implemented. In April, 1985 a department interdisciplinary team was organized to study in detail improvements required to US-131 from south of Cadillac to north of Manton. Since that time meetings and field reviews have been conducted. Also, reports including a traffic analysis report and scoping document have been completed. The following steps and studies still need to be completed before major improvements to US-131 can be implemented.

1. Engineering Report - This report will contain engineering details about the alignments being studied.
2. Draft Environmental Impact Statement (DEIS) - This document will give a detailed description of the project area, and analyze the proposed alternatives and their impacts. It will also include comments from the pre-study meeting held in June, 1986 and from review of the scoping document. This document is scheduled to be completed in 1989.
3. Public Hearing - A public hearing will be held to obtain citizen and local agency comments on the specific aspects of the project. This hearing is scheduled for spring, 1989.
4. Final Environmental Impact Statement (FEIS) - The FEIS will respond to the concerns of citizen and agency inputs and the specific impacts of the recommended alternative. This document must be approved by the Federal Highway Administration before the project can proceed. It is expected that the FEIS will be completed in 1989.
5. Final Design
6. Right-of-Way Acquisition
7. Construction of Approved Project

## II. FACILITY LOCATION AND FUNCTION

US-131 is a principal arterial serving north-south traffic from the Michigan/Indiana state line to Petoskey, Michigan southwest of the Mackinaw Bridge. As a principal arterial its primary function is to interconnect major population and economic activity centers, and also to provide service to recreational areas and large areas of special interest. US-131 is 268.8 miles in length and connects with Interstate freeways I-94 and I-96. This route services the metropolitan centers of Grand Rapids and Kalamazoo in southern Michigan, and tourist/recreational centers, including Cadillac, the Traverse City area, and Petoskey, in the northern lower peninsula. Refer to Exhibit 1 for the location of the project under study. US-131 is also a part of the state's Priority Commercial Network (PCN). PCN routes are used extensively for commerce and tourism and therefore are considered important to Michigan's economy.

Although the primary function of US-131 is to serve through trips with origins and destinations outside the study area, it carries a significant number of local trips. US-131 passes directly through the Cadillac central business district (CBD) and serves as its main business route. As such, in the CBD through trips are intermingled with local trips. Commercial activity centers are also located along US-131 both north and south of the CBD. Traffic conflicts are created by the mix of through and local trips. A select link analysis for year 2010 traffic volumes on US-131 north of M-115 indicates, that sixty percent of the trips using US-131 will be through trips. With the traffic and economic growth expected in the Cadillac area traffic conflicts will continue to be a problem.

There are other state trunklines that traverse the study area and are important to the regional economy. They are M-115, M-55, and M-42. M-115 is a regional arterial that extends from Clare, in the central lower peninsula, northwesterly to Frankfort on the Lake Michigan shoreline. M-115 primarily serves through traffic, especially those destined to the Lake Michigan and Grand Traverse Bay recreational areas. M-42 is a 25.3 mile regional arterial located almost entirely within Wexford County. It stretches from M-37 just east of Mesick to M-66 north of Lake City. M-42 is one of two east-west routes in the study area. It bisects the village of Manton 11 miles north of Cadillac.

M-55 is the third state trunkline that connects with US-131 in the study area. This route is a statewide arterial highway that crosses the state from Manistee on the Lake Michigan shoreline to Tawas City on the Lake Huron shoreline. Within the study area it parallels the south side of Lake Cadillac to the east and traverses Cadillac's central business district and residential areas to the west. According to Cadillac origin-destination studies, M-55 primarily carries local trips.

M-55 has been studied extensively in conjunction with the US-131 Cadillac bypass study. Early in the US-131 study it was suggested that M-55 be relocated as a part of the overall US-131 improvement plan. Since that time alternatives were developed to relocate M-55 along 13th Street in the city of Cadillac. A relocation along Boon Road in Haring



Township was also investigated. The primary objective of the relocation was to remove slow moving pulp trucks, other commercial vehicles, and through traffic from existing M-55 in Cadillac. The secondary objective was to provide access to developing industrial areas in the northern part of the city. Although there was some local support for relocating M-55, after study by the department, including review of origin-destination data and existing and projected traffic, it was recommended that the M-55 relocation was not necessary. Construction of a US-131 bypass of Cadillac would achieve the desired results of relieving through traffic from the city. Pulp trucks and other vehicles not destined to the Cadillac area would use the combination of M-115 and the US-131 bypass to avoid downtown Cadillac. Further, an interchange on the bypass at Boon Road would serve Cadillac's northern industrial areas. The principal reasons for not relocating M-55 were: low traffic volumes, costs of relocation, and adverse distances and travel times associated with the relocation.

### III. NEED FOR IMPROVED TRANSPORTATION SERVICE

#### A. Physical Features of the Roadway

The segment currently being studied begins where the freeway terminates south of Cadillac, and extends 20 miles north to the Wexford/Grand Traverse County line. Within the study area, US-131 has both urban and rural sections. The urban section which extends from slightly north to slightly south of the Cadillac city limits varies from four to five lanes with curb and gutter. On-street parking is permitted within the downtown area. The roadway is made up of a bituminous and composite (bituminous over concrete or brick) surface. The one-half mile southernmost section of US-131 has not received significant construction improvements since 1963. US-131 from south of M-55 (East) to 13th Street, 2.2 miles, was improved in 1982. A one mile segment from 13th Street to Boon Road, is in the department's fiscal year 1988 construction program. This section is currently 4 lanes and is scheduled to be widened to five lanes. Construction should be completed by September, 1989.

The rural section, which constitutes most of the study segment extends north of Cadillac through Haring, Cedar Creek, and Liberty Townships. This portion of US-131 is a two lane, 24 foot highway with eight foot paved shoulders. US-131 from Boon Road to one mile north of Manton has a composite surface. Improvements to this segment date back to the 1970's. US-131 from north of Manton to the Wexford/Grand Traverse county line (5.7 miles) is a rigid surface highway. Although there have been joint repairs within recent years, there have not been significant roadway improvements since 1958.

The topography along US-131 within Cadillac is relatively flat, however, north of town the landscape changes to rolling topography. Between Cadillac and Manton US-131 has poor vertical alignment. Approximately 3.2 miles (35% of its distance) have sight restrictions resulting in no passing zones. The lack of adequate passing zones cause long back-ups and delays when slow moving vehicles are encountered. This problem occurs most often during the summer tourist season.

US-131 crosses two rivers within the study area, the Clam River and the Manistee River. The Clam River flows through Cadillac just north of the CBD. US-131 is a four lane roadway within this section. According to the last inspection in 1986 the bridge was in fair condition. There is a need for minor rehabilitation to the deck and painting.

The Manistee River is located north of Manton near the Wexford/Grand Traverse county line. The roadway within this section is a two lane facility. This bridge was also inspected in 1986 and was rated somewhat higher than the Clam River bridge. The condition of the Manistee River bridge was rated good to fair with a need for maintenance to the deck and superstructure.

## B. Sufficiency Ratings

The MDOT has been conducting sufficiency ratings of the state's trunklines since 1961. The rating process includes a systematic evaluation of the condition and relative performance of highway segments.

The sufficiency rating is made up of four rating categories: surface, base, capacity, and accidents. Each category has a maximum point value with a maximum total sufficiency rating, for a highway segment with optimal conditions, of 100 points. The surface rating is based on factors such as surface and shoulder condition, ride, and pavement life expectancy. The base rating represents an analysis of the grading materials beneath the surface. Factors relating to soil, sub-base, drainage, and seasonal load restrictions are used in calculating this rating. The capacity rating represents the ability of a section of highway to carry existing volumes. Roadways that experience little or no traffic congestion are given the maximum number of points. Roadways that frequently encounter peak traffic congestion or delays receive low point scores. The accident rating represents the relative accident rate experience of the segment. The accident rates are based on a methodology developed by the Traffic and Safety Division.

Roadway segments are also subjectively evaluated and classified on a 5 point scale with 1 being the best. This type of evaluation gives you a general idea of the condition of the road. Surface, ride quality, shoulder/curb, base, and drainage conditions have also been evaluated in this manner. Below is a discussion of the condition and performance of US-131 as presented in the 1986 Sufficiency Rating Report. Both the rating points and subjective evaluation scoring were used in this analysis.

### 1. Surface Condition

US-131 is experiencing surface deterioration. A majority of the study area segment requires extensive maintenance. The sections most in need of repaving are north of Cadillac where the last year of significant surface improvements dates as far back as 1958. Also, the ride quality is poor between Cadillac and Manton. There is a high proportion of pavement roughness with continuous and rough bumps. The condition of both the transverse and longitudinal joints are poor.

### 2. Base/Drainage Condition

The condition of the base of the road, which includes soil, base and sub-base materials, ranges from excellent to fair. There is one segment from 13th Street to Boon Road that is in poor condition. This segment has been scheduled for improvements in 1988. The drainage condition is excellent except between 13th Street in Cadillac and M-42 west in Manton where it is rated fair.

### 3. Capacity

According to the sufficiency rating, US-131 is operating at Level of Service C to F. High traffic volumes and congestion is being experienced in Cadillac and the southern portion of Haring Township. In this area, the 30th high hour volume which is the hourly volume the road is designed to carry, is at or above capacity. Maneuverability within traffic is extremely limited. Queues often form where left turns are being made and where motorists enter and exit commercial establishments. There is difficulty exiting driveways during peak hours. US-131 north of Haring Road to the north Wexford county line is operating below capacity, however, traffic is sometimes congested due to slow moving trucks.

The department's Traffic and Safety Division has more extensively analyzed the operation of US-131 utilizing year 1985 and 2010 projected traffic volumes. A level of service analysis was prepared and the results are presented in Section III.D.3., Capacity Analysis.

### 4. Accidents

The accident rate on US-131 is relatively low on most segments in the study area, however, the rate increases significantly within the Cadillac city limits. The Cadillac CBD and commercial areas extending into Haring Township experience the highest number of accidents. Traffic conflicts can be anticipated with the high traffic volumes, the mix of through and local trips, and the numerous driveways abutting the road. The accident analysis section of this report gives details on the number and type of accidents being experienced on US-131.

### C. Existing and Future Land Use

Land use characteristics and transportation needs are interdependent. Land use influences the design and location of highways while at the same time highway systems have direct and indirect effects on the way in which land is utilized. The transportation system should adequately accommodate the desired movements between the land uses in an area.

Land use along US-131 in the study area varies from mixed uses south of Cadillac, to the central business district in the center of Cadillac, to strip commercial and finally rural development north of Cadillac and beyond Manton. US-131 bisects the two most populous municipalities in Wexford County, Cadillac and Manton. In 1980, the population of these communities are 10,199 and 1,212 persons, respectively. Cadillac is not only the most populous but it also encompasses the largest land area. Cadillac covers 5,000 acres, an increase of 34% over the 3,720 acres in its corporate limits in 1975. It serves as a regional center for commercial and industrial activities. The community's older and larger residences are located



in the eastern portion of the city on hillsides overlooking the lake. Newer residential areas are located around the southern shore of Lake Cadillac and in the north central portion of the city. Cadillac has over 300 developed commercial parcels and over 60 vacant commercial properties. In addition to the Central Business District (CBD) there is strip commercial development along US-131 north and south of the CBD. Small neighborhood grocery stores are located in the residential areas. Most commercial activity in Cadillac is along the state trunklines, US-131, M-55, and M-115. Industrial activity is concentrated in the northwestern portion of the city, in an area of contiguous industrial parks. Along with the older, heavy industries there are newly development light industrial areas. There are 47 developed and 23 vacant industrial sites totaling 338 acres. A new industrial park will add another 95 acres to the city's industrial land use.

Manton, the second most populous municipality in the county is located approximately 9.5 miles north of Cadillac on US-131. The Manton area is rural in character with primarily farms, forestland, and open space. The intersections of US-131 and M-42 define the eastern edge of Manton's business district. This area is comprised of commercial establishments that are of the type and scale that serve local residents and traffic. Businesses along US-131 are primarily highway oriented, including restaurants, motels, and gas stations. Manton's retail and service businesses serve smaller, more localized markets than does Cadillac.

According to the Wexford County Comprehensive Plan, Cadillac will retain its function as a regional center with its existing concentration of commercial activities. Manton will continue to be a local retail center.

Haring Township, because of its close proximity to Cadillac, has been experiencing residential and commercial growth and will continue to do so in the future. This township has the largest population of any township in Wexford County (2,523 persons in 1980) and is projected to have the largest population growth. Refer to Table 1. The largest expansion of commercial land use in the county also will be in Haring Township along Boon Road adjacent to US-131.

Industrial expansion will occur primarily in the industrial parks in Cadillac especially along 13th Street. The roadway has already been widened to a 4-lane facility from US-131 to No. 39 Road in order to accommodate industrial growth and the increase in traffic.

Residential development will be concentrated in and around existing cities and villages and around the lakes. The Wexford County Comprehensive Plan estimates a need for 3,800 additional year-round housing units by the year 2005. Most of this development is expected to be in Haring Township (700 units) and Cherry Grove Township (650 units) where population is projected to increase to 4,780 and 3,006 persons, respectively.

TABLE 1

WEXFORD COUNTY  
POPULATION PROJECTIONS

	<u>1980</u>	<u>2010</u>	<u>Change</u>	
			<u>Number</u>	<u>Percent</u>
Cadillac	10,199	10,675	476	4.7
Manton	1,212	1,359	149	12.1
Clam Lake Township	1,658	2,595	937	56.5
Haring Township	2,523	5,273	2,750	109.0
Cedar Creek Township	1,010	1,834	824	81.6
Liberty Township	542	1,126	584	107.7
Cherry Grove Township	1,517	3,366	1,849	121.9
Selma Township	1,289	2,704	1,415	109.8
Colfax Township	602	757	155	25.7
Greenwood Township	297	569	272	91.6
Henderson Township	140	161	21	15.0
Boon Township	372	457	85	22.8
Antioch Township	618	945	327	52.9
Hanover Township	308	855	547	177.6
South Branch Township	276	374	98	35.5
Slagle Township	395	850	455	115.2
Springville Township	817	1,861	1,044	127.8
Wexford Township	457	577	120	26.3
Mesick	374	388	14	3.7
Buckley	357	452	95	26.6
Harrietta	139	122	-17	-12.2
Wexford County	25,102	37,300	12,198	48.8

Source: Wexford County Comprehensive Plan

Outdoor recreational activities abound in Wexford County. The county has a wide variety of natural resources and a thriving tourist economy. There are lakes, national forest lands, scenic and camping areas, ski resorts, and trails. The comprehensive plan calls for improvements and expansion of all the recreational facilities.

Since the function of the transportation network is to adequately serve and connect land uses it's important to know the location of existing and future major traffic generators. Within the study area these traffic generators are the Cadillac CBD, commercial areas along US-131 in Haring Township, the industrial parks located in northeast Cadillac along 13th Street, the county fairground, Lake Mitchell State Park, and the Wexford County Airport in Haring Township. US-131 will be affected by traffic generated by these land uses. The growth and development projected for the area highlights the need for an improved transportation facility.

#### D. Traffic Data: Existing and Projected Conditions

Traffic volumes should be reviewed from two aspects; average annual daily traffic (AADT) and design hour volume (DHV). Average annual daily traffic is the traffic that occurs on a roadway during an average weekday during the year. It can serve as a barometer for traffic growth trends and possible traffic problems along a roadway. Design hour volume is the hourly volume the road is designed to carry. Volumes during peak hours indicate at what level of service the roadway is operating. In order to determine the possible need for improvements both the historical and projected traffic volumes have been investigated.

##### 1. Average Annual Daily Traffic

###### Travel Characteristics

One issue associated with any proposed highway improvement is the nature and volume of traffic that will utilize the facility. US-131 is a major trunkline with a primary function of carrying long distance trips. Within the study area the function of the road has been changing with the increased economic development in the Cadillac area.

In 1961 and 1977 origin and destination (O&D) studies were conducted in the Cadillac area. These studies reveal important information about the trips using US-131. In 1961 a weekday O&D study was undertaken during the month of August. Two stations were set up along US-131. One was south of Cadillac, 0.3 miles south of No. 43 Road on what is now known as Mackinaw Trail (formerly US-131). The second station was north of Cadillac, 0.3 miles north of Boon Road. Out of the total volume of 4,030 trips on US-131 south of the city 2,474 (61.4%) were through trips. The remaining 1,556 (38.6%) had terminals within the study area. On US-131 north of Cadillac there were a total of 4,082 trips. Of these trips, 2,379 (58.3%) were through trips while 1,703 (41.7%) were local trips.

A summer weekday O&D study was also undertaken in 1977. The US-131 station north of Cadillac had the same location as the 1961 O&D study; 0.3 miles north of Boon Road. However, the US-131 station south of Cadillac was changed slightly because of the US-131 freeway having been constructed. Instead of being located on Mackinaw Trail (former US-131) south of No. 43 Road it was located on US-131 0.2 miles south of Mackinaw Trail. The 1977 O&D study reveals that the percent of terminal and through trips have almost reversed since the 1961 study. At the south station there were a total of 5,361 trips of which 2,269 (42.3%) were through trips and 3,097 (57.7%) were terminal trips. At the north station there were a total of 5,580 trips; 2,123 (38%) were through trips and 3,457 (62%) were local trips. The increase in terminal trips reflect the growth of Cadillac as a regional center.

In 1977, a weekend O&D study was also conducted. Travel patterns on the weekend were more similar to the 1961 weekday. At the US-131 south station, 64.7% of the 5,642 trips were through trips and 35.3% were terminal trips. At the US-131 north station, 57.1% of the total 8,202 trips were through trips and 42.9% were terminal trips.

#### Traffic Growth Trends

Table 2 shows the historical traffic volumes on US-131 in the study area. Over the past fourteen years there has been relatively steady traffic growth. Volumes have fluctuated somewhat with the changes in Michigan's economic conditions. Generally, traffic volumes increase when economic conditions are favorable and decline when there are recessions. The traffic growth rate varies from 31.1% at the Cadillac south city limits to 79.1% just north of Boon Road. The annual growth rate ranges from 2.2% to 6.1% for these same locations. This rate is higher than the average growth rate for trunklines in the northern lower peninsula. Since 1977, the traffic volumes on trunklines in the northern lower peninsula increased at an average of 1.7% annually. Statewide they increased at an average of 3.3% annually.

Because of the recreational nature of travel within the region there are distinctive seasonal travel fluctuations on US-131. Travel is heaviest during the summer months, especially July, August and early September.

Permanent traffic recorders closest to the study area indicate that peak volumes occur most often during Sunday and Friday afternoon and early evening hours. Northbound travel on US-131 is heaviest on Friday and southbound travel is heaviest on Sunday. This is typical of recreational/vacation travel. Peak volumes on Sunday's tend to average approximately 19 percent higher than Friday peak volumes.

TABLE 2

US-131

AVERAGE DAILY TRAFFIC

VOLUME TRENDS

<u>Year</u>	<u>North of M-115</u>	<u>South of Pearl St. (Cadillac S. Limits)</u>	<u>North of Boon Rd.</u>	<u>South of M-42</u>	<u>North of NJCT M-42</u>
1974	5,000	9,000	N.A.	4,800	4,900
1975	5,300	9,200	4,300	4,800	5,700
1976	5,200	8,600	4,950	5,500	5,600
1977	5,700	9,400	5,300	5,300	6,200
1978	5,400	9,800	6,800	6,800	6,700
1979	5,200	9,000	6,200	6,200	6,100
1980	5,600	9,000	6,300	6,300	4,400
1981	6,500	13,600	6,000	6,000	9,300
1982	N.A.	N.A.	N.A.	N.A.	N.A.
1983	6,000	11,000	5,100	4,300	5,500
1984	6,500	11,000	5,900	5,600	5,700
1985	6,600	10,000	6,700	6,200	6,200
1986	6,300	10,000	7,000	6,200	6,300
1987	8,500	11,800	7,700	6,800	6,800
<b>Growth over 14 years</b>					
	70%	31.1%	79.1%	41.7%	38.8%
<b>Avg. Annual Growth</b>					
	5.0%	2.2%	6.1%	3.0%	2.8%

Source: Data Management Section, Bureau of Transportation Planning, MDOT

In 1987, traffic volumes on US-131 ranged from 8,500 AADT south of Cadillac near M-115, to 24,000 AADT within Cadillac, to 7,000 AADT near Manton. Volumes on M-115 near Cadillac range from 6,000 to 11,000 AADT and volumes on M-55 range from 6,000 to 8,000 AADT. Within recent years traffic has been increasing steadily with the improved economy. Increased local development and the resultant traffic have added to the number of trips utilizing the highway as a local arterial. Although travel of this nature is not prohibited it can contribute to congestion and safety problems.

US-131 is a part of Michigan's Priority Commercial Network (PCN). PCN routes are used extensively for commerce and generally have higher commercial volumes. Traffic conflicts created by truck travel has been a concern of local residents and city officials.

Truck traffic constitutes 4 to 10 percent of the vehicles using US-131 in the study area, see Table 3. The percentage of trucks are lowest within Cadillac and increases in the northern part of the county. Although the percentage of trucks in Cadillac are low in relation to total traffic, the number of trucks in the area are high. In 1987, commercial traffic in downtown Cadillac averaged 4.3 percent of the daily traffic. This is more than 950 trucks daily. Approximately 53 percent of the commercial traffic is composed of medium weight trucks providing services to area business.

North of Boon Road the percent of commercial traffic increases to 8-9 percent. In 1987, approximately 600 trucks traveled in this area daily. Most of these vehicles were heavy trucks (truck trailer and trailer combination trucks).

In general, as you proceed northerly away from the Cadillac area the number of trucks using US-131 declines, however, they compose a larger percent of the total traffic. Near the north Wexford county line daily commercial traffic averages 10 percent. The mix of commercial vehicles are composed of mostly truck trailer and combination trucks.

Other routes in the area such as M-115 and M-55 are carrying a similar percentage of truck traffic, however, there are lower daily truck volumes on these routes. Truck traffic on M-115 between Mesick and Cadillac averaged 10.6 percent (approximately 550 trucks), and M-55 west of Cadillac in Missaukee County averaged 8 to 12 percent (approximately 300 trucks). US-31 east of Ludington to the north Mason county line is another highly traveled north-south PCN route in the district. Commercial traffic averaged 5 to 11 percent, approximately 500 to 750 trucks daily.

Truck traffic percentages in the study area are projected to remain close to what currently exists. Refer to the following section, Traffic Projections, for details.

TABLE 3

1986 AND 1987 TRUCK TRAFFIC  
AS A PERCENT OF 24 HOUR TRAFFIC VOLUMES

<u>Route</u>	<u>Location</u>	<u>Heavy Truck Percentage</u>	<u>Medium Truck Percentage</u>	<u>Total Truck Percentage</u>
US-131	North of South St.	2.0%	2.3%	4.3%
US-131	North of Boon Rd.	5.0	3.9	8.9
US-131	North Wexford County	N.A.	N.A.	10.0
US-131	South of Cadillac	5.6	4.2	9.8
M-55	S. Jct. M-66	4.4	3.7	8.1
M-55	East of M-37	10.7	4.8	15.5
M-115	E. Jct. M-37	6.0	4.6	10.6
US-31	East of Ludington	3.1	2.4	5.5
US-31	North Mason County	7.0	4.1	11.1

## Traffic Projections

The Michigan Department of Transportation recently completed Traffic Analysis Report (T.A.R.) 1140 which included traffic projections for US-131 with and without a bypass of Cadillac. The projections were derived through an analysis of past traffic volume trends, origin and destination studies, population forecasts, and statewide traffic and select link assignments. Specifics regarding assumptions and the methodology used are contained in T.A.R. 1140.

Traffic projections were forecast from a base year 1985 traffic. In 1985, AADT on US-131 south of Cadillac was 9,000 vehicles. Volumes increased to a high of 17,000 vehicles between M-55 (East) and Boon Road. They then decrease to a low of 7,000 vehicles in Manton. Refer to Exhibit 2. By the year 2010, without a bypass of Cadillac, traffic on US-131 is expected to increase by 7,000 vehicles (70.0 percent) just north of Boon Road, and 6,000 vehicles (85.7 percent) in Manton. See Table 4 and Exhibit 3.

Projections were also developed for two bypass alternates. One alternate would bypass Cadillac to the east and tie back into existing US-131 north of Boon Road. The second alternate would be a complete new alignment of US-131, bypassing Cadillac and Manton, and finally transitioning back to existing US-131 near the Manistee River. See Exhibits 4 and 5. With either bypass alternate approximately 7,000 to 8,000 additional vehicles would be generated by the new facility. In the year 2010, existing US-131 which would be signed a business route, would average 7,000 (33%) fewer vehicles than projected with the no-build alternate. Local trips would continue to use existing US-131, however, through trips would divert to the bypass route. Projections indicate that 11,000 to 15,000 vehicles would use the bypass. These vehicles would include through trips currently using US-131 and new trips attracted to the improved facility.

Total truck traffic on US-131 is projected to range from 5 percent in downtown Cadillac to 8 percent north of Cadillac, see Table 5. The projected truck usage on the bypass is 9 percent of the AADT. Heavy trucks will constitute a majority of the truck mix.

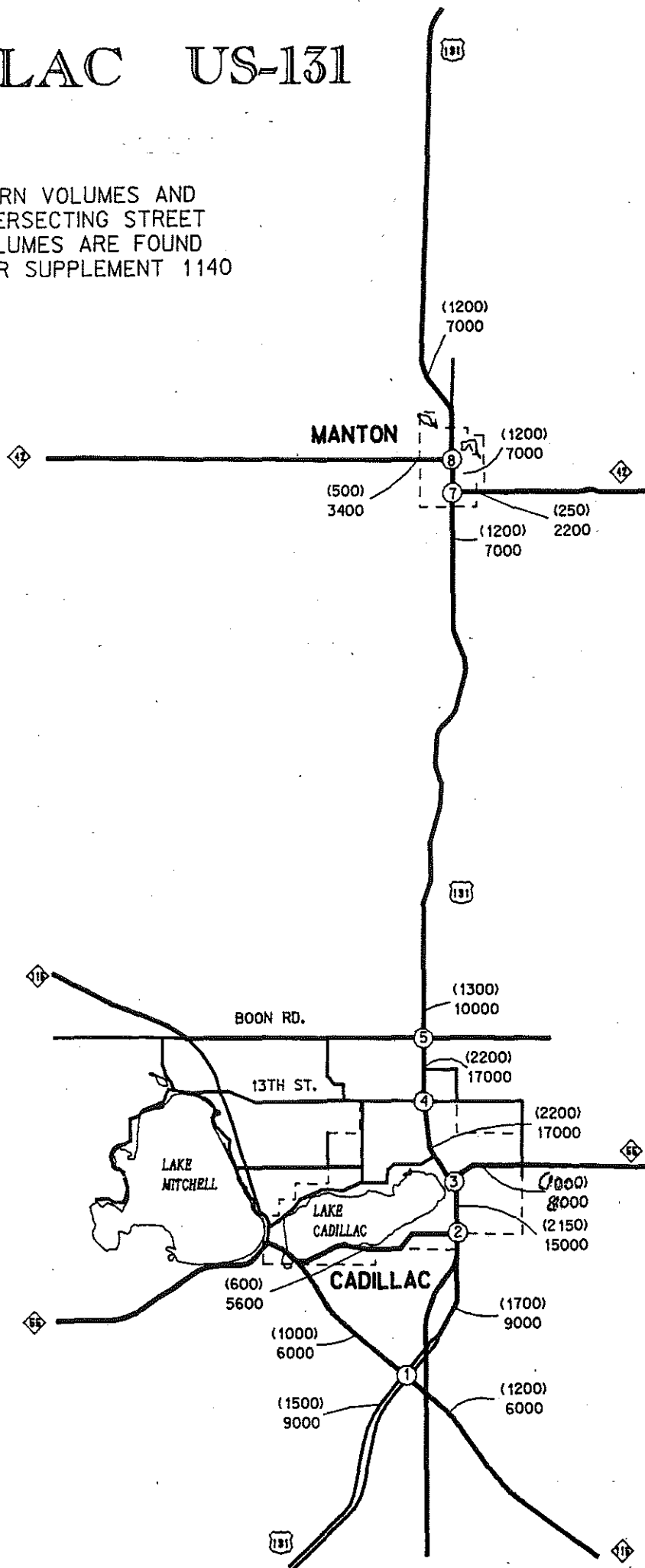
### 2. Design Hour Volume

Design hour volume (DHV) is the hourly volume a roadway is designed to carry. In Michigan, the design hour volume is based on the 30th highest volume the road is projected to experience. Design hour volumes for US-131 are reported in T.A.R. 1140 along with annual average daily traffic. In 1985, DHV on US-131 ranged from a low of 1200 vehicles in Manton and north of the city to a high of 2200 vehicles within the



# CADILLAC US-131

TURN VOLUMES AND INTERSECTING STREET VOLUMES ARE FOUND IN TAR SUPPLEMENT 1140



1985  
NO BUILD

## EXHIBIT 2

**LEGEND**  
AADT 0000  
DHV (000)

TABLE 4

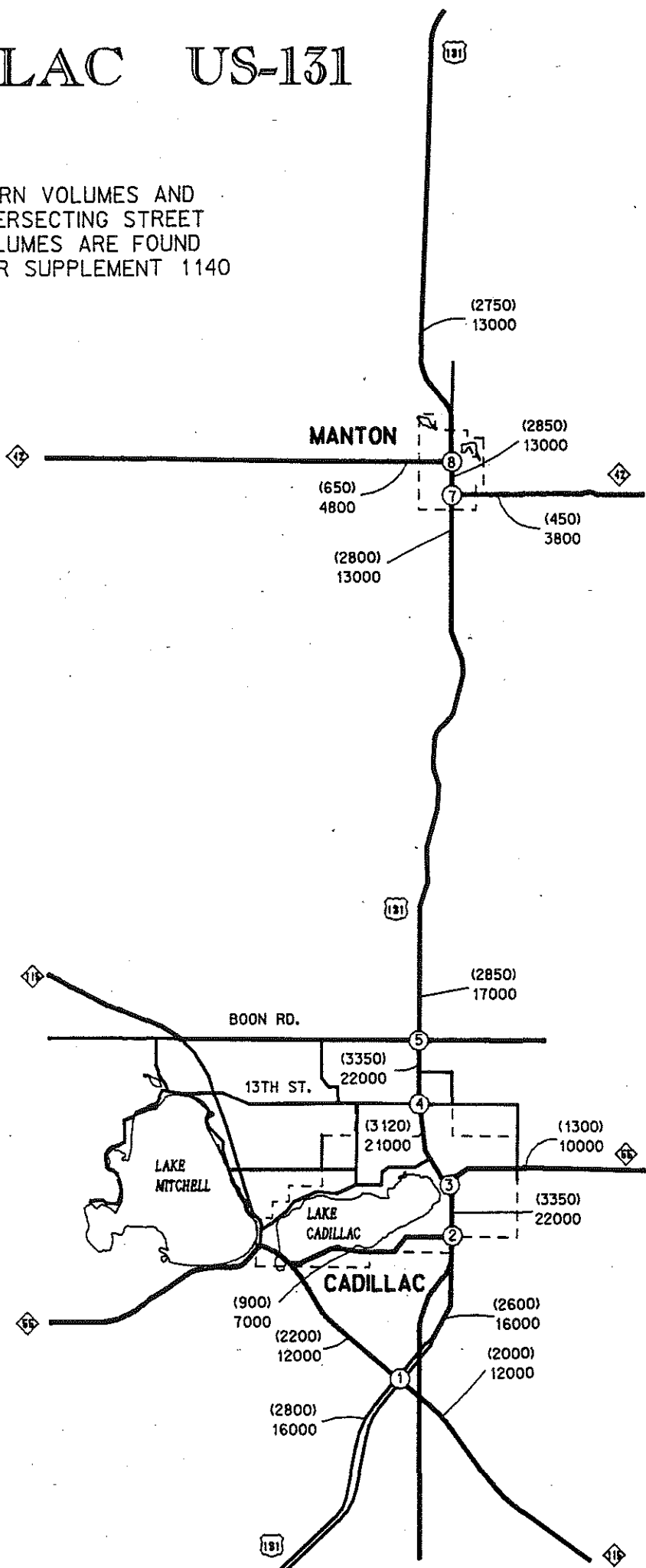
US-131, FORECASTED TRAFFIC VOLUMES  
 YEAR 1985 AND 2010  
 NO-BUILD ALTERNATES

	<u>1985*</u>	<u>2010</u>	<u>GROWTH</u>	
			<u>#</u>	<u>%</u>
M-115 to M-55 (West)	9,000	16,000	7,000	77.8
M-55 (West) to M-55 (East)	15,000	22,000	7,000	46.7
M-55 (East) to 13th Street	17,000	21,000	4,000	23.5
13th Street to Boon Road	17,000	22,000	5,000	29.4
North of Boon Road	10,000	17,000	7,000	70.0
South of M-42 (East)	7,000	13,000	6,000	85.7
M-42 (East) to M-42 (West)	7,000	13,000	6,000	85.7
North of M-42 (West)	7,000	13,000	6,000	85.7

\* Traffic volumes are forecasted and may vary slightly from volumes reported by the Data Management Section, MDOT.

# CADILLAC US-131

TURN VOLUMES AND INTERSECTING STREET VOLUMES ARE FOUND IN TAR SUPPLEMENT 1140



2010  
NO BUILD

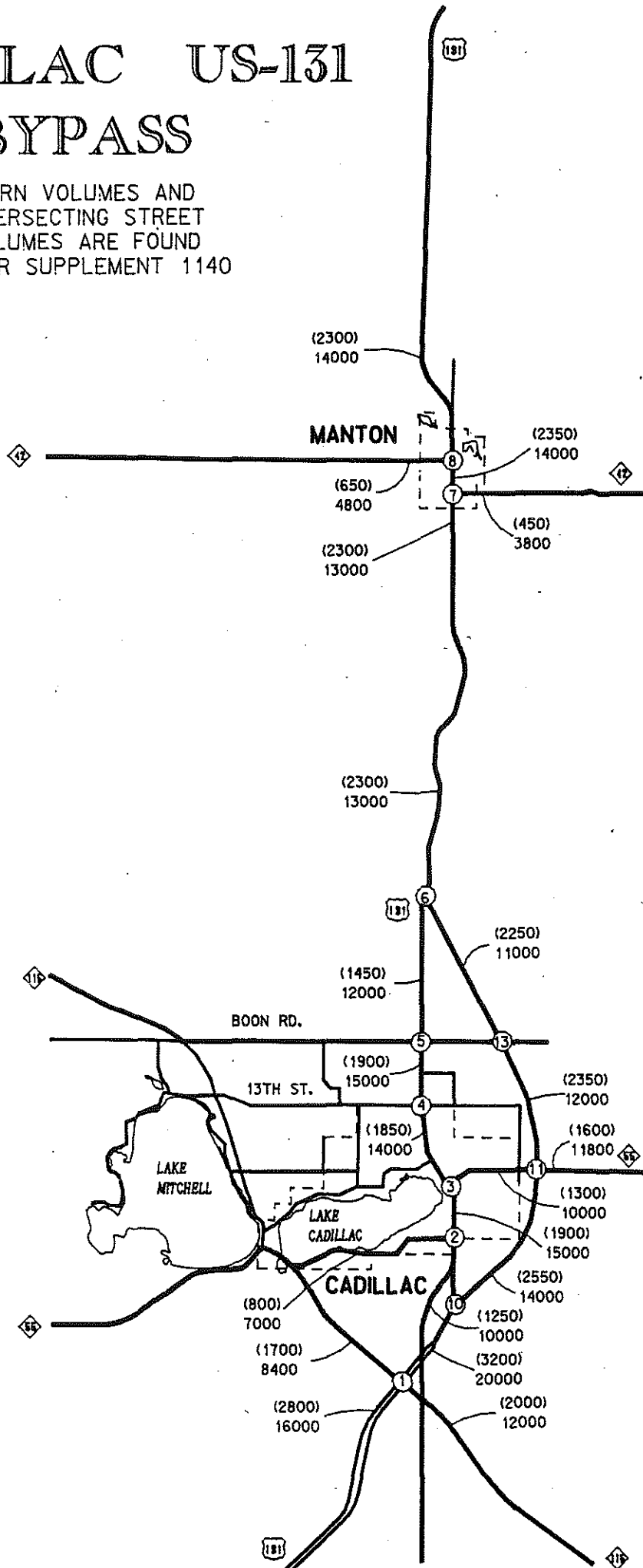
## EXHIBIT 3

**LEGEND**  
 AADT 0000  
 DHV (000)

PREPARED BY: MDOT-TECH. SERV.  
 MAPPING SECTION  
 US131TRAF

# CADILLAC US-131 BYPASS

TURN VOLUMES AND  
INTERSECTING STREET  
VOLUMES ARE FOUND  
IN TAR SUPPLEMENT 1140



2010  
ALTERNATE B

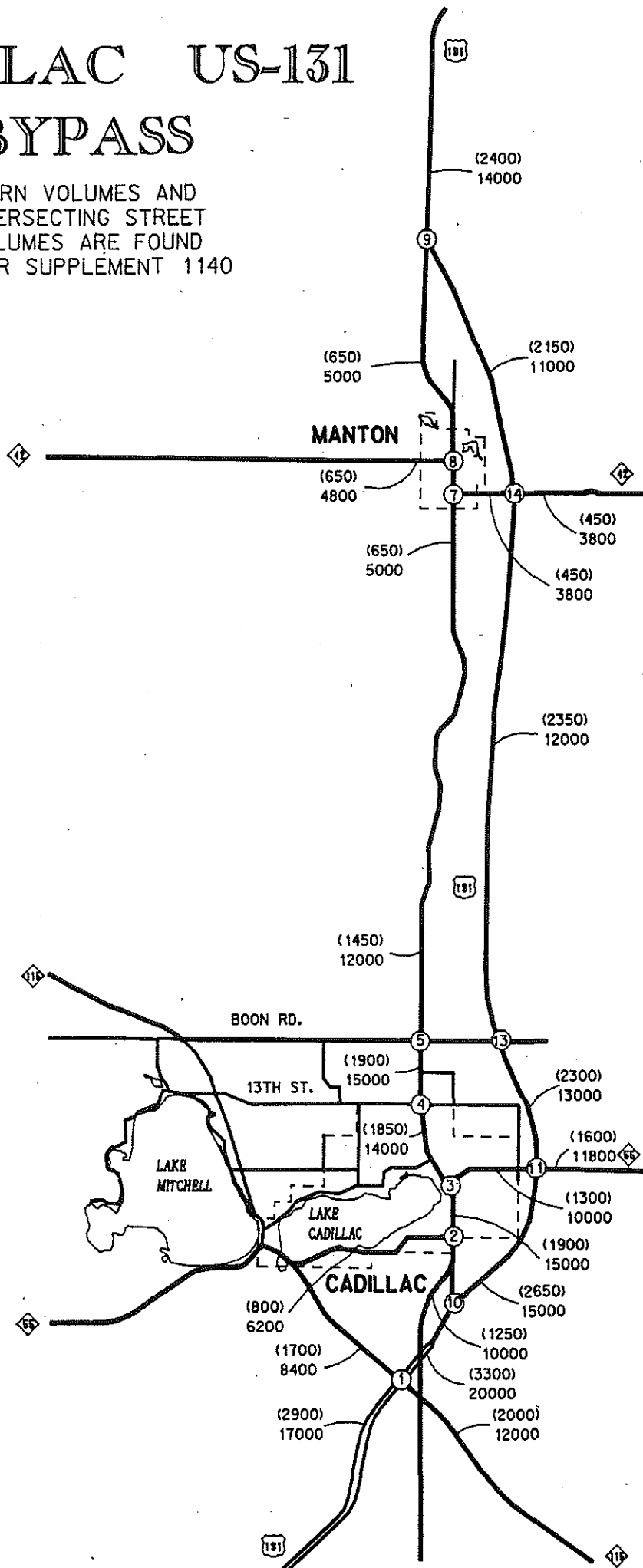
EXHIBIT 4

**LEGEND**  
AADT 0000  
DHV (000)

PREPARED BY: MDOT-TECH. SERV.  
MAPPING SECTION  
US131TRAF

# CADILLAC US-131 BYPASS

TURN VOLUMES AND  
INTERSECTING STREET  
VOLUMES ARE FOUND  
IN TAR SUPPLEMENT 1140



## LEGEND

AA DT 0000.  
DHV (000)

2010  
ALTERNATE C

EXHIBIT 5

**TABLE 5**  
**YEAR 2010 TRUCK TRAFFIC**  
**AS A PERCENT OF AADT**

<u>Route</u>	<u>Location</u>	<u>Heavy Truck Percentage</u>	<u>Medium Truck Percentage</u>	<u>Total Truck Percentage</u>
US-131 Bypass	on the bypass	6.0%	3.0%	9.0%
Existing US-131	South of Cadillac	5.0	3.0	8.0
Existing US-131	Downtown Cadillac	3.0	2.0	5.0
Existing US-131	North of Cadillac	5.0	3.0	8.0
M-55	East of Cadillac	7.5	5.0	12.5
M-55	West of Cadillac	11.0	3.5	14.5

Source: Traffic Analysis Report 1140, MDOT

Cadillac city limits. See Table 6. DHV averaged 13 percent of the annual average daily traffic (AADT) within Cadillac and 17 percent of the AADT near Manton.

With the no build alternative, DHV on US-131 in the year 2010 is projected to range from 2750 vehicles north of Manton to 3350 vehicles within Cadillac and near Boon Road. These projections indicate a 50 percent increase in DHV in Cadillac and more than a doubling of DHV north of the city.

A bypass of Cadillac that tied back into existing US-131 north of the city would reduce design hour volumes on US-131 in the city. DHV on existing US-131 would average 1900 vehicles in Cadillac and would range between 2250 and 2550 vehicles on the bypass route. DHV north of the bypass would be 2300 vehicles. A new freeway facility that bypassed Cadillac and Manton would reduce traffic volumes on existing US-131 and therefore lower DHV on the existing roadway. With this proposal, year 2010 DHV on existing US-131 would be 1900 within Cadillac, 1450 north of Boon Road and 650 near Manton. Year 2010 DHV on the new facility would average 2500, 2350, and 2150 for those respective locations.

Since design hour volumes will be lower on US-131 in Cadillac with a bypass, operational conditions should improve in that area. A capacity analysis was conducted using existing and projected traffic volumes. The results of this analysis is presented in the capacity analysis section below.

### 3. Capacity Analysis

The ultimate hourly capacity of a two-lane rural free access highway such as the road north of Cadillac is 2,800 passenger cars per hour, total, in both directions. The ultimate hourly capacity of a multi-lane urban highway such as the one within Cadillac is 2,000 passenger cars, per hour, per lane. The ultimate capacity, however, is attained only when there are ideal conditions, such as, all passenger cars in the traffic stream, 12 foot lane widths, no "no passing zones," level terrain, and no side interference (driveways, signalized intersections, or closely spaced intersections). Ideal conditions do not exist along US-131, therefore, the capacity of the road is less than the ultimate hourly capacity.

A capacity analysis for 1985 and 2010 was completed for US-131 from Cadillac to Manton. The traffic estimates previously discussed were inputs into this analysis. The principal objective of capacity analysis is the estimation of the maximum amount of traffic that can be accommodated by a facility. It is also intended to estimate the maximum amount of traffic that can be accommodated by a facility while maintaining prescribed operational qualities.

**TABLE 6**  
**DESIGN HOUR VOLUMES**  
**YEAR 1985 AND 2010**  
**NO-BUILD ALTERNATIVES**

	<u>1985</u>	<u>2010</u>	<b>GROWTH</b>	
			<u>#</u>	<u>%</u>
M-115 to M-55 (West)	1,700	2,600	900	52.9
M-55 (West) to M-55 (East)	2,150	3,350	1,200	55.8
M-55 (East) to 13th Street	2,200	3,120	920	41.8
13th Street to Boon Road	2,200	3,350	1,150	52.3
North of Boon Road	1,300	2,850	1,550	119.2
South of M-42 (East)	1,200	2,800	1,600	113.3
M-42 (East) to M-42 (West)	1,200	2,850	1,650	137.5
North of M-42 (West)	1,200	2,750	1,550	129.2



Level of Service is a qualitative measure describing traffic operational conditions and is generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Six levels of service, designated by letters A to F, define the condition of a facility. Level of Service A represents the best operating conditions and Level of Service F represents the worst. Levels of Service A to D representing free flow to high-density but stable flow conditions, are acceptable for Michigan roadways. Levels of Service E (conditions at or near capacity) and F (forced or breakdown flow) are unacceptable.

Table 7 shows the capacity analysis performed by the Traffic and Safety Division for US-131 in the study area. The results are expressed in terms of level of service. Peak hour traffic and existing cross sections were used in this analysis. Although US-131 is operating within the acceptable range today, by the year 2010, the entire roadway will be operating at an unacceptable level.

**TABLE 7**

**LEVEL OF SERVICE  
YEAR 1985 AND 2010  
NO BUILD ALTERNATIVES**

<u>Route</u>	<u>Intersection</u>	<u>1985</u>	<u>2010</u>
US-131	M-55 (West)	B	F
US-131	M-55 (East)	C-D	F
US-131	13th Street	C	F
US-131	Boon Road	D	F
US-131	M-42 (East) and (West)	C	F
US-131	Rural 2-lane section between Cadillac and Manton	D	F

Year 1985 traffic volumes indicate that within Cadillac, US-131 is operating at Level of Service B to D. Along the two-lane rural section between Cadillac and Manton the road is operating at Level of Service D and within Manton the road is operating at Level of Service C. If nothing is done to improve capacity, by the year 2010 the roadway will be congested and operating at Level of Service F.

An improved two-lane highway between Cadillac and Manton would not significantly improve the level of service for the year 2010 forecasted traffic volumes.

The capacity analysis using year 2010 forecasted traffic volumes indicates a bypass of Cadillac will not significantly improve traffic operations within Cadillac. Level of service at the M-55 (West) and (East) intersections will improve to "E," still an unacceptable level, and remain at "F" at 13th Street and Boon Road. In an urban area, the level of service is based on the average stopped delay per vehicle for the various movements within the intersection. Along US-131 within Cadillac the critical movement would be left-turns. Although through trips will be removed with a bypass, the large number of left turns at the intersections results in only a slight improvement in level of service within Cadillac. A bypass of Cadillac and Manton would improve Level of Service on existing US-131 to "D" along the two-lane rural section and to "B" within Manton.

#### E. Accidents

Accident trends, much like traffic trends, reveal problems and conflicts along a roadway. The number of accidents and accident rates were analyzed in order to determine whether US-131 in the study area is experiencing more problems than comparable district and statewide roadways. Accident severity was looked at in order to determine the type of accidents that are occurring.

Table 8 illustrates a five year trend of accidents from south of Cadillac to the north Wexford county line. From 1983 to 1985 the number of accidents on US-131 increased by a total of 159 (47%). The following two years accidents declined to 399 (19%).

Accident rates along US-131 were compared to District 3 and statewide rates. Analysis showed rates for the two lane section south of Cadillac were lower than District 3 and statewide rates. The accident rate on US-131 within Cadillac is much higher than either north or south of the city. Accident rates increase steadily until you reach north of 13th Street where they decline slightly between 13th Street and Boon Road, and then decline significantly north of Boon Road. Accident rates from the Cadillac south city limits to M-55 (West) increased between 1983 and 1985 then began to decline slightly. This trend generally occurs throughout the study area. The four-lane section within the city has a slightly higher rate than the district rate for comparable highways, but was much higher than the statewide rate for this type of road. From 1983 to 1987, US-131 within the Cadillac CBD has an accident rate of 2,272, 2,288, 2,917, 2,533 and 1,898 accidents per 100 million vehicle miles of travel. The District 3 rate for the same type of facility during these years was 1,085, 1,037, 1,337, 1,280, and 1,211, respectively. The statewide rates are even lower. The substantially higher rate within Cadillac suggests the need for an improved facility in this area.

TABLE 8

ACCIDENT TRENDS

1983 - 1987

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
End of Fwy. Section to Boon Road	275	297	380	363	334
Boon Road to S. Manton Village Limits	30	45	54	44	32
S. Manton to N. Manton Village Limits	16	16	18	32	12
N. Manton to N. Wexford Co. Line	<u>14</u>	<u>18</u>	<u>42</u>	<u>26</u>	<u>21</u>
TOTAL	335	376	494	465	399

Source: Technical Services Unit, Traffic & Safety Division, MDOT.

Accident rates drop significantly along US-131 north of Boon Road. The accident rate on this section between 1983 and 1987 averaged, 150 to 305 accidents per 100 million vehicle miles of travel. The rate on the two-lane rural section of US-131 averages less than the District 3 and statewide rate for comparable roadways.

Tables 9 and 10 illustrates the types of accidents that have been occurring on US-131. Over the past five years approximately 74 percent of all accidents were property damage. Of the 399 accidents reported in 1987 nearly one-third were rear-end accidents. Another 17 percent involved accidents at driveways. There was one head-on collision near the north Wexford county line which resulted in two fatalities. According to accident data obtained from the MDOT, Traffic and Safety Division, most accidents occurred between the hours of 12 noon and 5 P.M.

F. Public Transportation

Public transportation must be considered as a possible alternate to any proposed highway project. The Cadillac-Wexford Transit Authority (CWTA) established by Wexford County and the city of Cadillac operates a small bus system in the study area. CTWA is primarily a demand-response operation (dial-a-ride) with daily fixed service to Manton, Mesick, and Boon. The system covers all of Wexford County and transports clients to and from Lake City in Missaukee County under contract with Lake City Mental Health.

There are currently 13 buses in operation, of which seven are handicapped equipped. In 1987, CTWA covered 430,000 vehicle miles and provided service to approximately 127,000 passengers. The system averaged 458 passengers per weekday.

Greyhound lines operates intercity bus service in the Cadillac area. There are six buses daily connecting Cadillac to the north with Traverse City and St. Ignace and to the south with Grand Rapids, Lansing, Detroit, and points beyond.

Because of the large percentage of through trips, varied origins and destinations of motorists, and the recreational nature of travel in the study area public transportation will not alleviate the need for an improved facility. Service within Cadillac would have to be increased substantially in order to capture enough local trips to relieve the congestion being experienced on US-131. Also, intercity bus service would have to be increased and extended beyond those areas currently being served. Even then, the type of recreational/vacation trips attracted to this region would most likely continue to use private automobiles and recreational vehicles as their primary mode of transportation.

TABLE 9

ACCIDENT SEVERITY

1983 - 1987

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Property Damage Accidents	243	269	383	343	295
Injury Accidents	89	107	109	120	103
Number Injured	149	172	170	176	144
Fatal Accidents	3	0	2	2	1
Number of Fatalities	<u>3</u>	<u>0</u>	<u>2</u>	<u>3</u>	<u>2</u>
TOTAL ACCIDENTS	335	376	494	465	399

Source: Technical Services Unit, Traffic & Safety Division, MDOT.

TABLE 10

ACCIDENT TYPE

1987

	<u>Number</u>	<u>Percent</u>
Rearend	129	32.3
Parked Vehicle	26	6.5
Rearend-Driveway	35	8.8
Angle at Driveway	19	4.8
Other-Driveway	16	4.0
Head-On	16	4.0
Head-On Left-Turn	23	5.8
Fixed Object	21	5.3
Animal	24	6.0
Angle-Straight	16	4.0
Angle-Turn	21	5.3
Pedestrian	12	3.0
Rearend Left-Turn	6	1.5
Rearend Right-Turn	2	0.5
Overturn	10	2.5
Bicycle	8	2.0
Other	<u>15</u>	<u>3.8</u>
TOTAL	399	100.0

Source: Technical Services Unit, Traffic & Safety Division, MDOT.

#### IV. POSSIBLE ALTERNATIVES

There are a number of alternatives that should be considered when addressing ways to alleviate existing and future traffic problems along US-131. They include no action, low capital improvements, controlled access boulevard or highway, and freeway construction. These alternatives have varying degrees of impact upon the community and traffic operation. Following is a general discussion of each alternative. A recommendation will not be made until engineering and environmental review takes place and public input is obtained.

##### A. No Action (Maintain Existing)

This alternative involves only normal maintenance and upkeep of the existing roadway. It is a benchmark to measure the effect of making no improvements to the road and to measure the benefits of the other alternatives. Although large capital expenditures would not be required, the existing traffic problems and anticipated future deficiencies would not be corrected. US-131 would operate at an undesirable level of service from Cadillac to Manton.

##### B. Low Capital Improvements

This alternative would consist of a five lane cross section from the existing US-131 freeway to the southern city limits of Cadillac. Most of the possible traffic safety modifications through Cadillac have been implemented so this stretch would remain basically unchanged. A five-lane widening project along US-131 from 13th Street to Boon Road was let in August, 1988. Construction is expected to be completed in late 1989. From Boon Road north, existing US-131 would be upgraded to a good two lane roadway with improved vertical alignment and pavement condition. This may require complete reconstruction and a detour to maintain traffic. Through Manton, US-131 would remain basically as is with possible removal of on-street parking to accomplish four lanes. The inclusion of truck climbing lanes, passing relief lanes or additional turning lanes will also be studied.

The low capital improvement alternative will correct some minor deficiencies on US-131, however, problems will remain in the Cadillac area. Congestion will continue to increase and safety will be impaired. If truck climbing lanes or passing relief lanes are constructed north of Cadillac, delays due to slow moving vehicles would be lessened.

##### C. Controlled-Access Boulevard or Highway

This alternative would consist of a four-lane boulevard or divided highway with controlled access on an approved future alignment. At-grade intersections at major county roads would provide for local access and traffic circulation. With the boulevard, left-turns would be accommodated by cross-overs or storage lanes at the intersections.

The boulevard or highway would principally serve the through trips in the area. Existing US-131 would continue to serve local trips, especially those destined for the downtown area and the residential areas in Cadillac.

Both facilities would alleviate traffic north of Cadillac, however, within Cadillac and near Boon Road congestion would continue to be experienced. The additional capacity provided with these facilities should allow for fewer accidents along the rural section. Because of the possible points of conflict, primarily at the intersections, accident rates may be higher than with a freeway.

A boulevard is usually constructed in areas where a number of right and left turns are negotiated. North of Boon Road there are few movements of this type. A controlled-access divided highway may be more appropriate in this area.

Both facilities would be costly to convert to a freeway in the future. Structures, interchanges, and frontage roads would have to be provided. If any initial construction is to be adaptable to a future freeway, the benefits and costs of constructing these facilities would have to be closely investigated.

#### D. Freeway Alignments

A number of limited-access freeway alignments are being studied. The typical cross section is dual 24 foot pavements with a median of 118 feet. Right-of-way is proposed to be 416 feet. Frontage roads will be provided where necessary.

The primary difference in the freeway alignments currently being investigated is the location of the road between Cadillac and Manton, and north of Manton. (Refer to Exhibits 6-8.) In these areas, alignments are being considered both east and west of existing US-131. All alignments include an eastern bypass of Cadillac and Manton. All transition back to existing US-131 just south of the Manistee River.

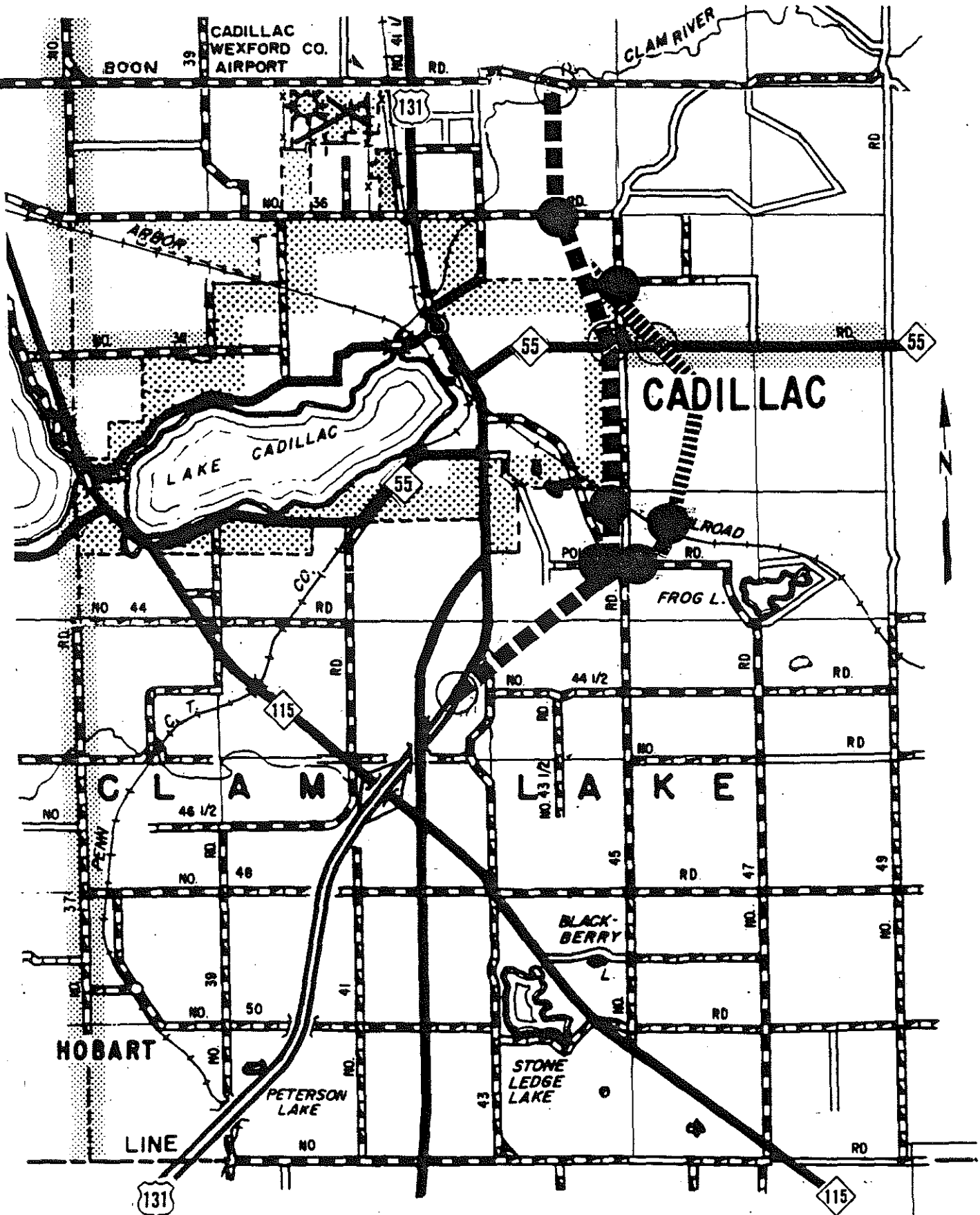
Any freeway alignment being studied would improve traffic operation within Cadillac however, because of the number of local trips, and the resultant left-turns, congestion would continue at the intersections. Benefits of the freeway would be primarily experienced by through trips. Travel time through the corridor will be reduced. Lower traffic volumes on existing US-131 and the separation of local and through trips should reduce accidents. Traffic delays due to no passing zones and slow moving vehicles will be eliminated.

#### Staged Construction

This alternative would allow for the possibility of staging construction rather than the initial construction of a freeway. After studies have been completed and an alignment is chosen, freeway construction could be staged in the following way:



# FREEWAY ALIGNMENTS



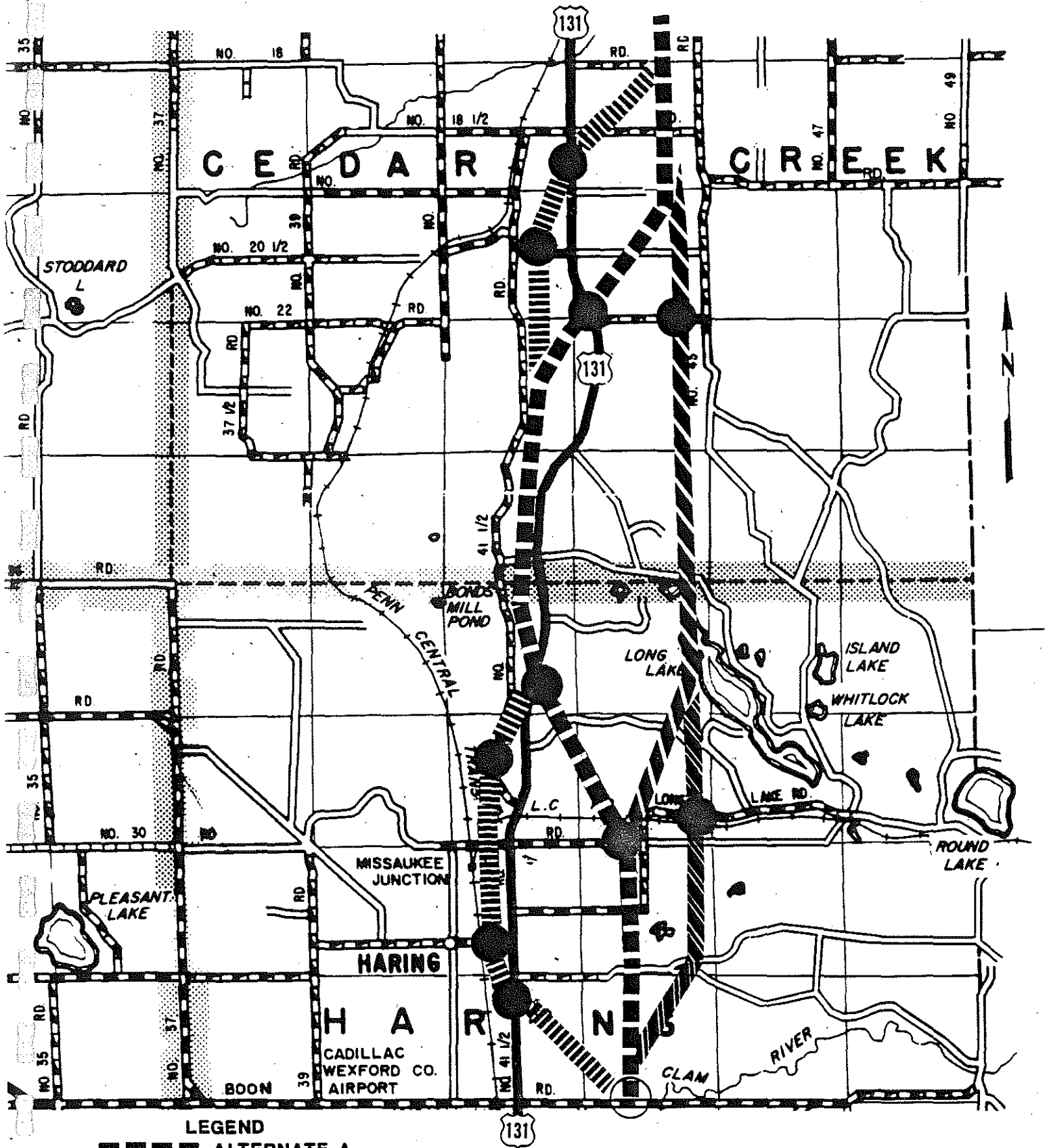
## LEGEND

- ■ ■ ■ ■ ALTERNATE A
- ▨ ▨ ▨ ▨ ▨ ALTERNATE B
- INTERCHANGES
- STRUCTURES

SEGMENT 1

EXHIBIT 6

# FREEWAY ALIGNMENTS



## LEGEND

-  ALTERNATE A
-  ALTERNATE B
-  ALTERNATE C
-  ALTERNATE D

-  INTERCHANGES
-  STRUCTURES

SEGMENT 2

EXHIBIT 7



1. Right-of-way reserved for an eventual freeway.
2. Interim improvements implemented. For example, construction of a bypass of Cadillac with improvements made to the two-lane rural section between Cadillac and Manton.
3. Two-lane highway constructed on the approved future alignment.
4. Four-lane highway on the approved future alignment.
5. Four-lane freeway constructed on the approved future alignment.

E. Interim Improvements

A two-lane highway constructed on the approved future alignment would be an interim improvement that would improve traffic operations and reduce the initial capital expenditure required to construct a freeway. However, by the year 2010 traffic would have increased such that the additional laneage would be required.

This alternative includes a 24-foot roadway with local access provided at major crossroads. This facility would primarily serve through trips destined north and south of the area and existing US-131 would serve local trips. Sufficient right-of-way could be purchased for the eventual construction of a freeway. According to the capacity analysis a facility of this type would not adequately serve year 2010 traffic volumes. When a freeway is warranted, additional capacity would be provided along with the necessary structures and interchanges to convert this facility to a freeway.

The advantages of this alternative includes accommodating traffic as it gradually increases and postponing some of the expense of constructing a four-lane freeway. Monitoring of traffic volumes, accidents, etc. would indicate when additional capacity is needed. A possible disadvantage of this alternative is that construction costs may be higher in the future.

F. Alternate Mode

This alternative would involve expansion of the mass transit system in order to remove enough vehicles from the roadway to alleviate capacity deficiencies. Although an extensive mass transit system may achieve some reduction in traffic during the weekdays, this alternative would not accommodate through trips. Peak hour volumes on US-131 occur on Friday and Sunday afternoons. Vacation and social/recreational trips make up a significant amount of the travel. These type of trips would not be served by traditional line-haul bus transportation nor could they be easily accommodated by improved intercity bus service. The through trips using US-131 have varied destinations and are often family-oriented.

G. Alternatives No Longer Under Study

Two alternatives attempting to utilize the existing roadway were considered but are no longer being studied. They are a dual lane, controlled-access highway and a freeway along existing US-131. Both of these alternatives include an eastern bypass of Cadillac with the two-lane rural section between Cadillac and Manton reconstructed to one of these facilities.

In order to accomplish a dual lane, controlled-access highway a new 24-foot pavement would be constructed adjacent to the existing roadway. Access would be provided primarily at local roads. Right-of-way would not be strictly controlled since a number of driveways would have access in order to avoid buying houses or large parcels of land.

Converting this facility to a freeway in the future would be costly. Structures and interchanges would have to be constructed, and frontage roads provided to connect local properties with interchanges.

A limited-access freeway along existing US-131 would include dual 24-foot pavements with interchanges at Boon Road and M-42. US-131 is the only continuous north-south highway serving this area of Wexford County. It serves as a collector of east-west roads and carries a significant portion of local trips. In order to provide for local traffic circulation, frontage roads and structures would be constructed.

These alternatives are no longer being studied because of their impacts on local access and adjacent property. A freeway along existing US-131 would have the greatest cost and number of relocations in comparison to other freeway alignments.

## V. CONCLUSIONS AND RECOMMENDATIONS

### A. Summary of Deficiencies

The need for improved transportation service within the US-131 corridor in Wexford County has been researched and the findings presented in this report. A number of areas were analyzed including existing and future traffic volumes, accidents, capacity and level of service, and existing and future development. Following is a summary of the current deficiencies along this route and the problems that are expected to occur by the year 2010.

1. US-131 is no longer serving its primary function as a principal arterial highway in Cadillac. Origin and destination studies indicate that local trips make up an increasingly larger portion of trips using US-131 in the study area. In 1961, 40 percent of the trips using US-131 were local trips. That percentage increased to 60 percent in 1977. With the recent development and expected future development local trips will continue to make up a large number of the trips on US-131. Although travel of this nature is not prohibited, use of a highway as an arterial street can contribute to congestion and safety problems.
2. Projected year 2010 traffic volumes indicate a need for additional capacity on US-131. Traffic volumes are projected to increase between 23 and 85 percent over existing levels. The current roadway will not be able to adequately handle these additional volumes.
3. The accident rates along US-131, from South Street to River Street in Cadillac, are substantially higher than the District 3 and statewide rate for comparable highways. In 1987, the accident rate within the Cadillac CBD averaged 1,898 per 100 million vehicle miles of travel. In comparison, the District 3 and statewide accident rates were 1,211 and 1,039 per 100 million vehicle miles of travel respectively, or 25 to 35 percent less.
4. Capacity analysis utilizing year 2010 traffic projections indicate that US-131 will operate at an unacceptable level of service for the entire study segment. If nothing is done to improve capacity the road will operate at Level of Service F. An improved two-lane highway between Cadillac and Manton would not significantly improve the level of service for the year 2010 forecasted traffic volumes.

B. Recommendation

Existing and projected future deficiencies indicate a need to improve US-131. Within Cadillac accident rates are high and capacity will be inadequate with projected 2010 traffic volumes. Additional capacity will also be required along the rural section between Cadillac and Manton. It is recommended that US-131 from the existing freeway section south of Cadillac to Manton be expanded and alternatives studied to determine environmental and other impacts of the expansion. At a minimum a bypass of Cadillac is warranted. The transportation improvement that would most effectively serve current and future traffic demands would be a bypass of Cadillac in conjunction with additional capacity provided from north of Cadillac through Manton.