

**TRAFFIC STUDY OF
W. FOND DU LAC AVENUE
IN THE VILLAGE OF
MENOMONEE FALLS BETWEEN
N. 124TH STREET (STH 145)
AND W. MAIN STREET (STH 74)**

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**MEMORANDUM REPORT
NUMBER 51**

**TRAFFIC STUDY OF W. FOND DU LAC AVENUE
IN THE VILLAGE OF MENOMONEE FALLS BETWEEN
N. 124TH STREET (STH 145) AND W. MAIN STREET (STH 74)**

WAUKESHA COUNTY, WISCONSIN

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Memorandum Report No. 51

TRAFFIC STUDY OF W. FOND DU LAC AVENUE IN THE VILLAGE OF MENOMONEE FALLS BETWEEN N. 124TH STREET (STH 145) AND W. MAIN STREET (STH 74)

INTRODUCTION

In recent years, Village of Menomonee Falls officials and citizens residing along W. Fond du Lac Avenue between N. 124th Street (STH 145) and Main Street (STH 74) have become increasingly concerned about pedestrian safety and excessive vehicular speeds on the roadway. Accordingly, on May 22, 1989, the Village of Menomonee Falls requested the Commission staff to conduct a traffic study of this segment of W. Fond du Lac Avenue. The study was to address these concerns and also determine if the roadway within the study segment provides adequate capacity to accommodate existing and probable future traffic volumes. This report presents the findings and recommendations of the requested traffic study.

EXISTING CONDITIONS

Street and highway systems may be classified in a variety of ways; two of the more important classification systems are the functional and the jurisdictional systems. The functional system is the basis for organizing, planning, designing, and constructing a street network, and includes three classes: 1) arterial streets; 2) collector streets; and 3) land access streets. Arterial streets are those streets and highways intended primarily to serve the movement of traffic. In addition, access to abutting property may be a secondary function of some types of arterial streets and highways, but it should always be subordinate to the primary function of expediting traffic movement. Collector and land access streets are sometimes referred to together as local, or nonarterial, streets. Collector streets are those streets or highways which are intended to serve as connections between the arterial street system and the land access street system. In addition to collecting traffic from, and

distributing traffic to, the land access streets, the collector streets usually have as a secondary function the provision of access to abutting property. Land access streets are those streets and highways which are intended to serve primarily as a means of access to abutting property. West Fond du Lac Avenue serves as an arterial street and is functionally classified as such in the year 2000 regional transportation system plan. Secondary to providing for the efficient movement of traffic, W. Fond du Lac Avenue also provides direct access to abutting parcels.

The jurisdictional classification of a facility identifies the governmental agency responsible for the construction, maintenance, and operation of the facility. The study segment of W. Fond du Lac Avenue is under the jurisdiction of the Village of Menomonee Falls. Therefore, the Village is responsible for the operational control and implementation of improvements along the study segment.

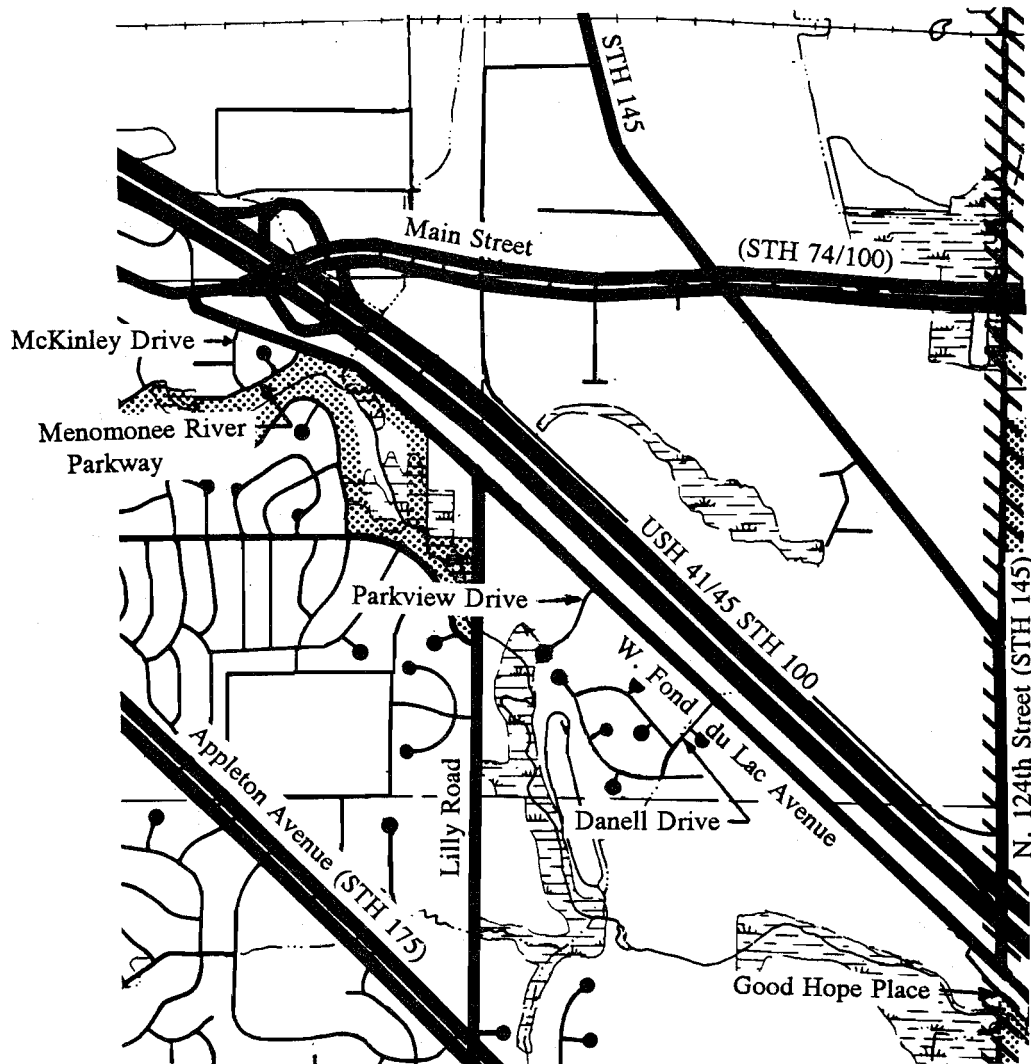
Roadway Physical and Operational Characteristics

As shown on Map 1, W. Fond du Lac Avenue between N. 124th Street (STH 145) and Main Street (STH 74) is approximately two miles long. It is in this segment intersected by McKinley Drive, the Menomonee River Parkway, N. Lilly Road, Parkview Drive, Danell Drive, and Good Hope Place. Traffic on the intersecting streets is controlled by stop signs on the intersecting street approaches. There is currently no traffic control on W. Fond du Lac Avenue, except at the intersection of W. Fond du Lac Avenue with Main Street (STH 74) where W. Fond du Lac Avenue traffic is controlled by a stop sign. It should be noted that the Wisconsin Department of Transportation plans to install traffic signals at this intersection during 1990. The northerly terminus of the Fond du Lac freeway (STH 145) is located at the intersection of W. Fond du Lac Avenue and N. 124th Street. The northwest- and southeastbound traffic lanes of W. Fond du Lac Avenue align directly with the USH 145 northbound off-ramp and the southbound on-ramp, respectively.

West Fond du Lac Avenue is constructed as a rural cross-section. Between Main Street (STH 74) and Lilly Road, the pavement width of W. Fond du Lac Avenue varies from 18 to 20 feet with no shoulders. Between Lilly Road and Parkview

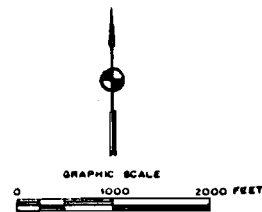
Map 1

W. FOND DU LAC AVENUE STUDY AREA: 1989



LEGEND

-  Freeway
-  Divided Standard Arterial
-  Undivided Standard Arterial
-  Nonarterial Land Access Street



Source: SEWRPC.

Drive, the pavement is 24 feet wide with two-foot-wide gravel shoulders; and from Parkview Drive to N. 124th Street (STH 145) W. Fond du Lac Avenue is 22 feet wide with negligible shoulders. Good design standards for an arterial facility with a rural cross-section call for 12-foot-wide traffic lanes and 10-foot-wide shoulders. A collector facility with a rural cross-section should have 11-foot-wide traffic lanes and five-foot-wide gravel shoulders. Thus, W. Fond du Lac Avenue does not meet the standards for either a rural arterial or collector facility.

The horizontal alignment of W. Fond du Lac Avenue is predominantly straight; however, immediately south of its intersection with Main Street (STH 74) there is a sharp horizontal curve with a radius of approximately 120 feet. The design speed¹ for this curve is 20 miles per hour, or 10 miles per hour less than the posted 30 mile per hour speed limit. The vertical alignment may be considered rolling, with vertical grades ranging between approximately 3 and 5 percent.

Development adjacent to the study segment of W. Fond du Lac Avenue is principally residential, including single-family and multi-family development. Two developments, an existing 40-lot single-family residential subdivision and a proposed 60-lot two-family residential subdivision, do not directly abut W. Fond du Lac Avenue, but W. Fond du Lac Avenue provides the only arterial street to which those subdivisions will have access. Rotary Park abuts the south side of W. Fond du Lac Avenue on both sides of the Menomonee River and attracts pedestrian traffic from the residences abutting W. Fond du Lac Avenue. There are no pedestrian paths or sidewalks located along W. Fond du Lac Avenue except within Rotary Park where a pedestrian path exists, and generally, no shoulders. In addition, numerous trees and shrubs are located within the right-of-way. Thus, pedestrians are forced to walk on the roadway,

¹The design speed of a facility is the maximum safe speed that can be maintained over a segment of highway where only the design features of the roadway influence vehicular operation.

except when walking within the northern portion of Rotary Park where the pedestrian path exists.

The posted speed limit on W. Fond du Lac Avenue is currently 30 miles per hour from Main Street (STH 74) to N. Lilly Road, and 40 miles per hour from N. Lilly Road to N. 124th Street (STH 145). In addition, no parking is allowed at any location along W. Fond du Lac Avenue within the study area.

Traffic Volumes

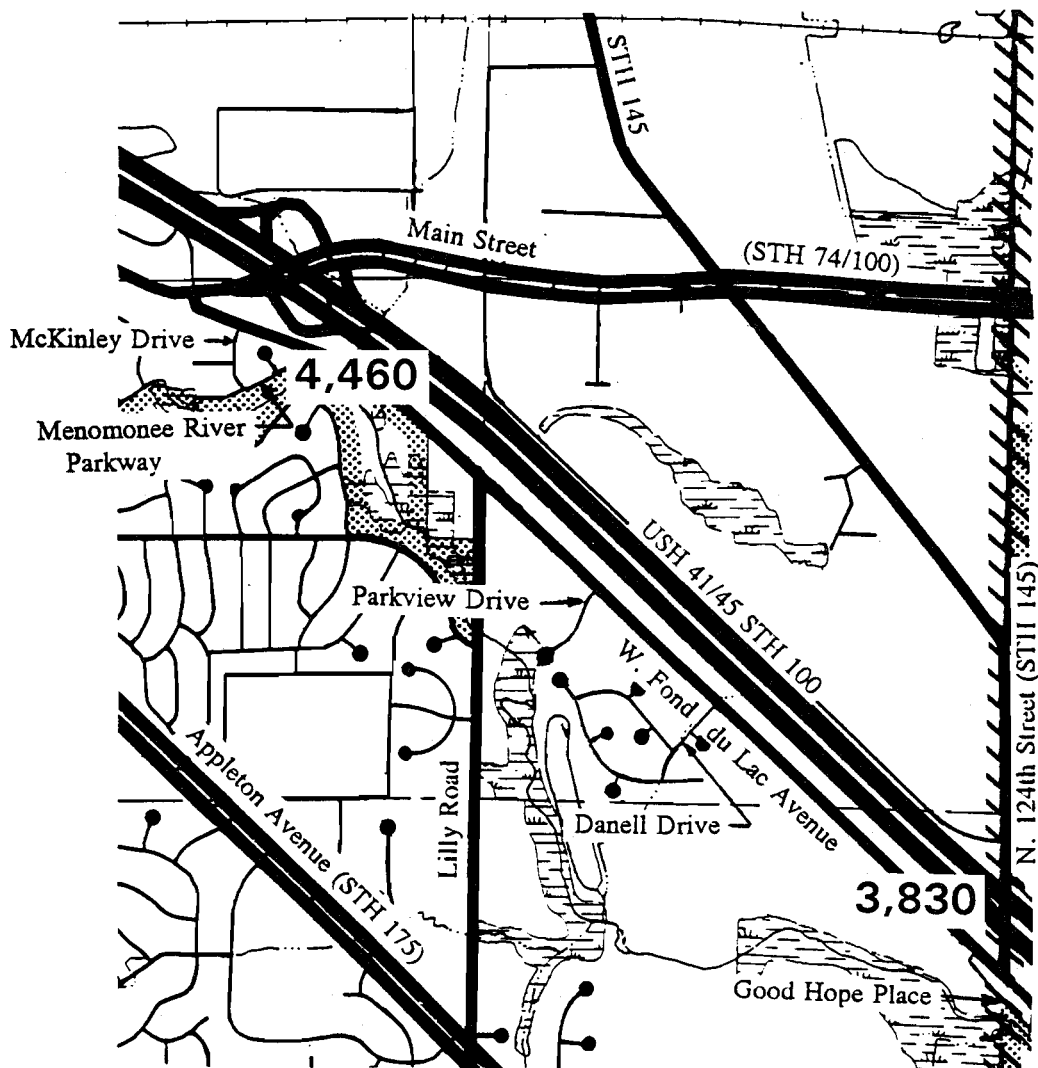
Shown on Figure 1 are the current average weekday traffic volumes on W. Fond du Lac Avenue as determined from traffic counts conducted by the Regional Planning Commission in July 1989. The volume of traffic ranges from approximately 4,460 vehicles per average weekday between Main Street (STH 74) and McKinley Drive to approximately 3,830 vehicles per average weekday between N. Lilly Road and N. 124th Street (STH 145).

The number of traffic lanes provided on a highway facility largely, although not entirely, establishes its traffic carrying capacity. Other factors influencing capacity include intersection control, turning lanes, and vehicle speeds. Because W. Fond du Lac Avenue traffic is uncontrolled at the cross street intersections, permitting uninterrupted traffic flow at speeds of up to 40 miles per hour, and because of an absence of auxiliary or turning lanes, it should be considered a rural facility for the purpose of establishing its traffic capacity. A two-traffic-lane rural facility generally has a design capacity of 7,000 vehicles per average weekday. Based on a comparison of the 1989 average weekday traffic volumes on W. Fond du Lac Avenue to design capacities, W. Fond du Lac Avenue is operating well below design capacity.

The historical growth trends since 1973 in average weekday traffic volume on the segment of W. Fond du Lac Avenue concerned is shown in Table 1. Traffic volume has increased by over 100 percent since 1973, or more than 4 percent annually. It is important to note that, until 1982, traffic volumes on the study segment were less than 2,500 to 3,000 vehicles per average weekday and, therefore, within the range of traffic volume considered acceptable for a land access facility. The current volume of approximately 4,400 vehicles per

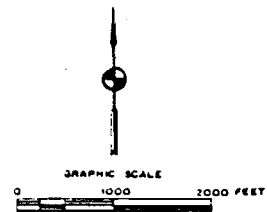
Figure 1

24-HOUR AVERAGE WEEKDAY TRAFFIC
VOLUME ON W. FOND DU LAC AVENUE: 1989



LEGEND

-  Freeway
-  Divided Standard Arterial
-  Undivided Standard Arterial
-  Nonarterial Land Access Street



Source: SEWRPC.

Table 1

TRAFFIC VOLUMES ON W. FOND DU LAC AVENUE
BETWEEN MAIN STREET (STH 74) AND N. 124TH STREET (STH 145)

Location	1973	1976	1979	1982	1985	1988	1989	Annual Growth Rate (percent)
South of Main Street....	2,230	2,650	2,880	2,690	3,960	4,420	4,460	4.2
North of N. 124th Street.....	1,730	1,770	1,700	2,950	2,650	3,910	3,830	4.8

Source: Wisconsin Department of Transportation and SEWRPC.

average weekday exceeds the acceptable range of traffic volume for a collector street and is within the range of traffic volume for an arterial facility. As noted earlier, the roadway cross-section of W. Fond du Lac Avenue does not meet design standards for either a rural arterial or a rural collector facility.

Operating Speeds

A spot speed study was conducted by the Regional Planning Commission on W. Fond du Lac Avenue on August 2, 1989. Spot speeds were recorded near Rotary Park within the 30 mile per hour speed zone and at Danell Drive within the 40 mile per hour speed zone. In addition, spot speeds were recorded for northwestbound traffic making the transition from the high speed freeway cross-section of W. Fond du Lac Avenue to the rural cross-section of W. Fond du Lac Avenue.

Near Rotary Park within the 30 mile per hour speed zone, the average travel speed between 2:30 p.m. to 3:30 p.m. was 35.1 per hour for vehicles traveling to the northwest; and 34.4 miles per hour for vehicles traveling southeast. The 85th percentile speed--the speed at or below which 85 percent of traffic is traveling--was measured to be 38.4 miles per hour and 37.2 miles per hour for traffic traveling northwestbound and southeastbound, respectively. The 10 mile per hour pace range--that is, the 10 mile per hour increment of speed range including the largest number of vehicles--was found to be 30 miles per hour to 39 miles per hour, with almost 81 percent of the traffic traveling to the northwest on W. Fond du Lac Avenue within this range; and 29 miles per hour to 38 miles per hour, with about 84 percent of the traffic traveling to the southeast within this range.

A spot speed study was also conducted on W. Fond du Lac Avenue within the 40 mile per hour speed zone between 4:30 to 5:30 p.m. The average vehicle speeds measured here were 43.5 miles per hour and 40.3 miles per hour for northwestbound traffic and southeastbound traffic, respectively. The 85th percentile speed was found to be 46.8 miles per hour for traffic traveling to the northwest and 42.8 miles per hour for vehicles traveling to the southeast on W. Fond du Lac Avenue. The 10 mile per hour pace range for this section of

W. Fond du Lac Avenue westbound was found to be 39 miles per hour to 48 miles per hour, with almost 84 percent of the traffic traveling to the northwest on W. Fond du Lac Avenue within this range; and 34 miles per hour to 43 miles per hour, with almost 88 percent of the traffic traveling southeastbound on W. Fond du Lac Avenue within this range.

On August 23, 1989, the speeds of northwestbound vehicles making the transition from the high speed freeway cross-section of W. Fond du Lac Avenue east of N. 124th Street (STH 145) to the rural cross-section of W. Fond du Lac Avenue west of STH 145 were recorded during the evening peak traffic hour. The speed data were collected in a 40 mile per hour speed zone, and the average travel speed was found to be 46.4 miles per hour, while the 85th percentile speed was found to be 51.5 miles per hour; that is, 15 percent of the vehicles recorded traveled above 51.5 miles per hour. It was also found that the 10 mile per hour pace range was 41 to 50 miles per hour, with 67.4 percent of the northwestbound traffic within this speed range.

Motorist compliance with the posted speed limit on the study segment is variable both with respect to location and direction of travel. Compliance is low on the section of W. Fond du Lac Avenue between Main Street (STH 74) and Lilly Road with the average speed about five miles per hour above the posted 30 mile per hour speed limit, and with 15 percent of the motorists exceeding the posted speed limit by about eight miles per hour. Traffic northwestbound on W. Fond du Lac Avenue between Lilly Road and N. 124th Street (STH 145) after having made the transition from the high speed freeway cross-section to the rural cross-section of W. Fond du Lac Avenue travels well above the posted 40 mile per hour speed limit. As these vehicles continue to the northwest, the 85th percentile speed drops from 51.5 miles per hour to 46.8 miles per hour, indicating that these motorists are reluctant to reduce their speed. However, compliance with the posted speed limit by southeastbound traffic on W. Fond du Lac Avenue between Lilly Road and N. 124th Street (STH 145) is good, as reflected by the 85th percentile speed of 42.8 miles per hour recorded for this traffic.

Accidents

The incidence of traffic accidents provides a measure of the operating characteristics of a roadway. The three commonly used measures for quantifying traffic accidents include: 1) the total number of accidents annually; 2) the rate of accident occurrence expressed as accidents per million vehicles entering an intersection or per million vehicle miles of travel; and 3) the severity of accidents as indicated by the number of fatal, personal injury, and property damage accidents. At those locations where any of these measures appears relatively high in comparison to other locations, a more detailed investigation may be warranted to determine if traffic management actions can be implemented to reduce the severity and number of accidents in the future.

Motor vehicle accident histories were obtained for W. Fond du Lac Avenue for the years 1987 through August 1990 and are shown in Table 2. A total of 42 accidents occurred on the study segment within the study period. It should be noted that traffic accidents during the study period increased each year, with 10 accidents occurring in 1987; 11 accidents in 1988; 13 accidents in 1989; and 8 accidents occurring for the first eight months of 1990. There were no fatal accidents during the three-year and eight-month study period. The majority of these accidents--70 percent of the total accidents in 1987; 64 percent in 1988; 62 percent in 1989; and 88 percent in the first eight months of 1990--were property damage only.

Shown in Figure 2 are the locations of the motor vehicle accidents which have occurred on the study segment within the three-year and eight-month history. Of the 42 accidents recorded on W. Fond du Lac Avenue, five accidents occurred at the intersection of W. Fond du Lac Avenue and N. Lilly Road; 34 accidents, or about 81 percent, occurred at midblock locations; and three collisions occurred at the intersection of N. 124th Street (STH 145) and W. Fond du Lac Avenue. As the incidence of intersection accidents was low at each intersection, no traffic engineering actions were considered at these locations.

Three midblock segments were analyzed: one midblock segment between W. Main Street (STH 74) and N. Lilly Road; a second segment between N. Lilly Road and Danell Drive; and the third segment between Danell Drive and N. 124th Street (STH 145). The three-year and eight-month frequency of accidents and average

Table 2

INCIDENCE AND SEVERITY OF MOTOR VEHICLE ACCIDENTS ON THE STUDY SEGMENT OF
W. FOND DU LAC AVENUE BETWEEN W. MAIN STREET (STH 74) AND N. 124TH STREET (STH 145)

Location	1987			1988		
	Injury	Property Damage	Total	Injury	Property Damage	Total
Intersection ^a						
N. Lilly Road.....	--	--	--	1	1	2
N. 124th Street (STH 145).....	--	--	--	1	1	2
Midblock						
Between W. Main Street (STH 74) and N. Lilly Road.....	1	3	4	--	3	3
Between N. Lilly Road and Danell Drive.....	1	2	3	2	--	2
Between Danell Drive and N. 124th Street (STH 145)..	1	2	3	--	2	2
Total	3	7	10	4	7	11

Location	1989			1990 ^b			Total		
	Injury	Property Damage	Total	Injury	Property Damage	Total	Injury	Property Damage	Total
Intersection ^a									
N. Lilly Road.....	--	3	3	--	--	--	1	4	5
N. 124th Street (STH 145).....	--	--	--	--	1	1	1	2	3
Midblock									
Between W. Main Street (STH 74) and N. Lilly Road.....	1	1	2	--	5	5	2	12	14
Between N. Lilly Road and Danell Drive.....	1	3	4	--	1	1	4	6	10
Between Danell Drive and N. 124th Street (STH 145)..	3	1	4	1	--	1	5	5	10
Total	5	8	13	1	7	8	13	29	42

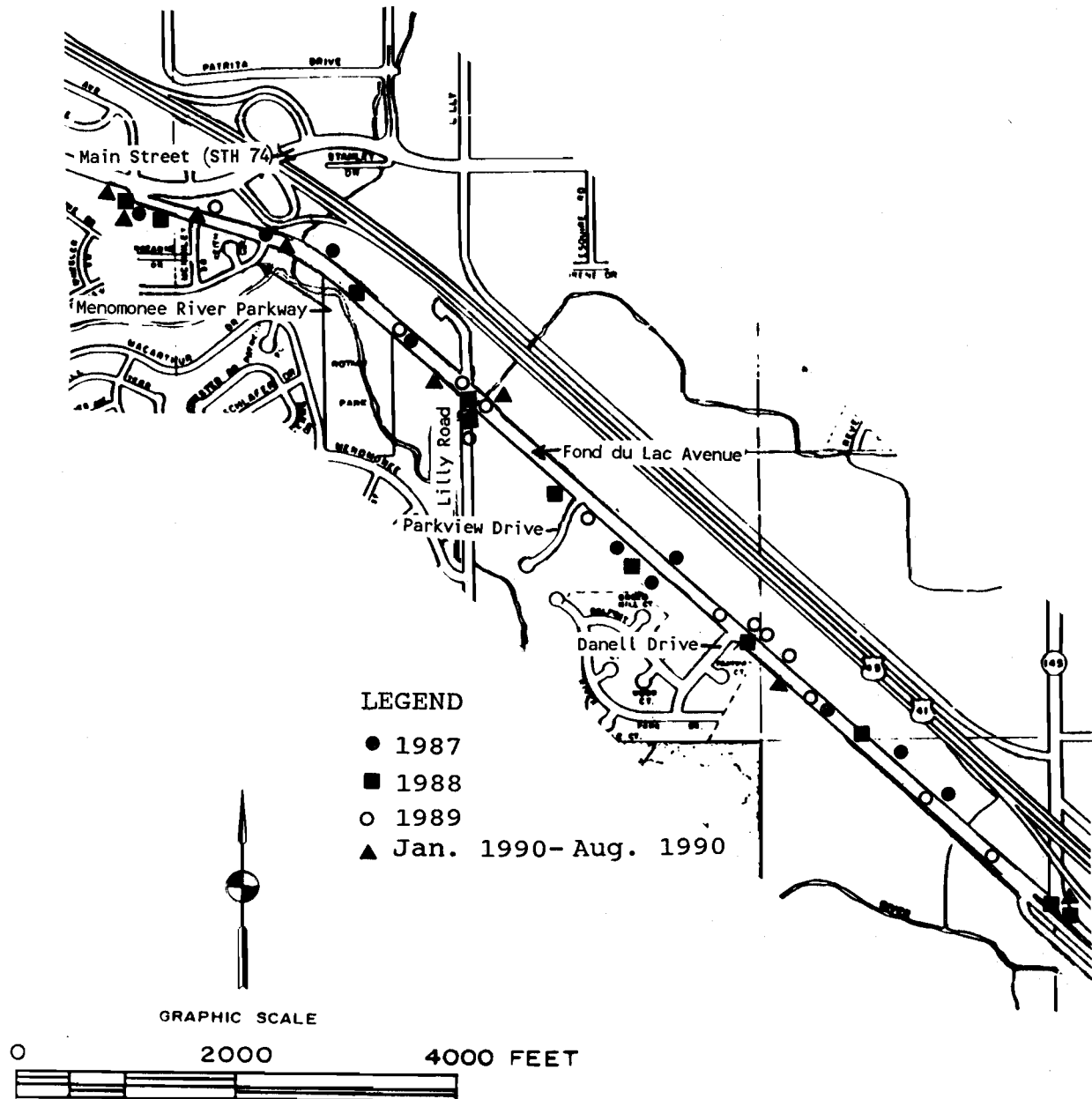
^aNo data were compiled for the intersection of W. Fond du Lac Avenue and W. Main Street (STH 74) because the installation of traffic signals at this intersection during 1990 may be expected to alter operating conditions at the intersection. Thus, the pattern of accidents occurring prior to the traffic signal installation would no longer be valid.

^b1990 data represent the months of January through August 1990.

Source: SEWRPC.

Figure 2

TRAFFIC ACCIDENT LOCATIONS
FOR THREE-YEAR AND 8 MONTH STUDY HISTORY



Source: SEWRPC.

accident rates on these midblock segments were similar, ranging between 10 and 14 total accidents, and between 3.2 and 4.4 accidents per million vehicle miles of travel. Twenty-two of the 34 midblock accidents, or approximately 65 percent, involved a single vehicle leaving the roadway and striking a ditch, culvert, or other fixed object along the roadway. Of the 22 accidents involving single vehicles leaving the roadway, 16, or about 72 percent, occurred at night or at dusk. Considering all of the 42 accidents which occurred on W. Fond du Lac Avenue, 20, or 48 percent, occurred at night, with 16 occurring at locations without artificial nighttime roadway lighting. Inclement weather was another factor in the occurrence of accidents. Of the 22 midblock collisions involving single vehicles leaving the roadway, 11, or 50 percent, occurred when the road was wet or ice or snow covered. Other factors which may have contributed to the accidents include excessive vehicle speed and the substandard roadway cross-section, particularly a lack of shoulders and clear zone. In addition, in the three-year, eight-month study history, in nine, or 21 percent of the total 42 accidents, alcohol was cited as a contributing factor.

No particular pattern could be discerned concerning the remaining 12 midblock accidents--that is, those which involved two vehicles. These accidents can likely be attributed to the substandard geometrics of W. Fond du Lac Avenue and poor weather conditions.

ANALYSIS AND RECOMMENDATIONS

This section of the memorandum presents a short-range transportation improvement plan consisting of low-cost traffic engineering actions intended to address the identified existing traffic problems. Also, a long-range transportation improvement plan of major physical roadway improvements which addresses not only the existing problems, but potential future problems to the year 2010.

Short-Range Highway Improvement Plan

Excessive Vehicular Speeds: A traffic management action considered to alleviate the vehicular speeding problem on W. Fond du Lac Avenue was the installation of a "Speed Zone Ahead" sign incorporating two flashing amber lights to

be located immediately west of the intersection of W. Fond du Lac Avenue with N. 124th Street (STH 145). The advantage of installing this sign is to alert northwestbound motorists exiting the Fond du Lac freeway to the impending change in the speed limit west of N. 124th Street (STH 145). There are no disadvantages to this alternative traffic management action. Therefore, it is recommended that this traffic management action be implemented, at an estimated cost of \$2,000.

Another traffic management action considered to alleviate the problem of excessive vehicular speeds was an increase in law enforcement activity on a random basis along the entire study segment of W. Fond du Lac Avenue. The advantages of this alternative traffic management action are increased compliance with the posted speed limit and the resultant improvement in traffic safety. The disadvantages of this action include the potential for decreased compliance in the absence of a police officer and the cost of the law enforcement activity. It is recommended that this traffic management action be implemented, at an estimated cost of \$6,000 per year for about 200 hours of enforcement.

Vehicular Accident Problem: The first alternative traffic management action considered to alleviate the vehicular accident problem along the study segment of W. Fond du Lac Avenue was a reduction in the speed limit between N. Lilly Road and N. 124th Street (STH 145) from the current 40 miles per hour to 30 miles per hour. The advantage of this alternative traffic management action is that traffic safety would be improved due to a reduction of vehicular speeds, thereby providing motorists with additional time to perceive and react to unexpected traffic and highway conditions. A reduction in the speed limit may also be expected to result in a reduction of accident severity. Finally, the lower speed limit is more appropriate than the existing speed limit for adjacent land development and existing driveway spacing. This traffic management alternative is recommended for implementation, with a trial period of six months to determine the effect the reduction of the posted speed limit actually has on the 85th percentile speed. After this trial period has elapsed, the desirability of the 30 mile per hour speed limit should be reevaluated. If the 85th percentile speed is not substantially reduced, or if there is a sub-

stantial reduction in the percentage of people in the 10 mile per hour pace speed, then the speed limit should be again raised to 40 miles per hour. Not only does disparity in travel speeds increase accident potential, but the severity in accidents is likely to increase as well. The disadvantage of this alternative traffic management action is a necessity for increased law enforcement activity. It is recommended that this alternative traffic management action be implemented, at an estimated cost of \$200.

The second alternative traffic management action considered to alleviate the vehicular accident problem along the study segment of W. Fond du Lac Avenue was the installation of reflectorized epoxy pavement markings delineating the edges of the pavement. The advantage of this alternative traffic management action is to improve traffic safety through the improved delineation of the roadway edge. Reflectorization of the pavement marking may be expected to further improve its visibility, particularly during periods of low ambient light intensity. The disadvantage of this alternative traffic management action is that the pavement markings may be covered by snow and ice, and the accumulation of sand applied to roadway surfaces during inclement weather. It is recommended that this alternative traffic management action be implemented, at an estimated cost of \$5,000.

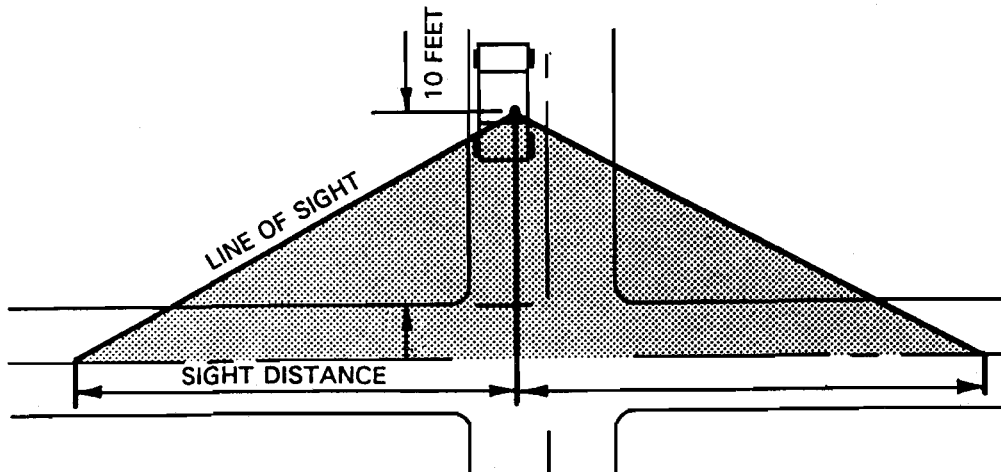
A third alternative traffic management action considered to alleviate the traffic accident problem was the removal of interfering trees and shrubs to create adequate sight triangles at the local street intersections along the study segment. Shown in Table 3 is the sight distance required to complete an exiting maneuver off a side street onto the major street. As vehicle speed increases on the major street, the sight distance required to safely enter or cross the traffic stream increases for a vehicle on the cross street. To provide the necessary sight distance for a vehicle to safely enter or cross the traffic stream, the sight triangle must be maintained free of obstructions. The advantage of this alternative traffic management action would be to improve traffic safety and improve visibility at the local street intersections for motorists on both W. Fond du Lac Avenue and on the cross streets. A disadvantage of this alternative traffic management action is that it will require the removal of trees and shrubs within the sight triangle, negatively

Table 3

SAFE SIGHT DISTANCE IN FEET FOR A PASSENGER VEHICLE TO
COMPLETE INDICATED MANEUVER FROM INTERSECTING CROSS STREET

Speed (miles per hour)	Left Turn onto Arterial		Right Turn onto Arterial		Crossing Arterial	
	Safe Sight Distance to the Right	Safe Sight Distance to the Left	Safe Sight Distance to the Right	Safe Sight Distance to the Left	Safe Sight Distance to the Right	Safe Sight Distance to the Left
25	325	375	N/A	325	250	250
30	405	415	N/A	405	300	300
35	515	500	N/A	515	350	350
40	675	575	N/A	675	400	400
45	840	610	N/A	840	450	450
50	1,050	695	N/A	1,050	500	500

Source: SEWRPC.



Source: U.S. Department of Transportation and SEWRPC.

impacting roadside aesthetics. It is recommended that this alternative traffic management action be implemented, at an estimated cost of \$1,000; and an estimated cost of \$200 for annual maintenance.

Other traffic management actions considered but rejected included: 1) the installation of a street lighting system; 2) the removal of roadside obstacles; and 3) the installation of prismatic raised pavement markers. A continuous street lighting system was rejected because: 1) nearly half the accidents on the study segment in 1987, 1988, 1989, and eight months of 1990 occurred during daylight hours when inadequate ambient light is not a problem; 2) the recommended traffic engineering actions may be expected to improve traffic safety, thus reducing the accident potential; 3) U. S. Department of Transportation warrants for such an installation which consider such elements as lane width, horizontal and vertical alignment, and a 2:1 ratio of night-to-daytime accidents are not met; and 4) the cost of a continuous street lighting system was estimated to be \$225,000. With respect to street lighting, it should be noted that installation of such lighting does not necessarily indicate to motorists that they are traversing a street segment with a significant potential for pedestrian usage. Thus, motorists are not likely to be more alert to pedestrians than under existing conditions, particularly given that vehicle volumes have reached the level at which motorists' expectations of pedestrians on the roadway are likely to be minimal. Pedestrians, believing themselves to be more visible, thus may gain a false sense of security with regard to using the roadway.

The removal of roadside obstacles, including mail boxes, utility poles, trees, and shrubs, was rejected because implementation of this traffic management action may be expected to have minimal impact without an attendant substantial improvement in the existing roadway cross-section, including the addition of shoulders and a clear zone.

Installation of plowable prismatic raised pavement markers was rejected because: 1) as with street lighting, the impact on daytime accidents is negligible; 2) the recommended traffic engineering actions may be expected to improve traffic safety; 3) the warrants for installation, as specified by the

Wisconsin Department of Transportation including a current annual average daily traffic volume of 6,000 vehicles are not met; and 4) the cost of installation was estimated to be approximately \$32,000.

The Village should continue to monitor the incidence of accidents. At some point in the future as traffic volumes increase and/or the ratio of nighttime-to-daytime accidents increases, some or all of the traffic engineering actions rejected herein may become appropriate.

Other Short-Range Actions: West Fond du Lac Avenue currently serves two incompatible functions: 1) the movement of vehicular traffic; and 2) pedestrian/cyclist movement. This problem is exacerbated by a significant increase in vehicular traffic on the study segment, particularly since 1982. It may be noted that none of the traffic management alternatives evaluated, whether recommended for implementation or rejected, would be expected to significantly reduce the potential for conflict between the pedestrian and vehicular traffic streams, as none of the alternatives assures the separation of the two.

To provide the greatest safety for pedestrians and cyclists, the two incompatible uses should be separated. The short range action recommended to accomplish this and to alleviate the citizen concern over pedestrian safety is the construction of pedestrian paths at the right-of-way line. The advantage of this action would be to provide pedestrians with a walkway other than the current roadway, thereby accomplishing the separation of pedestrians from vehicular traffic. The disadvantages of this alternative action are the cost of implementation and the necessity to remove trees, shrubs, and other obstacles adjacent to the roadway to accommodate the construction of five-foot-wide three-inch-thick bituminous concrete footpaths on both sides of the street at the the right-of-way line. It is recommended that this short-range action be implemented, at an estimated minimum cost of \$78,200.

Another short-range action considered to alleviate the vehicular accident problem on the horizontal curve immediately south of Main Street (STH 74) is the closure of the driveway located on the outside of that curve and serving the property located at N87 W14901, and the installation of a warning sign and

delineator posts to delineate the curve, as shown in Figure 3. Access to this property would be via an existing private roadway connecting the driveway at N87 W14901 and the driveway located at N87 W14873. The advantage of this roadway alternative is that closure of the driveway would permit the installation of appropriate warning signing and roadway delineators to improve traffic safety for southbound motorists on W. Fond du Lac Avenue. The disadvantages of this short-range action are that direct access to the property at N87 W14901 is denied, and that the cooperation of the property owner at N87 W14873 would be required to maintain access to the property at N87 W14901. However, it should be noted that the driveways serving these two properties are currently connected. It is recommended that the Village pursue the feasibility of this action and implement the driveway closure, signing, and roadway delineation if possible, at an estimated cost of \$1,000.

LONG-RANGE HIGHWAY IMPROVEMENT PLAN

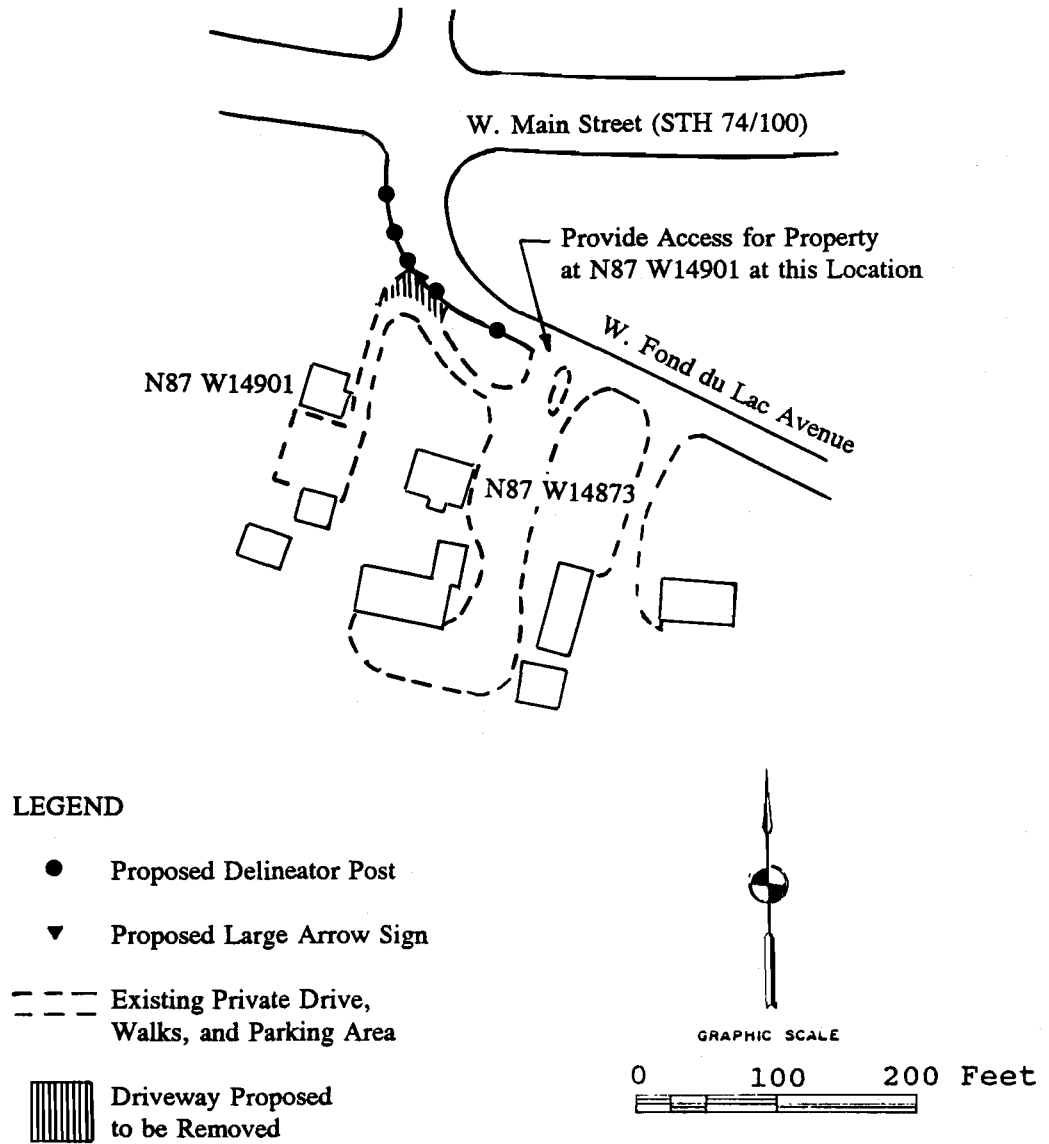
This section of the memorandum presents long-range improvement recommendations for W. Fond du Lac Avenue. Unlike short-range improvements, long-range improvements are those improvements which by their nature are capital intensive and require a relatively long time to implement.

Based upon adopted year 2000 regional land use and transportation system plans, the year 2010 regional land use plan under preparation, and the year 2010 Village land use plan, average weekday traffic forecasts for the year 2010 on the study segment of W. Fond du Lac Avenue were prepared. These volumes were prepared assuming that all other planned transportation improvements in Waukesha County and southeastern Wisconsin would be implemented.

Shown in Figure 4 are the forecast volumes for the study segment of W. Fond du Lac Avenue. It is forecast that, in the year 2010, approximately 9,000 vehicles per average weekday will use the segment of W. Fond du Lac Avenue between Main Street (STH 74) and N. Lilly Road, an increase of approximately 4,500 vehicles, or about 100 percent over the current traffic volume. On the segment of W. Fond du Lac Avenue between N. Lilly Road and N. 124th Street (STH 145) 7,000 vehicles are forecast to use this segment of the highway in the year

Figure 3

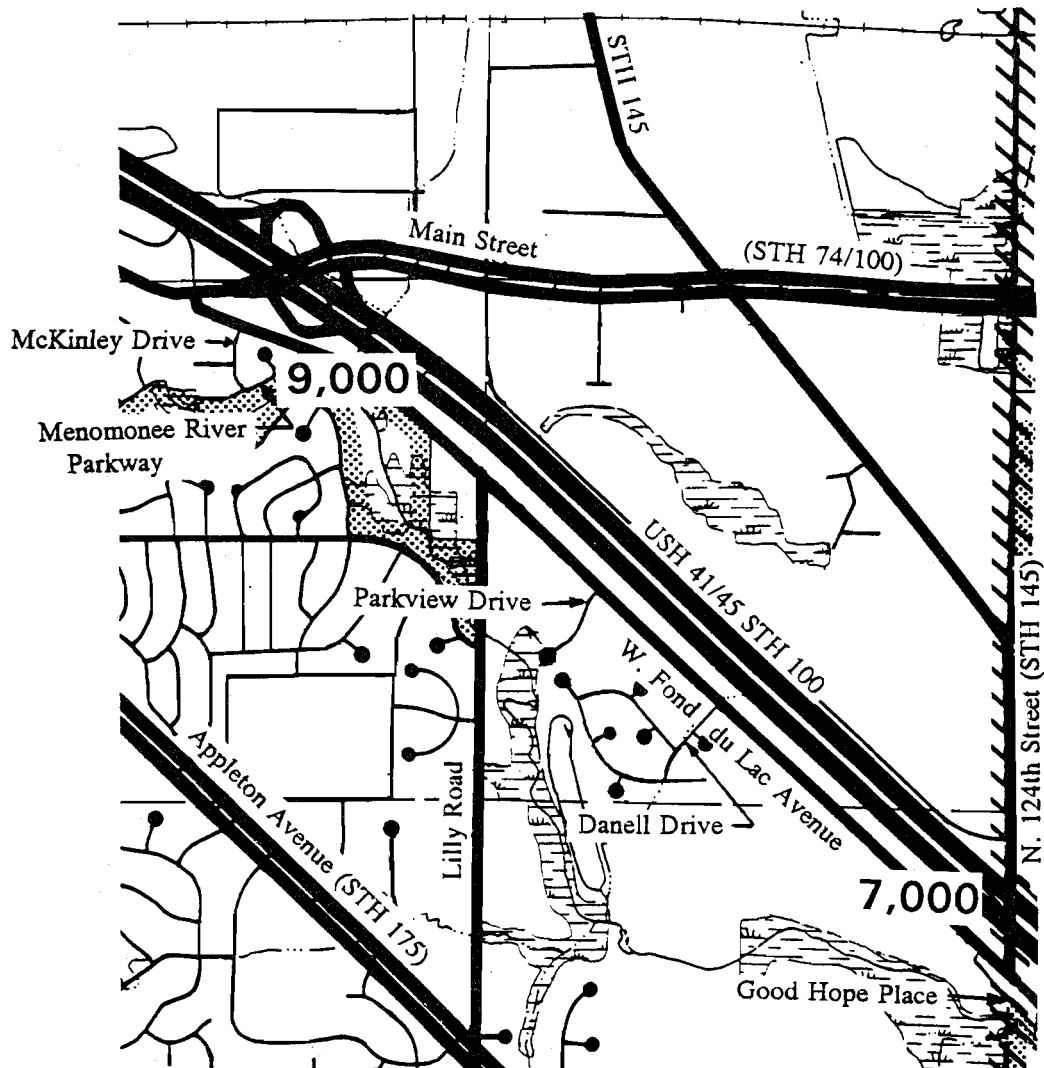
DRIVEWAY CLOSURE SOUTH OF MAIN
STREET (STH 74) ON W. FOND DU LAC AVENUE



Source: SEWRPC.

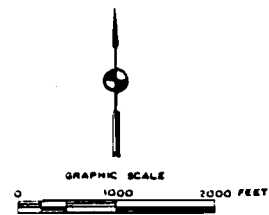
Figure 4

FORECAST AVERAGE WEEKDAY TRAFFIC FOR
DESIGN YEAR 2010 ON W. FOND DU LAC AVENUE



LEGEND

-  Freeway
-  Divided Standard Arterial
-  Undivided Standard Arterial
-  Nonarterial Land Access Street



Source: SEWRPC.

2010, an increase of approximately 3,200 vehicles per average weekday, or about 80 percent over the current traffic volume.

Comparison of the forecast year 2010 traffic volumes to the design capacity of W. Fond du Lac Avenue indicates that the study segment of W. Fond du Lac Avenue will be operating at or over the existing design capacity of the roadway. As a result, it may be expected that motorists will experience increased delay and an increase in the accident rate. Therefore, it is recommended that W. Fond du Lac Avenue be reconstructed as a two-lane urban roadway. The recommended cross-section, as shown in Figure 5, consists of two 12-foot-wide traffic lanes, two 10-foot-wide parking or auxiliary lanes, curb and gutter, and sidewalks on both sides of the facility.

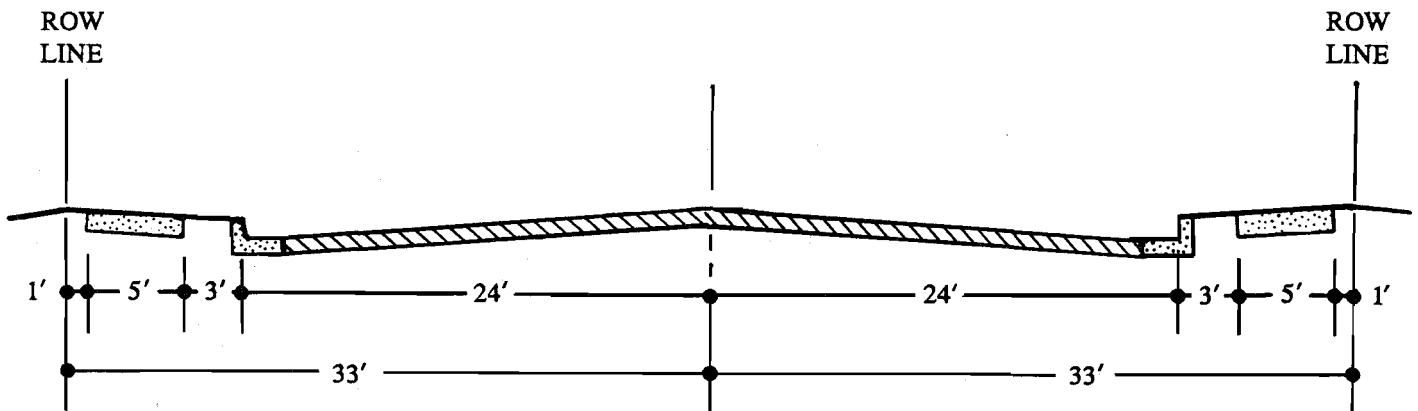
The implementation of the recommended cross-section would provide a capacity of approximately 13,000 vehicles per average weekday. This capacity is more than adequate for the forecast year 2010 traffic volume of 9,000 vehicles per average weekday. An improved W. Fond du Lac Avenue may be expected to improve access to and from intersecting cross streets and driveways as the auxiliary lanes may be utilized to accelerate and decelerate without interference from, or interfering with, through traffic. The additional pavement width and elimination of ditches immediately adjacent to the roadway may be expected to improve traffic safety.

SUMMARY

On May 22, 1989, the Village of Menomonee Falls requested that the Commission staff conduct a traffic engineering study of W. Fond du Lac Avenue in the Village of Menomonee Falls. The study was to address concerns raised by village officials and residents on W. Fond du Lac Avenue between Main Street (STH 74) and N. 124th Street (STH 145) about pedestrian safety and excessive vehicular speeds on the roadway and to evaluate roadway capacity with respect to existing and forecast year 2010 traffic volumes. This report presents the findings and recommendations of that study.

Figure 5

RECOMMENDED TWO-LANE URBAN CROSS-SECTION ON W. FOND DU LAC
AVENUE BETWEEN W. MAIN STREET (STH 74) AND N. 124TH STREET (STH 145)



Note: Right-of-Way varies between 66 feet and 83 feet between W. Main Street (STH 74) and N. 124th Street (STH 145).

Source: SEWRPC.

West Fond du Lac Avenue is constructed as a rural cross-section. The pavement width varies between 18 and 24 feet, and has shoulders which are two feet or less in width. Thus, the existing roadway does not meet design standards for pavement and shoulder width for either a rural arterial or a rural collector facility.

In July 1989 a count of traffic using W. Fond du Lac Avenue was taken. Approximately 4,400 vehicles use W. Fond du Lac Avenue between Main Street (STH 74) and N. Lilly Road; and approximately 3,830 vehicles per average weekday use W. Fond du Lac Avenue between N. Lilly Road and N. 124th Street (STH 145). Comparing the existing traffic volumes to the approximately 7,000 vehicles per average weekday design capacity of W. Fond du Lac Avenue, W. Fond du Lac Avenue is operating well under design capacity. Current average weekday traffic volumes exceed the threshold volume at which a facility is typically considered to be functioning as an arterial.

Spot speed studies were conducted on W. Fond du Lac Avenue to determine vehicular speeds near Rotary Park; near Danell Drive; and approximately 900 feet northwest of N. 124th Street (STH 145). Motorist compliance with the 30 mile per hour posted speed limit is low, with the 85th percentile speed about 38 miles per hour. Compliance by northwestbound traffic with the 40 mile per hour posted speed limit was also found to be low, with the 85th percentile speed about 47 miles per hour near Danell Drive, and about 52 miles per hour just west of STH 145. Southeastbound traffic compliance with the posted 40 mile per hour speed limit was found to be good, with the 85th percentile speed about 43 miles per hour.

A three-year and eight-month motor vehicle accident history for the study segment of W. Fond du Lac Avenue indicates that the most recurring type of accident is the single vehicle off-road accident. Within the study period, 42 accidents occurred on W. Fond du Lac Avenue. Twenty-two of these accidents, or about 52 percent, involved single vehicles leaving the roadway and striking an object located adjacent to the street. While neither the incidence of accidents nor the rate of accidents at any location within the study segment indicates a specific accident problem location, the number of single vehicle acci-

dents randomly occurring along the length of the study segment warranted additional investigation. Factors likely contributing to these accidents were excessive vehicular speeds and a substandard roadway cross-section.

A number of low cost, short-range traffic engineering improvements were considered and recommended for implementation to abate the traffic problems identified on the study segment of W. Fond du Lac Avenue, as shown in Table 4. Also shown in Table 4 are additional short-range actions and the long-range roadway improvement action recommended for implementation. It should be noted that the construction of pedestrian paths to separate pedestrian traffic from the vehicular traffic stream is the only recommended alternative which may be expected to significantly reduce the potential of pedestrian-vehicular conflicts.

Traffic forecasts were prepared for the study segment of W. Fond du Lac Avenue based upon the Commission's adopted year 2000 regional land use and transportation system plans, and on population and employment forecasts to the year 2010. The average weekday traffic on W. Fond du Lac Avenue between Main Street (STH 74) and N. Lilly Road is forecast to be about 9,000 vehicles per average weekday by the year 2010. It is also forecast that approximately 7,000 vehicles per average weekday will be using the segment of W. Fond du Lac Avenue between N. Lilly Road and N. 124th Street (STH 145). Thus, based upon the forecast traffic volumes, the existing roadway may be expected to be operating at or over design capacity by the year 2010. Therefore, reconstruction of the existing roadway to a two-lane urban cross-section may be expected to be necessary by the year 2010 to provide adequate capacity and to improve traffic safety for the forecast travel demand.

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Table 4

SUMMARY OF SHORT-RANGE AND LONG-RANGE ACTIONS RECOMMENDED
TO ABATE THE EXISTING TRAFFIC PROBLEMS ON W. FOND DU LAC AVENUE
BETWEEN MAIN STREET (STH 74) AND N. 124TH STREET (STH 145)

Term	Traffic Problem	Recommendation	Estimated Cost
Short-Range	Vehicular speeds.....	o Install "Speed Zone Ahead" sign with flashing amber lights just west of N. 124th Street adjacent to the northwestbound lane	\$ 2,000
		o Random law enforcement activity	6,000
	Vehicular accidents.....	o Reduce 40 mile per hour speed limit to 30 mile per hour speed limit from N. Lilly Road to N. 124th Street (STH 145)	200
		o Install reflectorized epoxy pavement markings to delineate roadway edge	5,000
		o Improve corner sight triangles at cross-street intersections	1,000
	Other.....	o Construct bituminous concrete sidewalks	78,200
		o Close driveway and install warning signing and roadway delineators	1,000
Long-Range	Capacity.....	o Construct two-lane urban roadway	\$3,100,000
--	Total	--	\$3,193,400

Source: SEWRPC.