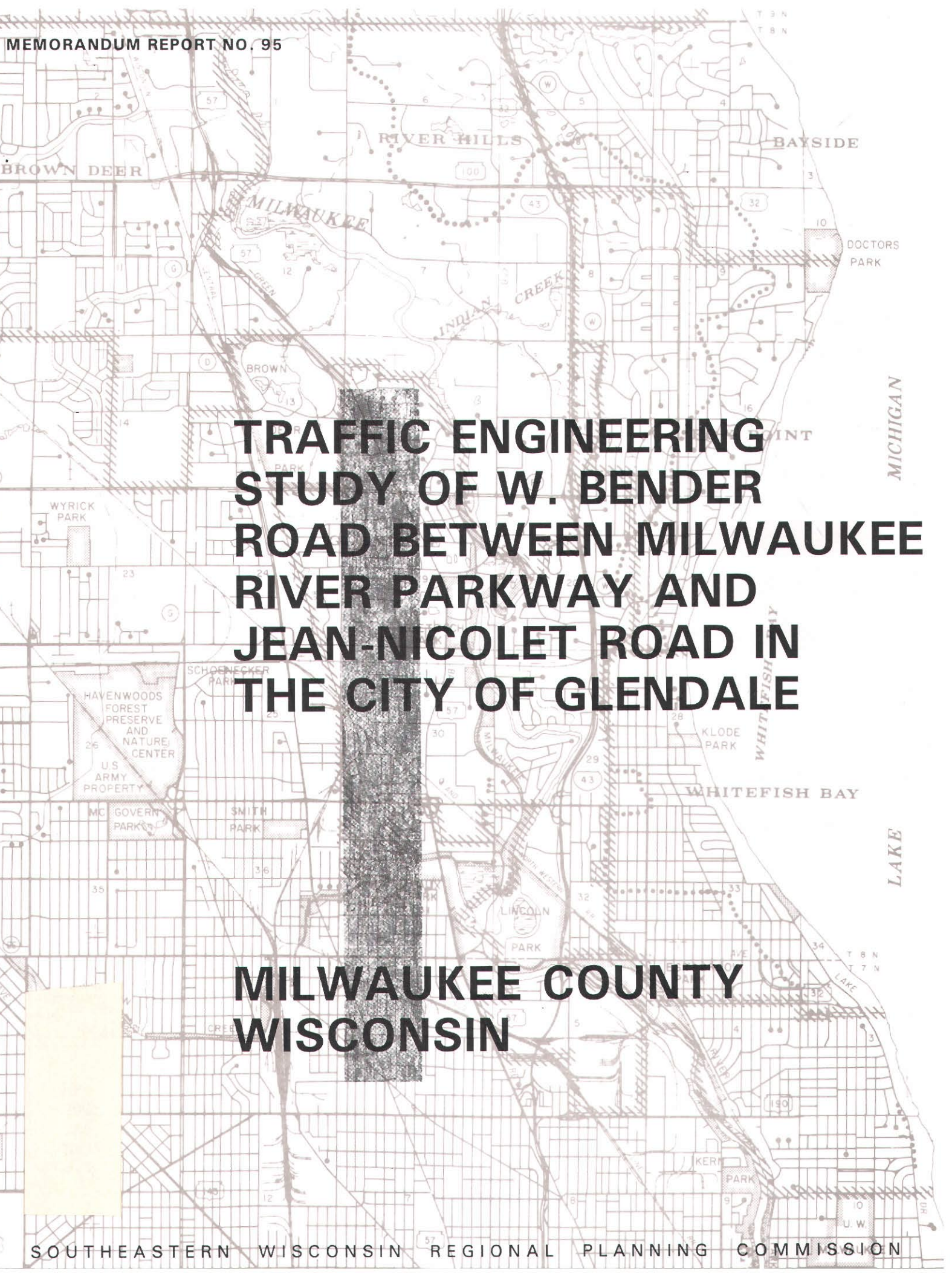
MEMORANDUM REPORT NO. 95



TRAFFIC ENGINEERING STUDY OF W. BENDER ROAD BETWEEN MILWAUKEE RIVER PARKWAY AND JEAN-NICOLET ROAD IN THE CITY OF GLENDALE

MILWAUKEE COUNTY WISCONSIN

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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Special acknowledgement is due Mr. John M. Hagen, SEWRPC Engineer, for his contribution to the conduct of this study and the preparation of this report.

MEMORANDUM REPORT
NUMBER 95

TRAFFIC ENGINEERING STUDY OF W. BENDER ROAD BETWEEN MILWAUKEE RIVER PARKWAY AND JEAN-NICOLET ROAD IN THE CITY OF GLENDALE

MILWAUKEE COUNTY, WISCONSIN

Prepared by the

Southeastern Wisconsin Regional Planning Commission
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August 1994

Inside Region	$2.50
Outside Region	$5.00

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Southeastern Wisconsin Regional Planning Commission
Memorandum Report No. 95

TRAFFIC ENGINEERING STUDY OF W. BENDER ROAD BETWEEN MILWAUKEE RIVER PARKWAY AND JEAN-NICOLET ROAD IN THE CITY OF GLENDALE

INTRODUCTION

This report presents the findings and recommendations of a traffic engineering study of that segment of W. Bender Road located between the Milwaukee River Parkway and Jean-Nicolet Road in the City of Glendale. The memorandum sets forth recommended traffic control measures for the segment of W. Bender Road concerned. The report was prepared by the Southeastern Wisconsin Regional Planning Commission staff at the request of the City of Glendale City Engineer. As outlined in the letter request of April 22, 1993, the traffic engineering study was to recommend appropriate traffic control measures to be implemented upon the City's reconstruction of W. Bender Road between Jean-Nicolet Road and the Milwaukee River Parkway. The memorandum also addresses comments and questions raised by the City of Glendale officials and staff at a July 22, 1994, interagency staff meeting. These comments and questions may be summarized under the following categories:

1) the installation of pavement markings

2) the installation of stop signs on W. Bender Road at N. Alberta Lane

3) the construction of a sidewalk on the north side of W. Bender Road from N. Sunnypoint Road to N. Jean-Nicolet Road.

INVENTORY AND ANALYSIS OF EXISTING CONDITIONS

Study Segment

The study segment of W. Bender Road is located within the City of Glendale in northern Milwaukee County. The study segment is shown on Map 1 and is about 0.7 miles, or 3,700 feet, in length extending from the Milwaukee River Parkway to Jean-Nicolet Road.

Roadway Characteristics

The reconstruction of W. Bender Road between Jean-Nicolet Road and the Milwaukee River Parkway, except for the final asphalt wearing surface, was tentatively scheduled to be completed by August 1993. The replacement of the bridge spanning the Milwaukee River was expected to be completed by November 1993, and the final surfacing of the road was to take place in October 1993. Due to construction delays, the reconstruction project was not completed and open to traffic until June 1994.

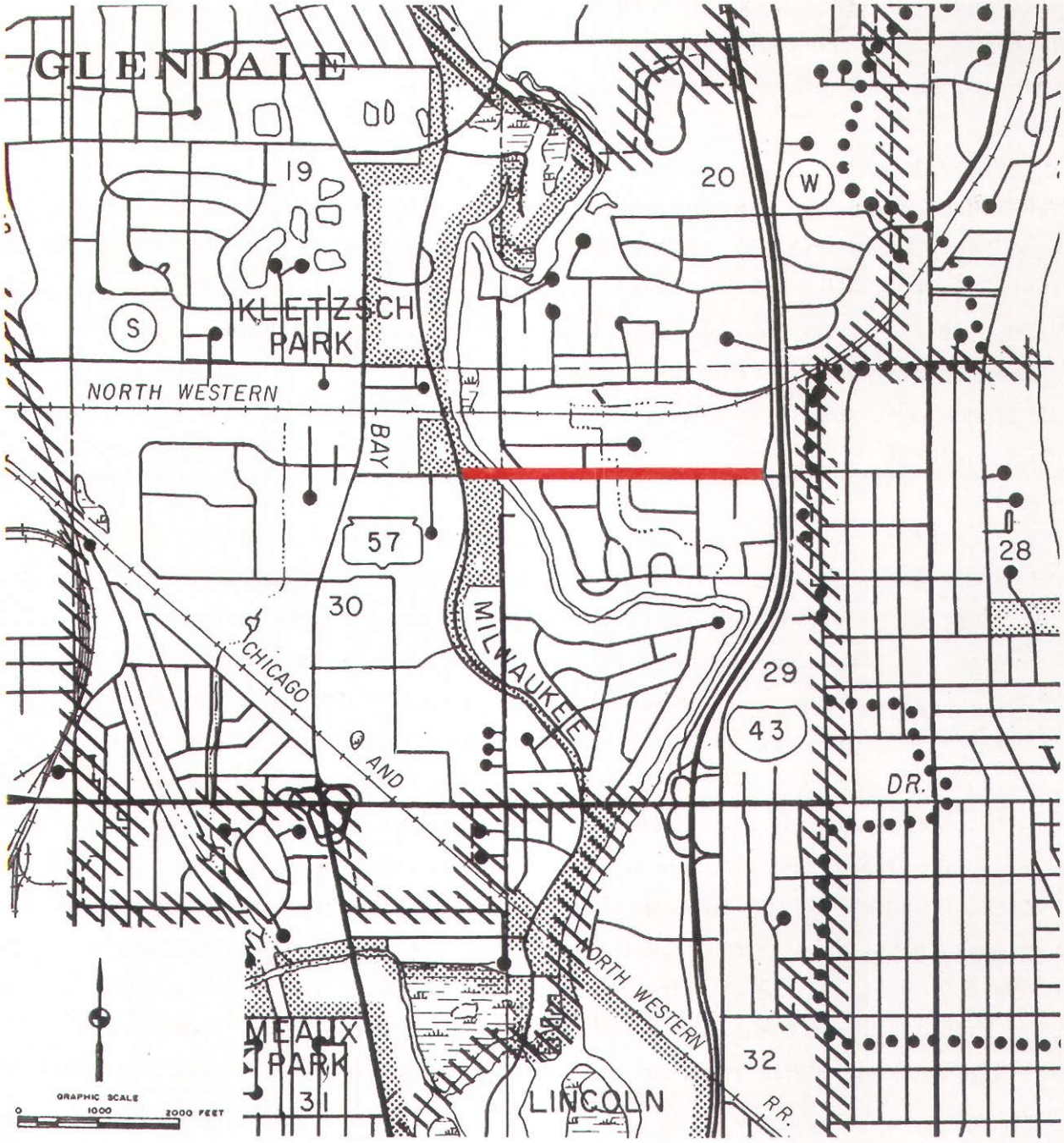
The reconstructed roadway will provide an urban cross-section with curb, gutter, and storm sewer having a pavement width of 44 feet, from face-of-curb to face-of-curb. This will replace an existing rural roadway approximately 40 feet in width with approximately seven-foot shoulders and drainage ditches. The former traveled way also provided a signed two-way bicycle and pedestrian path that utilized approximately five feet of roadway abutting the shoulder on the south side of the street.

Sight Distances

Intersection sight distances on the cross street approaches to W. Bender Road were examined to determine if these sight distances were restricted. Intersection sight distance is determined by the sight triangle at an intersection. Because all of the cross street approaches to W. Bender Road in the study segment are stop sign controlled, the intersection sight distance is defined as the distance required between a vehicle on a major street and a stop sign controlled intersecting minor street which would permit a motorist stopped on the minor street approach to either cross or enter the major street traffic stream without causing the vehicle on the major street to reduce speed. The

Map 1

THE W. BENDER ROAD STUDY SEGMENT IN THE CITY OF GLENDALE



LEGEND

W. BENDER ROAD STUDY SEGMENT

Source: SEWRPC.

necessary safe sight distance in feet for a passenger vehicle to complete an indicated maneuver from a crossing street is shown in Table 1. Intersection sight distance is restricted by shrubbery adjacent to the roadway in the southwest quadrant at the intersection of W. Bender Road and Jean-Nicolet Road. This restricted intersection sight distance represents a potential traffic safety problem, and may contribute to traffic accidents.

Traffic Volumes

Estimates of current average weekday traffic volumes based upon traffic counts conducted by the Regional Planning Commission in May 1993 are shown on Map 2. The average weekday traffic volumes on the W. Bender Road study segment range from 8,400 to 9,700 vehicles per average weekday. Map 2 also shows the 1993 hourly traffic volumes for the morning peak hour -- 7:00 a.m. to 8: a.m. -- and afternoon peak hour -- 5:00 p.m. to 6:00 p.m. -- at selected locations along the study segment.

Hourly traffic volumes in the greater Milwaukee area in 1992 were analyzed and compared to the 1993 traffic counts taken by the Commission staff to determine the existing hourly distribution of vehicular travel on the W. Bender Road study segment. As shown in Figure 1, this traffic count information indicates that hourly traffic volumes on the study segment exhibit a general increase from a low of less than 1 percent of the average weekday 24-hour volume during the early morning hours between 12:00 midnight and 6:00 a.m. to a high of about 9 percent of the average weekday 24-hour volume during the hours between 5:00 p.m. and 6:00 p.m. This distribution of hourly traffic volumes, as shown in Figure 1, is typical of the traffic flow pattern identified on other arterial streets and highways in the greater Milwaukee area except for the noticeable increase during the 8:00 p.m. to 9:00 p.m. time period. This variance may be attributed to the fact that Bay Shore Mall, a major area shopping center located approximately 0.5 miles southeast of the eastern edge of the study segment, closes weekdays at 9:00 p.m.

Sign Inventory

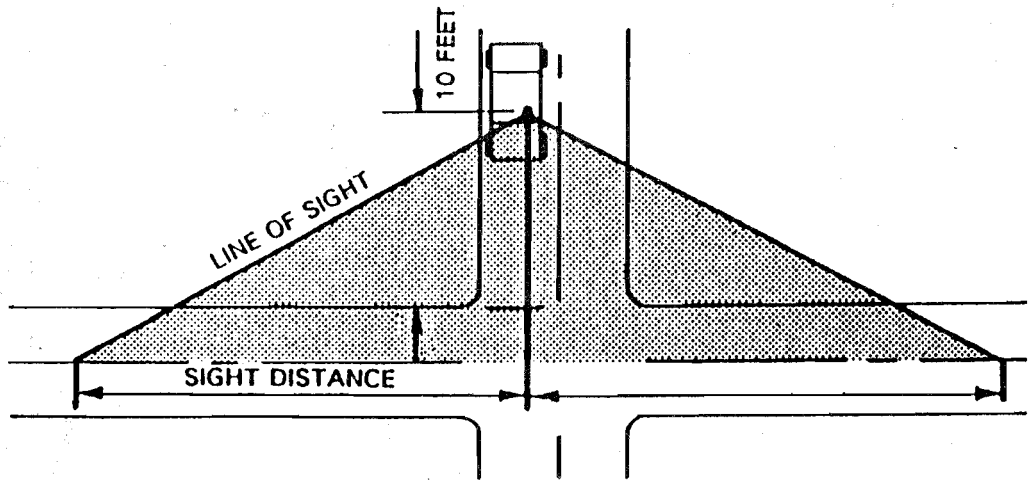
Traffic signs function either to impart the information necessary to control traffic or to guide motorists to their destinations in the simplest and most

Table 1

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

Speed (miles per hour)	Left Turn onto Street		Right Turn onto Street		Crossing Street	
	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

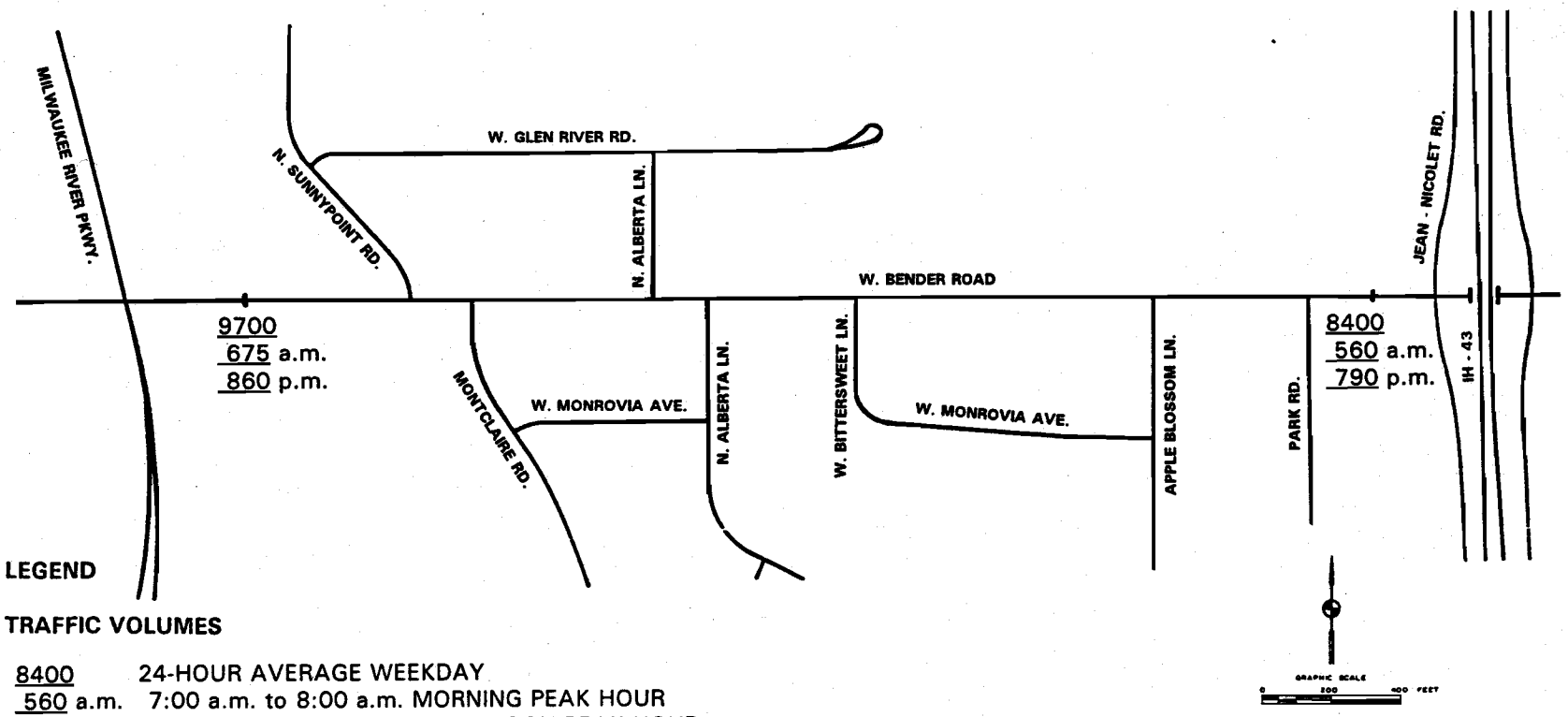
Source: American Association of State Highway and Transportation Officials and SEWRPC.



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

Map 2

AVERAGE WEEKDAY TRAFFIC VOLUMES
AND PEAK HOUR TOTAL TRAFFIC VOLUMES
AT SELECTED LOCATIONS OF THE
W. BENDER ROAD STUDY AREA: 1993



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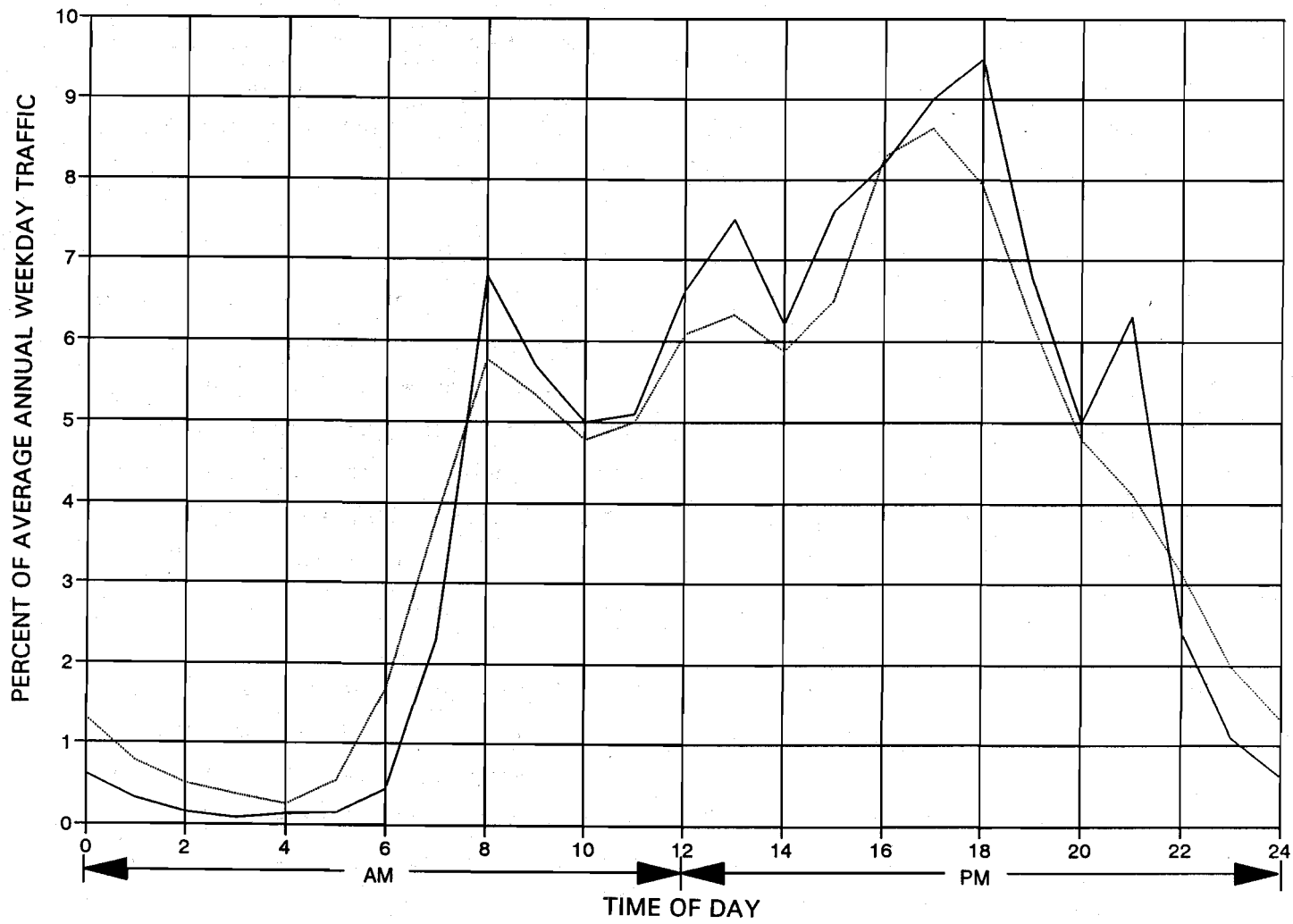
TRAFFIC VOLUMES

8400 24-HOUR AVERAGE WEEKDAY
560 a.m. 7:00 a.m. to 8:00 a.m. MORNING PEAK HOUR
790 p.m. 5:00 p.m. to 6:00 p.m. AFTERNOON PEAK HOUR

Source: SEWRPC.

FIGURE 1

HOURLY VARIATION IN ANNUAL
AVERAGE WEEKDAY TRAFFIC ON THE
W. BENDER ROAD STUDY SEGMENT: 1993



LEGEND

——— AVERAGE HOURLY WEEKDAY TRAFFIC VOLUME ON THE W. BENDER ROAD STUDY SEGMENT

····· AVERAGE HOURLY TRAFFIC VOLUME IN THE GREATER MILWAUKEE AREA

Source: SEWRPC.

direct manner possible. Sign messages may be either printed or symbolic; however, symbolic messages must mean the same thing to all motorists to be effective. Sign location is critical to the utility of the sign message. Signs must be placed sufficiently in advance of the condition addressed by the sign message to give motorists time to initiate the appropriate response to the message. There are two aspects to be considered in determining the amount of information to be imparted. First, the sign message must convey the appropriate information concisely. The second aspect relates either to a lack of signing or an overabundance of signing. Insufficient signing results in motorist confusion. Too much signing, however, does not necessarily relieve the confusion as the motorist may not see the most needed sign or may simply be unable to assimilate all the information being provided.

Traffic signs are generally classified into three categories according to their use: 1) regulatory; 2) warning; and 3) guide. Regulatory signs are used to notify the motorists of traffic laws and/or regulations. Warning signs call attention to conditions on, or nearby, the roadway that would otherwise not be readily apparent. Guide signs are used to provide motorists with information concerning route designations, destinations, points of interest, and other cultural, geographical, and recreational sites. Supplementary signs may be used to provide additional information that helps to clarify the messages being conveyed by the primary traffic sign.

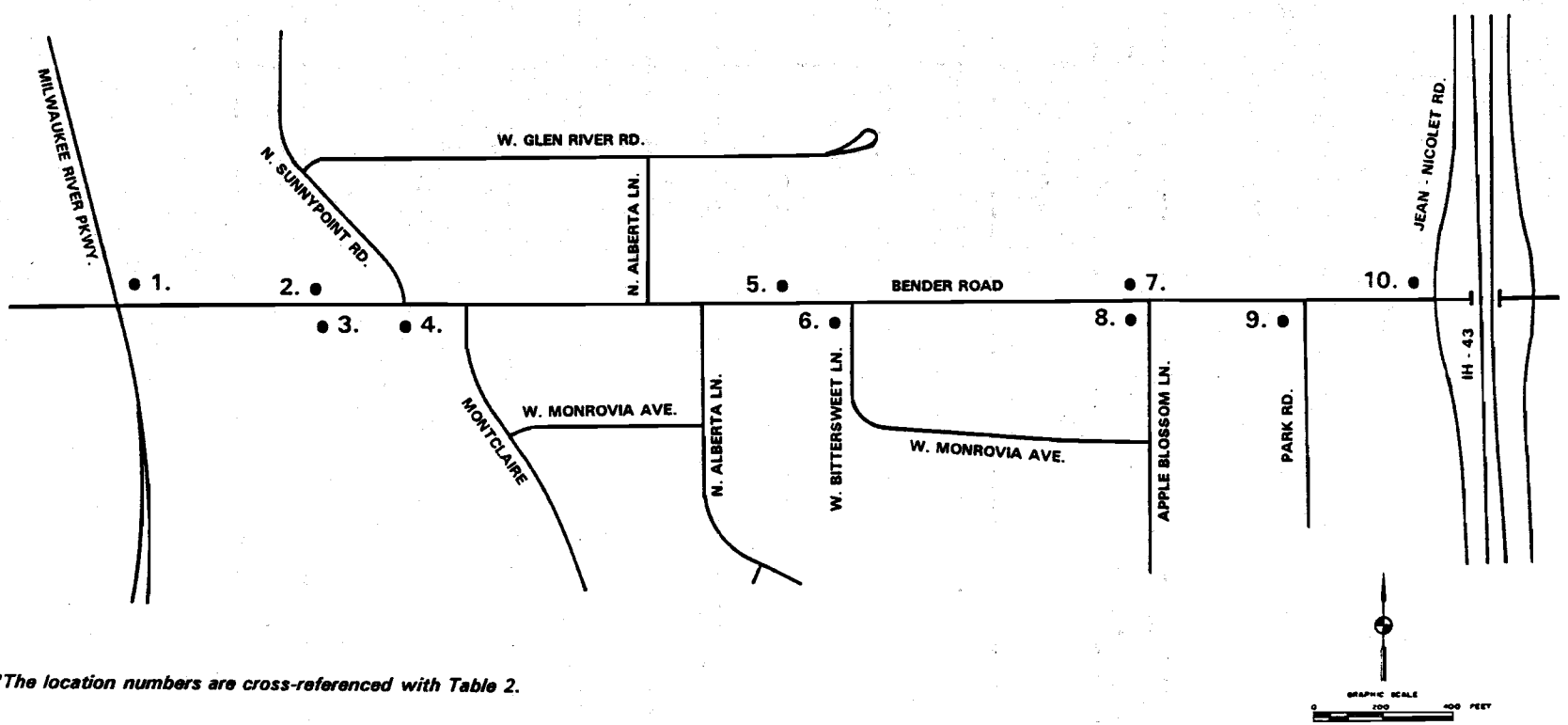
The Commission staff conducted an inventory of the existing traffic signs on the W. Bender Road study segment. The location of each sign on W. Bender Road is shown on Map 3 and the message of each sign is listed in Table 2. It should be noted that eight of the fourteen signs posted at ten locations are regulatory, three are advance warning signs of traffic control, two are considered guide signing, and one is a supplementary sign.

Spot Speed Study

A spot speed study was conducted by the Regional Planning Commission staff on the study segment of W. Bender Road at Montclaire Road on May 11, 1993, during the non-peak travel hours between 9:00 a.m. and 3:00 p.m. Table 3 summarizes the operating speed data observed at this location on the study segment of W. Bender

Map 3

LOCATION OF EXISTING TRAFFIC CONTROL SIGNING
ON W. BENDER ROAD BETWEEN MILWAUKEE RIVER PARKWAY
AND JEAN - NICOLET ROAD: 1993*



*The location numbers are cross-referenced with Table 2.

Source: SEWRPC.

Table 2

INVENTORY OF EXISTING TRAFFIC CONTROL SIGNING
ON W. BENDER ROAD BETWEEN MILWAUKEE RIVER PARKWAY
AND JEAN - NICOLET ROAD: 1993

Location (Reference Map 3)	Sign		
	Type	Message	Color
1	Regulatory	STOP	White on Red
	Supplementary	4-WAY	White on Red
	Regulatory	STOP	White on Red
2	Warning	STOP AHEAD	Black on Yellow
3	Regulatory	SPEED LIMIT 25	Black on White
4	Guide	BIKE AND PEDESTRIAN PATH	White on Green
5	Regulatory	SPEED LIMIT 25	Black on White
6	Regulatory	SPEED LIMIT 25	Black on White
7	Regulatory	SPEED LIMIT 25	Black on White
8	Regulatory	SPEED LIMIT 25	Black on White
9	Warning	Signal Ahead Pictograph	Black on Yellow
	Warning	SIGNAL AHEAD	Black on Yellow
	Guide	BIKE AND PEDESTRIAN PATH	White on Green
10	Regulatory	SPEED LIMIT 25	Black on White

Source: SEWRPC.

Table 3

OBSERVED OPERATING SPEED ON
W. BENDER ROAD AT MONTCLAIRE ROAD
IN THE OFF-PEAK TRAFFIC HOURS: 1993

	W. Bender Road
Posted Speed Limit.....	25 miles per hour
Average Speed.....	+5.5 miles per hour over the speed limit
Percent of Motorists Traveling at or Below the Posted Speed limit.....	4.4
85th Percentile Speed.....	+8.3 miles per hour over the speed limit
10 Mile Per Hour Pace.....	26 to 35 miles per hour
Percentage of Motorists Traveling Within the 10 Mile Per Hour Pace.....	88
Highest Observed Speed.....	41 miles per hour

Source: SEWRPC.

Road. The 85th percentile speed -- the speed at or below which 85 percent of the traffic was observed to be traveling -- may be considered to be the speed at which motorists perceive to be safe and reasonable for the roadway segment being traveled. The ten mile per hour pace is the 10 mile per hour speed range which includes the largest number of vehicles.

Because the 85th percentile speed is approximately 8.3 miles per hour above the speed limit on W. Bender Road at Montclaire Road, it may be concluded that there is a speeding problem at this location. Since 88 percent of all traffic travels within the 10 mile per hour pace and only 4.4 percent of the vehicular traffic travels at or below the posted speed limit, it may be further concluded that the speeding problem is significant.

Accidents

The incidence of traffic accidents provide another important measure of the efficiency and operating characteristics of the roadway. At locations on the roadway where the number and/or the severity of accidents appear relatively high in comparison to those at other locations, a more detailed investigation is warranted to determine possible traffic engineering actions that can be taken to reduce the number and the severity at these locations in the future.

Motor vehicle accident histories for the study segment of W. Bender Road were obtained from the City of Glendale Police Department, for the time period of January 1, 1990 through December 31, 1992. A total of 19 accidents were reported on the study segment during this period. Of the 19 total accidents, five involved personal injuries, and the remaining 14 involved property damage only. There were no accidents involving fatalities. The number of accidents on the study segment has decreased annually over the three year period with 11 accidents occurring from January 1st to December 31st of 1990, five in the period between January 1st to December 31st of 1991, and three having occurred between January 1st to December 31st of 1992.

All of the 19 total accidents reported occurred at intersections along the study segment.[1] The locations of the motor vehicle accidents which have occurred on the study segment during the past three years are shown on Map 4. As shown on Map 4, the traffic accidents occurred along much of the study segment. However, it may be noted that the accidents are concentrated at the intersections of W. Bender Road with Milwaukee River Parkway, Sunnypoint Road, Appleblossom Lane, Park Road, and Jean-Nicolet Road. Figure 2 contains the collision diagrams for each of the intersections along the study segment that experienced accidents reported during the three year period analyzed by the Commission staff.

Of the 19 total accidents, 16 occurred during daylight hours and three in darkness. Of the 19 accidents, eight were right-angle collisions, or about 42 percent; four were rear-end collisions, or about 21 percent; and three were left-turn collisions, or about 16 percent. The remaining 21 percent included out-of-control vehicles as well as backing vehicles. Of the 19 total accidents that occurred during the three year study period analyzed, five accidents, or about 26 percent, occurred on both Tuesday and Wednesday with four on Friday. Two months, August and September, had the most accidents occur with three, or about 16 percent of the total.

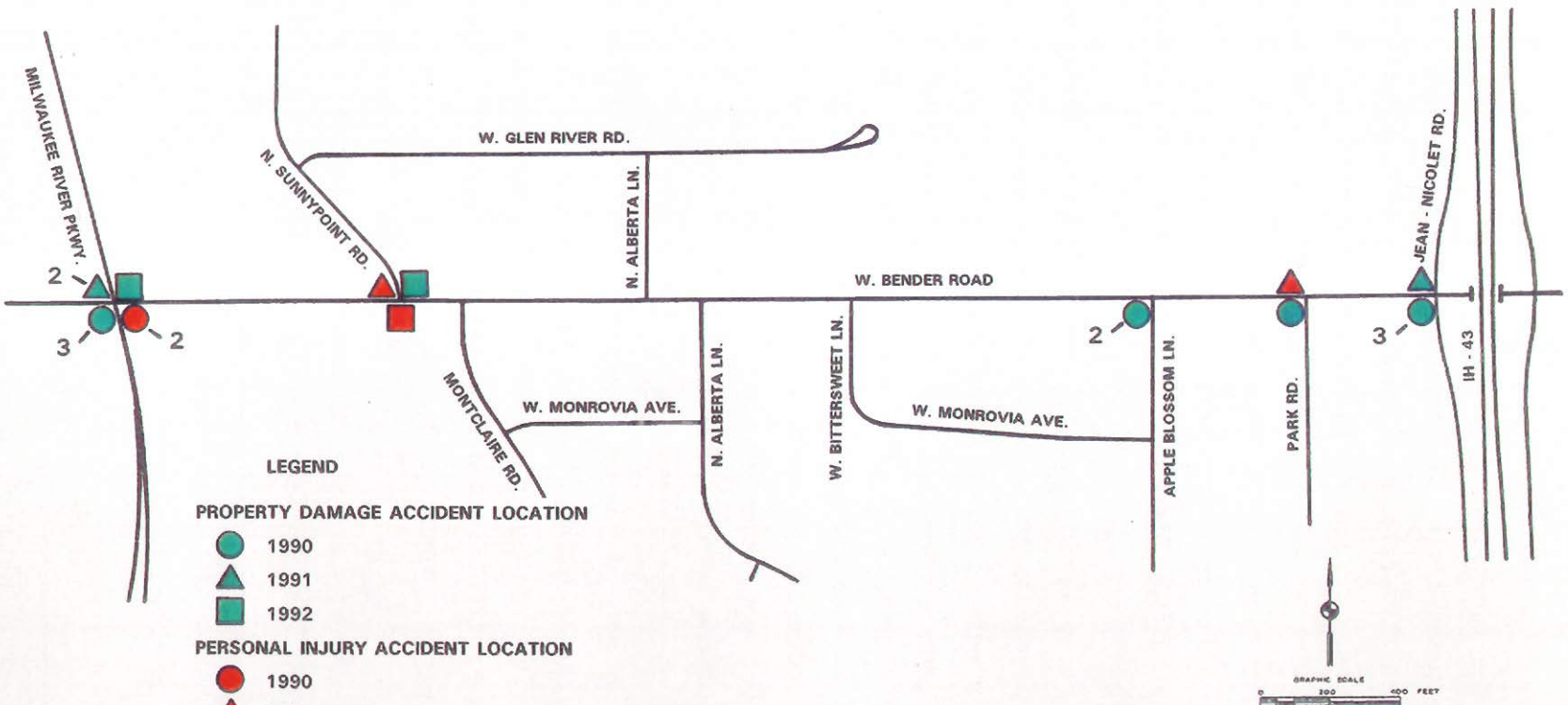
Because 84 percent of the total accidents during the three year traffic history reviewed by the Commission staff occurred during daylight hours, while 16 percent occurred during non-daylight hours--ambient light conditions do not appear to be a factor in traffic accidents on the study segment. Since no more than three accidents, or 16 percent, occurred in a particular month and no more than five accidents, or 26 percent occurred on a particular day of the week; neither time of year nor day of the week appears to be a factor in traffic accidents on the study segment. Wet pavement conditions were a factor in six accidents, or about 32 percent of all accidents on the study segment. When combined with "snowy" or "icy" pavement conditions, adverse pavement conditions were a factor in eight accidents, or about 42 percent of the total number of accidents which occurred

---

[1]Accidents were considered intersection accidents if they occurred within 150 feet of the intersection.

Map 4

LOCATIONS OF TRAFFIC ACCIDENTS ON
THE W. BENDER ROAD STUDY SEGMENT:
JANUARY 1, 1990, TO DECEMBER 31, 1992



Source: SEWRPC.

Figure 2

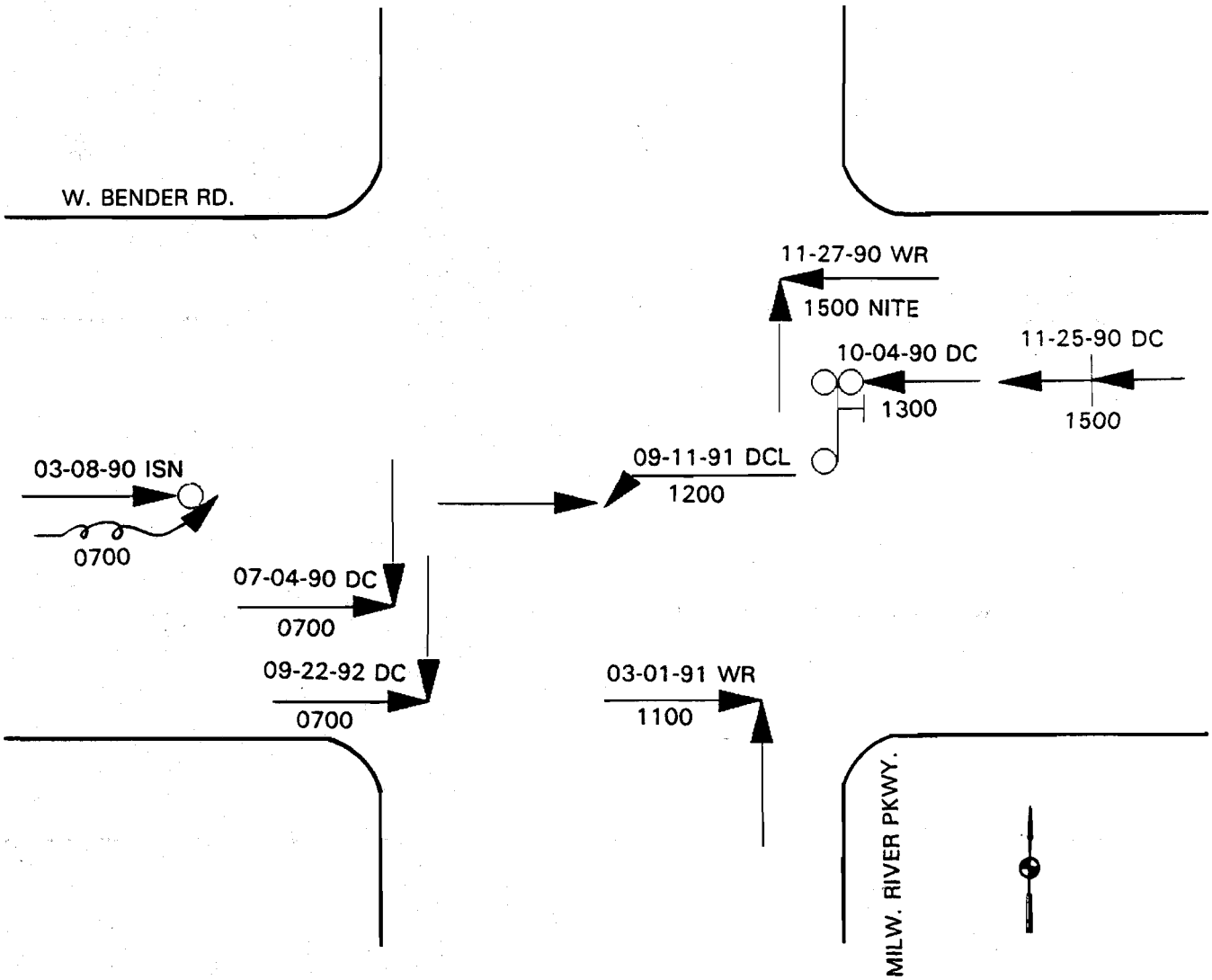
COLLISION DIAGRAM

Southeastern Wisconsin Regional Planning Commission

INTERSECTION W. Bender Rd. and Milwaukee River Pkwy.

PERIOD Three years FROM 01-01-90 TO 12-31-92

MUNICIPALITY City of Glendale PREPARED BY



SHOW FOR EACH ACCIDENT	LEGEND		SUMMARY			
1. TIME, DAY, AND DATE.	SYMBOLS	TYPES OF COLLISION	TYPE	DAY	NIGHT	TOTAL
2. PAVEMENT: D = DRY, I = ICY, W = WET	MOVING VEHICLE	REAR END	FATAL	0	0	0
3. WEATHER: C = CLEAR, F = FOG, R = RAIN, SL = SLEET, SN = SNOW, CL = CLOUDY	BACKING VEHICLE	HEAD ON	PEDESTRIAN INJURY	1	0	1
4. NITE - IF BETWEEN DUSK AND DAWN	NON-INVOLVED VEHICLE	SIDESWIPE	OTHER INJURY	1	0	1
	BICYCLE	CUT OF CONTROL	PROPERTY DAMAGE ONLY	5	1	6
	PEDESTRIAN	LEFT TURN	TOTAL	7	1	8
	PARKED VEHICLE	RIGHT ANGLE				
	FIXED OBJECT					
	FATAL ACCIDENT					
	INJURY ACCIDENT					

Figure 2 (continued)

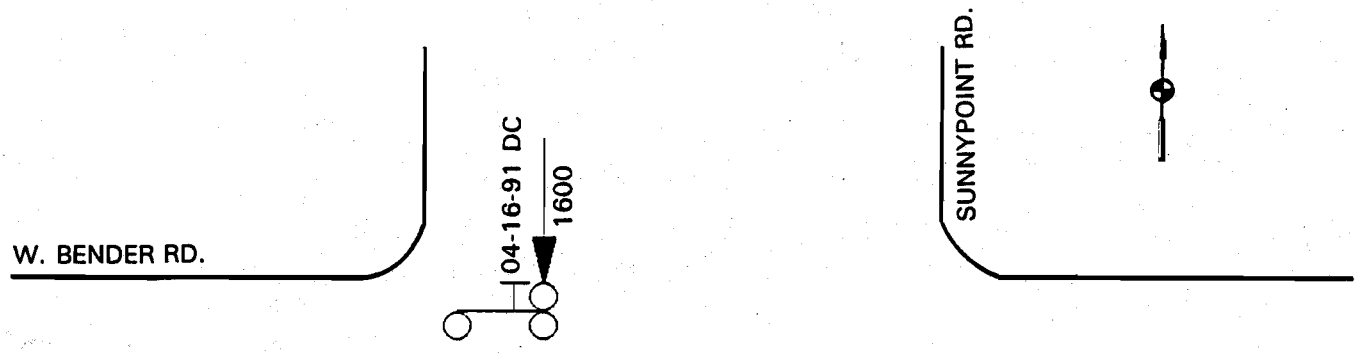
COLLISION DIAGRAM

Southeastern Wisconsin Regional Planning Commission

INTERSECTION W. Bender Rd. and Sunnypoint Rd.

PERIOD Three years FROM 01-01-90 TO 12-31-92

MUNICIPALITY City of Glendale PREPARED BY



SHOW FOR EACH ACCIDENT	LEGEND	
1. TIME, DAY, AND DATE.	SYMBOLS	TYPES OF COLLISION
2. PAVEMENT: D = DRY, I = ICY, W = WET	MOVING VEHICLE	REAR END
3. WEATHER: C = CLEAR, F = FOG, R = RAIN, SL = SLEET, SN = SNOW, CL = CLOUDY	BACKING VEHICLE	HEAD ON
4. NITE - IF BETWEEN DUSK AND DAWN	NON-INVOLVED VEHICLE	SIDESWIPE
	BICYCLE	OUT OF CONTROL
	PEDESTRIAN	LEFT TURN
	PARKED VEHICLE	RIGHT ANGLE
	FIXED OBJECT	
	FATAL ACCIDENT	
	INJURY ACCIDENT	

SUMMARY			
TYPE	DAY	NIGHT	TOTAL
FATAL	0	0	0
PEDESTRIAN INJURY	1	0	1
OTHER INJURY	1	0	1
PROPERTY DAMAGE ONLY	1	0	1
TOTAL	3	0	3

Figure 2 (continued)

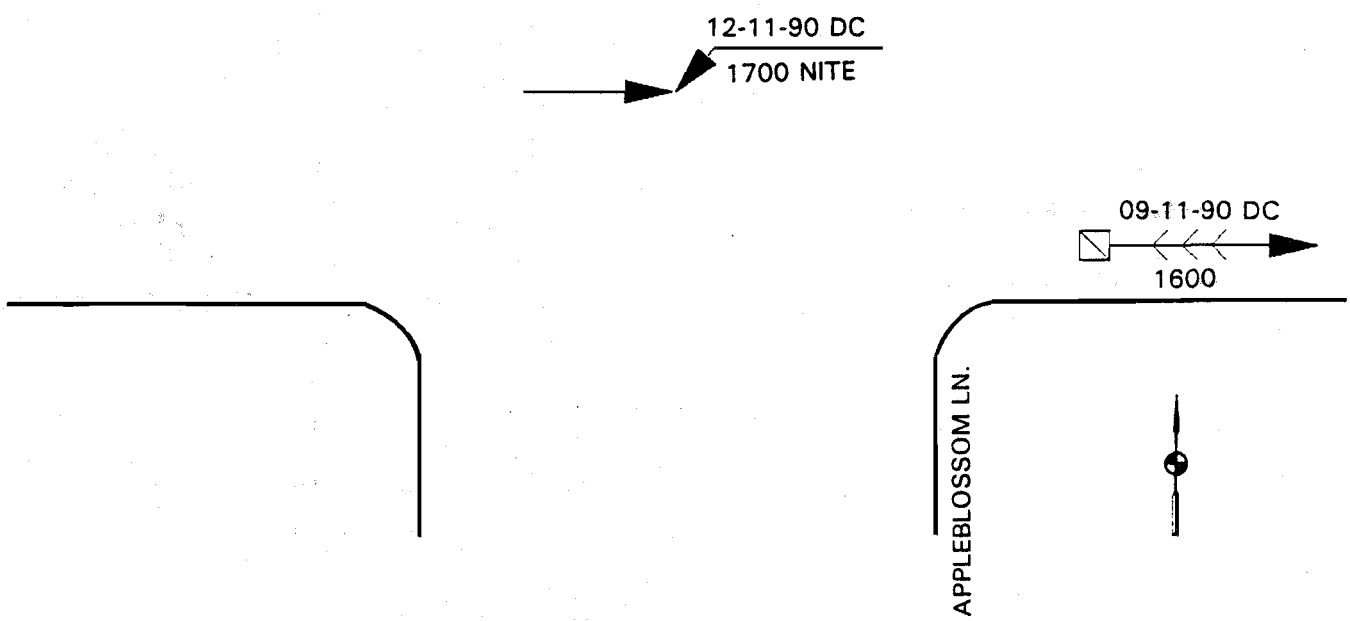
COLLISION DIAGRAM

Southeastern Wisconsin Regional Planning Commission

INTERSECTION W. Bender Rd. and Appleblossom Ln.

PERIOD Three years FROM 01-01-90 TO 12-31-92

MUNICIPALITY City of Glendale PREPARED BY



SHOW FOR EACH ACCIDENT	LEGEND	
1. TIME, DAY, AND DATE.	SYMBOLS	TYPES OF COLLISION
2. PAVEMENT: D = DRY, I = ICY, W = WET	MOVING VEHICLE	REAR END
3. WEATHER: C = CLEAR, F = FOG, R = RAIN, SL = SLEET, SN = SNOW, CL = CLOUDY	BACKING VEHICLE	HEAD ON
4. NITE - IF BETWEEN DUSK AND DAWN	NON-INVOLVED VEHICLE	SIDESWIPE
	BICYCLE	OUT OF CONTROL
	PEDESTRIAN	LEFT TURN
	PARKED VEHICLE	RIGHT ANGLE
	FIXED OBJECT	
	FATAL ACCIDENT	
	INJURY ACCIDENT	

SUMMARY			
TYPE	DAY	NIGHT	TOTAL
FATAL	0	0	0
PEDESTRIAN INJURY	0	0	0
OTHER INJURY	0	0	0
PROPERTY DAMAGE ONLY	1	1	2
TOTAL	1	1	2

Figure 2 (continued)

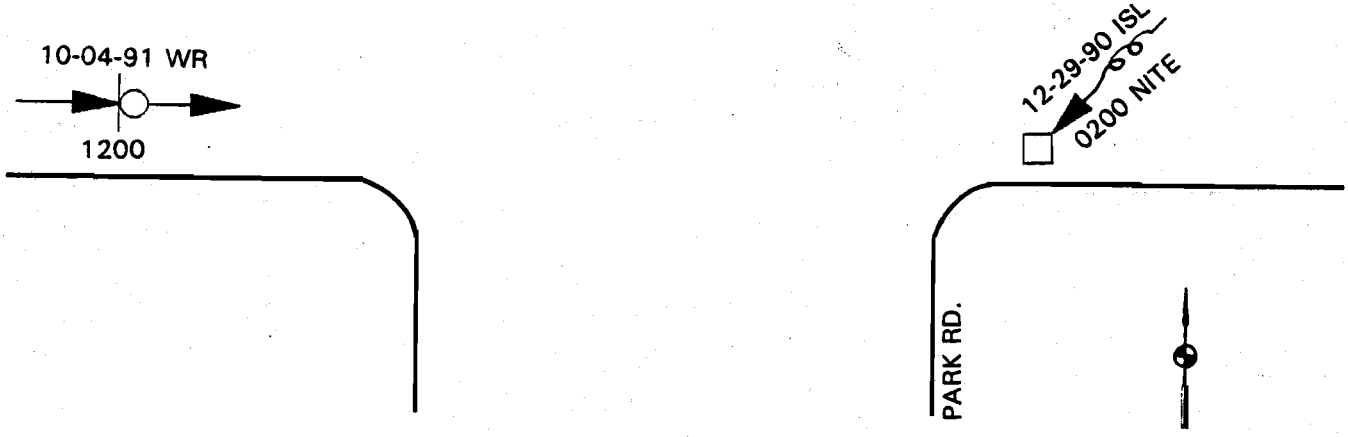
COLLISION DIAGRAM

Southeastern Wisconsin Regional Planning Commission

INTERSECTION W. Bender Rd. and Park Rd.

PERIOD Three years FROM 01-01-90 TO 12-31-92

MUNICIPALITY City of Glendale PREPARED BY



SHOW FOR EACH ACCIDENT	LEGEND		SUMMARY			
1. TIME, DAY, AND DATE.	SYMBOLS	TYPES OF COLLISION	TYPE	DAY	NIGHT	TOTAL
2. PAVEMENT: D = DRY I = ICY W = WET	MOVING VEHICLE	REAR END	FATAL	0	0	0
	BACKING VEHICLE	HEAD ON	PEDESTRIAN INJURY	0	0	0
	NON-INVOLVED VEHICLE	SIDESWIPE	OTHER INJURY	1	0	1
	BICYCLE	OUT OF CONTROL	PROPERTY DAMAGE ONLY	0	1	1
3. WEATHER: C = CLEAR F = FOG R = RAIN SL = SLEET SN = SNOW CL = CLOUDY	PEDESTRIAN	LEFT TURN	TOTAL	1	1	2
	PARKED VEHICLE	RIGHT ANGLE				
	FIXED OBJECT					
	FATAL ACCIDENT					
4. NITE - IF BETWEEN DUSK AND DAWN	INJURY ACCIDENT					

Figure 2 (continued)

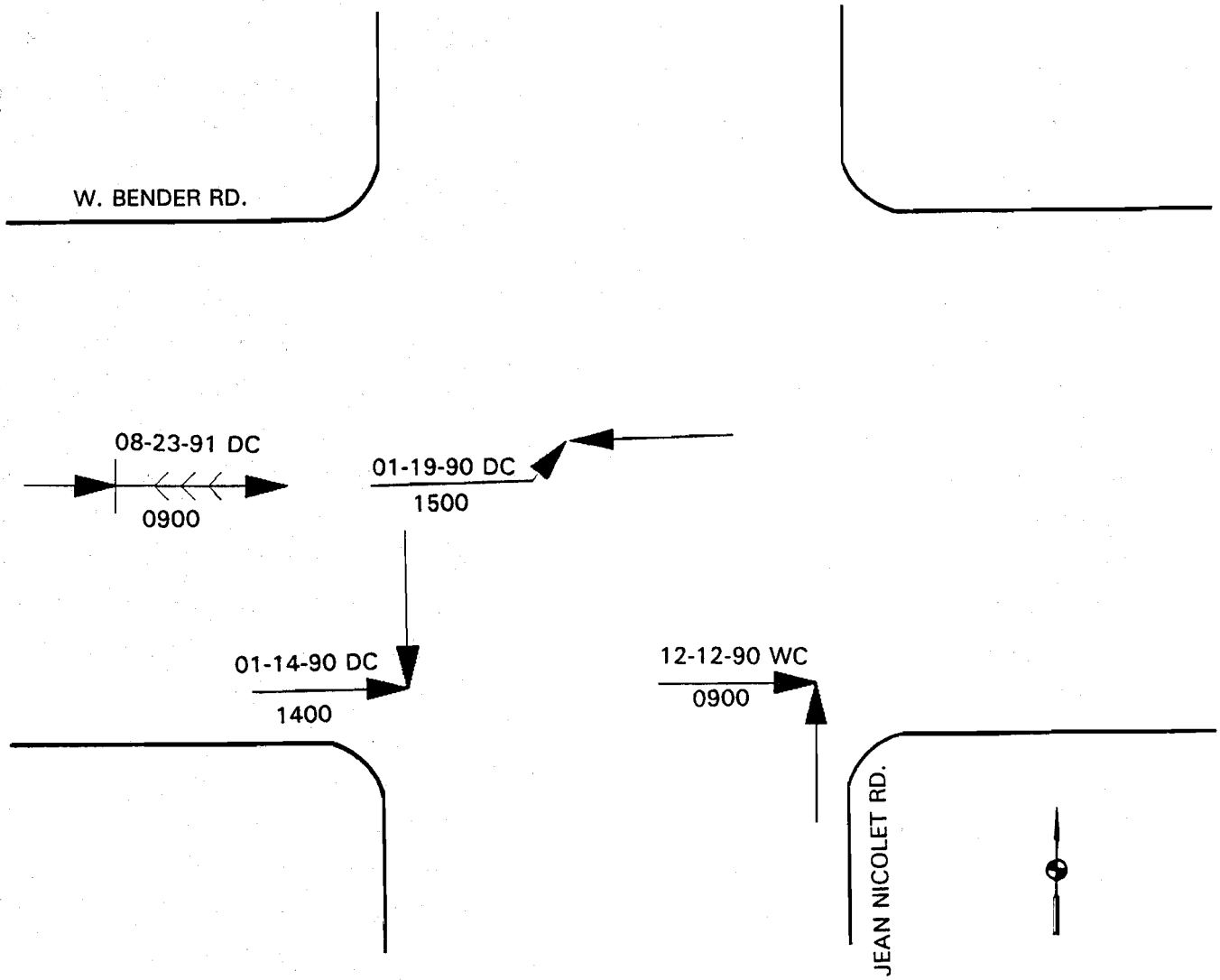
COLLISION DIAGRAM

Southeastern Wisconsin Regional Planning Commission

INTERSECTION W. Bender Rd. and Jean Nicolet Rd.

PERIOD Three years FROM 01-01-90 TO 12-31-92

MUNICIPALITY City of Glendale PREPARED BY



SHOW FOR EACH ACCIDENT	LEGEND	
1. TIME, DAY, AND DATE.	SYMBOLS	TYPES OF COLLISION
2. PAVEMENT: D = DRY, I = ICY, W = WET	MOVING VEHICLE	REAR END
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4. NITE - IF BETWEEN DUSK AND DAWN	NON-INVOLVED VEHICLE	SIDESWIPE
	BICYCLE	OUT OF CONTROL
	PEDESTRIAN	LEFT TURN
	PARKED VEHICLE	RIGHT ANGLE
	FIXED OBJECT	
	FATAL ACCIDENT	
	INJURY ACCIDENT	

SUMMARY			
TYPE	DAY	NIGHT	TOTAL
FATAL	0	0	0
PEDESTRIAN INJURY	0	0	0
OTHER INJURY	0	0	0
PROPERTY DAMAGE ONLY	4	0	4
TOTAL	4	0	4

during the three year period analyzed for this report. By comparison, eleven accidents, or 58 percent, occurred on dry pavement.

Failure to yield the right-of-way--cited six times--was the most frequently identified driver related potential contributing factor to the traffic accidents on the study segment. When combined with "disregarded stop sign," these two factors account for about 63 percent of all driver-related potential contributing factors. Inattentive driving and unsafe backing were each cited as factors in two accidents; following too close was cited once; and no driver-related factors were cited in two accidents.

Based on the analysis of the three year history of traffic accidents then, it may be concluded that: 1) the number of traffic accidents has been decreasing annually; 2) there are two locations where the concentration of accidents indicate that additional analysis for potential roadway improvements may be warranted; and 3) there are no other very strong patterns with respect to time of accident or nature of accident. Because of the concentration of accidents at two locations--the intersections of W. Bender Road with Milwaukee River Parkway with eight accidents, and W. Bender Road with Jean-Nicolet Road with four accidents--these two locations were reviewed to determine if any accident pattern exist which may be considered to be possible traffic safety problems.

Of the four accidents reported at the intersection of W. Bender Road and Jean-Nicolet Road during the three year history of traffic accidents analyzed by Commission staff, three accidents occurred in the year 1990, one accident in 1991, and no accidents in 1992. The decline in accidents at this intersection may be due in part to the fact that Jean-Nicolet Road was made discontinuous between Silver Spring Drive and W. Bender Road in April, 1991. This closure substantially altered the traffic patterns on Jean-Nicolet during the analysis period. The absence of any accidents over a sixteen month period from September, 1991 to December, 1992 strongly suggests that no traffic safety problem currently exists at this intersection.

Of the eight accidents reported at the intersection of W. Bender Road and Milwaukee River Parkway during the analysis period, five accidents occurred in

the year 1990, two accidents occurred in 1991, and one accident in 1992. This rather substantial decrease in the number of accidents may be attributed in part to the change of traffic control in 1991 from two-way stop control on the Milwaukee River Parkway approaches of the intersection to four-way stop control on all approaches. The number of accidents did decline significantly following the installation of the four-way stop signs, indicating that the change in traffic control has substantially abated the potential traffic safety problem at this intersection. However, the fact that two of the three accidents which occurred subsequent to the change in traffic control involved motorists disregarding the stop sign demonstrates that a traffic safety problem may still exist. In addition, because three years have not passed since the change in traffic control at this intersection, it may be premature to conclude that the traffic safety problem has been abated.

Pedestrians

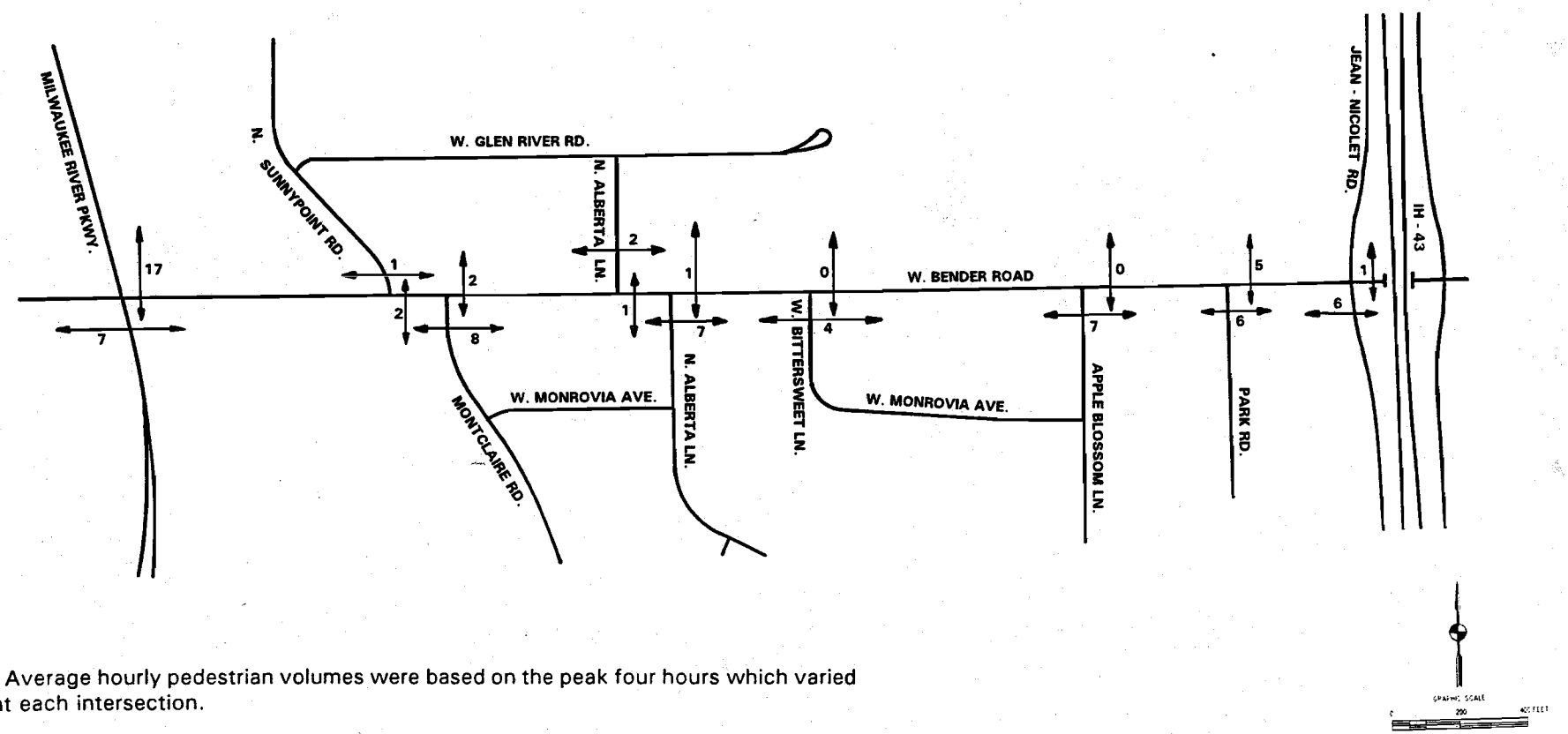
The Commission staff was not able to obtain accurate pedestrian volume counts in 1993 due to the fact that construction of the utilities for the new roadway was already underway by the second week of May 1993--the time of the preconstruction inventories. Therefore, post construction pedestrian counts were taken in mid-July of 1994. Map 5 shows the average hourly pedestrian volumes observed crossing streets at each intersection along the W. Bender Road study segment. The average hourly pedestrian volumes were based on the peak four hours of pedestrian counts taken during the nine-hour period -- 8:00 a.m. to 5:00 p.m. -- on an average weekday. It may be noted that no crosswalks were signed or indicated by pavement markings on the study segment prior to or after reconstruction.

PROBLEM IDENTIFICATION

One location along the segment of roadway concerned was identified as having substandard intersection sight distance. Existing plant material located too close to the intersection of W. Bender Road and Jean-Nicolet Road restricts intersection corner sight distance. Restricted sight distance reduces the time available for motorists to perceive and safely react to unexpected, potentially dangerous situations, and thus, may be considered to represent a traffic safety

Map 5

AVERAGE HOURLY PEDESTRIAN VOLUMES
AT INTERSECTIONS OF THE
W. BENDER ROAD STUDY AREA: 1994[a]



[a] Average hourly pedestrian volumes were based on the peak four hours which varied at each intersection.

problem. It may be noted that one of the four accidents observed over the two-year period at this intersection may have resulted from insufficient sight distance.

From the analyses of the spot speed study conducted by the Commission staff, it may be concluded that a speeding problem exists on the W. Bender Road study segment where the 85th percentile speed is 8.3 miles per hour above the posted speed limit.

An investigation of a three-year history of traffic accidents on the study segment indicates that the incidence of traffic accidents has decreased annually. Analysis of the pattern of accidents indicates a concentration of accidents at two locations--the intersections of W. Bender Road with Milwaukee River Parkway and with Jean-Nicolet Road. The incidence of accidents at these intersections has also decreased due to a change in traffic patterns at the W. Bender Road intersection with Jean-Nicolet Road and a change in traffic control at the W. Bender Road intersection with Milwaukee River Parkway. While the decrease in accidents at these two intersections indicates that the traffic safety problem may have been abated. However, because the accident history does not include at least three years of data following the changes, reaching a definitive conclusion in this respect may be premature.

Multiple stop signs are mounted on a single post on the east- and westbound approaches to the W. Bender Road intersection with Milwaukee River Parkway. Two signs on the same post conveying the same message serve no useful purpose. The Manual On Uniform Traffic Control Devices (MUTCD)[2] advises that signs should be individually erected except in cases where one sign supplements another. Thus, the use of two stop signs on the same post may be considered inappropriate.

In summary, two existing traffic problems were identified on the study segment of W. Bender Road. These included: 1) potential traffic safety problems due to

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[2]Promulgated by the U. S. Department of Transportation, Federal Highway Administration, this manual serves as the national standard governing the use and placement of traffic control devices including signs, signals, pavement markings, and other devices regulating, warning, or guiding traffic.

restricted intersection sight distance; and 2) vehicular speeding problems. In addition, because of insufficient historical data the concentration of traffic accidents particularly at the W. Bender Road intersection with Milwaukee River Parkway may indicate that a traffic safety problem exists at this intersection.

ALTERNATIVE AND RECOMMENDED TRAFFIC ENGINEERING AND IMPROVEMENT ACTIONS

Restricted Intersection Corner Sight Distance

The corner sight distance along the study segment of W. Bender Road is restricted by plant material at the intersection of W. Bender Road and Jean-Nicolet Road. The City of Glendale has a zoning ordinance specifying that a clear field of vision exist at intersections within a triangle which has the intersecting right-of-way lines as two of its sides, and a line which connects a point on each of the two intersecting right-of-way lines located 20 feet from the point of intersection as its third side.

It is recommended that the City of Glendale seek voluntary compliance with the zoning ordinance to improve the existing vision triangle in the southwest quadrant of the W. Bender Road intersection with Jean-Nicolet Road. This may be expected to require the removal of upright shrubs and a coniferous tree from the intersection's southwest quadrant. It is further recommended that the provision of adequate vision triangles should be required as development occurs or as existing development seeks to expand or change uses.

Vehicular Speeding Problem

The spot speed study conducted by the Commission staff demonstrated that motorists appear to be disregarding the posted speed limit along the study segment. No traffic engineering action may be expected to abate the vehicular speeding problem. Accordingly, the only action with the potential to abate the vehicular speeding problem is an increase in directed enforcement activity by law enforcement officials. The advantages of this action would be increased compliance with the posted speed limit and an attendant improvement in traffic safety. The disadvantages of this action include a potential decrease in

compliance when a law enforcement officer is not present and the cost of providing an increased level of enforcement activity.

It is recommended that the City of Glendale consider increasing its speed limit enforcement activity along the W. Bender Road study segment on a random basis, for two to three hours per day, particularly between the hours of 6:00 a.m. and 6:00 p.m. While diversion of existing personnel may permit implementation of this recommendation without additional expenditures by the City, such diversion would reduce the time these personnel are available for other tasks. Some additional associated costs, such as court time, may be expected to result from the directed enforcement activity.

A traffic engineering action considered but rejected was to raise the speed limit to 35 miles per hour. This recognizes that the 85th percentile speed--33.3 miles per hour--represents the speed considered by most motorists to be safe and reasonable for a particular roadway segment. The potential advantage of this action is increased compliance with the posted speed limit. The potential disadvantage is that motorists may travel even faster in response to the higher speed limit. Further, a speed limit of 35 miles per hour may not be appropriate for the residential and park land character of the land uses abutting the study segment and the attendant potential for pedestrian and vehicular conflicts. Thus, this action is not recommended.

Traffic Accidents

While not identified as a traffic problem per se, the concentration of traffic accidents the Milwaukee River Parkway intersection with W. Bender Road was identified as a potential concern because insufficient historical data exist to fully evaluate the effectiveness of the conversion from two way stop sign control to four way stop sign control. While the change in traffic control has likely contributed to the decrease in accidents, analyses of the three accidents which occurred subsequent to the change in traffic control indicates that two of the accidents--both involving eastbound vehicles--may have resulted from disregard for the stop signs. Because each of these accidents involved an eastbound vehicle, this may indicate a lack of or deficiency in the advance warning of the intersection's stop signs. Advance warning signs are located on both approaches

of W. Bender Road approximately 580 feet before the intersection notifying the motorists of a stop ahead. This distance exceeds the distance--400 feet--recommended in the Manual On Uniform Traffic Control Devices for placement of stop condition advance warning signs at an 85th percentile speed of 35 miles per hour. At 580 feet, the advance warning sign on the eastbound approach is located west of the W. Bender road intersection with Bridgewood Lane. When an intersection intervenes between the sign and the condition, a supplementary plate should be used to specify the distance to the condition. The advantage of providing an advisory distance plate is that motorists are made aware of the distance to the stop sign. There are no disadvantages to this action. Thus, it is recommended that advisory distance plates, setting forth the appropriate distance to the intersection, be added to the "STOP AHEAD" advance warning signs on the east- and westbound approaches to the W. Bender Road and Milwaukee River Parkway intersection at an estimated cost of $200.

Also considered but rejected was the installation of stop sign beacons on the east- and westbound approaches to the W. Bender Road intersection with Milwaukee River Parkway. The advantage of this action is improved driver awareness of the stop signs. While there are no disadvantages to this action, the number of accidents occurring at this intersection does not warrant such an installation. Thus, this action is not recommended for implementation.

It is recommended that the incidence of accidents and the type of accidents be closely monitored and the installation of stop sign beacons be reconsidered if the incidence of accidents, and particularly right angle collisions, increases.

At the intersection of W. Bender Road and Milwaukee River Parkway, the east- and westbound approaches each have two stops signs, one 30 inches in diameter, the other 24 inches in diameter, along with a "4-WAY" supplementary sign; all mounted on a single post. The posting of duplicate signs on the same post is inappropriate an serves no useful purpose. Therefore, it is recommended that the redundant 24 inch in diameter stop signs be removed from the east- and westbound approaches at the intersection of W. Bender Road and Milwaukee River Parkway at an estimated cost of $100.

SPECIFIC ISSUES RAISED AT INTERAGENCY STAFF MEETING

At the request of City of Glendale officials, the Commission staff was to comment on a number of questions related to pavement markings and roadway signing raised at a July 22, 1994, interagency staff meeting.

City officials inquired if the use of two solid yellow lines was appropriate centerline marking on the study segment. Two solid yellow lines are utilized to indicate no passing in either direction. No passing zones are used on two- or three-lane facilities where passing must be prohibited due to inadequate sight distances for motorists on the facility and which generally result from sharp changes in horizontal and/or vertical roadway alignment. Sight distance is adequate along the W. Bender Road study segment and field observations show no other special conditions that would require the installation of a no passing zone. It is therefore recommended that a standard two-lane, two-way dashed yellow centerline marking be installed along the study segment.

City staff and officials inquired if pavement markings should be installed to delineate the parking lanes. The marking of parking space limits does encourage more orderly and efficient use of curb side parking spaces at locations where there is great demand for parking and where parking meters are used. However, based on field observation and corroborated by City staff comments, there is little demand for on-street parking on the study segment. Because there is relatively little demand for on-street parking and no parking meters, and because there are numerous driveways and intersections along the study segment of W. Bender Road concerned, and because of a continual maintenance problem, pavement markings to delineate parking stalls are not recommended.

Responding to an inquiry regarding the provision of bicycle pavement markings and/or signing on the study segment of W. Bender Road, it may be noted that the study segment is not identified as a potential bicycle route in the Commission's Regional Bicycle and Pedestrian Facilities Plan for Southeastern Wisconsin: 2010. Such facilities are intended to connect major activity centers as well as transit stops and stations with a network of bicycle and pedestrian facilities. Milwaukee River Parkway, on the western limits of the study segment, is an

existing bicycle route and Lydell Avenue, just east of the segment of roadway concerned, is a proposed bicycle route in the Regional Bicycle Plan. W. Bender Road, one of five facilities to traverse both the Milwaukee River and IH 43 in the City of Glendale, would be a logical connection between these two bicycle routes in the Regional Bicycle Plan. A bicycle lane delineated by pavement markings and/or signing is not, however, recommended on the existing 44 foot roadway cross-section because the roadway cannot accommodate the desirable 2-eight foot parking lanes, 2-six foot bicycle lanes, and 2-twelve foot travel lanes.

At the request of citizens living adjacent to the study segment, City staff and officials inquired if the installation of stop signs on W. Bender Road at N. Alberta Lane was a potential solution to the speeding problems along the W. Bender Road study segment. The installation of stop signs on W. Bender Road at N. Alberta Lane in an attempt to control vehicular speed is not recommended because the purpose of stop signs is to assign right-of-way at intersections. It may be noted that the issue of right-of-way at this intersection has been clearly established through the installation of stop signs on the N. Alberta Lane approaches. The installation of stop signs is not recommended for use as a speed control device in the Manual on Uniform Traffic Control Devices. The installation of unwarranted stop signs may result in a general disregard for the stop signs, not only at this intersection, but for all traffic control devices. Their installation may also result in an increase in certain types of traffic accidents such as rear-end accidents; and studies indicate that motorists tend to increase their speed between stop signs to make up the lost time as a result of the stop. Finally, the installation of multiway stop signs should not be considered--provided adequate sight distance is available--unless 40 percent or more of traffic entering the intersection enters from one roadway and no more than 60 percent enters from the other roadway. Therefore, a stop sign at N. Alberta Lane is not recommended.

Sidewalks

The City of Glendale requested Commission staff to comment on the issue of a proposed crosswalk on the north side of W. Bender Road along the entire length of the study segment. Because this item is to be evaluated by the Glendale City

Council one year after the completion of the project, the comments were necessarily general in nature. W. Bender Road has been identified by the Commission in the adopted Regional Transportation Plan as an arterial facility and continues to function as an arterial based on traffic volumes collected for this report. As shown in Table 4, an arterial facility located in a residential area should have sidewalks provided on both sides of the roadway to separate vehicular and pedestrian movements. Therefore, it is recommended that sidewalks be provided on both sides of W. Bender Road.

Crosswalks

At the request of the City of Glendale, the Commission staff was to address the issue of crosswalk locations. Certain variables should be considered when locating crosswalks: nearby activities, vehicular and pedestrian volumes, vehicular speeds, sight distance, and the geometrics of the roadway being crossed. Crosswalk location is critical to the utility and safety of the crosswalk. Crosswalks should not be placed at locations where crossing the street may be particularly hazardous. Crosswalks located at areas with higher traffic volumes and speeds should be supplemented with advance warning signs and/or advance warning pavement markings. Conversely, crosswalks with low vehicular and/or pedestrian volumes may not warrant markings. Figure 3 presents the pedestrian and traffic volumes that warrant the installation of crosswalks. As shown in Figure 3, the volume thresholds are reduced for locations where young, elderly, or handicapped pedestrians make up a significant portion of the pedestrian population. All crossings at uncontrolled intersection legs and mid-block crossings should be supplemented with crosswalk signs as indicated in the Manual On Uniform Traffic Control Devices. Finally, crosswalks should be used selectively. Too many crosswalks reduces the overall effectiveness of each crosswalk.

Post construction pedestrian counts conducted along the study segment were compared to traffic volumes to determine the need for installing crosswalks. Table 5 shows that a comparison of the average hourly pedestrian volumes to the peak hour traffic volume along the study segment reveals no conclusive need for a crosswalk on W. Bender Road. Based upon staff observations prior to the pedestrian counts, particular consideration was given in the investigation to

Table 4

RECOMMENDATIONS FOR PROVISION OF SIDEWALKS IN AREAS OF EXISTING OR PLANNED URBAN DEVELOPMENT BY ROADWAY FUNCTIONAL CLASSIFICATION AND LAND USE CLASSIFICATION

Roadway Functional Classification	Land Use	New Streets[a]	Existing Streets
Arterial Streets[b]	Industrial	Both Sides	Both Sides
	Commercial	Both Sides	Both Sides
	Residential	Both Sides	Both Sides
Collector Streets	Industrial	Both Sides	Both Sides
	Commercial	Both Sides	Both Sides
	Residential	Both Sides	At least one side
Land Access Streets[c]	Industrial	Both Sides	Both Sides
	Commercial	Both Sides	Both Sides
	Residential (medium- and high-density)	Both Sides	At least one side
	Residential (low-density)	At least one side	At least one side

[a]Sidewalks may be omitted on one side of new streets where there are no existing or anticipated uses that would generate pedestrian trips on that side.

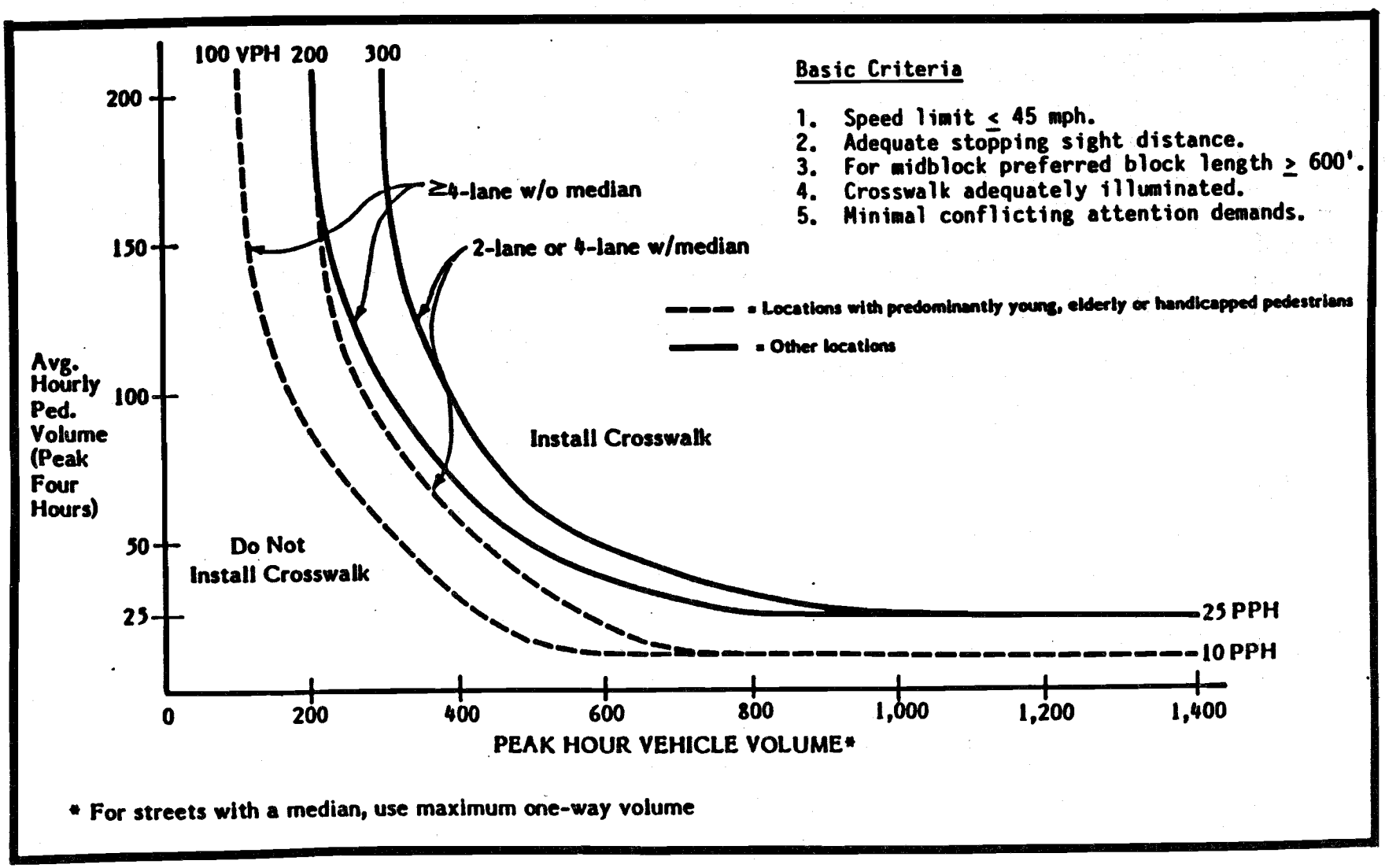
[b]Where there are marginal access control or service roads, the sidewalk along the main road may be eliminated and replaced by a sidewalk along the service road on the side away from the main road.

[c]Sidewalks need not be provided along courts and cul-de-sac streets less than 600 feet in length, unless such streets serve multi-family development; or along streets served by parallel off-street walkways.

Source: Federal Highway Administration and SEWRPC.

FIGURE 3

GUIDELINES FOR CROSSWALK INSTALLATION AT
UNCONTROLLED INTERSECTION LEGS, MIDBLOCK CROSSINGS,
AND SIGNALIZED INTERSECTIONS WITHOUT PEDESTRIAN HEADS



Source: U.S. Department of Transportation, Federal Highway Administration.

Table 5

COMPARISON OF AVERAGE HOURLY PEDESTRIAN VOLUMES TO PEAK HOUR TRAFFIC VOLUMES ALONG THE W. BENDER ROAD STUDY SEGMENT

Cross Street	Average Hourly Pedestrian Volume (Peak Four Hours)	Peak Hour Traffic Volume on Study Segment	Meets Guidelines for Crosswalk Installation at Uncontrolled Intersection Legs[a]
Milw. River Parkway	17	860	N/A[b]
Sunnypoint Road	2	860	No
Montclaire	2	860	No
Alberta Lane (north)	1	860	No
Alberta Lane (south)	1	860	No
Bittersweet Lane	0	860	No
Appleblossom Lane	0	860	No
Park Road	5	860	No
Jean-Nicolet Road	1	860	No

[a]*Guidelines for crosswalk installation are cross-referenced with Figure 3.*

[b]*The guidelines for crosswalk installation at uncontrolled intersections presented in Figure 3 are not applicable to the 4-way stop controlled intersection of Milwaukee River Parkway with W. Bender Road.*

Source: SEWRPC.

two possible crosswalk locations: the intersection of W. Bender Road with N. Sunnypoint Road, and the intersection of W. Bender Road with W. Bittersweet Lane. The crosswalk at the intersection of W. Bender Road with W. Bittersweet Lane was eliminated after post construction pedestrian counts showed no need for one at that location. The crosswalk at the intersection of W. Bender Road with N. Sunnypoint Road, however, required additional evaluation.

Upon further investigation, two crosswalk locations are recommended along the study segment concerned: the intersection of W. Bender Road with N. Sunnypoint Road, and the intersection of W. Bender Road with Park Road. The crosswalk at W. Bender Road and N. Sunnypoint is recommended due to the fact that the sidewalk on the north side of W. Bender Road terminates at N. Sunnypoint Road. It is therefore a logical place to encourage pedestrians to cross the roadway to use the sidewalk located along the south side of W. Bender Road. The second crosswalk is recommended at the intersection of W. Bender Road and Park Road. This crosswalk location is recommended, in part, due to the fact that its pedestrian volume is approaching levels which would warrant the installation of a crosswalk (refer to Table 5). Also, an apartment complex containing approximately 95 units has a driveway located on the north side of W. Bender Road directly opposite of Park Road; in effect, creating a four-legged intersection providing access to one of the more densely developed areas along the study segment concerned. No other location along the W. Bender Road study segment warranted the installation of crosswalk.

SUMMARY

On April 22, 1993, the City Engineer of the City of Glendale, requested Southeastern Wisconsin Regional Planning Commission staff assistance in identifying appropriate traffic control measures for the reconstructed segment of W. Bender Road located between the Milwaukee River Parkway and Jean-Nicolet Road. In May 1993, the Commission staff conducted pre-construction inventories. In July 1994, the Commission staff conducted additional post-construction inventories. This report presents the findings and recommendations of the requested study.

The study segment of W. Bender Road is located within the City of Glendale in northern Milwaukee County. The segment is about 0.7 miles, or 3,700 feet, in length from Milwaukee River Parkway to Jean-Nicolet Road. The reconstruction of W. Bender Road, completed in June 1994, provided an urban roadway cross-section 44 feet wide, face-of-curb to face-of-curb; replacing a rural roadway cross-section of approximately 40 feet in width with approximately seven-foot shoulders and drainage ditches. The former roadway also contained a signed two-way bicycle and pedestrian path that utilized approximately five feet of roadway abutting shoulder on the south side of the street.

City of Glendale staff identified a number of local concerns regarding the study segment of W. Bender Road, which included: 1) speed limit - requested 25 miles per hour; 2) no passing signs and/or double centerline pavement markings; 3) longitudinal delineation lines between travel and parking lanes; 4)additional sidewalk on the north side of W. Bender Road; 5) crosswalk locations and marking; 6) stop sign at N. Alberta Lane; and 7) bicycle pavement markings and/or signing.

Intersection sight distances on the cross street approaches to W. Bender Road were examined to determine whether sight distances were restricted. Intersection sight distance was found to be restricted by shrubbery adjacent to the roadway in the southwest quadrant at the intersection of W. Bender Road and Jean-Nicolet Road.

Average weekday traffic count data were collected at selected locations along the study segment. The average weekday traffic volumes on W. Bender Road within the study area range from 8,400 to 9,700 per average weekday. Hourly traffic volumes within the greater Milwaukee area in 1992 were analyzed and compared to the 1993 traffic counts taken by the Commission staff to categorize the existing hourly distribution of vehicular travel on the W. Bender Road study segment. The distribution of hourly traffic volumes on the segment concerned was found to be typical of the traffic flow pattern identified on other arterial streets and highways in the greater Milwaukee area except for a noticeable increase during the 8:00 p.m. to 9:00 p.m. time period. This variance was attributed to fact

that Bay Shore Mall, a major area shopping center located approximately 0.5 miles southeast of the eastern end of the study segment, closes weekdays at 9:00 p.m.

The Commission staff conducted an inventory of the existing traffic signs along the W. Bender Road study segment. A total of fourteen signs were found posted at ten locations: eight regulatory signs, three advance warning signs of traffic control, two guide signs, and one supplementary sign. Analyses of the sign data inventory data indicated that the multiple stop signs mounted on a single post on the east- and westbound approaches to W. Bender Road intersection with Milwaukee River Parkway serve no useful purpose and should therefore be considered inappropriate.

A spot speed study was conducted by the Commission staff on the study segment of W. Bender Road in May 1993. The 85th percentile speed, or the speed at or below which 85 percent of the traffic was observed to be traveling, was approximately 8.3 miles per hour above the speed limit, and only 4.4 percent of the vehicular traffic travels at or below the posted speed limit.

Motor vehicle accident histories for the study segment of W. Bender Road were inventoried for the time period of January 1, 1990 through December 31, 1992. A total of 19 accidents were reported on the study segment during this period with the number of accidents decreasing slightly in each consecutive 12-month period. Of the 19 total accidents, five involved personal injuries and the remaining 14 involved property damage only. There were no accidents involving fatalities. Because of the concentration of accidents at two locations--the intersections of W. Bender Road with Milwaukee River Parkway with eight accidents and W. Bender Road with Jean-Nicolet Road with four accidents--the two locations were reviewed to determine if any accident pattern exists which may indicate a potential traffic safety problem at these locations. No other significant patterns with respect to time or nature of accident were observed.

Since the Commission staff was not able to obtain accurate pedestrian volume counts due to the fact that construction of utilities for the new roadway was already underway by the time of the preconstruction inventories in May 1993; post construction pedestrian counts were conducted along the study segment in mid-July

of 1994. Average hourly pedestrian volumes crossing W. Bender Road varied from 17 to 0 per average weekday, and average hourly pedestrian volumes crossing side streets along the study segment varied from 8 to 1 per average weekday.

The inventory data were compared to generally acceptable engineering standards and two existing traffic problems were identified on the study segment of W. Bender Road. These included: 1) potential traffic safety problems due to restricted intersection sight distance; and 2) vehicular speeding problems. Because of insufficient historical data and the concentration of traffic accidents, the W. Bender Road intersection with Milwaukee River Parkway may be considered a location where a potential traffic safety problem exists. A number of traffic engineering actions to alleviate the traffic problems identified were considered.

The corner sight distance along the study segment of W. Bender Road is restricted by plant material at one intersection. The traffic engineering action considered to abate the problem of restricted intersection corner sight was improvement of vision triangles at the intersection of W. Bender Road and Jean-Nicolet Road.

The spot speed study conducted by the Commission staff demonstrated that motorists appear to be disregarding the posted speed limit along the study segment. No traffic engineering action may be expected to abate this particular problem. The only action with the potential to abate the vehicular speeding problem is an increase in enforcement activity by law enforcement officials. It was recommended that the City of Glendale consider increasing its speed limit enforcement activity along the W. Bender Road study segment on a random basis for two to three hours per day, particularly between the hours of 6:00 a.m. and 6:00 p.m. The Commission also recommends the City maintain the existing posted speed limit of 25 miles per hour along the length of the study segment.

While not specifically identified as a traffic problem, the concentration of traffic accidents at the W. Bender Road intersection with Milwaukee River Parkway was identified as a potential concern because insufficient historical data exists to fully evaluate the effectiveness of the conversion from two way stop control to four way stop control. This change in traffic control may have contributed

to a lower number of accidents in the years following; however, further analyses of the three accidents subsequent to the change in traffic control revealed a pattern of motorists disregarding the stop signs. This trend may indicate a lack of or deficiency in the advance warning of the intersection's stop signs. Advance warning signs are located on both approaches of W. Bender Road approximately 580 feet before the intersection notifying motorists of the stop ahead. However, the Manual On Uniform Traffic Control Devices recommends that the distance for placement of similar stop condition warning signs be 400 feet in advance of the stop condition based upon the 85th percentile speed of about 33 miles per hour. Therefore, it was recommended by the Commission staff that advisory distance plates be added to the "STOP AHEAD" advance warning signs on the eastbound and westbound approaches to the W. Bender Road and Milwaukee River Parkway intersection.

At the intersection, each of the W. Bender Road approaches have two stop signs and a four-way supplementary sign; all placed on a single sign post. The posting of duplicate signs on the same post is inappropriate and serves no useful purpose. It was also recommended that the redundant 24 inch in diameter stop sign be removed from the eastbound and westbound approaches at the intersection of W. Bender Road and Milwaukee River Parkway.

At the request of the City of Glendale, the Commission staff was to address comments and questions raised by City officials and staff at a July 22, 1994, interagency staff meeting. The comments and questions were categorized into the following: 1) the installation of pavement markings, 2) the installation of stop signs on W. Bender Road at N. Alberta Lane; and 3) the construction of a sidewalk on the north side of W. Bender Road from N. Sunnypoint to N. Jean-Nicolet Road. Table 6 summarizes the actions recommended by Commission staff to be implemented along the W. Bender Road study segment. The Commission staff did not recommend pavement markings to delineate parking lanes, or bicycle route, nor the installation of stop signs on W. Bender Road at N. Alberta Lane.

Table 6

ACTIONS RECOMMENDED TO BE IMPLEMENTED
ALONG THE W. BENDER STUDY SEGMENT

Local Concern	Recommended Action
Centerline pavement marking	• Install standard two-lane, two way dashed yellow centerline marking as indicated in the Manual on Uniform Traffic Control Devices.
Additional walk along the north side of W. Bender Road	• Provide sidewalk on north side to parallel the existing sidewalk on the south side of W. Bender Road.
Crosswalk locations and marking	• Standard crosswalk markings supplemented with advance warning signs as indicated in the Manual on Uniform Traffic Control Devices at the intersection of W. Bender Road with N. Sunnypoint. • Standard crosswalk markings supplemented with advance warning signs as indicated in the Manual on Uniform Traffic Control Devices at the intersection of W. Bender Road with Park Road.

Source: SEWRPC.