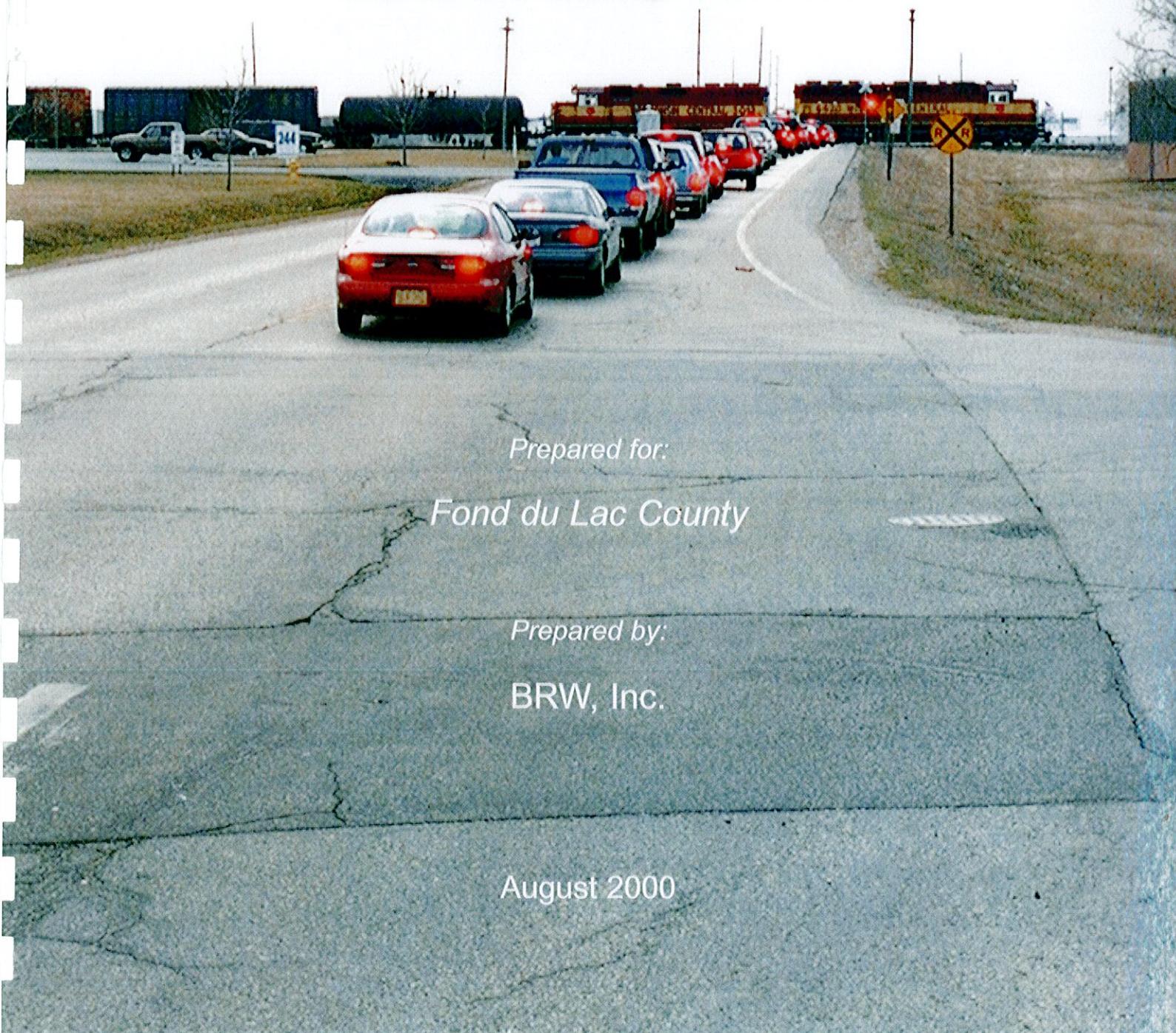


Pioneer Road Transportation Study

Summary Report

Pioneer Road (C.T.H. VV)
Military Road to U.S.H. 45 Road
Fond du Lac County, Wisconsin



Prepared for:

Fond du Lac County

Prepared by:

BRW, Inc.

August 2000

Pioneer Road Transportation Study

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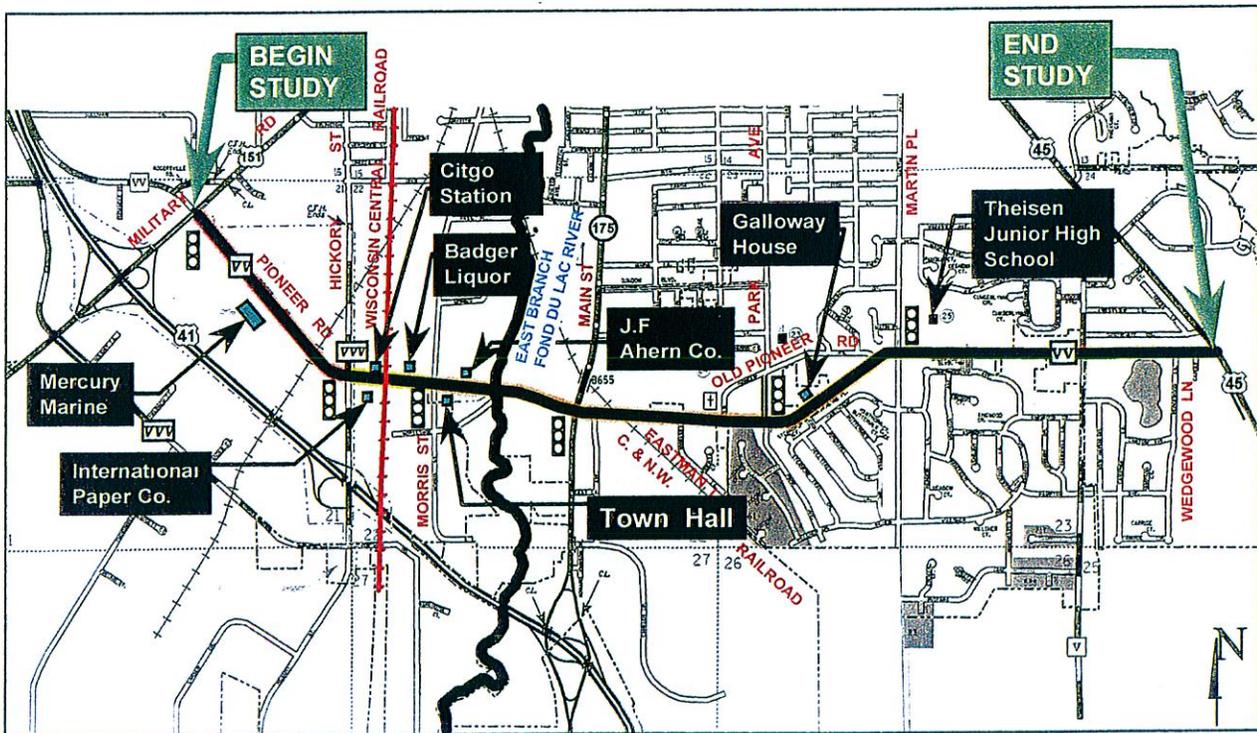
INTRODUCTION

Background

Pioneer Road (CTH VV), located in Fond du Lac, Wisconsin is a rural collector roadway that circumscribes the west and south sides of the city. Pioneer Road currently services an average daily traffic volume (ADT) ranging between 3,000 and 21,000 vehicles per day (vpd).

This project is a transportation study of a 3.16 mile section of Pioneer Road from Military Road (USH 151) to Fond du Lac Avenue (USH 45) (See **Figure 1**).

Figure 1
Pioneer Road Study Area



This study is the first step in the roadway reconstruction process. The next steps will include:

- Programming of Funds
- Preliminary Design and Acquisition of Right-of-Way
- Final Design
- Construction

Study Purpose

The purpose of this study is to analyze the existing conditions along Pioneer Road and recommend improvements needed within the corridor to enhance safe, efficient, multi-modal transportation for the next 20 to 30 years. This report provides estimates of future travel demand, identifies and evaluates alternative improvements and provides cost estimates and recommendations.

Study Objectives

Specific objectives to be accomplished as a part of the study include:

- Estimate the growth in travel demand in the corridor over the next 20 years.
- Determine the required roadway improvements (laneage, signals, etc.) necessary to accommodate the forecasted travel demand.
- Identify rail/highway conflicts and determine if a grade separation is warranted and feasible at the Wisconsin Central Railroad crossing near Morris Street.
- Identify the additional right-of-way needed for proposed improvements.
- Develop access guidelines to preserve the functionality of the improvements.
- Identify potential environmental concerns.
- Encourage and enhance pedestrian and bicycle travel.
- Minimize impacts on residences and business.
- Develop an implementation/staging plan for the proposed improvements.
- Involve and inform the public throughout the study process.

Study Process

A process was developed at the onset to guide the study, to involve a variety of interested parties and to solicit input from the public. Officials from the County and from the City oversaw the conduct of the study. Throughout the study, BRW staff met regularly with County and City staff to review progress and discuss issues.

A Technical Advisory Committee (TAC) was formed to provide input into the study. The TAC, consisting of 19 members, met three times with BRW for detailed progress briefings.

In addition to meetings described above, two direct mail surveys were conducted. The purpose of these surveys was to gauge the residents and businesses perception of transportation conditions and improvements needed on Pioneer Road. A significant majority of the respondents identified congestion and safety concerns on Pioneer Road with a railroad grade separation as the most important need. Additional lanes at intersections was the respondents second priority with additional through lanes and new sidewalks/paths a close third.

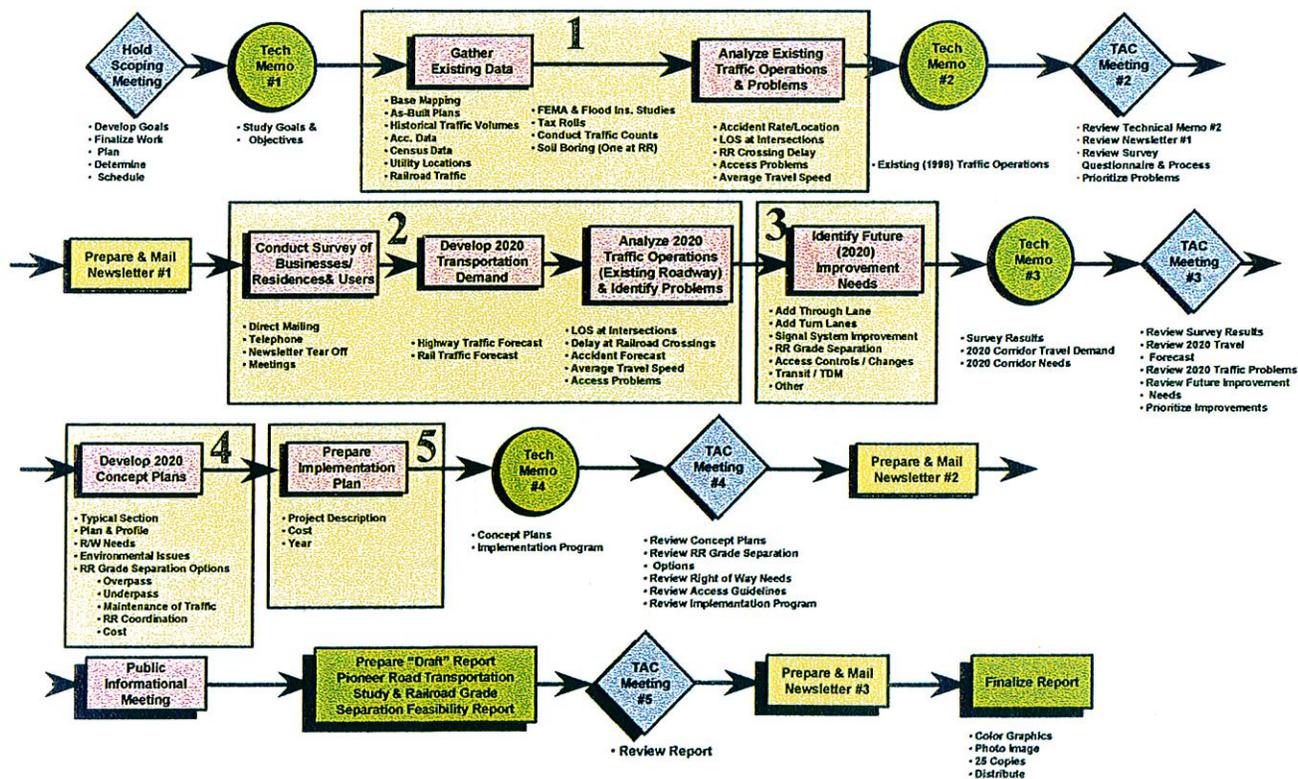
Engineering studies were conducted to document existing traffic conditions and to analyze improvement options. These studies are discussed in further detail in subsequent chapters of this report.

A public informational meeting was conducted and three project newsletters were mailed to corridor residents and businesses.

The survey responses and other public input were used by BRW and the County advisory staff in the development of the proposed improvements, which are described in this report.

Figure 2 shows a graphic of the process that was generally followed through the study.

Figure 2
Pioneer Road Study Process



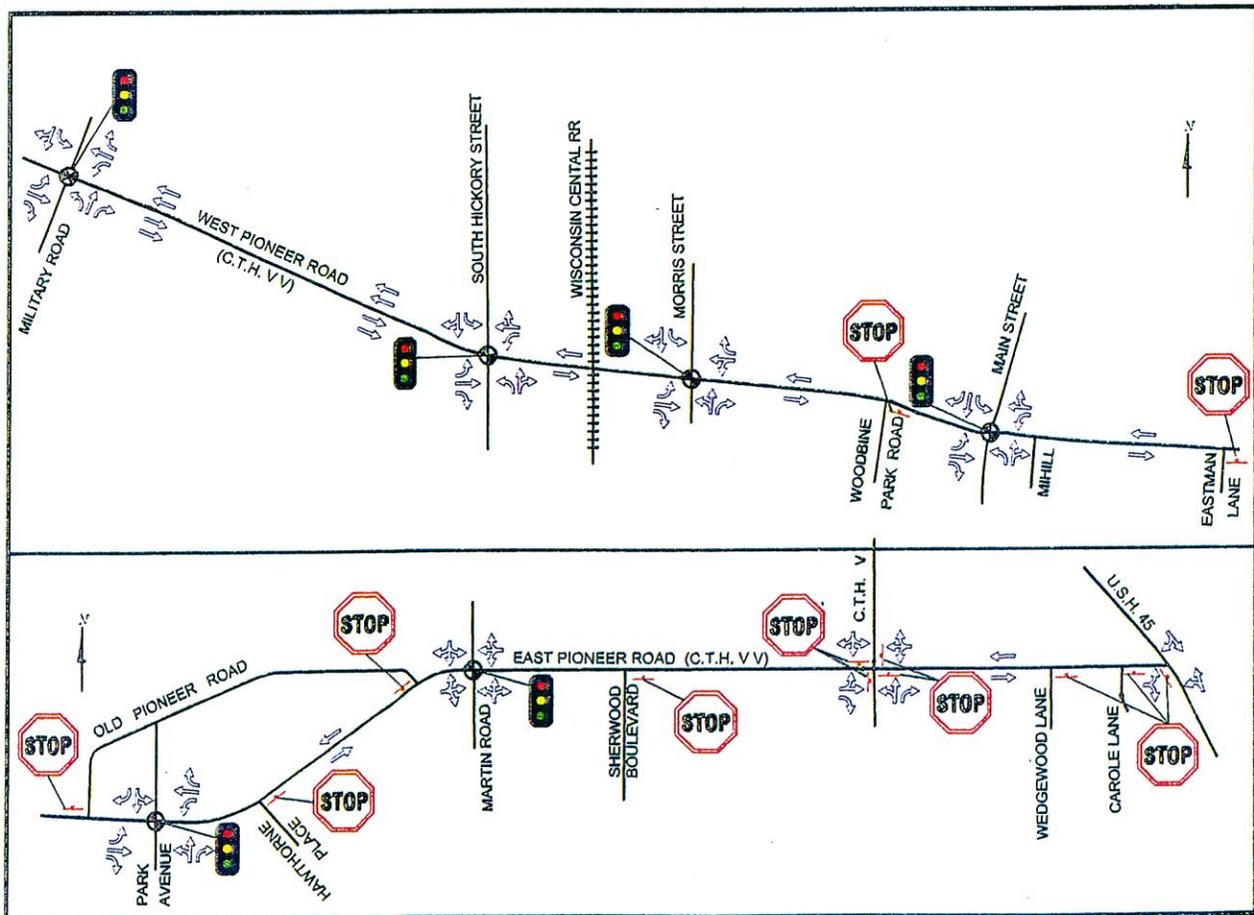
EXISTING CONDITIONS

Roadway Laneage and Traffic Control

Between Military Road and Hickory Street, existing Pioneer Road is a rural cross-section with two through lanes in each direction. Between Hickory Street and USH 45, Pioneer Road has a rural typical section but with only one through lane in each direction. In this segment there is a narrow, single-span bridge that spans the East Branch of the Fond du Lac River. There are two at-grade crossings of the Wisconsin Central Ltd. Railroad (WCL) in this segment. The posted speed limit on Pioneer Road is 35 miles per hour (mph).

There are sixteen intersections with Pioneer Road along the project. See **Figure 3** for the existing laneage conditions at these intersections.

Figure 3
Existing Intersection Traffic Control and Laneage Conditions



Land Use and Access

Existing land use along Pioneer Road varies considerably from west to east. Between Military Road and the East Branch of the Fond du Lac River land use is largely industrial, with scattered commercial properties. This segment provides access to several of Fond du Lac's largest employers including Mercury Marine and International Paper. The access driveways to the Mercury Marine plant experience very heavy demand during shift changes. This segment also includes two at-grade railroad crossings. The railroad crossing west of Hickory Street will be abandoned. The crossing east of Hickory Street is the main line of the WCL. The WCL operates approximately 30 trains per day over this single-track crossing. Also, the crossing is frequently occupied due to switching movements occurring at the International Paper siding.

From the East Branch of the Fond du Lac River through the intersection of Main Street, land use is mostly commercial. There are several driveways in this segment that serve the commercial developments. Some of these drives are in close proximity to the intersection. The drives have a negative affect on intersection traffic operations and pose safety concerns.

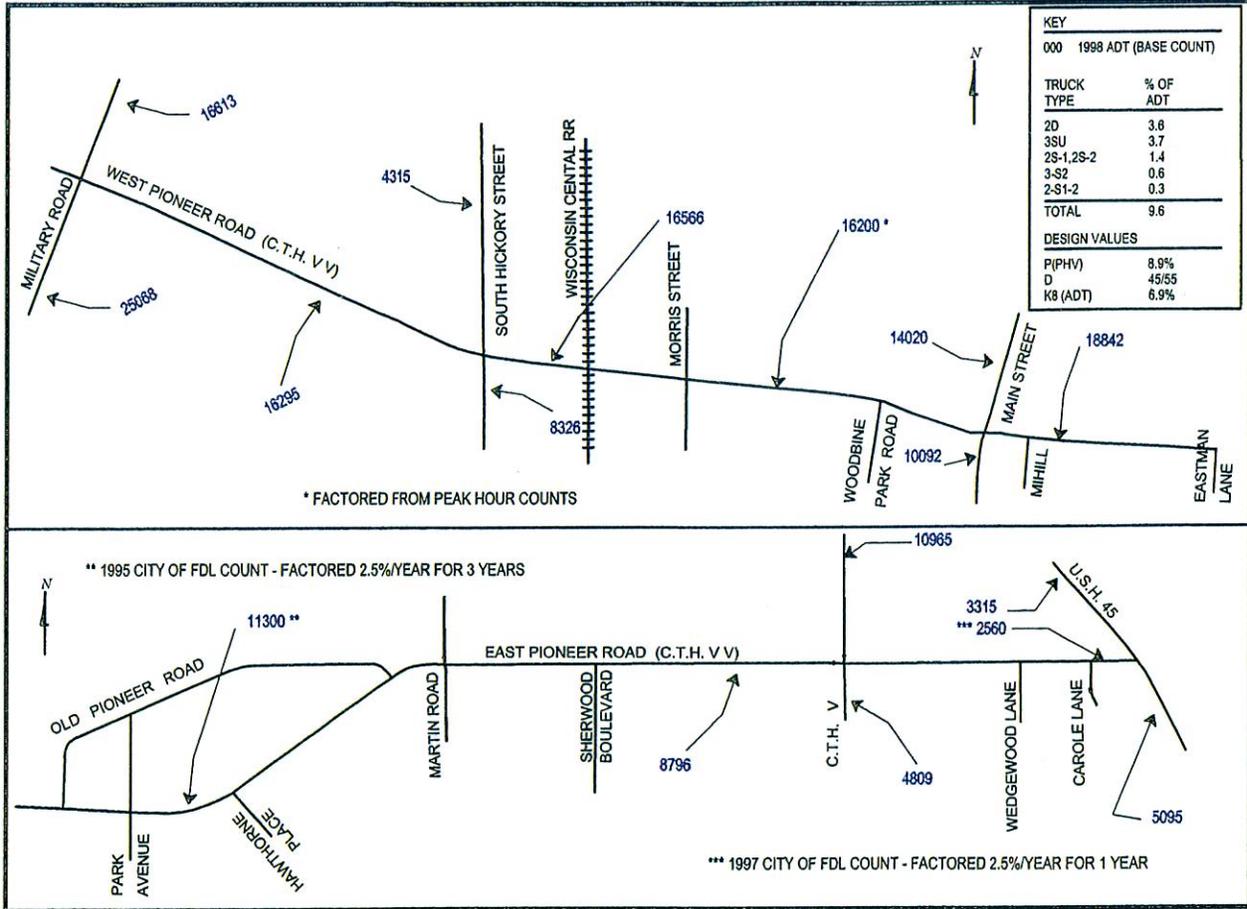
From Main Street to USH 45, land use is residential consisting of mostly medium and low density development. Theisen Junior High School fronts on Pioneer Road in this segment. Some pedestrian-auto conflicts have occurred as a result of school children crossing the street at random, mid-block locations. One recent injury accident was reported near the school on Pioneer Road where a motorist struck a pedestrian at a mid-block location. There is also an at-grade crossing of the WCL in this segment, just east of the Main Street intersection.

Daily Traffic Volumes

Existing traffic volumes vary considerably along the project. They range from over 16,000 vehicles per day (vpd) on the west end to over 18,000 vpd near Main Street to a low of just 2,600 vpd at the east end near USH 45 (See **Figure 4**, following page). Approximately 9.6% of the traffic is trucks with approximately 2.3% being semis.

The traffic distribution during the day on Pioneer Road is typical for urban arterial streets. The highest hourly volumes occur during the 4:00 p.m. to 5:00 p.m. period. This represents approximately 9% of the 24 hour volume.

Figure 4
Existing Corridor Traffic Volumes



Traffic Safety

Traffic crash data for a 3.5 year period between January 1, 1995 and July 1, 1998. There were a total of 190 crashes on Pioneer Road in the study area during this period. Locations with a high number of crashes include the intersections of Military Road, Hickory Street and Main Street (See **Figure 4**). Segments of Pioneer Road were compared with statewide average crash rates for County Trunk highways (See **Table 1**, below; **Figure 5**, following page). Generally the rates on Pioneer Road are higher than the statewide average.

Table 1
Pioneer Road – Crash Rate by Segment

Segment	Length (miles)	vehicles/day	vehicles/year	years	total vehicles	vehicle - miles	100 million vehicle - miles	Crashes (1)	Crashes/ 100 million vehicle miles	Statewide Average (2)	Comparison with S.W. Average
Military - Hickory	0.65	16,000	5,840,000	3.5	20,440,000	13,286,000	0.13	55	414	352	18%
Hickory - Main	0.65	16,000	5,840,000	3.5	20,440,000	13,286,000	0.13	82	617	352	75%
Main - Park	0.51	18,800	6,862,000	3.5	24,017,000	12,248,670	0.12	51	416	352	18%
Park - Martin	0.45	11,300	4,124,500	3.5	14,435,750	6,496,088	0.06	13	200	352	-43%
Martin - C.T.H. V	0.50	8,700	3,175,500	3.5	11,114,250	5,557,125	0.06	21	378	352	7%
C.T.H. V - U.S.H 45	0.37	2,500	912,500	3.5	3,193,750	1,181,688	0.01	8	677	352	92%

(1) The number of crashes for each segment includes the crashes within intersections on each end of the segment.
 (2) Average of Wisconsin statewide average crash rates for County Trunk Highways for 1995, 1996, and 1997.

Figure 5
Crash Locations – January 1995 to July 1998

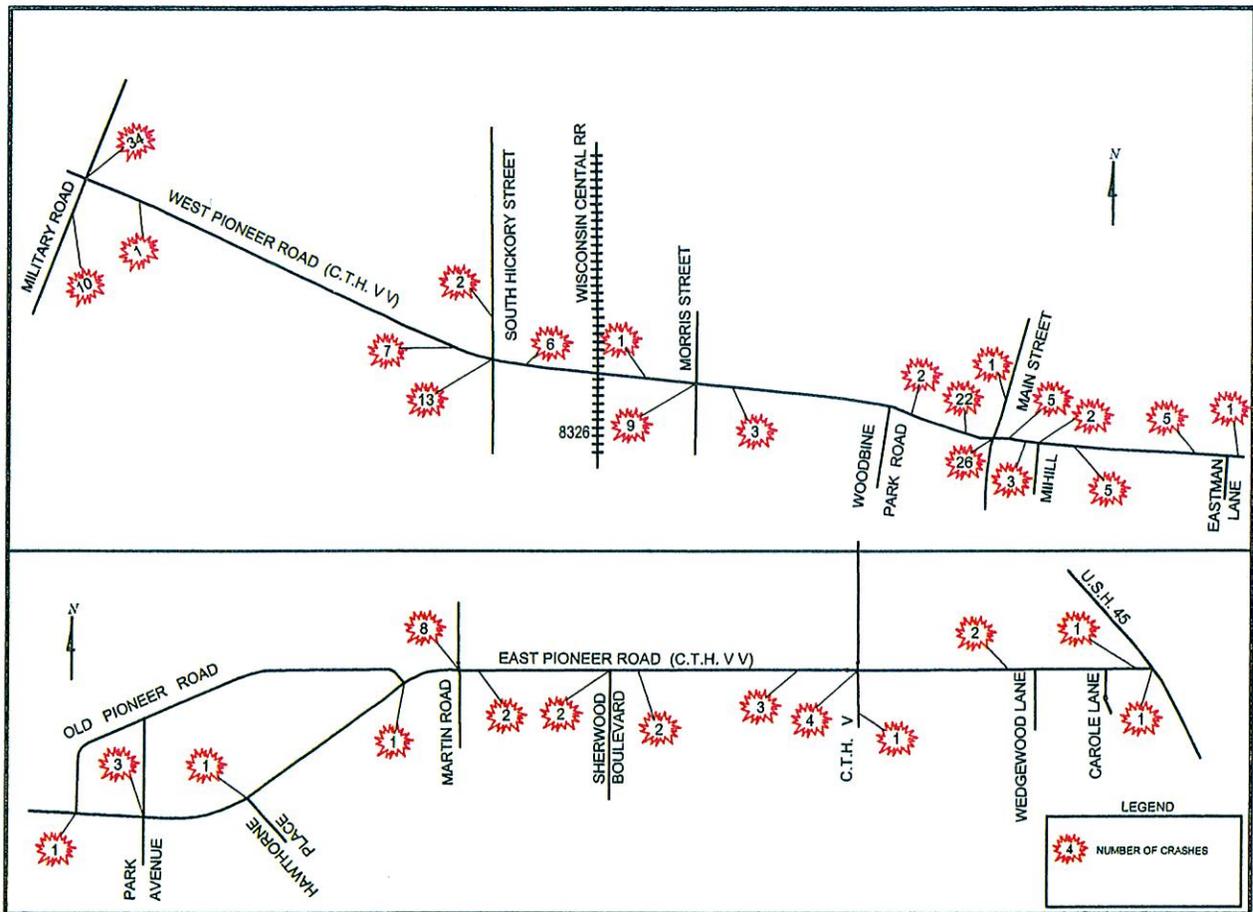
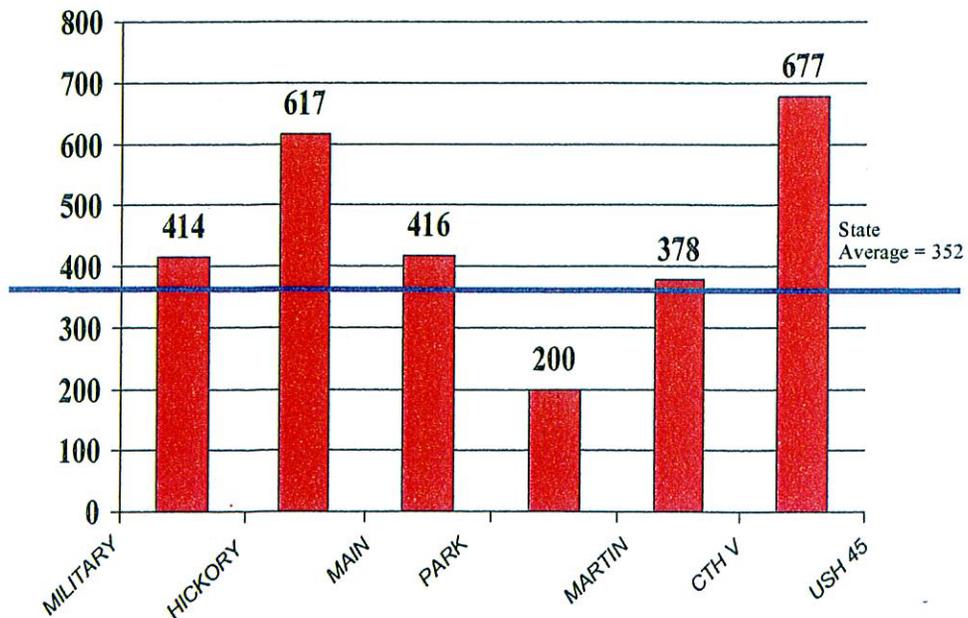


Figure 6
Pioneer Road Crash Rates versus Statewide Average



Traffic Operations

The peak hour Level of Service (LOS) was calculated at the majority of intersections on the project using current (1998) traffic volumes. LOS is a qualitative measure of traffic operations that ranges from A (excellent) to F (poor). In addition, several travel time runs were conducted during the evening weekday peak hour in March of 1999. Today, the peak hour LOS at the intersections is generally good with the exception of Main Street. The Main Street intersection currently operates at LOS D in the peak hour with the south approach right turn and through movement experiencing the most delay. The length of time needed to travel through the corridor during the evening peak hour was relatively constant unless a train was crossing the corridor. Without train delay the total travel times ranged between 7 and 8 minutes. This is an average travel speed of 24 to 27 mph. When a train was crossing Pioneer Road the travel time through the corridor increased to about 10.5 minutes.

Railroad Crossings

The Wisconsin Central LTD. (WCL) track crossing between Hickory Street and Morris Street has a significant influence on corridor traffic operations. The crossing is protected with signals and gates. The crossing carries approximately 34 trains per day. Trains range in length from 80 to 120 cars. Moving at a speed of 20 mph, trains can occupy the crossing for up to five minutes. Vehicles often back up to the east past the Fond du Lac River Bridge and to the west through the intersection with Hickory Street.

The train crossing also influences traffic operations at the Pioneer Road/Hickory Street intersection. Further, as the trains clear Pioneer Road, long queues of west bound vehicles are stopped again by the signal at Hickory Street. The calculated exposure factor at the crossing is 497,000. A grade separation can be considered when the exposure factor reaches 100,000.

In 1995, Mr. Daniel Zuraff, with the Wisconsin Office of the Commissioner of Railroads, authored a report entitled *Safety Recommendation for the Wisconsin Central LTD. Railroad Company Track Crossing with Pioneer Road Located in the City of Fond du Lac, Fond du Lac County (Crossing No. 690-099P)*. The report makes the following observations and recommendations:

- The Town of Fond du Lac Town Hall is located at the intersection of Morris Street and Pioneer Road approximately 1,500 feet east of the crossing. At this location the Town of Fond du Lac houses their emergency vehicles. Pioneer Road in an emergency vehicle route, has been used as a detour route, and is a major bypass route around the southern perimeter of the City.
- When a train is crossing Pioneer Road, traffic backs up approximately 0.25 miles west of Hickory Street and east of Fond du Lac River Bridge.

- Three train-vehicle accidents have occurred at the crossing between 1973 and 1995.
- WCL operates between 24 and 30 through trains per day in a 24-hour period at a timetable speed of 20 mph. WCL operates 4 to 6 switching moves at various times each day over the crossing. The average length of trains is between 80 and 120 cars.

The WCL track crossing east of Main Street only has a few crossings per week and is protected with signals. The effect of this crossing on Pioneer Road traffic operations is negligible.

Currently, the WCL track crossing west of Hickory Street (old C&NW line) is a spur serving an industrial park south of USH 41. It has only a few crossings per week. In the near future this line will be abandoned and converted into a bike trail.

A detailed account of the existing conditions can be found in *Technical Memorandum #2 – Analysis of Existing Traffic Operations*, March 1999, under separate cover.

FUTURE (2020) TRAVEL DEMAND

Land Use Forecast

As a part of the traffic forecast process, BRW met with City and County planning staff to discuss changes in land use patterns in the corridor that may influence future traffic demand. Topics discussed included planned changes in land use, developable land in the vicinity of the corridor and the influence of the proposed USH 151 Bypass. It was the consensus that historic traffic growth trends would continue into the future.

Historic Traffic Volumes

The Wisconsin Department of Transportation (WisDOT) provided historic traffic volumes at six locations along Pioneer Road for the years 1976, 1977, 1985, 1991, 1994 and 1997. BRW collected current (1998) traffic data at several locations. Counts taken prior to 1991 were adjusted to account for multiple axle vehicles. Historic and current traffic count data is portrayed in **Figures 7-12** (pages 11 and 12).

A traffic forecast prepared by WisDOT for the future USH 151 bypass, indicates traffic volumes will be reduced on Military Road by approximately 75 percent upon completion of the bypass. Traffic forecasts for the Pioneer Road/Military Road intersection were adjusted to account for traffic diversion to the bypass.

Traffic Forecast

The available historic traffic volumes at each of the six locations were plotted on a graph. Then a "best fit" trend line was developed using both linear and exponential functions. The line of best fit as determined by the higher correlation factor (R Value) was used to develop a 20-year growth factor. This growth factor is the multiplier by which the current traffic volume at each location is expected to grow over the next 20 years. The six growth factors were then averaged to determine a single (corridor wide) growth factor for the year 2000 (1.1), year 2010 (1.5) and year 2020 (2.0). The growth factors were used to develop the Pioneer Road Corridor Traffic Forecast shown in **Figure 13** (page 13).

More detailed information regarding future travel demand analysis can be found in *Technical Memorandum #3 – Pioneer Road Future (2020) Transportation Demand and Improvement Needs*, May 1999.

Figure 7
Pioneer Road – Historic Traffic Growth
Between Military Road and Hickory Street

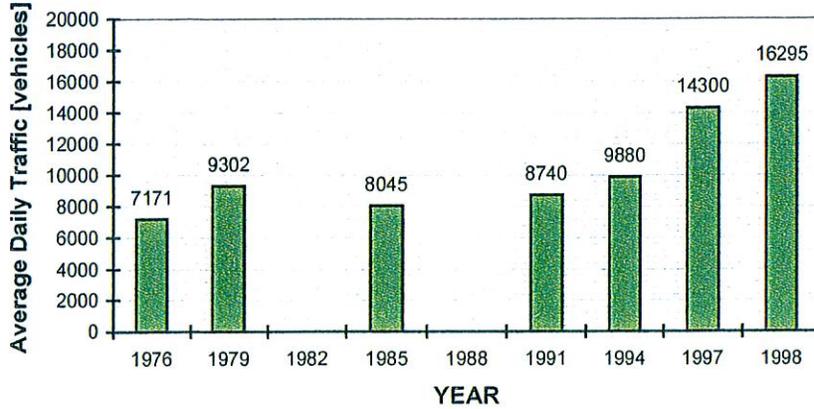


Figure 8
Pioneer Road – Historic Traffic Growth
Between Hickory Street and Main Street

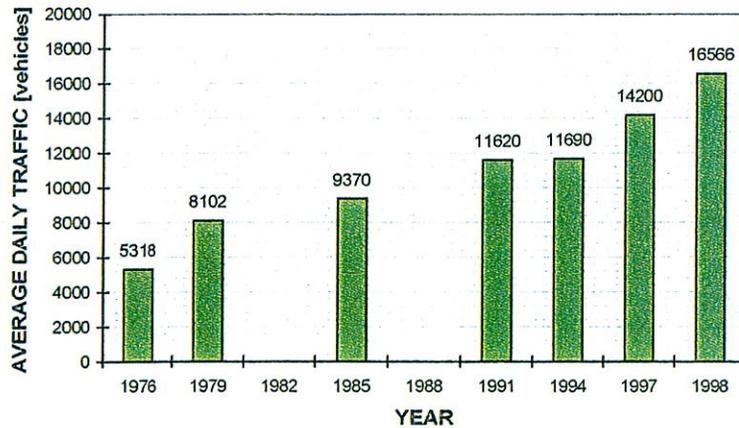


Figure 9
Pioneer Road – Historic Traffic Growth
Between Main Street and Park Avenue

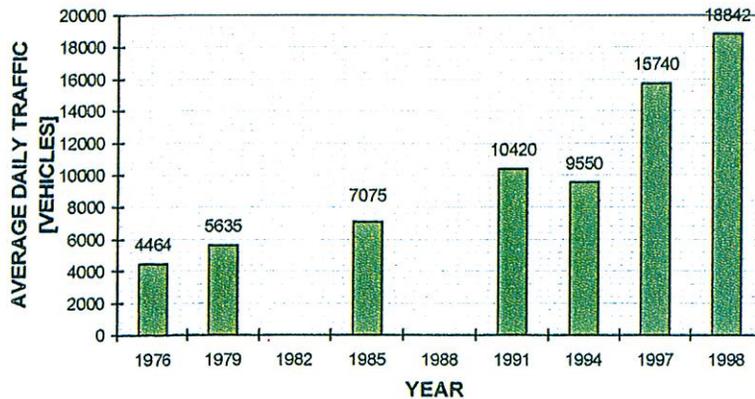


Figure 10
Pioneer Road – Historic Traffic Growth
Between Park Avenue and Martin Road

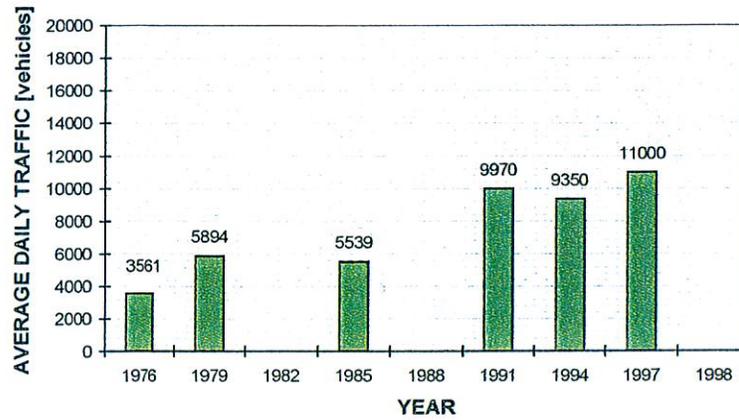


Figure 11
Pioneer Road – Historic Traffic Growth
Martin Road and CTH V

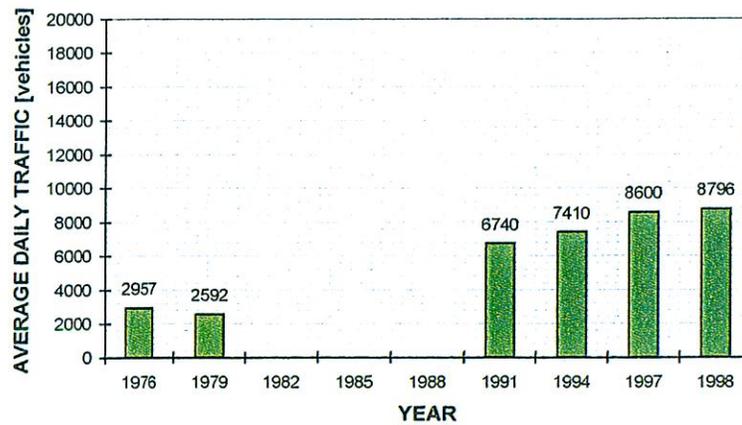


Figure 12
Pioneer Road – Historic Traffic Growth
CTH V and USH 45

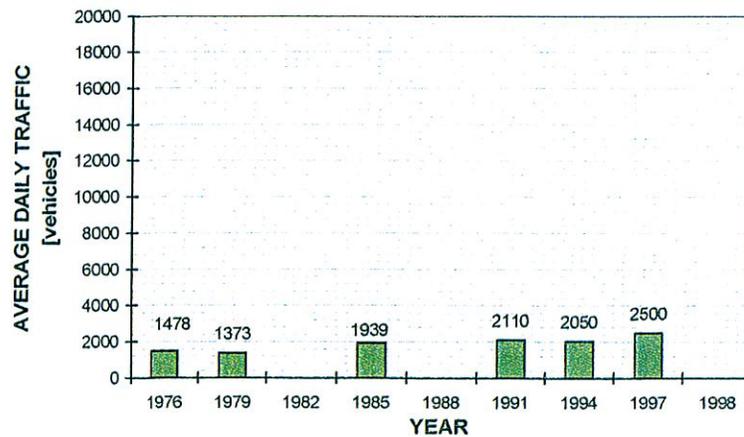
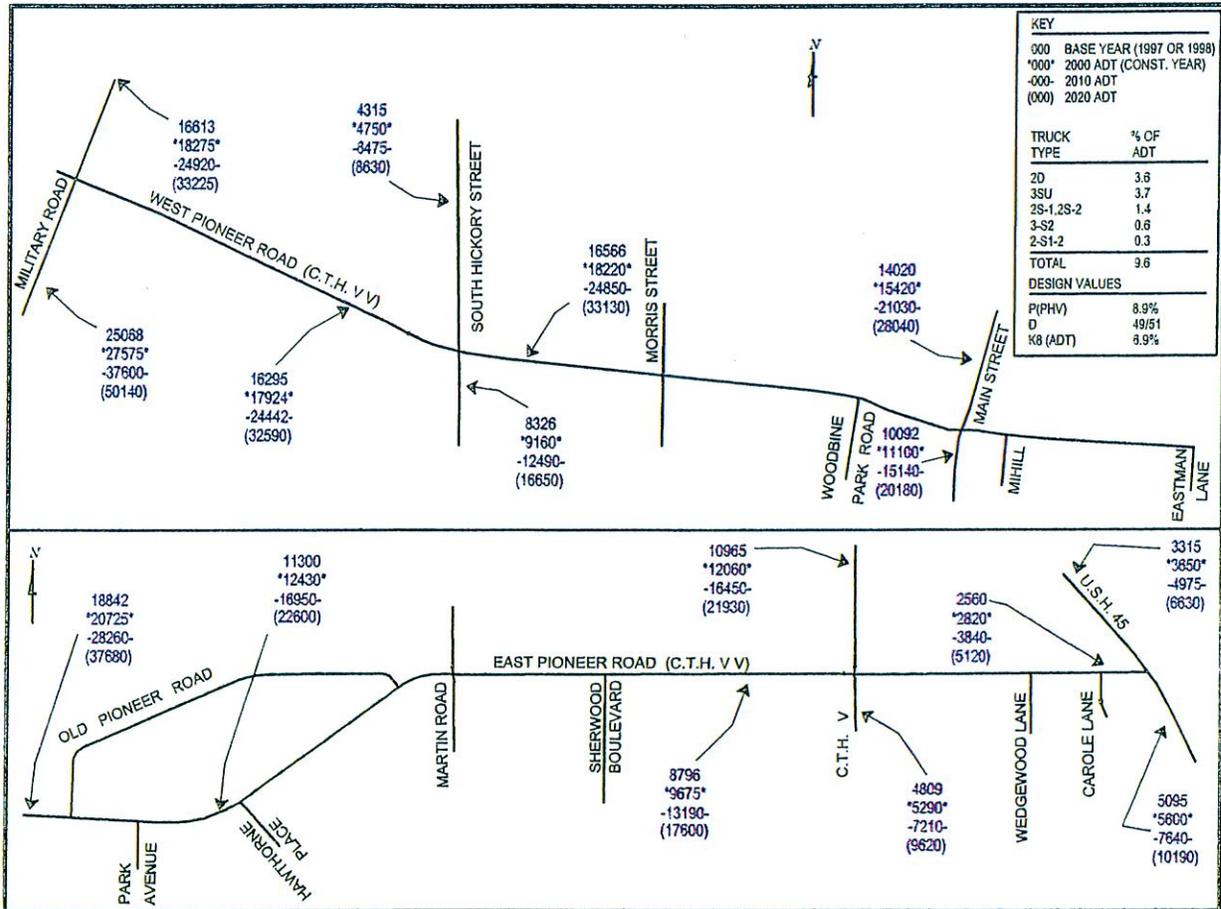


Figure 13
Corridor Traffic Forecast



FUTURE (2020) TRAFFIC OPERATIONS

2020 Traffic Operations with No Improvements

Future traffic operations were analyzed at key intersections along Pioneer Road using the peak hour forecast volumes presented in the prior chapter of this document. The future Level of Service (LOS) was determined at signalized intersections using Teapac/Signal 97 software and at unsignalized intersections using the Highway Capacity Software. The results of this analysis is shown in *Table 2*.

Table 2
2020 Intersection – Level of Service Summary
No Improvements in Corridor

Intersection	2020 No Improvements AM LOS PM LOS	Delay AM Delay PM (s)	Poorest LOS/ AM Movement PM Movement
Pioneer Road/Military Road	F	121.2	Various (F)
	F	119.9	Various (F)
Pioneer Road/Hickory Street	C	30.6	Various (D)
	F	242.3	Various (F)
Pioneer Road/Morris Street	E+	65.7	Various (F)
	F	101.1	Various (F)
Pioneer Road/Main Street	F	191.8	Various (F)
	F	380.6	Various (F)
Pioneer Road/Park Avenue	B	17.4	Various (C)
	D+	38.1	South app LT
Pioneer Road/Martin Road	-	-	-
	F	80.3	Various (F)
Pioneer Road/CTH V	F	369.0	Various (F)
	F	757.0	Various (F)
Pioneer Road/USH 45	A	8.2	-
	A	8.7	-

The analysis shows that traffic operations on Pioneer Road will significantly worsen over the next 20 years. Six of the eight intersections on the project will operate at LOS “F” during the afternoon peak traffic period by the year 2020. At LOS “F” severe traffic back-ups will occur on both Pioneer Road and on the major side streets at these intersections. At least three of the intersections will also experience LOS “F” during the morning peak hours. A detailed account of the LOS analysis can be found in *Technical Memorandum #3 – Pioneer Road*

Future (2020) Transportation Demand and Improvement Needs, May 1999, under separate cover.

2020 Traffic Operations with Additional Laneage Improvements

A solution to these future traffic problems is to increase roadway capacity by adding lanes to Pioneer Road and several of the side streets on the intersection approaches. Through an iterative process, additional lanes were added to each approach of an intersection and analyzed to determine the extent of improvement in operating conditions that could be achieved. This process continued until all intersection approaches operated at a LOS "D" or better with the 2020 forecasted traffic. The only exception is at Main Street. Because of the high volume of traffic forecasted for both Main Street and Pioneer Road, this intersection will operate at LOS "E" during the afternoon peak period in 2020.

The improved 2020 LOS that can be achieved with added lanes is shown in *Table 3*.

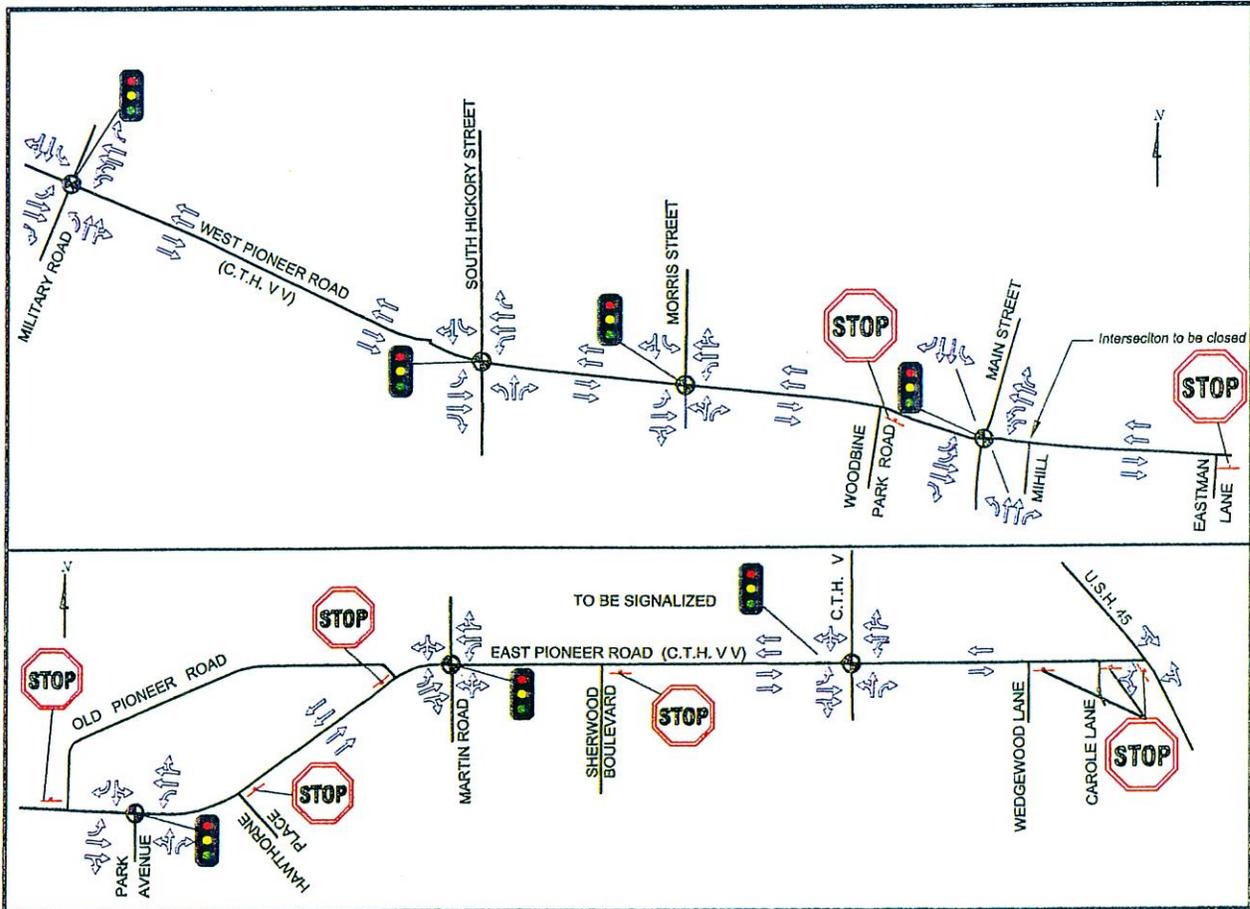
Table 3
LOS of Service Summary with Proposed Improvements

Intersection	AM LOS PM LOS	Delay AM Delay PM (s)	Poorest LOS/ AM Movement PM Movement
Pioneer Road/Military Road	C C+	33.3 21.2	Various (E+) Various (C)
Pioneer Road/Hickory Street	B C+	15.7 22.3	Various (C+) Various (C+)
Pioneer Road/Morris Street	B B	15.3 16.8	North app (C+) Various (C+)
Pioneer Road/Main Street	C E+	29.2 57.3	Various (C) Various (E)
Pioneer Road/Park Avenue	B+ B+	12.0 10.7	Various (C+) Various (B)
Pioneer Road/Martin Road	- B	- 16.3	- North app (C+)
Pioneer Road/CTH V	C+ D	24.3 52.1	Various (C) Various (E)
Pioneer Road/USH 45	A A	8.2 8.7	- -

The proposed laneage and traffic control to accommodate the forecasted 2020 traffic is shown in *Figure 14*. Two through lanes in each direction will be needed between Military Road and CTH V to reasonably accommodate the 2020 traffic demand. Additional turning

lanes will also be needed at most of the intersections. The four-way stop at CTH V will need to be replaced with a traffic signal. The intersection of Pioneer Road and MiHill Street should be closed because it is too close to Main Street for efficient and safe traffic operations.

Figure 14
Proposed Traffic Control and Laneage



Future Train Operations

The WCL currently (1999) operates 34 trains per day on the single main line trackage that crosses Pioneer Road between Hickory Street and Morris Street. The number of trains on the main line is expected to increase by 50% to 100% over the next 20 years. The WCL is currently planning for a second track on this line. Because of the urban area and the railroad yard in North Fond du Lac the trains are only moving at a speed of about 20 mph and they can occupy the crossing for up to five minutes. As the number of trains increase and the volume of highway traffic increases, the delay and resulting congestion on Pioneer

Road will increase. The vehicle queues will extend further beyond Hickory Street and beyond Morris Street and they will more frequently block the access for the Town of Fond du Lac emergency vehicles. The volume of traffic and the frequency of trains results in a calculated "exposure factor" of 497,000. According to the Wisconsin DOT a grade separation can be considered when the exposure factor exceeds 100,000.

A grade separation of the WCL tracks more than meets the warrant and is the only way to eliminate the crossing delay. A grade separation of Pioneer Road and the WCL is warranted and recommended. The railroad overpass versus railroad underpass configuration options will be investigated later in this report.

Future Pedestrian and Recreational Trail Needs

Segments of Pioneer Road are in residential or commercial areas where there is some pedestrian travel demand along the roadway. Other segments are in industrial areas where there is less pedestrian usage. Fond du Lac County maintains Pioneer Road. The County generally does not build urban type roadways and as a matter of policy does not construct sidewalks on their projects; however, because of the urban character of the study area the County will support the construction of a curb and gutter along the roadway with sufficient right-of-way for a future sidewalk. The sidewalk may be added later by the City, if warranted.

The Fond du Lac County Planning Department envisions a future recreational trail connector along Pioneer Road between the old C&NW Railroad right-of-way west of Hickory Street and Martin Road. This connector would link the Wild Goose State Trail, which will cross USH 41 on the abandoned C&NW Railroad bridge, with a proposed new trail along the USH 151 bypass that will enter the city along Martin Road.