# 1.0 PROJECT PURPOSE AND NEED

## 1.1 INTRODUCTION

The Wisconsin Department of Transportation (WisDOT), in consultation with the Federal Highway Administration (FHWA), has studied numerous alternatives for serving existing and projected traffic volumes while improving operational efficiency and safety for local and thru traffic on WIS 15. WIS 15 is located in east-central Wisconsin, between the city of New London and the town of Greenville, in Outagamie County. The majority of existing WIS 15 is a rural two-lane highway with about 2 miles of an urban section thru the Village of Hortonville. The Environmental Impact Statement (EIS) limits begin at the US 45 bypass of New London and extend approximately 11 miles east to WIS 76 on the west side of Greenville (see Figure 1.1-1). Although the EIS limits stretch all the way to WIS 76, the study limits extend only until Lily of the Valley Road because this is where improvements match the existing four-lane section that was constructed in Greenville in 2004. The west section of the study limits spans from US 45 to Givens Road. The east section of the study limits stretches from Givens Road, thru the Village of Hortonville, to Lily of the Valley Road. The east section is subdivided at Manley Road into the Hortonville segment and the Greenville segment.

The EIS documents the analysis of the various improvement alternatives, including the Preferred Alternative, designed to address the identified needs while also seeking to understand the environmental, cultural, socioeconomic, and land use impacts of the corridor alternatives.

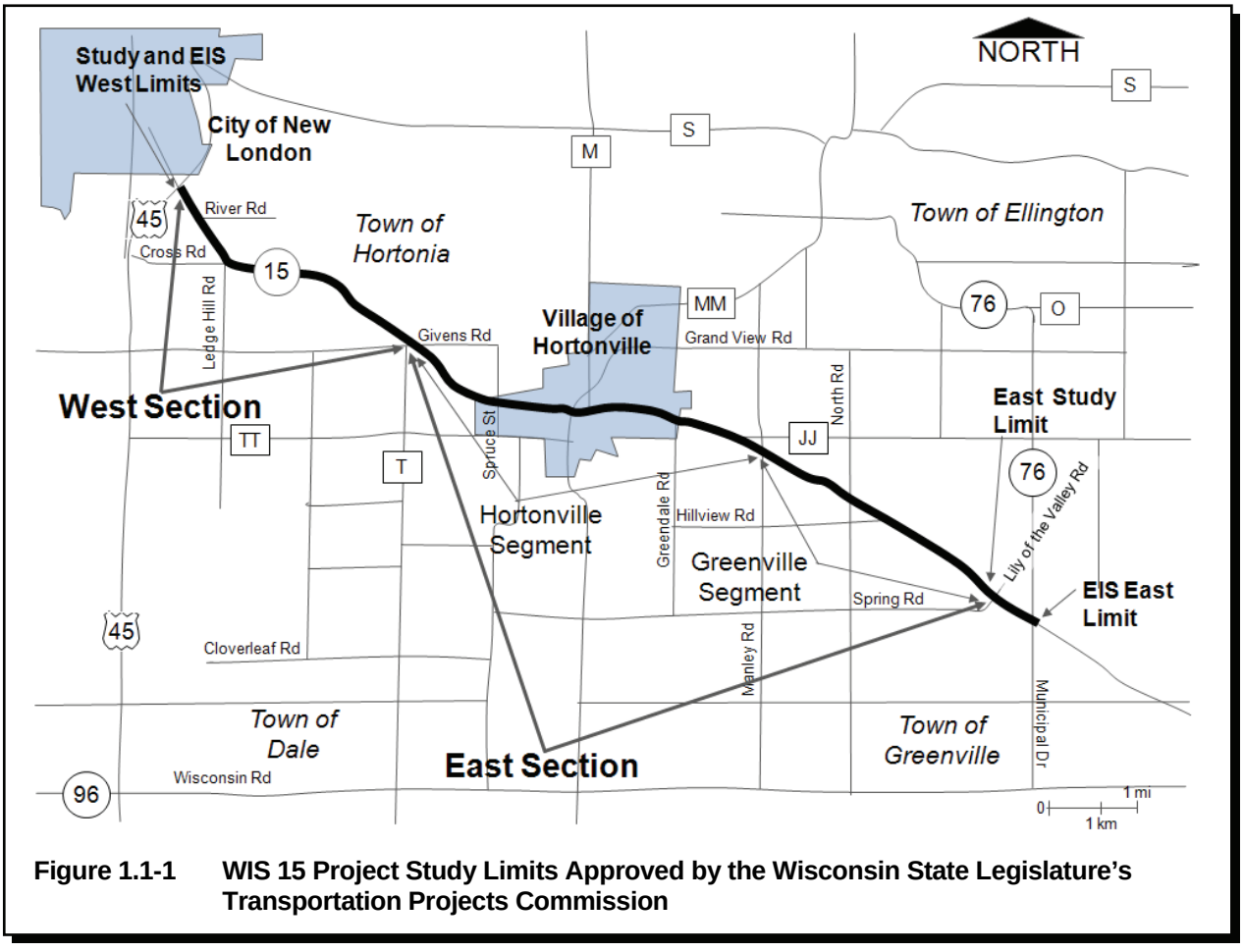


**Figure 1.1-1 WIS 15 Project Study Limits Approved by the Wisconsin State Legislature's Transportation Projects Commission**

## 1.2 PROJECT PURPOSE

The purpose of the project is to serve existing and projected traffic volumes while avoiding and minimizing impacts to the natural, physical, and socioeconomic environment where feasible and prudent. The project also seeks to minimize environmental impacts. Objectives for the proposed action on WIS 15 follow:

- Improve the operational efficiency of the WIS 15 corridor by providing a safe and dependable highway connection to and from regional communities while reducing conflicts between local and thru traffic.
- Improve the highway facility to meet current design standards for this commuter route in northeastern Wisconsin.
- Provide better mobility by meeting capacity needs and minimizing public and private access.
- Coordinate local governmental land use plans to alleviate development pressures on WIS 15 and intersecting roads, and preserve the corridor for future transportation use.

## 1.3 PROJECT NEED

### A. Summary of Project Need

Currently, WIS 15 exhibits inadequate physical characteristics compared to standards for rural state trunk highways. Because of steady growth and development in the Appleton Metropolitan Area, both vehicle and truck traffic volumes have been increasing along the corridor. This heavy regional traffic volume conflicts with local traffic, impairing the operational characteristics of WIS 15. Much of WIS 15 traffic has destinations and origins beyond Hortonville, yet all WIS 15 traffic must travel thru Hortonville's urban section. Thru-traffic hinders and makes local turning movements more difficult. Local traffic interrupts thru-traffic and increases the crash potential. Traffic volumes are growing to a point where the local traffic/regional traffic issues will grow more pronounced, affecting service levels and possibly travel safety.

### B. System Linkage and Route Importance

WIS 15 is a vital principal arterial highway that connects the Appleton Metropolitan area with Hortonville, New London, and other local communities. This commuter route serves the residents and employers in these areas. Capacity expansion of WIS 15 will allow the facility to complement the existing design for the US 45 bypass of New London to the north and of existing WIS 15 southeast to US 41 in Appleton. The improvements would help to complete an area network of roadways needed in this rapidly expanding region of Wisconsin.

WIS 15 is designated as a state long truck route, important to commercial and economic development interests within the state. The route connects the upper Appleton Metropolitan area to WIS 29 and northwest Wisconsin. Trucks account for approximately 5.2 percent of the average daily traffic (ADT) using the highway.

The Wisconsin State Legislature's Transportation Projects Committee (TPC) approved WIS 15 for further study in 2001. This approval demonstrates the importance and significance of WIS 15 as a logical progression of the Wisconsin State Highway Plan 2020. In the Connections 2030 Long-Range Multimodal Transportation Plan, WIS 15 is not classified as a Backbone or a Connector route. However, from 2008 to 2030, the Plan calls for the completion of a WIS 15 corridor plan from US 45 to US 41 and implementation of the results of that plan.

The East Central Wisconsin Regional Planning Commission (ECWRPC) has included highway expansion of WIS 15 in its long-range transportation and land use plan for the Appleton Metropolitan area.

### C. Existing and Future Traffic Volumes

For the purpose of the WIS 15 corridor study, traffic volumes are expressed as the average daily traffic (ADT). The ADT volumes reflect average travel conditions on a particular highway and average out seasonal variations. Existing traffic volumes were obtained from WisDOT count data. Forecast volumes,

developed by WisDOT's Traffic Forecasting Section in Madison, are based on WisDOT's historic counts and associated growth trends, data from regional and local plans that include present and future land use and development trends, and demographic data such as changes in population and employment. Existing traffic counts from 2007 compared with forecast traffic for 2040 show how traffic is expected to increase over time.

Traffic forecasts are showing steady increases along WIS 15. Latest (2007) traffic counts within the project limits range from 9,400 vehicles a day to 16,500 vehicles a day (see Table 1.3-1 below). Early projections for the rerouted US 45, completed in fall of 2003, had anticipated approximately 14 percent of the traffic to be diverted from WIS 15 to US 45. The traffic counts in Table 1.3-1 show that traffic using the relocated US 45 has caused WIS 15 traffic volumes to decrease, from 2000 to 2004, close to the projected 14 percent decrease west of Hortonville. Despite this decrease, WIS 15 traffic volumes have actually increased or remained the same, from 2004 to 2007, east of Hortonville. This increase suggests that Hortonville area development continues to place travel demands on WIS 15.

| Location on WIS 15 | 2000 ADT* | 2004 ADT* | 2007 ADT* | Percent Change (2004-2007) |
|---|---|---|---|---|
| County CB–WIS 76 (east of project limits) | 14,800 | 15,900 | 16,500 | +3.8% |
| WIS 76–County JJ (East Section, Greenville Segment) | 13,500 | 11,300 | 12,400 | +9.7% |
| County JJ– Greendale Rd (East Section, Hortonville Segment) | 15,400 | 15,400 | 16,500 | +7.1% |
| Greendale Rd–County M (East Section, Hortonville Segment) | 15,400 | 13,900 | 13,900 | None |
| County M–County T (East Section, Hortonville Segment) | 12,200 | 10,500 | 12,600 | +20.0% |
| County T–US 45 (West Section) | 11,300 | 9,900 | 9,400 | -5.3% |

* ADT from Wisconsin Highway Traffic Volume Data

**Table 1.3-1 Traffic Counts for 2000, 2004, and 2007**

Even with the recent rerouting of US 45, the ADT is forecasted to increase to 14,000 on the west portion near New London and 25,000 on the east side of Hortonville by the year 2040 as shown in Table 1.3-2. Appendix A contains additional traffic information.

| Location on WIS 15 | 2007 ADT* (count) | 2020 ADT (projection) | 2030 ADT (projection) | 2040 ADT (projection) |
|---|---|---|---|---|
| WIS 76–County JJ (East Section, Greenville Segment) | 12,400 | 15,400 | 17,700 | 20,000 |
| County JJ–Greendale Road (East Section, Hortonville Segment) | 16,500 | 20,000 | 22,500 | 25,000 |
| Greendale Rd–County M (East Section, Hortonville Segment) | 13,900 | 17,100 | 19,500 | 22,000 |
| County M–County T (East Section, Hortonville Segment) | 12,600 | 14,700 | 16,400 | 18,000 |
| County T–US 45 (West Section) | 9,400 | 11,200 | 12,600 | 14,000 |

* ADT from Wisconsin Highway Traffic Volume Data

**Table 1.3-2 Traffic Projections for 2020, 2030, and 2040**

Current WisDOT Facility Development Manual (FDM) standards (Procedure 11-15-1, Figure 1) for rural state trunk highways call for a four-lane facility to be considered at around 15,000 ADT. Figure 1.3-1 shows projected WIS 15 traffic volumes in relation to this threshold.

The Hortonville Segment of WIS 15 is already at the levels needed for expansion along the existing route. As traffic volumes increase to those forecasted for the design year 2040, the two-lane roadway and its existing highway geometrics will constrain traffic operations.

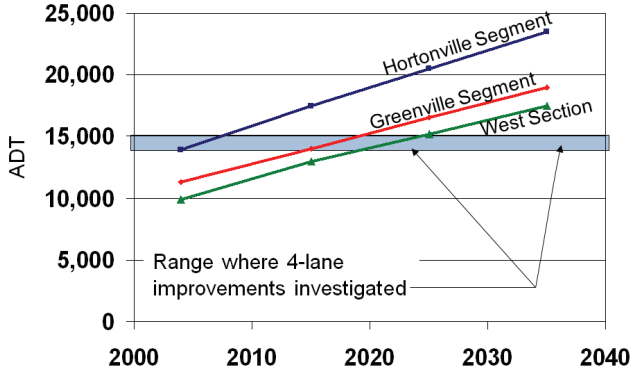


**Figure 1.3-1 WIS 15 Projected Traffic Volumes**

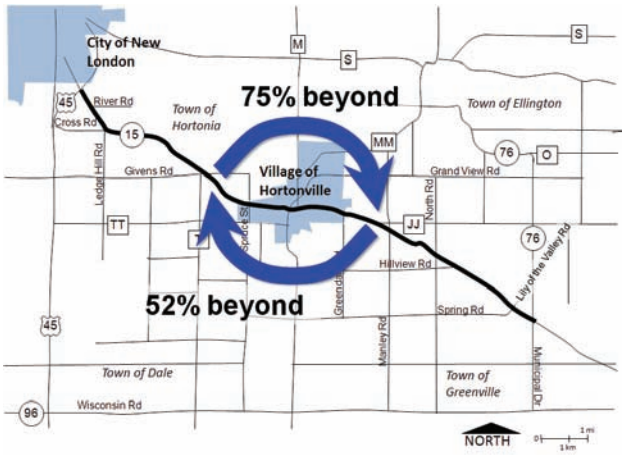


**Figure 1.3-2 Origin-Destination Study Results**

In 2000, an origin/destination (OD) survey was conducted between Greenville and Hortonville. Approximately 43 percent of all the vehicles were making thru trips (beyond Hortonville) and 52 percent of the truck traffic was thru trips. Another OD survey was conducted in the same area in 2005 (see Appendix F for the study results). This study found that the amount of thru traffic has increased since 2000 with nearly 60 percent of westbound traffic and 65 percent of westbound heavy truck traffic now having destinations beyond Hortonville. In 2008, yet another OD survey found nearly 52 percent of westbound traffic and 75 percent of eastbound traffic had destinations beyond Hortonville, as shown in Figure 1.3-2. This nonlocal traffic travels thru Hortonville and intermixes with the turning movements typical of an urban environment. Regional traffic is slowed by local turning movements and traffic control. Local traffic is hindered by the extra traffic and congestion created by the more regional traffic. These numbers reflect the mix of local and thru traffic along the existing route that combines to create conflict.

D. Traffic Operations

Roadway Level of Service (LOS) is a measure of a highway's ability to serve the traffic demands placed on it. Traffic and roadway design factors such as ADT volumes, peak-hour volumes, truck percentages, number of driving lanes, lane widths, vertical grades, passing opportunities, and numbers of access points affect the LOS. LOS ranges from "A" to "F" in order of decreasing operational quality. Table 1.3-3 shows the current and projected LOS levels for the no-build conditions along WIS 15, and Table 1.3-4 describes the characteristics of those levels. Steadily increasing traffic volumes and numerous access points have decreased the mobility and efficiency of the existing highway. Current and projected traffic volumes and traffic operations on WIS 15 indicate the existing two-lane roadway will not appropriately serve the urban Hortonville or surrounding rural areas. Traffic operations on WIS 15 will continue to deteriorate if improvements are not made on the highway.

| WIS 15 Segment | Segment Length In Miles | Existing LOS (2007) | Future LOS (2040) No-Build |
|---|---|---|---|
| West Section | 4.46 | LOS E | LOS E |
| Greenville Segment | 4.66 | LOS E | LOS F |

**Table 1.3-3 Highway Capacity Analysis Rural Results for No-Build**

East and west of Hortonville, WIS 15 is a rural roadway. In these sections, WIS 15 currently experiences LOS E during the peak hour. This LOS is characterized by average travel speeds of 25 to under 40 mph with passing being virtually impossible. Larger platoons form and the time spent following other vehicles is greater than 80 percent. By 2040, operations in the Greenville section are projected to deteriorate to LOS F, characterized by heavily congested flow and very irregular travel speeds.

| | Existing LOS (2007) | Future LOS (2040) No-Build |
|---|---|---|
| WIS 15–County M Intersection | LOS B-C | LOS D |

**Table 1.3-4 Highway Capacity Analysis Results for No-Build Inside Hortonville**

In Hortonville, WIS 15 is an urban roadway. Urban operations and LOS are calculated differently than rural operations. Urban operations typically are controlled by the average delay experienced at intersections. Because WIS 15 has the right-of-way (R/W) thru most of Hortonville, travel speeds thru the Village are close to the speed limit. In downtown Hortonville, the intersection of WIS 15 and County M (Nash Street) is constrained and at an angle. This signalized intersection is experiencing an LOS between B and C, with left turns experiencing greater delay and longer queues. In 2040 the operation deteriorates to LOS D. Village officials indicate that it is not unusual for vehicles to sit thru a signal cycle at this intersection, particularly left-turning vehicles. Because of the existing buildings in three of the four intersection quadrants, opportunities for intersection expansion without substantial R/W impacts are limited. Figure 1.3-3 shows the existing intersection. Table 1.3-5 shows the LOS for rural two-lane and urban signals.

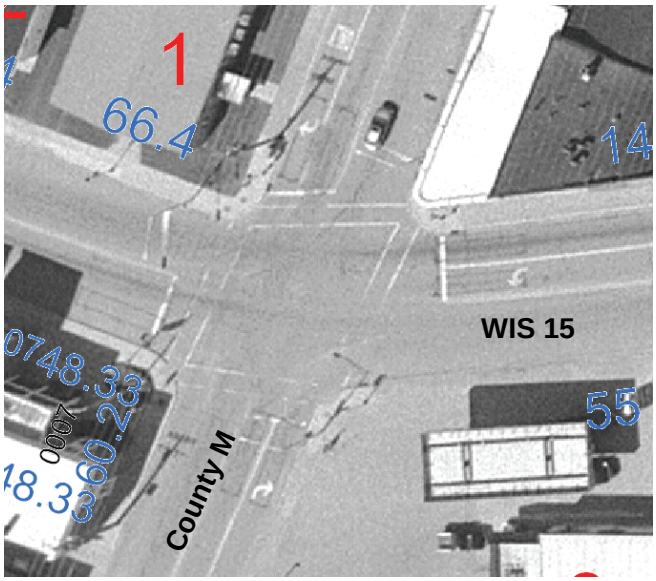


**Figure 1.3-3 WIS 15–County M Intersection**

The Hortonville WIS 15 segment creates delay for regional traffic traveling thru Hortonville, which makes up 52 percent of the westbound and 75 percent of the eastbound traffic traveling thru Hortonville. East of Hortonville, regional traffic travels on a 55 mph facility, yet when it enters Hortonville, the traffic must slow to between 25 mph to 45 mph (depending on section) and is subject to a poorly operating traffic signal. West of Hortonville, the traffic then speeds to 55 mph speeds. On a regional facility, it is desirable to keep traffic moving at consistent speeds.

Similarly, regional traffic hinders local traffic mobility. Because of the geographic features of a lake and a railroad traveling thru town, there are no east-west streets that travel all the way thru Hortonville other than WIS 15. Local traffic must use WIS 15 to arrive at destinations within town. Yet during peak periods, the central business district is congested with regional travelers moving thru Hortonville. In reality, regional traffic dominates downtown Hortonville during the morning and evening rush hours.

| Desirable | Rural Two-Lane Operations | Urban Signal Operations |
|---|---|---|
| A | ▪ Motorists travel at desired speed (55 mph or greater).<br>▪ Passing demand well below passing opportunities.<br>▪ Groups of three or more vehicles (platoons) rare.<br>▪ Drivers delayed less than 35% by slower vehicles. | ▪ Low control delay, up to 10 seconds per vehicle (seconds/vehicle).<br>▪ Many vehicles are not stopped by signal. |
| B | ▪ Average travel speeds of 50 mph or slightly higher.<br>▪ Passing demand becoming greater than opportunities.<br>▪ Percent time spent following about 50%. | ▪ Control delay between 10 and 20 seconds/vehicle.<br>▪ More vehicles stop than with LOS A. |
| C | ▪ Average travel speeds of 45 mph.<br>▪ Significant reductions in passing.<br>▪ Increases in platoon formation, platoon size, and frequency of passing impediments.<br>▪ Percent time spent following about 65%. | ▪ Control delay greater than 20 seconds/vehicle and less than 35 seconds/vehicle.<br>▪ The number of vehicles stopping is significant.<br>▪ Vehicles may sit thru more than one cycle. |
| **Undesirable** | | |
| D | ▪ Unstable traffic flow.<br>▪ Average travel speeds of 40 mph.<br>▪ Passing extremely difficult.<br>▪ Platoons of 5 to 10 vehicles common.<br>▪ Percent time spent following about 80%. | ▪ Control delay greater than 35 seconds/vehicle and up to 55 seconds/vehicle.<br>▪ Congestion noticeable and delays longer.<br>▪ Vehicles more likely to wait thru more than one cycle. |
| E | ▪ Average travel speeds of 25 to under 40 mph.<br>▪ Passing virtually impossible.<br>▪ Larger platoons form as slower vehicle or interruptions encountered.<br>▪ Percent time spent following greater than 80%. | ▪ Control delay between 55 and 80 seconds/vehicle.<br>▪ Vehicles frequently wait thru more than one cycle. |
| F | ▪ Heavily congested flow.<br>▪ Passing virtually impossible.<br>▪ Travel speeds highly variable. | ▪ Control delay greater than 80 seconds/vehicle.<br>▪ Delay unacceptable to drivers.<br>▪ Vehicles wait thru more than one cycle. |

Source: Highway Capacity Manual 2000, pp. 12-16 (rural two-lane highways) and 10-16 (urban streets).

**Table 1.3-5 Level of Service Characteristics**

E. Corridor Growth/Development

Over the past 10 years, there have been dramatic changes to the WIS 15 corridor and its surrounding land uses. The corridor includes the Town of Greenville, Village of Hortonville, Town of Hortonia, and the City of New London. The most dramatic changes have been on the east end, with less pronounced changes on the west end. In the Town of Greenville, from 2000 to 2007, the population has increased 27.4 percent. In this same period, the population increased by 15.2 percent, in Hortonville and by 1.6 percent in New London. Figure 1.3-4 shows the percent population increase for these towns as compared to the state average.

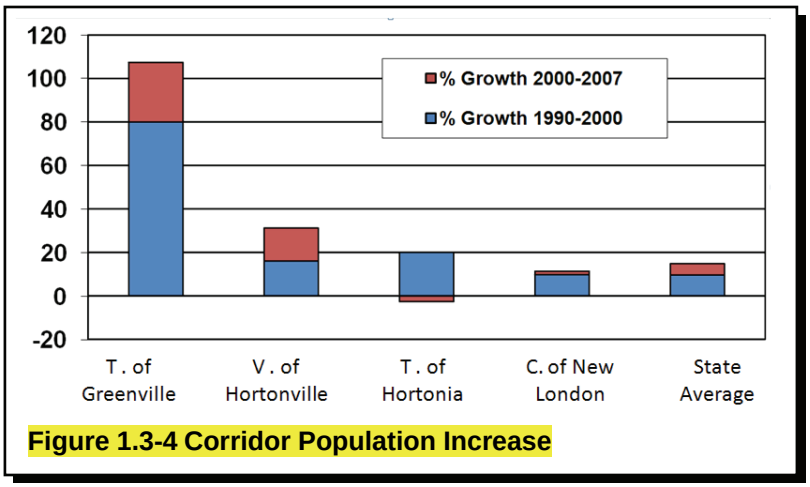


**Figure 1.3-4 Corridor Population Increase**

The land use adjacent to the corridor is transitioning from rural, agricultural uses to that of a suburban corridor development (commercial strips and residential subdivisions). These three communities, Town of Greenville, Village of Hortonville, and City of New London, directly adjacent to the corridor, are planning (or have planned) business parks and/or business park expansions for their communities. In addition, the Village of Hortonville has located all three of its public schools (elementary, middle, and high) directly off the intersection of WIS 15 and Warner Street within the Village limits.

As the Appleton Metropolitan area continues to grow, economic development has extended to the WIS 15 project limits. Hortonville has planned and finished construction of an addition to its existing industrial park. Greenville has grown tremendously with new schools, a YMCA, and many new businesses. Local towns are exploring opportunities adjacent to the WIS 15 corridor to develop business parks or commercial centers.

Land use plans from these local communities are either being completed or are completed, which will help balance transportation use with the environment and development land use. At this time, the Towns of Greenville, Dale, and Hortonia and the Village of Hortonville have completed comprehensive plans. Other surrounding communities have also completed their plans. Improvements to the local transportation network have not kept pace with the growth along the corridor, placing stress on WIS 15. Coordination with local communities' land use plans will help meet the long-term transportation needs for the area.

Increasing local development increases the level of conflict between local and regional traffic on WIS 15. Additional commercial and residential development increases access point usage, turning movements, and traffic control measures. These in turn hinder thru traffic mobility and safety. Growing thru traffic hinders local access and makes turning movements, particularly left turns, from local development increasingly difficult.

F. Existing Highway Characteristics

Roadway factors, such as type of facility, lane widths, shoulder widths, lateral clearances, and horizontal and vertical alignments, influence the capacity and safety of the road.

1. Pavement Infrastructure

Existing WIS 15 is a two-lane rural roadway with variable and aging pavements. Highway improvements over the 60-year life of the highway show several areas of asphalt overlay over asphaltic pavement or concrete pavement. The pavement is nearing a point where a more major infrastructure investment will be needed, such as reconstruction. Typically a pavement reconstruction is designed to last thru a 50-year life-cycle. Therefore it is important to invest these infrastructure monies on a highway that accommodates the future transportation needs of the corridor.

2. Pavement Cross Section

WIS 15 roadway cross sections are typically two 12-foot lanes with 8-foot shoulders of which 3 feet are paved. Turn lanes are found at most intersections and there are some parking lanes within the Village of Hortonville. Under current WisDOT standards (Procedure 11-15-1), WIS 15 design volumes warrant a four-lane divided roadway with 10-foot outside and 6-foot inside shoulders in the rural portions of the corridor. See Figure 1.3-5 for an illustration of these cross sections.

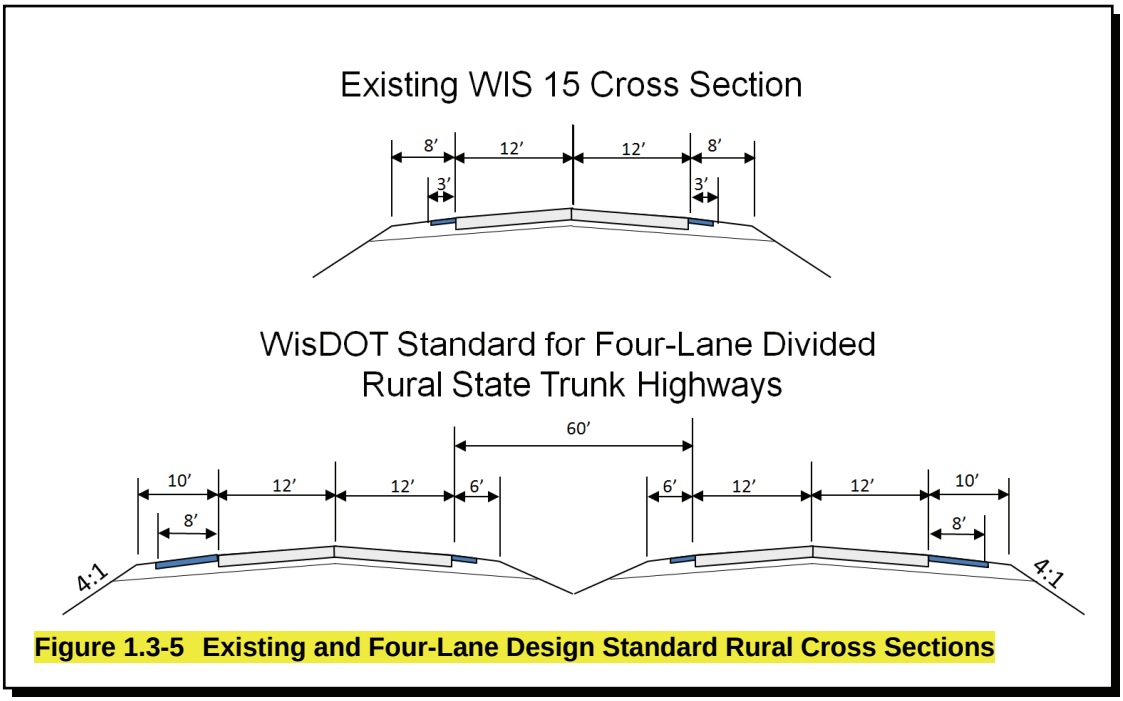


**Figure 1.3-5 Existing and Four-Lane Design Standard Rural Cross Sections**

3. Horizontal and Vertical Geometrics

Several horizontal curves are substandard resulting in operational and safety problems at the current posted speed. These poor geometrics, especially on the sections between New London and Hortonville and inside Hortonville, contribute to the injury rate of 27 to 31 outside Hortonville and 117 inside Hortonville injury crashes per 100 million vehicle miles traveled. As traffic volumes grow, these alignment deficiencies are likely to increase the crash rates for the corridor.

4. Access

In August of 1989, WisDOT adopted a statewide plan for managing access on the state highway system. The purpose of the access plan is to maintain service levels for thru traffic while providing reasonable access to abutting properties. The plan's goal is to seek a balance between preserving public highway investments and the desire for land development, tax base growth, and job creation.

Driveways from residential and commercial properties are located along the entire route. There are 299 access points within the project limits, which are summarized in Table 1.3-6. These access points, in combination with growing traffic volumes, provide opportunities for collisions. Turning movements associated with access points also affect traffic flow and service levels. Vehicles entering and exiting WIS 15 at numerous access points interrupt the flow of traffic. Drivers need to adjust their travel speed not because of the entering and exiting vehicles but also because of the very presence of the access points. As the area develops, access point usage will increase providing more opportunities for vehicle collisions. Typically increasing access point usage, combined with thru volume increases, leads to higher corridor crash rates.

| Type of Land Use | Number of Access Points | | | |
|---|---|---|---|---|
| | West Section* | East Section* | | Total |
| | | Hortonville Segment* | Greenville Segment* | |
| Agriculture | 14 | 3 | 14 | 31 |
| Commercial | 17 | 38 | 16 | 71 |
| Industrial | 4 | 6 | 3 | 13 |
| Residential | 36 | 68 | 44 | 148 |
| Local Roads and Streets | 13 | 13 | 6 | 32 |
| County and State Highways | 1 | 2 | 1 | 4 |
| *Total Number of Access Points* | *85* | *130* | *84* | *299* |
| *Number of Access Points per Mile* | *25* | *33* | *25* | *28* |

* For the purposes of counting access points, the segment limits vary from the standard limits. For this table, the west section is from US 45 to Spruce Road, the Hortonville Segment is from Spruce Road to Greendale Road, and the Greenville Segment is from Greendale Road to Spring Road.

**Table 1.3-6 Existing Access Summary**

G. Safety

A crash study report was prepared for WIS 15 between New London and Hortonville (West Section) and from Hortonville and Greenville (East Section) and the urban Hortonville section. Crashes from 2005 to 2008 have been analyzed. A total of 332 crashes occurred during the 4-year study period (including crashes involving deer). Crash rates are compared to Statewide Average Crash Rates for rural and urban state trunk highways. Currently, the WIS 15 rural sections are under or near the statewide averages. However, the Hortonville Segment is above both the total crash rate and the injury crash rate. In the future, WIS 15's crash rate is expected to increase as the traffic increases along the existing road. Areas where crashes are expected to increase include side roads, driveways, and access points because the exposure to collisions rises. Table 1.3-7 summarizes crash statistics for each section described above. Appendix A includes additional crash data from 2004 thru 2008.

| | East Section (Greenville Segment) Rural | East Section (Hortonville Segment) Urban | West Section Rural | State Average Rural (Urban) |
|---|---|---|---|---|
| Number of Road Miles | 4.66 | 1.3 | 4.46 | - |
| 2004-2008 Average AADT (veh/day) | 16,292 | 13,900 | 12,350 | - |
| Total Number of Crashes | 92 | 68 | 57 | - |
| Crashes per 100 Million Vehicle Miles (MVM) | 83 | 258 | 71 | 168.5 (242.5) |
| Number of Crashes with Injuries | 30 | 31 | 27 | - |
| NFI (Non-Fatal Injury) Crash Rate per 100 MVM | 27 | 117.5 | 34 | 44.5 (79) |
| Number of Fatal Crashes | 2 | 0 | 0 | - |
| Fatal Crash Rate per 100 MVM | 1.8 | 0 | 0 | 1.7 (0.6) |

**Table 1.3-7 Crash Statistics–2004 to 2008 (Excludes Deer Crashes)**