# Unusually Hazardous Transportation Plan



PROVIDING TRAFFIC ENGINEERING SOLUTIONS

**To:** Jeff Mahoney, Director of Business, McFarland Area School District

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**Subject:** McFarland Area School District – Unusually Hazardous Transportation Plan



McFarland Area School District 5101 Farwell Street, McFarland, WI 53558

McFarland Area School District Board of Education

Approved on April 21, 2025



#### INTRODUCTION

TADI was hired by the McFarland Area School District to update the School District's unusually hazardous transportation (UHT) plan. The McFarland Area School District consists of the following four schools:

- Conrad Elvehjem Primary (4K-2),
- Waubesa Intermediate School (3-5),
- Indian Mound Middle School (6-8), and
- McFarland High School (9-12).

According to Wisconsin law, any students residing two or more miles from the school are entitled to transportation to/from school by the school district. Therefore, students who reside within two miles are not automatically eligible for transportation provided by the school district. However, if students residing within two miles encounter unusually hazardous conditions walking to/from school, the school district may deem it necessary to provide transportation for those students.

This report outlines state statues regarding UHT plan development, provides a description of TADI's methodology used in UHT plan analysis, and proposes UHT plans for three schools within the school district.

According to the McFarland Area School District's existing bus routing policy, all students in grades 4K through 2 are eligible for bus service regardless of whether they live within two miles of the school. For students in grades 3 and above, eligibility for free bus service is determined as follows:

- Grades 3-5: Students who live 1 mile or more from school or within a designated hazardous zone.
- Grades 6-12: Students who live 2 miles or more from school or within a designated hazardous zone.

It is important to note that transportation is available for a \$200 per student fee for students residing within the McFarland village limits who do not live in a designated hazardous area. For students in grades 3-5, this applies to those living less than 1 mile from school, and for students in grades 6-12, this applies to those living less than 2 miles from school. This transportation fee is not applicable for 4K-2 students as they are already provided with transportation.

Full UHT plans were developed for the intermediate, middle, and high schools and are broken down into grades 3-5, grades 6-8, and grades 9-12 age groups.



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#### TRANSPORTATION IN AREAS OF UNUSUAL HAZARDS

Transportation in areas of unusual hazards and pick-up points for District-bused pupils requires constant evaluation. Wisconsin statutes require transportation of pupils residing 2 miles or more from the school, except in cities where school boards choose not to transport pupils within the school boundaries.

Because of unusually hazardous conditions in certain areas, a school board may deem it necessary to provide transportation to some pupils residing less than 2 miles from the school. An unusual hazard is an existing condition which seriously jeopardizes the safety of students in their travel to and from school and is further defined below. It is recognized that all traffic situations through which students must travel present some degree of hazard. When such hazards reach a degree of danger that is unacceptable to the community, the school board may identify such hazards as unusual for the purpose of proposing a plan to remove or diminish them.

Section 121.54(9), Wis. Stats., permits a school board to provide transportation in areas of unusual hazards.

#### Procedures for the Development or Revision of an Unusually Hazardous Transportation (UHT) Plan as Delineated in State Statutes

- 1. The school board shall develop a plan which shall show by map and explanation the nature of the unusual hazards to pupil travel and propose a plan of transportation if such transportation is necessary, which will provide proper safeguards for the school attendance of such pupils.
- 2. Copies of the plan shall be filed with the sheriff of the county in which the principal office of the school district is located.
- 3. The sheriff shall review the plan and may make suggestions for revision deemed appropriate. The sheriff shall investigate the site and plan and make a determination as to whether unusual hazards exist which cannot be corrected by local government and shall report the findings in writing to the state superintendent and the school board concerned.
- 4. Within 60, but not less than 30, days from the day on which the state superintendent receives the sheriff's report, the state superintendent shall determine whether unusual hazards to pupil travel exist and whether the plan provides proper safeguards for such pupils.
- 5. If the state superintendent makes findings which support the plan and the determination that unusual hazards exist which seriously jeopardize the safety of the pupils in their travel to and from school, the school board shall put the plan into effect and state aid shall be paid under s.121.58(2)(c) for any transportation of pupils under this subsection.



#### **The Appeal Process in State Statute**

- 1. Any person aggrieved by the failure of the school board to file a UHT plan with the sheriff may notify the school board in writing that an area of unusual hazard exists.
- 2. The school board shall reply to the aggrieved person in writing within 30 days of receipt of the aggrieved person's notice.
- 3. The school board shall send a copy of the board's reply to the sheriff of the county in which the principal office of the school district is located and to the state superintendent.
- 4. Upon receipt of the school board's reply, the aggrieved person may request a hearing before the state superintendent for a determination that an area of unusual hazard exists.
- 5. If the state superintendent determines that an area of unusual hazard exists, the state superintendent shall direct the school board to proceed as stated in the development and revision procedures listed previously.
- 6. Within 30 days after the sheriff's report is received by the state superintendent, any aggrieved person may request a hearing before the state superintendent on the determination by the sheriff and on the plan. After such hearing, the state superintendent shall proceed as stated in the development and revision procedures listed previously.

#### Suggested Criteria to Use for Identifying UHT Areas

Width of the shoulder of the road

Lack of crossing guards

Ages of children

Traffic count

Lack of law enforcement

Railroad crossing

Temporary hazards (e.g. construction projects or street repairs)

Lack of sidewalks

#### **Definitions of "Unusual Hazard"**

Chapter PI 7.01(2) of DPI Administrative Code defines an unusual hazard as an existing condition which constitutes more than an ordinary hazard and which seriously jeopardizes the safety of pupils in their travel to and from school. It is recognized that all traffic situations through which pupils must travel present some degree of hazard. That degree of hazard often depends on the age of the pupils concerned. When such hazards reach a degree of danger which is unacceptable to the community in which they exist, the school board, with its combined judgment reflecting the safety interests of the community, may identify such hazards as unusual for the purpose of proposing a plan to remove or diminish them.



#### TADI UNUSUAL HAZARD CRITERIA DEVELOPMENT

TADI's team of Road Safety Professionals (RSP), as certified through the Transportation Professional Certification Board, reviewed unusual hazard criteria in both Wisconsin and national school districts and researched factors that impacted pedestrian safety. The team developed objective and science-based criteria based on the amount of exposure to a potential hazard a student would be subjected to on a walking route to or from school.

The criteria estimate the risk a student would be exposed to walking along roadways and crossing roadways. The resultant numerical values are based on fundamental criteria research of hazards which have been shown to impact risk to pedestrians.

#### **Walking Along Criteria**

#### Distance Walked Available Walking Path Traffic Volume Vehicle Speeds Parking Activity

#### **Crossing Criteria**

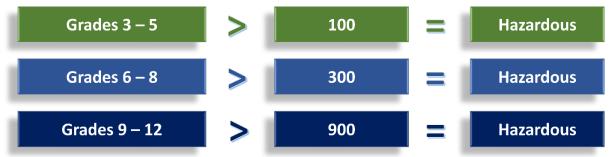
Crossing Width
Traffic Volume
Vehicle Speeds
Risk Adjustments
Existing Safety Features

The total exposure score is calculated by summing the walking along exposure score and the crossing exposure score.



#### **Hazardous Classification Thresholds**

The hazardous classification thresholds used for categorizing routes as acceptable or hazardous are shown in the following graphic. The thresholds are decided by the school district based on past levels of safety tolerance in the community and input from the project team. The thresholds incorporate research that shows crash risk varies by the age of the child, and that younger children have less perceptual judgement and motor skills than older children<sup>1</sup>.



<sup>&</sup>lt;sup>1</sup> O'Neal, Elizabeth & Jiang, Yuanyuan & Franzen, Lucas & Rahimian, Pooya & Yon, Junghum & Kearney, Joseph & Plumert, Jodie. (2017). Changes in Perception-Action Tuning Over Long Time Scales: How Children and Adults Perceive and Act on Dynamic Affordances When Crossing Roads. Journal of Experimental Psychology: Human Perception and Performance. 44. 10.1037/xhp0000378.



#### **Walking Along Exposure Score**

The walking along exposure score is calculated by summing the score for each individual segment that pupils walk along from origin to school. Each segment score is calculated by multiplying the factors of each of the five *Walking Along* criteria.

$$Walking \ Along \ Exposure \ Score = \sum W_D*W_P*W_V*W_S*W_R$$

Where

 $W_D$  = distance walked (mi);

 $W_P$  = available walking path;

 $W_V$  = hourly traffic volume;

 $W_S$  = posted speed limit;

 $W_R$  = parking activity and sight distance restrictions.

#### Distance Walked (WD)

The numerical value for walking distance,  $W_D$ , is the number of miles a student walks along the particular segment being analyzed.

#### Available Walking Path (W<sub>P</sub>)\*

Numerical values for available walking path,  $W_P$ , are based on crash modification factors developed from research that showed sidewalks resulted in an 88% reduction in pedestrian crash risk<sup>2</sup> and that paved shoulders of at least 4 feet resulted in a 71% reduction in pedestrian crash risk<sup>3</sup>. The categories used in selecting  $W_P$  are shown in the following table.

Category	$W_P$
Walking Path ≥ 10 feet from Thru Lane	1
Sidewalk without Driveways	5
Sidewalk with Driveways	10
≥4 feet	25
<4 feet*	50
None	85

\*Automatic hazard: It is considered an automatic hazard if pupils would need to navigate an arterial roadway with a posted speed limit of 45 mph or above that does not have a sidewalk or multiuse path.

The values above were estimated based on the results of the referenced research. For example, the value of 10 used for the "Sidewalk with Driveways" category is 88 percent less than the value of 85 used for the "None" category [85 \* (1 - 0.88) = 10].

Most sidewalk crashes occur at driveway conflict points, thus stretches of sidewalk that do not have conflicting driveways are expected to have lower crash risk. Roadways with no access points have

<sup>&</sup>lt;sup>2</sup> McMahon, P., Zegeer, C., Duncan, C., Knoblauch, R., Stewart, R., and Khattak, A., "An Analysis of Factors Contributing to 'Walking Along Roadway' Crashes: Research Study and Guidelines for Sidewalks and Walkways," FHWA-RD-01-101, (March 2002).

<sup>&</sup>lt;sup>3</sup> Gan, A., Shen, J., and Rodriguez, A., "Update of Florida Crash Reduction Factors and Countermeasures to improve the Development of District Safety Improvement Projects." Florida Department of Transportation, (2005).



been shown to have crash reductions of up to 44 percent for all crash types<sup>4</sup>. Thus, stretches of sidewalk that do not have conflicting driveways, "Sidewalks without Driveways", are expected to have a lower crash risk than sidewalks that cross driveways. The lower risk for sidewalks without driveways is reflected in the scoring criteria.

Lastly, when sidewalks or pathways do not have conflicting driveways, and have a large buffer zone from the travel lane, the risk to pedestrians is further reduced. To account for pathways with a large buffer, a category for pathways separated from the thru-lane of roadway travel by 10 feet or more was included and assigned a low risk exposure factor.

#### Hourly Traffic Volume (Wv)

Numerical values for hourly traffic volume,  $W_V$ , assumes a linear relationship that more traffic volume will lead to more risk exposure to a pedestrian. The categories used in selecting  $W_V$  are shown in the following table and represent the peak hour of traffic volumes. If peak hour volumes were not available but daily traffic counts were available, the peak hour volumes were estimated to be 10 percent of the daily traffic volumes. Any roadways with peak hour volumes exceeding 3,000 vehicles per hour are considered an automatic hazard for walking along.

Category	$W_V$	Category	$W_V$	Category	$W_V$
≤ 200	1	1,001-1,200	11	2,001-2,200	21
201-400	3	1,201-1,400	13	2,201-2,400	23
401-600	5	1,401-1,600	15	2,401-2,600	25
601-800	7	1,601-1,800	17	2,601-2,800	27
801-1,000	9	1,801-2,000	19	2,801-3,000	29

#### Posted Speed Limit (Ws)\*

Numerical values for posted speed limit,  $W_S$ , are based on a AAA research<sup>5</sup> regarding speed and pedestrian injury risk. The categories used in selecting  $W_S$  are shown in the following table.

Category	$W_S$	Category	Ws
≤25 or NP <sup>^</sup>	1.0	40	3.0
25	1.5	45	3.1
25 30 35	2.0	50	3.2
35	2.5	55	3.3

<sup>^</sup>NP = not posted

#### Parking Activity & Sight Distance Restrictions (W<sub>R</sub>)

Limited research is available that specifically isolates the impact of parking on pedestrian crash risk with regard to walking along roadways, but it is known that limiting sight distance increases crash risk<sup>6</sup>. When a sidewalk is not available, parking activity is expected to increase the risk of pedestrian

<sup>\*</sup>Automatic hazard: It is considered an automatic hazard if pupils would need to navigate an arterial roadway with a posted speed limit of 45 mph or above that does not have a sidewalk or multiuse path.

<sup>&</sup>lt;sup>4</sup> Lee, C., Xu, X., and Nguyen, V, "Non-intersection-related Crashes at Mid-block in an Urban Divided Arterial Road with High Truck Volume." Presented at the 90th Meeting of the Transportation Research Board, Washington, D.C., (2011).

<sup>&</sup>lt;sup>5</sup> Tefft, B.C. (2011). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. AAA Foundation for Traffic Safety.

<sup>&</sup>lt;sup>6</sup> Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004)



crashes as students would need to navigate around parked vehicles. This activity would put students closer to the travel lanes and could create sight-distance restrictions as they navigate around vehicles.

The numerical values for parking activity and sight distance restrictions,  $W_R$ , were estimated based on research<sup>7</sup> regarding sight distance for injury crashes of all crash types. The categories used in selecting  $W_R$  are shown in the following table and defined below.

Category	$W_R$	Definitions
N/A - Sidewalk	1.0	A sidewalk is present for pupils to walk on.
No Parking	1.0	Parking is not allowed or rarely used.
Light Parking	1.2	Sporadically parked vehicles during school arrival or departure hours.
Moderate Parking	1.5	Approximately half of available on-street parking spaces are parked in
		during school arrival or departure hours.
Heavy Parking <u>or</u>	2.0	Majority of the available parking spaces are parked in during school
Other Sight		arrival or departure hours <u>or</u> another sight distance restriction, such as
Distance Restriction		horizontal or vertical curvature exists that could impede the visibility of
		pedestrians.

<sup>&</sup>lt;sup>7</sup> Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004)



#### **Crossing Exposure Score**

The crossing exposure score is calculated by summing the score for each individual crossing that students must cross from origin to school. Each crossing score is calculated by multiplying the factors of each of the five crossing criteria.

Crossing Exposure Score = 
$$\sum C_W * C_V * C_S * C_R * C_E$$

Where

 $C_W = \text{crossing width};$ 

 $C_V$  = hourly traffic volume;

*Cs* = posted speed limit;

 $C_R$  = risk adjustments;

 $C_E$  = existing safety feature adjustment.

Note that for the McFarland Area School District, it is considered an automatic hazard if pupils would need to cross a 4-lane arterial roadway at an unsignalized crossing.

#### Crossing Width (Cw)

Numerical values for crossing width,  $C_W$ , are based on an assumed linear relationship that more distance to cross will lead to more risk exposure. The categories used in selecting  $C_W$  are shown in the following table.

Category	$C_W$	Category	$C_W$
≤ 10 ft	1	51-60 ft	6
11-20 ft	2	61-70 ft	7
21-30 ft	3	71-80 ft	8
31-40 ft	4	81-90 ft	9
41-50 ft	5	>90 ft	10

#### Hourly Traffic Volume (Cv)

Numerical values for hourly traffic volume,  $C_V$ , assumes a linear relationship that more traffic volume will lead to more risk exposure to a pedestrian. The categories used in selecting  $C_V$  are shown in the following table and represent the peak hour of traffic volumes. If peak hour volumes were not available but daily traffic counts were available, the peak hour volumes were estimated to be 10 percent of the daily traffic volumes.

Category	$C_V$	Category	$C_V$	Category	$C_V$	
≤ 200	1	1,001-1,200	11	2,001-2,200	21	
201-400	3	1,201-1,400	13	2,201-2,400	23	
401-600	5	1,401-1,600	15	2,401-2,600	25	
601-800	7	1,601-1,800	17	2,601-2,800	27	
801-1,000	9	1,801-2,000	19	2,801-3,000	29	



#### Posted Speed Limit (Cs)

Numerical values for posted speed limit,  $C_S$ , are based on a AAA research<sup>8</sup> regarding speed and pedestrian injury risk. The categories used in selecting  $C_S$  are shown in the following table and represent the posted speed of the roadway to be crossed.

Category	Cs	Category	Cs
≤25 or NP <sup>^</sup>	1.0	40	3.0
25	1.5	45	3.1
25 30 35	2.0	50	3.2
35	2.5	55	3.3

<sup>^</sup>NP = not posted

#### Risk Adjustments $(C_R)$

Numerical values for risk adjustments,  $C_R$ , are based on *CMF Clearinghouse* data regarding the impact of all-way stop control<sup>9</sup>, traffic signals with right-turn-on-red allowed<sup>10</sup> and sight distance restrictions<sup>11</sup>. Research has shown that these characteristics impact the likelihood of pedestrian related crashes. Intersections with all-way stop control, for instance, require all vehicles to stop thereby reducing vehicle speeds and reducing the risk to pedestrians. At signalized intersections, right-turn-on-reds (RTORs) can increase the risk to pedestrians as drivers can be focused on looking for approaching traffic to their left rather than looking for pedestrians in their path. Lastly, if the crossing has sight-distance restrictions, such as roadway curvature or nearby parking, applying the sight distance restrictions adjustment is suggested. The categories used in selecting  $C_R$  are shown in the following table and include combination categories if all-way stop control or traffic signals with RTORs are combined with a sight distance restriction.

Category	$C_R$
Sight Distance Restriction	2.0
All-Way Stop Control All-Way Stop Control with Sight Distance Restriction	0.6 1.2
Traffic Signal with RTORs	1.7
Traffic Signal with RTORs and Sight Distance Restriction	3.4

#### Existing Safety Features (C<sub>E</sub>)

At roadway and intersection crossings, there are several safety improvements that have been shown to reduce the risk of pedestrian crashes. Numeric values for safety treatment adjustment,  $C_E$ , are based on research showing certain treatments reduce the risk of pedestrian crashes. Note that only one treatment can be selected for this analysis and it is suggested that the most effective treatment be chosen. For example, if the crossing has a high visibility crosswalk and a pedestrian countdown timer,

<sup>&</sup>lt;sup>8</sup> Tefft, B.C. (2011). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. AAA Foundation for Traffic Safety.

<sup>&</sup>lt;sup>9</sup> Lovell, J. and Hauer, E., "The Safety Effect of Conversion to All-Way Stop Control." Transportation Research Record 1068, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 103-107.

 $<sup>^{10}</sup>$  American Association of State Highway and Transportation Officials. Highway Safety Manual. Washington, DC, 2010.

<sup>11</sup> Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004)



the factor of 0.3 for pedestrian countdown timer is suggested. The categories used in selecting  $C_E$  are shown in the following table and are based on crash modification factors from either the Wisconsin DOT's Crash Modification Factor Spreadsheet<sup>12</sup> or the Crash Modification Factor Clearinghouse<sup>13</sup>.

Research is limited on the specific safety benefit of crossing guards – which are difficult to isolate in studies. It is reasonable to conclude, however, that the safety benefits of crossing guards are expected to exceed that of engineering countermeasures. In a 2009 study of school zones in Florida<sup>14</sup>, it was stated "perhaps the clearest observation from the site visits and data analysis conducted for the 14 school sites throughout Florida was the great beneficial value of school crossing guards". It is suggested that sites with a crossing guard or guards be provided with a high-visibility crosswalk to help users of the crosswalk and the roadway recognize the importance of the crossing.

Category	$C_E$	Category	$C_E$
Multiple Crossing Guards	0.1	Rectangular Rapid Flash Beacon	0.5
Single Crossing Guard	0.2	High-Visibility Crosswalk	0.6
Pedestrian Hybrid Beacon	0.25	Median Refuge	0.7
Pedestrian Countdown Timer	0.3	Standard Crosswalk	1.0

 $<sup>^{12}\,</sup>https://wisconsindot.gov/Pages/doing-bus/local-gov/traffic-ops/manuals-and-standards/teops/ch12.aspx$ 

<sup>13</sup> www.cmfclearinghouse.org/

<sup>&</sup>lt;sup>14</sup> Study of school zones with traffic signals: final report, June 2009. M3 - Tech Report M1 - Report No. 7762-110 UR - <a href="https://rosap.ntl.bts.gov/view/dot/17495/dot 17495">https://rosap.ntl.bts.gov/view/dot/17495/dot 17495</a> DS1.pdf?



#### **UHT PLAN RECOMMENDATIONS**

#### **Recommended Hazardous Zones and Walk Zones**

The areas recommended to be classified as unusually hazardous are displayed on Exhibit 1. Exhibits 2-4 display the walk zones for each of the age groups analyzed.

- Exhibit 1 Proposed Hazardous Zones (all grades)
- Exhibit 2 Waubesa Intermediate (3-5) Proposed Walk Zone
- Exhibit 3 Indian Mound Middle School (6-8) Proposed Walk Zone
- Exhibit 4 McFarland High School (9-12) Proposed Walk Zone

The recommended hazardous zones for pupils in grades K4-12 is the area of the school district North of Sigglekow Road.



#### **Recommended Modifications to Roadway Network**

Opportunities to improve pedestrian safety were identified and are summarized in Exhibit 5, with a text summary provided below. If implemented, these improvements would not affect the UHT plan's proposed hazardous area but are expected to enhance safety within the designated walk zones.

#### USH 51 & Farwell Street/Severson Road

- Install high-visibility crosswalks at existing crosswalk locations.
- Implement a Leading Pedestrian Interval (LPI) for all pedestrian phases.
- Add "No Right Turn on Red (RTOR) when Pedestrians are Present" signage.

#### USH 51 & Larson Beach Road

- Install high-visibility crosswalks at existing crosswalk locations.
- Implement a Leading Pedestrian Interval (LPI) for all pedestrian phases.
- Add "No Right Turn on Red (RTOR) when Pedestrians are Present" signage.

#### Burma Rd & Farwell St

• Install high-visibility crosswalks at existing crosswalk locations.

#### Severson Street (between USH 51 & Lake Edge Road)

- Enhance street lighting.
- Extend sidewalk past right turn lane on south side of the west leg.

#### Holscher Road crossing at Red Oak Trail

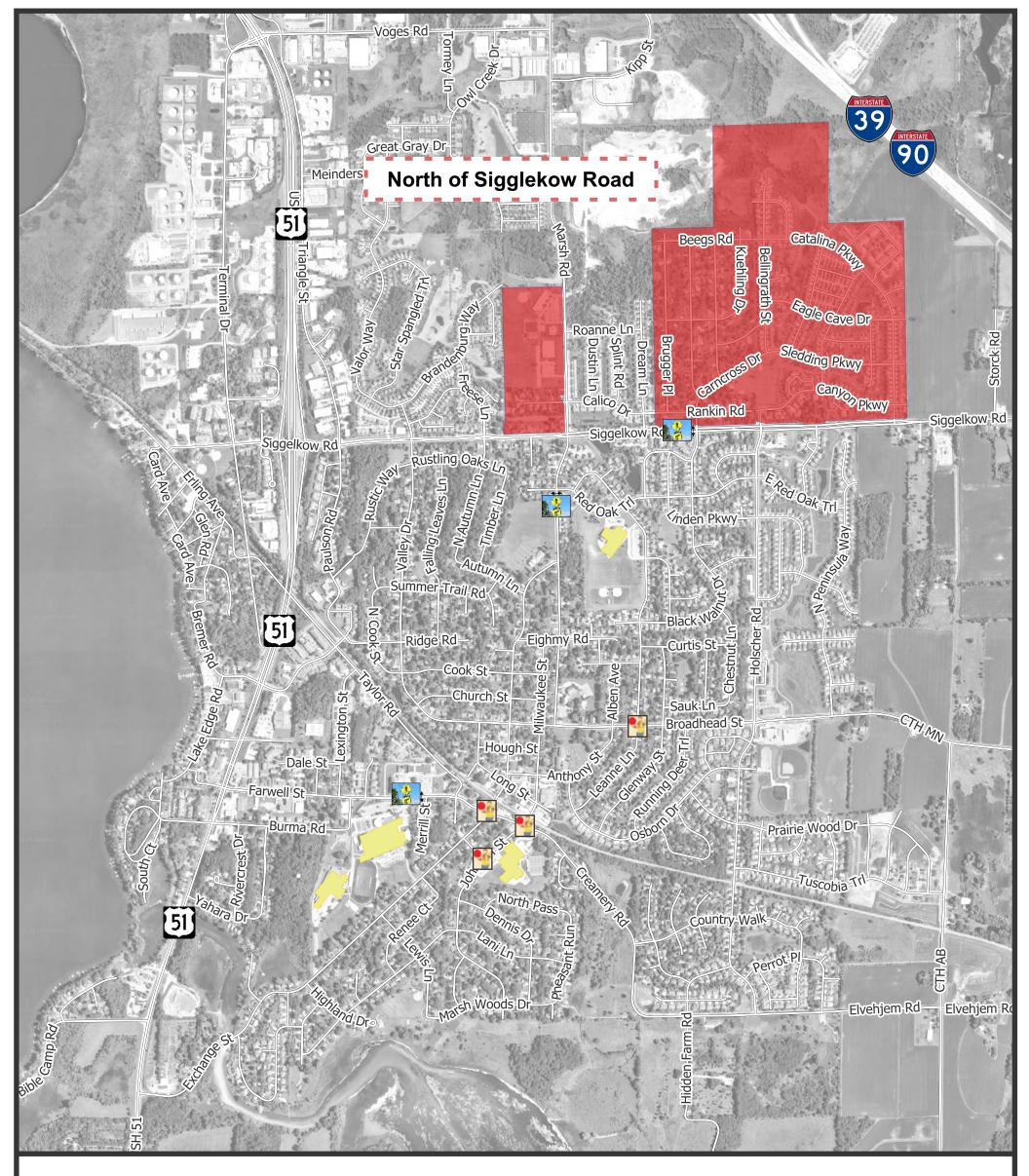
• Install a Rectangular Rapid Flashing Beacon (RRFB) on south leg crossing.

#### Crossings along Leanne Lane

- Install high-visibility crosswalks at the following locations to guide students to the crossing guard at Broadhead Street:
  - Black Walnut Court (west leg),
  - Scott Street (west leg), and
  - Broadhead Street (all four legs).



## **UHT EXHIBITS**





**School Buildings** 



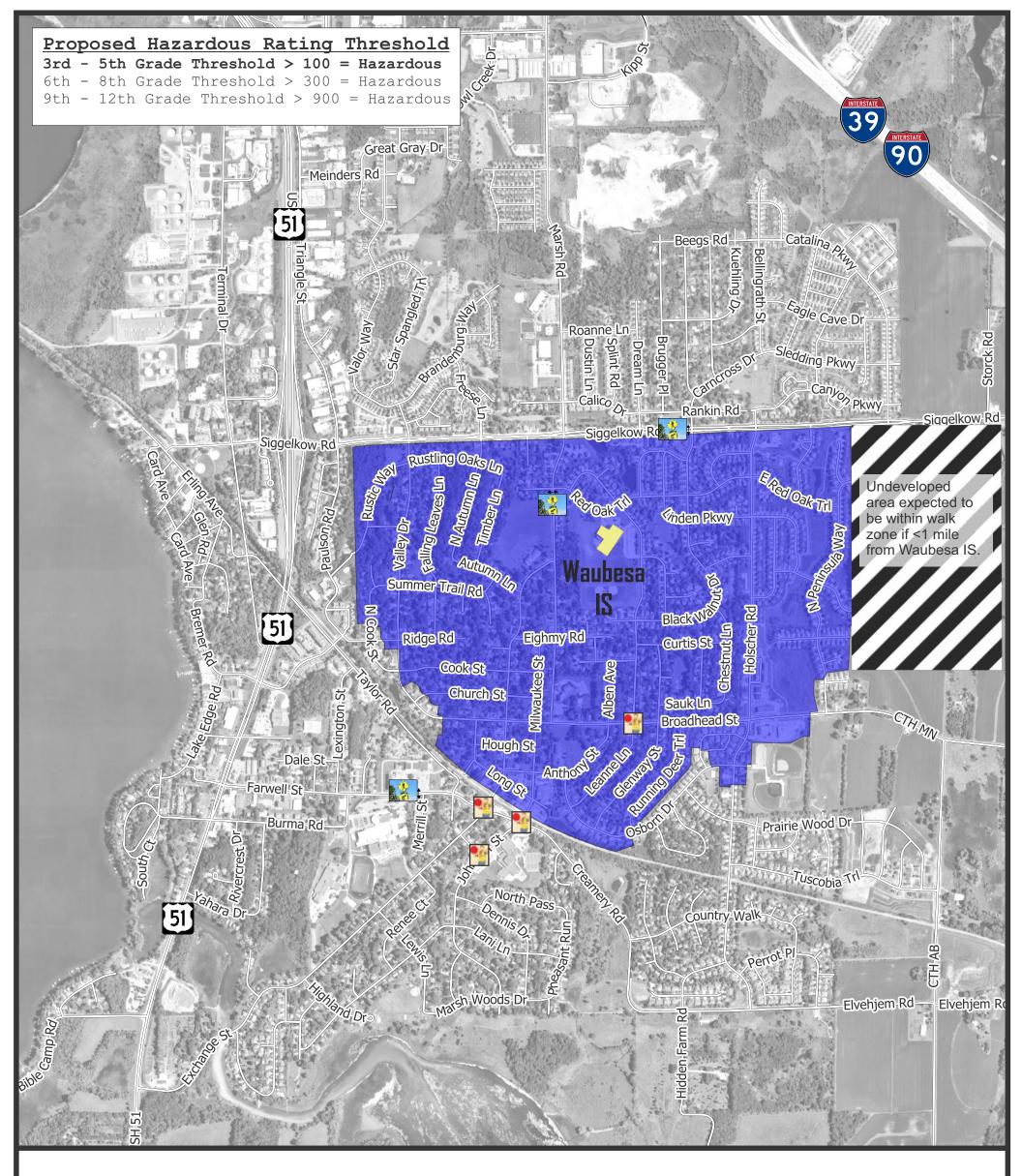
**Crossing Guard Location** 



**Proposed UHT Zone** 









Waubesa Intermediate School Building



**Crossing Guard Location** 

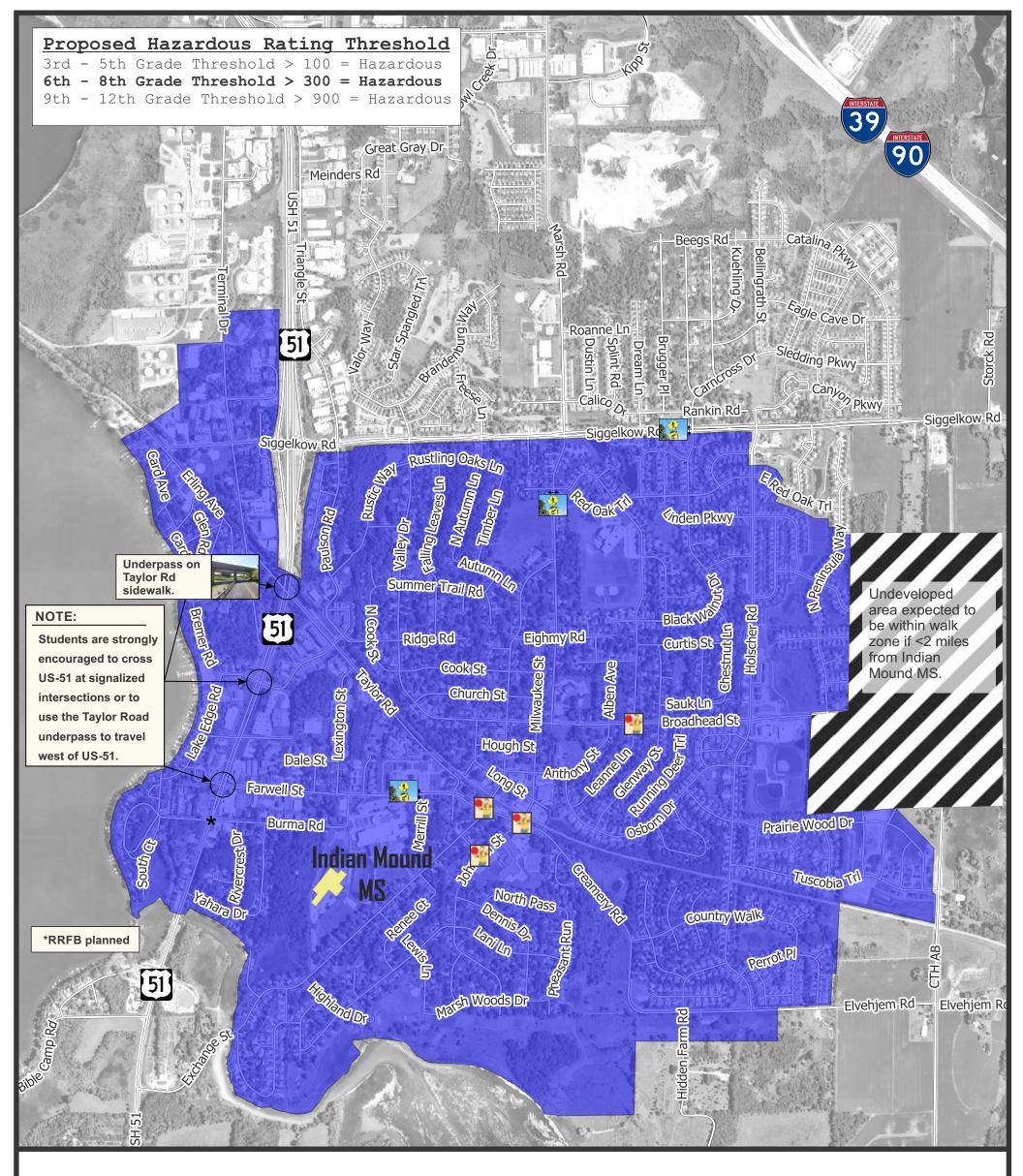


**Proposed Walk Zone** 











**Indian Mound Middle School Building** 



**Crossing Guard Location** 

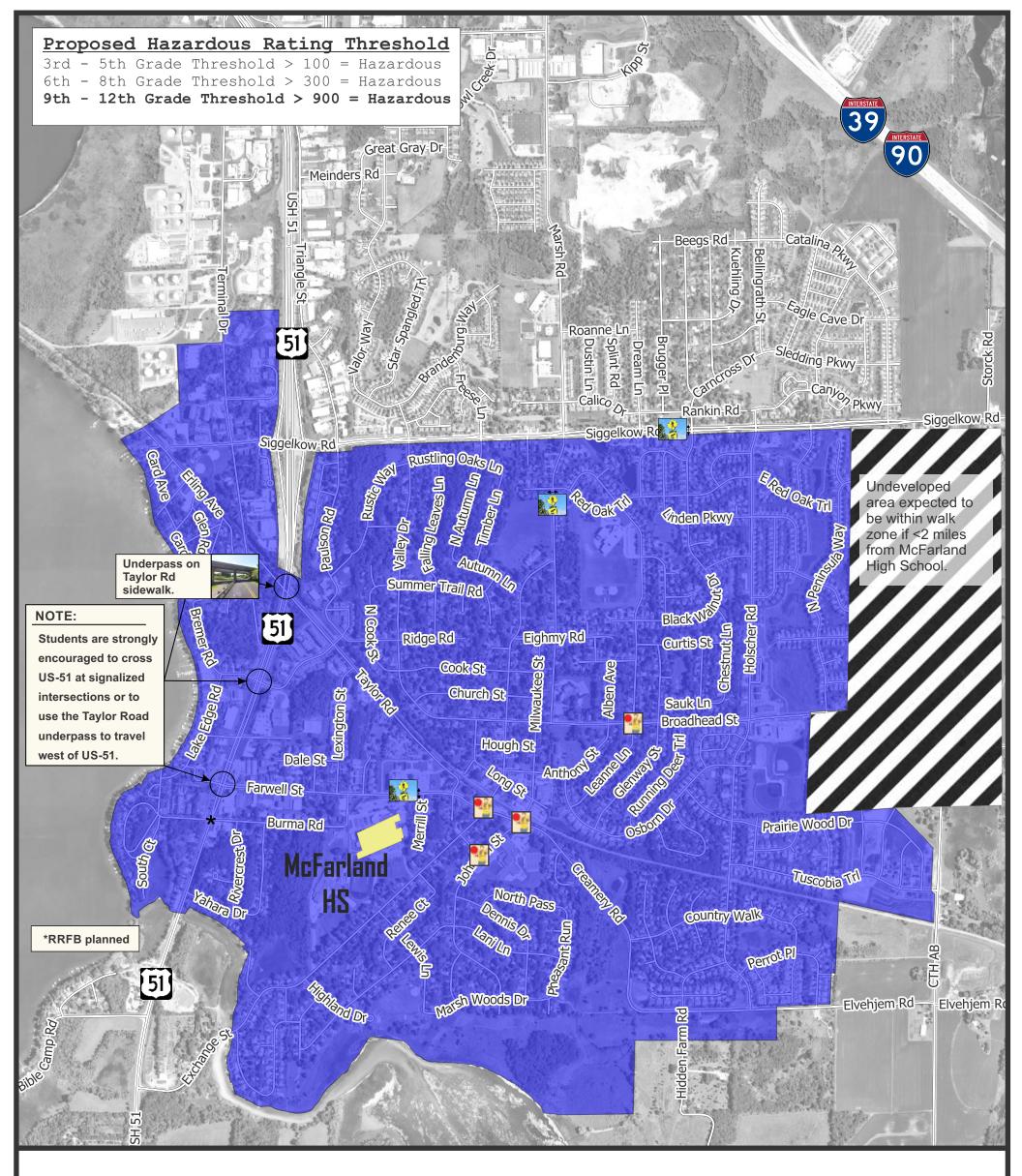


**Proposed Walk Zone** 











**McFarland High School Building** 



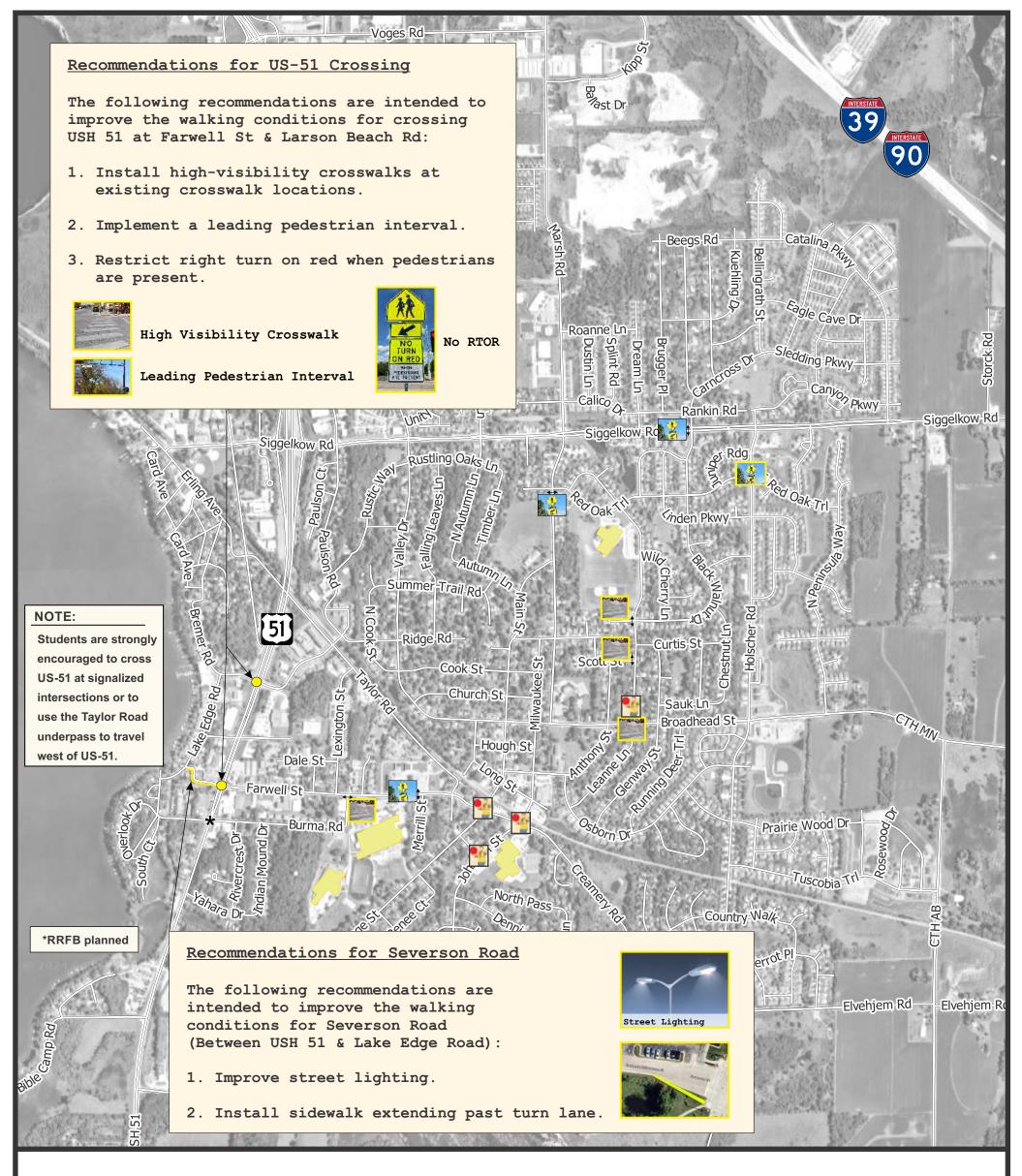
**Crossing Guard Location** 



**Proposed Walk Zone** 









**School Buildings** 



**Crossing Guard Location (Current)** 



Rectangular Rapid Flashing
Beacon (RRFB) Location (Current)



Rectangular Rapid Flashing
Beacon (RRFB) Recommendation



High Visibility Crosswalk Recommendation



**UHS 51 Intersection Recommendation** 



