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August 1, 2007

Dan Moser, Planning Consultant
Vandewalle & Associates
120 East Lakeside Drive
Madison, WI 53714

Re: Village of Cambridge, Wisconsin
Pedestrian Trail Crossing

Dear Dan,

Introduction

The Village of Cambridge has expressed interest in creating a pedestrian/bicycle network that connects to existing multiuse trails to the south of the Village with future trails to the northeast and/or northwest of the Village. Strand Associates, Inc. (SAI) has been retained to perform an evaluation of potential pedestrian crossings and review of intersection control options at two intersections in the study area, shown in Figure 1. A field visit was conducted by the SAI study team on May 14, 2007.

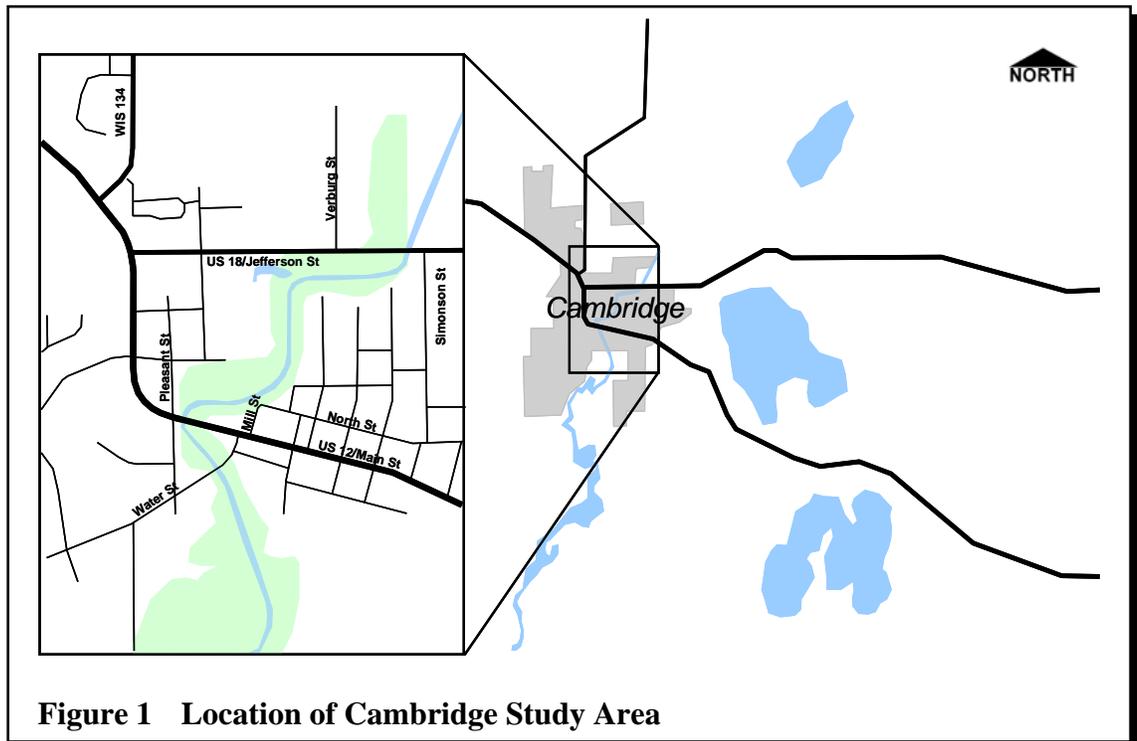
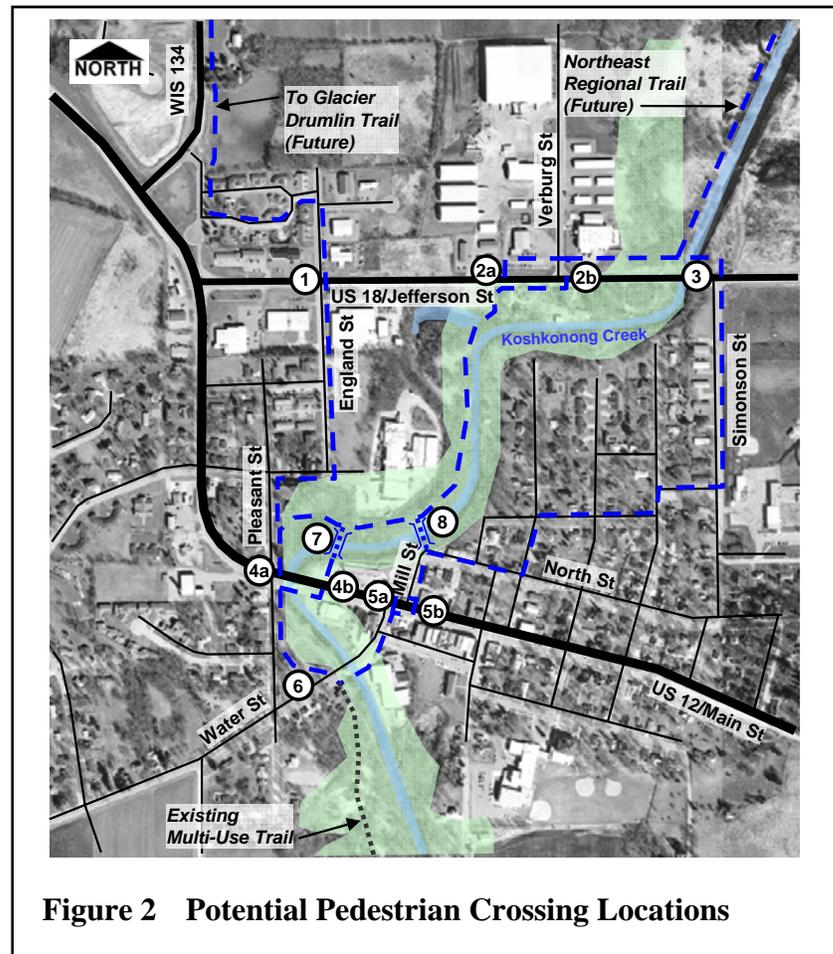


Figure 1 Location of Cambridge Study Area

In reviewing the various options, we will consider the following functional characteristics:

1. Connectivity with future trail extensions and other community elements.
2. At-grade crossing characteristics.
3. Grade-separated crossing characteristics.
4. Estimated cost.

Six roadway and two creek pedestrian/bicycle crossing locations were examined as part of this study. Each location is described in this section, noting its potential for grade separation, connectivity, and utilization of existing structures. The location of each of the crossings is shown in Figure 2.



US 18 and England Street

This is a potential north-south pedestrian crossing at US 18 and England Street. The picture in Figure 3 was taken from the south approach of the intersection, looking north.

A. Connectivity with Future Extensions and Other Community Elements

This crossing provides a west side connection between the existing southwest Multi-Use Trail and the northwest quadrant of the Village (shown in Figure 4) and would be the closest to the Glacier Drumlin Trail, located to the north of the Village of Cambridge. This location also provides a convenient connection across US 18 for the nearby elderly housing complex.



Figure 3 US 18 and England Street

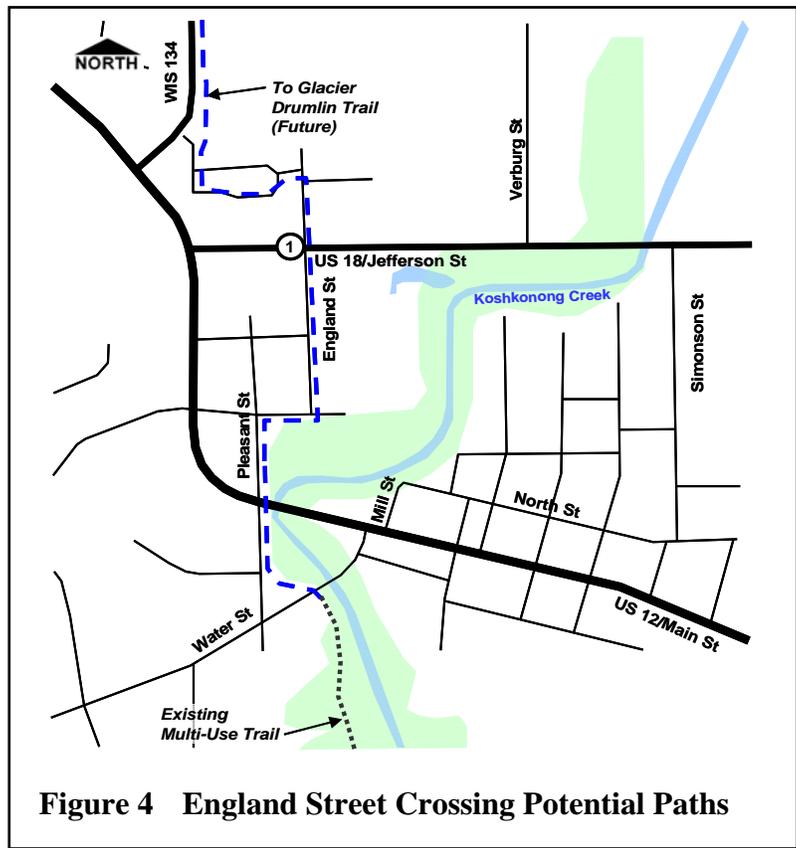


Figure 4 England Street Crossing Potential Paths



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Currently, there are no pedestrian facilities on any of the approaches of this intersection. On-street bike lanes and off-street bike path and/or sidewalks could be provided on England Street. On-street lanes would require restrictions for on-street parking on England Street. Off-street improvements would result in short-term disruption to the public terrace areas in front of the adjacent parcels.

B. At-Grade Crossing Characteristics

There are a number of features that are often included with at-grade crossings for these types of trail systems. Advanced pedestrian crossing warning signs or pedestrian crossing lights are provided to alert motorists of the upcoming crossing. Crosswalk treatments are provided to enhance the visibility of the crossing. Conventional pavement markings are the minimum requirement for identifying an at-grade crossing. Optional surface treatments such as brick or concrete are effective measures in distinguishing the crossing areas for motorists and pedestrians. Islands provide refuge for pedestrians, allowing them to cross the road in two stages, and can result in vehicle speed reductions through the intersection. Overhead lighting enhancements are provided to illuminate the crosswalk areas. Surface lighting consisting of pedestrian-actuated flashing yellow lights that are partially imbedded in the pavement along the crosswalk is also effective in indicating the crosswalk during day- and nighttime conditions.

The at-grade pedestrian crossing at England Street and US 18 is in a location where vehicle speeds on US 18 can be much higher than the posted speed limit of 35 mph. To account for this situation, we would expect that an at-grade crossing at this location include the following minimum improvements:

1. Pedestrian refuge islands with overhead lighting on both approaches of US 18.
2. Conventional crosswalk pavement markings.
3. Advanced pedestrian crosswalk warning signs with flashing yellow lights.

C. Grade-Separated Crossing Characteristics

The current setbacks and terrain at the west approach of this intersection would appear to accommodate installation of a below-grade pedestrian/bike crossing. The conditions at the east approach may also be suitable but they appear somewhat more constrained. The west approach would also be more compatible for use by residents of the elderly housing complex to the northwest of the intersection.

Such a crossing sited on the west approach would consist of a 10-foot x 10-foot precast concrete box structure across US 18 (shown in Figure 5) with approach ramps configured to meet the American with Disabilities Act (ADA) requirements.

To accommodate this structure, existing utilities along US 18 including sanitary sewer, water main, gas, and telephone would need to be relocated. In addition, storm sewer and drain tile from the structure

subgrade would also need to be provided to maintain current ditch line drainage patterns and to provide positive subgrade drainage for the structure.

Below-grade structures such as this have the potential to enhance the safety of pedestrian movements as long as they are consistently used. Unfortunately, these types of crossings are somewhat confining and as such are not comfortable or convenient for all potential users. As a result, there is still likely to be a percentage of potential users who will opt for making an at-grade crossing of the intersection even if this below-grade facility were provided. To accommodate users who are either uncomfortable with the grade-separated crossing, or who have found the grade-separated crossing inaccessible because of high water conditions, an at-grade crossing should be included with the grade-separated crossing.

D. Cost Estimate

The cost for the at-grade crossing improvements described previously is estimated to be \$35,000, including islands, lighting, pavement markings, and restoration.

The cost for the below-grade crossing improvements described previously are estimated to be \$200,000, including conventional utility relocations, structure, lighting, ramps, and restoration.



Figure 5 US 18 and England Street Below-Grade Crossing Location

US 18 and Verburg Street

There are two potential north-south pedestrian crossing options near US 18 and Verburg Street. The picture in Figure 6 was taken from the south side of the intersection, facing north. There is also an option for a crossing approximately 300 feet to the west of this intersection as shown in Figure 7.

The westerly option provides a somewhat more direct route from the future path location along the west bank of Koshkonong Creek. The easterly crossing should be at the east approach of the intersection. For an at-grade crossing, the easterly option would be more desirable as it is at an existing street intersection where motorists are more likely to anticipate conflicting vehicular and pedestrian movements. For a grade-separated crossing, the westerly location would be more desirable because there is an additional 25 feet of right-of-way (R/W) width to work with and fewer complications for positioning connecting ramps than near the intersection.

A. Connectivity with Future Trail Extensions and Other Community Elements

This crossing would provide a central connection between the existing southwest Multi-Use Trail and the future northeast regional trail, both shown in Figure 8, through the extension of a new trail system along the west bank of the Koshkonong Creek.

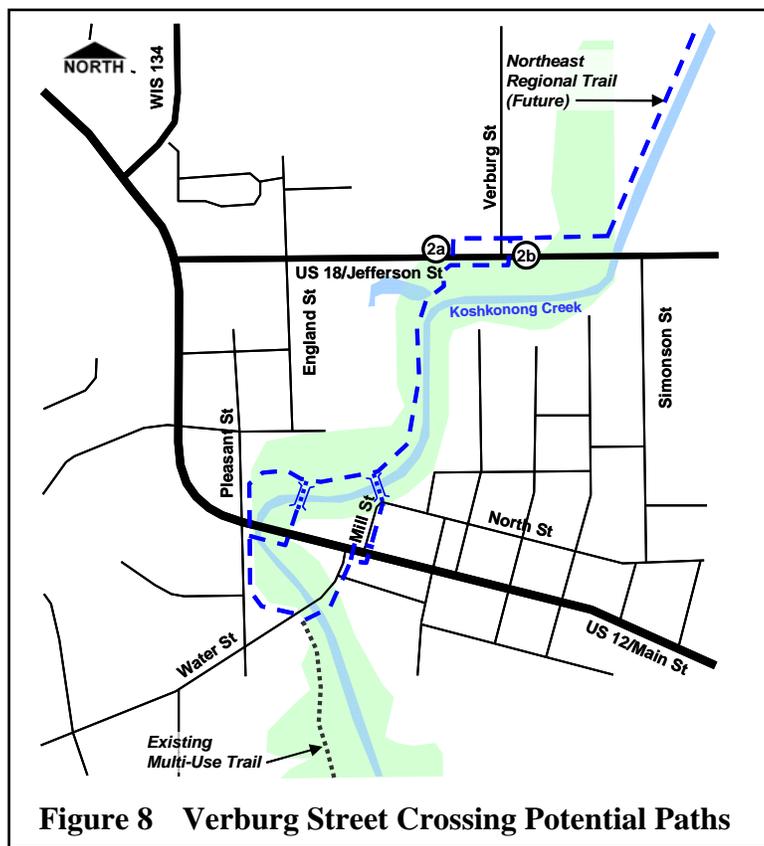
Currently, there are no pedestrian facilities on any approaches for this crossing location. All connections to this crossing would require off-street bike paths. US 18 has 100- to 125-foot R/W in the area of this crossing, which would provide adequate accommodations for off-road bike paths parallel with the highway.



Figure 6 US 18 and Verburg Street East Crossing Option Location



Figure 7 US 18 and Verburg Street West Crossing Option Location



B. At-Grade Crossing Characteristics

Possible features for this crossing are similar to those noted for England Street. Advanced pedestrian crossing warning signs or pedestrian crossing lights alert motorists of the upcoming crossing at this location. Crosswalk treatments enhance the visibility of the crossing. Conventional pavement markings are the minimum requirement for identifying an at-grade crossing. Optional surface treatments such as brick or concrete are effective measures in distinguishing the crossing areas for motorists and pedestrians. Optional surface lighting consisting of pedestrian-actuated flashing yellow lights that are partially imbedded in the pavement along the crosswalk is also effective in indicating the crosswalk during day- and nighttime conditions. Islands provide refuge for pedestrians, allowing them to cross the road in two stages, and can result in vehicle speed reductions through the intersection. Overhead lighting enhancements provide proper illumination of the crosswalk areas.

The at-grade pedestrian crossing at Verburg Street and US 18 should be located at the east approach of this intersection. In this location, vehicle speeds on US 18 can be much higher than the posted speed limit of 35 mph. To account for this situation, we recommend an at-grade crossing at this location include the following minimum improvements:

1. Pedestrian refuge islands with overhead lighting on both approaches of US 18.
2. Conventional crosswalk pavement markings.
3. Advanced pedestrian crosswalk warning signs with flashing yellow lights.

C. Grade-Separated Crossing Characteristics

The current setbacks and terrain at this location would allow for installation of a below-grade pedestrian/bike crossing. As a minimum such a crossing would consist of a 10-foot x10-foot precast concrete box structure across US 18 approximately 300 feet west of the Verburg Street intersection with approach ramps configured to meet ADA requirements.

To accommodate this structure, existing utilities along US 18 including sanitary sewer, water main, gas, and telephone would need to be relocated. In addition, storm sewer and drain tile from the structure subgrade would also need to be provided to maintain current ditch line drainage patterns and to provide positive subgrade drainage for the structure.

Below-grade structures, such as this, have the potential to enhance the safety of pedestrian movements as long as they are consistently used. Unfortunately, these types of crossings are somewhat confining and, as such, are not comfortable or convenient for all potential users. As a result, there is still likely to be a percentage of potential users who will opt to make an at-grade crossing at this intersection even if this below-grade facility were provided.

D. Cost Estimate

The cost for the at-grade crossing improvements described previously is estimated to be \$35,000, including islands, lighting, pavement markings, and restoration.

The cost for the below-grade crossing improvements described previously are estimated to be \$200,000, including conventional utility relocations, structure, lighting, ramps, and restoration.

US 18 and Simonson Street

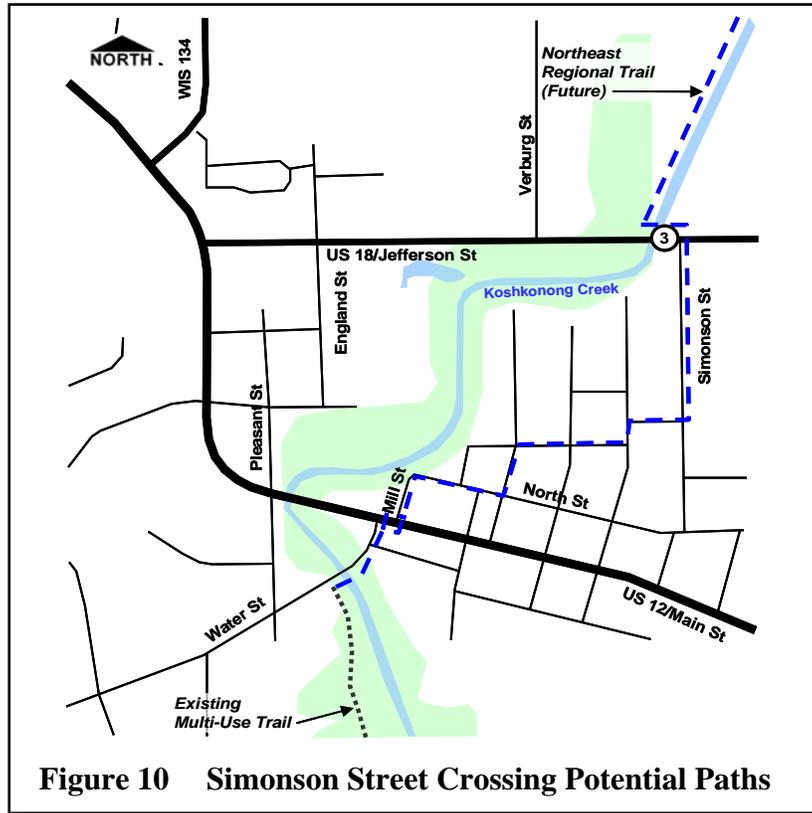
There is a potential north-south pedestrian crossing at US 18 and Simonson Street. The picture in Figure 9 was taken from the southeast corner of the intersection, looking west.



Figure 9 US 18 and Simonson Street

A. Connectivity with Future Trail Extensions and Other Community Elements

This crossing provides an eastside connection between the existing southwest Multi-Use Trail and the future northeast regional trail by using an internal village pathway system along existing village streets (shown in Figure 10).



Currently, there are no pedestrian facilities on any of the approaches for this crossing. On-street bike lanes and off-street bike paths and/or sidewalks could be provided on Simonson Street. On-street lanes would require restrictions for on-street parking on Simonson Street. Off-street improvements would result in short term disruption to the public terrace areas in front of the adjacent parcels. Steep existing terrace grades along the east side of Simonson Street would require extensive use of landscaping walls.

The proposed internal pathway system through the Village includes segments that present significant challenges in accommodating this type of facility. The most troublesome area is between Koshkonong Creek and North Street in the Mill Street area. Narrow sidewalks and premium on-street parking areas would need to be adjusted in this area to accommodate this type of pathway/trail system.

From a local perspective, this pathway would provide strong connections to and through the central business district and high school areas. The benefits from this increased



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accessibility would have to be balanced against the impacts to current on-street parking provisions.

It should also be noted that Simonson Street is located on the east side of Koshkonong Creek. Both at-grade and grade-separated crossings of US 18 at this intersection will require crossing Koshkonong Creek to access the northeast regional trail if it is located on the west side of the creek. The existing US 18 bridge across Koshkonong Creek should provide an adequate connection for such crossings.

B. At-Grade Crossing Characteristics

Possible improvements for this at-grade crossing are similar to those noted at the other potential US 18 crossings. Advanced pedestrian crossing warning signs or pedestrian crossing lights alert motorists of the upcoming crossing. Crosswalk treatments enhance the visibility of the crossing. Conventional pavement markings are the minimum requirement for identifying an at-grade crossing. Optional surface treatments such as brick or concrete are effective measures in distinguishing the crossing areas for motorists and pedestrians. Optional surface lighting consisting of pedestrian-actuated flashing yellow lights that are partially imbedded in the pavement along the crosswalk is also effective in indicating the crosswalk during day- and nighttime conditions. Islands provide refuge for pedestrians, allowing them to cross the road in two stages and can result in vehicle speed reductions through the intersection. Overhead lighting enhancements provide proper illumination of the crosswalk areas.

The at-grade pedestrian crossing at Simonson Street and US 18 should be located at the east approach to provide a direct connection to the high school property. In this location, vehicle speeds on US 18 can be much higher than the posted speed limit of 35 mph. To account for this situation, we recommend an at-grade crossing at this location include the following minimum improvements:

1. Pedestrian refuge islands with overhead lighting on both approaches of US 18.
2. Conventional crosswalk pavement markings.
3. Advanced pedestrian crosswalk warning signs with flashing yellow lights.
4. Sidewalk along the existing shoulder area to the west side of the bridge.

C. Grade-Separated Crossing Characteristics

The existing US 18 bridge over Koshkonong Creek at this location would allow for installation of a below-grade pedestrian/bike crossing, thus avoiding the cost and disruption associated with installation of a precast concrete box segment. As a minimum, such a crossing would be a 10-foot-wide paved path beneath the existing bridge along the west side of the creek with retaining walls and railings on the creek side to adjust the existing abutment areas beneath the bridge. Ramps connecting the paved path to the surface would need to be provided. The existing under-bridge conditions are shown in Figure 11.

Below-grade structures such as this have the potential to enhance the safety of pedestrian movements as long as they are consistently used. This type of crossing is much less confining than tunnels, and is more comfortable and convenient for all potential users. As a result, there will likely be fewer potential users who will opt to make an at-grade crossing of the intersection even if this below-grade facility were provided.

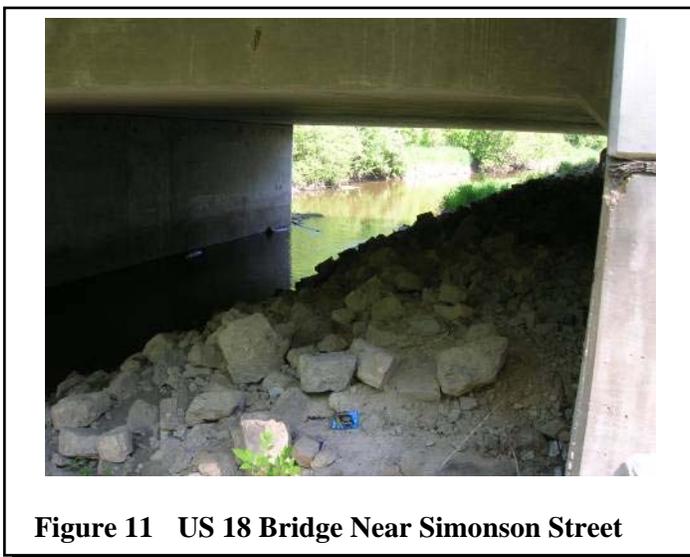


Figure 11 US 18 Bridge Near Simonson Street

The pathway provided beneath the bridge will be within a few feet of the normal creek elevation. During high flow periods in the creek, it is likely this path will become submerged inaccessible. These situations would not be frequent occurrences, but they would limit the use of this crossing. To accommodate users who are either uncomfortable with the grade-separated crossing, or who have found the grade-separated crossing inaccessible because of high water conditions, an at-grade crossing should be included with the grade-separated crossing, as shown in Figure 12.

D. Cost Estimate

The cost for the at-grade crossing improvements described previously is estimated to be \$60,000, including islands, lighting, pavement markings, and restoration.

The cost for the below-grade crossing improvements described previously are estimated to be \$125,000, including conventional retaining walls, paved path, lighting, ramps, and restoration.

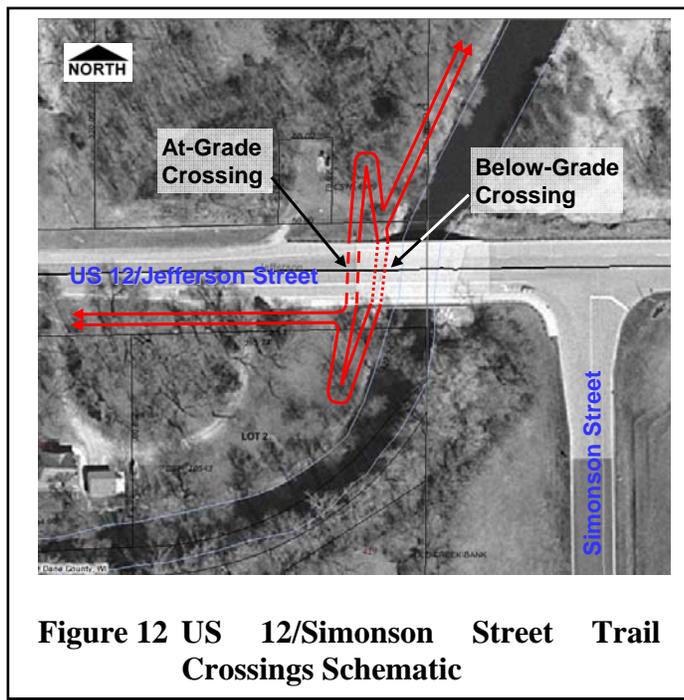


Figure 12 US 12/Simonson Street Trail Crossings Schematic

US 12 and Pleasant Street

There are two potential north-south pedestrian crossing options near US 12 and Pleasant Street. The existing crosswalk at the potential west crossing is shown in Figure 13, facing south. There is also an east option for an at-grade crossing on the other side of Koshkonong Creek to the east of this intersection as shown in Figure 14.

The easterly crossing would be approximately 100 feet east of the bridge over the Koshkonong Creek. The westerly option provides a somewhat more direct route from the future path location along the west bank of Koshkonong Creek. For an at-grade crossing, the westerly option would also be more desirable as it is at an existing street intersection where motorists are more likely to anticipate conflicting vehicular and pedestrian movements.

A. Connectivity with
Future Trail Extensions
and other Community
Elements

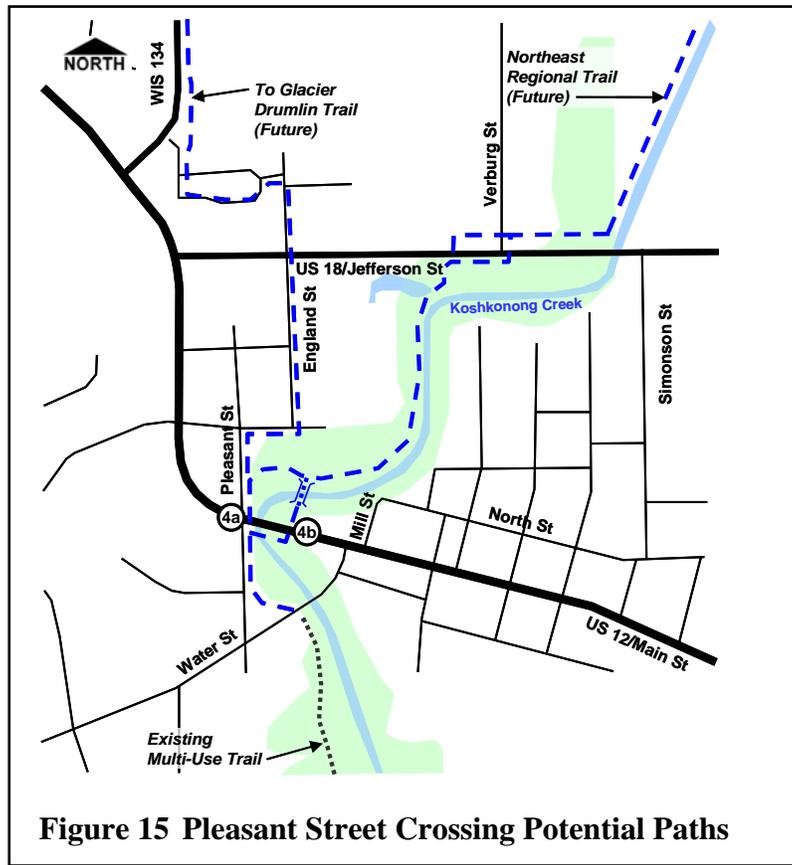
This crossing would provide a potential link between the existing southwest Multi-Use Trail and the future northwest and northeast regional trails. The link to the future northeast trail would require extension of a new trail system along the west bank of the Koshkonong Creek as shown in Figure 15. The connection to the northwest trail would be via England Street. Linkages to these trails would also be dependent on the location selected for future US 18 crossings.



Figure 13 US 12 and Pleasant Street West Option Location



Figure 14 US 12 and Pleasant Street East Option Location



Currently, there are only pedestrian facilities on the west approach for this crossing location. Construction of on-street bike paths would be possible along US 12 and Pleasant Street.

Construction of a pedestrian path on the east side of Pleasant Street would enhance the connectivity of the overall pedestrian network in Cambridge, since this side of the street currently does not have pedestrian facilities. It would also connect the existing park area with the trail system, thus providing a trailhead or staging option at this location.

B. At-Grade Crossing Characteristics

Possible improvements for this crossing are similar to those noted for England Street. Advanced pedestrian crossing warning signs or pedestrian crossing lights alert motorists of the upcoming crossing at this location, especially on the west approach, where a curve limits the sight distance to the crossing. Crosswalk treatments enhance the visibility of the crossing. Conventional pavement markings are the minimum requirement for identifying an at-grade crossing. Optional surface treatments such as brick or concrete are effective measures in distinguishing the crossing areas for motorists and pedestrians.

Optional surface lighting consisting of pedestrian-actuated flashing yellow lights that are partially imbedded in the pavement along the crosswalk are also effective in indicating the crosswalk during day- and nighttime conditions. Traffic islands for pedestrian refuge allow them to cross the road in two stages, which can result in vehicle speed reductions through the intersection. Overhead lighting enhancements provide proper illumination of the crosswalk areas.

The at-grade pedestrian crossing at Pleasant Street and US 12 should be located at the east approach of this intersection. In this location, vehicle speeds are less than those on US 18, but they can still be higher than the posted speed limit of 25 mph. To account for this situation, we would recommend an at-grade crossing at this location include the following minimum improvements:

1. Pedestrian refuge islands with overhead lighting on both approaches of US 12.
2. Conventional crosswalk pavement markings.
3. Advanced pedestrian crosswalk warning signs with flashing yellow lights.

C. Grade-Separated Crossing Characteristics

The existing US 12 bridge over Koshkonong Creek at this location would allow for installation of a below-grade pedestrian/bike crossing on the west side of the creek. The existing under-bridge conditions are shown in Figure 16. As a minimum, such a crossing would be a 10-foot-wide paved path beneath the existing bridge with retaining walls and railings on the creek side to adjust the existing abutment areas beneath the bridge. Ramps connecting the paved path to the surface would need to be provided. A steep slope to the south of the bridge and

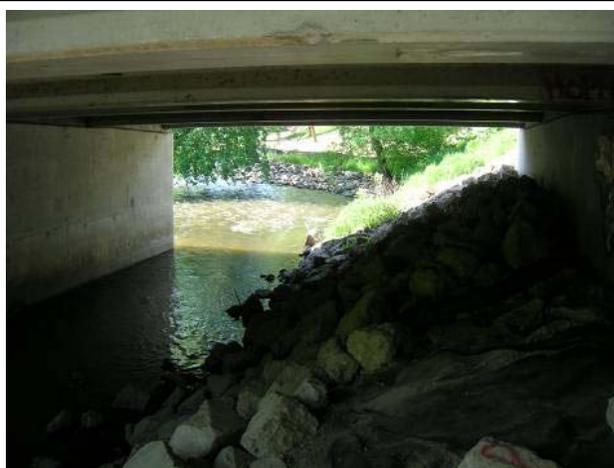


Figure 16 US 12 and Pleasant Street Below-Grade Option

large oak trees present significant challenges for siting a pedestrian trail on the east side of Pleasant Street. Additional retaining walls and other measures would have to be provided to construct a path in this location. It should be noted that the proposed pathway beneath the bridge will be within a few feet of the normal creek elevation. During high-flow periods, it is likely this path will become submerged and inaccessible. These situations would not be frequent occurrences, but they would limit the use of this

crossing. To accommodate users who are either uncomfortable with the grade-separated crossing, or who have found the grade-separated crossing inaccessible because of high water conditions, an at-grade crossing should be included with the grade-separated crossing as shown in Figure 17.

The east alternative does not have the potential for grade separation as it would be too low with respect to the creek and too disruptive to adjacent lands for providing ramp considerations.

D. Cost Estimate

The cost for the at-grade crossing improvements described previously are estimated to be \$35,000, including islands, lighting, pavement markings, and restoration.

The cost for the below-grade crossing improvements described previously are estimated to be \$140,000, including conventional retaining walls, paved path, lighting, ramps, and restoration.

US 12 and Mill Street/Water Street

There are two potential north-south pedestrian crossing options along US 12 at Mill Street and Water Street. Both crossings would use existing crosswalk locations, and connect to the trails in the same places. Figure 18 shows the existing pedestrian facilities of Mill Street and US 12, facing west along US 12.

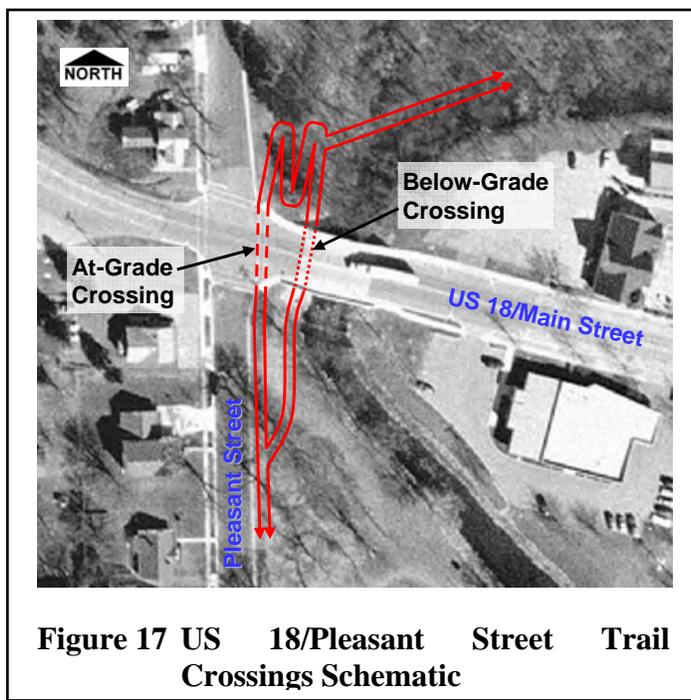


Figure 17 US 18/Pleasant Street Trail Crossings Schematic

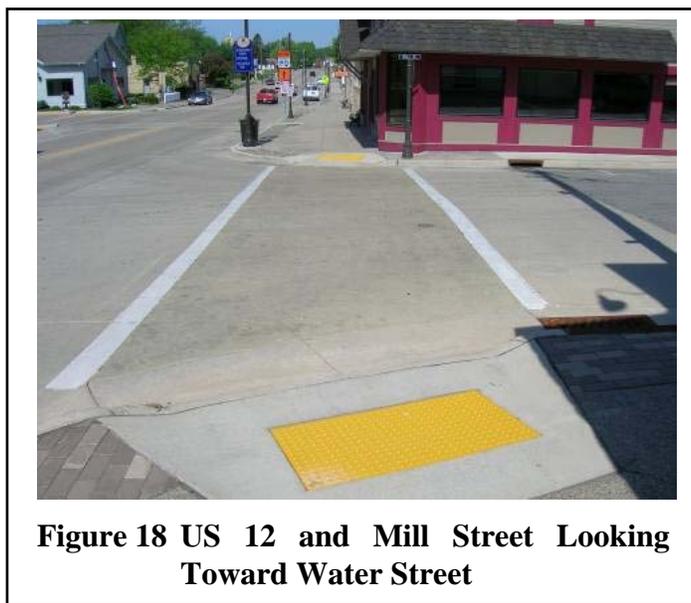
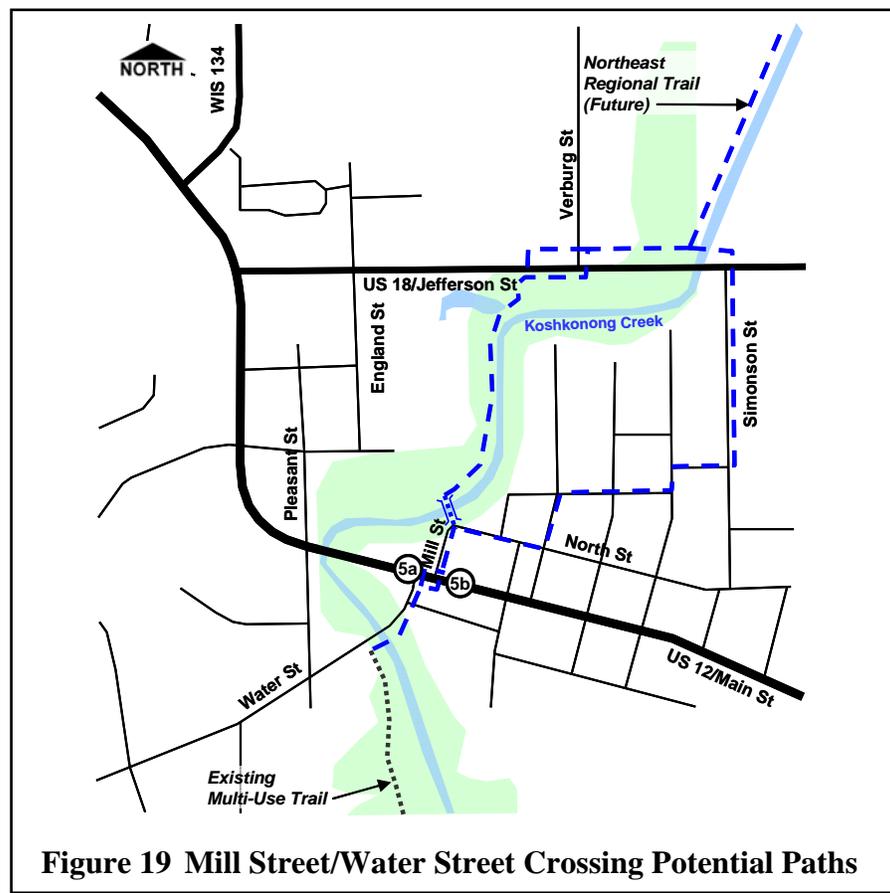


Figure 18 US 12 and Mill Street Looking Toward Water Street

Below- and above-grade crossings would not be feasible at this location, as there is insufficient space for providing connecting ramps.

A. Connectivity with Future Trail Extensions and Other Community Elements

This crossing provides a central connection between the existing southwest Multi-Use Trail and the future northeast regional trail by using an internal village pathway system along existing village streets or via a path on the west side of Koshkonong Creek as shown in Figure 19.



Currently, there are pedestrian facilities on all of the approaches for either crossing. On-street bike lanes could be provided on Mill Street. On-street lanes would require restrictions for on-street parking on Mill Street.

The proposed internal pathway system through the Village includes segments that present significant challenges in accommodating this type of facility. The most troublesome area is between Koshkonong Creek and North Street in the Mill Street area.



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Narrow sidewalks and premium on-street parking areas would need to be adjusted in this area to accommodate this type of pathway.

From a local perspective, this pathway would provide strong connections to and through the central business district and potentially to the high school area. The benefits from this increased accessibility would have to be balanced against the impacts to current on-street parking provisions.

B. At-Grade Crossing Characteristics

Possible improvements for this crossing are similar to those mentioned previously:

1. Advanced pedestrian crossing warning signs or pedestrian crossing lights.
2. Crosswalk treatments.
3. Conventional pavement markings.
4. Optional surface treatments such as brick or concrete
5. Optional surface lighting consisting of pedestrian-actuated flashing yellow lights that are partially imbedded in the pavement along the crosswalk
6. Traffic islands for pedestrians.
7. Overhead lighting enhancements.

The at-grade pedestrian crossing along US 12 in this area could be located at either Mill Street or Water Street. Both intersections have similar pedestrian crossing features, such as crosswalk treatments, currently in place. The location of the at-grade pedestrian/bicycle crossing could be enhanced by the following improvements:

1. Pedestrian refuge islands with overhead lighting on both approaches of US 12.
2. Advanced pedestrian crosswalk warning signs with flashing yellow lights.

C. Grade-Separated Crossing Characteristics

Neither of the crossing alternative locations has the potential for grade separation.

D. Cost Estimate

The cost for the at-grade crossing improvements described previously is estimated to be \$35,000, including islands, lighting, pavement markings, and restoration.

Water Street

Potential pedestrian crossings along Water Street were evaluated. Figure 20 shows the approximate location of a north-south crossing of Water Street looking north.

A. Connectivity with Future Trail Extensions and Other Community Elements

This crossing location would directly connect with an existing cross-county ski and bicycle trailhead located on the west side of Koshkonong Creek, to the south of the bridge. There are also currently few connections to the park area across Water Street from the trailhead. These trails are shown in Figure 21.



Figure 20 Potential Water Street Crossing Location

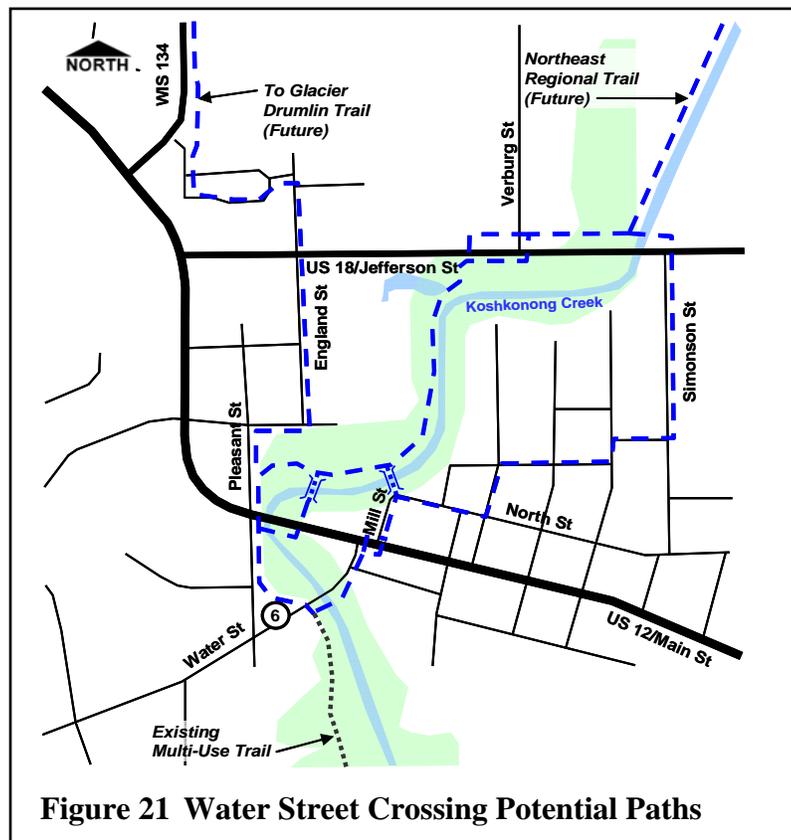


Figure 21 Water Street Crossing Potential Paths

Currently, there are no pedestrian facilities on any of the approaches at this location. On-street bike lanes and off street bike path and/or sidewalks could be provided on Water Street.

B. At-Grade Crossing Characteristics

Possible improvements for this crossing are similar to those mentioned previously:

1. Advanced pedestrian crossing warning signs or pedestrian crossing lights.
2. Crosswalk treatments.
3. Conventional pavement markings.
4. Optional surface treatments such as brick or concrete.
5. Optional surface lighting consisting of pedestrian-actuated flashing yellow lights that are partially imbedded in the pavement along the crosswalk.
6. Traffic islands for pedestrians.
7. Overhead lighting enhancements.

The at-grade pedestrian crossing of Water Street would be in a low vehicular-traffic area. We recommend the following improvements to make a crossing at this location more noticeable:

1. Conventional crosswalk pavement markings.
2. Advanced pedestrian crosswalk warning signs with flashing yellow lights.

C. Grade-Separated Crossing Characteristics

The existing bridge over the Koshkonong Creek, shown in Figure 22, could be utilized as part of the pedestrian trail; however, it would need enhancements if chosen for the pedestrian crossing. The bridge railing is too low to the ground to safely accommodate pedestrians and bicyclists. Widening the sidewalk on the bridge may also be necessary.

A grade-separated crossing of Water Street would not appear feasible nor warranted at this time based on the relatively low traffic volumes at this location.



Figure 22 Existing Water Street Bridge

D. Cost Estimate

The cost for the at-grade crossing improvements described previously is estimated to be \$10,000, including islands, lighting, pavement markings, and restoration.

Potential New Bridge Crossings of Koshkonong Creek

A. East Pedestrian Bridge

The potential for a pedestrian bridge over Koshkonong Creek connecting to Mill Street was evaluated. The picture in Figure 23 was taken near the corner of Mill Street and North Street, looking north.

This bridge location would provide a direct connection between the future trail system along the west side of the creek and the central business district over a scenic reach of the creek channel. Unfortunately, a bridge at this location would require the construction of a relatively long span between the creek banks. The significant cost for this type of structure must be balanced with its strategic and scenic location.

B. West Pedestrian Bridge

The west location for a potential pedestrian bridge across the Koshkonong Creek was also evaluated. This bridge would be located to the east of the US 12 bridge over the creek and to the north of a parking lot. Figure 24 indicates the existing terrain at the approximate location of a pedestrian bridge.



Figure 23 East Potential Pedestrian Bridge Location



Figure 24 West Potential Pedestrian Bridge Location



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The construction of a pedestrian bridge at this location would potentially have fewer impacts to the surrounding environment because of its lower height above the creek and more gradual slope of the banks. It is located on the west edge of the central business district. While this location does not have the scenic and strategic attributes of the eastern bridge location, it could be completed at far less cost. It also has the added advantage of being located at an existing parking area, thus providing the potential for it to be used as a trailhead destination.

US 12/US 18/WIS 134 Traffic Control Considerations

At the west edge of the Village of Cambridge, there are perceived traffic control concerns at the intersections of WIS 134 with US 12/18 and US 12 with US 18. Relatively high peak-hour commuter volumes on the through routes are making access to the US 12/18 corridor increasingly difficult from the stop-controlled approaches. Proposed future development to the west of these intersections would likewise be negatively affected by and could contribute to the current traffic situation.

To improve this situation, the Village has expressed interest in considering alternative traffic control treatments. For situations such as this, the applicable types of traffic control are:

1. All-way stop-control
2. Traffic signals
3. Roundabout

A. All-Way Stop Control

The application of all-way stop control at one or both of these intersections would provide equal access for all approaches to the USH 12/18 corridor. However, WisDOT does not consider this type of control feasible on rural US highways. Therefore, we have ruled out this type of control as an alternative.

B. Traffic Signals

Traffic signals offer more efficient means of controlling traffic when compared to an all-way stop-controlled system as they can be timed to provide more even distribution of delay for all approaches and for varying demands. Unfortunately, signals will result in increased delay for the major uncontrolled approaches and may increase the potential for crashes. Also, to install a signal system on marked routes such as these, the intersection volumes would have to meet or exceed certain volume thresholds referred to as warrants. If volumes do not meet these warrants, the installation of traffic signals at these intersections is not recommended. Again, while specific intersection volume counts have not been completed at these intersections, it would appear from available corridor volume counts and cursory field observations that this type of traffic control approach would not be appropriate for these intersections at this time.



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The spacing of traffic signals is also a key consideration. The USH 12/18 intersection would likely be considered too close to the USH 12/18–STH 134 intersection for signals to be installed at both intersections. Therefore one of these intersections would require some form of stop control if the other were to be signalized.

C. Roundabouts

A third and relatively new type of intersection control approach, at least for this country, is the use of an intersection design commonly referred to as a roundabout. The roundabout requires that a robust design geometry be established between the various approaches to the intersection and a circular connecting corridor. With this precise geometry, approach volumes and speeds are controlled automatically, allowing the use of yield conditions for all approaches into the intersection. As a result, most traffic will move through the intersection at a relatively constant and uniform speed without stopping, regardless of the approach being used. This type of control has been found to be successful for conventional intersections such as these in minimizing delays for all approaches. Studies have shown that roundabouts reduce both the number and severity of crashes in the intersection when compared to signalized intersections. Roundabouts have also been found to provide improved safety for pedestrian movements. Unlike traffic signals, roundabouts do not have to meet predetermined volume thresholds before they can be considered for marked routes such as these. On the negative side, roundabouts often require additional land for construction than a conventional intersection. For developed areas such as this situation, the land requirements can have significant impacts.

Figure A at the end of this report shows preliminary layouts for roundabouts at these two intersections. These layouts have been developed without specific traffic volume counts for the intersections. To provide a more precise layout, actual field data for intersection volumes and turning movements would need to be obtained.

As shown in Figure A, the roadway alignment between the roundabouts contains more curves than what are present between the intersections today. The reason for this is that roundabouts need to meet specific geometric requirements for safe entering and exiting angles and travel speeds. By deflecting the roundabout entrances, entering speeds are reduced so the circulating and entering vehicles are traveling at somewhat consistent speeds and make the roundabout more pedestrian- and bicycle-friendly.

Also shown in Figure A, the roundabout alignment for the US 12/US 18 intersection is somewhat closer to the gas station and the building at the northeast corner. Other than these impacts, the roundabouts would seem to have no other major impacts to adjacent parcels and would operate in an efficient and predictable fashion for this application.

Another option with using roundabouts for control is to provide a roundabout at either the USH 12/18 intersection or the USH 12/18–STH 134 intersection or both. If a roundabout were provided at one of these intersections, some form of stop control would



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likely be needed at the other. It would not be considered prudent to provide traffic signals at one of these intersections in combination with a roundabout at the other intersection as the resulting control would be inconsistent and confusing to the average motorist.

The cost for providing roundabouts at these two intersections is estimated to be approximately \$400,000 each, including the roadway realignment and relatively minor allowances for utility relocations. Land acquisition costs are not included in this cost.

WisDOT approval would need to be obtained to implement any of these improvements.

Conclusions and Recommendations

With the wide variety of options being considered, and their interdependence, the following conclusions and recommendations were developed through a step-wise process. The first step in this process was to identify the primary trail system corridor.

A. Trail System Corridor

In general, there are three distinct trail system corridors being considered:

1. West side (England Street)
2. Central (Koshkonong Creek)
3. Eastside (Simonson Street)

Each of these corridors includes a variety of localized options.

The eastside and the west side corridors include the use of existing street systems for most of their routes. The central corridor is routed primarily along Koshkonong Creek and relies on a relatively small amount of existing roadway R/W.

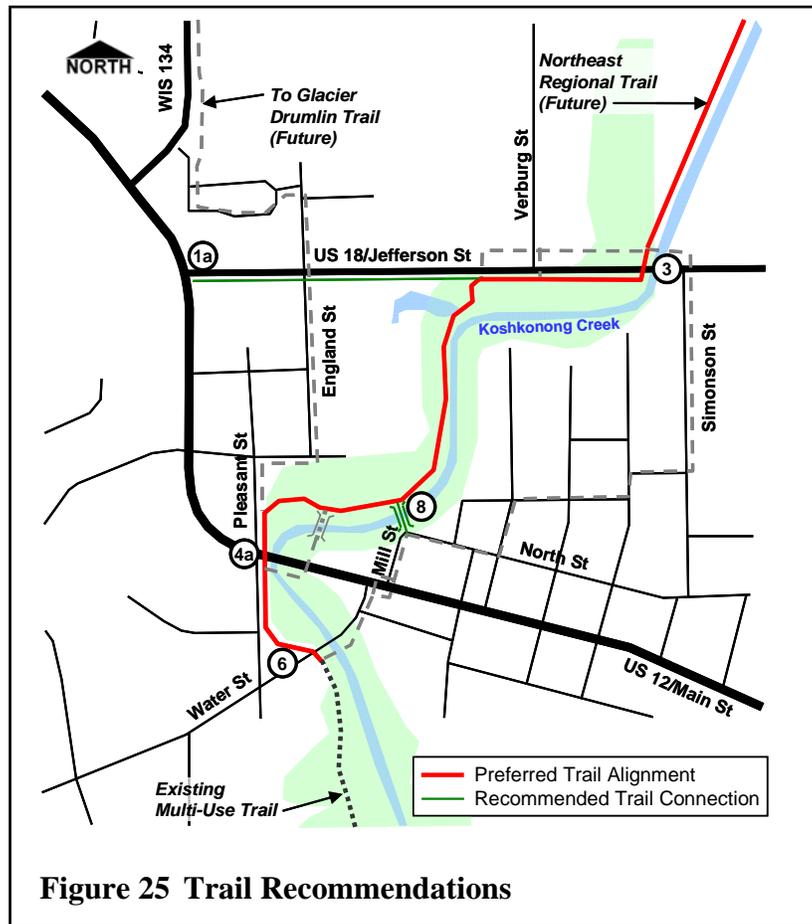
Some of the differences between on-street and off-street corridors for these types of trail systems are as follows:

1. On-street corridors generally include conflicts between pedestrian/bicycle movements and vehicular movements at driveways, intersections, and parking lanes. These conflicts inherently compromise the safety of prospective trail system users and inhibit mobility along the trail. The east side and west side corridors would be significantly affected by these conditions.
2. On-street corridors generally require adjustment to existing parking conditions and lead to much higher levels of local and transient pedestrian/bicycle use through established neighborhoods. Property owners adjacent to these routes may react in a variety of ways to these changes. Some reactions will be positive; unfortunately, the positive

reactions are not always as vocal as the negative reactions. The east side and west side corridors will include similar impacts.

3. Off-street trails are generally developed through previously inaccessible or underutilized public spaces. While there may be concerns regarding potential disturbance to these types of areas, the use of these areas can significantly enhance the experience in utilizing the trail.
4. Off-street trail systems are generally most costly to develop and maintain than on-street corridors. This is especially true where these trails are open on a year-round basis.

Given the more centralized location, the enhancements to safety, mobility, trail environment, and minimal impacts to existing private properties, we recommend that the Village pursue development of the central trail system depicted in Figure 25.





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B. Trail Crossing Locations and Type

The preferred trail corridor shown in Figure 25 includes key street crossings at Water Street, US 12 at Pleasant Street, and US 18 at Verburg Street or Simonson Street.

As noted previously, crossings of USH 12 and USH 18 would require approval from WisDOT. In discussing the potential for such crossings with WisDOT officials, it was noted that they would be reluctant to consider crossings that had a negative effect on vehicle mobility on the highway corridor. In that regard they would prefer grade-separated crossings. They also acknowledged that there would probably be a need to provide an at-grade crossing option with the grade-separated crossings. To accommodate individuals who were not inclined to use the grade-separated crossing.

To enhance safety and mobility, we recommend the following improvements be considered at these crossings:

1. Water Street

Conventional at-grade crossing with advanced warning signs (estimated cost: \$10,000).

2. US 12 and Pleasant Street

- a. Conventional at-grade crossing with pedestrian islands and advanced warning signs on the east approach (estimated cost: \$35,000).
- b. Below bridge grade-separated crossing with connecting ramps on the west side of the creek (estimated cost: \$140,000).

3. US 18 and Verburg Street

No crossing.

4. US 18 and Simonson Street

- a. Conventional at-grade crossing with pedestrian islands and advanced warning signs on the west approach, (estimated cost: \$35,000).
- b. Sidewalk along south shoulder for US 18 from crossing to west side of Simonson Street (estimated cost: \$25,000).
- c. Below bridge grade-separated crossing with connecting ramps on the west side of the creek (estimated cost: \$125,000).



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It should be noted that the above estimates have been developed without the benefit of detailed survey and soils information. As a result, they are intended more for comparison of relative options than for financial planning and budgeting. Before proceeding with additional planning, it is recommended that detailed information on the various sites be obtained and further evaluated.

C. Optional Connections/Extensions

1. Mill Street Bridge Connection

The connection of the trail system along the west side of Koshkonong Creek with Mill Street with a new bridge would provide an important destination-based link between a regional recreation trail and the Village's downtown business district. This bridge itself would serve as a gateway to the Village and enhance the attraction of trail tourists to the various downtown shops and restaurants.

2. West Side Connection

The preferred trail system provides a direct connection between the existing Multi-Use Trail and the future northeast regional trail. Unfortunately, it does not provide a connection to the northwest quadrant of the Village.

Future development patterns within the Village may dictate that a direct connection to this quadrant be provided. Such a connection would extend west along the south side of US 18 from the recommended trail corridor. The crossing of US 18 for this extension should be at England Street. If enhanced traffic control including all-way stop control, traffic signals, or a roundabout provided in the future at the intersection of US 12 and US 18, the England Street crossing should be relocated to the east approach of the US 12/US 18 intersection.

Sincerely,

STRAND ASSOCIATES, INC.

Michael H. Bridwell, P.E.

Enclosure