

Cherry Street Traffic and Safety Study Rising Sun, Maryland

Prepared for:



Town of Rising Sun
1 East Main Street
Rising Sun, MD 21911

Prepared by:



KCI Technologies, Inc.
1352 Marrows Road
Suite 100
Newark, DE 19711

**SEPTEMBER 2007
DRAFT**

INTRODUCTION

At the request of the Town of Rising Sun, KCI Technologies, Inc. (KCI) prepared a traffic study related to safety problems at the MD 273 (Main Street) at South Walnut Street intersection and the MD 274 (Queen Street) at Cherry Street intersection in Rising Sun, Maryland. In conjunction, the roadway segment referred to as Cherry Street and South Walnut Street, located between MD 274 and MD 273, is also part of this report. After discussing these locations with the Town Administrator, it was agreed that these two intersections along with the segment of Cherry Street & South Walnut Street that connect MD 273 with MD 274 pose the greatest safety concern and should be the focus of the study. **Figure 1** represents a snapshot of the study area with the two key intersections and roadway segment highlighted.

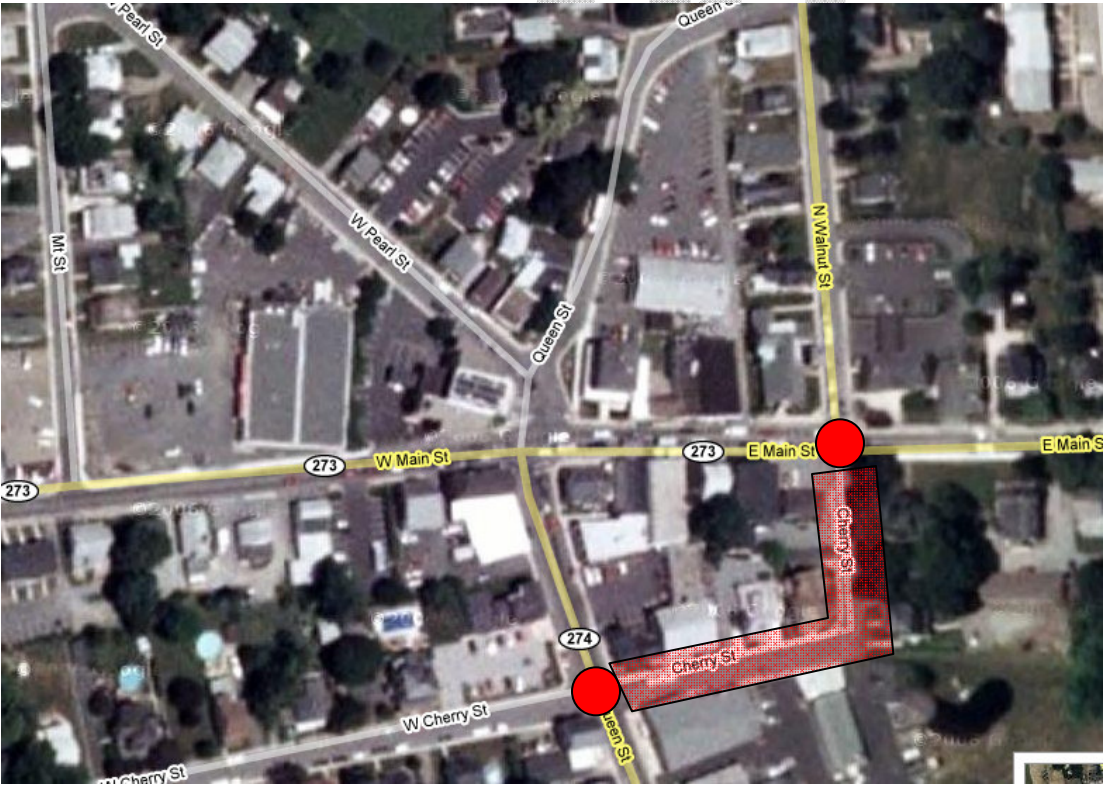


Figure 1. Study Area

Town officials have noted that motorists are using these two intersections as a means to avoid the existing traffic signal at the MD 273/MD 274 intersection. Vehicles traveling southbound on Walnut Street attempt to make a left-turn movement or a through movement at the intersection with MD 273. Likewise, vehicles traveling westbound on Cherry Street attempt to make a left-turn movement at the intersection with MD 274. Limited sight distance is one of the contributing factors to reduced safety at these intersections. The primary purpose of the study is to identify some reasonable and feasible alternatives for these two intersections to improve safety for commuters while not negatively affecting local residents and businesses.

This report includes the following information:

- Data Collection
- Accident Analysis
- Improvement Options
- Recommendations

DATA COLLECTION

KCI conducted a site visit on August 31, 2007 to observe general traffic conditions and to gather the physical characteristics of Cherry Street and adjacent roadways.

MD 273 (Main Street), between MD 274 (Queen Street) and Walnut Street



Figure 2. MD 273, looking west towards MD 274 (from just past Walnut Street)

- MD 273 is an east-west State route designated as rural minor arterial, with an estimated average annual daily traffic (AADT) of 6,950 vehicles (Based on the Maryland State Highway Administration's (SHA) Highway Location Reference).
- The overall roadway (curb to curb) width on this section of MD 273 is approximately 32'. This width accommodates two, 12'-wide travel lanes (one lane each direction and one eight-foot-wide parking lane).
- On-street parking is located on the south side of MD 273 (eastbound direction) in this block. There are pavement markings to designate eight parking spaces. The parking is not metered and only restricted with signing for time of day and duration (generally two-hour parking was allowed between 7:00 AM and 12:00 PM).
- The posted speed limit along MD 273 is 25 miles per hour (MPH). A cursory speed study showed that most drivers are abiding by the posted speed limit and driving within a range of 20 MPH to 30 MPH in both directions of MD 273. Only a few drivers were observed to be driving at speeds between 30 MPH and 35 MPH in both directions of MD 273.

- A one-way northbound alley is located along the north side of MD 273 in this block, providing access to the Town's municipal parking lot, a nearby church (located in the northwest quadrant of MD 273/Cherry Street & Walnut Street) and various businesses
- No bus stops were identified along this section of MD 273.
- Both overhead roadway lighting and ornamental, pedestrian-level lighting are present in this block; representative of recent streetscape improvements.
- Sidewalks are present on both sides of the street, adjacent to the back of curb.

MD 274 (Queen Street), between Cherry Street and MD 273 (Main Street)



Figure 3. MD 274, looking north towards MD 273 (from just south of Cherry Street)

- MD 274 is a predominantly north-south State route designated as rural major collector, with an estimated average annual daily traffic (AADT) of 5,525 vehicles (Based on the Maryland State Highway Administration's (SHA) Highway Location Reference). In the SHA Highway Location Reference, this section of MD 274 is inventoried as an easterly-westerly route.
- The overall roadway (curb to curb) width on this section of MD 274 is approximately 42'. This width accommodates two, 12'-wide travel lanes and two nine-foot-wide parking lane. On-street parking is located on both sides of MD 274 in this block. A total of 11 parking spaces are marked on both sides of the road (five on the east side (one of which is handicapped accessible), and six on the west side). The parking is not metered and only restricted by signing.
- The posted speed limit along MD 274 is 25 miles per hour (MPH). A cursory speed study showed that most drivers are abiding by the posted speed limit and driving within a range of 20 MPH to 30 MPH. Only a few drivers were observed to be driving at speeds between 30 MPH and 40 MPH in the northbound direction.
- No bus stops were identified along this section of MD 274.
- Both overhead roadway lighting and ornamental, pedestrian-level lighting are present in this block; representative of recent streetscape improvements.

- Sidewalks are present on both sides of the street, adjacent to the back of curb.

Cherry Street/Walnut Street, between MD 274 (Queen Street) and MD 273 (Main Street)



Figure 4. Cherry Street, looking westbound towards MD 274

- The overall roadway (curb to curb) width on this section of Cherry Street/Walnut Street is approximately 31'. This accommodates two travel lanes (one in each direction). On-street parking is not provided in this block.
- The posted speed limit along this section of Cherry Street/Walnut Street is estimated to be 25 miles per hour (MPH), since there is no posted speed limit sign present in this block. The section of Cherry Street, west of MD 274 is posted as 25 MPH.
- No bus stops were identified along this section of Cherry Street, although it was observed that school buses use this roadway segment to drop off and pick up school children.
- Double yellow pavement markings are present only at the intersection with MD 274 to delineate two-way traffic on this section of Cherry Street.
- Overhead roadway lighting is present in this block.
- Sidewalks are generally present on both sides of the street, adjacent to the back of curb, although no sidewalk exists on the east side of Walnut Street as it approaches MD 273.

Accident Data and Analysis

All available State of Maryland Motor Vehicle accident reports were provided by the Town's Police Chief for the MD 273/Walnut Street intersection and the MD 274/Cherry Street intersection for the period between January 2005 and July 2007 (approximately 2 ½ years). The following is a summary of these reports:

MD 273 at Walnut Street

- Nine (9) accidents reported over this time period

- The most prevalent cause of accidents was a “Failure to yield” to mainline traffic (MD 273) by side street traffic (Walnut Street)
- One reported accident was a rear-end collision on MD 273 due to high travel speeds and conflict with vehicles from side street
- All reported accidents were property-damage only (PDO)
- No pattern was determined for time-of-day, time of year, etc. for the reported accidents.

MD 274 at Cherry Street

- Eighteen (18) accidents reported over this time
- The most prevalent cause of accidents was a “Failure to yield” to mainline traffic (MD 274) by side street traffic (Cherry Street)
- Reported accidents consisted of a mix of PDO and Injury-related crashes
- No pattern was determined for time-of-day, time of year, etc. for the reported accidents.

From the limited data provided by the Town, we are only able to conclude that the “failing to yield” cause for many of these accidents could only be attributed to one or more of the following general factors:

- Poor sight distance for the side streets
- Excessive speeds on the major road
- Poor lighting conditions

Our field investigation did not determine any obvious speeding problems and the presence of both overhead and pedestrian lighting lead us to believe that this is also not a major factor in the types of accidents. Driving through the intersections and observing other drivers’ tendencies lead us to believe that sight distance is the most significant issue contributing to accidents and generally poor safety conditions at these intersections. The following section summarizes our evaluation of available sight distance for the key movements at both intersections.

Sight Distance Evaluation

As a result of the accident data and initial meeting held with the Town of Rising Sun, KCI conducted a cursory sight distance evaluation as part of our site assessment for the minor street approaches at both study intersections.

Two forms of sight distance were evaluated during the field visit; stopping sight distance and intersection sight distance. According to the American Association of State Highway and Transportation Officials’ (AASHTO) Policy on Geometric Design of Highways and Streets, stopping sight distance is provided continuously along each road so that motorists have adequate time to stop and react to another vehicle or other feature at an intersection approach. Intersection sight distance refers to the motorist on the side street looking if they have adequate clearance to enter or cross the major road.

For the two study intersections, intersection sight distance cases B1 and B2 from the minor road are most applicable. AASHTO defines Case B requirements for intersections with stop control on the minor road. Case B1 refers to a left-turn maneuver from the minor road onto the major road. Case B2 refers to a right-turn maneuver from the minor road onto the major road. Case B3 represents the crossing maneuver from the minor road, but for these two locations, verifying

that Cases B1 and B2 are met adequately addresses the crossing maneuver. **Figure 5** provides a general sketch of sight distance required for vehicles on a minor road approach.

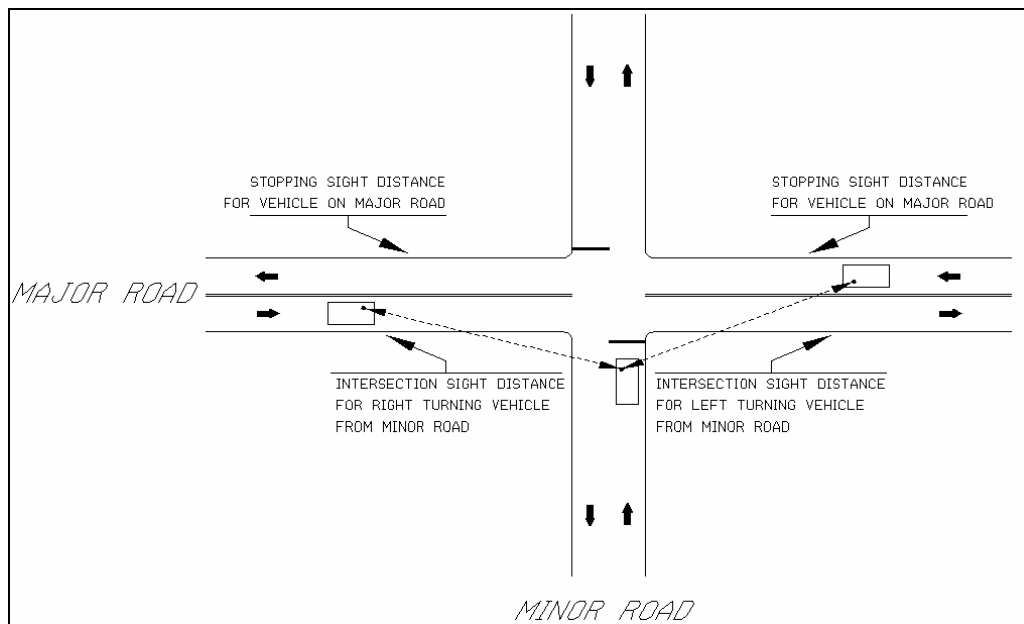


Figure 5. Sight Distance Schematic

The **required** sight distances for each location are based on AASHTO guidelines for a design speed of 35 MPH. It is common to set the design speed at 10 MPH above the posted speed limit to ensure a factor of safety for sight distance at an intersection.

The **theoretical** sight distance measurements were based on the actual field location of either stop bar or the stop sign, assuming that an approaching vehicle would comply with the signing and pavement markings on the side streets.

The **observed** sight distance measurements were based on where vehicles actually stopped prior to making a turn movement onto the major road. Oftentimes, this location was several feet beyond the location of the stop bar or stop sign location. This behavior was almost always necessary due to the sight distance limitations present at each intersection.

General field observations determined that existing obstructions (mainly on-street parking, existing landscaping, and building locations), and the locations of stop bar pavement markings on the side streets may be contributing to safety problems at these intersections. Below are summary tables of the sight distance evaluation for each side street approach.

Eastbound Cherry Street (at MD 274)
(photo shown of theoretical stop condition)



Stopping Sight Distance	
Required	250'
Theoretical	145' (Substandard)
Observed	> 500'
Intersection Sight Distance (ISD)	
Required ISD to the left (Case B1):	390'
Required ISD to the right (Case B2):	335'
Theoretical ISD for Left-Turn from Side Street	90' (Substandard)
Observed ISD for Left-Turn from Side Street	> 500'
Theoretical ISD for Right-Turn from Side Street	125' (Substandard)
Observed ISD for Right-Turn from Side Street	225' (Substandard)

The major obstruction for eastbound Cherry Street traffic is the existing building located in the southwest corner of the intersection. The theoretical intersection sight distance of 90' is caused by the location of the stop bar and the close proximity of the adjacent building. As seen in the photo above, a vehicle stopped at the stop bar, cannot see to the right for northbound MD 274 traffic, making either a crossing movement or left-turn movement very dangerous. Drivers were observed pulling forward, past the stop bar to get a better view of MD 274 traffic. Looking to the left, the on-street parking along MD 274 was also an obstruction. The theoretical intersection sight distance measurement of 125' reflects the constraints created by the on-street parking. This condition would likely be at its worst when all parking spaces are occupied. Again, as vehicles advance beyond the stop bar, their sight distance is improved but they no longer have the protection of the curbs to eliminate possible angle collisions or other "failure to yield" incidents.

Westbound Cherry Street (at MD 274)
(photo shown looking to the right)



Stopping Sight Distance

Required	250'
Theoretical	80' (Substandard)
Observed	90' (Substandard)
Intersection Sight Distance (ISD)	
Required ISD to the left (Case B1):	390'
Required ISD to the right (Case B2):	335'
Theoretical ISD for Left-Turn from Side Street	80' (Substandard)
Observed ISD for Left-Turn from Side Street	90' (Substandard)
Theoretical ISD for Right-Turn from Side Street	300' (Substandard)
Observed ISD for Right-Turn from Side Street	325' (Substandard)

Sight distance was severely limited for westbound Cherry Street traffic, as a result of the on-street parking located closest to the side street approach along MD 274. When the two parking spaces closest to Cherry Street are occupied sight distance is reduced to 80' or 90'. When looking to the left, a utility pole and a wide commercial driveway where cars have been observed to park, also limit the sight distance available to drivers. Vehicles on this approach were observed to also move beyond the stop bar location to obtain a better view of oncoming traffic. The same issue of losing the protection of the curbs comes into effect as a vehicle along Cherry pulls out to make a left-turn, right-turn or through movement.

Southbound Walnut Street (at MD 273)
(photo shown looking to the right)



Stopping Sight Distance

Required	250'
Theoretical	260'
Observed	270'
Intersection Sight Distance (ISD)	
Required ISD to the left (Case B1):	390'
Required ISD to the right (Case B2):	335'
Theoretical ISD for Left-Turn from Side Street	260' (Substandard)
Observed ISD for Left-Turn from Side Street	310' (Substandard)
Theoretical ISD for Right-Turn from Side Street	275' (Substandard)
Observed ISD for Right-Turn from Side Street	400'

Sight distance for motorists on southbound Walnut Street looking to the left appears to be adequate once they move beyond the existing stop bar. As shown in the photo that follows, the stop bar is set back quite far from the approaching lane on westbound MD 273. The “jog” in the road places vehicles on the southbound Walnut Street approach at a disadvantage for sight distance (approximately 300’ if a vehicle stays at the stop bar). Obstructed views are attributed to the existing trees and bank signs located on the northeast corner of the intersection. Looking to the right (towards the MD 273/MD 274 intersection), sight distance is also problematic as the setback of the stop bar and curb line again contribute to a shorter viewing distance. Shrubs and a utility pole both prevent the available sight distance for motorist looking to the right from being adequate. Based on required intersection sight distance, a vehicle on southbound Walnut Street should be able to see the MD 273/MD 274 intersection without obstruction.



Looking east on MD 273, note the location of the stopbar along South Walnut Street

Northbound Walnut Street (at MD 273)
(photo shown looking to the right)



Stopping Sight Distance

Required	250'
Theoretical	130' (Substandard)
Observed	180' (Substandard)

Intersection Sight Distance (ISD)

Required ISD to the left (Case B1):	390'
Required ISD to the right (Case B2):	335'
Theoretical ISD for Left-Turn from Side Street	260' (Substandard)
Observed ISD for Left-Turn from Side Street	> 500'
Theoretical ISD for Right-Turn from Side Street	120' (Substandard)
Observed ISD for Right-Turn from Side Street	160' (Substandard)

Intersection sight distance is inadequate for northbound Walnut Street traffic, looking both to the left and to the right. In looking to the left, on-street parking along MD 273 reduces the sight distance while an overgrown shade tree limits visibility to the right, as depicted in the photo above.

Traffic and Safety Improvement Concepts

Field observations and accident data analysis have validated the need for safety improvements at both the MD 273/Walnut Street and MD 274/Cherry Street intersections. The accident data revealed driver behavior on the minor street approaches that supports the results of the cursory sight distance evaluation. In most cases, sight distance is substandard for vehicles on the side street approaches. This is reinforced by observing vehicles ignore the placement of the stop bar and stop sign locations in an effort to improve their sight distance for oncoming traffic along the major roads. The following are a list of the initial improvement options for the recurring traffic and safety problems at these two intersections that were discussed with the Town and KCI prior to conducting this study:

1. Convert Walnut Street to one-way northbound only from MD 273 to Queen Street

Walnut Street, north of MD 273 is currently two-way with one-lane in each direction. Access is provided to the bank in the northeast quadrant of this intersection as well as various residential homes. If this section of Walnut Street was converted to one-way northbound, it may require that the existing bank access be converted to outbound only. Further evaluation of this impact is required. Please note that the bank does have a full-movement access point along MD 273. Converting this section to one-way northbound would also not necessarily reduce cut-through traffic using eastbound Cherry Street to avoid the MD 273/MD 274 intersection. The conversion to one-way would however, eliminate the right-turn out and left-turn out movements. In reviewing the available sight distance, these movements reflect some of the more limited sight distance movements at this intersection.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Removes southbound Walnut Street movements towards MD 273 intersection	Reduces access to bank and residential homes within block
Reduces conflict points at intersection	Reduces route options for emergency service vehicles
Creates potential for on-street parking along Walnut Street as a result of change to one-way traffic flow	Could promote speeds due to removal of southbound Walnut Street traffic
Removes existing sight distance problem for southbound Walnut Street traffic	May impact public and school bus route options. Further evaluation is needed to confirm this.
Provides opportunity to widen sidewalks and narrow roadway	Requires initial enforcement increase to address change in traffic flow
	Requires public education due to change in traffic pattern
	Requires signing and pavement marking adjustments

We feel that this is a viable option that can be explored once all interim improvements are exhausted.

2. Convert Cherry Street/Walnut Street to one-way eastbound only from MD 274 to MD 273

If the section of Cherry Street/Walnut Street between MD 274 and MD 273 was converted to one-way eastbound only, northbound MD 274 traffic would still be able to turn right onto Cherry Street. Southbound MD 274 traffic would be allowed to turn left onto this segment of road. Finally, eastbound Cherry Street traffic would be allowed to continue through, across MD 274. The intersection of MD 273/Walnut Street would be one-way outbound only. Therefore, southbound Walnut Street traffic would be redirected to the MD 273/MD 274 intersection if motorists wish to access the section of Cherry Street and Walnut Street.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Removes westbound movements towards MD 274 intersection Reduces conflict points at intersection Removes existing sight distance problem for westbound Cherry Street traffic	Reduces access to businesses and residential homes within block Reduces route options for emergency service vehicles Promotes speeds due to removal of southbound Walnut Street traffic May impact public and school bus route options Requires initial enforcement increase to address change in traffic flow Requires public education due to change in traffic pattern May encourage higher travel speeds and promote cut-through movement to northbound Walnut Street May promote avoidance of MD 273/MD 274 intersection by northbound MD 274 traffic seeking to head east on MD 273 Requires signing and pavement marking adjustments

We feel that this is a viable option that can be explored once all interim improvements are exhausted. It could work well in conjunction with the first option (converting the block of Walnut Street north of MD 273 to southbound only) because the combination of the two changes would eliminate the ability for motorists to use this route to avoid the MD 273/MD 274 traffic signal.

3. Eliminate the southbound through and left-turn movements from Walnut Street at the intersection with MD 273.

As noted in suggestion #1, the sight distance available for these two movements from southbound MD 273 does not appear to be the worst condition at this intersection. The benefits of removing the through movement and left-turn movements are that the accident severity would be improved. It would also eliminate the use of Cherry Street as a cut-through street to avoid the MD 273/MD 274 intersection.

Turn prohibitions could be enforced with a combination of physical roadway treatments and signing. Essentially, a right-in/right-out only movement would be created on the southbound approach. While a permanent concrete island would be preferred, other treatments such as raised tubular markers could be applied to define the right-in and right-out only movements. Advance signing on both approaches would be required to designate no left turns from MD 273 to Walnut Street.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Maintains two-way traffic along Walnut Street Reduces conflict points at intersection	May impact public and school bus route options Requires initial enforcement increase to address change in traffic flow
Removes existing sight distance problem for southbound Walnut Street traffic	Requires public education due to change in traffic pattern Requires signing adjustments May not have enough space at the intersection to construct physical barriers (curbed island, flexible posts, etc.) to prohibit turns. Further evaluation would be necessary. Use of physical barriers to prohibit certain movements may negatively impact pedestrian movements Physical treatments to prohibit turn movements (i.e., curbed islands) may require drainage modifications

At this time, we do not necessarily believe that physical treatments are feasible or justified as improvements for this location. This would be considered a long-term improvement if all other interim improvements do not improve the safety conditions.

4. Eliminate the westbound through and left-turn movement from Cherry Street at the intersection with MD 274.

At the intersection of MD 274 and Cherry Street, westbound traffic has poor sight distance looking either to the left or right. Making a through movement or a left-turn movement from westbound Cherry Street has contributed to at least half of the reported accidents. Providing a right-in/right-out only condition for westbound Cherry Street would eliminate these conflicts, but would still allow northbound MD 274 traffic to use Cherry Street to avoid the signalized intersection if they intend to travel eastbound on MD 273.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Maintains two-way traffic along Cherry Street Reduces conflict points at intersection	May impact public and school bus route options Requires initial enforcement increase to address change in traffic flow
Removes existing sight distance problem for westbound Cherry Street traffic	Requires public education due to change in traffic pattern Requires signing adjustments May not have enough space at the intersection to construct physical barriers (curbed island, flexible posts, etc.) to prohibit turns. Further evaluation would be necessary. Use of physical barriers to prohibit certain movements may negatively impact pedestrian movements Physical treatments to prohibit turn movements (i.e., curbed islands) may require drainage modifications

Similar to suggestion #4, we do not feel that this measure should be implemented unless all other interim options are considered. This would again fall under a long-term improvement.

5. Relocating the on-street parking on the south side of MD 273 to the north side of the road and adjust the pavement markings along MD 273 between MD 274 and Walnut Street.



Figure 6. Looking westbound on MD 273, towards MD 274/MD 273 intersection

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Improves sight distance for northbound Walnut Street traffic looking to the left Shifted parking complements existing curb line on north side of MD 273, east of Walnut Street	May negatively impact businesses on the south side of MD 273 May shift or worsen existing sight distance problems for Walnut Street along MD 273 May not be feasible for larger vehicles turning right onto MD 273 from northbound MD 274 Requires signing and pavement marking adjustments

While shifting the on-street parking on MD 273 from the south side to the north side would complement the existing curb offsets established along the State route, the parked vehicles would likely still create a sight obstruction for southbound Walnut Street motorists seeking to either turn left onto MD 273 or go through to Walnut Street/Cherry Street. At this time, we feel that restricting parking during peak hours should be considered prior to relocating the parking on MD 273.

6. Removing parking from MD 273 completely while creating minor curb extensions (bump outs) on the north side of MD 273 that would relocate the double yellow line so there is no shift for through traffic.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Improves sight distance for northbound and southbound Walnut Street traffic looking to the left and right, respectively Curb adjustments on north side of MD 273 provides opportunity to align pavement edge along westbound MD 273 Provides pavement area to consider a westbound left-turn pocket at MD 273/MD 274 intersection	Negatively impacts businesses on both sides of MD 273 May not be feasible for larger vehicles turning right onto MD 273 from northbound MD 274 Requires signing and pavement marking adjustments

While removing the on-street parking on MD 273 completely would reduce the number of sight obstructions for side street motorists, it will likely be opposed by local businesses. At this time, we feel that restricting parking during peak hours should be considered prior to relocating the parking on MD 273.

7. Restrict parking along MD 273 during the peak hours to improve sight distance for side street traffic during busiest travel times.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Improves sight distance for northbound and southbound Walnut Street traffic looking to the left and right, respectively during peak hours	Negatively impacts businesses on both sides of MD 273 during peak hours Requires signing adjustments

As noted above, we feel that this parking adjustment should be considered during the heaviest travel periods along MD 273.

8. Prohibit left-turning and through movements from the both side street approaches throughout the day due to substandard sight distance.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Removes sight distance issues for northbound and southbound Walnut Street traffic looking to the left and right	Requires initial enforcement increase to address change in traffic flow Requires signing adjustments Reduces route options for emergency service vehicles

While we feel that signing can be provided to instruct drivers of various movement restrictions, it may be difficult to enforce the condition long-term. This may be considered, but should be looked at in conjunction with other options.

9. Prohibit left-turning and through movements from the both side street approaches during peak periods only due to substandard sight distance.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Improves sight distance for northbound and southbound Walnut Street traffic looking to the left and right, respectively during peak hours	Requires initial enforcement increase to address change in traffic flow Requires signing adjustments Reduces route options for emergency service vehicles during peak hours

While we feel that signing can be provided to instruct drivers of specific time of day restrictions, it may be difficult to enforce the condition long-term. This may be considered, but should be looked at in conjunction with other options. Enforcement of this measure would be somewhat more manageable than the suggestion presented in #8.

10. Provide advance intersection warning signs (W2-1) and regulatory signs (R10-7) along both directions of MD 273 and MD 274 for the Cherry Street and Walnut Street intersections, respectively.

Advance intersection warning signs should be placed along MD 273 and MD 274 to alert drivers that a crossroad exists at Walnut Street and Cherry Street, respectively. Because sight distance to and from the side street is generally not adequate, motorists on the State routes could benefit from signing that identifies this cross street. Likewise, placement of “Do Not Block the Intersection” (R10-7) signing along MD 274 would provide motorists on Cherry Street and Walnut Street some additional protection to cross MD 274 or enter a queue to turn onto MD 274. While the R10-7 sign does not have the same affect as placing stop signs on MD 274, it should improve safety for vehicles exiting the side street.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Alerts motorists along State route of upcoming side streets	Requires signing adjustments

We feel that this improvement is low-cost and could be implemented almost immediately. The option should be considered as a first-step to addressing safety concerns at the intersections.

11. Provide crosswalk pavement markings for pedestrians crossing the side street approaches. This will provide more of an indication as to where vehicles are as they move past the stop bar location to check if it is safe to enter traffic on MD 273. To fit in with the recent streetscape improvements in Rising Sun, decorative, brick-paver crosswalks could be installed to better alert motorists of where they are as they move to view oncoming traffic. The brick-paver crosswalks would also act as a unique pavement surface for the side street traffic.

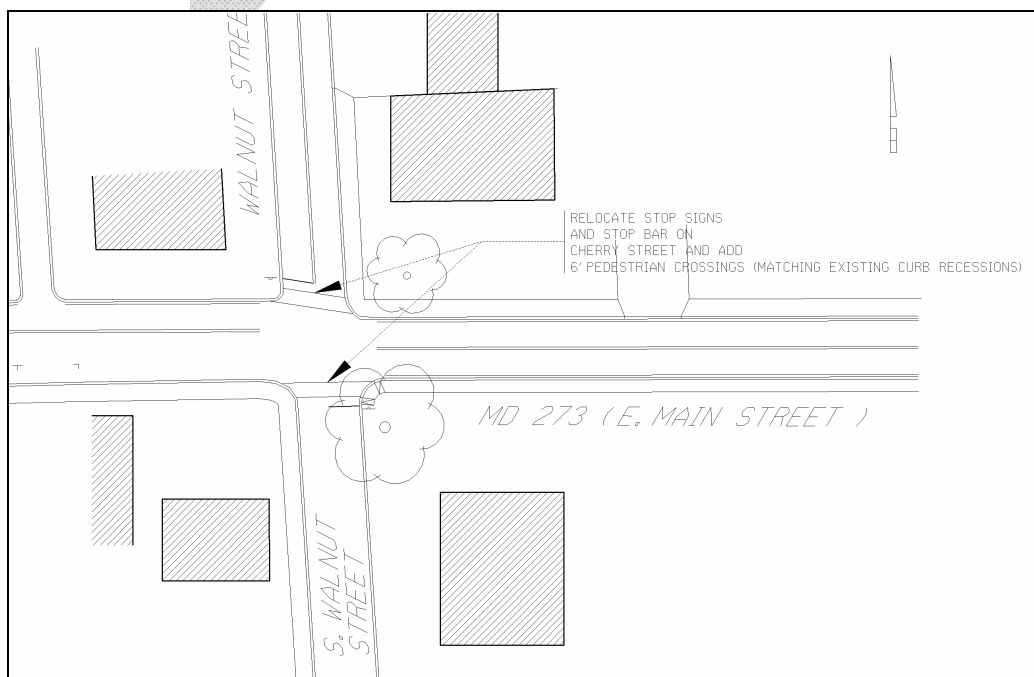


Figure 7. Crosswalk enhancements along Cherry Street & Walnut Street

While we feel that this suggestion could provide some added some measure of awareness to the side street motorists, the placement of crosswalks could ultimately change the location of the stopbars on the side street approaches. Further evaluation would be needed to verify any adjustment in the location of the stopbars for sight distance purposes.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Markings define the edge of road for side street traffic more than just stop bar	Does not necessarily improve where drivers stop to view oncoming traffic
Provide clearly defined walking area for pedestrians	Could introduce more pedestrian/vehicular conflicts

12. Convert the section of Cherry Street/Walnut Street to one-way eastbound only from MD 274 to MD 273 in combination with converting Walnut Street (north of MD 273 up to Queen Street) to one-way southbound. Northbound MD 274 traffic would be allowed to turn right onto this segment of road. Southbound MD 274 traffic would be allowed to turn left onto this segment of road. Finally, eastbound Cherry Street traffic would be allowed to continue through, across MD 274. The intersection of MD 273/Walnut Street would be one-way outbound only. Therefore, southbound Walnut Street traffic would be redirected to the MD 273/MD 274 intersection if motorists wish to access the section of Cherry Street and Walnut Street.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Removes key movements at both intersections that currently have poor sight distance	Reduces access to businesses and residential homes within block
Does not promote or provide a alternate route option to the MD 273/MD 274 intersection	Requires signing and pavement marking adjustments
	Reduces route options for emergency service vehicles
	May impact public and school bus route options
	Requires initial enforcement increase to address change in traffic flow
	Requires public education due to change in traffic pattern

This suggestion is mostly a combination of options #1 and #2 and should be considered once all interim options of signing and marking improvements are exhausted. Traffic numbers should be evaluated to determine the impact of removing movements through the changes in traffic flow.

13. Convert the section of Cherry Street and Walnut Street to one-way westbound in combination with converting Walnut Street (between MD 273 and Queen Street) to one-way northbound only. This would allow eastbound MD 273 and westbound MD 273 traffic to turn right and left onto Cherry Street, respectively. Likewise, traffic on MD 273 would be allowed to turn onto Walnut Street. The combination of these one-way conversions does eliminate the opportunity for traffic to use Walnut Street and Cherry Street as an alternate route around the MD 273/MD 274 intersection.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Removes key movements at both intersections that currently have poor sight distance Does not promote or provide a alternate route option to the MD 273/MD 274 intersection	Reduces access to businesses and residential homes within block Requires signing and pavement marking adjustments Reduces route options for emergency service vehicles May impact public and school bus route options Requires initial enforcement increase to address change in traffic flow Requires public education due to change in traffic pattern

This suggestion is a reverse of consideration of options #3 and could be considered once all interim options of signing and marking improvements are exhausted. Traffic numbers should be evaluated to determine the impact of removing movements through the changes in traffic flow.

14. It appears that the low lying branches from the tree in the southeast corner of the intersection could contribute to reduced sight distance. It is recommended to have some of the lower lying branches cut back to improve the sight distance for drivers looking to the right from northbound Cherry Street.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Low-cost option that may provide immediate benefits to northbound Walnut Street traffic looking to the right	No significant traffic or safety-related disadvantages

We feel that this option should be considered in conjunction with all other interim options.

15. Removing the two on-street parking spaces on the east side of MD 274, closest to the westbound Cherry Street approach in combination with creating a curb extension that would allow for the relocation of the stop bar and stop sign on the westbound Cherry Street approach. Although the theoretical and observed intersection sight distance results for vehicles looking to the right from this approach were calculated above the required distances, it was noted that no cars were parked in the aforementioned parking spaces at the time. It was determined that if vehicles, especially vans, SUVs or other vehicles with a greater height than typical passenger cars were parked in these spots, sight distance to the right would be greatly reduced.



**Figure 8. Westbound Cherry Street, looking north towards MD 274
(Remove parking from spaces marked with “X”)**

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Improves sight distance for westbound Cherry Street traffic looking to the right	Negatively impacts businesses on east side of MD 274
	Requires signing adjustments

We feel that these parking spaces should be removed to provide some sight distance improvement for motorists on westbound Cherry Street, looking north towards MD 273. While removal of parking may be opposed by local businesses, consideration to relocate these two spaces could be evaluated in more detail if the Town enforces this option.

16. Providing crosswalk markings across both side street approaches of Cherry Street. This would provide a visual alert to motorists as the approach MD 274

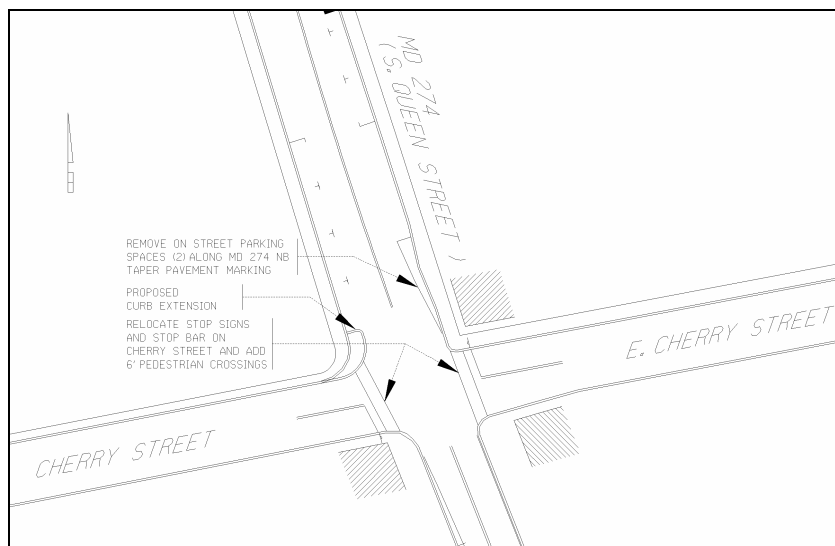


Figure 9. Proposed Curb Extensions, Crosswalks, and pavement markings

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Markings define the edge of road for side street traffic more than just stop bar	Does not necessarily improve where drivers stop to view oncoming traffic
Provide clearly defined walking area for pedestrians	Could introduce more pedestrian/vehicular conflicts

17. Provide curb extensions on the northwest and northeast corners of the intersection along MD 274.

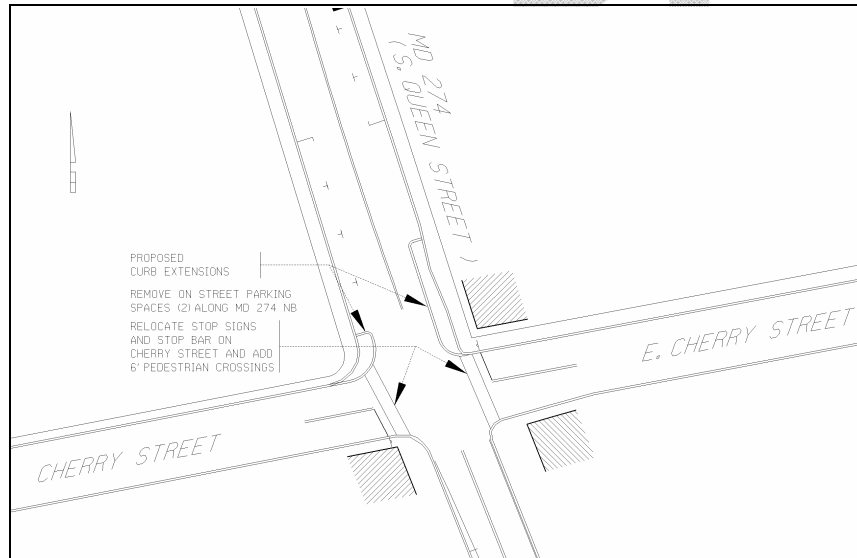


Figure 10. Proposed Curb Extensions along MD 274 at Cherry Street

Looking at the photo below, it appears that a curb extension would help line up a crosswalk for pedestrians crossing the eastbound Cherry Street approach at MD 274. Motorists are currently set back far on eastbound Cherry Street and do not have the protection of the same curb edge for both sides of their vehicle. As a motorist creeps out beyond the stop bar location, they find themselves protected by the curb edge to the south of them, but find that they are in the roadway segment of southbound MD 274 due to their encroachment in the on-street parking space. On-street parking along the west side of MD 274 between MD 273 and Cherry Street is delineated by pavement markings, but is not protected or delineated from the travel lane by curb extensions. We feel that placing a curb extension on the northwest corner of the intersection would help protect eastbound Cherry Street motorists and help them define how far out they can go past the stop bar to view oncoming traffic.



Figure 11. Southbound MD 274, just north of Eastbound Cherry Street approach

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Defines on-street parking lanes along MD 274 Extends curb edge to allow side street vehicles more area to advance prior to making turn onto MD 274	May impact existing parking spaces Requires signing adjustments

18. Consider a Hazardous Intersection Beacon (HIB) in advance of both approaches for the MD 274/Cherry Street intersection.

A hazard identification beacon (HIB) is one or more sections of a standard traffic signal head with a flashing circular yellow indication in each section. It shall be used only to supplement an appropriate warning or regulatory sign or marker. It may be warranted as an advanced warning device at an important intersection, bridge or railroad hidden by an obstruction or sharp curve in the highway or at other appropriate locations. It may also be warranted at physical obstructions existing immediately adjacent to or in the roadway. HIBs are often referred to as flashers.

The purpose of flashers is to attract attention to unexpected hazards. A flashing beacon is most effective as a warning of unexpected or hazardous conditions not readily visible to drivers. One of the more common locations where a flashing beacon is effective is above a stop sign controlled intersection located just beyond a curve that is hidden from the view of approaching motorists. In this particular location, drivers along the State route may not expect traffic from the minor side street such as Cherry Street or Walnut Street because of their generally poor sight distance and their close proximity to the major signalized intersection of MD 273 and MD 274. Below is an illustration of a roadside and mast arm application of the flashing beacon. The warning signs referred to in Recommendation #4 would be used with this application

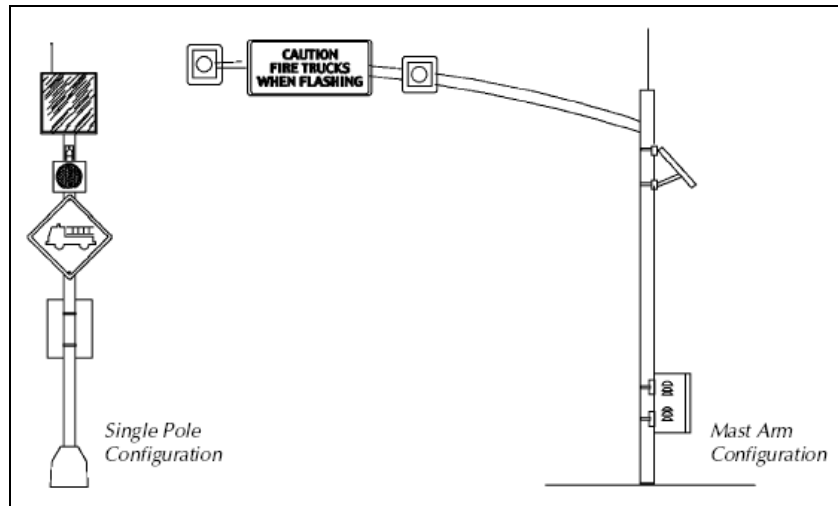


Figure 12. Hazardous Intersection Beacons

Please note that the request for placing a HIB along a State route would require a design request (DR) to be submitted to SHA's District office for review and approval; following a similar review and approval process as standard traffic signal. More detailed design would also be required prior to installing these traffic control devices.

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Improves sight distance for northbound and southbound Walnut Street traffic looking to the left and right, respectively during peak hours	May not warrant an advance beacon
	Requires signing adjustments
	May not have necessary right-of-way to accommodate beacon equipment

19. Relocate the utility pole on the southeast corner of the intersection and discourage parked vehicles in the adjacent driveway

Looking at the photo below, westbound Cherry Street traffic's view is obstructed looking left by a utility pole in the southeast corner of the intersection. In addition, when vehicles occupy the concrete driveway of the property located in the southeast corner of this intersection (shown in the picture), sight distance is further compromised. While this driveway is likely associated with a private property, it may be in the Town's best interest to try and prohibit parking in this area, at least during peak periods of traffic.



Figure 13. Southbound MD 274, at the westbound Cherry Street approach

Summary of Advantages and Disadvantages

<i>Advantages</i>	<i>Disadvantages</i>
Improves sight distance for westbound Cherry Street traffic looking to the left	Costs may be exorbitant to remove and relocate the utility pole from its current location

Unless a major utility relocation project is planned for MD 274, we conclude that the removal/relocation of this or any overhead utility poles is a long-term improvement and not feasible for immediate sight distance/safety relief.

OVERALL RECOMMENDATIONS

While we believe there is some level of improved safety gained for all improvements considered in the section above, below are our overall recommendations for these key locations based on available data and field investigation. Our overall recommendations take into consideration some combination of a few options presented earlier in this report. We also believe that the costs and additional design required to implement these improvements would be lower than other suggestions provided at this time, while still addressing safety. We also feel that other than parking restrictions placed during the peak periods, these improvements would cause the least amount of disturbance to the surrounding community. Finally, by starting with the recommended improvements listed for each intersection, an evaluation period can be established prior to considering more costly, impactful options. Nevertheless, coordination would be required with the Maryland State Highway Administration (SHA) for any improvements that fall within the State’s right-of-way along either MD 273 or MD 274.

MD 273/Walnut Street

- Clear all roadside obstructions, especially the shade tree in the southeast quadrant of intersection.
- Place crosswalk pavement markings or implement additional streetscape improvements to provide brick-paver crosswalks across both side street approaches. The change in paving surface on the crosswalk would improve the side street drivers’ awareness as they encroach on the State route to make a turn. Further evaluation would be required to verify if the stopbar location is changed on the side streets.

- Remove all on-street parking from MD 273 between MD 274 and Cherry Street/Walnut Street during the AM and PM peak hours only. This improvement would reduce sight distance obstructions for side street traffic during the hours where the most traffic exists on the State routes.
- Provide advance intersection warning signs (W2-1) with supplemental street name plaques along both directions of MD 273 for the Walnut Street intersection.
- Place “Do Not Block the Intersection” (MUTCD Designation R10-7) signs along both directions of MD 273 in advance of Walnut Street.

MD 274/Cherry Street

- Remove the two on-street parking spaces on the east side of MD 274, nearest the westbound Cherry Street approach. To provide more protection for vehicles looking to turn out of westbound Cherry Street or cross MD 274, we recommend that a curb extension be constructed in place of the existing parking space pavement markings.
- Place crosswalk pavement markings or implement additional streetscape improvements that provide brick-paver crosswalks across both side street approaches.
- Construct curb extension on MD 274 on the northwest corner of the intersection to provide more protection for vehicles looking to turn out of eastbound Cherry Street or cross MD 274.
- Provide advance intersection warning signs (W2-1) with supplemental street name plaques along both directions of MD 274 for the Cherry Street intersection.
- Place “Do Not Block the Intersection” (MUTCD Designation R10-7) signs along both directions of MD 273 in advance of the Cherry Street intersection.
- Seek to limit all other on-street parking along MD 274 between Cherry Street and MD 273 to off-peak periods (9:00 AM to 4:00 PM) only. This will allow for parking to be maintained for a part of the day when traffic volumes are generally lower, while emphasizing maximum available sight distance for Cherry Street traffic during the morning and evening peak periods. If traffic volumes are generally heavy during the midday lunch peak, parking should be restricted during this time as well.
- Seek to restrict parking within the private driveway in the southeast corner of the intersection as it contributes to inadequate sight distance. Field observations noted that cars parked in this driveway forced Cherry Street traffic to extend even farther beyond the existing stop bar location.

These options should be considered in the interim. If a more aggressive solution is sought, the one-way traffic flow conversions suggested in either option #12 or #13 should be explored for a period of six months to determine the effect on the local roadway network and the MD 273/MD 274 intersection.