NEWBERG COLLEGE STREET NEIGHBORHOOD TRAFFIC STUDY

SEPTEMBER 2012

DKS

Section 1. Introduction

The Newberg College Street Neighborhood Traffic Study develops solutions to address safety needs for all transportation system users in the neighborhood and specifically at the College Street/Sheridan Street intersection. A recent surge in population in the City, coupled with improvements to the nearby Chehalem Cultural Center, have increased travel demand on the local streets throughout the College Street Neighborhood.

The neighborhood is bounded by heavily traveled state highways on three sides and a rail line to the north. The state routes include OR 99W- Hancock Street and 1st Street to the south, OR 219- College Street to the east, and OR 240- Main Street to the west, and the Portland and Western Rail line crosses diagonally along the north edge. This neighborhood can be used to avoid periodic congestion on the surrounding state highways, as drivers seek quicker travel routes. Neighborhood residents have recently expressed concerns about safety associated with the increased traffic demand at the local intersections, most notably at the College Street/Sheridan Street intersection.

Study Area

The study area includes the College Street neighborhood in Newberg, and is generally bounded by North Street to the north, Hancock Street to the south, Edwards Street on the east and Main Street to the west, as shown below in Figure 1. This area represents the Cultural District for Newberg and includes the Chehalem Cultural Center, the Newberg City Library, and the Masonic Temple.

Figure 1: Study Area

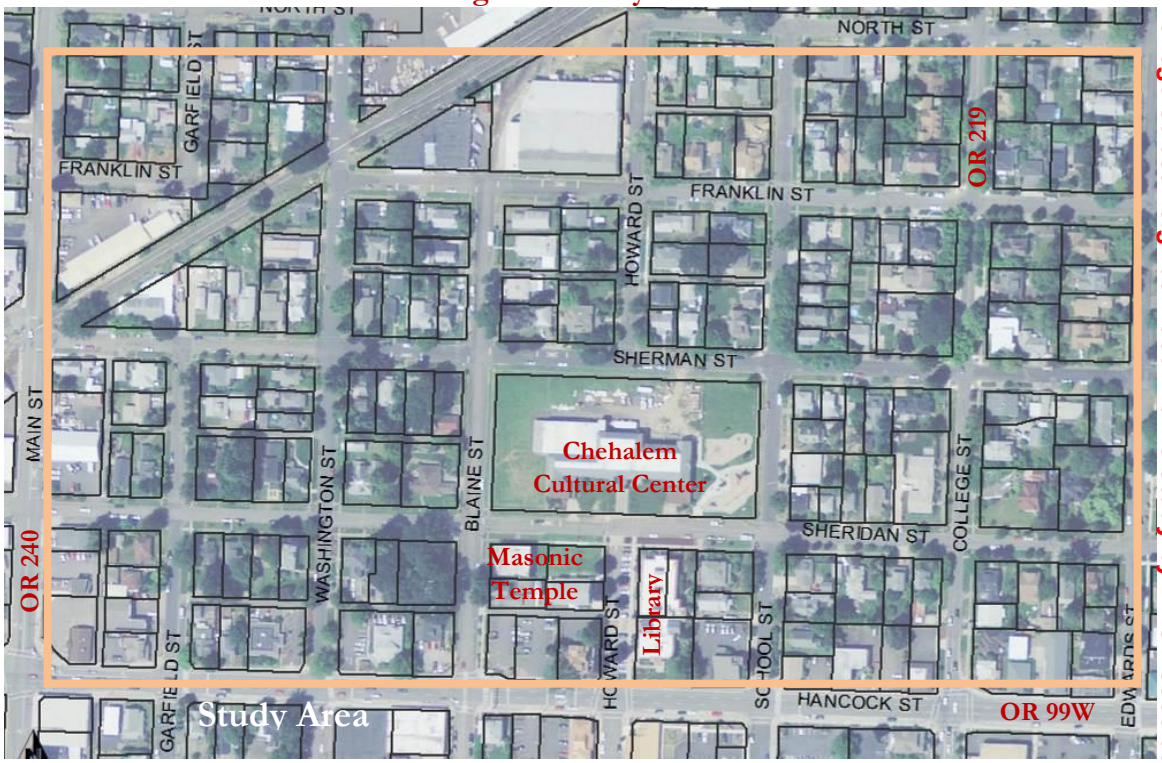


Exhibit A (for TSC-12-001)
College Street Neighborhood Traffic Study by DKS Associates

Section 2. Existing Conditions and Demonstrated Needs

Sheridan and Sherman Streets are two-way local streets with stop control at each intersection between Blaine Street and College Street. These streets connect Main Street (OR 240) with College Street (OR 219) and generally serve most east-to-west travel through the Cultural District. Blaine, School and College Streets provide most of the two-way travel between the Cultural District and the Hancock-1st Street couplet (also known as OR 99W). Howard Street, between Hancock and Sheridan Streets is the only one-way street in the neighborhood. It provides a connection to the City Library for drivers from the south (Hancock and 1st Streets).

All of the City streets within this neighborhood are classified as local streets; they are developed in a well-spaced grid system that provides convenient access to local properties. The width and layout of the streets vary (see Figure 2). The typical street layout is configured as follows:

- Paved curb-to-curb surface ranging in width from 24 to 36 feet
- On-street parking on both sides, with the exception of Sheridan Street and the portion of Howard and School Streets south of Sheridan Street
- Sidewalks on both sides ranging in width from 5 to 6 feet
- No bike lanes

Figure 2: Street Layouts and Intersection Control

Exhibit A (for TSC-12-001)
College Street Neighborhood Traffic Study by DKS Associates

Figure 3: Daily Traffic Volumes

Figure 4: Travel Speeds

Travel Conditions

College Street is a two-lane highway that lacks bicycle facilities, and does not allow on-street parking. The roadway is 24 feet wide between curbs. On an average day[1], the highway carries approximately 6,500 vehicles near Sheridan Street (see Figure 3 for the directional volumes). About 700 vehicles per day approach College Street on Sheridan Street, with 550 vehicles arriving from the west and 150 vehicles from the east. Most of the vehicles traveling away from College Street along Sheridan Street are heading eastbound (300 of the 500), either traveling across or turning from College Street. Overall, daily traffic volumes along eastbound Sheridan Street are double that of the westbound direction.

The posted speed along College Street is 25 miles per hour; however, most drivers approaching Sheridan Street travel at or below speeds of 30 miles per hour in the northbound direction and 34 miles per hour in the southbound direction[2] (see Figure 4). Most drivers on the side streets travel at or below speeds of 23 miles per hour. This is generally due to the relatively narrow paved surfaces along Sheridan and Sherman Streets (30 feet or less curb to curb) and the presence of on-street parking.

[1] Traffic data collected between 10/12 to 10/14/10 for Sheridan Street west of College Street; 11/2 to 11/4/10 for Sheridan Street east of College Street; and 1/10 to 1/12/12 for College Street.

[2] As determined by the 85th percentile speed for College Street, which is defined as the speed below which 85 percent of the vehicles are traveling.

Sight Distance Considerations

Based on these travel speeds, drivers should have at least 335 feet of sight distance when attempting to turn onto or cross College Street from side streets[3] (such as Sheridan and Sherman Streets). In addition, drivers on College Street should be able to see vehicles at least 200 feet in advance of the intersection[4] to allow sufficient reaction time to obstacles entering the roadway.

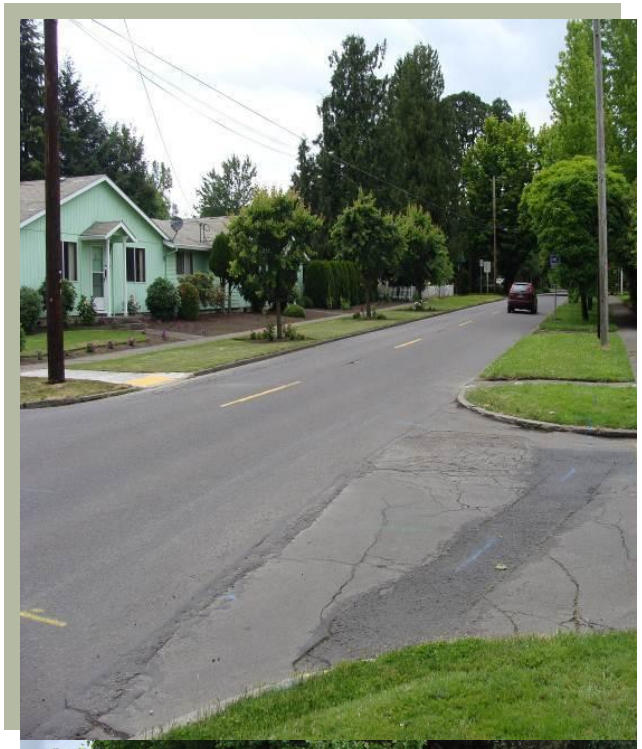
During a site visit (June 2012) it was found that adequate sight distance would not be available under current conditions for the eastbound Sheridan Street approach to College Street. Looking north from this approach, trees obscure and limit the sight distance to approximately 180 feet. Looking south from this approach, landscaping and queued vehicles block the view and limit the existing sight distance to less than 20 feet during congested periods of the day.

It was observed in the field that as eastbound vehicles on Sheridan creep out from the stop line to cross College Street or turn left, the sight distance is further reduced as the queued vehicles completely block the view of northbound vehicles on College Street. It was reported by local citizens that this type of creeping behavior is fairly common during peak hours.

Exhibit A (for TSC-12-001)
College Street Neighborhood Traffic Study by DKS Associates

[3]Based on the American Association of State Highway and Transportation Officials (AASHTO) sight distance requirements for safe egress as measured from 15 feet back from the edge of the travelled way with a 30 mile per hour design speed, Exhibit 9-55, p. 661.

[4]Ibid



Safety Considerations

Collisions at the College Street/Sheridan Street intersection have remained fairly steady over the past five years (2007 through 2011), ranging from one collision in both 2007 and 2009 to three in both 2008 and 2011[5]. No collisions were reported in 2010 at the intersection.

The total number of crashes experienced at an intersection is typically proportional to the number of vehicles entering it. Therefore, a crash rate describing the frequency of crashes per million entering vehicles (MEV) is used to determine if the number of crashes should be considered high. Using this technique, a collision rate of 1.0 MEV or greater is commonly used to identify when collision occurrences are higher than average and should be further evaluated. In 2008 and 2011, the intersection had crash rates over the 1.0 threshold. The collisions were further evaluated at this intersection to see if any trends exist.

[5]Based on the past five year of collision data, 2007 through 2011, ODOT Crash Analysis and Reporting Unit

The College Street/Sheridan Street intersection is two-way stop controlled, with Sheridan Street yielding the right-of-way. Most of the collisions at this intersection were angle type collisions (7 of the 8 collisions) meaning one vehicle pulled out in front of another. Of the seven angle type collisions, four were traveling eastbound and three westbound across College Street. In addition, seven of the eight collisions at this intersection over the past five years occurred during the weekday evening peak period (between 3 to 6 p.m.). This may indicate that temporary queued vehicles are limiting sight distance during the evening peak period. Although the trees obscure sight distance for the eastbound approach to College Street, they do not appear to contribute to collisions at the intersection. However, pruning the low hanging branches would ensure that the sight triangle remains clear.

The next section explores possible solutions to resolve the safety issues identified at this intersection.

Section 3. College Street/Sheridan Street Solutions

Eight alternatives solutions were reviewed for the College Street/Sheridan Street intersection as summarized below, and illustrated in Figures 5a and 5b.

- **Right-turn only Traffic Separator Alternative**

  Benefits: Low cost

  Shortfalls: Will restrict left-turns from College Street and left/through movements from Sheridan Street; may increase traffic on Sherman Street.

  Estimated Cost: $2,000

- **Right-turn only Signing Alternative**

  Benefits: Lowest cost

  Shortfalls: Least effective solution as drivers often ignore the signs

  Estimated Cost: $500

- **One-way Sheridan from College to School Alternative**

  Benefits: Potential to increase on-street parking along Sheridan Street

  Shortfalls: May increase traffic on Sherman Street

  Estimated Cost: $10,000

- **One-way Sheridan from College to Main Alternative**

  Benefits: Potential for a smaller street cross-section through the Cultural District and enhanced pedestrian accommodations

  Shortfalls: Could increase driver confusion with one-way streets; may increase traffic on Sherman Street

  Estimated Cost: $35,000

- **Dead-end Sheridan Street Alternative**

  Benefits: The westbound approach to College Street would remain open

  Shortfalls: Not enough right-of-way to construct the required 90 foot diameter turn-around circle

  Estimated Cost: $95,000

- **Vehicle Actuated Variable Message Sign Alternative**

  Benefits: All movements at the intersection would be maintained

  Shortfalls: Would require a controller and cabinet, loops or video detection devices, and LED message signs.

  Estimated Cost: $105,000

- **Add Signal Green Time at College / Hancock for southbound traffic**

  Benefits: More vehicle through-put for the College Street approach to 99W

  Shortfalls: Limited benefit to vehicle queuing depending on increased green time; possible offsetting impacts with longer queues on 99W

  Estimated Cost: $1,500

- **College Widening Alternative**

  Benefits: Construct more queue storage at the College Street approach to Hancock Street

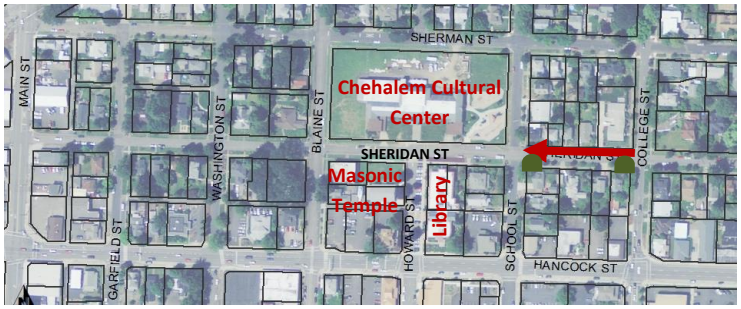
  Shortfalls: Expensive; would require removal of the landscape buffer on the west side of College Street and possible property acquisition

  Estimated Cost: $90,000

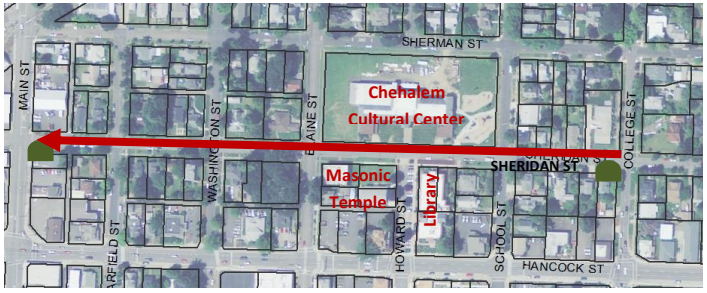
Figure 5a: The Eight Alternatives

Right-turn only Traffic Separator Alternative would restrict the Sheridan Street approaches to College Street to right-in, right-out only. Yellow pavement markings and raised plastic bollards would be constructed along the centerline of College Street at the Sheridan Street intersection. Right-turn only signs would be added to the Sheridan Street approaches to College Street.

Right-turn only Signing Alternative would restrict the Sheridan Street approaches to College Street to right-in, right-out only through signing. Right-turn only signs would be added to the Sheridan Street approaches to College Street.



One-Way Sheridan from College to School Alternative would modify Sheridan Street to be one-way westbound between College and School Streets. Corner curb bulb-outs would be constructed at the southwest corner of the College Street/Sheridan Street intersection and the southeast corner of the School Street/Sheridan Street intersection.



One-Way Sheridan from College to Main Alternative would modify Sheridan Street to be one-way westbound between College and Main Streets. Corner curb bulb-outs would be constructed at the southwest corner of the College Street/Sheridan Street intersection and the southeast corner of the Main Street/Sheridan Street intersection.

Figure 5b: The Eight Alternatives

Dead-end Sheridan Street Alternative would modify Sheridan Street to dead-end to the west of College Street. A 90 foot diameter circular turn-around would be constructed to serve emergency vehicles. Public walkways would provide walking and biking connections to College Street from the cul-de-sac.

Vehicle Actuated Variable Message Sign Alternative would install warning devices on Sheridan Street that instruct drivers of conflicting cross traffic on College Street. Graphical signs would be installed on College Street to warn drivers of approaching vehicles on Sheridan Street. Would require a controller and cabinet, loops or video detection devices, and LED message signs.

Signal Timing Alternative would modify the signal timing at the College Street/Hancock Street intersection. This would require ODOT coordination. The modified timing would provide additional green time for the College Street approach during the peak periods and reduce queues that limit sight distance.

College Widening Alternative would widen the southbound College Street approach to Hancock Street to provide 150 feet of storage for right turning vehicles.

Section 4. Cultural District Safety and Circulation Solutions

Traffic data collected along Sheridan and Sherman Streets between College and School Streets suggests that most drivers are traveling at or below speeds of 22 miles per hour. This is generally due to the relatively narrow paved surfaces along Sheridan and Sherman Streets (33 feet or less curb to curb) and the presence of on-street parking.

Sidewalks exist on both sides of most streets within the Cultural District. This coupled with the narrow street widths and low travel speeds allow safe pedestrian circulation between the Chehalem Cultural Center, the Library, Masonic Temple and the surrounding neighborhood. A few solutions, outlined later in this document, could further enhance pedestrian safety and circulation within the Cultural District.

Cut-through Traffic

Overall, the potential for drivers to utilize Sherman and Sheridan Streets as cut-through routes to avoid congestion on Hancock and 1st Streets between Main and College Streets is expected to be low under each solution evaluated. However, the potential is slightly higher along Sheridan Street due to fewer stop signs along the route. Drivers traveling along Sherman Street between Main and College Streets are required to stop at each cross-street with the exception of the Garfield and Howard Street intersections, while drivers on Sheridan Street must stop at only Blaine and School Streets (as shown in Figure 6). To further discourage cut-through traffic, and enhance pedestrian circulation adjacent to the Cultural Center, all-way stop control could be added to the Howard Street intersections with Sherman and Sheridan Streets.

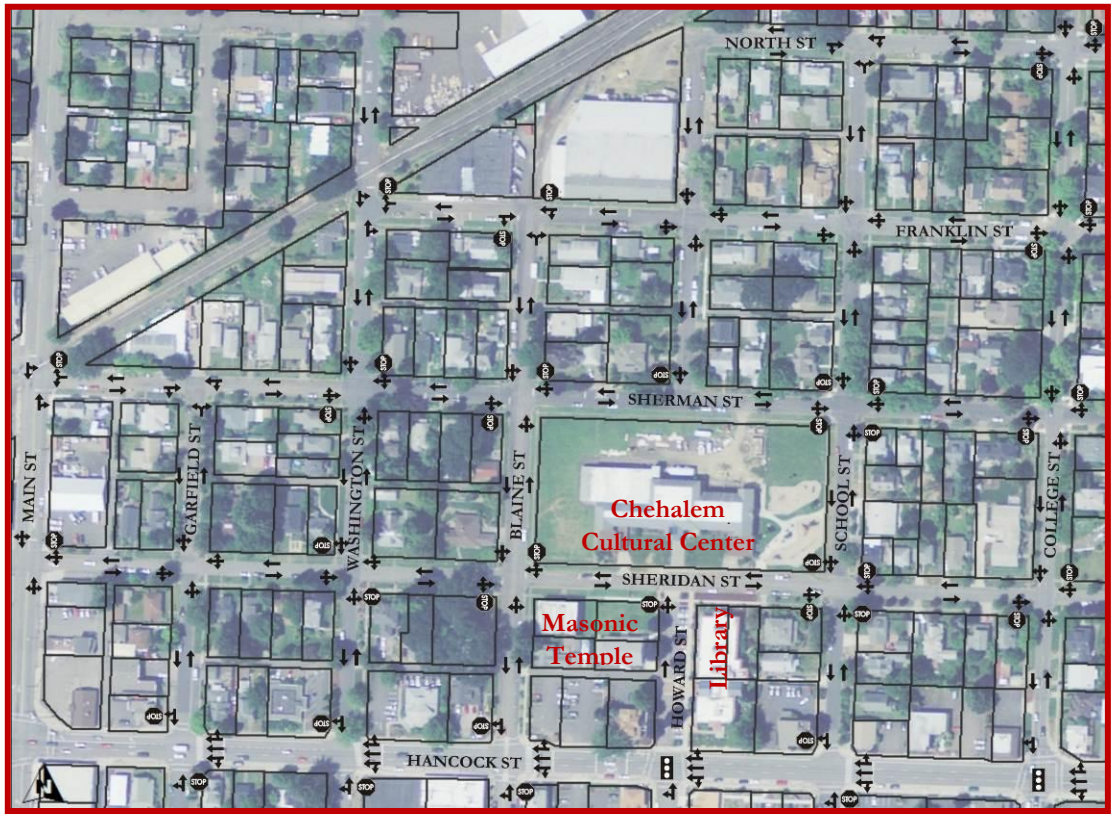


Figure 6: Cultural District Intersection Control

Exhibit A (for TSC-12-001)
College Street Neighborhood Traffic Study by DKS Associates

Section 5. Cultural District Recommended Solutions

The following solutions would improve safety for pedestrian and discourage drivers from utilizing Cultural District streets as cut-through routes. The numbers shown below correspond with those shown in Figure 7.

Short-term solutions

1. Convert the Sherman Street/Howard Street intersection to an all-way stop

   Benefits: Discourage cut-through traffic and enhance pedestrian circulation; provides an opportunity for a mid-block pedestrian crossing to the Cultural Center

   Shortfalls: Increased delay for residents of the neighborhood

   Estimated Cost: $3,000

2. Convert the Sheridan Street/Howard Street intersection to an all-way stop

   Benefits: Discourage cut-through traffic and enhance pedestrian circulation

   Shortfalls: Increased delay for residents of the neighborhood

   Estimated Cost: $3,000

Medium-term solutions

3. Add a curb extension into the parking lane on the south side of Sherman Street/Howard Street intersection. Add striped cross-walks and curb ramps to all legs. Create a direct connection from the curb extension south through the parking lot, connecting to the Cultural Center.

   Benefits: Slow down drivers and enhance pedestrian circulation to the north of the Cultural Center; potential to add pedestrian amenities

   Shortfalls: A few on-street parking spots would be eliminated

   Estimated Cost: $6,500

4. Add a curb extension into the parking lane on the north side of Sheridan Street/Howard Street intersection. Re-stripe the cross-walks on Sheridan Street and add a curb-ramp to the northeast leg of the intersection.

   Benefits: Slow down drivers and enhance pedestrian circulation to the south of the Cultural Center; direct connection from the library to the entrance of the Cultural Center; potential to add pedestrian amenities

   Shortfalls: Removal of a portion of the parking lane that was recently added along the north side of Sheridan Street

   Estimated Cost: $3,000

5. Add on-street parking on the north side of Sheridan Street between Blaine and Howard Streets by removing the landscaping strip. Allow 24-hour parking on both sides of the street.

   Benefits: Increased parking for homeowners/Cultural District visitors and comfort for pedestrians walking along the sidewalk

   Shortfalls: Elimination of the landscape buffer on the north side of the street

   Estimated Cost: $7,500

Long-term solutions

6. Add pedestrian-scale street lighting around the Chehalem Cultural Center along Blaine Street, Sherman Street, School Street and Sheridan Streets (similar to the lighting in front of the library as shown in the figure below).

   Benefits: Increased comfort, safety and security for pedestrians walking in the Cultural District; increase the willingness of pedestrians to walk to parking farther away

   Shortfalls: Most expensive; could increase maintenance costs associated with the lighting

   Estimated Cost: $17,000

7. Consider adding on street parking along the north side of Sheridan Street between Washington and Blaine Streets (**Estimated Cost:** $7,500), and School and College Streets (**Estimated Cost:** $10,000) by removing the landscaping strip.

   Benefits: Increased parking for homeowners/Cultural District visitors and comfort for pedestrians walking along the sidewalk

   Shortfalls: Elimination of the landscape buffer on the north side of the street; parking would be a block away from the Cultural Center

Figure 7: Cultural District Solutions

Exhibit A (for TSC-12-001)
College Street Neighborhood Traffic Study by DKS Associates

Section 5. College Street/Sheridan Street Recommended Solutions

The recommendation for the College Street/Sheridan Street intersection is the Right-turn only Traffic Separator Alternative. As shown in Table 1, this alternative is one of the least cost solutions, and would be expected to improve safety at the intersection most effectively. There would be no associated property impacts and only a small amount of traffic would be expected to divert to Sherman Street from Sheridan Street (traffic that previously traveled through or made left-turns at the College Street/Sheridan Street intersection). Raised plastic bollards would be installed along the centerline of College Street and would not be expected to reduce overall lane widths (see Figure 8 for an example).

The only other solution that would be most effective at improving safety at the College Street/Sheridan Street intersection (Vehicle Actuated Variable Message Sign Alternative**)** has that highest estimated project cost. Overall, the Right-turn only Traffic Separator Alternative would be expected to provide the most benefit on a dollar-for-dollar basis.

Table 1: Comparison of the Alternative Solutions for the College Street/Sheridan Street Intersection

Alternative	Property Impacts	Traffic Diversion Potential	Safety Effectiveness	Estimated Cost
Right-turn only Traffic Separator Alternative	None	Low to Sherman Street	Most Effective	$2,000
Right-turn only Signing Alternative	None	Low to Sherman Street	Least Effective	$500
One-way Sheridan from College to School Alternative	None	Moderate to Sherman Street	Effective	$10,000
One-way Sheridan from College to Main Alternative	None	High to Sherman Street	Effective	$35,000
Dead-end Sheridan Street Alternative	High	Moderate to Sherman Street	Effective	$95,000
Vehicle Actuated Variable Message Sign Alternative	None	None	Most Effective	$105,000
Add Signal Green Time at College / Hancock for southbound traffic	None	None	Effective	$1,500
College Widening Alternative	High	None	Effective	$90,000

Exhibit A (for TSC-12-001)
College Street Neighborhood Traffic Study by DKS Associates

Long-term, the City may wish to explore (in coordination with ODOT) the possibility of modifying the southbound Main Street approach to 1st Street (Highway 99W) to include a left-turn lane and a shared through/left-turn lane. This configuration would allow dual left-turns to 1st Street (Highway 99W). Additional data collection and analysis would likely be required by ODOT to support this consideration.

Figure 8: Example of Plastic Bollards along the Street Centerline restricting left-turns