



HARRISBURG AREA TRANSPORTATION STUDY

**> NEW BLOOMFIELD
TECHNICAL MEMO**



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PURPOSE OF THE STUDY

The intersection of SR 34 (Main Street) and SR 274 (S. Carlisle Street) in New Bloomfield Borough, Perry County, poses significant operational constraints that negatively affect traffic flows and introduce safety hazards in and around the intersection. Truck traffic is especially impacted at this intersection. Considering these realities and the intersection's importance in the regional transportation network, the Harrisburg Area Transportation Study (HATS) selected the New Bloomfield intersection as one of three locations that warranted a detailed review of existing conditions and the identification of potential remediation concepts, including intersection and regional circulation-focused improvements. The project involved four tasks – gathering and interpreting applicable data, documenting and observing existing conditions, outreach to local and state officials and other stakeholders and local freight/logistics operators, and the development of improvement alternatives/concepts. The results of these efforts as they relate specifically to New Bloomfield are described in the following technical memo.

BACKGROUND/DESCRIPTION OF ISSUES

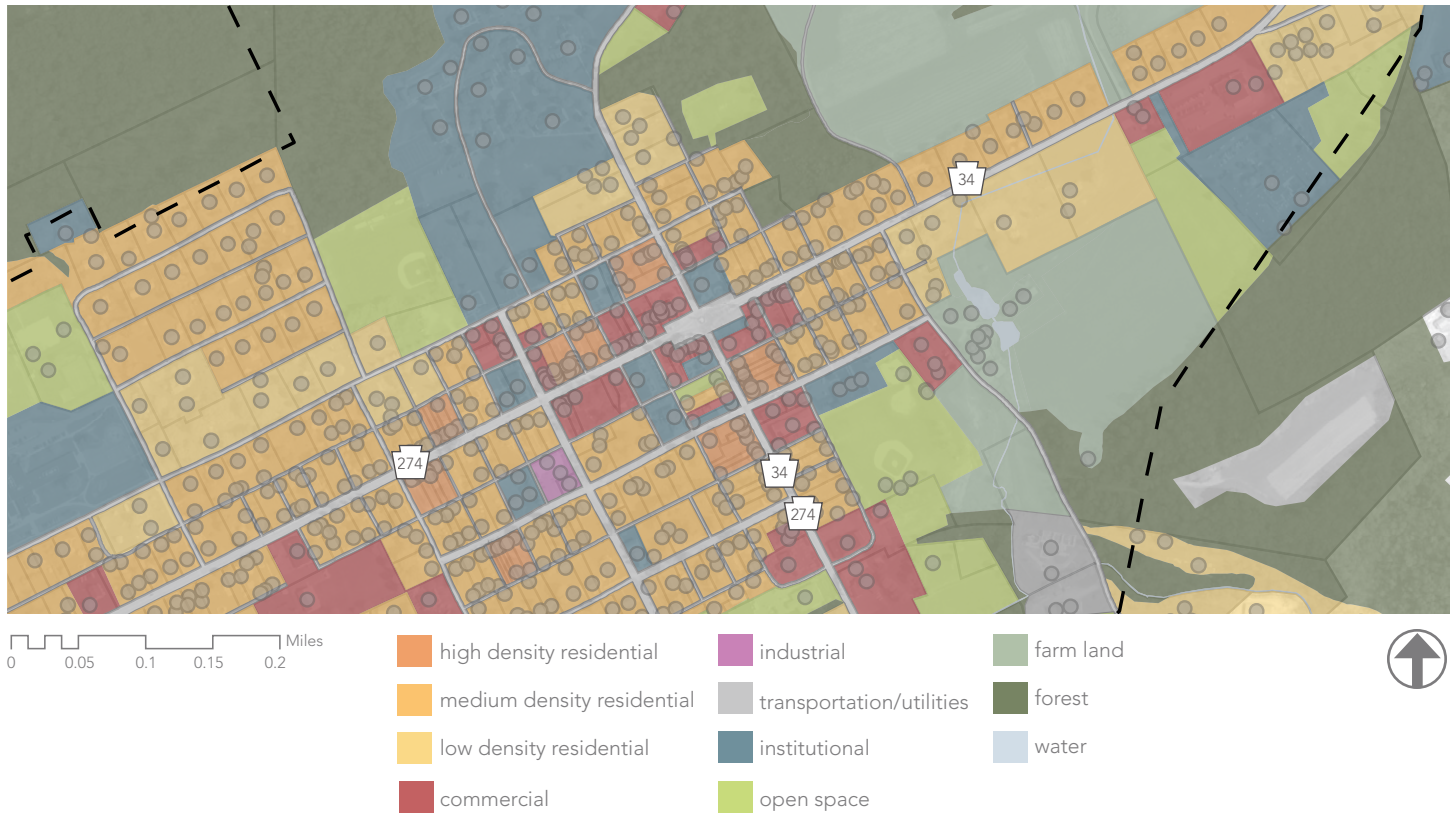
New Bloomfield plays a strategic role in Perry County's local transportation network and is home to numerous local businesses, county government facilities and courts and residents that rely on the area roadways (Figure 1). Pivotal to this network is New Bloomfield's primary intersection of SR 34 and SR 274. This intersection is a crossroads for Perry County and provides access to regional centers of commerce and employment and

major highways including the Pennsylvania Turnpike, Interstate 81, and U.S. Routes 11, 15, and 22. SR 34 is also the major roadway link between Newport and Carlisle (Figure 4). As such, nearby residents and businesses generate traffic through the intersection. However, the intersection poses significant operational challenges as its center is occupied by the historic Soldiers and Sailors Monument.

Mounted in 1898, the historic monument commemorates 19th Century soldiers and sailors and is located on a raised octagonal median in the center of the intersection that is seen from all approaches to the intersection. The Borough of New Bloomfield and area residents hold the monument in high regard and enjoy its presence in the center of town. However the existing geometry of the intersection is an operational hazard that challenges the movement of existing traffic flows around the monument and through the borough. This is particularly true with large trucks.

The SR 34 and SR 274 intersection is an important freight transportation node that serves the local economy and the area's business community. Freight movements with consumer products, forestry products, construction commodities, and other cargoes frequent the intersection, many of which consist of heavy loads involving 48' and 53' trailers. These movements are of particular concern considering the monument's presence in the center of the intersection which necessitates difficult maneuvers for trucks continuing straight around the monument and trucks making 270 degree movements around the monument continuing left through the intersection. In addition to the difficult truck maneuvers through the intersection, trucks often make

FIGURE 1: Local Land Uses



illegal movements through the intersection to avoid circling around the monument (Figure 2). During on-site visits to the intersection, the project team observed northbound trucks illegally turning left in front of the monument to avoid the more challenging turn around the monument.



FIGURE 2: Illegal Left Turns



The public interest in the monument poses additional safety hazards regarding pedestrian and motorist interactions. Currently, crosswalks connect the opposite sides of Main Street to the octagonal median in the center of the intersection. The crosswalks are entirely on the road surface with no separation or protection between pedestrians and motorists. This creates potential conflicts when pedestrians crossing Main Street at the Carlisle Street intersection and for those that occasionally visit the Soldiers and Sailors monument.

A meeting with PennDOT District 8-0 staff indicated that these crosswalks do not appear on the Department's design plans.

SUMMARY OF CONDITIONS

TRAFFIC VOLUMES

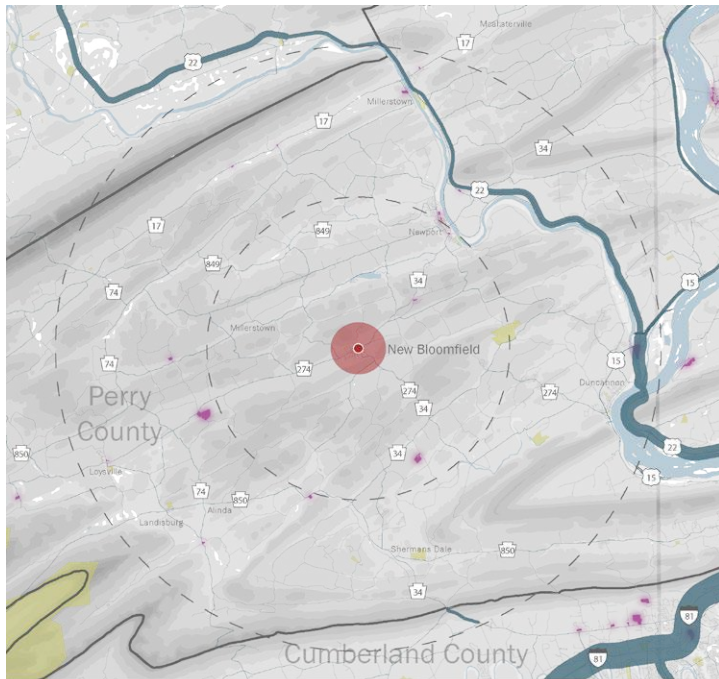
Based on multiple visits to the intersection, the SR 34 and SR 274 intersection does not appear to operate poorly through New Bloomfield. It does not appear that congestion or capacity is a concern. Of the three primary approaches to the intersection, West Main Street (SR 274 to/from the west) has the highest traffic volumes – an

FIGURE 3: Local AADT Truck Volumes

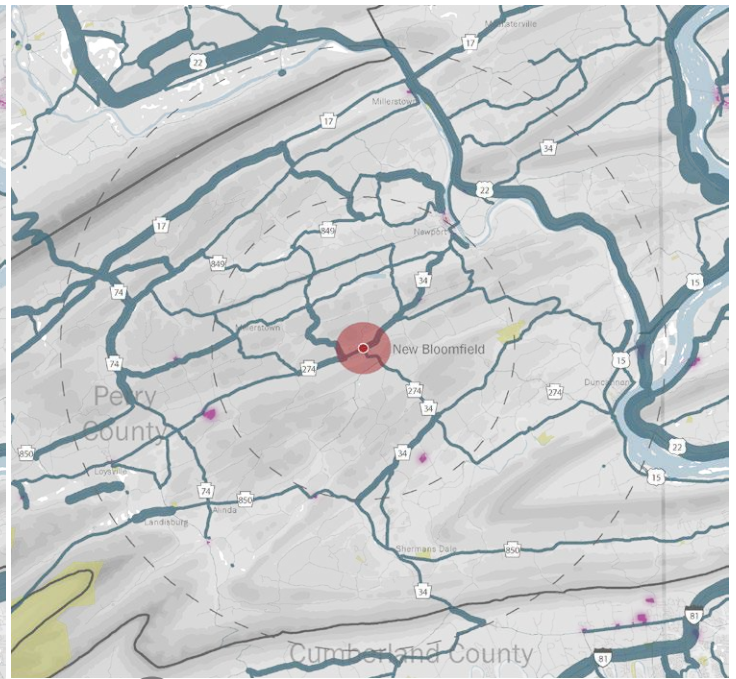


FIGURE 4: Regional Freight Volumes

AADT Truck Volumes



Freight Traffic Proportions (% of total AADT)



- Intersection
- █ Industrial Parcels
- County Boundary
- █ Parks
- Interstate
- U.S. Highway
- State Road
- 5 & 10 Mile Buffers

estimated annual average daily traffic (AADT) volume of 5,945. The northbound approach of South Carlisle Street (SR 34 and SR 274) carries the second highest number of vehicles with an estimated AADT volume of 5,774 vehicles. East Main St (SR 34 to/from the east) follows with an estimated AADT volume of 4,029 vehicles.¹ While this study did not include a detailed operational analysis, these traffic volumes confirm an intersection that does not have substantial operational concerns with respect to capacity.

Freight volumes through the intersection are highest to/from the Main Street westbound approach with an estimated annual average daily truck traffic (AADTT) volume of 403 vehicles, representing approximately 10% of the total AADT. The Main Street eastbound approach carries an estimated AADTT volume of 382 vehicles – 6% of the total AADT. The South Carlisle Street northbound approach carries a smaller number of trucks with an estimated AADTT of 289 – 5 % of the total AADT. Based on a review of regional travel patterns, these volumes do not indicate unusually high truck percentages. Local truck volumes and their regional context are represented in Figures 3 & 4.

CRASH DATA

PennDOT crash data reveals only one reportable crash at the intersection during the five year analysis period (2011-2015). The crash involving an SUV and small truck was a careless error on behalf of the SUV driver and not explicitly attributed to the intersection's existing design.

The lack of crash history at this intersection indicates that there is not an existing safety concern with the current intersection design. However, this does not necessarily mean that the presence of the monument within the center of the intersection does not create a potential safety hazard.

OBSERVED DEFICIENCIES

The project team conducted a field view and visit with local officials on Thursday, February 2, 2017 at the intersection with members from the project team, the Perry County Planning Commission, Perry County Commissioners, Perry County Economic Development Authority, Perry County Chamber of Commerce, and PennDOT District 8-0 to discuss the deficiencies of the intersection and explore possible solutions to alleviate the identified deficiencies. The identified issues below

are a compilation of the project team's observed deficiencies during the field view, deficiencies cited by the stakeholders during the field observations, and submitted answers to a questionnaire the project team provided to attendees. These deficiencies are represented in Figure 5.

The monument itself creates a visibility obstruction as vehicles and pedestrians approach the intersection from all directions. Vehicles on opposite sides of the intersection are often not visible to each other until the monument has been overtaken. This poses a potential safety hazard as motorists have less time to react to any obstacle or impediment that may be present on the far side of the monument. Pedestrians are particularly vulnerable as the crosswalks provide limited visual features to alert motorists of the crossing and are devoid of any physical elements to protect pedestrians from vehicle movements. The visual obstruction of the monument further complicates pedestrian crossings in the intersection as motorists and pedestrians are not visible to the other.

This hazard is exacerbated by the fact that the existing traffic pattern through the intersection is unclear for many motorists. The presence of the monument in the center the intersection bounded by an octagonal curb is suggestive of a traffic circle, though the existing traffic patterns do not operate in this way. Presently, the intersection operates as a two-way stop-controlled non-signalized intersection. The eastbound and westbound approaches of Main Street are uncontrolled, while the southbound and northbound approaches of Carlisle Street are stop-controlled. As such, this causes confusion for motorists when turns around the monument take place. Motorists turning left from Main Street onto Carlisle Street in either direction must circumvent the monument before crossing opposing traffic, often stopping adjacent to the monument in a location that may be obscured to traffic approaching from behind. This can also cause motorists on Main Street to slow down and sometimes yield to turning traffic despite Main Street traffic having the right-of-way. Motorists continuing straight or turning left around the monument from Carlisle Street also pose similar challenges as motorists will often pause adjacent to the monument, causing confusion for Main Street motorists that may be unfamiliar with the intersection's traffic patterns.

The geometry of the intersection physically constrains large vehicle movements through the intersection such as trucks and school buses. The requirement of vehicles to circle around the monument continuing straight through the intersection and making left turns in the

¹ PennDOT, Bureau of Planning and Research, Geographic Information Division, 2017

FIGURE 5: Intersection Deficiencies



intersection is challenging, as observed during multiple field views. This is especially true for trucks with 48' or 53' trailers. An autoturn analysis conducted by the project team confirmed the difficult left turn truck movements and illustrates the inability of large trucks to properly navigate around the monument (Figure 6).

During the field visit and through anecdotal information provided by the stakeholder team, truck trailers frequently become trapped by the octagonal monument curb and block the intersection causing truck operators to attempt correct the situation while blocking traffic on all approaches. Truck operators were observed abandoning the left turn move from S. Carlisle Street northbound to West Main Street westbound and continuing northbound around the monument to avoid blocking the intersection for extended periods. These difficulties have resulted in truck operators avoiding the 270 degree revolution around the monument by instead turning left in front of the monument, illegally entering the opposing lane of traffic and disrupting the intended flow of the intersection.

As a result of the existing intersection geometric deficiencies, mild congestion is also an issue during peak travel periods of 7:30AM-8:30AM and 3:30PM-

FIGURE 6: Autoturn Swept Path - 53' Trailer



5:00PM. This is attributed to motorists being confused by the intersection's designed traffic patterns in addition to navigational difficulties associated with larger vehicles circumventing the monument – especially the inflow of school buses through the intersection between 7:45AM-8:00AM. Both of these conditions slow traffic approaching the intersection and can cause traffic to queue approaching the intersection.

OUTREACH SUMMARY

In addition to the local official engagement during the field views, the project team conducted an outreach effort to local stakeholders and local freight industry personnel to gather information regarding the intersection's functionality and obtain an understanding of the types of freight movements that use the intersection. Among the eight local freight stakeholders the project team attempted to reach, two stakeholders responded to our efforts – Nyce Concrete and Super Valu.

Evidenced from the stakeholders contacted and those the project team attempted to reach, the SR 34 and SR 274 intersection in New Bloomfield facilitates the movement of various freight deliveries near and far to serve the economic needs of the local community. With many satellite locations of larger corporate entities in the area such as Super Valu, Dollar General, and Sunoco among others, many freight movements through the intersection are regional and interregional deliveries with trucks coming to/from nearby U.S. Highway 11/15 and U.S. Highway 22/322.

For both stakeholders, the New Bloomfield intersection plays an integral role in their freight transportation needs and serves as a critical node their businesses rely on. The location of the intersection in respect to its connections to highways 11/15 and 22/322 and the consideration of the mild topography of SR 34 and SR 274 to/from New Bloomfield compared to the more challenging topography of alternative routes amplifies its role as New Bloomfield area's primary freight transportation node.

Stakeholders cited the intersection's geometry as the primary operations constraint when sending and receiving truck deliveries in the area. The very tight

cartway width around the monument for trucks to make the 270 degree revolution for the left turn move was the principal concern. As a result of the geometric challenges, local stakeholders acknowledged that illegal truck movements do occasionally occur when truck operators do not feel they are capable of the intricate left turn move. This results in truck operators turning left into opposing traffic before the monument rather than circling around the monument in the proper direction of traffic. Improvised alternative routes are also occasionally used by truck operators to avoid left turn moves in the intersection by using nearby streets/intersections such as High St and Carlisle St to make left turns.

Local stakeholders indicated the peak delivery times are typically normal business hours between 8AM – 5PM. It is during these hours that stakeholders cited congestion that can occur as a result of traffic flow deficiencies through the intersection, particularly during the morning from 7AM – 9 AM and afternoon periods from 3PM – 6PM.

In terms of improvements, the general sentiment among stakeholders was to focus on the existing intersection to better facilitate truck movements through the intersection. Stakeholders recognized the existing safety hazards, existing design flaws of the intersection, and the lack of suitable alternative routes and believed proper investments in intersection design interventions could overcome the logistical challenges that are faced today. However, outreach also highlighted the importance of the visibility of the monument to the local community. This was further confirmed by local media coverage in the Patriot-News^{2,3}, ABC 27⁴, and Fox 43⁵. Copies of all relevant media coverage are included as an appendix to this document. Comments to these published articles on the respective news sites and social media posts of the articles reflected much concern among local residents for the monument's significance and continued presence in the intersection in addition to the safety hazards its existing location poses.

PROPOSED ALTERNATIVES

Based on a review of existing conditions, right-of-way constraints and feedback from stakeholders, the project team developed several potential alternative concepts aimed at addressing the intersection's existing deficiencies.

² http://www.pennlive.com/news/2017/02/almost_sacred_residents_balk_a.html

³ http://www.pennlive.com/perry-county-times/index.ssf/2017/03/report_on_monument_options_due.html

⁴ <http://abc27.com/2017/02/27/in-your-community-clearing-up-concerns-about-beloved-soldiers-and-sailors-monument/>

⁵ <http://fox43.com/2017/02/28/residents-leaders-dont-agree-with-suggestions-to-move-perry-county-veterans-monument/>

ALTERNATIVE ROUTES

A review of alternative routes was performed with the intention of potentially maintaining the current intersection design and diverting large trucks to routes that avoid the study intersection.

Barnett Woods Road lies approximately 0.1 mile east of the intersection and parallels S. Carlisle Street. A review of Barnett Woods Road indicates several physical characteristics that constrain the feasibility of using as a truck route. The existing road is narrow and generally intended for low traffic volumes for local residential traffic. The surrounding context of the roadway is generally residential, making regional truck movements difficult and/or not appropriate. A narrow, weight restricted bridge over a runoff basin is also insufficient for heavy truck movements and would require replacement for heavy vehicle traffic. Lastly, the intersections with Barnett Woods Road at SR 34 and SR 274 to the north and south, respectively, would require substantial improvements to adequately facilitate turning movements of heavy trucks.

Other parallel alternative routes within the existing grid network in New Bloomfield were reviewed as well, however these routes generally are narrow, low-speed and low-volume residential streets that are not appropriate for substantial volumes of large trucks.

The project team also performed a cursory review of opportunities for new parallel routes within close proximity to the study intersection. However no feasible locations were identified due to substantial right-of-way costs, impacts to residential and private properties, construction cost, and topography.

IMMEDIATE IMPROVEMENTS

While traffic flow is constrained by the intersection's geometry, the existing signage and striping is also a safety concern for motorists and pedestrians. The following suggestions are improvements to these elements that may serve as immediate improvements that can be implemented in a matter of months.

The project team recommends the intersection's existing striping is confirmed with PennDOT District 8-0 officials. During the course of the study, PennDOT officials expressed safety concerns with the existing intersection striping. Confirming the intersection's existing striping is consistent with PennDOT's standards will ensure the intersection is functioning as safely and efficiently as possible in its current configuration.

In addition to confirming existing striping, the exploration of improved striping to minimize confusion is recommended. The existing centerlines on Main Street diverge significantly on approach to the intersection and can lead motorists to believe the intersection functions as a traffic circle. Simplifying the striping on Main Street to more closely resemble a traditional 4-way intersection would minimize confusion and improve traffic flows. Similarly, ensuring the stop bars on the Carlisle Street approaches are clearly visible will bring greater awareness to motorists of the intersection's existing traffic pattern and improve flows.

INTERSECTION-SPECIFIC IMPROVEMENTS

Reviewing the observations and feedback collected over the course of the study, it is evident traffic flow is primarily constrained by the intersection's geometry as opposed to the intersection having insufficient capacity to accommodate existing traffic flows. The unique design challenges will require significant design interventions and capital investment to achieve improved traffic flows and safety. Therefore, a series of medium- to long-term intersection-specific improvements were developed and are proposed in order of time and financial investment needs.

Alternative 1 - Relocate Main Street to South of Monument



The first alternative is to preserve the monument's existing location on the octagonal median and shift the intersection functions to the south side of the monument, thereby creating a 3-way intersection at Main Street and S. Carlisle Street. This proposal requires the elimination of approximately 9 parking spots on Main Street and the acquisition of right-of-way on the south side of the intersection. This simplifies existing traffic patterns for the three heaviest movements at the intersection and eliminates the need to circle around the monument for through movements and left turns and reduces the number of challenging maneuvers for large trucks. The disadvantages of this proposal are the severing of through traffic on Carlisle Street and the required right-of-way acquisition on the south side of the intersection. Similar realignments of intersections have previously been carried out in the Tri-County area – most notably the intersection of 2nd St and Market St in downtown Harrisburg.

The elimination of through traffic on Carlisle Street has marginal impacts on the existing traffic flows as turn movements from E. Main Street and to W. Main Street are maintained in the design. N. Carlisle Street access would be converted to a "right-in/right-out" scheme. This would prohibit northbound and eastbound traffic from accessing N. Carlisle Street and prohibit southbound traffic from continuing southbound or turning eastbound. These movements can be easily accommodated via the existing street grid and require minimal detours. However, the right-of-way acquisition and utility relocation is costly and would result in the loss of public space on the southeast corner, triggering a necessary Section 4(f) approval. This configuration would also create challenges for each Main Street approach, as the angle of each approach may create a potential conflict, particularly for westbound traffic.

Alternative 2 - Shift Monument North



The second alternative shifts the monument's existing location slightly north to maintain its symbolic location and visibility in the center of the borough, creating a 3-way intersection at Main Street and S. Carlisle Street with an expanded curb-protected median surrounding the monument. As with Alternative 1, existing traffic patterns are simplified and the monument's modified location better facilitates heavy truck movements through the intersection. Alternative 2 eliminates minimal parking (4 spaces) on Main Street and eliminates the need for land acquisition and loss of public space to expand the footprint of the intersection. In addition to improving vehicle flows, pedestrian crossings are enhanced with the expansion of the monument's curb-protected median providing greater access to memorialize the monument and facilitate safer crossings.

Similar to Alternative 1, Alternative 2 would divert some traffic accessing N Carlisle Street. Turn movements from E Main Street and to W Main Street are maintained in this alternative. Through traffic moves to/from S Carlisle Street, turn moves from W Main Street and turn moves to E Main Street will require minor traffic diversions to nearby streets which can be accommodated by the borough's street grid.

Alternative 3A - Relocate Monument to Veterans Pathway; 4-Way Stop Implementation

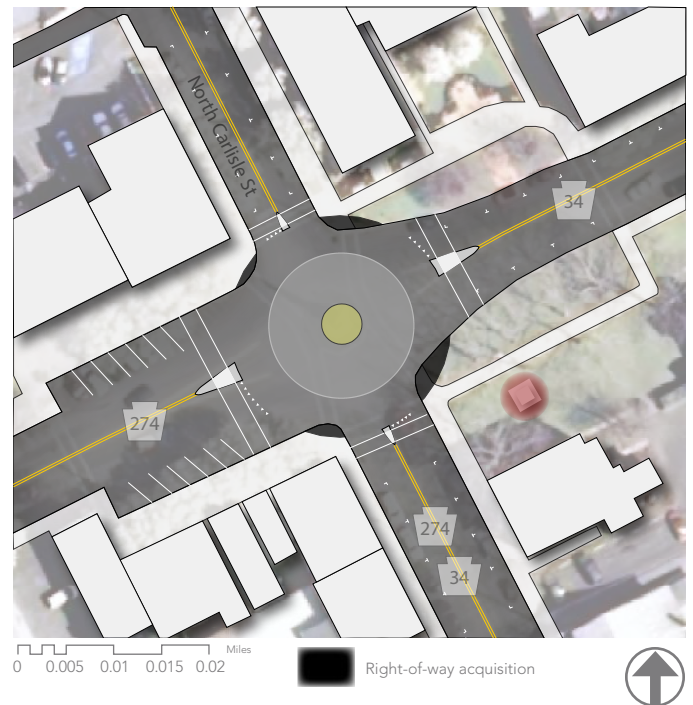


This alternative proposes the relocation of the monument to the adjacent park and transforms the intersection into a fully functioning four-way stop. The monument would be placed in Veterans Pathway, currently under county jurisdiction, located adjacent southeast to the intersection. This concept would have no impact on the number of existing parking spaces. This alternative simplifies traffic patterns by shrinking the footprint of the intersection with a standard two-way or four-way stop-controlled intersection.

Alternative 3 improves pedestrian crossings by implementing a full four-way stop with crosswalks. This alternative also memorializes the monument by relocating to the adjacent public space that will allow unrestricted pedestrian access to monument.

This alternative incorporates PennDOT's safety concerns that were expressed to the project team by District 8-0 officials during the course of the study. PennDOT strongly opposes visual obstructions and pedestrian traffic in the center of functioning intersections to maintain safety and efficiency. Relocating the monument nearby and allowing the intersection to be free of such hazards will be more favorably perceived by PennDOT officials.

Alternative 3B - Relocate Monument to Veterans Pathway; Traffic Circle Implementation



Alternative 3B proposes the relocation of the monument to the adjacent park and transforms the intersection into a traffic circle. Similar to Alternative 3A, the monument would be placed in Veterans Pathway, currently under county jurisdiction, located adjacent southeast to the intersection. This concept would have no impact on the number of existing parking spaces. However, this alternative would expand the footprint of the intersection and require the acquisition of ROW at all 4 corners to adequately accommodate large vehicle maneuvers.

In addition to improved vehicle flows, Alternative 3B improves pedestrian crossings by implementing crosswalks across splitter islands on all 4 approaches. This shortens curb-to-curb crossing distances and reinforces motorists' awareness of pedestrians and traffic flows. This alternative also memorializes the monument by relocating to the adjacent public space that will allow unrestricted pedestrian access to monument.

Similar to Alternative 3A, this alternative also incorporates PennDOT's safety concerns expressed to the project team. Relocating the monument nearby and allowing the intersection to be free of such hazards will be more favorably perceived by PennDOT officials.

⁶ Roundabouts an Informational Guide, U.S. Department of Transportation, Federal Highway Administration

SUMMARY OF ALTERNATIVES

After reviewing the elements of each of the proposed alternatives, the project team identified the strengths and weaknesses of each. The advantages and disadvantages of each alternative are compared in Figure 7.

Alternative 1 - Relocate Main Street to South of Monument

Strengths

- Simplifies traffic patterns
- Eliminates difficult maneuvers for large vehicles
- Preserves monument's existing location

Weaknesses

- Severs some traffic moves to/from N Carlisle Street
- Requires the acquisition of right-of-way
- Some loss of public space
- Reduces sidewalk space
- Difficult approach angle
- Elimination of parking

Alternative 2 - Shift Monument North

Strengths

- Simplifies traffic patterns
- Eliminates difficult maneuvers for large vehicles
- Preserves monument's location in the center of town
- Improves pedestrian facilities to/from the monument

Weaknesses

- Severs some traffic moves to/from N Carlisle Street
- Requires moving the monument to the north
- Eliminates some parking

Alternative 3A - Relocate Monument to Veterans Pathway; 4-Way Stop Implementation

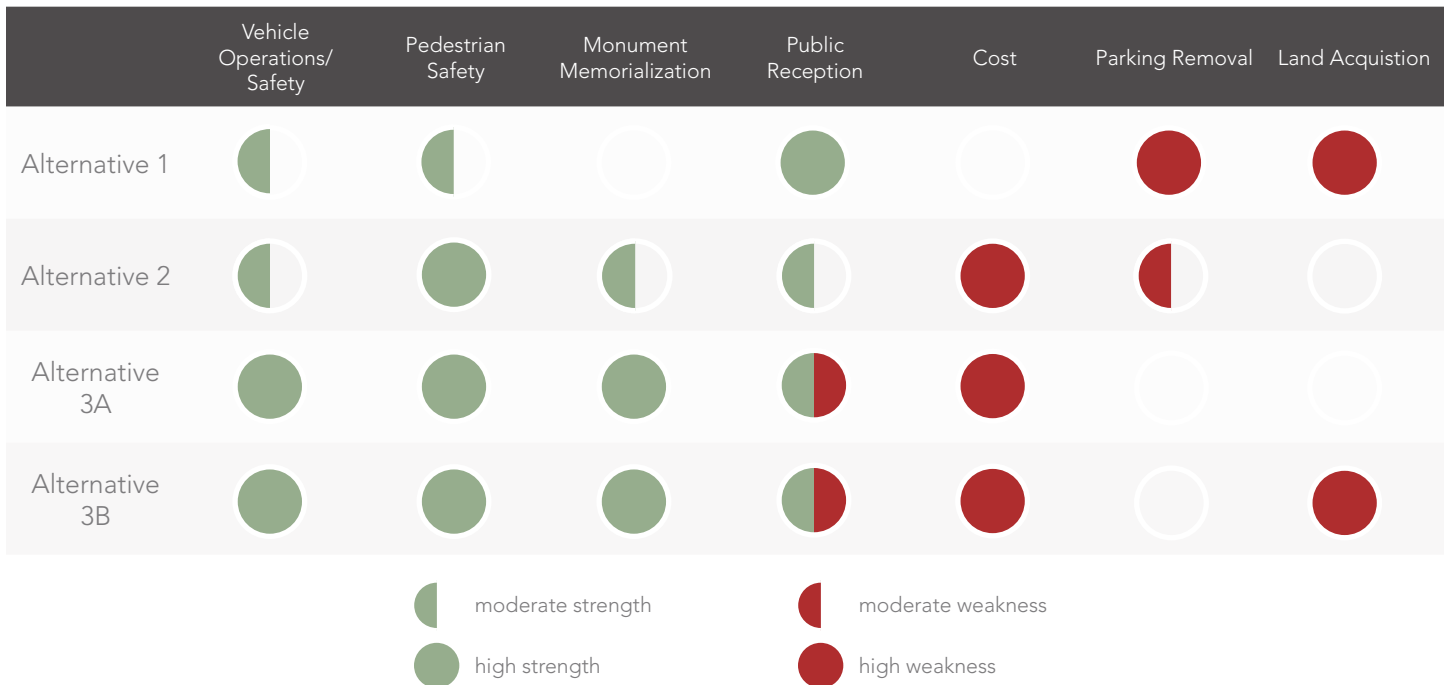
Strengths

- Simplifies traffic patterns
- Eliminates difficult maneuvers for large vehicles
- Improves pedestrian facilities to/from the monument
- Memorializes monument in adjacent green space

Weaknesses

- Requires the relocation of the monument
- Varied public support

FIGURE 7: Alternatives Comparison



Alternative 3B - Relocate Monument to Veterans Pathway; Traffic Circle Implementation

Strengths

- Improves traffic flow
- Accommodates large vehicle maneuvers
- Improves pedestrian facilities to/from the monument
- Memorializes monument in adjacent green space

Weaknesses

- Requires the relocation of the monument
- Requires ROW acquisition
- Varied public support

PREFERRED ALTERNATIVES

While a traffic study has not yet been formally completed, based on a review of the overall operations and impacts of each alternative, Alternative 2 is a preferred alternative to be advanced for further analysis. Alternative 2 improves overall vehicular operations for motorists while shortening and formalizing pedestrian crossings. Further, Alternative 2 improves pedestrian access to the Soldiers and Sailors Monument while maintaining the spirit of the monument as the center of New Bloomfield. These benefits outweigh the primary negative, which is the alteration of access to and from N. Carlisle Street. However, the limited number of vehicles that are anticipated to be impacted by this change in circulation can still be accommodated via a short (less than 1/4 mile) detour.

The primary weakness of Alternative 2 is the continued presence of the monument in the intersection which PennDOT believes to be a significant motorist and pedestrian safety concern. Thus, the project team recommends the consideration of Alternatives 3A/3B if a relocation of the monument from the intersection is required by PennDOT. Alternatives 3A/3B would improve vehicular flows by simplifying traffic patterns to a common 4-way stop or traditional traffic circle. Pedestrian crossings would be simplified with shorter crossing distances and motorists' familiarity with standard traffic patterns/procedures through the intersection. This alternative would also provide unrestricted pedestrian access to the monument in the adjacent Veterans Pathway.

NEXT STEPS

This study examined the existing conditions of the New Bloomfield intersection, identified and engaged stakeholders, and provided potential solutions for future planning and engineering investments. If the Borough, County, Harrisburg Area Transportation Study Metropolitan Planning Organization (HATS MPO), PennDOT and others wish to advance improvements to the monument square, the following next steps are proposed.

- Present this study's preliminary findings to the Borough, County and HATS MPO for further input on advancing any of the study's recommendations
- Identify through the HATS MPO the availability of funding to further develop alternatives to improve traffic and freight flow through the monument square. This may be done through the region's Transportation Improvement Program (TIP) or other identified funding sources such as PennDOT's or DCED's Multimodal Transportation Fund (MTF) grant program.
- Due to the historical and visual importance of the monument to the community, Perry County and the region, a robust public stakeholder and community involvement process should be implemented. The purpose of this public involvement process would be to gauge the community's reception to relocating the monument within or out of the existing intersection.
- Perform a detailed alternatives analysis that more closely examines traffic operations, costs, and impacts for the preferred alternatives
- Conduct a regional truck origin/destination study to understand the freight flows through the intersection and inform future planning and investment decisions.