



HARRISBURG AREA TRANSPORTATION STUDY

**> NEWVILLE TECHNICAL  
MEMO**



# NEWVILLE

## TECHNICAL MEMO



### PURPOSE OF THE STUDY

The intersection of SR 641 (Main Street) and SR 233 (High Street) in Newville Borough, Cumberland County, poses significant truck operational constraints that negatively affect traffic flows and introduce hazards in and around the intersection due to existing design constraints. Considering these realities and the intersection's importance in the regional transportation network, the Harrisburg Transportation Study (HATS) selected the Newville 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 with local and state officials and other stakeholders and local freight/ logistics operators, and the development of improvement alternatives. The results of these efforts as they relate specifically to Newville are described in the following technical memo.

### BACKGROUND/DESCRIPTION OF ISSUES

Newville plays a strategic role in Cumberland County's local transportation network and is home to numerous local businesses and residents that rely on the area roadways. Pivotal to this network is Newville's primary intersection of SR 641 and SR 233. This intersection is a rural center for Cumberland County and provides access to regional centers of commerce and employment and major highways including the Pennsylvania Turnpike, Interstate 81, and U.S. Route 11. SR 641 is also the major roadway link between Newburg/Roxbury and Carlisle.

As such, nearby residents and businesses generate traffic through the intersection. However, the intersection poses significant operational challenges, namely tight geometric radius corners, posted regulatory truck restrictions, and minimal room for intersection expansion due to existing buildings set a short distance from the curbline.

Newville, particularly the intersection of SR 641 and SR 233, has found itself as a crossroads in the Cumberland Valley. As the midpoint between the Blue Mountain Interchange (201) of the Pennsylvania Turnpike and Exit 37 of I-81. The primary problem is that trucks passing through town are using roads laid out in the mid-19th Century, which were designed to accommodate horse-drawn wagons, not modern 53' tractor trailers.

Due to the close proximity between the two major interstate highways, truck traffic avoids taking the Turnpike to Carlisle and backtracking south on Interstate 81 and instead exit at Blue Mountain, leading them directly through Newville (Figure 2).

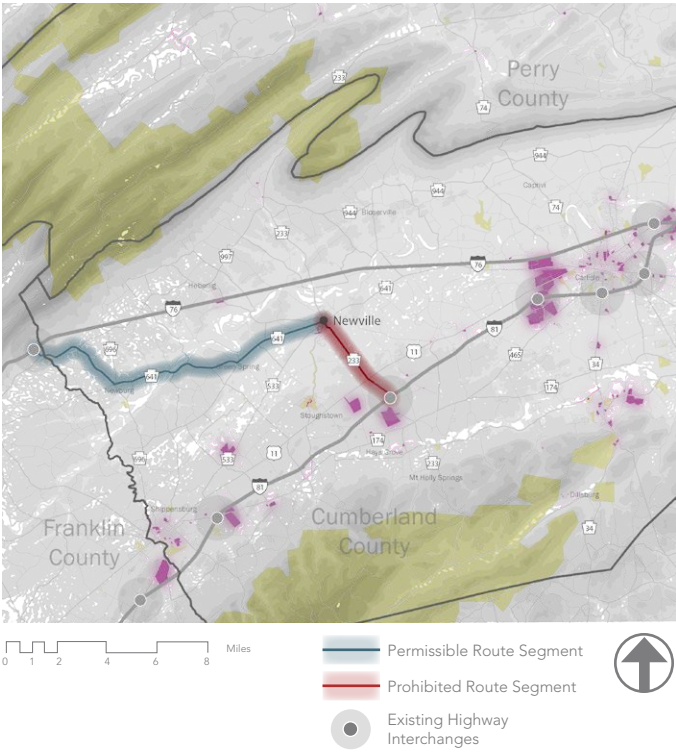
The route reduces the overall trip approximately 40 miles, saving time and fuel. But by taking this route, truckers (particularly those unfamiliar with the area) encounter the intersection of SR 641 and SR 233, where 25-foot-length truck turn restriction signage is posted, but frequently ignored.

Invariably, a truck will try to make the turn to avoid the posted route that leads them to Interstate 81 near Carlisle, ironically in the vicinity of the route the drivers are seeking to avoid. Some of the drivers can make the turn, albeit with substantial encroachment into oncoming travel lanes. However, many drivers cannot complete this turn, often becoming stuck in

FIGURE 1: Local Land Uses



FIGURE 2: Popular Truck Route to/from the Pennsylvania Turnpike



the middle of the intersection and creating gridlock. Normally these situations are rectified by the Borough police calling a tow truck to pull the stranded truck out of the intersection. At worst, those making the turn have knocked over utility poles, downed power lines or caused other mishaps.

Local residents have provided suggestions to improve the existing situation, including:

- Building a truck bypass around Newville
- Acquiring property/buildings adjacent to the intersection to enlarge its footprint

Neither option is feasible given the amount of investment either scheme would require, nor how substantially the center of Newville would be changed if numerous buildings were removed from the densely developed Main Street corridor.

# SUMMARY OF CONDITIONS

## TRAFFIC VOLUMES

Based on multiple visits to the intersection, the SR 641 and SR 233 intersection does not appear to operate poorly through Newville. It does not appear that congestion or capacity is a concern. SR 641 (Main Street) which runs east to west has the highest traffic volumes – an estimated annual average daily traffic (AADT) volume of 8,214. SR 233 (High Street) carries an estimated AADT volume of 5,941 vehicles.<sup>1</sup> While this study did not include a detailed operational analysis, these traffic volumes confirm this intersection does not have substantial operational concerns.

The freight volumes through the intersection on Main Street are an estimated annual average daily truck traffic (AADTT) volume of 421 vehicles, representing approximately 5% of the total AADT. High Street carries an estimated AADTT volume of 594 vehicles – 10% of the total, indicating that this corridor is particularly critical for truck traffic. Local truck volumes and their regional context are represented in Figures 3 & 4.

FIGURE 3: Local AADT Truck Volumes

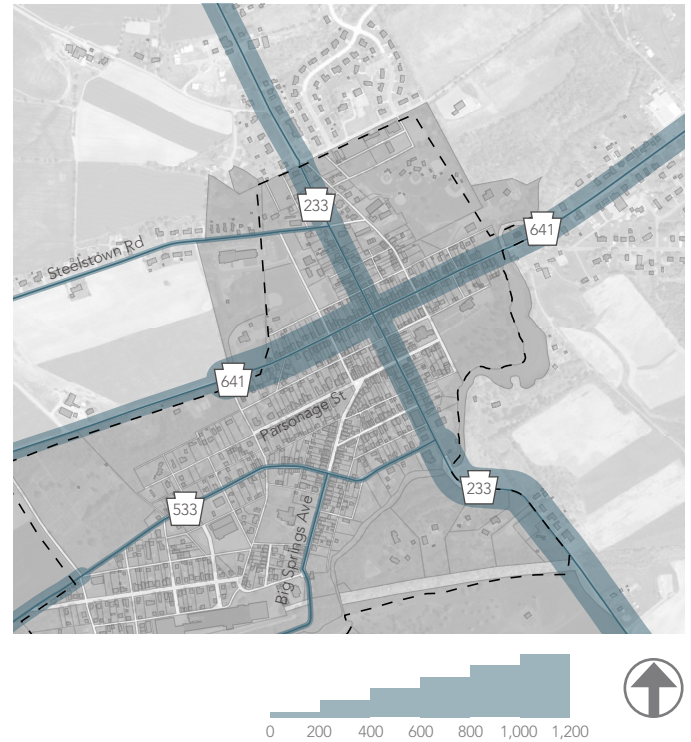
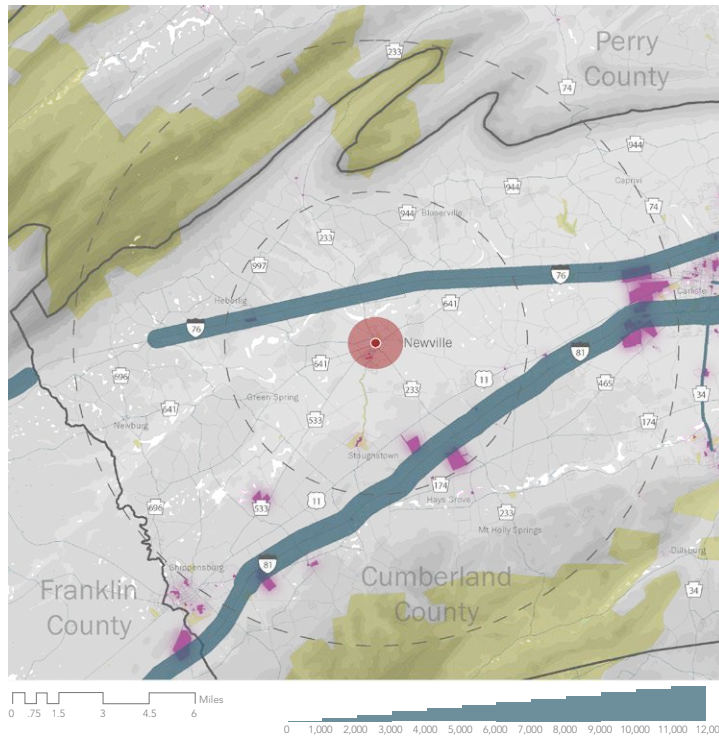
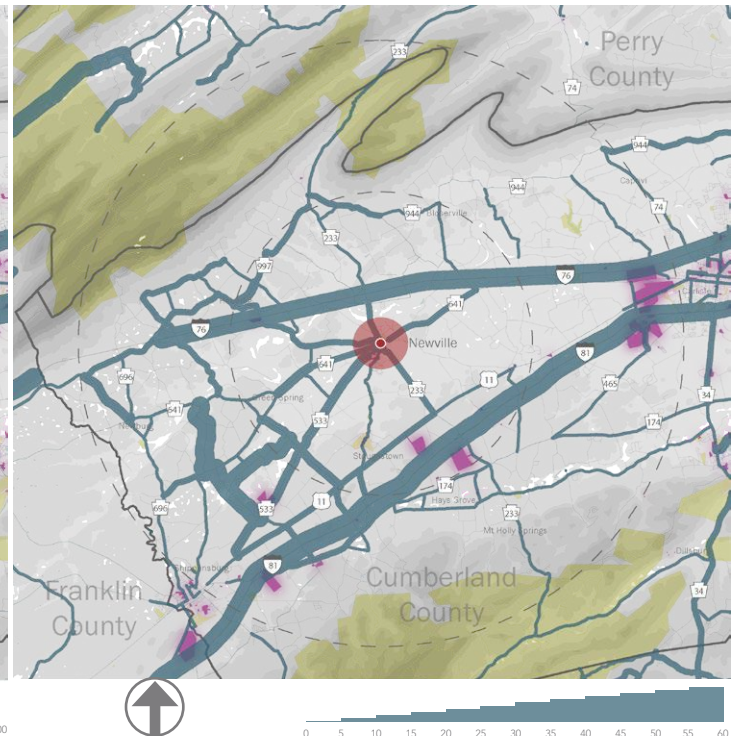


FIGURE 4: Regional Freight Volumes

AADT Truck Volumes



Freight Traffic Proportions (% of total AADT)



<sup>1</sup> PennDOT, Bureau of Planning and Research, Geographic Information Division, 2017

## CRASH DATA

PennDOT crash data reveals seven (7) reported crashes at the intersection during the five-year analysis period (2011-2015). While PennDOT crash data do not have extensive descriptions of all the causes of these incidents, the project team reviewed the available data to determine which incidents may have been partially triggered by existing intersection design and geometry constraints. Of the 7 crashes, 3 are inferred to be partially attributed to existing intersection design constraints while the remaining 4 are primarily attributed to driver error. Further analysis of the three crashes where design was cited as a contributing factor, including a review of crash narrative(s) is recommended. These three crashes are represented in Figure 5.

One incident involved an eastbound automobile on SR 641 turning right onto southbound SR 233 striking a utility pole located at the southwest corner of the intersection. While more specific crash details were not shared with the project team, it is plausible to presume the motorist was unaware of the tight right-turn clearance imposed by the utility pole's close location at the edge of the cartway.

The second and third incidents both involved westbound automobiles on SR 641 turning left into oncoming trucks traveling straight through the intersection. Both incidents were likely partially attributed to the tight intersection geometry considering both involved collisions into trucks attempting to travel through the intersection.

While it is possible these three crash incidents may have been attributed to existing intersection design flaws, there is a possibility the existing intersection conditions did not contribute to drivers' actions and these crash incidents. However, as a result of field visits and discussions with stakeholders, it is important to realize that these explanations are very real possibilities and thus suggested as crash data inferences. Further analysis of these three crashes, including a review of crash narratives(s) is recommended to confirm or refute these assumptions.

## OBSERVED DEFICIENCIES

The project team conducted a field view and visit with local officials on Wednesday, February 1, 2017 at the intersection with members from the project team, the Cumberland County Planning Commission, Newville Borough officials, and PennDOT District 8-0 to discuss the deficiencies of the intersection and explore possible

**FIGURE 5: Potential Design Induced Crashes**



solutions to alleviate the identified deficiencies. The identified issues below are a compilation of the project team's observed deficiencies during the field view and deficiencies cited by the stakeholders during the field observations as well as submitted answers to a questionnaire the project team provided to attendees.

- Intersection has very "tight" curb radius on all quadrants (~25'); not conducive for large truck turning maneuvers
- Borough roadway network consists of narrow cartway widths (some as narrow as 16 ft) with on-street parking in most locations
- The cartway widths of SR 641 (34') and SR 233 (25') approaching the intersection are narrow and constrain the intersection's footprint and ability to accommodate large vehicles
- Freight producers
  - Local officials believe that the Office Depot and Unilever distribution centers recently constructed on SR 233 south of Interstate 81 (Interchange 37) generate many of the truck trips through town
  - AB Martin Roofing Supply located west of the intersection down SR 641
- The most common trucks seen coming through the Borough are Swift Schneider (2-3x per day)

FIGURE 6: Intersection Deficiencies



traveling between their facility in Plainfield and the Pennsylvania Turnpike

- Many local waste trucks travel through the intersection in the morning hours
- Signal updates were never completed in 1993 as the Borough could not directly fund the improvements; only conduit and loops were installed
- Signage is a major contributor to the problem. Trucks moving between Interstate 81 and the Turnpike should do so in Carlisle, despite the longer trip.
- The Amish community avoids the intersection regularly; Buggies use Big Spring Road and the Rail Trail
- Cameras are being installed at the intersection for enforcement

- During the field view, 2 oversize load trucks passed through
- Multiple suggestions were mentioned during our field view, including improved signage, a re-design of intersection pavement markings, and re-routing of trucks

The geometry of the intersection physically constrains large vehicle movements through the intersection such as trucks and school buses. This is especially true for trucks with 48' or 53' trailers. During the field visit and through anecdotal information provided by the stakeholder team, truck trailers frequently become trapped by the existing intersection geometry and block the intersection, causing drivers to attempt to correct the situation while blocking traffic on all approaches.

## OUTREACH SUMMARY

In addition to the local official engagement during the field views, the project team contacted local stakeholders and freight industry personnel to gather information regarding the intersection's functionality and to obtain an understanding of the types of freight movements that use the intersection. Among the 7 local freight stakeholders the project team attempted to reach, 3 responded to our efforts – Big Spring School District, Valley Quarries, and Cumberland County Landfill.

Evidenced from the stakeholders contacted and those the project team attempted to reach, the SR 641 and SR 233 intersection in Newville facilitates the movement of goods both locally and regionally, serving the economic needs of the local community and generating economic and employment activity throughout the county. With many satellite locations of larger corporate entities in the area including Office Depot, Unilever, and Swift Trucking, many freight movements through the intersection are regional with trucks coming to/from Interstate 81 or the Pennsylvania Turnpike.

Stakeholders cited intersection geometry as the primary operations constraint when sending and receiving truck deliveries in the area. Because of the geometry challenges, local stakeholders acknowledged that illegal truck movements (intersection is posted for "No Turns, Trucks over 25' Long") do occur when truck operators feel they are capable of the difficult turn movements and reducing overall trip travel times. Such movements ignore the existing truck regulations that direct eastbound trucks to continue straight through the intersection on SR 641 to I-81.

Local stakeholders indicated the peak intersection times are typically between 7:30 AM – 4:30 PM. It is during these hours that stakeholders cited issues usually occur as a result of the intersection's geometric deficiencies, particularly during the morning peak period (7:30 AM – 9:00 AM) and evening peak period (3:00 PM – 5:30 PM). This feedback confirmed that peak hour delays/backups are attributed to the intersection's design constraints and its operational implications for trucks rather than roadway capacity issues.

In terms of improvements/deficiencies, stakeholders mentioned the following:

- Existing truck design flaws of the intersection (lack of adequate turn radii)
- Lack of suitable local alternative routes around the Borough
- Significant funding required to physically expand or improve design of this study intersection
- Additional enforcement required
- Explore alternate regional alternative routes
- Improve regional signing to direct trucks away from Newville Borough
- Consider removal of additional parking spaces near intersection
- Evaluate additional access points from Interstate 81 and the Pennsylvania Turnpike

## 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. The team determined that 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 immediate, short, medium, and long-term intersection-specific improvements were developed and are proposed below in order of time and financial investment needs.

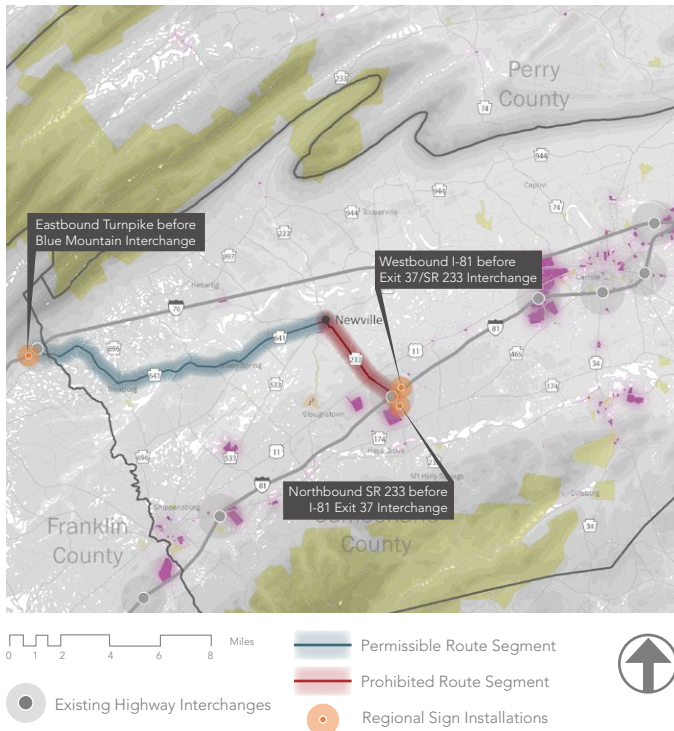
### IMMEDIATE IMPROVEMENTS

#### Alternative 1 - Additional Enforcement for Illegal Truck Turning Movements

The first alternative is to increase the enforcement of illegal truck turning maneuvers at the intersection of SR 641 and SR 233. Currently, all trucks over 25' in length are prohibited from making turns at this intersection. This proposal will require additional staffing needs for the Borough Police Department with possible coordination efforts with the Pennsylvania State Police for staffing /funding assistance. A strength of this increased enforcement effort option will be the reduced number of trucks in the Borough attempting to make these difficult/illegal maneuvers. This proposal would also satisfy PennDOT's request for increased enforcement in the area which was expressed to the project team. However, it is expected that illegal maneuvers would decline significantly once local operators realize that enforcement efforts are increased. Therefore long-term increased enforcement efforts may not be necessary. The disadvantages of this proposal are the additional Man-hour efforts and costs incurred by the Borough.

## SHORT-TERM IMPROVEMENTS

### Alternative 2 - Improve Regional Signage for Trucks



The second alternative is to implement a regional signing scheme that would post signs at strategic points to direct trucks to avoid the Borough of Newville. As an example, signs can be posted on the Pennsylvania Turnpike prior to the Blue Mountain Interchange to direct all commercial traffic inbound to the Key Logistics Center to utilize the Middlesex Interchange (Carlisle) and Interstate 81 to access warehouse facilities in Penn Township and Plainfield areas. This alternative would eliminate difficult truck turning maneuvers in the Borough and improve traffic flow/operations. The primary benefit of this alternative would be the low implementation cost associated with sign postings. However disadvantages include the potential sign maintenance/upkeep costs that may be expected of the Borough and the enforcement of proper intersection moves by local law enforcement. Coordination with PennDOT and the Pennsylvania Turnpike Commission would be required and the execution of an extensive outreach/PR program with all regional stakeholders that route trucks/large vehicles through this subject intersection would be recommended.

### Alternative 3 - Pavement Marking Revisions/Parking Removal

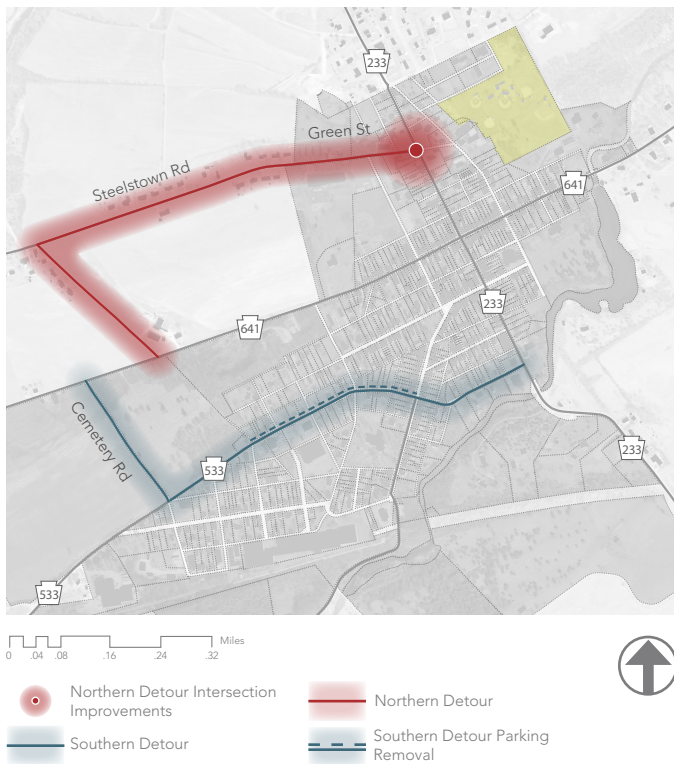


Alternative 3 consists of modifications to the existing pavement markings and the removal of existing parking spaces. The pavement marking modification will be to relocate stop bars and install signs "stop here on red" (will require enforcement) set back from the center of the intersection to allow trucks a wider turning path for tracking of truck/trailer tires. This option will also involve the removal of several parking spaces adjacent to the intersection to increase visibility and add cartway width for truck turning paths. An advantage of this is the improvement for truck turning maneuvers, as well as the minimal cost/time to implement. The disadvantages include the coordination required with PennDOT to modify the signal permit plan and elimination of several parking spaces. Further, this alternative would not necessarily accommodate all large vehicles, as the largest trailers would still have trouble navigating the intersection.



## MEDIUM-TERM IMPROVEMENTS

### Alternative 4 - Northern/Southern Truck Detours



### Alternative 5 - Intersection Curb Extensions

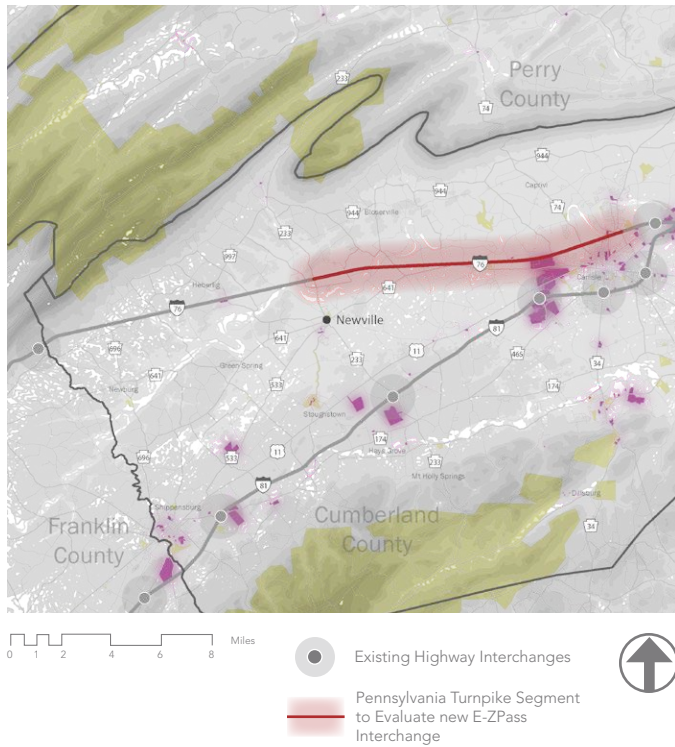
Alternative 5 seeks to improve pedestrian facilities and safety by preventing truck turning moves at the SR 641/SR 233 intersection with sidewalk curb extensions featuring protective bollards. Four 5' bulb outs would extend into SR 641 at each of the SR 641/SR 233 intersection corners - two on the north side (westbound travel lane) and two on the south side (eastbound travel lane). Extending the sidewalks into the travel lane at the intersection would shorten pedestrian crossing distances and better protect pedestrian facilities at the corners of the intersection - a desire expressed by Newville Borough officials as the Borough looks to revitalize the downtown area. Through the creation of these pedestrian facilities, truck operators would be further discouraged to make turning moves at the intersection as a result of the physical obstructions at the intersection. This recommendation would require a detailed traffic study to evaluate the impacts on all traffic types and inform the precise size of sidewalk bulb outs.

This alternative proposes the detour of all trucks to either north or south of the SR 641 / SR 233 intersection. For example, westbound trucks may be directed to use SR 533 (turning left prior to the intersection) or proceed straight through the intersection and turn left onto Green Street/Steelstown Road, left onto Kough Road, right onto SR 641 and proceed west on SR 641. Similarly, trucks approaching from the east may be directed across Cemetery Road, turning left onto SR 533 and right onto SR 233 or be directed to the Kough Road and Steelstown Road/Green Street before turning onto SR 233.

A clear advantage for this alternative would be that all difficult/illegal large vehicle turning movements are eliminated at the study intersection. However, several concerns with this concept exist, including narrow detour roadways, utility poles in clear zones, several vertical curves that limit sight distance, and existing pavement may need to be reinforced to accommodate additional loading from truck traffic. Additionally, the adjacent neighborhood contexts are of concern considering their residential nature, the presence of an elementary school on Green Street, and the historic character of the adjacent structures on SR 533 through Newville.

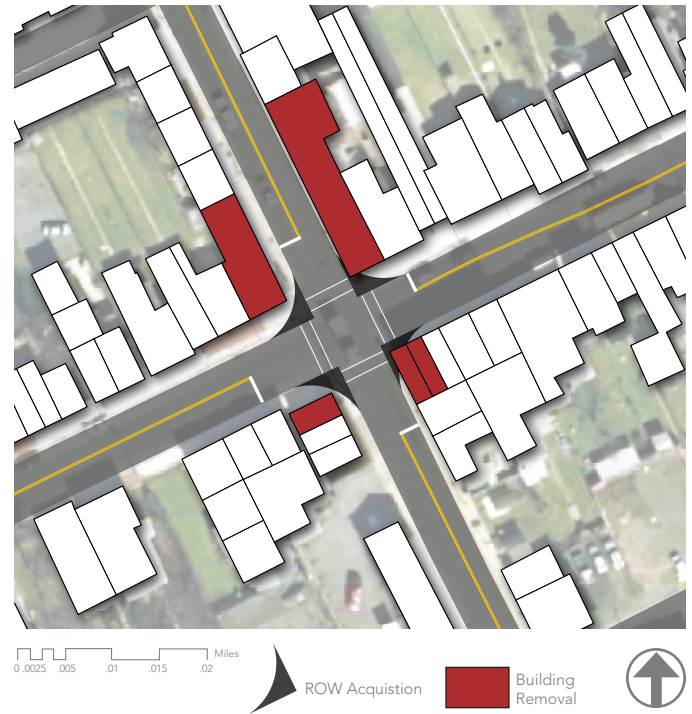
## LONG-TERM IMPROVEMENTS

### Alternative 6 - E-ZPass Interchange



This alternative proposes evaluating the feasibility of a new E-ZPass interchange on the Turnpike. The exact location could be determined during the feasibility phase however the most logical siting is between SR 233 and the Carlisle Interchange. The benefits of this alternative are the elimination of difficult maneuvers for large vehicles at the subject intersection, improve access to nearby warehouse facilities, and an increase in land value/building options near new interchange. Some disadvantages include the additional evaluation studies needed, funding availability given the substantial capital investment required, and unclear public support.

### Alternative 7 - Intersection Widening



This alternative proposes widening the existing intersection of SR 641/SR 233 to accommodate larger truck turning radii. Currently, this alternative would require, at minimum, a partial or total removal of at least four (4) structures adjacent to the intersection. The benefits of this alternative are the elimination of difficult turning maneuvers for large vehicles at the subject intersection and new signal and pedestrian facilities for the intersection. Some disadvantages are the acquisition of right-of-way/removal of existing structures, alteration of existing densely developed context of the area, new pavement structure/curbing/signal equipment required, elimination of available parking, significant cost associated with infrastructure and acquisitions, and unclear public support.

## SUMMARY OF ALTERNATIVES

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

### Alternative 1 - Additional Enforcement for illegal truck turning movements

- Strengths
- PennDOT supported approach
  - Short implementation time

Weaknesses

- Additional staffing/funding requirements
- Borough may need assistance from Local State Police to fully implement/enforce

Alternative 2 - Improve Regional Signage for trucks

Strengths

- Minimal cost to implement

Weaknesses

- Coordination required with PennDOT and Pennsylvania Turnpike Officials
- Outreach/PR program required with local stakeholders

Alternative 3 - Pavement Marking Revisions/Parking Removal

Strengths

- Minimal cost/time to implement

Weaknesses

- Coordination with PennDOT required for signal permit plan revision
- Eliminates several parking spaces
- Does not accommodate largest heavy vehicles

Alternative 4 - Northern/Southern Truck Detours

Strengths

- Eliminates difficult maneuvers for large vehicles at the intersection

Weaknesses

- Narrow and residential streets would need to be utilized

FIGURE 7: Alternatives Comparison



- Pavement structure would need to be upgraded
- Near-by schools would be a concern
- Requires coordination with adjacent municipalities
- Unclear public support

#### Alternative 5 - Intersection Curb Extensions

##### Strengths

- Discourages prohibited truck maneuvers at the intersection
- Improves pedestrian facilities at the intersection
- Advances Newville Borough's desire to reactivate the downtown

##### Weaknesses

- Smaller vehicle maneuvers through the intersection may be negatively affected

#### Alternative 6 - E-ZPass Interchange

##### Strengths

- Improves access to nearby warehouse facilities
- Increases land value/building options near new interchange

##### Weaknesses

- Requires a study to evaluate effectiveness/need/funding/etc.
- Will require support and coordination with the Pennsylvania Turnpike Commission
- Infrastructure funding
- Unclear public support

#### Alternative 7 - Intersection Widening

##### Strengths

- Eliminates difficult maneuvers for large vehicles
- New signal and pedestrian facilities
- Significant infrastructure upgrade for the Borough of Newville

##### Weaknesses

- Requires acquisition of right-of-way/removal of existing structures
- New pavement structure/curbing/signal equipment required
- Elimination of available parking
- Significant cost
- Unclear public support

## NEXT STEPS

This study examined the existing conditions of the Newville intersection, identified and engaged stakeholders, and recommended 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 this intersection, 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 this subject intersection in Newville Borough. 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 importance of traffic flow in around this study intersection to the community, Cumberland County and the region, a robust public stakeholder and community involvement process should be implemented. The purpose of this public involvement process is to gauge the community reception to the proposed alternatives.
- Perform a detailed alternatives analysis that more closely examines traffic operations, costs, and impacts for each of the proposed alternatives
- Conduct a regional truck origin/destination study to understand the freight flows through the intersection and inform future planning investment decision.
- Begin discussions with municipalities, Cumberland County, HATS and the Pennsylvania Turnpike Commission to evaluate stakeholder support and feasibility of further study of a new E-ZPass Interchange to be located between Exits 201 (Blue Mountain) and 226 (Carlisle).