

CORRIDOR

N Pennsylvania-Maryland Corridor N Completion Analysis & Impact Study



Final Report

October 14, 2020

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Study Overview

Labor market access, traveler safety, system resilience and north-south connectivity between the communities in central Pennsylvania and Maryland are as essential for the southern Alleghenies economy today as they were when the Appalachian Development Highway System (ADHS) was first envisioned in 1965. The ADHS is a 3,090-mile network of highways linking the Region to national Interstates and is designed to promote economic development across Appalachia. ADHS's 33 corridors provide access to regional and national markets, contributing to growth opportunities and improved access to businesses and residents in the region. In the years since US Route 219 (US-219) was initially designated as Corridor N, the National Highway System (NHS), Interstate Highway system and much of the ADHS has been completed, leaving south central Pennsylvania and Western Maryland as one of the few areas not yet fully benefitting from the envisioned access, safety, and mobility benefits of the 21st century transportation system. This report explores the implications of satisfying the region's need for the completion of this facility, as well as the business and economic opportunities associated with achieving this outcome.

The study offers a comprehensive, qualitative analysis of the impact(s) to businesses, regional freight, economic development and other implications of completing the ADHS Corridor N (US-219), from Meyersdale, PA to Corridor E (I-68) in Grantsville, MD. Corridor N is 68.1 miles in length and stretches from Corridor M (US-22) at Ebensburg, PA to Corridor E (I-68) near Grantsville, MD. Currently there are 1.3 miles under construction at a cost of \$63M. Approximately 8-miles remain unfinished between Corridor E and the area immediately south of Meyersdale, PA, including approximately 1.5-miles in Maryland and approximately 6-miles in Pennsylvania. In November 2018, an 11-mile section of four-lane roadway from Somerset, PA to just south of Meyersdale, PA (known as the Meyersdale Bypass) was completed. A 1.3-mile section starting at Corridor E is currently under construction and efforts are being made in Maryland to fund the approximately 1.5-mile remaining mileage. It is important to note that the entire Corridor from Somerset to the Maryland state line, including the recently completed 11-mile stretch and the proposed roadway, has been designated a Critical Rural Freight Corridor (CRFC). As a CRFC, it is a part of the National Highway Freight Network and is eligible for Federal funds apportioned to each state for freight projects as well as FASTLANE grant funds.

The current roadway (Meyersdale, PA to I-68 in Maryland) is a two-lane highway that impedes travel of all types of vehicles due to safety concerns and travel time. Completing this segment will increase the safety of all vehicles and offer a faster travel route that reduces overall transportation costs, as well as provides significant benefits to the region's economy. The current report is offered to provide detail about the economic and efficiency impacts the completion of Corridor N will provide to the businesses and residents in the region. Its findings are meant to build on past findings from the Appalachian

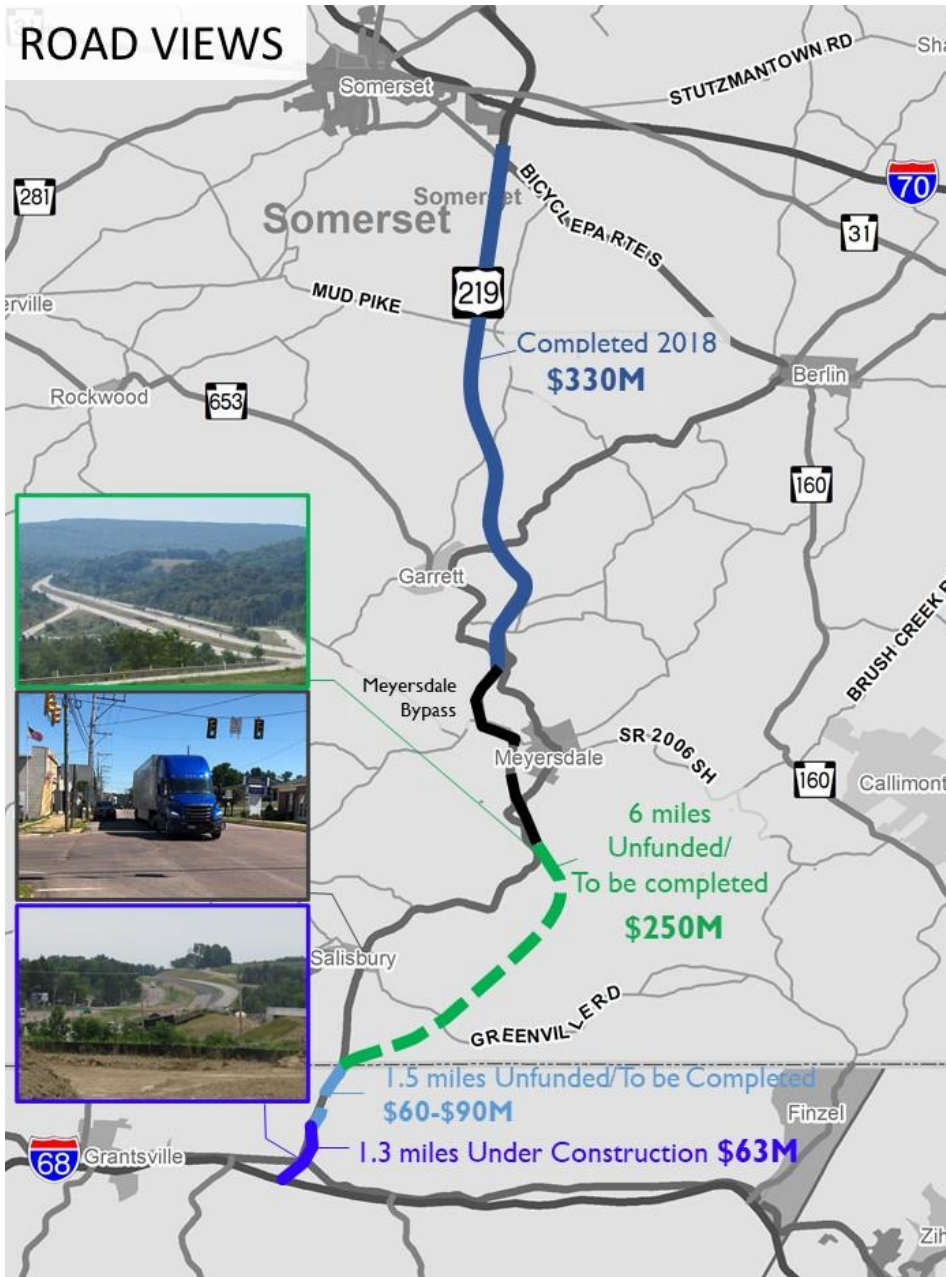
Regional Commission's 2017 ADHS Economic Impact Study and the Maryland State Highway Administration (SHA) US-219 Completion Benefit Cost Analysis (BCA). By gathering stakeholder input (including interviews with business leaders) and reviewing key data regarding job creation, this report will demonstrate the benefits and costs of completing US-219, as well as illustrate the project's potential for increased freight activity, improved transportation efficiency, safety, and increased economic opportunity for regional businesses.

Sponsorship and Regional Engagement

The Southern Alleghenies Planning and Development Commission (SAP&DC) was awarded funding from the Appalachian Regional Commission (ARC) to prepare an economic impact analysis for the completion of the remaining miles needed to connect US-219 (Corridor N of the Appalachian Development Highway System) south of Meyersdale with I-68 in Maryland.

There will still be an approximate 1.5-miles to complete in Maryland following the opening of the currently constructed section. The cost for the current section is \$63M, the estimated cost for the remaining 1.5 miles in Maryland is \$60-90M. The section connecting Somerset with Meyersdale was opened in November 2018 after five years of construction at the cost of \$330 million. Construction of 1.3 miles remaining on the Maryland section from I-68 to the Pennsylvania border was begun in October 2018, leaving an approximate 1.5 miles in Maryland and a 6-mile unfunded section from the Pennsylvania border to Meyersdale. These are the final sections needed to complete the 4-lane link connecting I-68 with the Pennsylvania Turnpike and points north. The estimated cost to complete this final 6-mile section is \$250 million. **Exhibit 1** illustrates five sections of US-219: The Somerset to Meyersdale section completed in 2018, the Meyersdale Bypass section that is complete, the Salisbury section where construction has not been funded, and the two Maryland sections that would complete the 4-lane roadway, one anticipated and one under construction.

Exhibit 1: Road Views – Completed, Not Started, Under Construction



This study will provide a comprehensive, qualitative analysis of the economic and safety impacts of completing the roadway. A study of this type is essential for ensuring that the Corridor’s needs and opportunities are appropriately represented when defining the purpose and need of future investment as well as meeting the criteria for programming.

The end goal of this report is to present a qualitative narrative of the study team’s outreach efforts. The concept is to let the local business stakeholders and community organizations tell the story in their own words of how an incomplete US-219 has impacted their past and hinders their current operations in terms of efficiency, expansion potential, labor access, and

safety. Business stakeholder views regarding the benefits that will accrue for their operations’ costs and efficiency when US-219 is completed are also examined in detail. The outreach narrative is supplemented with quantitative modeling analysis and graphics to illustrate and support the outreach findings.

Project Kick-Off Meetings

The Project kick-off was begun on January 31, 2020 with a series of meetings and listening sessions. SAP&DC Leadership and the consultant project team met with key stakeholders from the region in Pennsylvania, Maryland, and West Virginia in several listening sessions. The sessions provided the first opportunity for regional stakeholders to share with the consultants their views on the importance of the project and the value of a completed US-219 corridor for local, regional, and statewide businesses. The study team’s goal was to work closely with state DOTs, ARC, FHWA, and regional private sector stakeholders to define and illustrate the benefits of the completion of the incomplete approximate 6-mile section of US-219 that is not complete and not funded. Information garnered from the sessions, along with ongoing outreach from additional business owners, state and federal transportation officials, and other community leaders, guided the analysis and will form the basis for future state and federal funding applications.

The second phase of the Study involved regional business and stakeholder outreach; this effort was completed at the end of July 2020. Through the kick-off listening sessions, an initial list of regional businesses and community organizations were identified as potential candidates for interviews and site visits. These candidates were selected based on the size of their business, the generation of significant amounts of truck and auto traffic, and the potential impact of the



Legislative Breakfast

- Kick-off meeting with State & local elected officials
- Concerns about existing heavy truck traffic
- Critical link from Buffalo, DC & Baltimore
- Could lessen impact of future Turnpike closures

Theresa Crouse (Representative Downing's Office), Paul Edwards (Garrett County Commissioner), Tom Chernisky (Cambria County Commissioner), Carl Metzger (PA Representative), Robbie Mateo (U.S. Senator Robert Casey's Office), John Frick (U.S. Senator Pat Toomey's Office), Ben Wren (PA Senator Stefano's Office), Gerald Walker (Somerset County Commissioner), Pat Himes (U.S. Representative John Jay's Office), Colleen Dawson (Somerset County Commissioner), Scott Hunt (Cambria County Commissioner), Pam Tokar-lickes (Somerset County Commissioner), and Steve Howars (SAP&DC Executive Director)



- Share information between SAP&DC and the consulting team and TGCC, as they will continue to be a supporting agency advocating for the completion of the project.

Jennifer Walsh (TGCC Executive Director), Ron Aldom (Somerset County Chamber), Tom Prestash (PennDOT), Gerald Walker (Somerset County Commissioner), David Mopak (Garrett County Economic Development Council), Dr. Richard Lochter (Mineral County WV Commissioner), Nikki Donahoe (PennDOT), Robbie Mateo (U.S. Senator Bob Casey's Office), Linda Thomson (IAR Executive Director), Robin Summerfield (U.S. Senator Ben Cardin's Office), Theresa Crouse (PA Representative Matt Downing's Office), Carl Metzger (PA Representative), Julie Krieger (Somerset Trust), Sharon Corwell (TGCC Executive Assistant), and Colleen Pearson



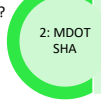
1: PennDOT Central Office

- PEL study was completed in 2016
- PE ~\$6M, Final Eng. ~\$35M, Project ~\$300M
- Join grant with MD and PN
- SAP&DC to designate Corridor N as a Critical Rural Freight Corridor

Tom Prestash and Nikki Donahoe of PennDOT District 9; Dean Roberts, Transportation Planning Manager of the PennDOT Center for Program Development and Management; and Brandon Carson and Brandon Peters from SAP&DC along with Gerry Kuncio and Justin Scott

What to know

1. What is the corridor’s statewide or regional significance?
2. What would enhance the PennDOT’s view of its value?
3. How can businesses in the region advocate for the corridor?
4. What are key economic development strategies?
5. What investments achieve economic objectives?
6. How can multi-state coalition support its completion?
7. Who should be involved?



2: MDOT SHA

- Legislators and businesses are involved
- SHA is conducting a benefit cost analysis (BCA)
- Stakeholders identified and on-board

Matt Baker and Barry Kidrowski of the Maryland State Highway Administration (SHA) potential stakeholders in Maryland include the Cumberland Area MPO (CAMPO), Inagerstown/Eastern Panhandle Metropolitan Planning Organization (Matt Mullenax), and Garrett County and that a good contact for future outreach is Gary Rudek, President of Total Biz Fulfillment

- An available work force and educational system
- A strong local workforce with secondary and post-secondary education
- Many would move back to Somerset county for work



3: Workforce Development



Susan Whistler (SAP&DC), Dr. Barbara Zaborowski (Work Force Development, Penn Highlands Community College), Linda Thomson (IAR - Somerset and Cambria Counties), and Denny Hutchison from the Somerset County Farm Bureau



More than 450,000 tourists attended the Flight 93 memorial last year.



4: Economic Development

- Extend the one-day reach of trucking
- Recreation and tourism playground
- Ghost Town Trail is top 5 trail in the country

Tom Smith (former Secretary of Transportation at WVDOH), Josh Boland (Somerset County Economic Development Council), and Linda Thomson (IAR)

- Casselman Mine - from Shanksville -> to river -> to rail
- \$8 million/year on trucking
- Braddock (Meyersdale) and Marple (Oakland, MD)
- Phoenix Tech, Grantsville industrial park, and the regional timber industry



5: Key Industry Leaders

Rob Bottegall and Tom Moran from Conco Coal in Garrett County Maryland

completion of Corridor N on

their operations. Site visits were initially planned to occur in late March and early April 2020. However, due to the COVID-19 lockdown, in-person meetings and site visits were postponed. To keep the project moving forward during the lockdown, an online survey and information gathering effort was initiated.

PublicInput.com Survey Effort

SAP&DC and the consultant team decided to expand the outreach to a larger pool of regional businesses and community organizations through an online survey effort. The survey is designed to allow the participant a platform to provide qualitative information as well as quantitative data regarding the Project. Survey participants were encouraged to provide their businesses' experiences and impacts regarding the current state of US-219, and how its completion will impact their future operations.

As of September 30, 2020, 129 participants contributed 1,328 responses and 505 comments through the www.PublicInput.com/US219 online survey website. The site is currently active (as of September 2020) and is continuing to gather public input about the project. This report includes a cross-section of responses that were submitted by the survey participants. All responses remain available through the survey website (publicinput.com/US219). The responses were universally in favor of completing US-219, with no responses that indicated opposition to the project.



Business and Stakeholder Site Visits

In July 2020 COVID-19 lockdown restrictions were lifted and scheduling of in-person meetings and site visits were initiated. These meetings were conducted and completed in late July and early August 2020.

A cross-section of the businesses identified in the stakeholder meetings were selected for site visits, including:

- Total Biz Fulfillment - Paul Ruddell
- Clapper's Industries - Jon Clapper
- Wheeler Brothers - Wendy Gianfrancsco
- Heritage Coal - Jason and Angela Svonavec
- J&J Truck Bodies/Riggs - Michael Riggs
- Corsa Coal - Tom Moran
- Bill Miller Equipment Sales - Joe Michaels and Lee Murdy
- Firefly Farms - Mike Koch
- Phenix Technologies - Frank Vitez
- Rocky Gap Casino Resort - Skylar Dice
- Beitzel Corporation - Shawn Bender

The site visit findings, coupled with the modeling and mapping effort, are presented in the following two sections of this document: Performance Profile: Infrastructure Conditions and Needs” and “Business and Economic Profile: Enhancements and Opportunities.”

Performance Profile: Infrastructure Conditions and Needs

Completion of Corridor N does not merely address the potential traffic carried on the Corridor itself, but instead addresses more comprehensive network resilience, safety, and accessibility issues. While interstate highways I-68 and I-76 make fast, safe, and rapid access to points east and west available from south central Pennsylvania, none of the routes connecting these facilities in the north-south direction provide a similar quality of connection. All of the north-south routes connecting the region are of relatively low capacity, are faced with safety challenges, and, while carrying light traffic, are ill-equipped to provide resilient accessibility when incidents of any kind occur. The following sections will address the current performance of Corridor N within the study region and immediate surrounding areas. The focus will be on the following topics:

- North-South Connectivity and Resilience
- Allegheny Mountain Tunnel
- Safety of Available Routes
- Delivery and Trucking Considerations

Qualitative findings from the site visits and survey effort will form the core of the narrative from the perspective of the region’s businesses and Corridor users, enhanced by spatial, statistical, and other descriptive detail from publicly available data sources. This narrative is supported by crash, speed, and mobility databases reporting historic average delay by route and areas of safety issues.

North-South Connectivity and Resilience

There is a distinct imbalance between east-west capacity and connectivity and that of north-south corridors within the study region. This leads to a lack of resilience on north-south routes (i.e., the ability to choose alternate routes if there is an incident). During the site visits, multiple firms have reported significant impacts on operations when there is an incident on the north-south routes including:

- Significant delays at loading docks as trucks are delayed leading to late shipments and longer shifts
- Increased overtime costs totaling an estimated \$10,000 annually for one firm
- Reported per-mile costs of north-south trucking higher than east-west due to delays and slower speeds
- Difficulty obtaining drivers willing to service customers along the route



As network resilience has become an increasing focus of transportation planning and performance measurement, it has come to be accepted that average annual daily traffic and recurring delay often overlook significant losses of time and reliability occurring on rural corridors like US-219. Furthermore, given the sparse nature of the north-south roadways serving south-central Pennsylvania, it is notable that when non-recurring incident delays affect access to the region, there are not parallel interstate or principal arterial routes available to make such access possible.

The historic incident delay for US-219 and its potential diversion routes can be observed and mapped to illustrate the impact of non-recurring delays on north-

south routes versus east-west routes throughout in the Southern Alleghenies Region. For the delay mapping effort, INRIX data was used to estimate the non-recurring delay on roadway segments throughout the region in a 5-year period. The data revealed the loss of speed occurring during the most severe incidents on each segment by each hour of the day for five years, from 2015 to 2019. The process summed up all the congested hours in five years for each segment.

The results are shown in **Exhibit 2** and **Exhibit 3**. The two exhibits display the same area with Exhibit 3 zoomed in closer to the project location. Results show that there is more congestion on the north-south segments like US-219 and US-220 than on the east-west corridors. The results show that non-recurring incidents bring speeds on all of the north-south routes in the region from ranges of 45 to 65 miles per hour to speeds between 8 and 16 miles per hour. The average speed declines across the board for the entire north-south “screenline” (the cross-section of north-south routes – numbered in Exhibit 2 from 1 to 5). The screenline analysis shows that the lack of connectivity is pervasive throughout the region. In the absence of a viable US-219 route, travelers cannot simply divert to another north-south route (as no routes on the screenline have significantly more incident capacity than US-219). The darker shades on the map show the segments with the most significant losses of speed in non-recurring incidents. Notably, there is a far greater loss of speed overall in the north-south direction than in the east-west direction, pointing to the reality that completion of US-219 satisfies not only a need of existing recurring daily traffic, but has a role in serving non-recurring traffic which does not appear in average annual daily traffic (AADT) models or counts.

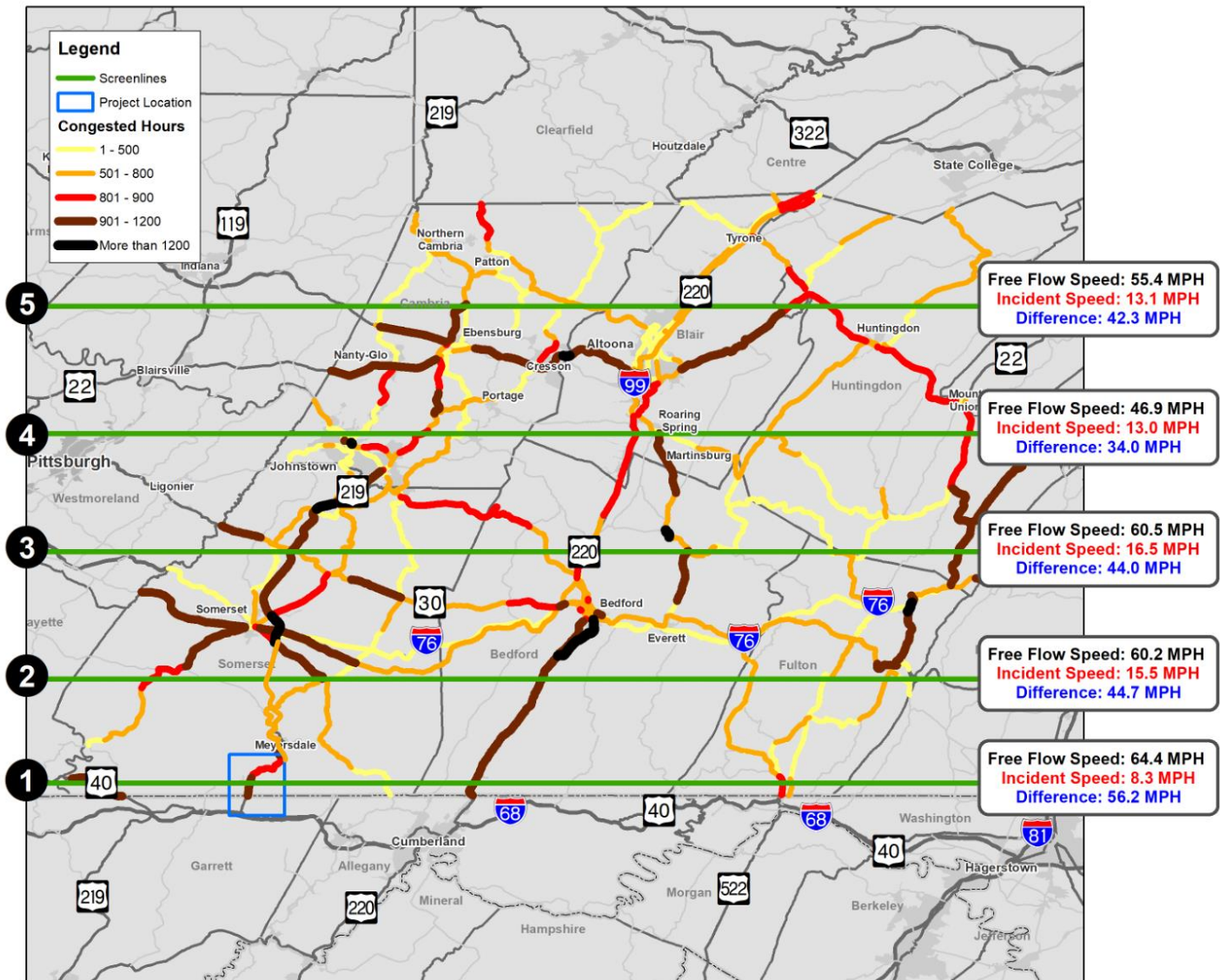
FROM SITE VISIT INTERVIEW:
(Industry – Warehousing & Distribution)

Any snowstorm to the north will cause delays to shipments and deliveries. We are forced to wait, but still need to get shipments out. That causes about \$10,000 per year in added overtime costs.

FROM PUBLIC INPUT SURVEY:

Route 219 south of Meyersdale is an unsafe, outdated rural 2 lane road. We avoid it when possible. Furthermore, lack of a limited access highway has hampered our efforts to recruit workers south of Meyersdale PA.

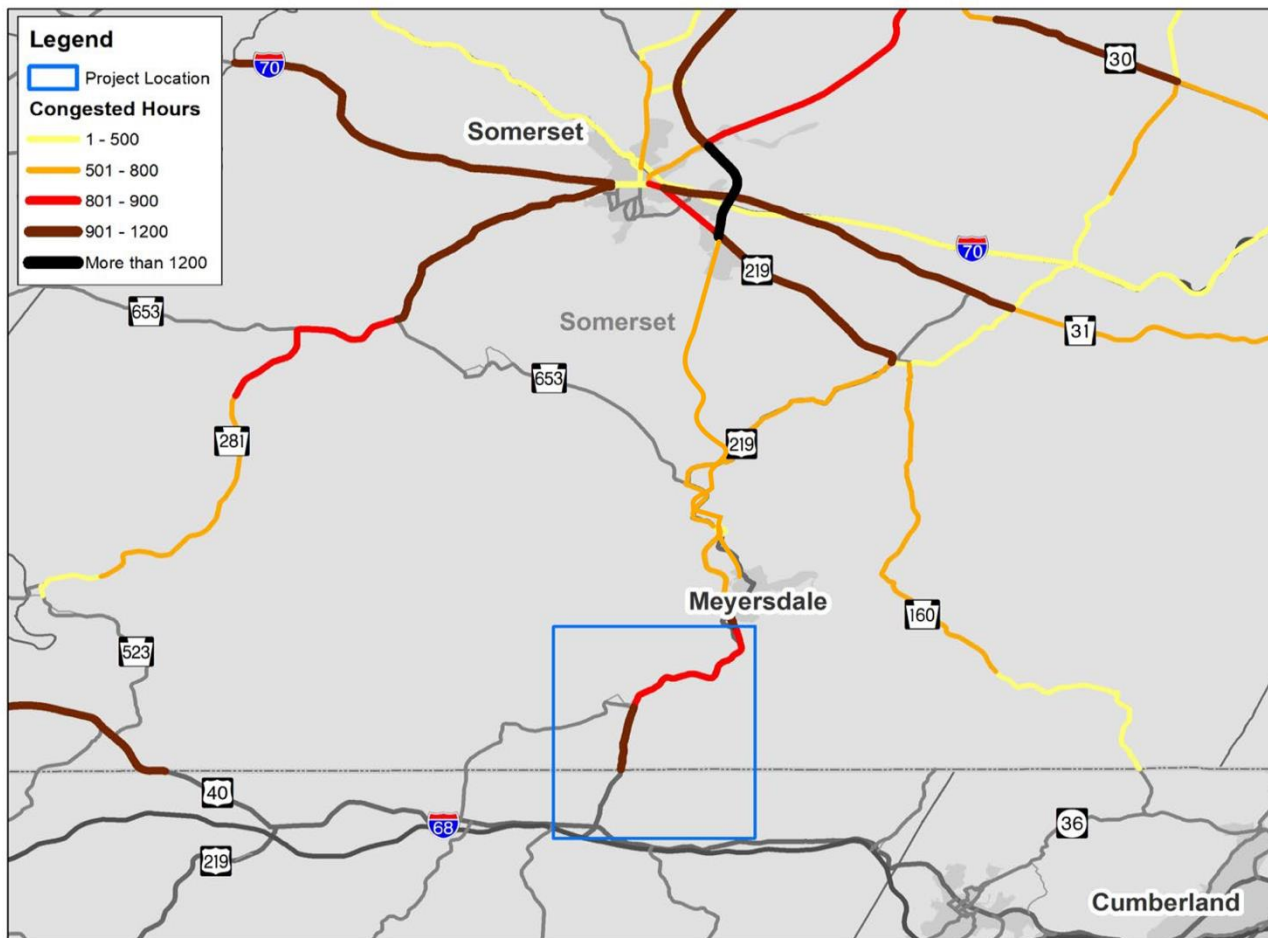
Exhibit 2: Total Number of Hours Congested in 5 Years



As can be seen in the above graphic, there are significantly more black, brown, and red segment indicators (higher congestion) on north-south routes than on east-west routes.



Exhibit 3: Total Number of Hours Congested in 5 Years – Zoomed View



The zoomed-in view of the delay map highlights the uncompleted section of US-219 and shows some of the highest levels of delay in the region.

FROM SITE VISIT INTERVIEW:
If I-76 shuts down for any reason (weather or accident) there are no options for us to get to I-68. Our shipments are shut down.



FROM PUBLIC INPUT SURVEY:
Speed limit and borough traffic causing lost time; Large commercial truckers do not like to use OLD Rt219 - too slow, too dangerous.

Pennsylvania Turnpike Tunnels

In addition to the overall network resilience benefits of making US-219 a viable and higher capacity north-south route, the facility could play an important role in hazardous material routing on Pennsylvania's transportation network. The four Pennsylvania Turnpike tunnels (Allegheny Mountain Tunnel, Blue Mountain Tunnel, Tuscarora Mountain Tunnel, and Kittatinny Mountain Tunnel) are located in Somerset, Franklin, and Cumberland Counties



along the Pennsylvania Turnpike (I-70/76). While the design of the tunnels has been continually upgraded to allow for enhanced capacity and performance over the years, the tunnels still leave significant unmet needs. The Pennsylvania Department of Transportation is evaluating potentially costly environmental, engineering and construction requirements associated with enabling hazardous materials to safely and fully utilize the tunnel. Presently trucks carrying hazardous materials are unable to use the tunnels and are forced to exit the Turnpike and travel either North to US-22 or South to I-68 (relying on US-219). The use of the two-lane antiquated design of US-219 as a hazardous materials route in the absence of a tunnel improvement (which may be costly and take years to complete) can pose unique risks to both the environment and the general population. The envisioned four-lane design for US-219 can offer a safer and more efficient option for this traffic in the absence of the envisioned tunnel improvement for both the near and potentially longer term. It is also likely that the overall cost of improving US-219 as an alternative route for diverted tunnel traffic may prove an economically cost-competitive option when compared to other tunnel improvement options under consideration.

Safety of Available Routes

The three primary north-south routes through the study region are US-219, SR-160, and SR-669, and all provide challenges and safety issues to their respective users. While the focus has been on the US-219 section from I-68 in Maryland to the Meyersdale section, SR-160 and SR-669, which are common alternatives to US-219, also suffer from safety issues. For example, within a six-year span, the Mount Harmony United Methodist Church along SR-160 in Wellersburg was struck by five runaway trucks.¹ The Church was eventually moved to avoid any further safety incidents.

¹ Pittsburg Post-Gazette, "After one too many runaway truck crashes, this Somerset County church is no more" November 20, 2018

Safety issues on SR-160 and SR-669 have led to truck and weight restrictions that limit these routes as an alternative, which drives truck traffic onto US-219 through Salisbury. Network resilience has now been limited due to these safety issues. The lack of route options only exacerbates the traffic levels, safety impacts, and delays for businesses operating north-south in the region, particularly on US-219.



Incomplete 219 costs **\$2.4M** in safety costs



Incidents cost businesses more than **\$2.5M**



3 deaths
26 injuries in 5 years



FROM PUBLIC INPUT SURVEY:

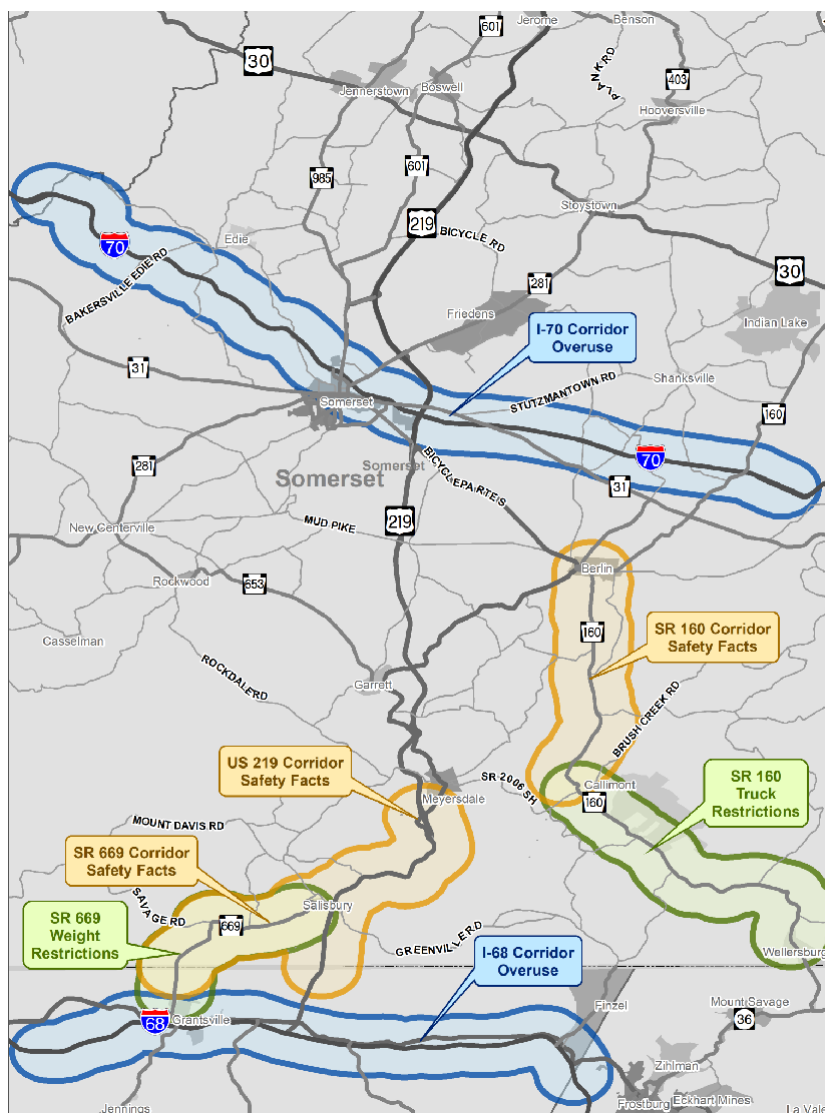
Our main issue is a safety concern when truck drivers avoid 219 due to various reasons. There have been numerous truck accidents in the Wellersburg area of our district. Many families have stressed their concerns about student risks factors related to transportation in that area.

FROM PUBLIC INPUT SURVEY:

I believe this is a vital corridor for medical and grocery supplies to the southern end of our county. Somerset County has many rural areas and travel time to the capital of the county is hampered by poor roads and low speed limits set for safety because most of the roads around here were designed for horse and buggy (1800's).

Exhibit 4 illustrates the primary north-south and east-west corridors in the study region. Note that east-west corridors are Interstates I-76 and I-68 while the north-south corridors are two-lane roads, or in the case of US-219, a partial two-lane road. The safety facts presented below the map focus on the north-south routes. As shown in the table, over the five-year period US-219 had 52 crashes, 13 of

Exhibit 4: Safety Analysis



Segment	Total Crashes (5-year)	Cost of Crashes per 100M VMT	Total Crashes Fatal & Injury (5-year)	% Truck
US219	52	\$2,430,753	13	17.1 %
SR160	33	\$20,521,848	9	7.8 %
SR669	16	\$1,596,289	9	3 %

which resulted in injury or death. Of particular note is the percentage of trucks on US-219 compared to SR-160 and SR-669. Of total traffic on US-219, 17.1 percent is made up of truck traffic versus 7.8 percent on SR-160 and 3.0 percent on SR-669. This difference may be due to truck restrictions forcing regional north-south truck traffic onto US-219 since it is the only option. US-219's 17.1 percent truck traffic is nearly twice the Pennsylvania system average for its functional classification (8.7 percent), highlighting US-219's unique role as a sole north-south connection for trucks accessing communities in the region.

FROM SITE VISIT INTERVIEW:
(Industry – Manufacturing)

We would be less inclined to use SR-160, even though it's a shorter route, and use US-219 if it was four-lanes to Somerset. It's dangerous going over Wellersburg Mountain.

Note: Interviewee also mentioned Mount Harmony Church being struck several times.

Delivery and Trucking Considerations

Though the safety of the two-lane section of US-219 was of universal concern for commuters and shippers involved in the study process, other key business issues included difficulty finding drivers/carriers to service the route, the additional costs for carriers willing to serve the route, and delays and lost time associated with the route. The difficulties associated with north-south routes, including truck and weight restrictions on SR-669 and SR-160, means businesses often use longer alternative routes or abandon markets all together. The delivery area for businesses north of Meyersdale is significantly reduced to the south, and likewise, businesses in Maryland limit suppliers and markets to the north.

Due to this situation, the businesses indicate that they limit the majority of their suppliers and markets to the east and west; those that can be accessed by I-76 and I-68. Not only does this eliminate a regional pool of suppliers and markets, but it also increases distances in which goods must be transported, putting unnecessary stress on the interstate system. The most mentioned location of suppliers that could be provided by regional businesses but instead are sought elsewhere are Pittsburgh and western Ohio.



FROM PUBLIC INPUT SURVEY:

The trucks that deliver/pick up to us lose time due to the need to jump onto local routes. This means that we are compressed to get them loaded and unloaded quickly. In addition, the lack of a clear “commuter” route into Somerset causes issues in attracting talent to our company. Potential employees prefer having a highway route to travel distance over.

FROM SITE VISIT INTERVIEW:

(Industry – Equipment Sales & Leasing)

The two-lane section has a direct impact on the business. Often, we cannot ship heavy equipment north on 219 because of the two-lane section or we have to remove parts to get it through Salisbury. Need to use more carriers, more escorts, and requires extra permits.

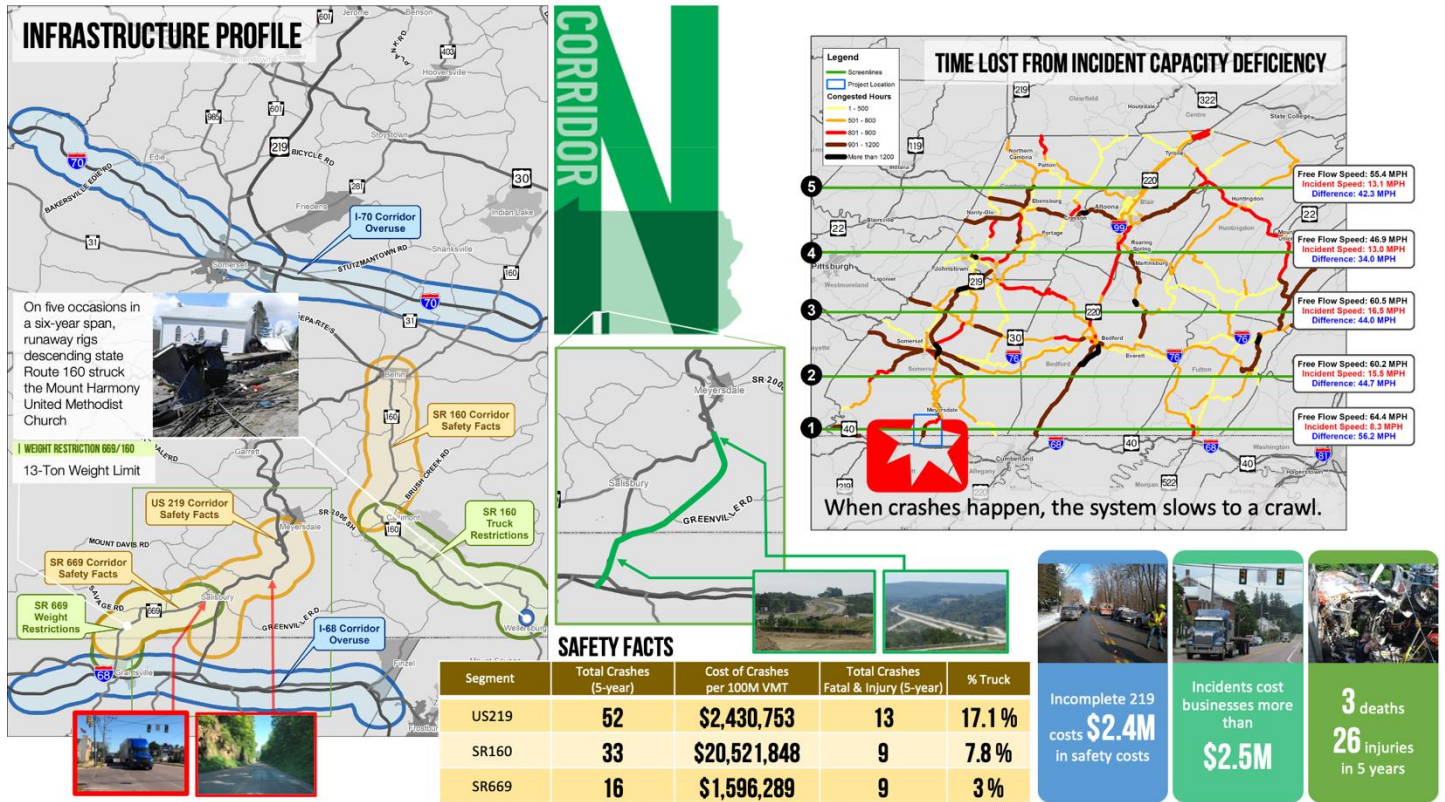
FROM PUBLIC INPUT SURVEY:

A completed 219 south to Md will allow more efficient, cost effective route to our facilities in WV and MD. It will also allow us to recruit from a greater geographic area as the commute will be shorter/ safer for workers from south of Meyersdale.

Infrastructure Performance Profile

Exhibit 5 presents a summary Infrastructure Profile infographic, which is a complete picture of highlights from the previous sections.

Exhibit 5: Infrastructure Profile Full Infographic



Business and Economic Profile: Enhancements and Opportunities

The completion of US-219 will provide significant benefits to the Somerset, Cambria, and Garrett County region’s businesses, workers, and consumers, as well as the general economic competitiveness of the communities along the route. Among other benefits, the project will provide new business opportunities, access to expanded labor pools, access to new markets, increased transportation efficiency, lower transportation costs, and lower supplier costs. The completion of US-219 will not necessarily relocate businesses from other regions or states (though that is possible), but it is expected to enable existing businesses to serve markets within the region at lower costs and with higher quality goods and services than are currently available, while also employing a more diverse labor pool from throughout the region. These benefits are difficult to quantify through traditional modeling efforts because the quantitative data is based on growing the status quo. It is notable that existing commuting patterns (as shown in the trip tables by which AADT forecasts have been estimated) do not include any assumptions about relocation of commuting trip ends or redistribution of jobs, despite the fact that most businesses indicated new hiring and workforce patterns as a primary use of the Corridor. This issue will be further addressed in the conclusions. The following sections will cover the topics of:

FROM SITE VISIT INTERVIEW:
(Industry – Manufacturing)

The completion of US-219 is the single biggest factor that will promote economic growth along the I-68 corridor in western Maryland.

- Workforce Availability
- Labor Market Implications
- Supply Chain and Consumer Implications



Heritage Coal could save **\$1,000,000** per year in transportation costs moving 500,000 tons of coal to the south.



J&J Truck Bodies could add an additional shift of 40 workers producing **\$1,000,000** per month in additional revenue.



Wheeler Brothers could hire a third shift leading to a **15% TO 17%** increase in annual output.



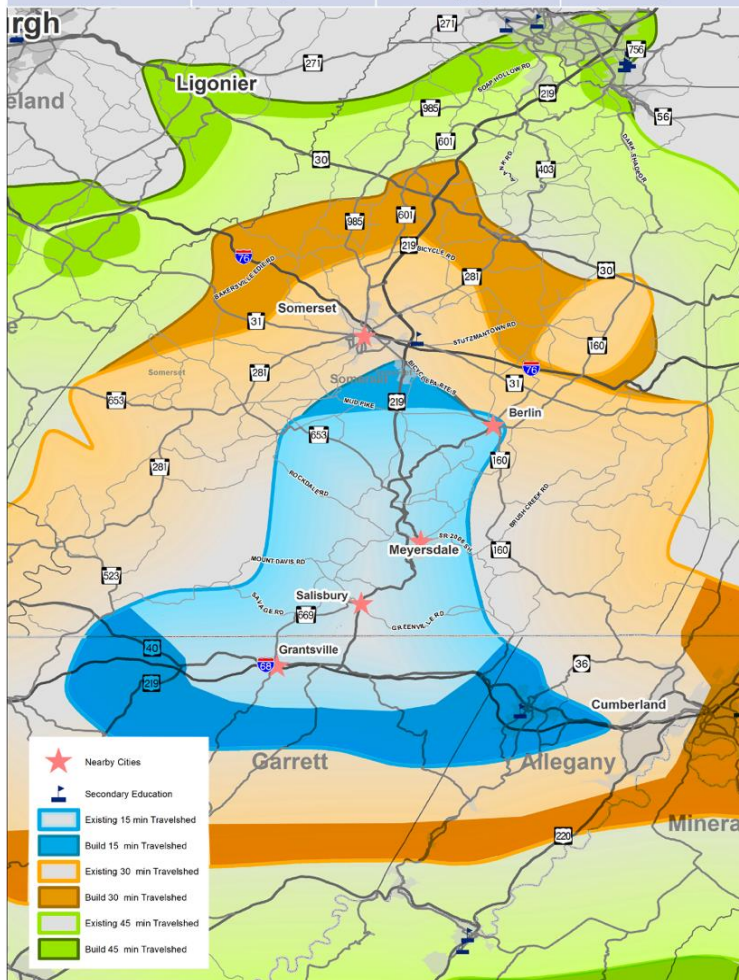
Total Biz Fulfillment could add an additional **90,000 FT²** of warehouse space if there was access to a larger labor pool.

Workforce Access

Access to labor markets and labor mobility was a primary concern for the majority of businesses interviewed. Eight of the 11 firms interviewed indicated significant issues attracting the number and quality of employees needed to expand their businesses. The completion of US-219 will effectively

Exhibit 6: Workforce Access Drivetime

 COMMUNITY	 Businesses Brought within 30 Minutes	 Employees Brought within 30 Minutes	 Professional/ Tech Services Jobs Brought within 30 Minutes
Rockwood	92	1,183	69
Somerset	64	652	43
Salisbury	1,025	12,289	352
Meyersdale	295	3,393	149
Grantsville	101	983	69
Garrett	633	7,694	309
Berlin	152	1,650	145



expand the labor pool “catchment area” for all employers to the north and south of the two-lane section of US-219.

Opportunities for employment for the residents of Somerset, Berlin, Meyersdale, Rockwood, Salisbury, Garrett, and Grantsville will all be expanded by the completion of US-219.

Exhibit 6 details the increased labor pool by town and the map shows the increased labor catchment area based on drive time analysis assuming the completion of US-219. The map is based on an analysis from ESRI Business enhanced by an analysis of additional mileage available in each direction given the available routes along the proposed improved Corridor. In the exhibit, the area shown in blue depicts a combined 15-minute travel-shed in each direction from the ends of the proposed improvement to US-219. The areas in light orange and green show the 30- and 45-minute radii, respectively. The darker shades of blue, orange, and green show the additional areas that can be accessed with the additional speed offered by the enhanced US-219. The table displays the additional businesses, employees, and services brought within the 30-minute (orange) radius, which enables easier trade with each other with the completion of US-219. The completed project adds significant reach to the commuting shed

along I-68 in Maryland for Meyersdale, Salisbury, and other Pennsylvania communities north of the improved segment. This allows employers to cast a wider net when looking for workers, and conversely, provides workers with an expanded pool of potential employers.

In total, 2,362 businesses are brought into a 30-minute drive time radius. An additional 27,844 employees and nearly 1,136 professional and tech services jobs will be accessible within 30 minutes that are currently not accessible. The actual market for the Corridor includes the additional new employees, businesses, and professional services as well as the core population and business markets of the six communities themselves.

Labor Market Implications

The increased labor catchment will create greater labor mobility, benefitting both regional businesses and workers. Multiple businesses have stated that additional shifts, production levels, and employment that have been planned or are possible are contingent on access to this wider labor pool provided by the completion of US-219. Simply put, the absence of the Maryland to Meyersdale US-219 segment has inhibited this potential economic growth. As well as access to general labor pools, many businesses discussed community colleges and technical schools they would like to recruit from. However, many of these facilities are currently outside of a reasonable drive time for the potential recruit to consider.

Benefits also accrue to the region's labor pool as competition for employees increases with more businesses competing for labor in markets that are currently not feasible. With the options for employment increasing due to greater access, a scenario where businesses will need to compete for skilled labor is possible. Workers taking newly accessible jobs can earn more per hour and be more productive due to less travel time.

FROM PUBLIC INPUT SURVEY:

A completed 219 south to MD would give us greater access to markets and labor in MD and WV. For example, when 219 was completed to Meyersdale, the commute for our employees living in Meyersdale went from 30 minutes to 15 minutes...on a much safer road. Since this section of 219 opened up, we've hired more employees from Meyersdale because the commute is not nearly as difficult.



FROM SITE VISIT INTERVIEW:
(Industry – Distribution)

We could add an additional distribution shift if we could find the workers. The completion of 219 would let us recruit further to south. 219 is a detriment to hiring new employees.

Note: Interviewee indicates a 15% to 17% increase in productivity.



FROM PUBLIC INPUT SURVEY:

This will provide a greater opportunity to recruit in areas that have a tremendous potential. Our greatest asset is finding young adults who have basic skills in working on farms. They are more apt to meet basic knowledge guidelines and be given credit towards our 4-year apprenticeship.

FROM SITE VISIT INTERVIEW:
(Industry – Manufacturing & Distribution)

There is a labor shortage. We need better access to labor and commute times reduced from the south (south of Meyersdale). We could hire an additional 40 employees if there was better access.

Note: Interviewee indicates a potential \$100 million per month in additional sales if the labor shortage can be resolved.

FROM SITE VISIT INTERVIEW:
(Industry – Distribution)

An additional 90,000 SF of warehouse could be built. Demand is there, but the employees are not. We would like to recruit north into Pennsylvania.



Supply Chain and Consumer Implications

The completion of US-219 will greatly increase and expand the north-south supply chain by opening access to new markets and suppliers, as well increasing access for consumers. The uncompleted section of US-219 currently serves as an artificial divide for markets, suppliers, and consumers between Pennsylvania and Maryland, forcing each to look east-west along the interstate highways (I-76 in Pennsylvania and I-68 in Maryland) to meet their needs. Multiple firms indicated that this leads to longer than necessary supply chains, increased transport costs, and higher-priced suppliers. This leads to higher costs for the region’s businesses. It is highly inefficient and puts additional strain on the interstate system.

Currently, the cost of labor and cost of living in this region is highly competitive compared to surrounding regions (though the increased labor pool catchment area is likely to put upward pressure on labor rates). The characteristics of the region’s labor pool, coupled with the completion of US-219, will significantly increase the attractiveness of using intra-region suppliers and expanding the market to the north and south. Shipping costs can be greatly reduced by supplying markets locally and reliability is increased simultaneously.

FROM SITE VISIT INTERVIEW:
(Industry – Mining/Coal)

Our transportation costs are \$15 per ton to ship our coal south; with 219 open we could reduce that cost to \$13 per ton. That’s on 500,000 tons annually. It would also open additional markets to the south and increase competition.



FROM PUBLIC INPUT SURVEY:
(Industry – Distribution)

We think it will make us more attractive to potential new employees because we’ll be easy to get to. We also believe that certain customers will be swayed by improved infrastructure serving our distribution facilities. For certain large customers, they see the lack of complete infrastructure as a potential hindrance to on-time deliveries.

FROM SITE VISIT INTERVIEW:

We do not serve dealers to the south of Meyersdale. Markets to the south are underserved, but most customers are just in time and it is not worth the risk. Our regional business (8% to 12% percent of total) could increase by over 15% if there was better access to the south.

Consumer markets will also open when US-219 is completed in the same way the business supplier markets will. Consumers to the north and south will now have easier and wider access to goods and services along the Corridor, benefiting both the consumer and the business. One site visit interviewee commenting on the region, in general, stated that there is a sense of isolation in certain communities due to the lack of access to points north and south. The completion of the Corridor can help alleviate that sense of isolation by opening new markets for these residents for goods, services, and entertainment.

FROM PUBLIC INPUT SURVEY:

Our showroom is in Somerset, PA and it will make it easier for customers to stop in and see actual samples of products they are interested in buying. It will also make it easier for us to get to the customer more quickly for prospects and install appointments.

FROM SITE VISIT INTERVIEW:

(Industry – Agriculture & Food Products)

We potentially see more customers coming from Pennsylvania if there is an improved route from the PA Turnpike. There is also value in completing US-219 north to Canada, opening (wholesale) markets in Ontario.

FROM PUBLIC INPUT SURVEY:

Without the completion of the corridor, new economic opportunities are harder to come by since businesses will be harder to get to. Without 219, our client potential is limited.



Role of US-219 In Changing Tourism and Destination Markets

In addition to labor and supply chain markets, the existing constraints on US-219 are understood to play a role in how tourism, housing, and bi-state, inter-regional traffic utilize the transportation network. These dynamics are important both because they demonstrate potential areas of impact that US-219 may have on economic activity in the region and suggest seasonal, inter-regional, and origin-destination market dynamics that have not yet been captured by existing forecasting models.

Tourism in the Region

Pennsylvania Resorts: The overall destination traffic to the Seven-Springs mountain resort and related resorts (Hidden Valley and Laurel Mountain) as well as routing to these destinations are expected to be affected by the completion of US-219. This is because traffic exchanged between the resorts and the Baltimore/Washington, DC markets (including significant charter bus traffic) currently utilizes I-70 and I-76 and accesses the resort by the I-76 exit in Breezewood, PA. In the example of the Seven-Springs resort, the new US-219 is likely to represent approximately a 20-minute time savings each way through the use of I-68 (a more direct interstate route to the Baltimore/DC Markets) while also saving the tolls associated with I-70/I-76. While these resorts are open year-round, for golfing in spring, summer, and autumn, there is a significant peak during ski season. Of Somerset County's 4.5 million visitors per year, approximately 2-2.5 million are associated with resort traffic, which is not a trip purpose explicitly recognized in existing forecasting models. Because this tourist trip exchange is between the Baltimore, MD and Washington, DC areas and a key location in Pennsylvania, the out-of-state nature of the traffic could make it more difficult to quantify in existing state-level traffic projections. However, the magnitude of the destinations and the clear market for US-219 based on travel time and cost can be understood as instrumental to the 2-2.5 million resort visitors.

The combination of re-routing existing resort traffic from I-76 to I-68 and the potential growth in the resort market could easily account for the utilization of US-219 of 1,000-2,000 AADT vehicles (with higher actual counts due to seasonality) greater than what is shown in any existing forecast to date. For example, if 50% of the resort's 2.5 million trips (1.25 million annual person-trips) are re-routed to I-68/US-219 on account of lower travel times and toll-savings with an average vehicle occupancy of 2 people per vehicle (625,000 annual vehicle trips), this would average to an AADT market of 1,712 trips. If this market were enhanced by 15-20% with growth in the region's tourism market (and the fact that the new US-219 offers a net increase in proximity to DC/Maryland markets not only over the existing route, but also over other competing destinations), it is conceivable that US-219 resort traffic alone could exceed model projections by 2,000 AADT vehicles.

Additional and Growing Resort Market in Maryland: There is also a significant tourist market in Maryland which may experience a similar utilization of US-219 in attracting traffic from Pennsylvania.

Garrett County in Maryland currently attracts 1.4 million visitors per year to its state parks, Deep Creek Lake, and the Wisp Ski Resort with steady increases in resort activity in the post-COVID summer (approximately 15%-20%) as markets have discovered lower-density resort destinations in 2020.

In addition to ski and outdoor resort traffic, the Rocky Gap Casino in Flintstone, MD is a key “special generator” of regional and inter-regional traffic not fully accounted for in existing traffic projections. The completion of US-219 to Somerset, PA would improve access to the Rocky Gap Casino from Pittsburgh market areas, reducing the travel time from Pittsburgh from 2 hours to 1.5 hours. This would increase the appeal of Rocky Gap as a day-trip gaming destination, while also re-routing weekend and peak season traffic from the Somerset and Johnstown areas who currently avoid the existing US-219. It is also notable that in addition to US-219’s potential market for tourist traffic, the labor market dynamics discussed earlier in this report are also highly pertinent to the development capacity of the resort industry, where staffing concerns are an ongoing concern. The ability to recruit workers and suppliers from beyond the region is essential to sustaining hospitality establishments.

Inter-Regional Commuting Between States

Consideration of destination tourist markets within the region surrounding US-219 further raises the wider topic of US-219’s role in long-distance inter-regional personal travel outside of the region (whether for business or tourist purposes). Traffic projections to date have been based on models focusing on individual states (Pennsylvania and Maryland). A more qualitative assessment of inter-regional traffic dynamics suggests a potential inter-regional market for US-219 beyond what has yet been quantified.

Viability of Intermediate Stops on Business Travel Tours: Through interviewing business travel stakeholders in the region, it has been cited that the status of US-219 greatly affects the viability of making intermediate stops in the Southern Alleghenies Region when traveling between Pittsburgh, PA and Washington, DC. Travelers have noted that a typical drive from areas surrounding Pittsburgh, PA to areas surrounding Washington, DC can take approximately 4 hours when accounting for peak traffic (especially on the DC side of the trip). Prior to the completion of the northern section of US-219, it would take an additional 30 minutes to make a stop in Somerset (hence the DC-Pittsburgh trip was 4 and a half hours if making a stop in Somerset). However, once the northern section of US-219 was completed, it became possible to make the Somerset stop as part of the Pittsburgh-DC trip within the same 4-hour window (no longer losing the half-hour to access Somerset). The completion of a section of US-219 to date not only has allowed the viability of the Somerset stop without a significant loss of travel time, but it has also supported a routing that saves toll charges. Completion of the final miles of US-219 from Meyersdale to I-68 will reduce additional time from this trip, enhancing the viability of including towns in the Southern Alleghenies in business travel tours between Baltimore, DC, and

Pittsburgh. Tours of this type are beyond the dynamics available in existing forecast models and warrant consideration when assessing the market for a completed US-219.

Enhanced Resilience for Long-Distance Travel: It should also be noted that the longest segment of limited access roadway I-76 is the 35 miles from Somerset to Bedford. When there is a crash or inclement weather incident on that segment, there is not currently a viable detour route. In contrast, a viable US-219 option could add resilience and re-routing to avoid this long segment (re-routing to I-68 during incidents), supporting the network impacts described in this report.

Amazon and the Digital Economy: Amazon’s current planning regarding a 50,000 person facility outside of Washington, DC and an associated fulfillment center in Virginia highlights the ongoing development and changes in truck traffic and warehousing markets that can extend well into Maryland and central Pennsylvania through the I-68/US-219 system. Opening warehousing capacity with access to I-68 by a larger access land market on US-219 has further potential to add to the US-219 market in the long-term.

New Business Attraction

In addition to its role in facilitating the market for long-distance tourist and business travel in the region, the completion of US-219 can have an impact on the region’s capacity for new business attraction. Some firms have actually chosen not to locate in the county, citing a lack of a north-south corridor (most notably a recent decision by a cat-litter manufacturer reporting to economic development authorities the decisive role of this deficiency in a location decision). However, the most significant potential for impact can be observed in terms of the natural competitive advantages that are attracting businesses to the region, representing both growing demand and anticipated economic impact of US-219 completion.

Most notably, agribusiness is a core aspect of the region’s economic base and a sector increasingly reliant on the accessibility of sites in the Southern Alleghenies Region to other sites within a same-day delivery radius. The completion of Route US-219 to I-68 would alleviate the strain placed upon Pennsylvania’s rural roadways and allow large-scale agricultural producers to increase productivity, reduce costs, and secure the safety of their drivers (as well as local traffic) by offering a more direct divided lane interstate for their fleet to travel.

For example, a South Carolina-based kale grower has recently begun a commercial farming operation in Somerset County. The nationally recognized multi-generation agricultural company supplies several national chains on a 365 days per year basis. The company chose Somerset for its ideal late summer climate and soil conditions. Despite Somerset County representing the most efficient natural location for its business activity, the firm faces multiple hindrances to their growth in the county:

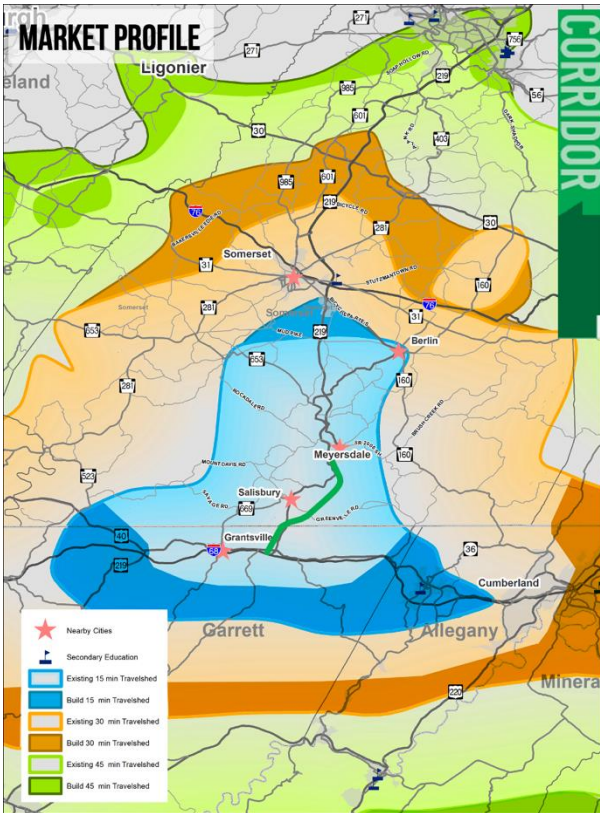
- Their current and most direct toll-free trucking route forces their drivers to travel upwards of 45 miles worth of mountainous two-lane PA roads.
- The current drive time between Somerset and their South Carolina headquarters puts their drivers at the upper levels set for daily long-haul truckers.
- The company would also like to expand their footprint in Somerset County by building a mid-Atlantic distribution center.
- As a supplier to grocery stores all along the East Coast, the completion of US-219 would be a significant factor in allowing Somerset based companies such as this quick, safe, and efficient ingress/egress to the Mid-Atlantic and beyond.

Housing, Development Capacity, and the Importance of Commuting Capacity: For all counties in the Southern Alleghenies Region, the workforce dynamics cited in the economic/market profile represent a significant development constraint that can be eased by more efficient commuting between communities. It is also notable that in addition to workforce constraints, the region is constrained in terms of its available housing to grow the local workforce. For example, in its 2018 housing study (conducted by Danther & Associates), the town of Grantsville found a net deficit of 262 housing units. 2020 real estate statistics for Alleghenies County, MD showed a 32 percent reduction in average days that houses were on the market in comparison to 2019. The housing crunch highlights the importance of commuting between labor markets to support the growing and diverse regional economy. The relationship between housing, new-business attraction, and commuting viability is a central dynamic in considering the need and viability of US-219.

Business and Economic Profile

Exhibit 7 presents the Market Profile infographic, which is a complete summary of highlights from the previous sections.

Exhibit 7: Business and Economic Full Profile



COMMUNITY	Businesses Brought within 30 Minutes	Employees Brought within 30 Minutes	Professional/ Tech Services Jobs Brought within 30 Minutes
Rockwood	92	1,183	69
Somerset	64	652	43
Salisbury	1,025	12,289	352
Meyersdale	295	3,393	149
Grantsville	101	983	69
Garrett	633	7,694	309
Berlin	152	1,650	145

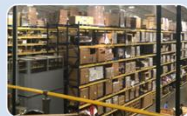
PRACTICAL RESULTS FOR BUSINESSES – COST SAVINGS, REVENUE & JOBS



Heritage Coal could save **\$1,000,000** per year in transportation costs moving 500,000 tons of coal to the south.



J&J Truck Bodies could add an additional shift of 40 workers producing **\$1,000,000** per month in additional revenue.



Wheeler Brothers could hire a third shift leading to a **15% TO 17%** increase in annual output.



Total Biz Fulfillment could add an additional **90,000 FT²** of warehouse space if there was access to a larger labor pool.

FROM PUBLIC INPUT SURVEY:
Completion of the 219 corridor would make it easier and quicker for potential customers to travel here, as well as vendors. Any time you expand/complete a roadway, you greatly reduce time and expand efficiency.

FROM PUBLIC INPUT SURVEY:
*Business expansion, added employees, a greatly expanded market, operational savings from expanded vendor options.
 We would see increased revenue due to new businesses coming to the area that we can bring on as potential clients.*

FROM PUBLIC INPUT SURVEY:
There are several ways - loss of opportunity for vendors and deliveries. Our options would be widely opened if that corridor were finished. We also stand to gain much additional tourism traffic from Altoona, Johnstown and even areas further North.

Conclusions (Q&A)

What is the statewide, regional, and national significance of completing US-219?

Completion of US-219 will provide the safest, most robust, and highest capacity route for essential north-south connectivity to Pennsylvania and Maryland's overall transportation system in south-central Pennsylvania region. No such route currently exists in the Southern Alleghenies Region, and none is likely to exist without the completion of US-219. In addition to saving lives and preventing costly loss to property, the route will support the resilience of the system to sustain the viability of the Southern Alleghenies economy during non-recurring incidents that are not reflected in average annual daily traffic estimates.

Completion of the route will enable businesses throughout the region to more efficiently utilize labor from within the region and areas along the I-68 corridor, providing better jobs and more skilled and affordable labor to Pennsylvania and Maryland businesses than they currently have. The labor market inefficiencies from the current lack of north-south connectivity have been observed in the current study in business-by-business detail. Specific examples have been given regarding how these inefficiencies impede business operations, affecting hiring, commuting patterns and the scale of business operations. In addition to the qualitative observations regarding the regional and national significance of completion US-219, the findings of this report suggest that additional unquantified sources of economic significance are likely to include:

- (1) Latent demand for labor and commuting (i.e., satisfying labor needs due through an expanded labor pool) within the 15-, 30- and 45-minute travel-shed radius of the proposed US-219 improvement.
- (2) Likelihood of redistribution of commuting and truck trip-ends, as well as potential new business expansion and attraction and new freight traffic generation associated with changes in labor and buyer-supplier access.
- (3) Explicit service of non-recurring annual and multi-year deficiencies on screenline north-south routes in the Southern Alleghenies Region to quantify peak demand, delay, and user cost on not only a daily but peak incident basis with, versus without, US-219.
- (4) Both growth in tourist markets supported by enhanced US-219's increased accessibility of Southern Alleghenies resort destinations as well as increased utilization of US-219 for inter-city traffic for both resort and business travel between Baltimore, Washington, DC, Pittsburgh and locations in the Southern Alleghenies Region.

For these reasons, one conclusion of the current study is significant evidence of travel demand for the Corridor that has yet to be fully documented through formal quantitative modeling of the Corridor's most likely traffic sources. Based on the findings presented in the current study, it is anticipated that scenarios representing the four elements of impact enumerated above can yield modeled forecasts representing benefits significantly above and beyond what is found in the 2019 Benefit/Cost Analysis. Further quantitative attention to the above four issues can match the qualitative findings of the current study, addressing considerations that: (1) the Corridor is of a low enough volume that a

statewide AADT model may not have the detail to capture the commuting patterns of such scenarios and a more refined analysis could better clarify the issues found in the current study, (2) a customized traffic analysis could capture truck movements between Maryland, Virginia and Pennsylvania treated as “external” by the state-level models currently in use, and (3) a better understanding of commuting patterns, tourist traffic and workforce implications of completing US-219 enable regional workforce and tourism accessibility strategies to further complement the investment in the completion of US-219.

Given the low volume of the existing corridor in relation to currently inaccessible commuting and delivery markets, it is likely that any forecasts overlooking latent demand could be off by a factor of anywhere from 1.5 to 2.5 or more, depending on the market scenario. For example, if 10 percent of the new employees rendered accessible in the market profile (see Exhibit 6) were to begin using the completed Corridor twice a day for a round-trip commute, that alone could readily double the current AADT forecast for the Corridor. Further changes in utilization depend on business travel, changes in business location, and overall business size or employment. While forecasting a future traffic volume is beyond the scope of the current study, a key finding is that there are critical sources of demand associated with the qualitative impacts of the Corridor which are likely to affect both the volume estimates and BCA if further explored within the context of this report.

Why is the Corridor completion important for businesses?

The completion of the US-219 Corridor is of immense importance to the sustainability, expansion, and profitability of businesses within the region. The region’s businesses are anticipated to accrue the following benefits:

- Reduced transportation costs with increased safety
- Access to new and/or expanded markets
- Access to local suppliers – better service at lower costs
- Increased access to regional labor markets
- Ability to recruit from a larger pool of community colleges and technical schools
- The ability to provide higher-paying jobs to more qualified workers
- Increased responsiveness to critical downstream markets – ability to satisfy just in time requirements
- Additional new retail consumers due to reduced drive times along the Corridor

FROM PUBLIC INPUT SURVEY:

Completion of Rt219 would increase our labor pool substantially. If prospective employees could get here, they would be more likely be interested in our business!

What business strategies does the Corridor support?

Expansion and efficiency are the core themes of regional business strategies addressed regarding US-219 completion. These were the strongest recurring themes throughout the site visit meetings and survey responses.

What Expansion means:

- More jobs
- Competition for employees equaling higher wages
- New and expanded facilities
- New and expanded markets

What Efficiency means:

- Lower transportation costs
- Faster transportation times
- Utilization of regional suppliers
- Improved safety
- Less travel and labor time lost (network resiliency)

FROM SITE VISIT INTERVIEW:
(Industry – Manufacturing)

I can easily see a significant increase in manufacturing and logistics operations if 219 is finished: say 15% to 20% overall increase... to me that is significant.

FROM PUBLIC INPUT SURVEY:

Opportunities for construction can come from any region. Having a faster more reliable route to navigate provides a greater opportunity for construction workers to continue and live in this region and work elsewhere. As we see the area providing less large construction work opportunities, we will see workers who may decide to move closer to metropolitan areas for survival. This project would help to allow those who appreciate the beauty and simplicity of a rural area still afforded opportunities to travel regionally.

What other public assets will have greater public return on investment from completing the Corridor?

Multiple public assets within the region will benefit greatly from the completion of US-219 through increased access and efficiency, including:

- Efficient access the interstate system for business and commuters
- Increased access to markets and suppliers
- Ability to attend and recruit from a wider range of community colleges and technical schools
- Increased safety and quality of life along the route (particularly Salisbury, where 17.1 percent of traffic through the town is truck traffic)

Corridor N Community Perspective

A comprehensive qualitative overview of the Southern Alleghenies business environment, the role of the highway system in regional, statewide, and national economic vitality finds that US-219 is expected to significantly enhance workforce access, tourism access and volume, reduce the risk and resilience costs of transportation for the region and its trading partners. It is furthermore found that the market demand for the Corridor is comprised largely of demand associated with emergent commuting patterns, inter-state and inter-regional or seasonal business travel, and expanded business operations not yet quantified by formal models in the region.

Appendix

Accident Frequency

The five-year INRIX data was also used to identify the segments prone to incidents. This was done indirectly by identifying the time periods when the speeds were under certain thresholds. The criteria used to define accident was:

- Segment speed < 10 mph
- Median speed > 45 mph

Using the above criteria, the total number of hours with accidents were estimated for each segment. As can be seen from the above criteria, only corridors with a median speed greater than 45 miles per hour were evaluated. Also, the total number of days on which accidents occurred, regardless of the length of slowdowns, were estimated. **Exhibit 8** shows total number of day with accidents in five years and **Exhibit 9** shows the total number of hours with accidents in five years.

Exhibit 8: Total Number of Days with Accidents in 5 Years

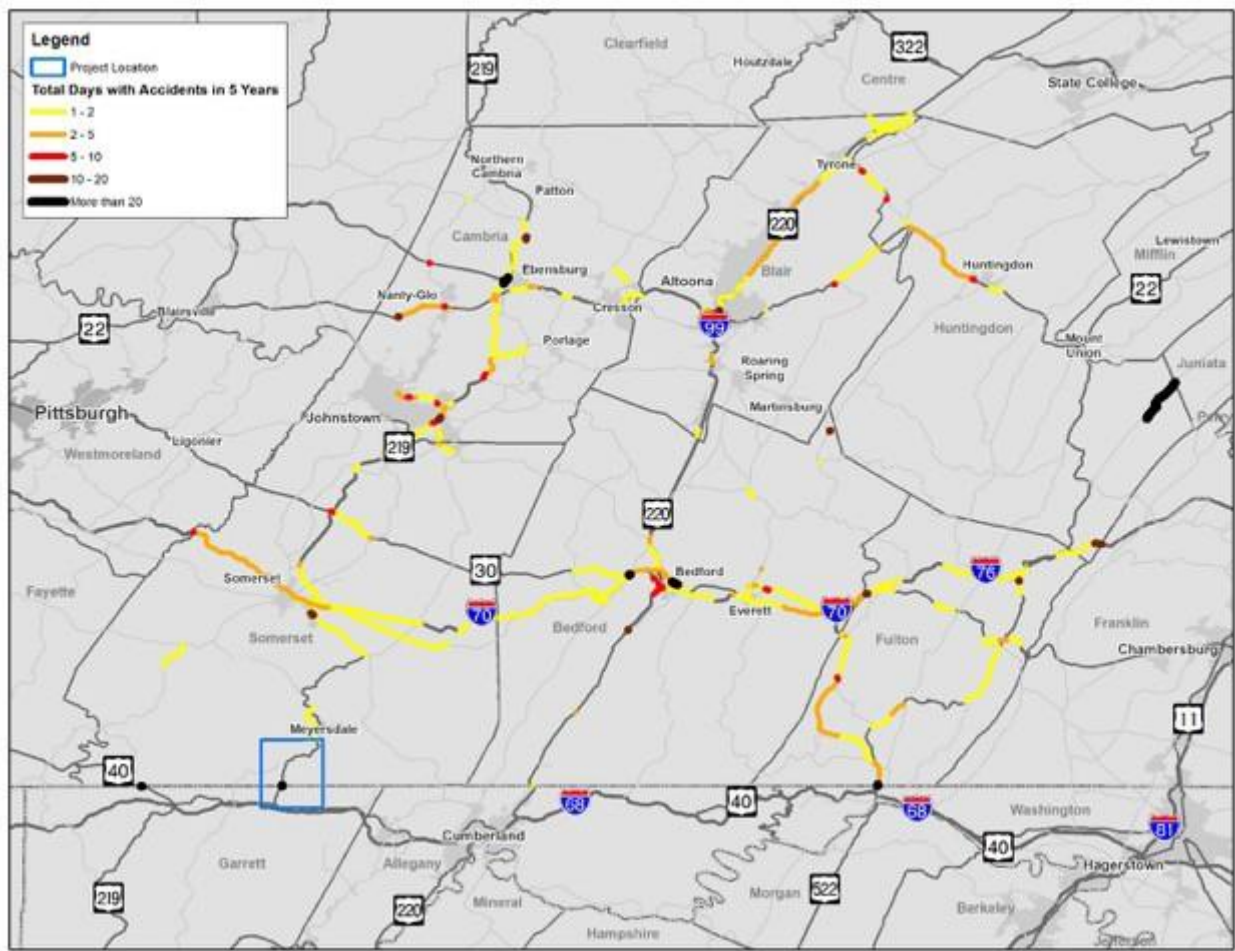
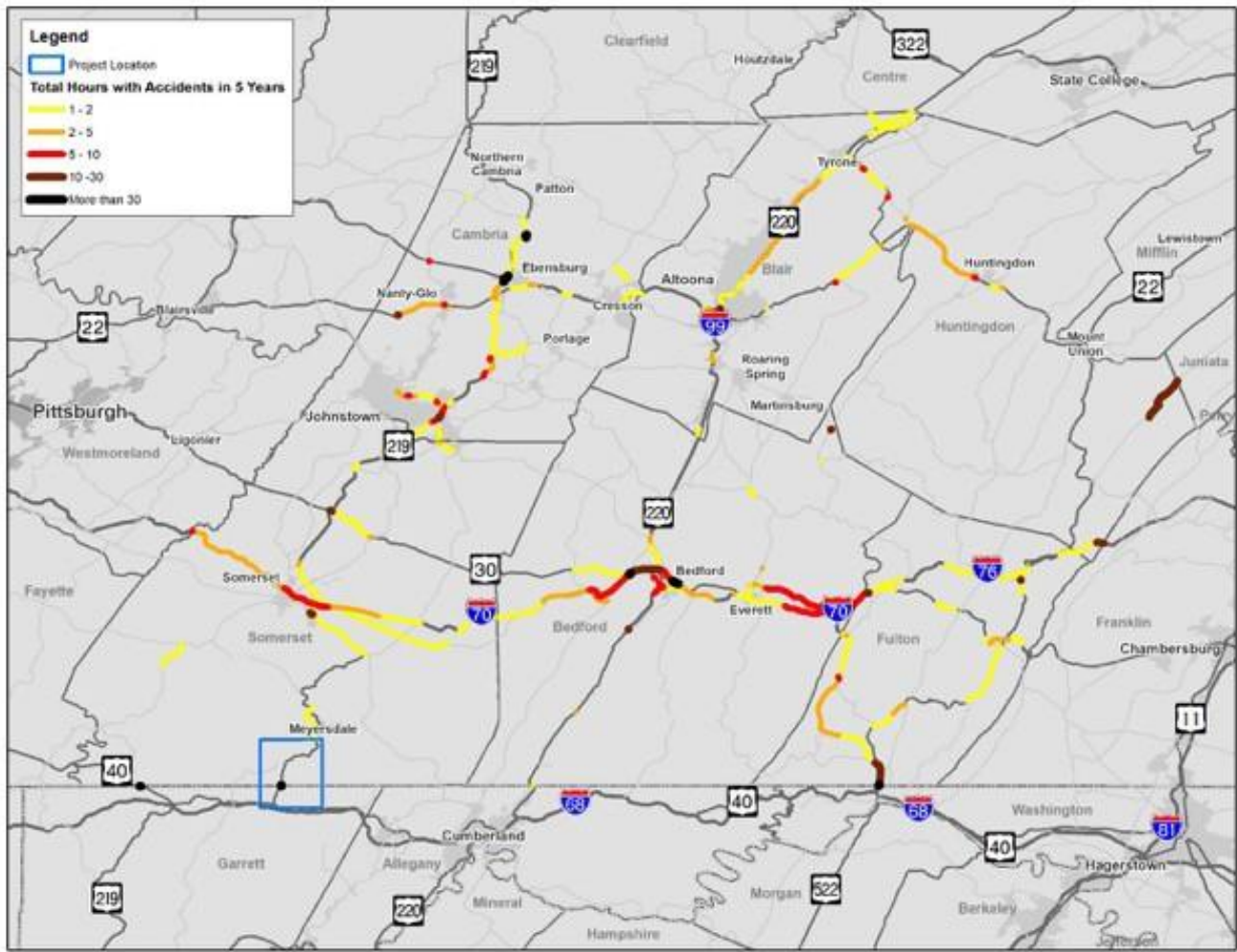


Exhibit 9: Total Number of Hours with Accidents in 5 Years



Incident by Type

Using the INRIX data, the incidents by type were estimated to get an assessment of the frequency and severity of non-recurring incidents. Ideally, there was interest in estimating the following three types of incidents:

- **Type 1 Incidents:** Non-recurring incidents which slow traffic by more than 10 MPH for at least five minutes
- **Type 2 Incidents:** Non-recurring incidents which slow traffic by more than 20 MPH
- **Type 3 Incidents:** Non-recurring incidents which average traffic to 0 MPH for at least 5 minutes

However, due to the limitations of the INRIX data, the above definitions could not be used to estimate the Type 1, Type 2, and Type 3 incidents. The INRIX data that was available had speeds and travel time values available for each hour and not by 5-minute intervals. Therefore, a slight change in the definitions was done, as shown below:

- **Type 1 Incidents:** Non-recurring incidents which slow traffic by more than 10 MPH
- **Type 2 Incidents:** No change in definition
- **Type 3 Incidents:** Non-recurring incidents where speed was less than 5 MPH

Using the revised definitions, the total number of hours in five years were estimated for each incident type for each segment. The revised definition of Type 1 incident will capture lesser number incidents as only those hours will be captured that have an average reduction in speed by more than 10 MPH for the entire hour. In the case of Type 3 incidents, the average speed for the hours within which traffic was not moving (0 MPH) for at least five minutes would be more than 0. Therefore, the Type 3 definition was changed to capture hours where the average speed was less than 5 MPH.

Exhibit 10, Exhibit 11, and Exhibit 12 show the heat maps of segments with total hours of Type 1, Type 2, and Type 3 incidents, respectively. As seen from these maps, the occurrence of Type 1 incidents is highest, followed by occurrences of Type 2 and then Type 3.

Exhibit 10: Number of Type 1 Incident Hours in 5 Years

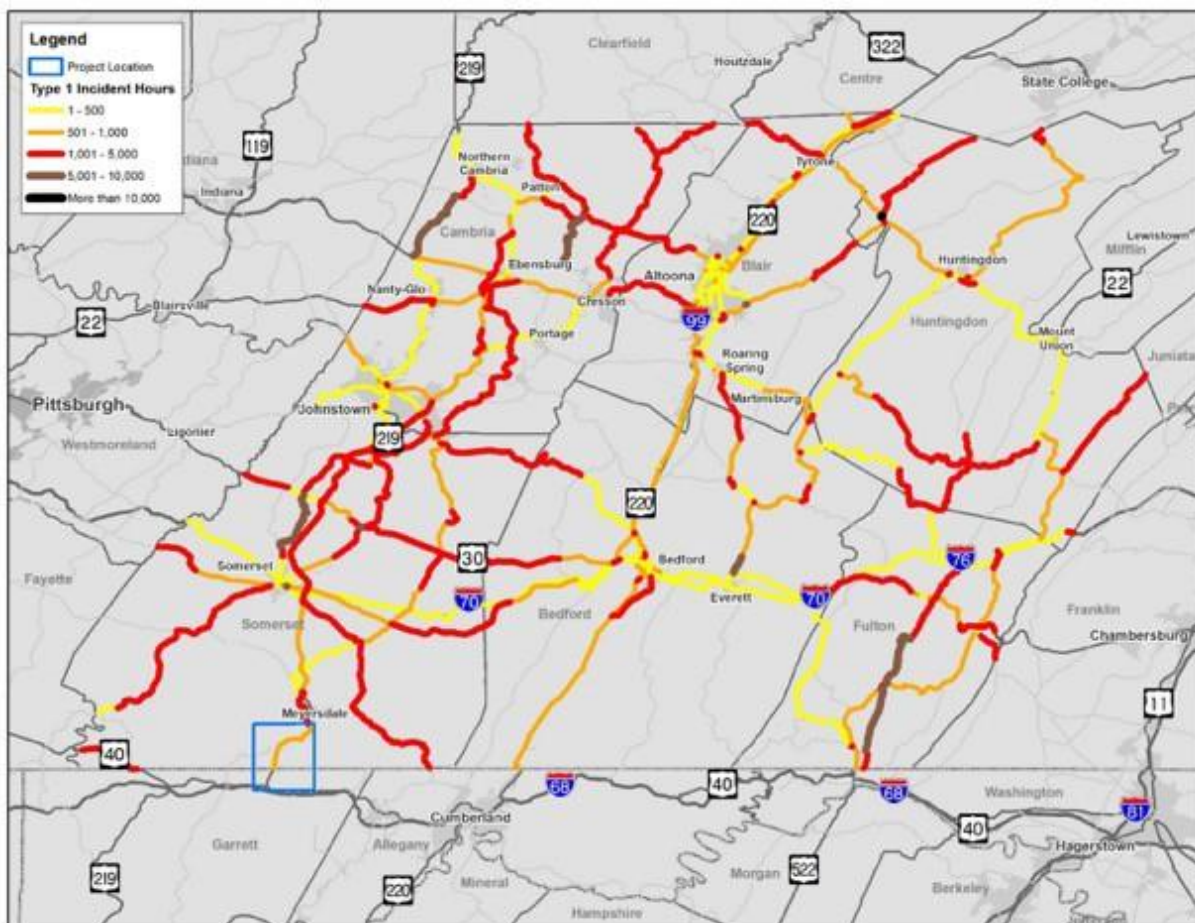


Exhibit 11: Number of Type 2 Incident Hours in 5 Years

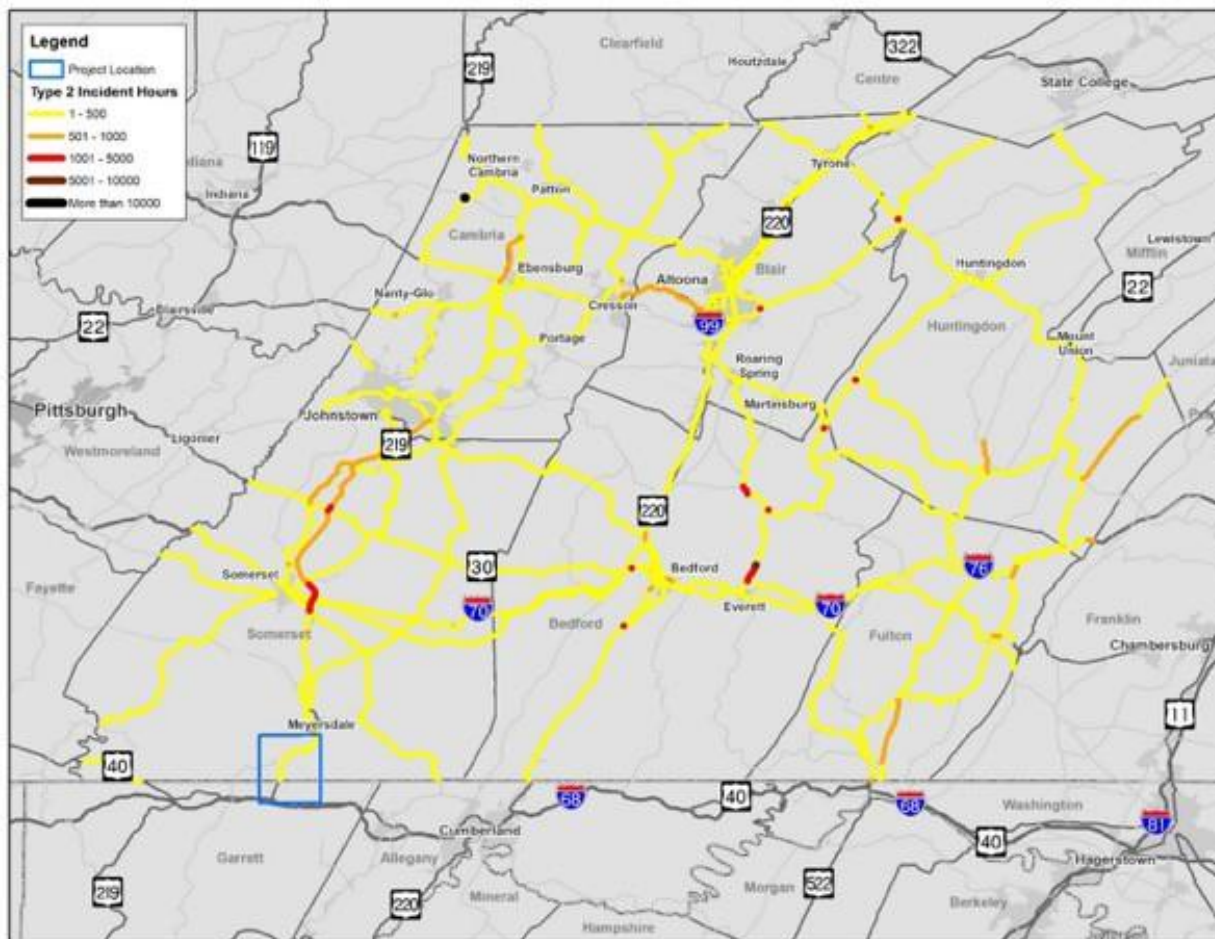


Exhibit 12: Number of Type 3 Incident Hours in 5 Years

