WV 45 / Martinsburg Pike Corridor Vision Plan (MP CVP)

STUDY REPORT

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Introduction

Purpose of the Study

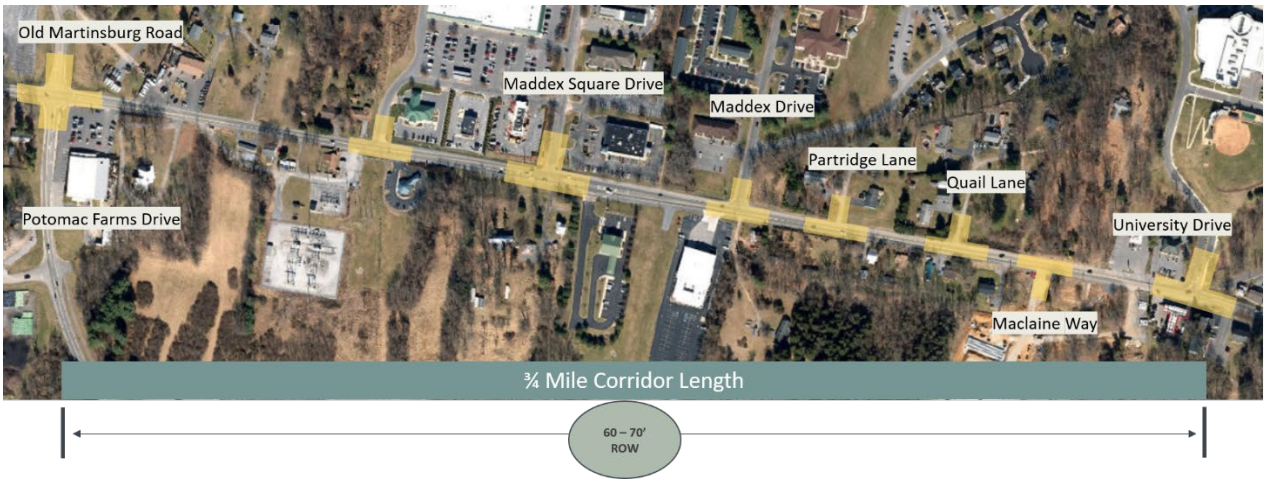
The Hagerstown / Eastern Panhandle Metropolitan Planning Organization (HEPMPO) is supporting the Corporation of Shepherdstown by developing a WV 45 / Martinsburg Pike Corridor Vision Plan (MP CVP). HEPMPO is the federally designated regional transportation planning body for the urbanized areas of Berkeley and Jefferson Counties (West Virginia), Washington County (Maryland), and a small portion of Franklin County (Pennsylvania). HEPMPO is responsible for creating the region's long-range transportation plan (LRTP) and provides a regional collaboration forum for public decision-making. The HEPMPO is governed by the **Interstate Council (ISC)** for transportation related short and long-term solutions that support the region's mobility needs. For their local planning partners, HEPMPO sponsors special studies like the MP CVP to foster collaboration between public agencies and other regional stakeholders in identifying innovative transportation solutions to address mobility and safety needs.

The ISC adopted a Complete Streets Resolution in 2018 that encourages new or improved road facilities be designed to prioritize safety, comfort, and access to destinations for all people who use the roadway including non-motorized travel. The Complete Streets concept does not stipulate specific street standards, but instead encourages a context-sensitive design approach that fits roadway design within the context of the neighborhood or community, recognizing that all streets are different and user needs will be balanced.

Corridor Selection

Martinsburg Pike is a two-lane road that serves as the primary connection between Shepherdstown and Martinsburg. The corridor has eight intersections (two with traffic lights and six without), street front housing, and store front access with limited sidewalks. It has multiple school and transit stops, is close to Shepherd University, and is used by bicyclists and pedestrians. The increasing development, traffic volumes, and speeds present safety concerns along the length of the corridor. The MP CVP Corridor stretches approximately ¾ of a mile and has 60 to 75-foot of right-of-way along the corridor from the West end of Shepherdstown from University Drive to Potomac Farms Drive as shown in **Figure 1**.

Figure 1: Shepherdstown, WV - Martinsburg Pike CVP Study Corridor Limits



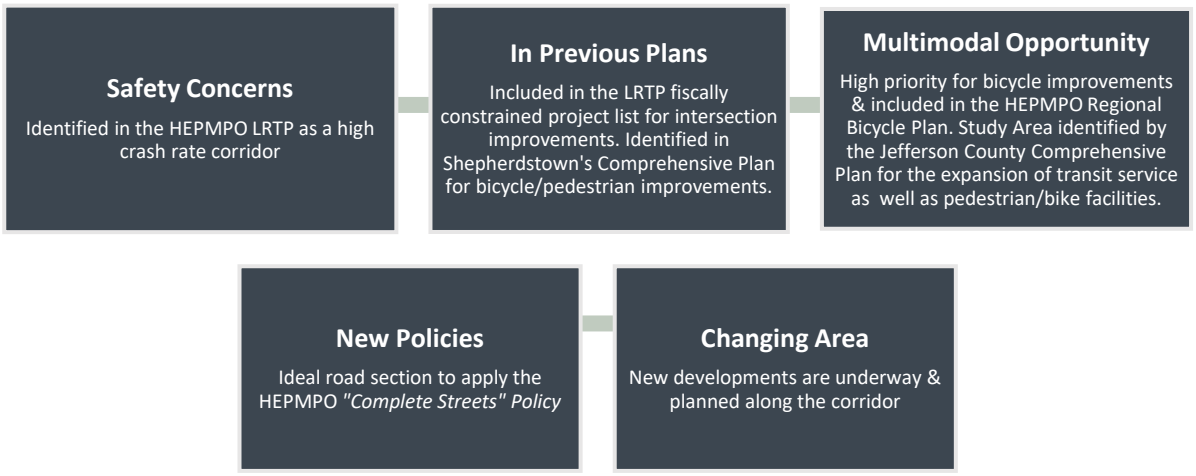
The study area was expanded to include the Maddex Farms housing areas along the north side of the corridor and to the south along Potomac Farms Drive to WV 480, Kearneysville Pike that turns into Duke Street in Shepherdstown. The southern portion of the study area is experiencing high residential growth, a new professional development center, and library that will become a significant area of influence for the corridor. The study area also includes potential bicycle connections and is defined in **Figure 2**.

Figure 2: Shepherdstown, WV – Martinsburg Pike CVP Study Area Limits

The Martinsburg Pike corridor has been identified by the Corporation of Shepherdstown and HEPMPO for needed safety improvements and as a growth area for Jefferson County. The process in selecting the corridor considered many factors, as summarized in **Figure 3**, and is an ideal corridor for implementing the complete streets concepts into the planning process. The overall goals of the MP CVP Study are to:

- Improve accessibility to downtown Shepherdstown, businesses, residential neighborhoods, the university, and adjacent amenities
- Improve vehicle, pedestrian, and bicycle safety
- Enhance economic development along the corridor.

Figure 3: MP CVP Selection Criteria



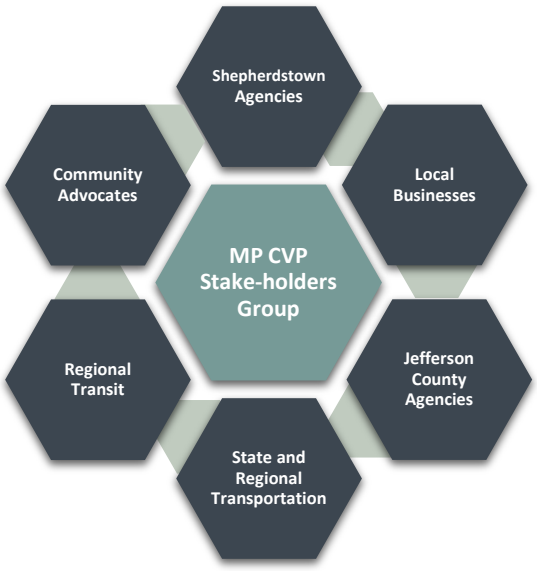
Complete Streets

This corridor vision plan is based on the HEPMPO Complete Street concepts and guidelines established in the *WVDOT West Virginia Corridor Management Handbook (2013).* Complete Streets or Corridor Management is a comprehensive, integrated approach to designing, constructing, and operating roads, streets, and adjacent rights-of-way in a way that supports safe and convenient travel along and across streets for all users. It includes pedestrians, bicyclists, motor vehicle drivers, public transportation riders, commercial and freight vehicles, and addresses people of all ages and abilities including children, youth, families, older adults, and individuals with disabilities. The benefits of complete street design concepts include:

- Improves safety for all users
- Expands quality transportation choices for non-drivers, persons with disabilities, and different modes of transportation
- Provides better bike, pedestrian, and transit connections to employment, education, residential, recreation, retail centers and public facilities, and
- Promotes healthy lifestyles and recreational opportunities; and creates more livable communities

MP CVP Stakeholders

The MP CVP Stakeholders play a key role in the conceptual design of the Martinsburg Pike Corridor providing local knowledge of issues within the corridor, directing the preferred character and design of the road and guiding the inclusion of local travel patterns, users, and community needs. The MP CVP stakeholders represented local government, developers and businesses, county and state transportation agencies, regional transit, and community



advocates. The stakeholders provided critical input by participating in the Visioning Workshop held at the Shepherdstown Volunteer Fire Department.

Visioning Workshop

Visioning workshops are a powerful tool in building consensus and bringing ideas to life in a clear, visual, and communicable way. The goal of the CVP Workshop was to identify preferred road improvements by type and location along the corridor. The 2-day workshop included both in-person and virtual stakeholder attendees, which enabled everyone to provide input and review products as they were developed. "Seeing is believing" as the saying goes, and the workshop helped participants to visualize the corridor by using 3D sketching tools to test ideas that participants readily understand. This process utilized a toolbox of strategies, highlighted in **Figure 4**, to arrive at a shared vision for the corridor. Translating the ideas into visual sketches helped show these transformations live during the workshop discussion, enabling attendees to adjust details and right-size the solution for each specific location along the corridor.

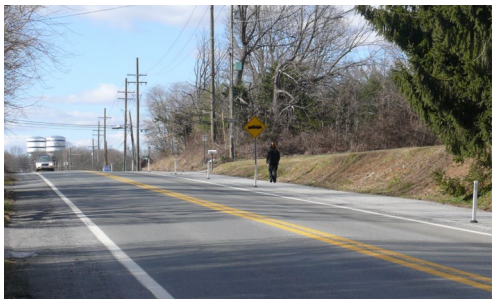
Figure 4: MP CVP – Visioning Strategy Toolbox

Understanding the Corridor

The ¾ mile corridor has eight intersections including the new road extension at Maclaine Way constructed for the WVU Medical Facility at Seneca Crossing. There are multiple access points for commercial and residential housing along the corridor along with new developments like Sheetz and ROCS that have final plans approved.

The corridor has been classified as a Minor Arterial - Rural under FHWA's Highway Functional Classification and a Feeder under the West Virginia Legal Functional Classification System. In both instances, the corridor serves smaller-sized cities and towns and provides connectivity to higher classified systems. It was also identified as "Surface Transportation Program Eligible" on the Federal-Aid System.

For the corridor, the low elevation point is University Drive on the east end of the corridor with a slight rise of 4-5 percent slope heading west before leveling at Maddex Drive to Maddex Square Drive and elevating again to Potomac Farms Drive with a 2 percent slope. Overall, the elevation change is approximately 50 feet between the Potomac Farms Drive intersection and University Drive.

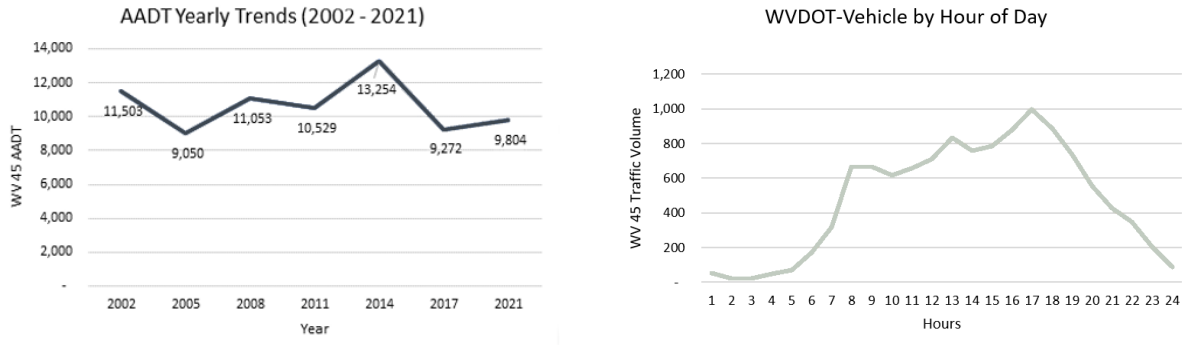


Elevation heading West to Maddex Drive

Travel Demand and Congestion

Over the last 20 years, the corridor has an average annual daily traffic (AADT) between 9,000 – 13,000 vehicles per day. Historic traffic counts have been conducted at only one location along the corridor, which is just east of University Drive. Counts are taken every three years at that location, except for the 2020 pandemic year. The latest count was performed in 2021 as shown in **Figure 5**.

Figure 5: WVDOH Traffic Counts on Martinsburg Pike



The traffic counts provide hourly volumes that are used to identify the morning, afternoon, and evening peak periods. The highest volumes on the corridor are between 4:00 pm and 7:00 pm. Truck traffic is estimated at 4.5% of the total traffic volume. Large heavy-duty trucks are restricted to those serving the local businesses, primarily at Maddex Square, and prohibited in the municipal limits of Shepherdstown on Martinsburg Pike. Through trucks are required to use the Potomac Farms Drive bypass for traveling North over the Potomac River into Maryland.

Based on the HEPMPO LRTP, the traffic is estimated to increase 27% over the next 25 years based on the projected population and economic growth in the area. The highest percentage of trips are attributed to non-work trips that include tourism to the historic sites in the area, Shepherd University students and visitors, shopping, and dining travel. Work trips make up approximately 20 percent of the trips on weekdays.

The speed limit along Martinsburg Pike is 45 miles per hour (mph) transitioning from 25 mph in the city limits east of University Drive. The free-flow speed at the traffic count location between University Drive and Maddex Drive is 53 mph. The primary congestion locations are contributed to the traffic lights at Potomac Farms Drive and Maddex Square Drive as well as backups from the stop sign intersections with Duke Street in Shepherdstown and University Drive. **Figure 6** provides the medium and higher congestion locations as calculated from TomTom travel speed data collected between 2016-2017.

Figure 6: Martinsburg Pike Congestion Locations:

Historic Sites and Flood Plains

The Shepherdstown Historic District was added to the National Register for Historic Sites and expanded to include the entire town in 1980s. The town is known for its historic sites dating back to the 18th Century, quaint lodging, unique dining venues, and Shepherd University that attracts all generations of visitors.

With the majority of the registered historic and architecture sites located in the municipal limits, there is only one house along the corridor that is registered as a historic site. **Figure 7** shows the municipal limits and the historic sites in the area.

> *"Welcome to Shepherdstown - a true blend of amazing history and modern wonders. Visit us soon and discover for yourself why we were voted one of the Coolest Small Towns."*
> *Shepherdstown Visitors Center*

Figure 7: Shepherdstown Historic District and Registered Sites

The Potomac River flood plain is limited to the Town Run tributary located on the East side of Shepherdstown that has minimal impact along the Martinsburg Pike corridor. There are drainage ditches along the corridor for capturing heavy rain and runoff, but excess flooding is not expected.

Safety

An analysis of recent roadway crashes provided insight into the safety issues along the study corridor. A total of 59 crashes occurred along Martinsburg Pike between Potomac Farms Drive and University Drive between 2015 – 2019. The safety analysis reviewed the total number of crashes, crashes that resulted in an injury (there were no fatal crashes), and crashes involving a person walking or biking. Crashes were analyzed by crash type, crash location, weather condition, lighting condition, and a comparison of crash rates between the study corridor and all West Virginia roadways.

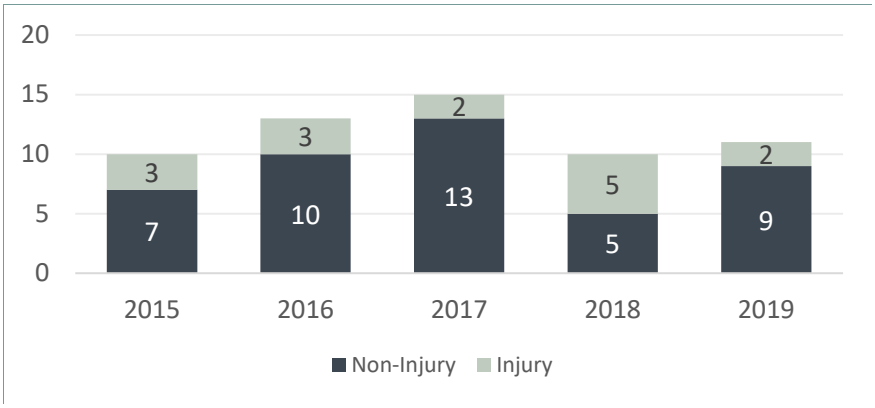
Key takeaways from the safety analysis found that the crash rate within the study corridor is higher than the average crash rate across the state. The study corridor crash rate is 491 crashes per 100 million vehicle miles traveled, while the statewide average crash rate in 2013 was 300 crashes per 100 million vehicle miles traveled. Injury crashes primarily occurred at intersections, with the highest amount of injury crashes along the corridor at the intersection with University Drive/Sheetz.

Crashes by Year

Based on data obtained from the West Virginia Department of Transportation, a total of 59 crashes occurred along the study corridor between 2015 and 2019. An average of 11.8 crashes occurred annually, with no significant trend in crashes increasing or decreasing during the five-year period, as shown in **Figure 8**. A slight upward trend occurred between 2015 – 2017 but decreased beginning in 2018.

Of the 59 crashes, 44 were non-injury, also known as property damage only. An average of 8.8 non-injury crashes occurred annually along the study corridor between 2015 - 2019. A total of 15 injury crashes occurred between 2015 and 2019 (average of 3 annually). No fatal crashes occurred. An average of 3 injury crashes occurred annually within the study area. 2018 is a notable year as it has the lowest overall and non-injury crashes, but the highest injury crashes during the five-year period. The crash data did not present explanations for this abnormality. One injury crash involved a person on a bicycle.

Figure 8: Crashes by Injury Annually 2015-2019



Crashes by Location

Total and injury-related crashes primarily occurred at intersections, with the largest number occurring at the University Drive/Sheetz driveway intersection with Martinsburg Pike, as shown in **Figure 9** and **Figure 10**.

Figure 9: All Crashes Heat Map 2015 - 2019

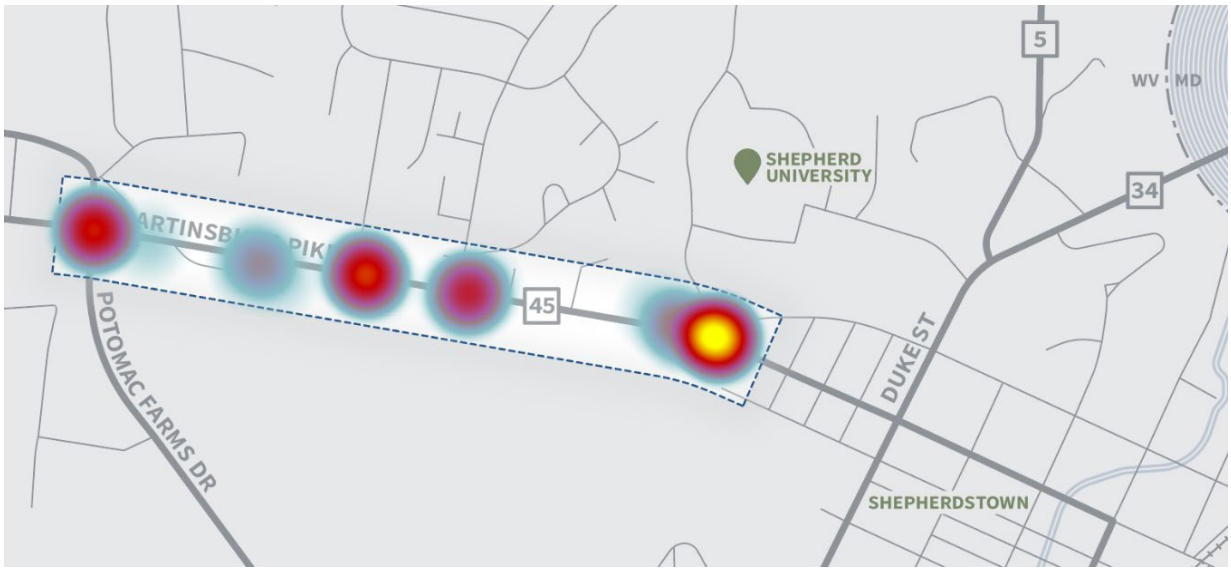
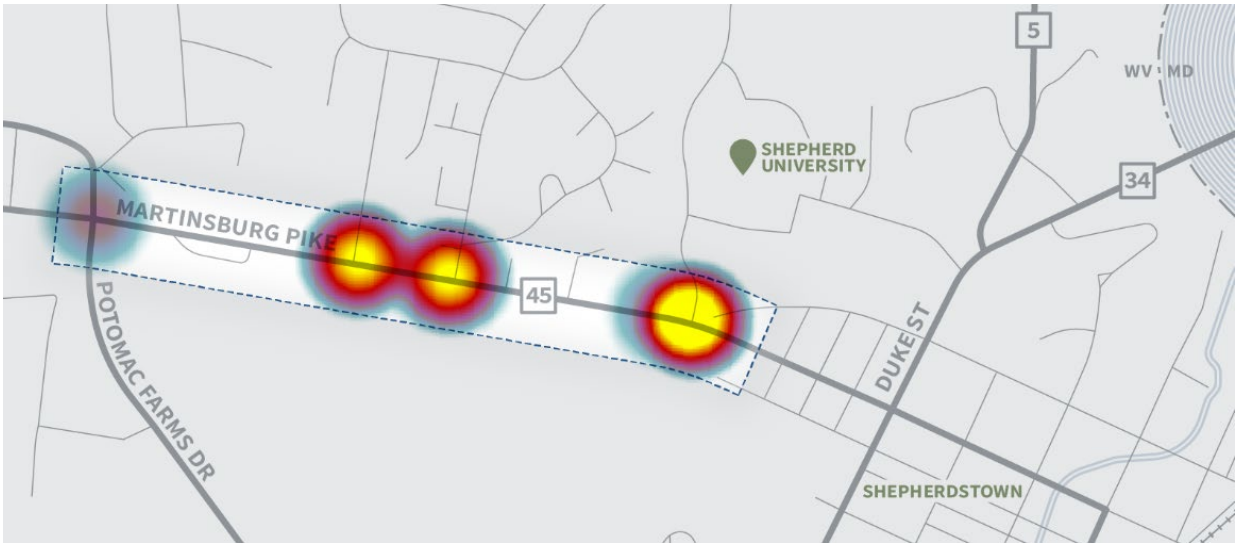


Figure 10: Injury Crashes Heat Map 2015 – 2019



Crashes by Type

Of the 44 non-injury crashes, 57% were rear-end and 32% were angle crashes, as shown in **Table 1**. Angle crashes include front-to-side angle crashes, right angle crashes, and angle crashes where a direction was not recorded. Angle crashes typically occur due to turning conflicts at intersections or driveways. Rear end crashes typically occur due to vehicles slowing to make left or right turns and the following vehicles colliding with the slowed vehicle. Martinsburg Pike has commercial shopping centers

and frequent driveways within the study area but lacks visual cues to alert drivers that the land use context has changed from rural to suburban. This appears to result in inappropriate vehicle speeds which contributes to the high crash rate.

Table 1: Non-Injury Cash Types 2015-2019

Crash Type	Percentage of All Non-Injury Crashes
Single Vehicle Crash	2%
Rear End	57%
Head-On	2%
Sideswipe, Same Direction	2%
Sideswipe, Opposite Direction	5%
Angle (Front-to-Side) Opposite Direction	14%
Right Angle	14%
Angle (Direction Not Specified)	5%

Of the 15 injury crashes, 40% were rear-end and 60% were angle crashes, as shown in **Table 2**. Injury crashes had a higher proportion of angle crashes than non-injury crashes, highlighting the importance of mitigating conflicts with turning vehicles along the study corridor. One single vehicle crash occurred, but upon further investigation it was identified that the crash involved a person riding a bicycle and was reclassified as an angle crash.

Table 2: Injury Crash Types 2015-2019

Crash Type	Percentage of All Non-Injury Crashes
Rear End	40%
Angle (Front-to-Side) Same Direction	7%
Angle (Front-to-Side) Opposite Direction	20%
Sideswipe, Opposite Direction	20%
Right Angle	7%
Angle (Direction Not Specified)	14%

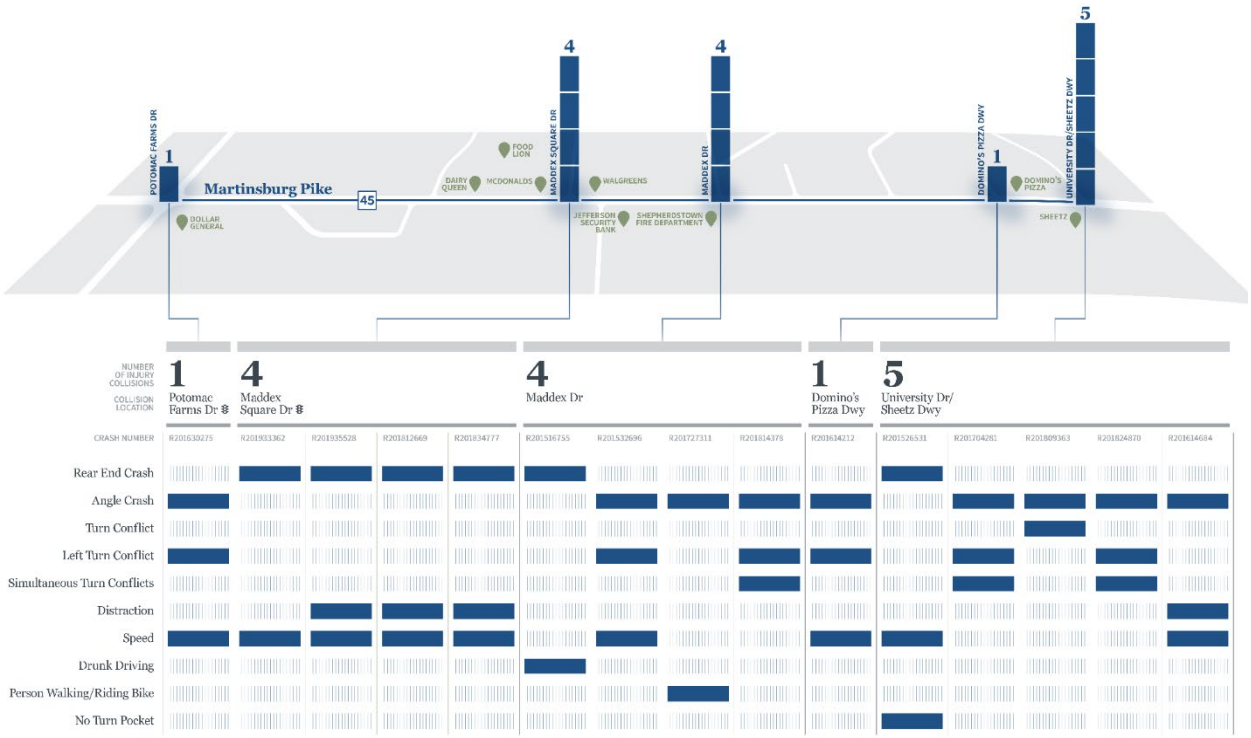
Of the rear end injury crashes, nearly all were headed eastbound toward Duke Street. Context along Martinsburg Pike headed eastbound, toward Shepherdstown, changes from rural to commercial suburban but the roadway design attributes continue to feel rural. As noted earlier, this results in inappropriate vehicle speeds in an area with increased conflicts due to vehicles turning into and out of adjacent businesses, neighborhoods, and driveways.

Of the eight turn conflict injury crashes, most were left turn related, highlighting the potential need for left turn pockets or a two-way left turn lane, and increased awareness and visibility of driveway crossings. Pedestrians and bicyclists walking or riding along the road, or using the shared used shoulder need further protection from left and right turning vehicles that will cross their path. The shared use shoulder has eastbound and westbound pedestrian and bicycle traffic. Drivers pulling in and out of driveways often only look left for oncoming vehicle traffic; not right, where contra flow bicycle and pedestrian traffic is operating on the shared use shoulder. This was likely the case in the single bicycle

injury crash along the corridor. Drivers need increased awareness of two-way pedestrian and bicycle traffic when entering or existing driveways and intersections.

A review of the crash narratives for the injury crashes pointed to other underlying elements. **Figure 11** highlights the location and attributes associated with injury crashes between 2015 and 2019. Turn conflicts, speed, and distracted driving played notable roles among injury crashes along the study corridor.

Figure 11: Injury Crash Locations and Attributes Derived from Crash Report Narratives 2015-2019



The safety analysis was augmented by a walk audit, in which participants concurred with the crash analysis conclusion that most crashes (injury and non-injury) were angle and rear-end crashes at intersections within the study area.

Crashes by Road Condition

Weather and lighting can play a role in crashes and crash outcomes but that does not appear to the case along Martinsburg Pike for non-injury crashes. 84% of non-injury crashes occurred in daylight conditions and 11% occurred in dark but lighted conditions. 79% of non-injury crashes occurred in dry conditions and 19% occurred in wet conditions. These percentages are roughly proportional to when people are traveling, meaning that lighting conditions and weather are not influencing crash patterns.

Weather and lighting also played a slightly larger role in injury crashes. 60% of injury crashes occurred in daylight conditions, 27% occurred in dark but lighted conditions, and 13% occurred in dark with no lighting. 93% of injury crashes occurred in dry conditions, and 7% occurred in wet conditions. Overall, rain plays a larger role in non-injury crashes, while lighting conditions plays a bigger role in injury crashes as noted in **Figure 12** and **Figure 13**.

Figure 12: Crashes by Lighting Conditions and Injury Type 2015 - 2019

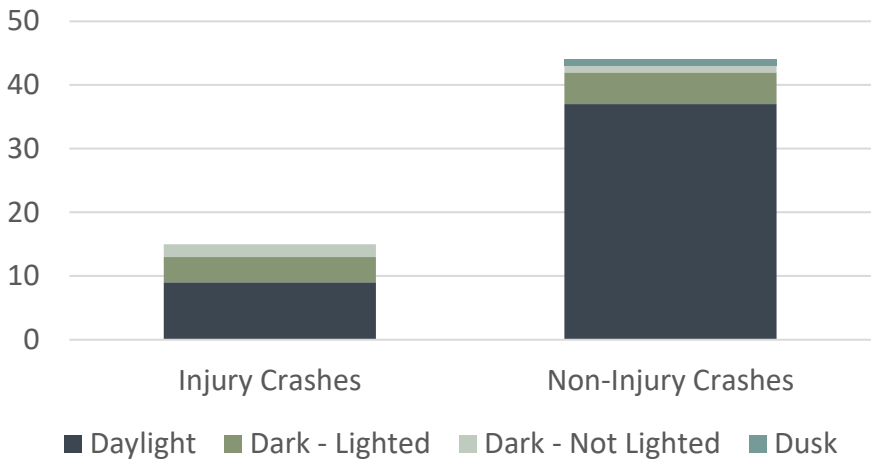
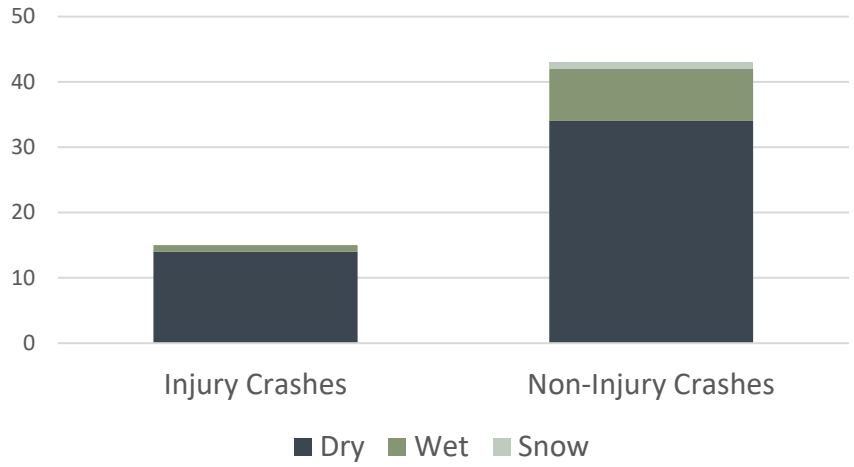


Figure 13: Crashes by Road Surface Condition and Injury Type 2015 - 2019



Understanding the Corridor Users

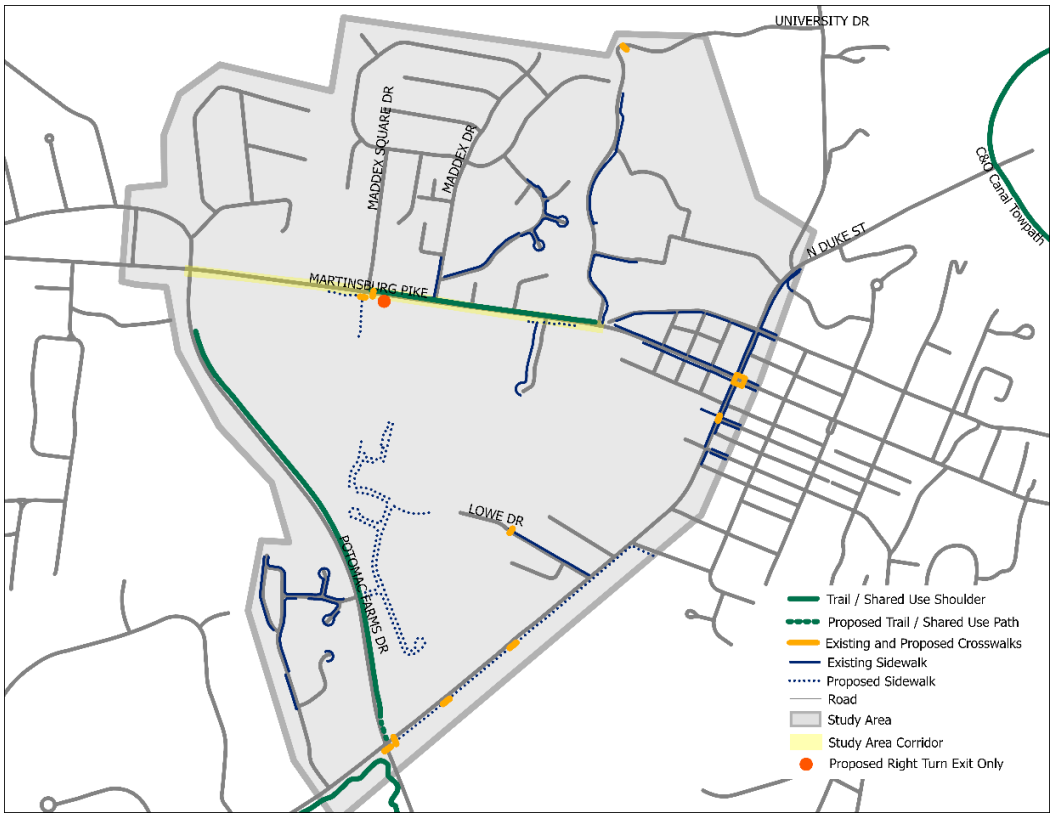
Active Transportation

People walk and bike along Martinsburg Pike to reach retail and employment destinations, access nearby trails, access the Shepherd University campus, and for recreational purposes. Existing and proposed pedestrian and bicycle facilities were reviewed as part of this study. Throughout the study's walk audit, stakeholders highlighted key destinations, most notably Shepherd University and retail stores.

Existing Pedestrian and Bicycle Facilities

Along the study corridor itself, a bollard protected shared use shoulder exists along the northern portion of Martinsburg Pike from University Drive to Maddex Square Drive, as shown in **Figure 14**. Currently, sidewalk only exists in front of BB&T bank, and there are no crosswalks. Sidewalks along intersecting roads exist partially on Maddex Drive, University Drive, and Maclaine Way at the new West Virginia University (WVU) Medical facility. Beyond the study corridor, but within the study area exist shared use paths, sidewalks, and a few crosswalks. A shared used path runs along the eastern edge of Potomac Farms Drive and a trail runs through Morgan's Grove Park. Sidewalks exist within the Shepherd University campus including along University Drive connecting to Martinsburg Pike, along the northern edge of Lowe Drive, within the existing residential development of Colonial Hills, and along Martinsburg Pike from University Drive west through Duke Street. East of the study area within downtown Shepherdstown, sidewalks are generally continuous, and crosswalks are provided at intersections. In many locations, sidewalks are older brick that is uneven.

Figure 14: Existing and Proposed Active Transportation Facilities



Programmed Pedestrian and Bicycle Facilities

Enhancements are proposed for pedestrian and bicycle facilities both along the corridor and within the study area. Along the corridor, sidewalks are proposed along the frontages of new developments including the relocated Sheetz, the WVU Medical facility, and the ROCS sites. A crosswalk is proposed at the eastern leg of the signalized Maddex Square Drive intersection. An additional crosswalk is proposed across the driveway of the relocated Sheetz. The crosswalks and sidewalks at Maddex Square Drive and the new Sheetz are meant to provide a safer crossing for users of the shared use shoulder and access to the Sheetz convenient store. An additional proposed safety element within the Maddex Square Drive area is a right turn exit only out of the Erie Insurance driveway.

Beyond the study corridor, proposed pedestrian and bicycle enhancements include new sidewalks within the Colonial Hills Phase 3A residential development, along Duke Street/Kearneysville Pike between Minden Street and Potomac Farms Drive. A proposed extension of the shared used path along Potomac Farms Drive will connect to Morgan's Grove Park. Crosswalks are proposed at three locations along Duke Street/Kearneysville Pike where future residential development roadways will be added. Additionally, crosswalks are proposed at the eastern and southern legs of the Duke Street/Kearneysville Pike and Potomac Farms Drive intersection.

Pedestrian Counts

Figure 15 shows the 2020 pedestrian counts taken at four intersections to identify typical Saturday mid-day activity patterns. As these counts were taken during 2020, COVID-19 may have impacted the pedestrian activity and counts. Overall, the highest count was at University Drive.

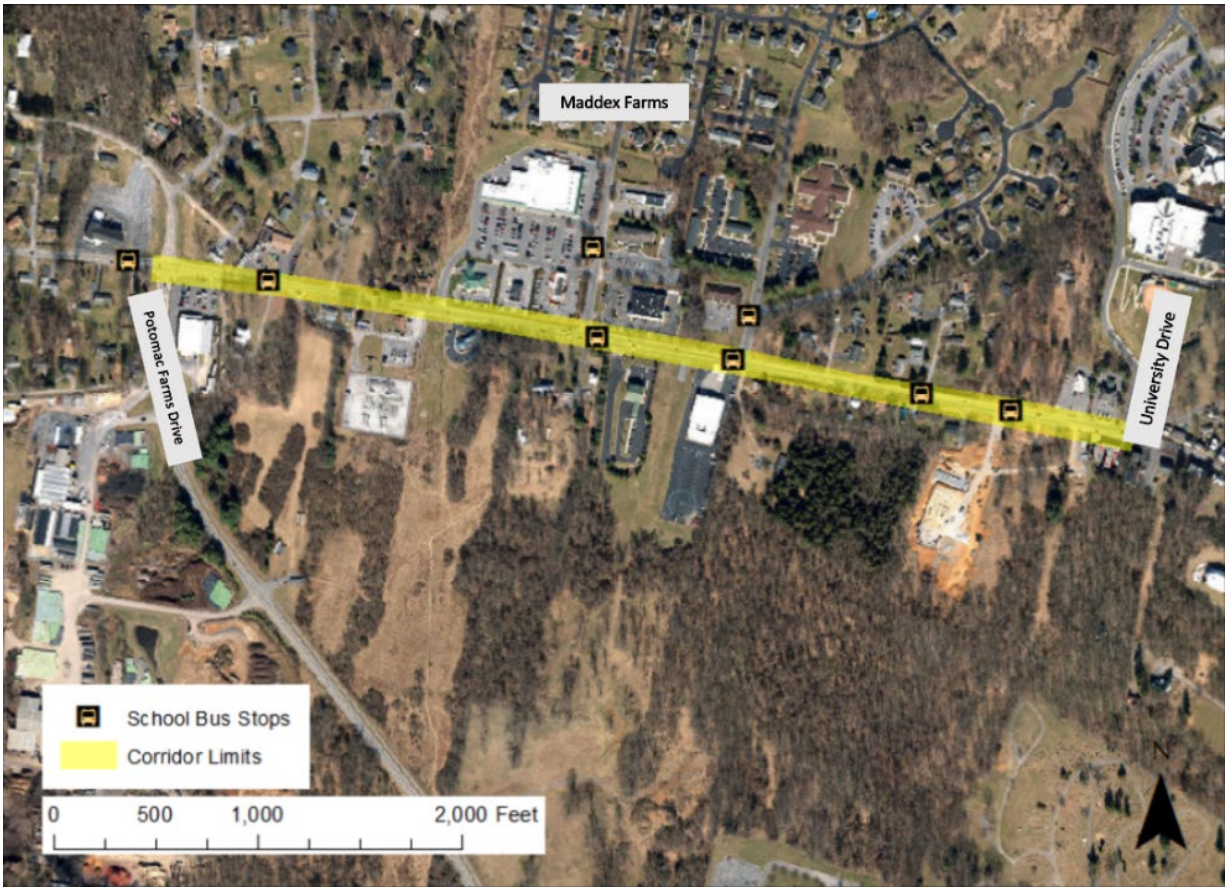
Figure 15: 2020 Mid-Day Saturday Pedestrian Counts

Transit

Current Service

The corridor and area are served by two bus systems, school buses and public transit buses that serve Shepherd University. The public-school system, Jefferson County Schools, has a total of eight bus stops along or near the study corridor. Six school bus stops are along Martinsburg Pike, and two school bus stops are nearby at Maddex Farms and University Heights, as shown in **Figure 16**. School buses stopping to board and alight students on Martinsburg Pike highlight the need for safe pedestrian facilities such as buffered sidewalks, shared use paths, and crosswalks.

Figure 16: Jefferson County Schools Bus Stops



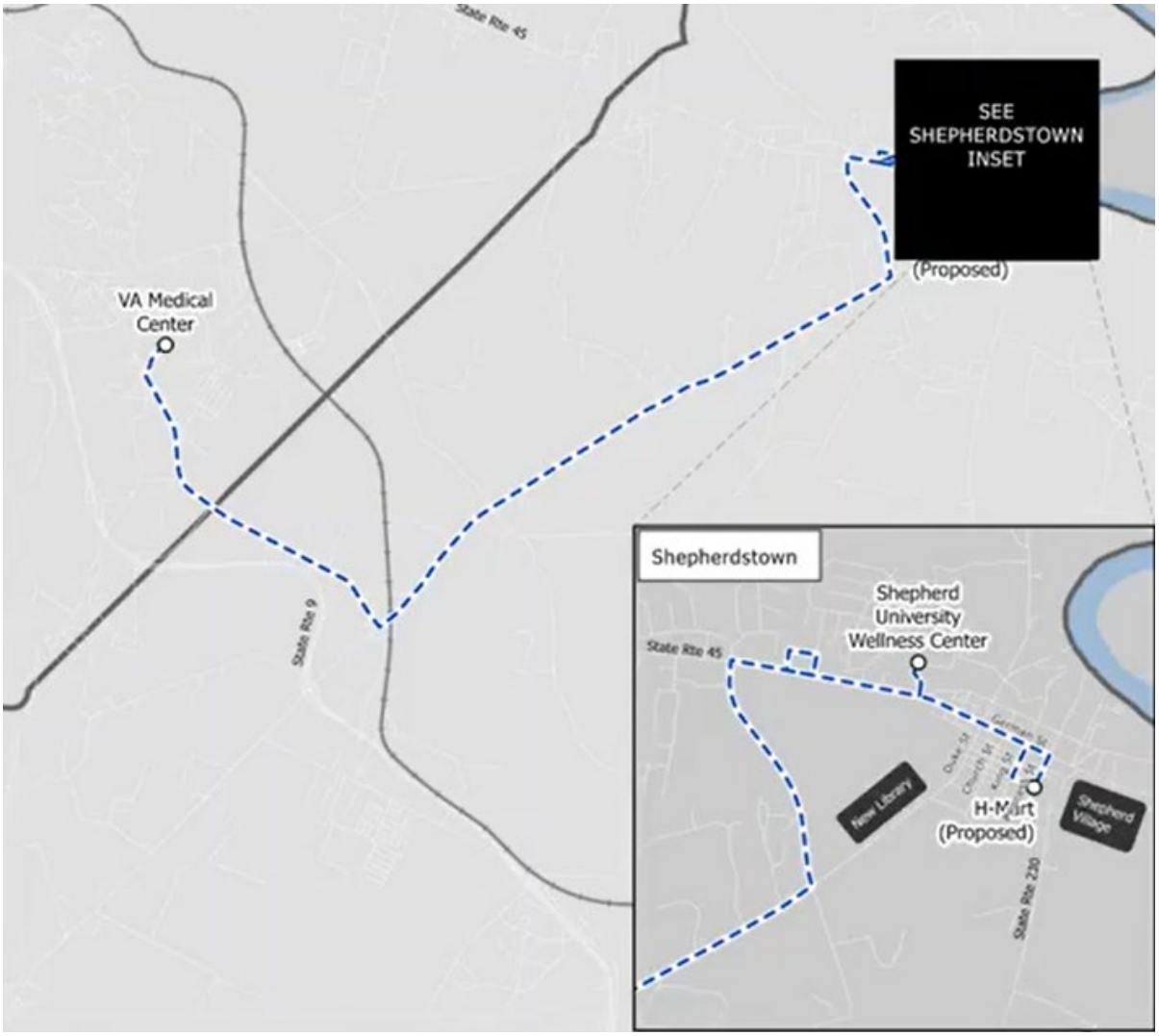
Jefferson County and Shepherd University are serviced by the Eastern Panhandle Transit Authority (EPTA), which routes travel along Martinsburg Pike but do not have any stops within the study area. Ram Force One and Ram Express provide circulator service within campus and an express route between campus and the Caperton Transportation Center in Martinsburg.

Future Routes

The EPTA recently prepared a Transit Development Plan to guide the next five years of transit service in the area, including adding Route 21. Route 21 will operate between Shepherdstown and the VA Medical Center, as illustrated in **Figure 17**, between 8:00 AM and 4:00 PM hourly on weekdays. Bus stop and shelter locations within Shepherdstown such as the library, Food Lion, Shepherd University, Shepherd Village, and the post office are being considered. The proposed Route 21 is a lower priority route for

EPTA and is not expected to be implemented until the fourth or fifth year of the Transit Development Plan.

Figure 17: Proposed EPTA Route 21



Zoning/Developments/Future Land Use

Current zoning, recent and proposed developments, and future land uses were reviewed to better understand land use impacts on the study corridor. Additionally, the workshop and walk audit spent time discussing development and land use impacts on Martinsburg Pike. Stakeholders discussed the remaining residential parcels within the study area and the need to retain access to destinations and the frequency of driveways along Martinsburg Pike.

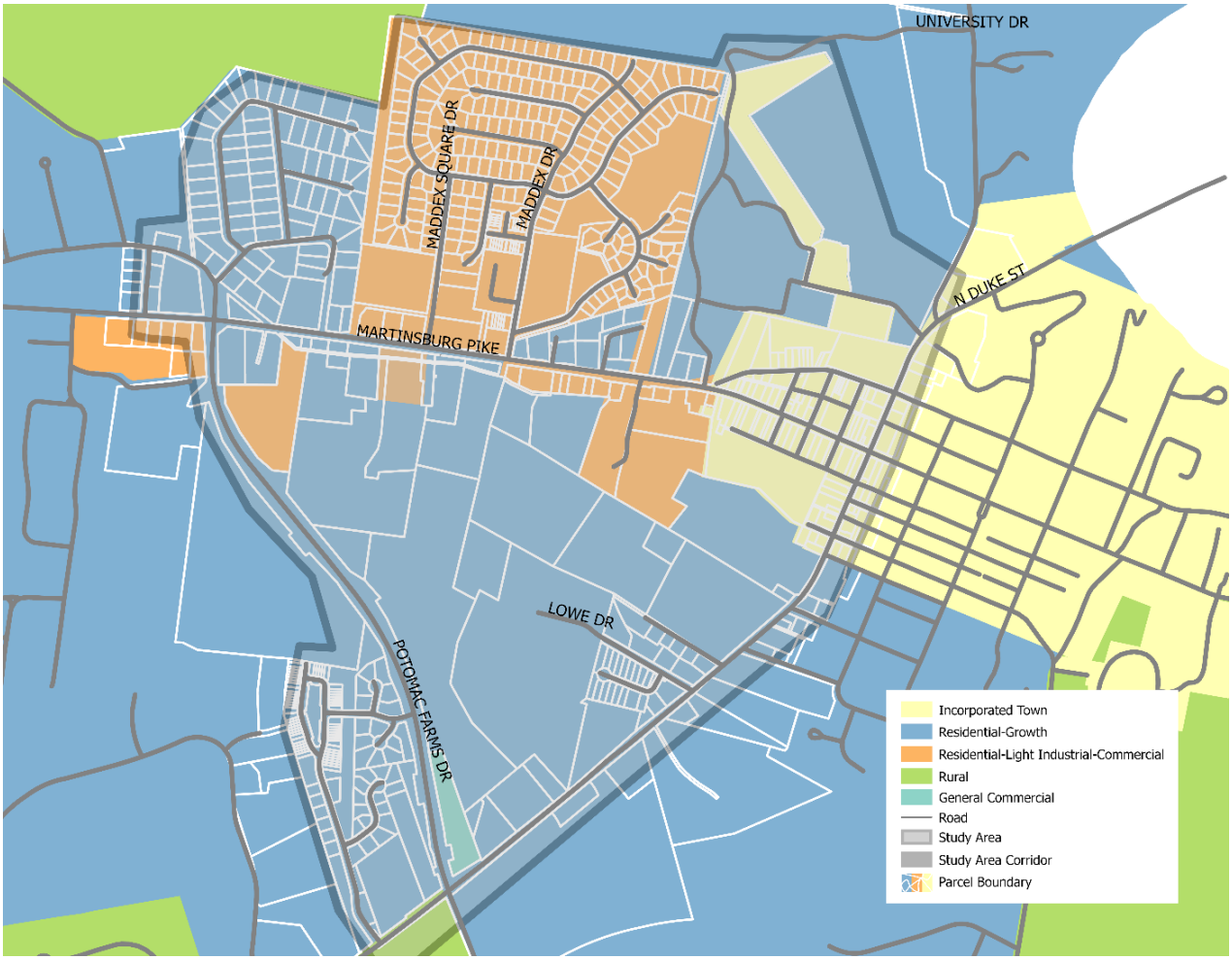
Primary findings indicate that an increase in redevelopment along the study corridor and within the study area will generate more trips, but also has potential to increase the usage of bicycle and pedestrian facilities if leveraged well. One caution is that the current program of adding sidewalks as fronting properties develop will likely result in discontinuous facilities unless/until sidewalk gap closures are programmed for completion.

Zoning

The Martinsburg Pike Corridor is located entirely within the Shepherdstown Growth Management Boundary. Most of the study corridor is zoned as *Residential-Light Industrial-Commercial*, with the remaining corridor area designated as *Residential Growth*, as show in **Figure 18**. Within the study area, most of the land is zoned for *Residential Growth*, followed by *Residential-Light Industrial-Commercial*, *Incorporated Town*, and a small section that is *General Commercial*.

With the relocation of the Sheetz from University Drive to Maddex Square Drive, the former Sheetz parcel was rezoned from *Residential Growth* to *Residential -Light Industrial-Commercial*.

Figure 18: Martinsburg Pike Study Corridor and Area Zoning



Developments

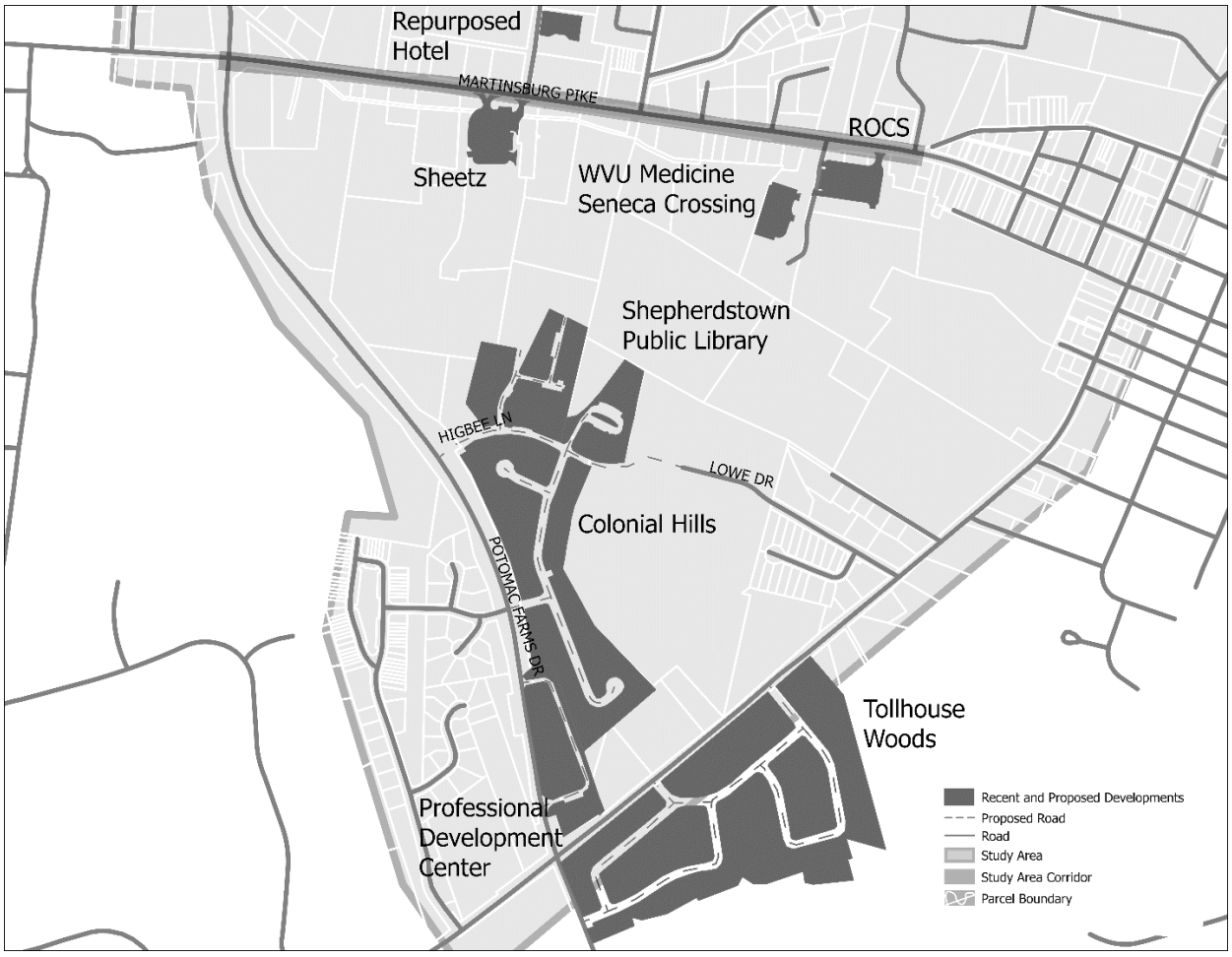
Recent and proposed developments are highlighted in **Figure 19**. Developments are proposed along the study corridor and within the study area.

Corridor

Along the Martinsburg Pike study corridor, four sites have been recently developed or are proposed developments including the WVU Medical facility, ROCS convenient store, the relocation of Sheetz gas station, and a hotel being repurposed into apartments.

The WVU Medical facility, the relocated Sheetz, and ROCS will have driveways or streets that access Martinsburg Pike. The repurposed hotel will access Martinsburg Pike via Maddex Square Drive. Due to increased vehicle and non-vehicle traffic and increased turning movements into driveways and at intersections, active transportation enhancements have been proposed, as well as reconfiguring the Maddex Square Drive signal and a partial roadway reconfiguration. At the Maddex Square Drive signalized intersection, timing changes have been proposed to improve traffic flows and pedestrian crossing. At the WVU Medical facility, the roadway was widened, and a left turn pocket was added.

Figure 19: Martinsburg Pike Study Area Recent and Proposed Developments



Area of Influence

Outside of the immediate study area but within the area of influence, four proposed developments are proposed or under construction: Colonial Hills Phase 3A residential development, Tollhouse Woods residential development, a Professional Development Center, and the Shepherdstown Public Library.

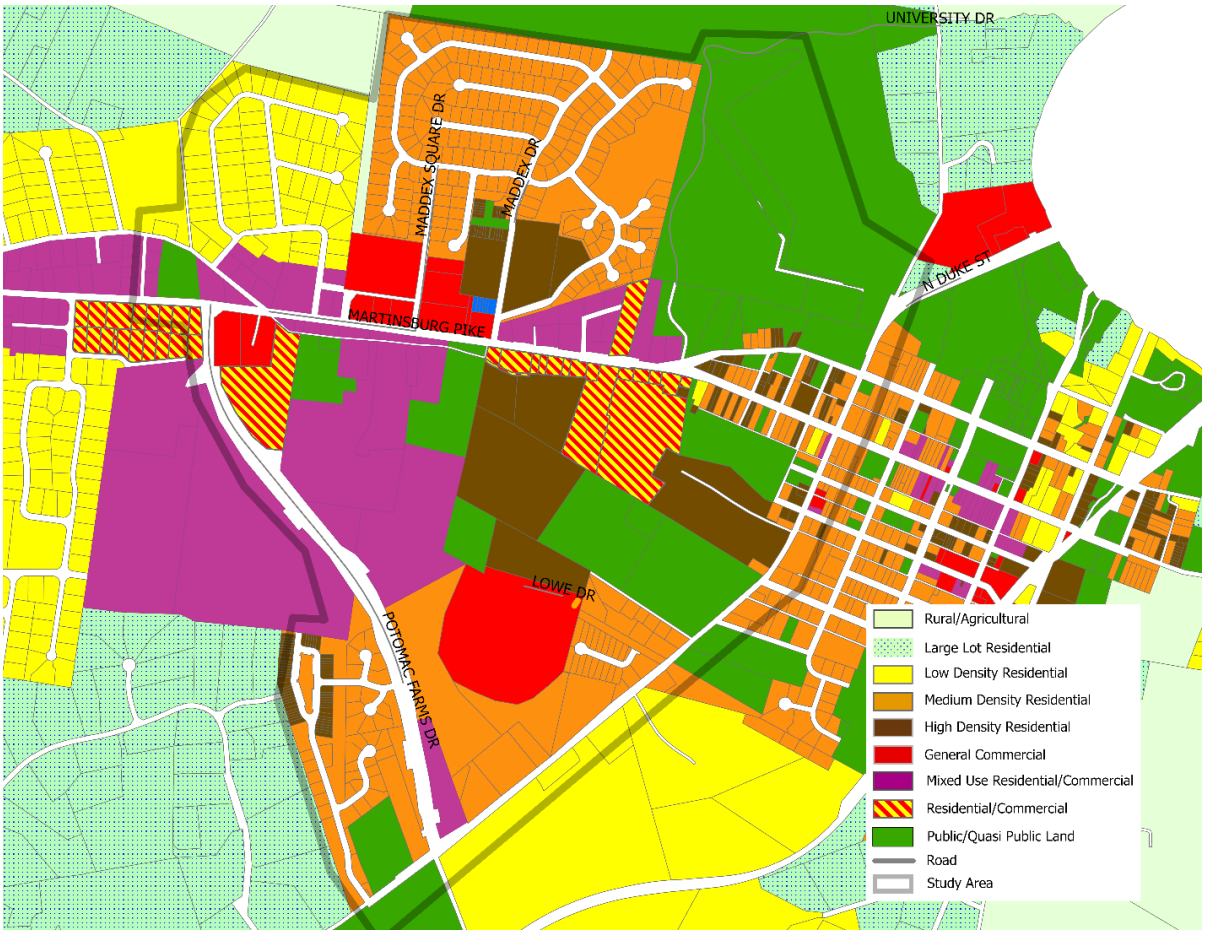
New roadways will be added or extended with these four new sites. Residential developments will increase driving and active transportation users in the study area. The library and development center will be destination sites for educational, social, and employment opportunities. Sidewalks and crosswalks are proposed within the residential developments.

While recent and proposed developments within the study area propose some pedestrian facilities, collectively the pieces are not comprehensive enough to provide adequate safe and connected travel for people walking or biking along Martinsburg Pike within the study area.

Future Land Use

The Envision Jefferson 2035 Comprehensive Plan for Jefferson County identifies future land uses within the Martinsburg Pike study area, as shown in **Figure 20.** Much of the future land use designation along the corridor is *Mixed Use Residential/Commercial*, followed by *Residential/Commercial*, and *General Commercial*. Using the future land use as a guide, along with the recent and proposed developments, the corridor will likely experience increased travel demand for all modes as corridor users access increased retail and employment destinations.

Figure 20: Martinsburg Pike Study Area Future Land Use



Within the study area, future land uses are primarily *Medium Density Residential*, *Public/Quasi Public Land* (including Shepherd University), *Mixed Use Residential/Commercial*, and *Low Density Residential*. As the area continues to grow in population, future and existing residents will make trips within the study area and along the corridor by various transportation modes. Maintaining safe access between residential areas and commercial areas improves active transportation access.

Re-envisioning the Corridor

Complete Streets Overview

The term “Complete Streets” refers to street design that accommodates safe use and access for all users, not solely drivers. For many years, road design standards have focused on moving vehicles and providing sufficient space for vehicles, but often without similar infrastructure and space allocation for other modes of transportation. The movement towards reimagining “Complete Streets” acknowledges that catering to cars alone has led to an increase in speeding, traffic accidents, and pedestrian-involved crashes. Streets that don’t provide designated and protected space for pedestrians and bicyclists leave those users unable to get around, dependent on cars for even short trips, or placing themselves in harm’s way as they attempt to cross the street.

“Complete Streets” are designed for everyone, from young children to the elderly, and the able-bodied to those with limited mobility. There is no one-size-fits all complete street design; each street should provide the access and modes suited to its location, users, and design speed. Sidewalks, safe crossing points, and narrowed drive lanes are common baseline components. Where excess space occurs in the right-of-way, Complete Streets reallocate that space to serve more users, and maximize the functionality of the street.

A fundamental philosophy underlying Complete Streets is the idea that design impacts behavior. In other words, if the speed limit is 30 mph, the road should be designed for 30 mph. Signs, signalization and stoplights, and regulations mitigate speed only; they impose rules and penalties but they are not self-enforcing especially when the road is comfortable to drive on at faster speeds. Complete Streets use road design to indicate the appropriate speed, calm traffic beyond that speed, and guide clear movements of all modes.

West Virginia enacted the “Complete Streets Act” as part of State Code (17-4A) in 2013. This means that new road construction and improvements should strive to improve safety, accessibility, and mobility to accommodate all users regardless of age or abilities throughout the planning, design and construction process by incorporating the latest design standards for bike/ped, transit, and highway facilities.

Strategy Toolbox

Common strategies for converting existing and overly wide roadways to Complete Streets include:

- Continuous sidewalks
- Demarcated crosswalks
- Designated bike lanes
- Buffers between modes
- ADA-accessible curbs at intersections
- Pedestrian islands
- Medians
- Bus lanes
- Parallel parking
- Raised and textures paving
- Landscaping and trees

- Pedestrian-scaled lighting and signage
- Traffic signals

Sidewalks should be 5’ minimum width for comfortable use, though 6’ width is recommended to allow pedestrians passing one another. Demarcated crosswalks use paint or materials to provide a clear crossing point for pedestrians that is visible to cars approaching. Bike lanes serve other forms of active transportation, and various types of buffers between multimodal spaces and driving lanes further protects users. Pedestrian islands and medians separate driving lanes and allow a resting place for pedestrians as they cross; this allows them to cross only one direction of traffic at a time and is especially helpful on wide and busy roads. Continuous bus lanes or bus pull-offs are appropriate in areas with frequent public transit. On-street parking is a beneficial tool to include in traffic calming, as the presence of parking prompts drivers to slow down. Parking can also be employed as a buffer between drive lanes and multimodal lanes to further protect bicyclists and pedestrians. Other streetscaping elements such as landscaping, trees, planters, lighting, and materials also guide how people use the street.

The National Association of City Transportation Officials (NACTO) Urban Street Design Guide (2013) details more strategies and applications to achieve Complete Streets and shows how they can be adapted to work in varying contexts.

Street Rendering from the NACTO Urban Street Design Guide

Speed Impacts

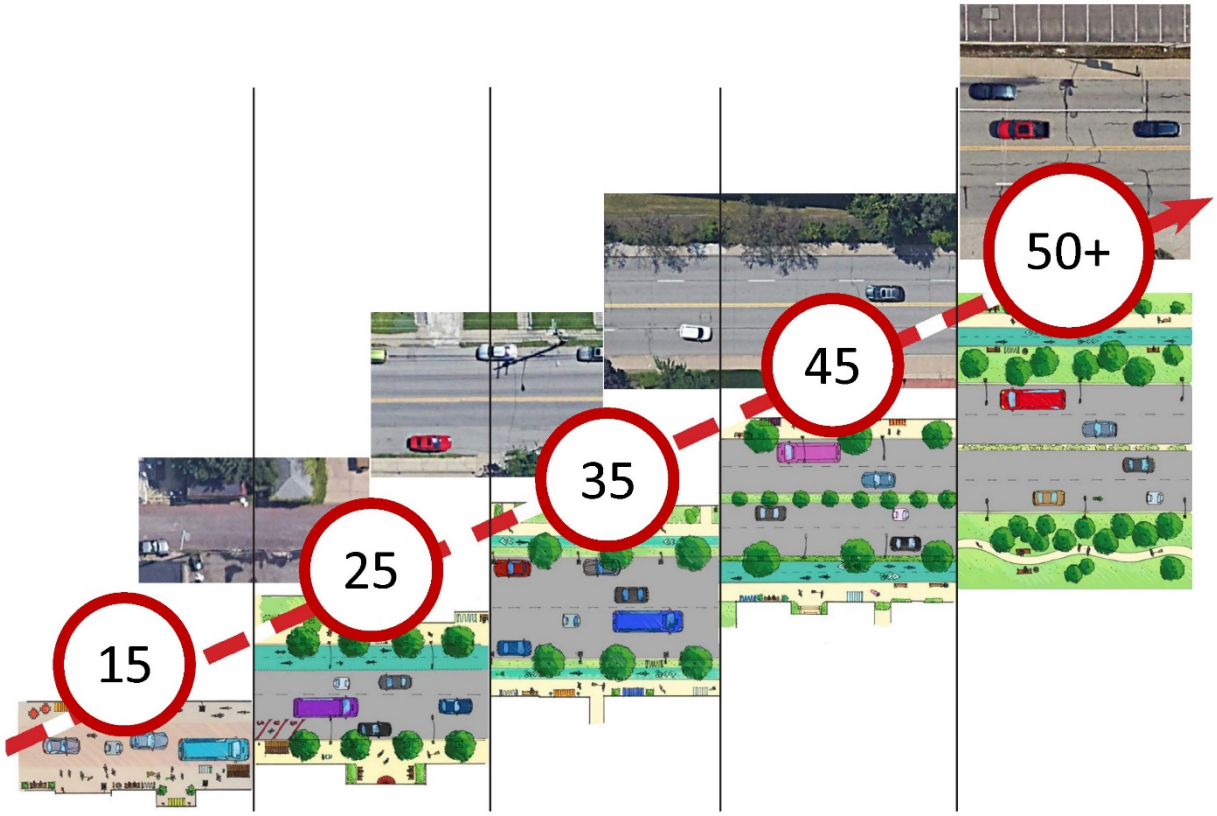
Traffic calming on busy corridors is often an issue of public health. Speeding vehicles cause substantial damage to other drivers, pedestrians and bicyclists, and property. The crash data along Martinsburg Pike shows a high rate of crashes at University Drive, Maddex Drive, and Maddex Square Drive. Speed was a factor in half of the crashes documented between 2015-2019. Rear end and angled crashes are also predominant; these types of crashes often occur when a vehicle is stopping or turning and impede

traffic flow. In other words, turning movements require a slower speed than the posted limit but the roadway design doesn't sufficiently prepare following vehicles to anticipate and slow down accordingly.

The rate of accident fatality rises sharply in accordance with vehicle speed based on a 2010 DC Transport Research Laboratory study. Accidents that occur at 25mph have a fatality rate of under 10%. While accidents at this speed are regrettable and to be avoided, it's important to understand that if and when they do occur, they are likely to cause only minimal damage. When vehicles reach 30mph, the risk of fatality rises to 10%. At 35mph the risk jumps to 20%, doubles again to 40% when speed reaches 40mph, and continues to rise exponentially in relation to speed from there. A pedestrian involved in a collision with a vehicle traveling at 50mph is over 90% likely to be killed.

In the United States, motor vehicle crashes are a leading cause of death and kill over 100 people every day. In West Virginia in 2018, about 300 people were killed in motor vehicle traffic crashes and the estimated cost in medical care and lost labor is over $417 million. Road design that enables and facilitates higher speeds is both dangerous and expensive. By altering the road design to best suit the desired speed and incorporating traffic calming elements that discourage speeding, roads such as Martinsburg Pike can be made safer for all users. **Figure 21** shows how road design can vary to support different speeds. A wide, multilane roadway supports higher speeds and as not a suitable design if 30mph is the intended limit.

Figure 21: Road Design and Speed Level

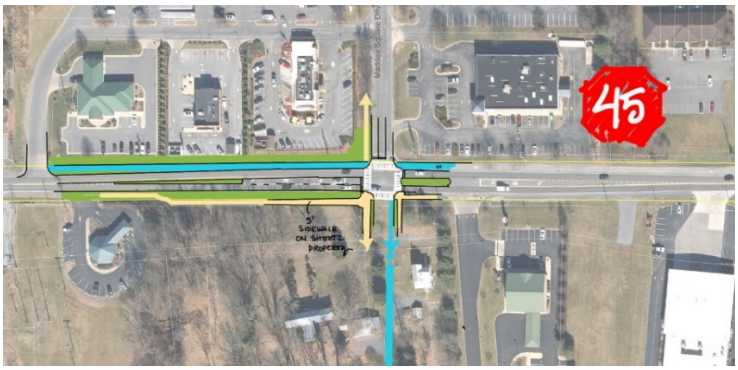


MP CVP Visioning Workshop

Visioning Process

The Martinsburg Pike visioning workshop gathered stakeholders in person and online to participate in a two-day session to explore and test transportation improvement concepts along the corridor. Stakeholders gathered at the Shepherdstown Fire Department, located within the study area, and opened the workshop with a review of the site's constraints, crash history, and current development underway and proposed. They then embarked on a walking tour outside to look at the corridor and discuss points of conflict.

The walking tour included on-site measurements at points along the corridor and allowed hands-on testing of potential road realignments. In front of the Fire Department, the added shoulder on the south side of the road created an 18' travel lane, far exceeding the recommended 11' width appropriate for a 35mph road. At Maddex Drive, the intersecting road is unmarked but is sufficiently wide to accommodate 3 lanes of travel. As a result, cars turning left pull far ahead towards Martinsburg Pike, impeding pedestrian crossing, and can hide cars turning right from view of oncoming traffic. As a group, chalk markings were added to the road to measure out potential road narrowing, and the group was able to visualize the changes as they were discussed. Similar options were explored, discussed, and tested with the group throughout the two-day workshop to gather ideas and reveal preferred solutions for connectivity and traffic calming along the corridor.



Conceptual Design

The concept plan uses the full right-of-way, which varies from 60’ to 75’, and maintains the current 11’ driving lanes throughout. This leaves a substantial amount of space to be better defined throughout the corridor. The concept plan, shown in **Figure 22**, separates the two primary drive lanes with a continuous central section that accommodates a median with turn lanes where needed. To the north side, the multimodal path is maintained in its current alignment and extended to the west to meet Potomac Farms Drive. On the south side, a sidewalk is added continuously from University Drive to Potomac Farms Drive. Where the right-of-way allows, a planted buffer is added between the drive lane and the sidewalk, and at each intersection a painted crosswalk is provided to maintain pedestrian connectivity and safety throughout the length of the corridor.

Figure 22: Martinsburg Pike Concept Plan

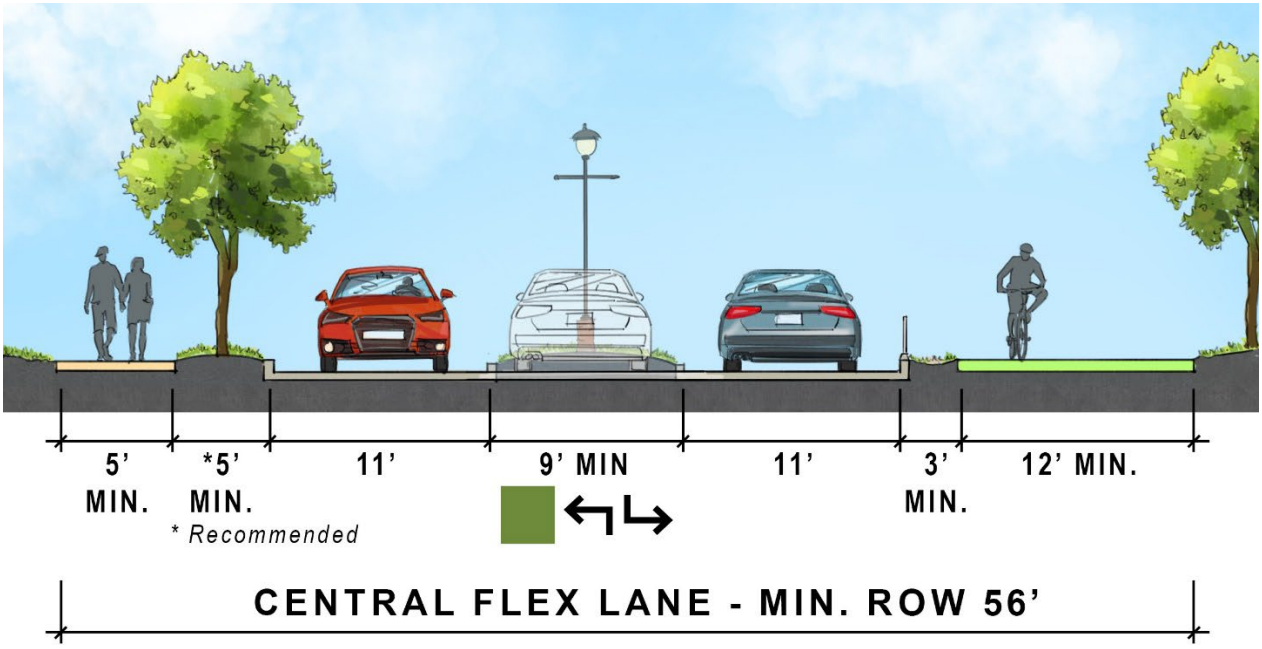
Cross Sections

The proposed road design employs a basic “standard” road section that requires 51’ of right-of-way minimum. By including all recommended features, the standard section is 56’ wide. Numerous elements vary block-by-block as suits the access needs and specific right-of-way at each point.

The standard section, shown in **Figure 23**, depicts two 11’ drive lanes, a 12’ multimodal path with 3’ buffer, a 5’ sidewalk with recommended 5’ planted buffer, and a 9’ central lane that accommodates a median in mid-block locations and a left turn lane at key intersections. This 56’ easily fits into the entire corridor and allows space for additional variations where needed:

- Right turn lane
- Larger planted strip
- Larger median
- Accommodates the current location of the multimodal path, which is not located at the edge of the right-of-way in all locations

Figure 23: Martinsburg Pike Standard Section



Plan Details by Block

Block by block, the concept plan tested and proposed preferred alignments for each block and intersection in response to the right-of-way and access needs in each location.

Figure 24: Block by Block - Potomac Farms Drive/Old Martinsburg Road

1. At Potomac Farms Drive, a roundabout is achievable within the available right-of-way. The traffic volumes are suited to a single lane roundabout, which accommodates all turning movements without requiring additional turn lanes. Instead, the space previously used for turn lanes can be turned into green buffers that also act as pedestrian islands. As pedestrians cross the roadway, they only need to cross one lane of traffic at a time, which creates a much safer condition. The roundabout itself provides a clear indication to drivers that they must slow down and allows space for entrance signage or other gateway features in the center. The center of the roundabout can be paved with a mountable curb within the first 10' to allow large trucks additional space to maneuver, when needed.
2. East of Potomac Farms Drive, the median continues and provides space for an attractive boulevard entrance into Shepherdstown. Access into adjacent properties is limited to 24' width, which better manages movements in and out and provides more protection for the multimodal path and sidewalk at each crossing. The multimodal path continues on the north side and is located along the edge of the right-of-way, which allows maximum space to be allocated to the central median.
3. Before Maddex Square Drive, there are a series of alley access points and several residential properties with driveways from Martinsburg Pike. An alternating direction turn lane is provided to allow cross traffic and easy turns. To further enable access to and from the individual properties, the median can alternate between raised median and at-grade special paving. The use of special paving visually continues the separation of traffic while allowing space for cars to turn in and out of the adjacent properties. Keeping a raised and/or planted median between these access points ensures that the central median doesn't become a passing lane.

Figure 25: Block by Block - Maddex Square Drive

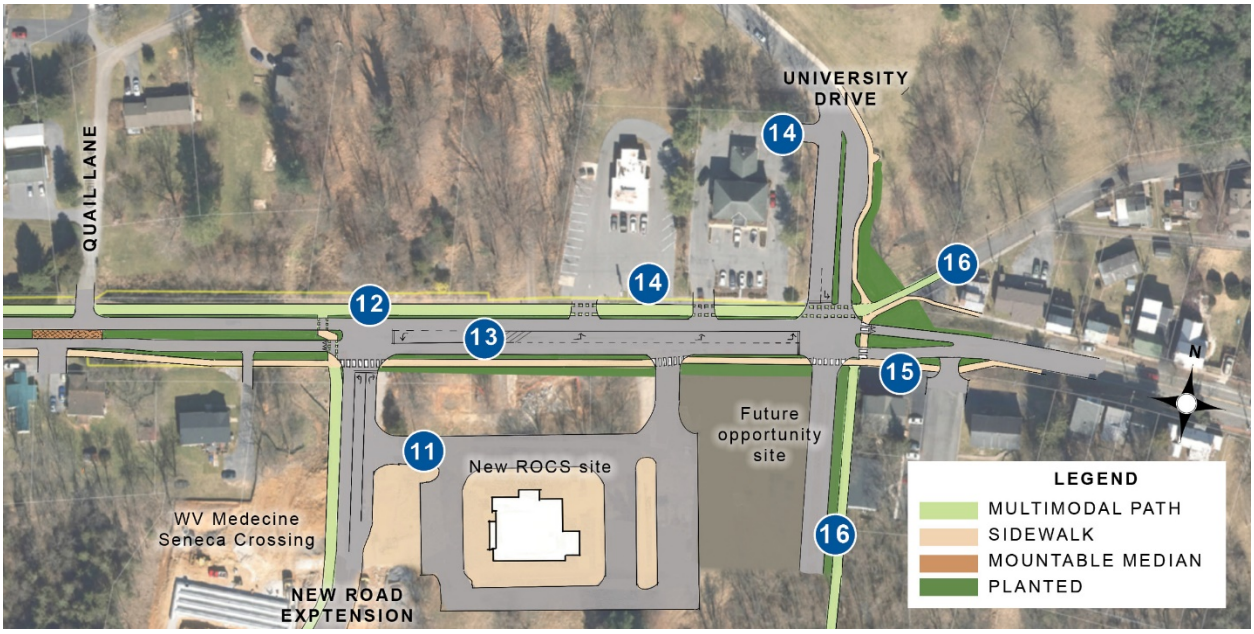
4. Around Maddex Square Drive, traffic flow into the shopping area and the new gas station and street merits the inclusion of left turns lanes. Workshop participants noted though that the alley leading out of the shopping plaza is supposed to be right turn in/right turn out only, but is often not respected. By continuing the central median at this location, that movement is naturally enforced and unexpected left turning conflicts are avoided.
5. Upon approach to Maddex Square Drive, the median transitions to a left turn lane in both directions. As this is a major intersection, painted crossings are shown on all 4 sides to protect pedestrians and bicyclists.
6. The multimodal path continues on the north side, and crosses Martinsburg Pike to connect to a future multimodal path extending south. The sidewalk also crosses north to connect to the shopping plaza. The addition of a one-way road from the bank to the new road extension provides new left turn access to Martinsburg Pike.
7. As the gas station plans to include a sidewalk on their property, additional right-of-way can be provided as a green buffer between the road and the sidewalk.

Figure 26: Block by Block - Maddex Drive

8. East of Maddex Square Drive, the left turn lane transitions back to a median, and then returns to a left turn lane at Maddex Drive. The driving lanes shift slightly south, in order to maintain the current alignment of the multimodal path. This shift means there is less right-of-way available to the south, so while the sidewalk is continued, no green buffer is provided.
9. A median is added into Maddex Drive to better organize turn movements in and out, and demarcated crossings are provided for both the multimodal path and the sidewalk. The median is continuous to the east of Maddex Drive, and allows the crosswalk at this intersection to include a pedestrian refuge in the center.

10. A series of private properties and driveways results in the continuous median have an alternating character of raised/green median with at-grade mountable paving that allows crossing for residential uses. These turn pockets do not allow truck use.

Figure 27: Block by Block - University Drive



Around University Drive, the speed limit drops abruptly to 25mph with little change in the current road design. The conceptual plan proposes several improvements to better facilitate the change in speed and prompt drivers to slow down earlier upon their approach.

11. The new road into the WVU Medical facility at Seneca Crossing is envisioned as continuing south and connecting to further development in the future. The existing sidewalk along the west side of the new road extension is a desired location for a multimodal path extension. The traffic generated by development in and out of the new road, including traffic into the ROCS, is suited to a left turn lane and wider turning radius in and out of this road.
12. The median is continued on the left side of the intersection and accommodates a staggered multimodal crossing. The staggered alignment ensures that bicyclists must dismount as they cross, and allows more space for vehicles turning left to see them, creating a safer crossing. This is also the ideal access point for truck traffic into the ROCS.
13. To the east of the intersection, a left turn lane is provided for University Drive and Maclaine Way. The sidewalk is on the ROCS property, which allows the south lane to include a small shift as well as include a large green buffer.
14. Access management is suggested for the two northern parcels. Instead of keeping two access points each, which creates frequent conflicts, a new rear entrance is proposed off of University Drive.
15. On the east side of the intersection, the central median includes a pedestrian refuge for the crosswalk and can also host welcome signage or gateway elements to indicate entrance to the

core of town. The eastbound lane shifts here to further prompt slower speeds and realign with the existing lanes beyond this point.

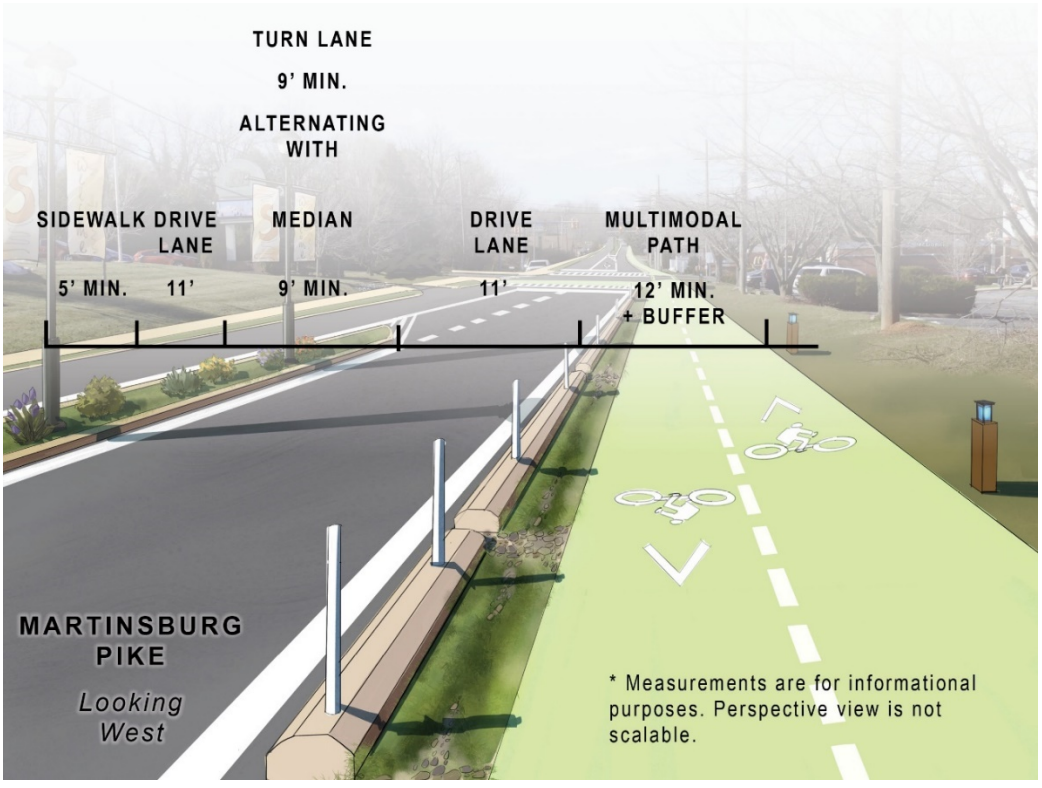
16. Finally, stakeholders identified two multimodal path alignments in this area. West High Street is closed to traffic but can be easily adapted to allow a trail. West Back Alley similarly is a safe and desirable location for a trail. With the closure of the current gas station, it will be important to avoid new curb cuts in this intersection, extend a continuous sidewalk, and offer clear demarcated crossings for multimodal and pedestrian use across both University Drive and Martinsburg Pike. The High Street and Back Alley multimodal paths should connect through this intersection.

Multimodal Path Improvements

Besides continuing the multimodal path, several improvements are also suitable here. Stakeholders described difficulty using the current path due to debris and gravel in the way. The surface is not plowed in the winter, so it is often unpassable and further fills with snow pushed off of roadway. Salt and gravel make the surface uneven. There is a buffer provided between the drive lane and the multimodal path, but the only physical barriers are lightweight flex posts. During the site tour, numerous posts were visibly broken or missing, so the posts are clearly not sufficiently deterring cars from entering that space.

Suggested improvements, illustrated in **Figure 28**, include a concrete curb with rounded or angled edges. This provides a solid barrier between the drive lane and multimodal path, and can be used in conjunction with the current posts for added security and visual deterrence. Also, the asphalt and gravel buffer zone can be treated with a mix of low maintenance plants and rock bed that can filter rain, snow melt, gravel, salt, and other debris and keep it from being easily transferred into the path.

Figure 28: Rendering of Suggested Multimodal Improvements



Intersections/Options/Alternatives

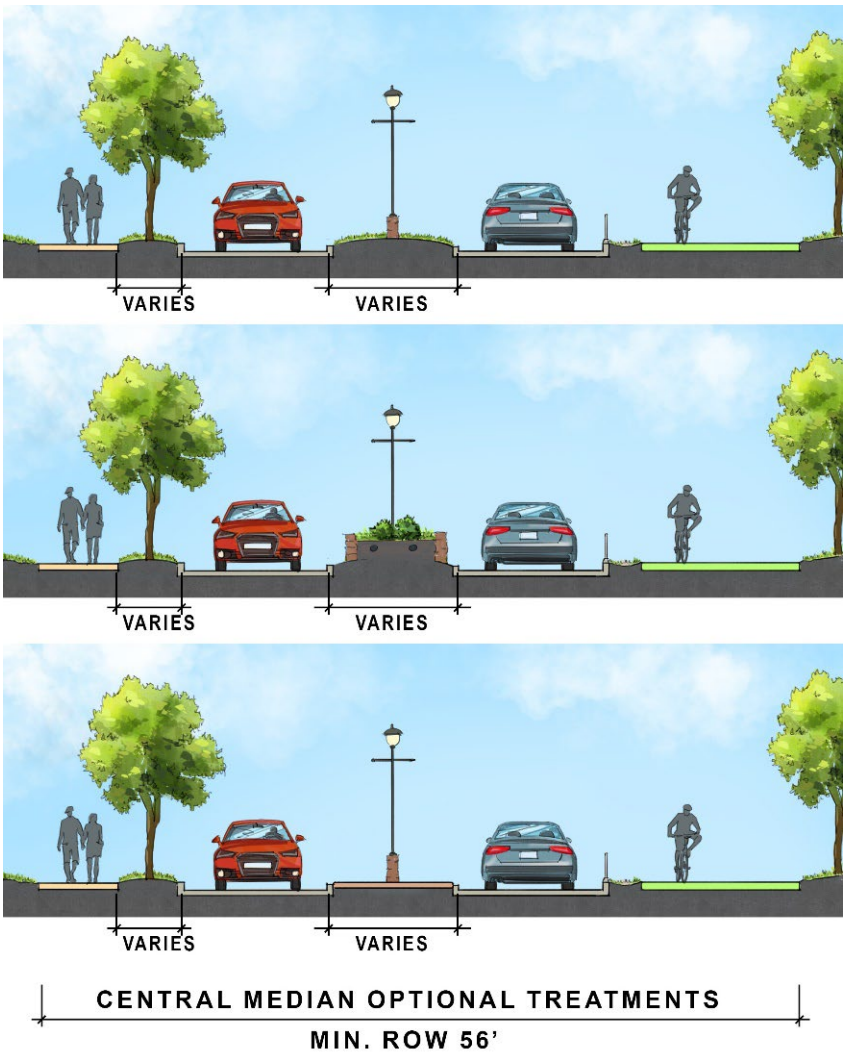
Several alternatives were explored and tested throughout the workshop. The use of an alternating median and turn lane was highly favored and was clearly the preferred concept. However, substantial variation is possible within this concept. The main options developed involve the design and treatment of the median, and the design of the intersection around the Shepherdstown Fire Department entrance.

Option 1: Median treatment

Although the median was viewed as desirable by stakeholders, it also raised questions about ownership and maintenance. To address these concerns, several options, shown in **Figure 29**, were prepared to depict varying levels of maintenance and visual appeal:

- Continuous low green planted median
- Stone walls, consistent with similar stone wall materials in Shepherdstown
- Periodic groupings of native plantings that can be sponsored by local businesses or organizations
- Low hardscape with special paving between curbs

Figure 29: Section of Central Median Options



Option 2: Access into the Shepherdstown Fire Department

The entrance into the Fire Department is offset from the Maddex Drive intersection, which results in conflicting turning movements. A safer configuration would be to realign the entrance with Maddex Drive and remove curb cuts to the west end of the parcel, illustrated in **Figure 30**, so that all movements in and out from north and south are occurring in a clear intersection location.

Figure 30: Fire Department Entrance Realignment

Planning Level Cost Estimates

A planning level cost estimate was completed based on the proposed road design. Assumptions were made based on typical unit costs and relative percentages from prior projects. A summary of the cost estimate is shown in **Table 3**.

Table 3: Martinsburg Pike Planning Level Cost Estimate

Item	Cost Estimate (Low)	Cost Estimate (High)
Design Improvements		
Signing & Pavement Marking	$27,000	$37,000
Roundabout (Includes Signing & Pavement Marking)	$1,500,000	$1,500,000
Median Island & Widening	$2,125,000	$2,605,000
Traffic Signal (Includes Signing & Pavement Marking)	$140,000	$250,000
Multi-Use Trail	$486,000	$816,000
Sidewalk	$317,000	$317,000
Fire Station Flashing Warning Beacon	$52,000	$70,000
Design Improvements Total	**$4,647,000**	**$5,596,00**
Project Items		
Equipment Package	$14,000	$14,000
Construction Surveying	$56,000	$56,000
CPM Schedule	$14,000	$14,000
Unforeseen Water Pollution Control	$14,000	$14,000
Project Items Total	**$98,000**	**$98,000**
Percentage Items		
Mobilization (4%)	$190,000	$228,000
Maintenance & Protection of Traffic (10%)	$475,000	$569,000
Contingencies (25%)	$1,186,000	$1,424,000
Inspection (12%)	$569,000	$683,000
Engineering (25%)	$1,186,000	$1,424,000
Percentage Items Total	**$3,606,000**	**$4,328,000**
Project Total	**$8,352,000**	**$10,021,000**

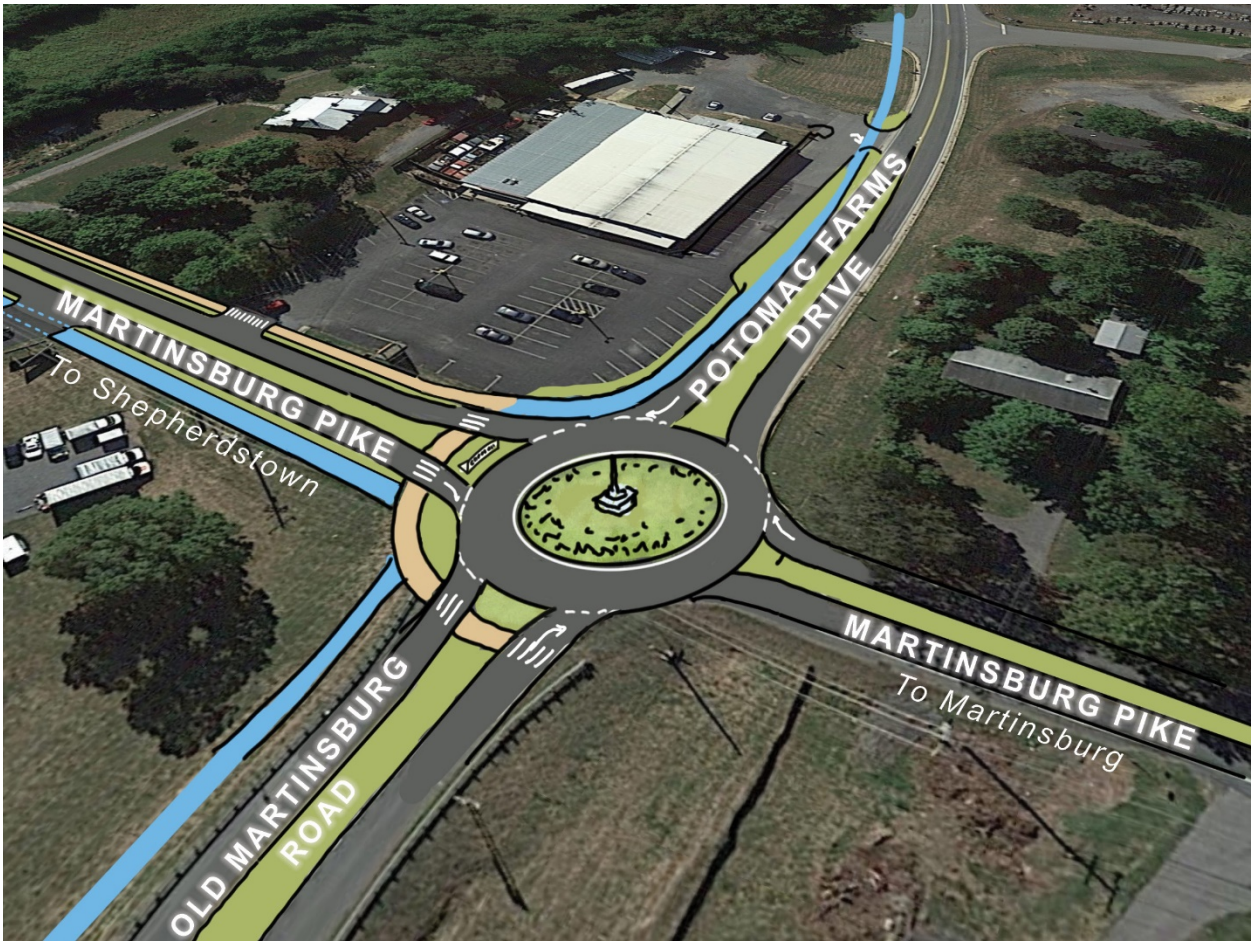
Esthetics

The use of a median should consider how to best contribute to the corridor's visual appearance and improve the overall aesthetic. The varying options for median treatment describe how the median can be an attractive gateway to Shepherdstown even minimizing landscaping and ensuring easy maintenance is preferred.

The aesthetics of the corridor also contribute to traffic calming and improved safety by providing clear visual cues, upon entry to this corridor, that the road character has changed and drivers are entering a town. Clear and attractive signage benefits businesses as drivers can more easily see them, especially when they are already driving more slowly. A consistent streetscape character should be considered along the entire corridor with the use of similar materials, light fixtures, and signage standards. Gateway signage such as carved stone walls, sculptural elements, or banners hung from light posts can be incorporated into the median throughout the length of this corridor.

Specific aesthetic attention should be paid to the roundabout at Potomac Farms Drive and the median at University Drive. These each mark a clear entrance to a new place. The roundabout is the entrance to town and provides a central space for a grand gesture. The median at University Drive marks the entrance to the core town and residential district. At each location, the lanes narrow and the speed limit is lowered. Gateway features at these sites will be visible upon approach, prompt drivers to slow down, and aid directional wayfinding and marketability for all destinations in these blocks.

Figure 31: Roundabout at Potomac Farms Drive



Signage

To improve safety for vehicles, pedestrians, and bicycles, signing improvements were recommended for the proposed road design. The improved signage will alert drivers to changes in traffic patterns and speed limits, pedestrian and bicycle crossings, as well as the entering of emergency vehicles onto the roadway. Signage recommendations for the corridor are shown in **Table 4**.

Table 4: Signage Recommendations

Section	Signage Recommendation
Potomac Farms Drive (See **Figure 32**)	• Add Reduced Speed Limit Ahead Warning Sign (W3-5) • Add Roundabout Circulation plaques (R6-5P) • Add Chevrons (R6-4) along roundabout • Add Yield signs (R1-2) prior to the entrances to the roundabout • Add combination Bike and Pedestrian Crossing signs (W11-15) and Downward Diagonal Arrow plaques (W16-7P) at crosswalks • Add new Speed Limit sign (R2-1) • Add Keep Right (R4-7) signs • Add Advance Turn Arrow Auxiliary signs (M5-3 & M6-2) to existing route signs
Maddex Square Drive (See **Figure 33**)	• Add new Speed Limit signs (R2-1) • Add Keep Right (R4-7) sign
Maddex Drive (See **Figure 34**)	• Add Pedestrian Crossing Signs (W11-15) and Downward Diagon Arrow Plaques (W16-7P) at crosswalks • Add Emergency Vehicle Warning System • Add Fire Station Advance Warning signs (W11-8) • Add new Speed Limit signs (R2-1) • Add Keep Right (R4-7) sign
University Drive (See **Figure 35**)	• Add new Speed Limit signs (R2-1) • Add Keep Right (R4-7) signs • Add combination Bike and Pedestrian Crossing signs (W11-15) and Downward Diagonal Arrow plaques (W16-7P) at crosswalks • Add No Motor Vehicle sign (R5-3) • Add Two-way Traffic sign (W6-3)

Figure 32: Signage Recommendations at Potomac Farms Drive

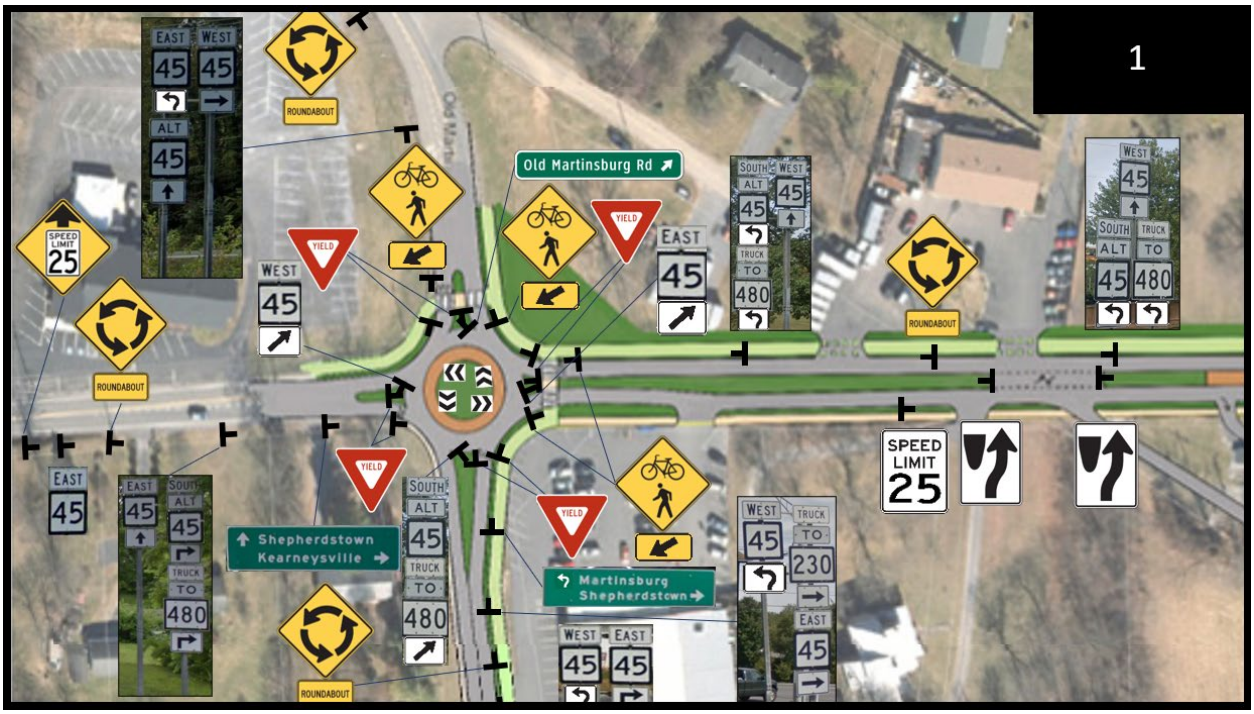


Figure 33: Signage Recommendations at Maddox Square Drive

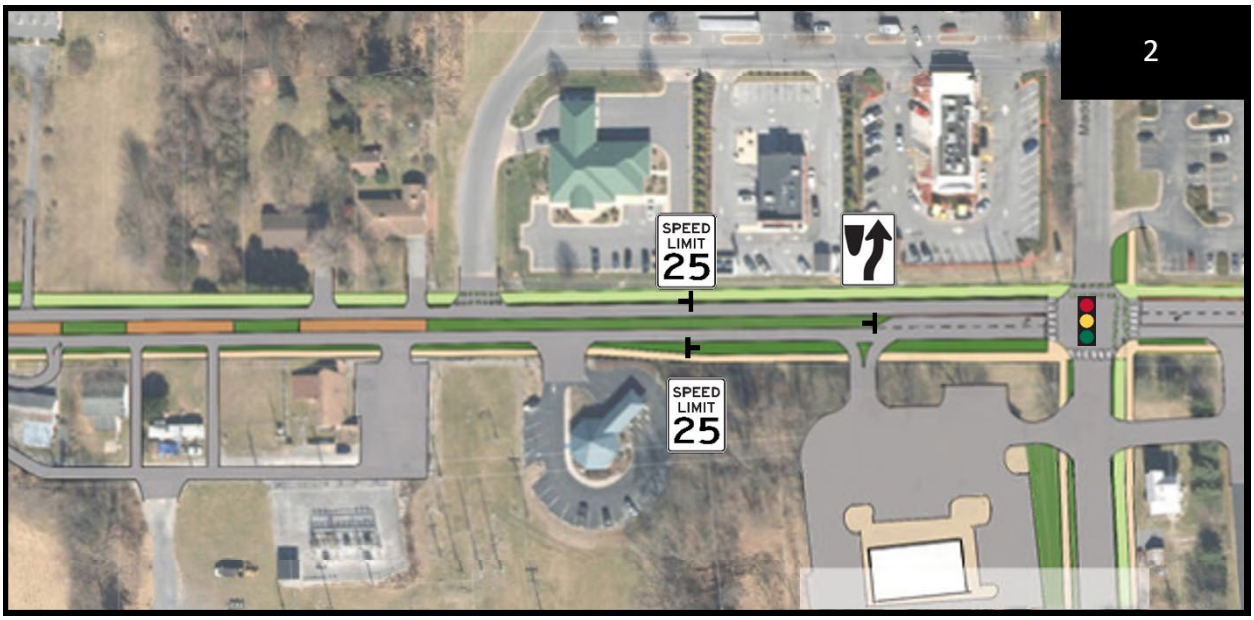
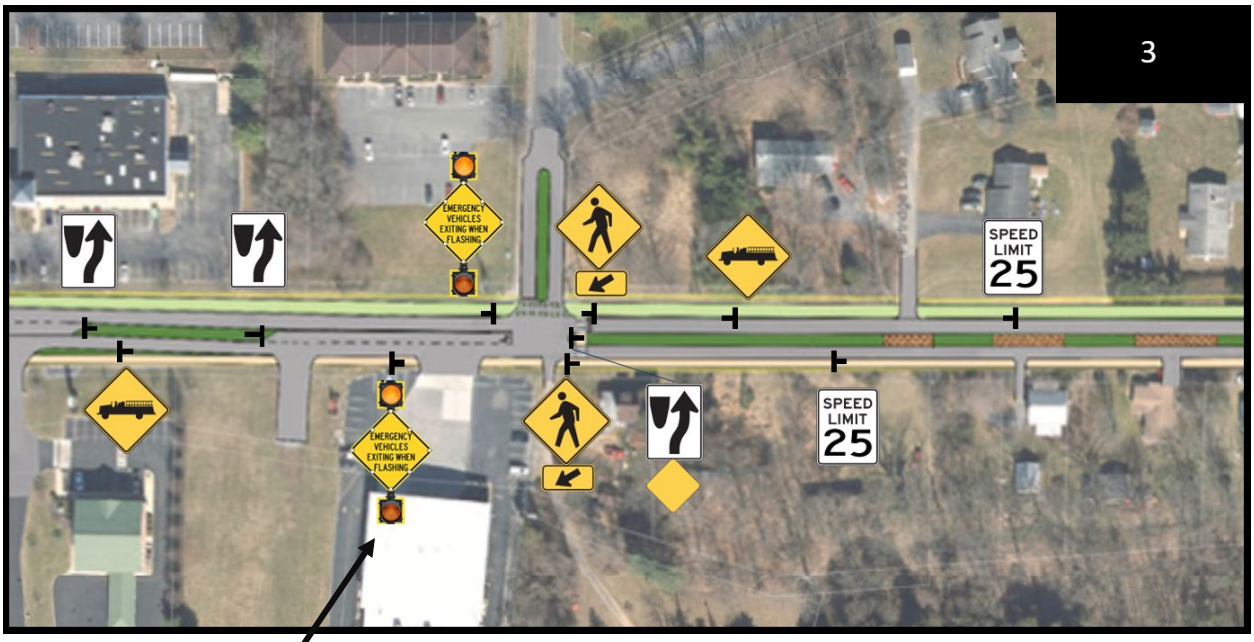


Figure 34: Signage Recommendation at Maddex Drive



SOLAR POWERED EMERGENCY VEHICLE WARNING SYSTEM

EMERGENCY VEHICLE WARNING ALTERNATIVES

Figure 35: Signage at University Drive

Funding Opportunities

The next steps to implementing and advancing the vision plan is securing funding for engineering design, obtaining environmental clearance, and construction. To achieve the goals of this CVP, the Corporation of Shepherdstown, along with their partners at WV Department of Highways (WVDOH), will need to identify and pursue state, federal, and private funds and grant programs. **Table 5** summarizes potential funding opportunities available.

Table 5: Funding Opportunities

Grant & Funding Programs	Description
Federal, State, & Local Opportunities	
Transportation Alternatives (TA) Program	Program funds nontraditional transportation projects. Projects include bicycle and pedestrian infrastructure and signals, traffic calming techniques, and lighting and safety-related infrastructure.
Recreational Trails Fund Program	The program provides funding for the construction and maintenance of both motorized and non-motorized recreational trails. Projects include pedestrian, bicycle, and equestrian facilities, in-line skating, cross country skiing, and off-road motorized vehicles.
American Jobs Plan	Federal transportation funding source that can be used for a variety of transportation projects that seeks to create opportunity, equity, and affordable access for communities.

Grant & Funding Programs	Description
Surface Transportation Block Grant Program (STGB)	The program provides flexible funding to State and local agencies that can be used on a variety of transportation projects. Projects include pedestrian and bicycle infrastructure.
Rebuilding American Infrastructure with Sustainability & Equity (RAISE) Discretionary Grant Program	The program funds multimodal, multi-jurisdiction projects that have significant local or regional impact, but are more difficult to support through traditional DOT programs.
Appalachian Regional Commission (ARC) Grants and Funding	Program grants are awarded to state and local agencies and governmental entities to advance economic development. Projects include bike and trail network projects that support art, culture, tourism, and community revitalization.
Federal Lands Access Program (FLAP)	Program improves public roads, transit systems, and other transportation facilities that provide access to, are adjacent to, or located within federal lands. Projects include bike/pedestrian planning, engineering feasibility studies, trail-related enhancements, and the rehabilitation, restoration, or construction of multiuse trails.
Private Grant Opportunities	
PeopleForBikes Community Grant Program	Program provides funding for bicycle infrastructure and advocacy projects in communities across the U.S. Projects include bike paths, rails, lanes, bridges, mountain bike trails, bike parks, BMX facilities, as well as campaigns to increase investment in bicycle infrastructure.

Areas of Further Study

During the 2-day workshop, several ideas and needs were identified in development of the conceptual design of this corridor. These include providing multimodal access to Shepherd University facilities, Shepherdstown Public Library, and new housing developments, as well as new roads at the new Sheetz and ROCS locations. An increase in demand along the corridor as a result of these ideas will require additional planning efforts to ensure safe access for vehicles, bicyclist, and pedestrians.

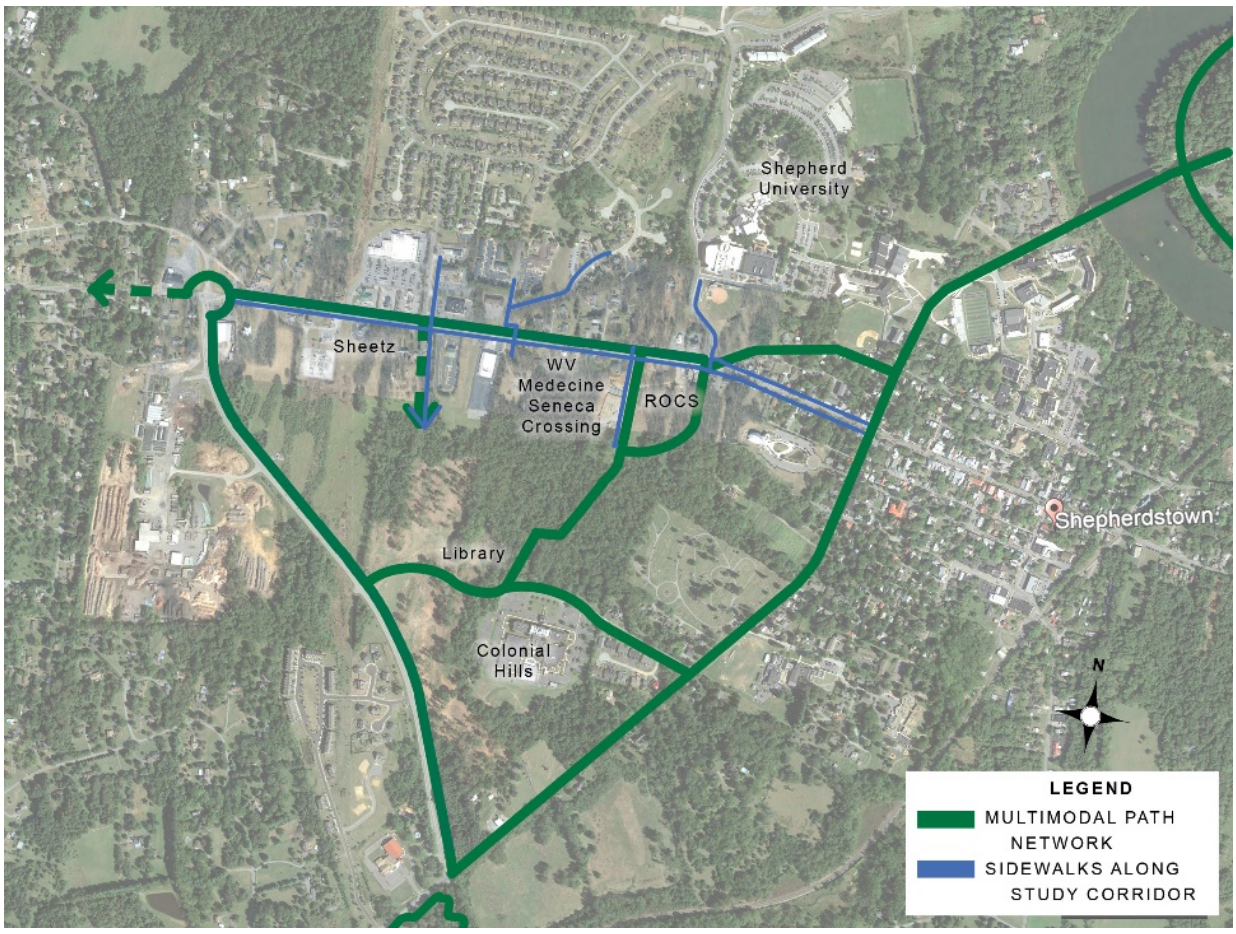
Multipurpose Trail Connections

While proposed enhancements for pedestrian and bicycle facilities will help to address gaps within the current multimodal network, there are opportunities to expand the pedestrian and bicycle network.

Figure 36 illustrates an opportunity at University Drive to design a new streetscape that will connect the current bike lane to West High Street while diverting bicyclist away from the narrow streets with limited shoulders in the historic district of Shepherdstown. This will provide a safe and easy access to North Duke Street and other bike path connections. **Figure 37** highlights potential opportunities within the multimodal network that would further strengthen connectivity to Shepherdstown and neighborhoods within the study area as well as tie into the C&O Canal Towpath in Maryland.

Figure 36: Rendering of Sidewalk Connection along Corridor

Figure 37: Potential Trail Connections within Study Area



Maclaine & University Roads Traffic Signal Study

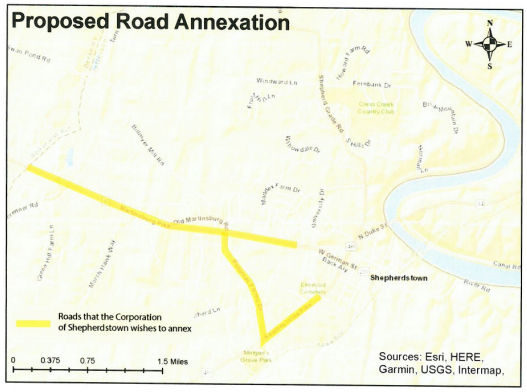
A traffic signal study is recommended for the intersections at Maclaine Way and / or University Drive. The opening of the WV Medical Clinic and ROCS as well as the potential repurpose or development at the old Sheetz location is expected to increase vehicle and pedestrian traffic along the corridor. A traffic

signal study will provide a detailed review of the intersections, turning movements, and pedestrian activities, which will determine if traffic signals are needed for one or both intersections.

Corridor Speed Limit Study

The proposed reduction to 25mph along the corridor will require a speed limit study. This will ensure best practices and methodologies are used in establishing the speed limit. They include engineering impacts along the corridor due to the implementation of the traffic roundabout and intersection design changes, traffic signal optimization, and bicycle and pedestrian safety considerations.

Figure 38: Shepherdstown Road Annexation Request



The Corporation of Shepherdstown in seeking to annex Martinsburg Pike from the municipal limits to the Berkeley County line that includes the corridor limits. The proposed annexation also includes Potomac Farms Drive and a section of Kearneysville Pike, as shown in **Figure 38**. At the time of this report, the Shepherdstown annexation request was still in negotiations with the WVDOH. The annexation will allow Shepherdstown to enforce speed limits and will include a maintenance agreement for the corridor.

Links & New Roadways

Growth and development around the corridor will increase multimodal demand and require additional connections to allow for access to the new library, the university, and new housing in the southern part of the study area. Future planning and development efforts are on-going and the new connecting facilities for Sheetz and ROCS (Maclaine Way) provide opportunities to relieve traffic from the corridor and additional to access Potomac Farms Drive. The dashed red lines shown in **Figure 39** are conceptual only.

Figure 39: Conceptual Connections to Potomac Farms Drive