Morgantown - Monongalia
MMMPO Metropolitan Planning Organization

Complete Streets

University Avenue Corridor Study

Project Workbook

Complete Streets

In Partnership With:

City of Morgantown West Virginia University West Virginia Division of Highways

"We would like to thank ALL of those who participated in the development and creativity of this Plan. It is through them and their collective efforts that the recommendations will move forward towards implementation. Thank you!"

Acknowledgement. *This Project is the product of many hands, including the following and the many citizens, residents, businesspeople, students, faculty and others that gave generously of their time and talents, including the following people.*

Advisory Committee
- Brian Carr (WVDOH)
- Frank Scafella (Sunnyside Up!)
- Elwood Penn (WVDOH)
- Randy Hudak (WVU)
- Ron Justice (WVU)
- Matthew Latimer (WVU)
- Fouad Shoukry (WVDOH)
- Maria Smith (Mountain Line)
- David Bruffy (Mountain Line)
- John Thompson (WVU)

Morgantown-Monongalia MPO
- Bill Austin (Project Manager)
- Wesley Nugent (City Council)
- Jennifer Selin (City Council)

City of Morgantown
- Chris Fletcher (Development Services)
- Damien Davis (City Engineer)

Stantec Consulting Services Inc.
- Brian Aldridge
- Mike Rutkowski
- Scott Lane
- Max Bushell
- Matt Noonkester
- Michelle Peele
- Kenny Thompson
- Andrew Kohr
- Christa Greene
- Kellie Reep
- Jeff Weller

Table of Contents

Morgantown Public Works Department installing traffic signals at the Stewart Street and University Avenue intersection in 1962.

- Source: Tinnell, Shannon Colaianni, Morgantown, 2011, page 24.

Executive Summary

Nestled along the Monongahela River, Morgantown, West Virginia is no stranger to transportation obstacles. In the earliest times since settlement, the Town suffered from a lack of transportation options. Harsh winters that closed roads and an untamed river contained growth in the area. The year of 1886 brought major changes to the area including railroad and a series locks and dams taming a then wild river. These transportation options opened trading to nearby major cities and bolstered the economy for the area with large industrial facilities. A year later Morgantown gained additional reasoning for growth with the birth of West Virginia University. The University has continued to attract applicants nationwide offering courses of study in education and medicine. The influx of jobs and education options sparked growth for the community. By 2010, 28, 827 people call Morgantown home. Proper planning for future growth is needed to support this diverse community.

The Town of Morgantown undertook the development of a Corridor Study for University Avenue (from Patteson Drive to Beechurst Avenue). The corridor area runs 1.9 miles and is immensely diverse in land use and appearance, including commercial nodes near the southern termini changing to a campus and residential setting along the way to a commercial center at the north. Along with diverse uses demands on the streets are diverse with sidewalks, public transportation and bicycles all moving through the public rights-of-way. The overall goal of the project is to improve the corridor for safer and smoother automobile, pedestrian, and bicycle flows. The improvements will also create a more aesthetically pleasing environment that supports residents and future development.

"The Goal of our project is the promotion of safe, beautiful and more efficient travel for every user in the University Avenue Corridor, and in so doing support existing communities as well as promoting favored redevelopment in the future."

Economy Glass Works, 1908

- Source: Lewis Hine, LC-DIG-nclc-01178, Library of Congress Prints & Photographs Division, Washington, DC, 20540

Photo taken in front of Commencement Hall, removed in 1965 to make way for the Mountainlair Student Center in front of Grumbein's Island on University

Project Study Area

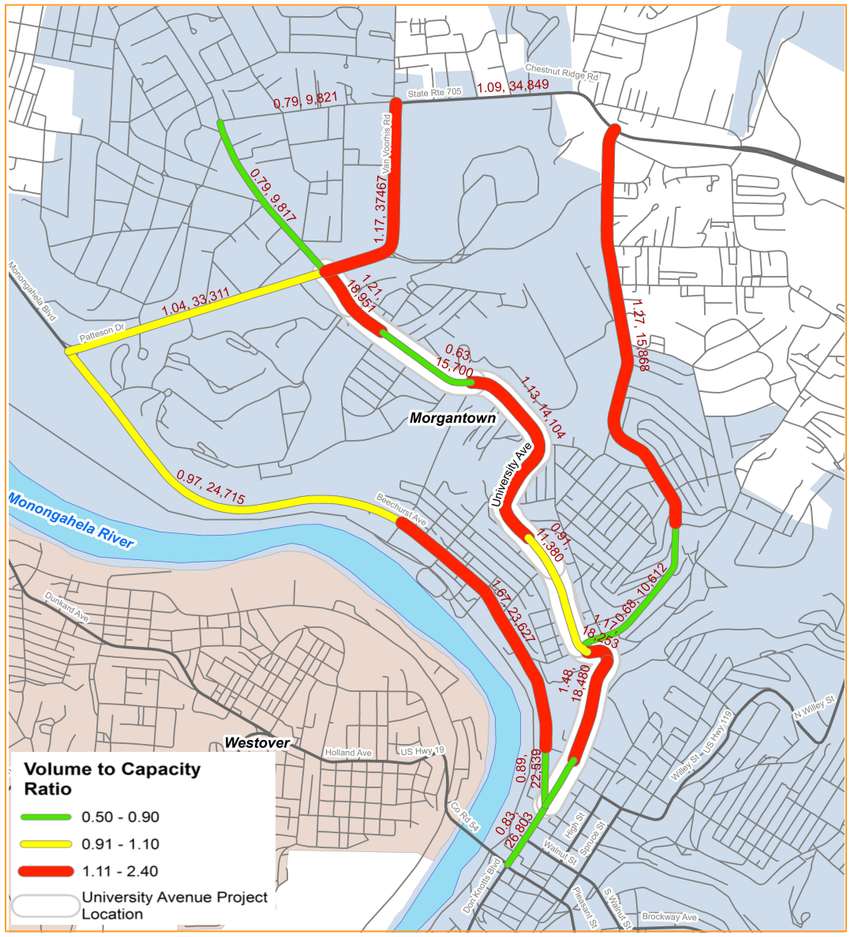
Performance

Understanding the demographics and dynamics of an area helps define the context for recommendations that are best suited for the community. The University Corridor is dominated by students from West Virginia University and they rely heavily on walking, biking, and public transportation to and from the campus. A Quality/Level of Service assessment was completed to understand how the corridor currently operates for multi-modes of travel. The study indicated that areas along the corridor scored comparatively lower to other areas due to the lack of sidewalks, narrow shoulders widths, and no dedicated bicycle travel facilities. The bicycle score would be markedly worse if the travel speeds were higher on the roadway, but could be much improved if wider shoulders or separation existed between the roadway and the bicycle path of travel. Fairly high transit frequencies contribute to a good score, although better stop facilities / amenities would elevate the score still higher.

18%

of work trips in Morgantown are made by walking

A similar study was completed for vehicles to understand how volumes of traffics are being handled within the study area. Results indicated the portions of University Avenue as well as other area roadways are experiencing extensive degrees of congestion. The 8th Street/University Avenue intersection and the College Avenue/University Avenue intersection encounter substantially more delay than any other location studied. All of this information was used to help identify issues and design specific solutions during the analysis phase of the study.



Roadway Vehicular Capacity compared to Volume (V/C Ratio) – green indicates capacity to spare, red indicates operating over capacity.

Past Planning Efforts

A review was completed of past, adopted plans and policies that may influence recommendations stemming from the current study. The following are plans/polices reviewed and considered during the development process :

- City of Morgantown Comprehensive Plan (2013)
- City of Morgantown Downtown Strategice Plan (2010)
- City of Morgantown Pedestrian Safety Plan (2010)
- City of Morgantown Bicycle Plan (2012)
- Greater Morgantown Metropolitan Planning Organization Complete Streets Plan (2008)
- Feasibility Study for Grumbeins Island (2011)
- Morgantown Monongalia MPO Long Range Transportation Plan (2012)
- Morgantown Monongalia MPO Bicycle Plan (2013)
- University Avenue Pedestrian Crossing Project

Public Engagement, Planning Themes Issues and Value Statements

The public engagement events reared several common themes that the stakeholders and citizen felt were issues that needed to be addressed within the corridor. The following are the common themes that prevailed:

Theme #1: The Maintenance and Appearance of the Corridor is Lacking.

Theme #2: The Safety of Pedestrians, Cyclists, Transit Patrons and Automobile Drivers can be improved.

Theme #3: Constraints Placed on the Corridor from Narrow Rights-of-Way and Building Setbacks, as well as Topography, will Play a Key Role in Limiting Traditional Capacity Expansions.

Theme #4. Redevelopment Opportunities Along the Corridor Need to be Kept in Mind as an Important Subtext to Traditional Transportation and Mobility Concerns.

The following are five Issue and Value Statements building upon the concerns and comments from the public meetings as well as the project team's field data collection.

Issue #1: Pedestrian and Bicyclist Considerations Come First

Value Statement: Although automobile travel is substantial – over 18,000 vehicles per day in some places – the corridor is heavily used by students of West Virginia University and residents of the surrounding communities. The vulnerability of these users is high compared to automobile drivers and passengers. Furthermore, substantial increases in carrying capacity of the roadway for automobiles will be costly, potentially damaging to existing developments, and create an unfavorable aesthetic along the corridor. Grumbein's Island and its high level of pedestrian and automobile conflicts is especially important to call out, but the entire length of the corridor benefits when solutions favor people choosing to use the very limited space for non-automobile travel options. It is better to create an environment where walking and biking are not only encouraged but make the most sense for traveling.

Issue #2: The Safety of All Users is Critical

Value Statement: Hand-in-hand with creating pedestrian- and bicycle-friendly environments is the concept that the corridor should be safe for everyone to move across and through. Many of the comments received from the public invoked safety-related language, whether it be for a lack of lighting, unsafe design, or poor accommodations for pedestrians crossing the street. The most outstanding example of which is that three-fourths (76%) of the Project Symposium respondents felt that University Avenue is "unsafe" or "very unsafe" today. As traffic pressures mount from redevelopment and intensification of uses within and without the corridor, these safety concerns are likely to increase.

Issue #3: Automobile Delays in the Corridor Should be Reduced *if* the Actions Taken are not in Conflict with Other Values

Value Statement: Although pedestrians, cyclists and overall safety come first, ensuring the smooth, if not high speed, movement of cars in the corridor is very important. Frequently, traffic studies focus almost exclusively on quantifying the effects of recurring delay, and then only for cars, not people. One way of integrating across the Issues and Values identified here is to account for traffic delays created by automobile crashes, since any lane closure or partial closure is felt acutely due to the limited range of options and constrictive terrain. Another suggestion is to account for the delay and quality of service incurred by people, whether in automobiles, on foot, cycling, in transit vehicles or using any other mode of transport.

Issue #4: The Corridor has to Support Surrounding Uses through Attractive Design

Value Statement: University Avenue is more than how rapidly it can move people and things through space, it serves as a way of getting to jobs, upholding land values, encouraging favored redevelopment, and making sure that everyone gets to class before the bell rings. Creating an aesthetic environment through the use of improved streetscaping details and repair/maintenance is vital to this objective.

Issue #5: Supporting Transit is the Future of the Corridor

Value Statement: The space limitations and future development trends of the University, downtown core, national preferences, and the corridor itself are pushing towards a heavier reliance on public transportation. Morgantown has charted a course towards investment in public transportation service of a high quality; updating the PRT and moving towards a BRT - type of service are now high on the list of infrastructure and service needs. In turn, environments that address the first four Issues are well on the way to creating transit-favorable environments.

Complete Street Framework

The premier challenge of this project is balacing the needs of the community in a confinded physical space. Though the project carries constraints, it is important to recognize that all streets serve a combination of functions, all of which are intimately tied to the travelway, pedestrian, and building zones. The basic context zones of streets help define the role of the street and its design throughout its lifecycle.

A core assumption was gaining an understanding of the latest thinking of how properties in the vicinity of University Avenue would develop and re-develop. Anticipating future development is always challenging, but the assumptions used in the Study relied on the input of professional planners and businesspeople that work with proposed development actions every day. The project team also considered how existing development parameters like building setbacks from the street, allowable heights/density, design elements (e.g., to encourage and support walking and transit use) and market forces might change demands on University Avenue.

The consultant was tasked with working with the City to develop sound development practices that may include regulatory measures such as right-of-way encroachment measures, access management guidelines, spacing standards and protocols for development and redevelopment. Early coordination resulted in identifying a number of refined objectives:

1. A primary concern is to arrange setbacks (or build-to lines) to accommodate future widening of the roadway and intersections in the corridor.
2. Manage intersection spacing and driveway spacing to help preserve roadway capacity and reduce crashes and crash-related delays.
3. Consider existing zoning and future zoning in terms of the impacts to the demand for roadway capacity, in part conducted through an independent future year assessment in *CommunityViz*™ software.
4. Address how future commercial nodes of development in the corridor might differ from each other with respect to design, density, and range of services/products offered to the community.

Best Practice Development Guidance

Recommendations are included to ensure that the character of the University Avenue Corridor retains and promotes historical character; creates desirable economic growth through infill development and redevelopment; and preserves transportation mobility and safety for every type of user while promoting a density and complementary mix of uses that support fixed-route transit service. This information is provided as a policy directive, but is not adopted as part of any overall ordinance changes by the City of Morgantown. Additional review through the normal process required of ordinance revisions will be required to refine and adopt the final language into the code of ordinances.

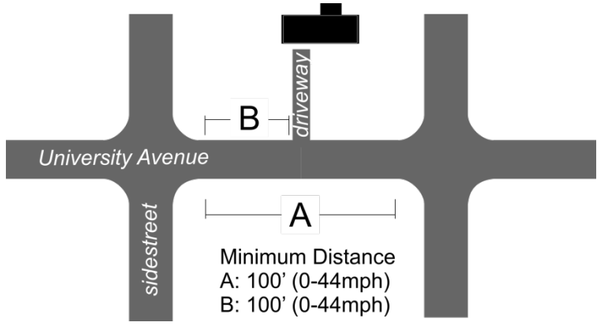
Best practice considerations are comprised of two tiers and two segments, as defined as follows:

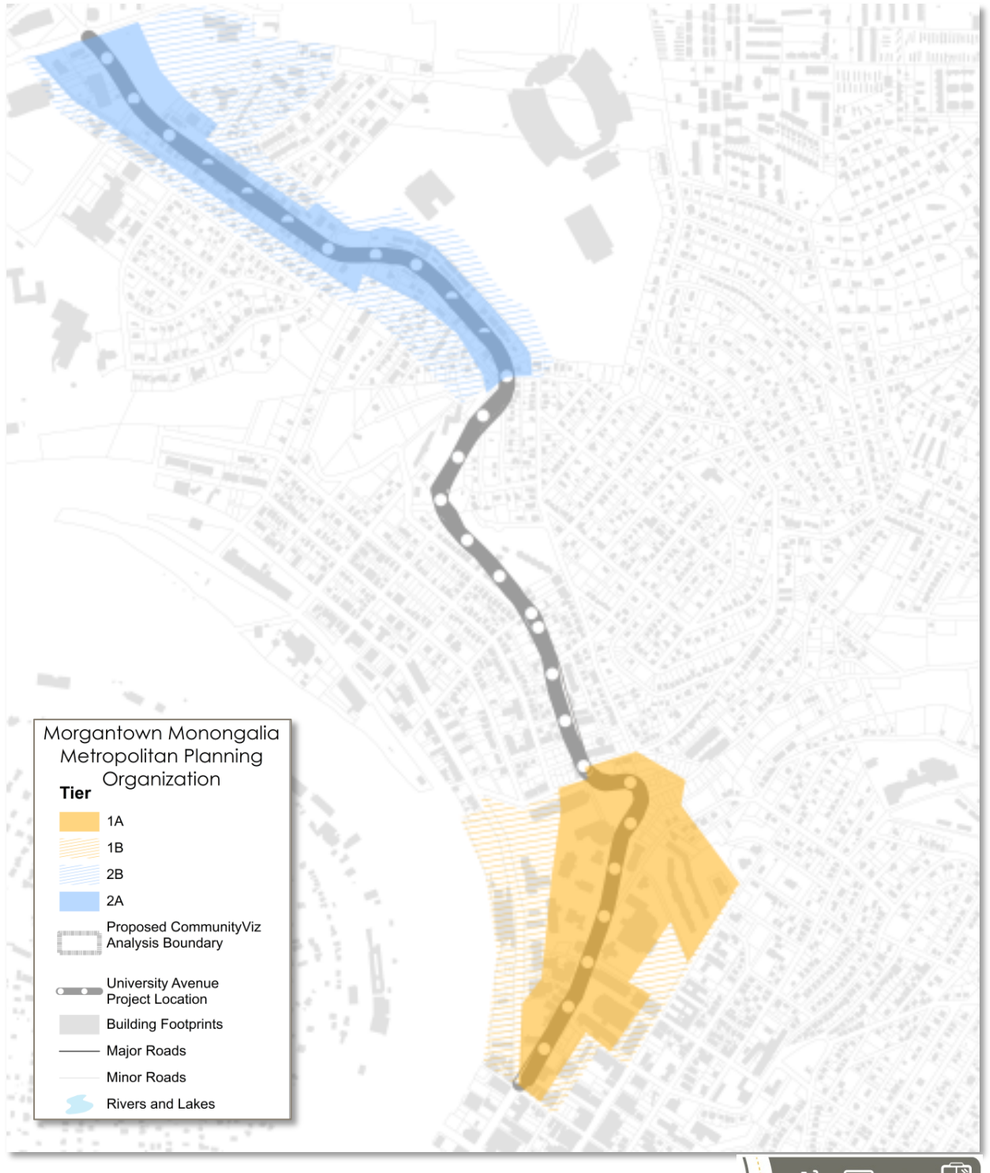
Segment A: University from Beechurst Ave to Campus Drive

Segment B: North Street to WV 705 (Patterson Ave)

Areas designated as Commercial Nodes should have requirements with the specific purpose of creating high-quality, integrated development patterns that support commercial activities targeted towards the area's residents and employees. Potential provisions that should be pursued under the overlay district include: Frontage Design, Retail Frontage, Awnings and Galleries, Vista, Cross-Block Passage, Building Preservation, Corner Lot Frontages, Height, Off-Street Parking, Bicycle Parking, and Signage.

Provisions to be considered for Tiers 1 and 2 include: Building Aesthetics, Pedestrian-Scale Lighting, Off-Street Parking Relocation, Street Trees, and Driveway Spacing.



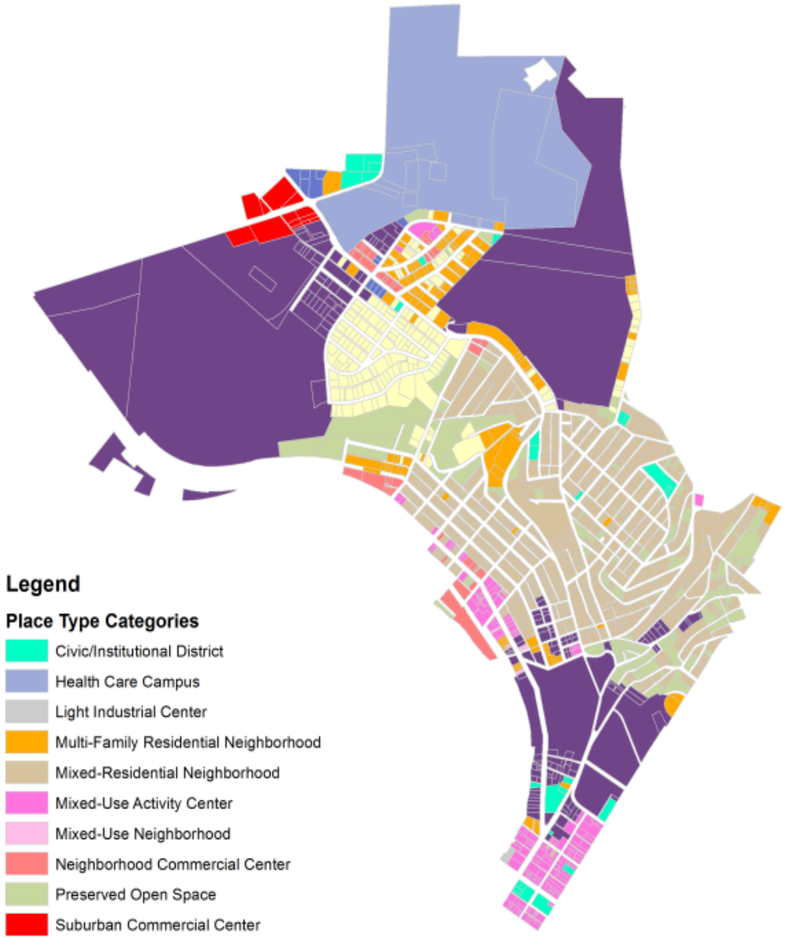


Development Status and Impacts

CommunityViz™ scenario planning software used during the development to evaluate impacts related to future development. Based on these results of the scenario planning, the development/redevelopment is expected to have a profound impact to the study area. Population is expected to double within the study area, mainly due to the 150% increase in multifamily dwelling units. Total employment should increase a moderate 15% due to the influx of office, institutional and retail. Impacts to infrastructure may be minimal with the total peak hour trips generation of approximately 3,500 PM trips. Water and sewer demand increases by 2.15 MGD and 1.86 MGD, respectively.

Design Considerations

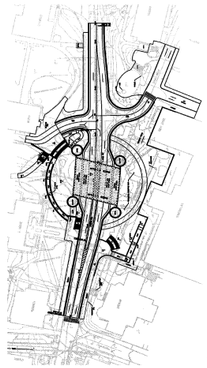
The development of recommendations for University Avenue begins and, in some respects, ends with the constraints imposed by both the width of the available right-of-way and the often-steep topography. These conditions, coupled with heavy and increasing usage of the corridor, contribute to higher crash rates as well as concerns both on and near the University Avenue Corridor. Overall, this study recommends several laneage improvements to a select number of intersections along University Avenue.

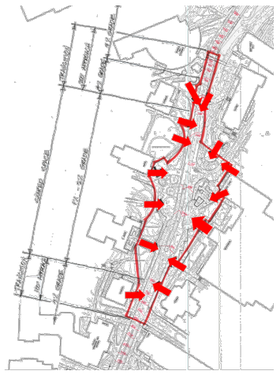


Land Use Place Types

Grumbein's Island

This area of University Avenue in front of Mountainlair Plaza, has been a continual frustration for all local stakeholders. WVDOH owns and operates this section of the roadway. Over 18,000 vehicles per day conflict with thousands of pedestrians crossing the street to reach the Mountainlair student center. Many previous planning studies have been completed in the past on this area. Three design options were reviewed in the Plan. Two of the options are from previous feasibility studies and the third is a new design for consideration.





Option #1: Pedestrian Plaza Bridge/Tunnel Separation. A feasibility study was conducted by Alpha Associates in 2011. The study was commissioned by WVU and the Morgantown Monongalia Metropolitan Planning Organization (MMMPO). The analysis included several options for a grade separation for the plaza that would essential separate pedestrian and bicycle flow from vehicular traffic. The study include pedestrian and traffic data collection, seven grade-separation alternatives and cost estimates. Average construction cost is $10.4 million.

Option #2: Pedestrian "Open Space" Intersection. The WVU commissioned another study in 2014 to evaluate a less costly alternative for addressing the problems at Grumbein's Island. This alternative concept is called an "Open Space" intersection, much like the European style intersection that allows free movement by all modes. The premise is simple. Grumbein's Island would be redesigned to act like a large courtyard, free of obstructions, signage and barriers. Vehicles, pedestrians, bicyclists and buses would interact freely. Right of way would not be dictated by a traffic signal, sign or barrier. That said, travelers, whether by four wheels, two wheels or by foot would pass through the area on a first-come, first-serve basis. The opinion of probable cost of construction cost is $5 million.

Option #3: Pedestrian "Raised Intersection" Gateway

A third option was developed as a part of the public design workshops conducted in September 2015. Instead of allowing pedestrians and bicyclists to cross anytime and anywhere, this option dictates the timing and location of pedestrian crossings. It utilizes a raised plant-able median to channelize pedestrians to the preferred crossing location in front of the Mountainlair. A two-phase traffic signal would be installed at this location, actuated by pedestrians or bicyclists that desire to cross this redesigned, wide intersection. During peak periods (class turnover), the pedestrian phase would get adequate time (e.g., 45 seconds) to allow the desired amount of pedestrian crossing. Traffic would receive a comparable time (two minutes) of green phase to allow the queue to dissipate. During off-peak periods (i.e., between classes and after school hours), the green time for the pedestrian phase would be less. The opinion of probable cost for this option is approximately $3 million and represents the most cost feasible option of the three alternatives.

The Loop

The Loop project is a potential project under consideration by the University. It is the section of University Avenue represented by the sharp horizontal curve around WVU School of Business near Falling Run Road. The purpose of the Loop project is to enable the university to improve walking conditions through the campus to better utilize the campus footprint, ultimately, to improve the connection of all modes. WVU is considering an expansion of the campus and to enhance pedestrian, bicycle and roadway connections. In essence, this improvement will open up the Quad and create a sense of place. Total construction cost for the Loop is $10.2 million (See Appendix B for details).

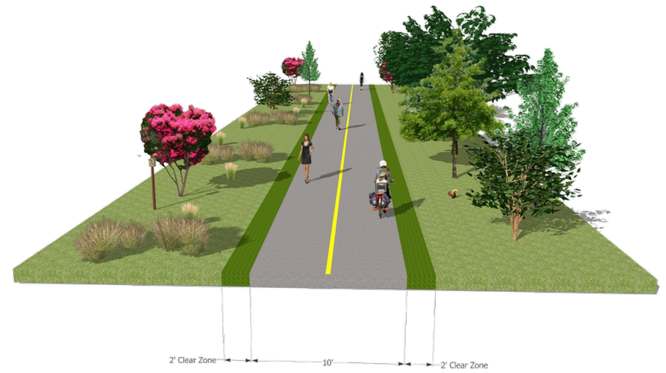
Campus Connector

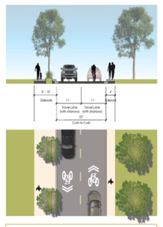
The connector is a natural landscape and gravel multiuse path that provides an alternative route for bicyclists and pedestrians between the residential area south of University Avenue and the Evansdale Campus and boasts one of the best views of the river in the City. More so, it provides a recreational amenity in an area that is well defined by development and steep slopes. The issue with the Campus Connector is that its path has never been defined very well, often crossing through privately owned property. The existing grade along this gravel path is typically greater than 20%. Total cost for the project is $2,556,000.

Transit Integration Strategies

Three public transportation options are discussed in the Complete Streets Corridor Report.

- ***Fixed Bus Route (Mountain Line Transit Authority***. This system provides fixed bus route services to the Morgantown region, WVU as well as University Avenue. Three routes provide service along University Avenue between Beechurst Avenue and WV 705. The Transit Administration identified the need for high quality bus shelters along the corridor to provide a safe haven for riders as well as bus information and schedules.
- ***Personal Rapid Transit***. This system is currently available to citizens in the study area. Powered by electric motors, the computer-driven cars arrive at your station within five minutes of pushing a signal button. The system now connects the main downtown campus with the Morgantown central business district and the two suburban campuses along a linear alignment. A Master Plan for updating and expanding the system was completed in 2009. Based on this plan, the system is currently undergoing a major upgrade at a cost of approximately $125 million spread over approximately five years. The upgrade includes the technology control system, the power system, and the cars. The cars will be the last phase performed. The infrastructure improvements are primarily focused on the track heating system.
- ***Bus Rapid Transit.*** The concept of a BRT line within the study area was introduced by staff members of the Mountain Line Transit Authority to connect both campuses and the PRT, operating as a PRT Extension. This new service would provide needed relief to University Avenue as well as Beechurst Avenue. In effect, this service would operate with five-minute frequencies over a 10-minute trip from one end to the other. The new BRT service is estimated to cost $4.1 million (startup cost), annual operating cost of $500,000. A future study should be commissioned that addresses the following outstanding issues relative to BRT feasibility.
    - Roadway infrastructure improvements (constructability and cost) including retrofit of existing facilities and new location
    - Vehicle displacement impacts along specific routes utilizing bus only lanes
    - Right of way and access requirements for vehicular mobility and property
    - Return on Investment, including loss of existing fixed-route ridership
    - Passenger facilities and information technology improvements





New sidewalks, context-sensitive bicycle treatments, and a University Connector route are some of the suggested used in the corridor recommendations.

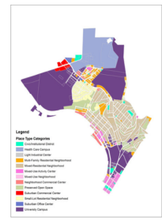
TREAT WALKING AS THE MOST IMPORTANT ISSUE TO ADDRESS

The addition of street trees and better lighting, as well as recommendations to replace crumbling pavement and sidewalk, are integral to our project.

PRESENT A GREAT IMAGE TO RESIDENTS, VISITORS, AND BUSINESSES

Proposed crossing improvements at a number of locations, and a complete re-design of Grumbein's Island and "the Loop" area, are key recommendations.

REDUCE CRASHES AND CRASH-RELATED DELAYS



Anticipating traffic impacts from new development and proposing design standards that ensure cost-effective construction were two important points.

BETTER INTEGRATE THE ROAD WITH THE ADJACENT COMMUNITY

How the Design Team Addressed the Major Project Themes

Complete Streets Design Theme

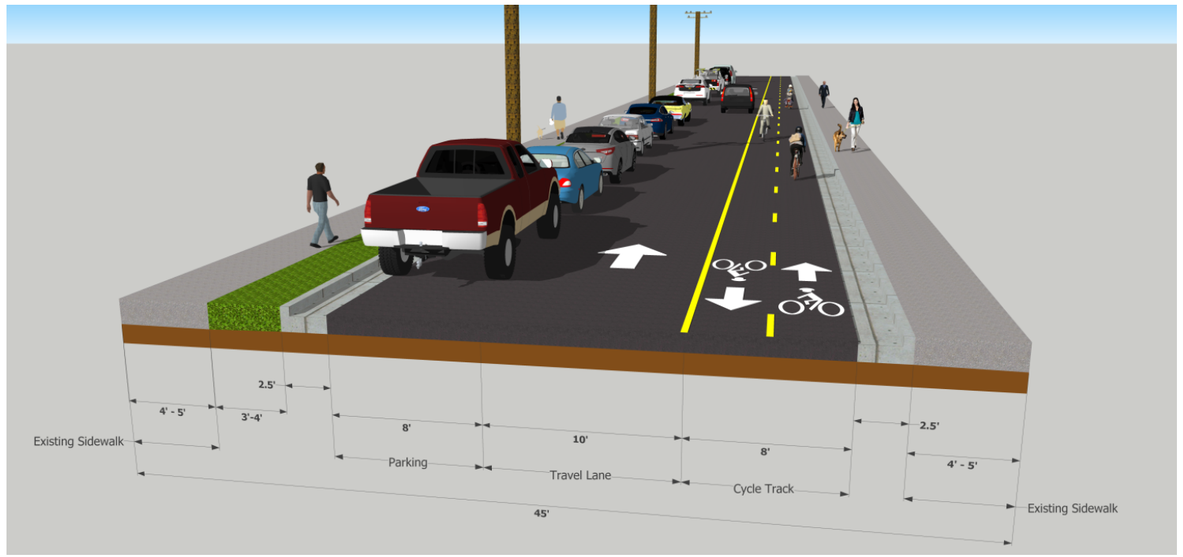
The input from the public, technical analysis of the project team members, and the physical realities of University Avenue all dictated the elements that were incorporated into the final corridor concept design.

Preferred Concept Plan

When developing the concept designs for University Avenue Complete Streets Corridor Study, several design considerations were assumed to create the highest value facility while minimizing construction and traffic control impacts. Because this is a built environment and a retrofit of an urban arterial, the challenges were great. Traditional design practices may be impractical and limited by the existing rights of way and challenging terrain. However, redesigning University Avenue to accommodate a higher level of bicycle and pedestrian activity, mobility and safety is paramount.

The following design criteria were used when designing the University Avenue improvements.

- Terrain: mountainous
- Design Speed: 30 MPH
- Lane widths: 11-foot wide preferred, 10-foot minimum (matches existing based on existing geometry from Campus Drive to Third Street/ Beverly Avenue)
- Cross slope: 2%
- Shoulder widths: 2 feet wide, curb and gutter
- Bicycle lanes: 5-foot wide bike lanes preferred, 4-foot minimum
- Sidewalks: 5-foot wide sidewalk preferred, 4-foot minimum (from back of curb), wider sidewalks desirable where space allows
- Grades: Maximum 10% grade (matches existing based on existing geometry from Campus Drive to Third Street/ Beverly Avenue)



Preferred Access Plan, Showing Intersection Hot Spots and Typical Cross-Sections

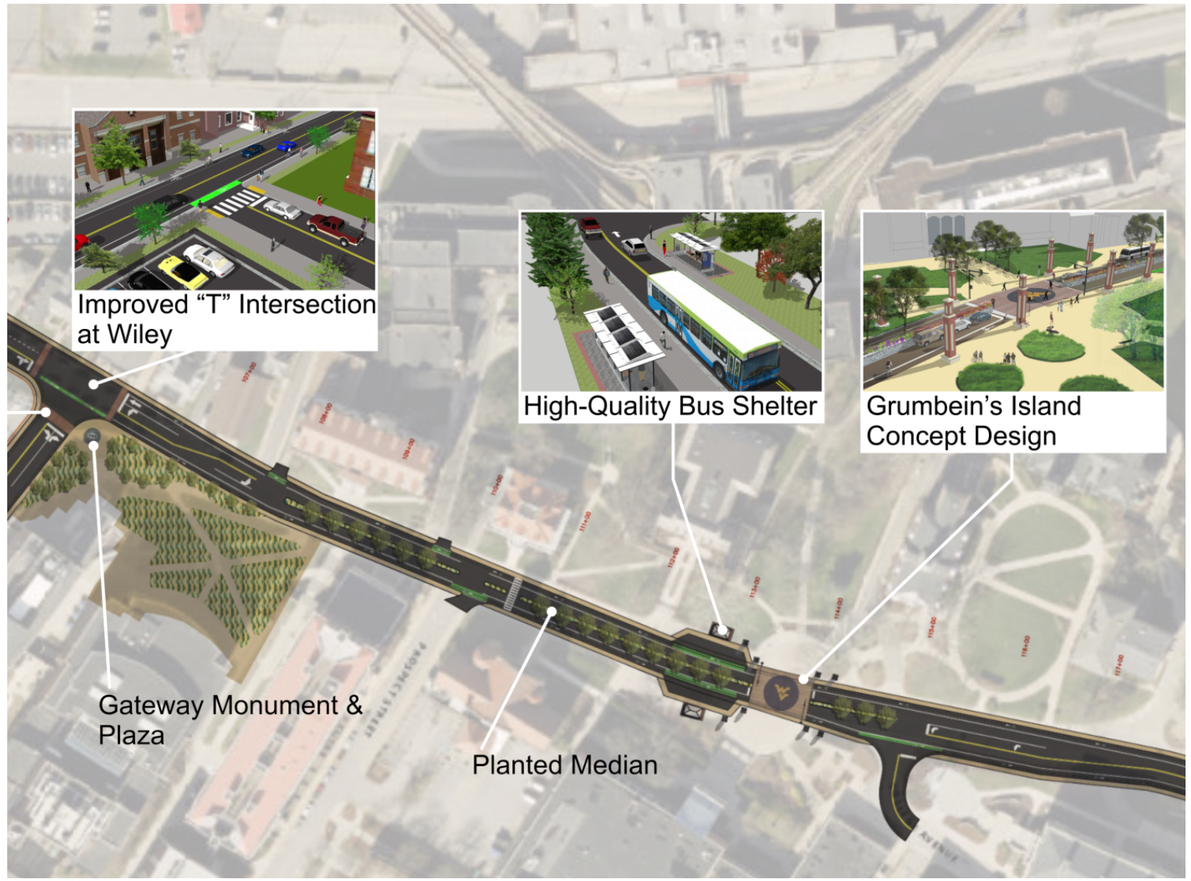
Concept Designs

The Concept Designs (as illustrated by the figure to the right) represent approximately 20% design plans for the entire University Avenue corridor. All multimodal elements for vehicular, bicycle, pedestrian and transit have been integrated into the Concept Designs. Intersection treatments and laneage improvements are included in these design plans. See full report for a complete set of the Concept Designs.

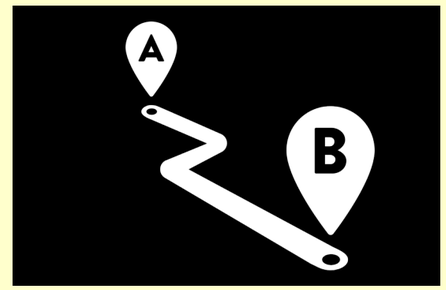
Construction Costs & Phasing

The ultimate success of the University Avenue Complete Streets Corridor Study rests on the ability of local and state officials and leaders to carry out the recommendations of the plan. This effort is made easier by describing a series of defined steps — or action items — to move the process forward. However, defining the cost and potential funding mechanisms will allow a framework or "blueprint" for implementation. From the outset of the study, a key objective was to develop cost-effective recommendations (at a variety of scales) that set the stage for additional improvements to University Avenue in the future. With a diminishing return on the dollar, all efforts should focus on creating an environment conducive to change along the University Avenue corridor.

The opinion of probable cost for constructing the 1.9 miles of improvements is approximately $27.8 million.



project & purpose



Project and Purpose

While High Street may arguably be the most photographed street in the City, University Avenue is one of the few major arterials that binds the Morgantown community together, thanks in large part to the challenges presented by topography and water that have shaped the City since its formation. Downtown, student housing, classrooms, commercial developments, and landmark communities like Sunnyside, Suncrest, and First Ward all have residents and visitors that depend on the access that University Avenue provides. The demands on this street are also diverse, with sidewalks nestled against the curbline, and public transportation and bicycles all moving through and across public rights-of-way. In many places these uses compete with cars for limited space, due again to constraints imposed both by topography and history.

The corridor considered for this study stretched from Beechurst Avenue in downtown Morgantown to WV 705 (Patteson Drive) near the West Virginia University Alumni Center. This segment is 1.9 miles long, but changes immensely in use and appearance along its length (Figure 1). Beginning at Beechurst Avenue, University Avenue provides access to diverse and urban land uses, changing to a campus setting as it winds its way north through the University. The Avenue then becomes a densely inhabited residential street, then briefly turns – sharply – into a scenic route following a ridgeline before becoming a dense residential corridor again. Finally, just before University Avenue meets with WV Highway 705, it becomes an urban commercial corridor, with nearby land uses taking advantage of the high degree of accessibility that both roadways provide.

Purpose of the Project: This study contains information that supports the original problem statement conceived during the project scoping process; namely, that the University Avenue Corridor, while one of the lynchpins to many parts of the community, needs to be improved by creating a gateway to downtown Morgantown and between both University campuses. It also needs an increase in capacity and/or operational improvements for all modes. Lastly, University serves as a critical parallel arterial to the congested Beechurst Avenue corridor as well as serving a growing population (5,000 new beds of planned development) surrounding the facility. University Avenue provides an important connection to crosstown facilities like Falling Run and Stewart Street and provides for the distribution of traffic going to and coming from downtown throughout the network. Ultimately, improvements are needed to make University Avenue more pedestrian- and bicycle-friendly, promote safer/smoother automobile traffic flows, and create a more aesthetically pleasing environment that supports residents and the development of quality commerce. Primarily, this study had to respect past efforts at designing solutions in the corridor, but move forward to create a uniform vision for University Avenue.

The ***Project Workbook*** begins with a historical overview of the corridor, moving into recent, past planning efforts and how they pertain to the current study. Demographic and development trends will also be discussed, before moving into data collection efforts not only from a technical standpoint but also from the viewpoints of the stakeholders and participants of early rounds of engagement. The report identifies five issues and accompanying value statements, and an overarching mission statement. These statements were used to subsequently produce performance measures that define how various recommendations contribute to the success in achieving this vision. The remaining sections of the Workbook focus on specifc corridor improvements

The Project Team, which included representatives of the City, MPO, University, WVDOH, neighorhoods, and the private consultant (Stantec Consulting Services Inc.) invites the reader to contact us for more information:

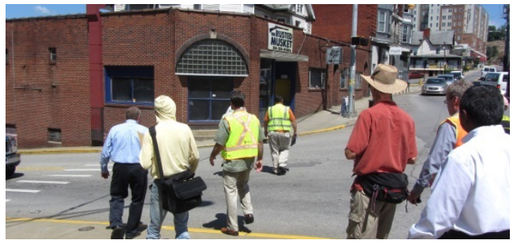
Bill Austin, AICP, Executive Director of the Morgantown-Monongalia MPO (http://plantogether.org):
(304) 291-9571 / info@plantogether.org

Figure 1: Project Study Area

University Avenue in a Historical Context

Morgantown, the County Seat of Monongalia County, West Virginia, is nestled along the Monongahela River in the Appalachian foothills. First settled in 1772 by Colonel Zackquill Morgan, the Town was not formally chartered by the State of Virginia (as West Virginia was not acknowledged as a separate state until after the Civil War) until 1785, when it was christened "Morgan's Town." The area remained predominantly agricultural until late in the 19th Century, mostly as a result of a lack of transportation options. The river would serve as an important trade conduit to other areas of the nation; however, the river flows north to Pittsburgh, Pennsylvania, while the primary markets for goods were on the eastern seaboard during the late 18th and early 19th centuries. The transportation difficulties, including nearly impassable roads during the winter, meant that growth continued at a slow pace in Morgantown from its first charter in 1785 until the 1880s and 1890s, when two revolutionary developments occurred. The first, in 1886, was that the Baltimore & Ohio (B&O) Railroad finally reached Morgantown, bringing an influx of goods and people to the area. The second was in 1890, when a system of locks and dams were installed on the Monongahela River, finally taming the river's currents and allowing a brisk trade to Pittsburgh and beyond. These transportation improvements brought massive changes to Morgantown, opening the community to new settlers and increased trade.

Now graced with two reliable modes of transportation and bolstered by the boom in coal-mining operations, the City opened its doors to new industries as well as to the emigrants, mostly Eastern and Southern Europeans, who came to work in the mines and factories. While coal-mining, and to a lesser degree timbering operations, glass-making, ironworks, and potteries – kick-started the economy in Morgantown, the growth in educational institutions was another key development in the City's history. Beginning with the formation of the Monongahela Academy in 1814 and the Woodburn Female Seminary in 1858, the major turning point occurred in 1867, when the two institutions were given to the newly created State of West Virginia as part of the restructuring that resulted from the Morrill Act/Land Grant College Act. This act encouraged the creation of land-grant colleges to teach agriculture, home economics, and other fields of study in each state. In Morgantown, the new, unified land-grant college was renamed West Virginia University in 1868. The venerable institution continues to attract applicants from across the State and Country today.



Over the course of the 20th Century, Morgantown continued to grow, both by way of annexation and through organic growth. Historic growth drivers, notably coal-mining and coal-fired power generation, have remained in Morgantown, while the expansion of the natural gas industry has also contributed to the economic development of the City. However, these industries are no longer the chief employers in the Region. That distinction now goes to the fields of education and medicine, which have become cornerstones of Morgantown's prosperity. The top employers in the Region are West Virginia University, Mylan Pharmaceuticals, and two regional hospitals.

Figure 2: Economy Glass Works, 1908

- Source: Lewis Hine, LC-DIG-nclc-01178, Library of Congress Prints & Photographs Division, Washington, DC, 20540

Figure 3: Photo taken in front of Commencement Hall, removed in 1965 to make way for the Mountainlair Student Center in front of Grumbein's Island on University Avenue.

- Source: Tinnell, Shannon Colaianni, Morgantown, 2011, page 86.

University Avenue Today

More recently, Morgantown grew 6.4% between 2010 and 2013 from 28,827 to 30,666 people, according to the US Census Bureau's American Community Survey. Including West Virginia University students, who account for 29,175 people, the total population of the city is 59,841. As West Virginia University has grown, the areas surrounding the University have also grown as well. In particular, the University Avenue corridor has become an important arterial through campus, linking neighborhoods, commercial areas, and the greater Morgantown community with the University. [i,ii]

Growth has occurred in the University Avenue corridor, along with some changes to the workforce. Within half-mile of University Avenue between 2003 and 2012 (ten years), the representation of professionals has declined by 5.3% while the percentage of people in travel-related industries (lodging and food service) has increased by 4.7%.

Educational services, an area that one would expect to see some increase, did in fact rise by 1.6%. In short, the area has started to become a destination for out-of-town visitors, with the market beginning to respond to the consumer demands of that group. Another substantial trend is that the number of workers living within the study area (half-mile of University Avenue) has declined by 45% in the ten years prior to 2012 (the most recent year for which data is available). Figure 4 substantiates comments received during this study concerning the rising importance of students as the primary population in this corridor.

Additional demographic research indicated some important differences in the University Avenue corridor (again, looking within a half-mile of the roadway) compared to the surrounding area (Figure 5).

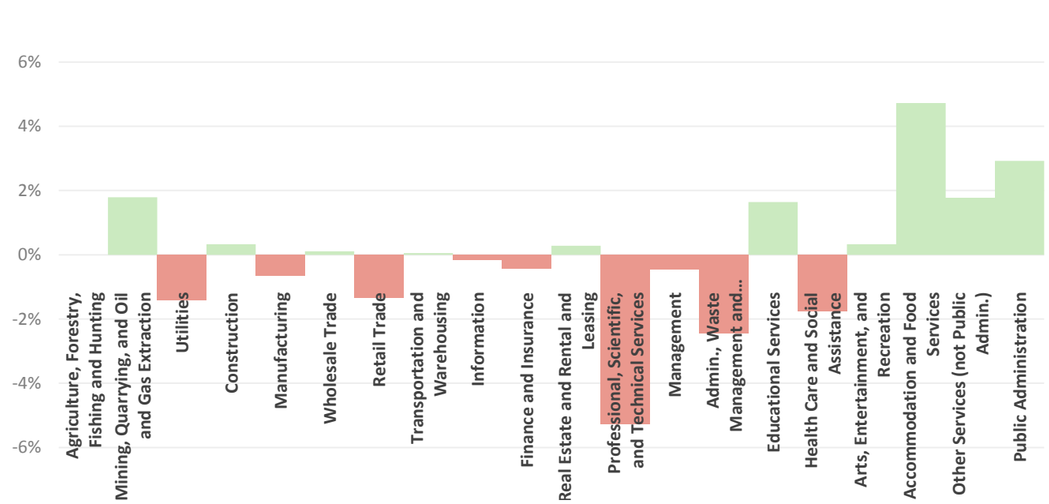


Figure 4: Employment Type Changes (%), 2003 to 2012 within half-mile of University Avenue

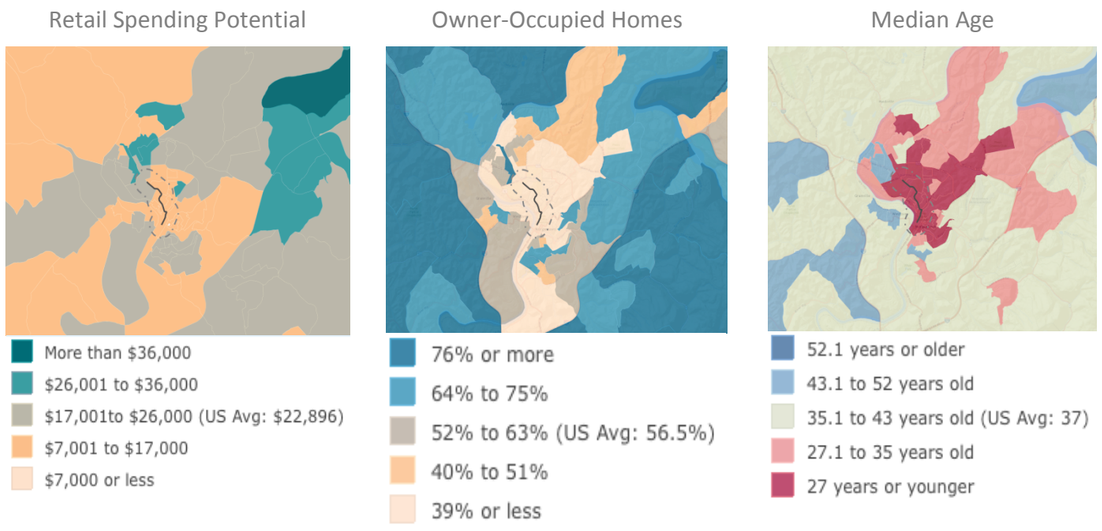


Figure 5: Retail Spending, Owner-Occupied Housing, and Median Age of Resident (ESRI Business Analyst On-Line)

One of the most frequent comments heard was the desire for more commercial / retail business development within the study corridor. However, the area immediately surrounding the corridor is one of the lower categories of retail spending expenditures. The incomes of students are likely figured into these calculations, indicating that new retail opportunities would likely veer away from sit-down establishments and cater to the needs of daytime populations commuting into the area as well as student demands.

Similarly, the percentage of owner-occupied homes in the center of Morgantown and particularly adjacent to the corridor is relatively low compared to the surrounding area.

The median age of residents also reflects the influence of the student population, being less than 27 years throughout the study corridor and in the communities immediately to the east of the corridor and study area.

To summarize, the University Avenue corridor study area has been, and is increasingly, dominated by students as well as businesses and housing that cater to them. While the overall population has been increasing inside the half-mile buffer around the roadway, both the number of workers and number of owner-occupied residences are declining. The following discussion will focus exclusively on the roadway performance, but the degree of demographic change should be kept in mind during the development of appropriate recommendations in this corridor.

Existing Conditions and Performance

Part of the study's directives were to assess the University Avenue Corridor based on more than just traditional level-of-service (LOS) delay measures. The LOS measure is typically shown as an A-through-F scale, which gives it a somewhat inappropriate comparison to a report card. LOS is based purely on vehicular delay; in other words, how long will it take for a car to pass through an intersection. Furthermore, the LOS is usually calculated based on a one-hour "worst case" scenario in the morning or evening peak periods of travel. The theory is that if the roadway and intersections can accommodate the worst case then every other period of the day is resolved as well. Frequently, these delays are calculated not for a segment of roadway but only for the intersections that usually manage or hinder traffic flows.

Multi-Modal Level-of-Service

One way of considering performance across various modes of travel is to apply a multimodal level-of-service measure based on the quality of the experience for pedestrians, bicyclists, and transit users. The Florida Department of Transportation has created a Quality/LOS (Q/LOS) model that is intended for use at sketch planning levels to identify how well arterials serve different types of users[iii]. Figure 8 illustrates the performance of each alternative mode of travel – keeping in mind that 18% of work trips alone are made by walking in Morgantown, making walking a very good alternative.

The northbound direction of University Avenue has several long stretches in the middle of the corridor without sidewalk in the northbound direction (east side); almost the entire length of the corridor has sidewalk in the southbound direction. This difference accounts for a lower Q/LOS pedestrian score.

Figure 6: Contemporary University Avenue

Figure 7: Sidewalk Quality Varies Significantly along University Avenue

	University Avenue			
Mode of Travel	Northbound		Southbound	
Pedestrian	4.5	E	3.5	C
Bicycle	4.2	D	4.2	D
Transit	4.7	B	5.7	B

Figure 8: Multimodal Quality/Level-of-Service (Existing) – Numeric Scores Reflect Sidewalk Quality Based on a Number of Factors, such as Sidewalk Width and Condition, Pavement Condition, and Presence of Amenities

Figure 9: Congested Conditions for Automobiles along University Avenue

Otherwise, the values are fairly similar for all modes in both directions. Improvements to sidewalk buffers would improve the pedestrian score. The bicycle Q/LOS score would be markedly worse if the travel speeds were higher on the roadway, but could be much improved if wider shoulders or separation existed between the roadway and the bicycle path of travel. Fairly high transit frequencies contribute to a good score, although better stop facilities/amenities would elevate the score still higher.

Vehicular Level-of-Service

Figure 10 describes the capacity of roadways in the area now compared to the volumes of traffic that they are handling: green means there is capacity to spare, and red means that the roadway is operating over its capacity for at least some portion of the day. University Avenue as well as "reliever" routes are all experiencing some degree of congestion, according to this measure of performance.

The study team also considered automobile-only level-of-service (LOS) for 10 intersections (see Design Considerations Chapter) in the University Avenue Corridor study. Several observations were made during this assessment.

First, the higher-volume intersections will typically have lower performance since they are processing more traffic through the intersection. The Patteson / Van Voorhis intersection exemplifies this fact. Second, PM (evening) delays and performance are typically higher/worse, perhaps because there is more University-related activity during early evening/late afternoon hours. Finally, the unsignalized intersections are performing better, but primarily because the main line (University Avenue or Beechurst Avenue) is operating uninterrupted and carrying much more traffic than the side streets where traffic has to "wait its turn" for a gap in traffic to appear before merging onto University. Also, drivers will typically try to make left turns in congested roadway conditions at locations that are signalized instead of waiting for a gap in traffic to make a safe turn out of a sidestreet onto the main roadway, which diverts some travelers away from unsignalized intersections.

In some intersections just one movement is causing much of the delay. These specific movements include the northbound 8th Street/University Avenue movement and the eastbound College Avenue/University Avenue movement. These two approaches at these intersections encounter substantially more delay than any other location studied. All of this information was used to help identify issues and design specific solutions during the analysis phase of the study.

18%

of work trips in Morgantown are made by walking

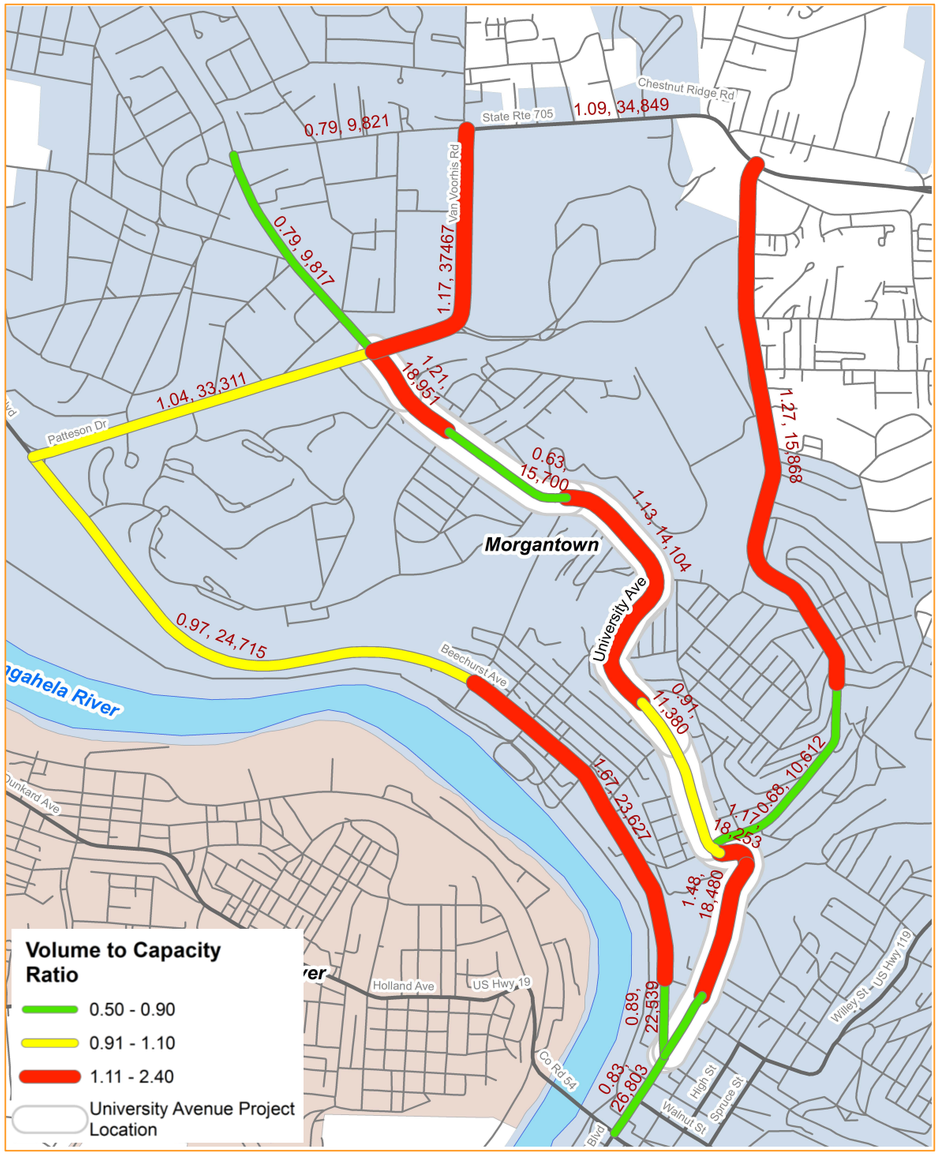
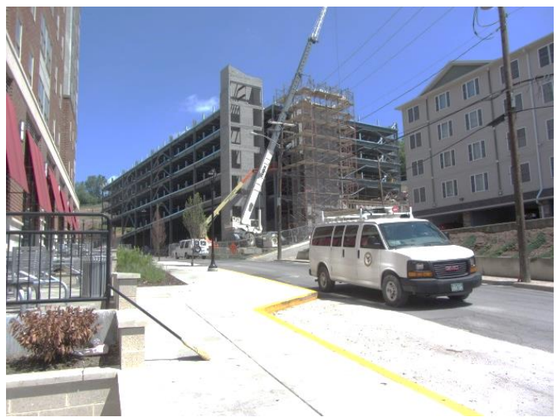


Figure 10: Roadway Vehicular Capacity compared to Volume (V/C Ratio)

Physical Corridor Characteristics

Primary data collection looked at the physical characteristics of the roadway, which is summarized in Figure on the next page. Some of this information validated the emphasis of certain intersections with University Avenue as being “hot spots” to target for improvements. Note that sidewalks are fairly continuous on one side of the street (although small gaps do occur), but are much more sporadic on the opposing side of the street. The vertical grade in the middle of the corridor is in the same stretch where the roadway pavement widths are most narrow.



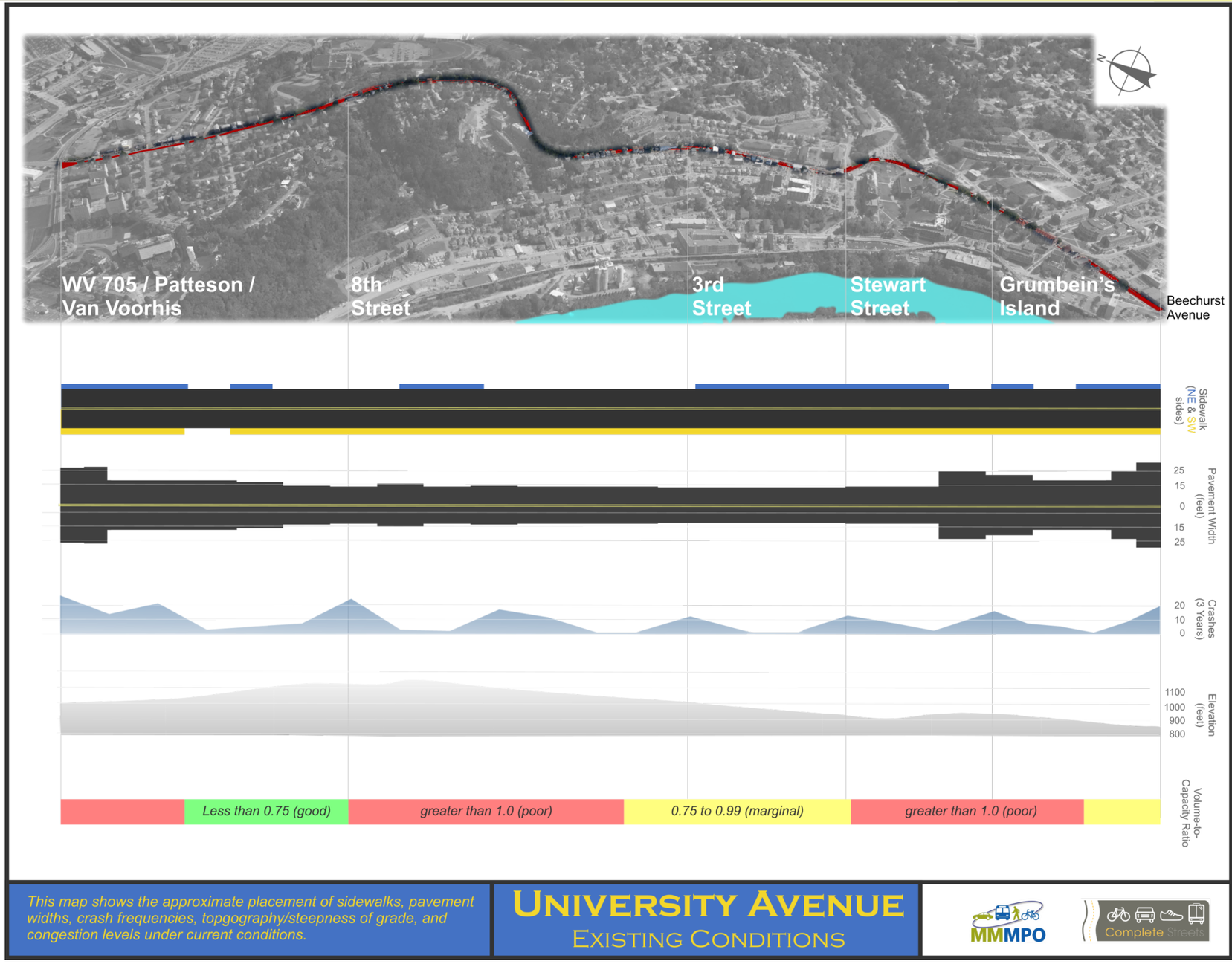
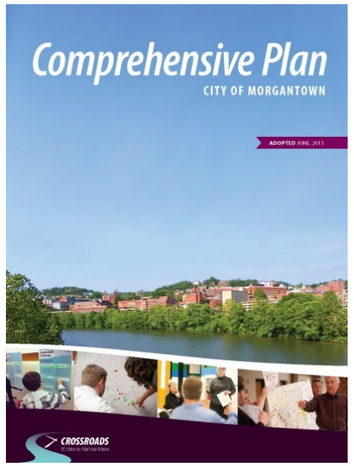


Figure 11: Existing Conditions Poster Presented at Project Symposium

Review of Past Planning Efforts

An important part of the context of the University Avenue Corridor is describing the past, adopted plans and policies that may influence recommendations stemming from the current study. Recent and relevant planning documents are outlined in the section that follows, with each plan description followed by the specific salient elements from each document that may influence the University Avenue Complete Streets Corridor Study Project.



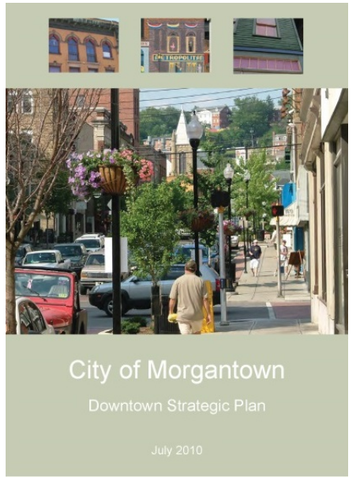
City of Morgantown Comprehensive Plan (2013)

The City of Morgantown's Comprehensive Plan is the "blueprint" for the future of the community. Incorporating numerous elements, the goals of the plan are to address transportation challenges, including automobile congestion, the promotion of walking and bicycling, and reducing truck traffic; realigning the development focus on providing infill development as opposed to greenfield development; strengthening Morgantown's neighborhoods through redevelopment or preservation; enhancing community appearance by maintaining architectural quality and character; and increasing collaboration between local governments, businesses, and major local institutions. This plan also links transportation facilities for all modes of transportation as a key economic development driver.

Application to the University Avenue Complete Streets Plan

The stated goal of the Comprehensive Plan is to create a ***"balanced, safe, attractive, well-connected transportation system that offers reduced congestion, supports and encourages desirable growth, and integrates private vehicles, public transportation, biking, and walking."*** *Clearly, a Complete Streets approach to transportation planning embodies the vision for transportation set out in this plan. University Avenue is mentioned as a roadway operating at levels above efficient capacity, while locations along the roadway are discussed in the plan as areas of serious safety concern (University and Beechurst). Additionally, these areas also lack pedestrian connections.*

> ***"Balanced, safe, attractive, well-connected transportation system that offers reduced congestion, supports and encourages desirable growth, and integrates private vehicles, public transportation, biking, and walking."***
>
> *City of Morgantown Comprehensive Plan (2013)*



City of Morgantown Downtown Strategic Plan (2010)

Morgantown's Downtown Strategic Plan is a visioning document focusing primarily on creating and enhancing Morgantown's Downtown area as a safe, vibrant destination for people of all ages, whether they are permanent residents, students, children, and/or visitors. With the ultimate goal of creating a hub for the community, this plan focuses on the development of new clusters of 21st Century businesses and small industries downtown, improving downtown housing options, enhancing the pedestrian experience, and strengthening the downtown area's connection to neighborhoods and surrounding amenities.

Application to the University Avenue Complete Streets Plan

University Avenue is specifically mentioned in this document as an area in need of improvement in terms of streetscape character, architecture, and safety. According to the plan, all intersections along University Avenue are unsafe for pedestrians and the roadway serves as a visual and physical barrier between downtown and the Monongahela River. Truck traffic on University Avenue is also a concern articulated in this plan, while wayfinding is lacking on the corridor. Another important consideration in this plan is housing; the recommendation is to add more housing along University Avenue. Other recommendations suggest installing gateways along University Avenue, constructing mixed-use developments, enhancing the corridor to improve the pedestrian experience, and conducting a detailed traffic/urban design study to balance design quality, pedestrian needs, and manage automobile congestion. The study suggests design considerations for new development as well as pedestrian improvements and recommends the creation of a specific design guidelines document for the area.

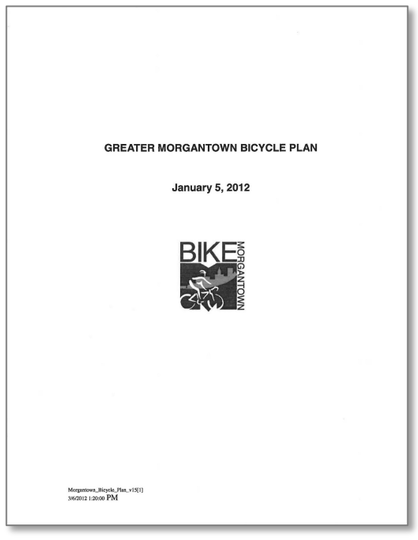
City of Morgantown Pedestrian Safety Plan (2010)

The City of Morgantown Pedestrian Safety Plan is the vision of the Morgantown Pedestrian Safety Board, an entity whose members are appointed by the Morgantown City Traffic Commission. This plan, adopted in 2010, articulates clear recommendations to improve pedestrian safety in Morgantown. Chief among those is the need to adopt sidewalk and crosswalk standards city-wide, which will ensure that all gaps in the network are completed, any new sidewalks meet ADA standards, and sidewalks are well-lit for safety. Additionally, the plan calls for designating connective network sidewalks, i.e. building a sidewalk network that is complete and comprehensive, improving intersection safety, expanding the use of trails in Morgantown, and establishing, implementing, and enforcing a sidewalk maintenance policy. Other recommendations include establishing a financial foundation for on-going sidewalk improvement, replacement, and maintenance, improving lighting and security for streets and trails, making ADA pedestrian accessibility a high priority, and supporting the implementation of Safer City initiatives. These Safer City initiatives are categorized in six ways, by engineering, education, enforcement, environment, evaluation, and equality.

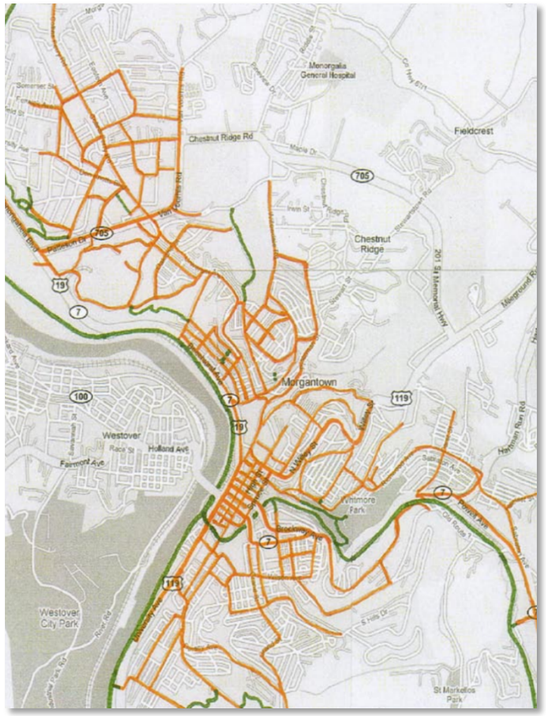
Application to the University Avenue Complete Streets Plan

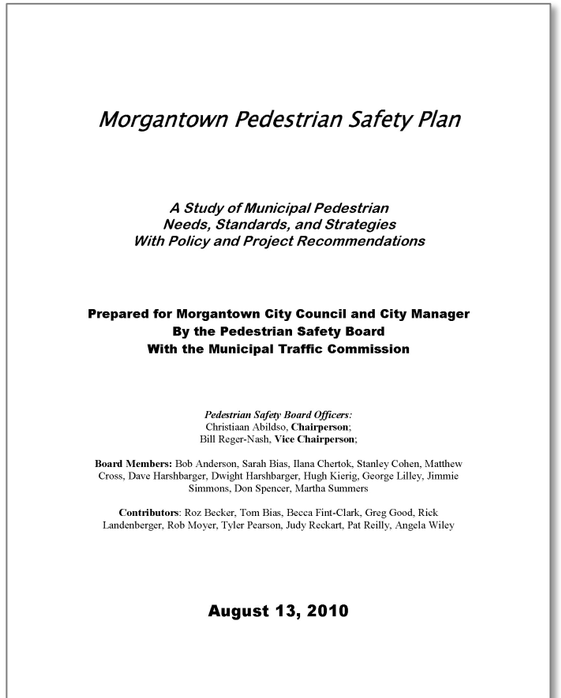
While University Avenue is not specifically called out in this plan, the plan overall supports this project, specifically the Complete Streets elements recommending connectivity; safety and comfort improvements, such as lighting, pedestrian buffering, and intersection signal timing improvements; as well as other traffic calming. Trails are also addressed in this document.

City of Morgantown Bicycle Plan (2012)



The City of Morgantown Bicycle Plan, developed in 2012, has only one stated purpose: to make Morgantown a Bicycle Friendly Community by 2020. The plan was developed by the Morgantown Municipal Bicycle Board and was vetted before the Traffic Commission and ultimately the City Council before being presented to the public for comment. The goals outlined in the plan are ambitious. Not only will the rate of bicycling increase in Morgantown, while the rate of bicycle crashes decreases, but by 2020, five percent of all trips in and through Morgantown will be made by bicycle. With this as the goal, the objectives of the plan are to educate bicyclists and motorists with regard to safety, enforce traffic laws whose violation endangers bicyclists, remove roadway impediments and improve the bicycling infrastructure, provide rewards to residents who ride bicycles, measure bicycle and automobile incidents to identify strategies to improve bicycling, and to treat bicyclists as equals to motorists in all City activities.




Morgantown Pedestrian Safety Plan

A Study of Municipal Pedestrian Needs, Standards, and Strategies With Policy and Project Recommendations

Prepared for Morgantown City Council and City Manager
By the Pedestrian Safety Board
With the Municipal Traffic Commission

Pedestrian Safety Board Officers:
Christiaan Abildso, **Chairperson**;
Bill Reger-Nash, **Vice Chairperson**;

Board Members: Bob Anderson, Sarah Bias, Ilana Chertok, Stanley Cohen, Matthew Cross, Dave Harshbarger, Dwight Harshbarger, Hugh Kierig, George Lilley, Jimmie Simmons, Don Spencer, Martha Summers

Contributors: Roz Becker, Tom Bias, Becca Fint-Clark, Greg Good, Rick Landenberger, Rob Moyer, Tyler Pearson, Judy Reckart, Pat Reilly, Angela Wiley

August 13, 2010

Application to the University Avenue Complete Streets Plan

While the spirit of the City of Morgantown Bicycle Plan supports the implementation of Complete Streets on University Avenue, the plan specifically call for a redesign of the corridor to widen the up-hill side of University Avenue between Falling Run Road and Patteson Drive to provide a bicycle-climbing lane. Additionally, the plan recommends a study of traffic patterns in areas between the two WVU campuses, including Sunnyside, Wiles Hill, and Evansdale, in order to minimize the difficulty and perceived risk of bicycle travel between the campuses. The plan also calls for a widening of University Avenue from Boyers Avenue to Patteson Drive to allow motorists to safely pass bicyclists and to allow for the construction of a Star City bicycle path along the same section.

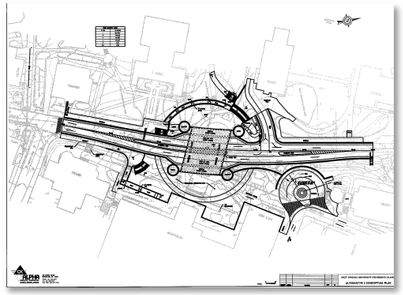
Greater Morgantown Metropolitan Planning Organization Complete Streets Policy (2008)

As an MPO policy resolution, the Complete Streets policy applies to the entire MPO planning area, not only the Morgantown City limits. This document reaffirms the MPO's commitment to implementing Complete Streets in Morgantown on all collector and connector street projects.

Application to the University Avenue Complete Streets Plan

As a planning effort for University Avenue, this project is very much in the spirit of this Complete Streets Policy for the City of Morgantown citing health, safety, biking, walking, air quality, and reduction of per capita demand for automobile use.

Feasibility Study for Grumbein's Island (2011)

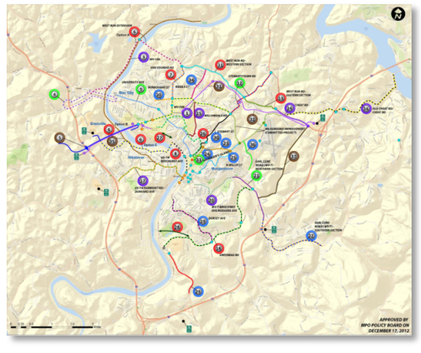


The Feasibility Study for Grumbein's Island suggests a number of alternatives to improve the Grumbein's Island location, a major pedestrian crossing across University Avenue on the campus of West Virginia University. The study evaluated seven alternatives and moved forward with two final alternative possibilities, one which lowered University Avenue and extended Mountainlair Plaza over the road and the other which raised University Avenue over the plaza. The relative cost is $10,408,653 and $9,534,485 respectively.

Application to the University Avenue Complete Streets Plan

As Grumbein's Island represents an important crossing point for pedestrians and creates significant delay on University Avenue for automobiles, this study applies directly to this current planning effort. The proposed solutions would require a substantial investment and should be evaluated over the course of the study for compatibility with the proposed changes to the corridor.

Morgantown Monongalia MPO Long-Range Transportation Plan (2012)

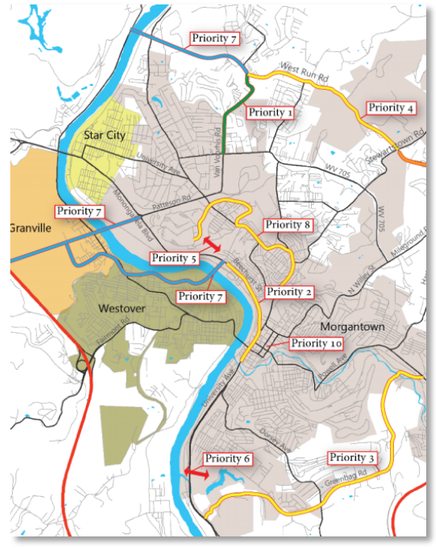


As the guide for planning and improving the transportation system in the jurisdiction of the Morgantown Monongalia Metropolitan Planning Organization, this plan is the overarching planning document for transportation in the region. The goals of this plan are to recommend infill developments, ensure that development follows transportation infrastructure investment, preserve open space and natural features in rural areas, use quality design, advocate for development that integrates mixed-uses, connect locations to allow more opportunity to walk, bike, and use transit, support the creation of mixed use areas, complete neighborhoods through integrated public spaces, connect to adjacent neighborhoods, access to transportation alternatives, provide high-quality park space as part of future development, and encourage affordable housing. There are many relevant objectives and measures, such as increasing bicycling, adding sidewalk, reduce reliance on auto travel, and reducing travel delay across different travel modes.

Application to the University Avenue Complete Streets Plan

As the guide for the planning and design of major roads in Morgantown, this plan has very specific recommendations for University Avenue. The stated goal for the corridor is to "provide a bicycle and pedestrian focused corridor and improve traffic capacity", while the main recommendations are to provide completed sidewalks on both sides of the street for its entire length, provide 15-foot lanes in the uphill direction for bicycle climbing via widening or restriping, include bicycle route signing and marking, improve pedestrian crossings on entire corridor, increase automobile capacity via turn lanes, improved intersections, etc., improve safety at key intersections (Law School and Patteson Blvd.), and provide identifiable bus stop locations and shelters at key locations. The first implementation action is to begin a preliminary engineering study (this study) to identify solutions along the corridor, focusing primarily on traffic and capacity, pedestrian and bicycle safety/flow, as well as cost.

Morgantown Monongalia MPO Bicycle Plan (2013)



The Morgantown Monongalia MPO Bicycle Plan is a policy document incorporated into the MPO 2040 LRTP with a 25 year planning horizon. Including all incorporated areas of Monongalia County, this plan envisions bicycling as becoming a practical and safe option across the region and seeks to achieve this goal by improving bicycle safety and increasing bicycle ridership. To achieve these goals, there are four primary objectives: that bicyclists ride safely, that there is an informative bicycle data system, that there is a well maintained, safe, effective network of bicycle routes, and that motorists drive in a cycling-friendly manner. The recommendations included in the plan correspond not only to engineering improvements, but also education, encouragement, and enforcement initiatives, as well as some activities to evaluate bicycling in Monongalia County.

Application to the University Avenue Complete Streets Plan

In addition to being specifically mentioned in this plan as a corridor in need of enhancement, the University Avenue corridor is located within an area marked as ripe for infill development. However, roadway is identified as "dangerous" with heavy, high speed motor traffic, though this may be tempered by a priority project to mark shared lanes along a portion of University Avenue. There is a recommendation for a marked, shared lane between Riverview Drive and Campus Drive as a "Top Five" priority project. Several locations along University Avenue are marked as "key safety improvements" including the Beverly, Patteson, and Stewart intersections.

University Avenue Pedestrian Crossing Project

This document examines a portion of University Avenue between Evansdale Drive in the north and Inglewood Boulevard in the south, which is characterized by multi-family residential development and includes a Mountain Line Bus route. The recommended changes include substantial pedestrian enhancements, including crosswalk striping, new pedestrian oriented signage, providing new street furniture, increasing sidewalk widths, and modifying the speed limit.

Application to the University Avenue Complete Streets Plan

This project is very relevant to the University Avenue Complete Streets Plan as it suggests pedestrian improvements along and across University Avenue.

Grumbein's Island, in front of the Mountainlair

Summary of Public Engagement & Planning Themes

Throughout the planning and design process, a number of activities were conducted to effectively engage key stakeholders, property owners and the general public. In addition, several specific tools were also used to help facilitate meaningful input and feedback into the planning process.

- ***Project Symposium:*** was conducted in June 2015 to bring together elected officials with the general public to discuss specific needs for University Avenue. A push button exercise was used to collect instant feedback for a multitude of planning themes and desired outcomes. The symposium resulted in the development of specific planning themes and guiding principles used throughout the planning process.
- ***Advisory Committee Meetings:*** members of the Advisory Committee (AC) included the development community, City, WVDOH, WVU, MPO staff, and bicycle advocates. Several meetings with the AC were administered throughout the planning process. Their leadership was the foundation of guidance and needs of the community in during the planning and design process
- ***Walk Audit:*** was conducted with the Advisory Committee as well as interested citizens. Participants were led along the University corridor to discuss multimodal issues and gain a better understanding of how it feels to be a pedestrian or cyclist along the corridor. This provided an opportunity to collect candid photos of the corridor.
- ***Design Workshop/Charrette:*** this multiday event hosted in the major conference room at the Mountainlair, WVU campus, allowed the Project Team of landscape architects, engineers and planners to work with City, WVDOH staff and WVU officials as well as groups (Group Topics) on specific transportation and land use recommendations for the corridor. Interactive mapping exercises along with "pin up" sessions were facilitated with meeting participants to analyze and vet specific recommendations.
- ***Client Work Sessions:*** these meetings provided an opportunity for City and MPO staff to work side-by-side with the Project Team regarding specific land use and transportation recommendations.
- ***Public Open House:*** this event allowed the Project Team to showcase the Preferred Access Plan and associated Concept Designs for the University Avenue Complete Streets Project. Public attendees were allowed to walk through the plan corridor and ask specific questions of the Project Team and MPO representatives. A discussion of next steps as well as funding opportunities was included.

Multiple outreach tools were used to solicit feedback and inform the public of meeting opportunities as well as input into issues and problem areas along the University Avenue corridor. These tools include: MindMixer website, QuestionPro public questionnaire, and push button technology to anonymously record responses to questions posed at public meetings.

These are described as key points, but not necessarily in priority order.

Theme #1: The Maintenance and Appearance of the Corridor is Lacking. Sidewalks and roadway pavement alike are frequently in poor condition, showing cracking and edge deterioration. Morgantown

Figure 12. Project Symposium Participants Identifying Issues and Potential Solutions

Figure 13: Project Symposium Participants Learning about the Results of the Existing Conditions

has substantial wear placed on its infrastructure due to frequent freeze-thaw cycles, but heavy traffic volumes contribute to maintenance problems as well. In a related sense, a lack of street trees, run-down building facades, and little pedestrian-scale lighting also contribute to an appearance that isn't appropriate for such an important gateway to the University and the City center.

Theme #2: The Safety of Pedestrians, Cyclists, Transit Patrons and Automobile Drivers can be Improved. The existing corridor has substandard geometry at several intersections (although the improvements at Beverly should help this location), and pavement markings and signage are deteriorated, inadequate or simply missing. Bicycle infrastructure is largely absent, and sidewalks are typically adjacent to the back of the curb throughout the study area. The area surrounding Grumbein's Island in front of the Mountainlair Student Center was mentioned many times, not surprisingly. However, other locations and crossings such as Campus Drive, Stewart Street, and 8th Street as well as locations farther north were also highlighted as places where improvements to pedestrian and cyclist safety could be made relatively easily.

Theme #3: Constraints Placed on the Corridor from Narrow Rights-of-Way and Building Setbacks, as well as Topography, will Play a Key Role in Limiting Traditional Capacity Expansions. This point speaks for itself, although the ability to improve some intersection locations does exist, and it is these locations that are often the source of crashes and numerous pedestrian-automobile conflicts. Many participants were willing to point out very specific improvements at key locations along University Avenue as well as Beechurst Avenue (a primary "reliever" route for University Avenue).

Theme #4. Redevelopment Opportunities Along the Corridor Need to be Kept in Mind as an Important Subtext to Traditional Transportation and Mobility Concerns. While there is ample cause for increased attention to many transportation safety and mobility concerns in the University Avenue Corridor, people repeatedly came back to the potential for increased private investment focusing on more varied (i.e., not just student-related) housing stock as well as retail investments into the corridor. Similarly, protecting existing communities and linking them back to the University Avenue Corridor were also important to people.

From these findings, the following issues and value statements were derived that are described in the following section.

Issue	Response
Maintenance of Public Infrastructure	
Source: Steering Committee and public meeting comments concerning crumbling infrastructure like sidewalks, curb-and-gutter, sidewalk/utility conflicts, and drainage inlet location/design	*The concept design includes new and replacement sidewalks and curbing in many locations, and proposals for relocating utility poles out of pedestrian travelways. Replacement of crosswalks and crossing treatments are also included in the design of the recommendations.*
Appearance and Aesthetics	
Source: Survey (57% gave appearance as the highest-or second-highest-ranking concern in the corridor; 78% said that aesthetics were important or very important)	*Streetscaping, including pedestrian-scale lighting and street trees, are an integral part of the design. The corridor development best practices include a number of provisions for improving appearance and aesthetic quality of the built environment.*
Safety, for All Travelers	
Source: Survey (60% said that safety was bad or very bad; 79% said improving safety was important; other respondents noted lack of lighting)	*Many provisions for crossing treatments, bicycle lanes, relocation of some transit stops, and geometric changes at intersections (e.g., Willey/University intersection) will reduce crashes and improve walking, biking and transit safety.*
Respect Physical Constraints	
Source: Steering Committee, which noted that minimizing private property takings and disruption during construction as being very important in the design process	*The often-narrow right-of-way is impacted minimally, with (at most) 1-2 buildings being acquired. An important aspect of the design necessary to stay in the current ROW is the use of retaining structures, which account for 19.5% of the total project cost, even without the "Loop" component.*
Quality Redevelopment	
Source: Survey (over 50% said that current development patterns were bad; 70% said that more regulatory control was important or very important)	*The report suggests a number of best practices that can be undertaken in partnership with the City, University, and WV Department of Highways that, with the cooperation of private development interests, help improve the quality of materials and design without sacrificing the character of the corridor.*
Support Transit Services	
Source: Public meetings, as well as a focus group meeting with transit operator	*The report recommends the consolidation of transit stops and increasing the quality and level of amenity in the design recommendations.*
Improve Walking and Bicycling	
Source: Survey (73% said that walking was the most important design consideration; 62% said that improving cycling conditions was important or very important)	*New and replaced/improved sidewalks, curb ramps, pedestrian signalization (e.g., Grumbein's Island), geometric changes, and an overall emphasis on improving the quality of the built environment to encourage more walking and biking were integrated into the recommended design and best practice development guidance in the report.*

Figure 14. Common Issues and Project Team Responses

Issues and Value Statements

Based on the work done through this study, a number of issues and concerns have emerged that will shape the focus of the overall effort. These discussions are described in detail in the attachments that follow the main body of this report, containing information from the first Project Symposium conducted on June 22, 2015, as well as polling, surveying and mapping exercises. Additionally, comments from 10 stakeholder interviews and a field audit (also conducted on June 22nd) contributed to the project team's understanding of the corridor.

The following are five Issue and Value Statements building upon the concerns and comments from the public meetings as well as the project team's field data collection. Ultimately, all of these issues are combined into a single core Mission Statement. The Issues, Value Statements and Mission Statement will all be used to measure the value of recommendations, for example in the creation of performance measures.

Issue #1: Pedestrian and Bicyclist Considerations Come First

Value Statement: *Although automobile travel is substantial – over 18,000 vehicles per day in some places – the corridor is heavily used by students of West Virginia University and residents of the surrounding communities. The vulnerability of these users is high compared to automobile drivers and passengers. Furthermore, substantial increases in carrying capacity of the roadway for automobiles will be costly, potentially damaging to existing developments, and create an unfavorable aesthetic along the corridor. Grumbein's Island and its high level of pedestrian and automobile conflicts is especially important to call out, but the entire length of the corridor benefits when solutions favor people choosing to use the very limited space for non-automobile travel options. It is better to create an environment where walking and biking are not only encouraged but make the most sense for traveling.*

Issue #2: The Safety of All Users is Critical

Value Statement: *Hand-in-hand with creating pedestrian- and bicycle-friendly environments is the concept that the corridor should be safe for everyone to move across and through. Many of the comments received from the public invoked safety-related language, whether it be for a lack of lighting, unsafe design, or poor accommodations for pedestrians crossing the street. The most outstanding example of which is that three-fourths (76%) of the Project Symposium respondents felt that University Avenue is "unsafe" or "very unsafe" today. As traffic pressures mount from redevelopment and intensification of uses within and without the corridor, these safety concerns are likely to increase.*

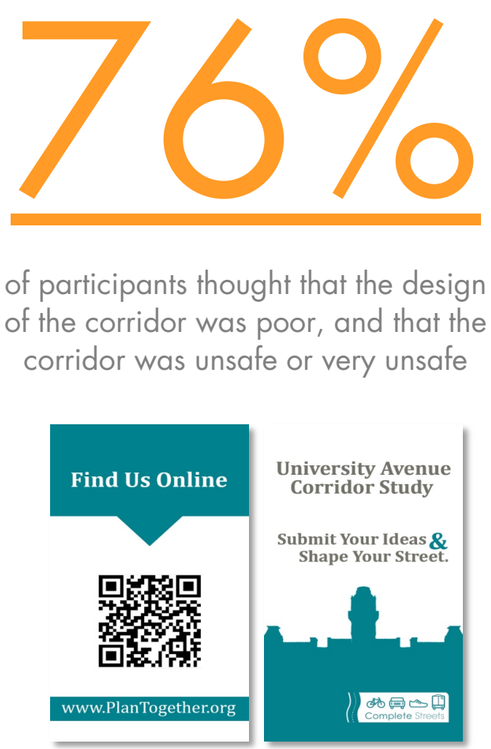


Figure 15. Project Contact Cards Used to Brand the Study

Issue #3: Automobile Delays in the Corridor Should be Reduced *if* the Actions Taken are not in Conflict with Other Values

Value Statement: *Although pedestrians, cyclists and overall safety come first, ensuring the smooth, if not high speed, movement of cars in the corridor is very important. Frequently, traffic studies focus almost exclusively on quantifying the effects of recurring delay, and then only for cars, not people. One way of integrating across the Issues and Values identified here is to account for traffic delays created by automobile crashes, since any lane closure or partial closure is felt acutely due to the limited range of options and constrictive terrain. Another suggestion is to account for the delay and quality of service incurred by people, whether in automobiles, on foot, cycling, in transit vehicles or using any other mode of transport.*

Issue #4: The Corridor has to Support Surrounding Uses through Attractive Design

Value Statement: University Avenue is more than how rapidly it can move people and things through space, it serves as a way of getting to jobs, upholding land values, encouraging favored redevelopment, and making sure that everyone arrives safely and on time. Nearly 88% of the people that were asked in the Project Symposium said that commercial development is a desirable land use type to happen more in the future. Creating an aesthetic environment through the use of improved streetscaping details and repair/maintenance is vital to this objective.

Issue #5: Supporting Transit is the Future of the Corridor

Value Statement: *The space limitations and future development trends of the University, downtown core, national preferences, and the corridor itself are pushing towards a heavier reliance on public transportation. Morgantown long ago charted a course towards investment in public transportation service of a high quality; updating the PRT and moving towards a BRT (bus rapid transit)-type of service are now high on the list of infrastructure and service needs. In turn, environments that address the first four Issues are well on the way to creating transit-favorable environments.*

Considering these five premier issues and their accompanying value statements, an overarching Mission Statement reads as follows:

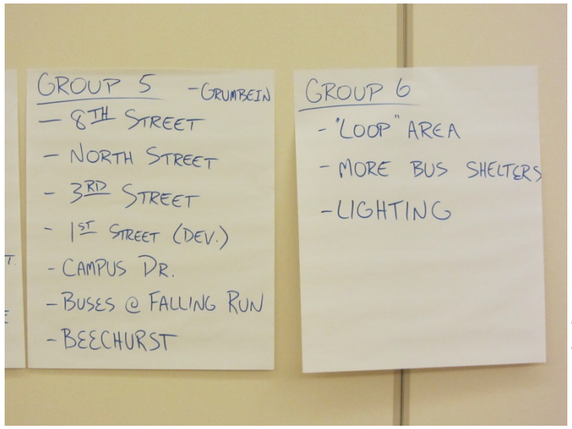


Figure 16. Groups in a Workshop Identified their Ideas

Figure 17: Students Crossing Willey Street

"The Goal of our project is the promotion of safe, beautiful and more efficient travel for every user in the University Avenue Corridor, and in so doing support existing communities as well as promoting favored redevelopment in the future."

development
trends & purpose

Development Trends Assessment

This chapter addresses the underlying assumptions and technical considerations, and how the project team's core understanding of how streets should function influenced the overall design process and recommendations.

Complete Street Framework

Within the overall scope of the University Avenue project, there is an implied recognition that every street has a place in a hierarchy of roadways, from slow local road to a fast freeway. When the street is performing in alignment with its expected and designed-for role, then only minor adjustments are generally required. However, when a street that was intended to service local land uses starts carrying too much "through" traffic, or when a freeway has interchanges spaced too closely together that cause congestion, then the road – and the overall transportation network under performs. A classic case in point has been dubbed a "stroad," an ill-favored combination of street and road that does not perform well in any capacity. "Stroads" mix high-speed vehicular traffic with many turning cars, pedestrians, and bicyclists in a dangerous, ineffective, and unproductive (economically) mixture. In order to create fewer "stroads," it is important to recognize that all streets serve a combination of functions, all of which are intimately tied to the travelway, pedestrian, and building zones (Figure 18).

The basic context zones of streets help define the role of the street and its design throughout its lifecycle. The ramifications of poor street design are well-stated in Charlotte's *Urban Streets Design Guidelines* (City of Charlotte, 2007):

> *"…There are many ways to meet motorists' expectations for safe and efficient travel. However, doing so can have unintended and paradoxical results - many of the design elements…also tend to encourage higher speeds, thereby potentially reducing the safety of not only motorists, but also bicyclists and pedestrians. Design features that can encourage higher speeds include:*
>
> - *wide travel lanes (particularly if the overall street cross-section is wide),*
> - *a large clear zone (including a lack of street trees),*
> - *medians,*
> - *large (wide) curb radii at inter sections and driveways, and*
> - *straight, flat sections of streets with long blocks and widely spaced intersections.*
>
> *Some drivers drive fast to reduce their travel times. Some drivers simply like to drive fast. Besides the safety paradox just described, this "need for speed" usually translates into rapid acceleration and deceleration between intersections, often with minimal impact on a driver's total travel time, but with significant impacts on pedestrians, bicyclists, and others using the street. These types of interrelationships and tradeoff s need to be considered when attempting to address motorists' expectations, particularly if that involves physical changes to streets and intersections."*

The University Avenue Complete Street Corridor Project proposes physical changes to the street itself, and recognizes ongoing changes in the surrounding context, or desired changes people would like to see happen. Balancing these competing needs in a confined physical space is the premier challenge of University Avenue.

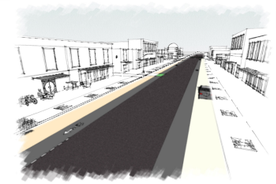
Complete Streets Basic Context Guide

Three Context Zones…

- Defined by the overall environment and framework of the corridor
- Stresses context-specific treatment for three primary areas:
  - Building form and massing
  - Pedestrian space and design treatments
  - Travelway modal integration (bike, transit, vehicular)

1. Travelway Zone

- Defined by the edge of pavement or curb line that traditionally accommodates the travel or parking lanes needed for vehicles in the transportation corridor
- Recommendations focus on modes of travel and medians
- Travelway zone focuses on two objectives:
  - Achieve greater balance between travel modes sharing the corridor
  - Promote human scale for the street and minimize pedestrian crossing distance



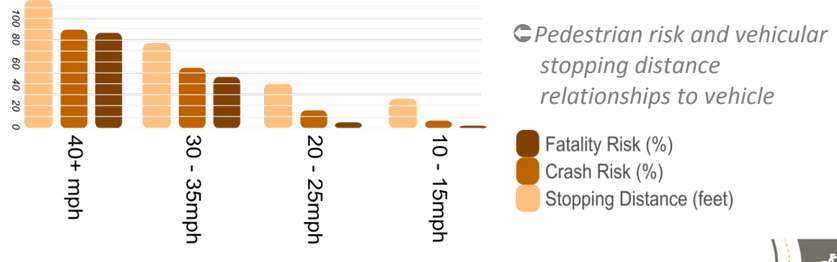
2. Pedestrian Zone

- Extends between the outside edge of the sidewalk and the face-of-curb located along the street
- Quality of the pedestrian realm is achieved through four primary areas:
  - Continuous pedestrian facilities (on both sides of the road if possible) to maximize safety and mobility needs
  - High-quality buffers between pedestrians and moving traffic
  - Safe and convenient opportunities to cross the street
  - Consideration for shade and lighting needs

3. Building Zone

- Define and frame the roadway
- Building scale and massing focus on two areas:
  - Orientation (setbacks, accessibility, etc.)
  - Design and architectural character (height, etc.)

Figure 18. Complete Streets make safer streets, in part due to creating safer speeds
(source for speed-related pedestrian risk: NACTO)



A core task of the Study was to gain an understanding of the latest thinking of how properties in the vicinity of University Avenue would develop and re-develop. Anticipating future development is always challenging, the assumptions used in the Study relied on the input of professional planners and businesspeople that work with proposed development actions every day. The project team also considered how existing development parameters like building setbacks from the street, allowable heights/density, design elements (e.g., to encourage and support walking and transit use) and market forces might change demands on University Avenue.

The consultant was tasked to work with the City to consider regulatory measures such as right-of-way encroachment measures, access management guidelines, spacing standards and protocols for development and redevelopment. Early coordination resulted in identifying a number of refined objectives that pertain to land use-transportation integration.

1. A primary concern is to arrange setbacks (or build-to lines) to accommodate future widening of the roadway and intersections in the corridor.
2. Manage intersection spacing and driveway spacing to help preserve roadway capacity and reduce crashes and crash-related delays.
3. Consider existing zoning and future zoning in terms of the impacts to the demand for roadway capacity, in part conducted through an independent future year assessment in *CommunityViz*™ software.
4. Address how future commercial nodes of development in the corridor might differ from each other with respect to design, density, and range of services/products offered to the community.

Best Practice Development Guidance

Any guidance for future development would want to help ensure that the character of the University Avenue Corridor is retained while promoting its historical character; creating desirable economic growth through infill development and redevelopment; and preserving transportation mobility and safety for every type of user by promoting density and a complementary mix of uses that support fixed-route transit service. Private and public development actions must be designed to coordinate with these objectives for the corridor to work in the ways that the public and stakeholders suggested. The following is provided as guidance, but is not adopted as part of any overall ordinance changes by the City of Morgantown. Additional review through the normal process required of ordinance revisions will be required to refine and adopt the final language into the code of ordinances. Applying these recommendations, whether through ordinance, design standard, or policy modifications, would typically require partnership between land owners, developers of property, the City of Morgantown, West Virginia University, and the West Virginia Division of Highways.

The University Avenue Corridor changes character and design along its length; the following are generalized descriptions of two key segments of the corridor.

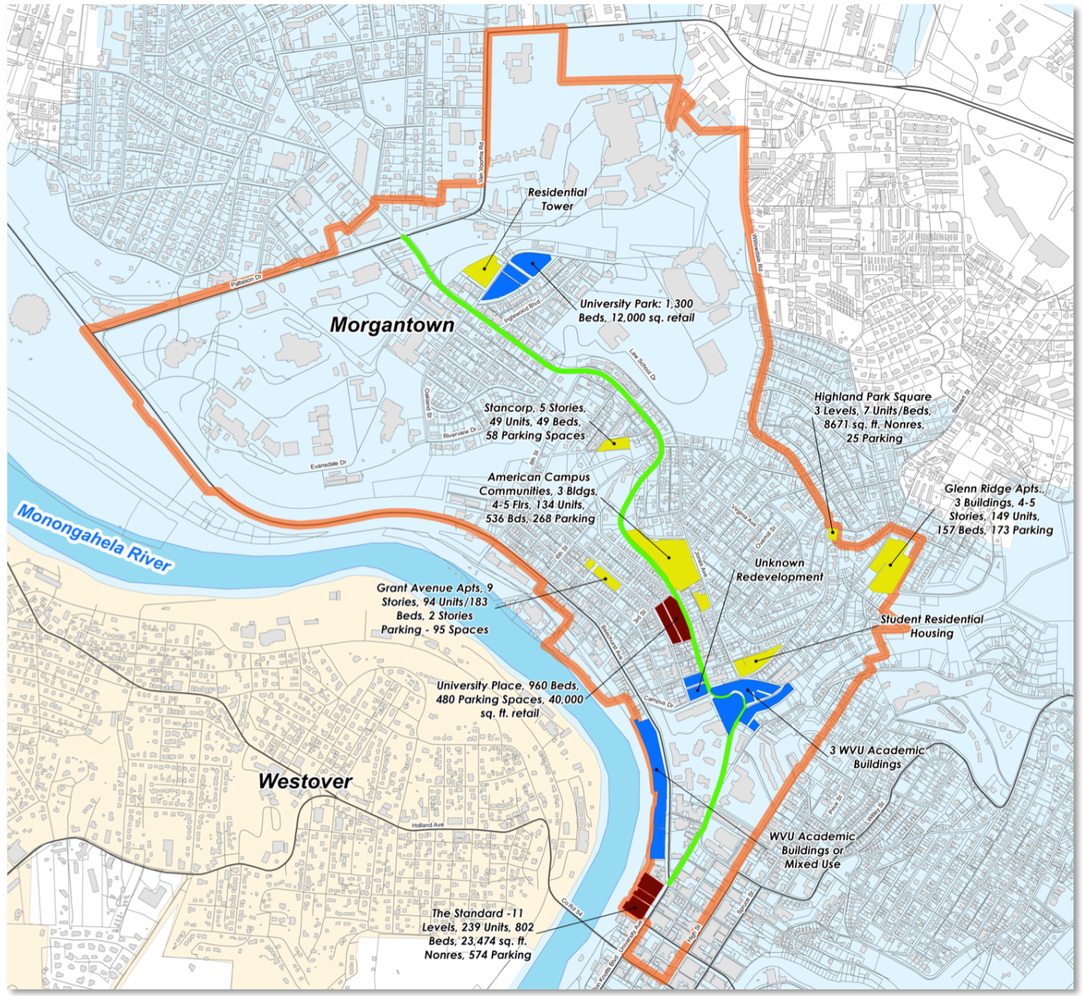


Figure 19. Potential Development Actions

- **Segment A: University** – characterized by uses that are either predominantly owned/operated by West Virginia University or that serve student and faculty populations; largely institution and commercial, with some multifamily (student) housing. This Segment is defined as being from Beechurst Avenue to Campus Drive. It is important to note that Campus property is exempt from City zoning, but private development is required to follow code.
- **Segment B: Arterial Corridor** – characterized by larger lot sizes, greater stratification of uses, and attached parking service; single-family homes and larger-lot commercial properties are interspersed in this segment. This Segment is defined as University Avenue from North Street to WV 705.

Tier 1 for each segment is the first row of properties adjacent to University Avenue; Tier 2 is defined is the second and subsequent rows of properties as shown in Figure 20.

Additional or alternative requirements may be placed upon commercial nodes to create development opportunities as desired by the City's Comprehensive Plan and accepted by the residents and property owners directly affected. The design and performance standards herein could supersede or supplement those provided in other parts of the City's zoning regulations where conflicts exist.

Areas designated as commercial nodes should have requirements with the specific purpose of creating high-quality, integrated development patterns that support the objectives of improving walking/bicycling environments; improving safety; and increasing the quality of the aesthetics along the corridor. All of these objectives relate directly to the goals of this project developed through stakeholder interactions, and mesh with the recommended transportation design treatments.

The following provisions represent regulatory direction within commercial node(s) that should be pursued to further the purposes this corridor plan and the City's Comprehensive Plan. Zoning map amendment, zoning text amendment, design standards, overlay district(s), etc. are various regulatory measures that should be studied by the City to advance the principles and objectives of this corridor plan.

- Frontage Design. The public Frontage and private Frontage should be coordinated as a single, coherent landscape and paving design.
- Retail Frontage. Shopfront at Sidewalk level should be required along the entire length of its private Frontage for mixed-use and nonresidential buildings. A minimum fenestration standard (clear storefront glazing) should be stated and shaded by an awning overlapping the sidewalk. With the exception of access to upper residential uses, the first floor should be confined to Retail use.
- Awnings and Galleries. Buildings should be required to provide a permanent cover over the Sidewalk, either cantilevered or supported by columns. A Gallery Frontage may be combined with a retail Frontage. Awnings, Arcades, and Galleries should be permitted to encroach upon the sidewalk to within two or three feet of the curb but must clear the sidewalk vertically as provided in the City's building code and/or zoning regulations.
- Vista. Buildings should be required to provide architectural articulation of a type and character that responds visually to its axial location, as approved by a design review committee.
- Cross-Block Passage. A minimum eight-foot-wide pedestrian access should be required to be reserved between buildings.
- Corner Lot Frontages. Buildings on corner lots should have two private Frontages.

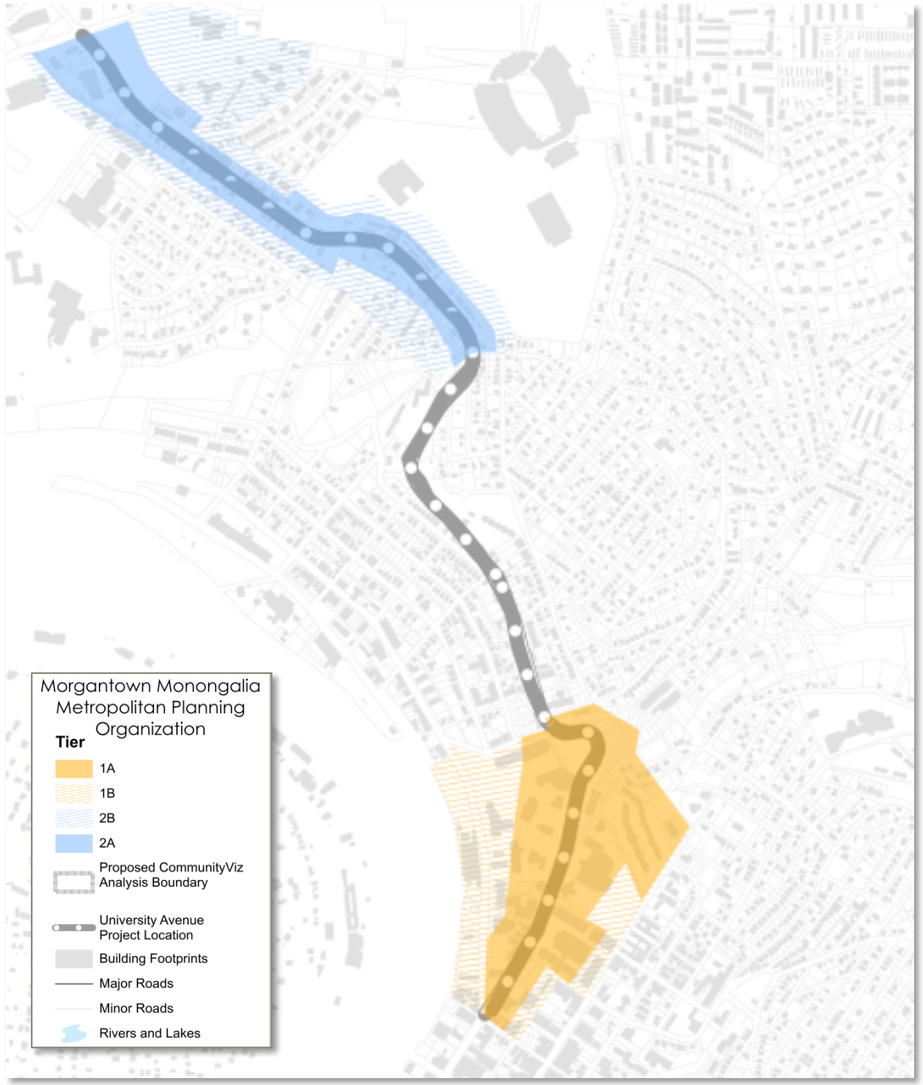


Figure 20. Tiered Overlay Districts

- Height. The minimum building height should be two (2) stories to promote mixed-use development with a maximum height of three (3) or four (4) stories. All nonresidential floor space provided at street level of a mixed-use development should have a minimum floor-to-ceiling height of eleven (11) feet.
- Off-Street Parking. Parking should be accessed by Rear Alleys or Rear Lanes, when such are available. Structured parking Garage decks should be located at the third level except that side- or rear-entry types could be allowed in the first or second Level, but from a rear alley or rear lane when such are available.
- Bicycle Parking. Minimum short- and long-term bicycle storage facilities should be required.
- Signage. Signage should be externally illuminated or reverse halo, but should not be permitted to project light through the sign face.

The following provisions represent regulatory direction in both Tier 1 and Tier 2 areas, with specifications for each segment. The exact specifications are suggestions only; it is assumed that a more detailed effort would be conducted to refine each element.

- Building aesthetics rely on quality design and materials, improving not only the value of surrounding properties but also invite pedestrians and cyclists into the transportation system. Developments that abut University Avenue should have two-sided architecture at street intersections maintaining consistency of materials, coloring, fenestration, and architectural interest along street frontages, especially at pedestrian level (typically first ten feet of elevation). Flat, blank, or windowless walls along public right-of-ways should not be allowed.
- Pedestrian-scale street lighting creates a safer environment for pedestrians, which is strongly encouraged in the University Avenue corridor. A pedestrian-scale street lighting standard using single-column posts should be developed for University Avenue and applied throughout to establish a harmonious sense of place. Minimization of ambient lighting and glare effects, particularly near residential areas, should be accommodated in the fixture design.
- Relocating off-street parking away from the street frontage improves the appearance and the pedestrian accessibility of properties fronting University Avenue. Off-Street parking in front of buildings should be permitted in Tier 2 areas by-right; the City should review off-street parking between the building and street in Tier 1B. Tier 1A off-street parking between the building and the street should be prohibited.
- Street trees provide shade and buffer areas for pedestrians, encouraging more pedestrian travel along University Avenue. Street trees (suggested spacing: 1 per 30 centerline feet) in Tier 1A should be required; tree plantings might not be a requirement in other locations but are encouraged to be at a similar spacing and using a similar planting design and materials when possible given right-of-way, line-of-sight, accessibility, and other considerations.
- Driveway spacing standards vary by the posted speed along University Avenue, and are intended to provide a safe street environment for all users and to reduce vehicular delays created by minor crashes. Spacing between driveways or medians should be measured along the right-of-way line between the tangent projection of the inside edges of adjacent driveways, opposite street driveways or median openings. The City Engineer could be permitted to reduce the connection spacing requirements for situations where they prove impractical, but in no case should the permitted spacing be less than 85% of the standard. Spacing below 85% of the standard should require the issuance of a variance. For sites with insufficient road frontage to meet minimum spacing requirements, consideration should first be given to providing access via connection to a side street; utilization of a joint or shared driveway with an adjacent property that meets the recommended spacing requirement; or, development of a service road to serve multiple properties. Figure 21 indicates

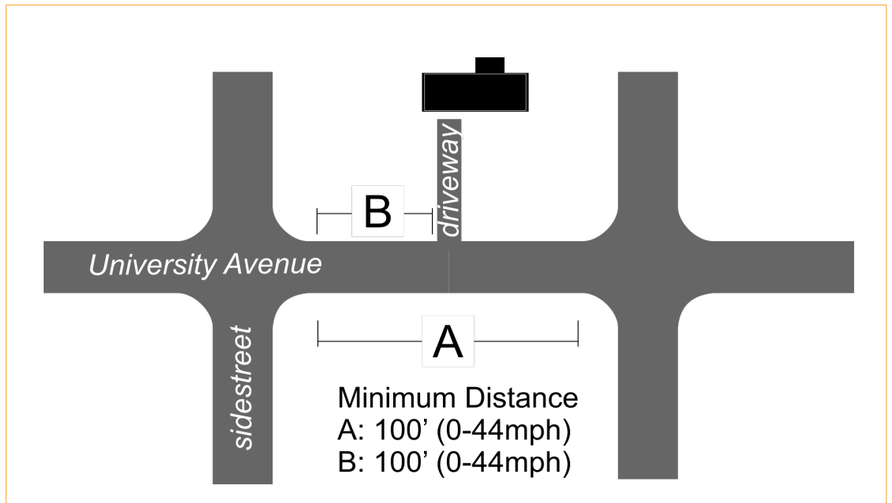


Figure 21. Driveway Spacing

appropriate driveway spacing standards for streets and property driveways with access to University Avenue and side streets.

Development Status and Impacts

CommunityViz™ is a scenario planning software tool that allows decision-makers to evaluate the impacts related to development. It helps translate complex planning data into easily understandable outputs. Using existing land use data, including land use types, building heights, and floor to area (FAR) ratios, the tool can reasonably estimate figures for a number of metrics, such as total population, total employment, total dwelling units, water and sewer impacts, number of students (K – 12), and, perhaps most importantly for the purposes of this plan, AM and PM trips generated.

Working in collaboration with the City of Morgantown officials and the MPO staff, a variety of data inputs were generated for use in the CommunityViz model for the study area around the University Avenue corridor. To begin, each parcel in the study area was coded for development status and place type. The development status element consists of five groups, underdeveloped, undeveloped, developed, committed development, and permanent open space, while the place type refers to the specific land use. Development status is very important, as only those parcels designated as underdeveloped or undeveloped are able to accommodate new growth. The placetype codes are also very important and provide the basis for applying metrics to each specific land use type. Placetypes were created using aerial imagery and by examining the *Morgantown Comprehensive Plan* and *West Virginia University Campus Map for Downtown and Health Sciences Campuses*.

As an example, students are only generated in residential areas, hence no commercial, industrial, or institutional parcels should be considered when examining the potential for student generation. For the purposes of this model, only those parcels that were designated by the City of Morgantown/MPO as ripe for development/redevelopment (evaluated in a quasi-soft site analysis as depicted in Figure 22) were considered as under-developed, or undeveloped and ready to be developed. The results of this analysis reflect the existing and additional population, jobs, and students generated from those specific redevelopment projects only. A general assessment of land ripe for redevelopment based on other considerations (I.e., speculation) was not considered in this analysis.

In order to reflect the reality in Morgantown, data sources with specific information for Morgantown were examined, including www.city-data.com and the US Census American Community Survey. This was especially important for the student generation, person per household, and employment metrics.

The baseline conditions represent what is currently on the ground in the University Avenue project study area. Each parcel was coded (by Place Type) according to the predominant use on the parcel. The build condition includes the programmed development, though it is important to remember that this new development replaces any existing development. Hence, the full built-out figures are not just a simple addition of the base year and committed development figures; this figure accurately reflects the new build-out conditions and does not include any information from the existing development that was replaced by new development. Figure 23 on the following page provides a summary of the performance measures.

Based on these results, the development/redevelopment is expected to have a profound impact to the study area. Population is expected to double within the study area, mainly due to the 150% increase in multifamily

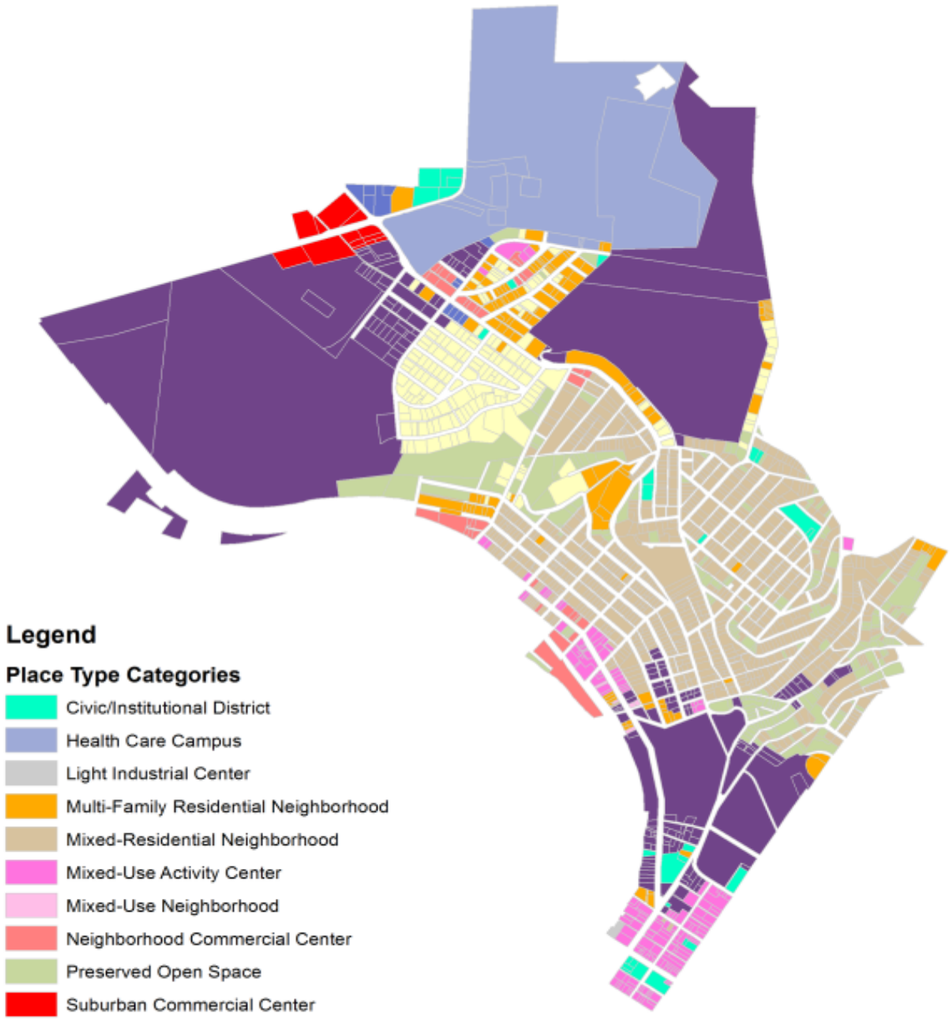


Figure 22. Land Use Place Types

dwelling units. Total employment should increase a moderate 15% due to the influx of office, institutional and retail. Impacts to infrastructure may be minimal with the total peak hour trips generation of approximately 3,500 PM trips. Water and sewer demand increases by 2.15 MGD and 1.86 MGD, respectively.

Metric / Measure	Units	Base Year	Committed Development	Full Build-Out
Community Populations				
Population	People	4,671	5,485	9,792
Employment	People	14,842	2,444	17,040
Residential Development Profile				
Total Dwelling Units	Dwelling Units	1,972	2,887	4,680
Single Family Dwelling Units	Dwelling Units	1,038	0	1,011
Multifamily Dwelling Units	Dwelling Units	934	2,887	3,669
Non-Residential Development Profile				
Retail Space	Square Feet	1,134,366	296,578	1,344,692
Office/Institutional Space	Square Feet	11,597,462	1,595,838	13,194,441
Industrial Space	Square Feet	0	0	0
Land Use Profile/Representation				
Standalone Single Family	Percentage	—	—	21%
Standalone Multifamily	Percentage	—	—	5%
Standalone Destinations	Percentage	—	—	3%
Mixed Use Development	Percentage	—	—	68%
Open Space	Percentage	—	—	3%
Home Choices				
Standalone Single Family	Percentage	—	—	20%
Standalone Multifamily	Percentage	—	—	31%
Mixed Use Environment	Percentage	—	—	49%
Supporting Infrastructure				
New Students, K-12	Students	1,578	2,310	3,744
Net New AM Trips	Trips	—	—	2,930
Net New PM Trips	Trips	—	—	3,434
Sewer Service Demand (study area)	MGD	—	—	1.86
Water Service Demand (study area)	MGD	—	—	2.15

Figure 23. Development Performance Metrics

Committed Development Inventory:

		Committed Development Program				
Map ID	General Reference	SF_DU	MF_DU	RET_SF	OFF_SF	IND_SF
1	Residential Tower	0	350	0	0	0
2	University Park	0	400	12,000	0	0
2	University Park	0	250	0	0	0
3	Stancorp	0	49	0	0	0
4	Grant Avenue Apartments	0	94	0	0	0
4	Grant Avenue Apartments	0	8	0	0	0
5	American Campus Communities	0	134	0	0	0
6	University Place	0	480	40,000	0	0
7	Unknown Redevelopment	0	66	0	0	0
8	Highland Park Square	0	7	8,671	0	0
9	Unknown Redevelopment	0	59	17,712	0	0
9	Unknown Redevelopment	0	70	21,068	0	0
10	3 WVU Academic Buildings	0	0	0	1,190,648	0
11	Student Residential Housing	0	50	0	0	0
12	Glenn Ridge	0	149	0	0	0
13	WVU Academic Buildings or Mixed Use	0	482	173,653	405,190	0
14	The Standard	0	239	23,474	0	0

Single Family Dwelling Unit (SF_DU), Multifamily Dwelling Unit (MF_DU), Retail Square Feet (RET_SF), Office Square Feet (OFF_SF), Industrial Square Feet (IND_SF)

Trip Generation Summary (AM/PM):

		ITE Trip Calculations — Peak Hour Reporting					
Map ID	General Reference	New AM Trips	AM Trip Credit	Net AM Trips	New PM Trips	PM Trip Credit	Net PM Trips
1	Residential Tower	179	64	115	217	78	139
2	University Park	170	16	154	224	20	204
2	University Park	102	37	65	124	89	35
3	Stancorp	25	0	25	30	0	30
4	Grant Avenue Apartments	48	0	48	58	0	58
4	Grant Avenue Apartments	4	0	4	5	0	5
5	American Campus Communities	68	58	10	83	70	13
6	University Place	227	17	210	357	22	335
7	Unknown Redevelopment	27	6	21	33	8	25
8	Highland Park Square	8	4	4	22	16	6
9	Unknown Redevelopment	38	0	38	82	0	82
9	Unknown Redevelopment	36	29	7	75	28	47
10	3 WVU Academic Buildings	1,181	7	1,174	1,029	6	1,023
11	Student Residential Housing	26	0	26	31	0	31
12	Glenn Ridge	76	0	76	92	0	92
13	WVU Academic Buildings or Mixed Use	732	227	505	1,105	198	907
14	The Standard	111	47	64	169	183	0

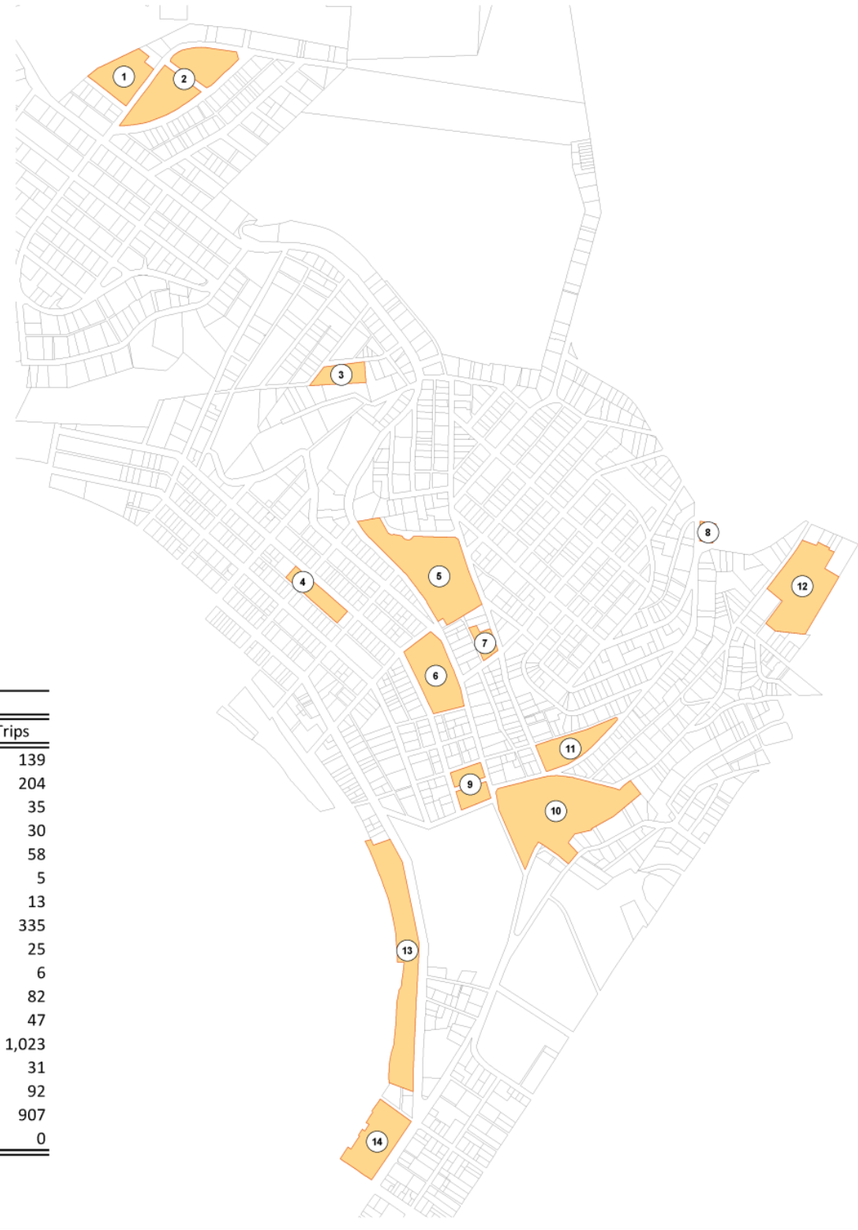
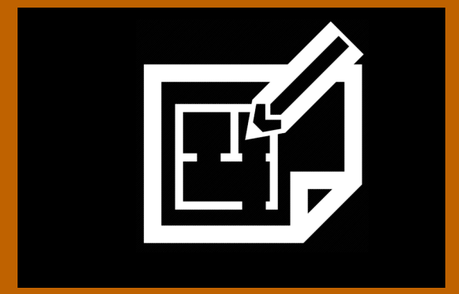


Figure 24: Future Development Anticipated for the University Avenue Corridor

design
considerations



Design Considerations

The development of recommendations for University Avenue begins and, in some respects, ends with the constraints imposed by both the width of the available right-of-way and the often-steep topography (Figure 25). Both of these characteristics, while creating a strong sense of place and memorable vistas, create challenges for bicyclists, pedestrians, drivers, and design engineers.

Over time, non-standard and in some cases undesirable design elements have crept into the corridor: sidewalks abutting fast-moving vehicular traffic; utility poles embedded in sidewalks reducing the clearance for mobility handicapped users; and narrow travelways that leave little room for error on the part of drivers.

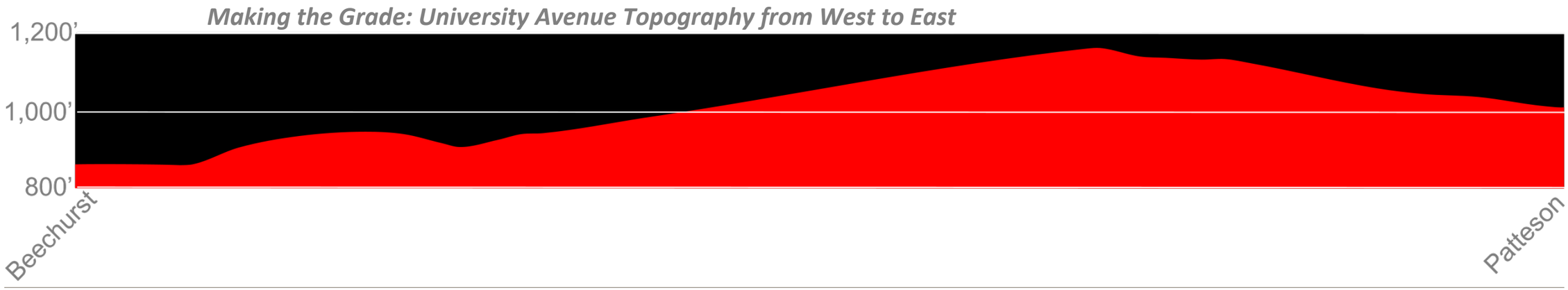


Figure 25. Profile (Grade) on University Avenue

These conditions, coupled with heavy and increasing usage of the corridor, contribute to higher crash rates as well as concerns both on and near the University Avenue Corridor. To partly respond to these concerns as well as provide critical information into recommended intersection designs, the study team considered ten intersections more closely. Traffic and congestion assessments were performed for these ten locations (Figure 26).

Most of these locations are performing fairly well, although some locations in the afternoon (PM) peak periods of travel are falling into a lower level-of-service (LOS E or F). However, it was rare for traveler delays to exceed 60 seconds at any approach on any intersection; University Avenue/Jones Avenue and University Avenue/College Avenue were two such locations.

Overall, this study recommends several laneage improvements to a select number of intersections along University Avenue. To that end, no traffic is expected to be diverted to other, parallel facilities (e.g., Beechurst Avenue or Jones Avenue) as a result of the University Avenue Complete Streets Study recommendations.

Certainly, one location of keen interest is Grumbein's Island, a heavy pedestrian-automobile crossing with University Avenue and the Mountainlair student center. The large numbers of students crossing the street create both congestion for automobile traffic navigating along University Avenue, and potentially dangerous conditions for pedestrians.

The following section describes the steps taken to assess Grumbein's Island and to create a third concept for its improvement.

Intersection	Signal?		Base Year Existing LOS & Delay (sec) AM (secs)	Base Year Existing LOS & Delay (sec) PM (secs)	Base Year w/Redev. & Improvements LOS & Delay (sec) AM (secs)	Base Year w/Redev. & Improvements LOS & Delay (sec) PM (secs)
University Ave @ Patteson Dr		**Overall**	**D (51.7)**	**D (54.0)**	**E (69.6)**	**E (77.1)**
		EB	E (58.5)	E (56.8)	E (71.3)	E (63.8)
		WB	D (43.1)	D (44.9)	D (53.3)	E (55.1)
		NB	D (40.7)	E (55.3)	F (112.4)	F (123.9)
		SB	E (67.3)	E (75.4)	E (59.8)	F (89.1)
University Ave @ Evansdale Dr/Alumni Dr		**Overall**	**A (5.3)**	**B (11.4)**	**A (5.2)**	**C (20.8)**
		EB	A (9.4)	B (14.6)	D (39.7)	E (56.9)
		WB	A (1.9)	A (1.7)	B (12.9)	A (8.8)
		NB	A (5.3)	B (10.3)	A (3.9)	B (15.6)
		SB	A (4.7)	B (11.5)	A (1.3)	B (15.3)
University Ave @ Riverview Dr/Law School Dr	STOP	**Overall**	**A (1.4)**	**A (2.2)**	**A (1.9)**	**A (8.2)**
		EB	A (2.2)	A (0.3)	A (2.1)	A (0.1)
		WB	A (0.4)	A (0.3)	A (0.6)	A (0.5)
		NB	B (14.1)	C (17.7)	D (27.3)	D (30.5)
		SB	C (17.1)	D (34.0)	D (31.7)	F (270.5)
University Ave @ 8th St/Jones Ave	STOP	**Overall**	**A (9.8)**	**E (42.8)**	**E (49.6)**	**F (-)***
		EB	A (0.1)	A (0.2)	A (0.1)	A (0.3)
		WB	A (2.1)	A (3.3)	A (1.4)	A (1.2)
		NB	F (56.8)	F (290.9)	F (-)*	F (-)*
		SB	C (18.6)	D (25.8)	E (35.0)	F (50.5)
University Ave @ Beverly Ave	STOP	**Overall**	**A (0.4)**	**A (0.8)**		
		EB	B (10.6)	B (10.6)		
		WB	N/A	N/A		
		NB	A (0.4)	A (0.9)		
		SB	A (0.0)	A (0.0)		
University Ave @ Campus Dr/Stewart St		**Overall**	**C (25.6)**	**D (38.2)**	**F (170.3)**	**F (128.7)**
		EB	B (19.3)	B (17.1)	D (48.2)	F (96.6)
		WB	D (39.5)	D (51.5)	F (210.4)	E (78.1)
		NB	C (20.3)	D (37.6)	D (51.1)	F (82.5)
		SB	C (26.2)	D (39.5)	F (-)*	F (-)*
University Ave @ College Ave	STOP	**Overall**	**A (4)**	**B (13.8)**	**B (11.5)**	**F (-)***
		EB	D (26.1)	F (113.1)	F (77.5)	F (-)*
		WB	C (20.7)	F (72.2)	F (71.6)	F (-)*
		NB	A (0.1)	A (0.2)	A (0.1)	A (0.3)
		SB	A (3.3)	A (3.3)	A (3.8)	A (4.0)
University Ave @ Beechurst Ave/Fayette St/Don Knotts Blvd		**Overall**	**C (34.2)**	**C (32.9)**	**D (52.5)**	**D (36.3)**
		EB	D (50.4)	D (52.9)	E (55.8)	D (44.1)
		SWB	C (22.7)	D (41.1)	C (27.4)	D (35.7)
		NB	D (48.2)	D (37.4)	E (79.0)	E (56.5)
		SB	B (18.2)	C (26.8)	B (15.8)	C (23.7)
Beechurst Ave/Monongahela Blvd @ 8th St	STOP	**Overall**	**A (2.8)**	**A (5.6)**	**B (13.5)**	**D (34.9)**
		EB	C (22.2)	E (44.1)	D (32.7)	F (-)*
		WB	C (23.6)	F (55.0)	F (104.6)	F (-)*
		NB	A (0.1)	A (0.0)	A (0.1)	A (0.0)
		SB	A (0.7)	A (1.7)	A (0.6)	A (1.9)
Beechurst Ave @ Campus Dr		**Overall**	**B (18.7)**	**C (28.4)**	**C (24.8)**	**F (94.5)**
		EB	N/A	N/A	N/A	N/A
		WB	B (15.9)	C (21.2)	E (69.8)	C (24.9)
		NB	C (23.8)	C (28.3)	A (7.8)	F (161.7)
		SB	B (11.5)	C (30.9)	C (27.7)	D (46.8)

* F (-) represents failing level of service for this particular intersection approach

Figure 26. Performance of Studied Intersections

Grumbein's Island

The concept of Grumbein's Island was first created in 1934 by Professor John B. Grumbein. It is located in front of the Mountainlair Plaza and represents the highest level of confluence between vehicular traffic and pedestrians along the entire corridor. It has been a continual frustration for the WVU administration, WVDOH and the City of Morgantown. WVDOH owns and operates this section of University Avenue. Over 18,000 vehicles per day conflict with thousands of pedestrians crossing the street to reach the Mountainlair student center. In fact, a number of studies have previously been commissioned that looked at alternative ways to address the safety and congestion problems at this location. This section evaluates two previous studies as well as a third option, and attempts to balance the issues of safety, constructability, liability, and costs. The following summary discusses two design options from previous studies as well as an introduction to a new design option. It is important to note that the new design option is that of the Consultant with direction and feedback from the Steering Committee.

From this research, data analysis and discussions with local staff and WVU officials, several observations can be made for four performance metrics (Safety, Constructability, Liability, and Construction Cost). A performance rating (excellent, good, fair, poor) is assigned to each metric for comparative reasons.

Option #1: Pedestrian Plaza Bridge/Tunnel Separation

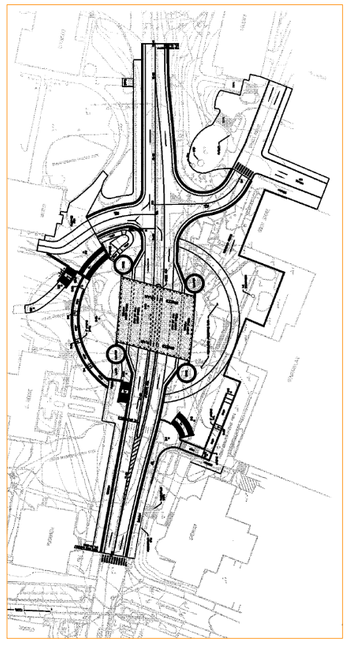
A feasibility study was conducted by Alpha Associates in 2011. The study was commissioned by WVU and the Morgantown Monongalia Metropolitan Planning Organization (MMMPO). The analysis included several options for a grade separation for the plaza that would essential separate pedestrian and bicycle flow from vehicular traffic. The study include pedestrian and traffic data collection, seven grade-separation alternatives and cost estimates. From this data and discussions with local staff, WVDOH and WVU officials, several observations can be made for each performance metric below.

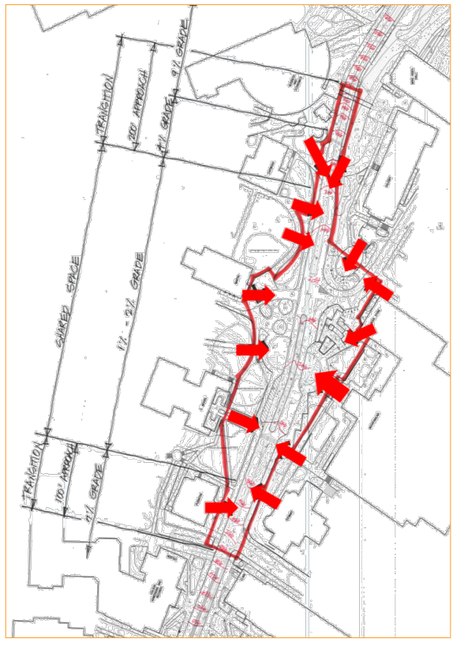
Safety Implications (excellent)*:* This option provides the highest level of safety between modes as it separates the modal conflicts.

Constructability (poor): This option will require major disruption to mobility for all modes. The construction duration is approximately one year including utility impacts. Traffic control may require closure of University Avenue to through traffic.

Liability (excellent): The grade separation would have to be built to WVDOH standards. Limited liability issues are anticipated.

Construction Cost (poor): Average construction cost is $10.4 million. This project has been analyzed and discussed for several years with no real commitment towards construction.





"The Grumbein's Island Feasibility Study Steering Committee seeks to create an alternative configuration for the study corridor that improves the safety and security of users while minimizing the delay for all modes of transportation using the corridor. This should be accomplished by minimizing vehicular and pedestrian conflicts while creating the most desirable path for pedestrians to access their destination. The proposed configuration should be fiscally feasible and it should enhance the sustainability and utility of the corridor to the university community and the community at large."

Option #2: Pedestrian "Shared Space" Intersection

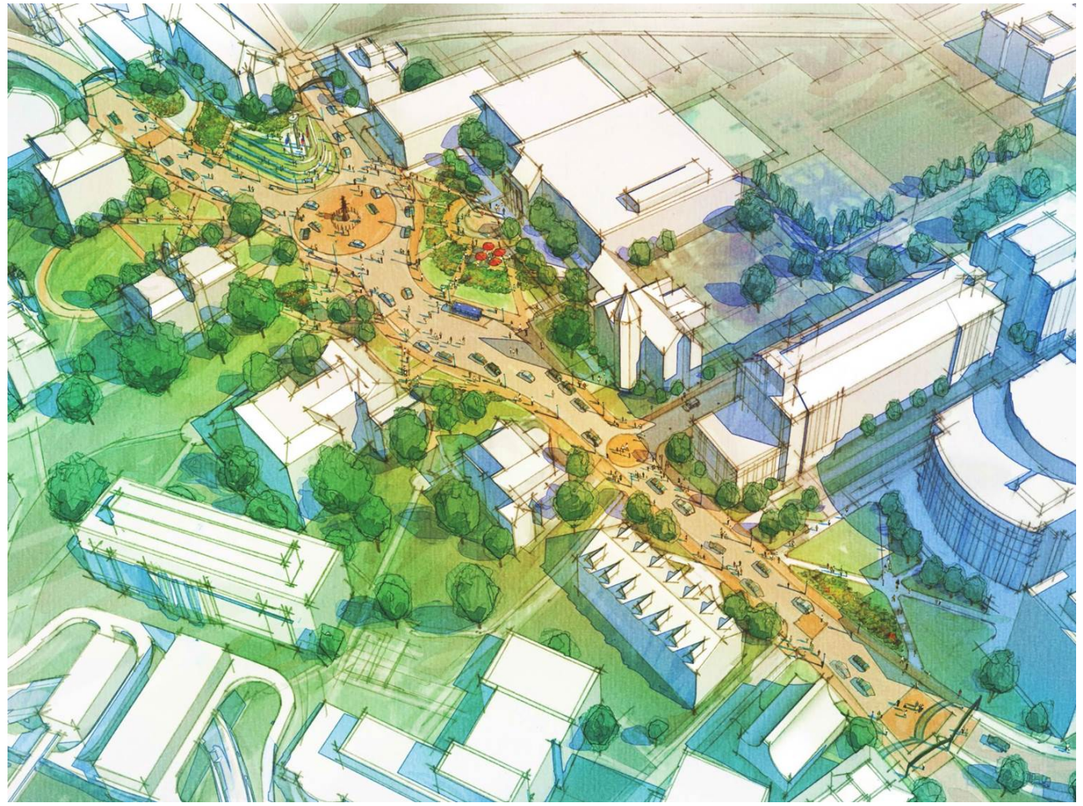
The WVU commissioned another study in 2014 to evaluate a less costly alternative for addressing the problems at Grumbein's Island. This alternative concept is called a "Shared Space" intersection, much like the European style intersection that allows free movement by all modes. The premise is simple. Grumbein's Island would be redesigned to act like a large courtyard, free of obstructions, signage and barriers. Vehicles, pedestrians, bicyclists and buses would interact freely. Right of way would not be dictated by a traffic signal, sign or barrier. That said, travelers, whether by four wheels, two wheels or by foot would pass through the area on a first come, first serve basis. From this data and discussions with local staff, WVDOH and WVU officials, several observations can be made for each performance metric below.

Safety Implications (poor): This option does not address the abrupt interruptions to travel for vehicles and pedestrians. There is no known precedent for this type of intersection design within WV or the surrounding states. There are simply too many unknown variables regarding safety.

Constructability (Good): This option will require moderate disruption to mobility for all modes. The construction duration is approximately nine months including utility impacts. Traffic control may require lane shift or closure of University Avenue to through traffic.

Liability (poor): Whoever owns and operates University Avenue would have to bear the responsibility and liability of safety and maintenance. WVDOH currently owns this section of the road and has expressed a concern for the design of the Shared Space concept because it does not meet current MUTCD standards.

Construction Cost (Good): Average construction cost is $5 million. However, because it represents such a large footprint, this cost is subject to impacts to utilities, stormwater drainage, and the level of streetscape, lighting and landscaping.



Option #3: Pedestrian "Raised Intersection" Gateway

A third option was developed as a part of the public design workshops conducted in September 2015. As the options to date were vetted, we gained a better understanding of the prevailing issues as summarized by one of the attendees: ***"the problem with Grumbein's Island is that students (pedestrians) are crossing anytime and anyplace they want. This causes conflicts and disruption to traffic and safety problems for the kids."*** *(source: public meeting participant).*

With this in mind, the approach was to make the crossing more predictable. Instead of allowing pedestrians and bicyclists to cross anytime and anywhere, this option dictates the timing and location of pedestrian crossings. It utilizes a raised plant-able median to channelize pedestrians to the preferred crossing location in front of the Mountainlair. A two-phase traffic signal would be installed at this location, actuated by pedestrians or bicyclists that desire to cross this redesigned, wide intersection. During peak periods (class turnover), the pedestrian phase would get adequate time (e.g., 45 seconds) to allow the desired amount of pedestrian crossing. Traffic would receive a comparable time (two minutes) of green phase to allow the queue to dissipate. During off-peak periods (i.e., between classes and after school hours), the green time for the pedestrian phase would be less. Post construction, a timing and phasing assessment should be conducted to optimize the timing for each phase of peak and off-peak periods.

It should be noted that, with 18,000 VPD and thousands of pedestrian crossings per day, this option will not eliminate the congestion issue. However, it will make traffic movements more predictable and more efficient.

In this way, the pedestrian gateway provides a safe haven for pedestrians and bicyclists, while allowing traffic to flow more efficiently. More so, it can become a gateway centerpiece and a vibrant meeting place of activity. With street trees for shade, plant-able median, bench seating, well-lit monumental lighting, pavement pavers and public art, the Grumbein's Island Gateway can become a quality landmark for WVU and the City of Morgantown once again.

Safety Implications (Good): this option provides a balance between pedestrian/bicycle and vehicular right of way, making crossings more predictable and safe.

Constructability (Good): this option will require moderate disruption to mobility for all modes. The construction duration is approximately six months. Traffic control may require lane shift or closure of University Avenue to through traffic.

Liability (Good): The design of this intersection would meet MUTCD standards, similar to other City or State-owned and operated intersections. More importantly, the movements at the intersection are seen to be managed through commonly accepted practices.

Construction Cost (Good): The opinion of probable cost is approximately $3 million. This option provides the lowest cost option of the three.

Figure 27 on the following page provides a conceptual rendering of Option 3.

THE DOMINION Post

MPO seeks input for street project

Forums held for University Ave. improvements

BY CONOR GRIFFITH
The Dominion Post

The Morgantown Monongalia Metropolitan Planning Organization (MPO) is looking for ways to improve a section of University Avenue, from Evansdale to downtown Morgantown, and is seeking the public's input on this project.

Anyone interested in providing that feedback will have a chance to do so Monday and Tuesday, in the small Gold Ballroom of the Mountainlair, when the MPO will host public drop-in sessions from 10 a.m - 3 p.m. both days.

Those attending can meet with engineers, landscape architects and urban planners to look at ways to improve a two-mile stretch of University Avenue from W.Va. 705/Patteson Drive to Beechurst Avenue.

"Members of the community can come in and make suggestions," MPO Executive Director Bill Austin said. "We felt this was a central location for everyone in the corridor."

Austin said the drop-in sessions are meant to follow up on interviews conducted in the community to address safety, aesthetics and pedestrian issues, such as the Grumbein's Island crossing outside the Mountainlair.

The drop-in sessions, along with preceding interviews, are part of a larger study to address the rapid development of the University Avenue corridor. Other long-term goals of the study include developing a land-use model to determine the anticipated transportation effects of planned development and the development of intersection concepts.

Austin said the study isn't limited to University Avenue. Concerns and traffic patterns regarding Willowdale Road, Monongahela Boulevard and the streets adjacent to University Avenue are up for comment as well.

SEE **PROJECT**, 2-A

Grumbein's Island Design Options Summary*

Option	Safety Implications	Constructability	Liability	Construction Costs
Option 1: Plaza Bridge / Tunnel	Excellent	Poor	Excellent	Poor ($10.4 million)
Option 2: Shared Space Intersection	Poor	Good	Poor	Good ($5 million)
Option 3: Raised Intersection	Good	Good	Good	Good ($3 million)

* This table provides a synopsis of each design option for Grumbein's Island against the four performance criteria categories (Excellent, Good, Fair and Poor).

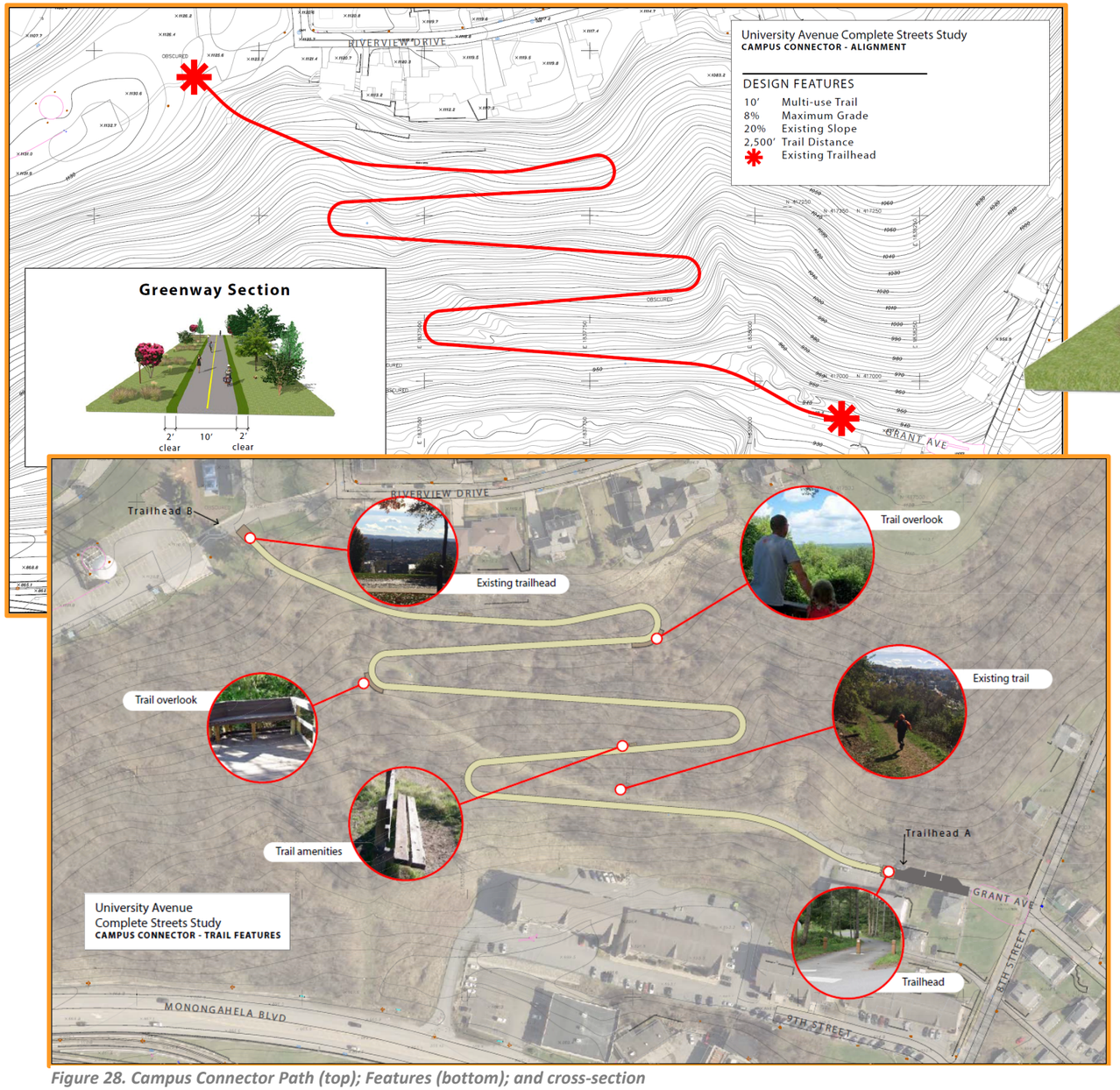
Figure 27. Conceptual Design for Grumbein's Island (inset: at night)

Campus Connector

One of the most treasured amenities within the study area and Morgantown is the Campus Connector. Today, it exists nothing more than a goat path of natural landscape and gravel connecting Grant Avenue to Riverview Drive. Located between University Avenue and Beechurst Avenue, this multiuse path provides an alternative route for bicyclists and pedestrians between the residential area south of University Avenue and the Evansdale Campus and boasts one of the best views of the river in the City. More so, it provides a recreational amenity in an area that is well defined by development and steep slopes. The issue with the Campus Connector is that its path has never been defined very well. The existing grade along this gravel path is typically greater than 20%. ADA (Americans with Disabilities Act) compliance recommends a grade between 5% - 8% for a similar facility. The topographical challenges make it difficult for the average pedestrian to transcend let alone a bicyclist. ADA compliancy may be achieved through the provision of landing areas along the path to be spaced no more than 200 feet apart on a trail where at least 70% of its length is not more than 8.33% slope. The surface on the trail must also be firm and stable but not necessarily paved and the cross-slopes are no more than 5%.

During the public outreach events, several bicycle and pedestrian advocates wanted the design team to evaluate the path in hopes that a more well-defined facility could be developed. The result of this analysis is shown in Figure 28 on the next page.

The intent of the recommendations was to provide a public amenity that could be used by all users including bicyclists and pedestrians as well as for commuting and recreational purposes. The multiuse path would be a preferred ten feet in width to accommodate bidirectional flow. It would connect two new trailheads between Grant Avenue and Riverview Drive, near the water tower. The redesigned trailheads should include signage, receptacles, and gateway features. The realigned path would meander up the mountain landscape using an 8% percent maximum grade for a distance of 2,500 feet. Trail amenities including resting areas, bench seating, and trail overlooks could be constructed along the path providing maximum utility and recreation.



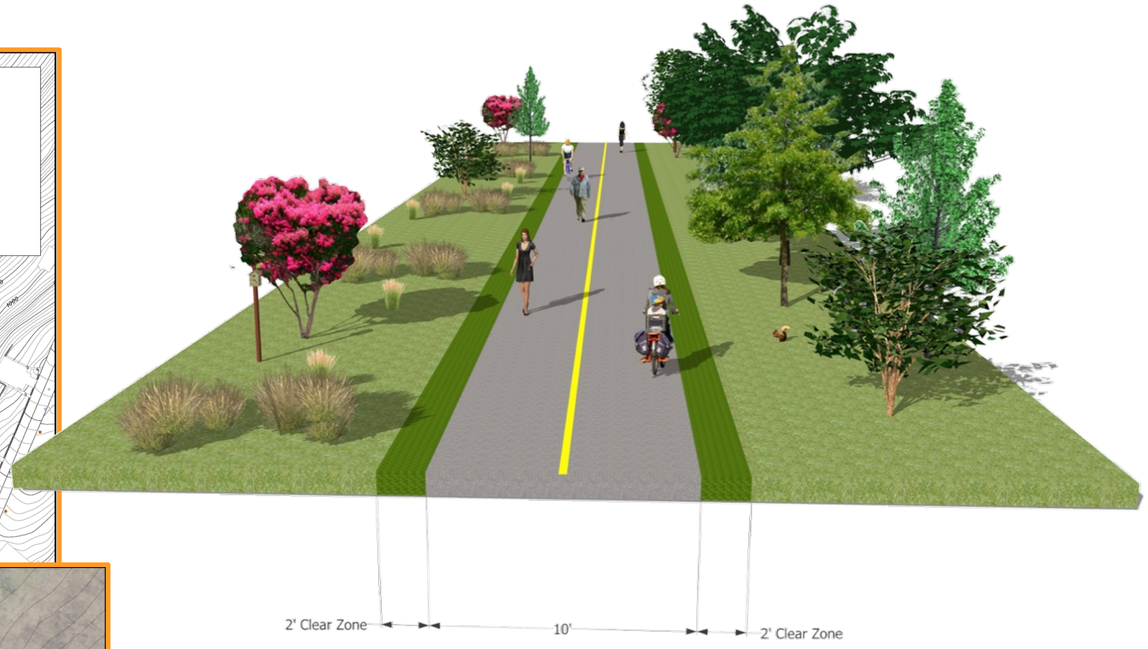


Figure 28. Campus Connector Path (top); Features (bottom); and cross-section

Opinion of Probable Costs for Campus Connector	
Construction Subtotal	$1,860,000
Contingency (20%)	$372,000
Design (10%)	$223,000
Mobilization (3%)	$67,000
Demobilization (1.5%)	$34,000
Total Construction Costs	**$2,556,000**

Transit Integration Strategies

Public Transportation for the study area is primarily provided by **Mountain Line Transit Authority**. This system provides fixed bus route services to the Morgantown region, WVU as well as University Avenue. Seventeen service routes are provided throughout the weekday and weekends with 15 – 60 minute headways, depending on the route. As shown in Figure 29, there are three routes that provide service along University Avenue between Beechurst Avenue and WV 705.

With this in mind, the Transit Administrator and their staff met with the project team members to discuss transit integration and needs along the University Avenue corridor. A few key issues were identified, including:

- Route service currently operates as a "flag down" demand system. This is great for responsiveness, but, poor for operational efficiency.
- Ridership at key locations is limited by demand and access.
- Very few physical amenities are provided for patrons of the transit system.
- Reliability and route consistency is greatly impacted by incidents/crashes and congestion along the corridor.

These discussions resulted in physical provisions for transit amenities along the entire corridor. That is, one of the highest priorities for transit services along the corridor was to implement high quality bus shelters. Bus shelters would improve the operational efficiency of service and provide a safe-haven for transit riders. Working with the transit administrator, the project team evaluated ridership demand along the entire corridor as well as design and safety features to identify the most appropriate location for implementing high-quality bus shelters like that shown in Figure 30 on the next page. Each shelter can be designed to include protected bench seating, information kiosk/arrival times, lighting, receptacles, and shade. Ten (10) high quality bus shelters were located along the entire corridor as evaluated by the Transit Administrator (*refer to earlier sections on complete street design*). Routes and stops are subject to change in the Falling Run area as it is currently under study. Further considerations for transit needs are needed as the project goes into final design.

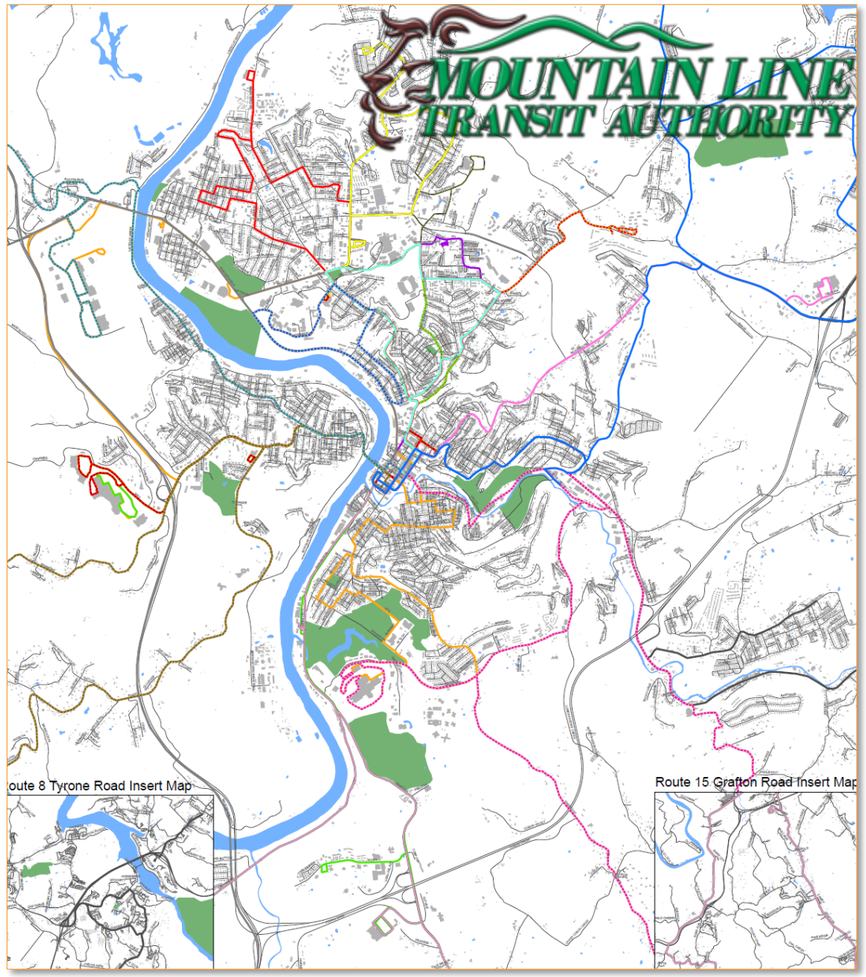


Figure 29. Mountain Line Transit System

Personal Rapid Transit (PRT)

The **Personal Rapid Transit (PRT) system** is another public transit system available to citizens in the study area. The PRT is a unique and easy-to-use transportation solution for WVU students, faculty, staff, and the Morgantown community. There are five stations: Walnut Street Downtown; Beechurst Avenue for the Downtown campus; Engineering Sciences; the Evansdale Residential Complex; and Health Sciences. Powered by electric motors, the computer-driven cars arrive at your station within five minutes after you push a button.

Morgantown PRT is open to the public (federally funded program) but it is operated by the University. It runs primarily during class days. During the fall and spring semesters, it operates from 6:30am to 10:15pm weekdays and 9:30am–5:00pm on Saturdays, being closed on Sundays.

In terms of function, the PRT system has been described as the "best kept transit system secret" in the U.S. It connects various spatially separated parts of the WVU campus. The terrain in Morgantown is quite hilly and walking and bicycling are difficult as is auto travel. This is especially true during the winter. A shuttle bus system was used for many years to help students get around but it was unable to provide very good service because of heavy auto congestion and narrow, hilly roads.

Construction of the system was begun in 1971 (during the Nixon Administration) and it was finished one year later. Extensive testing then took place and it was opened for passenger service in 1975. Phase I consisted of approximately 5.2 miles of guideway, 45 vehicles, 3 stations and a maintenance/control facility. In 1978, the system was shut down so that Phase II could be constructed. The vehicle fleet was expanded to 71, 3.5 lane-miles of guideway, 2.5 stations (one existing station was expanded), and a second maintenance facility was added. Operations were resumed in 1979 and have been continuous since then with a 99% reliability factor.

The system now connects the main downtown campus with the Morgantown central business district and the two suburban campuses along a linear alignment. The total system includes 8.7 miles of guideway and 5 stations. The distance between the two end stations is about 3.6 miles (6 km) with relatively few intermediate stops. The system can be operated in either a scheduled or demand-responsive mode, depending on the predictability of demand.

A Master Plan for updating and expanding the system was completed in 2009. Based on this plan, the system is currently undergoing a major upgrade at a cost of approximately $125 million spread over approximately 5 years. The upgrade includes the technology control system, the power system, and the cars. The cars will be the last phase performed. The infrastructure improvements are primarily focused on the track heating system. (*source: http://transportation.wvu.edu/prt*)

Figure 30. High-Quality Transit Stop (top); PRT (bottom-left); and Articulated Bus used for Bus Rapid Transit (bottom-right)

Bus Rapid Transit (BRT)

Bus rapid transit (**BRT**) is a bus-based mass transit system. A true BRT system generally has specialized design, services and infrastructure to improve system quality and remove the typical causes of delay. Sometimes described as a "surface subway", BRT aims to combine the capacity and speed of light rail or metro with the flexibility, lower cost and simplicity of a rubber-tire bus system.

To be considered BRT, buses should operate for a significant part of their journey within a fully dedicated right of way busway to avoid traffic congestion. In addition, a true BRT system has most of the following elements.

- Alignment in the center of the road (to avoid typical curb-side delays).
- Stations with off-board fare collection (to reduce boarding and alighting delay related to paying the driver).
- Station platforms level with the bus floor (to reduce boarding and alighting delay caused by steps).
- Bus priority at intersections (to avoid intersection signal delay).

The concept of a BRT line within the study area was introduced by staff members of the Mountain Line Transit Authority. The premise is to implement a BRT service that connects both campuses and the PRT, operating as a PRT Extension. This new service would provide needed relief to University Avenue as well as Beechurst Avenue. In effect, this service would operate with five-minute frequencies over a 10-minute trip from one end to the other, as depicted in Figure 31. The route would potentially utilize Jones Avenue, Medical Center Drive, Alumni Drive and Evansdale Drive, with some new location facilities. It would connect to all the dorms/apartments along Jones Ave., provide for special events like WVU football games and trips to the Medical Center.

A ridership analysis has not been conducted for BRT options; however, ridership is expected to be significant for several reasons. Staff administrators estimate the system would carry approximately one million rides a year. Capacity would be approximately 4.3 million rides per year, varying with bus size and seating. It would also serve as a viable alternative when the PRT experiences a service disruption (2.4 million rides per year). This new service would not necessarily eliminate bus trips on University Avenue, but it is expected to lower vehicular trips on University Avenue.

The new BRT service is estimated to cost $4.1 million (startup cost), annual operating cost of $500,000, utilizing eight (8) articulated buses and operating between 6:30am – midnight (365 days a year). A future study should be commissioned that addresses the following outstanding issues relative to BRT feasibility.

- Roadway infrastructure improvements (constructability and cost) including retrofit of existing facilities and new location.
- Vehicle displacement impacts along specific routes utilizing bus only lanes.
- Right of way and access requirements for vehicular mobility and property.
- Return on Investment, including loss of existing fixed-route ridership.
- Passenger facilities and information technology improvements.

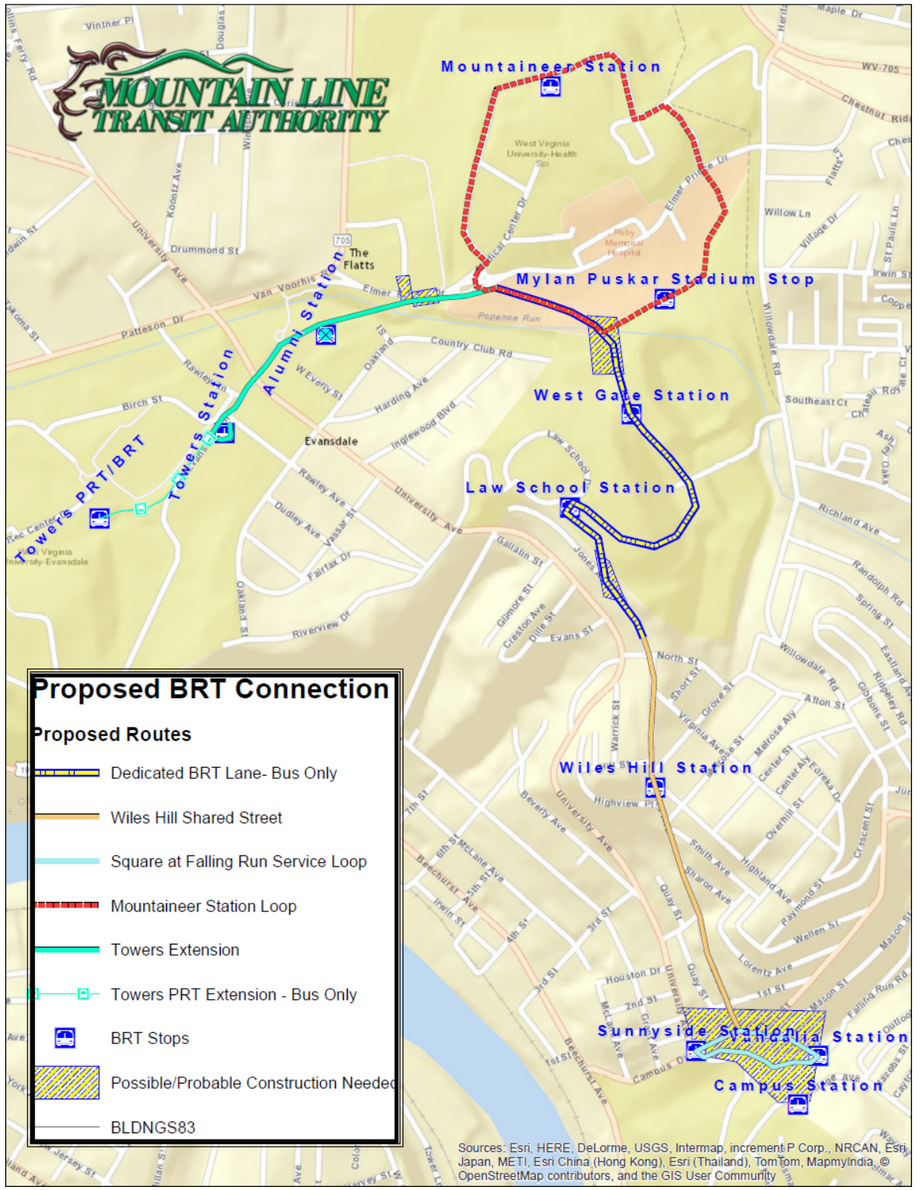


Figure 31. Proposed BRT Connection

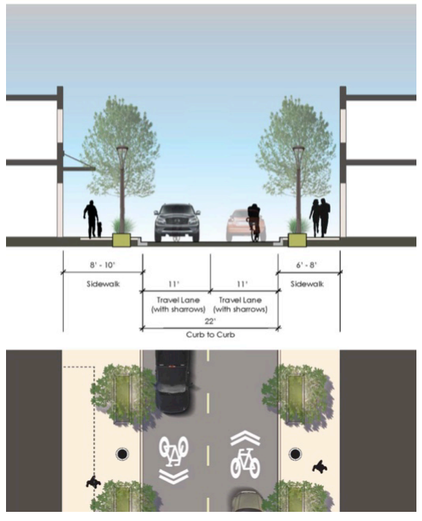
complete streets
design theme

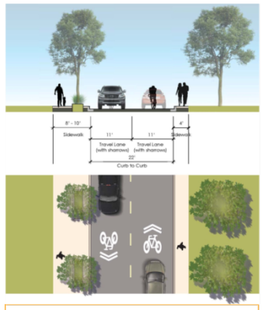
Complete Streets Design Theme

The input from the public, technical analysis of the project team members, and the physical realities of University Avenue all dictated the elements that were incorporated into the final corridor design.

The graphic at right (Figure 32) illustrates how the design team addressed the major concerns of stakeholders while still respecting the desire to maintain an overall vision a nd physical “constructability.”

Typical street cross-sections and standardized crossing treatments helped shape specific design treatments throughout the corridor.





New sidewalks, context-sensitive bicycle treatments, and a University Connector route are some of the suggested used in the corridor recommendations.

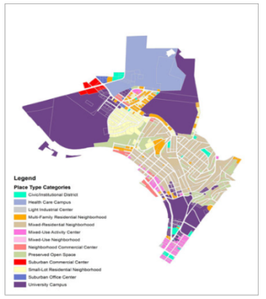
TREAT WALKING AS THE MOST IMPORTANT ISSUE TO ADDRESS

The addition of street trees and better lighting, as well as recommendations to replace crumbling pavement and sidewalk, are integral to our project.

PRESENT A GREAT IMAGE TO RESIDENTS, VISITORS, AND BUSINESSES

Proposed crossing improvements at a number of locations, and a complete re-design of Grumbein’s Island and “the Loop” area, are key recommendations.

REDUCE CRASHES AND CRASH-RELATED DELAYS



Anticipating traffic impacts from new development and proposing design standards that ensure cost-effective construction were two important points.

BETTER INTEGRATE THE ROAD WITH THE ADJACENT COMMUNITY

Figure 32: How the Design Team Addressed the Major Project Themes

Preferred Concept Plan

When developing the concept designs for University Avenue Complete Streets Corridor Study, several design considerations were assumed to create the highest value facility while minimizing construction and traffic control impacts. Because this is a built environment and a retrofit of an urban arterial, the challenges were great. Traditional design practices may be impractical and limited by the existing rights of way and challenging terrain. However, redesigning University Avenue to accommodate a higher level of bicycle and pedestrian activity, mobility and safety is paramount.

The following **design criteria** were used when designing the University Avenue improvements.

- Terrain: mountainous.
- Design Speed: 30 MPH.
- Lane widths: 11-foot wide preferred, 10-foot minimum (matches existing based on existing geometry from Campus Drive to Third Street/ Beverly Avenue).
- Cross slope: 2%.
- Shoulder widths: 2 feet wide, curb and gutter .
- Bicycle lanes: 5-foot wide bike lanes preferred, 4-foot minimum.
- Sidewalks: 5-foot wide sidewalk preferred, 4-foot minimum (from back of curb), wider sidewalks desirable where space allows.
- Grades: Maximum 10% grade (matches existing based on existing geometry from Campus Drive to Third Street/ Beverly Avenue).

The following provides a description of all associated design considerations for the University Avenue Complete Streets corridor improvements. Many of these items have been discussed previously in more detail.

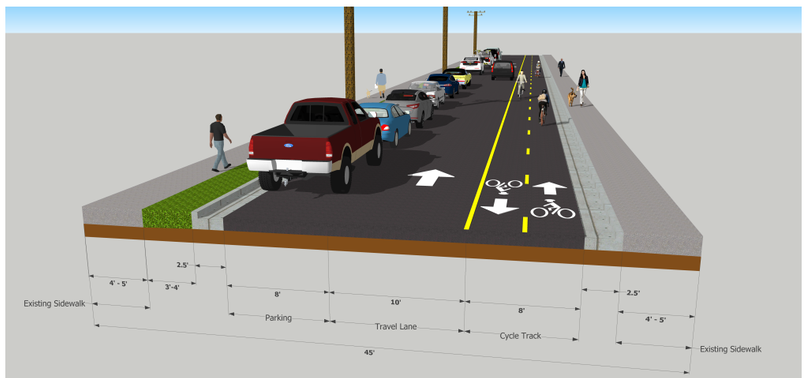
From Beechurst Avenue (near CBD) to Patteson Drive (WV 705), University Avenue represents a narrow and sometimes dangerous passageway for vehicles, pedestrians, and buses through a steeply rolling terrain. Issues related to poor infrastructure design, sight distance problems, safety issues and lack of bicycle and pedestrian facilities have plagued the corridor for decades. The corridor already supports up to 17,000 vehicles per day. Compound this with the impending development pressures of 10,000 new beds and multi-family units within the study area and the warrants for additional multimodal improvements become obvious.

Concept Designs

The design considerations for each section of the roadway are described below followed by the **concept designs**, engineered using AutoCAD™(see cross-section to the right).

From Beechurst Avenue to 3rd Street: This section University Avenue is currently one way (inbound) at Beechurst Avenue. Based on the need to support bidirectional traffic along this arterial, it is recommended that University Ave. support two-way traffic between Beechurst and Willey Street. On street parking would be limited to weekends to accommodate church parking needs. Willey Street would be redesigned to a "T" intersection to alleviate the dangerous curve flowing into Grumbein's Island. Limited retaining walls may be necessary to accommodate proper access to the adjacent parking lot. An opportunity for an enhanced gateway in front of the Downtown Campus Library would be ideal to bring more awareness to bicycle and pedestrian activity as vehicles approach the main campus and Grumbein's Island. See Grumbein's Island recommendations on page 16. Bike lanes would be installed from Willey Street to Stewart Street with appropriate signage and pavement marking throughout. The "Loop" project would address the topo challenges and dangerous curve near Falling Run Road. Street trees, high visibility crosswalks and high quality bus shelters would be constructed at select locations. An exclusive left turn lane would be added at Stewart Street.

3rd Street at Beverly Avenue has been reconstructed recently to add another street/driveway access for the parking deck, creating a five-legged intersection with a signal. This creates significant challenges for traffic operations, sight distance and bike/ped mobility and safety. In fact, the slope along 3rd Street is currently greater than 25% making it impossible to accommodate adequate sight distance for approaching vehicles. The City of Morgantown is currently reviewing the operation of this intersection. The traffic study will include an examination of the intersection geometry in relation to access by emergency service vehicles. In keeping with the design characteristics identified by this study, it is recommended to convertBeverly to an outbound operation including a bidirectional cycle track, as depicted in the cross-section on the next page. The construction limits would impact only the north side of Beverly and require four utility poles to be relocated, while not requiring additional ROW. This recommendation would improve the current signal operations by eliminating an entire phase. It would also alleviate a dangerous sight distance problem at Beverly and 3rd Street. The implementationof this recommendation would be dependent on the findings of a traffic study addressing the issues at the Beverly Avenue/3rd Street/University Avenue intersection.

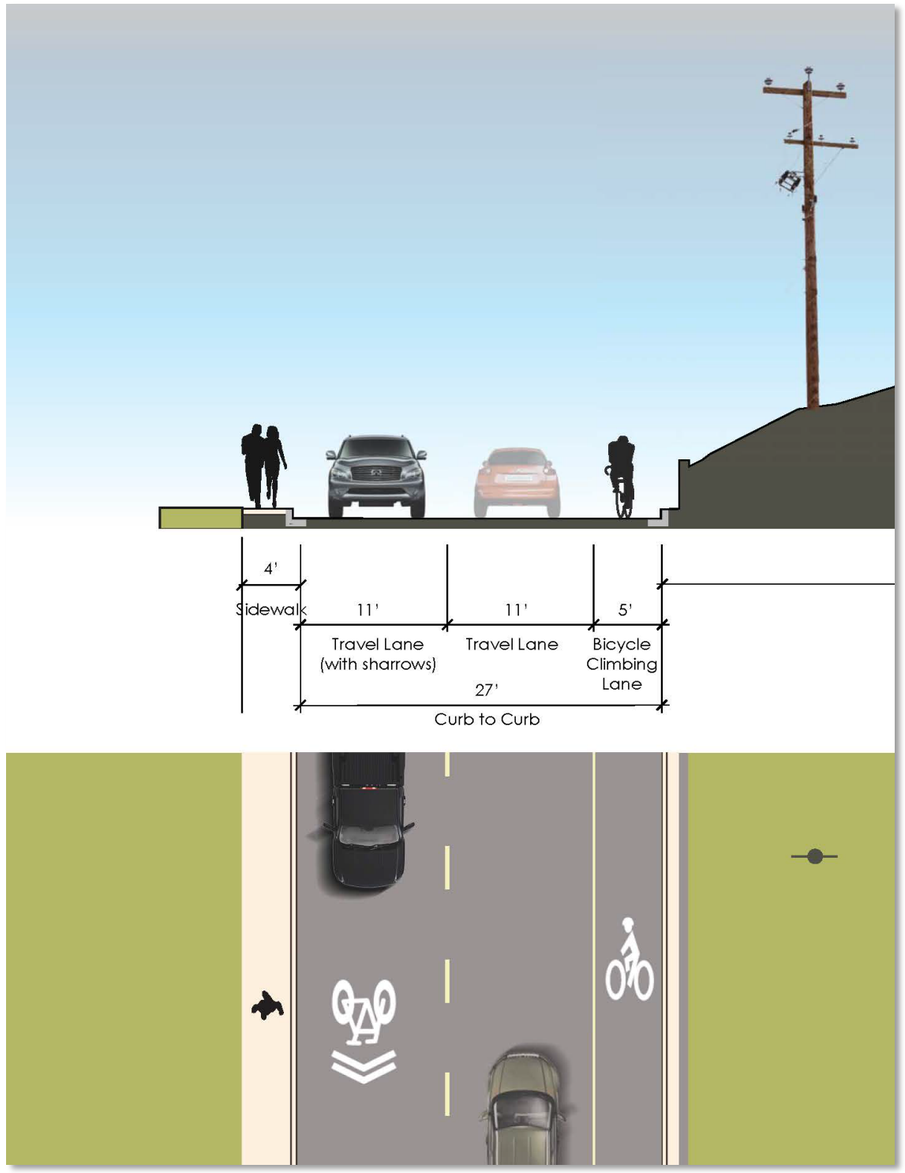


Optional Concept Design

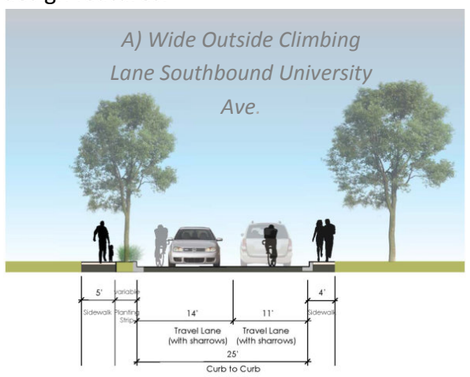
From 3rd Street to Gilmore Street: This section of University Avenue is very narrow. Recommendations include a continuous west-side sidewalk (4 feet) and a bike climbing lane (5 feet) in the northbound direction (Sharrow in the southbound direction) (see cross-section to the right). Due to the limited right-of-way issues and in an attempt to limit additional retaining wall construction, a 4 foot wide sidewalk is recommended in lieu of a standard 5 foot wide sidewalk. Also, a retaining wall will be necessary to construct the bike lane. See cross section to the right. The dedicated bike climbing lane is needed to properly separate slow moving cyclists from faster moving traffic. A Sharrow is recommended in the SB direct as bicycle and vehicular speeds are expected to be similar. Street trees, high visibility crosswalks and high quality bus shelters would be constructed at select locations.

From Gilmore Street to Patteson Drive: This section of University Avenue varies in width and traffic demand. The bike climbing lane and west-side sidewalk continues to the 8th Street intersection. Exclusive left turn lanes are recommended at the 8th Street intersection to address this high crash location. Sidewalks and Sharrows on both sides of the road are recommended from 8th Street to Patteson Drive, as the terrain levels out in this section of University Avenue. Exclusive left turn lanes are recommended at the Law School Drive intersection to accommodate a high demand for left turns. On street parking (approximately 30 spaces) is recommended on the east side of University between 8th Street and Oakland Street to accommodate future redevelopment and encourage traffic calming along University Avenue. Due to the terrain issues along this segment, better accomodation for bicycling is recommended. There are two options for considerations: A) a 14' wide outside southbound lane, between Oakland Street and 8th Street, to accomodate safe bicycle travel up-hill and option (see below) B) maintain two 11' travel lanes and install a wide 8'-10' sidepath to accomodate pedestrians and bicyclists (see below). Street trees, high visibility crosswalks and high quality bus shelters would be constructed at select locations.

The redesign of Alumni Drive/University Avenue Intersection is recommended to address safety issues related to free-flow vehicles and right-of-way accommodations for bicyclists and pedestrians. This would include the removal of the free-flow ramps/lanes and the separated turn lanes at Alumni Drive leg of the intersection. This redesign would make the intersection more traditional and predictable for all users and reduce the crossing distance for pedestrians. Exclusive left turns are recommended at all quadrants. A narrow, decorative median (small plantings and/or brick pavers) could be installed to delineate traffic lanes and provide a pedestrian refuge. The northeast quadrant of the intersection could be used to design another gateway including a potential monument and gateway design features.



Bike Climbing Lane Section, North of 3rd Street



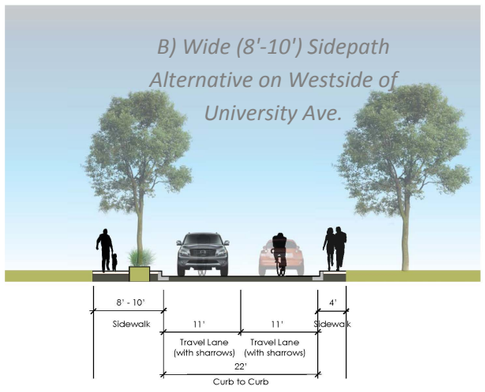


Figure 33 on this page shows graphically how the typical cross-sections developed for this project are used to create a context-sensitive and seamless set of design solutions that addressed the specific needs of various corridor segments.

The following pages (Figure 34) illustrate the design concepts that have been previously described as they were applied to the full length of the University Avenue Corridor.

Figure 33. Preferred Access Plan, Showing Intersection Hot Spots and Typical Cross-Sections

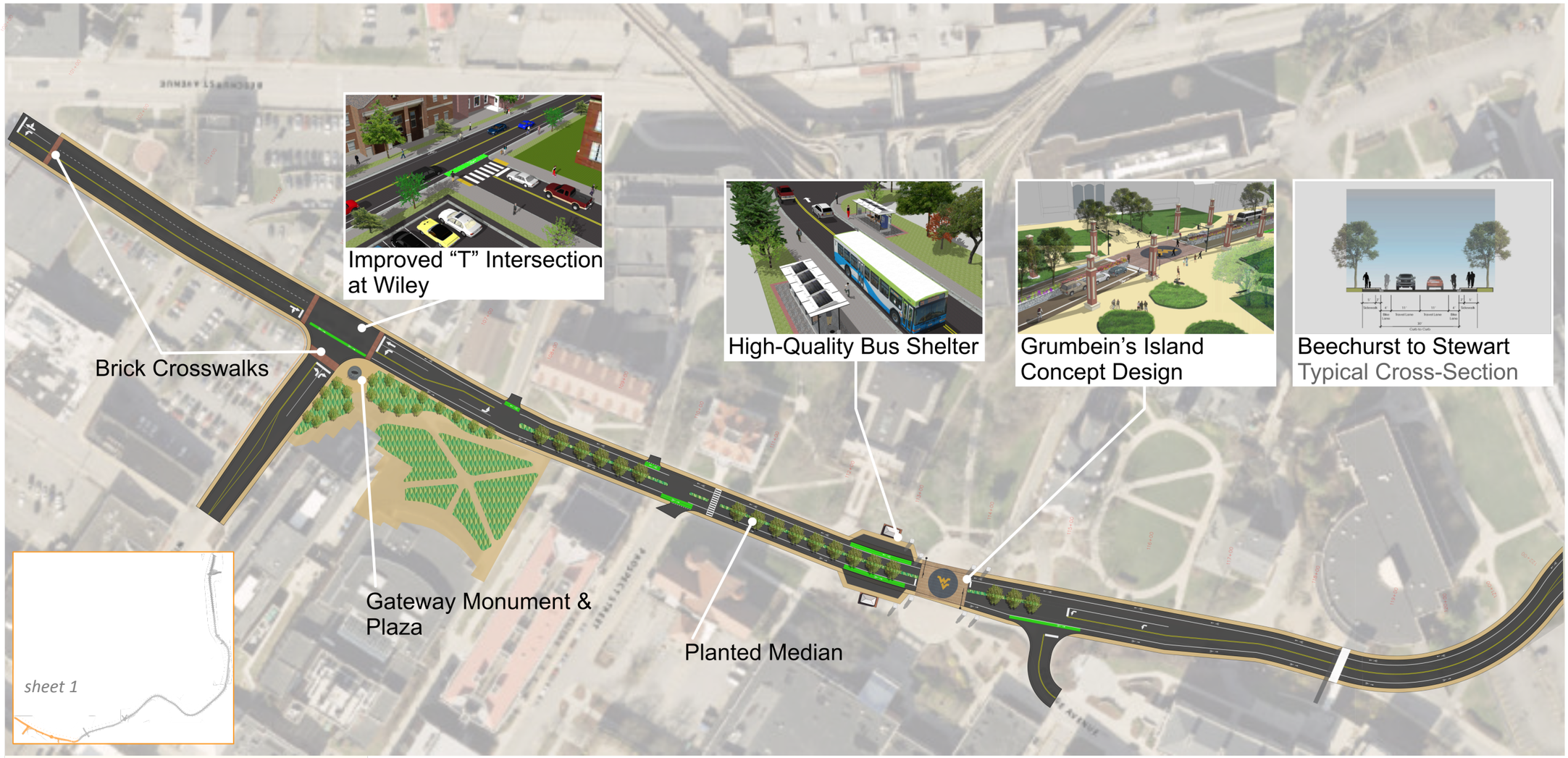


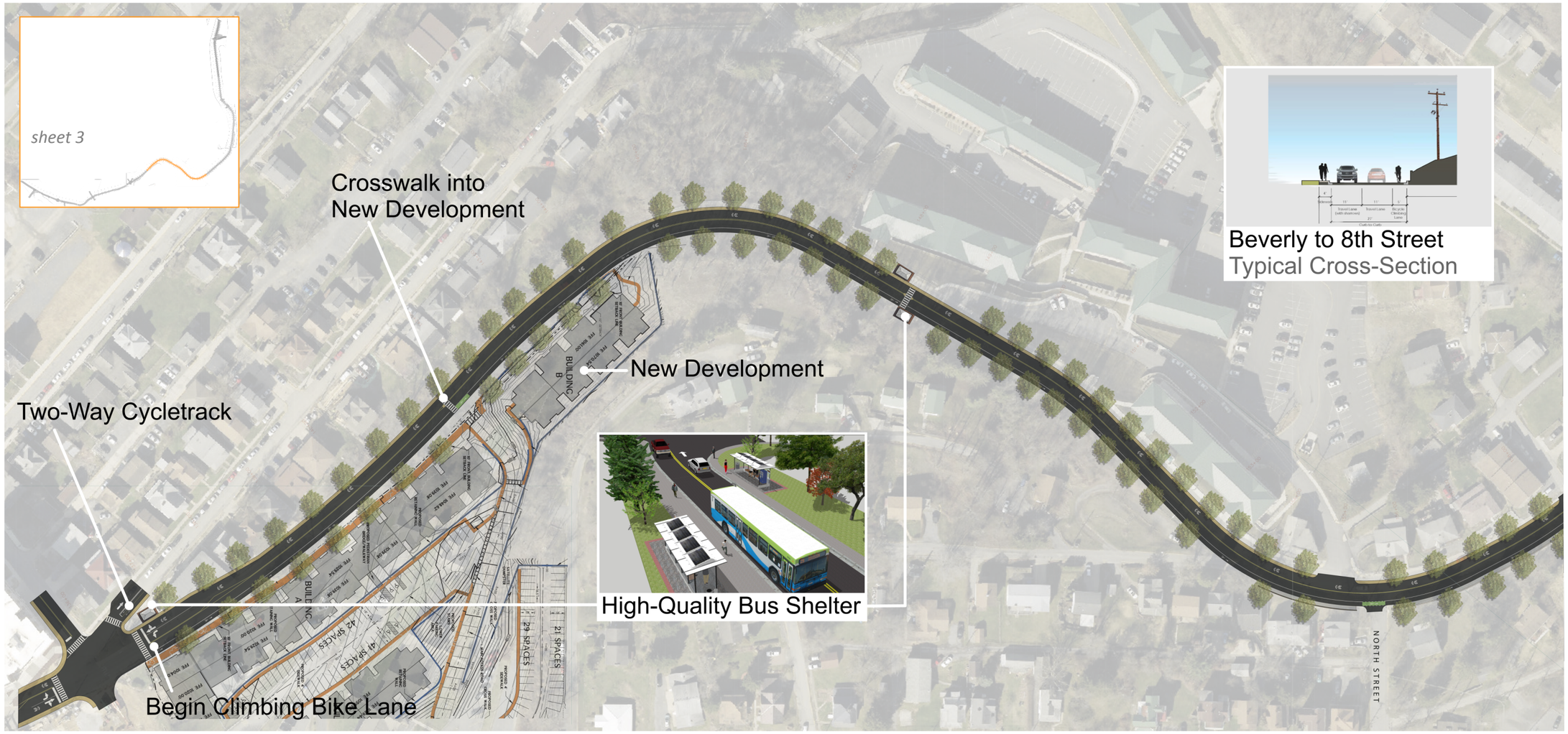
Figure 34: Corridor Concept Design (multiple pages)

The Loop Road
Typical Cross-Section

High-Quality Bus Shelter

Stewart to Beverly
Typical Cross-Section

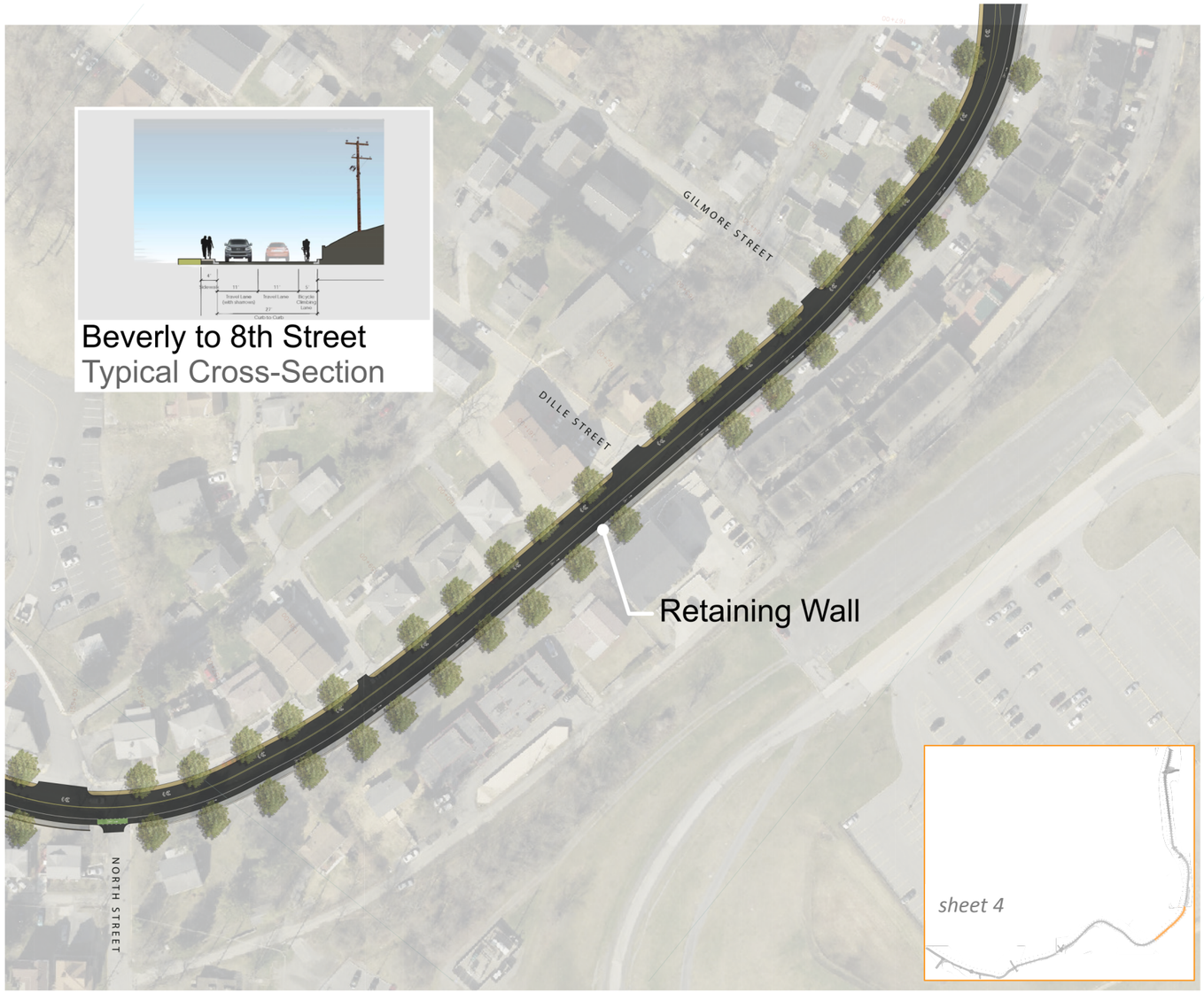
COMPLETE STREETS IMPROVEMENT PLAN - UNIVERSITY AVENUE



NORTH

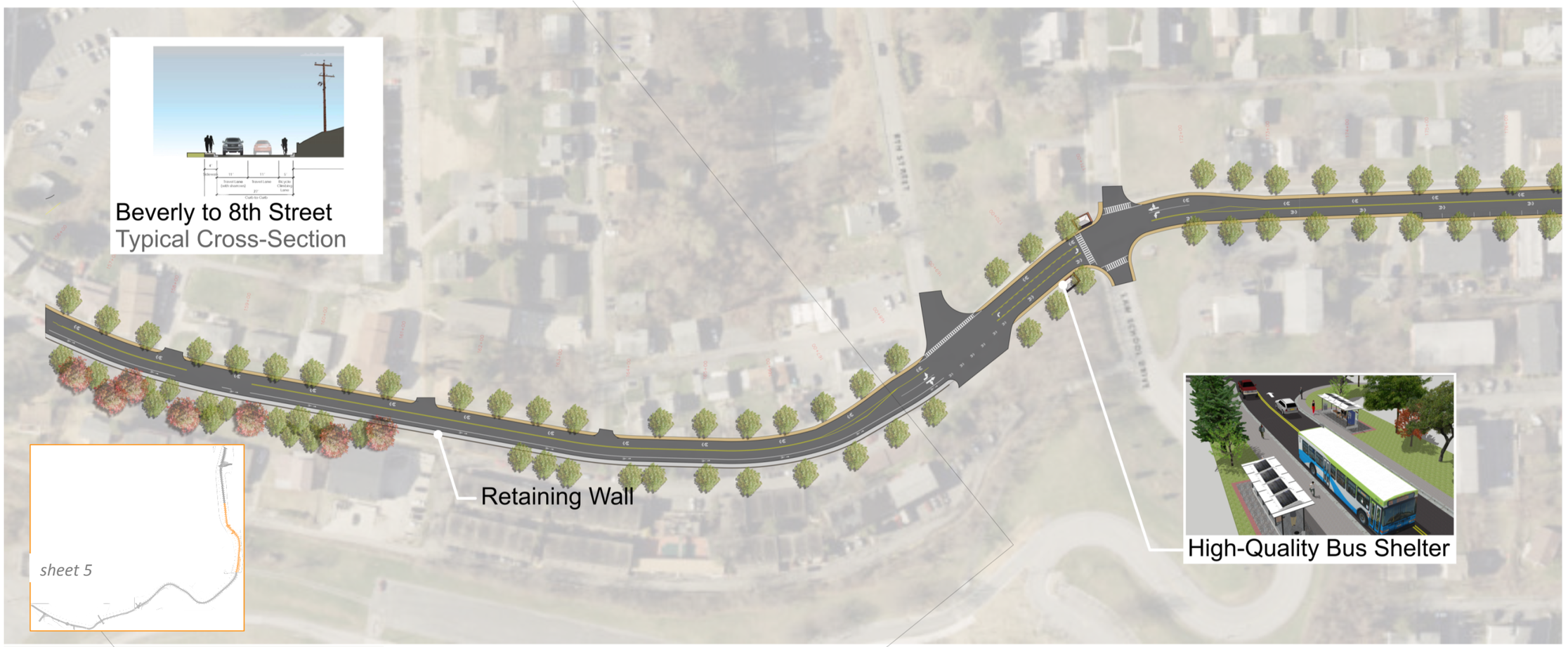
COMPLETE STREETS IMPROVEMENT PLAN - UNIVERSITY AVENUE

COMPLETE STREETS IMPROVEMENT PLAN - UNIVERSITY AVENUE



Beverly to 8th Street
Typical Cross-Section

NORTH


Beverly to 8th Street
Typical Cross-Section
Retaining Wall
sheet 5
High-Quality Bus Shelter
Stantec
MMMPO
Complete Streets
NORTH
COMPLETE STREETS IMPROVEMENT PLAN - UNIVERSITY AVENUE

High-Quality Bus Shelter

8th Street to Evansdale
Typical Cross-Section

8th Street to Evansdale
Typical Cross-Section

Evansdale to W. 705
Typical Cross-Section

Stantec MMMPO Complete Streets

NORTH

COMPLETE STREETS IMPROVEMENT PLAN - UNIVERSITY AVENUE

Construction Costs & Phasing

The ultimate success of the University Avenue Complete Streets Corridor Study rests on the ability of local and state officials and leaders to carry out the recommendations of the plan. This effort is made easier by describing a series of defined steps — or action items — to move the process forward. However, defining the cost and potential funding mechanisms will allow a framework or "blueprint" for implementation. From the outset of the study, a key objective was to develop cost-effective recommendations (at a variety of scales) that set the stage for additional improvements to University Avenue in the future. With a diminishing return on the dollar, all efforts should focus on creating an environment conducive to change along the University Avenue corridor.

Like other corridors throughout the state, University Avenue has crossed the line where commuter-based traffic congestion, unsafe travel conditions, and non-sustainable development patterns are no longer are tolerated. The Morgantown region has begun to change how it does business by identifying critical issues: Local incentives for the development community are not necessarily protocol. The amount of available land ready for redevelopment is limited. And, this is an attractive place for doing business.

The quality of private investment in both design and community amenities will have a profound impact on the attractiveness of the area, and successful and sustainable development will come only through a cooperative effort between public and private ventures.

Figure 35 provides a breakdown of the construction costs associated with the University Avenue recommended improvements. These include items related to Complete Streets, landscaping, signal improvements, sidewalks, retaining walls, new pavement, structures, curb and gutter, traffic control, etc.

The opinion of probable cost for constructing the 1.9 miles of improvements is approximately $27.8 million.

Segment	Description	Length	Design ($Millions)	Construction ($Millions)
1. Beechurst Avenue to Prospect Street	Convert University Avenue to two-way traffic flow from Beechurst Avenue to Willey Street. Realign Willey Street to provide a t-intersection.	0.2 Miles	$0.22	$2.30
2. Grumbeins Island - Prospect Street to north of College Avenue	Construct a boulevard section with signalized pedestrian crossing in front of the Mountain Lair.	0.1 Miles	$0.30	$3.00
3. The "Loop" - from north of College Avenue to Stewart Street	West Virginia University is exploring concepts to realign University Avenue and raise its grade in the area commonly referred to as the "Loop".	0.2 Miles	$0.80	$10.2
4. Stewart Street to Third Street	Realign Stewart Street and Campus Drive to improve sight distance at University Avenue.	0.25 Miles	$0.14	$1.48
5. Third Street to north of Law School Drive	Construct a northbound bicycle climbing lane on University Avenue north of Third Street. Widen to provide turn left turn lanes on University Avenue at 8th Street and Law School Drive.	0.7 Miles	$0.64	$6.67
6. North of Law School Drive to south of Alumni Drive	Replace existing curbs and provide for possible future on-street parking.	0.3 Miles	$0.23	$2.28
7. South of Alumni Drive to WV 705	Reconstruct Alumni Drive intersection with University Avenue. Extend northbound right-turn lane at WV 705 to Alumni Drive. Construct raised median between Alumni and WV 705.	0.15 Miles	$0.17	$1.82
		SUBTOTAL	**$2.5**	**$27.8**

Note: Estimated costs include sidewalk replacement, Complete Streets, landscaping and traffic signal replacement/reconstruction, where appropriate. The Loop project is anticipated to be constructed by others.

Figure 35. Opinion of Probable Costs for Construction

ENDNOTES

[1] Tinnell, S.C. (2011). *Then & Now: Morgantown*. Charleston, SC: Arcadia Publishing.

[2] United States Census Bureau. (2015). *Morgantown (city), West Virginia QuickFacts*. Retrieved from http://quickfacts.census.gov/qfd/states/54/5455756.html.

[3] Florida Department of Transportation Systems Planning Office. Highway Capacity/Level of Service. http://www.dot.state.fl.us/planning/systems/programs/sm/los/

[4] Center for Applied Transect Studies, SmartCode v.9.2. Website: www.smartcodecentral.org, originally by Duany Plater-Zyberk. 2003

[redacted]

Appendix A Stakeholder Outreach Summary

[redacted]

Project Symposium Meeting Summary

A Project Symposium for the subject project was held at the West Virginia University Alumni Center in Morgantown, West Virginia on June 22, 2015 at 7:30PM. The following individuals were in attendance:

Fouad Shouksy
Frank Gmeindl
Matt Latimer
Morti Shamberger
Jeff Mikorski
Wes Nugent
Bill Rice
Ed Sneckenburger
Don Spencer
Mathew Cross
Randy Hudak
Holly Childs
Chris Phillips
Byron Phillips
Frank Scafella
Nancy Ganz
Chris Gluda
Damien Davis
Brian Carr
Bill Kawecki
Jim Craig
Ron Justice
Maria Smith
Andy Dye
Ryan Lynch
James A. Prete
Bill Reger-Nash
Christian Abildso
Neha Lal
Jimmie Simmons

Staff:

Bill Austin, MM Metropolitan Planning Organization
Brian Aldridge, Stantec Consulting Services
David Dixon, Stantec Consulting Services
Scott Lane, Stantec Consulting Services
Mike Rutkowski, Stantec Consulting Services

Bill Austin welcomed the participants to the meeting and explained the purpose, which is to introduce the project and gather feedback from those in attendance.

Brian Aldridge spoke to a slide presentation next. He reviewed the various components of the corridor study, including outreach, analysis techniques, recommendations and schedule (final report due by March, 2016). He reviewed the context of the study as well, noting the 18% mode share for walking in the County (2% transit, 1% biking), far higher than many other communities. He finished by summarizing how design, even elements behind the curbline and off the street, influence various types of transportation users and modes of travel.

David Dixon picked up on this theme and discussed how development trends have changed nationwide, and the thinking about how to design transportation systems that support these development types. He noted that the US population is expected to grow by over 30% from 2010 to 2040, while the West Virginia population is expected to grow by much less (5%). Many of these citizens will be much older in 2040, with more than half being over the age of 65.

Many of these people will lead the charge for more compact development and lifestyles; we anticipate a surplus of sprawl-type housing and a need for more compact area-residences. A different kind of labor force will seek out compact developments, with Mr. Dixon noting that knowledge workers seek places offering community-rich lifestyles. Many of these workers will be minorities.

Mr. Dixon further reviewed several cities that are taking proactive steps to realize this vision, such as Tampa, Florida. He noted some of the objectives of these communities are strongly supported by the contexts of the University Avenue corridor and Morgantown generally, including finding strong partners, expanding downtown, university-driven growth (largely driving the area's residential development scene), infill development opportunities, hospital-related employment, and major arterial intersections.

Mike Rutkowski spoke next and led the audience through a remote polling session intended to help define success for the project. The responses to each of the substantive questions are shown as Attachment A.2. Notable items from this exercise included that residents were the largest group represented (29%); that three-quarters (76%) rated the corridor as somewhat unsafe or very unsafe; and that poor design (50%) and pedestrian crossings (29%) were the biggest reasons why the corridor is unsafe. Walking was rated as the most unsafe mode of travel in the corridor today. Half the respondents suggested that roundabouts or other innovative design measures were acceptable ways of improving safety, and 92% said that they would support access management measures on the corridor. Intersection redesigns, pedestrian crossings and general safety improvements were the most often-cited techniques for improving University Avenue. Grumbein's Island was chosen as the location needing the most attention, but it was closely followed by the CBD, Sunnyside Community and other locations. Regulatory controls (44%) and improved designs for aesthetics (29%) were the top two objectives from a policy standpoint. Many people (88%) said that more commercial development should be encouraged in the corridor, while 78% said that more open space and parks were definitely or somewhat needed in the corridor. However, 92% of respondents said that more restaurants and entertainment options would be desirable in the corridor. Finally, while private development or public private partnerships were the most popular choices for how to pay for infrastructure improvements, the City of Morgantown was cited as the top choice (23%) as the entity that should be responsible for financing complete street improvements, but was closely followed by the University, WV Department of Highways, and private entities.

After this exercise, Brian Aldridge asked that everyone move to a table with a map of the corridor and write their concerns and suggestions on the maps. Mr. Lane facilitated this part of the discussion, and the staff assisted with each table, as necessary. The following is a grouping of the responses, with those ideas that got more than one comment on different maps shown with an asterisk (*). These comments were also transcribed along with the map-based comments received from ten focus group meetings conducted by telephone or in person.

Roadway Recommendations

1. Two-way traffic on South end of University Avenue.
2. Improve sight distance at Grand Central Station.
3. Improve intersection capacity at Beechurst and Campus Drive intersection.
4. Improve sight Distance at 8th Street.
5. Straighten alignment and improve geometry at Willey Street.
6. Improve sight distance at Riverview Drive.
7. Add turning lanes on Stewart St., North and South leg.
8. Add turning lanes west bound at Campus Dr. and Beechurst.
9. *Consider one-way pair using Jones and University Avenue.
10. *Implement 2010 plan (see #15)
11. *Extend Jones Ave south to College Avenue.
12. Create campus connector from 8th St to Riverview Drive.
13. Connect/ Extend Jones Ave to Law School Drive.

Pedestrian Recommendations

14. Implement the shared space crossing at Mountain Lair.
15. *Create grade-separated crossing near Mountain Lair.
16. Review and improve pedestrian crossing at 3rd Street and Beechurst.
17. *More prominent crosswalks all along University.

18. Add sidewalks on 8th Street.
19. High pedestrian crossing count warrants improved crossing around Oakland Street.
20. Install pedestrian-activated signal near Evans Street.
21. Improve pedestrian crossing at Inglewood Boulevard.

Transit Recommendations

22. Bus shelters at Oakland Street, Law School Drive, and Campus Drive.

General Transportation Recommendations

23. Create "bypass" around Grumbein's Island behind Mountain Lair.
24. Add loading and unloading area off street on Beechurst north of 3rd Street.
25. Improve street lighting on University Avenue focusing between 8th Street to Grumbein's Island.
26. Widen University Avenue to east side.
27. Create trail and Bike/ Pedestrian route from Law school Dr. to Jones Riverview.
28. Create Bike/Pedestrian corridor on Grant Avenue, and extend to Riverview Drive.
29. Widen Jones Ave. to allow cyclist and pedestrians an improved route.

Bicycling Recommendations

30. Create better bike route from Stadium west to County Club Drive.
31. *Designate southbound Rawley Lane as a bike route.
32. Install bridge across Monongahela River extending from Beechurst and 8th Street.

Traffic Control Recommendations

33. Signalize intersection of 8th and University Ave close to Law School Drive signal.
34. Signalize 3rd Street and Beechurst intersection.

General Recommendations

35. Create scenic overlook looking west from University Avenue near Grand Central.

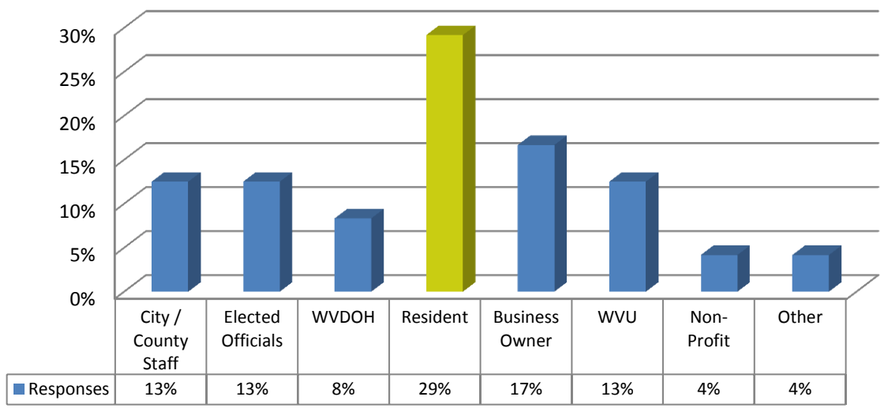
Each group was asked to summarize their group's comments to the rest of the participants. Mr. Lane then wrapped up the session by thanking everyone for his or her time and participation, noting that the next upcoming workshop date had not been determined but would likely be in the September timeframe.

The meeting ended at approximately 9:30 p.m.

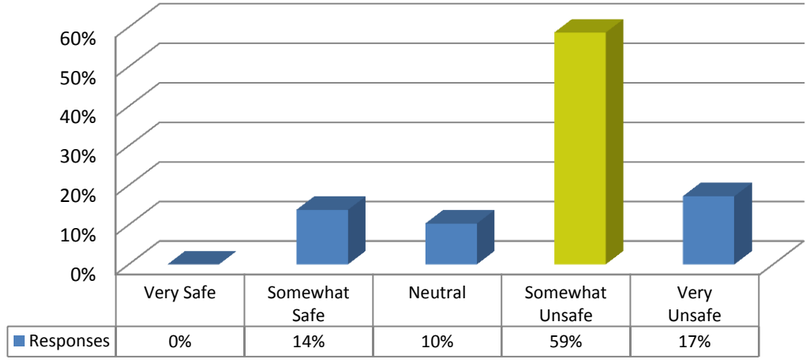
jsl

Polling Exercise Responses (June 22, 2015)

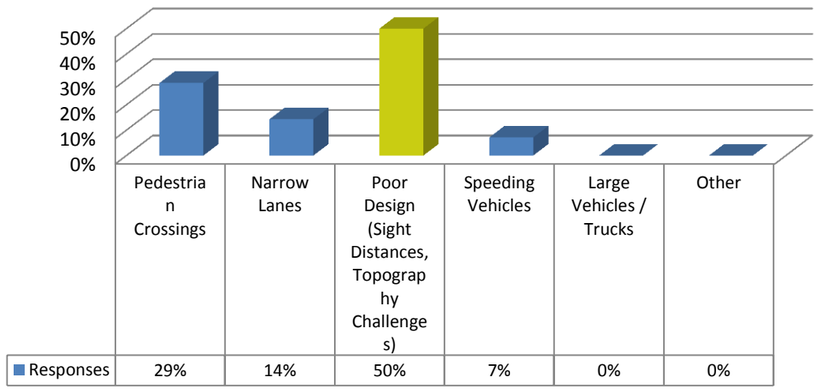
2. Who do you primarily represent?



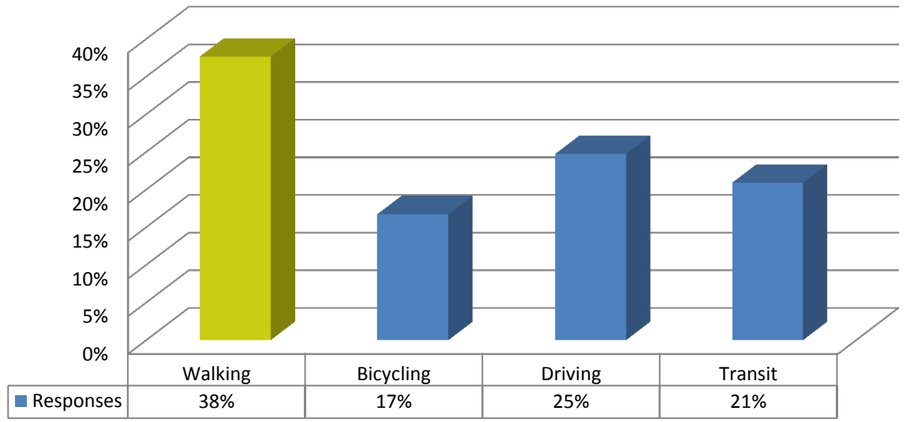
3. How safe would you rate University Avenue?



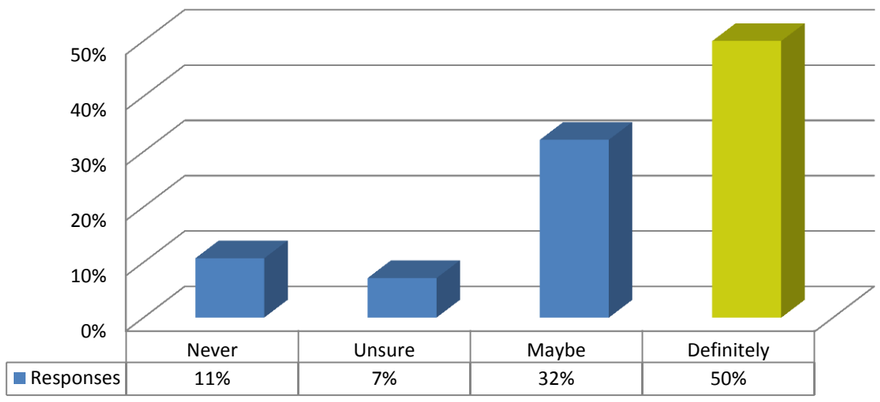
4. What is the biggest safety problem along University Avenue?



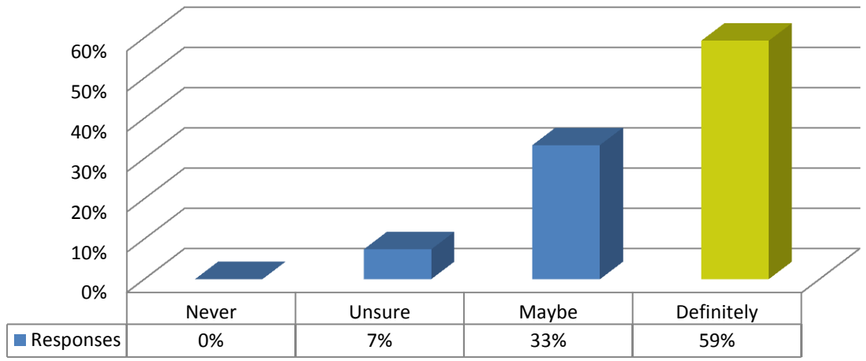
5. Which modes are most important to improve relative to University Avenue? (highest to lowest)



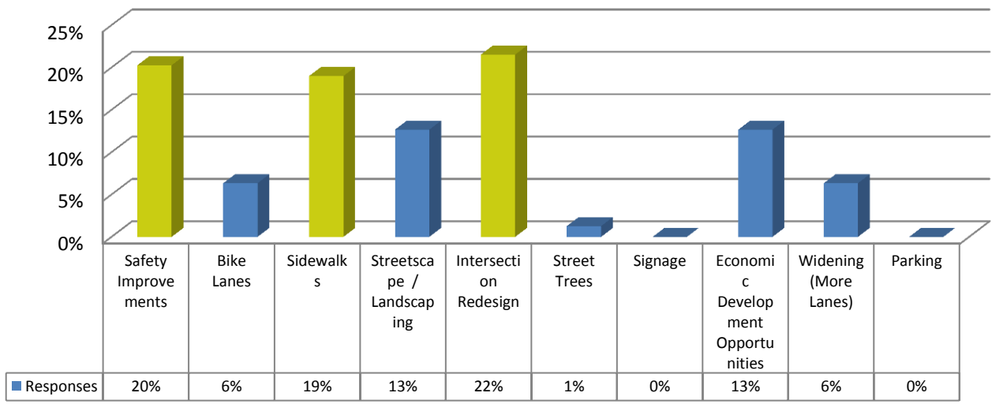
6. Would you support Roundabouts or innovative intersection designs on University Avenue?



7. Would you support Access Management (control driveways, medians, connectivity, etc.) on University Avenue?

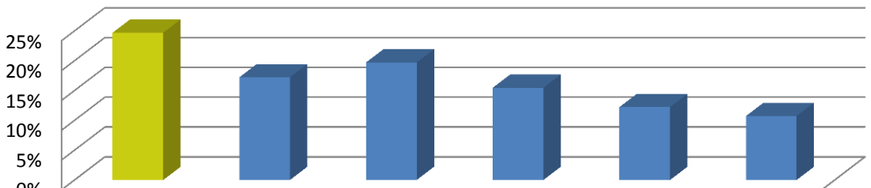


8. What is the highest priority need along the University Avenue corridor? (Pick Top Three)



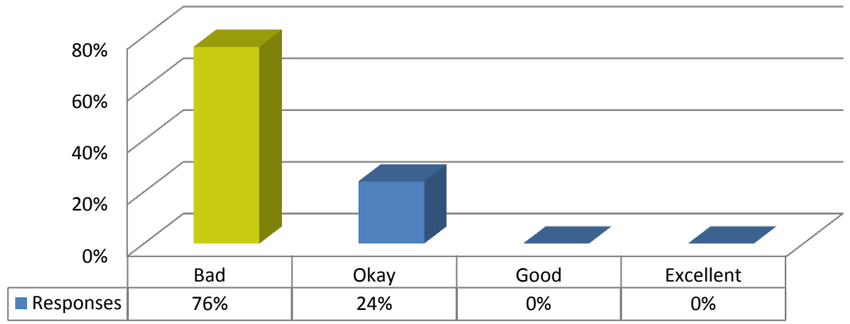
	Safety Improvements	Bike Lanes	Sidewalks	Streetscape / Landscaping	Intersection Redesign	Street Trees	Signage	Economic Development Opportunities	Widening (More Lanes)	Parking
Responses	20%	6%	19%	13%	22%	1%	0%	13%	6%	0%

9. How important are the following locations/activity nodes within the entire study area? (highest to lowest)

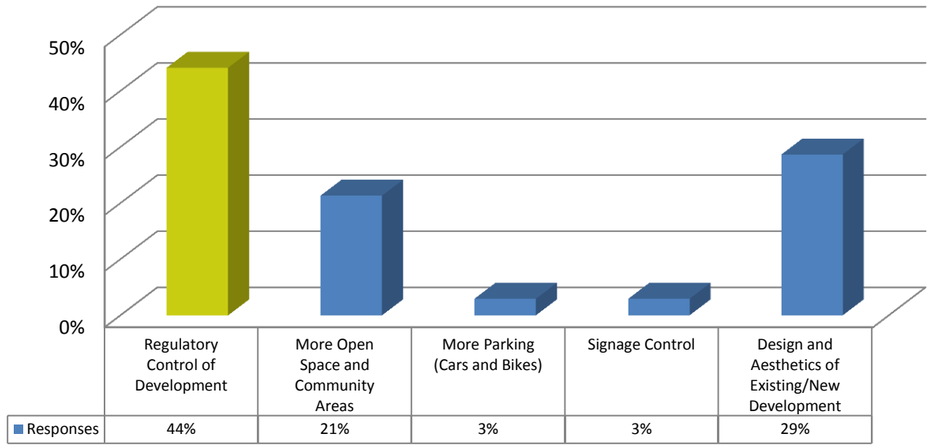


	Grumbein's Island	Central Business District	Sunnyside Neighborhood	Beechurst Ave	Surrounding Residential Communities	Easy Access to PRT Line
Responses	25%	17%	20%	15%	12%	11%

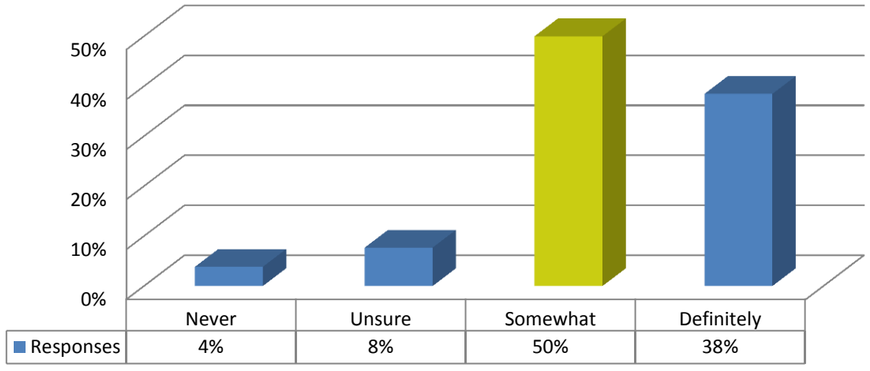
10. How would you rate the quality (in terms of design and appearance) of development along the University Avenue corridor?



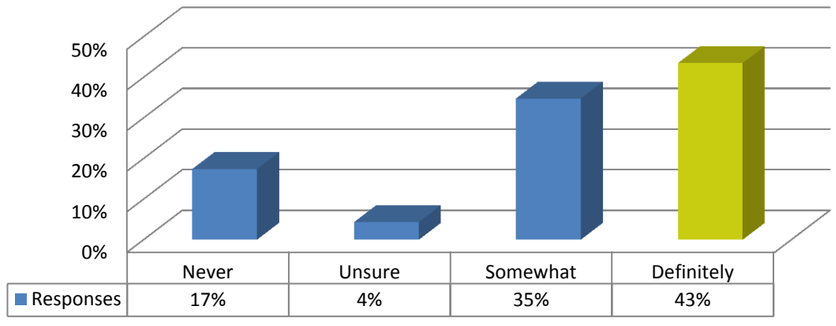
11. What is the most important thing needed relative to land use and development along University Avenue? (Rank Top Three)



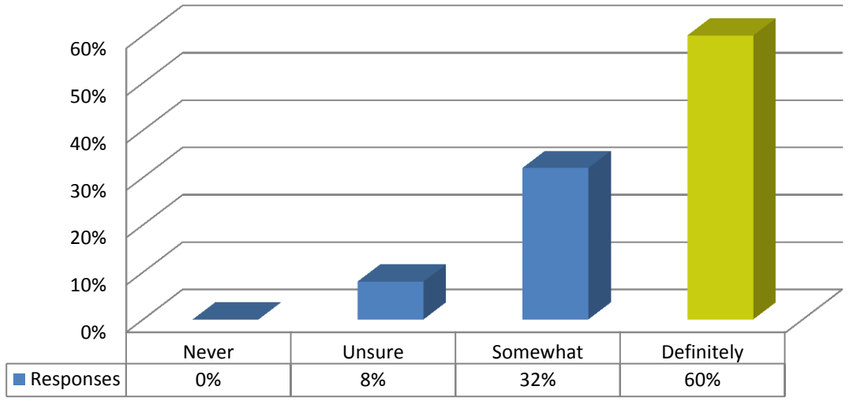
12. Should Commercial and Shopping Development be supported along University Avenue?



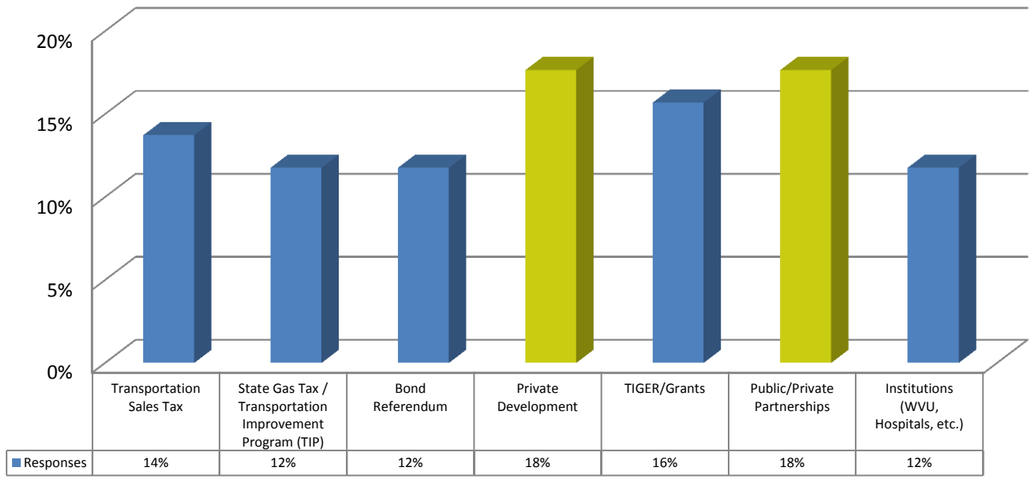
13. Should Open Space/Parks be supported along University Avenue?



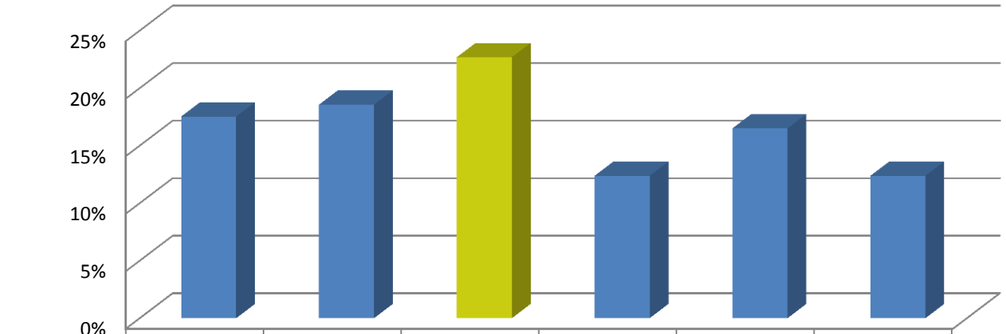
14. Should Entertainment/Restaurants be supported along University Avenue?



15. How do we pay for these improvements? (Pick Top Two)



16. Who should be responsible for Complete Streets Improvements on University Avenue? (choose all that apply)



	WV Department of Highways	West Virginia University	City of Morgantown	County of Monongalia	Development (New)	Business Owners
Responses	18%	19%	23%	12%	16%	12%

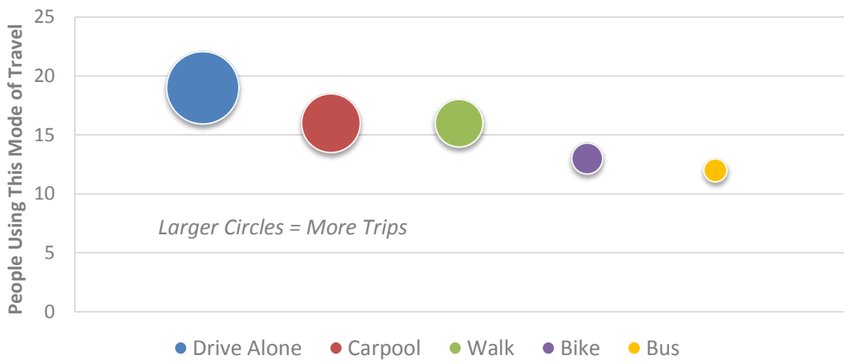
On-Line Survey Results (as of July 1, 2015)

This survey was conducted on-line, and the results summarized to present relevant differences among the respondents. On the day the survey was taken, the total number of respondents was 26 (n=26); note that not every respondent was required to answer every question so the number of responses vary.

All of the respondents cited that they were “very familiar” with the University Avenue corridor, with over 60% stating that they travel in the corridor at least six or more times each week.

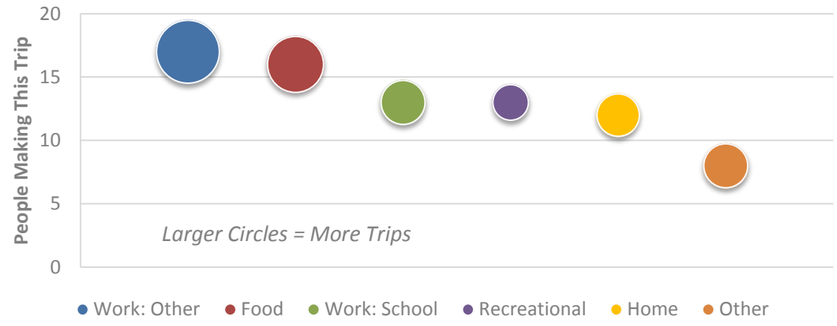
When asked about their travel preferences, the majority (68%) said that they “often” drove alone. Interestingly, 93% of the respondents said that they ride with someone else (carpool) at least some of the time, and over 30% said that they do so “often.” About 80% said that they walk at least sometimes in the corridor, and 38% ride a bicycle in the corridor at least sometimes.

The graph below also illustrates this phenomenon, with “higher” bubbles indicating more people use that mode of transportation, and the size of the circle indicating the frequency with which it is used.



The types of trip focused on work trips, with 53% of people citing work trips to locations other than the University were “often” their destination, and 38% citing work trips to the University as often being their destination. Although many people cited food and restaurant trips as a type of trip they make, they are more like to only make this trip “sometimes” (44%) than work trips. Although relatively fewer people cited trips to home as a trip they make using the University Avenue corridor, 42% of those that did said that they use the corridor “often.”

When you’re on University Avenue, what is the purpose of your trip?

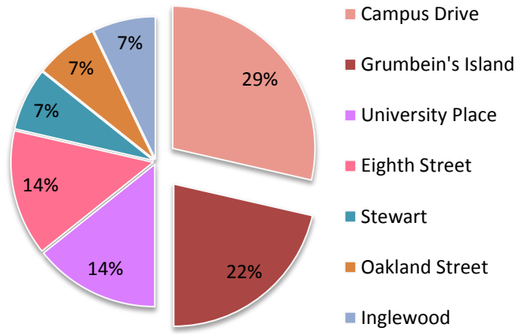


As with other surveys, many (60%) of the respondents cited the safety in the corridor as being poor or very poor (1 or 2 on a five-point scale). When asked what aspect of travel was the most important one to focus on, 73% indicated that walking was “most important” to them, and nearly 90% said that safety was “important” or “most important.”

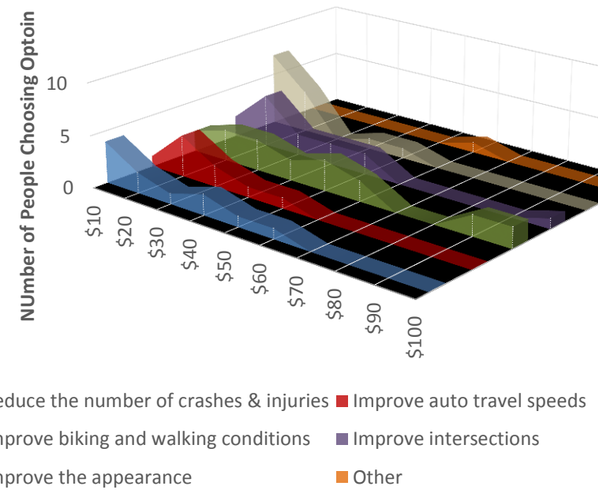
Please rate the importance of improving each mode relative to University Avenue? (1 is least and 5 is most)

	Walking	Bicycling	Driving	Transit	Safety
Least Important	0%	5%	14%	0%	0%
Less Important	0%	5%	0%	5%	11%
Neutral	9%	26%	19%	26%	11%
Important	18%	37%	43%	53%	37%
Most Important	73%	26%	24%	16%	42%

When asked about which location along the corridor was the most important to focus on, nearly 30% noted Campus Drive, and one-fifth (22%) cited Grumbein's Island. Eighth Street and Stewart Street intersections were the next most important locations.



Lastly, when respondents were asked how much they would spend (out of $100) on various types of improvements, the most-often cited improvement was to the appearance of the corridor. However, improving intersections and safety were frequently chosen. Making the corridor more accommodating of bicycling and walking received an even spread of votes across a larger range of monetary "investment" than other options, with a few respondents citing that they would devote 90%-100% of their allotment to this type of improvement.



Summary of Stakeholder Interviews

Chris Fletcher, Planning Director *(note: interview conducted by Scott Lane via telephone)*

A lot of development between Third and Stewart. Strong commercial node developing and increasing intensity. Nothing proposed but it will probably happen.

Before Eight Street development and travel patterns are weird, more demand for turning lanes. Same for Eighth Street which is heavily traveled.

Obsolete commercial north of Eighth Street needs to be redeveloped. High-end single-family north of Eighth Street that likely won't change.

East side (University Park) will see assemblage, buildings are reaching the end of their functional life and are likely to get torn down and replaced. This is the only future development represented in the travel demand model.

Jones Avenue is a parallel route where BRT might happen but is in a residential area. Moving BRT through the University/Stewart intersection is a mystery. Third and Beechurst may perform worse when the Third and University signal goes in. In Sunnyside, bike and pedestrian travel should be the focus. A 94-unit, nine-story development is being proposed; that would be the norm. Commercial development between Third and Riverview streets is not a good thing. Stand-alone commercial north of Riverview will continue. Existing uses are not pedestrian-friendly, mainly driven by market not seeing the demand. Not seeing vertical mixed use yet. Developers are still acquiring property and student housing is still being built in spite of high vacancy rates. Some of the student housing stock is older residential units.

Location-Specific Comments:

- Northbound left turns on North Street - lots of cut-through traffic.
- Beechurst intersection with University Avenue has some capacity issues.
- Stewart intersection has major delays in peak evening past ACC site / bend. Not enough capacity.
- Grumbein's Island is a long-standing issue. Needs grade separation, although underground utilities and appearance are concerns of WVU. Narrow ROW translates to property acquisition. Steep slopes mean more retaining walls.

Rick Biafora, Metro Properties/Biafora Holdings, LLC
Dave Biafora, Metro Properties/Biafora Holdings, LLC
Martin Biafora, Metro Properties/Biafora Holdings, LLC
Dave Biafora started with a clothing store and renting out apartments. They now have 2,400 residential units with 600 more being built. The Planning Department isn't friendly to development.

Need to get input from WVU but they keep things close to the vest. An example is a new traffic signal across from Oakland to support 1,300 more students. Students need to be able to walk to school. The student market is not getting to 40,000 students. Number of students decreased last year. WVU is a bargain university. The Loop bridge was taken out by WVU years ago. There are 317 beds at Grand Central Station; no more would be built. They built two buildings with 156 beds each north of Third Street. 230 units at south Price Street.

Lower University Avenue at Grumbein's Island to create a grade-separated facility.

More beautification would help generally throughout the corridor, but there isn't much else to do to improve it.

Prices are too high for land to redevelop on any kind of scale. People will not drive to frequent small-scale retailers like Sheetz.

Jack Thompson, Chamber of Commerce
New housing is pretty much gone now, but some properties are coming on the market, a phenomenon that hasn't happened in a generation. Not sure if the downtown market is ready for young adults. The local neighborhoods aren't very diverse. There isn't enough depth in the market to support many talented young professionals. Lack of venture capital dollars is also a hindrance. A BID hasn't been explored in part because you can't collect the taxes to support them; recently Morgantown received home rule authority from the State.

Getting people to the Riverside Trail to use for commuting, school, etc. is important. The trail is heavily used, popular. There are many people that walk between campus and downtown.

Creating more street life, landscaping, streetscaping, lighting and maintenance are critical to triggering more development. More 20-30 job employers are who they are trying to lure into the area. A big part of the issue is poorly maintained properties that are variable on the private side and uniformly poorly maintained public infrastructure. The City is now a home-rule place, acquired recently. The County has almost no regulations, so it's much easier to build there than redevelop in-town.

The core industries are education (university) and health care, including Mylan, for example. Redevelopment doesn't just happen but takes strong City participation. Sometimes opposing developers or neighborhood groups kill some developments. There is some opposition to outside development, and West Virginia gets little good press.

Frank Gmeindi, Morgantown Bicycle Board
First came to Morgantown in 1972 as a graduate and walked it every day.

The slopes of the sidewalk make it un-walkable in the winter due to snow and ice, particularly the stretch between Riverview and Gilmore. Shared lane markings and signage are coming in 2016 for certain locations in the corridor.

An extension of Jones Avenue south to College Avenue would follow the path of a previous bridge. Taking Jones through Terrace Heights (near the end of its functional life) and making it a one-way pair with University Avenue would be one improvement to consider.

Ryan Zaph and Mark Lehosit, MonPower
Mon Power is installing new poles to serve additional customers. Poles are being removed north of Beverly to Grand Central. The lighting is going away with those poles.

The City is taking over decorative lighting because they can respond faster to repair needs - may be cheaper as well. The city would own any new lights. Moving three poles may cost $75,000 in part because of what lies underneath.

Sequencing construction will be difficult. But they are currently moving poles for the Sunnyside Up and for the University Park development (pushing back the poles in a few places).

Lighting on the poles can be accommodated in some spots. Could potentially do pedestrian-scale lighting, with the recommendation that these light fixtures be metered. Damien Davis (City Engineer) coordinates these actions, but if you piecemeal the pole relocation, it is much more costly. $10,000 per pole to bury (plus cost of conversion). Conduit per foot is approximately $5. They are willing to roughly estimate cost for power/lighting work.

Location-Specific Comments:

- Grand Central Station to 3rd street it's just street lighting. No primary power.
- One sub transmission line crosses University near 6th Street
- From 6th Street northward to WV705, the power is more complicated

They will look at giving us a GIS layer of pole locations.

We should reach out to Frontier telephone (Tim Spencer, 304-296-7459). Their costs may run 10 times the power company costs of relocation (hard to splice fiber).

Scott Wright and Doug Smith, Morgantown Utility Board
The sewer lines south of Campus Drive are vital, and are hard to relocate. North is normal distribution typically with 8" lines; some projects with the University are underway now. They noted that their trucks stay out of the corridor during the school season. Everyone used to live on campus, then they moved out of the area, now they are moving back into the campus area.

Water capacity is fine; there is a concern about providing sewer on the north end as well as the center-west side if there is increased density. Additional density may require new infrastructure.

There is some desire about doing a streetscaping project on Third Street and perhaps taking out on-street parking. Beverly Avenue needs improved sidewalk and lighting since more students use that street instead of University Avenue. The section of University Avenue south of Fayetteville Street is terrible; particularly the intersection of Westover. Football traffic is bad but it is rare, only seven times a year. When they drive, they stay away from campus (Grumbein's) when kids are in.

Location-Specific Comments:

- Pump Station on Beechurst
- 12" line from Willey to Loop
- Straighten Wiley intersection, and signalize

Matt Cross, Morgantown Pedestrian Safety Board
He is on the Pedestrian Safety Board, which gets a vote on the Traffic Safety Commission. Students should feel comfortable walking to and from school. We need much more regular and frequent transit service; walking is better for ecology, student health and traffic reduction.

It would be great to have a scenic overlook south of Grand Central Station (used to be a great overlook before new student halls). The scenic value of the community, which is in an area that has gotten used to historic exploitation (oil, coal, etc.), would be improved by stronger design standards for new development (e.g., Sheetz).

The WVU leadership doesn't coordinate with other groups, including the Morgantown Pedestrian Safety Board. The priority on University Avenue is for pedestrians, not cars. The Evansdale Campus created a car-oriented set of functions separate from the main campus, which reduced the number of cars going downtown.

Concurrent signaling works, but the all-red phases downtown are very inefficient. Crossing at Third/Beechurst is problematic because of the number of pedestrians crossing Beechurst. The intersection of Pleasant Valley is also problematic.

Developers should pay for pedestrian and other improvements as a part of their costs.

Randy Hudak, WVU Assoc. Vice President)
WVU (President Gordan Gee)

- Philosophy – increase diversity, foreign students.
- WVU is advocating accessibility to campus, no cars, and walkability. Live and play in the same location.
- WVU has paid approximately $20 million in the last 10 years.

Need better pedestrian amenities (priority), such as the following:

- Bicycling is so very dangerous
- Very few students bring bikes to school
- 8th and Law School are important. Bad sight distance at Law School and 8th
- Better marked crosswalks
- Lighting – lots of complaints that it's too dark. Aesthetic lighting needed as well.
- Buses – Need more quality shelters
- WVU – is investing $95 million into PRT. Thinks it is a more viable option than expanding bus networks. They want PRT to be the first choice over buses

Location-Specific Comments:

- Grumbein's island – Solutions - nothing works. Options seem to speed up traffic. Open to the Shared Space concept that has been presented, with the following concerns:
  - Need to get decision-makers on board
  - WVU maintains Grumbein island (lighting, plowing, planting, etc.)
  - Campus/Beechurst is problematic
  - Straightening out the loop will help the spillback problem
- University Avenue between 3rd and 6th streets is way too narrow; needs sidewalks
- New signal at Oakland/University. Spurred by 1,300 new beds off Oakland to the north.

Need to tie into the aesthetics and architecture along the corridor.

Hospital – Health Science and Ruby Hospital (2 facilities) incl. trauma center – parking issues. From 3pm – 5pm it's turnover time, resulting in gridlock on University Avenue.

B&O tax is 3.5% and it should be used to pay for gaps in infrastructure. Hard to understand where this money goes.

Wes Nugent, City Council and MPO Chair
Mr. Nugent stated that he was an alumnus of WVU.

Advice – be very strategic. Pick the best projects/solutions that can be constructed.

Wiles Hill residential area would not like to see parking decks. They have passed on-street (Blue Curb) parking (resident parking permit).

With respect to Grumbein's Island there are two primary problems: 1) the pedestrian/vehicle conflict (safety) balanced with the throughput demand, and 2) capacity limitations. Not quite sure he supports it, and he is concerned that WVU is more worried about aesthetics than safety and performance. The location needs crossing guards, and he is open to innovative intersection design

Another bridge over the River may improve access to Law School

One concern is not to push more cut-through traffic into neighborhood

Improvements should focus on priority choke points and problem intersections.

Likes BRT concept since it focuses on the University Campus community but opens transit to Wise Hill residential community. It serves as a direct and fast connection between campuses.

Ryan Lynch, Falcon Consulting and Management

- His company focuses on site/civil contract work.
- The 3rd Street improvements (construction) will last seven weeks.
- Developing University Place (102 beds in the Town Homes) and the parking deck.
- Biggest need is pedestrian safety as it's very heavy pedestrian activity between 3rd Street and Grumbein's Island. They have traffic operations study prepared for 3rd Street/University Avenue.

Location-Specific Comments:

- The existing one-way segment is useless, and needs to be converted to two-way traffic
- Grumbein's Island – recommend separate students from vehicles
- Loop – can do something special there combining the infrastructure improvements with new development opportunities.
- The 3rd Street to Beverly segment has lots of queuing during AM, all the way back from Grumbein's
- Two proposed crosswalks at Overhill and at 3rd. Desires pedestrian signal at Overhill.

[redacted]

Appendix B- The Loop (Potential Future Project)

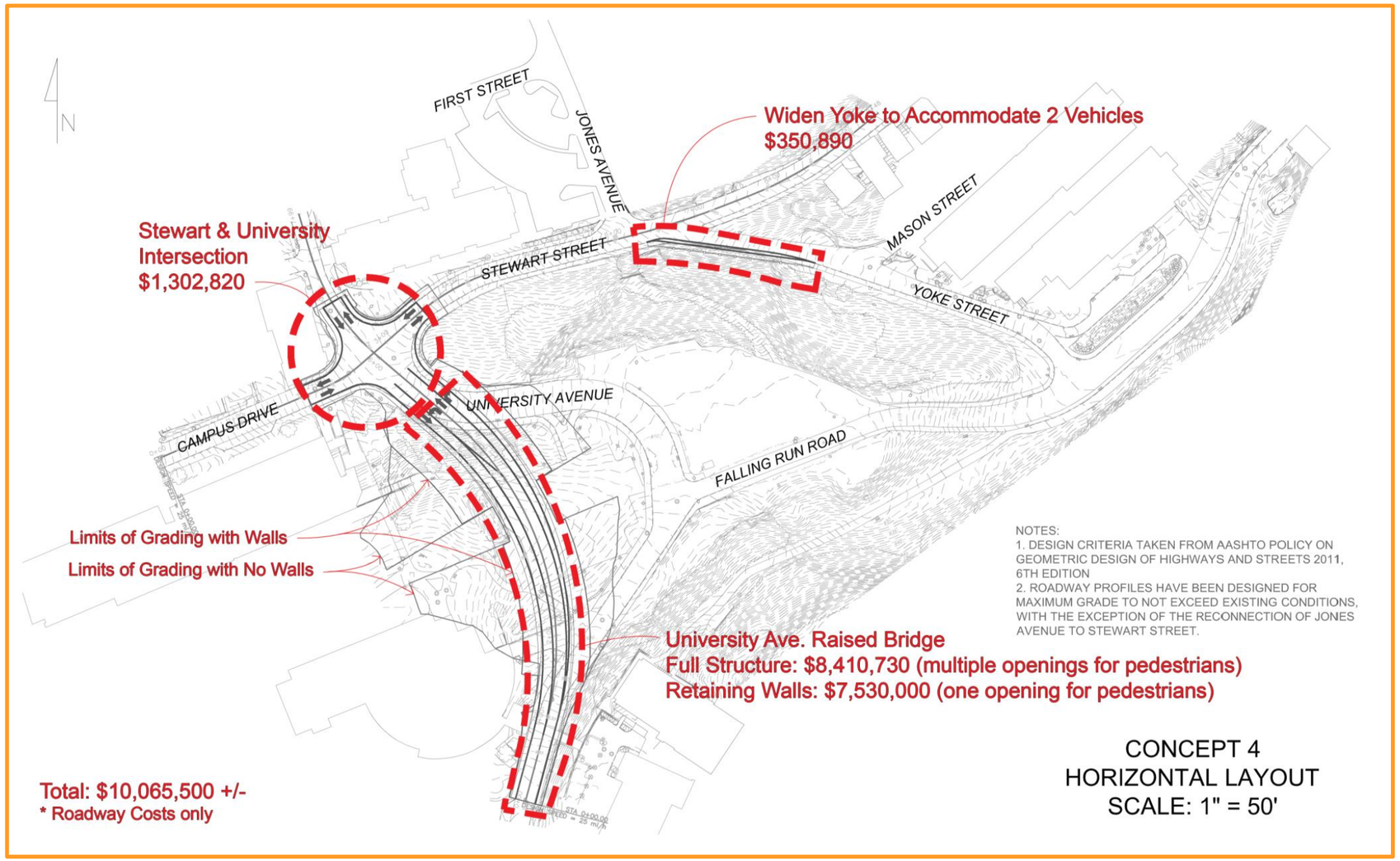
[redacted]

The Loop (Potential Future Project)

The Loop project is an initiative sponsored by WVU and is currently ongoing. It is the section of University Avenue represented by the sharp horizontal curve around WVU School of Business near Falling Run Road. The purpose of the Loop project is to enable the university to expand walking conditions through the campus to better utilize the campus footprint, ultimately, to improve the connection of all modes. WVU is considering an expansion of the campus and to enhance pedestrian, bicycle and roadway connections. In essence, this improvement will open up the Quad and create a sense of place. Representative images of the Loop project are to the right.

The project may include the construction of up to three (3) new administrative campus buildings, as depicted to the right. This would require a realignment of existing University Avenue including a new bridge to flatten out the dangerous curve and topographic challenges. The new bridge would include a sidewalk for pedestrians as well as on-road bike lanes and a tunnel underpass. Total construction cost of the roadway portion of this project is $10.2 million and is described in more detail on the following page.

However, there are significant challenges to this project. The intersection of University and Campus Drive is congested today and is expected to have an increase in traffic levels as development occurs. The unsignalized intersection of Falling Run/University Avenue is at the vertex of a dangerous curve along University Avenue and has existing LOS problems (Falling Run approach) during both the AM and PM peaks. It is also a major transit stop location. The proposed realignment of Falling Run road has not been determined and represents and will be a particular challenge to accommodate due to topographical and stream issues. Falling Run Road carries approximately 7,000 trips per day.



Construction Costs	Utilities**	$1,455,000
	Stewart/University Intersection	$1,350,000
	University Ave Bridge	$8,450,000
	Yoke	$400,000
	Roadway	**$10,200,000**
	Subtotal	**$11,655,000**
Building Total Costs	B&E Building	$18,710,000
	International Building	$23,370,000
	Building Total Costs	**$42,080,000**
	Research Building	$24,930,000

** Steam -$400,000. Chilled Water-$170,000. 23kv Electric -$260,000 Water -$40,000. Natural Gas -$40,000. Sanitary-$45,000. Fiber-$250,0 Storm-$250,000

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Appendix C- Mapbook

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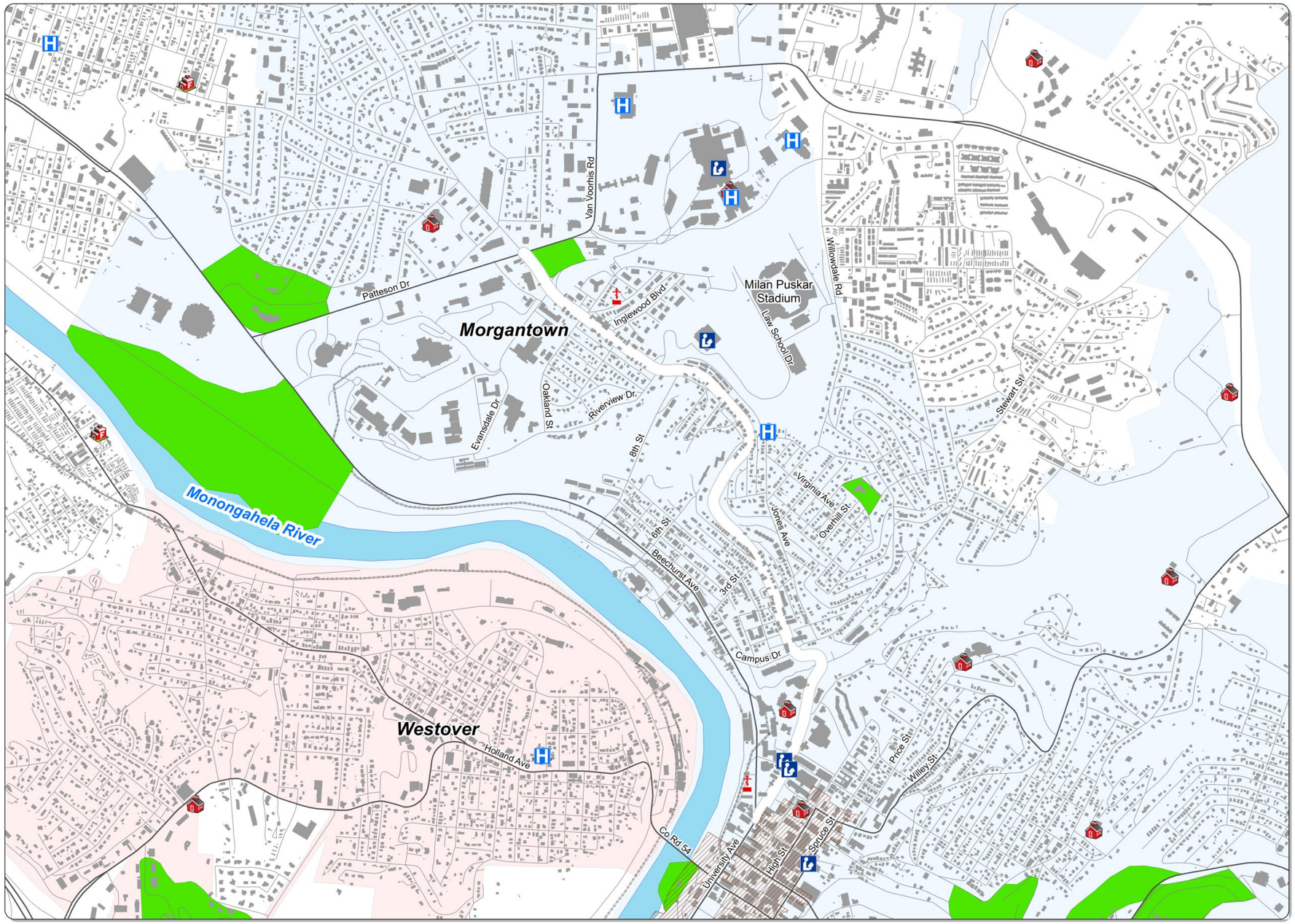
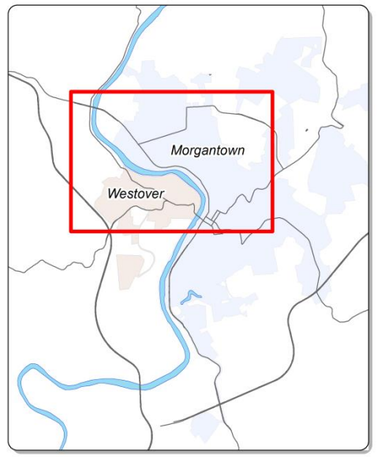




Complete Streets Improvement Plan, University Avenue, Morgantown, West Virginia

Morgantown Monongalia Metropolitan Planning Organization

- Fire Departments
- Hospitals/Health Facilities
- Libraries
- Places of Worship
- Schools
- Historic Areas
- Building Footprints
- University Avenue Project Location
- Major Roads
- Minor Roads
- Parks
- Rivers and Lakes
- Morgantown
- Westover

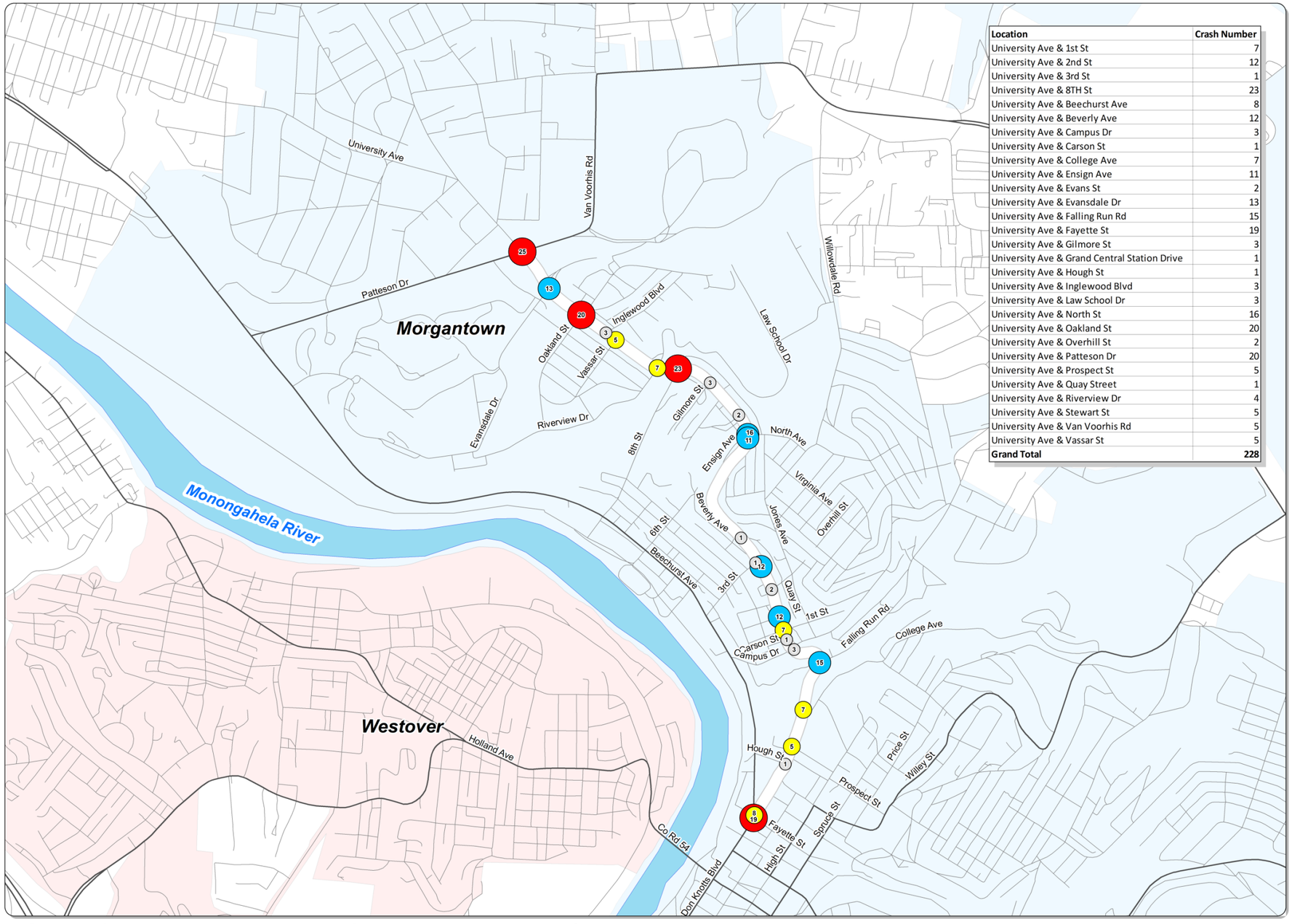
Community Landmarks

0 1,200 2,400 4,800 Feet

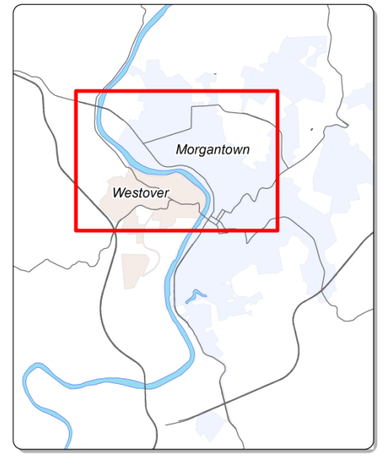
N W E S

MMMPO

Complete Streets



Location	Crash Number
University Ave & 1st St	7
University Ave & 2nd St	12
University Ave & 3rd St	1
University Ave & 8TH St	23
University Ave & Beechurst Ave	8
University Ave & Beverly Ave	12
University Ave & Campus Dr	3
University Ave & Carson St	1
University Ave & College Ave	7
University Ave & Ensign Ave	11
University Ave & Evans St	2
University Ave & Evansdale Dr	13
University Ave & Falling Run Rd	15
University Ave & Fayette St	19
University Ave & Gilmore St	3
University Ave & Grand Central Station Drive	1
University Ave & Hough St	1
University Ave & Inglewood Blvd	3
University Ave & Law School Dr	3
University Ave & North St	16
University Ave & Oakland St	20
University Ave & Overhill St	2
University Ave & Patteson Dr	20
University Ave & Prospect St	5
University Ave & Quay Street	1
University Ave & Riverview Dr	4
University Ave & Stewart St	5
University Ave & Van Voorhis Rd	5
University Ave & Vassar St	5
Grand Total	**228**



Complete Streets Improvement Plan, University Avenue, Morgantown, West Virginia

Morgantown Monongalia Metropolitan Planning Organization

Crash Numbers, 2012 - 2014

- 1 - 3
- 4 - 8
- 9 - 16
- 17 - 25
- University Avenue Project Location
- Major Roads
- Minor Roads
- Rivers and Lakes
- Morgantown
- Westover

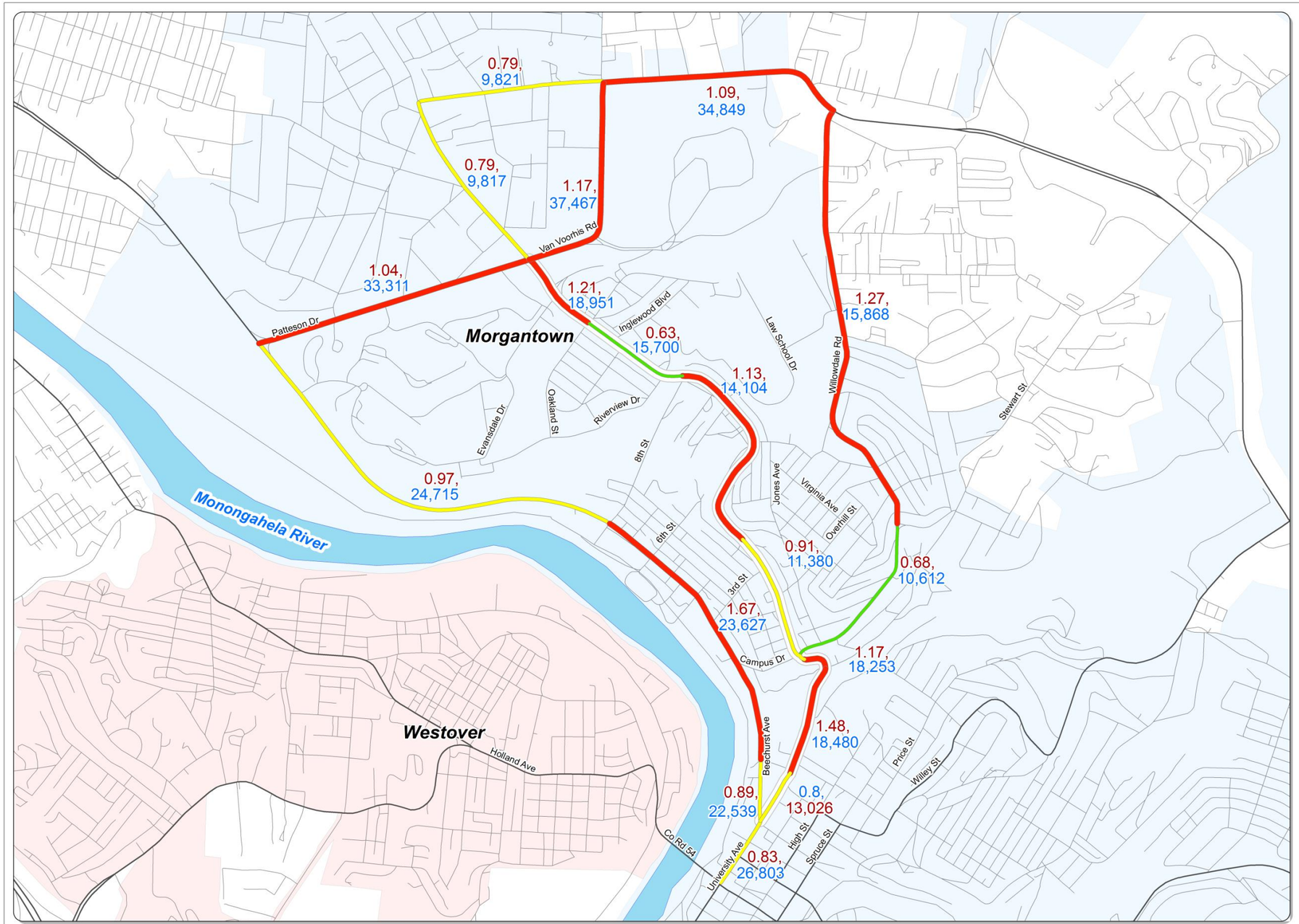
Crash Frequency by Intersection

0 1,200 2,400 4,800 Feet

N W E S

MMMPO

Complete Streets

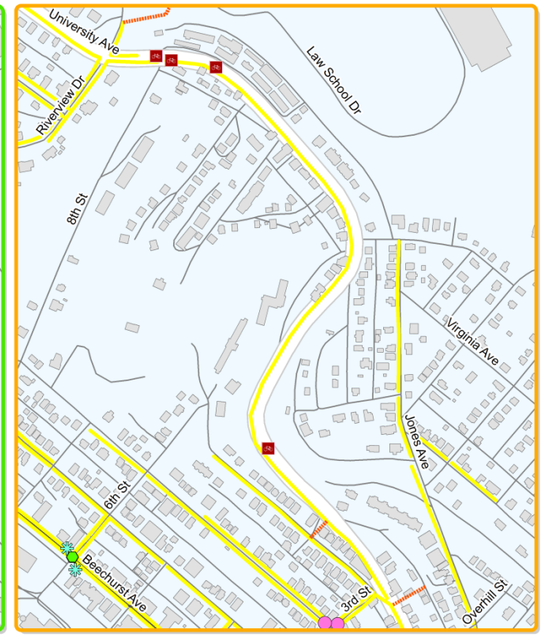


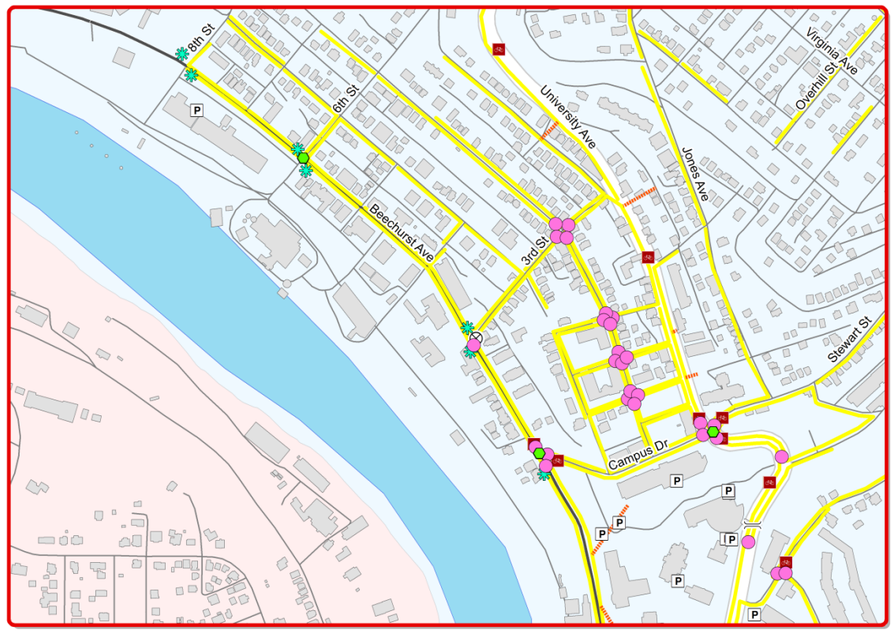
Complete Streets Improvement Plan, University Avenue, Morgantown, West Virginia

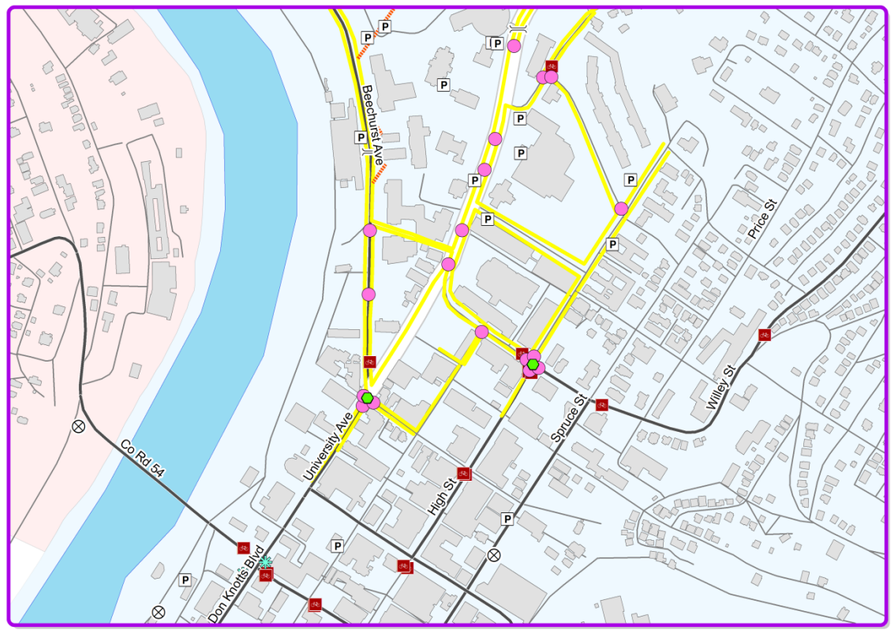
Morgantown Monongalia Metropolitan Planning Organization

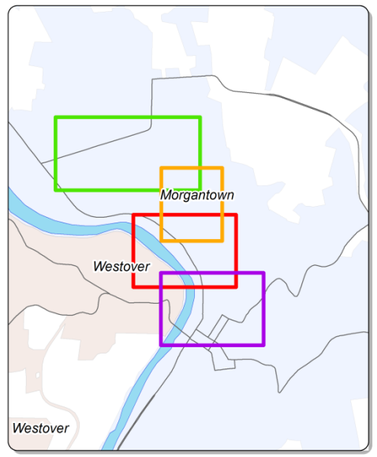
Volume to Capacity Ratio

- 0.50 - 0.75
- 0.76 - 0.99
- 1.00 +
- University Avenue Project Location
- Major Roads
- Minor Roads
- Rivers and Lakes
- Morgantown
- Westover









Complete Streets Improvement Plan, University Avenue, Morgantown, West Virginia

Morgantown Monongalia Metropolitan Planning Organization

- Pedestrian Signal
- Overpass
- Crosswalk
- Proposed "Bicycles May Use Full Lane" Sign
- Committed Bicycle Shelters
- Committed Bicycle Sharrow
- Bicycle Rack
- Stairs
- Sidewalk
- Building Footprints
- University Avenue Project Location
- Major Roads
- Minor Roads
- Rivers and Lakes
- Morgantown
- Westover

Morgantown/Westover Pedestrian and Bicycle Amenities

0 600 1,200 2,400 Feet

N W E S

MMMPO

Complete Streets

Endnotes

Tinnell, S.C. (2011). *Then & Now: Morgantown*. Charleston, SC: Arcadia Publishing.

United States Census Bureau. (2015). *Morgantown (city), West Virginia QuickFacts*. Retrieved from http://quickfacts.census.gov/qfd/states/54/5455756.html.

University Avenue Complete Streets Study

Project Workbook