



STATE HIGHWAY
ADMINISTRATION

MD 190 NEEDS ANALYSIS

JULY 2024

Acknowledgements

This report is the result of a needs evaluation performed by the Maryland State Highway Administration (SHA) Office of Planning and Preliminary Engineering and the SHA District Three Office.

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Introduction

Project Background and Process

The Maryland State Highway Administration (SHA) Office of Planning and Preliminary Engineering (OPPE), in consultation with SHA District 3, completed a comprehensive Needs Analysis for MD 190 (River Road) between Springfield Drive and Little Falls Parkway within Bethesda. This document outlines short-, mid-, and long-term visions for the corridor by identifying strategies to address pedestrian and bicycle network deficiencies, enhance multimodal safety and improve travel conditions along the corridor.

This Needs Analysis provides a road-map to deliver improvements based on SHA's Context Driven - Access & Mobility for All Users 1.0, a planning and design resource centered on establishing safe and effective multi-modal transportation systems. With pedestrian and bicyclists crashes and fatalities along the corridor, the MD 190 Needs Analysis identifies deficiencies and provides recommendations to improve safety and mobility for all users based on SHA's Context Driven - Access & Mobility for All Users 1.0.



Purpose

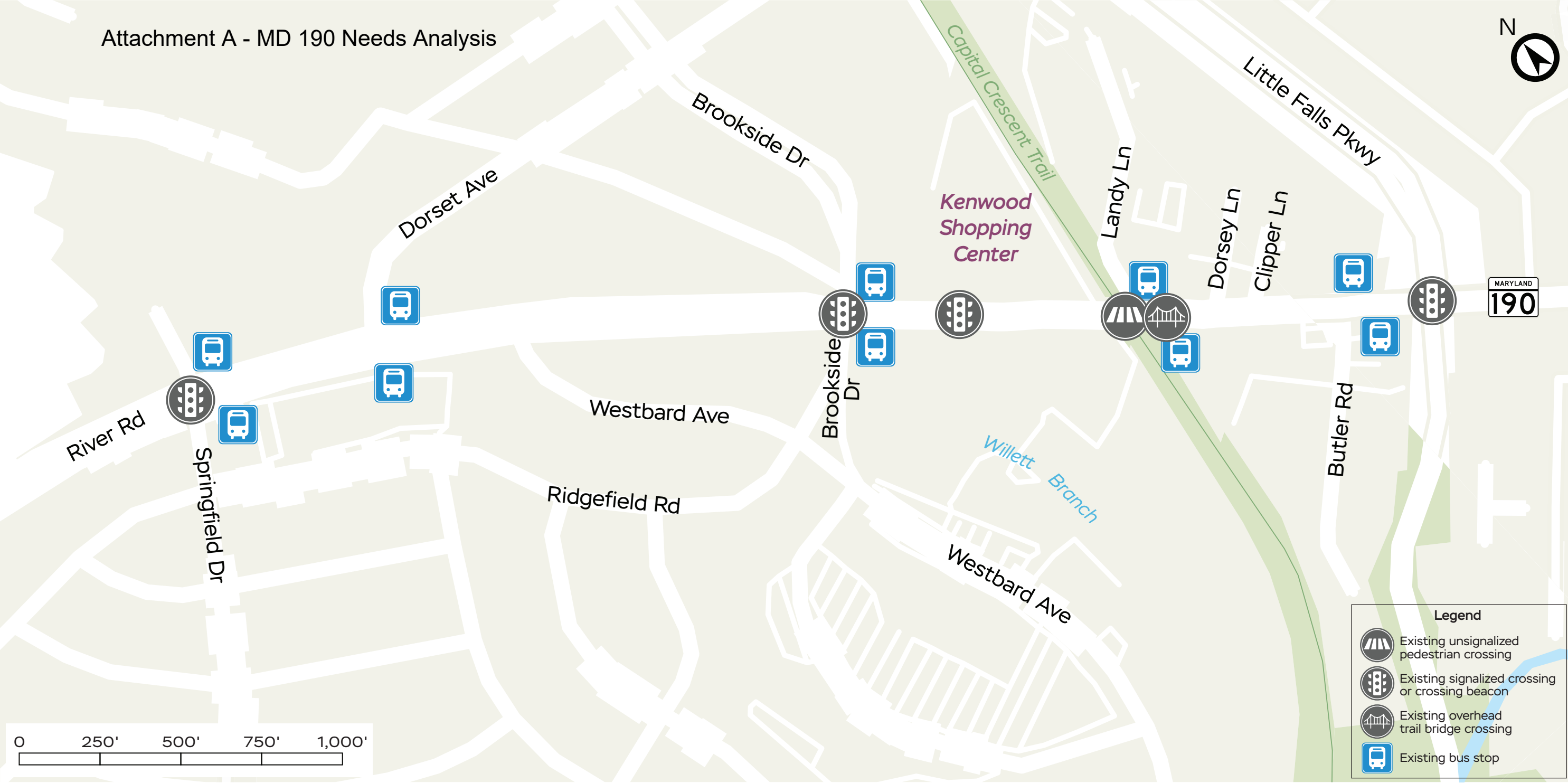
The MD 190 corridor contains residential, commercial, and industrial land uses, serving as a critical link between Washington DC, the I-495 Capital Beltway, and inner suburbs in Montgomery County. MD 190 carries significant volumes of commercial and commuter traffic connecting the residential developments to the west with the commercial land use within Washington DC to the east. The surrounding communities include a mix of well-established residential neighborhoods and businesses, so widening the road to significantly improve existing pedestrian or bicycle facilities is not feasible within the existing public right of way. Posted speeds are 35 MPH in the residential area to the west, where the character of the roadway is wider with a raised grassy median and lower driveway density. Posted speeds are 35 MPH to the east where land use intensity and driveway density increase. The new Westbard development is located within the study area. It consists of a mixed-use facility with bicycle connection, including a separated one-way cycle track along Brookside Drive connecting to MD 190. With the new development, higher concentrations of pedestrian and bicycle activity are expected, leading to greater demand for supporting sidewalk and bicycle facilities, coupled with demand for more frequent opportunities to cross the street. These expectations further limit opportunities to improve vehicular travel along the corridor. In 2022, a fatal bicycle crash occurred within a marked bicycle lane near the 5200 block of River Road.

Approach

This Needs Analysis was completed to identify context driven transportation improvements that will improve mobility, accessibility, safety and experience for users of the MD 190 corridor. Acknowledging differences in how pedestrians, bicyclists, transit users, and drivers experience travel, their sensitivity to barriers, stress and vulnerability to conflicts are central to this holistic approach. The resulting recommendations are based on two key variables, CONTEXT, which is identified by roadside land use and intensity, and COUNTERMEASURES that are appropriate to address user demand along the corridor.

Context varies within any corridor. This is in part due to the existing conditions along the roadside, which influences the level of activity and demand to travel along or to cross a road. Over time, demand may also increase, as growth occurs, or new transportation facilities are provided. This requires a review of the existing conditions in the field, to experience the character and travel conditions along the corridor, and a scan of long-range plans to reveal potential future conditions. Additional historical data, like traffic volumes and crash locations are layered, to provide a complete picture of how the road functions, supporting observations that are made in the field.

With a more complete understanding of conditions on MD 190, the corridor was segmented into Context Zone segments based on SHA's Context Driven 1.0 Guide. The entirety of the subject corridor lies within a Suburban Activity Center (Zone C) , with an Urban Core (Zone A) to the north in Bethesda and to the east near Washington DC, and Suburban (Zone D) to the west. Because the study limits lie within the same context zone, the team looked at a variety of other factors during the segmentation process, including land use, access points, roadway characteristics, transit routes, and non-motorist amenities. With these segments defined, needs can be paired with tools to address the challenges that users encounter in the corridor and improve the user experience along MD 190.



MD 190

STUDY AREA/CORRIDOR OVERVIEW

MD 190 Corridor Overview

MD 190 (River Road) is an urban principal arterial roadway connecting Darnestown to Washington DC. The study limits include Springfield Drive to the west and Little Falls Parkway to the east. This segment consists of a four-lane divided roadway with a raised median dividing the roadway on the western portion, and a two-way left-turn lane dividing the roadway on the eastern portion, with signalized and unsignalized intersections, turn lanes, and driveways to many local businesses. MD 190 consists of several marked pedestrian crossings at signalized intersections, marked unbuffered bike

lanes, and Washington Metropolitan Area Transit Authority (WMATA) Metrobus and Montgomery County Ride On bus stops. The segment is intersected by the Capital Crescent Trail, which provides a grade-separated crossing as well as an uncontrolled midblock crossing. The posted speed limit is 35 mph approaching and throughout the segment.

Starting at the western end of the corridor, the land uses adjacent to MD 190 from Springfield Drive to Brookside Drive is primarily residential with side streets leading to

neighborhoods, single family homes, churches, and the Kenwood Country Club. From Brookside Drive to Little Falls Parkway, many driveways connect to industrial and commercial locations, such as a shopping center, fast food restaurants, gas stations, condominiums, auto services, a garden center, a parking garage, a building products business, and storage centers. Additional condominiums and apartments are located along Westbard Avenue, just south of MD 190.

Existing Conditions & Safety

Overview

The experience of travel along the MD 190 corridor varies depending on factors like travel model, time of day, trip purpose, and origin/destination. Providing context for these variations in travel at a corridor level begins with a scan of existing traffic conditions, which are explained through metrics that describe traffic or the user experience.

To establish a baseline for this needs analysis, a variety of public data sources from SHA and Montgomery County were assembled and visualized to help explain existing travel conditions along the corridor. These measures are separately illustrated for pedestrians, bicyclists, bus transit, and automobile traffic on the subsequent pages.

These data sources identify challenges that road users may encounter at specific areas along the corridor, including higher volume segments of the street, and areas of concentrated activity where greater transit service is provided.

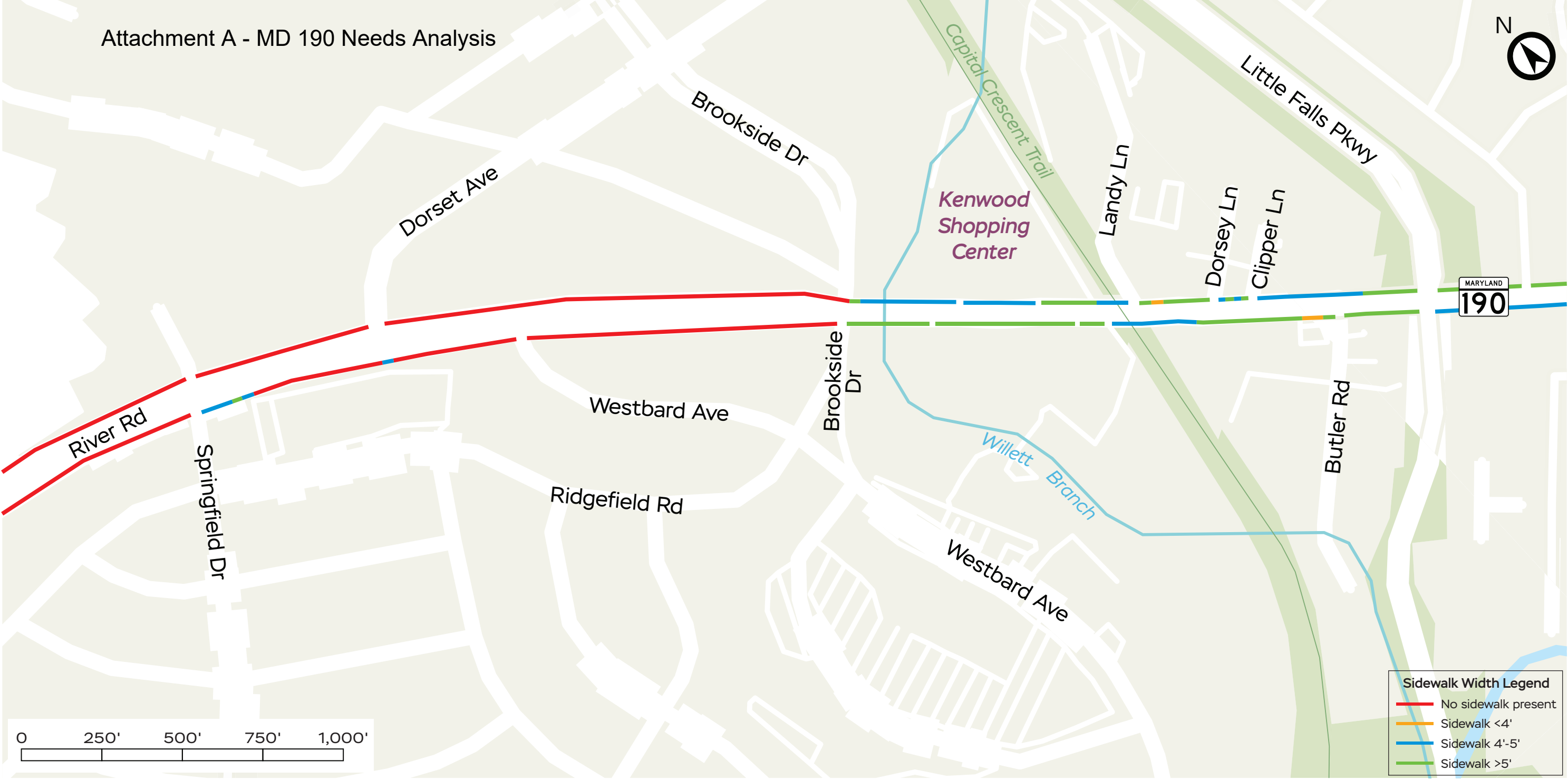
Safety is represented in the crash evidence recorded in the corridor. Review of crash history offers valuable insights into challenges that users are experiencing, and possible needs to reduce the potential for similar collisions to occur in the future.

Field Review

Field reviews were conducted in the late spring of 2023 to review existing conditions in the MD 190 corridor. Observations were collected using GIS equipped tablets, allowing opportunities, challenges, and photographs of existing conditions to be recorded geospatially along the corridor for review and mapping. Initial assessments were developed from observed conditions as investigators traveled along the corridor. Key themes that were observed included:

- » Many driveway access points resulting in frequent turning movements.
- » Narrow and unbuffered bike lanes.
- » Lack of bicycle facilities, resulting in sharing the sidewalk or riding in high speed and volume traffic.
- » Sidewalks directly abutting high speed or heavily trafficked segments of MD 190.
- » Obstructions within the sidewalk (utility poles, sign posts, light poles, fire hydrants).
- » Consistent pedestrian and bicycle volumes at several signalized intersections and at the unsignalized marked crosswalk near the Capital Crescent Trail Bridge.
- » Insufficient pedestrian crossing times at several signalized intersections.
- » Queuing creating inconsistent behaviors/expectations at access points.
- » Unmarked crossings of minor side-streets.
- » Posted speed limit may be too high within heavy commercial/industrial area.
- » Opportunities to upgrade lighting throughout the corridor.





MD 190

PEDESTRIAN TRAVEL CONDITIONS

Pedestrian Travel Conditions

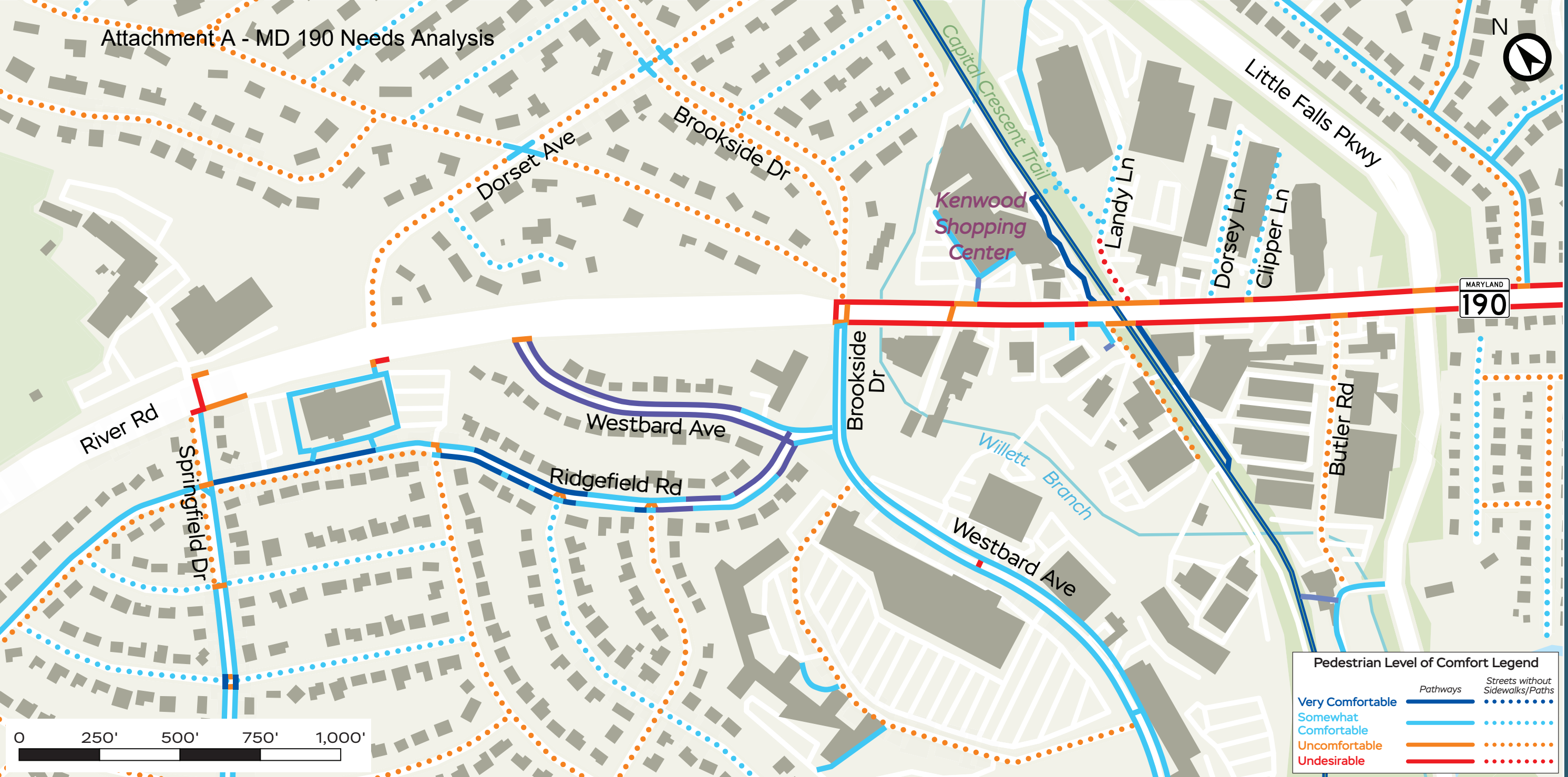
Pedestrian facilities were evaluated by measuring the width of the sidewalk throughout the corridor to determine if there is adequate space to accommodate minimum ADA guidelines. The SHA Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways requires a minimum 5-foot wide sidewalk width with design waivers required for any substandard width. The US Access Board’s Public Right-of-Way Accessibility Guidelines (PROWAG) require a continuous clear width of 4 feet for pedestrian access routes.

Sidewalk width is particularly important throughout this study area as there is a high volume of pedestrians throughout the day accessing their commercial, industrial, and residential communities. A narrow

sidewalk limits the number of pedestrians that can travel through the area, requires pedestrians to travel single file, and forces pedestrians to travel uncomfortably close to automobile traffic. When the sidewalk width is reduced to less than the desirable minimum of 5 feet, a passing zone, allowing space for a pedestrian to comfortably pass, should be placed frequently. When obstacles, such as signs, utility poles, and fire hydrants, are placed within the sidewalk, the useable width is compromised but may create isolated pinch points down to 32 inches. Additionally, pedestrians who use walking aids or wheelchairs have a harder time using the narrow sidewalks.

There is no sidewalk present along both sides of the western

segment of the MD 190 study corridor between Springfield Drive and Brookside Drive, which is mostly lined with wooded areas but is generally a residential area with bus stops at intersections. Along the eastern segment of the study corridor between Brookside Drive and Little Falls Parkway, the sidewalk width varies. The sidewalk width is at least 5-feet throughout much of the southern (eastbound) portion with some narrower segments. Along the northern (westbound) side of the corridor, the sidewalk width varies between a 4-foot to 5-foot segment, sometimes widening to greater than the state minimum width.



Pedestrian Level of Comfort

Pedestrian Level of Comfort (PLOC) was created by the Montgomery County Planning Department to identify locations in the existing walking network that are uncomfortable due to insufficient or incomplete sidewalks and crossings, and to quantify how different investments will increase connectivity. The PLOC was inspired by the Bicycle Level of Traffic Stress (BLTS) analysis conducted for the Montgomery County Bicycle Master Plan.

Factors such as pathway width and condition, buffer from traffic, number of lanes to cross, traffic speed, presence of crosswalk markings, availability of median islands, land use, roadway functional classification, and right-turn on red affect comfort levels and are

considered when scoring the thresholds. The four main scores are undesirable (level 4), uncomfortable (level 3), somewhat comfortable (level 2) and very comfortable (level 1). Based on lack of available data at the time that Montgomery Planning was conducting this analysis, there are some factors that are not considered, such as pedestrian and street lighting, or the presence of a Leading Pedestrian Interval (LPI) at crossings. These factors are to be scored separately.

It is important to note that “comfort” differs from “safety.” Safety is the fundamental priority of any transportation system, while comfort relates to a path that is enjoyable and comfortable for people of all ages. When a street receives a relatively poor score, it is a sign that

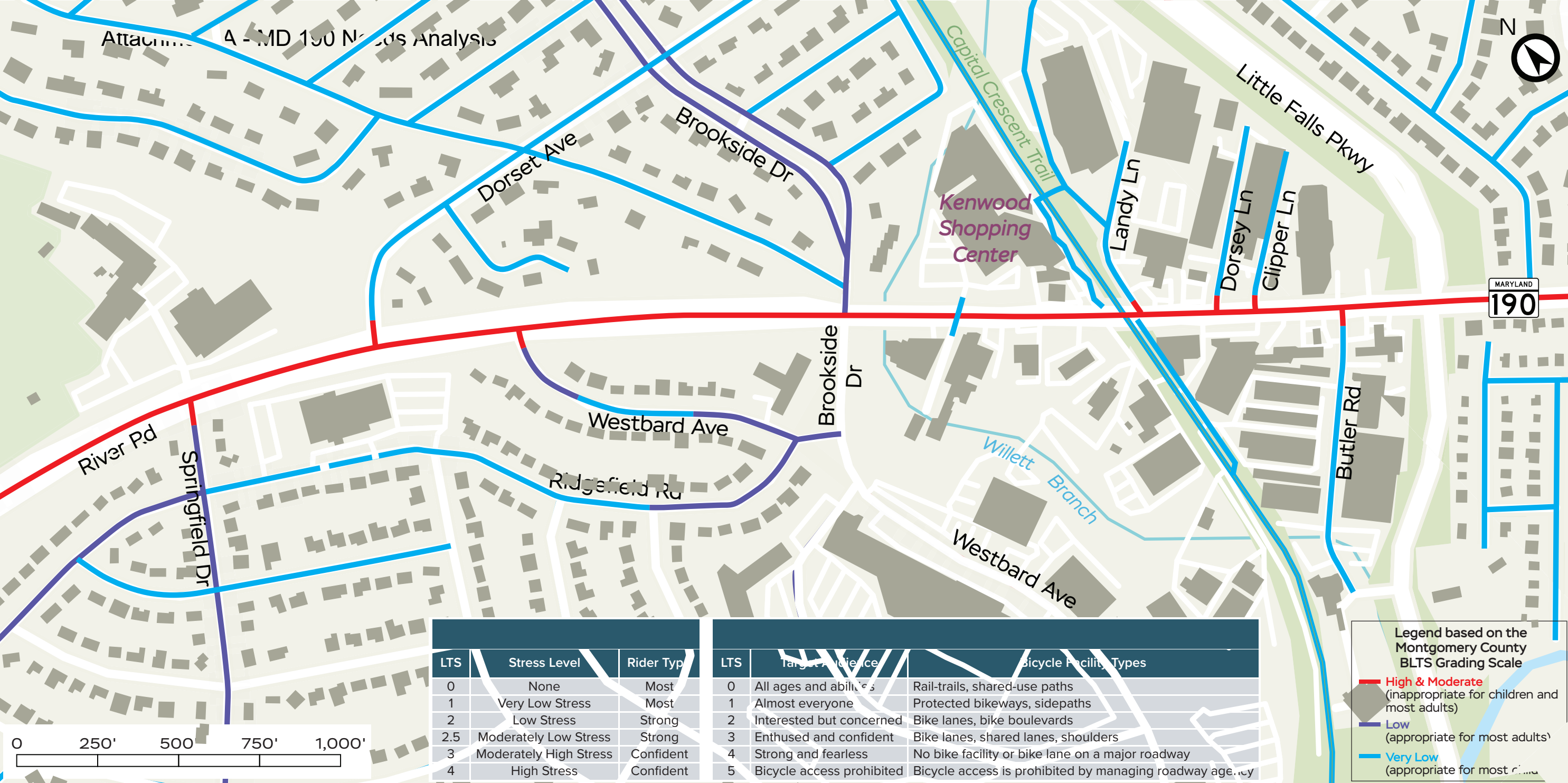
change is needed to make people more comfortable and not deter pedestrian activity.

The PLOC along MD 190 between Brookside Drive through Little Falls Parkway is graded primarily at undesirable (level 4), largely due to narrow sidewalks and minimal separation from the travel lanes. The segment of MD 190 between Brookside Drive and Springfield Drive is not graded as there are no sidewalks present along the corridor. All of the marked crossings over MD 190 are graded at level 3 or level 4, based on the width of the roadway, number of lanes required to cross, the speeds of oncoming traffic, and the lack of pedestrian refuge.



Within the western segment between Springfield Drive and Brookside Drive, a wide shoulder is provided with bicycle lane markings in both directions. At some locations, the wide shoulder is interrupted by acceleration/deceleration and auxiliary lanes and bicyclists travel in mixed traffic. Within the western segment, the marked bicycle lane varies from greater than 4 feet at full width, less than 4 feet within the taper, and no bicycle lane is provided within the presence of acceleration/deceleration and auxiliary lanes. In the eastern segment between Brookside Drive and Little Falls Parkway, a narrow bicycle lane of 4 feet is present to Butler Road, where the bicycle lane is absent eastward to Little Falls Parkway. There are no

buffered bicycle lanes in the study corridor.



MD 190

BICYCLE LEVEL OF TRAFFIC STRESS

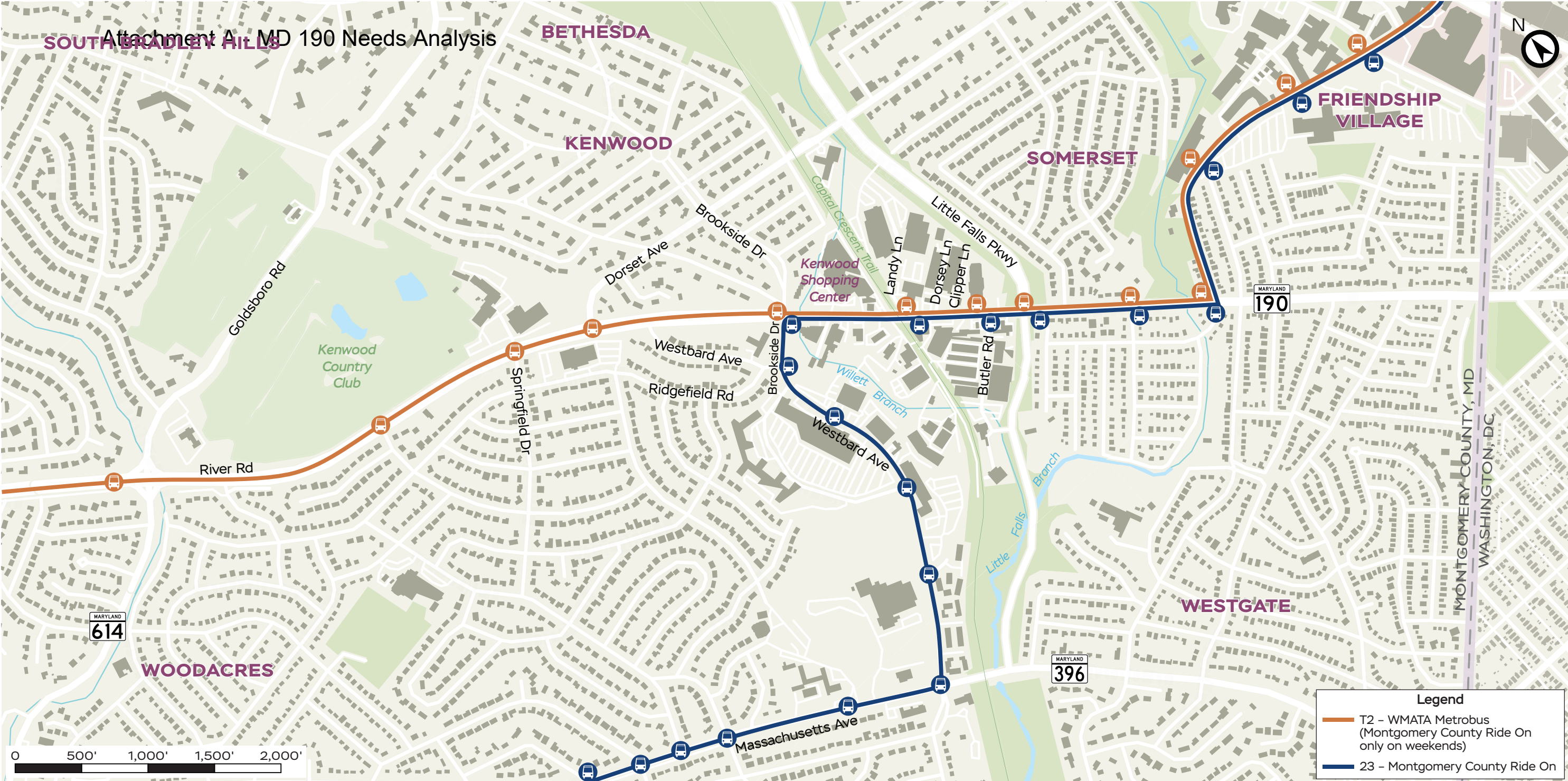
Bicycle Level of Traffic Stress

Bicycle Level of Traffic Stress (BLTS) is a methodology that quantifies the amount of stress bicyclists feel when they ride close to traffic. The Montgomery County Planning Department has provided this metric for all roadways within the County based on factors such as traffic speed, number of lanes, on-street parking activity, and ease of intersection crossing. The goal of this methodology was to address which roads needed improvements as part of the 2018 Montgomery County Bicycle Master Plan to recommend ways of creating a connected bikeway system that will appeal to a wider range of riders. The revised level of stress is categorized by the categories shown above in Table 1.

The Maryland Department of Transportation (MDOT) is transitioning to the BLTS system with influence by the Montgomery County's Revised Level of Traffic Stress. Variables that determine the BLTS include the presence and type of bicycle facility, speed limit, and number of through lanes/traffic volume. The LTS scores are summarized by the categories shown above in Table 2.

Along MD 190, there are four (4) traffic lanes, high travel speeds (35 mph), high traffic volumes (~30,000 vehicles/day), and lack of separated or dedicated bicycle facilities. This segment of MD 190 is graded a Stress Level 4 by the Montgomery County BLTS while the

MDOT BLTS is graded between Stress Level 2 through 4, indicating that MD 190 does not provide bicycle infrastructure for all ages and would typically only be traveled by the most confident of bicyclists.



MD 190

TRANSIT TRAVEL CONDITIONS

Transit Travel Conditions

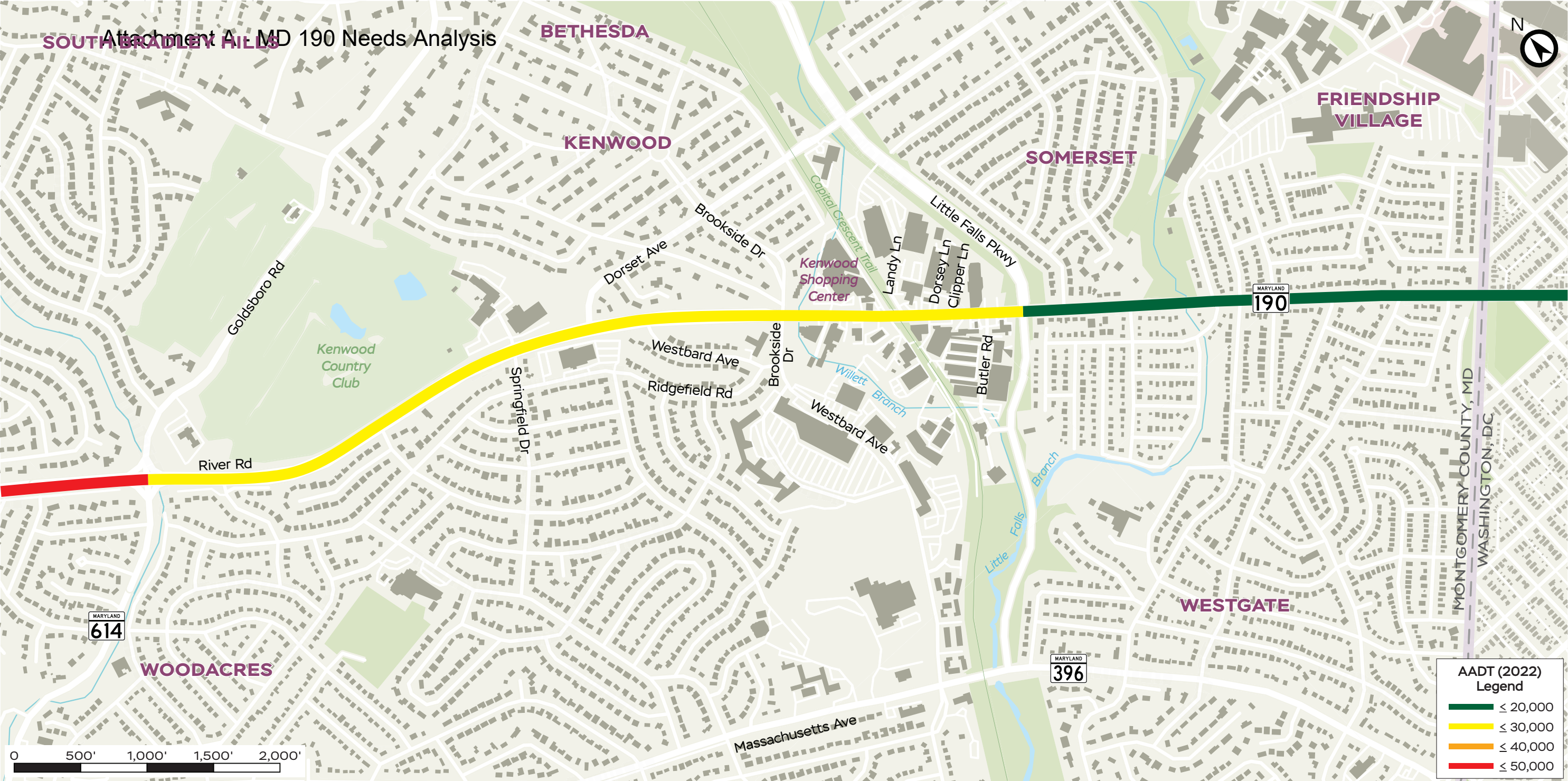
The MD 190 corridor serves both Montgomery County Ride On and Washington Metropolitan Area Transit Authority (WMATA) Metrobus transit routes.

The WMATA T2 bus runs along MD 190 throughout the entirety of the segment and to Washington DC, making about six (6) stops within the study segment. The T2 bus provides weekday service in both directions with headways of approximately 30 minutes with service by WMATA, while the T2 bus provides weekend service in both directions with headways of approximately 35-45 minutes with service by Montgomery County Ride On.

The Montgomery County Ride On 23 bus runs throughout the segment between Westbard Ave through the east of the segment to Washington DC, making about four (4) stops within the study segment. The 23 bus provides service Monday-Saturday in both directions with headways of approximately 35 minutes.

Within the western portion of the corridor at Springfield Drive and Dorset Avenue, auxiliary lanes are provided at some bus stops so buses can pull out of the right-most through travel lane for boarding/alighting. At other stops along the corridor, buses generally stop within the right-most through travel lane, blocking the bike lane.

Throughout the corridor, transit stop configurations require buses to mix with bicycle traffic.



MD 190

AUTOMOBILE TRAVEL CONDITIONS

Automobile Travel Conditions

Annual Average Daily Traffic (AADT) is an estimate of the mean traffic volume across all days for a year for a given location along a roadway. SHA manages a traffic monitoring program and estimates AADT on all state-maintained roadways including MD 190.

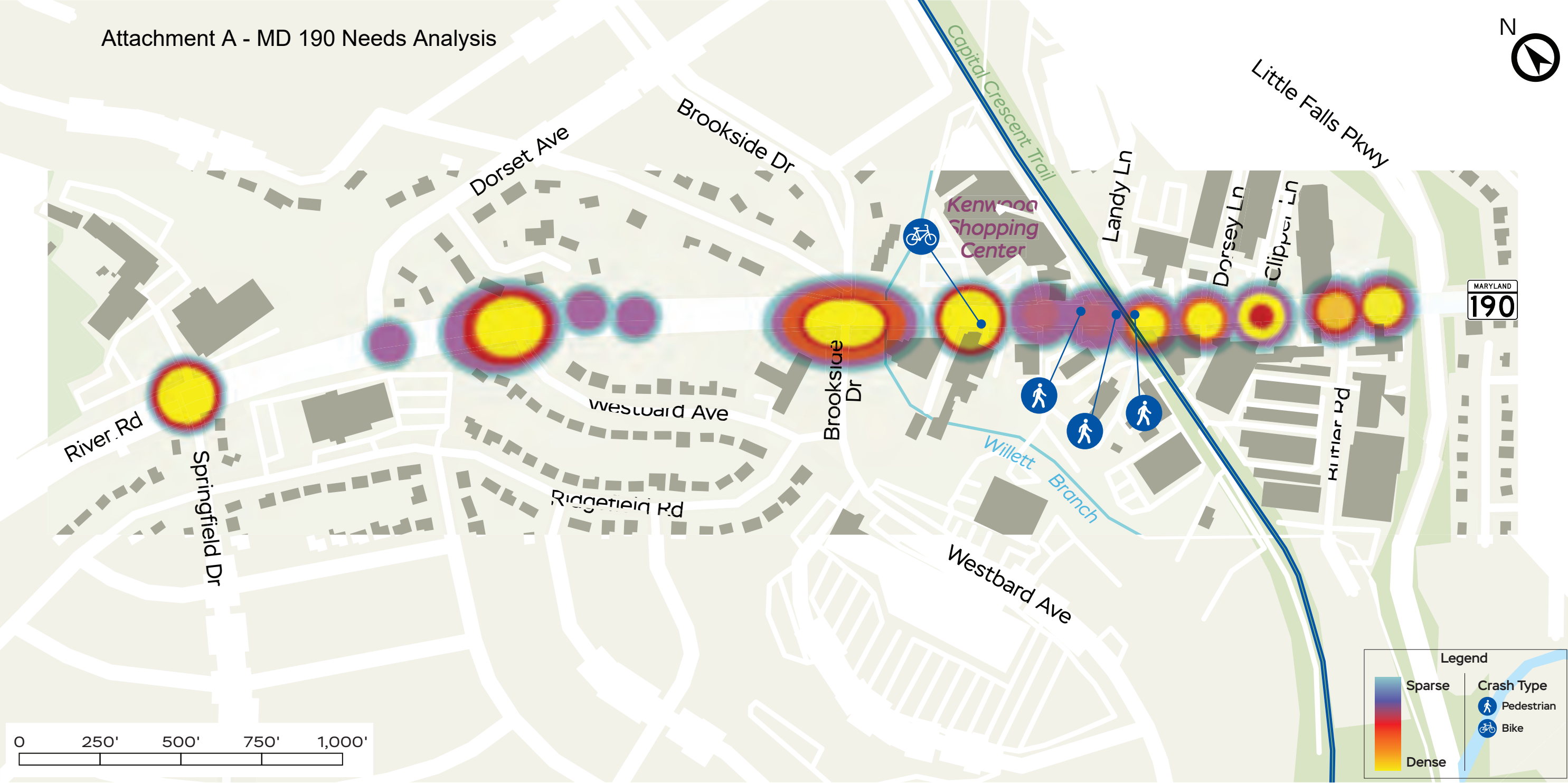
Within the study segment of MD 190 between Springfield Drive and Little Falls Parkway, the 2022 AADT is approximately 25,000. To the east of the study segment towards Washington DC, the 2022 AADT is approximately 20,000. To the west of the study segment towards I-495 (Capital Beltway), the 2022 AADT is approximately 45,000.

In the western portion of the study corridor, MD 190 is a four-lane divided roadway with raised median and turn bays and acceleration lanes at intersections. In the eastern portion of the study corridor, MD 190 is

a four-lane undivided roadway with turn bays at signals and a center two-way turn-lane spanning from the Kenwood Shopping Center to Butler Road. Closely spaced driveways provide access to commercial and industrial businesses throughout the eastern segment of the study corridor. The two-way left-turn lane provides an opportunity for turning vehicles from MD 190 to move out of the through lanes to wait for a gap in oncoming traffic and improves traffic flow and reduces risk for left-turn crashes. Motorists turning from the driveways onto MD 190 were frequently observed making a two-stage left turn into the two-way left-turn lane before merging onto the through lane.

In the morning peak period, the peak direction of travel along MD 190 is eastbound towards Washington, D.C. and queues typically extend to

Brookside Drive/Ridgefield Road, blocking driveways along the south side of MD 190. Observations showed some motorists experiencing delays as they turned to and from MD 190 in the middle of the queues. In the evening peak periods, the peak direction of travel along MD 190 is westbound towards I-495 (Capital Beltway) and queues along the corridor typically formed starting from the Brookside Drive intersection eastward. Once through this intersection, westbound vehicles were observed accelerating towards Springfield Drive as the character of the roadway changed. At locations where driveways exist, queuing along MD 190 results in inconsistent road user expectation, unexpected conflicts, and sight line obstructions. No cycle failures (vehicles waiting more than one signal cycle to travel through the intersection) were observed during either peak period.



Crash History

Crash data along MD 190 from Springfield Drive to Little Falls Parkway was reviewed for a six-year period (2017-2022). The crash data reviewed only included reported crashes involving a motor vehicle. Within this period, a total of 84 crashes were reported, including 34 injury crashes and 1 fatal crash. The most prominent collision types included rear end, angle, and left-turn collisions, occurring frequently at signalized intersections or at the unsignalized access points/driveways.

There were four crashes that involved a pedestrian or bicyclist; including three crashes involving a pedestrian that resulted in

injuries and one crash involving a bicyclist that resulted in a fatality. For two of the three pedestrian-involved crashes, the pedestrian was crossing at the uncontrolled, marked crosswalk underneath the Capital Crescent Trail Bridge. For the third pedestrian-involved crash, the pedestrian was crossing just west of the Capital Crescent Trail Bridge, outside of a marked crosswalk. All three pedestrian-involved crashes occurred under dark or nighttime conditions and involved a motorist traveling in the right-most lane along the westbound direction of MD 190. One of the pedestrian-involved crashes occurred on wet surface conditions while it was raining.

The fatal bicycle-involved crash occurred along eastbound MD 190 at the driveway opposite from the Kenwood Station Shopping Center entrance. The collision involved a bicyclist traveling within the marked bicycle lane and a truck turning from eastbound MD 190 into the driveway. The collision occurred in the afternoon while it was still light outside.

Potential Improvements and Prioritization

Overview

Meeting the broad needs of MD 190 users will require thoughtful and intentional investments over time. Change in established highway corridors rarely occurs rapidly, often taking place incrementally to leverage opportunities for long-term improvements in safety or mobility. Strategic approaches are required to outline manageable projects, identify funding and achieve meaningful change.

Best practice resources provide guidance on enhancing safety, particularly for non-motorized road users, and enhancing multi-modal accessibility. To establish a toolkit appropriate to address needs in the MD 190 corridor, the following best practices from national and local guidebooks were consulted:

- » Maryland-National Capital Park and Planning Commission Westbard Sector Plan
- » MDOT SHA Bicycle and Pedestrian Design Guidelines
- » MDOT SHA Context Driven: Access & Mobility for All Users
- » MDOT SHA Pedestrian Safety Treatments Best Practices Guidelines
- » Montgomery County Complete Streets Guide
- » Montgomery County Bicycle Facility Design Toolkit
- » USDOT FHWA Proven Safety Countermeasures
- » USDOT FHWA Roadway Departure Safety
- » USDOT FHWA Traffic Signal Timing Manual
- » US Access Board, PROWAG, 2023

SHA has a variety of near-term, mid-term, and long-term opportunities to address needs in the MD 190 corridor. This study aims to develop the corridor for a broader reorientation to achieve the grander vision discussed in the Westbard Sector Plan.



Westbard Sector Plan

The Westbard Sector Plan, prepared by the Montgomery County Planning Department and approved and adopted by the Maryland-National Capital Park and Planning Commission (M-NCPPC) on July 2016, identifies general goals for developments within the Sector Plan boundaries. The Sector Plan goals along MD 190 include narrowing lanes to provide a buffered bike lane, installing additional traffic signals, and consolidating driveway access points along the corridor.



Segments

The MD 190 corridor can be segmented into distinct contexts based on the varying density and mixes of use that tend to generate activity or demand for local access. Segment 1 includes MD 190 between Springfield Drive and Brookside Drive. This area includes a four-lane divided highway with two lanes in each direction. Segment 1 consists of mostly residential land uses with roadways accessing neighborhoods and the Kenwood Country Club. Segment 2 includes MD 190 between Brookside Drive and Little Falls Parkway. Segment 2 includes multiple commercial and industrial land uses, including over 20 uncontrolled access points and a center two-way left-turn lane.

Improvement options were identified for the segments and classified as near-term, mid-term, and long-term. The near-term improvements include changes to pavement markings, additional signage, and basic modifications to signal timings. These improvements are intended to be implemented within 3-6 months. The mid-term improvements include restriping the corridor, using colored pavement markings, signal timing phasing improvements, and other improvements that would be implemented within a year. Long-term improvements include much more involved modifications, such as impacts to underground and aboveground utilities, drainage, and coordination with businesses that would be implemented within several years. With all potential improvement options, improving the visibility of pedestrians or bicyclists is a priority along MD 190 by keeping a Complete Streets vision in mind, particularly in areas where vehicles and these users may experience conflicts.

The improvement options are listed in the following sections.

Near-Term Improvements

Corridor-wide

The MD 190 corridor includes multiple opportunities for short-term improvements that will improve safety, access, and mobility for travelers in the corridor. ADA compliance should be ensured during the installation of any of these near-term improvements. Potential near-term improvements to be implemented throughout the study corridor, including those already in development by SHA, include improving awareness for all road users of speeds and the presence of bicycles.

Near-Term Improvements	
Location	Improvement Description
Corridor-wide	Improve awareness of speed limits with additional signs at key locations (completed)
	Improve awareness of bike lanes (completed) by:
	» Installing “Ahead” and “Ends” signs
	» Installing “Bike Lane” signs
	» Installing “Begin Right Turn Lane Yield to Bikes” signs
	Trim foliage blocking sight distance and signs relating to speeds, pedestrians, and bicyclists



Additional speed limit signs along westbound MD 190 west of Springfield Drive



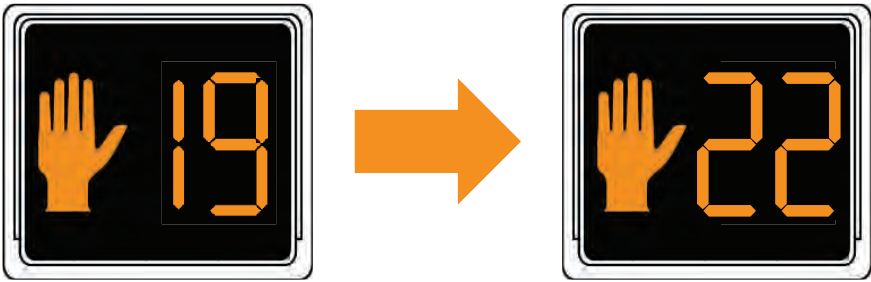
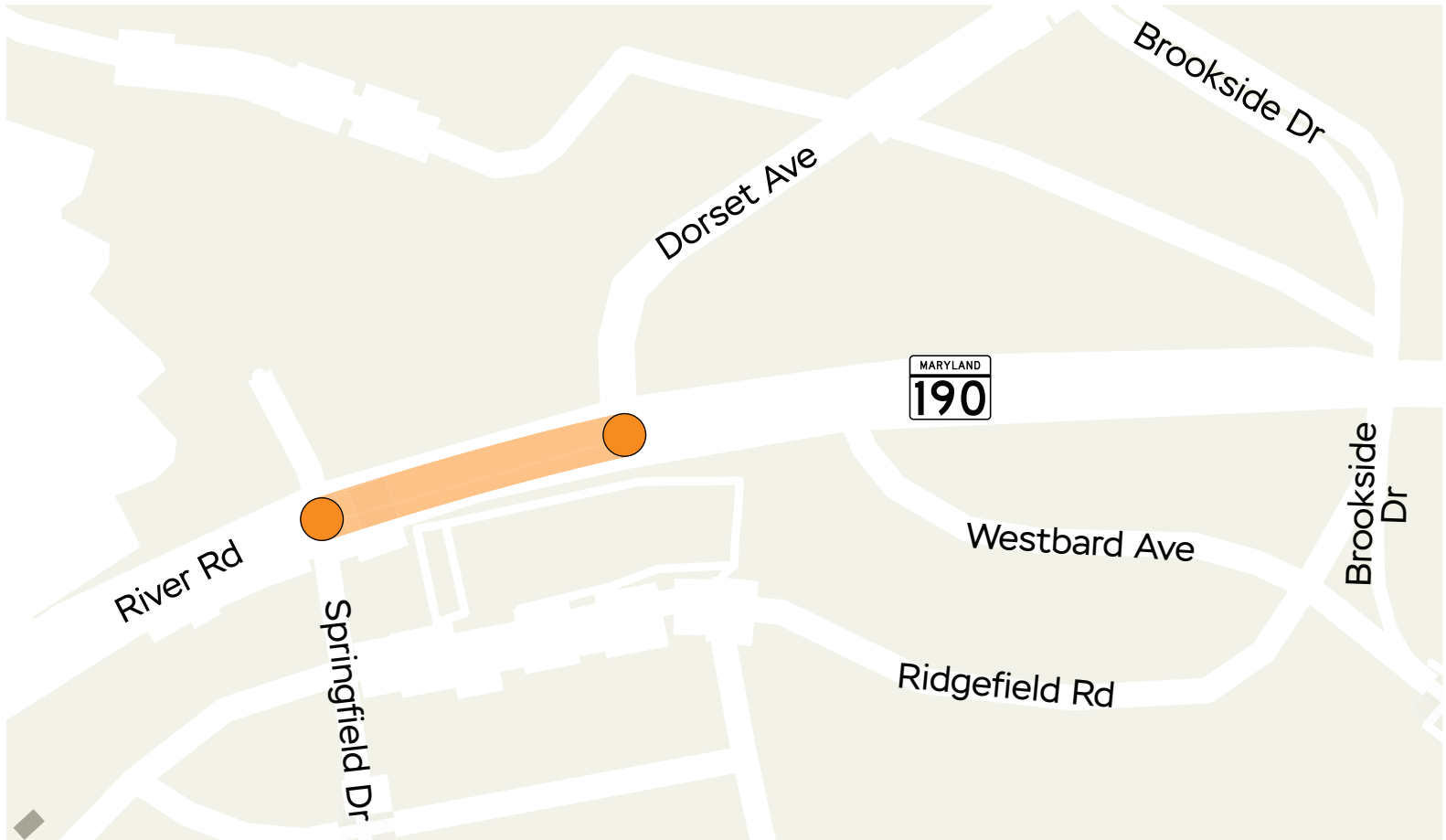
Bike lane sign along eastbound MD 190 approaching Little Falls Parkway

Near-Term Improvements

Segment 1 (MD 190 between Springfield Drive and Brookside Drive)

Potential improvement options throughout Segment 1 target improving the signal timings for vehicular and pedestrian safety at Springfield Drive by lengthening the time allotted for pedestrians to cross MD 190, and lengthening the timing for vehicles to clear through the intersection after the light turns yellow. By increasing the yellow and red phases, the green phase will be slightly reduced to ensure coordination with surrounding signals along the corridor. Another potential improvement treatment includes improving awareness of the unsignalized side street at Dorset Avenue. Public feedback indicated a request to provide a sign along MD 190 alerting motorists of the presence of vehicles turning to/ from Dorset Avenue.

Near-Term Improvements	
Location	Improvement Description
Springfield Drive	Extend pedestrian clearance intervals (flashing don't walk time)
	Extend vehicle clearance intervals (yellow/all-red time)
WB MD 190 at Dorset Ave	Install an Advance Intersection Warning sign



Near-Term Improvements

Segment 2 (MD 190 between Brookside Drive and Little Falls Parkway)

Potential improvement options throughout Segment 2 target improvements at intersections, including upgrading pavement markings, improving signal timings for vehicular and pedestrian safety, and improving awareness of bicyclists with signing installation. These potential signal timing improvements include lengthening the allotted for pedestrians to cross MD 190 and lengthening the timing for vehicles to clear through the intersection after the light turns green.

At the time of this analysis, the intersection of MD 190 at Brookside Drive was a three-legged intersection with the south leg closed due to the construction of Westbard Avenue. The intersection contains high volumes of pedestrians and bicyclists and will need to be evaluated once the south leg is reopened to traffic.

Potential segment improvements include separating parked vehicles at businesses by providing a separating system, such as flex posts, at key locations where turning conflicts are present. To keep bicycle lanes clear, restricting vehicles from parking on the roadway to load/unload may be considered.

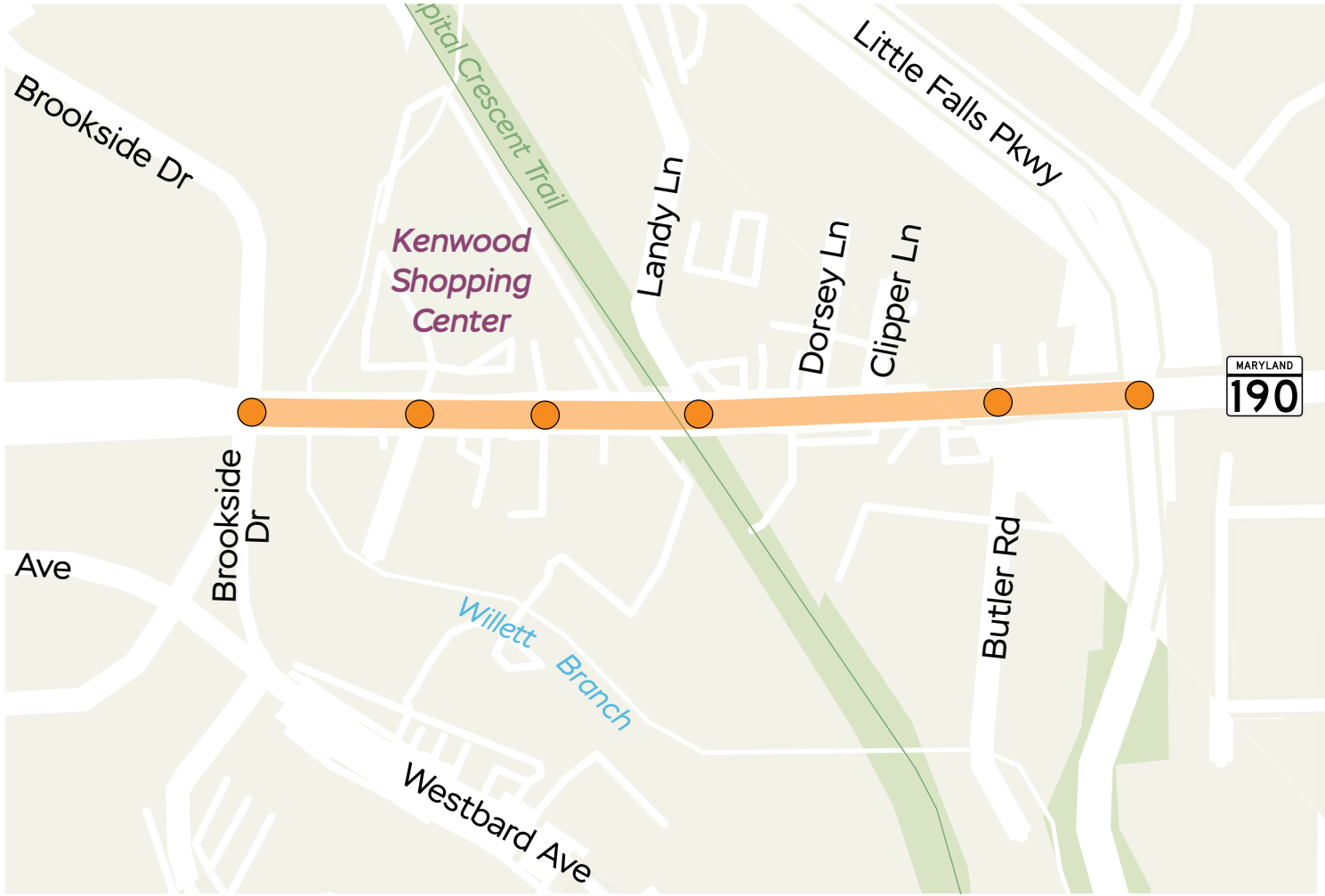
Near-Term Improvements	
Location	Improvement Description
Brookside Drive	Replace crosswalks with continental crosswalks (completed)
	Extend vehicle clearance intervals (yellow/all-red time)
	Evaluate conditions for crossing pedestrians with the reopening of the signal
Kenwood Shopping Center	Replace crosswalks with continental crosswalks (completed)
	Extend vehicle clearance intervals (yellow/all-red time)
	Modify the pedestrian clearance times
Talbert's Ice & Beverage Service/ Bethesda Smoke Shop	Install delineation between EB MD 190 sidewalk and parking to prevent vehicles from parking on the sidewalk
Little Falls Parkway	Replace crosswalks with continental crosswalks
Uncontrolled Driveways	Install a lane separator system and/or flex posts approaching key locations
Throughout Segment 2	Improve awareness of bike lanes for turning traffic at driveways and intersections (Work Order for flex posts previously submitted; pending construction)
	Consider "No Parking/Standing/Stopping" zones and signs to prevent trucks blocking bike lane



Continental crosswalk markings at Kenwood Shopping Center signal



Example of lane separator system/flex posts



Mid-Term Improvements

Projects that require additional design, analysis, and coordination that are expected to take one or multiple years to implement are considered mid-term improvements. The potential mid-term improvements identified for the corridor include strategies to improve separation of vehicle and pedestrian/bicycle traffic and vehicle speed management strategies including lane narrowing, vertical delineation, and reduction of posted speed limits.

Segment 1 (MD 190 between Springfield Drive and Brookside Drive)

The existing wide shoulder throughout Segment 1 is marked as a bicycle lane. With the presence of acceleration/deceleration lanes approaching and departing unsignalized side streets, the bike lane narrows and disappear in both directions of MD 190. To provide a consistent and buffered bicycle lane throughout this segment, a potential treatment option includes narrowing the lanes to provide space for bicycle lanes in both directions to be separated from vehicular traffic.

This improvement option is categorized within the mid-term time frame for the installation of lane markings, lane delineators, and green pavement, shifting/narrowing lanes to accommodate a buffer space and bicycle lane, and potential conflicts with above-ground utilities.

Mid-Term Improvements	
Location	Improvement Description
Throughout Segment 1	Convert the existing bike lane shoulder to a barrier-separated bike lane with green pavement for conflict zones

Segment 1 (MD 190 between Springfield Drive and Brookside Drive)



Attachment A - MD 190 Needs Analysis

Mid-Term Improvements

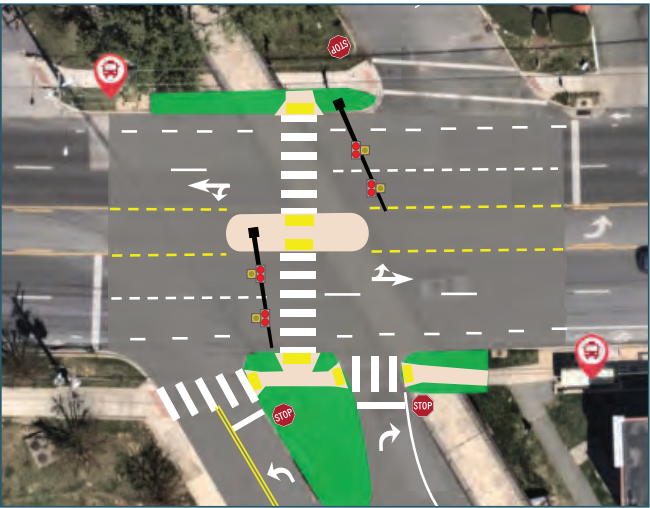
Segment 2 (MD 190 between Brookside Drive and Little Falls Parkway)

The intersection of MD 190 at Kenwood Station is a pedestrian generator with direct access to the shopping center on the north leg. To protect non-motorists, potential treatment options include restricting right turns on red from the shopping center to avoid conflicts with pedestrians within the crosswalk, modifying signal timings to allow more crossing time for pedestrians, and installing a hardened centerline to slow down left-turning vehicles and improve safety for pedestrians.

There are opportunities for mid-term improvements at the uncontrolled crosswalk under the Capital Crescent Trail bridge, including realigning the crosswalk and providing a median refuge to create a shorter crossing distance and providing pushbuttons and pedestrian hybrid beacons to provide a protected crossing. Challenges for the development of this mid-term improvement include utility conflicts and maintaining driveway access for businesses.

Several improvement options could be implemented throughout the whole segment, including relocating obstructions such as utility poles, sign posts, and fire hydrants from within the sidewalk to maximize sidewalk width for pedestrian comfort, modifying the existing bicycle lane to a buffered bicycle lane (connecting to Segment 1) by reducing lane widths and providing space between vehicular traffic and bicycle traffic, and reducing the speed limit within the segment and further east to slow down vehicles thereby improving safety for all road users.

Mid-Term Improvements	
Location	Improvement Description
Kenwood Station Shopping Center	Evaluate implementing a right turn on red restriction exiting the shopping center to improve pedestrian safety and lessen the impact of limited sight distance
	Implement a Leading Pedestrian Interval (LPI) for the west leg
	Install a hardened centerline for the west leg to slow down left-turning vehicles and improve safety for pedestrians
Landy Lane/under Capital Crescent Trail bridge	Install Pedestrian Hybrid Beacon (PHB), pedestrian median refuge, and access management (in progress)
Within Sidewalk	Relocate obstructions, including utility poles, sign posts, and fire hydrants
Throughout Segment 2	Convert the existing bike lane shoulder to a barrier-separated bike lane with green pavement for conflict zones
Throughout Segment to Washington DC	Reduce speed limit from 35mph to 30mph (in progress)



Preliminary concept for improvements at crossing under Capital Crescent Trail bridge

Segment 2 (MD 190 between Brookside Drive and Little Falls Parkway)



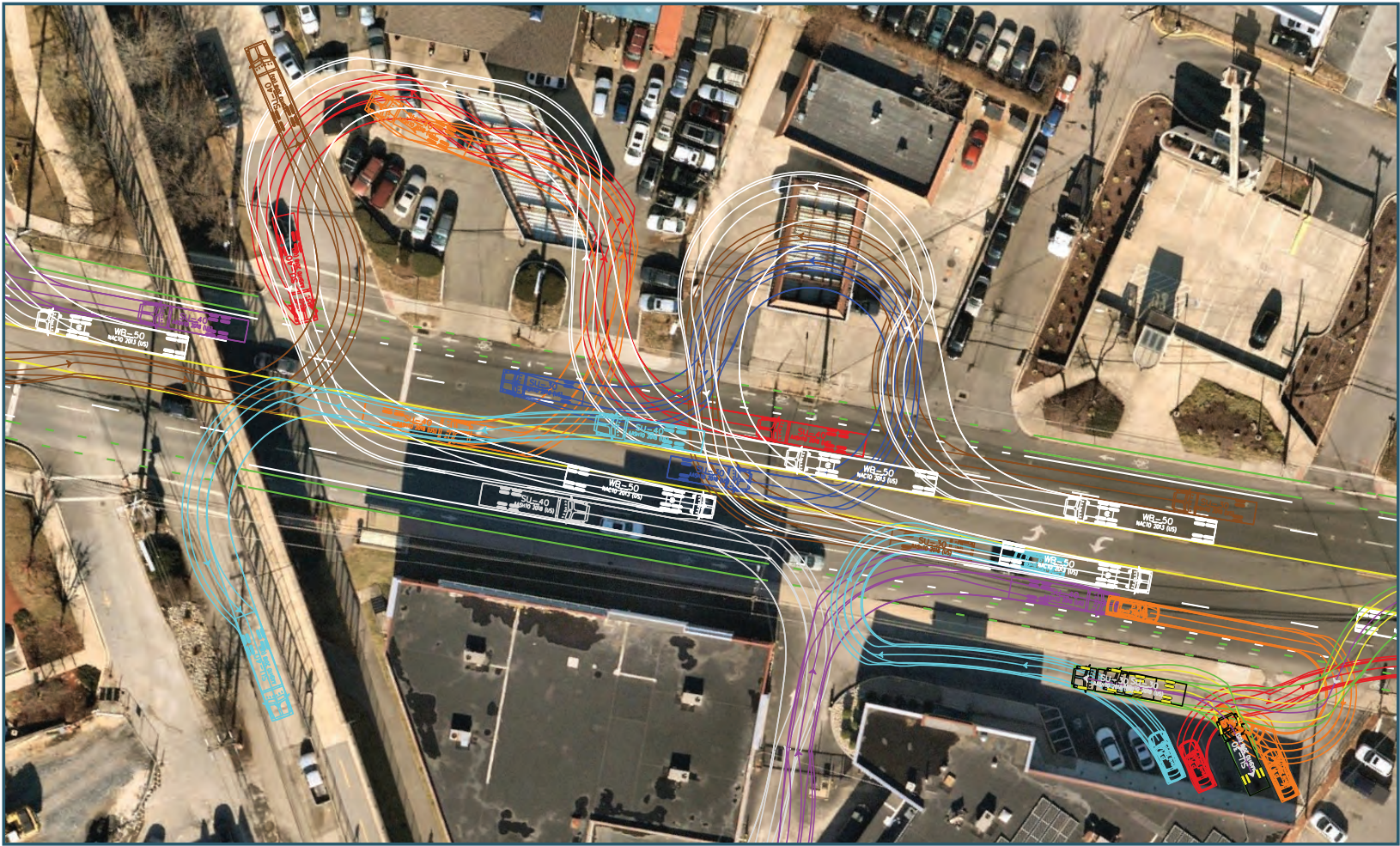
Long-Term Improvements

Projects that require significant design, analysis, and coordination that are expected to take many years to implement are considered long-term improvements. The potential long-term improvements identified for the corridor include strategies to further improve separation of vehicle and pedestrian/bicycle traffic, access management strategies, and an additional protected crossing across MD 190.

Corridor-wide

To maximize safety for all road users along the corridor including motorists, bicyclists, and pedestrians, a shared use path option could be considered in the long-term throughout the corridor. A pathway along the south side of MD 190 would provide bicycle and pedestrian access separated from the roadway with a grassy buffer. A bicycle lane would still be provided in the westbound direction in Segment 1 (MD 190 between Springfield Drive and Brookside Drive). To provide space for the shared use path, vehicle travel lane widths would be narrowed and shifted. Additional design and analysis would be necessary for drainage, linework, pavement conditions, resurfacing, underground utilities, and stormwater management. A preliminary concept is shown on the next page.

As discussed in the Westbard Sector Plan, consolidation of the 22 uncontrolled access points within Segment 2 (MD 190 between Brookside Drive and Little Falls Parkway) is a goal for the corridor to reduce the number of conflict points, turning maneuvers, reduce risk for left-turn crashes, and improve safety for non-motorists. Extensive coordination with local businesses and evaluation of truck turning paths will be important with this potential long-term option.



Preliminary analysis of truck turning paths at corridor driveways

Long-Term Improvements	
Location	Improvement Description
Throughout Segment	Implement Westbard Sector Master Plan improvements, including improving access management to consolidate/reduce the number of driveways and intersections and address pattern of left-turn crashes
	Implement a Shared Use Path along the south side of MD 190
	Upgrade all HID fixtures to be LED and evaluate existing corridor lighting

Segment 1 (MD 190 between Springfield Drive and Brookside Drive)



Segment 2 (MD 190 between Brookside Drive and Little Falls Parkway)

