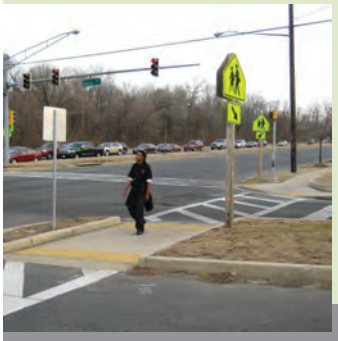
Naylor Road Metro Station Area Accessibility Study

Pedestrian and Bicycle Metro Station Access

Transportation Land-Use Connection (TLC)



National Capital Region Transportation Planning Board
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The Maryland-National Capital Park and
Planning Commission

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KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

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INTRODUCTION

Through a grant from the National Capital Region Transportation Planning Board's (TPB) Transportation/Land-Use Connections (TLC) Program, the Maryland-National Capital Park and Planning Commission (M-NCPPC) and Kittelson & Associates, Inc. (KAI) completed a study to develop recommendations for improving non-motorized access to the Naylor Road Metro Station in Prince George's County, Maryland. The study evaluates the quality and adequacy of existing pedestrian and bicycle infrastructure (e.g., sidewalks, crosswalks, traffic signals) and identifies locations for low-cost, short-term improvements. This report summarizes the key components of that study, which included:

- Public participation process (including a project website to collect comments and a public meeting held within the study neighborhood);
- Coordination with overlapping projects in the study area;
- Existing pedestrian and bicycle facilities and challenges in the Naylor Road station area;
- Potential pedestrian and bicycle access improvements, with descriptions and graphics, applicable to specific locations within the study area; and
- A complete list of recommended pedestrian and bicycle safety improvements with cost estimates.

In addition to this study, several other organizations are working simultaneously toward improving conditions for pedestrians and cyclists around the Naylor Road Metro station. Some of the other projects include:

- *Naylor Road Metro Station Area Access and Capacity Study* – the Washington Metropolitan Area Transit Authority (WMATA) is studying future demand for each access mode and identifying improvements and access strategies for accommodating future development in the station area.
- *Branch Avenue (MD 5)/Naylor Road (MD 637) Streetscape Improvement*– the Maryland State Highway Administration (SHA) is examining improvements to Branch Avenue and Naylor Road through its Community Safety and Enhancement Program.
- *Branch Avenue in Bloom* – the Maryland-National Capital Park and Planning Commission in partnership with the Maryland Small Business Development Center is working to revitalize

the areas around the Naylor Road Metro Station and St. Barnabas Road to attract commercial development and investment.

This study aims to complement efforts by other agencies by identifying near-term recommendations and focusing on areas outside the scope of the other studies.

Recommendations

Table 1 summarizes the recommended high-priority access improvements that can be implemented in the near-term, depending on available funding. This summary prioritizes improvements that provide high value for cost. The recommendations contained in Table 1 were developed under consideration of related projects in the study area, and are based on project team observations of existing deficiencies and public feedback. Recommended improvements include new pedestrian crossings, enhancements to existing crossings, signal timing and design modifications, bicycle lanes, and other pedestrian and bicycle amenities. The complete project list developed through this study is presented in the Recommendations and Funding section.

Table 1 Interim, High-Priority Recommended Station Access Improvements

Location	Description	Type of Treatment	Cost Estimate	
			Low	High
Suitland Parkway/ Naylor Road	Add and update pedestrian signals	Signal Hardware	$20,000	$40,000
	Restripe existing pedestrian crossings and add missing crosswalks	Striping	$200	$500
Naylor Road	Add shared lane markings (sharrows) and Bikes May Use Full Lane signs (R4-11) from Branch Avenue to Oxon Run Drive and through Naylor Road roundabouts.	Sharrows and Signs	$1,300	$1,600
	Remove fence around Metro station	Fence Removal	minimal	
Naylor Road/Branch Avenue	Install rapid flash beacons at existing marked crosswalk at eastbound right-turn lane.	Signing	$2,500	$4,000
Branch Avenue/Metro Station Access	Provide marked crossings on all approaches	Striping	$500	$1,000
	Provide countdown timers at all crossings	Signal Hardware	$20,000	$40,000
Oxon Run Drive	Add shared lane markings (sharrows) and Bikes May Use Full Lane signs (R4-11) from 23rd Parkway to Naylor Road	Sharrows and Signs	$2,400	$2,800
		Total Costs	***$46,900***	***$89,900***

To implement the recommended improvements in Table 1, near-term action items were developed. The following list summarizes several key action items associated with implementation of the station access improvements:

- Strategically pursue improvements through capital improvements funding or grant funding. In the case where grants, construction in conjunction with another roadway project, or a willing land owner make construction of any of the recommended improvements possible, pursue funding sources for that project.
- Incrementally implement improvements by constructing new pedestrian crossings, neighborhood paths, or other improvements with interim-design features first, then incrementally develop additional amenities as needed as funding becomes available.
- Develop design and applicable permitting for the recommended improvements as soon as possible to ensure "shovel-ready" projects when funding becomes available.
- Work with other jurisdictions and agencies to encourage implementation.

The following sections of the report provide additional details regarding the study methodology, cost estimates, and recommendations of the study.

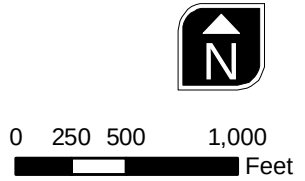
STUDY OVERVIEW

The Branch Avenue Corridor Sector Plan[1], completed by M-NCPPC in 2008, calls for streetscape improvements and transit-oriented development along Branch Avenue between St. Barnabas Road and the District boundary. Following the Sector Plan, Prince George's County commissioned this study focusing specifically in the vicinity of the Naylor Road Metro station. Funded by a Transportation/Land-Use Connections Program grant from MWCOG, this study evaluates the quality and adequacy of the existing pedestrian and bicycle network for accessing the Metro station. The study area, which is illustrated in Figure 1, includes the ½-mile radius around the station, excluding the portion that falls within the District of Columbia.

While M-NCPPC is leading this effort, several other agencies are also conducting studies in the area which will improve the bicycle and pedestrian environment. WMATA is beginning a station access study to accommodate the expected growth in passenger demand related to the planned transit-oriented development. Additionally, Maryland SHA is planning to implement streetscaping and traffic calming measures along Branch Avenue and Naylor Road, beginning construction in 2013.

This plan focuses its recommendations around the concurrent planning efforts by WMATA and SHA, though some effort was made to provide input to those studies on behalf of Prince George's County. Recommendations are aimed at improving the pedestrian and bicycle environment around the Naylor Road Metro station, with an emphasis on low-cost, near-term improvements. They include pedestrian crossing improvements, signal timing changes, traffic calming measures, and new facilities for pedestrian and bicycle comfort and convenience.

[1] *Branch Avenue Corridor Sector Plan and Sectional Map Amendment*. Maryland-National Capital Park and Planning Commission Prince George's Planning Department. 2008.



LEGEND

- 1/4-mile Station Buffer
- 1/2-mile Station Buffer
- DC Boundary
- Green Line

NAYLOR ROAD METRO STATION AREA
PRINCE GEORGE'S COUNTY, MARYLAND

FIGURE 1

H:\profile\11290 - Naylor Rd Station Accessibility Study\gis\01 - Base Map.mxd

Study Process

A visit to the study area occurred in January 2011 by KAI and M-NCPPC staff, who conducted a thorough walking tour of the Naylor Road Metro station area, thereby experiencing the pedestrian network first-hand. Data collection for the study also included a review of crash history along area roadways and solicitation of community observations through a project website which allowed residents to spatially identify deficiencies in the pedestrian and bicycle networks. While the public comment feature of the website is now closed, the comments received during the project are still available for viewing. The website can be accessed at http://map.project.kittelson.com/NaylorMetro.

In addition to the website, public outreach occurred through an open house held on April 14th at the Hillcrest Heights Community Center located in an adjacent neighborhood. The workshop allowed local residents and other interested members of the community to express concerns and ideas for improvements. The planning process also included meetings with other agency stakeholders that may be responsible or interested in various aspects of the study's recommendations. In particular, stakeholder outreach included staff from SHA, WMATA, the Prince George's County Department of Public Works and Transportation (DPW&T), and Branch Avenue in Bloom, focusing on coordination among the related projects.

Background

The Naylor Road station area features a mix of single-family residential, multifamily residential, and suburban style retail development. Branch Avenue (MD 5), a six-lane arterial bisecting the study area, acts as a barrier for accessing the station from the east. It features a number of retail establishments, all of which are surrounded by surface parking lots and numerous driveways. Suitland Parkway, a limited access facility with some traffic signals, borders the station to the north. The Parkway includes a traffic signal at its intersection with Naylor Road (MD 637), which is located at the northwest corner of the station. Naylor Road roughly bounds the station to the west and south. Limited pedestrian and bicycle access across these roadways isolate the Naylor Road station from the surrounding area, making it difficult to access the station without a vehicle.

The primary existing land uses within the study area are residential (single family detached and mid-rise apartments), institutional, and strip retail. Despite its proximity to the Metro station and District of Columbia, the development pattern is auto-oriented with extensive off-street parking, deep building setbacks, and limited pedestrian accommodation.

Planning Context and Past Studies

The Branch Avenue Corridor Sector Plan recommends designation of the Naylor Road Metro Station area as a Regional Center with a mixed-use, high-density residential/office/retail land use classification. As a result, the County envisions transit oriented development with significant increases in office space, retail, and residential units. Since the current parking supply at the station is fully utilized most days, improvements for walking, cycling, and feeder bus access are needed to facilitate the anticipated growth in station access demand.

As higher densities increase the demand for walking and biking, corresponding improvements to the transportation system are needed to support this demand. The Countywide Master Plan of Transportation[2] provides the basic framework for transportation improvements within Prince George's County. In particular, it identifies principles for "complete streets" (i.e., streets that accommodate all modes within the transportation system – not just automobiles). These principles are:

1. **Encourage medians as pedestrian refuge islands** – Frequently, the single-most important improvement for pedestrian safety is a pedestrian refuge. Particularly along multilane roads, it is often not possible for pedestrians to cross all lanes of traffic at once. A median or pedestrian refuge provides the pedestrian a safe and attractive place to stand while waiting to cross the remaining lanes of traffic.
2. **Design turning radii to slow turning vehicles** – A common hazard for pedestrians in urban and suburban environments is relatively fast-moving right-turning traffic. Most difficult are "free" right turn lanes where the motorist does not have to stop. Also problematic are right turns or intersections with wide turning radii that allow motorists to make the turning movement at a high rate of speed. Designing turning radii to slow turning vehicles can be a very effective means of reducing speed and improving pedestrian safety.
3. **Find wasted space and better utilize it** – Space can often be found within rights-of-way that is not necessary for through traffic or turning movements. This is common in many intersections with wide turning radii, but may also be present along roads with center turn lanes where no ingress/egress points exist. This "extra" space can often be used to improve

[2] *Countywide Master Plan of Transportation*. Maryland-National Capital Park and Planning Commission Prince George's County Planning Department. 2008.

the pedestrian environment through sidewalk connections, pedestrian refuges, or traffic calming. Similarly, wide outside curb lanes can be striped for designated bike lanes.

4. **Time traffic signals to function for all modes** – Traffic signals should allow pedestrians adequate time to comfortably cross all lanes of traffic, and should prioritize short cycle lengths over long green times aimed at providing the greatest vehicle capacity for the main line.
5. **Reduce crossing distances** – Wide roads with multiple turn lanes require the pedestrian to cross a much longer distance with significantly more exposure time to oncoming traffic. Crossing distances can be minimized with medians, pedestrian refuges, reduced turning radii, curb extensions, and other measures. These features should be utilized where feasible to minimize the pedestrian's exposure to traffic.
6. **Increase crossing opportunities** – Large blocks provide few opportunities for pedestrians to safely cross busy roadways. Although pedestrians may prefer to cross at signalized intersections, the total space between intersections and controlled crossings may discourage pedestrians from utilizing these locations. Rather, pedestrians may be indirectly encouraged to make mid-block crossings. Smaller block sizes provide additional opportunities for pedestrians to cross roadways at controlled intersections and within a designated crosswalk with appropriate lighting, pavement markings, and signs.
7. **Encourage pedestrian-scaled land use and urban design** – Pedestrian-scaled development can enhance the walking environment. This is related to the block size principle, but also involves mixed land uses; the provision of attractive streetscapes, building frontages, and pedestrian amenities such as benches, trash receptacles, and lighting; safe crosswalks; and comprehensive pedestrian facilities and connections.
8. **Acknowledge that pedestrians will take the most direct route** – As with motorists, pedestrians will use the most direct, efficient connection or route possible. It is important that connections accommodate pedestrians heading to a variety of destinations. Direct routes should be provided and long, circuitous ones avoided. Due to the extra time and effort required to walk the extra distance, pedestrians will frequently attempt the shortest connection or road crossing available, even if one has not been formally provided. Every effort should be made to accommodate these movements during the planning and design of road improvements and development projects.
9. **Ensure universal accessibility** – all ages and user groups should be accommodated along area sidewalks and intersections, including the elderly, children, and disabled groups. All

street crossings should include ADA-compliant curb cuts and ramps, and all pedestrian signal push buttons should be handicapped-accessible.

10. **Pursue targeted education and enforcement efforts to reduce bicycle and motor vehicle crashes** – Education and enforcement programs help support changes to sidewalks, intersections and the roadway. Enforcement programs to reduce pedestrian and bicycle and motor vehicle crashes should address behaviors by motorists, pedestrians and bicyclists. Where possible, education and enforcement efforts should be leveraged. For example, education and enforcement activities through Safe Routes to School (SRTS) programs in schools in the study area could be combined with similar programs targeting other audiences. MWCOG's on-going Street Smart pedestrian safety education campaign offers another opportunity to promote safe driving and walking practices for travelers within the region.

The project team used these principles to guide selection of the study recommendations.

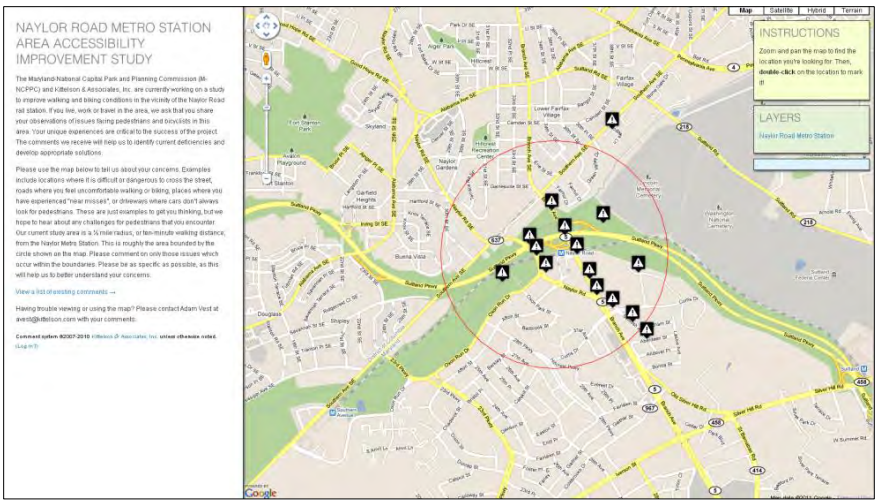
EXISTING CONDITIONS AND CHALLENGES

Public comments (gathered from the project website and public meeting), field visits to the station area, and conversations with the project team revealed an existing pedestrian and bicycle environment with several opportunities for improvement. The study area has many pedestrian facilities, including sidewalks, marked and unmarked crosswalks, and refuge islands for pedestrians, but several locations lack adequate facilities and potentially compromise pedestrian safety. There are no dedicated bicycle facilities in the study area.

Pedestrian facilities are provided around much of the Naylor Road rail station, including sidewalks and crosswalks. However, some notable gaps exist in the network, particularly for pedestrians accessing the station from Oxon Run Drive. Moreover, some of the existing facilities do not meet standards set forth in the 2009 Manual on Uniform Traffic Control Devices (MUTCD)[3] and/or the draft US Access Board Public Rights-of-Way Accessibility Guidelines (PROWAG)[4].

Public Outreach

The project website developed for this study included a public comment feature for nearby residents and interested parties to leave specific notes about pedestrian and bicycle concerns in the study area. Several of the received comments involved high vehicle speeds and unsafe conditions on roadways near the station, particularly on Branch Avenue (MD 5).



Screen-capture of the public comment based website used to gather public observations and issues during the project.

[3] *Manual on Uniform Traffic Control Devices*. Federal Highway Administration. 2009. Accessed at: http://mutcd.fhwa.dot.gov/

[4] *Public Rights of Way Accessibility Guidelines*. U.S. Access Board. 2005. Accessed at: http://www.access-board.gov/prowac/

A public meeting was held on April 14th at the Hillcrest Heights Community Center, located approximately ½ mile from the Naylor Road Metro station, to gather additional feedback from the public. Representatives from the M-NCPPC, WMATA, and SHA all presented on their respective projects in the study area. Participants were encouraged to mark areas of concern on several large maps of the study area. During the course of the meeting, residents expressed major concerns about not only safety at crossings and vehicle speeds, but also of personal safety while walking in the area. People noted the lack of pedestrian amenities such as street lighting and trash receptacles in their neighborhoods.

Field Review

Field visits by the project team also evaluated the quality and adequacy of existing pedestrian and bicycle infrastructure (e.g., sidewalks, crosswalks, bike lanes, traffic signals) and identified the location of trip generators (e.g., Naylor Road Metro station, shopping, residential clusters, etc.). The intent of the field walks was to experience the study area first-hand to understand both real and perceived barriers to walking. The Federal Highway Administration (FHWA) Pedestrian Road Safety Audit Guidelines and Prompt Lists[5] were used as guidance for the site visit and developing existing pedestrian deficiencies in the study area.

The results of the field visit noted several key deficiencies in the pedestrian and bicycle environment in the Naylor Road station area. Many locations lack sidewalks, most notably the east side of Branch Avenue across from the station. While a sidewalk is provided on the near side of the street, many pedestrians travel to the station from origins east of Branch Avenue.

Additionally, some of the sidewalks that are provided do not allow adequate space for pedestrians to pass one another and are placed immediately adjacent to high-speed traffic. In other locations, obstructions make walking along the sidewalk difficult. Moreover, land uses adjacent to Branch Avenue feature closely spaced driveways which provide frequent potential conflict points for pedestrians walking down the sidewalk.

Several major roadways in the study area have missing or inadequate pedestrian crossings. Pedestrians are often required to travel long distances between intersections to reach crossing

[5] *FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists*. U.S. Department of Transportation and the Federal Highway Administration. 2007. Accessed at: http://drusilla.hsrc.unc.edu/cms/downloads/PedRSA.reduced.pdf

locations; mid-block crossings are infrequent. Many intersections in the study area also have large curb radii, which create longer crossing distances for pedestrians and allow vehicles to turn at higher speeds.

Finally, crash data were collected and analyzed for state roadways in the study area to determine historical trends. Both Branch Avenue and Naylor Road have experienced extremely high rates of crashes over the past three years. Nine pedestrian crashes were reported along Branch Avenue in the three years between 2007 and 2009.

Appendix A provides a detailed summary of the existing conditions analysis, including the field review and crash analysis.

TOOLBOX OF POTENTIAL STRATEGIES

The Toolbox of Potential Strategies contains descriptions and examples of possible pedestrian and bicycle improvements to implement in the Naylor Road Metro station area. These tools are based on some of the best practices across the country and are applicable to many locations in the study area. The Naylor Road Station Area Accessibility study focused on near-term improvements that can be implemented at specific locations. Additional future considerations are presented at the end of this section, intended to serve as guidance as development occurs and/or additional funding becomes available.

The strategies presented in the Toolbox are countermeasures to many of the existing pedestrian issues presented in the previous section of this report. While each strategy is only applicable in limited locations, the combination of systematic pedestrian improvements throughout a given area has been shown to create significant improvements to pedestrian safety. For instance, a study contained in the 2010 Transportation Research Record, entitled "Reduction of Pedestrian Fatalities, Injuries, Conflicts, and Other Surrogate Measures in Miami-Dade, Florida"[6], documents the positive impact of inexpensive pedestrian safety measures. Several small-scale pedestrian improvements were implemented on eight high-crash corridors, following a public education and enforcement program on pedestrian safety. The two years following the installation of improvements resulted in a 41 percent reduction in the number of crashes.

The strategies contained in the next few pages are low-cost pedestrian and bicycle improvements that could be implemented in the next 1 to 5 years, depending on available funding. Improvements include new installations or changes to existing pedestrian crossings, minor signal timing changes, and additional amenities for pedestrians and cyclists. The treatments presented on the following pages are organized into five categories:

- Striping Changes
- Signal Timing Changes
- Crossing Improvements
- Comfort and Convenience
- Other Improvements

[6] Reduction of Pedestrian Fatalities, Injuries, Conflicts, and Other Surrogate Measures in Miami-Dade, Florida." Transportation Research Board: Journal of the Transportation Research Boards, No. 2140. 2009.

Treatments are organized to address pedestrian and bicycle deficiencies that were documented during public comment sessions, field visits, and a review of historical crashes. Each category relates to one or more of the 10 complete streets principles identified in the Countywide Master Plan of Transportation.

The specific treatments within each category present alternatives for improvements. Each treatment is presented on a half-page with the following basic information:

- Typical cost provided by the Pedestrian and Bicycle Information Center[7]
- Description
- Effectiveness
- Implementation considerations
- Compliance with standards contained in the MUTCD, PROWAG, and the *Maryland SHA Bicycle and Pedestrian Design Guidelines*[8]
- Photo or graphic

This information is intended to provide an overview of each treatment, with information on its intended application. Many of the summaries also provide one or more examples of recommended improvements in the Naylor Road Metro station area. Each example in the study area provides additional context for the development of the complete recommendation list for this plan.

Several references were used to compile the information in the following sections, including the *Desktop Reference for Crash Reduction Factors*, "Pedestrian Countdown Signals: Experience with an Extensive Pilot Installation,", *NCHRP Report 562: Improving Pedestrian Safety at Unsignalized Crossings, Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*, and other references cited throughout this report.

[7] "Engineer Pedestrian Facilities." Pedestrian and Bicycle Information Center. Accessed at http://www.walkinginfo.org.

[8] *Maryland SHA Bicycle and Pedestrian Design Guidelines*. Maryland State Highway Administration. Accessed at: http://www.sha.maryland.gov/Index.aspx?PageId=25.

Signal Timing Changes

Signal timing changes at intersections range from minor changes in the amount of time for crossing pedestrians to the addition of pedestrian signals and push-buttons. These intersection improvements provide walkers with the time and awareness to cross approaches of the intersection, increasing safety for pedestrians and drivers. The strategies identified in this section are consistent with the complete street principles in the Countywide Master Plan, which states "Time traffic signals to function for all modes."

LEADING PEDESTRIAN INTERVAL

Cost: Minimal staff time for signal re-timing

Description: Pedestrians are allowed to begin crossing at the crosswalk before conflicting vehicles start moving. For example, right-turning vehicles may have a red light for 5 to 7 seconds while pedestrians and through vehicles are allowed to begin through the intersection.

Effectiveness: Pedestrians get a head start on vehicles in crossing the roadway, increasing the percentage of turning drivers yielding to pedestrians. Note that right-turn-on-red is often prohibited in conjunction with leading pedestrian intervals

Implementation Considerations: Adding a leading pedestrian interval reduces the amount of green time available for conflicting vehicle movements.

Compliance with Standards: Pedestrian Walk intervals should be a minimum of 4 to 7 seconds in duration. The Flash Don't Walk phase, according to the 2009 MUTCD, is based on the amount of time it takes a pedestrian to cross with a walk speed of 3.5 feet per second.

PEDESTRIAN COUNTDOWN SIGNALS

Cost: $20,000 to $40,000 for all four legs

Description: Newer pedestrian signal heads, contrasted with static Walk/Flash Don't Walk signals, inform pedestrians of the time remaining to cross the street with a countdown on the signal head.

Effectiveness: Fewer pedestrians crossing the street late in the countdown, as compared to signal heads with only the Flash Don't Walk light. Fewer pedestrians left in crosswalk in steady don't walk phase.

Implementation Considerations: Pedestrian signal heads should be clearly visible while pedestrians are waiting and crossing the street.

Compliance with Standards: The 2009 MUTCD requires all new pedestrian signals, and any retrofitted signals, to include countdown pedestrian signals. Per MUTCD guidance, the countdown should include enough time for pedestrians to cross the full width of the street or, in rare cases, reach a refuge island.

Application in Study Area: The Metro Entrance on Branch Avenue does not have a pedestrian signal phase. Pedestrians were observed frequently crossing at this intersection. As part of the installation of crosswalks and sidewalks at this location, pedestrian countdown signals should be installed for MUTCD compliance and pedestrian safety.

PROHIBIT RIGHT-TURNS ON RED

Cost: $300 to $500 per sign; $1,000 to $3,000 for electronic signs

Description: Reduces conflicts between cars and pedestrians by prohibiting cars to turn right, into the path of crossing pedestrians. This treatment may be deployed on a full-time or restricted basis.

Effectiveness: Electronic NRTOR signs have been shown to decrease pedestrian/vehicle conflicts significantly. According to the AASHTO Highway Safety Manual, NRTOR also significantly reduces pedestrian crashes.

Implementation Considerations: Restricting right-turns at an intersection may increase delay for drivers.

Compliance with Standards: Prohibiting right-turns at intersections during the red phase complies with MUTCD standards

Application in Study Area: Following installation of the pedestrian crossings and signals at the Metro entrance on Branch Avenue, "No Turn On Red" signs may improve safety.

CYCLE LENGTH ADJUSTMENTS

Cost: Minimal

Description: Reduce the amount of green time, and therefore overall cycle length, at intersections to decrease the amount of time pedestrians wait to cross the street.

Effectiveness: By reducing the average amount of time pedestrians wait to cross the street, pedestrians are more likely to cross during the Walk phase.

Implementation Considerations: May reduce capacity for vehicles and require coordination with jurisdictions operating signals on a corridor

Compliance with Standards: Signal timing changes comply with MUTCD standards as long as the minimum Walk and clearance times for the intersection are met.

Application in Study Area: Signals along Branch Avenue and Suitland Parkway have very long cycle lengths. Reducing the cycle lengths would reduce delay and improve walkability.

PUSH-BUTTON RETROFITS

Cost: $5,000 to $10,000 for all four legs

Description: Signs above the pedestrian push-button indicate direction of crossing. "Confirm" press buttons acknowledge activation through a light or sound after called by a pedestrian.

Effectiveness: Confirm press buttons have been shown to increase the number of pedestrians using the push-button, and more pedestrians wait for the Walk phase at the signal.

Implementation Considerations: New confirm press pedestrian push-buttons are easily exchanged with existing ones. New installations at intersections without existing push-buttons are more costly.

Compliance with Standards: The MUTCD specifies that separate poles, located at least 10 feet apart, should be used for pedestrian push-buttons unless physical constraints make use of two poles impractical.

Application in Study Area: All locations without confirm press push-buttons are candidates for installation. Priority should be given to locations with high pedestrian volumes or existing trends of low compliance. For example, the Metro Station entrance on Branch Avenue and the intersection of Suitland Parkway/Naylor Road should include confirm press push-buttons with the installation of crosswalks and pedestrian signals.

Crossing Improvements

Crossing improvements include upgrading intersection and mid-block crosswalks, reducing crossing distances for pedestrians, and adding new crossing locations. The strategies contained in this section improve safety at pedestrian crossings by reducing the amount of time they are exposed to vehicle traffic. Several of the complete street principles identified in the Countywide Master Plan relate to crossing improvements:

- Encourage medians as pedestrian refuge islands.
- Design turning radii to slow turning vehicles.
- Reduce crossing distances.
- Increase crossing opportunities.

RAISED MEDIAN ISLANDS

Interim striping/flex-bollards cost: $1,300 to $2,000 per crossing; **full construction cost:** $4,000 to $30,000 per crossing

Description: Provide a protected area in the middle of a crosswalk for pedestrians to stop while crossing. Interim islands consist of striping on the pavement to identify pedestrian space, while fully constructed islands typically include curbs and signs notifying drivers to avoid the location.

Effectiveness: Installing raised medians have been shown to reduce the number of crashes at marked and unmarked crosswalks, as documented in the *Desktop Reference for Crash Reduction Factors*

Implementation Considerations: Raised islands should notify crossing pedestrians that they are exiting a safe place by including detectable warning surfaces or changes in direction (for example, directing pedestrians towards oncoming traffic) in the design.

Compliance with Standards: At a minimum, raised islands should be 6 feet wide to accommodate persons in wheelchairs. Wider islands are often preferred, particularly when included on multilane facilities.

Application in Study Area: Refuge island should be installed wherever pedestrians must cross multiple lanes of traffic in each direction, including Suitland Parkway, the Metro entrance on Branch Avenue, and the proposed mid-block crossing on Branch Avenue.

IN-STREET "STOP FOR PEDESTRIANS" SIGNS

Cost: $300 to $500 per sign

Description: Signs placed in the middle of crosswalks to increase driver awareness of pedestrians and the legal responsibility to yield right-of-way to pedestrians in crosswalks

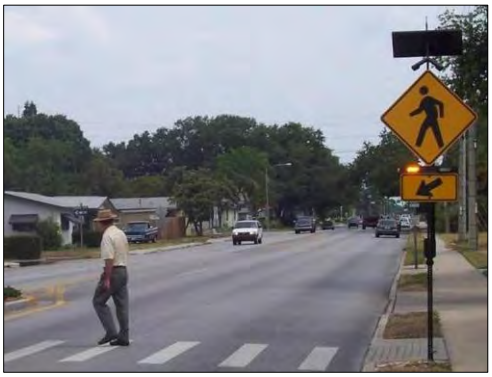
Effectiveness: Increases the number of drivers that yield to pedestrians in the crosswalk.

Implementation Considerations: Signs are placed in the middle of the roadway and are subject to possible damage from cars and trucks. In-street signs usually require more maintenance due to more frequent replacement.

Compliance with Standards: Signs comply with the latest guidance contained in the MUTCD and provided by SHA. Placement within crosswalks are specified in Chapter 11 of the *Maryland SHA Bicycle and Pedestrian Design Guidelines*

Application in Study Area: A sign is recommended at the painted crosswalks at each leg of the roundabouts on Naylor Road.

RECTANGULAR RAPID FLASH BEACON



Cost: $10,000 to $15,000 for both directions

Description: Signs with a pedestrian-activated "strobe-light" flashing pattern attracts attention and notifies the driver that pedestrians are at the crosswalk.

Effectiveness: RRFBs on the side of the road increase driver yielding behavior significantly (to around 80% typically). Additional signs can be included on a center island or median, although these have a lower marginal benefit as compared to roadside signs.

Implementation Considerations: Flashing pattern can be activated with manual push-buttons or automated passive (e.g., video or infrared) pedestrian detection, and should be unlit when not activated.

Compliance with Standards: The MUTCD gave interim approval to RRFBs for optional use in July 2008. The interim approval allows for usage as a warning beacon to supplement standard pedestrian crossing warning signs and markings at either a pedestrian or school crossing, where the crosswalk approach is not controlled by a YIELD sign, STOP sign, traffic-control signal, or at a roundabout.

Application in Study Area: Vehicles turning right from Branch Avenue (southbound) onto Naylor Road travel at high speeds through a yield-controlled pedestrian crossing. A Rectangular Rapid Flash Beacon is recommended at this location to increase pedestrian visibility and remind drivers to stop for crossing pedestrians.

PEDESTRIAN HYBRID SIGNAL

Cost: $50,000 to $75,000 per installation

Description: The pedestrian activated signal (also known as a HAWK signal), unlit when not in use, begins with a flashing yellow light altering drivers to slow. A solid red light requires drivers to stop while pedestrians have the right-of-way to cross the street. While the pedestrian signal is in the Flash Don't Walk Phase, the overhead signal flashes red, and drivers may proceed if the crosswalk is clear.

Effectiveness: Studies show that hybrid signals result in over 95 percent of drivers yielding to pedestrians. Moreover, drivers experience less delay at hybrid signals compared to other signalized intersections.

Implementation Considerations: Pedestrian Hybrid Signals should only be installed at marked crosswalk locations with additional signs to warn drivers about the pedestrian crossing. Maintenance is similar to a full signal.

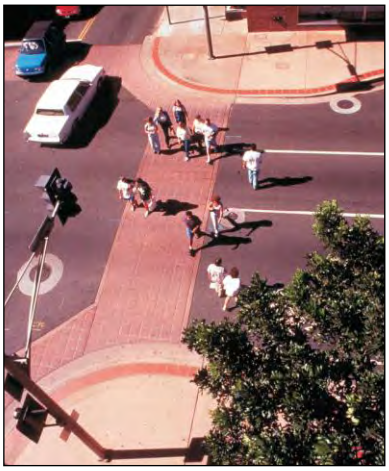
Compliance with Standards: Included in the 2009 MUTCD

Application in Study Area: The long distances between pedestrian crossings on Branch Avenue could be reduced with the installation of a pedestrian hybrid signal between the Metro entrance and Curtis Drive.

CURB EXTENSIONS

Interim striping cost: $1,300 to $2,000 per corner; **full construction cost:** $5,000 to $25,000 per curb

Description: Extend the sidewalk into the street (typically a parking lane) to create additional space for pedestrians



Effectiveness: Allow pedestrians and vehicles to see each other at the crosswalk. Curb extensions (or pedestrian bulb-outs) also reduce crossing distance for pedestrians, reducing the amount of exposure to traffic.

Implementation Considerations: Curb extensions are more easily installed along roadways with on-street parking since not all lanes are used for through traffic. They may be installed at intersections or mid-block crossings.

Compliance with Standards: Guidance for the design of curb extensions are provided in Chapter 10 of the *Maryland SHA Bicycle and Pedestrian Design Guidelines*.

Application in Study Area: Curb extensions at the intersection of Oxon Run Drive/Oxon Park Street would significantly reduce crossing distances and better use the wasted space.

REDUCED CURB RADII

Interim striping cost: $2,500 to $4,000 per corner; **full construction cost:** $5,000 to $25,000 per curb

Description: Reconstructing a street corner with a smaller radius to reduce vehicle speeds while turning.

Effectiveness: Smaller curb radii can improve the safety for pedestrians at intersections by reducing crossing width, providing additional space for pedestrians to wait before crossing, and slowing turning vehicles.

Implementation Considerations: The design of the curb radius is a function of the angle between the intersecting streets, typical size of vehicles at the intersection, and maintenance. For example, intersections with several large trucks may need to have a slightly larger curb radius than local streets, typically 15 to 25 feet. However, streets with on-street parking or bicycle lanes can have smaller radii since vehicles have more space to negotiate turns.

Compliance with Standards: Guidance for the design of right-turn lanes and appropriate curb radii are provided in Chapter 10 of the *Maryland SHA Bicycle and Pedestrian Design Guidelines*.

Application in Study Area: The Metro entrance on Branch Avenue includes a large radius for the southbound right-turn that is recommended for reduction. Vehicles on Branch Avenue are able to turn into the Metro station while maintaining a relatively high speed. Reducing the turning radius would also reduce the total crossing distance for pedestrians.

Comfort and Convenience

Strategies to improve comfort and convenience for pedestrians enhance the pedestrian environment to encourage walking between destinations. Types of improvements include pedestrian-scaled amenities such as wayfinding signs, parks, lighting, and benches. The strategies contained in this section focus on creating a comfortable and safe pedestrian environment that increases the number of pedestrians in the area. These strategies primarily fulfill needs to "Encourage pedestrian-scaled land use and urban design," as included in the Countywide Master Plan of Transportation

IMPROVED WAYFINDING

Cost: $500 for signs, more for complete network

Description: Signs directing pedestrians and bicyclists towards destinations in the area, typically including distances or average walk or bike times.

Effectiveness: Wayfinding signs make it easier for residents and visitors to navigate the station area.

Implementation Considerations: Signing should be uniform and consistent through the area, and should complement existing wayfinding signs implemented by other agencies.

Compliance with Standards: Wayfinding is not a traffic control device and is not covered by the MUTCD.

Application in Study Area: Provide guidance on reaching the rail station and on location of key destinations for pedestrians and cyclists departing rail station.

LANDSCAPING

Cost: wide range based on treatment

Description: Landscaping treatments range from planted strips on roadways to small "pocket" parks on corners to improve aesthetics.

Effectiveness: Not applicable

Implementation Considerations: Depending on the application, landscaping costs vary substantially based on the type of amenities provided. The amount of space available for landscaping will influence the extents. Landscaping such as shrubs, trees, and flowers should be regularly maintained to preserve the quality of public space.

Compliance with Standards: Landscaping is not a traffic control device, and is not covered by the MUTCD.

Application in Study Area: No specific location identified; however, landscaping should be considered when development opportunities or agency improvements occur.

LIGHTING

Cost: $10,000 to $15,000 per light

Description: Pedestrian-scaled lighting along sidewalks and pathways

Effectiveness: Street lighting enhances pedestrian safety and security by lighting areas at night, making walkers visible to drivers and others. Lighting is particularly beneficial in commercial districts or frequently traveled routes.

Implementation Considerations: The physical structure (pole) should not obstruct sidewalks and all pathways, particularly crosswalks, should be well lit. Lighting levels should be uniform as to not distract drivers on the roadway.

Compliance with Standards: The Illuminating Engineering Society of North America provides specific guidance for walkways and bikeways.

Application in Study Area: Oxon Run Drive was identified by the community as a location that lacks adequate lighting for pedestrians, creating an unsafe environment. Additional lights are recommended on the roadway.

BENCHES AND TRASH RECEPTACLES

Cost: $500 to $1,500 for benches and $500 to $1,000 for trash receptacles

Description: Benches are typically placed along sidewalks or multiuse pathways for pedestrians to rest, while trash receptacles provide a location for waste along frequented paths.

Effectiveness: Benches enhance pedestrian areas, particularly commercial districts, by allowing people to socialize and linger.

Implementation Considerations: These investments should be made where there is currently, or expected, heavy pedestrian activity. In order to preserve park and open spaces, trash cans should be provided to reduce the likelihood of littering in these more sensitive areas. Trash cans need to be emptied regularly to prevent overflowing.

Compliance with Standards: Street furniture should not reduce the minimum clear distances required for adjacent pedestrian walkways.

Application in Study Area: Both treatments are recommended throughout the study area.

Bicycle Accommodation

Accommodations for cyclists are often as simple as repainting lines on the road and adding signs to make motorists aware of cyclists. Striping changes include new or revised pavement markings that upgrade sections of roadway or intersections, often by reallocating vehicle space to accommodate pedestrians, bicycles, or transit vehicles. Roadside signs help reinforce the on-street facilities for cyclists in the street. Roadway striping changes can include a wide array of strategies, but the treatments contained in this section focus on using existing roadway space for pedestrians and bicyclists. Striping changes may also be accompanied with flex-posts (inexpensive delineators to reinforce pavement markings) or other treatments. The following striping and signing changes in this section serve to "Find wasted space and better utilize it," as stated in the Countywide Master Plan.

BIKE LANE MARKINGS

Cost: $3,500 to $4,500 per mile

Description: Bike lanes are the area of a roadway designated for non-motorized bicycle use, separated from vehicles by pavement markings.

Effectiveness: Bike treatments improve safety and comfort by increasing visibility and awareness of cyclists, in addition to providing adequate facilities for biking.

Implementation Considerations: Bike lanes are typically 5 feet or wider on roadways with a curb and gutter. Consideration should be given for a wider bike lane depending on the amount space consumed by existing gutters and other obstructions.

Compliance with Standards: AASHTO recommends a minimum width of 5 feet for bike lanes adjacent to parking, curbs, or guardrails. If additional space is available, a bicycle lane buffer can be used to provide additional comfort to riders. Use bicycle lane word and/or symbol and arrow markings (MUTCD Figure 9C-3) to define the bike lane and designate that portion of the street for preferential use by bicyclists.

Application in Study Area: Bike lanes on Branch Avenue would help establish cyclists on a higher speed roadway.

SHARED LANE MARKINGS

Cost: $2,000 to $5,000 per mile

Description: Shared lane markings, or sharrows, are pavement markings used where space does not allow for a bike lane. They reinforce drivers' awareness of cyclists and help position riders outside of opening car doors.

Effectiveness: Bike treatments improve safety and comfort by increasing visibility and awareness of cyclists, in addition to providing adequate facilities for biking.

Implementation Considerations: Sharrows should be placed every 100 to 250 feet.

Compliance with Standards: The MUTCD outlines guidance for sharrows in section 9C.07. Markings should be placed every 100 to 250 feet along bike routes.

Application in Study Area: Shared lane markings on Naylor Road and Oxon Run Drive will help establish cyclists on those roadways. Furthermore, shared lane markings should also be considered at both Naylor Road roundabouts.

BICYCLE SIGNS

Cost: $200 per sign

Description: Bicycle signs can be installed on their own or to supplement on-street bike facilities. Signs help reiterate cyclists' right to the road, raise motorists' awareness where bicycles may be present, and provide directional guidance for cyclists following a bike route.

Effectiveness: Bike signs improve safety and comfort by increasing visibility and awareness of cyclists.

Implementation Considerations:
Several bike signs can help support cycling:

Bikes May Use Full Lane (R4-11) – this regulatory sign informs vehicles that cyclists are entitled to use the full lane and carries more authority than the Share the Road sign.

Bike Route (D11-1) – directional signs help guide cyclists along preferred routes and remind motorists to be aware of bicycles on the roadway.

Bicycle Destination Signs (D1-3) – destination signs help encourage cycling by illustrating cycling distance. Approximate travel times are generally added based on a 10 mile per hour average speed.

Compliance with Standards: Chapter 9 of the 2009 MUTCD provides recommendations on these and other sign types.

Application in Study Area: *Bikes may use full lane* signs should be used with shared lane markings and wherever cyclists may be present without a bike path. Wayfinding to Naylor Road Metro station is critical, and directions should be provided to access the Oxon Run Trail when the connections are made.

R4-11

D11-1

D1-3c

Other Improvements

This last type of treatments included in this section are improvements that include installing new walkways, consolidating or relocating bus stops to improve transit times, and establishing waiting space for transit riders at stops. The strategies contained in this section improve pedestrian comfort and safety by defining space for walkers, while improving access to transit. Two complete street principles identified in the Countywide Master Plan relate to the improvements contained in this section:

- Acknowledge that pedestrians will take the most direct route.
- Ensure universal accessibility.

BUS STOP CONSOLIDATION/ RELOCATION

Cost: minimal cost to remove existing stops; new shelters cost $10,000 to $15,000

Description: Bus stops located close to one another can be consolidated into a single stop, reducing the total number of stops the bus has to make and concentrating boardings/alightings at one location. Bus stops can also be relocated to improve access to existing sidewalks, crosswalks, or destinations.

Effectiveness: Reducing the number of stops from 10 per mile to 8 per mile increases average bus speeds by 1.5 minutes/mile or more, depending on average dwell time at stops.

Implementation Considerations: The placement of bus stops depends on the existing transit network and operator. Coordination with WMATA and The Bus is necessary to determine if or where potential stops could be moved. Consideration should also be given to the available right-of-way and/or willingness of adjacent property owners to have stop amenities on their property.

Compliance with Standards: WMATA's *Guidelines for the Placement and Design of Bus Stops* provide standards for WMATA bus stops, including spacing standards. The Draft PROWAG guidelines also specify the minimum dimensions for bus stops, which include a clear length along the roadway of 8 feet and a clear width perpendicular to the roadway of 5 feet.

Application in Study Area: The existing bus stops on 28th Parkway are very closely spaced and could be consolidated in conjunction with an improved pedestrian crossing.

PEDESTRIAN WALKWAYS


Cost: $11 to $15 per square foot

Description: Sidewalks and multiuse pathways are the primary facilities for pedestrians to travel and provide mobility to various destinations.

Effectiveness: Safe and comfortable walkways have been shown to increase pedestrian use.

Implementation Considerations: Walkways should be part of every new roadway and retrofitted in locations without them to complete a network of pedestrian facilities. Where possible, a buffer (4 to 6 feet) should be provided to separate pedestrians from vehicle traffic.

Compliance with Standards: For ADA compliance, the minimum clear width of a sidewalk is 4 feet, but the FHWA and the Institute of Transportation Engineers (ITE) recommend a 5-foot minimum for pedestrians to pass one another or walk side-by-side.

Application in Study Area: Several locations identified in the study area

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BUS STOPS ON OPEN-SECTION ROADWAYS

Cost: $3,500 to $5,000

Description: Bus stops located along open-section roadways do not have the typical amenities of other stops, and usually only include a signing marking the stop. Concrete pads for boarding/alighting passengers at stops should be provided.

Effectiveness: Concrete pads further signify the presence of a bus stop, provide a location for passengers for wait comfortably, and ease passenger loading.

Implementation Considerations: Consideration should be given to accessibility to and from the bus stop, in addition to providing amenities at the stop. Stops without adjacent sidewalks or space for pedestrians to walks on the shoulder are difficult for riders to access and likely underutilized and unsafe.

Compliance with Standards: A 5′ by 8′ unobstructed landing pad is required at bus stops to accommodate wheelchairs.

Application in Study Area: 28th Parkway and Oxon Run Drive both feature bus stops without typical amenities. At a minimum, concrete pads should be provided at these stops.

RECOMMENDATIONS AND FUNDING

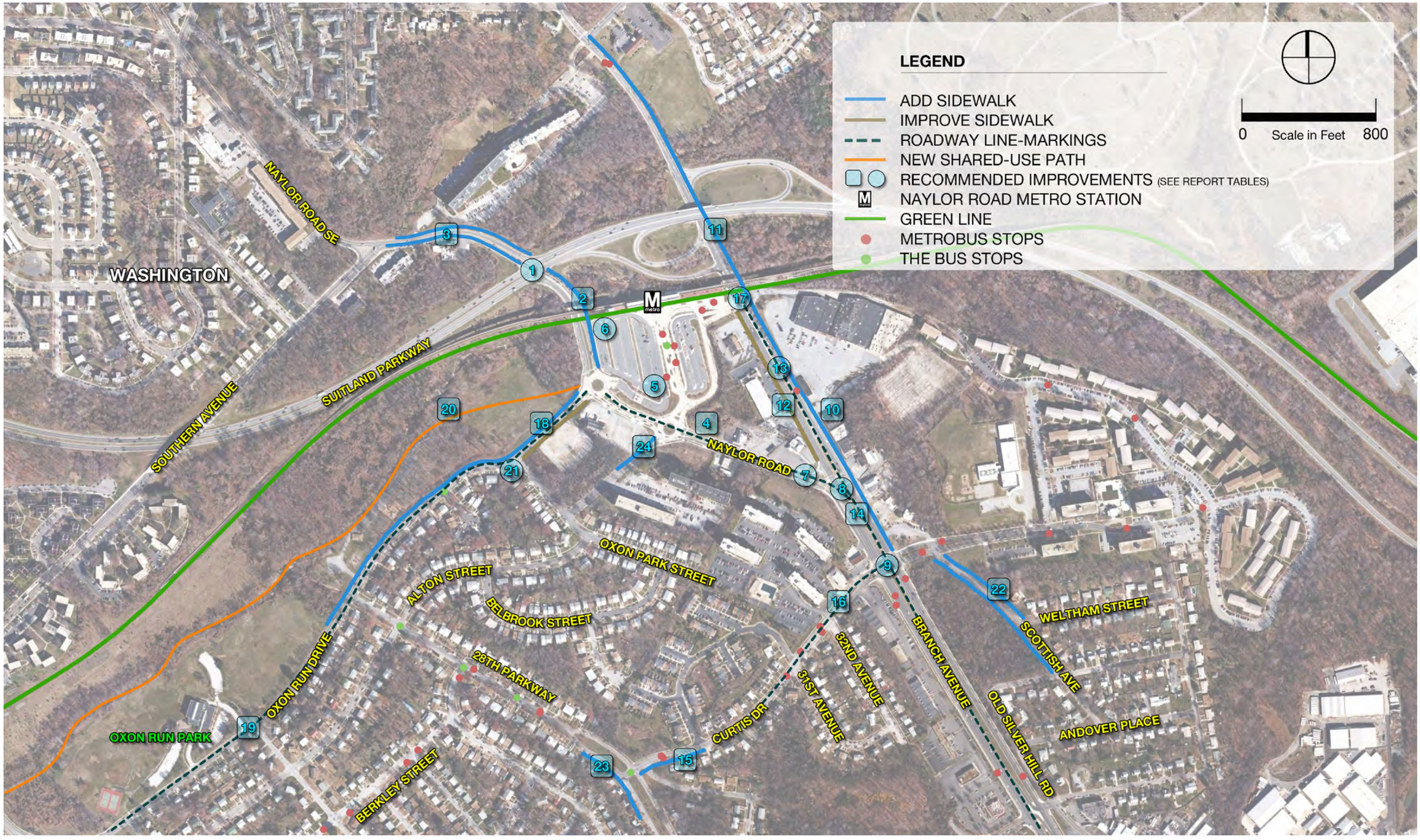
The improvements list for the Naylor Road Metro Station Area Accessibility study applies treatments from the Toolbox of Potential Strategies to locations in the study area that were documented by members of the community, field visits, and crash data review. Each improvement includes the specific location for the improvement, the type of treatment, and a cost estimate for installation. Table 2 shows the complete list of recommended improvements. Figure 2 identifies these locations on a map of the study map, with the Table numbers corresponding to the numbers on the map. As shown in Table 2, there are a number of near-term, high priority improvementes that were identified for the Naylor Road station area. Figure 2 shows the locations of the recommended improvements.

Table 2 Recommended Pedestrian and Bicycle Station Access Improvements

No.	Location	Description	Type of Treatment	Priority	Cost Estimate	
					Low	High
1	Suitland Parkway/ Naylor Road	Add and update pedestrian signals	Signal Hardware	High	$20,000	$40,000
		Restripe existing pedestrian crossings and add missing crosswalks	Striping	High	$200	$500
		Add pedestrian refuge areas (on all four approaches)	Pedestrian Refuge	Low	$16,000	$120,000
2	Naylor Road	Add sidewalks on east side of street between Suitland Parkway and Oxon Run Drive	Sidewalks	Medium	$38,000	$52,000
3		Add sidewalks on both sides of street, north side of Suitland Parkway	Sidewalks	Low	$69,000	$94,000
4		Add shared lane markings (sharrows) and Bikes May Use Full Lane signs (R4-11) from Branch Avenue to Oxon Run Drive and through Naylor Road roundabouts.	Sharrows and Signs	High	$1,300	$1,600
5		Remove fence around Metro station	Fence Removal	High	minimal	
6		Provide sidewalks where desire lines are present • Northwest corner of park-and-ride • East side of roundabout at Oxon Run Drive	Sidewalks	Medium	$19,000	$26,000

No.	Location	Description	Type of Treatment	Priority	Cost Estimate	
					Low	High
7		Provide additional marked crossing opportunity between Good Hope Avenue and Branch Avenue	Striping	Low	$500	$1,000
8	Naylor Road/Branch Avenue	Install rapid flash beacons at existing marked crosswalk at eastbound right-turn lane.	Signing	High	$2,500	$4,000
9	Branch Avenue/Curtis Drive	Reduce traffic signal cycle length	Signal Timing	Low	minimal	
10	Branch Avenue	Add sidewalks on east side of Branch Avenue (between Metro access and Curtis Avenue)	Sidewalks	Medium	$110,000	$150,000
11		Add sidewalks on east side of Branch Avenue (Suitland Parkway)	Sidewalks	Low	$85,000	$120,000
12		Widen sidewalks on west side of Branch Avenue	Sidewalks	Low	$120,000	$150,000
13		Install mid-block pedestrian hybrid signal between Metro Station Access and Naylor Road	Pedestrian Hybrid Signal	Medium	$50,000	$70,000
14		Reduce number of travel lanes on Branch Avenue and add buffered bike lanes in each direction	Striping	Low	TBD by Maryland SHA	
15	Curtis Drive	Add sidewalks on south side of Curtis Drive between Lloyd Court and 28th Parkway	Sidewalks	Medium	$13,000	$18,000
16		Install bicycle climbing lanes on uphill section of road (between 30th Street and Branch Avenue)	Striping	Medium	$100	$500
17	Branch Avenue/Metro Station Access	Provide marked crossings on all approaches	Striping	High	$500	$1,000
		Provide countdown timers at all crossings	Signal Hardware	High	$20,000	$40,000
		Add pedestrian refuge at all crossings	Pedestrian Refuge	Medium	$16,000	$120,000
		Reduce southbound right turn radius	Curb Radius	Low	$2,500	$4,000
18	Oxon Run Drive	Add sidewalk on north side of the street and widen sidewalk on south side	Sidewalks	Medium	$80,000	$110,000
19		Add shared lane markings (sharrows) and Bikes May Use Full Lane signs from 23rd Parkway to Naylor Road	Sharrows and Signs	High	$2,400	$2,800
20		Provide connection to proposed Oxon Run Trail	Off-street path	Medium	$90,000	$110,000

No.	Location	Description	Type of Treatment	Priority	Cost Estimate	
					Low	High
21	Oxon Run Drive/Oxon Park Street	Add curb extension to reduce size of intersection and reduce curb radii	Curb Extension	Medium	$1,200	$2,000
		Add crosswalks to all approaches	Striping	Medium	$500	$1,000
22	Scottish Avenue	Add sidewalks on both sides of Scottish Avenue between Curtis Drive and Aberdeen Street	Sidewalks	Medium	$57,000	$78,000
23	28th Parkway	Add sidewalk on south side of 28th Parkway between Duggan Street and 200 feet west of Curtis Drive	Sidewalks	Low	$35,000	$48,000
24	Good Hope Road	Add sidewalk on north side of Good Hope Road	Sidewalks	Low	$11,000	$15,000
25	Other	Add bus stop amenities, including benches, shelters, sidewalks to bus stop, and ADA accessibility	Transit Amenities	Medium	Varies	
				Total Costs	***$860,700***	***$1,379,400***



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RECOMMENDED TRANSPORTATION IMPROVEMENTS
NAYLOR ROAD METRO AREA, PRINCE GEORGE'S COUNTY, MARYLAND

FIGURE 2

IMPLEMENTATION

To facilitate implementation of the recommended pedestrian safety improvements, this section identifies near-term action items, improvements that may be suitable for inclusion in upcoming capital improvement programs, and potential funding sources. Policies and regulatory changes are recommended to prioritize, program, fund and construct the improvements recommended in the Naylor Road Metro Station Area Accessibility study improvement list.

Near-Term Action Items

The following list of near-term action items provide a guide toward realizing the pedestrian safety improvements identified in this report and a framework for project selection, programming, design, and construction. Recommended implementation strategies are:

Implementation Strategy 1. Strategically Pursue Projects

- Action Item 1.1. Pursue capital improvements funding or grant funding for projects.
- Action Item 1.2. In the case where grant requirements or construction in conjunction with another roadway project or a willing land owner makes construction of any of the recommended improvements possible, pursue funding sources for that project regardless of priority.

Implementation Strategy 2. Incrementally Implement Projects

- Action Item 2.1. Consider constructing new pedestrian crossings, neighborhood paths, or other improvements with minimum-design features first, then incrementally develop additional amenities as desired by neighborhood residents.
- Action Item 2.2 Develop permitting and design for the recommended improvements as soon as possible in order to have the improvements prepared for funding when it becomes available.

Implementation Strategy 3. Work with Other Jurisdictions and Agencies to Encourage the Pedestrian Safety Improvements

- Action Item 3.1. Work with WMATA, Maryland SHA, Prince George's County Department of Public Works and Transportation, and other agencies to construct the recommended improvements.

Funding Sources

Fully implementing the recommended improvements will require funding. Existing, potential, and anticipated funding sources that are available to fund the improvements included in the improvement list were identified. This section presents a variety potential funding sources available to help pay for future improvements, including Federal, State, regional, local, and private sector funding programs. Most of the programs are competitive and involve the completion of extensive applications with clear documentation of project need, costs, and benefits. Several of these sources may be currently used in the study area, while others present new opportunities to fund projects.

The majority of funding for pedestrian projects is acquired through the non-motorized programs and funding opportunities provided by the Federal Highway Administration's Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) program, which was enacted in 2005. SAFETEA-LU authorizes the Federal surface transportation programs for highways, highway safety, and transit for the five-year period 2005-2009. SAFETEA-LU expired in September 2009, but has been maintained through a series of extensions from Congress. A new federal transportation bill is expected to renew or replace SAFETEA-LU. While federal funding sources are likely to change somewhat as a result of new legislation, we anticipate that most of the programs described below will continue to be available.

There are a number of programs within SAFETEA-LU that provide for the funding of pedestrian and bicycle projects.

WMATA BICYCLE & PEDESTRIAN CAPITAL IMPROVEMENT PROGRAM

WMATA funds construction for station-area improvements for pedestrians (within ½-mile of the station) and bicycles (within 3-miles of the station). Development of the next six-year Capital Improvement Program (CIP), which includes about $9 million in funding, is currently underway and WMATA is seeking potential projects. Since many of the recommendations from this study are eligible for CIP funding, M-NCPPC planners should submit qualified projects to WMATA.

RECREATIONAL TRAILS PROGRAM

The Recreational Trails Program of the Federal Transportation Bill provides funds to states to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails
- Purchase and lease of trail construction and maintenance equipment
- Construction of new trails, including unpaved trails
- Acquisition or easements of property for trails
- Acquisition of land or easements for trail right-of-way. State administrative costs related to this program (limited to seven percent of a State's funds)
- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a State's funds)

SAFE ROUTES TO SCHOOL (SRTS)

The purpose of the Safe Routes to Schools program is to provide children a safe, healthy alternative to riding the bus or being driven to school. The SRTS Grants were established to address pedestrian and bicycle mobility and safety near schools, and eligible projects must be within two miles of a primary or middle school (K-8).

Under the SRTS Program, Federal funds are administered by the state transportation department. Under the Maryland Safe Routes to School Program, approximately $2.5 million was available for funding in 2008. The grants can be used to identify and reduce barriers and hazards to children walking or bicycling to school. As presently structured, A Safe Routes to School Plan is required for a project to be eligible for the infrastructure grant program. If this requirement continues to be a feature of a re-authorized Sate Routes program, local jurisdictions should work with the school district to develop this plan, which includes outreach, studies and safety education.

TRANSPORTATION ENHANCEMENTS

Administered by the Maryland Department of Transportation, this program is funded by a set-aside of Highway Trust Funds. Projects must serve a transportation need. These funds can be used to build a variety of pedestrian, bicycle, streetscape and other improvements that enhance the cultural, aesthetic, or environmental value of transportation systems. The statewide grant process is highly competitive.

Maryland State Highway Administration (SHA) works with developers and local governments on pedestrian and bicycle access issues from State roadways that directly access transit stations. *Fund 78: Pedestrian Access to Transit Program*, provides funding for improved pedestrian access to transit

stops through the construction of sidewalks. Over $13 million has been allocated to this program in FY 2011-2016. Furthermore, SHA's *Fund 33: ADA Compliance Program* provides accommodations for disabled persons through a commitment to remove barriers that impede the movement of all pedestrian along State roadways.

TRANSPORTATION, COMMUNITY AND SYSTEM PRESERVATION PROGRAM

The Transportation, Community and System Preservation Program provides federal funding for transit-oriented development, traffic calming, and other projects that improve the efficiency of the transportation system, reduce the impact on the environment, and provide efficient access to jobs, services and trade centers. The program is intended to provide communities with the resources to explore the integration of their transportation system with community preservation and environmental activities.

LOCAL IMPROVEMENT DISTRICTS (LIDS) AND BUSINESS IMPROVEMENT DISTRICTS (BIDS)

Local Improvement Districts (LIDs) and Business Improvement Districts (BIDs) are often used by cities to construct localized improvement projects such as streets, sidewalks, and landscaping. Through the LID/BID process, the costs of local improvements are spread among property owners and/or businesses within the district through a special property tax assessment (in the case of LIDs) or a fee paid by businesses (in the case of BIDs). The cost can also be allocated based on property frontage or other methods such as trip generation. Formation of a LID or BID within the Naylor Road Metro station study area could provide a dedicated source of funding to ensure implementation of this plan's recommendations.

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Appendix A

Existing Conditions Memorandum

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
36 S Charles Street, Suite 1920, Baltimore, MD 21201 P 410.347.9610 F 410.347.9611

MEMORANDUM

Date: February 24, 2011 Project #: 11290.0

To: Chidy Umeozulu, M-NCPPC
Fred Shaffer, M-NCPPC

From: Jamie Parks, AICP, Adam Vest, P.E., and Conor Semler

Project: Naylor Road Metro Station Accessibility Study

Subject: Existing Conditions Summary

The Maryland-National Capital Park and Planning Commission (M-NCPPC) has undertaken an accessibility study for the Naylor Road Metro station area. This memorandum summarizes the existing conditions in the study area, which includes a review of background crash data and a field visit to the study area.

Background

The study area for this project is a ½-mile radius around the Naylor Road Metro station, excluding the area within the District of Columbia boundary. Note, however, that this study does consider connections to the District via Naylor Road (MD 637) and Branch Avenue (MD 5). Figure 1 provides a base map of the study area including the ½-mile radius of the Metro station.

The primary existing land uses within the study area are residential (single-family detached and mid-rise apartments), institutional, and strip retail. Despite its proximity to the Metro station and the District, the development pattern is auto-oriented with extensive off-street parking, deep building setbacks, and limited pedestrian accommodation.

The Branch Avenue Corridor Sector Plan, published by M-NCPPC in 2008, recommends designation of the Naylor Road Metro Station area as a Regional Center with a mixed-use, high-density residential/office/retail land use classification. As a result, the County projects significant increases in office space, retail, and residential units. Since the current parking supply at the station is fully utilized most days, improvements for walking, cycling, and feeder bus access are needed to facilitate the anticipated growth in station access demand.

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Feet

LEGEND

- 1/4-mile Station Buffer
- 1/2-mile Station Buffer
- DC Boundary
- Green Line

NAYLOR ROAD METRO STATION AREA
PRINCE GEORGE'S COUNTY, MARYLAND

FIGURE 1

H:\profile\11290 - Naylor Rd Station Accessibility Study\gis\01 - Base Map.mxd

Existing Conditions Summary

The existing conditions analysis included a review of existing crash data and a site visit to evaluate station access issues.

CRASH DATA SUMMARY

Maryland State Highway Administration (SHA) provided historical crash data for its roadways for the years 2007 to 2009. SHA is responsible for two main roads in the study area, including Branch Avenue (MD 5) and Naylor Road (MD 637). Table 1 and Table 2 present the crash frequency and severity during these years, and Table 3 details the types of crashes that occurred. *Crash data are provided in Attachment "A."*

Table 1 **Crashes by Year and Accident Severity – Branch Avenue (MD 5)**

Branch Avenue (MD 5)	2007	2008	2009	Total
Fatal	0	0	0	0
Injury	26	26	30	82
Property Damage Only	49	23	36	108
Total	75	49	66	**190**
Average Daily Traffic (ADT)[1]	58,870	57,101	57,102	--
Accident Rate per MEV per mile	3.5	2.4	3.2	--

[1] Traffic data obtained from Maryland State Highway Administration – Internet Traffic Monitoring System: http://shagbhisdadt.mdot.state.md.us/ITMS_Public/default.aspx

Table 2 **Crashes by Year and Accident Severity – Naylor Road (MD 637)**

Naylor Road (MD 637)	2007	2008	2009	Total
Fatal	0	0	0	0
Injury	4	7	3	14
PDO	9	7	10	26
Total	13	14	13	40
Average Daily Traffic (ADT)[1]	20,772	20,420	20,421	--
Accident Rate per MEV per mile	2.8	3.1	2.9	--

[1] Traffic data obtained from Maryland State Highway Administration – Internet Traffic Monitoring System: http://shagbhisdadt.mdot.state.md.us/ITMS_Public/default.aspx

Table 3 **Crashes by Type**

Crash Type	Branch Avenue (MD 5)		Naylor Road (MD 637)	
	Number of Crashes	Percent of Total	Number of Crashes	Percent of Total
Opposite Direction	6	3%	2	5%
Rear End	47	25%	14	35%
Sideswipe	25	13%	5	13%
Left Turn	26	14%	3	8%
Angle	39	21%	4	10%
Pedestrian	7	4%	- -	- -
Parked Vehicle	4	2%	1	3%
Fixed Object	14	7%	8	20%
U-Turn	6	3%	- -	- -
Truck	4	2%	- -	- -
Overturn	- -	- -	1	3%
Other	12	6%	2	5%

Both Branch Avenue (MD 5) and Naylor Road (MD 637) have experienced extremely high rates of crashes over the past three years. Many of the prominent accident types include rear end, angle, and fixed-object crashes, and none of the crashes have resulted in fatalities. While these data are significant for traffic in the study area, the purpose of this study is not directly related to traffic safety. Further investigation of these issues is recommended.

SHA also provided a summary of pedestrian crashes along Branch Avenue (MD 5). Pedestrian safety is critical for effective Metro station access, and improving pedestrian safety is a primary objective of this study. Nine pedestrian crashes have occurred along Branch Avenue since 2007, the details of which are provided in Table 4.

Table 4 **Pedestrian Crash Data between 2007 and 2009 – Branch Avenue**

Date	Mile Point	Details
4/6/07	14.67	Bike was using crosswalk - failed to stop at crosswalk sign struck car turning left from MD 5 northbound (classified as pedestrian accident)
7/6/07	14.67	Pedestrian was in intersection but not in crosswalk struck by southbound car on MD 5
9/22/07	14.67	Pedestrian under the influence of alcohol was not in intersection and crosswalk was struck by northbound vehicle on MD 5 northbound (Hit and Run)
5/9/08	14.38	Pedestrian was not in intersection and crosswalk was struck by southbound car on MD 5
1/16/09	14.78	Pedestrian was not in intersection and crosswalk was struck by southbound car on MD 5
3/26/09	15.07	Rear End collision between a pickup truck and a van on northbound MD 5 resulted in the pickup truck driving onto a sidewalk, striking a pedestrian. Note – this crash was not classified as a pedestrian accident because the pedestrian strike occurred after the initial collision
5/9/09	14.69	Juvenile related accident – pedestrian involved in secondary collision - this crash was not classified as a pedestrian accident - no additional information available
9/18/09	14.67	Bike was traveling northbound in southbound lanes when struck by a southbound car on MD 5
12/15/09	14.83	Pedestrian was not in intersection and crosswalk was struck by northbound car on MD 5

Site Visit Findings

Representatives from Maryland-National Capital Park and Planning Commission (M-NCPPC) and Kittelson & Associates, Inc. (KAI) conducted a field visit to the study area on January 31st, 2011. The tour began at the Hillcrest Heights Community Center on Oxon Run Road and headed northeast toward the Metro station. The walk then continued along Naylor Road (MD 637), southeast along Branch Avenue (MD 5), and southwest along Curtis Drive to 28th Parkway and back to the Community Center. This section summarizes the existing conditions in the study area to identify specific locations where pedestrian, bicycle, and transit deficiencies were observed. It also identifies overall trends that will be considered in more depth as the project progresses.

The field visit evaluated the quality and adequacy of existing pedestrian infrastructure (e.g., sidewalks, crosswalks, traffic signals), and identified the location of pedestrian trip generators (e.g., Naylor Road Metrorail, shopping, residential clusters, etc.). The intent of the field walk was to experience the study area first-hand to understand both real and perceived barriers to walking and cycling. The FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists were used as guidance for the site visit in identifying existing pedestrian deficiencies in the study area.

Pedestrian facilities are provided around much of the Naylor Road rail station, including sidewalks and crosswalks. However, some notable gaps exist in the network, particularly for pedestrians accessing the station from Oxon Run Drive. Moreover, some of the existing facilities do not meet standards set forth in the 2009 Manual on Uniform Traffic Control Devices (MUTCD) and/or the draft US Access Board Public Rights-of-Way Accessibility Guidelines (PROWAG). The following sections describe the results of the field visit.

ACCESSIBILITY FINDINGS

The 2008 Countywide Master Plan of Transportation identifies ten complete streets principles for planning in Prince George's County. The principles are:

1. Encourage medians as pedestrian refuge islands.
2. Design turning radii to slow turning vehicles.
3. Find wasted space and better utilize it.
4. Time traffic signals to function for all modes.
5. Reduce crossing distances.
6. Increase crossing opportunities.
7. Encourage pedestrian-scaled land use and urban design.
8. Acknowledge that pedestrians will take the most direct route.
9. Ensure universal accessibility.
10. Pursue targeted education and enforcement efforts to reduce bicycle and motor vehicle crashes.

Bicycle and pedestrian access deficiencies were identified during the field visit, and are summarized in this section. The deficiencies are organized around the complete streets principles using specific examples from the Naylor Road study area. As part of the final product for this plan, the project team will identify specific projects to improve each of these areas. Locations of the existing transportation issues are identified in Figure 2. Transportation issues identified in the map are referenced in the following section under the relevant principle.

N

0 250 500 1,000 Feet

NUMBER	TYPE	DESCRIPTION
1	Turning Radius	Naylor Road/Branch Avenue
2	Turning Radius	Branch Avenue driveway
3	Turning Radius	Branch Avenue driveway
4	Turning Radius	Suitland Parkway/Naylor Road
5	Turning Radius	Oxon Run Drive/Oxon Park Street
6	Turning Radius	Oxon Run Drive/28th Parkway
7	Turning Radius	28th Parkway/Curtis Drive
8	Turning Radius	Curtis Drive/31st Avenue
9	Wasted Space	Very wide section on Curtis Drive
10	Wasted Space	Very wide intersection at Oxon Run Drive/Oxon Park Street
11	Signal Timing	Long Cycle Length - Suitland/Naylor
12	Signal Timing	Long Cycle Length - Branch/Metro Driveway
13	Signal Timing	Long Cycle Length - Branch/Naylor
14	Signal Timing	Long Cycle Length - Branch/Curtis
15	Desire Lines	Station Access from South
16	Desire Lines	Station Access from Northwest
17	Desire Lines	Burton Court to Oxon Park Street Connection
18	Accessibility Barrier	Stairs on Sidewalk along 31st Avenue
19	Accessibility Barrier	Sidewalk bulge along Curtis Drive
20	Accessibility Barrier	Missing Curb Cut at Curtis Drive/31st Avenue
21	Accessibility Barrier	Missing Curb Cuts at Curtis Drive Apartment Drive
22	Accessibility Barrier	Missing Curb Cuts at bus stop
23	Accessibility Barrier	Missing Curb Cuts and Sidewalk at Bus Stop
24	Accessibility Barrier	Missing Curb Cuts at Bus Stop
25	Accessibility Barrier	Missing Curb Cuts at Bus Stop
26	Accessibility Barrier	Missing Curb Cuts at Bus Stop
27	Accessibility Barrier	Missing Curb Cuts at Bus Stop
28	Accessibility Barrier	Missing Curb Cuts at Bus Stop
29	Accessibility Barrier	Missing Curb Cuts at Bus Stop
30	Accessibility Barrier	Missing Curb Cuts and Sidewalk at Bus Stop
31	Accessibility Barrier	Missing Curb Cuts at Bus Stop
32	Access Management	Very wide driveway along Branch Avenue
33	Pedestrian Crossing	Many pedestrians cross mid-block
34	Pedestrian Crossing	Very long pedestrian crossing
35	Pedestrian Crossing	Very long pedestrian crossing
36	Pedestrian Crossing	Pedestrian Crossing Missing
37	Pedestrian Crossing	Pedestrian Signal Heads misplaced/missing
38	Pedestrian Crossing	Pedestrian Crossing Missing
39	Pedestrian Crossing	Pedestrian Crossing Missing
40	Pedestrian Crossing	Pedestrian Crossing Missing

TRANSPORTATION ISSUES
NAYLOR ROAD STATION AREA
PRINCE GEORGE'S COUNTY, MARYLAND

FIGURE 2

H:\proj\file\11290 - Naylor Rd Station Accessibility Study\gis\02 - Transportation Issues.mxd

1. ENCOURAGE MEDIANS AS PEDESTRIAN REFUGES

Pedestrian refuge islands are provided at long crossing locations where pedestrians may not be able to cross the width of the street during one pedestrian phase. They provide pedestrians a safe and attractive place to stand while waiting to cross the remaining lanes of traffic, and are particularly useful along multilane roads.

Photo Caption: A pedestrian refuge island is provided on Curtis Road at its intersection with Branch Avenue.

Study Area: Pedestrian refuge islands are common along Branch Avenue and Naylor Road, but some difficult crossings still exist (Suitland Parkway/Naylor Road).

2. DESIGN TURNING RADII TO SLOW TURNING VEHICLES

Curbs with large turning radii for right-turn movements encourage motorists to make the turn at a high rate of speed. This can be very dangerous and inhospitable for pedestrians. Designing turning radii to slow turning vehicles can be effective for reducing speeds and improving safety.

Photo Caption: The intersection of Oxon Run Drive/28th Parkway has a large turning radius which permits vehicles to turn while maintaining high speeds. Tightening this and other radii will force drivers to slow down and reduce the chance of not seeing pedestrians crossing the street.

Study Area: Large turning radii exist at a number of intersections in the study area. See numbers 1-8 in Figure 2.

3. FIND WASTED SPACE AND BETTER UTILIZE IT

Many suburban-style intersections feature excess pavement space that could be better utilized to accommodate all travel modes. Pavement which is not needed for through traffic or specific turning movements, such as intersections with wide turning radii or along roads with unnecessarily wide travel lanes, can be used for other purposes. For example, this "extra" space can be used to improve the pedestrian environment through the provision of sidewalk connections, pedestrian refuges, or traffic calming. Wide outside curb lanes can also be striped for designated bike lanes.

Photo Caption: Curtis Road is 46 feet wide, well over what is needed for two lanes of traffic and two parking lanes. Reallocation of this space could provide bicycle lanes and/or wider sidewalks.

Study Area: Several locations feature excess pavement which could be better utilized. See numbers 9 and 10 in Figure 2.

4. TIME TRAFFIC SIGNALS TO FUNCTION FOR ALL MODES

Traffic signals should allow pedestrians adequate time for comfortably crossing all lanes of traffic, preferably within one signal phase. Additionally, signal cycle lengths should be kept short (less than 90 seconds is desirable) to minimize excessive pedestrian delay. Lastly, signal timing can be used to calm traffic by coordinating vehicle progression to a safe and appropriate speed.

Photo Caption: A pedestrian push-button is provided to cross Branch Avenue at Naylor Road. Actuation demonstrates that pedestrians have been planned for, and this type of button provides audible feedback to the user. However, automatic pedestrian signals reduce delay for pedestrians.

Study Area: All of the traffic signals along Branch Avenue and Naylor Road have long cycle lengths, resulting in excessive pedestrian delay. This is likely responsible for the high levels of jaywalking observed in the study area. Long crossing distances are partially responsible for the long cycle lengths, as minimum green times on side streets often need to be extended to accommodate a walk phase. See numbers 11-14 in Figure 2.

5. REDUCE CROSSING DISTANCES

Wide roads with multiple turning lanes require pedestrians to cross much longer distances and significantly increase their exposure to oncoming traffic. Crossing distances can be minimized with medians, pedestrian refuges, reduced turning radii, curb extensions, and other measures.

Photo Caption: The intersection of Oxon Run Drive/Oxon Park Street is excessively large and encourages fast turning movements. Tightening this intersection would calm traffic and reduce pedestrian crossing distance.

Study Area: Crossing distances along Branch Avenue (MD 5) and Suitland Parkway are very long and create an uncomfortable environment for pedestrians. Some low-volume roads also have long crossing distances, but are less threatening. See numbers 34 and 35 in Figure 2.

6. INCREASE CROSSING OPPORTUNITIES

Long blocks tend to create poor pedestrian environments as they provide few opportunities to cross busy roadways. Crossing at signals is generally preferred, but a lack of opportunities to cross requires pedestrians to walk significant distances out-of-direction and increases total travel distance. This may encourage pedestrians to cross at uncontrolled mid-block locations. Smaller block sizes and designated mid-block crossing locations provide additional opportunities to cross roadways and reduce out-of-direction travel. Crossings should be signal-controlled or marked with a designated crosswalk with appropriate lighting, signs, and pavement markings.

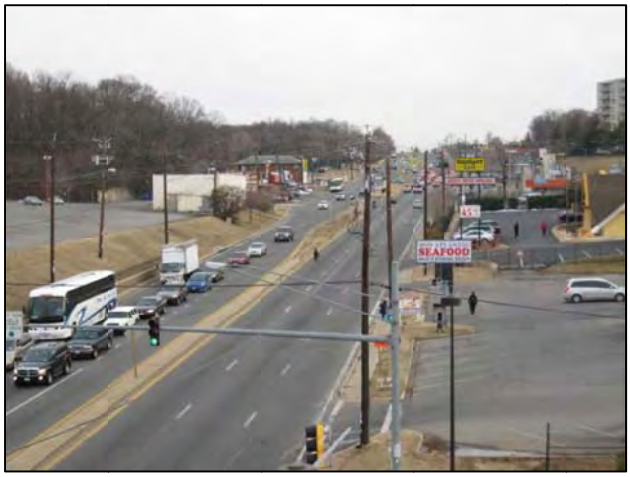


Photo Caption: Many pedestrians cross Branch Road (MD 5) at midblock locations due to long traffic signals and large spacing between controlled crossing opportunities.

Study Area: Most roadways in the study area have sufficient crossing opportunities, with the exception of Branch Avenue and Suitland Parkway. There appears to be little demand for additional at-grade crossings of Suitland Parkway. Improving crossing options on Branch Avenue is a high priority. See number 33 in Figure 2.

7. ENCOURAGE PEDESTRIAN-SCALED LAND USE AND URBAN DESIGN

Pedestrian-scaled development can enhance the pedestrian environment. Short block lengths, a mixture of land uses, attractive streetscapes, buildings fronting the street, and pedestrian amenities such as benches, trash receptacles, lighting, safe crosswalks, and comprehensive pedestrian facilities and connections all contribute to a vibrant pedestrian environment.

Photo Caption: An auto-oriented shopping center with far more parking than is demanded. The buildings do not front the street, nor is a sidewalk provided.

Study Area: Auto-oriented development is commonplace in the Naylor Road Station area, particularly along Branch Avenue (MD 5), with destinations set back from the road and parking placed along the property frontage. Reducing the number of driveways and encouraging street front development will improve the pedestrian experience.

8. ACKNOWLEDGE THAT PEDESTRIANS WILL TAKE THE MOST DIRECT ROUTE

Pedestrians will use the most direct, efficient connection possible, and these connections should be strengthened and prioritized by transportation planners. Long, circuitous pedestrian routes will be ignored and should be avoided.

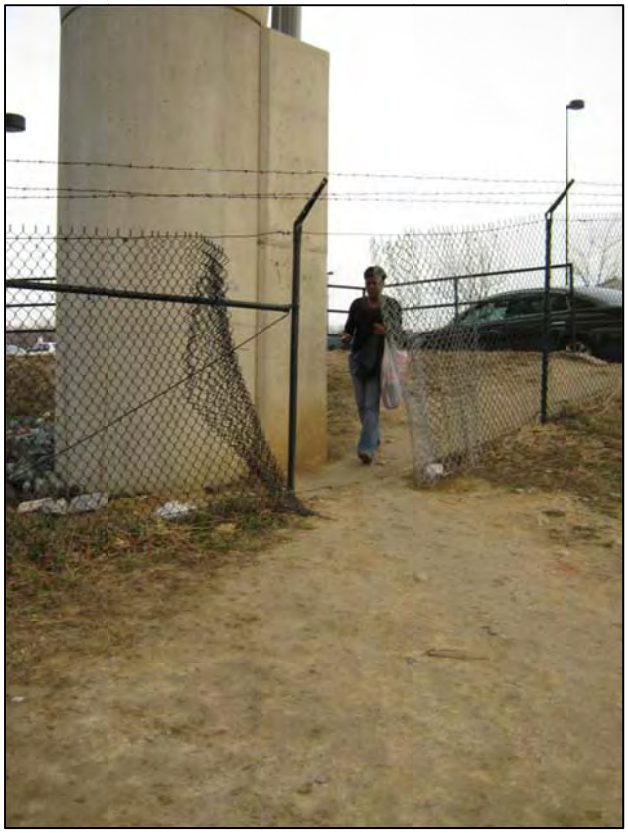


Photo Caption: This fence around the Naylor Road Metro station is located at a natural pedestrian access point and has been repeatedly cut open and repaired. Numerous examples of strong pedestrian desire lines were observed, particularly around the Metro station.

Study Area: Pedestrian desire lines in the station area are common and well-established which suggests both a large volume of pedestrian activity and significant frustration with the formalized pedestrian connections. See numbers 15-17 in Figure 2.

9. ENSURE UNIVERSAL ACCESSIBILITY

All ages and user groups should be accommodated along area sidewalks and intersections, including the elderly, children, and disabled groups. All street crossings and bus stops should include ADA-compliant curb cuts and ramps, and all pedestrian signal buttons should be handicapped accessible.

Photo Caption: The sidewalk along 31st avenue features stairs which are inaccessible for some mobility impaired pedestrians.

Study Area: Inaccessible sidewalk features are found throughout the study area, including missing curb cuts, unavoidable barriers, and inaccessible bus stops. See numbers 18-31 in Figure 2.

10. PURSUE TARGETED EDUCATION AND ENFORCEMENT EFFORTS TO REDUCE BICYCLE AND MOTOR VEHICLE CRASHES

Educating and enforcing dangerous motorist and bicycle behavior will allow all road users to feel safe and welcome using the street. High speed, aggressive driving is dangerous and will discourage all but the most hearty riders from bicycling. A lack of cyclists is often a sign of poor facilities rather than low demand.

Photo Captions: Only a handful of bicycles were observed parked at the Naylor Road Metro station on several visits to the station (top). A cyclist rides on the wrong side of the road on Oxon Run Drive (bottom).

Study Area: Very little bicycle activity was observed in the study area, likely due in part to the lack of accommodation for cyclists and high volumes and speeds along major thoroughfares like Branch Avenue (MD 5) and Naylor Road (MD 637).

OTHER ISSUES

Sidewalk Continuity

All streets should provide sidewalks on both sides of the road. In extraordinary circumstances, where space is limited, a wide shoulder may serve as an adequate pedestrian facility. Gaps in the pedestrian network reduce safety and comfort for pedestrians.

Photo Caption: A sidewalk abruptly ends on Naylor Road. While there is a sidewalk on the other side of the road, it forces pedestrians to cross.

Missing sidewalks are relatively common in the station area, and are identified in Figure 2.

Sidewalk Width

Sidewalks should have adequate width to accommodate persons in wheelchairs, allow pedestrians to pass one another, and provide comfort for pedestrians to walk two or three abreast in high activity areas.

Photo Caption: The width of the sidewalk on Branch Avenue (MD 5) frequently changes, with several narrow sections that are uncomfortable for pedestrians.

Study Area: Inadequate sidewalks are found along portions of Branch Avenue (MD 5) and Oxon Run Drive, and are identified in Figure 2.

Sidewalk Obstructions

Sidewalks should be clear of obstructions to allow people in wheelchairs safe and comfortable connections, adequate space, and to provide room for pedestrians to pass one another. PROWAG specifies that sidewalks should be at least 4 feet wide at all times, including locations where fixed elements are on the path.

Photo Caption: The tree's roots have caused the sidewalk to bulge creating a tripping hazard and barrier for wheel-chair users.

Study Area: Sidewalk obstructions are not common in the study area, but should be monitored and maintained. See number 19 in Figure 2.

Unmarked Crosswalks

On narrow, low-speed streets, unmarked crosswalks are generally sufficient for pedestrians to cross the street safely, as the low-speed environment makes drivers more responsive to the presence of pedestrians. Consideration should be given to installing crosswalk markings and signs at locations where traffic volumes are high, near schools, and at long crossings of multiple vehicle lanes.

Photo Caption: An unmarked crossing along 28th Parkway.

Study Area: Unmarked crosswalks are common on low-volume streets, but also exist at some intersections along Branch Avenue and Naylor Road. See numbers 36-40 in Figure 2.

Bicycle Facilities

Designated facilities for cyclists, such as bike lanes, shared lane markings, and secure bike parking, provide increased safety and an enhanced travel experience. The presence of bicycle facilities also increases the visibility of cycling and encourages growth in ridership.

Photo Caption: Bike lockers at the Naylor Road Metro Station provide secure bicycle storage and encourage bike access to transit.

Study Area: Aside from bicycle parking at the Metro station, no bicycle facilities were found in the study area. Provision of dedicated bike infrastructure could increase ridership.

Crosswalk Signs

Pedestrian crosswalk signs designate crosswalk locations and are used at locations where people are crossing the road. These signs advise drivers where to watch for pedestrians and increase the visibility of the crossing location.

Photo Caption: A pedestrian crosswalk sign along Naylor Road has been knocked down.

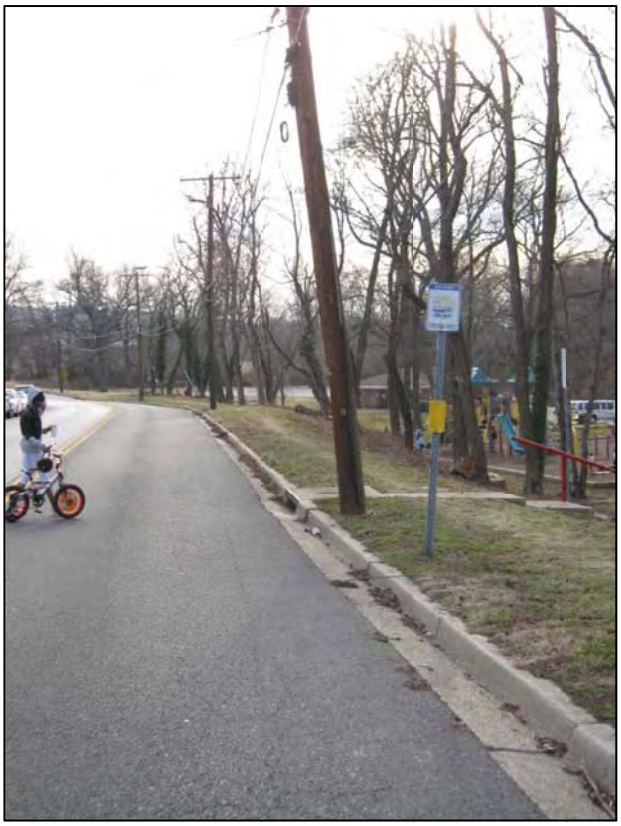
Study Area: A number of unsignalized crossing are found along Naylor Road and Oxon Run Drive near the Metro Station, where high levels of pedestrian and auto activity interact. Driver compliance at these locations was very low.

Curb Ramps

Curb ramps enable persons in wheelchairs and with strollers to safely and easily cross at intersections, and are required for to meet accessibility standards. Ideally, two ramps should be provided at each corner (one leading to each crosswalk). Ramps are also needed at bus stops so passengers in wheelchairs can approach and board.

Photo Caption: A missing curb ramp (and sidewalk) along Oxon Run Drive.

Study Area: Curbs without ramps are found at several locations, which are identified with numbers 20-31 in Figure 2.



Access Management

Driveways are locations with potential conflicts between vehicles, pedestrians, and cyclists. Driveways can be consolidated between two or more adjacent land uses and narrowed to a minimum width for safe ingress/egress vehicle movements to improve safety and comfort for pedestrians and cyclists.

Photo Caption: Strip development along Branch Avenue (MD 5) features dangerous access frontage and lacks designated pedestrian facilities.

Study Area: Branch Avenue (MD 5) has dangerous access configurations along the road through the study area.

Wayfinding

Signs indicating the location of destinations, transit facilities, and areas of interest are beneficial to all roadway users. Wayfinding targeted at cyclists typically includes distance and average travel times to these destinations.

Photo Caption: An example of a sign directing travelers to the Metro Station.

Study Area: Limited wayfinding is found in the station area.

Incomplete Signals

Missing or improperly located pedestrian signal control devices can be a hazard when crossing busy intersections. Ensuring that all control devices operate as expected and can be used safely and efficiently helps improve pedestrian safety.

Photo Caption: Pedestrian signal heads at the intersection of Suitland Parkway/Naylor Road are either missing or misplaced.

Study Area: Several intersections in the study area are missing pedestrian signals on some or all approaches, including Suitland Parkway/Naylor Road and the Metro Station access driveway along Branch Avenue. See numbers 38-40 in Figure 2.

Transit Stop Amenities

Bus stop features such as benches, shelters, and curb cuts provide comfort and convenience to transit riders. They also help to identify bus stops and increase the prominence of transit in a neighborhood.

Photo Caption: A bus stop made virtually inaccessible in winter. Riders would have to stand in the street to wait for the bus.

Study Area: Bus transfers within the Naylor Road Metro Station property are very well established and provide a high level of amenity. However, the bus stops located outside of the station in the study area are no more than signs installed on the side of the road.

Inviting Station Design

Designing stations for pedestrians is the most cost-effective way to attract ridership. Pedestrian-friendly features include safe, direct access to the station, pleasant streetscapes, and shade/protection from sun and rain.

Photo Caption: A small gap in the Naylor Road Station fence is provided for pedestrian access to the station. The fence, which is not intended to completely prohibit access (there are openings in several locations), is equipped with barbed wire on the top to prevent climbing.

Study Area: The Naylor Road station, surrounded by a tall fence with barbed wire, discourages and inconveniences pedestrian access. Some pedestrians (accessing from Naylor Road to the north) are required to walk an additional 700 feet in order to reach the nearest opening in the fence. It is not apparent what purpose this fence serves, and options to reduce or remove the fence should be pursued.

Winter Maintenance

Sidewalk snow clearance is a common problem for local agencies. Few agencies have an established sidewalk snow removal program and instead rely on property owners to keep the walkways clear. Ensuring that the sidewalks are clear and accessible is critical for pedestrian station access.

Photo Caption: A snow- and ice-covered sidewalk along Branch Avenue (MD 5) forces pedestrians to walk in the street to access the Metro station.

Station Area: Snow removal on sidewalks is a significant problem throughout the study area, particularly along Branch Avenue.

ATTACHMENTS

A. Crash Data

Attachment A

Crash Data

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Study Worksheet Output rev. 09/2010-2

Name: William MacLeod

Date: 02/17/2011

Location: MD5 fm .03 mile north of Colebrooke Drive to DC Line

Logmiles: From 014.27 To 015.27 Length: 1.00

County: Prince George's, D3 Period: January 01, 2007 To December 31, 2009

Note:

YEAR >>	2007	2008	2009	Total
Fatal	0	0	0	0
No. Killed	0	0	0	0
Injury	26	26	30	82
No. Injured	48	45	55	148
Prop. Damage	49	23	36	108
Total Crashes	75	49	66	190
Opposite Dir.	4	0	2	6
Rear End	25	14	18	57
Sideswipe	6	8	11	25
Left Turn	8	6	12	26
Angle	16	7	16	39
Pedestrian	3	1	3	7
Parked Veh.	0	4	0	4
Fixed Object	9	3	2	14
Other	4	6	2	12
U-Turn	1	3	2	6
Backing	0	0	0	0
Animal	0	0	0	0
Railroad	0	0	0	0
Fire / Expl.	0	0	0	0
Overturn	0	0	0	0
Truck Related	2	0	2	4
Night Time	32	26	23	81
Wet Surface	11	9	14	34
Alcohol	4	4	4	12
Intersection	42	20	25	87
Total Vehicles	153	102	132	387
Total Trucks	2	0	2	4
Truck %	1.3	0.0	1.5	1.0

Comments:

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Summary Output rev. 03/2010-1

Name: William MacLeod

Date: 02/17/2011

Location: MD5 fm .03 mile north of Colebrooke Drive to DC Line

Logmiles: From 014.27 To 015.27 Length: 1.00

County: Prince George's, D3 Period: January 1, 2007 To December 31, 2007 Note:

SEVERITY	FATAL	INJURY	P-DAMAGE	TOTAL
Accidents		26	49	75
Veh Occ		46		
Pedestrian		2		

DAY OF THE WEEK	SUN	MON	TUE	WED	THU	FRI	SAT	UNK
	7	4	12	12	13	13	14	

MONTH OF THE YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
	5	4	8	8	4	9	2	8	11	6	7	3	

CONDITION	DRIVER	PED
Normal:	116	2
Alcohol:	3	1
Other:	34	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:	4	4	3	4	1	1	1	6	7	2	1		
PM:	3	5	4	1	4	4	2	5	4	4	2	3	

VEHICLES INVOLVED PER ACCIDENT	1	2	3	4	5	6+	UNK	TOTAL
	12	50	11	2				153

VEHICLE TYPE			
	Motorcycle/Moped	1	Tractor Trailer
100	Passenger Vehicle	1	Passenger Bus
	Sport Utility Veh	1	School Bus
11	Pick-Up Truck	2	Emergency Veh
1	Trucks (2+3 axles)	36	Other Types

SURFACE	
11	Wet
63	Dry
1	Sno/Ice
	Mud
	Other

MOVEMENTS	NORTH			SOUTH			EAST			WEST		
	LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
	5	58		6	43		7	6		3	4	1

OTHER MOVEMENTS 20

PROBABLE CAUSES

	Influence of Drugs		Improper Lane Change
3	Influence of Alcohol		Improper Backing
	Influence of Medication		Improper Passing
	Influence of Combined Subst.		Improper Signal
	Physical/Mental Difficulty		Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
39	Fail to give full Attention		Illegally in Roadway
	Lic. Restr. Non-compliance		Bicycle Violation
	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
11	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
1	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center		Vehicle Defect
	Fail to Stop for School Bus		Wet
	Wrong Way on One Way		Icy or Snow Covered
2	Exceeded Speed Limit	1	Debris or Obstruction
	Operator Using Cell Phone		Ruts, Holes or Bumps
	Stopping in Lane Roadway		Road Under Construction
3	Too Fast for Conditions		Traffic Control Device Inop.
2	Followed too Closely		Shoulders Low, Soft or High
1	Improper Turn	12	Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:			2	2
	UnRelated:		1	1	2
Rear End	Related:		3	4	7
	UnRelated:		5	13	18
Sideswipe	Related:		1	1	2
	UnRelated:			4	4
Left Turn	Related:		3	5	8
	UnRelated:				
Angle	Related:		8	8	16
	UnRelated:				
Pedestrian	Related:		1	1	2
	UnRelated:		1		1
Parked Vehicle	Related:				
	UnRelated:				
Other Collision	Related:			3	3
	UnRelated:			1	1

F	Bridge	01			
I	Building	02			
X	Culvert/Ditch	03			
E	Curb	04		2	2
D	Guardrail/Barrier	05	1	2	3
	Embankment	06			
O	Fence	07	1		1
B	Light Pole	08			
J	Sign Pole	09			
E	Other Pole	10		1	1
C	Tree/Shrubbery	11			
T	Contr. Barrier	12			
S	Crash Attenuator	13			
	Other Fixed Object		1	1	2

WEATHER		ILLUMINATION		TOTALS	
68	Clear / Cloudy	39	Day	2007	75
	Foggy	4	Dawn/Dusk		
6	Raining	30	Dark - Lights On		
1	Snow / Sleet	2	Dark - No Lights		
	Other		Other		

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Summary Output rev. 03/2010-1

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Date: 02/17/2011

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Accidents		26	23	49
Veh Occ		44		
Pedestrian		1		

DAY OF THE WEEK

SUN	MON	TUE	WED	THU	FRI	SAT	UNK
5	9	6	5	4	10	10	

MONTH OF THE YEAR

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
2	5	6	5	4	3	6	2	4	4	5	3	

CONDITION	DRIVER	PED
Normal:	75	1
Alcohol:	4	
Other:	25	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:	1	2	4	3	1	1	2	2	6		1		1
PM:	3	1	2		1	3	3	4		5		3	

VEHICLES INVOLVED PER ACCIDENT

1	2	3	4	5	6+	UNK	TOTAL
6	34	8	1				102

VEHICLE TYPE

1	Motorcycle/Moped		Tractor Trailer
71	Passenger Vehicle	2	Passenger Bus
18	Sport Utility Veh		School Bus
1	Pick-Up Truck	1	Emergency Veh
	Trucks (2+3 axles)	10	Other Types

SURFACE

9	Wet
40	Dry
	Sno/Ice
	Mud
	Other

MOVEMENTS

NORTH			SOUTH			EAST			WEST		
LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
1	39		6	24		4	3			5	

OTHER MOVEMENTS 20

PROBABLE CAUSES

1	Influence of Drugs		Improper Lane Change
2	Influence of Alcohol		Improper Backing
	Influence of Medication		Improper Passing
	Influence of Combined Subst.		Improper Signal
	Physical/Mental Difficulty	1	Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
29	Fail to give full Attention		Illegally in Roadway
1	Lic. Restr. Non-compliance		Bicycle Violation
1	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
4	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center		Vehicle Defect
	Fail to Stop for School Bus		Wet
	Wrong Way on One Way		Icy or Snow Covered
	Exceeded Speed Limit		Debris or Obstruction
	Operator Using Cell Phone		Ruts, Holes or Bumps
	Stopping in Lane Roadway		Road Under Construction
2	Too Fast for Conditions		Traffic Control Device Inop.
2	Followed too Closely		Shoulders Low, Soft or High
	Improper Turn	6	Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:				
	UnRelated:				
Rear End	Related:		2	1	3
	UnRelated:		8	3	11
Sideswipe	Related:			2	2
	UnRelated:		2	4	6
Left Turn	Related:		3	3	6
	UnRelated:				
Angle	Related:		2	3	5
	UnRelated:		2		2
Pedestrian	Related:				
	UnRelated:		1		1
Parked Vehicle	Related:				
	UnRelated:		1	3	4
Other Collision	Related:		3		3
	UnRelated:		1	2	3

F	Bridge	01			
I	Building	02			
X	Culvert/Ditch	03			
E	Curb	04			
D	Guardrail/Barrier	05	1		1
	Embankment	06			
O	Fence	07			
B	Light Pole	08			
J	Sign Pole	09		1	1
E	Other Pole	10			
C	Tree/Shrubbery	11		1	1
T	Contr. Barrier	12			
S	Crash Attenuator	13			
	Other Fixed Object				

WEATHER

39	Clear / Cloudy
1	Foggy
9	Raining
	Snow / Sleet
	Other

ILLUMINATION

20	Day
2	Dawn/Dusk
25	Dark - Lights On
1	Dark - No Lights
1	Other

TOTALS

2008	49

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Summary Output rev. 03/2010-1

Name: William MacLeod

Date: 02/17/2011

Location: MD5 fm .03 mile north of Colebrooke Drive to DC Line

Logmiles: From 014.27 To 015.27 Length: 1.00

County: Prince George's, D3 Period: January 1, 2009 To December 31, 2009 Note:

SEVERITY	FATAL	INJURY	P-DAMAGE	TOTAL
Accidents		30	36	66
Veh Occ		50		
Pedestrian		5		

DAY OF THE WEEK	SUN	MON	TUE	WED	THU	FRI	SAT	UNK
	10	8	5	6	13	15	9	

MONTH OF THE YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
	5	8	8	8	3	6	3	7	6	3	4	5	

CONDITION	DRIVER	PED
Normal:	102	5
Alcohol:	4	
Other:	26	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:	1	2	2	2			3	2	8	4	2	1	
PM:	4	3	2	5	2	3	3	5	4	1	6	1	

VEHICLES INVOLVED PER ACCIDENT	1	2	3	4	5	6+	UNK	TOTAL
	8	50	8					132

VEHICLE TYPE			
2	Motorcycle/Moped		Tractor Trailer
85	Passenger Vehicle		Passenger Bus
23	Sport Utility Veh	2	School Bus
8	Pick-Up Truck	1	Emergency Veh
2	Trucks (2+3 axles)	9	Other Types

SURFACE	
14	Wet
49	Dry
2	Sno/Ice
	Mud
1	Other

MOVEMENTS

NORTH			SOUTH			EAST			WEST		
LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
9	51		7	43		1	3	3	3	1	

OTHER MOVEMENTS 11

PROBABLE CAUSES

	Influence of Drugs	1	Improper Lane Change
5	Influence of Alcohol		Improper Backing
1	Influence of Medication	1	Improper Passing
	Influence of Combined Subst.	1	Improper Signal
	Physical/Mental Difficulty		Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
27	Fail to give full Attention		Illegally in Roadway
	Lic. Restr. Non-compliance		Bicycle Violation
2	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
10	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center		Vehicle Defect
	Fail to Stop for School Bus		Wet
	Wrong Way on One Way		Icy or Snow Covered
	Exceeded Speed Limit		Debris or Obstruction
1	Operator Using Cell Phone		Ruts, Holes or Bumps
1	Stopping in Lane Roadway		Road Under Construction
	Too Fast for Conditions		Traffic Control Device Inop.
2	Followed too Closely		Shoulders Low, Soft or High
	Improper Turn	14	Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:				
	UnRelated:		1	1	2
Rear End	Related:		1		1
	UnRelated:		4	13	17
Sideswipe	Related:		1	1	2
	UnRelated:		2	7	9
Left Turn	Related:		7	2	9
	UnRelated:		1	2	3
Angle	Related:		4	7	11
	UnRelated:		4	1	5
Pedestrian	Related:		1		1
	UnRelated:		2		2
Parked Vehicle	Related:				
	UnRelated:				
Other Collision	Related:				
	UnRelated:		1	1	2

F	Bridge	01			
I	Building	02			
X	Culvert/Ditch	03			
E	Curb	04			
D	Guardrail/Barrier	05			
	Embankment	06			
O	Fence	07			
B	Light Pole	08	1		1
J	Sign Pole	09		1	1
E	Other Pole	10			
C	Tree/Shrubbery	11			
T	Contr. Barrier	12			
S	Crash Attenuator	13			
	Other Fixed Object				

WEATHER		ILLUMINATION		TOTALS	
53	Clear / Cloudy	36	Day	2009	66
	Foggy	6	Dawn/Dusk		
10	Raining	22	Dark - Lights On		
1	Snow / Sleet	1	Dark - No Lights		
2	Other	1	Other		

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Summary Output rev. 03/2010-1

Name: William MacLeod

Date: 02/17/2011

Location: MD5 fm .03 mile north of Colebrooke Drive to DC Line

Logmiles: From 014.27 To 015.27 Length: 1.00

County: Prince George's, D3 Period: January 1, 2007 To December 31, 2009 Note:

SEVERITY	FATAL	INJURY	P-DAMAGE	TOTAL
Accidents		82	108	190
Veh Occ		140		
Pedestrian		8		

DAY OF THE WEEK

SUN	MON	TUE	WED	THU	FRI	SAT	UNK
22	21	23	23	30	38	33	

MONTH OF THE YEAR

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
12	17	22	21	11	18	11	17	21	13	16	11	

CONDITION	DRIVER	PED
Normal:	293	8
Alcohol:	11	1
Other:	85	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:	6	8	9	9	2	2	6	10	21	6	4	1	1
PM:	10	9	8	6	7	10	8	14	8	10	8	7	

VEHICLES INVOLVED PER ACCIDENT

1	2	3	4	5	6+	UNK	TOTAL
26	134	27	3				387

VEHICLE TYPE

3	Motorcycle/Moped	1	Tractor Trailer
256	Passenger Vehicle	3	Passenger Bus
41	Sport Utility Veh	3	School Bus
20	Pick-Up Truck	4	Emergency Veh
3	Trucks (2+3 axles)	55	Other Types

SURFACE

34	Wet
152	Dry
3	Sno/Ice
	Mud
1	Other

MOVEMENTS

NORTH			SOUTH			EAST			WEST		
LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
15	148		19	110		12	12	3	6	10	1

OTHER MOVEMENTS 51

PROBABLE CAUSES

1	Influence of Drugs	1	Improper Lane Change
10	Influence of Alcohol		Improper Backing
1	Influence of Medication	1	Improper Passing
	Influence of Combined Subst.	1	Improper Signal
	Physical/Mental Difficulty	1	Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
95	Fail to give full Attention		Illegally in Roadway
1	Lic. Restr. Non-compliance		Bicycle Violation
3	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
25	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
1	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center		Vehicle Defect
	Fail to Stop for School Bus		Wet
	Wrong Way on One Way		Icy or Snow Covered
2	Exceeded Speed Limit	1	Debris or Obstruction
1	Operator Using Cell Phone		Ruts, Holes or Bumps
1	Stopping in Lane Roadway		Road Under Construction
5	Too Fast for Conditions		Traffic Control Device Inop.
6	Followed too Closely		Shoulders Low, Soft or High
1	Improper Turn	32	Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:			2	2
	UnRelated:		2	2	4
Rear End	Related:		6	5	11
	UnRelated:		17	29	46
Sideswipe	Related:		2	4	6
	UnRelated:		4	15	19
Left Turn	Related:		13	10	23
	UnRelated:		1	2	3
Angle	Related:		14	18	32
	UnRelated:		6	1	7
Pedestrian	Related:		2	1	3
	UnRelated:		4		4
Parked Vehicle	Related:				
	UnRelated:		1	3	4
Other Collision	Related:		3	3	6
	UnRelated:		2	4	6

F	Bridge	01			
I	Building	02			
X	Culvert/Ditch	03			
E	Curb	04		2	2
D	Guardrail/Barrier	05	2	2	4
	Embankment	06			
O	Fence	07	1		1
B	Light Pole	08	1		1
J	Sign Pole	09		2	2
E	Other Pole	10		1	1
C	Tree/Shrubbery	11		1	1
T	Contr. Barrier	12			
S	Crash Attenuator	13			
	Other Fixed Object		1	1	2

WEATHER

160	Clear / Cloudy
1	Foggy
25	Raining
2	Snow / Sleet
2	Other

ILLUMINATION

95	Day
12	Dawn/Dusk
77	Dark - Lights On
4	Dark - No Lights
2	Other

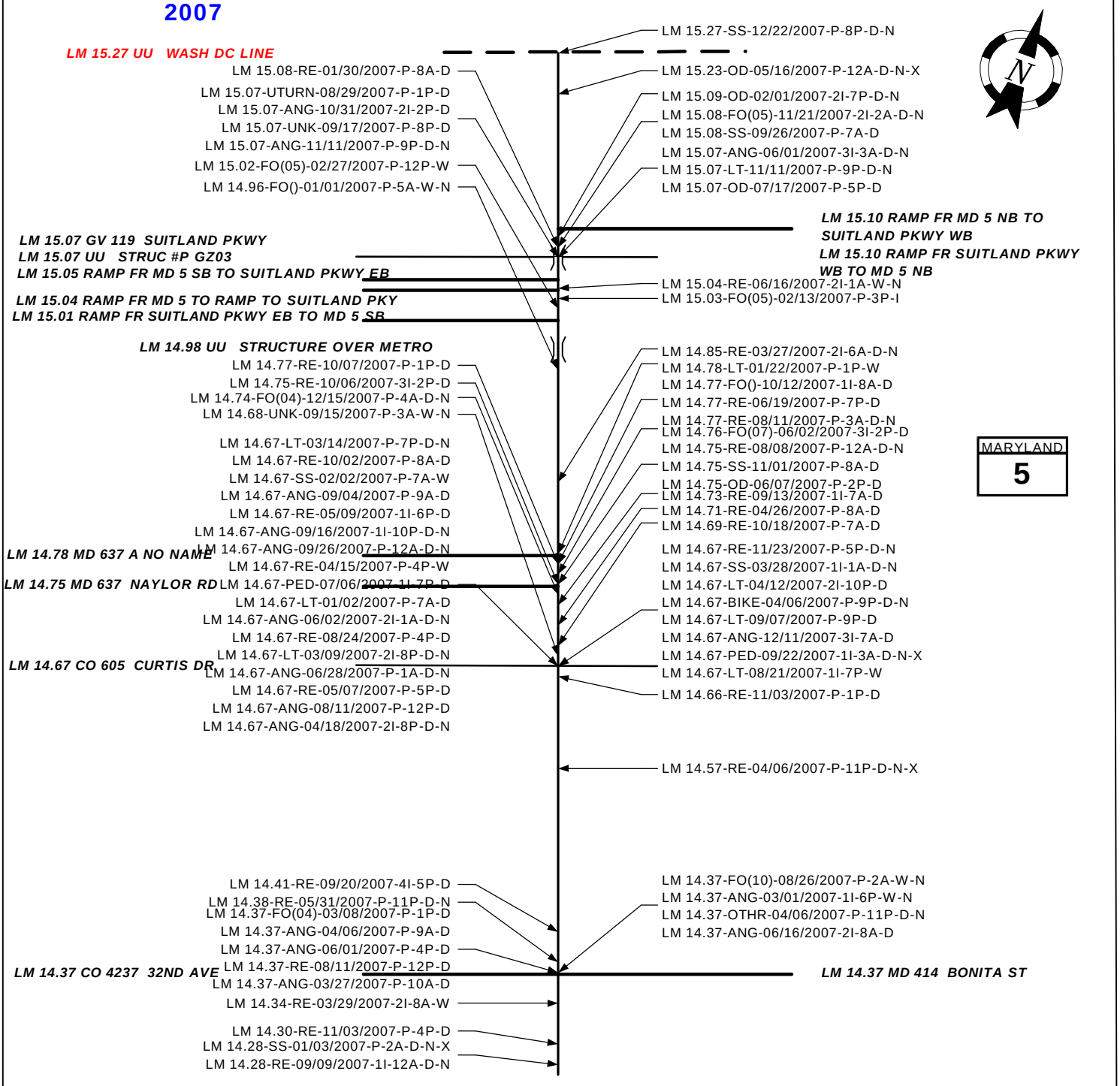
TOTALS

07-09	190

Office of Traffic & Safety
Traffic Development & Support Division
Crash Analysis Safety Team

Location: MD 5 from .03 mile north of Colebrooke Drive to DC Line
County: PRINCE GEORGES
Study Period: 01/01/2007 to 12/31/2007
Analyst: WMACLEOD Date: 02/17/2011

2007



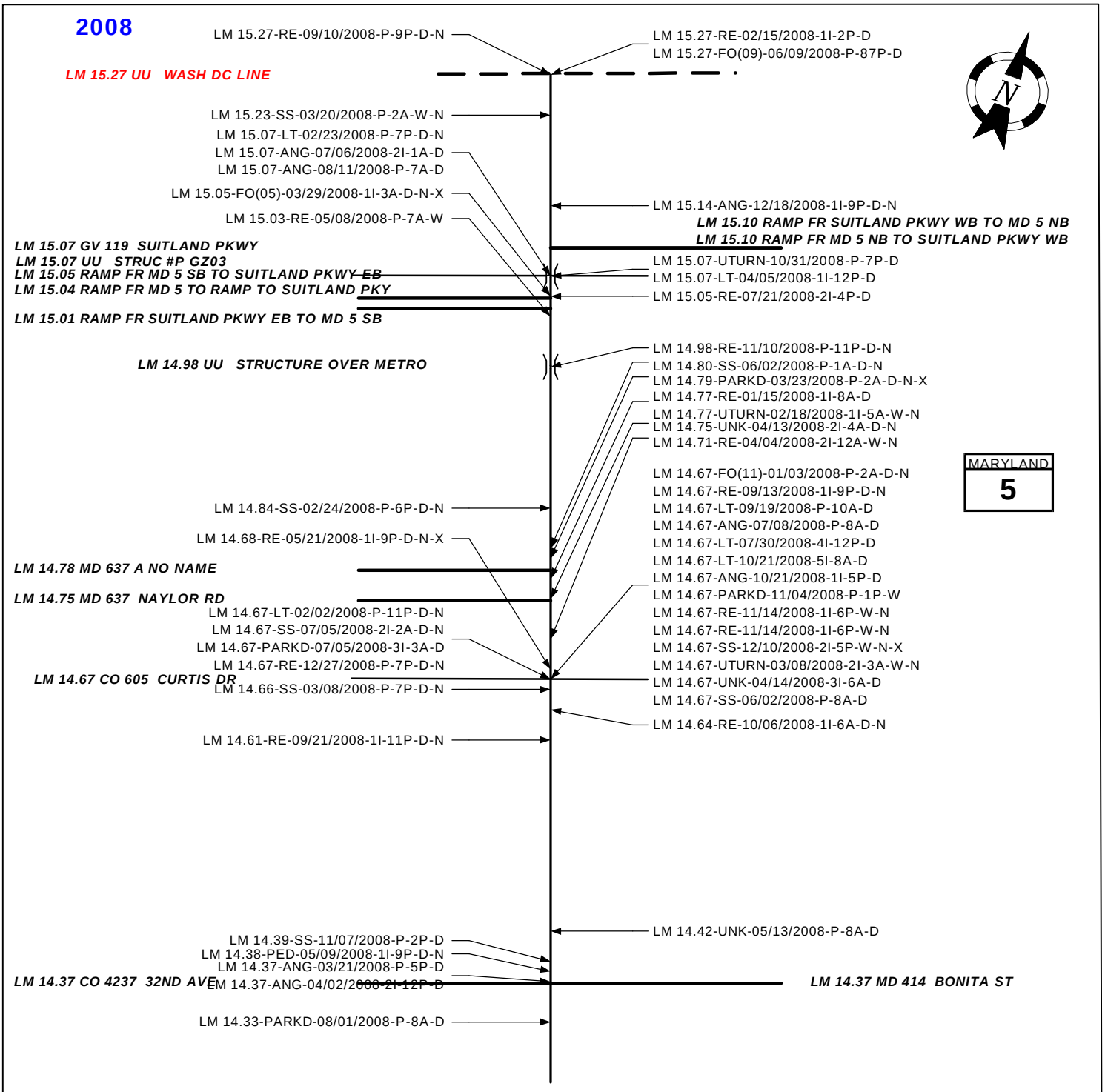
KEY:LogMile-CollisionType (FixedObjectStruck) -Date-Severity-Time-Surface-Illumination-Alcohol

template 06-27-06

F - Fatalities	SS - Sideswipe	FO - Fixed Object	OFFRD - Off Road	00 - Not Applicable	08 - Light Support Pole	N - Night
I - Injury	PARKD - Parked Vehicle	OOBJ - Other Object	RUNWY - Downhill Runaway	01 - Bridge or Overpass	09 - Sign Support Pole	X - Alcohol
P - Property Damage	PED - Pedestrian	OT - Overturn	FIRE - Explosion Fire	02 - Building	10 - Other Pole	D - Dry Surface
OD - Opposite Direction	BIKE - Bicycle	SPILL - Spilled Cargo	BCKNG - Backing	03 - Culvert or Ditch	11 - Tree Shrubbery	W - Wet Surface
LT - Left Turn	PEDAL - Other Pedalcycle	JCKKNF - Jackknife	UTURN - U-Turn	04 - Curb	12 - Construction Barrier	I - Icy Surface
RE - Rear End	CONVY - Other Conveyance	SPRTD - Units Separated	OTHR - Other	05 - Guardrail or Barrier	13 - Crash Attenuater	S - Snowy Surface
ANG - Angle	ANIML - Animal	NCOLL - Other Non Collision	UNK - Unknown	06 - Embankment	88 - Other	
				07 - Fence	99 - Unknown	

Office of Traffic & Safety
Traffic Development & Support Division
Crash Analysis Safety Team

Location: MD 5 from .03 mile north of Colebrooke Drive to DC Line
County: PRINCE GEORGES
Study Period: 01/01/2008 to 12/31/2008
Analyst: WMACLEOD Date: 02/17/2011



KEY:LogMile-CollisionType (FixedObjectStruck) -Date-Severity-Time-Surface-Illumination-Alcohol

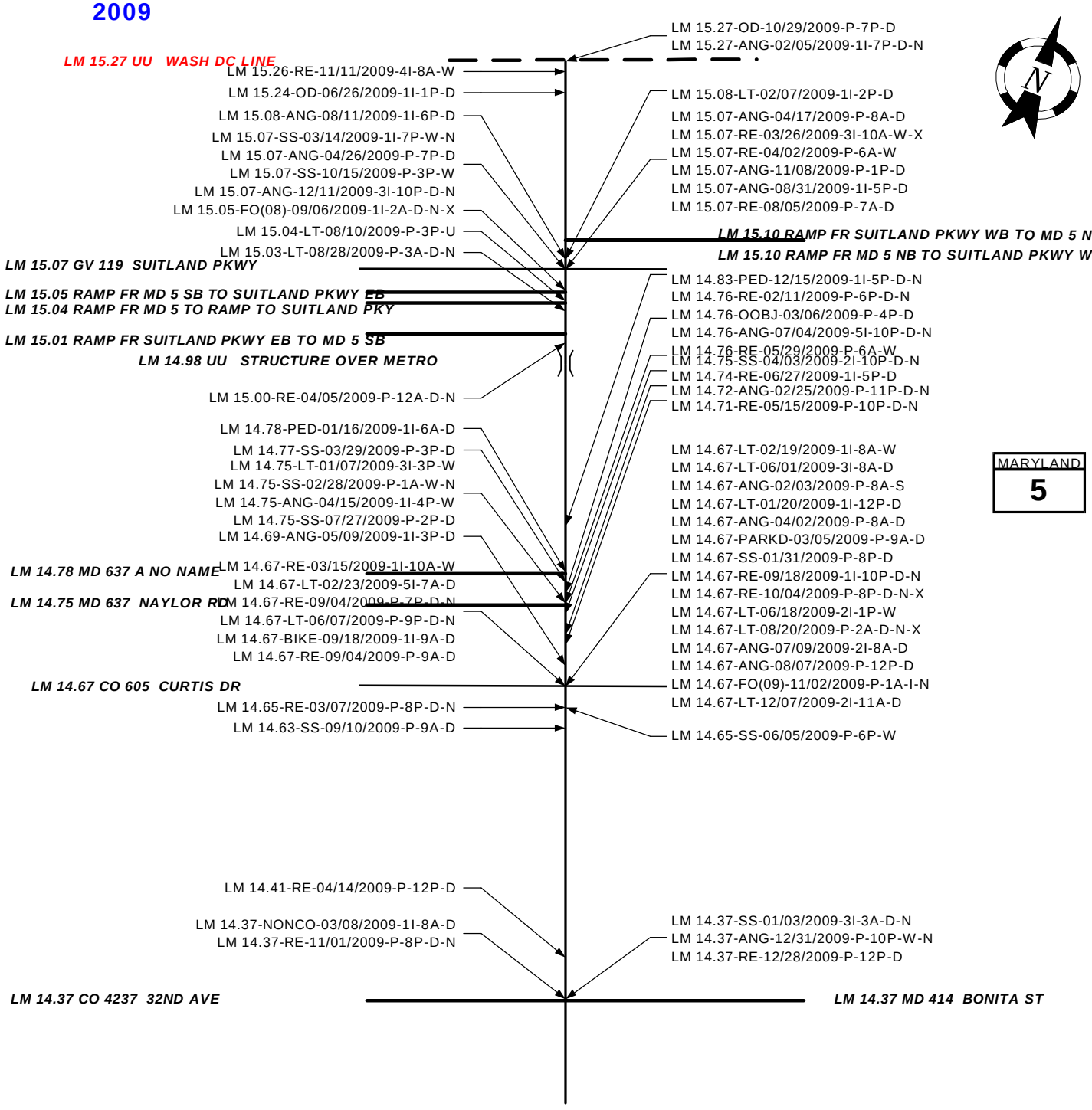
template 06-27-06

F - Fatalities	SS - Sideswipe	FO - Fixed Object	OFFRD - Off Road	00 - Not Applicable	08 - Light Support Pole	N - Night
I - Injury	PARKD - Parked Vehicle	OOBJ - Other Object	RUNWY - Downhill Runaway	01 - Bridge or Overpass	09 - Sign Support Pole	X - Alcohol
P - Property Damage	PED - Pedestrian	OT - Overturn	FIRE - Explosion Fire	02 - Building	10 - Other Pole	D - Dry Surface
OD - Opposite Direction	BIKE - Bicycle	SPILL - Spilled Cargo	BCKNG - Backing	03 - Culvert or Ditch	11 - Tree Shrubbery	W - Wet Surface
LT - Left Turn	PEDAL - Other Pedalcycle	JCKKNF - Jackknife	UTURN - U-Turn	04 - Curb	12 - Construction Barrier	I - Icy Surface
RE - Rear End	CONVY - Other Conveyance	SPRTD - Units Separated	OTHR - Other	05 - Guardrail or Barrier	13 - Crash Attenuater	S - Snowy Surface
ANG - Angle	ANIML - Animal	NCOLL - Other Non Collision	UNK - Unknown	06 - Embankment	88 - Other	
				07 - Fence	99 - Unknown	

Office of Traffic & Safety
Traffic Development & Support Division
Crash Analysis Safety Team

Location: MD 5 from .03 mile north of Colebrooke Drive to DC Line
County: PRINCE GEORGES
Study Period: 01/01/2009 to 12/31/2009
Analyst: WMACLEOD Date: 02/17/2011

2009



KEY:LogMile-CollisionType (FixedObjectStruck) -Date-Severity-Time-Surface-Illumination-Alcohol

template 06-27-06

F - Fatalities	SS - Sideswipe	FO - Fixed Object	OFFRD - Off Road	00 - Not Applicable	08 - Light Support Pole	N - Night
I - Injury	PARKD - Parked Vehicle	OOBJ - Other Object	RUNWY - Downhill Runaway	01 - Bridge or Overpass	09 - Sign Support Pole	X - Alcohol
P - Property Damage	PED - Pedestrian	OT - Overturn	FIRE - Explosion Fire	02 - Building	10 - Other Pole	D - Dry Surface
OD - Opposite Direction	BIKE - Bicycle	SPILL - Spilled Cargo	BCKNG - Backing	03 - Culvert or Ditch	11 - Tree Shrubbery	W - Wet Surface
LT - Left Turn	PEDAL - Other Pedalcycle	JCKKNF - Jackknife	UTURN - U-Turn	04 - Curb	12 - Construction Barrier	I - Icy Surface
RE - Rear End	CONVY - Other Conveyance	SPRTD - Units Separated	OTHR - Other	05 - Guardrail or Barrier	13 - Crash Attenuater	S - Snowy Surface
ANG - Angle	ANIML - Animal	NCOLL - Other Non Collision	UNK - Unknown	06 - Embankment	88 - Other	
				07 - Fence	99 - Unknown	

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Study Worksheet Output rev. 09/2010-2

Name: William MacLeod

Date: 02/20/2011

Location: MD5 fm .03 mile north of Colebrooke drive to DC Line

Logmiles: From 014.27 To 015.27 Length: 1.00

County: Prince George's, D3 Period: January 01, 2007 To December 31, 2009

Note: Two secondary pedestrian collisions included

YEAR >>	2007	2008	2009	Total
Fatal	0	0	0	0
No. Killed	0	0	0	0
Injury	2	1	5	8
No. Injured	2	1	7	10
Prop. Damage	1	0	0	1
Total Crashes	3	1	5	9
Opposite Dir.	0	0	0	0
Rear End	0	0	1	1
Sideswipe	0	0	0	0
Left Turn	0	0	0	0
Angle	0	0	1	1
Pedestrian	3	1	3	7
Parked Veh.	0	0	0	0
Fixed Object	0	0	0	0
Other	0	0	0	0
U-Turn	0	0	0	0
Backing	0	0	0	0
Animal	0	0	0	0
Railroad	0	0	0	0
Fire / Expl.	0	0	0	0
Overturn	0	0	0	0
Truck Related	0	0	0	0
Night Time	2	1	1	4
Wet Surface	0	0	1	1
Alcohol	1	0	1	2
Intersection	2	0	1	3
Total Vehicles	3	1	6	10
Total Trucks	0	0	0	0
Truck %	0.0	0.0	0.0	0.0

Comments:

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Summary Output rev. 03/2010-1

Name: William MacLeod

Date: 02/20/2011

Location: MD5 fm .03 mile north of Colebrooke drive to DC Line

Logmiles: From 014.27 To 015.27 Length: 1.00

County: Prince George's, D3 Period: January 1, 2007 To December 31, 2009

Note: Two secondary pedestrian collisions included

SEVERITY	FATAL	INJURY	P-DAMAGE	TOTAL
Accidents		8	1	9
Veh Occ		2		
Pedestrian		8		

DAY OF THE WEEK	SUN	MON	TUE	WED	THU	FRI	SAT	UNK
			1		1	5	2	

MONTH OF THE YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
	1		1	1	2		1		2			1	

CONDITION	DRIVER	PED
Normal:	8	8
Alcohol:	1	1
Other:	1	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:				1			1			1	1		
PM:				1		1		1		2			

VEHICLES INVOLVED PER ACCIDENT	1	2	3	4	5	6+	UNK	TOTAL
	8	1						10

VEHICLE TYPE

	Motorcycle/Moped		Tractor Trailer
7	Passenger Vehicle		Passenger Bus
2	Sport Utility Veh		School Bus
	Pick-Up Truck		Emergency Veh
	Trucks (2+3 axles)	1	Other Types

SURFACE

1	Wet
8	Dry
	Sno/Ice
	Mud
	Other

MOVEMENTS

NORTH			SOUTH			EAST			WEST		
LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
1	5			3				1			

OTHER MOVEMENTS

PROBABLE CAUSES

	Influence of Drugs		Improper Lane Change
1	Influence of Alcohol		Improper Backing
	Influence of Medication		Improper Passing
	Influence of Combined Subst.		Improper Signal
	Physical/Mental Difficulty		Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
2	Fail to give full Attention		Illegally in Roadway
	Lic. Restr. Non-compliance		Bicycle Violation
	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center		Vehicle Defect
	Fail to Stop for School Bus		Wet
	Wrong Way on One Way		Icy or Snow Covered
	Exceeded Speed Limit		Debris or Obstruction
	Operator Using Cell Phone		Ruts, Holes or Bumps
	Stopping in Lane Roadway		Road Under Construction
	Too Fast for Conditions		Traffic Control Device Inop.
	Followed too Closely		Shoulders Low, Soft or High
	Improper Turn	6	Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:				
	UnRelated:				
Rear End	Related:				
	UnRelated:		1		1
Sideswipe	Related:				
	UnRelated:				
Left Turn	Related:				
	UnRelated:				
Angle	Related:				
	UnRelated:		1		1
Pedestrian	Related:		2	1	3
	UnRelated:		4		4
Parked Vehicle	Related:				
	UnRelated:				
Other Collision	Related:				
	UnRelated:				

F	Bridge	01
I	Building	02
X	Culvert/Ditch	03
E	Curb	04
D	Guardrail/Barrier	05
	Embankment	06
O	Fence	07
B	Light Pole	08
J	Sign Pole	09
E	Other Pole	10
C	Tree/Shrubbery	11
T	Contr. Barrier	12
S	Crash Attenuator	13
	Other Fixed Object	

WEATHER

8	Clear / Cloudy
	Foggy
1	Raining
	Snow / Sleet
	Other

ILLUMINATION

4	Day
1	Dawn/Dusk
4	Dark - Lights On
	Dark - No Lights
	Other

TOTALS

07-09	9

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC History Output rev. 09/2010-1 - Combined Year Listing

Name: William MacLeod

Date: 02/20/2011

Location: MD5 fm .03 mile north of Colebrooke drive to DC Line

Logmiles: From 014.27 To 015.27 Length: 1.00

County: Prince George's, D3 Period: January 01, 2007 To December 31, 2009

Note: Two secondary pedestrian collisions included

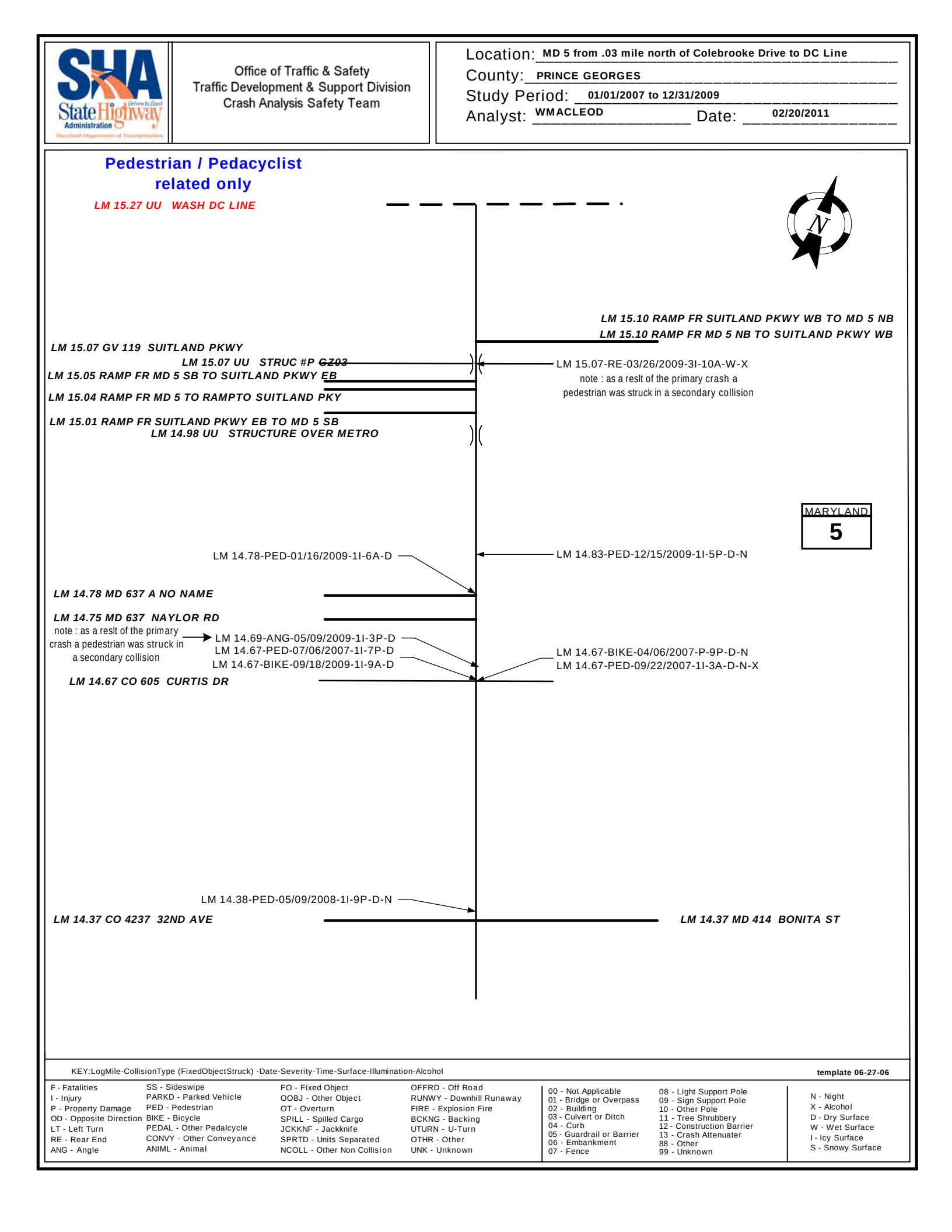
MilePt	Int Rel	Date	Severity	Time	Light	Surface	Alc Rel	FixObj	Collision	Movement V1	Movement V2	Probable Cause
MD0005												
14.38		05092008	1 Injured	09P	Night	Dry			PED	SS	--	Other or Unknown
14.67	✓	04062007	Property	09P	Night	Dry			PED	NL	--	Fail to give full attention
14.67	✓	07062007	1 Injured	07P	Day	Dry			PED	SS	--	Other or Unknown
14.67		09222007	1 Injured	03A	Night	Dry	✓		PED	NS	--	Fail to give full attention
14.67	✓	09182009	1 Injured	09A	Day	Dry			PED	ER	uu	Other or Unknown
14.69		05092009	1 Injured	03P	Day	Dry			ANGLE	NS	uu	Other or Unknown
14.78		01162009	1 Injured	06A	Day	Dry			PED	SS	--	Other or Unknown
14.83		12152009	1 Injured	05P	Night	Dry			PED	NS	--	Other or Unknown
15.07		03262009	3 Injured	10A	Day	Wet	✓		RREND	NS	NS	Under influence of alcohol

Fixed Object: 01 = Bridge 02 = Building 03 = Culvert/Ditch 04 = Curb 05 = Guardrail/Barrier 06 = Embankment 07 = Fence
08 = Light Pole 09 = Sign Post 10 = Other Pole 11 = Tree/Shrubbery 12 = Construction Barrier 13 = Crash Attenuator

Office of Traffic & Safety
Traffic Development & Support Division
Crash Analysis Safety Team

Location: MD 5 from .03 mile north of Colebrooke Drive to DC Line
County: PRINCE GEORGES
Study Period: 01/01/2007 to 12/31/2009
Analyst: WMACLEOD Date: 02/20/2011

Pedestrian / Pedacyclist related only



KEY:LogMile-CollisionType (FixedObjectStruck) -Date-Severity-Time-Surface-Illumination-Alcohol

template 06-27-06

F - Fatalities	SS - Sideswipe	FO - Fixed Object	OFFRD - Off Road	00 - Not Applicable	08 - Light Support Pole	N - Night
I - Injury	PARKD - Parked Vehicle	OOBJ - Other Object	RUNWY - Downhill Runaway	01 - Bridge or Overpass	09 - Sign Support Pole	X - Alcohol
P - Property Damage	PED - Pedestrian	OT - Overturn	FIRE - Explosion Fire	02 - Building	10 - Other Pole	D - Dry Surface
OD - Opposite Direction	BIKE - Bicycle	SPILL - Spilled Cargo	BCKNG - Backing	03 - Culvert or Ditch	11 - Tree Shrubbery	W - Wet Surface
LT - Left Turn	PEDAL - Other Pedalcycle	JCKKNF - Jackknife	UTURN - U-Turn	04 - Curb	12 - Construction Barrier	I - Icy Surface
RE - Rear End	CONVY - Other Conveyance	SPRTD - Units Separated	OTHR - Other	05 - Guardrail or Barrier	13 - Crash Attenuater	S - Snowy Surface
ANG - Angle	ANIML - Animal	NCOLL - Other Non Collision	UNK - Unknown	06 - Embankment	88 - Other	
				07 - Fence	99 - Unknown	

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Study Worksheet Output rev. 09/2010-2

Name: William MacLeod

Date: 02/17/2011

Location: MD 637 (Naylor Rd) from DC Line to MD 5 (Branch Ave)

Logmiles: From 000.00 To 000.61 Length: 0.61

County: Prince George's, D3 Period: January 01, 2007 To December 31, 2009

Note:

YEAR >>	2007	2008	2009	Total
Fatal	0	0	0	0
No. Killed	0	0	0	0
Injury	4	7	3	14
No. Injured	6	8	4	18
Prop. Damage	8	7	10	25
Total Crashes	12	14	13	39
Opposite Dir.	0	0	2	2
Rear End	6	5	3	14
Sideswipe	1	1	3	5
Left Turn	0	3	0	3
Angle	1	2	1	4
Pedestrian	0	0	0	0
Parked Veh.	0	1	0	1
Fixed Object	2	2	4	8
Other	2	0	0	2
U-Turn	0	0	0	0
Backing	0	0	0	0
Animal	0	0	0	0
Railroad	0	0	0	0
Fire / Expl.	0	0	0	0
Overturn	1	0	0	1
Truck Related	0	0	0	0
Night Time	2	7	7	16
Wet Surface	4	3	3	10
Alcohol	0	1	0	1
Intersection	6	3	5	14
Total Vehicles	22	32	22	76
Total Trucks	0	0	0	0
Truck %	0.0	0.0	0.0	0.0

Comments:

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Summary Output rev. 03/2010-1

Name: William MacLeod

Date: 02/17/2011

Location: MD 637 (Naylor Rd) from DC Line to MD 5 (Branch Ave)

Logmiles: From 000.00 To 000.61 Length: 0.61

County: Prince George's, D3 Period: January 1, 2007 To December 31, 2007

Note:

SEVERITY	FATAL	INJURY	P-DAMAGE	TOTAL
Accidents		4	8	12
Veh Occ		6		
Pedestrian				

DAY OF THE WEEK

SUN	MON	TUE	WED	THU	FRI	SAT	UNK
1		2		3	5	1	

MONTH OF THE YEAR

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
	2		1	1			2	1	4		1	

CONDITION	DRIVER	PED
Normal:	19	
Alcohol:		
Other:	3	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:	1								2	1		2	
PM:	3		1	1							1		

VEHICLES INVOLVED PER ACCIDENT

1	2	3	4	5	6+	UNK	TOTAL
2	10						22

VEHICLE TYPE

	Motorcycle/Moped		Tractor Trailer
17	Passenger Vehicle		Passenger Bus
	Sport Utility Veh		School Bus
	Pick-Up Truck		Emergency Veh
	Trucks (2+3 axles)	5	Other Types

SURFACE

4	Wet
7	Dry
1	Sno/Ice
	Mud
	Other

MOVEMENTS

NORTH			SOUTH			EAST			WEST		
LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
	3						11			7	

OTHER MOVEMENTS 1

PROBABLE CAUSES

	Influence of Drugs		Improper Lane Change
	Influence of Alcohol		Improper Backing
	Influence of Medication		Improper Passing
	Influence of Combined Subst.		Improper Signal
	Physical/Mental Difficulty		Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
9	Fail to give full Attention		Illegally in Roadway
	Lic. Restr. Non-compliance		Bicycle Violation
	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
1	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center		Vehicle Defect
	Fail to Stop for School Bus		Wet
	Wrong Way on One Way		Icy or Snow Covered
	Exceeded Speed Limit		Debris or Obstruction
	Operator Using Cell Phone		Ruts, Holes or Bumps
	Stopping in Lane Roadway		Road Under Construction
	Too Fast for Conditions		Traffic Control Device Inop.
	Followed too Closely		Shoulders Low, Soft or High
	Improper Turn	2	Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:				
	UnRelated:				
Rear End	Related:			4	4
	UnRelated:		2		2
Sideswipe	Related:			1	1
	UnRelated:				
Left Turn	Related:				
	UnRelated:				
Angle	Related:		1		1
	UnRelated:				
Pedestrian	Related:				
	UnRelated:				
Parked Vehicle	Related:				
	UnRelated:				
Other Collision	Related:				
	UnRelated:			2	2

F	Bridge	01			
I	Building	02			
X	Culvert/Ditch	03			
E	Curb	04			
D	Guardrail/Barrier	05			
	Embankment	06	1		1
O	Fence	07			
B	Light Pole	08		1	1
J	Sign Pole	09			
E	Other Pole	10			
C	Tree/Shrubbery	11			
T	Contr. Barrier	12			
S	Crash Attenuator	13			
	Other Fixed Object				

WEATHER

11	Clear / Cloudy
	Foggy
	Raining
	Snow / Sleet
1	Other

ILLUMINATION

10	Day
	Dawn/Dusk
2	Dark - Lights On
	Dark - No Lights
	Other

TOTALS

2007	12

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Summary Output rev. 03/2010-1

Name: William MacLeod

Date: 02/17/2011

Location: MD 637 (Naylor Rd) from DC Line to MD 5 (Branch Ave)

Logmiles: From 000.00 To 000.61 Length: 0.61

County: Prince George's, D3 Period: January 1, 2008 To December 31, 2008

Note:

SEVERITY	FATAL	INJURY	P-DAMAGE	TOTAL
Accidents		7	7	14
Veh Occ		8		
Pedestrian				

DAY OF THE WEEK

SUN	MON	TUE	WED	THU	FRI	SAT	UNK
4	1	2	1	2	3	1	

MONTH OF THE YEAR

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
1	3	1	1	2	1	1		1	2	1		

CONDITION	DRIVER	PED
Normal:	19	
Alcohol:	1	
Other:	12	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:			1		1	1		1	2				
PM:	1					2	1	1	1		1	1	

VEHICLES INVOLVED PER ACCIDENT

1	2	3	4	5	6+	UNK	TOTAL
2	9	1	1	1			32

VEHICLE TYPE

	Motorcycle/Moped		Tractor Trailer
17	Passenger Vehicle		Passenger Bus
7	Sport Utility Veh		School Bus
2	Pick-Up Truck		Emergency Veh
	Trucks (2+3 axles)	6	Other Types

SURFACE

3	Wet
11	Dry
	Sno/Ice
	Mud
	Other

MOVEMENTS

NORTH			SOUTH			EAST			WEST		
LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
2	1	1	1	10		1	4			4	1

OTHER MOVEMENTS 7

PROBABLE CAUSES

	Influence of Drugs		Improper Lane Change
1	Influence of Alcohol		Improper Backing
	Influence of Medication		Improper Passing
	Influence of Combined Subst.		Improper Signal
	Physical/Mental Difficulty		Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
7	Fail to give full Attention		Illegally in Roadway
	Lic. Restr. Non-compliance		Bicycle Violation
1	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center	1	Vehicle Defect
	Fail to Stop for School Bus		Wet
1	Wrong Way on One Way		Icy or Snow Covered
1	Exceeded Speed Limit		Debris or Obstruction
	Operator Using Cell Phone		Ruts, Holes or Bumps
	Stopping in Lane Roadway		Road Under Construction
	Too Fast for Conditions		Traffic Control Device Inop.
	Followed too Closely		Shoulders Low, Soft or High
	Improper Turn	2	Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:				
	UnRelated:				
Rear End	Related:			1	1
	UnRelated:		3	1	4
Sideswipe	Related:				
	UnRelated:			1	1
Left Turn	Related:		1		1
	UnRelated:		1	1	2
Angle	Related:				
	UnRelated:		2		2
Pedestrian	Related:				
	UnRelated:				
Parked Vehicle	Related:				
	UnRelated:			1	1
Other Collision	Related:				
	UnRelated:				

F	Bridge	01			
I	Building	02			
X	Culvert/Ditch	03			
E	Curb	04		1	1
D	Guardrail/Barrier	05			
	Embankment	06			
O	Fence	07			
B	Light Pole	08			
J	Sign Pole	09		1	1
E	Other Pole	10			
C	Tree/Shrubbery	11			
T	Contr. Barrier	12			
S	Crash Attenuator	13			
	Other Fixed Object				

WEATHER

12	Clear / Cloudy
	Foggy
2	Raining
	Snow / Sleet
	Other

ILLUMINATION

7	Day
	Dawn/Dusk
7	Dark - Lights On
	Dark - No Lights
	Other

TOTALS

2008	14

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Summary Output rev. 03/2010-1

Name: William MacLeod

Date: 02/17/2011

Location: MD 637 (Naylor Rd) from DC Line to MD 5 (Branch Ave)

Logmiles: From 000.00 To 000.61 Length: 0.61

County: Prince George's, D3 Period: January 1, 2009 To December 31, 2009

Note:

SEVERITY	FATAL	INJURY	P-DAMAGE	TOTAL
Accidents		3	10	13
Veh Occ		4		
Pedestrian				

DAY OF THE WEEK

SUN	MON	TUE	WED	THU	FRI	SAT	UNK
1	1	2	1	4	2	2	

MONTH OF THE YEAR

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
4	1			2	2		1			3		

CONDITION	DRIVER	PED
Normal:	17	
Alcohol:		
Other:	5	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:	1				1		1	1	1				
PM:		2	1			1		1	1			2	

VEHICLES INVOLVED PER ACCIDENT

1	2	3	4	5	6+	UNK	TOTAL
4	9						22

VEHICLE TYPE

	Motorcycle/Moped		Tractor Trailer
17	Passenger Vehicle	1	Passenger Bus
3	Sport Utility Veh		School Bus
1	Pick-Up Truck		Emergency Veh
	Trucks (2+3 axles)		Other Types

SURFACE

3	Wet
8	Dry
2	Sno/Ice
	Mud
	Other

MOVEMENTS

NORTH			SOUTH			EAST			WEST		
LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
	6	1		1			7			3	

OTHER MOVEMENTS 4

PROBABLE CAUSES

	Influence of Drugs		Improper Lane Change
	Influence of Alcohol		Improper Backing
	Influence of Medication		Improper Passing
	Influence of Combined Subst.		Improper Signal
	Physical/Mental Difficulty		Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
9	Fail to give full Attention		Illegally in Roadway
	Lic. Restr. Non-compliance		Bicycle Violation
	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
1	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center		Vehicle Defect
	Fail to Stop for School Bus		Wet
	Wrong Way on One Way		Icy or Snow Covered
	Exceeded Speed Limit		Debris or Obstruction
	Operator Using Cell Phone		Ruts, Holes or Bumps
	Stopping in Lane Roadway		Road Under Construction
	Too Fast for Conditions		Traffic Control Device Inop.
	Followed too Closely		Shoulders Low, Soft or High
	Improper Turn	3	Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:			1	1
	UnRelated:		1		1
Rear End	Related:			1	1
	UnRelated:			2	2
Sideswipe	Related:			2	2
	UnRelated:		1		1
Left Turn	Related:				
	UnRelated:				
Angle	Related:			1	1
	UnRelated:				
Pedestrian	Related:				
	UnRelated:				
Parked Vehicle	Related:				
	UnRelated:				
Other Collision	Related:				
	UnRelated:				

F	Bridge	01			
I	Building	02			
X	Culvert/Ditch	03			
E	Curb	04		1	1
D	Guardrail/Barrier	05	1	1	2
	Embankment	06			
O	Fence	07		1	1
B	Light Pole	08			
J	Sign Pole	09			
E	Other Pole	10			
C	Tree/Shrubbery	11			
T	Contr. Barrier	12			
S	Crash Attenuator	13			
	Other Fixed Object				

WEATHER

8	Clear / Cloudy
	Foggy
3	Raining
2	Snow / Sleet
	Other

ILLUMINATION

6	Day
	Dawn/Dusk
7	Dark - Lights On
	Dark - No Lights
	Other

TOTALS

2009	13

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support Division

SHA 52.1 ADC Summary Output rev. 03/2010-1

Name: William MacLeod

Date: 02/17/2011

Location: MD 637 (Naylor Rd) from DC Line to MD 5 (Branch Ave)

Logmiles: From 000.00 To 000.61 Length: 0.61

County: Prince George's, D3 Period: January 1, 2007 To December 31, 2009

Note:

SEVERITY	FATAL	INJURY	P-DAMAGE	TOTAL
Accidents		14	25	39
Veh Occ		18		
Pedestrian				

DAY OF THE WEEK

SUN	MON	TUE	WED	THU	FRI	SAT	UNK
6	2	6	2	9	10	4	

MONTH OF THE YEAR

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
5	6	1	2	5	3	1	3	2	6	4	1	

CONDITION	DRIVER	PED
Normal:	55	
Alcohol:	1	
Other:	20	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:	2		1		2	1	1	2	5	1		2	
PM:	4	2	2	1		3	1	2	2		2	3	

VEHICLES INVOLVED PER ACCIDENT

1	2	3	4	5	6+	UNK	TOTAL
8	28	1	1	1			76

VEHICLE TYPE

	Motorcycle/Moped		Tractor Trailer
51	Passenger Vehicle	1	Passenger Bus
10	Sport Utility Veh		School Bus
3	Pick-Up Truck		Emergency Veh
	Trucks (2+3 axles)	11	Other Types

SURFACE

10	Wet
26	Dry
3	Sno/Ice
	Mud
	Other

MOVEMENTS

NORTH			SOUTH			EAST			WEST		
LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
2	10	2	1	11		1	22			14	1

OTHER MOVEMENTS 12

PROBABLE CAUSES

	Influence of Drugs		Improper Lane Change
1	Influence of Alcohol		Improper Backing
	Influence of Medication		Improper Passing
	Influence of Combined Subst.		Improper Signal
	Physical/Mental Difficulty		Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
25	Fail to give full Attention		Illegally in Roadway
	Lic. Restr. Non-compliance		Bicycle Violation
1	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
2	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center	1	Vehicle Defect
	Fail to Stop for School Bus		Wet
1	Wrong Way on One Way		Icy or Snow Covered
1	Exceeded Speed Limit		Debris or Obstruction
	Operator Using Cell Phone		Ruts, Holes or Bumps
	Stopping in Lane Roadway		Road Under Construction
	Too Fast for Conditions		Traffic Control Device Inop.
	Followed too Closely		Shoulders Low, Soft or High
	Improper Turn	7	Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:			1	1
	UnRelated:		1		1
Rear End	Related:			6	6
	UnRelated:		5	3	8
Sideswipe	Related:			3	3
	UnRelated:		1	1	2
Left Turn	Related:		1		1
	UnRelated:		1	1	2
Angle	Related:		1	1	2
	UnRelated:		2		2
Pedestrian	Related:				
	UnRelated:				
Parked Vehicle	Related:				
	UnRelated:			1	1
Other Collision	Related:				
	UnRelated:			2	2

F	Bridge	01			
I	Building	02			
X	Culvert/Ditch	03			
E	Curb	04		2	2
D	Guardrail/Barrier	05	1	1	2
	Embankment	06	1		1
O	Fence	07		1	1
B	Light Pole	08		1	1
J	Sign Pole	09		1	1
E	Other Pole	10			
C	Tree/Shrubbery	11			
T	Contr. Barrier	12			
S	Crash Attenuator	13			
	Other Fixed Object				

WEATHER

31	Clear / Cloudy
	Foggy
5	Raining
2	Snow / Sleet
1	Other

ILLUMINATION

23	Day
	Dawn/Dusk
16	Dark - Lights On
	Dark - No Lights
	Other

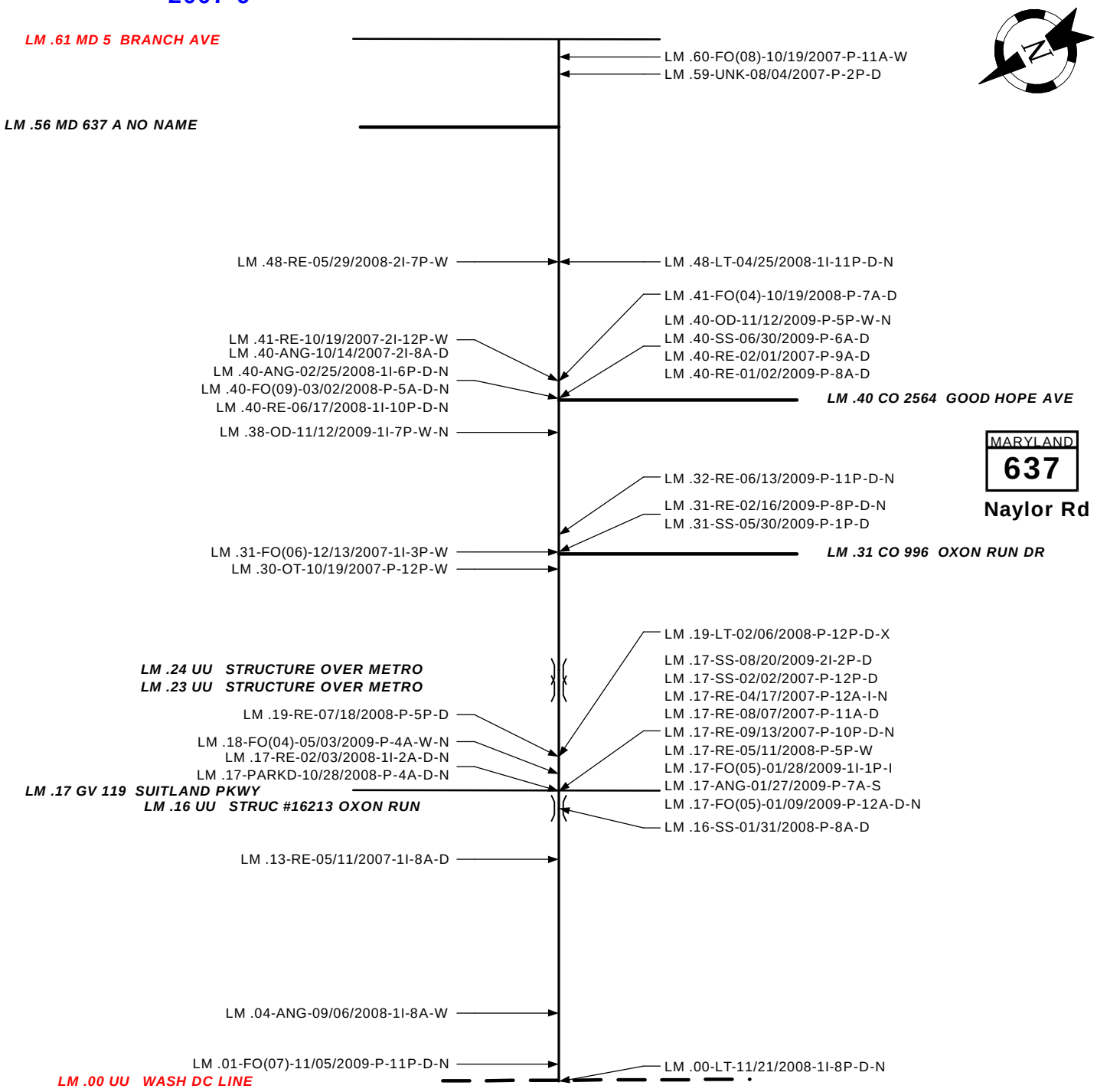
TOTALS

07-09	39

Office of Traffic & Safety
Traffic Development & Support Division
Crash Analysis Safety Team

Location: MD 637 (Naylor Rd)
County: PRINCE GEORGES
Study Period: 01/01/2007 to 12/31/2009
Analyst: WMACLEOD Date: 02/19/2011

2007-9



KEY:LogMile-CollisionType (FixedObjectStruck) -Date-Severity-Time-Surface-Illumination-Alcohol

template 06-27-06

F - Fatalities	SS - Sideswipe	FO - Fixed Object	OFFRD - Off Road	00 - Not Applicable	08 - Light Support Pole	N - Night
I - Injury	PARKD - Parked Vehicle	OOBJ - Other Object	RUNWY - Downhill Runaway	01 - Bridge or Overpass	09 - Sign Support Pole	X - Alcohol
P - Property Damage	PED - Pedestrian	OT - Overturn	FIRE - Explosion Fire	02 - Building	10 - Other Pole	D - Dry Surface
OD - Opposite Direction	BIKE - Bicycle	SPILL - Spilled Cargo	BCKNG - Backing	03 - Culvert or Ditch	11 - Tree Shrubbery	W - Wet Surface
LT - Left Turn	PEDAL - Other Pedalcycle	JCKKNF - Jackknife	UTURN - U-Turn	04 - Curb	12 - Construction Barrier	I - Icy Surface
RE - Rear End	CONVY - Other Conveyance	SPRTD - Units Separated	OTHR - Other	05 - Guardrail or Barrier	13 - Crash Attenuater	S - Snowy Surface
ANG - Angle	ANIML - Animal	NCOLL - Other Non Collision	UNK - Unknown	06 - Embankment	88 - Other	
				07 - Fence	99 - Unknown	

Appendix B

Public Meeting Resources

Project Study Area

Legend

- PEDESTRIAN CRASHES
- BICYCLE CRASHES
- METROBUS STOPS
- THE BUS STOPS

NAYLOR ROAD METRO STATION AREA
PRINCE GEORGE'S COUNTY, MARYLAND

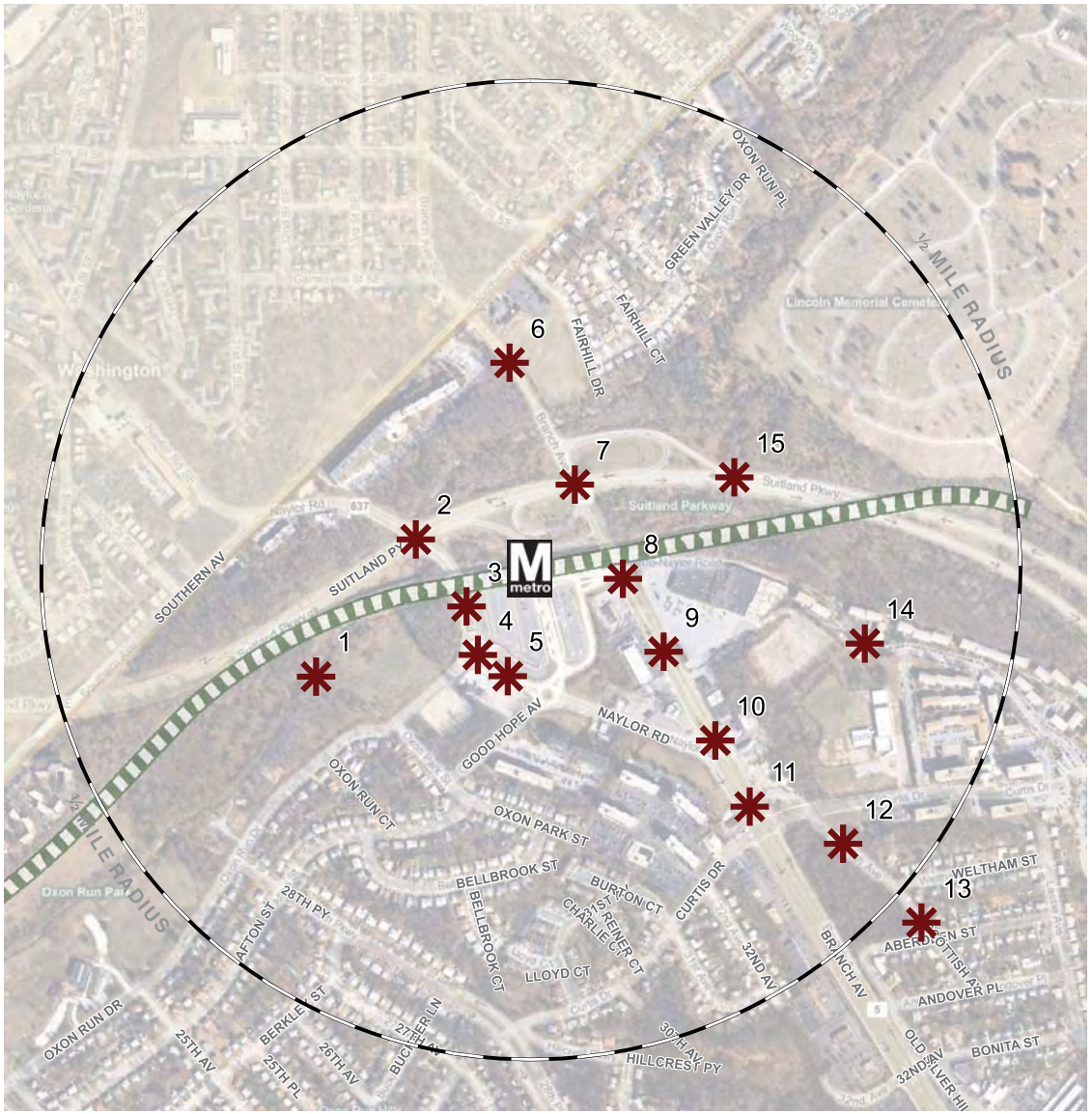
0 250 500 1,000 Feet

The Maryland-National Capital Park and Planning Commission

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

Metropolitan Washington Council of Governments

Website Comments



1. No connection to the Oxon Run Trail to the southwest
2. This is a difficult intersection for pedestrians to cross.
3. There is no station entrance on this side of the station
4. WMATA's anti-pedestrian fence along Naylor Road seems to be a deliberate act aimed at discouraging pedestrian access.
5. Why does WMATA require pedestrians from these areas to walk two or three extra blocks to get around the fence?
6. No sidewalk or safe pedestrian pathway, especially during bad weather, between the Metro Station and the large apartment building at Branch Ave./Southern Ave.. At least one pedestrian death along here a couple of years ago.
7. Underpass where Branch Ave. goes under Suitland Pkwy. dangerous for pedestrians. Not safe for bicycles in either direction between station entrance and Southern Ave.
8. No crosswalk and poorly timed signal here for pedestrians crossing Branch Ave. from Metro to church and businesses.
9. No sidewalk or safe bicycle route on east side of Branch Ave. between station entrance and Curtis Dr.
10. Numerous homicides within a block of Branch Ave./Naylor Rd. over the past half dozen years.
11. At the NE corner of Branch Ave./Curtis Dr. is a 7/11 Store. The parking lot is used as a thru street by motorists. This is extremely dangerous to vehicular and particularly pedestrian traffic.
12. This block of Scottish Avenue has no sidewalk, deep ditch on one side, and no place for pedestrians to get out of the roadway when cars pass each other going opposite directions.
13. Sidewalk on northern part of east side of block ends before the intersection. No sidewalk on west side. Turning vehicles often careless and speeding around corner.
14. Lack of sidewalks and easy Branch Ave. crossing at station entrance require residents of this part of Carriage Hill apartments to walk extra blocks to get to safe crossing points.
15. Where are the bike trails along on Suitland Pkwy. so that I can ride into the District? The area around Naylor Road Metro will never be improved if the liquor stores, a night club and condo isn't removed and better patrolled. Improve the schools in the area.

Existing Issues

A sidewalk abruptly ends on Naylor Road. While there is a sidewalk on the other side of the road, it forces pedestrians to cross.

Sidewalk Continuity

All streets should provide sidewalks on both sides of the road. In extraordinary circumstances, where space is limited, a wide shoulder may serve as an adequate pedestrian facility. Gaps in the pedestrian network reduce safety and comfort for pedestrians.

The width of the sidewalk on Branch Avenue (MD 5) frequently changes, with several narrow sections that are uncomfortable for pedestrians.

Sidewalk Width

Sidewalks should have adequate width to accommodate persons in wheelchairs, allow pedestrians to pass one another, and provide comfort for pedestrians to walk two or three abreast in high activity areas.

The tree's roots have caused this sidewalk to bulge creating a tripping hazard and barrier for wheel-chair users.

Sidewalk Obstructions

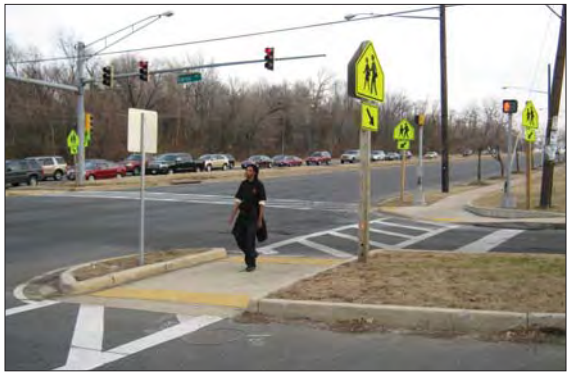
Sidewalks should be clear of obstructions to allow people in wheelchairs safe and comfortable connections, adequate space, and to provide room for pedestrians to pass one another. Accessibility requirements specify sidewalks should be at least 4 feet wide at all times, including locations where fixed elements are on the path.

Existing Issues

An unmarked crossing along 28th Parkway.

Unmarked Crosswalks

On narrow, low-speed streets, unmarked crosswalks are generally sufficient for pedestrians to cross the street safely, as the low-speed environment makes drivers more responsive to the presence of pedestrians. Consideration should be given to installing crosswalk markings and signs at locations where traffic volumes are high, near schools, and at long crossings of multiple vehicle lanes.



A pedestrian refuge island is provided on Curtis Road at its intersection with Branch Avenue.

Pedestrian Refuge Medians

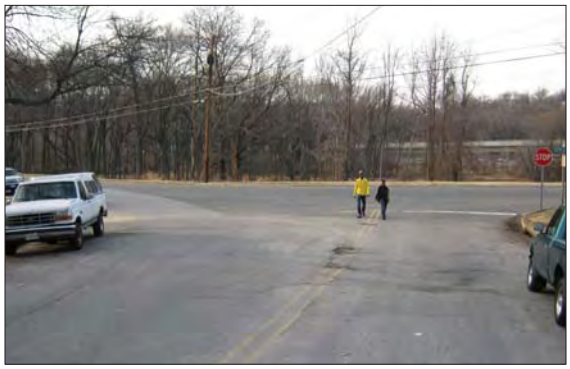
Pedestrian refuge islands are provided at long crossing locations where pedestrians may not be able to cross the width of the street during one pedestrian phase. They provide pedestrians a safe and attractive place to stand while waiting to cross the remaining lanes of traffic, and are particularly useful along multilane roads.

Pedestrian signal heads at the intersection of Suitland Parkway/ Naylor Road are either missing or misplaced.

Pedestrian Signals

Missing or improperly located pedestrian signals can be a hazard when crossing busy intersections. Ensuring that all control devices operate as expected and can be used safely and efficiently helps improve pedestrian safety.

Existing Issues



The intersection of Oxon Run Drive/Oxon Park Street is excessively large and encourages fast turning movements. Tightening this intersection would calm traffic and reduce pedestrian crossing distance.

Crossing Distances

Wide roads with multiple turning lanes require pedestrians to cross much longer distances and significantly increase their exposure to oncoming traffic. Crossing distances can be minimized with medians, pedestrian refuges, reduced turning radii, curb extensions, and other measures.

Pedestrian crossing mid-block on Branch Avenue.

Mid-Block Crossings

Long blocks tend to create poor pedestrian environments as they provide few opportunities to cross busy roadways. Crossing at signals is generally preferred, but a lack of opportunities to cross requires pedestrians to walk significant distances out-of-direction and increases total travel distance. This may encourage pedestrians to cross at uncontrolled mid-block locations.

This fence around the Naylor Road Metro station is located at a natural pedestrian access point and has been repeatedly cut open and repaired.

Metro Station Connectivity

Lack of direct pedestrian and bicycle connections result in longer walking distances and may ultimately limit the number of potential Metro riders.

Existing Issues

The intersection of Oxon Run Drive/28th Parkway has a large turning radius which permits vehicles to turn while maintaining high speeds.

Curb Radii

Curbs with large turning radii for right-turn movements encourage motorists to make the turn at a high rate of speed. This can be very dangerous and inhospitable for pedestrians. Designing turning radii to slow turning vehicles can be effective for reducing speeds and improving safety.

Cyclist traveling on Oxon Run Drive on the wrong side of the street on a roadway with no bicycle facilities.

Bicycle Facilities

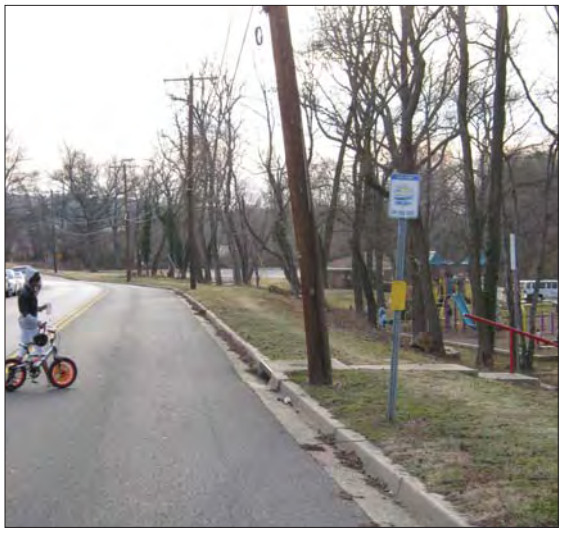
Designated facilities for cyclists, such as bike lanes, shared lane markings, and secure bike parking, provide increased safety and an enhanced travel experience. The presence of bicycle facilities also increases the visibility of cycling and encourages growth in ridership.

The desire path along the north side of Oxon Run Drive could provide a connection to the proposed Oxon Run Trail.

Multi-use Trails

Multi-use trails provide pedestrian and bicycle connectivity to street networks and places of interest, as well as recreational use.

Existing Issues



Bus Stop on Oxon Run Drive with no amenities (e.g., sidewalk, crosswalk, curb cut, bench, etc.).

Transit Accessibility

Bus stop features such as benches, shelters, curb cuts, and lighting provide comfort and convenience to transit riders. They also help to identify bus stops and increase the prominence of transit in a neighborhood. Walking is the principle access mode for passengers so a comprehensive pedestrian network should be considered near bus stops.

A pedestrian push-button is provided to cross Branch Avenue at Naylor Road. Actuation demonstrates that pedestrians have been planned for, and this type of button provides audible feedback to the user. However, automatic pedestrian signals reduce delay for pedestrians.

Traffic Signals

Traffic signals should allow pedestrians adequate time for comfortably crossing all lanes of traffic, preferably within one signal phase. Additionally, signal cycle lengths should be kept short (less than 90 seconds is desirable) to minimize excessive pedestrian delay. Lastly, signal timing can be used to calm traffic by coordinating vehicle progression to a safe and appropriate speed.

Solutions Toolbox: Bicycle Improvements

Wayfinding

$200 per sign

Signs directing pedestrians and bicyclists towards destinations in the area, typically including distance and average walk/cycle times.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Eases navigation for residents and visitors by bicycle ▪ Provides guidance to destinations from streets and along multi-use trails ▪ Offers another indication to motorists of the presences of bicycles	▪ Maintenance and vandalism	▪ Areas around Metro Stations, specifically to and from adjacent bicycle and pedestrian facilities ▪ Along multi-use trails

Bicycle Sharrows

$2,000 - $5,000 per mile

A shared-lane marking, or sharrow, is a pavement marking that can be used where space does not allow for a bike lane. Sharrows remind motorists of the presence of bicycles and indicate to cyclists where to safely ride within the roadway.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Reduce wrong-way and sidewalk riding ▪ Improves cyclists positioning in the roadway ▪ Informs motorists of bicyclists ▪ Used on streets without adequate space for bike lane markings	▪ Pavement marking maintenance ▪ Not as effective as a bike lane	▪ Streets with moderate speeds and traffic volumes, and where space for bike lane markings is limited

Enhanced Sharrows

$10,000 per mile

Combines the sharrow marking with a colored stripe that further emphasizes the presence and likely riding location of cyclists.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Further the benefits provided by normal sharrows	▪ Pavement marking maintenance ▪ Not as effective as a bike lane	▪ Streets with limited space for bike lane markings

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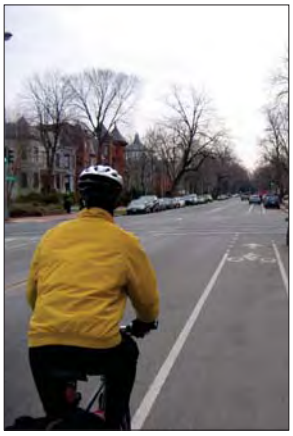
Solutions Toolbox: Bicycle Improvements



Bike Lane Markings

$3,500 - $4,500 per mile

The area of roadway designated for non-motorized bicycle use, separated from vehicles by pavement markings.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Improves safety and comfort by increasing the visibility and awareness of cyclists ▪ Provides facilities for bicyclists	▪ May still have conflicts with motorists (e.g, dooring) ▪ Motorists may illegally park in bike lane	▪ Non-local streets with adequate space for accommodation

Bike Box

$1,500 - $2,500 per location

A marked area in front of the stop bar at a signalized intersection that allows cyclists to correctly position themselves for turning movements during the red signal phase by pulling ahead of the queue.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Decreases conflicts and crashes between cars and bicycles ▪ Separates bicycles from cars at the intersection	▪ Lack of public understanding ▪ Pavement marking maintenance and costs	▪ Located in a right-hand lane where on-street bike treatments exist. Should be implemented in conjunction with a No Right Turn On Red sign and regulation

Bicycle Boulevard

Costs Vary

Low volume and low speed streets that have been optimized for bicycle travel through treatments such as traffic calming and traffic reduction, signage and pavement markings, and intersection crossing treatments.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Converts well-connected streets prone to cut-through traffic to streets well-suited for bicycle transportation ▪ Allows through movements for cyclists while discouraging similar through trips by non-local motorized traffic ▪ Creates a comfortable, low-volume, low-speed space for bicyclists and pedestrians	▪ Some treatments more expensive than others ▪ In areas with few alternative routes, reduces those that can relieve traffic during peak travel times	▪ Streets parallel to larger, high traffic streets

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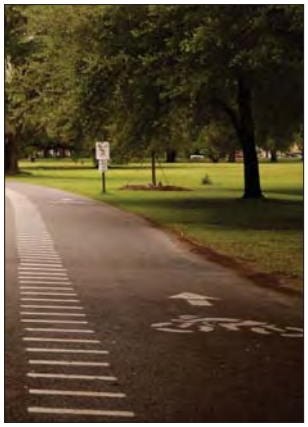
Solutions Toolbox: Bicycle Improvements

Cycle Track

Costs Vary

An exclusive bike lane separated from vehicle travel lanes, parking lanes, and sidewalks. Any parking is moved adjacent to moving traffic and bike lane is next to curb. They can be one-way, two-way, at street level, at sidewalk level, or at an intermediate level.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Higher level of safety than bike lanes ▪ Reduced risk of "dooring" compared to a bike lane ▪ Attractive to a wider spectrum of the public than bike lanes	▪ Potential conflicts at intersections ▪ Can be expensive ▪ Requires more space than bike lane	▪ A street with enough off-street space for construction or a street that has too many lanes and can be reduced by one lane



Multiuse Pathways

Costs Vary

Paved pathways away from the road and out of the path of turning vehicles designed with space adequate for safe use by both pedestrians and bicyclists.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Separates bicyclists from vehicle traffic ▪ Combination of pedestrians and bicyclists requires less space than separate facilities for each	▪ Needs adequate space to accommodate buffer from street and width to allow the passing of bicyclists and pedestrians ▪ Bicycle and pedestrian conflicts ▪ Unsafe in highly urban areas or along roads with driveways	▪ Proposed Oxon Run Trail

Bicycle Parking

$50 - $1,000 per Space

Devices and/or areas that allow secure bicycle parking, often located at areas of high bicycle and pedestrian traffic such as Metro Stations, shopping centers, schools, and multi-use trails.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Provides a secure location to store and lock bicycles ▪ Locations are generally very close to and visible from the point of interest ▪ Relatively inexpensive and easy installation ▪ Encourages community bicycle use	▪ Requires space in potentially busy area ▪ May remove an on-street parking space	▪ Bicycle parking could be either implemented or expanded at areas of high bicycle ridership and pedestrian traffic (e.g., Metro Stations, busy bus stops, shopping centers, libraries, schools, etc.)

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Solutions Toolbox: Crossing Treatments

In-Street "Yield for Pedestrians" Signs

$300 - $500 per sign

Signs placed in the middle of crosswalks to increase driver awareness of pedestrians and the legal responsibility to yield right-of-way to pedestrians in crosswalk.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Increases the number of motorists that yield to pedestrians in the crosswalk ▪ Reinforces the right of pedestrian in the travelway	▪ If used too often, motorists have a tendency to ignore the signs	▪ Areas with high mid-block crossings and/or poor yielding rates by motorists

High Visibility Crosswalks

$200 - $500 per crossing

Clear, reflective roadway markings and accompanying devices at intersections and priority pedestrian links, located only where motorists should expect pedestrians with sufficient sight distance and reaction time.

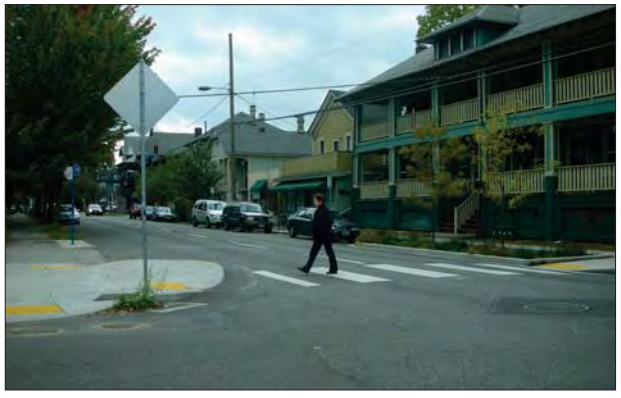
ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Warns motorists of potential for pedestrians ▪ Designates a preferred location for pedestrians ▪ DC Law requires motorists to stop for pedestrians in crosswalks	▪ Most effective with other traffic control (signals, stop signs) or physical treatments (bulb outs) that help to reinforce crosswalks and support reduced vehicle speeds ▪ Motorists may ignore	▪ All intersections and preferred mid-block crossing locations

Raised Crosswalk

$5,000 per crossing

A pedestrian crossing area raised higher to give motorists and pedestrians a better view of the crossing area. A raised crosswalk is essentially a speed table marked and signed for pedestrian crossing.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Provides better view for pedestrians and motorists ▪ Slows motorists travel speeds ▪ Broad application on both local & collector streets	▪ Can be difficult to navigate for large trucks, buses, and snow plows	▪ Areas with high speeds and/or difficulty crossing street



Bulb-Outs/Curb Extensions

$15,000 - $25,000 per location

An extension of the curb or the sidewalk into the street (in the form of a bulb), usually at an intersection, that narrows the vehicle path, inhibits fast turns, and shortens the crossing distance for pedestrians.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Shorter crossing distances for pedestrians ▪ Reduces motorist turning speeds ▪ Increased visibility between motorists and pedestrians ▪ Enables permanent parking ▪ Enables tree and landscape planting, and water runoff treatment	▪ Can only be used on streets with unrestricted on-street parking ▪ Physical barrier can be exposed to traffic ▪ Greater cost and time to install than high visibility crosswalks	▪ Streets with on-street parking

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Solutions Toolbox: Crossing Treatments

Raised Median Islands/Pedestrian Refuge Area

$4,000 - $30,000 per crossing

Provides a protected area in the middle of a crosswalk for pedestrians to stop while crossing street.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Reduces the number of crashes at marked and unmarked crosswalks ▪ Preferred on multi-lane streets ▪ Requires shorter gaps in traffic to cross the street ▪ Used to create entry point into area of high pedestrian activity	▪ Must have at least 6 feet of space to accommodate wheelchairs; not all streets will have adequate space ▪ Physical barrier in the street	▪ Areas with high volume traffic conflict or high pedestrian crash locations

Rectangular Rapid Flash Beacon

$12,000 - $15,000 for both directions

Signs with a pedestrian-activated "strobe-light" flashing pattern that attracts attention and notifies motorists that pedestrians are crossing

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Typically increases motorists yielding behavior ▪ Warning information to drivers at eye level	▪ Motorists may not understand flashing lights ▪ Pedestrians may not activate flashing light	▪ Areas with high mid-block crossings

Pedestrian Hybrid Signal (HAWK)

$50,000 - $75,000 per crossing

Pedestrian activated signal, unlit when not in use, begins with a yellow light alerting drivers to slow, and then a solid red light requires drivers to stop while pedestrians have the right-of-way to cross the street. The example Shown is at Georgia Avenue and Hemlock Street.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ A very high rate of motorists yielding to pedestrians ▪ Drivers experience less delay at hybrid signals compared to other signalized intersections	▪ Expensive compared to other crossing treatments ▪ Requires pedestrian activation	▪ Larger roadways where mid-block crossing is difficult or crossing. opportunities are limited

Reduced Curb Radii

$5,000 - $30,000 per corner

Reconstructing a street corner with a smaller radius to reduce vehicle turning speeds.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Forces sharper turn by right-turning motorists ▪ Improves safety of pedestrians by reducing crossing width and slowing motorists ▪ Reduces speed of right-turning motorists	▪ Could be expensive ▪ Space may not be available	▪ Any intersection with high turning speeds, high pedestrian volumes, and where space permits.

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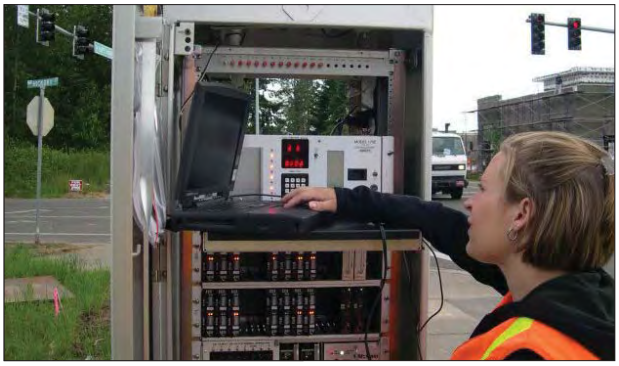
Solutions Toolbox: Intersection Treatments

Prohibit Right-Turns on Red

$300 - $500 per sign

Mounted sign eliminates the right of motorists to make a right turn at a red light. Can be used full-time or under restricted time intervals.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Reduces conflicts between motorists and pedestrians ▪ Improved pedestrian safety	▪ Reduces time motorists have to make a right turn ▪ Potential vehicle queuing	▪ Signalized intersections where left-turning movements interfere with crossing pedestrians

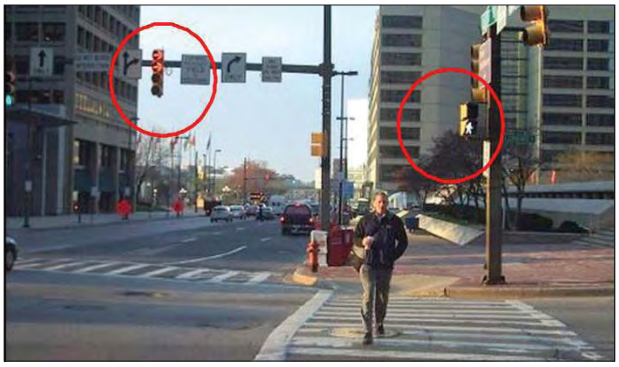


Signal Timing Modification

Minimal Cost

Adjustments of existing signal timings to more readily accommodate all modes. Could include reducing cycle lengths to decrease the amount of time pedestrians wait at signals.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Improve conditions for pedestrians ▪ Improve overall safety of intersection	▪ Improving conditions for one mode is often done at the expense of others (e.g., giving more time to pedestrians often means motorists receive less green time)	▪ Any intersection where signal timing is an issue and where the adjustment does not worsen intersection congestions



Leading Pedestrian Interval

Minimal Cost

Pedestrians are given advance time to begin crossing at the crosswalk before conflicting vehicles start moving.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Puts pedestrians well into the crosswalk and more visible before vehicles begin moving into the crossing zone ▪ Improves pedestrian safety	▪ Reduces green time for conflicting vehicle movements ▪ Can add to delays at highly congested intersections	▪ Signalized intersections where right-turning movements interfere with crossing pedestrians

Push Button Retrofits

$5,000 - $10,000 for all four legs

Signs above the pedestrian push-button that indicate direction of crossing. "Confirm" press buttons acknowledge activation through a light or sound after called by a pedestrian.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Confirmation buttons have been shown to increase the number of pedestrians using the push-button ▪ Pedestrians more likely to wait for the Walk phase signal	▪ Expense of implementing comprehensively	▪ All signalized intersections

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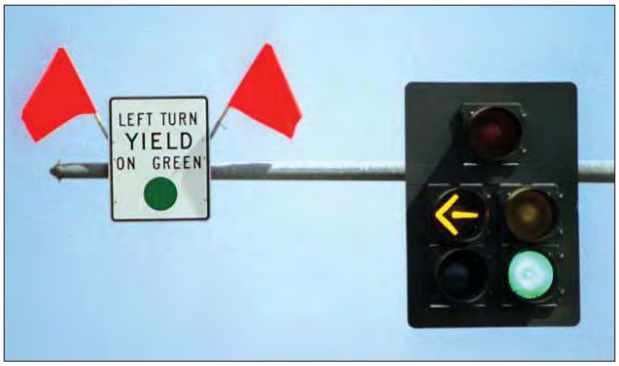
Solutions Toolbox: Intersection Treatments

Pedestrian Countdown Signals

$20,000 - $40,000 for all four legs

Walk/Don't Walk pedestrian signals with countdown signal informing pedestrians of the time remaining to cross the street.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Fewer pedestrians cross the street late in the countdown as compared to signal heads with only the Flashing Don't Walk light	▪ Expense of implementing comprehensively	▪ All signalized intersections



Protected Left-Turns

$5,000 - $10,000 per left turn lane

Allows left turning vehicles a protected movement (i.e., no conflicting movements), generally involving the installation of a left-turn arrow.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Removes conflicts between left-turning vehicles and oncoming through movement vehicles ▪ Improves left-turning operations	▪ Less green time for through and right turn movements ▪ Less green time for pedestrian crossings	▪ Intersections where left-turning movements are difficult to make due to congestion, and intersections with high left-turn/through movement crashes and/or rear end crashes

Modify Existing Lanes or Geometry

Costs Vary

Modify the existing intersection geometry to respond to conditions including reducing pedestrian crossing exposure to traffic, adding or eliminating a traffic movement, creating space for the type and level of pedestrian activity.

ADVANTAGES	CHALLENGES	LOCATION TYPE
▪ Improve vehicle capacity ▪ Decrease congestion	▪ Lack of right of way and/or physical space ▪ High cost and long timeframe	▪ Intersections with serious congestion and/or safety issues that may be remedied by modifying the existing layout of the intersection.

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