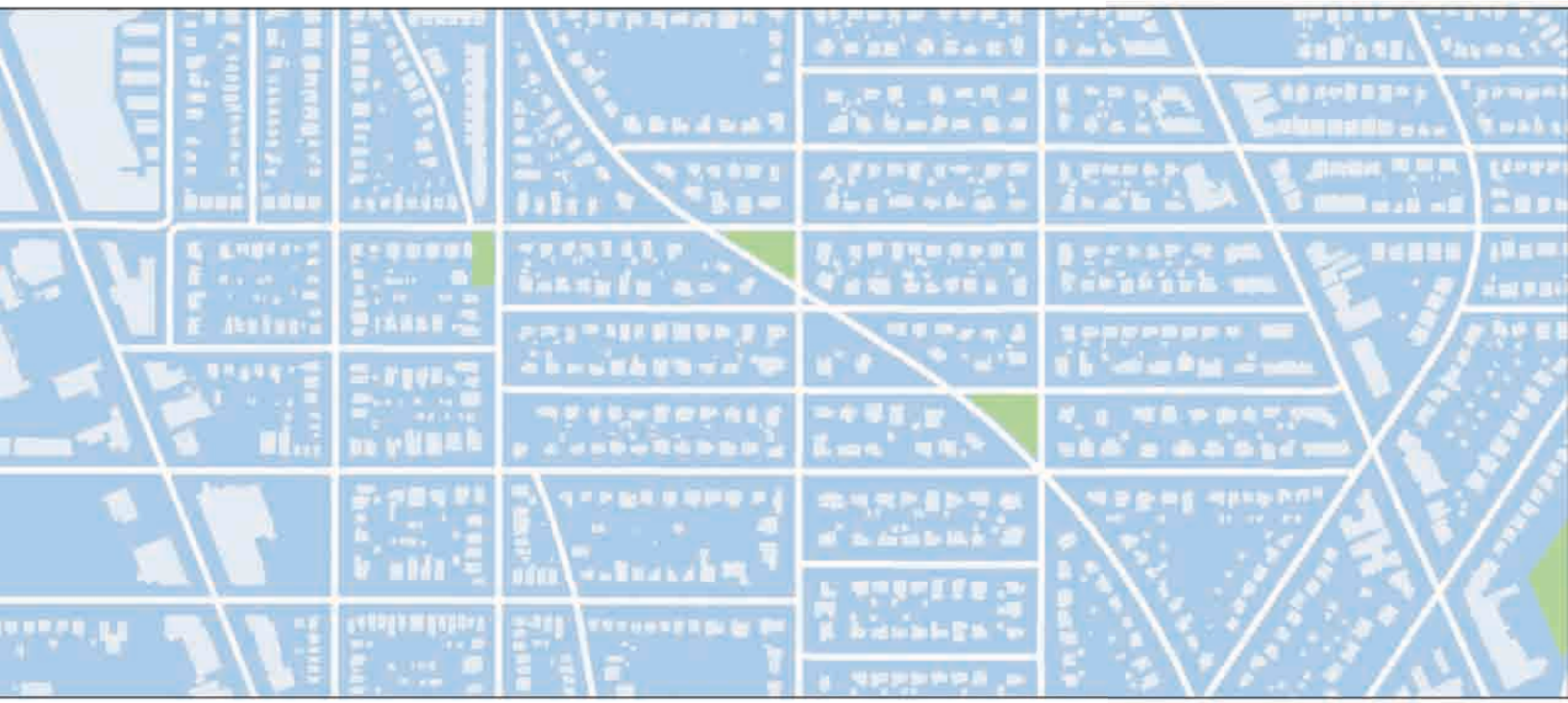
Rock Creek West II Livability Stud y

Final Report

February 2011



livability PROGRAM

PB 125 YEARS

Rock Creek West II Livability Study

Final Report

February 2011

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DDOT - Policy, Planning, and Sustainability Administration

DDOT – Infrastructure Project Management Administration

DDOT – Transportation Operations Administration

DC Metropolitan Police Department

DC Office of Planning

Councilmember Mary Cheh's Office

ANC 3E, 3F, and 3G

Deal Middle School, Janney Elementary School, Lafayette Elementary School, Murch Elementary School, Wilson High School

Connecticut Avenue Pedestrian Action

Residents of Friendship Heights, Chevy Chase, Forest Hills, Tenleytown, and American University Park

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1 Introduction

The District Department of Transportation (DDOT) initiated the Rock Creek West II (RCW2) Livability Study to take a big picture look at the street network and identify concrete actions to increase transportation and safety options in the study area. The RCW2 area is shown in Figure 1. This project focuses on transportation safety and quality of life issues for all users.

Transportation Livability

Livability is a term that refers to community quality of life as experienced by the people who live, work, and recreate there. Livability recognizes that strong communities rely on the interplay among transportation, public health, housing, cultural resources, and the natural environment.

Transportation, in particular, is central to livability. Travel choices govern our ability to get around; the operations of our transportation facilities impact safety and comfort; and the designs of our public spaces directly affect the prosperity and enjoyment of the city.

DDOT's Livability program includes transportation studies for various neighborhoods of the District. The studies take a "big picture" look at the street network and identify concrete actions that adhere to the principles outlined in the DDOT Action Agenda. The goals of this study are to:

Ensure safe passages for all users of the street network. This involves special attention to the most vulnerable users of the system (pedestrians, bicyclists, children, and the elderly); and taming traffic while maintaining overall mobility.

Prioritize sustainable living in DC communities. This means providing a robust set of transportation choices and designing streets to encourage physical activity. It also means designing streets in ways that help preserve, protect, and/or restore ecological systems.

Foster prosperous places by building and operating streets as unique urban places that support retail and employment districts. Enhancing prosperous places also may entail the expansion of civic open spaces within or along streets.

The RCW2 Livability Study is one of the first three to be initiated in 2010.

Traffic Calming Tools

A central goal of transportation livability is to provide safe streets for all users. Traffic calming, or the slowing of motor vehicle traffic to create a safer and more comfortable environment for a community, ties into the concept of livability through the common goal of improving quality of life. The focus of this study is on livability, using traffic calming as a tool to create safer, healthier neighborhoods. And because traffic calming is most applicable to local and collector streets, this study focuses on recommendations on these streets.

There are a number of tools that can aid in traffic calming, ranging from visual traffic calming to physical devices (including diversion and non-diversion tools). A summary of traffic calming tools, their advantages, and appropriate use is shown in Table 1.

Study Area

The RCW2 area, shown in Figure 1, is located in the northwest quadrant of the District, in Ward 3. It includes the community-oriented neighborhoods of American University Park, Chevy Chase, Forest Hills, Friendship Heights, and Tenleytown; and community anchors such as public schools, recreation centers, community centers, libraries, and three universities. The study area is bounded by Rock Creek Park, a major recreational and scenic amenity for the city, and by the state of Maryland.

Although the neighborhoods in the study area are largely residential, major commuter routes such as Connecticut Avenue and Wisconsin Avenue pass through the area and act as barriers. A number of transportation issues in the study area have been identified by DDOT and residents, including: aggressive driving such as speeding and blocking crosswalks, insufficient pedestrian crossing times at intersections, unsignalized crosswalks, cut-through traffic on residential streets, missing sidewalks, and wide streets and intersections. These conditions cause pedestrian and bicycle safety issues, particularly for the elderly and children.

To determine the boundaries for the Livability program, DDOT's Strategic Planning branch referred to and considered the Comprehensive Plan area element boundaries, locations of DDOT planning work over the last 10 years, natural and built barriers, and MWCOG traffic analysis zones. The boundaries represent reasonable subareas of the District for which to determine street grid characteristics and evaluate multimodal transportation conditions.

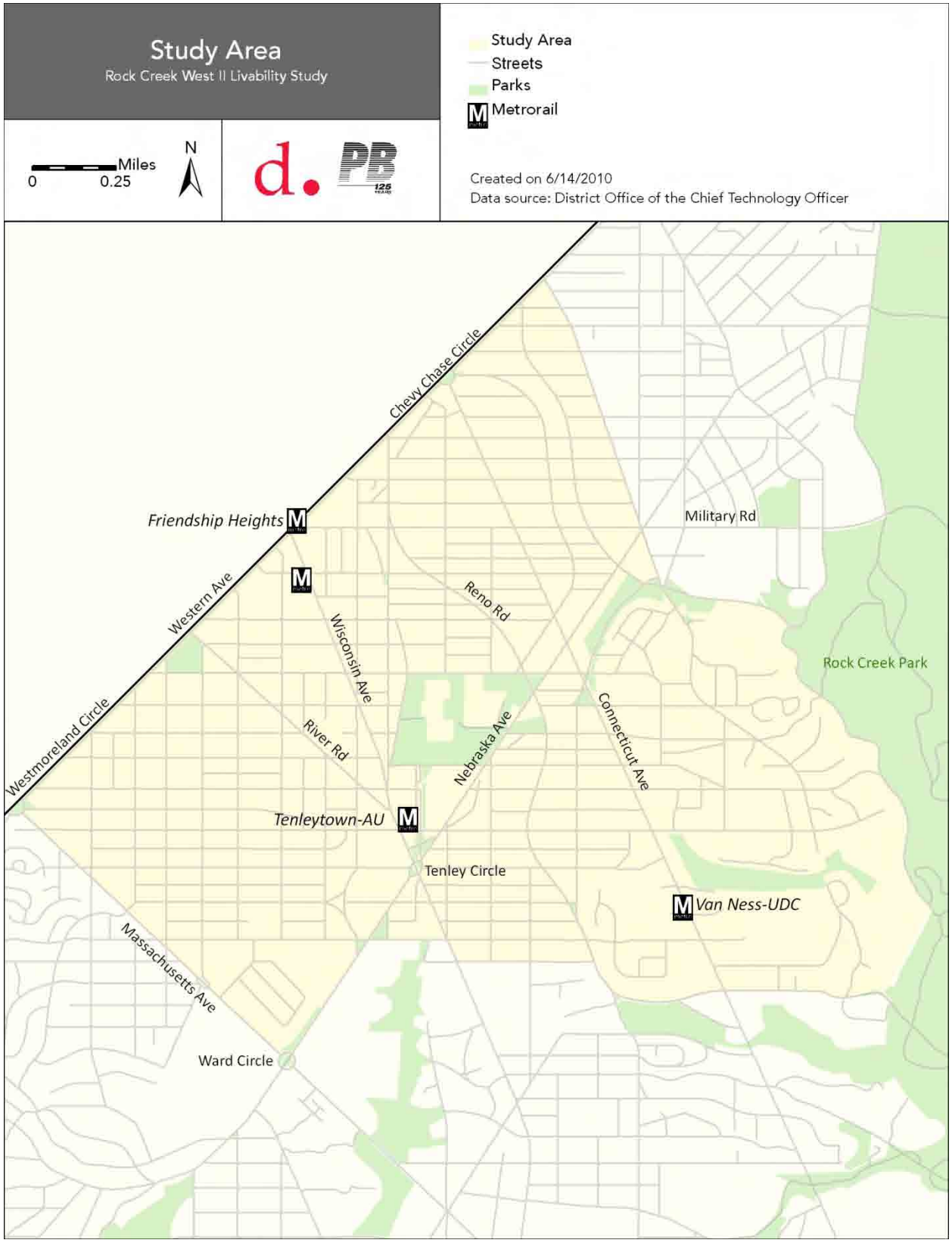
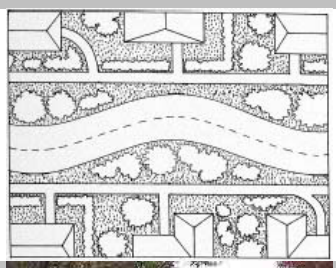
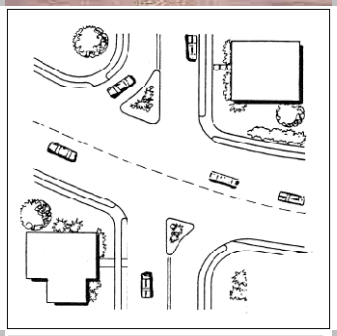
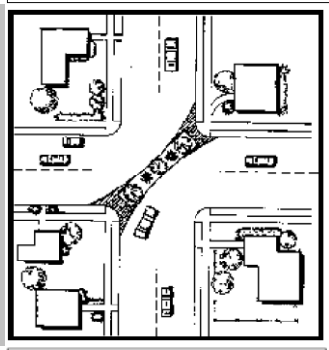
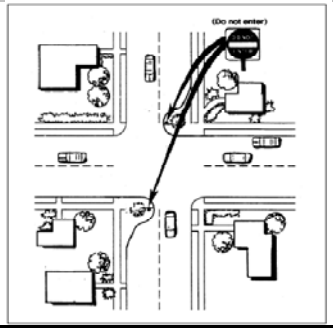


Figure 1: RCW2 Study Area

Table 1: DDOT's Traffic Calming Toolbox

Traffic Calming Measure		Advantages	Appropriate Use
	Diversion		
Chicane		- Reduced vehicle speed - Enhanced landscaping opportunities	Local street that is not a bus route with speeding issues
Neighborhood Traffic Circle		- Reduced vehicular speed - Improved vehicular safety - Enhanced street's aesthetic value	Local street with speeding and safety issues, that could benefit from a gateway
Forced Turns		- Reduced conflict points - Reduced traffic volumes	Street with turning movement related safety issues
Diagonal Diverter		- Reduced traffic conflict points - Reduced traffic volumes - Enhanced street's aesthetics	Local street with safety issues that does not serve key purpose in larger network
Half Closures/ Semi-diverters		- Reduced conflict points - Reduced traffic volumes	Local street with safety issues that does not serve key purpose in larger network

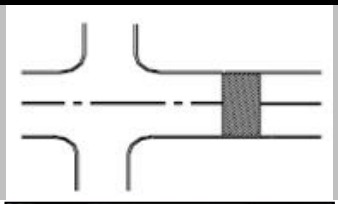
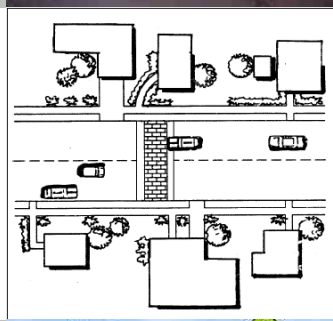
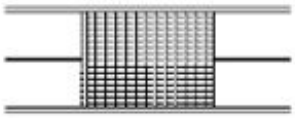
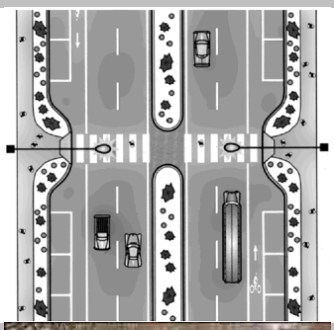
Traffic Calming Measure		Advantages	Appropriate Use
Full Street Closures		- Reduced conflict points - Reduced traffic volumes	Local street that does not serve key purpose in larger network
Speed Bumps		- Reduced vehicle speeds	Limited use; spot location with major speeding issue
Speed Humps		- Reduced vehicle speeds	Local street with speeding issue (that is not a bus or emergency vehicle route)
Speed Tables		- Reduced vehicle speeds	Local or collector street with speeding issue
Raised Crosswalk		- Reduced vehicle speeds - Improved pedestrian and motorist visibility	Local and possibly collector street with speeding or safety issue
Raised Intersection		- Reduced vehicle speed - Provide better pedestrians and motorists visibility	Local and possibly collector street with speeding or safety issue

Figure 72: Suggested intersection and traffic calming design on First Street

Traffic Calming Measure		Advantages	Appropriate Use
Rumble Strips		- Reduced vehicle speeds	Limited use; spot location with major speeding issue
	Non-diversion		
Curb Extensions		- Reduced pedestrian crossing distance - Increased pedestrian visibility - Reduced speed for right turning vehicles - Enhanced landscaping opportunities	Local or collector street with pedestrian safety issues
Median Barriers		- Reduced turning movement conflicts - Pedestrian refuge - Reduced vehicle speeds	Street with speeding or safety issues that would benefit from placemaking
On-Street Parking		- Reduced vehicle speed - Increased safety with buffer between vehicles and pedestrians/bikes - Works well with curb extensions	Street with speeding and pedestrian safety issues that would benefit from parking
Gateways / Entry Treatments		- Psychological cue that the street is more than just for cars - Reduced entry speeds - Improved aesthetics	Street with speeding issues that would benefit from placemaking

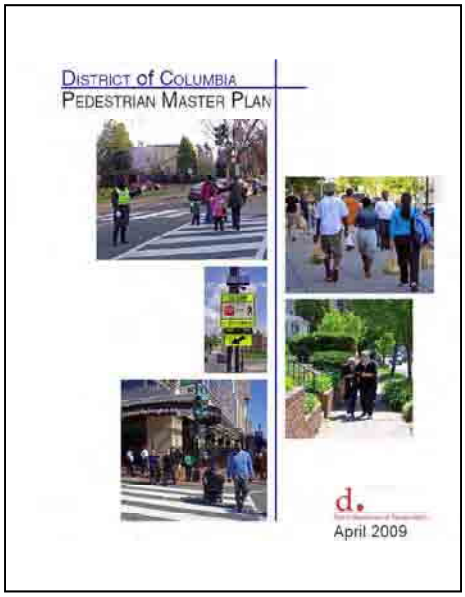
History

Transportation improvements have been the subject of much recent discussion in the RCW2 area. Though the area's major transportation infrastructure was built long ago, smaller changes such as traffic calming, additional sidewalks, and safe school routes are a top priority for residents. The neighborhoods are home to major arterial streets and large traffic circles, and destinations are sometimes divided by these facilities. Additionally, because these roadways serve a regional role in the transportation network, commuter and through traffic moves through the area. The demand for traffic calming—in particular, speed humps—has increased in recent years as a response to these conditions.

Although the installation of speed humps and other measures responded to real problems, the need for a broader view of systemwide transportation issues was identified and demanded by residents. By looking at the entire study area network from a multimodal perspective with land uses in mind, competing transportation needs can be balanced. That is what this study aims to achieve.

Previous Efforts and Plans

Not surprising for such a large study area, there have been numerous studies and plans completed for parts of RCW2 in recent years. These are summarized in the paragraphs that follow, and detailed in Appendix B. As the project team collected data about the study area and surveyed residents, recommendations from these previous studies were recorded. Developing a comprehensive understanding of previous recommendations helped inform the ultimate recommendations of this study. The previous recommendations that aligned with the livability project goals and were still applicable in 2010 were carried forward.



The District of Columbia Pedestrian Master Plan 2009 (DCPMP) proposes improvements to the pedestrian environment throughout the District, in order to reduce pedestrians involved in crashes with motor vehicles and by making it a comfortable and accessible mode of travel throughout all areas of the District. Within Ward 3, it identifies both Wisconsin Avenue NW (from Western Avenue to Woodley Road, NW) and Connecticut Avenue NW (from Western Avenue to Calvert Street, NW) as priority corridors that require improvements to the pedestrian environment.

The District of Columbia Bicycle Master Plan 2005 (DCBMP) enhances the image of a growing, bicycle-friendly city and develops guidelines to establish high-quality bicycle facilities and programs that will provide safe and convenient bicycle transportation. The DCBMP also proposes new infrastructure including new bike lanes and multi-use trails.

The District of Columbia Strategic Highway Safety Plan 2007 (SHSP) develops a comprehensive framework that identifies key transportation safety needs and guides investment decisions to improve the District's transportation system for all users. In order to achieve its goals, the SHSP identifies five Critical Emphasis Areas (CEAs) that play key roles in creating safe transportation environments. These five CEAs include High-Risk Drivers, Bicyclist and Pedestrian Safety, Engineering/Facilities Infrastructure, Special Vehicles, and Special Target Areas.

Wisconsin Avenue Corridor Transportation Study 2005 examines the existing and future traffic conditions, identifies issues, and provides short-term and long-term traffic management and infrastructure improvements along Wisconsin Avenue NW.

Friendship Heights Transportation Study 2003 (+ 2005 Addendum) (FHTS) examines the existing and future traffic conditions, identifies issues, and provides short-term and long-term traffic management and infrastructure improvements.

The Connecticut Avenue Transportation Study 2003 (CATS) evaluates the transportation conditions in the Van Ness area of Connecticut Avenue NW by assessing existing traffic conditions and developing recommendations to improve mobility and safety. The major roadways in the study area evaluated in this report include Connecticut Avenue NW, Reno Road NW, Albemarle Street NW, Van Ness Street NW, and Tilden Street NW.

The DC Safe Routes to School Program (SFRS) works to improve the ability of elementary and middle school students' safety to walk and bike to and from school.

Murch Elementary School developed and implemented an award winning SFRS program in 2009. The program aimed to increase the number of children walking and biking to school, increase students' understanding of the link between their everyday actions to the broader community and the world, give students exercise every day by increasing opportunities for kids to have fun while being healthy, and decrease the amount of car traffic before and after school.

The Connecticut Avenue Pedestrian Action 2009 (CAPA) is a community group formed to promote and create a safer pedestrian environment along Connecticut Avenue NW. A CAPA Study, the draft Pedestrian Safety Audit, was released in November 2010 that assessed existing pedestrian conditions along the corridor and included recommendations to improve mobility and safety for pedestrians and cyclists. Several of the report's recommendations within the RCW2 study area have been incorporated into this study.

Roadway Safety Audits and DDOT Shop Orders have been performed citywide since 2009. Many locations in our study area have been studied, including:

- 36th Street and Fessenden Street
- 39th Street and Reno Road
- 45th Street and Fessenden Street
- 45th Street and Massachusetts Avenue
- 46th Street and Fessenden Street
- 48th Street and Yuma Street
- Tenleytown Area (shop order prepared)
- Connecticut Avenue and Albemarle Street (shop order prepared)
- Connecticut Avenue and Upton Street
- Connecticut Avenue and Van Ness Street (shop order prepared)
- Connecticut Avenue and Veazey Terrace (shop order prepared)
- Connecticut Avenue and Yuma Street
- River Road and Western Avenue (shop order prepared)
- Ward Circle (shop order prepared and implemented)
- Wisconsin Avenue and Jenifer Street
- Wisconsin Avenue and Van Ness Street
- Wisconsin Avenue and Windom Place
- Van Ness Street and International Drive (shop order prepared)

Where applicable to livability goals, recommendations from these audits have been included in this study.

Project Scope

The District Department of Transportation (DDOT) initiated this project to improve a variety of safety problems and quality of life issues in the study area caused by speeding, aggressive driving, challenging intersection geometry, deficient infrastructure, and multimodal conflicts. To address these issues, the project team:

- Developed an active project website, www.rockcreekwest2livability.com
- Incorporated citywide and large-scale transportation planning recommendations including many of the District of Columbia policies, plans and master plans
- Integrated small-scale planning work including various neighborhood studies that have been conducted in the study area
- Held three public meetings and numerous Task Force meetings with a community stakeholder group, gaining valuable input into the project issues and potential impact of recommendations
- Conducted and analyzed an online survey with excellent participation, which let DDOT know how residents perceive the livability of their streets, and the location of specific issues
- Identified study area hot spots based on public comments, field visits, and data research
- Developed a new street classification system for RCW2, defining the context and character of individual streets and determining what function each street serves in the greater network
- Considered traffic calming tools and techniques to improve livability, taking into consideration past applications and results
- Developed recommended solutions based on the street classification, the nature of the issue, and planning and engineering methods and standards
- Refined the recommendations based on internal DDOT coordination and public comments

Figure 2: Screen shot from project website

2 Existing Conditions

Neighborhoods

The study area consists of four neighborhoods divided by two main north-south arterials, Connecticut Avenue and Wisconsin Avenue. Three of these neighborhoods are centered around intense commercial development at Metrorail stations, and all four consist primarily of single-family residential development.

Chevy Chase, the northernmost neighborhood in the study area, is bordered by Connecticut Avenue to the west, Rock Creek Park to the east, the Maryland border to the north, and Nebraska Avenue to the south. The commercial corridor of Chevy Chase extends along Connecticut Avenue from the Maryland border to Livingston Street. Outside of that commercial center, the neighborhood consists mostly of single-family detached houses and small parks. Several churches are located in Chevy Chase, and the Lafayette Elementary School is located just outside of the study area at Northampton Street and Broad Branch Road.

Several blocks to the south of Chevy Chase lies the neighborhood of Forest Hills. This neighborhood is located between Connecticut Avenue and Rock Creek Park and consists of single-family residential development and a concentration of commercial development along Connecticut Avenue. Two major institutional uses are located in Forest Hills: the University of the District of Columbia (UDC), a public university serving 5,000 students, located near the intersection of Van Ness Street and Connecticut Avenue, and Howard University School of Law, serving 500 law students, located across Connecticut Avenue from UDC. These two institutions and the Van Ness-UDC Metrorail station are the center of the commercial corridor of the Forest Hills neighborhood.

Figure 3: 41st Street in the Friendship Heights neighborhood

The Friendship Heights neighborhood is centered along Wisconsin Avenue, extending from the Maryland border south to Fessenden Street. Friendship Heights is characterized by intense commercial development near the border with Maryland and medium-density residential development throughout the neighborhood. Several corporate headquarters are located in Friendship Heights, and high-end boutiques and department stores are located in this area along Wisconsin Avenue. The Friendship Heights Metrorail station is located at Jenifer Street and Wisconsin Avenue.

Several blocks to the south, Tenleytown is a large neighborhood consisting of single-family residential development, a commercial corridor, several schools, a large park, and a major university. The commercial heart of Tenleytown is located at the Tenleytown Metrorail station, at Wisconsin Avenue and Albemarle Street. Several public schools are located near this intersection: Woodrow Wilson High School one block to the east, Deal Middle School two blocks to the northeast, and Janney Elementary School one block to the west. American University, a major university serving nearly 10,000 students, is located on 84 acres approximately 5 blocks to the southwest of the Metro station. Fort Reno, a large urban park owned by the National Park Service and hosts a popular summer concert series, is located approximately one block northeast of the Metro station.

Transportation Network

Street Network

The study area includes a robust network of all types of streets. DDOT classifies streets into a set of sub-systems based on the way each is used, or intended to be used. Because this approach defines roadways in terms of how they relate to the surrounding network, it aims to promote efficiency and appropriate use of all streets. Figure 4 shows the RCW2 street network.

Existing Functional Classifications

Functional classification refers to a process by which roadways are classified into a set of sub-systems based on the way each roadway is used. Central to this process is an understanding that travel rarely involves movement along a single roadway. Rather, each trip or sub-trip initiates at a land use, proceeds through a sequence of streets, roads and highways, and terminates at a second land use.

The highway classification process is required by federal law. Each state must assign roadways into different classes in accordance with standards and procedures established by the Federal Highway Administration. DDOT previously adopted a *Functional Street Classification Plan* based on traffic volumes, land use, and expected growth. The five functional highway systems identified are:

- Freeways
- Principal arterials
- Minor arterials
- Collector streets
- Local streets

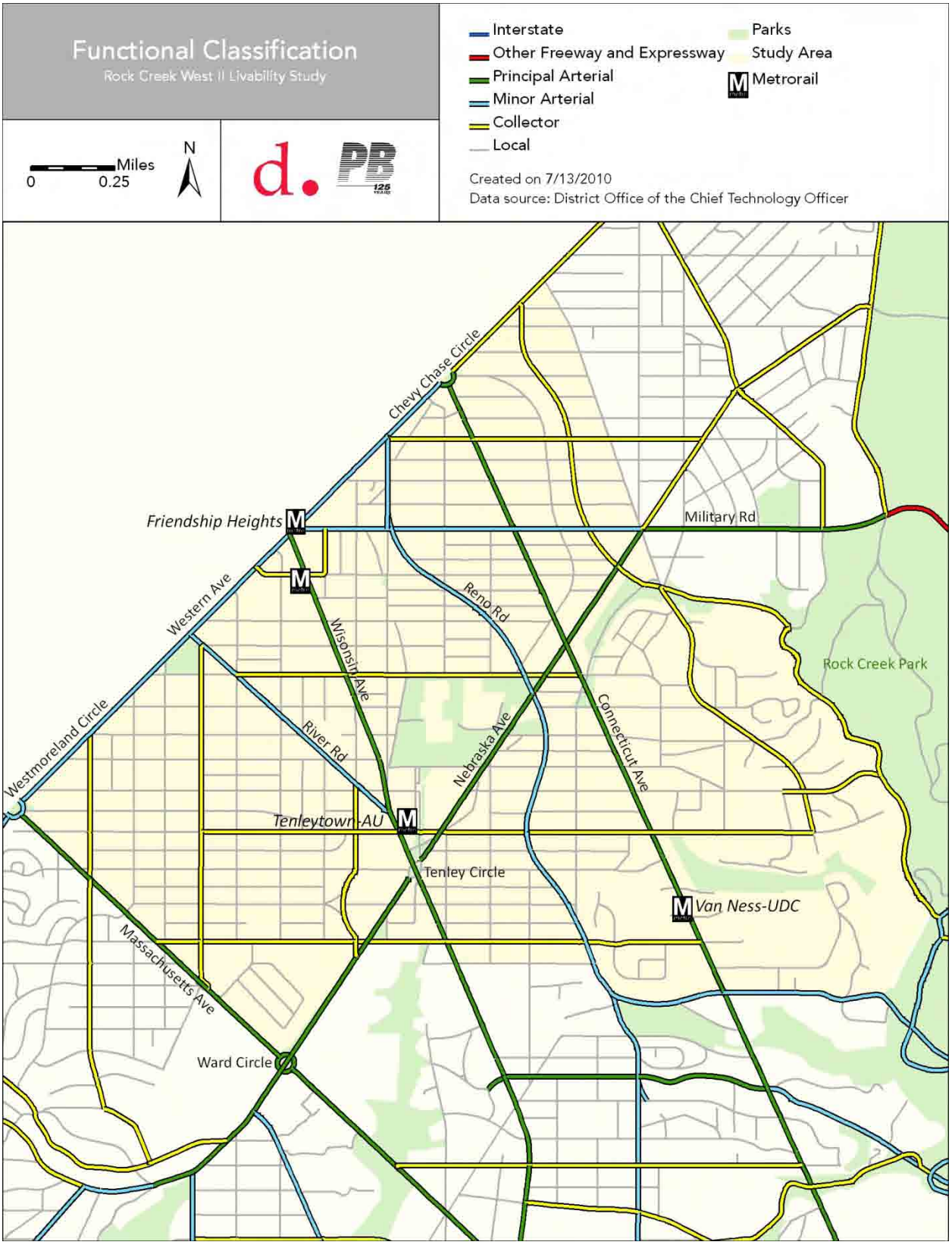


Figure 4: Study Area Functional Classifications

To maximize mobility and access, traffic is supposed to move in a progression through the hierarchy of streets: local to collector to arterial to freeway, and back down the hierarchy between the origin and destination of a trip.

Arterials provide the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control. Arterials conduct vehicular traffic between collectors and freeways.

Collectors provide a less highly developed level of service at a lower speed for shorter distances by collecting traffic from local roads and connecting them with arterials. Collectors conduct vehicular traffic between local and arterial streets.

Local roads consist of all roads not defined as arterials or collectors; primarily provides access to land with little or no through movement.

Most of the streets in RCW2 function as intended. The principal arterials of Connecticut, Wisconsin, Massachusetts, and Nebraska Avenues carry the most vehicles and much of the traffic moves through the study area and beyond. These are typically the widest streets, with two travel lanes and two variable parking/travel lanes (during rush hours), whereas local streets and collectors are the most narrow with two travel lanes and two parking lanes.

Traffic Volumes

Many of the streets in the study area carry high volumes of cars. While there are no freeways or expressways in the study area, there are several principal arterials: Massachusetts Avenue, Wisconsin Avenue, and Connecticut Avenue as northwest-southeast connectors and Nebraska Avenue as a southwest-northeast connector. These streets are direct routes to the employment centers in downtown Washington, and many carry heavy commuter traffic during peak periods. Minor arterials include Reno Road and River Road, both of which provide northwest-southeast connections. Collector streets in the study area are well-spaced and connect both east-west and north-south.

According to DDOT's 2008 traffic counts, Connecticut Avenue carries the heaviest volumes in the study area (38,500 annual average daily traffic). Wisconsin Avenue (31,100 AADT), Massachusetts Avenue (24,600 AADT) and Nebraska Avenue (17,000 AADT) are also high-volume streets. Minor arterials Reno Road (28,500 AADT) and River Road (13,500 AADT) also experience high traffic volumes. Van Ness Street (11,100 AADT) and Albemarle Street (6,500 AADT) are the busiest collector streets in the study area. See the AADT counts in Figure 5 for the entire study area.

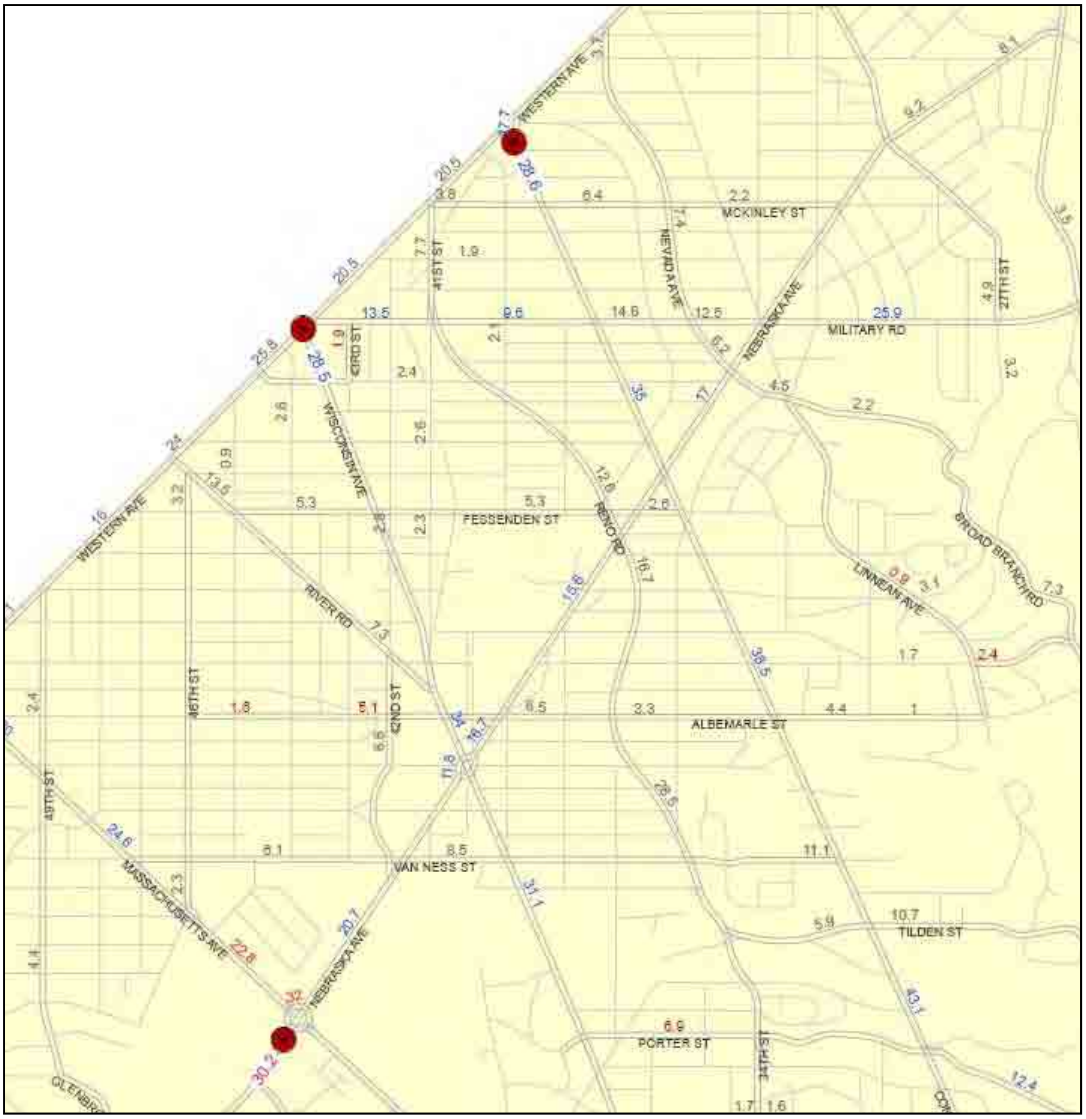


Figure 5: Traffic Volumes in the Study Area

Bicycle and Pedestrian Facilities

The Rock Creek West study area has a strong pedestrian network, consisting of sidewalks and crosswalks, many with pedestrian countdown signals. The sidewalk network can be seen in Figure 6. The commercial corridors in the study area along Connecticut Avenue and Wisconsin Avenue have wide sidewalks and ample pedestrian amenities. Many local residential streets also have a connected sidewalk network, though some gaps remain. Streets with missing sidewalks include:

- 42nd Street NW, between Van Ness Street and Yuma Street
- North side of Van Ness Street NW, from 47th Street to 42nd Street
- Butterworth Place NW, from Westmoreland Circle to 45th Street
- North side of Fessenden Street NW, from 41st Street to 39th Street
- North side of Ellicott Street NW, from 47th Street to 45th Street
- North side of Albemarle Street NW, from 49th Street to 45th Street
- Alton Street NW, from 49th Street to 45th Street
- 47th Street NW and 48th Street NW, from Warren Street to Brandywine Street

Sidewalk requests have also been submitted to DDOT by residents. A list of these requests can be found in Appendix A, along with a list of the sidewalks under contract to be built by 2011.

There is also a connected network of bicycle routes in the area, also shown in Figure 6. While no separated or on-street bicycle facilities or trails exist in the study area, there are many signed bicycle routes. Nebraska Avenue, Massachusetts Avenue, River Road, Albemarle Street, and Fessenden Street are the most extensive signed bicycle routes in the study area, and together they provide a far-reaching network of bicycle routes. Bicycling is popular in the study area because of the proximity to Rock Creek Park, which offers an excellent network of trails and weekend car-free roads for cyclists.

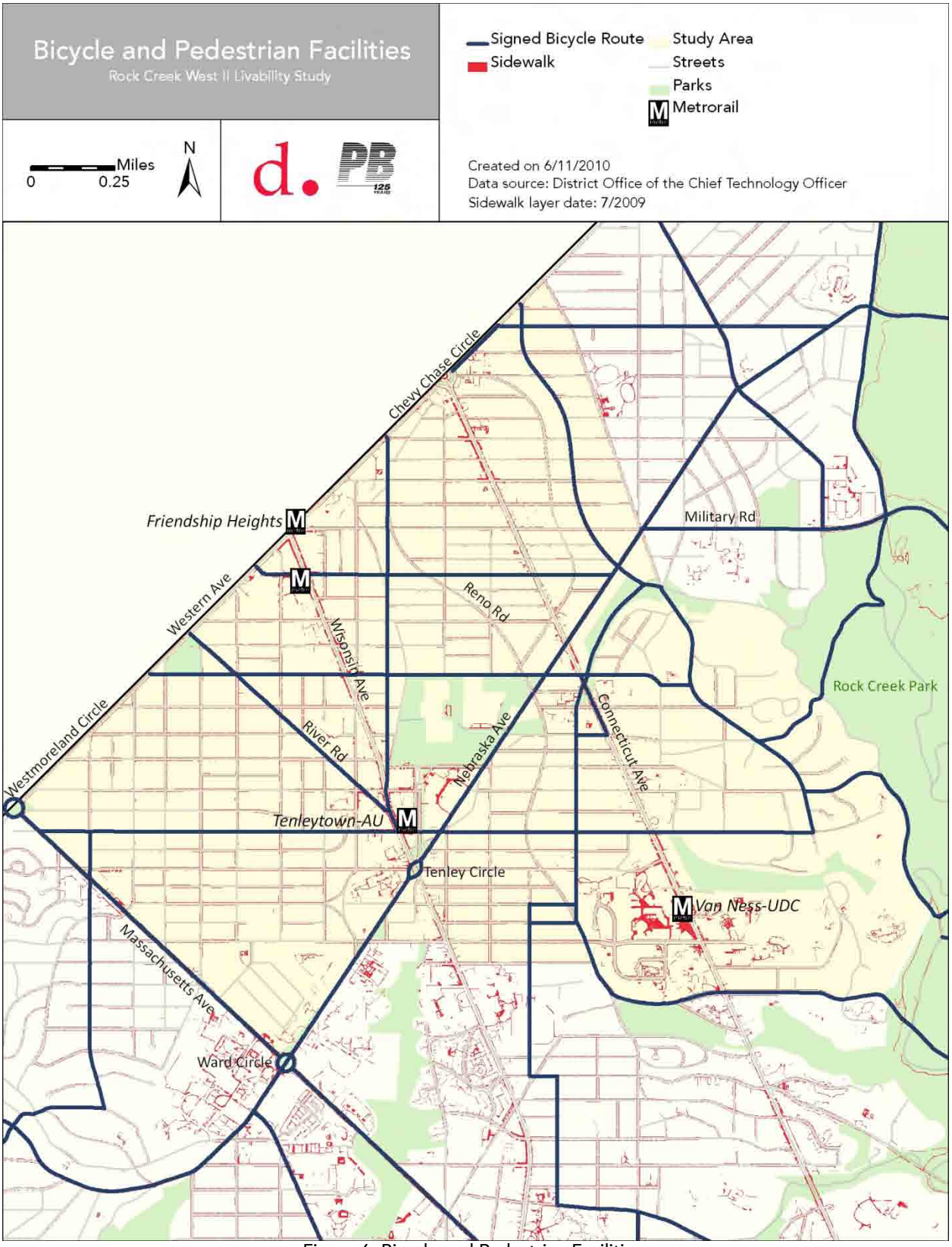


Figure 6: Bicycle and Pedestrian Facilities

Transit Service

The study area is well-served by Metrorail and Metrobus. Of the three Metrorail stations in the study area, Friendship Heights is the busiest station, with 9,696 average weekday boardings (according to WMATA's "6/18/09 Metrorail Average Weekday Passenger Boardings"). The Tenleytown (7,290 average weekday boardings) and Van Ness-UDC (7,276 average weekday boardings) stations are also busy stations.

Metrobus serves the area, with several routes along the principal arterials: Wisconsin Avenue, Connecticut Avenue, Nebraska Avenue, and Massachusetts Avenue. Collector streets like McKinley Street and Van Ness Street are also bus routes. Buses also run along the local Yuma Street from east to west. See Figure 7 for WMATA's bus route map in the study area.

The Metrorail stations serve as major Metrobus transfer points. Other important transfer points include Chevy Chase Circle and the intersections of Connecticut Avenue with Nebraska Avenue and McKinley Street.

Figure 7: Study Area Transit Options

Traffic Safety

Data from DDOT recording the number of vehicular collisions between 2007 and 2009 was aggregated to show the study area intersections with safety issues. The resulting data is shown in Table 2. These figures were not normalized by traffic volume, so many of the intersections with large numbers of collisions are located on high-traffic roads like Connecticut Avenue and Wisconsin Avenue.

The intersections with the most collisions over the three-year time period were located in areas of high traffic. Fourteen of the top 15 intersections were located along the two busiest roads in the study area, Connecticut Avenue and Wisconsin Avenue. Ward Circle, the intersection with the most collisions during the three-year period, is located at the intersection of two principal arterials, Massachusetts Avenue and Nebraska Avenue.

Table 2: Traffic Collisions by Intersection, 2007-2009

Rank	Intersection	Total Collisions, 2007-2009
1	Ward Circle	80
2	Chevy Chase Circle	56
3	Connecticut Ave & Nebraska Ave	45
4	Connecticut Ave & Van Ness Street	35
4	Western Ave & Wisconsin Ave	35
6	Connecticut Ave & Yuma Street	32
6	Wisconsin Ave & Van Ness Street	32
6	Connecticut Ave & Veazey Terrace	32
6	Wisconsin Ave & Jenifer Street	32
10	Wisconsin Ave & Albemarle Street	31
11	Connecticut Ave & Military Road	29
12	Wisconsin Ave & Fessenden Street	28
13	Connecticut Ave & Fessenden Street	26
14	Connecticut Ave & Albemarle Street	24
15	Wisconsin Ave & Brandywine Street	23
15	Tenley Circle	23

Pedestrian collision data was also recorded for the three-year period. The intersections with recorded incidents of pedestrian collisions with vehicles are shown in Figure 8 as stars. During the 2007-2009 timeframe, there were four fatal pedestrian collisions in the study area: at Connecticut & Fessenden Street, at Connecticut & Ellicott Street, at Connecticut & Legation Street, and at Connecticut & Nebraska Avenue. The intersections with more than one pedestrian collision over the three-year period are listed in Table 3.

Many of the intersections with high rates of pedestrian collisions are located in areas with many pedestrians, such as Friendship Heights and Tenleytown; therefore, these intersections may not necessarily be dangerous or poorly designed, but the large numbers of pedestrians may inflate the crash rate for these intersections.

Table 3: Collisions Involving Pedestrians by Intersection, 2007-2009

Intersection	Pedestrian Collisions, 2007-2009
Wisconsin Ave & Jenifer Street	5
Wisconsin Ave & Fessenden Street	4
Wisconsin Ave & Western Avenue	4
Connecticut Ave & Legation Street	3
Connecticut Ave & Nebraska Avenue	3
Connecticut Ave & Van Ness Street	3
Connecticut Ave & Veazey Terrace	3
Wisconsin Ave & River Road	3
Connecticut Ave Northampton Street	2
Military Road & 43rd Street	2
Nebraska Ave & Van Ness Street	2
Ward Circle	2
Wisconsin Ave & Veazey Street	2
Wisconsin Ave & Warren Street	2

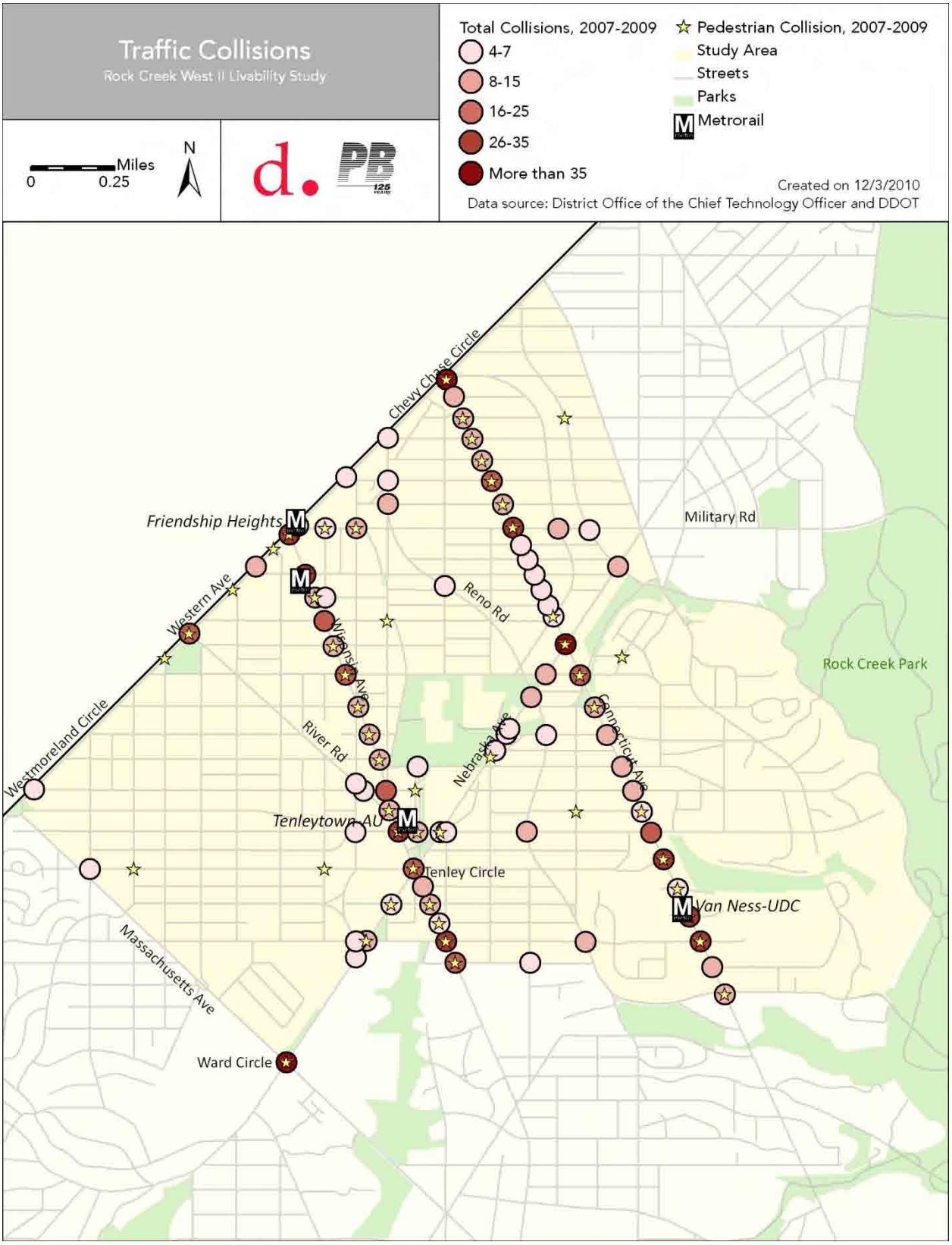


Figure 8: Traffic Collisions in RCW2

Community Perceptions

DDOT surveyed residents of the RCW2 area about their concerns with study area intersections. An online survey was available from June 14 to July 9. The survey asked residents where they lived, what they liked and did not like about their streets, and what intersections in the study area concerned them. Figure 9 shows the location of intersections that received at least one comment through this survey. Respondents made a total of 1,082 comments about 176 intersections in the study area through the online survey. The full text of the survey is presented in Appendix A.

Survey respondents could choose from a number of concerns in the study area, ranging from aggressive driving to inadequate infrastructure. As seen in Figure 10, motorist speeding was the most frequent comment made about an intersection. In fact, the top three most frequent concerns had to do with aggressive driving: motorists speeding, motorists running red lights or stop signs, and motorists failing to yield at intersections.

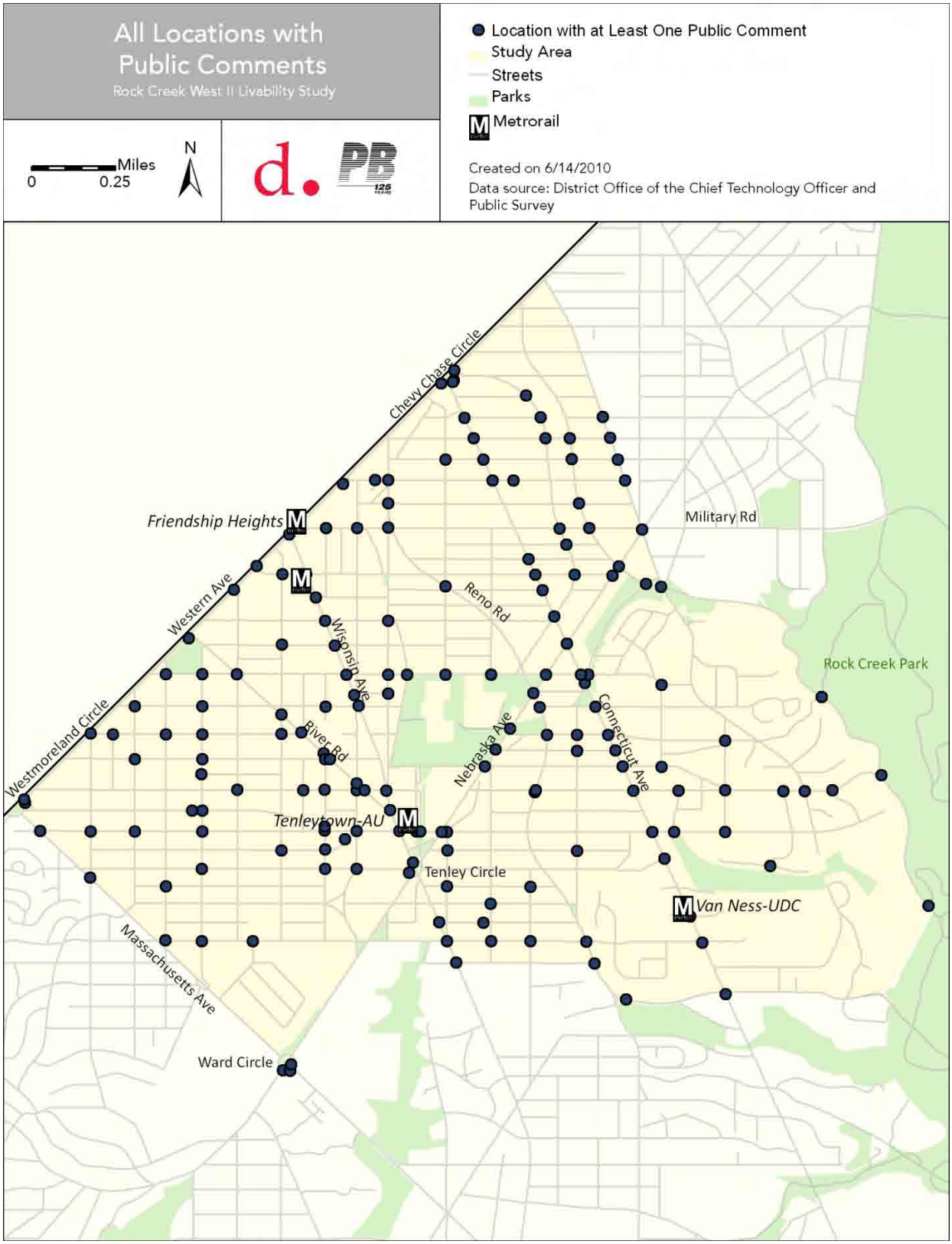


Figure 9: Intersections Receiving One or More Comments from Online Survey

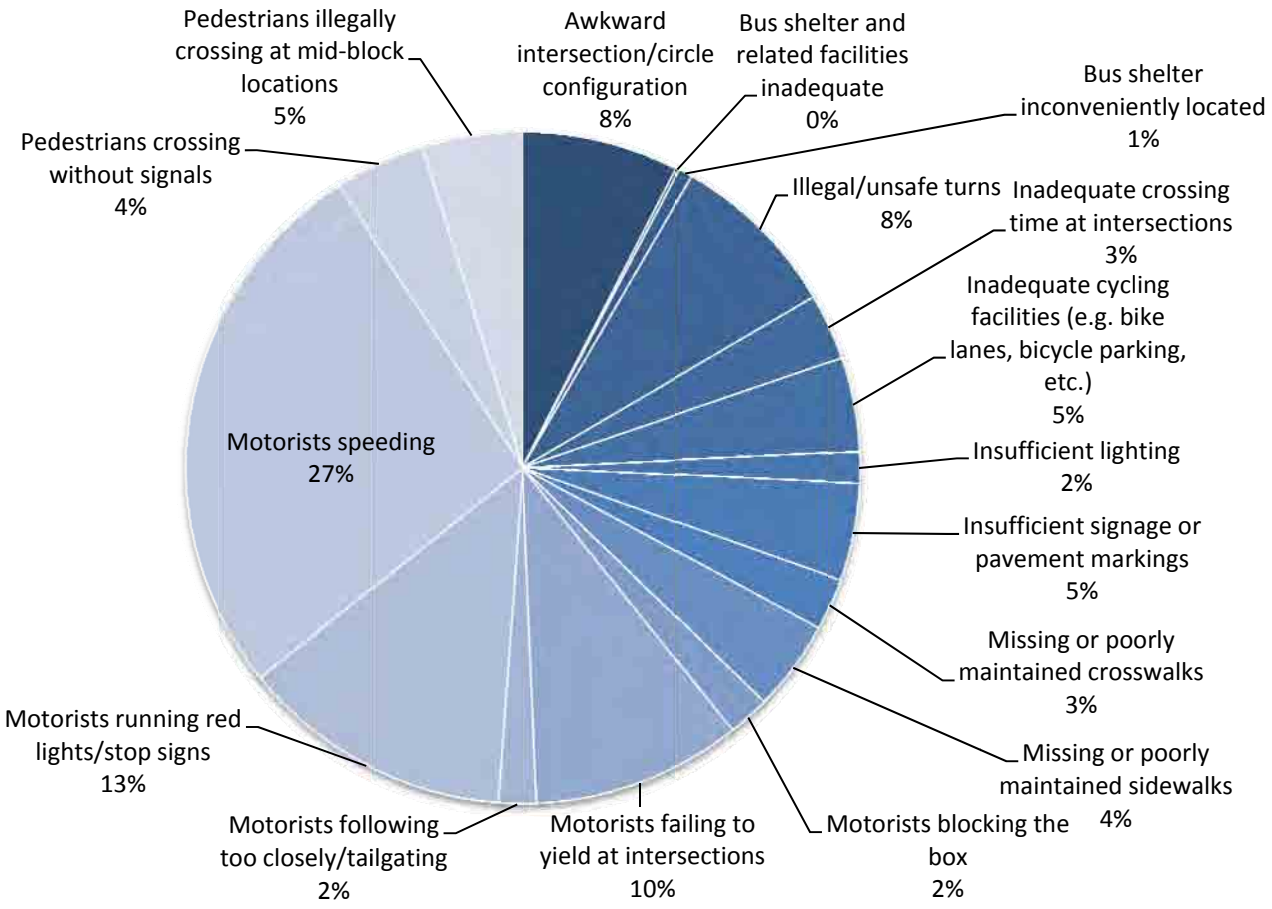


Figure 10: Summary of Concerns from Public Survey

The online survey also asked respondents in what mode their concern was greatest. For example, a respondent could say that he or she had a concern as a pedestrian in an area with motorists failing to yield, or as a cyclist in an area with inadequate cycling facilities. The majority of respondents (64 percent) had concerns as pedestrians. An additional 30 percent had concerns as motorists, followed by 5 percent of respondents concerned as cyclists, and one percent as transit users.

The survey also offered respondents a chance to specify a time of day when the concern was greatest. Most respondents (81 percent) said that their concern was applicable at all times. Eleven percent said their concern was applicable during the morning rush hour, and three percent said their concern was applicable during the afternoon rush hour. Two percent had concerns later in the evening. All other times received less than one percent of the total responses.

Figure 11 shows the intersections in the study area that received the greatest number of comments, and Table 4 identifies the intersections with fifteen or more comments from the online survey. The two traffic circles in the study area, Ward Circle and Chevy Chase Circle, received the largest number of comments. The intersection of two principal arterials, Connecticut Avenue and Nebraska Avenue, received the third-highest

number of comments, and the intersection of 42nd Street and Albemarle Street, in a residential neighborhood adjacent to Janney Elementary School, received the fourth-highest number of comments.

Table 4: Intersections with Most Comments from Online Survey

Rank	Intersection	Total Comments	Most Frequent Comment
1	Ward Circle	73	Awkward intersection
2	Chevy Chase Circle	62	Awkward intersection
3	Connecticut Ave & Nebraska Avenue	52	Motorists speeding
4	42nd Street & Albemarle Street	33	Motorists speeding
5	Connecticut Ave & Morrison Street	28	Motorists speeding
6	Wisconsin Ave & Jenifer Street	24	Pedestrians crossing mid-block
6	Wisconsin Ave & Albemarle Street	24	Motorists running red lights
8	Nebraska Ave & Broad Branch Road & Military Road	23	Illegal/unsafe turns
9	Connecticut Ave & Van Ness Street	22	Motorists failing to yield, speeding
10	Connecticut Ave & Davenport Street	20	Motorists speeding
10	Reno Road & Van Ness Street	20	Motorists speeding
12	Connecticut Ave & Fessenden Street	18	Motorists running red lights
13	Connecticut Ave & McKinley Street	17	Motorists speeding
14	Connecticut Ave & Albemarle Street	16	Inadequate crossing time
15	Wisconsin Ave & Western Avenue	15	Pedestrians crossing mid-block
15	42nd Street & Brandywine Street	15	Awkward intersection

While the intersections with more than three concerns are still primarily focused on Connecticut Avenue and Wisconsin Avenue, as in the traffic collisions analysis, many of the comments focused on neighborhood streets as well. Clusters of comments are evident in Tenleytown along 42nd Street and 43rd Street, in Forest Hills along Van Ness Street, in Friendship Heights along Military Road and Livingston Street, and in Chevy Chase along Nevada Avenue. These clusters, overlaid with the traffic collision data, helped to define the focus areas for further study.

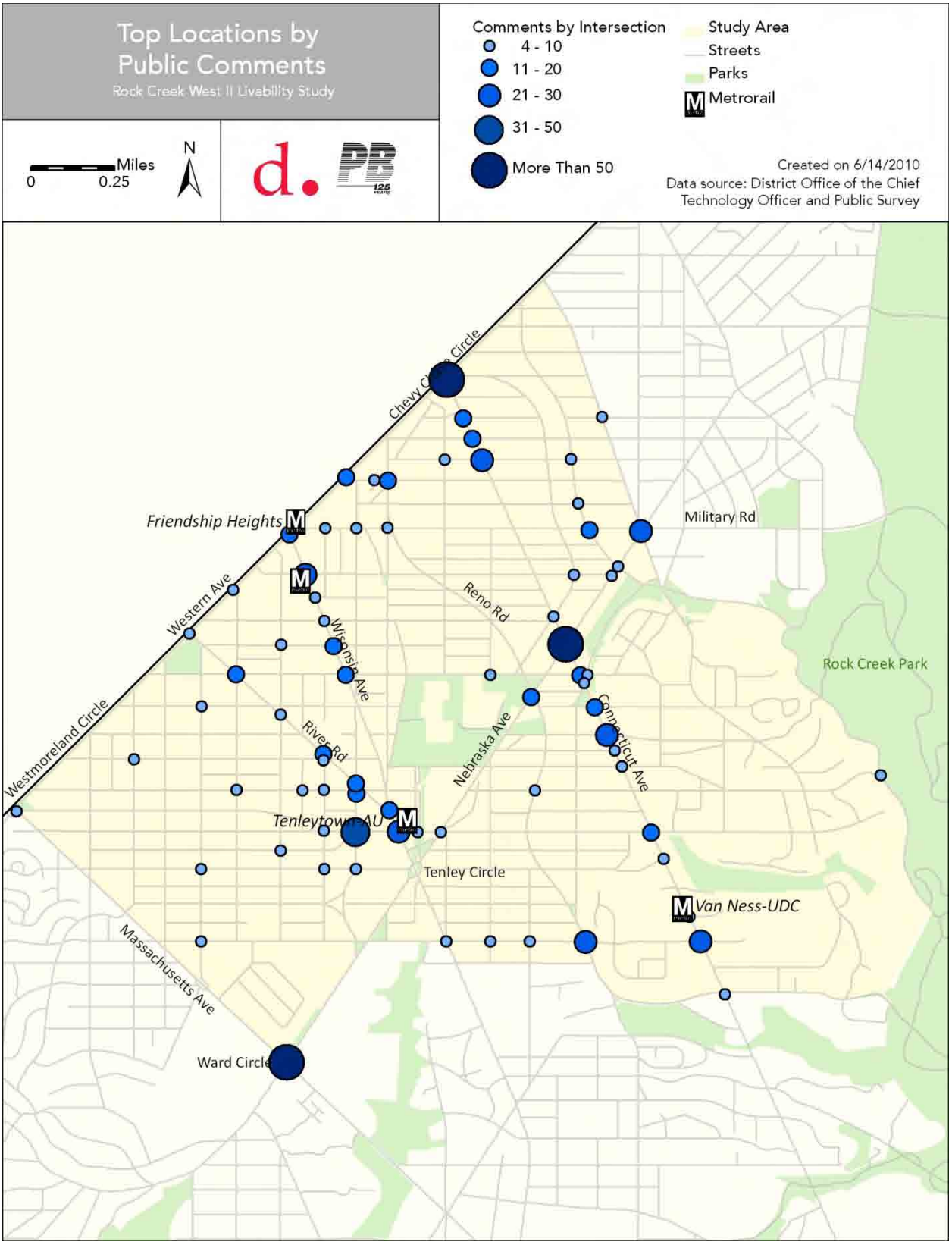


Figure 11: Intersections with Four or More Comments from Online Survey

3 Network Analysis

This study included a network-level analysis of the streets in Rock Creek West II (RCW2), which produced two elements:

- New proposed street classifications, to guide future improvements
- An identification of livability gaps, or hot spots, and a refined list of areas of focus, for which specific recommendations are made

New Street Classifications

The RCW2 Study expands on traditional functional classifications, as described in Section 2, and develops street types, shown in Figure 13. These street types were created to incorporate land use into transportation functions (as applied to arterials), to simplify classifications (minor and principal arterials were made one category), and to include a typology that prioritizes bicycles. The new street types also better characterize streets, as described below, allowing for the creation of system-wide recommendations discussed in Section 4. These types are compatible with functional classifications.

Local Street

A local street provides access within neighborhoods. Local streets also connect residential areas with schools and other community uses. These streets are typically narrow (30-feet wide), have on-street parking, street trees, sidewalks, and no lane markings. Local streets are often stop-sign controlled at four-legged intersections, and signal controlled at very few major intersections.

Local streets should be low-speed and low-volume, providing a comfortable environment for the most vulnerable users. Livability treatments, including traffic calming measures, are very appropriate for local streets.

Bicycle Boulevard

Bicycle boulevards are shared roadways with bicycle priority. Typically overlapping with local streets and sometimes collector streets, these routes carry a low volume of vehicles traveling at low speeds. Bicycle boulevards should have smooth pavement, gradual slopes, narrow cross-sections, and street trees. These streets should provide direct connections to destinations and other bicycle facilities.

Figure 12: Portland Bike Boulevard
(Flickr Creative Commons)

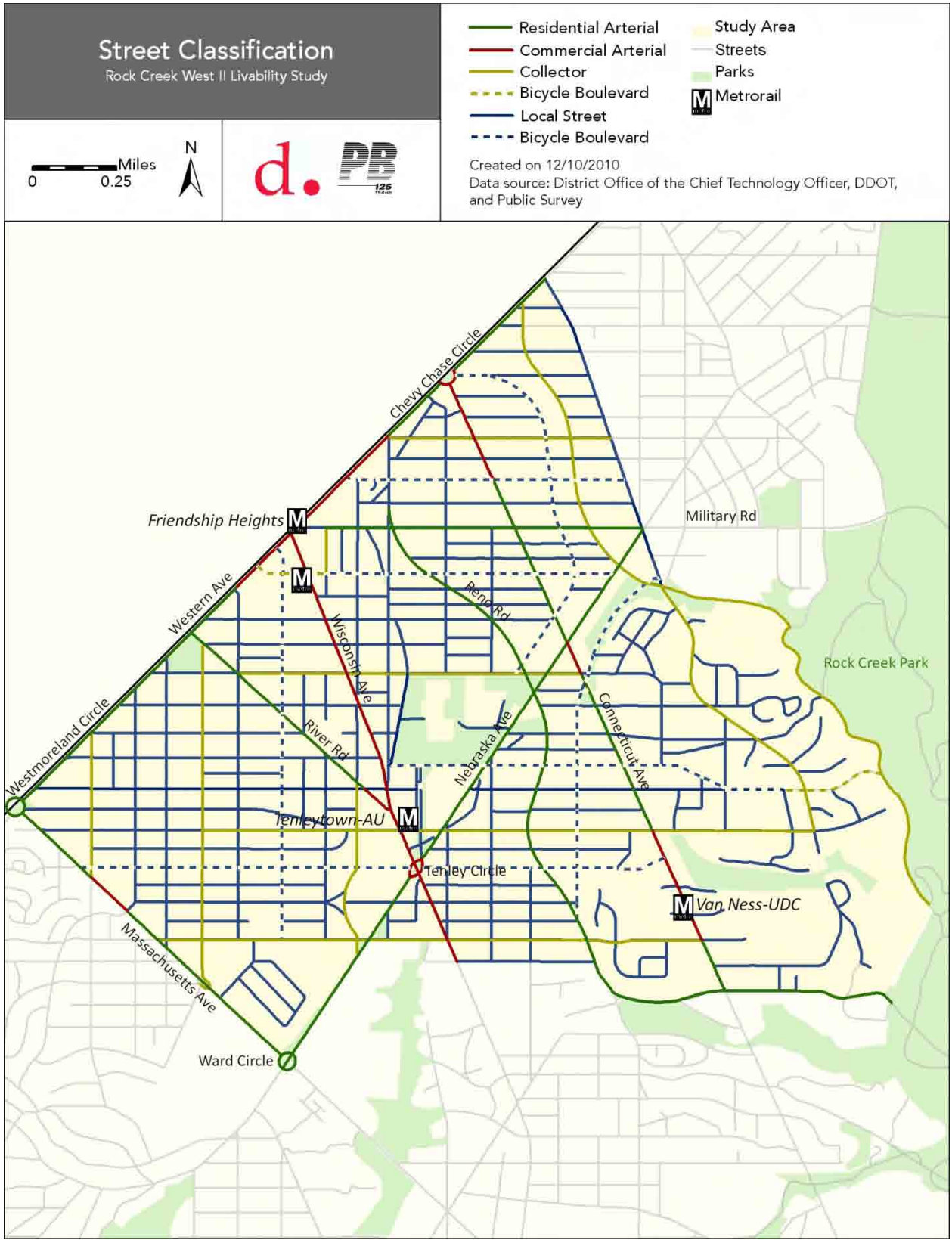


Figure 13: Proposed Street Classifications

Collector Street

Collector streets provide access between neighborhoods and from neighborhoods to some community destinations. They span longer distances than local streets, typically providing a continuous connection through a collection of neighborhoods. Collectors are typically narrow (between 30- and 36-feet wide), two lanes, have on street parking, street trees, sidewalks, and centerlines. Vehicular travel is emphasized more on collectors than local streets, so where the two intersect, the local street would typically be stop-signed controlled. The intersection between collectors and major streets is typically signalized.

Though collectors provide a connection across neighborhoods and between local streets and arterials, they should be low-speed and safe for all users. Most collectors travel through residential areas, but there are some commercial segments. Because of this, collectors should emphasize speed limit compliance and safe travel.

Arterial Street

These streets provide the highest level of vehicular service at the greatest speed for the longest uninterrupted distance. Arterials move vehicular traffic between collectors and freeways. This category includes both principal and minor arterials, since the two are similar with regards to their context in a livable community.

Arterial streets are typically between four and six lanes wide, either divided or undivided, with large setbacks, and most carry bus traffic. Many are evacuation routes and truck routes. Arterial streets emphasize vehicular travel, but should include pedestrian facilities and an attractive streetscape so that all modes can travel safely and easily. The two types of arterials and their potential livability treatments are described below.

Residential Arterial

These pass through residential areas, and are typically medium or high in density. An example is Nebraska Avenue NW as the large amount of pedestrian traffic means that livability treatments should balance the operational priority of vehicles with the safety priority for all users.

Commercial Arterial

The most common type of arterial, commercial arterials pass through commercial or mixed-use areas. Wisconsin Avenue NW is an example as these streets see a mix of high pedestrian volumes and vehicles traveling through or into parking lots or garages.

Screening of Hot Spots

In order to move from systemwide analysis and recommendations to discrete, spot issues and recommendations, the project team screened various data sources.

DDOT first identified locations in RCW2 with livability gaps. These locations, called hot spots, were identified based on:

- Public comments. This project has heavily relied on community feedback, in four forms:
    - Comments received at the June 16, 2010 public meeting. Working sessions for ANC 3E, 3F, and 3G provided a wealth of information about study area issues.
    - Comments sent to DDOT via email or the project website.
    - Comments received from the project Task Force, which includes ANC, MPD, and public school representation.
    - Responses to the online survey, conducted in June and July 2010. DDOT received nearly 400 responses to the survey, which provided responders with an opportunity to document a variety of transportation issues with specific streets and intersections.
- Existing conditions mapping including street classifications, major destinations, transit facilities, bicycle and pedestrian facilities, and collision data.

The two main sources of livability gaps were combined to identify hot spots. DDOT focused on collision data, since safety is one of the Department's top priorities, and public comments, since perceptions about transportation issues are critical to livability. Figure 14 shows these two combined data sources.

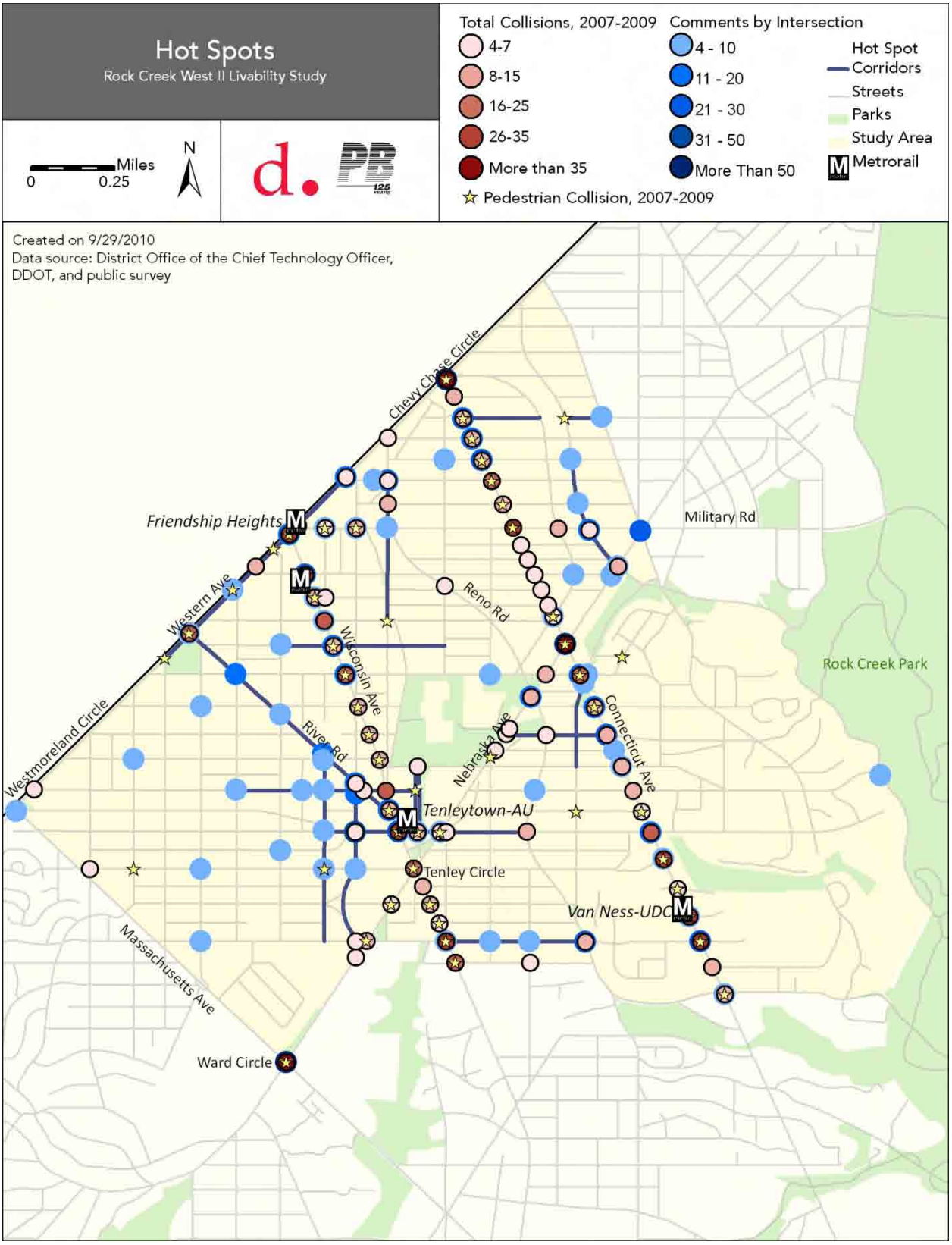


Figure 14: Study Area Hot Spots

Focus Areas

With the RCW2 hot spots identified, DDOT identified corridors and intersections for further study and specific improvement recommendations. These locations are similar to the hot spots, but with an emphasis on local and collector streets. Additionally, a windshield survey of every street in RCW2 was used to prioritize some locations above others. This survey identified major transportation facility issues.

While collision data and public comments reveal issues on the major arterials, such as Connecticut and Wisconsin Avenues, these streets have often been the subjects of previous study. Additionally, local streets can benefit most from livability and traffic calming improvements, as their lower traffic volumes and minor role in the transportation system make them suitable for more substantial treatments. These streets, along with collectors, connect and house residences, schools, and other community facilities, making them key players in livability.

Local streets with the most comments and collisions were included in the Areas of Focus, as were collector streets with similar qualities. The vast majority of the local and collector streets identified have never been studied before, at least not in the last five to 10 years. High-accident and high-comment arterials were also included, but those that were recently studied were excluded.

The Areas of Focus are shown in Figure 15, and summarized in Table 5.

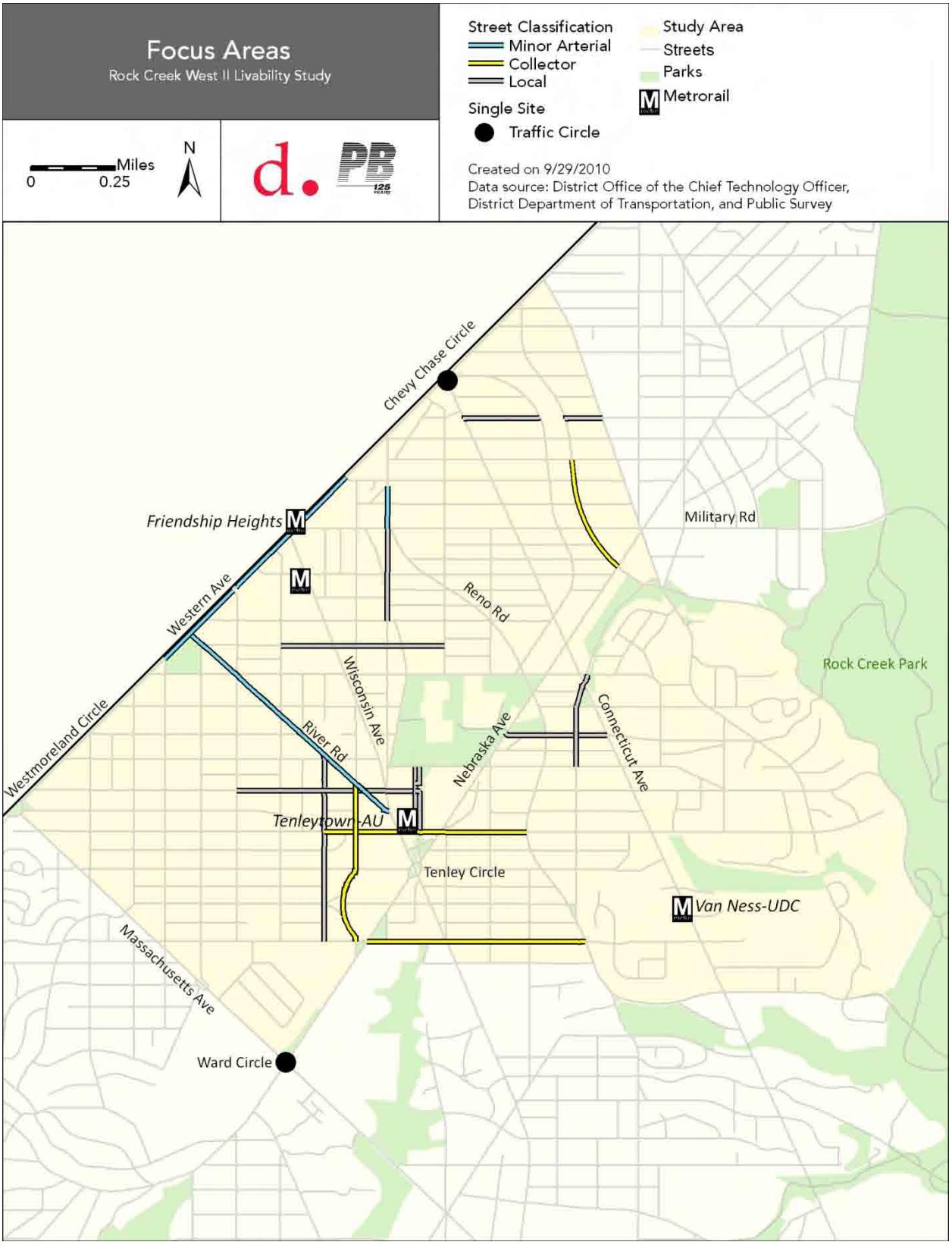


Figure 15: Study Focus Areas

Table 5: Areas of Focus and Their Characteristics

Corridor	From	To	Total Comments	Most Frequent Comments	Total Crashes, 2007-2009	Pedestrian Crashes	Functional Classification
43rd St NW	Van Ness St	River Road	39	Motorists Speeding	7	1	Local
Brandywine St NW	45th St	40th St	36	Motorists Speeding, Motorists Running Stop Signs/Lights, Motorists Failing to Yield	29	1	Local
Davenport St NW	Nebraska Ave	Connecticut Ave	24	Motorists Speeding	22	0	Local
Garrison St NW	44th St	39th St	22	Illegal/Unsafe Turns, Motorists Failing to Yield, Motorists Speeding	6	0	Local
36th St NW	Chesapeake St	Fessenden St	20	Awkward Intersections, Motorists Failing to Yield	4	0	Local
Northampton St NW	Connecticut Ave	Broad Branch Rd	19	Motorists Speeding, Pedestrians Crossing Without Signals, Motorists Failing to Yield	15	3	Local
41st St NW	Livingston St	Harrison St	19	Pedestrians Crossing Without Signals, Motorists Failing to Yield	14	1	Local

Corridor	From	To	Total Comments	Most Frequent Comments	Total Crashes, 2007-2009	Pedestrian Crashes	Functional Classification
Fort Drive & 40th St NW	Albemarle St	Chesapeake St	8	Awkward Intersections	16	2	Local
Albemarle St NW	43rd St	Reno Road	82	Motorists Failing to Yield, Motorists Running Stop Signs/Lights, Motorists Speeding	61	3	Collector
Van Ness St NW	Wisconsin Ave	Reno Road	73	Motorists Speeding, Motorists Failing to Yield	50	4	Collector
42nd St NW	Van Ness St	River Road	68	Motorists Speeding, Motorists Running Stop Signs/Lights, Motorists Failing to Yield	20	1	Collector
Nevada Ave NW	Nebraska Ave	Morrison St	29	Motorists Speeding, Motorists Failing to Yield	21	0	Collector
River Road NW	Western Ave	Wisconsin Ave	66	Awkward Intersections, Motorists Speeding	44	6	Minor Arterial
Western Ave NW	47th St	Livingston St	41	Pedestrians Illegally Crossing Mid-Block, Awkward Intersections	67	10	Minor Arterial

Corridor	From	To	Total Comments	Most Frequent Comments	Total Crashes, 2007-2009	Pedestrian Crashes	Functional Classification
Ward Circle	N/A	N/A	70 (survey)	Aggressive driving, unsafe pedestrian behavior, infrastructure deficiencies	80	1	N/A
Chevy Chase Circle	N/A	N/A	60 (survey)	Aggressive driving, infrastructure deficiencies	56	2	N/A

4 Recommendations

A primary focus of this study was to apply systematic, "big picture" planning to the Rock Creek West II (RCW2) area. Therefore, this study goes beyond recommendations for discrete, spot livability improvements at specific areas of focus, and develops system recommendations with broad applicability across the study area. Both levels of recommendations are discussed in this section.

System Recommendations

Because of the size of the RCW2 area, it was neither possible nor desirable to address all issue locations in this study. By developing system recommendations, common principals and methods were identified which can be used as a guide for uniformity across the study area in evaluating and developing recommendations on future projects. These system recommendations are intended to be guidelines, and were developed with the understanding that each individual intersection or location will have unique conditions and constraints.

System recommendations are presented below, grouped by street type. The majority of the streets in the RCW2 area are local, residential streets, and the arterial network has been the subject of many previous studies. Accordingly, these system recommendations have been developed with a primary focus on local streets, although other classifications are also considered as presented below.

Local Streets

Local streets comprise the majority of the streets in RCW2, and are perfect candidates for livability improvements due to their residential nature, their high level of access, and their purpose of serving short, local, multimodal trips. Recommended livability treatments for local streets are presented in the paragraphs that follow.

Curb Extensions

Either located at an intersection or in the middle of a block, curb extensions (also known as bump outs or neck downs) narrow the roadway width by approximately 12 feet and reduce pedestrian crossing distance, if a crosswalk is also present. Curb extensions can vary in width, but are generally six-feet wide. There are geometric considerations when applying curb extensions to local streets, including providing adequate turning radius at intersections, and providing proper drainage either through the storm drain system or low impact development (LID) treatment.

Curb extensions can either be paved, vegetated for landscaping only, or vegetated to provide bioretention of stormwater (also called green curb extensions). Paved curb extensions are preferred in areas with high pedestrian traffic, and can be constructed of various materials. Where possible, green curb extensions, an LID treatment, should be considered to reduce demand on the storm drain system and to treat and absorb stormwater in a natural, environmentally-friendly, and cost effective manner.

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Proposed Green Curb Extensions

Green curb extensions are a relatively recent adaptation of sustainable practices to roadway engineering. They have not yet been installed in the District, and are not covered by DDOT design guidelines. The City of Portland has pioneered their installation, in a notably wet climate, and has shown that they are effective in reducing peak storm water flows. They work best on streets with a moderate slope (one or two percent), similar to most of the RCW2 streets. When recommended, green curb extensions are installed at or near a low point in the roadway so that the water will drain to them. The physical specifics of each location will dictate design details such as the curb extension length and the types of plantings. Maintenance is required on green curb extensions—weeding and sediment removal—and the frequency needed will depend on the plantings used. Recognizing both the potential expense of this maintenance and the benefits to the surrounding community, many jurisdictions enlist residents who live near the LID feature to help with maintenance.

Through this project, DDOT identified several locations to install curb extensions with the goal of improving livability by calming traffic. These locations are noted in the Focus Area Recommendations part of Section 4. From this group of locations, many appear to be suitable for stormwater management treatments based on the best practices noted in the previous paragraph. Based on DCGIS elevation data and aerial imagery showing curb inlets, DDOT should advance the design of green curb extensions at the following locations, also shown in Figure 17:

- 43rd and Chesapeake Streets (southern leg of 43rd Street)
- 43rd and Albemarle Streets (all corners)
- 43rd and Van Ness Streets (northern leg of 43rd Street)
- Brandywine and 42nd Streets (western leg of Brandywine Street)
- Brandywine and 46th Streets (both legs of Brandywine Street)
- Davenport Street and Connecticut Avenue (both legs of Davenport Street)
- Davenport Street and Reno Road (both legs of Davenport Street)
- River Road and 44th Street (all corners)

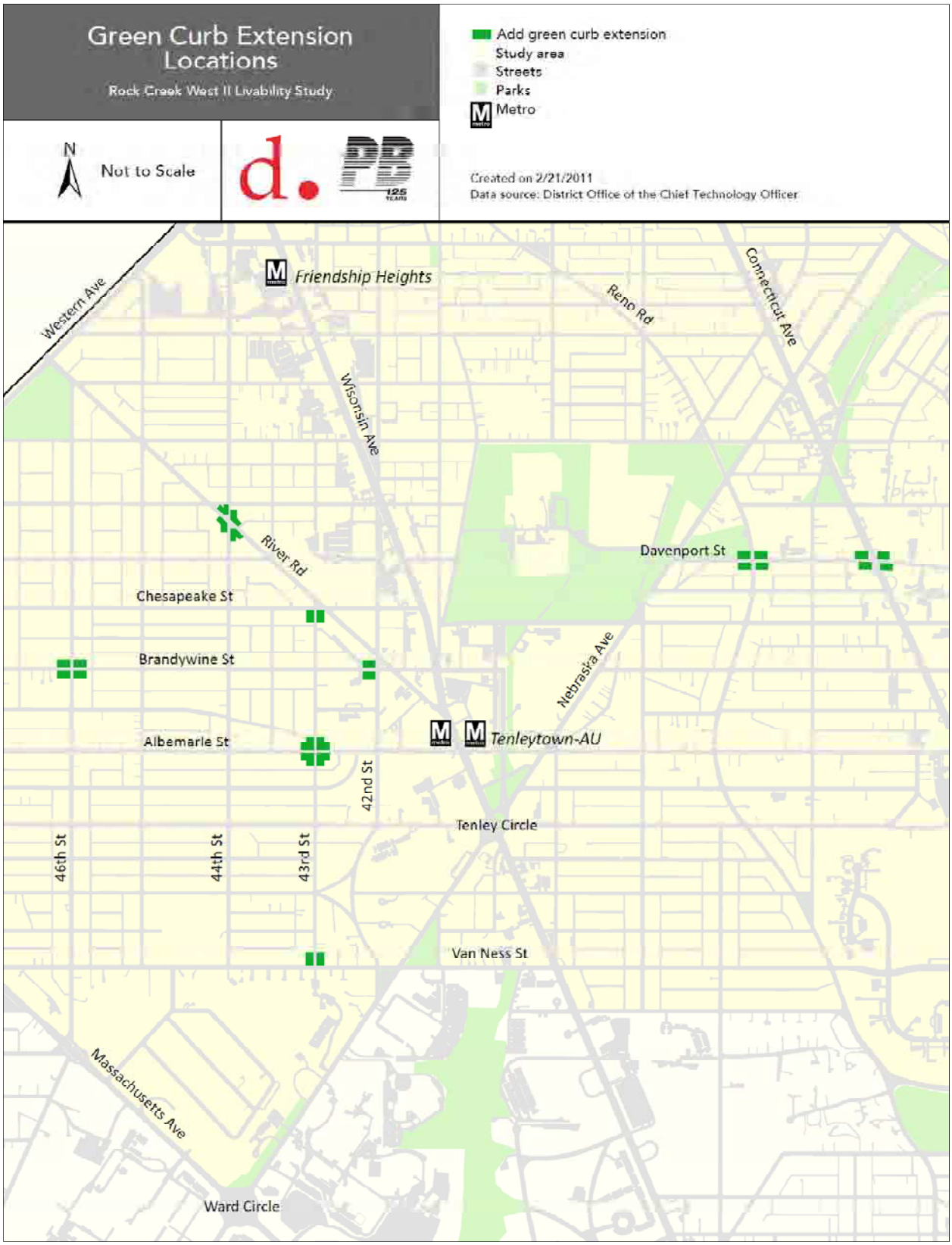

Figure 17: Proposed Green Curb Extensions

Gateway Treatments

Gateway treatments are physical additions to an intersection or segment of roadway that give identity to the place that lies beyond. Gateway treatments have the potential to reinforce the intended functional classification of streets, by encouraging longer trips on arterials, and reserving local streets for low-speed, neighborhood trips. They do this by providing a visual cue to roadway users that they have entered a distinct place. Gateways can take many forms—an arch, landscaping at intersection corners or on a median, special paving materials on the roadway surface, artwork on the pavement itself (sometimes called road tattoos), intersection curb extensions, etc.—but they are all aesthetically-oriented and provide a visual cue that vehicles are leaving the arterial and entering the neighborhood streets. This study has focused on curb extension gateways applied to local streets.

Curb Extension Gateways
To address the vulnerability of local streets to cut-through traffic and speeding, curb extensions are recommended for local streets where they intersect with collectors and arterials. The curb extensions have the potential to do three things:

- Reduce the turning radius from the more major roads, forcing motorists to reduce travel speed.
- Provide a visual cue to drivers that they have entered a distinct place. This will work best if the curb extensions are landscaped with attractive plantings, or paved with a distinct material.
- Reduce the distance to cross the local street by approximately 12 feet.

Design of curb extension gateways will need to accommodate the needs for access to the local neighborhood by all potential vehicle types.

Other Local Street Recommendations

Many other traffic calming measures are appropriate for local streets. These include:

- Neighborhood traffic circles, which work best when in succession
- Chicanes, which will force speed reduction by horizontal deflection.
- Speed humps, raised crosswalks, and raised intersections. Per DDOT policy, a speed study and transportation analysis is required before installation of these vertical deflection measures. Exceptions can be made when the measure is adjacent to a school.
- Traffic diverters, blocking all traffic or certain turning movements from the street. A transportation analysis is recommended before installing this type of treatment, to verify the issue and assess impacts.
- Distinctive paving and streetscape materials
- On-street parking. Most local streets in the District already have on-street parking.
- Lane narrowing or road diet, which can include incorporating a bicycle facility such as sharrows, bike lanes, or cycletracks

For any individual street or intersection, the choice and design of livability treatments should only be made following an assessment of the nature of the issues to be addressed, as well as site-specific constraints and opportunities.

Bicycle Boulevards

This study recommends designating several local roadways in RCW2 as bicycle boulevards, which are shared roadways with bicycle priority. The recommended routes were chosen because they carry a low volume of vehicles traveling at low speeds, they connect to destinations and/or proposed bicycle facilities, and they did not receive a large number of complaints from residents. In short, these streets are already good routes for bicyclists. The proposed network is shown in Figure 21.

The District does not currently have any bicycle boulevards, and therefore an entire branding and implementation strategy should be developed. All routes should have consistent and distinct pavement markings and wayfinding signs, more substantial than bicycle route signs. Some corridors or intersections should receive more substantial treatments such as bicycle boxes at intersections or bicycle traffic signals. Site-specific planning and design will be required along each boulevard to determine which measures are most appropriate to result in a bicycle friendly, bicycle priority street.

Figure 18: Berkeley wayfinding
(Flickr Creative Commons)

Figure 19: Pavement marking
(Flickr Creative Commons)

Figure 20: Bike box
(Flickr Creative Commons)

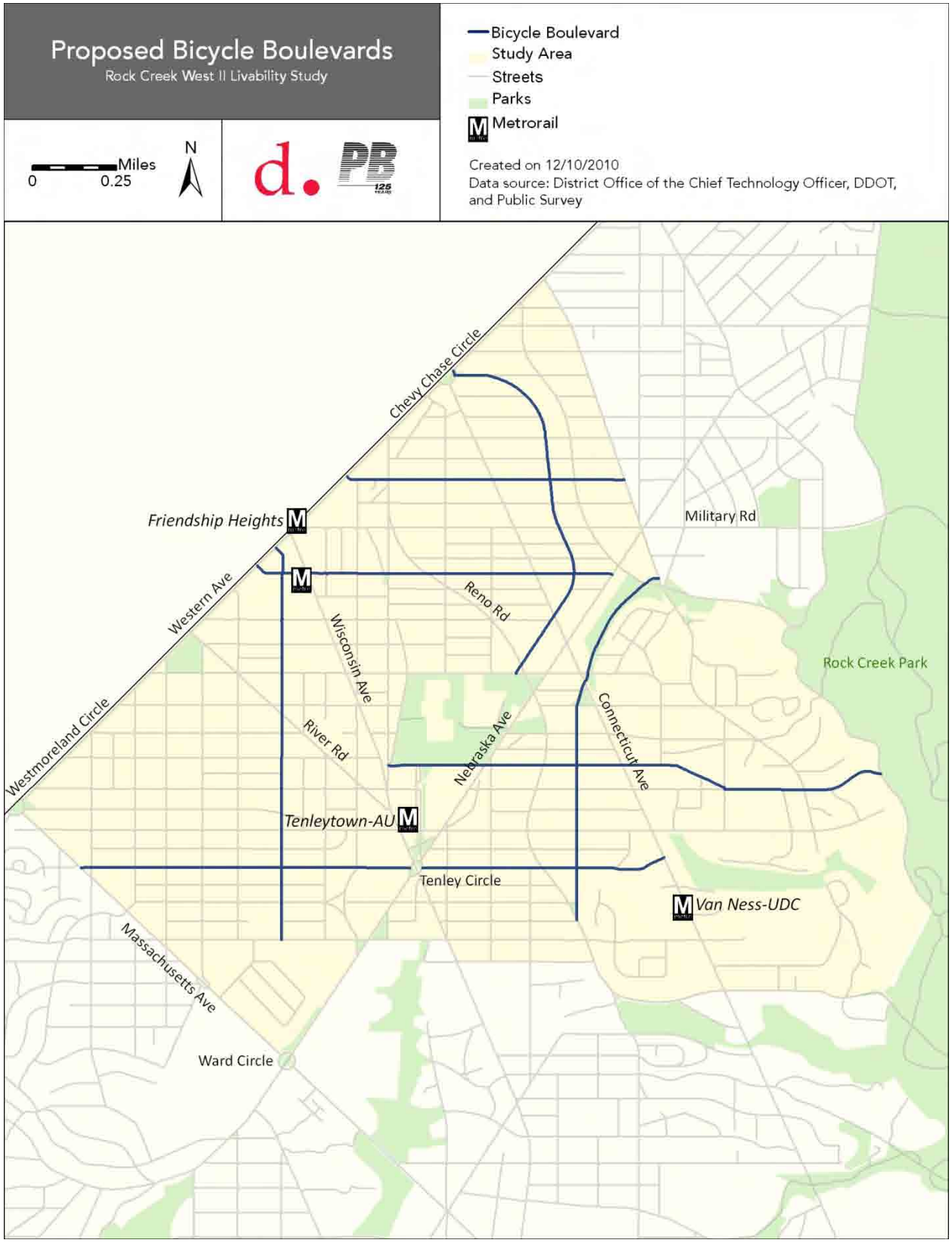

Figure 21: Proposed Bicycle Boulevards

Bicycle boulevards are also well-suited for many local street livability measures such as curb extensions, neighborhood traffic circles, speed humps, raised crosswalks or intersections, traffic diverters, distinct paving materials, and gateway treatments.

Collector Streets

Collector streets share some characteristics with local streets, as many in the District and RCW2 are similarly narrow, two lanes wide, and have on-street parking. However, they serve a different purpose in the transportation network, serving more trips for longer distances, and sometimes accommodating bus routes and large vehicles. These transportation needs may limit the applicability of some livability improvements to collectors. Recognizing these limitations, the following livability improvements are recommended for consideration on collector streets:

- Curb extensions, either green or paved
- Neighborhood traffic circles. If emergency vehicles need to travel these routes, mountable curbs may be required.
- Bicycle sharrows, or if space allows, a bike lane or cycletrack
- Gateway treatments such as distinct paving or landscaping materials, particularly in school areas or areas with other significance
- Narrow medians, typically six-feet wide
- Digital speed indicator signs, placed below a speed limit sign. Care should be taken when placing these signs, as many collectors are also residential streets.
- Speed tables, raised crosswalks, and raised intersections, under certain conditions. Per DDOT policy, a speed study and analysis is required before the installation, and many collector streets have operational requirements that would prohibit these measures. Speed humps are generally not allowed on collectors.

Arterial Streets

Opportunities for livability treatments on arterial roadways are more limited due to the important role they serve in the transportation network. Many arterials are bus and/or truck routes, and they serve high volumes of commuters and neighborhood residents. Horizontal and vertical deflection measures, such as neighborhood traffic circles or speed humps, cannot be applied to arterials as they would have a detrimental impact on traffic and potentially safety. There are, however, low-impact traffic calming measures that can establish the appropriate balance between pedestrian safety, neighborhood livability, and accommodating traffic flow. These are presented below for the different classifications of arterials.

Residential Arterials

The following types of livability treatments are recommended for consideration along arterials lined with houses or apartment buildings:

- Curb extensions, where dedicated parking lanes exist
- Reduced curb radii at intersections, where possible
- Sharrows
- Bike lanes or cycletracks where space allows
- Distinctive paving materials
- Medians

Commercial Arterials

The following types of livability treatments are recommended for consideration on arterials in commercial or mixed-use use areas:

- Curb extensions, where dedicated parking lanes exist
- Bike lanes
- Distinctive paving materials
- Medians
- High-intensity activated crosswalk (HAWK) signals, where warranted, activated with pedestrian push buttons.
- Mid-block pedestrian crossings, if warranted and if site conditions are favorable
- Special treatments at large curb cuts, such as crosswalks or special paving to maintain the sidewalk path and enhance the pedestrian environment

As previously stated, these system recommendations are guidelines. Livability improvements on any type of street should be evaluated and applied on a case-by-case basis.

Focus Area Recommendations

The areas of focus led to additional data collection and analysis at some locations, which resulted in recommendations for streets and intersections within the study area. The final recommendations are presented in the sections that follow. Appendix D includes a table with both the initial recommendations made in October 2010 as well as the final recommendations, which takes into account the initial response from the public and any additional input. Expected impacts, which include traffic, pedestrian, and safety considerations, are listed for each location.

Chevy Chase

Many of the comments for the Chevy Chase neighborhood focused on the circle itself and cut-through traffic on neighborhood streets. Motorists speeding and failing to yield were the main two concerns in the neighborhood, and the conflict between speeding vehicles and pedestrians was a central issue for residents. Therefore, many of the recommendations for the Chevy Chase Circle are focused on enhancing pedestrian visibility and safety, while clarifying and calming traffic throughout the neighborhood. Figure 22 shows all recommendations.

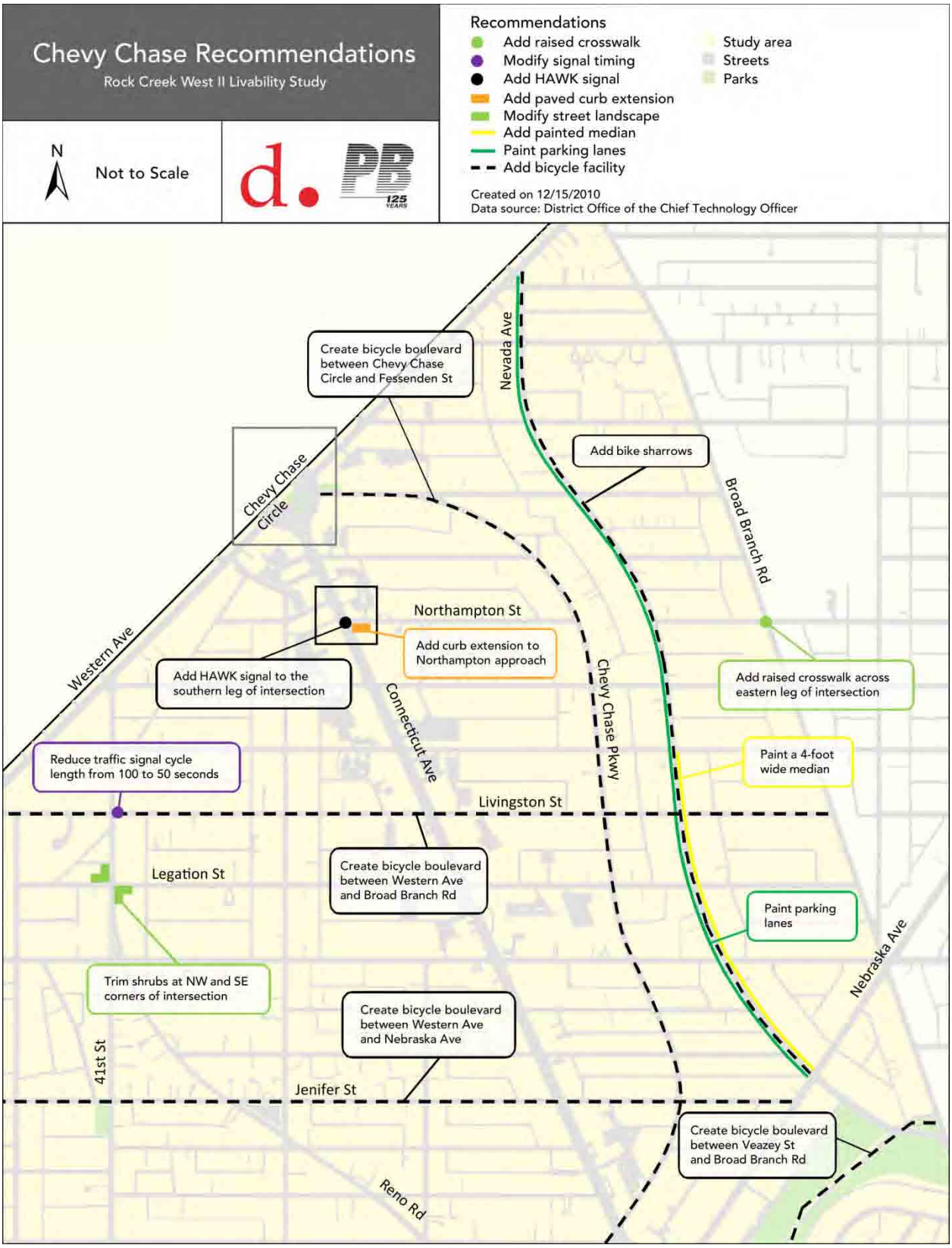

Figure 22: Chevy Chase Recommendations

Chevy Chase Circle

Comments: 62

Issues

The awkward configuration of Chevy Chase Circle presents many conflicts, including motorists failing to yield and motorists speeding. This is at least in part caused by the confusing nature of the circle, including the fact that it is not signalized, yet it is not designed like a modern roundabout which forces yielding by its geometry. For a circle of its size, both the diagrammatic signs approaching the circle and the street signs at each leg are too small. Finally, the two crosswalks that lead into the center of the circle are unsignalized and thus unprotected.

Figure 23: Pedestrians Crossing Chevy Chase Circle

Chevy Chase Circle has been the subject of previous DDOT recommendations. In 2002, DDOT developed signal design plans for the Western Avenue NW approaches. The plan was never implemented due to lack of community support.

Final Recommendations

- Short-term (see Figure 24):
  - To the Connecticut Avenue approaches, add clear, diagrammatic advanced signage explaining circle exits. Such signs will be large, approximately 8' x 8', although final design may change this.
  - Add new pedestrian and crosswalk warning signs
  - Provide overhead street name signs at each circle leg with 12" lettering complying with the MUTCD.
- Long-term (see Appendix C for details). The previous DDOT plan was analyzed to determine its effectiveness in solving the identified issues. Results show that signalizing Western Avenue as well as the existing crosswalks into the circle could improve traffic conditions for the following approaches: Connecticut Avenue (north leg), Western Avenue (east and west legs), and Chevy Chase Parkway (west leg). Full signalization of the circle, with every approach signalized, was also analyzed, but initial results showed unfavorable traffic impacts with large delays. The final recommendations are:
  - Add traffic signals at the Western Avenue approaches to the circle, and coordinate these with the existing Oliver St NW signal
  - Signalize the existing crosswalks leading into the circle

Expected Impacts

- Short-term: The diagrammatic signage and new street signs are expected to reduce weaving and vehicle collisions in the circle. The pedestrian warning signs are expected to increase driver awareness of pedestrians, and increase pedestrian safety.
- Long-term: Traffic signalization of two legs is expected to provide more efficient traffic flow by reducing peak hour delays for the Connecticut Avenue and Western Avenue approaches to the

circle. The reconfiguration is also expected to improve pedestrian safety by providing protected pedestrian crossings, and improve and vehicle safety by reducing weaving and merging movements at Western Avenue. Appendix C includes a memorandum that details the expected impacts of this change.

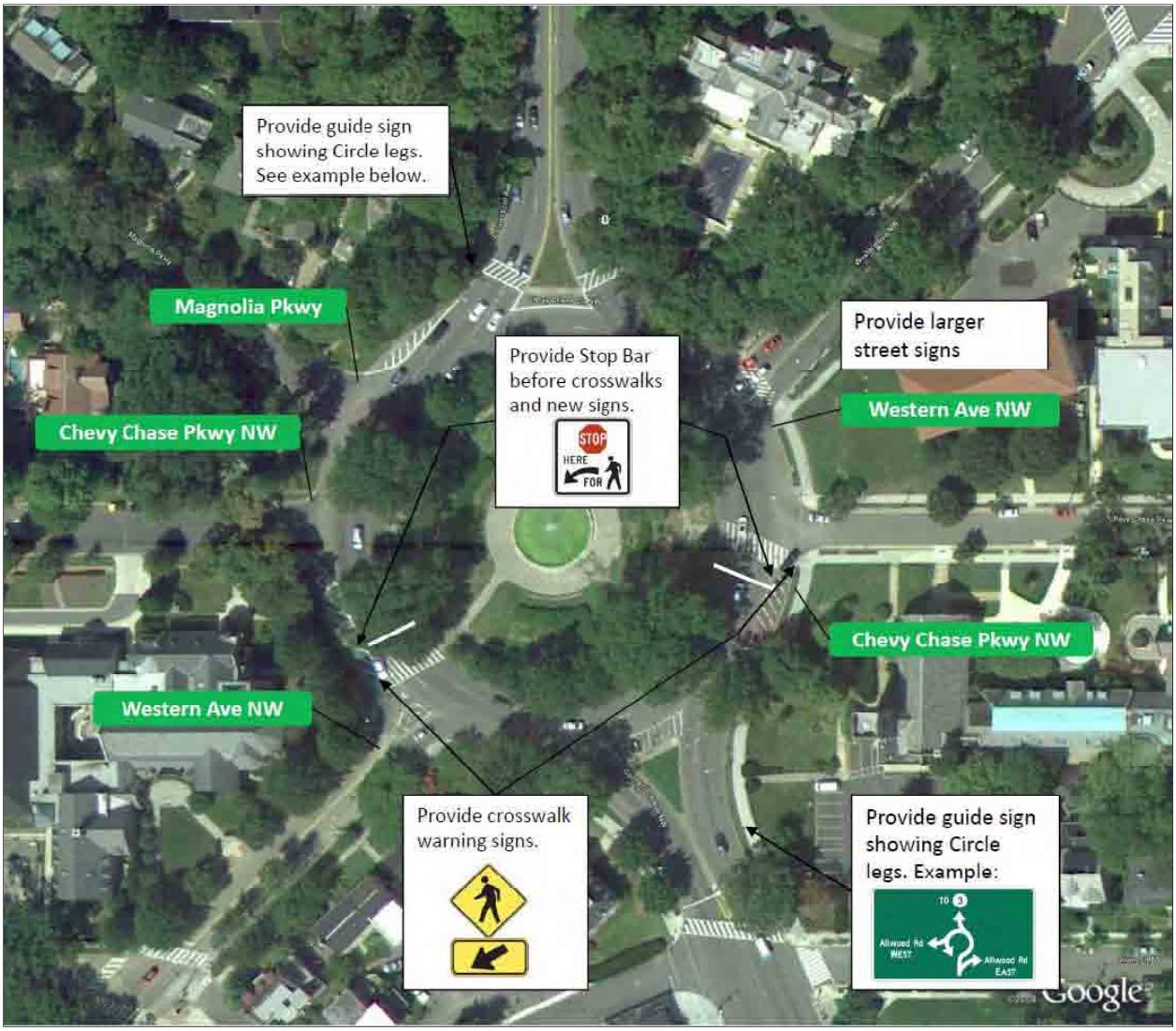

Figure 24: Chevy Chase Circle Short-Term Recommendations

Connecticut Avenue & Northampton Street

Comments: 13

Issues
Survey respondents reported that the intersection of Connecticut Avenue and Northampton Street was the site of aggressive driving and motorists speeding. A very high volume of pedestrians cross Connecticut Avenue, a major arterial, at this intersection, and there is no traffic signal for protection. Currently, DDOT provides orange flags at each end of the crosswalk for pedestrians to carry across, to increase visibility. A peak hour pedestrian count showed 127 pedestrians per hour crossing Connecticut Avenue, with approximately half of them using flags. Details about the pedestrian crossings are in Appendix C.

Final Recommendations

- Add paved curb extension to the southeastern Northampton Street approach.
- Add a High-intensity Activated crosswalk (HAWK) signal to the southern leg of the intersection. The signal will only be activated when pedestrians push the buttons provided at each end of the crosswalk.

Expected Impacts

- Adding curb extensions will reduce the speed of vehicle turning onto Northampton by narrowing the roadway and reducing turning radii. This will create a gateway effect from an arterial to a local street. They will also reduce the pedestrian crossing distance across Northampton.
- The addition of a HAWK signal will provide a protected pedestrian crossing and improve pedestrian safety.

41st Street and Livingston Street

Comments: 11

Issues
According to the survey, a major concern at 41st Street and Livingston Street was pedestrians crossing without signals. The signal cycle length is long, resulting in pedestrians waiting as much as 1.5 minutes or more to cross, which may contribute to jaywalking. Longer cycle lengths are typically not pedestrian-friendly or suitable for urban areas unless required by complex phasing or heavy traffic volumes.

Final Recommendation

- Reduce traffic signal cycle length from 100 to 50 seconds.

Expected Impacts

- Pedestrians will have much shorter waits for crossing signals, which should increase compliance with the signal and therefore improve safety.

41st Street and Legation Street

Comments: 1

Issues
There is poor visibility at the intersection of 41st Street and Legation Street due to shrubs in public space. According to the survey, motorists speed along 41st Street, and those turning from Legation Street find it difficult to make the turn. The intersection currently does not meet the warrant for an all-way stop.

Figure 25: Sight distance at 41st Street and Legation Street

Final Recommendation
Trim shrubs at the northwest and southeast corners of the intersection to improve visibility.

Expected Impacts
Trimming the shrubs will improve visibility for motorists approaching the intersection, particularly those approaching from Legation Street.

Nevada Avenue (between Western Avenue and Nebraska Avenue)

Comments: 29

Issues
The primary comment along Nevada Avenue had to do with motorists speeding, particularly near the intersections with Military Road and Nebraska Avenue. Field inspection showed wide travel lanes, which typically contributes to high speeds. Though this is a signed bicycle route, no pavement markings or specific bike facilities exist.

Final Recommendations

- Paint a 4-foot wide median on Nevada Avenue between Morrison Street and Nebraska Avenue. This leaves 11-foot wide travel lanes, consistent with the 9-foot parking lane/11-foot travel lane south of Nebraska Avenue.
- Paint the existing 7-foot wide parking lanes between Western Avenue and Nebraska Avenue
- Add bike sharrows to Nevada Avenue in both directions

Expected Impacts

- The addition of a median between Morrison Street and Nebraska Avenue, and the painting of the parking lanes that are already there should reduce vehicle speeds by visually narrowing the roadway and channelizing traffic.
- The addition of bicycle sharrows in both directions will alert drivers to bicycle traffic along Nevada Avenue, and potentially lead to increased cyclist volumes on this street.

Northampton Street and Broad Branch Road

Comments: 5

Issues
According to the survey, the major issues at Northampton Street and Broad Branch Road were motorists speeding and failing to yield. Because this intersection is adjacent to Lafayette Elementary School, these issues are of particular concern. High-visibility crosswalks are present across all legs of the intersection.

Final Recommendation

- Add a raised crosswalk along the eastern leg of the intersection.

Expected Impacts

- A raised crosswalk would reduce vehicle speeds due to vehicle deflection and improve pedestrian visibility and safety directly in front of the school.

Friendship Heights

Concerns in Friendship Heights focused on the three arterials in the neighborhood: Western Avenue, River Road, and Wisconsin Avenue. Many of the issues reported in the neighborhood focused on pedestrian safety and motorists speeding along arterials. Therefore, many of the recommendations for the Friendship Heights neighborhood focus on enhancing pedestrian safety and visibility, and slowing traffic on the arterials as well as local neighborhood cut-through streets. Figure 26 shows the recommendations.

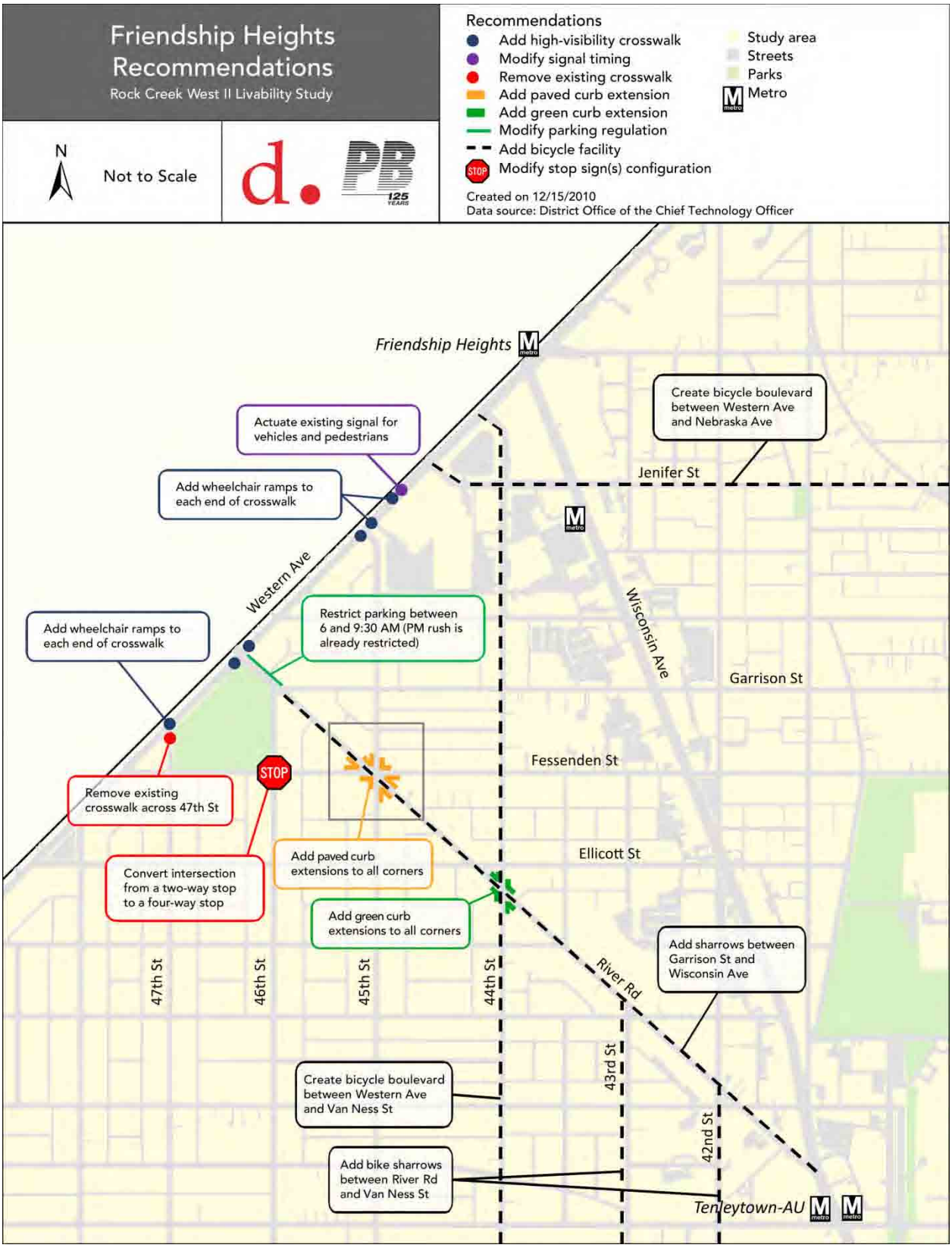

Figure 26: Friendship Heights Recommendations

Western Avenue and 47th Street

Issues
The existing crosswalk leads to no sidewalk, forcing pedestrians into 47th Street.

Final Recommendation
- Remove crosswalk across 47th Street. Add a high visibility crosswalk across the eastern leg of Western Avenue, which leads to a sidewalk.

Expected Impacts
- The removal of the existing crosswalk and the addition of the new high visibility one will direct pedestrians to the proper paths and facilities, and should improve pedestrian safety.

Western Avenue and River Road

Comments: 6

Issues
Unsafe turns and an awkward intersection were reported at Western Avenue and River Road. There is noted congestion for westbound traffic along River Road.

Final Recommendations
- Restrict parking during the morning rush hours for the 4600 block of River Road. Evening rush hour parking is already restricted.
- Add a high-visibility crosswalk at the intersection of Western Avenue and River Road, across both legs of Western Avenue.

Expected Impacts
- The restriction of rush hour parking will provide more space for vehicles turning right, reducing congestion at this intersection.
- The high-visibility crosswalk will alert drivers to pedestrian crossings, encourage pedestrians to cross at crosswalks, and should improve pedestrian safety.

Fessenden Street and 46th Street

Comments: 1

Issues
Residents reported high pedestrian traffic at this location, adjacent to a park. There are also sight distance issues. Additionally, at this intersection 46th Street is a collector and Fessenden Street is a local street, but Fessenden Street lacks a stop sign. When DDOT installs a two-way stop at the intersection of a collector and local street, the local street typically is stop-sign controlled.

Final Recommendations

- Convert this intersection from a two-way stop to an all-way stop.

Expected Impacts

- Installing stop signs at the Fessenden Street approaches would control traffic on the local street, which is typical DDOT policy. The all-way stop would improve traffic control and safety. Additionally, an all-way stop could make it easier for pedestrians to cross.

River Road and 45th Street and Fessenden Street

Comments: 12

Issues

This six-legged intersection is wide and has poor visibility, for both motorists and pedestrians. According to the survey, motorists speed along River Road, making it difficult for pedestrians to cross and for cars to turn from 45th Street and Fessenden Street.

Final Recommendations

- Add curb extensions to all six corners of the intersection.

Expected Impacts

- The addition of curb extensions will reduce the pedestrian crossing distance and potentially improve pedestrian visibility. Curb extensions could also reduce vehicle speeds due to the narrowed roadway. Additionally, for vehicles traveling from River Rd onto 45th Street, a local road, the curb extensions will provide a visual cue that the street is residential and low speed.

River Road and 44th Street

Comments: 6

Issues

Residents reported both motorist and pedestrian concerns: motorists speeding, unsafe turns, poorly-maintained crosswalks, and pedestrians crossing illegally. There is poor visibility at this intersection, particularly for turns coming from 44th Street.

Final Recommendations

- Add green curb extensions to all corners of the intersection.

Expected Impacts

- The addition of green curb extensions could reduce vehicle speeds by narrowing the roadway. Curb extensions will also reduce the pedestrian crossing distance and improve pedestrian sight lines. Additionally, for vehicles traveling from River Road onto 44th Street, a local road, the curb extensions will provide a visual cue that the street is residential and low speed.

River Road (between Garrison Street and Wisconsin Avenue)

Comments: 50

Issues

The top concern of respondents was motorists speeding along River Road. With many awkward intersections along its length, due to the angled intersections, visibility is poor. Pedestrian access across River Road is also poor, as most crossings are unsignalized. And though River Road is a signed bicycle route, there are no pavement markings or special treatments to indicate this use.

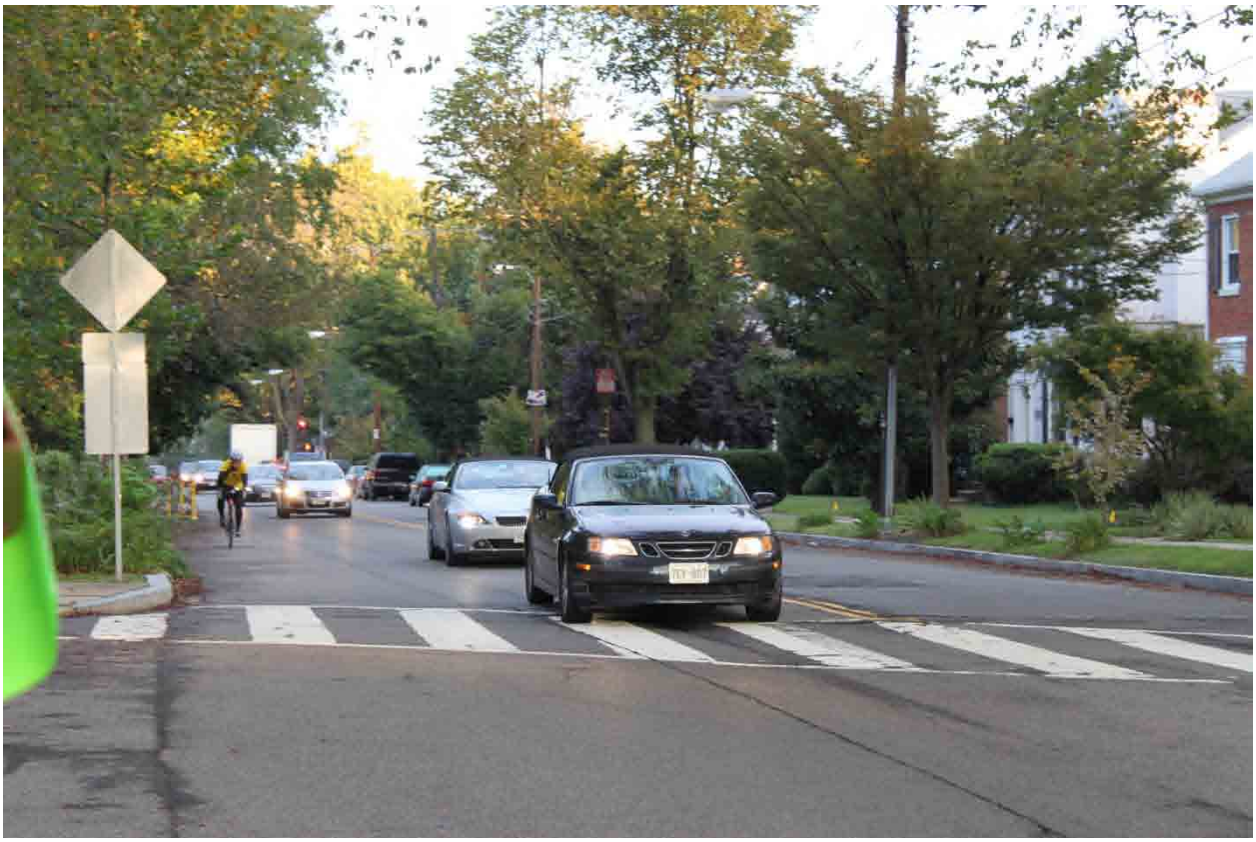

Figure 27: River Road

Final Recommendations

- Add bike sharrows in both directions.
- ANC to request a permanent speed camera from the Metropolitan Police Department.

Expected Impacts

- The bike sharrows will alert drivers to bicycle traffic and could increase cyclist volumes along River Road.
- The speed camera could reduce speeding by enforcement.

Western Avenue and 45th Street, Western Avenue and Geico Road

Comments: 6

Issues
Conflicts between pedestrians and motorists were reported at the intersection of Western Avenue and 45th Street, including motorists failing to yield and pedestrians crossing mid-block. The nearby intersection of Western Avenue and Geico Road lacks pedestrian facilities and has an underutilized signal.

Final Recommendations

- Add high-visibility crosswalk at the intersection of Western Avenue and 45th Street.
- Actuate signal at Geico Road for both vehicles and pedestrians. Add crosswalks across Western Avenue and add wheelchair ramps.

Expected Impacts

- The addition of a high-visibility crosswalk will alert drivers to pedestrian crossings, encourage pedestrians to cross at crosswalks, and improve pedestrian safety.
- The actuation of the signal at Geico Road will increase pedestrian safety by providing a protected crossing and visible crosswalks.

Forest Hills

Residents of the Forest Hills community reported concerns about cut-through traffic on local east-west neighborhood streets, as well as issues with motorists speeding through the neighborhood. The recommendations aim to address these concerns about motorists, while also encouraging additional access for pedestrians and bicyclists in the community. Figure 28 shows the recommendations.

Figure 28: Forest Hills Recommendations

36th Street & Fessenden Street

Comments: 15

Issues
The intersection with Connecticut Avenue, 36th Street, and Fessenden Street has an awkward configuration due to the diagonal alignment of Connecticut Avenue intersecting with the other streets. This creates sight distance issues. Survey respondents reported a failure to yield on the part of motorists.

Final Recommendations (see Figure 29)

- Remove the segment of 36th Street between Connecticut Avenue & Fessenden Street, and replace it with green space. An LID treatment is recommended here.
- Remove one parking space from NW corner of intersection on 36th Street, as recommended in the Connecticut Avenue Transportation Study.

Figure 29: 36th Street and Fessenden Street Recommendation

Expected Impacts

- Removing the small section of 36th Street between Connecticut Avenue and Fessenden Street will resolve the sight distance issue for northbound 36th Street traffic. It will improve sight distance for southbound 36th Street traffic and allow additional left turns from northbound 36th Street to Connecticut Avenue. It also provides an opportunity to expand the existing green space and make it more accessible to neighborhood residents.
- Removing the parking space will improve visibility for southbound 36th Street traffic.

Davenport Street (intersections at Nebraska Avenue, Reno Road, 36th Street, and Connecticut Avenue)

Comments: 38

Issues
Reported issues include motorists speeding along Davenport Street and motorists failing to yield at the intersection with Connecticut Avenue. Davenport Street connects east from Nebraska Avenue to Connecticut Avenue and through to Rock Creek Park, so it could be a convenient cut-through route for east-west traffic. The intersection with 36th Street is adjacent to Murch Elementary School.

Final Recommendation
- Add curb extensions to Davenport Street approaches at Nebraska Avenue and 36th Street. Add green curb extensions to Davenport Street approaches at Reno Road and Connecticut Avenue. These locations are consistent with the system-level recommendation of installing curb extensions where local streets approach collectors and arterials.

Expected Impacts
- The addition of curb extensions at these intersections has the potential to reduce vehicle speeds by narrowing the roadway. Curb extensions also enhance pedestrian access by reducing the crossing distance for pedestrians. Adding curb extensions at the intersection with collectors and arterials provides a gateway and slowing effect for motorists turning from these streets.

36th Street (between Veazey Terrace and Broad Branch Road)

Comments: 2

Issues
Respondents reported motorists speeding along 36th Street. As a north-south connection between Reno Road and Nevada Avenue, 36th Street likely serves cut-through traffic. There are no bicycle facilities along 36th Street, though it is a signed bicycle route.

Final Recommendations
- Add high-visibility crosswalks across all legs of intersections with Davenport Street and Ellicott Street.
- Designate 36th Street as a bicycle boulevard between Yuma Street and Broad Branch Road. Add pavement markings and wayfinding signs for cyclists. Sharrows should be painted on the road between Yuma Street and Broad Branch Road.

Expected Impacts
- High visibility crosswalks at Davenport Street and Ellicott Street have the potential to caution motorists to slow down and condition motorists to expect pedestrians. This could reduce aggressive driving in the school zone.
- The designation of 36th Street as a bicycle boulevard will improve the connectivity of the bicycle network and may lead to additional cyclists utilizing this route. It can also reduce vehicular speeds along 36th Street due to visual cues for multimodal traffic.

Van Ness Street (between Wisconsin Avenue and Connecticut Avenue)

Comments: 62

Issues
Van Ness Street is a collector that provides uninterrupted east-west connectivity through the entire study area, making it a preferred route for motorists traveling between Massachusetts Avenue, Nebraska Avenue, Wisconsin Avenue, and Connecticut Avenue. As such, the street carries significant volumes of motorists and residents report speeding along Van Ness Street.

There are no lane markings between Reno Road and International Court, making it unclear whether there is a turn lane at Reno Road.

Though Van Ness Street is not currently a bicycle route, it would provide a convenient connection from the Van Ness Metrorail station to points east and west through the study area.

Final Recommendations
- Add bike sharrows in both directions between Wisconsin Avenue and Connecticut Avenue.
- Add a centerline between Reno Road and International Court to meet the new raised median.
- Implement previous DDOT recommendations for the intersection of Van Ness Street and Connecticut Avenue, from the Connecticut Avenue Transportation Study. These include: increased pedestrian signal timing, and the addition of a right turn lane from eastbound Van Ness Street to southbound Connecticut Avenue.

Expected Impacts
- Bicycle sharrows along Van Ness Street may alert drivers to bicycle traffic and lead to increased cyclist volumes.
- The centerline between Reno Road and International Court could clarify travel lanes and reduce vehicle speeds by visually narrowing the roadway.
- The implementation of previous DDOT recommendations at Van Ness Street & Connecticut Avenue is likely to improve pedestrian safety and reduce vehicle congestion.

Tenleytown and American University Park

Residents of the Tenleytown and American University Park neighborhoods reported many concerns about cut-through traffic on local north-south neighborhood streets. These concerns about motorists speeding and failing to yield were especially pronounced at locations near Janney Elementary School. Many of the recommendations for this area aim to enhance pedestrian safety, slow motorists on neighborhood streets, and discourage cut-through traffic. Figure 30 shows the recommendations.

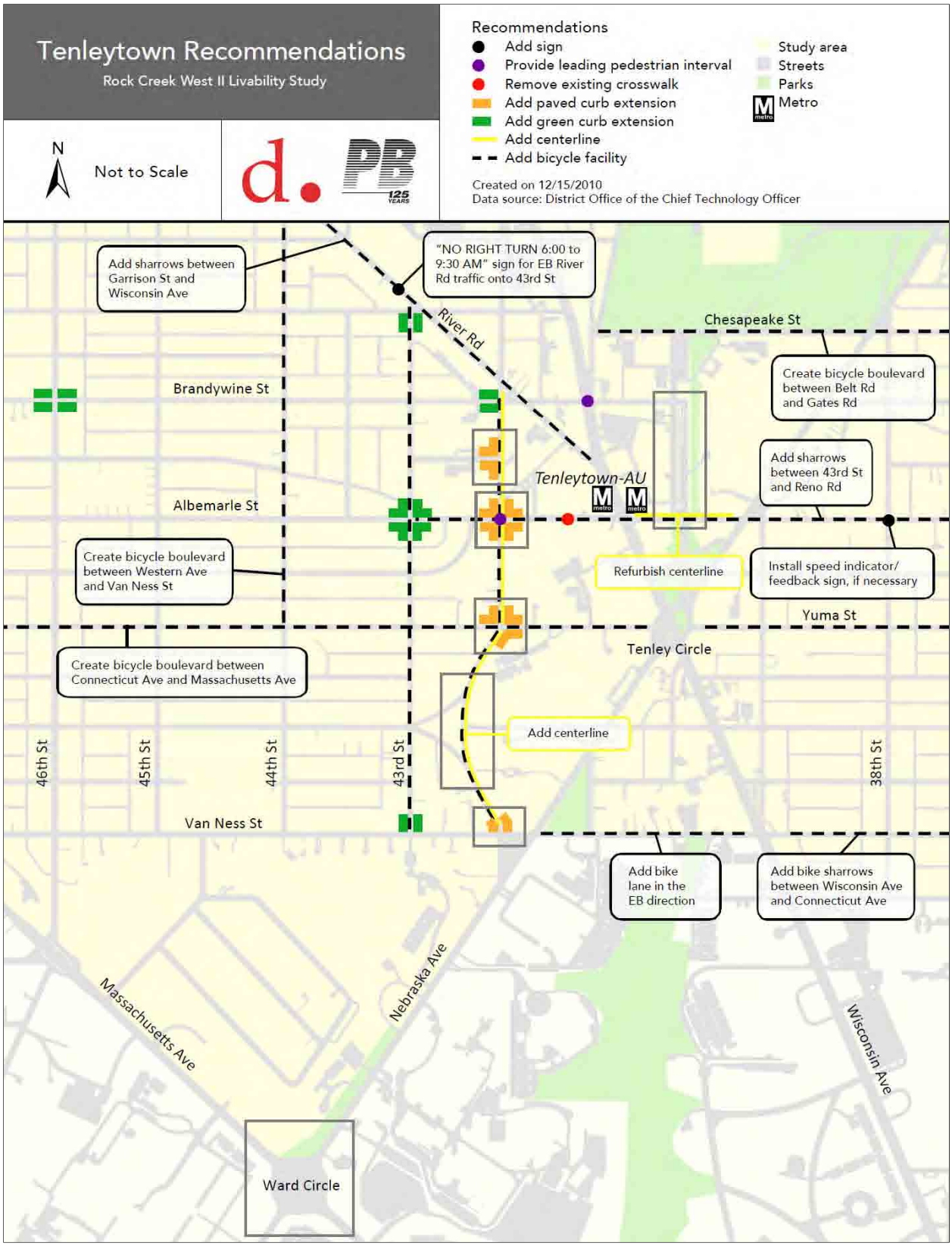

Figure 30: Tenleytown Area Recommendations

43rd Street (between River Road and Van Ness Street)

Comments: 45

Issues
43rd Street provides a direct connection between River Road and Nebraska Avenue, making it a preferred cut-through route for commuters. Many residents reported motorists speeding along 43rd Street. Residents were concerned with the volume of cut-through traffic, coupled with motorists failing to yield to pedestrians, during morning peak periods along this local neighborhood street.

Final Recommendations
- Add "NO RIGHT TURN 6:00 AM to 9:30 AM" signs at southwest corner of 43rd Street and River Road intersection, to prevent cut through traffic from River Road to Nebraska Avenue.
- Add bike sharrows in both directions.
- Add green curb extensions at River Road, Albemarle Street, and Van Ness Street. By focusing narrowing treatments at the intersections with collectors and arterials, motorists coming from these streets will have a smaller turning radius.

Expected Impacts
- If obeyed and enforced, the new signage will eliminate morning cut-through traffic and restore 43rd Street to its intended function as a local street. It may lead to increased traffic on the eastern segment of River Road, Wisconsin Avenue, and Nebraska Avenue. DDOT should consider these impacts before making this change, and potentially modify the timing of the nearby traffic signals.
- Bicycle sharrows could improve cyclist safety and increase cyclist volumes.
- The addition of curb extensions should reduce vehicle speeds by narrowing the roadway. In particular, motorist coming from collectors and arterials will need to reduce their speed while turning onto 43rd Street. Pedestrian crossing distance will also be reduced at these intersections.

42nd Street (between River Road and Van Ness Street)

Comments: 65

Issues
Residents reported significant cut-through traffic and motorists speeding along 42nd Street. This is a major concern because of the high pedestrian volumes, mostly children, crossing 42nd Street, particularly at Albemarle Street. Though 42nd Street is a collector and should carry traffic between local streets and arterials, it should not be a cut-through from arterial to arterial, nor should motorists speed along the roadway.

Final Recommendations
- Add a centerline along 42nd Street.
- Add curb extensions to the following intersections: Butterworth Place (northwest and southwest corners), Yuma Street (northwest, northeast, and southeast corners), and Van Ness Street (all corners). Add green curb extensions to the intersection with Brandywine Street (southwest and southeast corners).
- Add bike sharrows in both directions.

Expected Impacts

- The addition of a centerline should reduce vehicle speeds due to the visual narrowing of the roadway.
- The curb extensions could discourage cut-through traffic by narrowing the roadway at intersections and reducing the turning radii. Eventually the curb extensions could change the behavior of both local and cut-through vehicular traffic.
- Bicycle sharrows could improve cyclist safety and increase cyclist volumes.

42nd Street and Brandywine Street

Comments: 15

Issues

This is an intersection with an awkward configuration because of its proximity to River Road. Many residents reported that morning commuters typically make a fast right turn from River Road onto 42nd Street and fail to yield at the intersection with Brandywine Street. Still others reported speeding along Brandywine Street, as it provides a direct connection east to Wisconsin Avenue and Wilson High School. Many of the intersections are stop-sign controlled.

Figure 31: 42nd Street and Brandywine Street Recommendation

Final Recommendation (see Figure 31)

- Because it has limited utility and is awkwardly configured, remove the segment of Brandywine Street between 42nd Street and River Road, and replace it with green space and potentially a LID treatment.

Expected Impacts

- This recommendation removes the awkward intersection. The addition of green space offers an opportunity for placemaking and increases the pervious surface and potential for low-impact development. It is expected that there would be additional left turns from eastbound Brandywine Street to northbound 42nd Street, but these would likely remain at low volumes.

42nd Street and Albemarle Street

Comments: 33

Issues

Many of the comments at this intersection concerned motorists failing to yield at the intersection, or motorists speeding. These issues become even more prominent during the morning and afternoon rush periods, when children are walking to and from Janney Elementary School. A morning rush hour pedestrian count showed approximately 240 pedestrians per hour cross 42nd Street at this intersection.

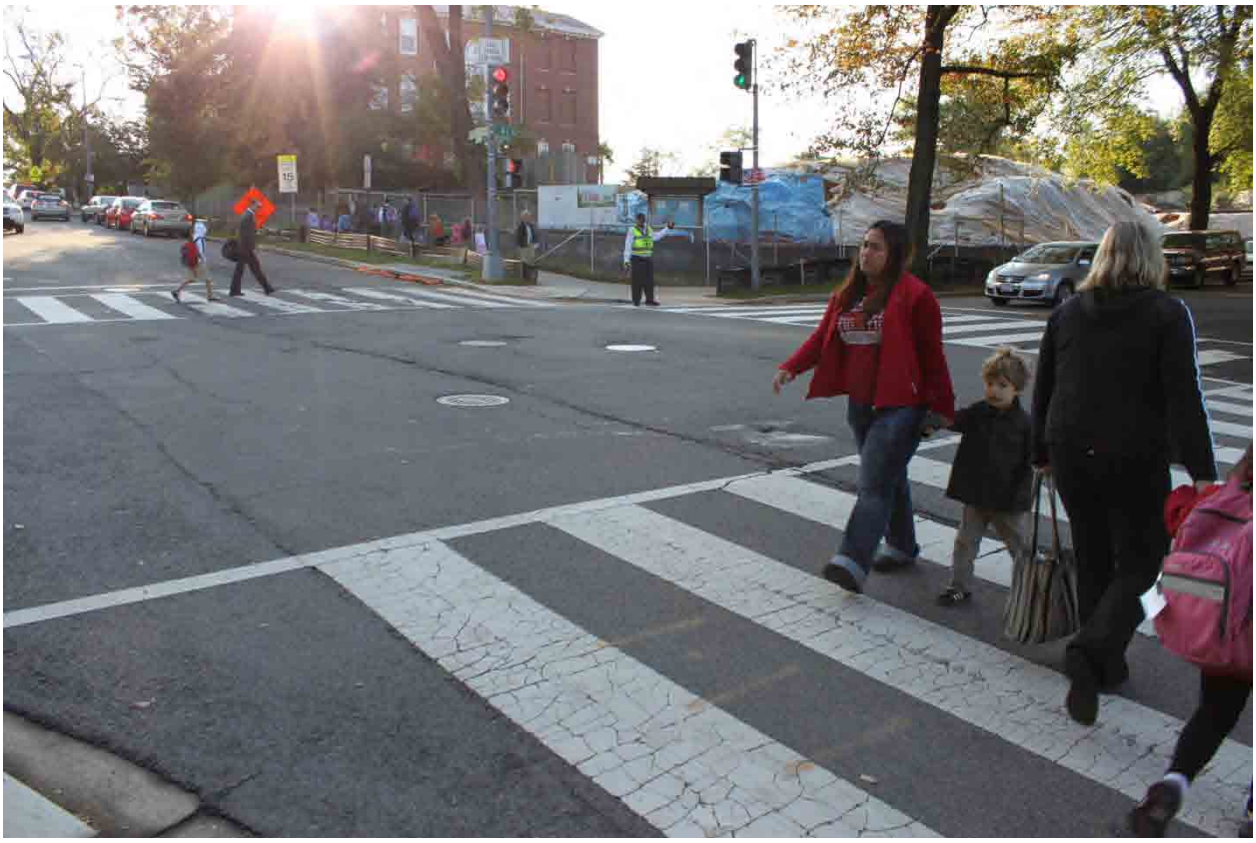

Figure 32: Morning rush hour at 42nd Street and Albemarle Street

Final Recommendations

- Provide a leading pedestrian interval (advanced pedestrian signal phase) at the traffic signal.
- Add curb extensions to all corners.

Expected Impacts

- A leading pedestrian interval could improve pedestrian safety by providing advanced crossing time.
- Curb extensions would reduce pedestrian crossing distance and could improve pedestrian visibility.

42nd Street and Warren Street

Issues: Residents report that motorists speed along 42nd Street, particularly in this segment, and make fast turns onto Warren Street. This stretch of roadway is without traffic controls on 42nd Street and the land uses are set back from the road. This configuration encourages speeding.

Final Recommendation

- Construct neighborhood traffic circles at both connections to Warren Street. See Figure 33 and Appendix D for details.

Expected Impacts

- Neighborhood traffic circles would reduce vehicle speeds, could improve pedestrian safety, and provide an opportunity for landscaping/placemaking including an LID treatment, if site conditions are appropriate. Neighborhood traffic circles, particularly when placed in a progression, are one of the most effective traffic calming tools to reduce speeds.

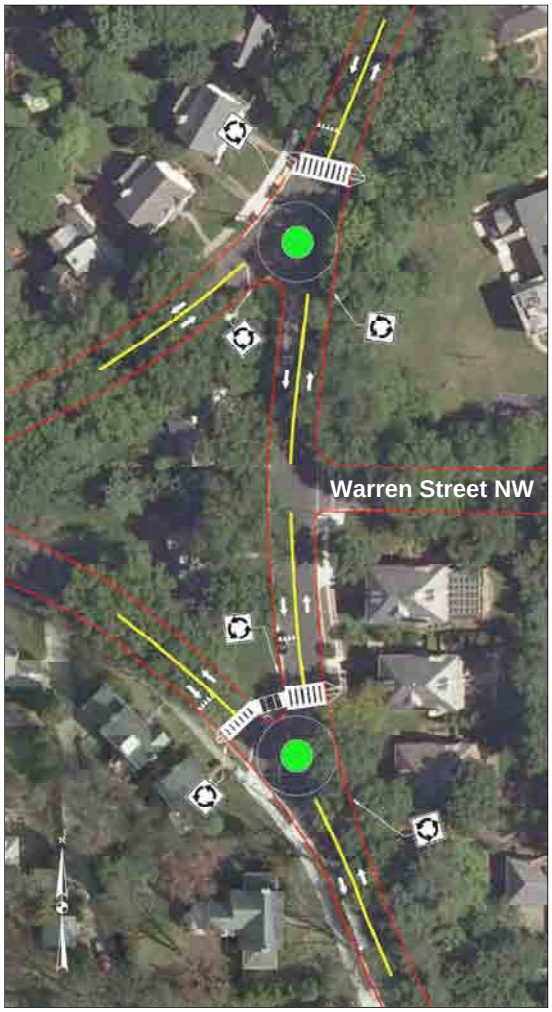

Figure 33: 42nd Street and Warren Street Recommendation

Van Ness Street (between Nebraska Avenue and Wisconsin Avenue)

Comments: 62

Issues
Respondents reported motorists speeding along Van Ness Street. Between Nebraska and Wisconsin Avenues, the roadway is wide, with no parking on the south side of the street but no lane markings to indicate that condition. The width could be contributing to speeding.

Final Recommendations

- Reconfigure Van Ness Street between Nebraska Avenue and Wisconsin Avenue to include one 11-foot wide travel lane in each direction, a parking lane on the north side, and an eastbound bicycle lane.

Expected Impacts

- The reconfiguration of Van Ness Street has the potential to reduce vehicle speeds by narrowing lanes and adding other modes of travel to the street.
- The addition of a bicycle lane could improve cyclist safety and increase cyclist volumes. Though there is only space for the lane for a short segment, it would connect to sharrows at each end.
- Bicycle sharrows along Van Ness Street may alert drivers to bicycle traffic and lead to increased cyclist volumes.

Albemarle Street (between 43rd Street and Reno Road)

Comments: 83

Issues
Respondents reported motorists speeding along Albemarle Street. Many residents were concerned about aggressive driving in the school zone. There are no bicycle facilities along Albemarle Street.

There is a mid-block crossing in front of Janney Elementary School, east of the 42nd Street intersection. This crosswalk is unsignalized and though it is painted as high visibility, its location is near the crest of a hill and it is not always visible. This configuration is not ideal and at worst, potentially unsafe for crossing children.

Final Recommendations

- Between Wisconsin Avenue and Nebraska Avenue, refurbish the centerline along Albemarle Street.
- Near 38th Street intersection, install a permanent-looking speed indicator or feedback sign if warranted. DDOT should perform a speed study to make this determination.
- Remove the mid-block crossing in front of Janney Elementary School, and direct school children to cross at the improved 42nd Street intersection.
- Add bike sharrows in both directions of Albemarle Street between 43rd Street and Reno Road.

Expected Impacts

- The refurbished centerline could reduce vehicle speeds due to visual narrowing of the roadway.
- The speed indicator could reduce vehicle speeds due to driver awareness of speed. A speed indicator sign could also be moved to other locations in RCW2 or in the city, as needed.
- Removing the mid-block crossing should reduce the number of pedestrians crossing at that location, thereby reducing pedestrian-vehicle conflicts and improve safety by directing pedestrians to cross at protected locations.
- The addition of bike sharrows could alert drivers to bicycle traffic and lead to increased cyclist volumes.

Brandywine Street (between 46th Street and Wisconsin Avenue)

Comments: 33

Issues

Respondents reported motorists speeding along Brandywine Street, as it provides an east-west connection from Western Avenue to Tenleytown and Wisconsin Avenue. There are no bicycle facilities on Brandywine Street.

Final Recommendations

- Because gateway and narrowing treatments should be focused at the intersection of local streets and collectors/arterials, add green curb extensions at 42nd Street and 46th Street.
- Provide a leading pedestrian interval (advanced pedestrian signal phase) at the intersection of Brandywine Street and Wisconsin Avenue, per a previous recommendation in the Friendship Heights Study.
- Designate Brandywine Street between 30th Street and Broad Branch Road a bicycle boulevard. Add pavement markings and wayfinding signs, with the potential for additional treatments.

Expected Impacts

- Curb extensions could reduce vehicle speeds by narrowing the roadway. They will also reduce pedestrian crossing distance. Finally, they will reduce the amount of stormwater flowing into the city's system by allowing for on-site soil and vegetation drainage.
- The leading pedestrian interval has the potential to improve pedestrian safety by providing advanced crossing time with no vehicle conflicts, and time for pedestrians to enter into the crosswalk and become visible to motorists.
- The designation of a bike boulevard could reduce vehicle speeds due to visual cues and lead to increased cyclists on Brandywine Street.

40th Street/Fort Drive

Comments: 8

Issues
Both 40th Street and Fort Drive, which parallel each other in the vicinity of the Tenleytown-AU Metrorail Station, are discontinuous streets with limited utility for through traffic, although they provide important local access to adjacent businesses and institutions and for bus connections to the Metrorail station. They intersect with Albemarle Street at a two-way stop, and intersect with Brandywine Street to the north. Within this block, 40th Street, owned by DDOT, carries one lane of southbound traffic and Fort Drive, owned by the Washington Metropolitan Area Transit Authority (WMATA), carries one lane of northbound traffic. The two are separated by a wide median.

The intersection of 40th Street and Fort Drive with Albemarle Street is problematic. It is staggered, so that Fort Drive lines up to the north and south, but to the south it is two-way. There is no 40th Street to the south. Therefore, southbound motorists approaching Albemarle Street do not have a direct line of sight to approaching traffic. This staggered intersection, stop-sign controlled for 40th/Fort only, is awkward, confusing, and obstructs some views.

Because 40th Street is one-way southbound, yet carries loading and service vehicles associated with the commercial and retail directly west of the street, there is a break in the median immediately north of the Albemarle Street intersection, to allow u-turns. While this is functional for vehicles, allowing them to bypass the intersection, it creates unnecessary circulation and is potentially unsafe for pedestrians; the median break is directly on top of a crosswalk.

Pedestrian volumes are significant due to the adjacent Metrorail station, Wilson High School directly to the east, Metrobus service on both streets, and substantial American University (AU) shuttle service on both streets. The street has a high level of activity from many modes of travel, and therefore a high chance for conflicts.

Final Recommendations (See Figure 34, and more details in Appendix D)

- Between Brandywine Street and Albemarle Street, reverse directions of 40th Street (to be northbound) and Fort Drive (to be southbound), to align approaching traffic movements at the Albemarle Street intersection.
- Remove the u-turn break in the median near the intersection of Albemarle Street. Replace with a median break and new crosswalk at the Whole Foods garage entrance and exit.
- Due to reversed directions of traffic, move Metrobus and shuttle stops to the median side of both 40th Street and Fort Drive.
- Convert metered parallel parking to angled parking along west side of 40th Street and east side of Fort Drive.

Expected Impacts

- The reversal of the direction of 40th Street and Fort Drive will improve visibility and could improve safety by aligning approaching traffic to the intersection with Albemarle Street. There will be a need to relocate Metrobus stops, shuttle stops, and parking.
- The circulation change would impact service and delivery vehicles associated with retail to the west, many of which use 40th Street today. DDOT and other entities would need to coordinate with the property owners and other stakeholders to mitigate impacts and develop a balanced solution.

- The addition of a median break and crosswalk at Whole Foods will relocate u-turns from the intersection to where most vehicles are coming from, and therefore could improve circulation.
- The conversion to angled parking will provide additional on-street parking for Wilson High School and other community destinations, as shown in Table 6. It will also narrow the travel-way and potentially calm traffic.

Figure 34: 40th Street/Fort Drive Recommendation

Table 6: Comparison of Existing and Proposed Curbside Uses for 40th Street and Fort Drive

	40th Street		Fort Drive	
Curbside uses	Existing	Proposed	Existing	Proposed
Number of metered parking spaces*	33	53	28	44
Number of Metrobus stops**	1	1	2	2
Number of shuttle spaces***	0	1	1	1

*Numbers are approximate for both existing and proposed. For the proposed configuration, the numbers would change based on needs of nearby land uses. These numbers do not include Zipcar spaces. Additionally, there is no existing or proposed designated Kiss & Ride zone.

**In both existing and proposed, one Metrobus stop is provided at the north end of Fort Drive, one at the south, and one is provided at the south end of 40th Street.

***Though shuttles currently use space at the northwest corner of the 40th Street and Albemarle Street intersection, this is not signed as a shuttle zone and because the buses block the intersection, it is not an idea location.

Ward Circle

Comments: 73

Issues
Ward Circle is the intersection of Massachusetts and Nebraska Avenues. Despite its name, it is not quite a circle, as Nebraska Avenue passes through the center via bypass lanes. Because of this geometry, turning movements are made at multiple places within the circle, causing confusion and weaving movements. The accident rate here is the highest within the RCWII study area. The pedestrian facilities are minimal, which is an issue due to its proximity to American University (AU) and the corresponding high pedestrian volumes. Additionally, AU has plans to expand and build on a property adjacent to the circle, which could mean increased vehicle-pedestrian conflicts due to increased pedestrian volumes.

Ward Circle was the subject of a DDOT Roadway Safety Audit in 2009, and in December 2010 had pavement markings refurbished and new signs installed to address the audit findings.

The National Park Service owns Ward Circle and DDOT owns, maintains, and operates its transportation infrastructure.

Final Recommendations
Both short-term and long-term recommendations were developed, recognizing both the immediate need for improvements and the complications expected in coordinating and implementing a long-term solution.

- Short Term:
  - For the Nebraska Avenue approaches, modify signal timing to include leading pedestrian intervals (advanced pedestrian signal phasing).
  - Add diagrammatic signage at all circle approaches to improve wayfinding.
- Long Term:
  - Signalize Massachusetts Avenue approaches to circle.

In the future, DDOT may wish to conduct further detailed study on reconfiguration of the circle, including removal of the bypass lanes and full signalization. PB conducted an initial, conceptual traffic analysis of this reconfiguration, presented in Appendix C. Initial results showed significant traffic delays associated with this configuration; therefore, it is not recommended at this time. If conversion to a traditional DC traffic circle is desired for placemaking reasons, a more detailed study should be performed.

Expected Impacts
- Short-Term:
  - Leading pedestrian intervals (LPIs) at the Nebraska Avenue signals would provide time for pedestrians to cross Nebraska Avenue without vehicle conflicts, with the goal of improving pedestrian safety. Additionally, LPIs allow pedestrians to enter the crosswalk and become more visible before vehicles are permitted to turn.
  - Additional signage would clarify lane assignments and reduce weaving and confusion.
- Long-Term: Signalization of the Massachusetts Avenue approaches would provide time for pedestrians to cross without vehicle conflicts, with the goal of improving pedestrian safety. Signalization could also improve traffic safety by controlling all traffic movements and eliminating confusion over yielding to circle traffic.

5 Implementation

Project Costs

A planning-level, order-of-magnitude cost estimate was developed for the proposed recommendations, shown in Table 8. The costs reflect the conceptual nature of the work to date. These numbers will help DDOT prioritize and phase implementation of the recommendations. DDOT should conduct a design-level cost estimate when more detailed design is done, before implementing parts of the project. The study's estimated cost for the entire suite of Rock Creek West II (RCW2) improvements is approximately $9.4 million.

Costs were compiled using unit costs from various sources and include the following allowances:

- 5 percent for landscaping
- 5 percent for erosion and sediment control during construction
- 15 percent for drainage and utility relocation
- 10 percent for maintenance of traffic during construction
- 25 percent design contingency, to reflect the conceptual nature of the design
- 10 percent for construction mobilization

The costs do not include other projects costs such as additional planning and engineering, overhead, profit and fees, contractor's contingency, or escalation beyond 2010 dollars.

Because cost data was taken from various state departments of transportation, cities, and references and was reported for different years, all estimates were escalated to 2010 USD values utilizing the PB Highway Construction Cost Index:

Year	Index	Growth
2006	131.9	n / a
2007	136.6	3.6%
2008	158.5	16.0%
2009	144.6	-8.8%
2010	156.0	7.9%

The items listed within the cost estimates, detailed in Appendix D, do not use the standard item description utilized by DDOT's estimator catalogue due to the planning level of the estimates.

Table 7: Construction Cost Estimates

LOCATION	TOTAL (2010 USD)
36th and Davenport	252,000
36th and Ellicott	4,000
36th and Fessenden	158,000
36th Street Corridor	98,000
40th and Fort	355,000
41st and Legation	2,000
41st and Livingston	4,000
42nd and Albemarle	263,000
42nd and Brandywine	395,000
42nd and Butterworth	130,000
42nd and Van Ness	65,000
42nd and Warren	127,000
42nd and Yuma	194,000
42nd Street Corridor	28,000
43rd and Albemarle	470,000
43rd and River	118,000
43rd and Van Ness	65,000
43rd Street Corridor	17,000
44th and River	470,000
44th Street Corridor	147,000
45th, River, and Fessenden	389,000
46th and Fessenden	2,000
Albemarle Street Corridor	58,000
Brandywine and 46th	235,000
Brandywine and Wisconsin	4,000
Brandywine Street Corridor	51,000
Chesapeake Street Corridor	82,000
Chevy Chase Circle (Long Term)	1,079,000
Chevy Chase Circle (Short Term)	616,000
Chevy Chase Parkway Corridor	109,000
Davenport and Connecticut	231,000
Davenport and Nebraska	65,000
Davenport and Reno	231,000
Garrison and Wisconsin	23,000
Gates Road Corridor	21,000
Jenifer Street Corridor	85,000
Livingston Street Corridor	55,000
Nevada Avenue Corridor	109,000
Northampton and Broad Branch	14,000

Northampton and Connecticut	415,000
River and Western	1,000
River Road Corridor	8,000
Van Ness Street Corridor	30,000
Ward Circle (Long Term)	1,052,000
Ward Circle (Short Term)	361,000
Western and 45th	3,000
Western and 47th	7,000
Western and Geico	550,000
Western and River	3,000
Yuma Street Corridor	109,000
TOTAL CONSTRUCTION COST ESTIMATE	9,360,000

Performance Measures

For a project to be focused and effective in meeting stated project goals and objectives, it is essential to measure performance of the process and the products that will span a continuum from day one to time horizons that will extend out to years in the future. And since the essence of livability involves fulfilling the expectations of individuals, families and communities, the measurement process must include gauging the perceptions of people as well as the performance of physical elements. This means that qualitative measures based upon survey research should play as important a role as quantitative measures based upon field measurements. Both are needed to understand the impact of investments made and changes implemented.

The measures themselves must be manageable in a number of different ways. Experience with performance measures indicates tendencies to adopt measures that are too numerous, too complex, too expensive in terms of data requirements, and not always on the mark with respect to stated objectives or actions to be taken. Specific measures for the RCW2 recommendations should:

- Relate to stated goals and objectives
- Be easy to understand and describe
- Require data that are relatively easy and affordable to collect
- Provide a basis for actions likely to improve outcomes over time (what gets measured gets done)

With those guidelines in mind, Table 9 shows the proposed performance measures for this project. Each of the recommendations was categorized into one of six issues, and measures for each issue are presented. Table 10 categorizes each recommendation by Issue Category.

Both the quantitative and qualitative measures should be recorded before improvements are made, to establish a "Baseline." The "Post", or monitoring that occurs after implementation occurs, should happen according to the following schedule:

- Measures using crash data: 2 years after implementation
- All other measures: 6 months after implementation and 2 years after implementation

Most changes can be seen and measured six months after implementation, once new driving patterns and behaviors form. For measures using crash data, a different schedule is proposed. Because crashes are more infrequent and caused by so many different factors, meaningful trends are typically not seen after six months. Therefore, measures using crash data should be taken two years after implementation.

Table 8: Proposed Performance Measures for RCW2 Improvements (data that DDOT already has is shaded)

		Performance Measures (shaded cells=DDOT already has data)			
		Quantitative		Qualitative	
Issue category	Goal	Baseline	Post	Baseline	Post
Motorists speeding	Reduction in speed	85th percentile speed	85th percentile speed	% of survey respondents who said speeding was an issue	% of survey respondents who said speeding was an issue
	Reduction in crashes	Average annual crash rate between A and B or within area C, recent 2-year period	Average annual crash rate between A and B or within area C, 2 successive years		
Failure to obey intersection control	Reduction in crashes related to driver behavior at intersections	Average annual crash rate related to intersection behavior between A and B or within area C, recent 2-year period	Average annual crash rate related to intersection behavior between A and B or within area C, 2 successive years	% of survey respondents who said motorists failing to yield, running red lights, and making illegal turns was an issue	% of survey respondents who said motorists failing to yield, running red lights, and making illegal turns was an issue
Lack of bicycle facilities	Increase in bicycle facilities such as lane, sharrows, cycletracks, and boulevards	Lane-miles of bicycle facilities between A and B or within area C	Lane-miles of bicycle facilities between A and B or within area C	% of survey respondents who said lack of bicycle facilities was an issue	% of survey respondents who said lack of bicycle facilities was an issue
	Increase in cyclist volumes	Average # of cyclists per hour passing point A over a defined period of time	Average # of cyclists per hour passing point A over a defined period of time (under similar weather and seasonal conditions as baseline)		
	Reduction in cyclist-related crashes	Average annual rate of cyclist fatalities and injuries between A and B or within area C, recent 2-year period	Average annual rate of cyclist fatalities and injuries between A and B or within area C, 2 successive years		

		Performance Measures (shaded cells=DDOT already has data)			
		Quantitative		Qualitative	
Issue category	Goal	Baseline	Post	Baseline	Post
Inadequate roadway infrastructure	Reduction in crashes caused by infrastructure deficiencies such as poor visibility, inadequate signage or pavement markings, and confusing geometry	Average annual rate of infrastructure-related crashes between A and B or within area C, recent 2-year period	Average annual rate of infrastructure-related crashes between A and B or within area C, 2 successive years	% of survey respondents who said awkward intersections, poor visibility, inadequate signage, or xxx was an issue	% of survey respondents who said awkward intersections, poor visibility, inadequate signage, or xxx was an issue
Pedestrian safety	Reduction in pedestrian-related crashes	Average annual rate of pedestrian fatalities and injuries between A and B or within area C, recent 2-year period	Average annual rate of pedestrian fatalities and injuries between A and B or within area C, 2 successive years	% of survey respondents who said poorly marked/located crosswalks, lack of pedestrian facilities, or pedestrians crossing mid-block was an issue	% of survey respondents who said poorly marked/located crosswalks, lack of pedestrian facilities, or pedestrians crossing mid-block was an issue
Cut-through traffic	Reduce cut-through traffic on local streets, shift traffic from local streets to collectors and arterials	Average daily traffic (seasonally adjusted), recent 2-year period	Average daily traffic (seasonally adjusted), 2 successive years	% of survey respondents who said cut-through traffic was an issue, local roads only	% of survey respondents who said cut-through traffic was an issue, local roads only

Table 9: Performance Measure Category by Recommendation

Location	Final Recommendation	Performance Measure Issue Categories
36th St & Fessenden St	Remove 36th Street between CT and Fessenden; replace with green space	Inadequate roadway infrastructure
36th St & Davenport St; 36th St & Ellicott St	Add high-visibility crosswalks across all legs	Pedestrian safety; Motorists speeding
36th St & Davenport St	Add curb extensions to all corners of intersection	Pedestrian safety; Motorists speeding
36th St, entire corridor (between Veazey St and Linnean Ave)	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments	Lack of bicycle facilities
40th St & Albemarle St	Paint crosswalks across 40th St curb cuts. Between Brandywine St and Albemarle St: reverse directions of 40th St (to be NB) and Fort Dr (to be SB). Convert metered parallel parking to angled parking along west side of 40th and east side of Fort Dr Remove u-turn break in median near intersection. Add median break and new crosswalk at Whole Foods garage entrance/exit	Pedestrian safety; Inadequate roadway infrastructure
41st St & Livingston St	Reduce traffic signal cycle length from 100 to 50 seconds	Pedestrian safety
41st St & Legation St	Trim shrubs at NW and SE corners of intersection	Inadequate roadway infrastructure
42nd St & Warren St	Construct neighborhood traffic circles at both connections to Warren St	Motorists speeding; Pedestrian safety
42nd & Albemarle St	Provide leading pedestrian interval (advanced pedestrian signal phase) at traffic signal Add curb extensions to all corners	Pedestrian safety
42nd St, entire corridor (between River Rd and Van Ness St)	Add a centerline	Motorists speeding
42nd St, entire corridor (between River Rd and Van Ness St)	Add curb extensions to the following intersections: Butterworth Pl (NW and SW corners), Yuma (NW, NE, SE corners), and Van Ness (all corners)	Motorists speeding; Cut-through traffic

Location	Final Recommendation	Performance Measure Issue Categories
42nd St, entire corridor (between River Rd and Van Ness St)	Add bike sharrows in both directions	Lack of bicycle facilities
43rd St, entire corridor (between River Rd and Van Ness St)	Maintain two-way operations, but add "NO RIGHT TURN 6:00 to 9:30 AM" signs at SW corner of 43rd St & River Rd intersection Add bike sharrows in both directions.	Cut-through traffic; Lack of bicycle facilities
43rd St & Albemarle St, Yuma St, and Warren St	Add curb extensions at River Rd, Albemarle St, and Van Ness St	Motorists speeding; Pedestrian safety
44th St between Western Ave and Van Ness St	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments	Lack of bicycle facilities
46th St & Fessenden St	Convert from two-way to all-way stop	Pedestrian safety; Failure to obey intersection control
Albemarle St between 42nd St and Wisconsin Ave	Remove mid-block crossing	Pedestrian safety; Inadequate roadway infrastructure
Albemarle St from Wisconsin Ave to Nebraska Ave	Refurbish centerline	Motorists speeding
Albemarle St around 38th St	Install permanent-looking speed indicator/feedback sign if warranted	Motorists speeding
Albemarle St between 43rd St and Reno Rd	Add bike sharrows in both directions	Lack of bicycle facilities
Brandywine St & 45th St, 44th St, 43rd St, and 42nd St	Add curb extensions at 42nd & 46th	Motorists speeding; Pedestrian safety
Brandywine St & 42nd St	Remove Brandywine St between 42nd and River; replace with green space	Motorists speeding; Inadequate roadway infrastructure; Pedestrian safety
Brandywine St & Wisconsin Ave	Provide leading pedestrian interval (advanced pedestrian signal phase)	Pedestrian safety
Brandywine St between 30th St and Broad Branch Rd	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments	Lack of bicycle facilities
Chesapeake St Between Belt Rd and Gates Rd	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments	Lack of bicycle facilities

Location	Final Recommendation	Performance Measure Issue Categories
Chevy Chase Circle (all major approaches)	Add clear, diagrammatic advanced signage explaining circle "exits" (short-term)	Inadequate roadway infrastructure
Chevy Chase Circle	Install traffic signals at Western Avenue approaches and at crosswalks, per completion of traffic analysis (long-term)	Inadequate roadway infrastructure; Pedestrian safety; Failure to obey intersection control
Chevy Chase Parkway between Chevy Chase Circle and Fessenden St	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments	Lack of bicycle facilities
Davenport St & Nebraska Ave, Reno Rd, Connecticut Ave	Add curb extensions to Davenport St approaches	Motorists speeding; Pedestrian safety
Garrison St & Wisconsin Ave	Remove concrete and bricks over planting strip	Motorists speeding
Gates Rd between Chesapeake St and 30th St	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments	Lack of bicycle facilities
Jenifer St between Western Ave and Nebraska Ave	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments	Lack of bicycle facilities
Livingston Rd between Western Ave and Broad Branch Rd	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments	Lack of bicycle facilities
Nevada Ave between Morrison St and Nebraska Ave	Paint median	Motorists speeding
Nevada Ave between Western Ave and Nebraska Ave	Paint parking lanes	Motorists speeding
Nevada Ave between Western Ave and Nebraska Ave	Add bike sharrows in both directions	Lack of bicycle facilities
Northampton St & Connecticut Ave	Add curb extension to southeastern Northampton approach Add HAWK signal at intersection	Motorists speeding; pedestrian safety Pedestrian safety
Northampton St & Broad Branch Rd	Add raised crosswalk across eastern leg of intersection	Motorists speeding; Failure to obey intersection control; Pedestrian safety

Location	Final Recommendation	Performance Measure Issue Categories
River Rd & Western Ave	Restrict parking during the AM rush hours (PM rush is already restricted) in 4600 block	Inadequate roadway infrastructure
River Rd & 45th St & Fessenden St	Add curb extensions to all four corners of the intersection	Inadequate roadway infrastructure; Motorists speeding; Pedestrian safety
River Rd & 44th St	Add curb extensions to all corners of intersection	Inadequate roadway infrastructure; Motorists speeding; Pedestrian safety
River Rd between Garrison St and Wisconsin Ave	Add bike sharrows in both directions Request permanent speed camera from MPD	Lack of bicycle facilities Motorists speeding
Van Ness St between Nebraska Ave and Wisconsin Ave	Reconfigure road to include one travel lane in each direction, a parking lane on the north side, and an EB bike lane	Motorists speeding; Lack of bicycle facilities
Van Ness St between Wisconsin Ave and Connecticut Ave	Add bike sharrows in both directions	Lack of bicycle facilities
Van Ness between Reno Rd and International Ct	Add centerline to meet new raised median	Motorists speeding
Van Ness St & Connecticut Ave	Implement previous DDOT recommendations: increased pedestrian signal timing, right turn lane from EB Van Ness St to SB Connecticut Ave	Pedestrian safety; Inadequate roadway infrastructure
Ward Circle (Nebraska Ave approaches)	Add leading pedestrian interval to signals (short-term)	Pedestrian safety
Ward Circle	Add signage at approaches (short-term)	Inadequate roadway infrastructure
Ward Circle	Signalize Massachusetts Ave approaches (long-term)	Pedestrian safety; Inadequate roadway infrastructure
Western Ave & 45th St, River Rd	Add high-visibility crosswalks at intersections, across Western Ave	Pedestrian safety
Western Ave & 47th St	Remove crosswalk across 47th St, add high visibility one across eastern leg of Western Ave	Pedestrian safety
Western Ave & Geico Rd	Actuate signal for both vehicles and pedestrians, add crosswalks across Western Ave, add wheelchair ramps	Pedestrian safety; Inadequate roadway infrastructure
Yuma St between Massachusetts Ave and Connecticut Ave	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments	Lack of bicycle facilities

Next Steps

Now that the livability study phase has ended, some of the projects identified will move to implementation. Many, however, will require more coordination, actions by the community, and funding and programming by DDOT. The following items are anticipated to progress in the near future:

- **Pavement Removal**: DDOT is pursuing a citywide contract for pavement removal in various locations, and the 36th St/Fessenden St/Connecticut Ave recommendation and the 42nd St/Brandywine recommendation will be part of that contract.
- **Green Infrastructure**: DDOT is also planning to pursue a contract for numerous green infrastructure, or LID treatments. The green curb extensions proposed as part of this project (discussed in Section 4) will be included as a part of that contract.
- The retiming of the 41st St NW and Livingston Street intersection, and the shrub trimming at 41st and Legation Street.
- The all-way stop at 46th Street NW and Fessenden Street.

Other projects will move forward as funds become available, as the community builds momentum, or as overlapping projects come online.

Some community actions that can be taken in the near future include:

- Requesting speed cameras, where necessary, from the DC MPD.
- Coordinating with the appropriate Advisory Neighborhood Commission (ANC) for projects that need more study, such as Ward Circle, and 40th Street and Fort Drive.
- Working with DDOT, through the ANCs, on prioritization and finalization of many of the recommendations presented in this report.

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