Road Safety Audit for the Lincoln Memorial Circle

September 2014

Paul S. Sarbanes Transit In Parks
Technical Assistance Center
UNDERSTANDING RESOURCES SOLUTIONS

This document was prepared for the Federal Transit Administration and National Park Service by the Paul S. Sarbanes Transit in Parks Technical Assistance Center

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AUTHOR

This document was authored by Natalie Villwock-Witte of Western Transportation Institute at Montana State University, the lead organization of the Paul S. Sarbanes Transit in Parks Technical Assistance Center (TRIPTAC).

ACKNOWLEDGMENTS

The author would like to acknowledge the contributions of Eliza Voigt, Michael Alvino, Dan Nabors, Norah Ocel and Phil Shapiro for reviewing and providing input for and feedback on the report. The author would also like to acknowledge the technical editing performed by Carla Little.

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EXECUTIVE SUMMARY

A Road Safety Audit (RSA) was performed for the Lincoln Memorial Circle (LMC) from Wednesday, April 30, 2014 through Saturday, May 3, 2014 to provide recommendations for safety improvements.

The objectives for this RSA are to:

- Identify issues affecting safety of all users in the study area
- Identify alternatives to increase accessibility throughout the LMC
- Identify safety improvements for non-motorized users
- Identify safety improvements for motorized users

The RSA Team recommended improvements for thirteen locations within the scope defined for the RSA.

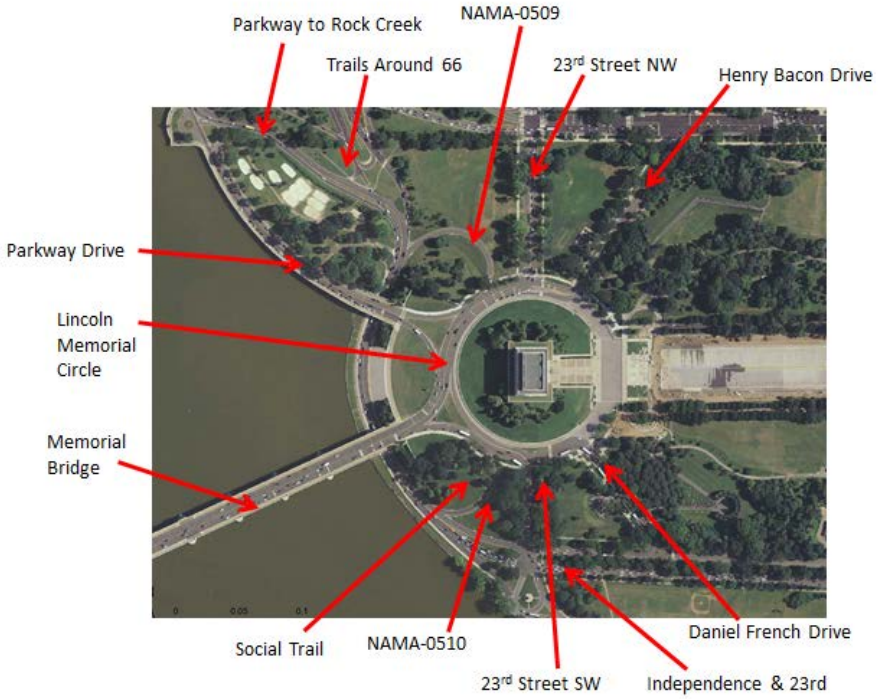

Figure 1: Findings & Suggestions Locations (1)

An overview of the recommended changes, which can be made in qualitative time frames of short, medium, and long-term, can be found in the following tables.

SHORT-TERM CHANGES

This section presents changes recommended in the short-term.

Table 1: Recommended Short-Term Changes

	Location	Recommended change
1	Henry Bacon Drive	Bus Parking – enforcement needed
2	Henry Bacon Drive	Pedestrian Sign – remove
3	23rd Street NW	Pedestrian Crossing Timing – investigate the ability to allot more time
4	LMC	Delineators – install more, install at gaps of 2 to 3', create a plan for replacement
5	NAMA-0509	Crosswalks - restripe
6	NAMA-0509	Yield Sign – remove obstructions
7	Parkway Drive	Crosswalk Markings – restripe according to DDOT standards
8	Parkway Drive	Install "PED XING" pavement markings for westbound traffic
9	Parkway Drive	Rumblestrips – replace
10	Parkway Drive	Pedestrian Signs – install advance warning signs facing eastbound direction; replace advance warning signs facing westbound traffic; install crossing signs at crosswalk for eastbound and westbound traffic
11	Parkway Drive	No U-turn – investigate need
12	Arlington Memorial Bridge	Pavement wayfinding – investigate application for eastbound
13	Arlington Memorial Bridge	Advance pedestrian crossing signs – investigate feasibility of installation
14	NAMA-0510	Stop signs along pedestrian/bicycle pathway – remove; consider on-pavement warning of crossing for trail users
15	NAMA-0510	On-road pedestrian crossing signs – remove; install DDOT's R1-6a; install DDOT's R1-6a and W16-7P at crosswalk
16	NAMA-0510	Rectangular rapid flashing beacon (RRFB) – consider applicability
17	23rd Street SW	Stop signs along pedestrian/bicycle pathway – remove; consider on-pavement warning of crossing for trail users
18	23rd Street SW	Buses – enforce no-parking on pedestrian crossing
19	Daniel French Drive	Buses – accessibility of pedestrian crossing
20	Parkway to Rock Creek	Wayfinding – provide information at decision point
21	Parkway to Rock Creek	Pedestrian/Bicyclist crossing – install vertical signage
22	Trails Around I-66	Identify Discontinuity of Trail Across I-66 – install informational signage

MEDIUM-TERM CHANGES

This section presents changes recommended in the medium-term.

Table 2: Recommended Medium-Term Changes

	Location	Recommended change
23	Overall	Signals – investigate compliance to Architectural Barriers and Accessibility Standards
24	Overall	Signage – perform study
25	Overall	Pavement Markings – perform study
26	Henry Bacon Drive	Curb ramps – widen
27	23rd Street NW	Curb ramps - widen
28	NAMA-0509	Pedestrian Crossing Sign - replace
29	Parkway Drive	Refuge Island – investigate applicability
30	Arlington Memorial Bridge	Rumblestrips – replace
31	NAMA-0510	Gap between pavement and curb ramp – level pavement to curb ramp elevation
32	Daniel French Drive	PM Bus Egress – enforcement
33	Independence & 23rd	Crosswalk timing - reconfigure
34	Trails Around I-66	Rock Creek Park Crossing – investigate feasibility of providing a defined crossing

LONG-TERM CHANGES

This section presents changes recommended in the long-term.

Table 3: Recommended Long-Term Changes

	Location	Recommended change
35	Overall	Pedestrian/Bicyclist Crossings Options – perform a study to investigate feasibility of options
36	NAMA-0509	Investigate applicability of stop control, narrowing roadway width and potentially configuration of NAMA-0509 accessing the LMC
37	NAMA-0510	Merge – investigate feasibility of increasing merge area
38	Daniel French Drive	Re-route traffic – perform a study to investigate impact of reversing traffic
39	Social Trail	Social trail – construct hard surface trail

INTRODUCTION

The Lincoln Memorial is located at the western end of the National Mall in Washington D.C. and is one of the most visited tourist sites in the city with approximately 6.2 million annual visitors (2). The Lincoln Memorial Circle (LMC), which surrounds the Lincoln Memorial, is a crossing point for vehicles using Rock Creek Parkway, George Washington Memorial Parkway (GWMP), I-66, the Arlington Memorial Bridge, and several other arterials. Non-motorized users may pass through the LMC when connecting from the Mount Vernon Trail to the Rock Creek Park Trail via the Arlington Memorial Bridge (Figure 2).

Figure 2: Rock Creek Park Trail & Mount Vernon Trail (Image courtesy of Dan Nabors)

There are two road managers in the area: the District Department of Transportation (DDOT) and the National Park Service (NPS).

Because of its location, the LMC is heavily utilized by both vehicles and non-motorized users (pedestrians and bicycles). Interactions between these user groups are becoming more of a concern as visitors and residents make more frequent use of non-motorized modes. Furthermore, accessibility for non-motorized users throughout the LMC is a concern. In particular, Locations A, B and C, identified in Figure 3, are barriers for non-motorized user crossings. Many non-motorized users are observed trying to cross at these locations, and while many make the traverse, some turn around and look for other options.

The study area for this road safety audit (RSA) is roughly bounded by the red lines in Figure 3.

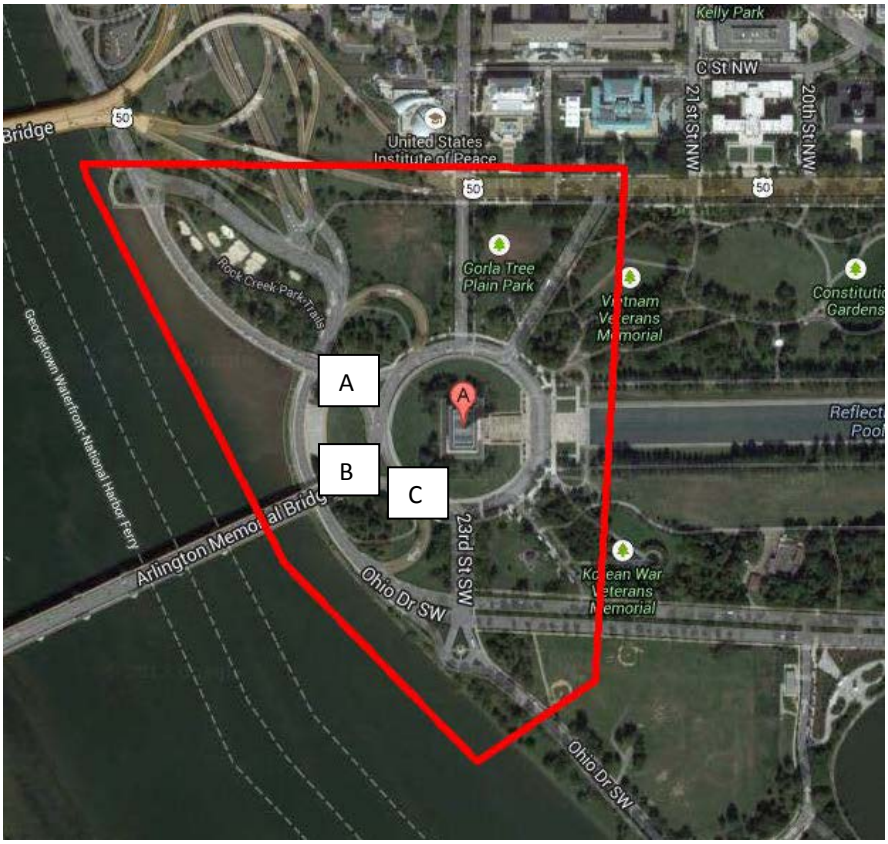

Figure 3: Study Boundary (1)

The objectives for this RSA are to:

- Identify issues affecting safety of all users in the study area
- Identify alternatives to increase accessibility throughout the LMC
- Identify safety improvements for non-motorized users
- Identify safety improvements for motorized users

BACKGROUND

This section presents information on the dates of the RSA, identifies the RSA Team, identifies the topics discussed during the start-up meeting, defines a conflict, summarizes the crash data for the study area, discusses the collected volume data, discusses relevant findings from an on-going tour bus operation study, and presents relevant sections from the DDOT design manual. Regarding the DDOT design manual, this information is included because although NPS owns and operates the majority of the roadways in the study area, it may not have guidelines associated with all traffic features, like crosswalk design. As a

result, the NPS may want to consider choosing a design consistent with the surrounding infrastructure, which are all DDOT roadways.

An RSA was performed for the LMC from Wednesday, April 30, 2014 through Saturday, May 3, 2014. In addition, a pre-visit planning meeting was conducted Wednesday, April 9, 2014. The RSA was conducted according to the following schedule:

- Wednesday, April 30, 2014: Start-Up Meeting
- Thursday, May 1, 2014: Weekday Field Observations
- Friday, May 2, 2014: Follow-Up Observations; Summary of Recommendations
- Saturday, May 3, 2014: Weekend Field Observations

RSA ASSESSMENT TEAM

The RSA assessment team was composed of the following members:

- Michael Alvino, National Park Foundation, Transportation Scholar, National Mall and Memorial Parks (NAMA)
- James Asirifi, Federal Highway Administration – Eastern Federal Lands Highway Division (FHWA-EFLHD), Safety Engineer
- Norah Ocel, FHWA-EFLHD, Safety Engineer
- George Branyan, DDOT, Pedestrian Program Coordinator
- Mike Goodno, DDOT, Bicycle Program Specialist
- Dan Nabors, TRIPTAC (Vanasse Hangen Brustlin, Inc. (VHB)), Transportation Engineer
- Phil Shapiro, TRIPTAC (Shapiro Transportation Consulting, LLC (STC)), Deputy Director
- Natalie Villwock-Witte, TRIPTAC (Western Transportation Institute at Montana State University), Research Engineer

START-UP MEETING

The Start-Up Meeting was conducted to allow introductions among all of the stakeholders and the RSA Team. In addition, the project schedule, logistics, and additional items were discussed.

ATTENDEES

Michael Alvino, NAMA
Eliza Voigt, NAMA
Phil Shapiro, TRIPTAC
Dan Nabors, TRIPTAC
Jim Burton, NAMA
Einar Olsen, NPS - National Capital Region (NCR)
Joel Gorder, NPS - NCR
Mike Goodno, DDOT
George Branyan, DDOT
Norah Ocel, FHWA
James Asirifi, FHWA

Makayah Royal, NPS - NCR

In addition to introductions, coordination details, and logistics, the following nine topics were discussed at the RSA Start-Up meeting:

- Non-motorized user perspective via bike share
- Crash data
- Delineator installation date
- Underpass example
- Average annual daily traffic (AADT) differences
- Non-motorized counts
- Arlington Memorial Bridge and Vietnam Veterans Memorial connection
- Definition of a conflict
- Fatality Analysis Reporting System (FARS) database

Information obtained regarding some of these topics is provided in subsequent sections.

Non-motorized user perspective via bike share: Regarding the non-motorized user perspective, DDOT offered to provide access to bike share so that RSA participants would be able to experience the study area on a bike.

Crash data: Questions were raised regarding the crash data provided for 2013. Compared to the crash data for other years, there was significantly less information. One hypothesis presented was that the number of crashes was not provided for the entire year.

Delineator installation date: At the east end of the Arlington Memorial Bridge, just prior to where the roadway diverges to follow the circle in either direction, there are delineators in between the opposing directions of travel (Figure 4). Jim Burton indicated that the delineators were installed at the end of 2012.

Figure 4: Delineators

Underpass example: As mentioned in the Introduction, access for non-motorized users across various parts of the circle is inhibited as a result of the vehicular traffic. Therefore, an underpass is one of many potential solutions that could be proposed. Representatives from the NPS - NCR suggested that a good example of an underpass for pedestrians can be found at the Wolf Trap Center for the Performing Arts, another NPS unit. The underpass provides a link between the vehicle parking lot and the main area.

AADT differences: Several other road safety audits ((3), (4)) have been performed in close proximity to the LMC, including one along the Mount Vernon Trail (5). During the Rock Creek and Potomac Parkway RSA, differences in AADT counts were found when comparing the information provided by FHWA-EFL and DDOT. Therefore, the Transportation Scholar was directed to contact Daniel Holt (FHWA-EFL) to obtain AADT counts documented by FHWA-EFL.

Non-motorized counts: Volunteers for GWMP count non-motorized users along the Mount Vernon Trail. One of these counts was performed in close proximity to the west side of the Arlington Memorial Bridge.

Arlington Memorial Bridge and Vietnam Veterans Memorial connection: NCR representatives recommended walking the route between the Arlington Memorial Bridge and the planned Vietnam Veterans Memorial Visitor Center. The future site of the Vietnam Veterans Memorial Visitor Center is located in the northeast corner of the study area (Figure 3).

Definition of a conflict: During the start-up meeting, Makayah Royal initiated a discussion about the definition of a conflict. Dan, Norah, Phil and George all offered potential definitions. While the definitions were similar, they differed to some degree. Therefore, the meeting participants recommended that the report provide a definition of a conflict.

FARS database: Norah Ocel recommended checking the FARS database for the study area.

DEFINITION OF A CONFLICT

A conflict is a situation where motorists, pedestrians, or bicyclists are making sudden stops or other evasive maneuvers where there are designated facilities. Such a condition would necessitate an improvement to the road or environment.

In contrast, uncontrolled crossings are locations where pedestrians or bicyclists are crossing at undesignated places. This condition implies a situation in which the risk is elevated for all users because there is no control to help provide information or guidance on expectations of users of the facilities.

CRASH DATA SUMMARY

Crash information for the LMC was obtained from NPS for 2011 through 2013. The total number of crashes of all types in 2011, 2012 and 2013 were 24, 25, and 10, respectively. As can be seen in Figure 5, only a small number of the reported crashes involved pedestrians

or bicycles. The crashes discussed hereafter do not include property damage only crashes, as data is not collected for this crash categorization.

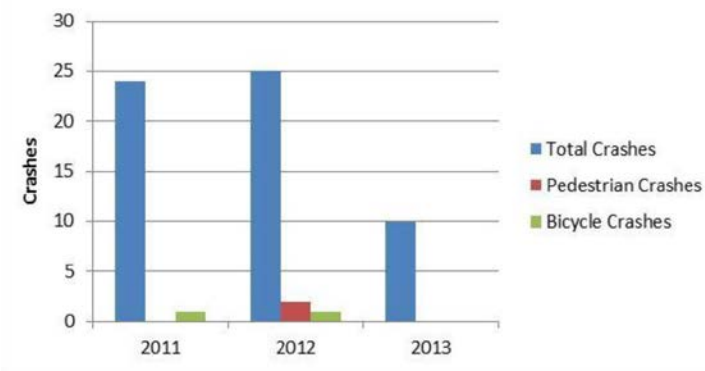

Figure 5: Crashes by Year (Chart credit: Dan Nabors)

A follow-up search of the FARS database was performed, as was recommended during the Start-Up Meeting. No fatal crashes were identified for the previous three years.

The NPS uses a system of nodes to locate crashes. The following three tables summarize the number of crashes, categorized by location and collision type (what the vehicle collided with). In some cases, the totals shown in these tables will be less than the total number of crashes identified in Figure 5 because some route information was unavailable.

Table 4: 2011 Crash Summary

2011	Memorial Bridge	LMC	Daniel French	23rd Street South	Parkway Drive	Off Ramp LMC	On Ramp LMC	Henry Bacon	23rd Street North	TOTAL
Other Motor Vehicle	3	1	3	1	2	2	-	2	-	14
Parked Motor Vehicle	-	-	-	-	-	-	-	1	-	1
Fixed Object	-	-	-	-	-	-	-	-	1	1
Pedalcycle	-	-	-	1	-	-	-	-	-	1
Pedestrian	-	-	-	-	-	-	-	-	-	0
Non-Collision	-	1	-	-	-	-	-	-	-	1
TOTAL	3	2	3	2	2	2	0	3	1	18

Table 5: 2012 Crash Summary

2012	Memorial Bridge	LMC	Daniel French	23rd Street South	Parkway Drive	Off Ramp LMC	On Ramp LMC	Henry Bacon	23rd Street North	TOTAL
Other Motor Vehicle	2	2	-	-	1	3	-	2	4	14
Parked Motor Vehicle	-	-	1	-	-	-	-	-	-	1
Fixed Object	-	-	-	-	-	-	-	-	1	1
Pedalcycle	1	-	-	-	-	-	-	-	-	1
Pedestrian	1	-	-	-	-	-	-	1	-	2
Non-Collision	1	1	-	-	1	-	-	-	-	3
TOTAL	5	3	1	0	2	3	0	3	5	22

Table 6: 2013 Crash Summary

2013	Memorial Bridge	LMC	Daniel French	23rd Street South	Parkway Drive	Off Ramp LMC	On Ramp LMC	Henry Bacon	23rd Street North	TOTAL
Other Motor Vehicle	1	1	-	-	1	4	-	-	1	8
Parked Motor Vehicle	-	-	-	-	-	-	-	-	-	0
Fixed Object	-	-	-	-	-	-	-	-	-	0
Pedalcycle	-	-	-	-	-	-	-	-	-	0
Pedestrian	-	-	-	-	-	-	-	-	-	0
Non-Collision	-	-	-	-	-	-	1	-	-	1
TOTAL	1	1	0	0	1	4	1	0	1	9

Two generalizations can be drawn from these tables. First, the majority of collisions are with other motor vehicles (i.e. two motor vehicles are involved in the crash). Second, for every year, the off-ramp from the LMC (a.k.a. off-ramp from Arlington Memorial Bridge to Ohio Drive) has a comparably greater number of collisions between motor vehicles than other locations.

Another observation that can be seen from these tables is that the number of crash records in 2013 decreased by at least half when compared with 2012 or 2011. Records from 2013 were only accessible for the first half of the year because in June of 2013, a new crash reporting system was implemented by the United States Park Police.

The following figures summarize crashes by month (Figure 6) and day of the week (Figure 7). Fifty-one percent of the total crashes occur between May and July. The majority of the crashes occur on Wednesday and Thursday. Pedestrian crashes were found to occur on Thursday and Friday and bicyclist crashes were found to occur on Saturdays.

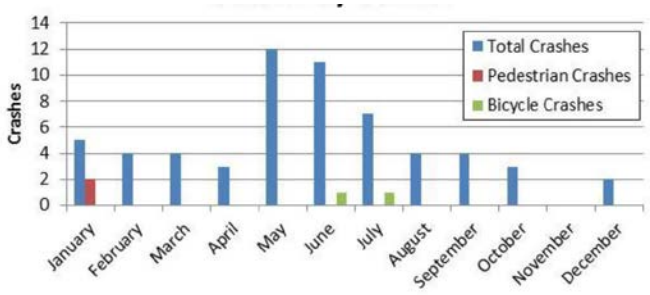

Figure 6: Crashes by Month (Chart credit: Dan Nabors)

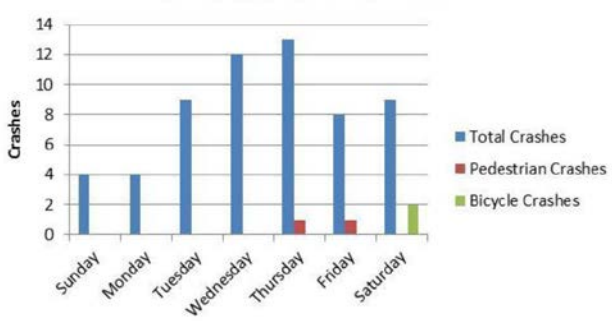

Figure 7: Crashes by Day of the Week (Chart credit: Dan Nabors)

When looking at the crashes by time of day (Figure 8), forty-five percent of the crashes occurred between 1 and 6 PM, including all bicycle and pedestrian crashes.

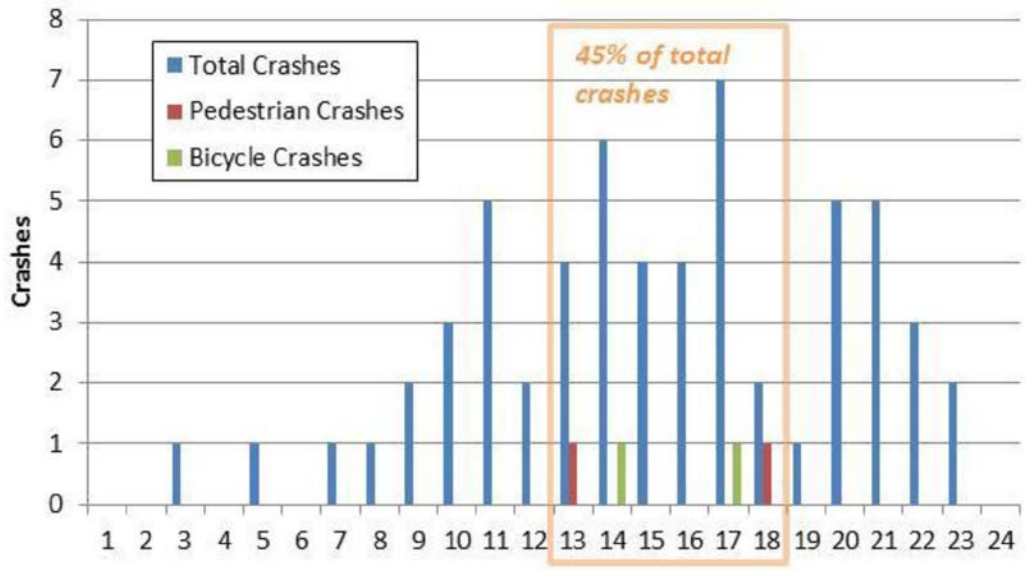

Figure 8: Crashes by Time of Day (Chart credit: Dan Nabors)

VOLUME

The following provides information on the best available count information for vehicles and bicycles and pedestrians. The reader should be cautious in drawing any kind of comparison between these two types of counts, as the vehicle counts were an average annual daily traffic count, whereas the bicycle and pedestrian counts were a twenty-four hour count. Furthermore, the only available bicycle and pedestrian counts were taken outside of the defined study area. However, it was the only count data available for bicycles and pedestrians.

VEHICLES

AADT (in thousands) for five key locations on or near the LMC was taken from DDOT (6). The locations are displayed in Figure 9, and the data is presented in Table 4.

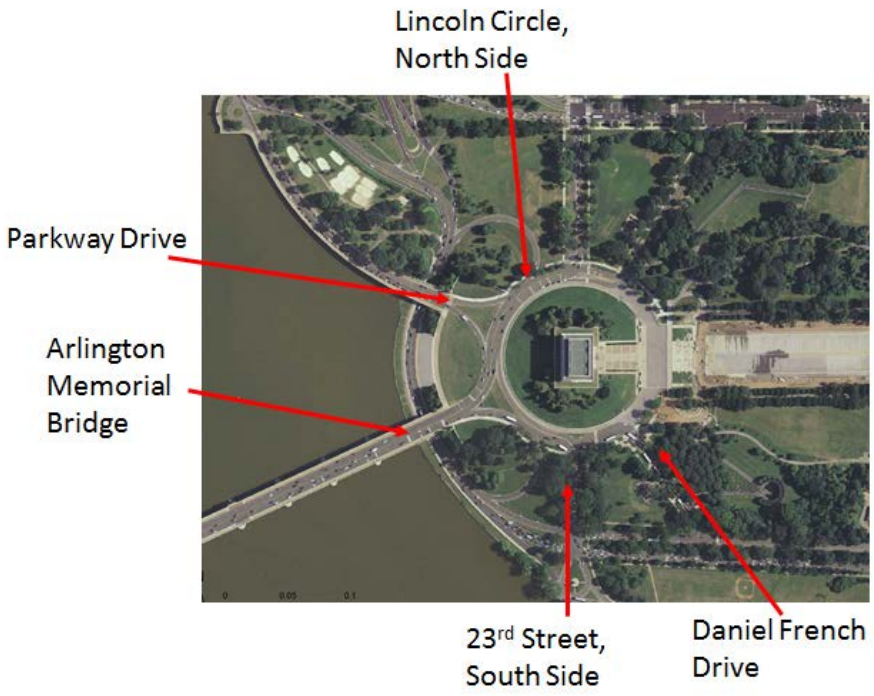

Figure 9: DDOT AADT Count Locations (1)

Table 7: DDOT AADT in Thousands

Year	Arlington Memorial Bridge	Lincoln Circle, North Side	23rd Street, South Side	Daniel French Drive	Parkway Drive
2012	50.2	27.8	7.8	-	11.5
2011	54.2	24.1	7.9	0.9	11.6
2010	53.9	23.9	7.9	0.9	-
2009	55.9	24.8	8.1	1	-

At the Start-Up meeting, a recommendation was made to obtain AADT from FHWA-EFL. The contact provided by FHWA-EFL recommended utilizing DDOT AADT data. In addition, he indicated that for Parkway Drive, based on a 24-hour, in-house count performed in March of 2013, the average daily traffic was determined to be 11,706 (7).

BICYCLE & PEDESTRIAN

Metropolitan Washington Council of Governments partnered with GWMP to obtain a count for bicycles and pedestrians on the Arlington Memorial Bridge. Miovision video monitoring technology was used to collect the data. The data presented in Figure 10 was collected on Wednesday, June 19, 2013 from 6am until 6am the following day.

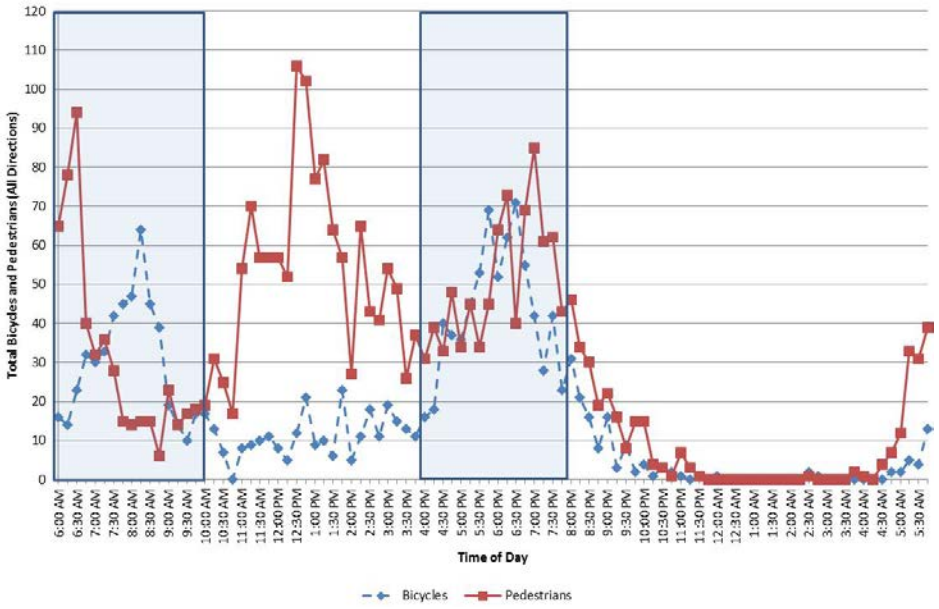

Figure 10: Bicycle and Pedestrian Volumes on Arlington Memorial Bridge in June of 2013 (Figure Courtesy of Metropolitan Washington Council of Governments)

NAMA should consider performing bicycle and pedestrian counts in the vicinity of the LMC based on the best recommendations available for performing such counts.

TOUR BUS STUDY

Phase I of a multi-phase study for the NAMA on tour buses was completed in January of 2013 (8). The study concluded that the tour bus loading and unloading capacity on Henry Bacon Drive was underutilized. The study indicated that restrictions on the presence of tour buses occur during the weekdays from 4-6:30 PM. The study also found that Daniel French Drive had a "consistent stream of tour buses." Furthermore, it identified few infractions and consistent police presence. The study recommended signage and other methods of communication to redirect some of the use from Daniel French Drive to Henry Bacon Drive.

DDOT DESIGN & ENGINEERING MANUAL

There are two sections from the DDOT Design and Engineering Manual, 2009 Edition that should be highlighted related to the RSA (9). The first is section 43.7, which identifies locations where crosswalks are to be marked. The relevant bullet point pertains to those locations with large pedestrian use, like crossings around the LMC. It states:

> High visibility crosswalks are required at all uncontrolled crosswalks and all crosswalks (including signalized or stop-controlled crosswalks) leading to a block with a school, with a designated school zone area, along a designated school walking route, or on blocks adjacent to a Metro station. [This is broadly interpreted to include all moderate to high ped locations.]

The second one, section 43.7.1 Definitions of Types of Crosswalk Markings, describes the design of crosswalks painted by DDOT:

> Parallel crosswalk markings are two 6 inch lines placed at either edge of the crosswalk. The stripes are perpendicular to the roadway centerline except in the case of skewed intersections. High visibility crosswalk markings add longitudinal markings in addition to the 6 inch edge lines. The edge lines are perpendicular to the roadway centerline except in the case of skewed intersections. Decorative crosswalk markings are crosswalks that are marked with brick, stamped concrete, or other materials.

FIELD REVIEW

Two field reviews were conducted: the first on Thursday, May 1, 2014 and the second on Saturday, May 3, 2014. The Thursday field review was conducted to gain an understanding of the interactions between commuter vehicular traffic and a mix of commuter and tourist non-motorized users. The Saturday field review was conducted to gain an understanding of the interactions between predominately tourist non-motorized users and non-commuter vehicular traffic.

THURSDAY, MAY 1, 2014

The observed conditions were somewhat abnormal. From Monday through Thursday, the Washington D.C. area experienced an unusual amount of rainfall, between 3 and 7 inches over this time period (10). In addition, predictions of rain through the morning rush hour were given, potentially affecting the number of non-motorized users. Extensive flooding and road closures occurred. In particular, Rock Creek Parkway had closures due to the flooding and downed trees. There were also additional police enforcement efforts concentrated around the White House on this day due to expected protests. With regard to non-motorized traffic, Rock Creek Park Trail experienced obstructions. Furthermore, the Capital Crescent Trail was closed.

TIME & WEATHER

The first portion of the visit was conducted from about 7:30 AM until 11 AM on foot and bike share. The second portion of the visit was conducted from 1-3 PM in a vehicle. The third portion of the visit took place from about 4-5:30 PM on foot. While the morning was cloudy, the afternoon weather was clear and sunny, with highs around 73 degrees.

PERSPECTIVES FROM U.S. PARK POLICE

During this site visit, the RSA Team met with Officer Erich Koehler, U.S. Park Police, Central District, and his associate to learn more about their experience with the area. They indicated that:

- Most traffic violations are given to locals because they are habitual offenders. For example, citations are frequently given to drivers who make a U-turn when heading westbound towards the Arlington Memorial Bridge to eastbound towards Ohio Drive.
- There are more crashes than those included in the data, but the officers indicated that they believe the crashes to be underreported.
- The curbs on Arlington Memorial Bridge are tall (10" vs. typical 6"). A question was posed to U.S. Park Police regarding whether or not many accidents involved vehicles mounting the curbs along the bridge. The U.S. Park Police indicated that this was not a problem.
- Speed limits throughout the area are 25 mph, unless otherwise marked. However, it is unclear if the public are aware of this. The only other speeds that were marked are 30 mph.
- There is a concern regarding the rapid expansion of the offering of "pedicabs" (Figure 11), which occupy a lane of traffic. As shown in the Figure 11, pedicabs are bicycles with trailers that carry pedestrians. Washington D.C. issues permits for pedicab operations, and NAMA issues Commercial Use Authorizations (CUA) as well.
- In the case of the pedestrian/bicyclist crossing of the off-ramp from the Arlington Memorial Bridge to Ohio Drive (NAMA-0510), pedestrians/bicyclists must yield to vehicles. They recommend warning drivers of the crosswalk while on the Arlington Memorial Bridge. They have recorded radar speeds during enforcement operations of 70 or 80 mph coming across the bridge. The speed limit is posted at 30 mph.

Figure 11: Pedicab

OTHER OBSERVATIONS

As compared to cars and other vehicles, it was observed that buses are least likely to yield to bicycles and pedestrians.

The RSA Team observed a gap between the roadway and trail (Figure 12) as the trail crossed NAMA-0510 (off-ramp from Arlington Memorial Bridge to Ohio Drive) that can be problematic to bicycle tires.

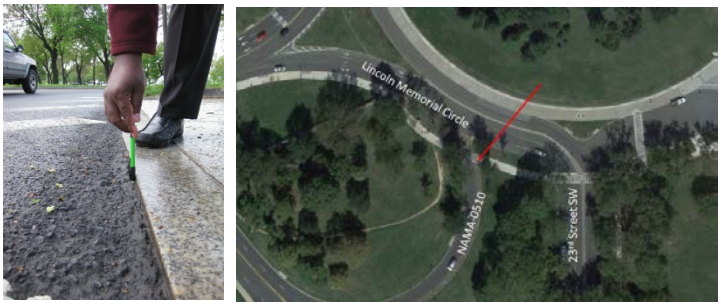

Figure 12: Gap between roadway and curb ramp from trail (Photo credit: Norah Ocel) (1)

FRIDAY, MAY 2, 2014

While conditions were improving, Rock Creek Park Trail remained obstructed and Capital Crescent Trail was closed. No known closures were identified for the roadways on Friday.

TIME & WEATHER

Conditions were observed from about 8:15 AM until about 10 AM. Weather was about 70 degrees and sunny.

SATURDAY, MAY 3, 2014

This day was specifically chosen because no public events were identified that would irregularly affect traffic.

TIME & WEATHER

Weather was about 73 degrees and sunny. The visit was performed from about 11 AM until 1 PM.

FINDINGS & SUGGESTIONS

Findings & Suggestions are divided into thirteen locations within the study area: Henry Bacon Drive, 23rd Street NW, the LMC, NAMA-0509, Parkway Drive, Arlington Memorial Bridge, NAMA-0510, 23rd Street SW, Daniel French Drive, Social Trail, Independence & 23rd, Parkway Drive to Rock Creek Parkway, and Trails Around 66. The locations are shown in Figure 13. A description of the findings and suggestions follow.

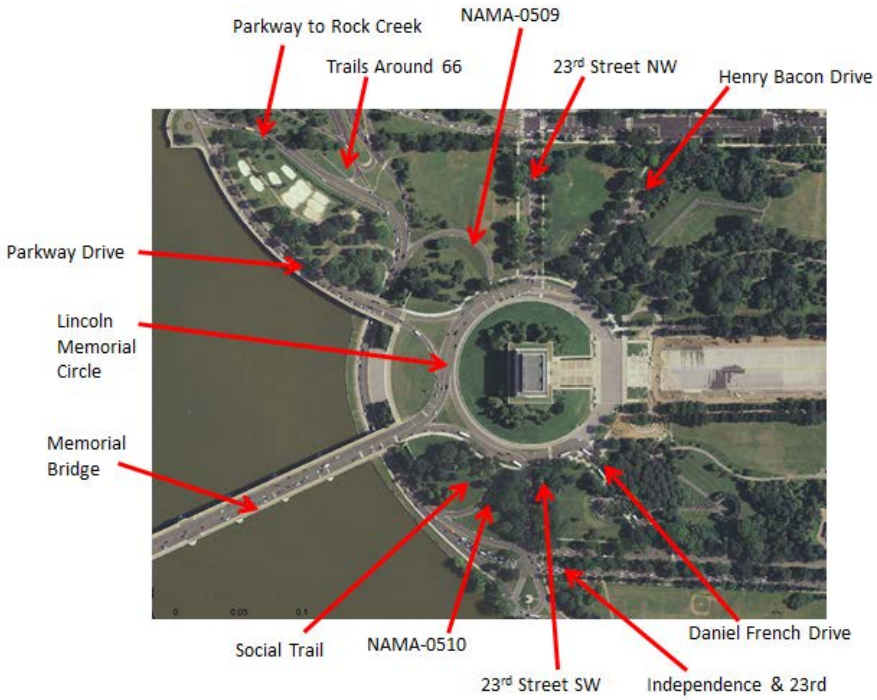

Figure 13: Findings & Suggestions Locations (1)

No specific findings related to pedicabs are provided. However, it is recommended that this issue be investigated in the near future as more is understood about the demand and safety concerns.

OVERVIEW

This section provides an overview of the findings and includes some general recommendations. More specific findings and suggestions are detailed in later sections by location. Recommendations are also prioritized and summarized in the section "Short, Medium, and Long-term Changes."

Overall findings and suggestions identified by the RSA Team can be grouped into five categories:

- Signals
- Curb Ramps
- Signs
- Pavement Markings
- Pedestrian/Bicyclist Crossing Options

Signals: Traffic signals are actuated, with a fixed amount of time provided for bicycles and pedestrians when the push buttons are pressed. The Architectural Barriers and Accessibility Standards (11) should be reviewed to determine if all of the signals are in compliance.

Curb Ramps: Many curb ramps in the study area are significantly narrower than the crosswalks (Figure 14) and often have a gap between them and the pavement (Figure 12), which can be problematic for bicyclists, people with mobility restrictions, or those pushing strollers.

Figure 14: Curb ramp, narrower than crosswalk

Signs: Throughout the study area, there are locations where 1) signs could be considered, 2) the current signage was not compliant with the Manual on Uniform Traffic Control Devices (MUTCD), 3) there are conflicts between the existing signs, and 4) signs needed to be repaired/replaced (Figure 15). Therefore, one general recommendation is to perform a comprehensive signage study for pedestrians, bicycles and vehicles. In 2011, Hunt Design Associates completed the National Mall Wayfinding Plan, which will likely serve as a good basis when developing a comprehensive signage study. The following sections will identify specific signage issues based on the location.

Figure 15: Sign in need of repair (Photo credit: Norah Ocel)

Pavement Markings: The pavement markings throughout the study area were inconsistent. Additionally, several pavement markings were faded. On the Arlington Memorial Bridge, for example, wayfinding currently exists in one direction but not the other. Additionally, the current crosswalk designs are not consistent with DDOT standards. Therefore, a suggestion is to perform a pavement marking study. The following sections will detail specific locations where the current pavement markings are recommended for changes.

Pedestrian/Bicycling Crossing Options: As mentioned in the Introduction, there are many pedestrians and bicyclists who want to cross at three locations within the LMC (see some example photos in the Appendix); however, the current option (shown in Red in Figure 16) is a circuitous route that increases travel time. (Note: The red path is a distance of 0.55 mi, the blue path is 0.21 mi, and the yellow path is 0.07 mi.)

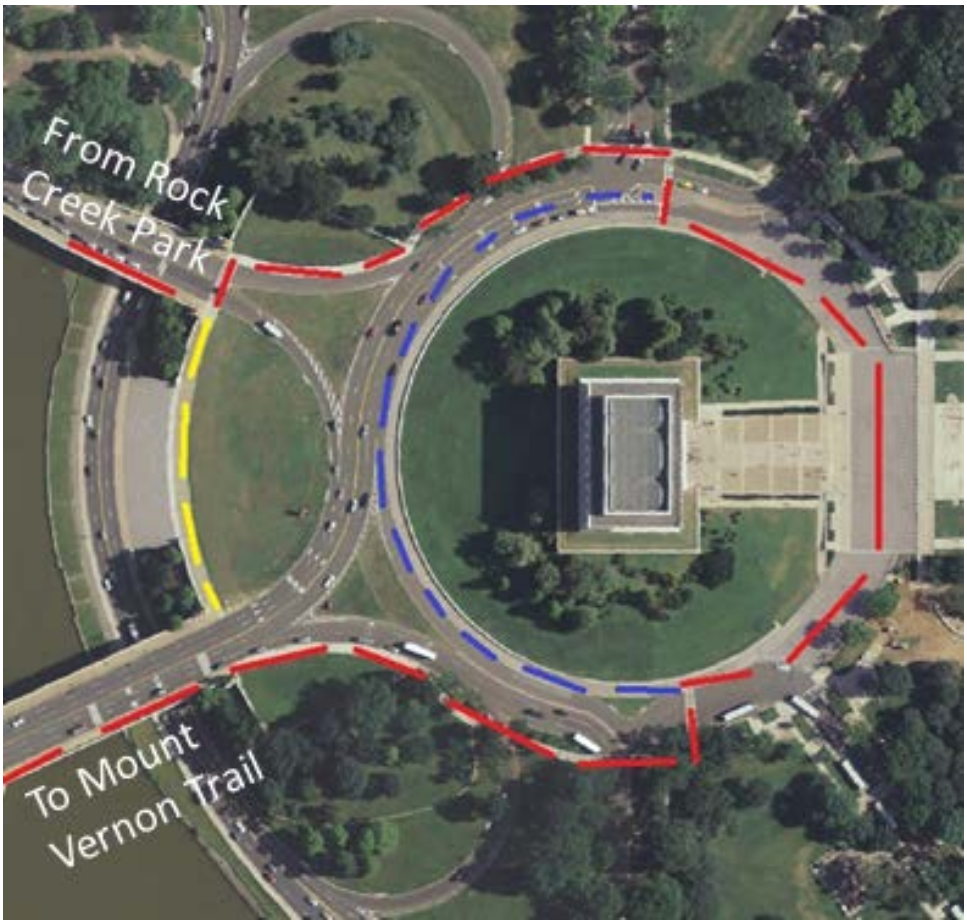

Figure 16: Pedestrian Travel Times (Graphic Credit: Dan Nabors) (1)

Furthermore, there is little information indicating the designated path. Therefore, the RSA Team discussed three options, each with its own benefits and drawbacks (Figure 17): 1) a tunnel crossing to the Lincoln Memorial's rear side from where the steps originate, 2) a tunnel from the steps to between the social trail and Arlington Memorial Bridge, or 3) a route that makes use of the social trail under Ohio Drive or a floating boardwalk.

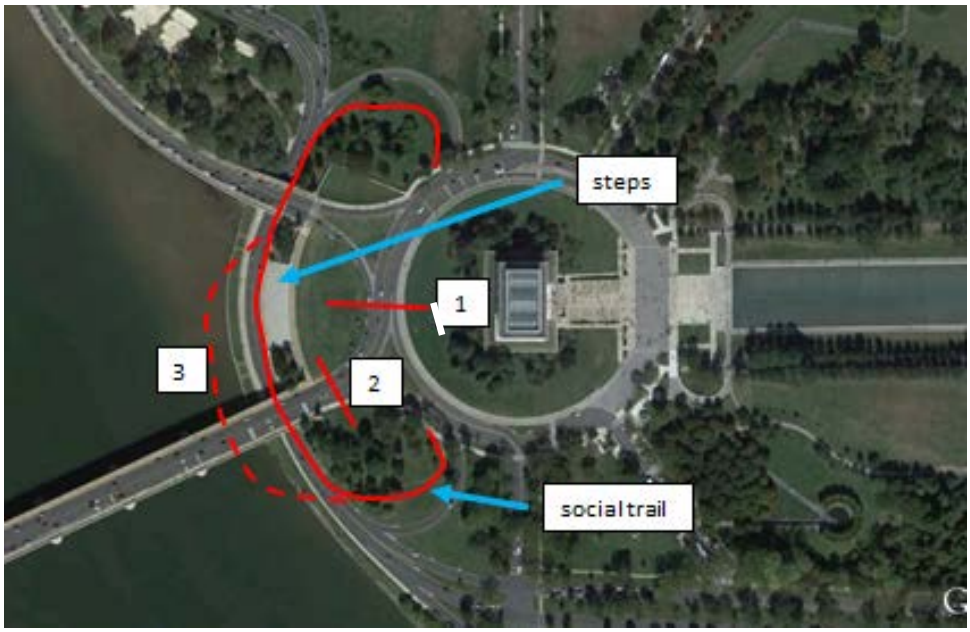

Figure 17: Three options for pedestrian/bicyclist crossings (1)

Regarding the first option, there are several considerations. First, additional engineering investigations would have to be performed to determine if this solution is feasible. In addition, the rear entrance is used for access during special events at the Lincoln Memorial. Finally, there is a concern with regard to how a tunnel may impact existing infrastructure, like the steps.

Regarding the second option, there are also several considerations. Again, additional engineering investigations would have to be performed to determine the feasibility of a tunnel. It also may affect existing infrastructure like the steps and the wall of the Arlington Memorial Bridge (Figure 18).

Figure 18: Looking East, South Side of Arlington Memorial Bridge

To create a configuration like the third option, the narrow walkway underneath the Arlington Memorial Bridge would have to be addressed (Figure 19). However, there is a possibility that the narrow walkway could be addressed during an upcoming Arlington

Memorial Bridge project led by the GWMP. Therefore, NAMA should present the need to GWMP to determine if such a modification could be addressed.

Figure 19: Narrow walkway under Arlington Memorial Bridge

If additional space could be reallocated from the roadway to this path, a bicycle route could be installed here. However, discussions during the RSA indicated that this pathway was created from minimal space during a more recent construction project on Ohio Drive. Therefore, another potential option that could be considered is a floating boardwalk on the west side. This concept is shown by the dashed line in Figure 17. Figure 20 shows a photo of a boardwalk on water at the Rocky Mountain Arsenal National Wildlife Refuge near Denver, Colorado; this image is only provided for conceptual purposes. A potential drawback with providing the connection on the west side of Ohio Drive (i.e. a boardwalk) is that locations where a bicyclist could cross Ohio Drive on the north and south side of the Arlington Memorial Bridge would have to be identified.

Figure 20: Boardwalk on water at Rocky Mountain Arsenal National Wildlife Refuge

HENRY BACON DRIVE

Observations made regarding traffic and pedestrian travel specific to Henry Bacon Drive include:

- Parked buses obstruct traffic flows during the evening peak period,
- A pedestrian sign is placed at an incorrect location, and
- A need for wider curb ramps.

Parked Buses: The photo in Figure 21 was taken within the peak period, which shows buses parked in a traffic lane. Enforcement can help remedy the problem.

Figure 21: Henry Bacon Drive, PM Peak

Pedestrian Sign: The arrow in Figure 22 shows the approximate location of the pedestrian sign shown in Figure 23. This sign should be removed as the purpose of this sign is unclear.

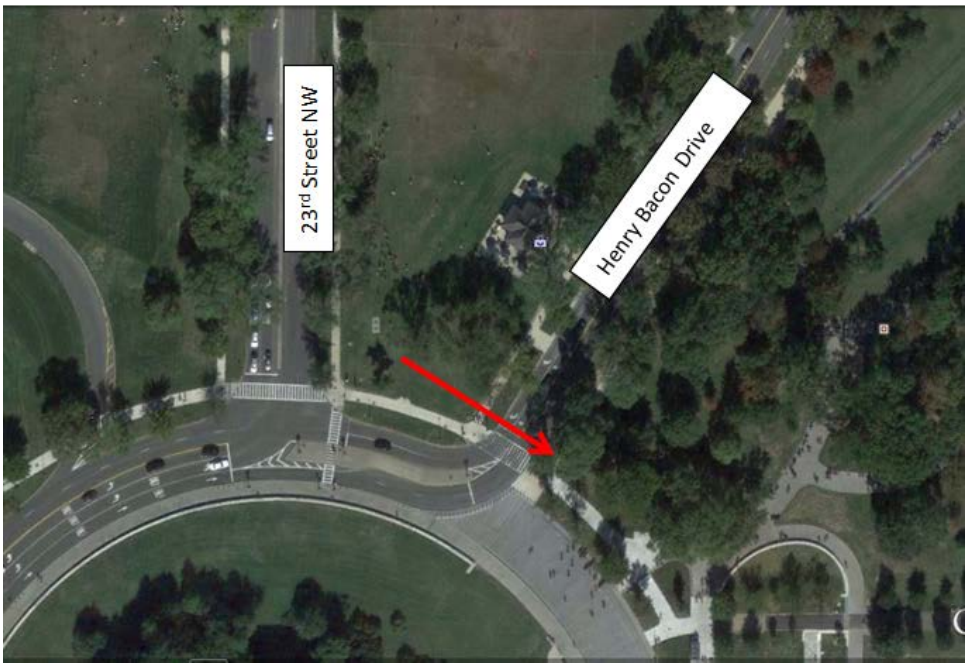

Figure 22: Henry Bacon Drive, Location of Pedestrian Sign (1)

Figure 23: Henry Bacon Drive, Pedestrian Sign

Curb Ramps: The existing curb ramps at Henry Bacon Drive shown in Figure 24 (left) do not correspond well with the provided crosswalk space. As an alternative, they could be widened like the one shown in Figure 24 (right) so that the curb ramp width coincides with the crosswalk width.

Figure 24: Henry Bacon Drive, Curb Ramps, Left: Existing, Right: Recommended (Left Photo credit: Dan Nabors)

23RD STREET NW

Two observations were made for 23rd Street NW: signals and curb ramps.

Signals: The signal for the crosswalk shown in Figure 25 has a short duration during which pedestrians are allowed to cross. However, there appears to be additional time that can be utilized without conflict to vehicular movements. Therefore, the signals at this location should be investigated to determine if additional time can be provided for pedestrians to cross within the current timing configuration.

Figure 25: 23rd Street NW, Crosswalk (1)

Curb ramp: The curb ramps at 23rd Street NW are narrow and do not match up well with the painted crosswalks (Figure 26). Pedestrian and bicyclist demand in the area utilizes all of the defined space. Therefore, considerations should be made for providing a curb ramp that spans the same width as the identified crosswalk.

Figure 26: 23rd Street NW, Existing Curb Ramp

LMC

Delineators are currently installed in two locations within the LMC, as shown by the solid red lines in Figure 27. The intended function of the delineators is to discourage motorists from making a U-turn within the circle.

The RSA Team recommends extending the northernmost installation to 23rd Street NW (Figure 28), as shown by the dashed red line. Furthermore, the delineators should be installed no more than 2 to 3 feet apart. In addition, as experience has shown with the existing installation of delineators, a plan is needed to identify who will replace the damaged delineators and how often it will occur.

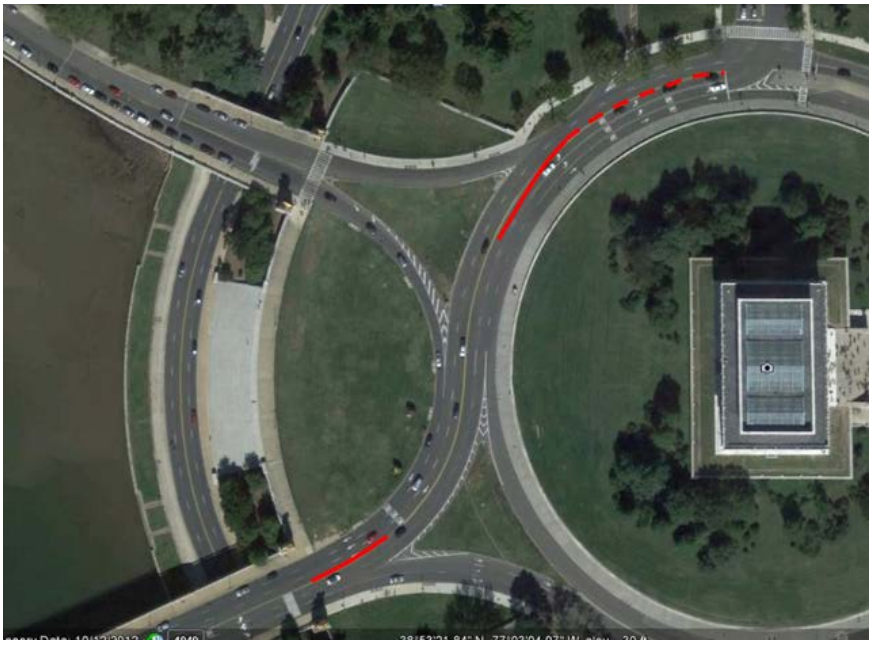

Figure 27: Delineator Installation (1)

Figure 28: Existing Northern Delineator Installation

NAMA-0509

Findings and suggestions related to NAMA-0509, which is the on-ramp from Rock Creek Parkway to the LMC, fall into three categories:

- Crosswalks
- Yield signs
- Pedestrian crossing signs

Figure 29: NAMA-0509 approach to the LMC

Crosswalk: The RSA Team recommends that the crosswalk traversing NAMA-0509 be restriped according to DDOT standards for visibility and consistency. Additionally, if feasible during future roadway reconstructions, the width of the roadway accessing the LMC from NAMA-0509 should be investigated for narrowing. This would make the pedestrian crosswalk shorter, which would expose pedestrians to motor vehicle traffic for a shorter duration.

Yield Signs: There are two recommendations related to the yield signs for access to the LMC from NAMA-0509. First, the trees may be partially obstructing the yield signs (Figure 29).

Trimming should be performed if this is confirmed to be the case. Furthermore, if the DDOT signage is installed at the crosswalk to indicate that motorists need to stop for crossing bicyclists and pedestrians, it should be investigated whether or not a stop sign can be warranted at this location. However, this will require investigating the warrants for installing a stop sign (see MUTCD (12)) and potentially realigning the angle at which NAMA-0509 intersects the LMC.

Pedestrian Crossing Signs: The type of existing pedestrian crossing warning signs on the approach from NAMA-0509 are not correct. Instead, they should be removed, and replaced with DDOT's R1-6a sign (not including fine information) (Figure 30) in advance of the crossing and at the crossing with DDOT's W16-7P. However, installing R1-6a may be confusing to a driver as a result of the existing close proximity of the yield sign (the R1-6a sign indicates a stop for pedestrians compared with the yield control to enter the circle). Therefore, a previously discussed, further analysis is warranted.

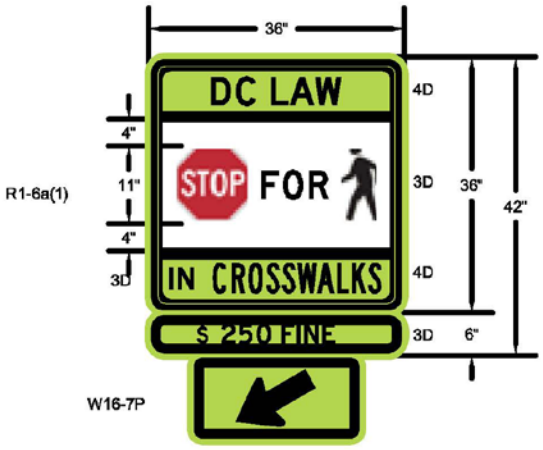

Figure 30: DDOT's R1-6a and W16-7P

PARKWAY DRIVE

The findings and suggestions related to Parkway Drive can be grouped in the following five categories:

- Pavement markings
- Rumblestrips
- Refuge island
- Pedestrian signs
- No U-turn

Pavement Markings: The existing crosswalk markings on Parkway Drive just prior to the entrance to the LMC are faded, as shown in Figure 31. They should be restriped according to DDOT standards. Additionally, the park should consider installing pavement markings indicating "PED XING" on the westbound approach prior to the crosswalk.

Figure 31: Parkway Drive crosswalk markings

Rumblestrips: Prior to the crosswalk on Parkway Drive before the LMC there are remnants of rumblestrips. These rumblestrips need to be replaced and installed to current standards, taking into consideration the speed of motorists, the need for snow removal, and ensuring that they are designed to accommodate bicyclists. A project that is being implemented in the near future should be considered for replacing the rumblestrips.

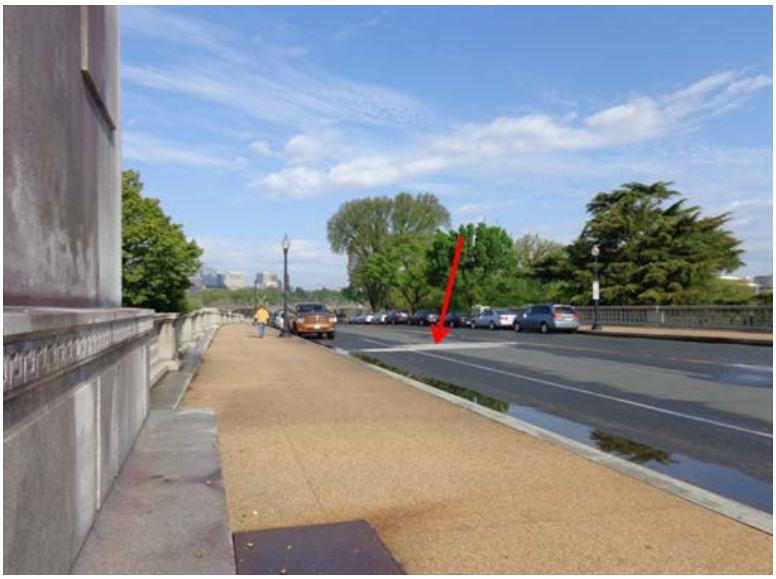

Figure 32: Parkway Drive rumblestrips

Refuge Island: The existing lanes for Parkway Drive connecting to the LMC are wide and have gentle radii, which enables vehicles to travel at higher speeds. The installation of a median island, which can be achieved by narrowing the lanes (Figure 33), can help calm the traffic and create a refuge area for crossing pedestrians and bicycles.

Figure 33: Parkway Drive looking west

Pedestrian Signs/U-turn Signs: The existing pedestrian crosswalk signs for westbound traffic (Figure 33) are not the standard signs for pedestrian crosswalks. They should be replaced with DDOT's R1-6a sign (not including fine information) (Figure 30). In addition, there are no advance pedestrian warning signs for the eastbound approach. Two signs should be installed on the eastbound approach, one on the north side and one on the south side. Furthermore, NPS should consider installing DDOT's R1-6a and W16-7P signs (Figure 30) for both approaches at the crosswalk.

No U-Turn: A no U-turn or no left-turn sign may be installed in the median for westbound traffic on Parkway Drive. The RSA Team observed at least one vehicle making this maneuver.

ARLINGTON MEMORIAL BRIDGE

The findings and suggestions for the Arlington Memorial Bridge can be grouped into the following three categories:

- Rumblestrips
- Pavement markings/wayfinding
- Advance pedestrian crossing warnings

Rumblestrips: The existing, raised transverse rumblestrips are ineffective (Figure 34), as they have been worn down. They should be replaced. However, considerations should be taken with regard to why the rumblestrips are currently ineffective. There is the potential that they have been worn down as a result of snowplow operations. Therefore, designs that can provide the function of warning the driver while at the same time remain effective over time should be implemented. One potential approach would be to have a plan with regard to maintaining any installed rumblestrips. Because the rumblestrips are located on a bridge, it is not recommended that the rumblestrips be grooved into the pavement.

Figure 34: Rumblestrips on the Arlington Memorial Bridge

Pavement Markings/Wayfinding: For westbound traffic, pavement wayfinding currently exists. A similar installation should be considered for eastbound traffic. In addition, pavement markings should be considered to bring awareness to motorists of the upcoming pedestrian crossing of NAMA-0510.

Pedestrian Crossing Signs: After crossing the bridge, the road bends, and shortly thereafter, there is a pedestrian crosswalk of NAMA-0510. While there are pedestrian crossing warning signs just past the bend, the feasibility of installing pedestrian crossing warning signs prior to this bend should be investigated to calm traffic sooner and enhance safety. As mentioned in the sub-section, Perspectives from U.S. Park Police, some motorists have been observed traveling over the Arlington Memorial Bridge at speeds of 70 mph or 80 mph.

NAMA-0510

Findings and suggestions for NAMA-0510, also called the off-ramp from the LMC or off-ramp from the Arlington Memorial Bridge to Rock Creek Parkway, fall into four categories:

- Stop signs along bicycle/pedestrian pathway
- Gap between curb ramp and pavement
- On-road pedestrian crossing signs
- Improve merge

Stop Signs: The current design has both stop signs for the bicycle/pedestrian pathway and regulatory signs for motorists that indicate they are required to stop for bicycles/pedestrians. These two regulatory sign configurations contradict each other. Observing traffic, the majority of vehicles stop for crossing pedestrians/bicyclists. Therefore, to avoid the contradictory signs, it is recommended that the stop signs along the bicycle/pedestrian pathway be removed (Figure 35).

Figure 35: NAMA-0510 Pedestrian/Bicycle Pathway Stop Signs

In addition, the park may want to consider some kind of warning for trail users about vehicles crossings. One example that the park may want to consider is including a pavement marking that says, "ROAD XING" on each approach to the crossing (Figure 36). Additional design details can be found in Section 8.1 and Section 8.2 of the Loudoun County Pedestrian and Bicycle Design Toolkit (13).

Figure 36: Loudoun County "ROAD XING" Markings (13)

Gap between curb ramp and pavement: There is a gap between the curb ramps and the pavement shown in Figure 35, as demonstrated by Figure 12. During the RSA, a bicyclist stopped to express his concern that this configuration presented a danger to bicyclists, as it can cause ruptured tires. Therefore, the road pavement should be leveled with the crosswalk curb ramp.

Pedestrian signs: There are several on-road pedestrian crossing signs. However, they contradict each other (Figure 37).

Figure 37: Pedestrian Crosswalk

One sign indicates that the motorists should yield to pedestrian/bicyclists; however, another sign indicates that motorists should stop for pedestrians/bicyclists. Figure 38 shows a close-up of the warning signs for motorists.

Figure 38: Contradictory Signs (Photo credit: Norah Ocel)

The RSA Team recommends removing both the "State Law Yield to Pedestrian Within Crosswalk" sign and the "D.C. Law Stop for Pedestrians Within Crosswalk" sign. The advance sign should be replaced with DDOT's R1-6a (Figure 31). The sign at the crosswalk sign should be replaced with the DDOT R1-6a and W16-7P sign (Figure 30) on both sides (left and right) of the crosswalk. The removal of the existing signs should coincide with the

new installation to ensure that a warning is always provided for motorists. It should be noted that while a sign according to DDOT standards is recommended for installation, this roadway is under NPS jurisdiction.

In the future, the NPS should investigate the potential application of rectangular rapid flash beacons (RRFB) (14) at this crosswalk. An RRFB can be used to increase "driver awareness of potential pedestrian conflicts" (14). Figure 39 shows an RRFB. Of all of the crossings observed throughout the study area, this particular crossing appears to have some of the highest volume of crossing pedestrians/bicyclists and vehicles throughout the entire day.

Figure 39: RRFB

Merge: At the merge from NAMA-0510 to Ohio Drive, the team observed many conflicts between vehicles. In fact, during the RSA field visit, a crash was observed (Figure 40). Therefore, the geometry of this merge area should be investigated to determine if a better acceleration area can be provided.

Figure 40: Crash at merge from NAMA-0510 to Ohio Drive

23RD STREET SW

The findings and suggestions associated with 23rd Street SW fall into two categories:

- Stop signs along bicycle/pedestrian pathway
- Buses

Stop Signs: Similar to the recommended removal of the stop signs on the pathway at NAMA-0510, the stops signs along the pathway crossing 23rd Street SW should be removed (Figure 41). In addition, the park may want to consider some kind of warning for trail users regarding vehicles crossings, as was recommended for NAMA-0510.

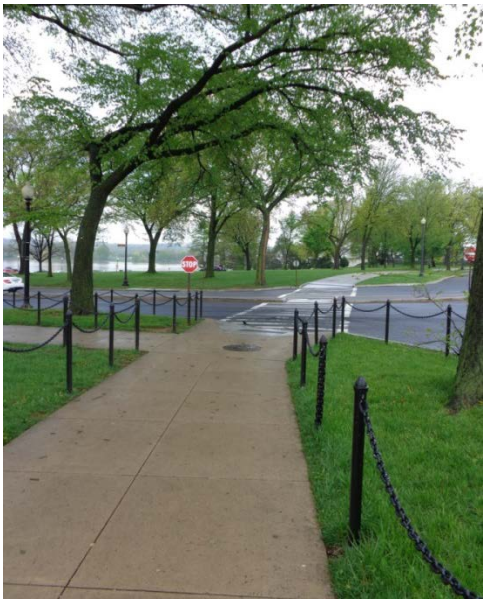

Figure 41: Stops signs on pathway crossing 23rd Street SW

Buses: Buses on 23rd Street SW often stack up and block the pedestrian/bicyclist pathway crossing (Figure 42). Enforcement should focus on ensuring that the buses are not blocking these crossings and that there is a set-back to ensure that pedestrians/bicyclists are visible.

Figure 42: Buses on 23rd Street SW

DANIEL FRENCH DRIVE

Findings and suggestions associated with Daniel French Drive address three issues:

- Buses
- PM Bus Egress
- Re-route traffic

Buses: Buses on Daniel French Drive often stack up and block the pedestrian/bicyclist pathway crossing (Figure 43). Enforcement should focus on ensuring that the buses are not blocking these crossings and that there is a set-back to ensure that pedestrians/bicyclists are visible.

Figure 43: Buses blocking crosswalk on Daniel French Drive

PM Bus Egress: During the afternoon peak period, buses were observed occupying Daniel French Drive for long periods of time. A solution needs to be identified to encourage bus egress from this location in the evening.

Re-route traffic: The current design has traffic moving from 23rd Street SW to Daniel French Drive. However, additional engineering studies should be performed to investigate the feasibility of reversing the direction of traffic so that traffic would enter on Daniel French Drive and exit on 23rd Street SW. This change would then allow for the possibility of removing the NAMA-0510 ramp and routing traffic instead through 23rd Street SW. Considering that the vast majority of crashes found in Table 4 through Table 6 were between vehicles entering Ohio Drive from NAMA-0510, this new configuration could bring safety benefits to motor vehicles. Again, engineering studies should be performed to investigate the feasibility of this alternative. The viewsheds and other considerations related to the historic properties of the area would have to be considered as well.

SOCIAL TRAIL

There is one finding and suggestion associated with the social trail near 23rd Street SW.

- Construct hard surface trail

The recommendation is to construct a hard surface for the existing social trail (Figure 44). During the Ohio Dive reconstruction, a four foot walkway was created beneath the Arlington Memorial Bridge (Figure 19). The team observed that this walkway is being

utilized by some on foot, and therefore, constructing a hard surface trail is desirable. However, prior to constructing the hard surface, NAMA should ensure that connectivity is provided on the opposite side and that the surface underneath the bridge, which is currently cobblestone, can be traversed by the intended users (i.e. handicapped accessible, traversable by bike).

Figure 44: Existing Social Trail

INDEPENDENCE & 23RD

The finding and suggestion associated with Independence and 23rd Street relate to one issue:

- Reconfigure crosswalk timing

The current timing requires a user to stop at both the southern and northern crossings of Independence (Figure 45), imparting significant delay.

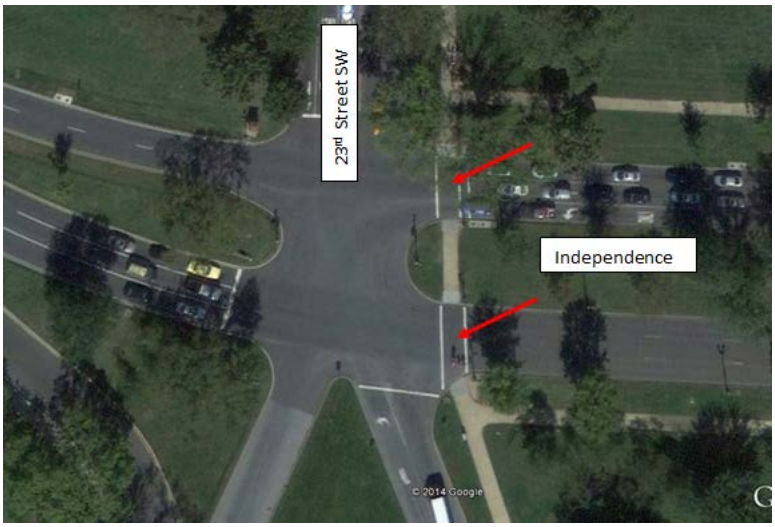

Figure 45: Independence and 23rd Street SW North and South Crossings (1)

As a result, users disregard the pedestrian crossing indications (Figure 46). Therefore, the team recommends a reconfiguration of the timing for this crosswalk.

Figure 46: Signal delay at Independence and 23rd Street SW

PARKWAY DRIVE TO ROCK CREEK PARKWAY

The findings and suggestions associated with Parkway Drive to Rock Creek Parkway fall into two categories:

- Improve wayfinding
- Pedestrian/bicyclist crossing

Wayfinding: The current wayfinding from Rock Creek Park to the Lincoln Memorial is limited. Therefore, improvements to the wayfinding are necessary. NAMA is currently participating in a study by DDOT that is working to improve the wayfinding in this area, although it is specific to bicycles. Figure 47 shows a decision point, where a non-motorized

user would want to cross to head towards Hains Point or continue straight to head to the Lincoln Memorial.

Figure 47: Parkway Drive & Rock Creek Parkway Wayfinding (1)

Figure 48 shows the elevation view of this location, pointing out where additional wayfinding information would be useful. In addition, Figure 48 shows a social trail with a drop-off over a curb (following the yellow and red lines). The feasibility of making a smoother transition at this location should be investigated. Finally, Figure 48shows a drop-off in the right of the photo (indicated by the circle), which could be improved by providing a transition from the asphalt pathway to the concrete pathway.

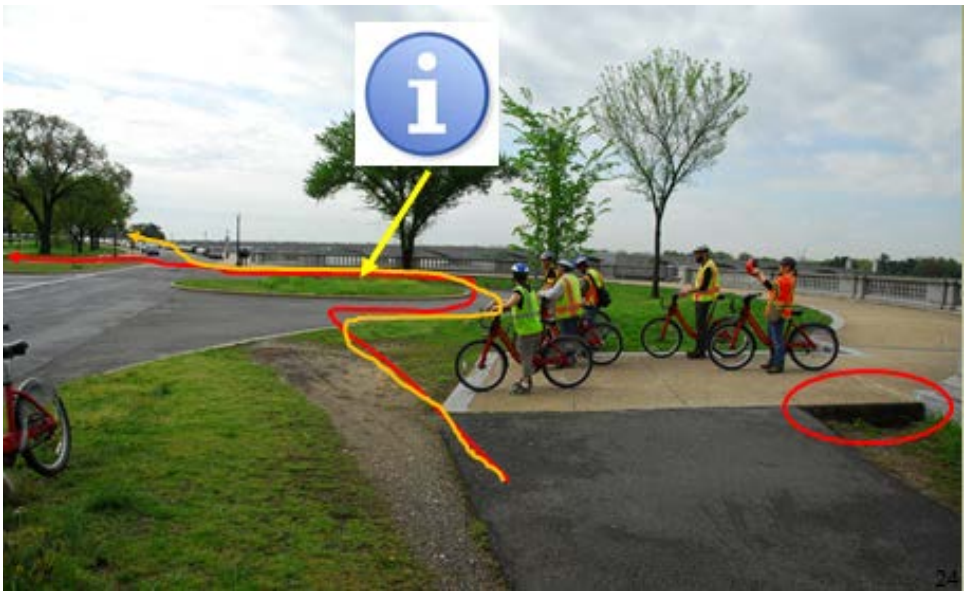

Figure 48: Parkway Drive & Rock Creek Parkway Intersection, Elevation View (Image credit: Dan Nabors)

Pedestrian/Bicyclist Crossings: The pedestrian/bicycle crossing on Parkway Drive shown in Figure 47 near the arrow does not have any vertical signage to identify the crossing to motorists. DDOT's R1-6a and W16-7P (Figure 30) could be used at this location.

TRAILS AROUND I-66

There are two findings and suggestions associated with the trails around I-66.

- Identify discontinuity of trail across I-66
- Rock Creek Parkway Crossing

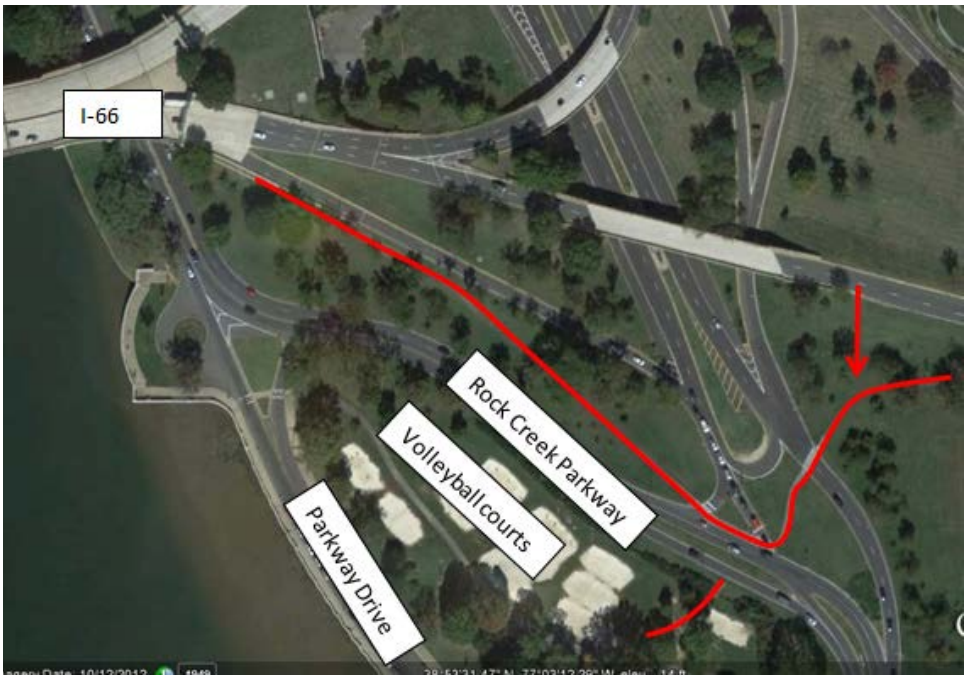

Figure 49: Trails around I-66 (1)

Discontinuity of Trail Across I-66: The top red line shown in Figure 49 is an established hard-surfaced trail that continues east to the intersection of 23rd Street NW and Constitution Avenue. It appears as if the majority of users of this trail then cross Rock Creek Parkway to access Rock Creek Trail or the volleyball courts. However, bike share users have been observed following this trail all the way to the I-66 bridge. Once they follow the bridge to the other side of the river, the trail unexpectedly stops. Therefore, one recommendation is to provide information at the location identified by the arrow regarding the discontinuity of the trail.

Rock Creek Park Crossing: A social trail currently exists as identified by the lower red line in Figure 49. People making use of this trail are likely either accessing the Rock Creek Trail or the volleyball courts. The feasibility of creating a defined, protected crossing should be investigated.

SHORT, MEDIUM, & LONG-TERM CHANGES

The team synthesized the suggestions from the previous section and developed a recommended qualitative timeline for changes to be made (short-term, medium-term, or long-term). The thirty-nine recommendations are presented in the following three tables within the following three sections.

SHORT-TERM CHANGES

This section presents changes recommended in the short-term.

Table 8: Recommended Short-Term Changes

	Location	Recommended change
1	Henry Bacon Drive	Bus Parking – enforcement needed
2	Henry Bacon Drive	Pedestrian Sign – remove
3	23rd Street NW	Pedestrian Crossing Timing – investigate the ability to allot more time
4	LMC	Delineators – install more, install at gaps of 2 to 3', create a plan for replacement
5	NAMA-0509	Crosswalks - restripe
6	NAMA-0509	Yield Sign – remove obstructions
7	Parkway Drive	Crosswalk Markings – restripe according to DDOT standards
8	Parkway Drive	Install "PED XING" pavement markings for westbound traffic
9	Parkway Drive	Rumblestrips – replace
10	Parkway Drive	Pedestrian Signs – install advance warning signs facing eastbound direction; replace advance warning signs facing westbound traffic; install crossing signs at crosswalk for eastbound and westbound traffic
11	Parkway Drive	No U-turn – investigate need
12	Arlington Memorial Bridge	Pavement wayfinding – investigate application for eastbound
13	Arlington Memorial Bridge	Advance pedestrian crossing signs – investigate feasibility of installation
14	NAMA-0510	Stop signs along pedestrian/bicycle pathway – remove; consider on-pavement warning of crossing for trail users
15	NAMA-0510	On-road pedestrian crossing signs – remove; install DDOT's R1-6a; install DDOT's R1-6a and W16-7P at crosswalk
16	NAMA-0510	Rectangular rapid flashing beacon (RRFB) – consider applicability
17	23rd Street SW	Stop signs along pedestrian/bicycle pathway – remove; consider on-pavement warning of crossing for trail users
18	23rd Street SW	Buses – enforce no-parking on pedestrian crossing
19	Daniel French Drive	Buses – accessibility of pedestrian crossing
20	Parkway to Rock Creek	Wayfinding – provide information at decision point
21	Parkway to Rock Creek	Pedestrian/Bicyclist crossing – install vertical signage
22	Trails Around I-66	Identify Discontinuity of Trail Across I-66 – install informational signage

MEDIUM-TERM CHANGES

This section presents changes recommended in the medium-term.

Table 9: Recommended Medium-Term Changes

	Location	Recommended change
23	Overall	Signals – investigate compliance to Architectural Barriers and Accessibility Standards
24	Overall	Signage – perform study
25	Overall	Pavement Markings – perform study
26	Henry Bacon Drive	Curb ramps – widen
27	23rd Street NW	Curb ramps - widen
28	NAMA-0509	Pedestrian Crossing Sign - replace
29	Parkway Drive	Refuge Island – investigate applicability
30	Arlington Memorial Bridge	Rumblestrips – replace
31	NAMA-0510	Gap between pavement and curb ramp – level pavement to curb ramp elevation
32	Daniel French Drive	PM Bus Egress – enforcement
33	Independence & 23rd	Crosswalk timing - reconfigure
34	Trails Around I-66	Rock Creek Park Crossing – investigate feasibility of providing a defined crossing

LONG-TERM CHANGES

This section presents changes recommended in the long-term.

Table 10: Recommended Long-Term Changes

	Location	Recommended change
35	Overall	Pedestrian/Bicyclist Crossings Options – perform a study to investigate feasibility of options
36	NAMA-0509	Investigate applicability of stop control, narrowing roadway width and potentially configuration of NAMA-0509 accessing the LMC
37	NAMA-0510	Merge – investigate feasibility of increasing merge area
38	Daniel French Drive	Re-route traffic – perform a study to investigate impact of reversing traffic
39	Social Trail	Social trail – construct hard surface trail

CLOSEOUT MEETING – FINDINGS PRESENTATION

On Tuesday, June 24, 2014, the findings of this report were presented to stakeholders during a closeout meeting.

CONCLUSIONS

The sections above contain many findings and recommendations that the NPS can consider for enhancing safety and mobility in the LMC. Some of the changes can be made in the more immediate future in combination with upcoming construction projects or as a result of the relatively inexpensive nature of the solution. Others will require further studies and investment of funds.

There is a need to more fully understand the issues related to pedicabs, including demand and safety concerns. The team had limited background information on the problem during the pre-visit planning and Start-Up Meeting. In addition, few observations of pedicabs were made during the field visit. As a result, no Findings & Suggestions related to pedicabs were developed as part of this study.

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APPENDIX

The following photos depict pedestrians/bicyclists trying to make the Lincoln Memorial Circle crossing.