


Transportation Report

American University 2011 Campus Plan

Washington, DC

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INTRODUCTION

This report contains the Transportation Report in support of the American University 2011 Campus Plan. It summarizes the impact of the 2011 Plan, outlines short- and long-term recommendations to mitigate potential impacts, and outlines a Transportation Demand Management (TDM) program for the University. Additionally, the report summarizes the background information gathered in order to develop the recommendations outlined in this report, including an existing conditions assessment and a summary of background documents consulted. Technical analyses of intersection capacity supporting the findings within this document are attached as the “*Transportation Technical Analysis*”.

American University is located near the intersection of Massachusetts Avenue and Nebraska Avenue at Ward Circle in Northwest, Washington, D.C., as shown in Figure 1. The University has a head-count of approximately 10,800 students and 1,700 faculty/staff.

Report Organization and Summary

This report is organized into three sections. The first section summarizes the transportation components of the 2011 American University Campus Plan, and the second section summarizes the transportation components for the Tenley Campus. Finally, the third section provides the background information used to develop the 2011 Plan short- and long-term recommendations. The “*Transportation Technical Analysis*”, which provides the details of the technical analysis not included in the main body of this text, is included as an attachment to this report. The following provides a brief summary of each section as they appear in this report:

2011 Campus Plan – Main Campus

This section provides a summary of the transportation components of the American University 2011 Campus Plan for the Main Campus. Based on the proposed changes on the Main Campus, including the East Campus development and the Nebraska Hall addition, the potential impacts of the Campus Plan are outlined and short- and long-term mitigation measures are presented. Finally, the Transportation Demand Management Plan for the Main Campus is outlined, with specific measures highlighted for the East Campus development and the Nebraska Hall addition.

2011 Campus Plan – Tenley Campus

Similar to the Main Campus section, this section provides a summary of the transportation components of the American University 2011 Campus Plan for the Tenley Campus. Based on the proposed changes on the Tenley Campus, the potential impacts of the Tenley 2011 Campus Plan are outlined and recommendations are presented.

Background Information

This section provides the background information gathered and analyzed by Gorove/Slade in order to complete the Transportation Report. This includes an overview of the existing pedestrian and bicycle network, the AU Shuttle and WMATA transit services, the parking availability, and the roadway network for the Main and Tenley Campuses. The background information section also includes an overview of University. Finally, this section includes a summary of the 2000 American University Master Plan and the 2005 Study for the SIS Parking Facility.

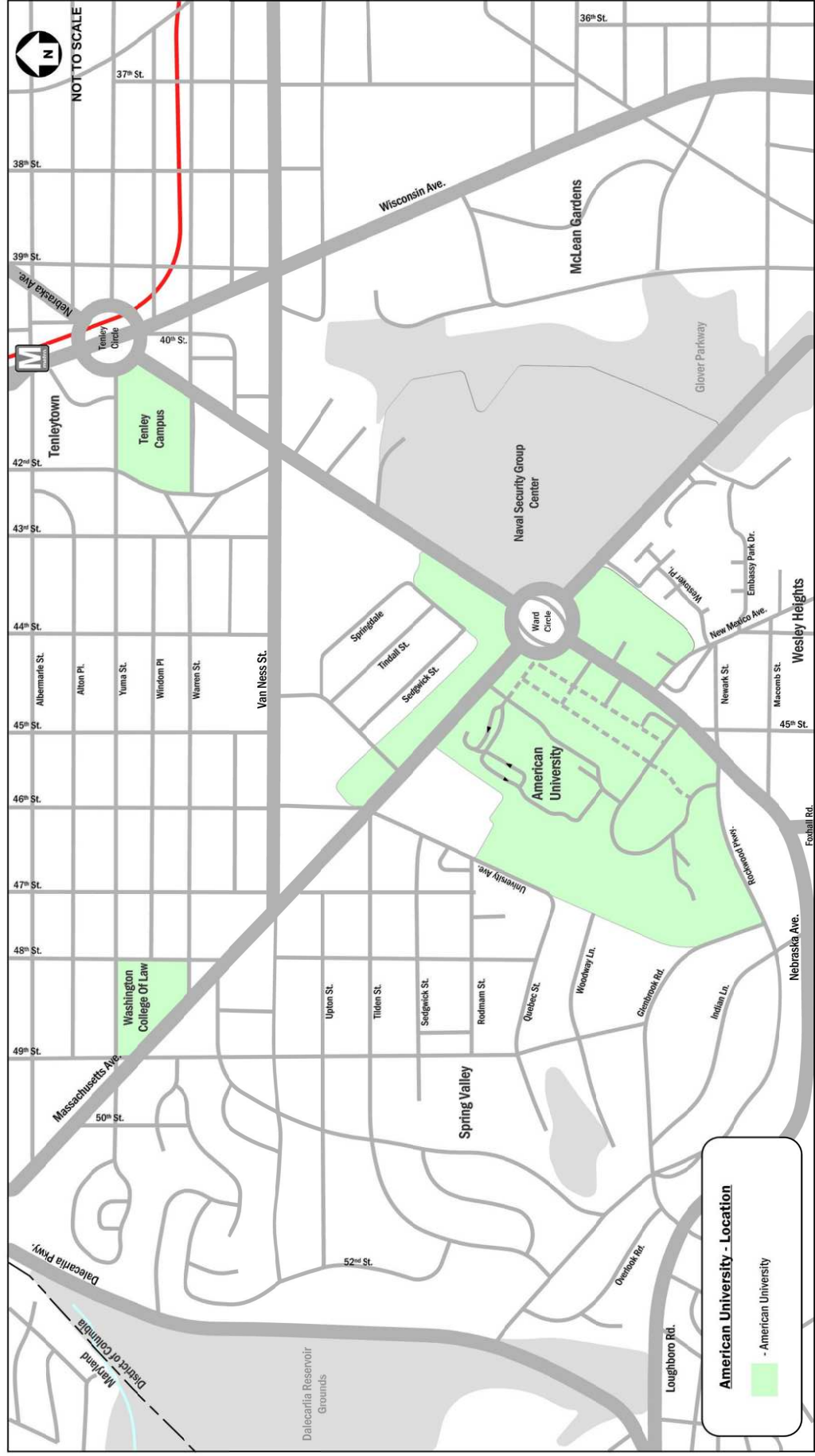


Figure 1: Campus Location

Report Scope

Gorove/Slade took the following actions as part of this study:

- Established a scope of work during meetings with the University;
- Reviewed University and neighborhood transportation studies compiled since 2000;
- Met with the University to identify existing conditions, concerns, and opportunities;
- Conducted several campus visits to establish existing conditions, concerns, and opportunities;
- Conducted field reconnaissance of existing roadway and intersection geometrics, traffic controls, speed limits and operations;
- Performed morning and afternoon peak period turning movement counts at the study intersections;
- Determined the existing levels of service at the study intersections;
- Compiled parking usage surveys to determine the parking demand;
- Assembled list of concerns and opportunities;
- Aided the Campus Plan team in refining plan alternatives and the selected 2011 Plan;
- Constructed a traffic model of campus based on available data and observations to evaluate and refine the recommendations of the 2011 Plan;
- Analyzed future conditions with and without the 2011 Plan to determine potential impacts due to development on the Main Campus, East Campus, and Tenley Campus;
- Analyzed existing Transportation Demand Management (TDM) program and recommended future steps to be included in the TDM program; and
- Compiled Transportation Report.

2011 CAMPUS PLAN – MAIN CAMPUS

This section of the report summarizes the transportation components of the American University 2011 Campus Plan, outlines the potential impacts of the 2011 Plan, and recommends short- and long-term mitigation measures. The Transportation Demand Management plan for the Main Campus is also outlined, with specific measures highlighted for the East Campus development and the Nebraska Hall addition.

2011 Campus Plan Overview

The 2011 Campus Plan Update focuses on improving the University through the addition of:

- New campus housing;
- Recreation, dining, and activity space;
- More faculty offices;
- Improved science and research facilities;
- Enhanced athletic facilities;
- An admissions welcome center; and
- An Alumni Center.

Figure 2 identifies in general the locations of development areas in the 2011 Plan. The *American University 2011 Campus Plan* provides a more detailed description of the proposed development.

Transportation Components of 2011 Plan

Although the University plans on improving campus life and adding and/or renovating several buildings on campus, infrastructure changes to its transportation network are relatively minor. As shown on Figure 2 and Figure 3, the most significant changes consist of the removal of parking on development sites and the removal of a right-in/right-out driveway on Nebraska Avenue, which will be replaced by a new driveway on Massachusetts Avenue (also a right-in/right-out). In addition, there are minor infrastructure improvements to the campus transportation system within the campus itself, including landscaping and roadway improvements to enhance the pedestrian environment on campus and reduce vehicular circulation in the center of campus.

Three development sites within the 2011 Plan are submitted for further processing in conjunction with the Campus Plan. The most significant of these are the East Campus and Nebraska Hall addition. The following contains a summary of their transportation access, details are included in the *American University 2011 Campus Plan*.

- *East Campus*
Development of the East Campus (across Nebraska Avenue from the Main Campus, on the Nebraska Avenue Parking Lot) will consist primarily of new residence halls with some academic, administrative, and retail space. The development will result in the net loss of approximately 403 parking spaces. Vehicles will access the site via a primary entrance on New Mexico Avenue, east of its intersection with Nebraska Avenue, and a secondary right-in/right-out access on Massachusetts Avenue, east of Ward Circle. The surface parking lot will be mostly removed (the eastern end of the lot will remain as a location for a future development site) and an underground facility for parking and loading access will be constructed under the new development. Vehicles will be able to traverse the

length of the site and thus can access either driveway from any location on the site. Loading docks for the new buildings will be accessed from the underground facility through the primary driveway on New Mexico Avenue, entering and exiting the East Campus without any maneuvers that block traffic along New Mexico Avenue.

Details on TDM measures and accommodations of pedestrians, bicycles, and the AU shuttle are included in the recommendations below.

- Nebraska Hall addition

The addition to Nebraska Hall, an existing residence hall, will increase the amount of beds at Nebraska Hall to accommodate more on-campus housing. The development will result in the net loss of approximately 26 surface parking spaces. Vehicle access to the site will continue to be located along Nebraska Avenue. Due to the low amount of parking on the site, vehicular access will be minimal and consist mostly of a small amount of deliveries and pick-up/drop-off activity.

Details on TDM measures and accommodations of pedestrians, bicycles and the AU shuttle are included in the recommendations below.

Access details on the other development sites will be developed in conjunction with their further processing applications.

The 2011 Plan includes the following components to help accommodate the transportation demand on campus and meet the goals of the plan:

1. Maintain and improve the AU Transportation Demand Management (TDM) policies and programs;
2. Improve conditions on major roadways to minimize conflicts between pedestrians and vehicles; and
3. Work with the community and District and Federal agencies towards a long-term solution for Ward Circle.

The following segments of this section of the report describe these components.



Figure 2: 2011 Campus Plan Development Sites



Figure 3: Transportation Infrastructure Changes

Transportation Impacts

The impact of the 2011 Plan on the surrounding transportation network is established by determining how the campus will change transportation patterns in the future. Generally, these changes are due to two things: (1) growth in travel demand and (2) infrastructure changes that alter the geometry or operations of the network.

Transportation Demand Trends

Gorove/Slade has three sets of parking and traffic data collected at the AU Main Campus from the Fall semesters of 1999, 2008, and 2010. Examining these trends shows that traffic and parking demand has been decreasing steadily for the past 11 years. Figure 4 shows how both parking demand and trips generated by the campus during the commuter peak hours are trending down. Campus trip generation has been decreasing at a rate of 3.9% per year since 1999, parking demand at a rate of 3.1%. These decreases are not rates (divided by population numbers) but show a steady decline in vehicular travel to and from campus, even with a sustained increase in total campus population and activity.

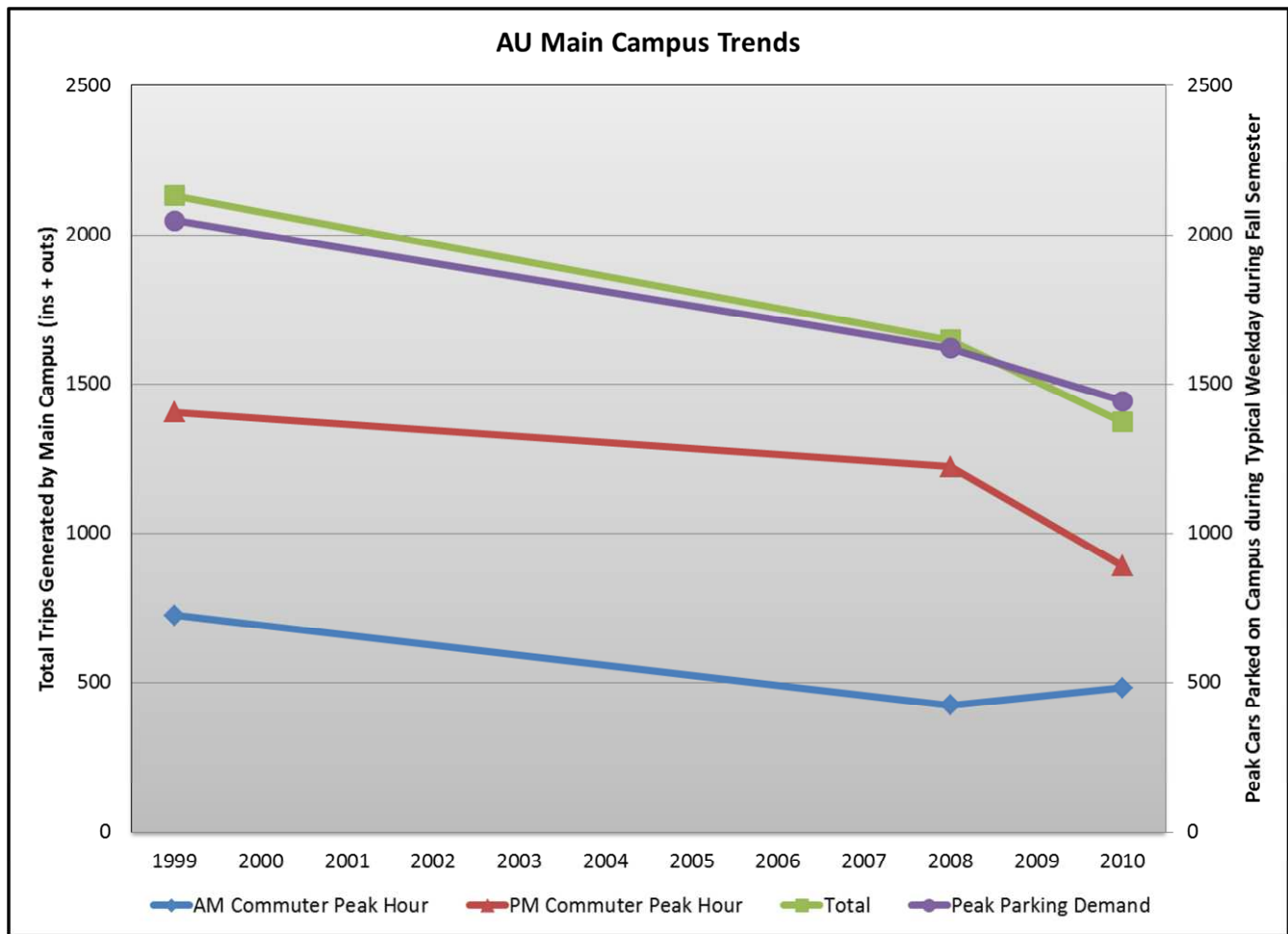


Figure 4: AU Campus Traffic & Parking Trends

At the same time, trends in AU shuttle ridership are up. Data does not exist on walking and biking to campus from the same time periods, but observations from AU staff indicate an increase in those modes as well.

These trends in campus transportation demand lead to the following conclusions:

- Increases in campus population will not lead to increases in peak hour traffic or parking demand; and
- There will be an increase in AU shuttle ridership and the amount of people walking and biking to and from campus.

Summary of Technical Analyses

A detailed technical analysis of the 2011 Plan impacts on vehicular and pedestrian capacity and delays is included as an attachment to this report. This section provides a summary of its findings.

The impact of the 2011 Plan on the transportation network is determined by examining the changes to pedestrian and vehicular capacity and congestion on the roadways surrounding the campus during the commuter peak hours on a typical weekday. The impact is determined by examining the differences in future capacity and delay projections between a scenario with development of the Plan and a scenario without development of the Plan.

The main differences between the year 2020 scenarios with and without the development of the 2011 Plan are:

- The construction of new buildings on the East Campus will lead to an increase of pedestrian activity on the Nebraska Avenue crosswalks near campus. Thus, the scenario with the campus plan includes more activity in several crosswalks within and adjacent to campus as compared to the scenario without the development of the Campus Plan.

Pedestrian trip projections, contained in the *Technical Transportation Report*, show that with development of the 2011 Plan, the number of pedestrians crossing Nebraska Avenue at the crosswalk at the intersection of New Mexico Avenue and Nebraska Avenue will be 203 and 473 per hour during the AM and PM peak hours, respectively. This equates to an average of 6 and 13 pedestrians during each “Walk” phase for the crosswalk over Nebraska Avenue. The total amount of time available for pedestrians to cross during each traffic signal cycle (the combination of “Walk” and “Don’t Walk” times) is 51 seconds during the AM peak hour, and 49 seconds during the PM peak hour (out of a total signal cycle length of 100 seconds).

Similarly, the amount of pedestrians crossing Nebraska Avenue at Ward Circle adjacent to East Campus is expected to be 376 and 509 during the AM and PM peak hours, respectively. This equates to an average of 10 and 14 pedestrians during each “Walk” phase for the crosswalk over Nebraska Avenue. The total amount of time available for pedestrians to cross during each traffic signal cycle (the combination of “Walk” and “Don’t Walk” times) is 59 seconds during the AM peak hour, and 58 seconds during the PM peak hour (out of a total signal cycle length of 100 seconds).

- The removal of surface parking on campus will re-distribute some existing parkers and change travel patterns.
- The removal and replacement of a vehicular access point to the East Campus will alter vehicular patterns.

Since the “impact” of the 2011 Plan is defined by comparing future scenarios with and without the 2011 Plan, the technical analysis was designed to locate these differences. As described in the technical report, there are no locations at study intersections within or near the Main Campus where an unacceptable level of vehicular or pedestrian delay exists in the scenario with the 2011 Plan that does not exist in the scenario without the 2011 Plan. Thus, the “impact” of the 2011 Plan on study area intersections is negligible.

The technical analyses do show several locations where unacceptable levels of delay exist, in either the existing conditions or in future conditions with or without the 2011 Plan. The analyses show that existing and non-AU based traffic growth by the year 2020 will lead to congestion on several commuter routes, including Ward Circle in the morning and evening peak hours and Nebraska Avenue heading southeast-bound in the evening rush hour.

Specifically, these locations are:

- Massachusetts Avenue and University Drive/46th Street: Vehicles on the northbound approach of University Drive to Massachusetts Avenue experience unacceptable levels of delay under existing and future conditions during the morning peak hour.
- Massachusetts Avenue and 45th Street: Pedestrians using the crosswalks across Massachusetts Avenue experience unacceptable levels of delay in existing and future conditions during the morning and afternoon peak hours. These delays are due to the large amount of commuter traffic that generates few gaps for pedestrians to cross a four-lane wide crosswalk.
- Ward Circle – Traffic Signal at the Southern-Most Point of Circle: This intersection experiences long delays, but DDOT plans to change the intersection to allow for a separation of right-turning traffic from the Circle onto Nebraska Avenue southwest-bound from the pedestrians in the crosswalk crossing Nebraska Avenue. This modification, plus associated signal timing changes, mitigates the delays.
- Ward Circle – Unsignalized Approaches (Massachusetts Avenue): The right turn from Massachusetts Avenue northwest-bound into Ward Circle is projected to operate at unacceptable levels of delay during the morning and afternoon peak hours under future conditions. These delays are generated by the number of pedestrians crossing at the intersection and heavy volumes of conflicting vehicles for which the vehicles are required to yield. A recommendation described in the following section can mitigate the vehicular delays at this intersection. In addition, the pedestrian crossings of Massachusetts Avenue also operate at unacceptable levels of delay due to the high amount of commuter traffic that limits the number of acceptable gaps in traffic.
- Massachusetts Avenue and Nebraska Avenue Complex (NAC) Driveway: Exiting traffic from the NAC has an unacceptable level of delay during existing and future conditions. A recommendation described below can mitigate this condition.
- Massachusetts Avenue and Westover Place: Exiting traffic from Westover Place experiences an unacceptable level of delay during both peak hours under existing and future conditions. A recommendation described below can partially mitigate these delays.

Recommendations

The results of the technical analysis show that the 2011 Plan does not create any unacceptable levels of delay that would not exist without its development. However, the analyses showed that, in general, for the AU Main Campus to minimize its impacts to the surrounding area, it needs to accomplish the following goals:

- Minimize impacts with vehicular commuter traffic; and
- Minimize pedestrian & vehicular conflicts at key crosswalks.

The following section outlines short-term measures that AU can implement or help implement with the assistance of local transportation agencies to meet these goals.

Following the short-term measures is a section that examines long term solutions for Ward Circle. While AU recognizes that solving the safety and congestion issues at Ward Circle is a topic beyond the scope of its 2011 Plan, the University is willing to work with the community and the District and Federal agencies towards a long-term solution to Ward Circle, to help the safety and convenience of its students, faculty, and staff.

Figure 5 summarizes the mitigation measures recommended below.

Short-Term

As summarized on Figure 5, the short-term recommendations in this report are as follows:

- Goal: Minimize impacts with vehicular commuter traffic
 - Maintain and enhance TDM programs. The section reviewing the University’s TDM program follows this section of the report.
 - Enhance bicycle facilities:
 - Widen sidewalks along the north side of Nebraska Avenue to a minimum of 10 feet. This will provide enough room for cyclists to bicycle off-street. During meetings with DDOT over the course of the campus plan process, there has been discussion of a DDOT plan to widen the northern sidewalk along Nebraska Avenue between Tenley and Ward Circles. This recommendation would allow for the extension of that concept along the AU Main Campus. As the sidewalks are not on AU property, the University is open to working with DDOT to along the length of Nebraska Avenue between the Tenley and Main Campuses to help implement this concept.
 - Install new short- and long-term bicycle parking at development sites. The residence halls located on the East Campus and the Nebraska Hall addition should include long-term storage for on-campus students in an enclosed and secure location. Short-term parking should be provided at DDOT-approved racks as close as possible to the front door of new buildings constructed on campus.
 - Provide locations for and install new Capital Bikeshare stations. Three potential locations are shown on Figure 5 near future and existing residence halls. These locations were chosen since there is a desire to limit the amount of bicycles in the inner pedestrian core of campus, to locate them near potential riders living in on-campus housing, and to match them to future bicycle lanes, facilities, and bicycle friendly routes on and off campus. Some of these locations fall outside of University property, thus the University is open to working with DDOT to ensure that spaces for future expansion are reserved.

The impetus for constructing new Bikeshare stations at these locations should be based on monitoring of the existing station on Campus. At a time when demand for Capital Bikeshare reaches the need to expand, the University is willing to work with DDOT to ensure installation of future stations.

- Enhance AU Shuttle Service (details in following section).
- Improve conditions along southeast-bound Nebraska Avenue adjacent to campus through elimination of a driveway and installation of landscape features that reduce mid-block crossings.
- Extend right-turn only lane at the existing bus stop location adjacent to the driveway along New Mexico Avenue, to help traffic turn on to Nebraska Avenue.

- Goal: Minimize pedestrian & vehicular conflicts at key crosswalks
 - Install an actuated traffic signal at the location of the new right-in/right-out driveway on Massachusetts Avenue. This signal will be a pedestrian activated traffic signal, which can also provide a green left turn arrow for traffic exiting the DHS complex, since pedestrians and left turning vehicles would not conflict with each other.

A controlled crosswalk in the location would reduce the number of crossings at the nearby crosswalk at the southeast corner of Ward Circle at Massachusetts Avenue, which is an unsignalized crossing that can create excessive delays for vehicles when large numbers of pedestrians are present and can present a hazard to pedestrians crossing against large traffic volumes moving at high speeds.

The *Transportation Technical Analysis* shows that this recommendation provides a vehicular capacity improvement at three intersections; (1) the delay experienced by drivers on northwest-bound Massachusetts Avenue entering Ward Circle would be reduced to an acceptable level due to the expected shift in pedestrians using the crosswalk at the new traffic signal, (2) the delays for traffic exiting the DHS complex would be reduced to acceptable levels, (3) the delays for traffic exiting Westover Place would be reduced due to gaps in traffic generated by the new traffic signals.

A preliminary traffic signal warrant at this location based on future vehicle and pedestrian projections shows that a traffic signal would likely be warranted at this location. This report recommends that after approval of the Campus Plan, a full traffic signal warrant be conducted with accompanying traffic signal design.

- Consolidate several bus stops along Nebraska and Massachusetts Avenue to accomplish two goals: (1) reduce mid-block pedestrian crossings along Nebraska Avenue and (2) take advantage of the new traffic signal to provide controlled crossings of Massachusetts Avenue for bus riders (this recommendation is described in more detail below).
- Eliminate access to parking from Nebraska Avenue and construct a landscaped barrier to deter mid-block pedestrian crossings. This improvement will help minimize the amount of mid-block crossings along Nebraska Avenue between Ward Circle and New Mexico Avenue.
- Alter the traffic signal at the crosswalk at the southern-most signalized intersection of Ward Circle across Nebraska Avenue to separate right turning vehicles from pedestrians at the crosswalk. The *Transportation Technical Analysis* shows that this improvement, with accompanying changes in signal timings, could eliminate any unacceptable levels of delay at this traffic signal.

AU is willing to commit to incorporating these changes into the 2011 Plan, constructing them at the time of development on the adjacent parcel. (For example, the landscaped barrier along Nebraska Avenue would be constructed in conjunction with the development of the East Campus sites.) Implementation of some of these measures will require the assistance and approval of local transportation agencies, notably for the recommendations not located on University property. For these measures, AU is willing to take the lead on designing and implementing these short-term recommendations.

In addition to these goals, there will be opportunities to improve AU shuttle service based on infrastructure changes proposed in the 2011 Plan and recommendations contained in the Rock Creek West II (RCW2) Livability Study. Figure 6 identifies existing shuttle routes and stops and WMATA bus routes and stops on and adjacent to the main campus. The 2011 Plan recommendation to relocate the Washington College of Law from 4801 Massachusetts Avenue to the Tenley Campus will eliminate the need for the Red Shuttle route, which is one of the two existing routes.

To address pedestrian issues along the Nebraska Avenue corridor associated with shuttle and bus stop activity, this study recommends relocating some existing stop locations. Figure 7 illustrates the shuttle route changes that will result from the relocation of the Washington College of Law and recommended stop location improvements. The stop location improvements will eliminate existing pedestrian pathways between stops and the Main Campus that encourage jaywalking across Nebraska Avenue. In addition, the proposed relocation of a stop on Massachusetts Avenue to the new traffic signal would allow bus riders to cross Massachusetts Avenue at a controlled crosswalk.

The Rock Creek West II (RCW2) Livability Study recommends several changes to traffic patterns and transportation infrastructure near the Tenleytown Metrorail station. Improvements are recommended for 40th Street and Fort Drive between Albemarle Street and Brandywine Street. These streets are used today by AU shuttles for passenger pick-up/drop-off and turnaround. The recommendations contained in the RCW2 Livability Study include the following:

- Paint crosswalks across the 40th Street curb cuts;
- Reverse the direction of 40th Street and Fort Drive;
- Convert the metered on-street parking on 40th Street and Fort Drive to angled on-street parking;
- Remove the U-turn break near Albemarle Street and add a new median break near for the Whole Foods garage driveway;
- Convert Albemarle Street from one-way southbound to one-way northbound; and
- Convert Fort Drive from one-way northbound to one-way southbound.

The study indicates that AU shuttle stops will need to be relocated to accommodate these recommendations. This report recommends that the AU shuttle stop maintain its high visibility and proximity to the Tenleytown Metro. The University is open to working with DDOT, WMATA and other stakeholders as needed to develop a plan that incorporates the RCW2 Livability Study recommendations and quality transit stops for WMATA and the AU shuttle.

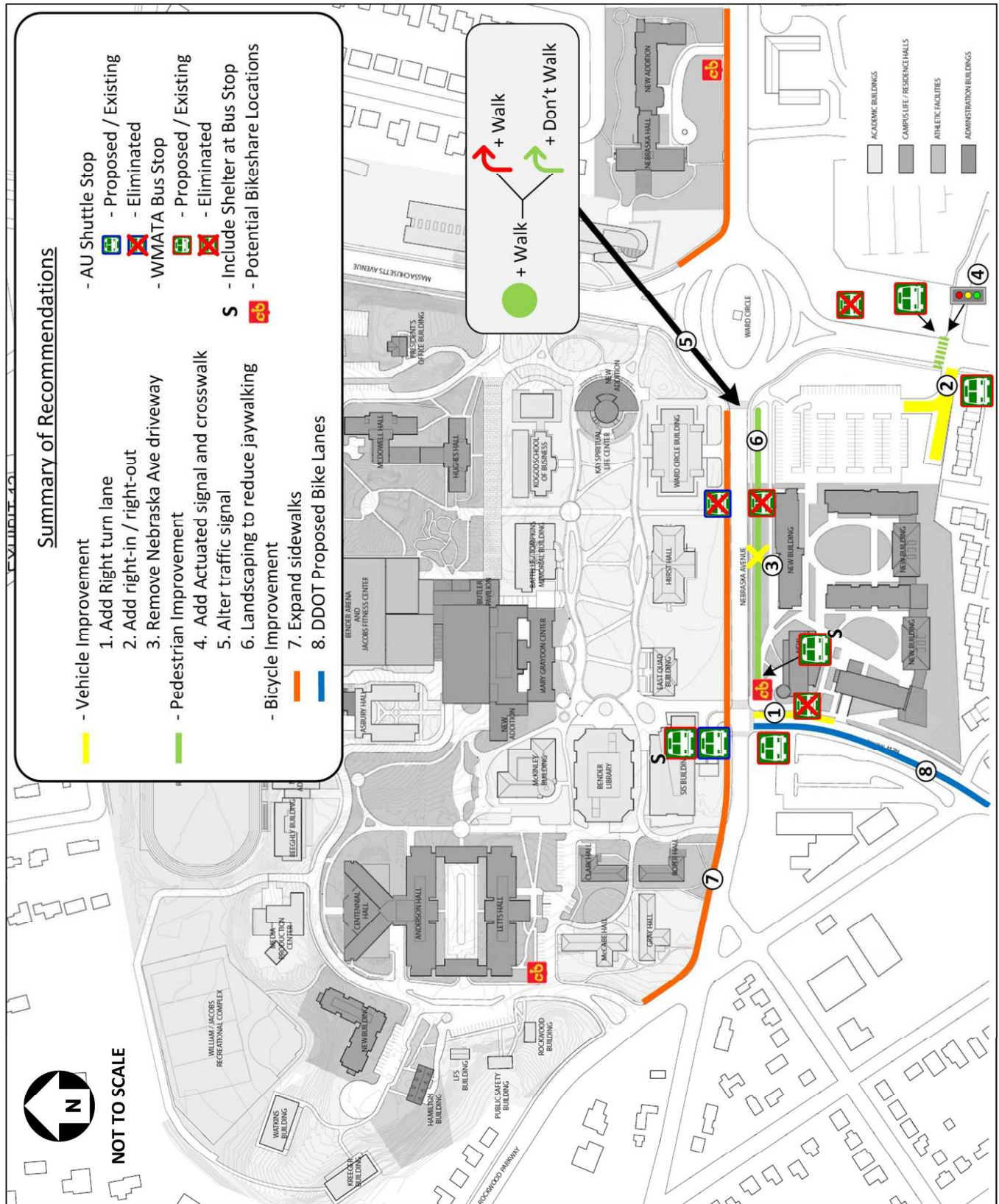


Figure 5: Short Term Recommendations

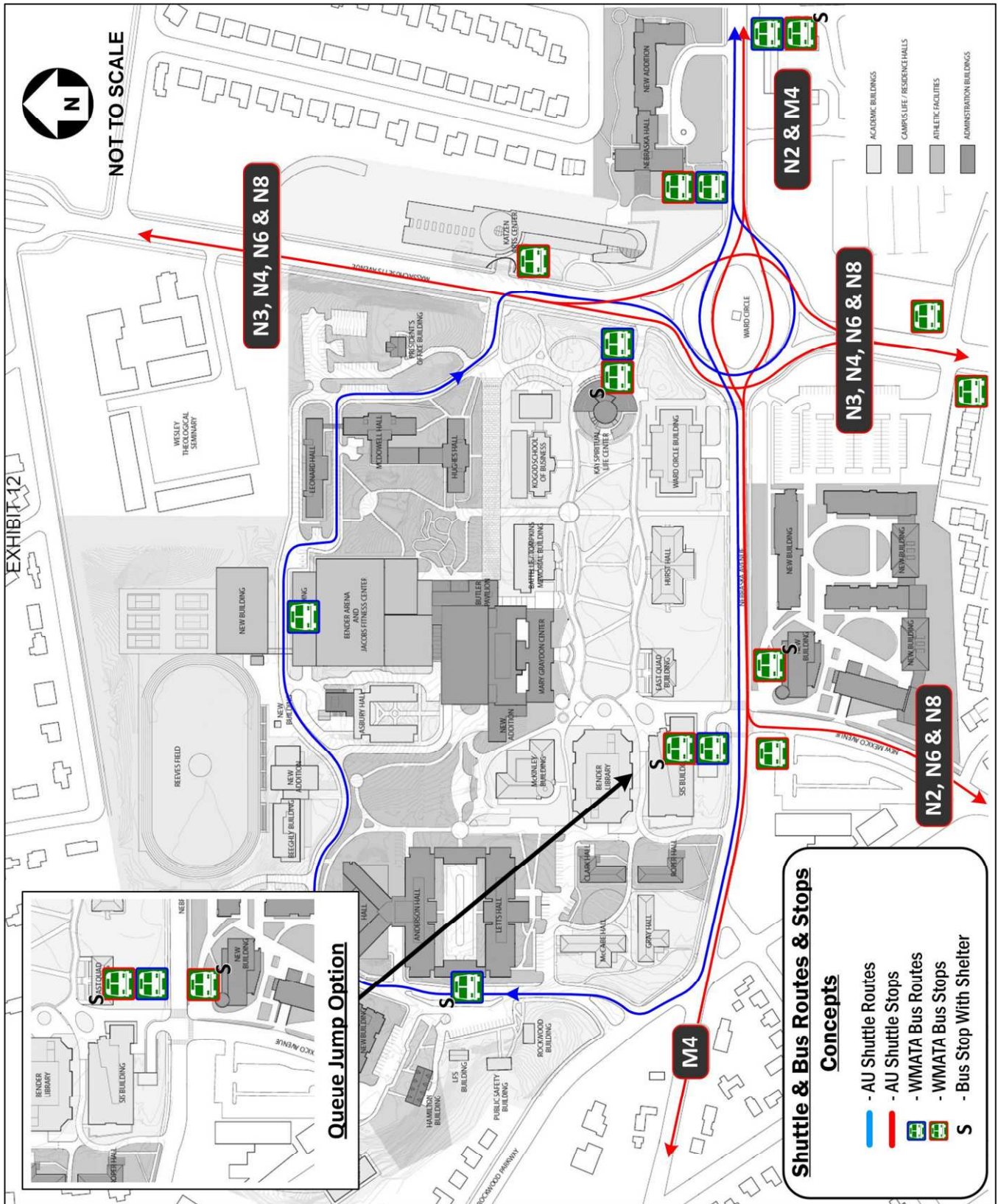


Figure 7: Concept of Future AU Shuttle Route and Stops and WMATA Bus Routes and Stops

Long-Term

The data collected, traffic modeling performed, and communications with AU staff and community members have shown consistent problems with Ward Circle. It has a significantly high crash rate, drivers seem confused traveling through it, drivers are often observed performing illegal movements, and traffic models show that congestion is only expected to increase by the year 2020.

While AU recognizes that solving the safety and congestion issues at Ward Circle is a topic beyond the scope of its 2011 Plan, the University is willing to work with the community and District and Federal agencies towards a long-term solution to Ward Circle, to help the safety and convenience of its students and faculty/staff.

This report recommends that AU lead a joint study on long-term options for Ward Circle. This study would need to include representatives from the various stakeholders with interest in Ward Circle such as AU and the surrounding community, including major parcel owners such as Department of Homeland Security, DDOT, and the National Park Service.

The goal of this study would be to reach a conclusion on a plan for Ward Circle that meets goals outlined by the stakeholder group. Likely, these goals would prioritize safety and convenience, but the final list would be left to the stakeholders to agree upon. Upon reaching a preferred alternative, the process would move on to looking for funding sources and preliminary design.

This report recommends including at least five alternatives in the study:

- No-build
No changes from the existing condition, other than signing, marking, and operational changes that do not require significant investment.

- No-build with additional crosswalks
This alternative would add controlled crossings at Ward Circle across Massachusetts Avenue into the center of the Circle. Currently, during the green lights for Nebraska Avenue through traffic, no vehicles cross where a potential crosswalk leading to Ward Circle would be located, unless they are making illegal movements.

The benefits from this concept would be a dispersal of pedestrians to several crosswalks. A reduction of pedestrians using the unsignalized crosswalks across Massachusetts Avenue at Ward Circle would lead to decreases in congestion at the Circle.



- Grade-separated
This alternative would be a grade-separated alternative, similar to a “Dupont Circle” solution, where safety and congestion issues are solved by tunneling one of the roadways at the circle, combined with controlled pedestrian

crossings at each crosswalk. There are several drawbacks to this concept, including space and monetary constraints.

- Fully signalized circle, with removal of inner lanes

This concept would look at converting the Circle to a more traditional District circle with a traffic signal located at each approach and no center through lanes. Initial traffic modeling of this concept showed that the safety improvements made through simplifying the circle and signalized every crosswalk may be offset by large increases to queuing, delays, and congestion.

- Traditional intersection

This alternative would involve removing the Circle and replacing it with a traditional, perpendicular intersection controlled by a traffic signal. Initial traffic modeling of this concept shows that it could provide the safety benefits without a significant impact to vehicular delay. However, removing the Circle would be detrimental to the monumental character of the location.

Transportation Demand Management

This section of the report reviews the existing Transportation Demand Management (TDM) program at AU and makes recommendations for inclusion in the 2011 Plan. The goal of the TDM program is not only to reduce the vehicular demand to the campus, but to organize, market, and monitor the different TDM strategies employed to ensure efficiency in their implementation. Currently, AU implements several very successful TDM strategies, including the AU shuttle system.

TDM Management

Effective TDM programs require an institutional framework to implement and manage individual TDM strategies. AU should organize all TDM programs under a single point of contact. This person will be responsible for monitoring and managing the programs, and would serve as a point of contact for DDOT or other transportation entities.

It is recommended that the University implement a plan to add new TDM strategies and begin to manage, market, and monitor all of their TDM operations to ensure efficiency in their implementation. This would ensure a system where inefficient or wasteful strategies do not get resources that could be used for ones that are more successful.

Thus, the recommendations for the TDM program are as follows:

- Assemble yearly monitoring reports, which collect performance data on the TDM strategies and make recommendations for additions and deletions from the plan based on the relative success of the performance measures;
- Promote TDM measures through coordination of marketing activities; and
- Incorporate new TDM measures to encourage use of non-automobile based services.

Monitoring

TDM monitoring programs help to evaluate campus travel habits and the effectiveness of TDM strategies. A monitoring program would include research and measurements of traffic, parking, and transportation use, such as traffic counts at gates and garages, parking occupancy counts, survey responses from campus user groups, participation/enrollment in TDM programs, and discussions on the relative effectiveness of each program to budget/resources allocated. A monitoring program can be an effective resource for evaluating TDM strategies and ensuring an efficient allocation of resources.

Many Federal agencies have implemented monitoring programs to evaluate TDM programs and traffic demand. For example, the National Institutes of Health has had a monitoring program in place for more than 15 years. It uses the reports to evaluate TDM strategies and to keep the local jurisdictions apprised on TDM success.

It is recommended that AU implement a similar program to collect performance data on the TDM strategies and make recommendations for additions and deletions from the plan based on the relative success of the performance measures. Ideas on what performance data can be collected are included in the discussion of each TDM measure below.

Marketing

Creating a TDM marketing program that provides detailed transportation information to the campus community can maximize the effectiveness of TDM strategies. A marketing program would educate the AU community about transportation policies and diverse travel options.

An effective marketing strategy should consist of an access guide that provides comprehensive transportation information for the entire AU community. The most effective strategy for providing travel information may be to create an enhanced transportation web site accessible from AU's home page. The site could also include additional information, such as transit maps that identify AU Shuttle and WMATA/DDOT routes and stops, vehicle routing and parking maps, bicycle maps, and other transportation information and policies. The web allows personalized information depending on the needs and interests of an individual user, making it a good medium to disseminate information to the varied users of the University.

Another option that would complement a web site would be to produce a multi-modal access brochure, which could be handed out to all new students and employees along with their orientation information and placed in information kiosks. This assists with developing good travel habits early on in their tenure at AU. Visitors to the campus would also benefit from this promotion. Awareness increasing campaigns can introduce new initiatives to alter travel habits during the year.

It is recommended that AU explore these ideas and others and incorporate them into the official TDM program. A discussion of marketing efforts and their relative impact should be included in the monitoring reports.

TDM Measures

Over the years AU has instituted several transportation policies and created services to reduce campus traffic. These policies and services have had a major impact on AU trip generation rates and travel habits. The following lists the key policies and services, and how they may be enhanced.

Parking

- ***Existing Program***

AU currently has a parking supply of approximately 2,724 spaces. Surveys performed in the Fall of 2010 showed that, on a typical weekday during the semester, the parking inventory peaked at 53% occupied.

The cost of parking for full time employees is \$120 per month. For on and off campus students, parking is \$964 per academic year. On campus after 5:00 PM on weeknights and all day on weekends, certain lots are available for general use. Resident freshmen students are not allowed to have cars on campus.

As part of its "Good Neighbor Policy", AU tickets AU-based vehicles parked on neighborhood streets. There are regular meetings between AU and the community regarding this program to maintain its effectiveness in reducing AU's impact on the neighborhood.

- Future Ideas

Based on the surveys of available parking on campus, the 2011 Plan should not and does not include any new parking facilities. Even with the removal of several surface parking lots, the resulting inventory will be sufficient to handle future demand.

The parking pricing policies should be constantly evaluated. The costs for on-campus parking should be high enough to significantly deter driving alone to campus, while not hurting the campus in the marketplace for faculty and staff, or generating a higher amount of off-campus and on-street parking.

- Monitoring

The success of parking policies on campus could be measured in several ways, including (1) the amount of non-carpool passes sold per year compared to full-time equivalent employees and (2) the amount of occupied spaces on a typical semester weekday.

Carpooling

- Existing Program

AU has an existing carpooling program for its employees that provides a discount on parking (\$61 a month compared to \$120 a month for a full-time employee).

AU also offers a ride matching and sharing service called Zimride. Zimride is a web-based service that allows for students, faculty, and staff to offer and accept rides. Employees can use Zimride to find potential carpool partners.

- Future Ideas

AU could explore several measures to encourage more participation in its carpool program, including (1) providing preferred parking for participants, (2) widening the pricing discount to carpoolers, and (3) implementing a Guaranteed Ride Home (GRH) program. AU should require all carpoolers to register with Commuter Connections to take advantage of their GRH program.

- Monitoring

The success of the campus carpooling program could be measured through the number of carpools and total participants and the ratio of carpool passes to overall employee parking passes on campus.

Car-Sharing

- Existing Program

Car sharing is an effective strategy for reducing campus trip rates. Car sharing is a model of car rental where users rent cars for a short period, often by the half-hour for an all-inclusive rate, which includes gas and insurance. Car sharing is ideal for campuses where students do not have access to private vehicles. It also allows employees that commute by transit to have easy access to a vehicle during the course of the day for errands or emergencies.

AU provides access to Zipcar, a private car-sharing operator, by providing two spaces reserved for Zipcar use in the Nebraska Avenue parking lot.

- Future Ideas

AU should maintain Zipcar availability during construction on the Nebraska Avenue Lot and, in general, should provide Zipcar with as many spaces as they request are needed on campus. The use of Zipcar should be monitored by the TDM coordinator, and if usage is high enough, the University should encourage more Zipcars be located on or near campus. Zipcar should be aggressively marketed to students as an alternative to private automobile ownership.
- Monitoring

Measuring the success of the car-sharing program would require cooperation from the car-sharing provider to help measure the use of vehicles parked adjacent to or on campus.

Transit

- Existing Program

The AU Shuttle service provides a high-quality connection to the Tenleytown-AU Metrorail station, linking the campus to the regional WMATA Metrorail service. In addition, several Metrobus routes stop adjacent to campus on Nebraska and Massachusetts Avenues.

AU offers employees enrolment in the SmartBenefits program, which allows for \$230 a month of pre-tax salary to be used for transit fares.
- Future Ideas

AU should investigate several ways to improve transit service on campus, including: (1) improving information on websites, including maps of specific routes that service campus, both AU shuttle and Metrobus; (2) coordinate with WMATA to see if SmarTrip cards can be available on campus, with a possible AU-branded card; and (3) exploring adding real-time tracking of AU shuttles, which could be incorporated in a website and displays at stops.
- Monitoring

The success of the shuttle program can be measured through ridership per year compared to total population levels. The ridership on each individual route could also be examined to determine the relative success of routes on a daily and weekly basis and to indicate where service could be added or reduced. In addition, the overall percentage of employees registered in the SmartBenefits program is a good indicator of transit use.

Bicycle Programs

- Existing Program

Bicycling is increasingly popular in the District, and bicyclists and parked bicycles are visible throughout the campus. Most bicycling is likely done between campus and off-campus housing, retail, and recreation. Bicycle parking is located throughout campus and at most buildings. In some locations, bicycles are locked to railings or poles when the racks are full or not conveniently located.

The University also has a bike-lending program run by students. The Bike Lending service lends bikes, without charge, for use by AU students and staff for up to 6 hours for transportation or recreational use.

Employees of AU that commute primarily by bicycle can sign up for a commuter bike benefit of \$20 a month. Shower facilities for commuting students and faculty/staff can be found in several locations on campus, including

the Sports Center and the new SIS building. Enclosed parking for commuters is located in several places, including the new SIS garage (where parking is located adjacent to the shower facilities).

A Capital Bikeshare station is located near campus on the sidewalk along Massachusetts Avenue.

- Future Ideas

Increased bicycle use could reduce demand for other transportation services that are at or above capacity. Improving bicycling conditions is a lower cost option than many TDM strategies, and DDOT has been aggressively promoting cycling, which makes it a good area for improvement.

There are several options for promoting bicycling at AU, including providing bicycle information and improving bicycle parking.

- Marketing

As part of a marketing campaign, AU could provide information about bicycle riding in the District, bike routes between campus and major destinations, and locations on campus for bike parking and storage.

- Parking

Good bike parking is essential to promoting bicycle riding and should consist of short- and long-term parking. Quality short-term parking consists of well-designed bicycle racks that securely support a bicycle's frame and front wheel. DDOT has an existing set of standards for bicycle parking, which many existing campus bike racks would not meet. Parking should be located near major campus access points and destinations and covered where possible to prevent exposure to the elements. Long-term parking provides enhanced storage for commuters looking for a secure parking location and provides for students and staff that may ride only occasionally. AU could improve both short- and long-term parking to encourage bicycling.

- Bike Sharing

AU should market and encourage use of the existing Capital Bikeshare location on campus. In addition, AU should reserve space for a future location, possibly along Nebraska Avenue or on the East Campus.

- Incentives

Many universities also provide incentives to encourage cycling. Incentives range from providing bicycle helmets, locks, and lights at cost or a discount to providing free bikes to all incoming students. Some universities have programs that require students to register their bicycles (sometimes in combination with free, high-quality locks) to help prevent theft or increase recovery rates. The University of Miami offers free locks to students when they register their bikes. Several small universities offer free bikes to students, including the University of New England and Ripon College in Wisconsin.

- Monitoring

The monitoring of bicycle program success depends on the TDM strategies employed. Increases in quality parking could be directly measured by counting the number of high quality parking locations added since the last monitoring report and providing a running total. The number of new bike registrations per student would also be a good measure to include. Bike sharing usage could be measured by the amount of activity at a bike-sharing station.

2011 CAMPUS PLAN – TENLEY CAMPUS

This section of the report provides a summary of the transportation components of the American University 2011 Campus Plan for the Tenley Campus. Based on the proposed changes on the Tenley Campus, the potential impacts of the Tenley 2011 Campus Plan are outlined and recommendations are presented. Detailed recommendations on site access, TDM programs, and other transportation related issues will be compiled for the further processing application of the Tenley Campus. At the time of this report, this is expected to occur 60 to 75 days after submittal of the Campus Plan application.

Tenley Campus Plan Overview

The 2011 Plan for the Tenley Campus focuses on creating a campus for the Washington College of Law following the demolition of several existing buildings and the addition of approximately 244,000 square feet of campus space in the approximate footprints of existing buildings. The Tenley Campus will consist of approximately 300,000 square feet of new and renovated facilities. The existing residence beds on the Tenley Campus will be relocated to new residence halls proposed for the Main Campus as part of the 2011 Plan.

The 2011 Plan anticipates the Law School will have a head count of 2,000 students spread over the day and 500 faculty/staff. The *American University 2011 Campus Plan for the Tenley Campus* provides a more detailed description of the proposed development. The Tenley Campus is not applying for further processing at the time of the Campus Plan application, and thus details on the site design will be addressed in the further processing application.

Transportation Components of Campus Plan

The most significant changes to the transportation infrastructure of the Tenley Campus will consist of building approximately 400-500 underground parking spaces. The Campus Plan also proposes retaining a minimal amount of the existing surface parking on site (currently 79 spaces). Vehicular access to the garage, loading areas and pick-up/drop-off activity is currently in the design phase. Details of vehicular access to the site will be presented in the Tenley Campus' further processing application.

As part of American University's goal of creating a sustainable campus, there are several concepts incorporated into the plan that enhance transportation sustainability. These include moving the Law School within walking distances of a Metrorail Station and incorporating many design elements (described below) that encourage non-automobile usage. These elements, plus the proximity of the Tenley Campus to the Main Campus and the connection provided by the AU shuttle, will aid in minimizing the vehicular trip generation of the site. In addition, the proximity of the Campus to the retail and services provided in Tenleytown could help reduce automobile trips generated by the site.

The transportation components of the proposed Tenley Campus will be detailed in its further processing application. This report recommends that they include:

- Providing quality vehicular access for Tenley Campus users, designed with minimal impact to the surrounding transportation network. The location of the parking garage access should be a compromise between:
 - Providing quality access to and from the garage;
 - Minimizing impacts to commuter traffic; and
 - Minimizing impacts to neighborhood traffic.
- Examining the driveways currently located along Yuma Street to see if they can be reduced or eliminated.

- Maintaining a location for pick-up/drop-off and taxi activity.
- Maintaining parking spaces reserved for car-sharing services (currently located within the pick-up/drop-off facility located along Nebraska Avenue)
- Providing bicycle infrastructure for several categories of cyclists:
 - Provide space for a Capital Bikeshare station on Campus.
 - Provide short-term on-street bicycle parking that meets DDOT standards near the major entrances to the Campus, along Yuma Street, and adjacent to the pick-up/drop-off area on Nebraska Avenue.
 - Provide long-term commuter based parking in the new parking garage, in an enclosed and secure location. Provide shower facilities available for use by bicycle commuters.
- Maintaining the existing AU Shuttle stops and service on Nebraska Avenue.

Transportation Impacts

The impact of the 2011 Plan for the Tenley Campus on the surrounding transportation network is established by determining how the campus will change transportation patterns in the future. Generally, these changes are due to two things: (1) growth in travel demand and (2) infrastructure changes that alter the geometry or operations of the network. Impacts due to changes in vehicle travel patterns from the 2011 Plan will be generated by the addition of approximately 400-500 parking spaces on the campus. The relocation of the WCL will shift this demand to a new location, and this could have an impact at nearby intersections. This move is also expected to shift existing trips from Metrobus and private vehicle to Metrorail and will lead to an increase in walking and biking demand to and from campus.

Summary of Technical Analysis

A detailed technical analysis of the impacts of the 2011 Plan on vehicular and pedestrian capacity and delays near the Tenley Campus is included as an attachment to this report.

The impact of the 2011 Plan on the transportation network was determined by examining the changes to pedestrian and vehicular capacity and congestion on the roadways surrounding the campus during the commuter peak hours on a typical weekday. Impacts are determined by examining future capacity and delay projections between a scenario with development of the 2011 Plan and a scenario without development of the 2011 Plan and locating differences where the addition of the 2011 Plan generates an unacceptable condition that does not exist in the scenario without the 2011 Plan.

The main differences between the year 2020 scenarios with and without the development of the 2011 Plan are:

- The relocation of the WCL will lead to an increase of pedestrian activity on the Nebraska Avenue and Wisconsin Avenue crosswalks near campus. The future projections with the campus plan include more pedestrian activity in adjacent crosswalks compared to the future conditions without the 2011 Plan.
- The addition of approximately 400-500 parking spaces will add additional trips to the roadway network adjacent to the Tenley Campus. Thus, the future scenario with the 2011 Plan fully developed generated more local traffic on adjacent roadways than the plan without development of the 2011 Plan.

The traffic capacity analyses contained in the technical report show that, within intersections near the Tenley Campus, several locations will operate at unacceptable levels of service without development of the 2011 Plan:

- Albemarle Street & Fort Drive/40th Street: The north and southbound approaches at this intersection, which are stop-controlled while the east-west movements are not, will experience unacceptable levels of delay. In addition, the north-south crosswalks across Albemarle Street will have an unacceptable level of service for pedestrians. The *Transportation Study* for the U.S. Department of Homeland Security Nebraska Avenue Complex Master Plan “Draft Environmental Impact Statement” performed by Kimley-Horn and Associates, Inc. recommends the installation of an all-way stop sign control at this intersection. This report concurs with this recommendation, as it will improve both vehicular and pedestrian conditions.
- Tenley Circle: Some of the intersections that comprise Tenley Circle will have movements that operate with unacceptable levels of delay. The traffic models used in the analyses show that updated signal timings in the future scenarios can mitigate these conditions.

The traffic capacity analyses contained in the technical report show that, within intersections near the Tenley Campus, there is only one location where the addition of the 2011 Plan leads to an unacceptable condition:

- Nebraska Avenue & Warren Street: Westbound traffic from Warren Street during the afternoon peak hour operates at an unacceptable level of service. The delays at this intersection are generated by traffic going to and from the WCL garage, which at the time of the technical analyses, was assumed to be accessed from Warren Street. Since the garage access location may be relocated, mitigation measures for the delays at this intersection will need to be determined after a final location for the WCL garage driveway is selected and the capacity analyses revised.

Recommendations

Based on the design of the proposed Tenley Campus, its transportation goals, and the results of the technical analyses, the following are this report’s recommendations:

- *Update the technical analyses once the parking garage access is designed*
As described above, the access location for the WCL garage is not finalized. At the time of further processing, the technical analyses performed for the 2011 Plan should be revised and recommendations made where needed to mitigate impacts generated from the driveway.
- *Minimize parking impacts to surrounding neighborhood*
The parking supply of 400 to 500 spaces is based on an existing parking study of the WCL campus (detailed in the “Background Information” section of this report) that identified a typical peak demand of 410 spaces, which would require a supply of around 450 spaces. The concept also assumes that demand generated by the growth in the campus population would be offset by the re-location of the WCL closer to a Metrorail station.

Even with an adequate supply of parking there is still concern that there will be parking on neighborhood streets during high activity days or special events or by students who do not wish to pay the parking fees. Thus, this report recommends the following:

- Use excess parking on the Main Campus and the connection via the AU shuttle to supplement the new garage. The existing WCL uses a similar arrangement using excess supply in the Katzen garage.
- During special events, encourage parking in the local public parking garages located in Tenleytown.

- Employ the “Good Neighbor” on-street parking ticketing program employed at the Main Campus, existing WCL campus, and at the Tenley Campus. This measure has been shown to effectively reduce on-street parking by students at these campuses and would help ensure minimal student parking in the Tenleytown neighborhood.
- Provide a quality TDM program to minimize vehicular trip generation

The Tenley Campus TDM program should incorporate the same programs and policies identified for the Main Campus described in this report. These programs include:

 - Monitoring and marketing of programs;
 - Carpooling and ride-matching services;
 - Commuter benefits for transit (SmartBenefits) and bicycle commuters; and
 - The continued operation of the AU shuttle.

These measures would be in addition to the infrastructure recommendations listed above, such as reserved spaces for car-sharing, a Capital Bikeshare station, and short and long term bicycle parking with access to showers.

BACKGROUND INFORMATION

This section details the existing conditions of the transportation facilities and services at American University Main and Tenley Campuses and the surrounding neighborhoods. The first part of this section contains text detailing existing conditions and issues for each facilities and service. The second section contains a series of figures that map existing conditions and summarize conditions and issues. Figure 1, shown previously, identifies the location of the AU Main Campus, as well as the Tenley campus and the existing Washington College of Law.

Pedestrian Facilities

Existing Pedestrian Network

Main Campus

The American University Main Campus is a compact campus that has good pedestrian walkways throughout and a vibrant, pedestrian only center. The size of the campus, pedestrian amenities, and location of transit stops and parking results in high pedestrian traffic throughout campus.

Campus housing, transit stops, and parking lots located on the periphery are the primary sources of pedestrian traffic. The primary destination is the campus quad, the Eric Frieheim Quadrangle. The quad is buffered from busy arterials immediately adjacent to the campus and internal campus roads by buildings and landscaping. It attracts and concentrates academic and social activities and has numerous formal and informal gathering locations outside. On days with nice weather, students and staff can be seen throughout the quad socializing or small classes in session on the steps of an academic building. Photo 1 captures conditions in the quad on such a day.

Between the core and campus housing, transit stops, and parking lots there are good walkways for pedestrians. Figure 8 identifies primary and secondary pedestrian pathways. This figure highlights that AU roadways, parking, and transit routes are located on the periphery of the campus, which limits the number of locations where pedestrian pathways and vehicular traffic cross. This results in excellent pedestrian conditions in most locations.



Photo 1: Eric Frieheim Quadrangle

There are pathways between off-campus housing and parking facilities that result in heavy pedestrian volumes at crossings on Massachusetts and Nebraska Avenue. Most of these crossings have good pedestrian amenities to limit potential conflicts with vehicular traffic on these major arterials though some pedestrian crossings at Ward Circle, where Massachusetts Avenue yields at the crosswalk, are observed to be difficult.

There are locations where pedestrian walkways and gathering space could be enhanced but there are no major areas of concern. Improvements to pedestrian treatments could be done in tandem with long-term maintenance or construction projects. Improvements include expanding walkway widths in the locations with heavy traffic, establishing uniform walking design and landscaping, and enhancing street crossing facilities and amenities at major crossings. Shuttle stops, the open space northwest of McKinley located at the northwest corner of the main quad, and pedestrian crossings on Massachusetts Avenue and Nebraska Avenue are three locations where pedestrian issues were identified. These locations are identified on Figure 8.

Tenley Campus

The Tenley campus comprises a single city block and has good pedestrian walkways between buildings and the adjacent pedestrian network. The campus is within walking distance of AU’s Main Campus, the Tenley-AU Metrorail station, and commercial uses located along Wisconsin Avenue. The Tenley campus proximity to transit and diverse land uses allow many trips to be made by walking. Photo 2 captures conditions at Tenley campus.

DDOT Pedestrian Master Plan

The *DC Pedestrian Master Plan* from April 2009 identifies several recommendations to increase pedestrian activity by making walking a comfortable and accessible mode of travel throughout all parts of the District. These recommendations include constructing new sidewalks where missing on streets in the Districts, improving pedestrian access and safety at controlled and uncontrolled crossing and intersections, and improving pedestrian access and safety at bus stops while maximizing transit efficiency.



Photo 2: Tenley Campus Main Entrance and Adjacent Sidewalk



Figure 8: Main Campus Pedestrian Paths

Rock Creek West II Livability Study

The Rock Creek West II (RCW2) Livability Study was initiated by the District Department of Transportation (DDOT) to take a big picture look at the roadway network and to identify concrete actions to increase transportation and safety options, concentration on transportation safety and quality of life issues for all users. The RCW2 study is the first of three Livability Studies to be initiated in 2010.

The draft final recommendations for the RCW2 Livability Study were presented to public in October 2010, and based on public comments and additional analysis, the draft final recommendations were presented to the public in December 2010. The final report for the project will be posted following the closing of the public comment period, which is expected in February 2011. The study focuses on an area located in the northwest quadrant of the District, in Ward 3. It includes the 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, including AU. The study area is bounded by Rock Creek Park and the state of Maryland.

Near the AU Main and Tenley Campuses, several corridors and intersections were included in the RCW2 study. Table 1 shows the reported issues, the final recommendations, and the impacts expected from the proposed changes.

Table 1: Draft Final Recommendations from Rock Creek West II Livability Study

Location	Reported Issue	Final Recommendation (12/2010)	Expected Impacts
40 th Street & Albemarle Street	Awkward intersection; poor visibility; poorly marked/located crosswalks.	Paint crosswalks across 40 th Street curb cuts.	Improve pedestrian environment in service vehicle area.
		Between Brandywine Street & Albemarle Street: reverse direction of 40 th Street (to be NB) and Fort Drive (to be SB).	Improve visibility and safety by aligning approaching traffic to intersection. Need to relocate Metrobus and shuttle stops and parking.
		Convert metered parallel parking to angled parking along west side of 40 th Street and east side of Fort Drive.	Additional on-street parking for Wilson HS and community destinations; narrowing of travel-way and traffic calming.
Fort Drive near Albemarle Street	Unclear parking regulations.	Remove U-turn break in median near intersection. Add median break and new crosswalk at Whole Foods garage entrance/exit.	Relocate U-turns from intersection to where most vehicles are coming from, improving circulation.
Fort Drive near Albemarle Street	Unclear parking regulations.	Clarify parking signage.	Clarify parking regulations, reduce violations, and make more user friendly.
42 nd Street & Warren Street	Motorists speeding.	Construct neighborhood traffic circles at both connections to Warren Street.	Reduce vehicle speeds; improved pedestrian safety; landscaping/place-making opportunity.

Location	Reported Issue	Final Recommendation (12/2010)	Expected Impacts
42 nd Street between River Road and Van Ness Street	Motorists speeding and cut-through traffic.	Add a centerline. No turn restrictions. Add curb extensions to the following intersections: Brandywine (SW & SE corners), Butterworth PI (NW & SW), Yuma (NW, NE, and SE), and Van Ness (all).	Reduce vehicle speeds due to visual narrowing of roadway. Discourage cut-through traffic by narrowing roadway at intersections and reducing turning radii; change behavior of vehicular traffic (local and cut-through).
Albemarle Street between 42 nd Street and Wisconsin Avenue	Aggressive driving in school zone.	Remove mid-block crossing.	Reduce pedestrian-vehicle conflict and improve safety; direct pedestrian to cross at protected locations (intersections).
Albemarle Street from Wisconsin Avenue to Nebraska Avenue	Motorists speeding.	Refurbish centerline.	Reduce vehicle speeds due to visual narrowing of roadway.
Van Ness Street between Nebraska Avenue and Wisconsin Avenue	Motorist speeding; wider roadway.	Reconfigure road to include one travel lane in each direction, a parking lane on the north side, and an eastbound bike lane.	Reduce vehicle speeds by narrowing lanes and adding other modes; improve cyclist safety; increase cyclist volumes.
Nebraska Avenue approaches to Ward Circle	Pedestrian safety, failure to yield.	Add raised islands and reconfigure crosswalks to provide pedestrian refuges (short-term).	Reduced pedestrian crossing distance; more visible crosswalks; improved pedestrian safety.
Ward Circle	Vehicle weaving, unclear lane marking.	Add channelizing island and lane marking arrows (short-term).	Clarify assignments within the circle; eliminate some weaving; discourage prohibited movements.
	Unclear wayfinding.	Add signage on approaches and within the circle (short-term).	Clarify lane assignments; reduce weaving and confusion.
	High accident rate, inadequate pedestrian facilities, poor visibility, and confusing configuration.	Future detailed study needed.	Placemaking opportunity; restoration to traditional DC traffic circle.
Yuma Street between Massachusetts Avenue and Connecticut Avenue	No bicycle facilities.	Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments.	Reduced vehicle speeds due to visual cues; increased cyclists.

Bicycle Facilities

Existing Bicycle Network

Main Campus

Bicyclists are visible throughout the campus during pleasant weather and bicycle racks are often full, regardless of weather. AU requires that bicycles must be registered with Public Safety. Bicycling is common at AU even though it has a compact campus and access routes (external to campus) with fair to poor bicycling conditions. Access routes to campus are less than ideal due to changes in topography and roadway conditions. The adjacent streets, in particular Massachusetts Avenue and Nebraska Avenue, have narrow lane widths, high traffic volumes, and high traffic speeds. The District Department of Transportation (DDOT) indicates that bicyclist use the sidewalk in the vicinity of AU due to roadway conditions, one of a few locations in the District where this is recommended (DDOT, March 2010).

Most campus destinations are within walking distance, a quarter mile or less, of housing, transit stops, or parking lots, which results in most on-campus trips done by walking rather than bicycle. Due to this most bicycling is likely done between campus and off-campus housing, retail, or recreation. Figure 9 identifies bicycle routes and parking locations.

Bicycle parking is located throughout campus at most buildings. Photo 3 captures a Capitol Bikeshare Station and bicycle parking on campus. AU parking regulations stipulate that, “when parked, bicycles must be in bicycle racks or other spaces or areas designated for their use. Bicycles must be parked clear of sidewalks, ramps, building entrances and handrails/fences.” In some locations, bicycles are locked to railings or polls when the racks are full or not conveniently located. This indicates the additional bike parking is warranted.

The newly created DC bike-sharing system, Capital Bikeshare, which premiered in September 2010, has three stations located in the vicinity of the AU campus, as shown on Figure 9. One station is located along Massachusetts Avenue near Ward Circle, adjacent to the Glover Gate, as shown in Photo 3. A secondary station is located adjacent to the Tenleytown/AU Metro station, providing a bicycle connection to the Tenleytown campus, as well as an additional mode of transportation between the Metrorail station and the Main Campus. A third station is located along Wisconsin Avenue near Newark Street.



Photo 3: Bicycle Parking Conditions on Campus

Memberships to the Capital Bikeshare system are available on a yearly, monthly, or daily basis for a \$75, \$25, or \$5 fee, respectively. Additionally, the first 30 minutes of each trip on Capital Bikeshare is free, with an additional fee paid for each 30 minute period thereafter.

Overall, the campus has good bicycle amenities but some improvements are possible, particularly with parking. Long-term bicycle storage may be a solution for students that bring their bikes to campus to use and do so infrequently but often enough to want convenient parking options. Another area for improvement is sidewalks that have heavy pedestrian traffic and are also designated for bicycling, such as along Nebraska Avenue between the Tenley Campus and Main Campus. In these locations, expanding the width of the pedestrian and bicycle right-of-ways may be warranted. Coordination with DDOT could help expedite the creation of shared-use trails along Massachusetts and Nebraska Avenues (included in the DC Bike Plan). These trails would improve conditions for bicyclists and pedestrians. AU could also coordinate with DDOT to expand Capitol Bikeshare.

Tenley Campus

Bicyclists are visible throughout the campus during pleasant weather and bicycle racks are often full, regardless of weather. The Tenley campus has a bike rack located at the main entrance that is frequently occupied with bicycles. The adjacent streets at the Tenley campus have narrow lane widths, high traffic volumes, and high traffic speeds, which reduces the attractiveness of bicycling.

As stated previously, the newly created DC bike-sharing system, Capital Bikeshare, which premiered in September 2010, has three stations located in the vicinity of the AU campus, as shown on Figure 9. A station is located adjacent to the Tenleytown/AU Metro station, approximately one block from the Tenleytown campus. Other stations are located along Massachusetts Avenue near Ward Circle, adjacent to the Glover Gate and along Wisconsin Avenue near Newark Street.

Bicycle Master Plan

As shown in the *DC Bicycle Master Plan* from April 2005, DDOT's proposed bicycle infrastructure for the roadways in the vicinity of the proposed development includes several multi-use trails, on-street bike lanes, and signed bicycle routes. The facilities will significantly improve bicycling conditions in the study area and may lead to higher rates of cycling. They also provide additional links between the University and major residential and commercial destination in northwest, DC and beyond. Figure 10 illustrates future and proposed bicycle conditions from the Bicycle Master Plan.

Rock Creek West II Livability Study

As described above, the RCW2 study includes both pedestrian and bicycle recommendations. Many of the recommendations contained in Table 1 are bicycle oriented, which if implemented would greatly increase the amount of bicycle facilities in the vicinity of the campus.

AU Shuttle Service

AU provides free shuttle service between the Main Campus and the Tenley campus, Washington College of Law and Tenleytown/AU Metro station. AU shuttle service is an essential transportation service provided by the University. Figure 11 identifies shuttle routes and stop locations. On campus, shuttles enter and exit via Fletcher and Glover gates; stops are located near these gates. Another heavily used stop is located on Nebraska Avenue adjacent to the Ward Circle Building. These stops are major sources of pedestrian traffic and high volumes of passengers waiting, boarding and alighting. The on-campus routes and stops are well located because they separate vehicle routes and pedestrian routes, which limit conflicts.

AU provides shuttle service to reduce campus vehicle trips and parking demand. Since 1995, ridership grown has grown significantly and continuously, which speaks to the quality and convenience of the service provided. In 2010, AU shuttle provide approximately 1.67 million passenger trips. Figure 12 illustrates annual ridership trends since 1995. Note that beginning in August 2010 AU began utilizing automated passenger counters, prior to that the counts were performed manually. Quality control checks by AU found that the automated counters are accurate.

A review of shuttle conditions found no major areas of concern but improvements to shuttle routes and stops are possible. Stop improvements include adding amenities such as shelter, seating, and route information and eliminating some stops to reduce jaywalking. Photo 4 shows the existing conditions at two shuttle stops located on the Main Campus. Intelligent Transportation Systems (ITS) could be implemented to enhance shuttle service. For example, shuttle stops could provide information on the time remaining until the next bus arrives. This information could also be made available on the internet, which would help passengers plan their trip before departing for the shuttle stop. Another possible improvement to the AU shuttle system would be the addition of bicycle racks to shuttle vehicles, to allow for better integration of the two modes.

Transit

The AU Main Campus is directly served by Metrobus and linked with Metrorail Stations located on the Red Line by AU Shuttles and Metrobus. The AU Tenley Campus is directly served by Metrobus and is within walking distance of the Red Line Tenley-AU Metrorail Station. Figure 13 identifies Metrobus routes and stops and the nearest Metrorail station location that serve the AU Main and Tenley Campuses. Transit connects the campus and destinations throughout the District and Maryland.

Ridership data from WMATA indicates that approximately 400 riders board and alight at the stops immediately adjacent to AU. The data was collected in 2002 and 2004 and reflects conditions on a typical weekday. The data indicates that Metrobus ridership is lower than typical, daily AU shuttle ridership, but that it provides access for a number of AU faculty, staff, students and visitors.

To encourage transit use by employees, AU operates a SmartBenefits program for employees. The SmartBenefits program provides employees with pre-tax dollars to pay for monthly transit expenses, up to \$230 per month. There are no plans in place to change transit services in the near term. Improvements to Metrobus could be made by adding amenities such as shelters, seating, and route information to the closest Metrobus stops to campus.

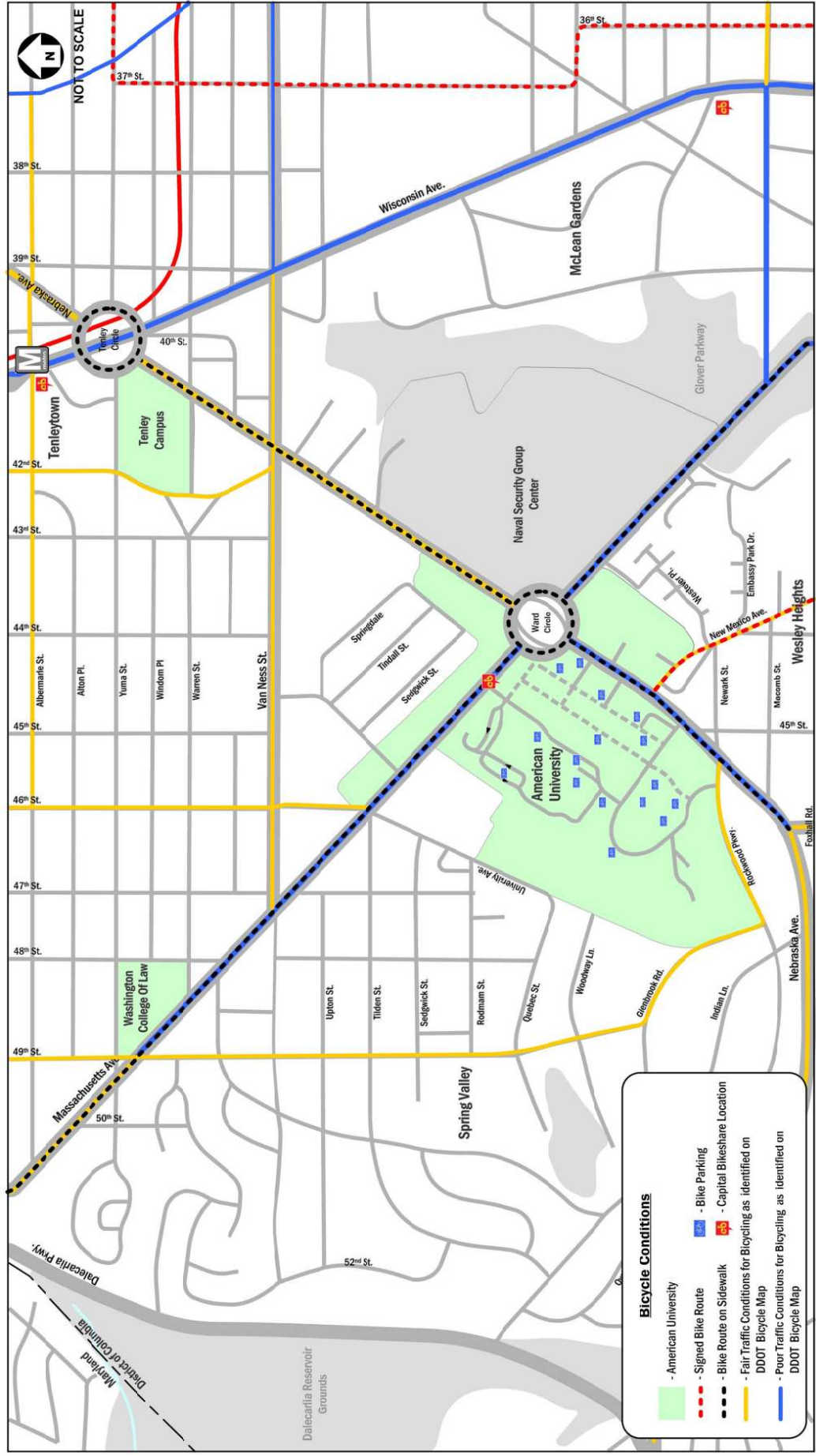


Figure 9: Existing Bicycle Facilities

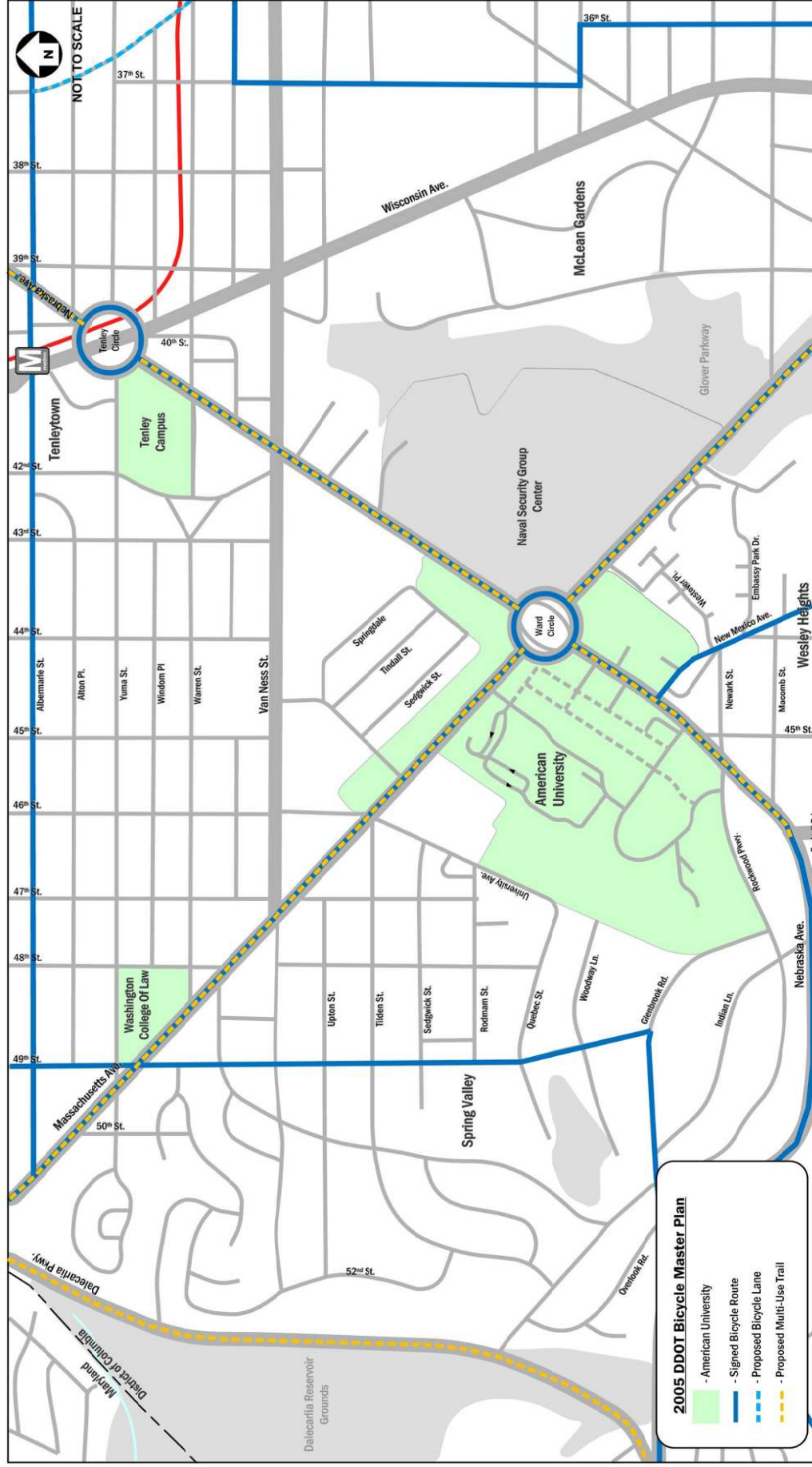


Figure 10: Bicycle Master Plan

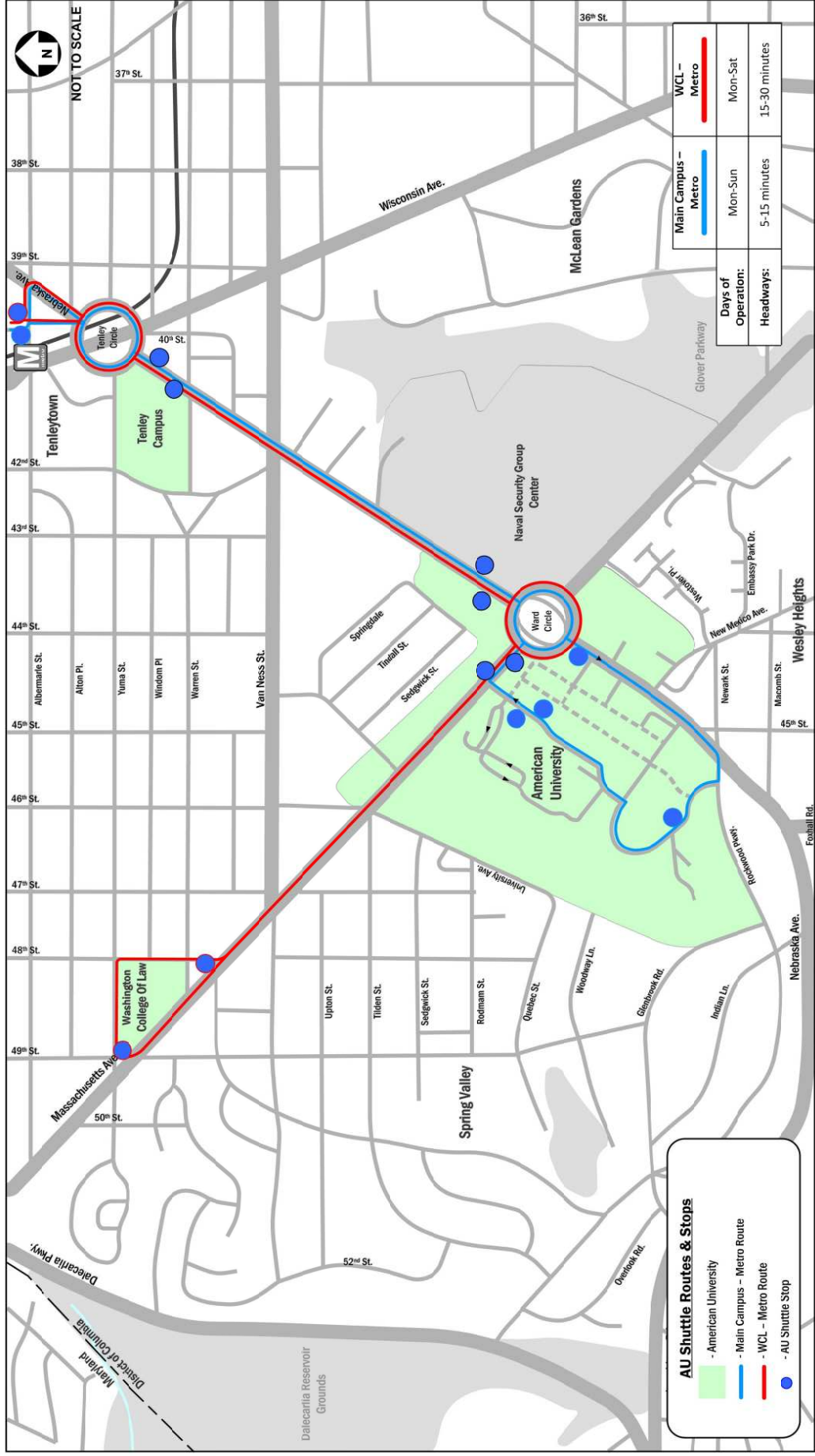


Figure 11: AU Shuttle Routes and Metro Bus Stops

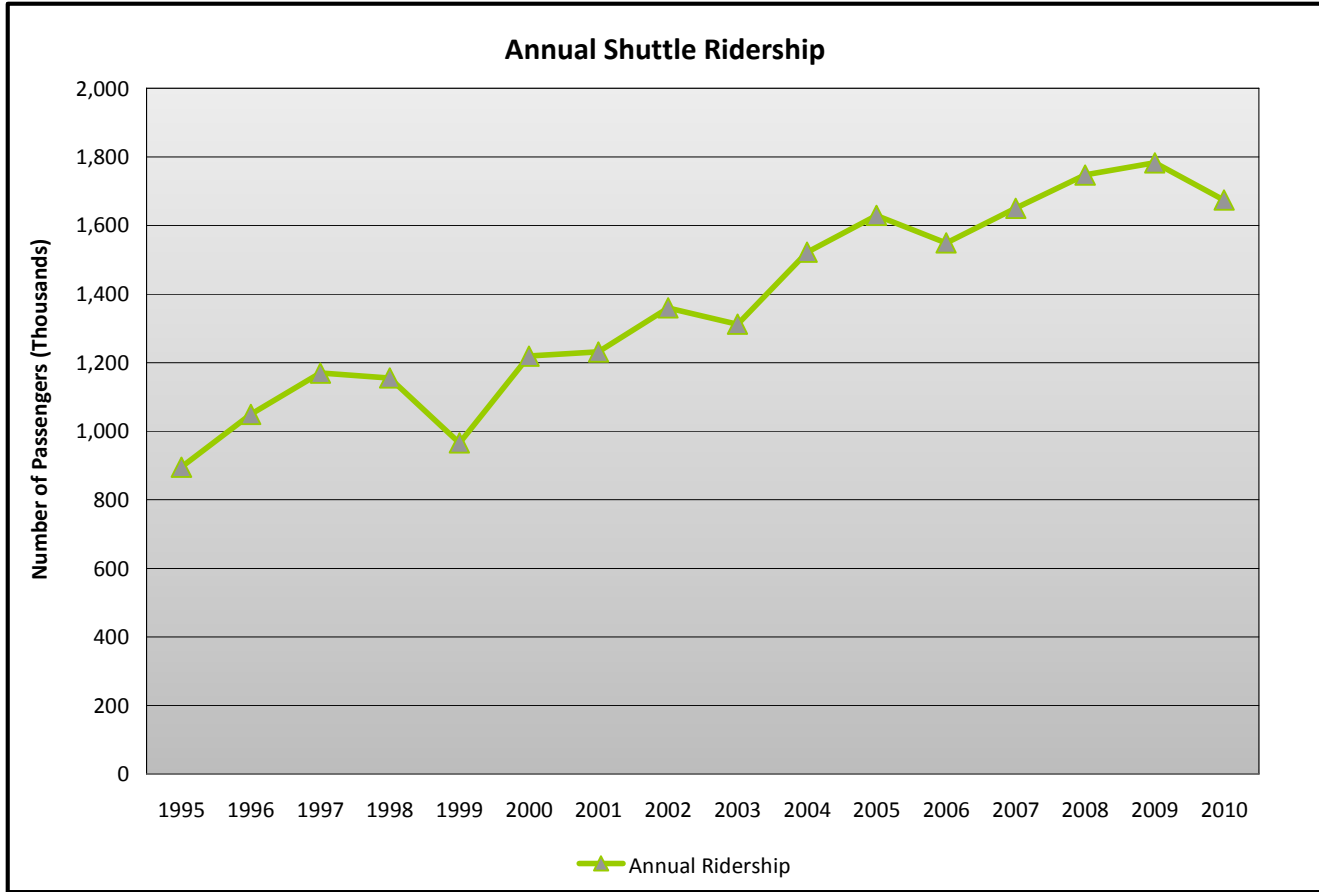


Figure 12: AU Shuttle Ridership Trends Since 1995



Photo 4: Conditions at AU Shuttle Stops

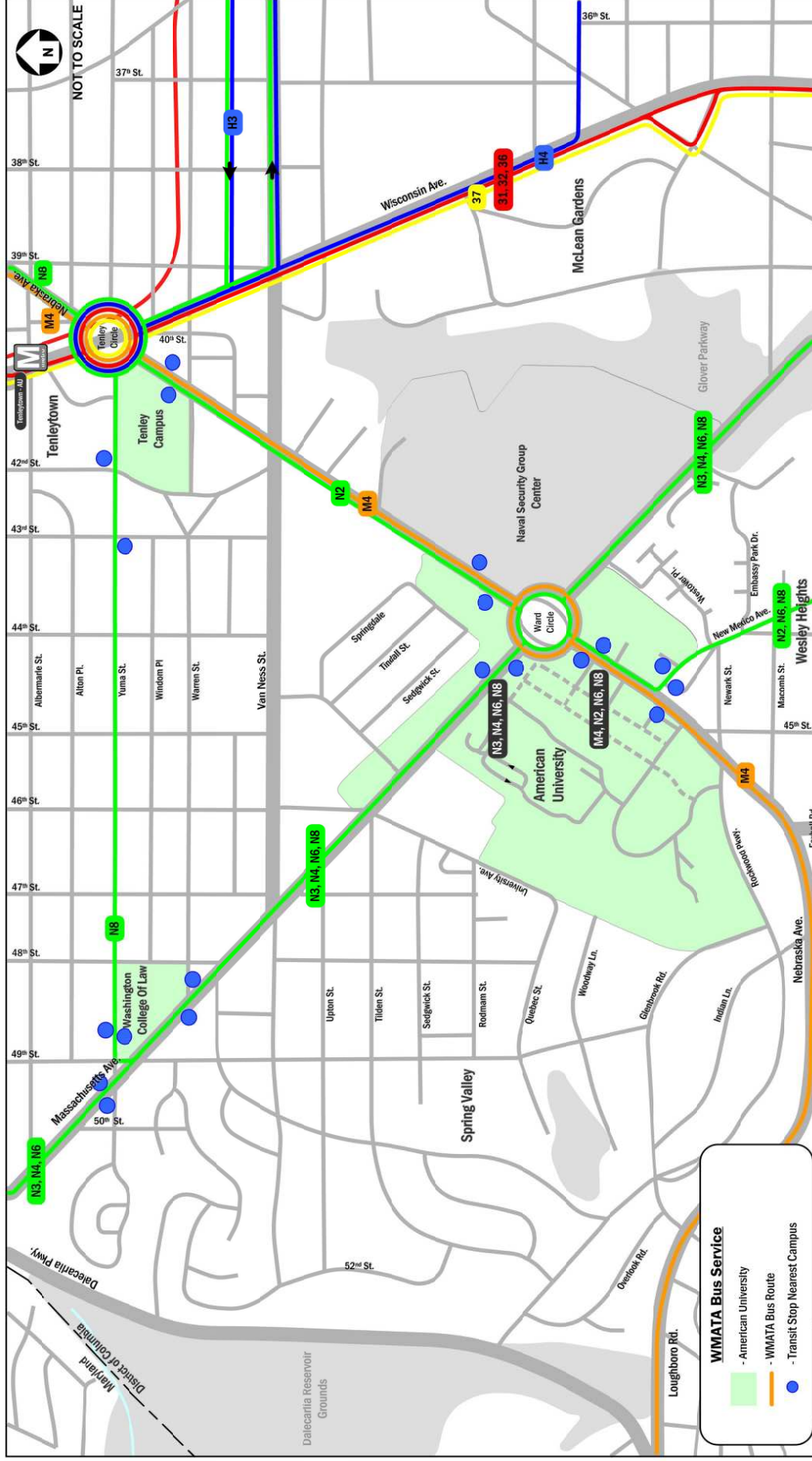


Figure 13: Area Transit Services

Parking

AU requires all students, faculty, staff, visitors and guests to park on-campus. To accommodate demand for parking, the university provides ample parking spaces that exceeds demand and strictly enforces parking restrictions on the residential streets surrounding AU.

The University has multiple surface parking lots and parking garages located throughout the campus. AU has a total of 2,724 parking spaces. Most parking on the Main Campus is located on the periphery of the campus core, which reduces on-campus vehicle and pedestrian conflicts because these pathways rarely cross. The Tenley campus has 65 parking spaces located in a surface lot and along the driveway adjacent to Nebraska Avenue. Figure 16 identifies parking lot locations, including the newly opened garage under the new SIS building.

Parking at the University is by permit-only on weekdays between the hours of 8:00 am and 5:00 pm. Table 2 details the parking permits issued since the 2005-2006 academic year. Hourly permits are valid in the Nebraska lot and Katzen Garage and can be purchased from the Pay-As-You-Go machines on site or from the Transportation Services office.

Table 2: Parking Permit Sales

Academic Year	Average Monthly Faculty Enrollment	Annual Student Permit Sales
2005 - 2006	1,146	708
2006 - 2007	1,198	913
2007 - 2008	1,112	866
2008 - 2009*	1,169	488

* Represents data from 2008 only.

AU has implemented parking management programs to minimize on-street parking in the adjacent neighborhood. The management program has a strict enforcement component that has effectively reduced the number of AU vehicles parking on-street. The parking policy states that, “any member of the University community who parks in the surrounding neighborhood in an effort to circumvent the parking policy will receive a \$75.00 fine.” Citation data and conversations with AU transportation services staff indicate that on-street parking has decreased since 2005 due to strict enforcement.

AU has unused capacity that could accommodate future growth in demand, or that could be reduced to minimize costs and impacts associated with providing parking. The university conducts regular parking lot surveys to establish usage. Table 3 lists data compiled during the 2010 Fall Semester as collected by Gorove/Slade during field surveys. In addition to parking provided for faculty/staff, students, and visitors, there is ADA parking, service vehicle parking and other parking spaces located throughout campus. Table 3 lists the number of these spaces, and Figure 16 identifies their location and designated use where possible.

Parking supply and usage indicates both supply and demand have decreased since the 2000 Plan. This trend can be seen for both the Main Campus and the Tenley Campus. A reason for this may be the significant increase in annual AU shuttle ridership seen since 2000, which may indicate a reduction in driving by faculty, staff, students, and visitors. Another reason may be the availability of car-sharing on campus, which reduces the need for individual car ownership.

Table 3: Parking Supply and Usage (Fall 2010)

#	Lot Name	Type	Total Spaces	Occupied	Percent Occupied	Available	Percent Available
1	Kreeger	Faculty and Staff	22	13	59%	9	41%
2	Clark	Faculty and Staff	52	6	12%	46	88%
3	Nebraska	All Permits	901	487	54%	414	46%
4	Nebraska Hall	Students	27	14	52%	13	48%
5	SPG	Faculty and Staff	461	231	50%	230	50%
6	Tenley	Faculty and Staff	79	58	73%	21	27%
7	Katzen	All Permits	471	256	54%	215	46%
8	McDowell	Students	46	27	59%	19	41%
9	Asbury	Faculty and Staff	43	29	67%	14	33%
10	Hamilton	Faculty and Staff	58	53	91%	5	9%
11	Centennial	Students	141	82	58%	59	42%
12	SIS	All Permits	283	103	36%	180	64%
	Various	Service, ADA, & Other	140	84	60%	56	40%
Total			2,724	1,443	53%	1,281	47%
	Total	On-campus Student	214	123	57%		
	Total	Faculty and Staff	715	390	55%		
	Total	All Permits and Visitors	1,655	846	51%		
	Total	Service, ADA, and Other	140	84	60%		

Note: Data collected during peak parking times for commuter-based parking (commuter students and faculty & staff, 3pm on a weekday).

Washington College of Law Parking Demand Analysis

In addition to the parking data collected by Gorove/Slade in 2010 Fall Semester, a parking demand analysis was performed for the Washington College of Law (WCL). The purpose of the analysis was to determine the existing parking demand for the WCL to be used to help guide American University with the decision of how many parking spaces to build on the Tenley Campus for the future relocation of the WCL.

Currently, the WCL provides parking for faculty, staff and students in several facilities. The main parking facility is the WCL garage located on Massachusetts Avenue. Additional parking is provided in the SuperFresh grocery parking lot, the Yuma parking lot located under the SuperFresh lot, and the Katzen garage located on the AU main campus. A limited number of spaces are also located in the public parking lot at 4910 Yuma Street. In addition, some drivers park in other off-street lots located on Massachusetts Avenue across from the WCL or in on-street parking spaces located in the vicinity of the WCL (both metered spaces and within the neighborhood). Some visitors to the WCL park in the main garage, but most visitors (notably those arriving for special events), are told to park in surrounding public lots, including the public parking lot accessed from Massachusetts Avenue located across from the WCL.

Data Collection

Gorove/Slade conducted two data collection efforts as part of this analysis. An online survey was distributed to the WCL population to determine the existing mode split and parking locations of the WCL users. Observations were also performed at the WCL parking facilities discussed above to determine peak parking demand at the existing WCL.

Online Survey

The online-survey was distributed to the WCL population on Tuesday, April 13, 2010. The purpose of the survey was to determine the current mode split of the WCL and the locations utilized for parking by each of the user types. Table 4 shows the mode split results. Table 5 summarizes the respondents' answers to the parking questions.

Table 4: Survey Results - Mode Split

Mode	Student	Adjunct Faculty	Faculty	Staff	Total
Walk	9.0%	0.0%	3.8%	0.0%	7.2%
Bike	2.5%	0.0%	0.0%	0.0%	1.9%
Drive Alone	45.8%	81.8%	94.2%	70.3%	54.2%
Scooter/Motorcycle	1.6%	4.5%	1.9%	0.0%	1.5%
Drove Carpool	3.8%	4.5%	0.0%	9.4%	4.1%
Carpool Rider/Dropped-Off	5.4%	0.0%	0.0%	3.1%	4.5%
Metrorail & Shuttle	12.4%	0.0%	0.0%	9.4%	10.5%
Metrorail & Walk	1.8%	0.0%	0.0%	0.0%	1.4%
Metrobus	13.0%	9.1%	0.0%	7.8%	11.1%
Shuttle Only	4.7%	0.0%	0.0%	0.0%	3.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Table 5: Survey Results - Parking Location

Parking Location	Student	Adjunct Faculty	Faculty	Staff	Total
Mass Ave Garage	64.9%	5.0%	32.0%	21.6%	50.4%
Katzen	11.0%	5.0%	0.0%	13.7%	9.5%
YumaLot	0.4%	40.0%	60.0%	45.1%	17.8%
SuperFresh	0.0%	30.0%	2.0%	0.0%	2.0%
4910Yuma	3.1%	0.0%	4.0%	9.8%	4.0%
Other Off-Street	1.8%	0.0%	0.0%	2.0%	1.4%
On-Street	18.9%	20.0%	2.0%	7.8%	14.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

These results show that over half of the WCL students who responded to the survey currently do not drive alone, utilizing other modes such as Metrorail and walking. Thus, the amount of students that may switch from driving to Metrorail as a result of moving closer to the station may not be as high as originally thought. Faculty and staff at the WCL who responded to the survey have high percentages of driving. Thus, measures to reduce parking demand may need to focus on the populations of faculty and staff to have a significant impact.

The parking location table shows a fair percentage of survey respondents listing “on-street” as their parking location. One purpose of the survey was to help determine this proportion, and the result of approximately 15% parking on-street seems reasonable, based on field observations and the amount of tickets issued enforcing the good neighbor policy.

Parking Observations

Gorove/Slade performed parking observations of the existing WCL facilities to determine the parking accumulation patterns over the course of a day and to help determine the peak existing parking demand. Gorove/Slade staff manually counted the SuperFresh and Yuma parking facilities on Thursday, April 1, 2010. AU-based vehicles were determined through their displayed permits.

WCL staff provided Gorove/Slade with data for the WCL parking garage on Massachusetts Avenue. The data was the number of accumulated vehicles recorded each half hour between 8am and 8pm for weekdays between February 15, 2010 and March 19, 2010.

Figure 14 shows the average parking accumulation per weekday in the main WCL garage. This data is an average of the weekday data provided by WCL staff, excluding days within or influenced by Spring Break.

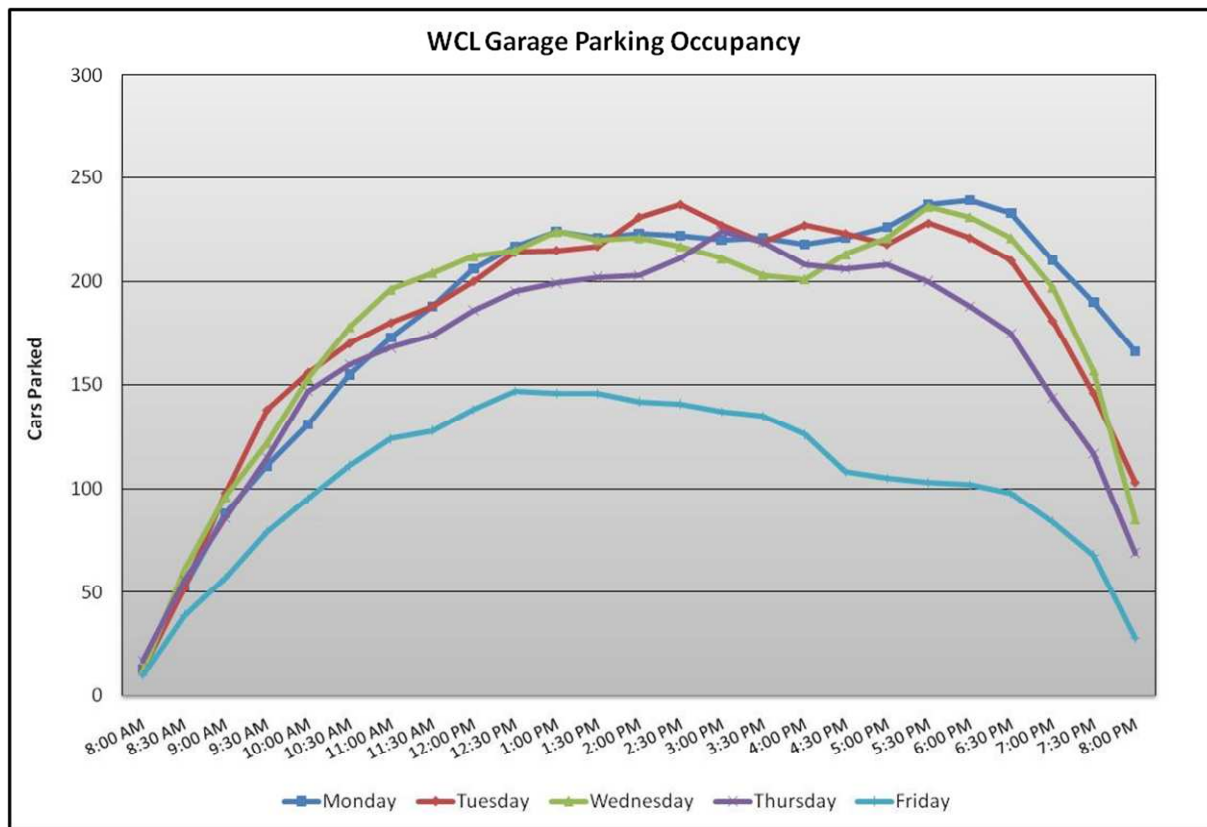


Figure 14: Average Parking Accumulation in WCL Garage

The average peak demand within the garage is approximately 240 spaces, which occurs early evenings on Mondays and Wednesdays. The future demand analyses base WCL garage existing demand on an average of the Monday through Wednesday demand.

Based on the WCL parking counts, the manual counts of other facilities and the survey results, Gorove/Slade assembled a profile of parking demand over the course of a typical weekday. Figure 15 shows the results of this analysis.

The peak parking demand of the WCL on a typical weekday was determined to be around 410 spaces, occurring around 2:00 pm and again at 5:30 pm.

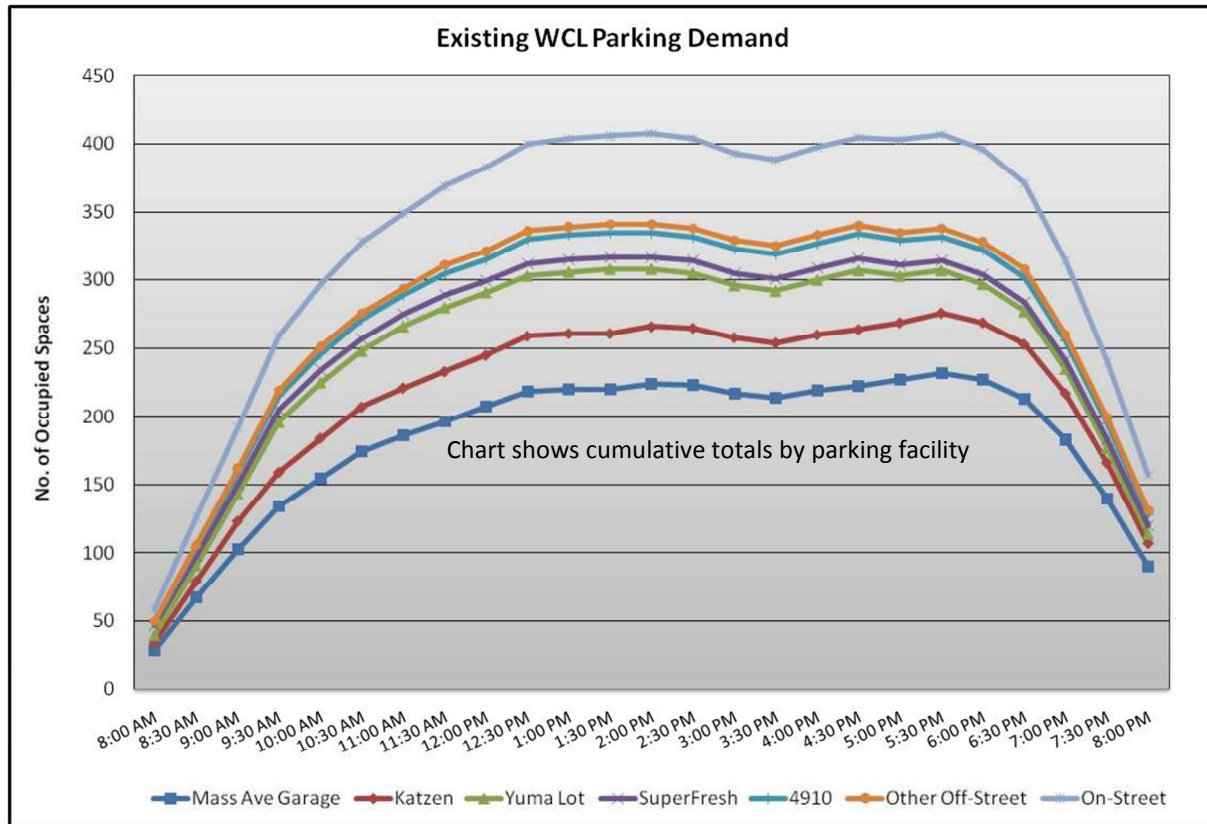


Figure 15: Existing WCL Total Parking Demand

Traffic Overview

Site Access and Circulation

Access for the AU Main Campus is provided primarily by Massachusetts Avenue and Nebraska Avenue, as well as 46th Street, Tilden Street, University Avenue, New Mexico Avenue, 45th Street, Rockwood Parkway, Newark Street, and Glenbrook Road. Site access for the Main Campus is provided by Glover Gate on the north side of the campus on Massachusetts Avenue, Fletcher Gate on the south side of campus on Rockwood Parkway, and Woods gate on the east side of campus on Nebraska Avenue. Access to the Nebraska Avenue Parking Lot is provided on Nebraska Avenue and New Mexico Avenue.

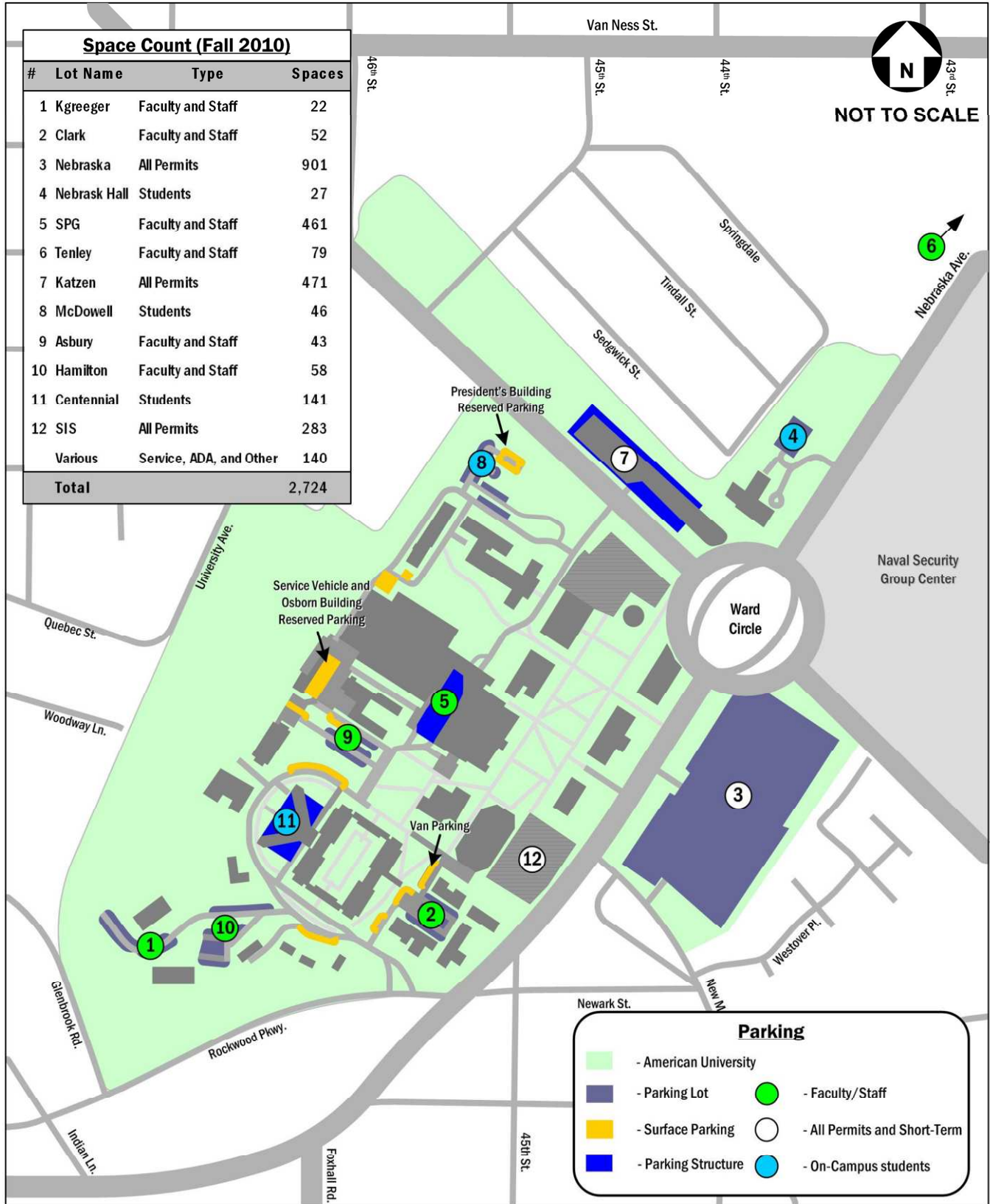


Figure 16: Campus Parking

Passenger drop-off and pick-up activity occurs throughout the campus. Figure 17 identifies the most commonly used locations for passenger drop-off and pick-up. There are no designated drop-off or pick-up locations on campus or areas where this activity is easily accommodated. Shipping and receiving facilities are located throughout the Main Campus. Figure 17 identifies the location of shipping and receiving facilities. These facilities and the vehicle ingress and egress routes do not cross or conflict primary pedestrian routes.

Access for the Tenley Campus AU is provided primarily by Nebraska Avenue, as well as Yuma Street. Drive way access is provided on both these streets. The driveway on Nebraska Avenue is primarily used to pick-up and drop-off activities and there are a few parking spaces. The Yuma Street driveway provides access to pick-up and drop-off facilities and a parking lot with 65 spaces as well as parking for service vehicles.

Passenger drop-off and pick-up activity occurs at multiple locations for the Tenley Campus. Figure 18 identifies the most commonly used locations for passenger drop-off and pick-up. There are no designated drop-off or pick-up locations on campus or areas where this activity is easily accommodated. Shipping and receiving facilities are located along Yuma Street. Figure 18 identifies the location of shipping and receiving facilities.

Roadway Capacity Analysis

Gorove/Slade conducted field reconnaissance to obtain the existing lane usage and traffic controls at the intersections within the Main Campus and Tenley Campus study areas. Traffic controls located within the study area are shown on Figure 19 and Figure 20 for the Main and Tenley Campuses, respectively. Turning movement counts were conducted at the study intersections in order to determine the peak hour traffic volumes on the roadways near the Main Campus and Tenley Campus.

The traffic volumes obtained were used to estimate the percent of traffic within the regional roadway network that is attributable to the AU Main Campus, as shown in Figure 21. Traffic volumes entering and exiting the regional area bounded by the study intersections were summed in order to determine the total regional traffic. In order to calculate the AU-generated traffic, volumes entering and exiting the Glover Gate, Fletcher Gate, and Nebraska Avenue Parking Lot were summed. AU Main Campus-based vehicles account for 7.5% and 8.5% of all traffic into the study area on roadways adjacent to the campus during the commuter weekday AM and PM peak hours, respectively. Traveling out of the study area, AU Main Campus-based vehicles account for 2.2% and 11.2% of all traffic on roadways adjacent to the campus during the commuter weekday AM and PM peak hours, respectively.

Morning and afternoon peak hour traffic observations were conducted at the study area intersections for both Campuses in order to determine traffic conditions near the University. Traffic observations are shown on Figure 22 and Figure 23 for the morning and afternoon peak hours of the Main Campus, respectively. Traffic observations are shown on Figure 24 and Figure 25 for the morning and afternoon peak hours of the Tenley Campus, respectively.

Existing conditions capacity analyses was performed to determine the existing Levels of Service (LOS) for the AM and PM peak hours for the study intersections. The existing LOS capacity analyses were based on: (1) the existing lane use and traffic controls; (2) the peak hour turning movement volumes; and (3) the *Highway Capacity Manual 2000* (HCM) methodologies (using Synchro 7 software).

The capacity analyses results indicate that all study area intersections operate at acceptable levels of service during both the morning and afternoon peak hours. Figure 26 and Figure 27 present the existing capacity analysis results for the Main Campus, and Figure 28 and Figure 29 present the existing capacity analysis results for the Tenley Campus. Detailed results and observations can be found in the Transportation Technical Appendix.

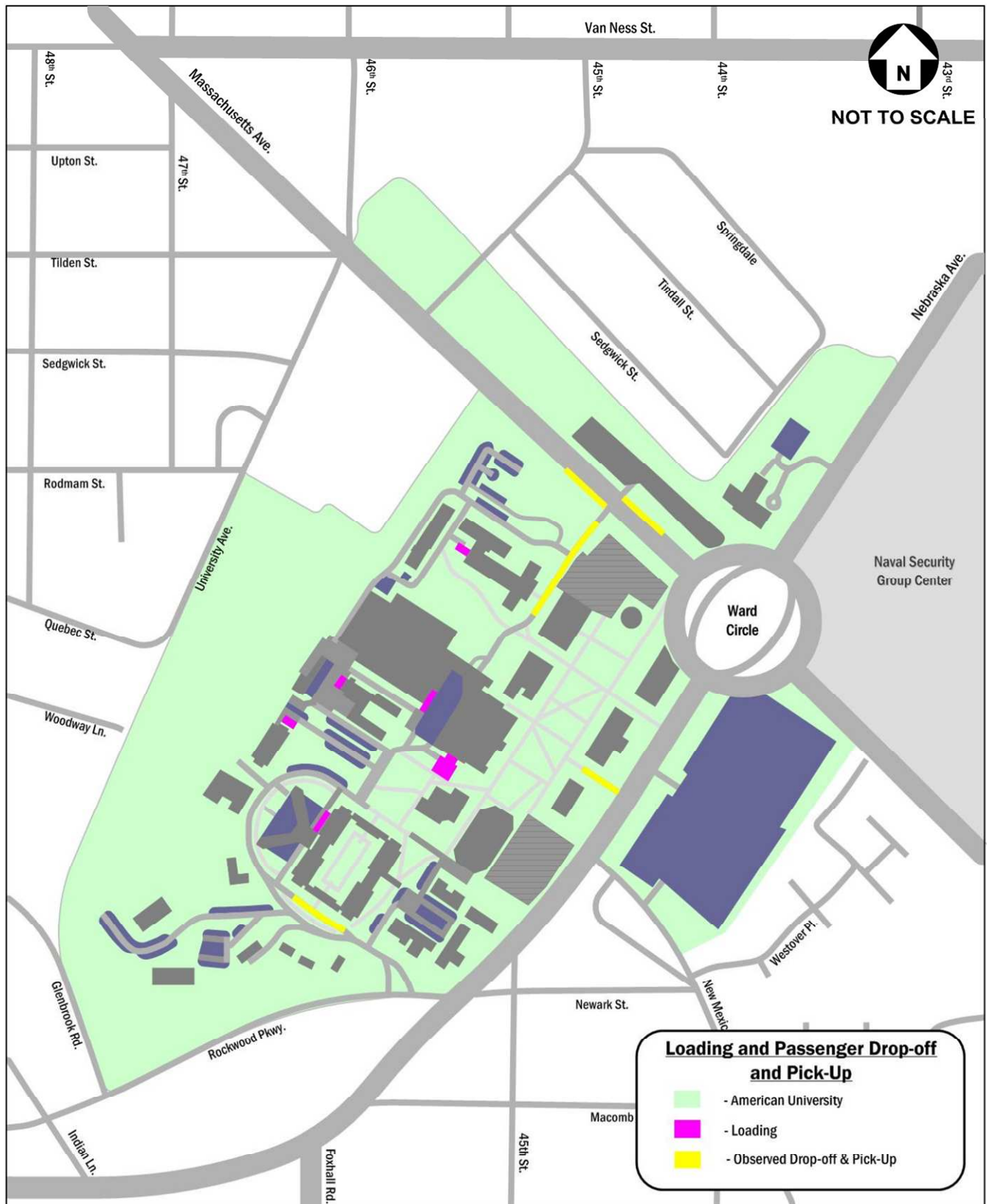


Figure 17: Campus Loading Docks and Pick-up and Drop-off Locations

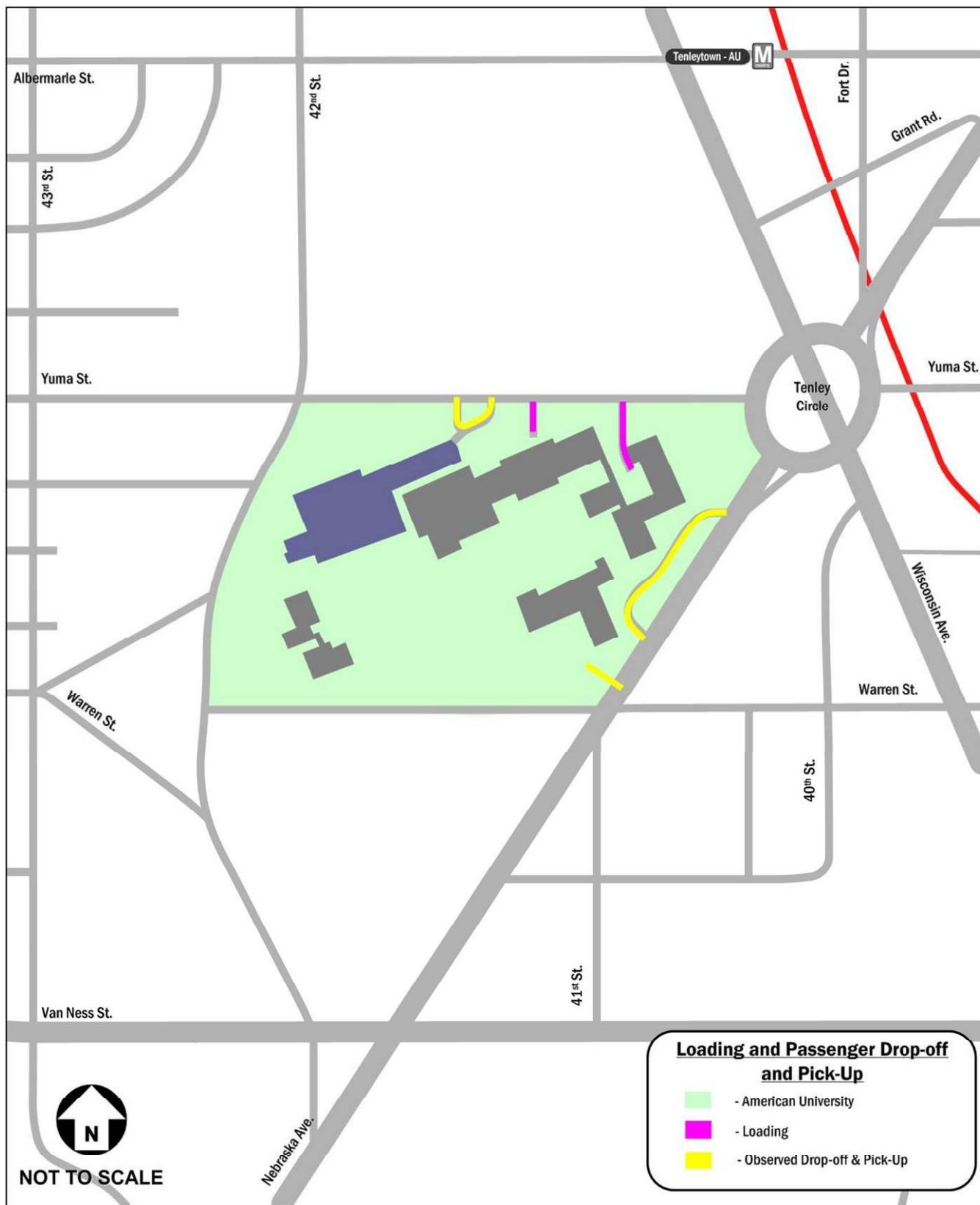


Figure 18: AU Tenley Campus Loading and Passenger Drop-off and Pick-up



Figure 19: Main Campus Traffic Controls



Figure 20: Tenley Campus Traffic Controls

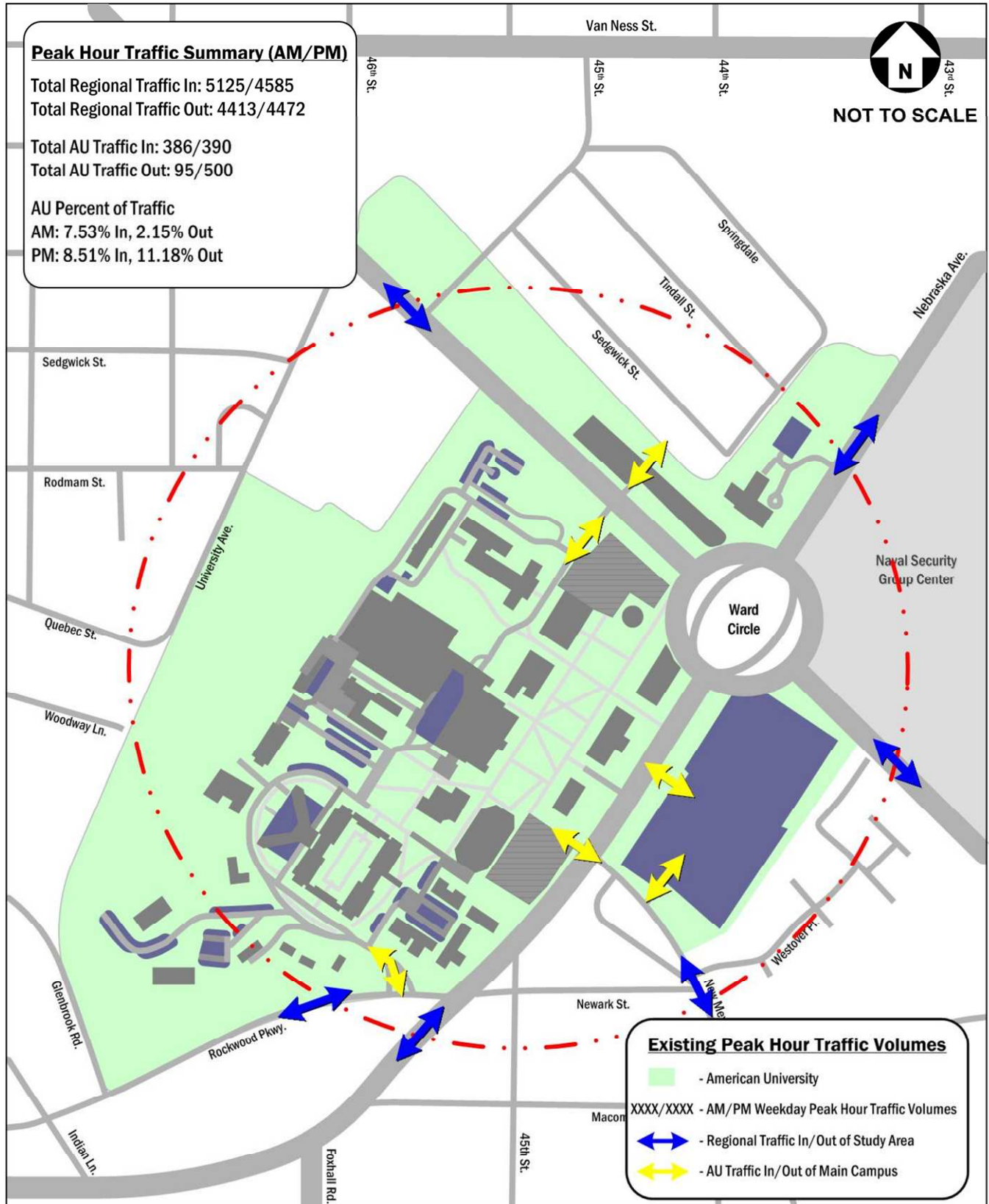


Figure 21: Regional and AU-Generated Traffic Volumes for Main Campus



Figure 22: Existing Morning Peak Hour Traffic Observations for Main Campus



Figure 23: Existing Afternoon Peak Hour Traffic Observations for Main Campus

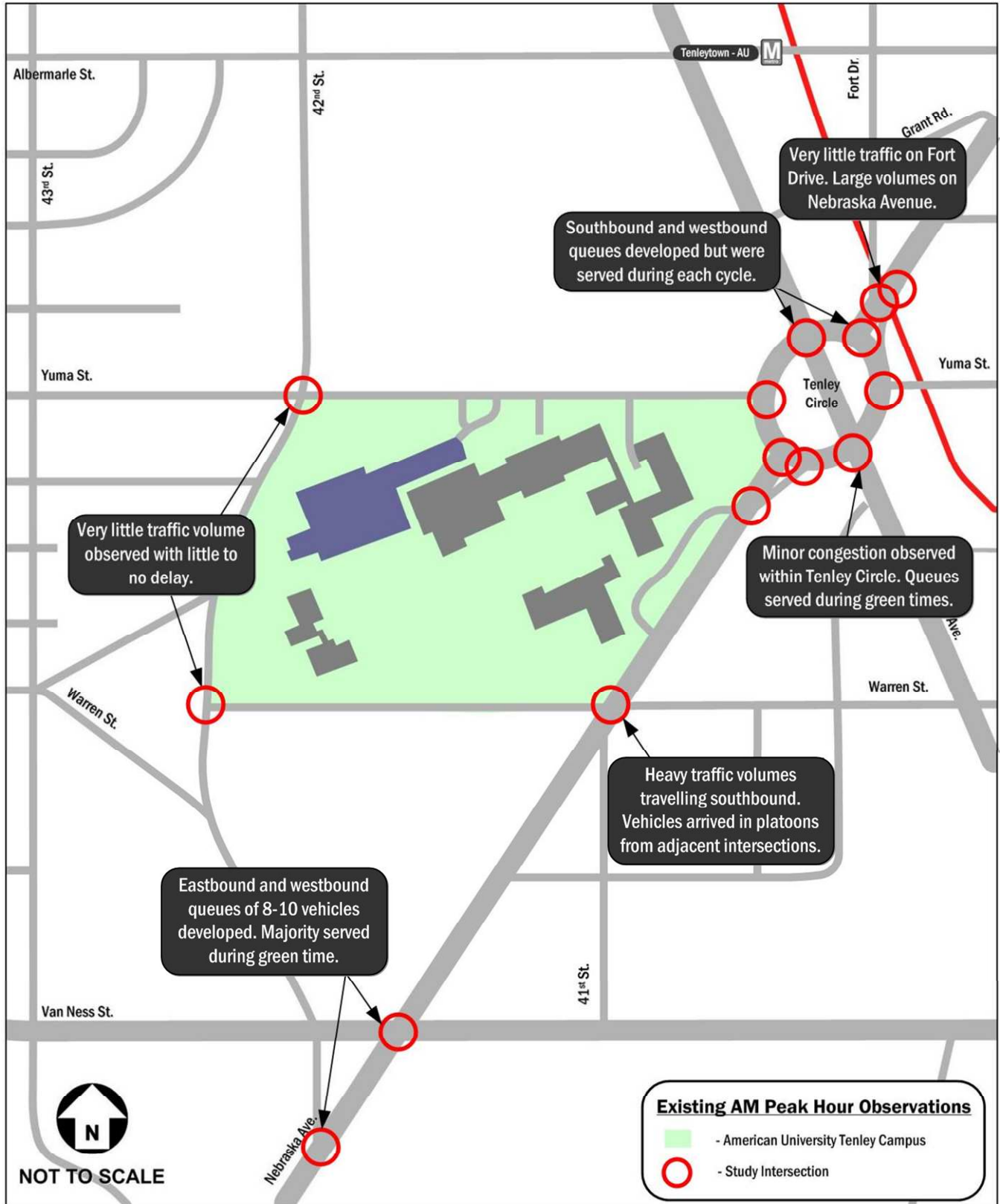


Figure 24: Existing Morning Peak Hour Traffic Observations for Tenley Campus

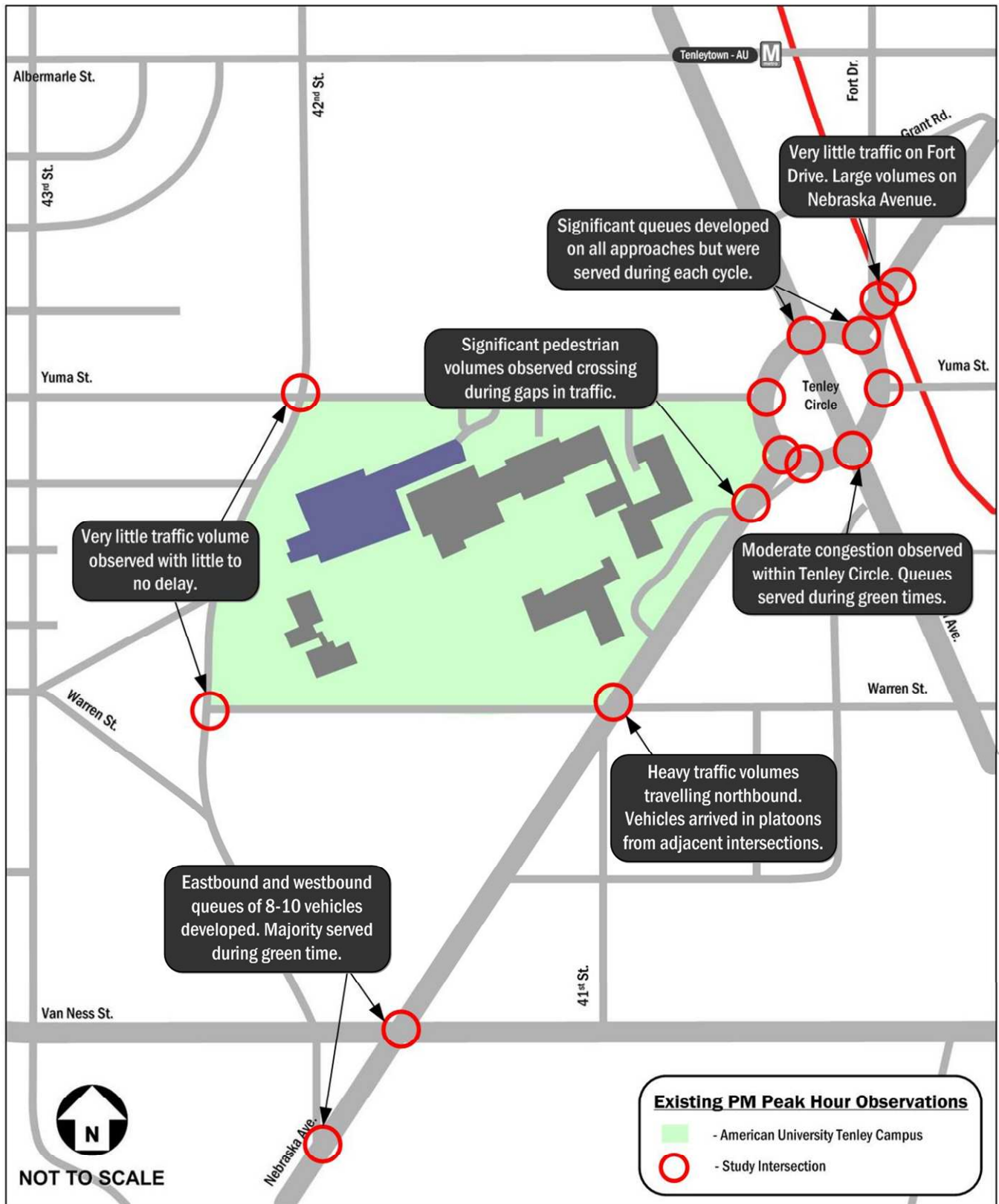


Figure 25: Existing Afternoon Peak Hour Traffic Observations for Tenley Campus



Figure 26: Existing Morning Peak Hour Levels of Service for Main Campus



Figure 27: Existing Afternoon Peak Hour Levels of Service for Main Campus



Figure 28: Existing Morning Peak Hour Levels of Service for Tenley Campus



Figure 29: Existing Afternoon Peak Hour Levels of Service for Tenley Campus

Car-Sharing

AU has car-sharing on-campus provided by Zipcar. Zipcar is a private company that allows registered users to reserve cars for a minimum of 30 minutes or for longer periods up to several days. Car-sharing provides individual access to automobiles for trips made easier by car. Many universities have car-sharing programs because they reduce the number of students that bring cars to campus, which reduces the number of parking spaces that are needed.

On the main campus, two vehicles for car-sharing are available in the Nebraska Avenue lot, one is available at The Berkshire, and one is available at Foxhall. At the Tenley Campus, one vehicle is located in the parking lot. There are five additional vehicles available adjacent to the Tenleytown-AU Metrorail station.

Intersection Safety

A safety analysis was performed to determine if there was an abnormally high accident rate at any study area intersection. The District Department of Transportation (DDOT) provided the last three years of intersection accident data: from 2007 to 2009. This data set included all intersections adjacent to American University except for intersections at University gates and parking lot entrances.

This data was reviewed and analyzed to determine the accident rate at each location. The existing crash rates were based on: (1) existing crash data provided by DDOT; (2) the peak hour turning movement volumes; and (3) the *Traffic Engineering Handbook* methodologies. For intersections, the accident rate is measured in accidents per million-entering vehicles (MEV). The accident rates per intersection are shown in Table 6. Intersections with no accidents recorded during the 2007 to 2009 time period are not included in Table 6.

According to the Institute of Transportation Engineer’s *Transportation Impact Analysis for Site Development*, an accident rate of 1.0 or higher is an indication that further study is required. Of the study intersections, only Ward Circle measures an accident rate higher than 1.0.

Table 6: Intersection Accident Rates

Location	Total Accidents (2007 to 2009)	Accident Rate (per million-entering vehicles*)
Massachusetts Ave & Tilden/46th St/University Ave	10	0.41
Massachusetts Ave & Nebraska Ave (Ward Circle)	80	1.67
Nebraska Ave & New Mexico Ave	14	0.46
Nebraska Ave & Newark St/Rockwood Pkwy	3	0.11
Rockwood Pkwy & Glenbrook Rd	1	0.30
Nebraska Ave & Fort Dr	5	0.35
Nebraska Ave, Wisconsin Ave, & Yuma St (Tenley Circle)	23	0.54
Nebraska Ave & Warren St	8	0.64
Nebraska Ave & Van Ness St	14	0.69
Nebraska Ave & 42 nd St	7	0.38

* - Volumes estimated based on turning movement count data

Sustainability

Numerous universities are developing broad sustainability initiatives and incorporating them into campus planning and policy documents. AU recently created a sustainability coordinator to identify new sustainability initiatives. AU is also a signatory to *The American College & University Presidents Climate Commitment*, which is an effort to address global warming by neutralizing greenhouse gas emissions. Current AU transportation programs, such as the AU shuttle program, already accomplish many transportation sustainability goals. In addition, the location of AU, and its compact design indirectly lead to many sustainable transportation qualities

This section of the report presents a broad review of transportation sustainability on campus, starting with establishment of goals and detailing campus policies and programs.

Sustainable transportation initiatives have three goals:

- Improve accessibility and mobility
- Conserve Environmental resources
- Enhance social equity and economic vitality

The remainder of this section examines these three goals in detail, identifying current programs and policies and making recommendations on how to better achieve these goals.

Improve Accessibility and Mobility

AU accessibility and mobility needs are met by an off campus multimodal transportation network including sidewalks, bike routes, transit, and an extensive roadway network. On campus, AU provides a campus shuttle service, as well as pedestrian, bicycle, and vehicular services.

- *Pedestrian:*
 - *Current Status:* AU has excellent walkways, a vibrant pedestrian core, and many destinations within walking distance. This allows many trips to be made by walking, especially those within campus. This promotes public health, reduces automobile trips, and creates vibrant public spaces.
 - *Possible Improvements:* It is likely that in order to increase the amount of campus users that walk to/from campus, AU will need to encourage more student, faculty and staff to live within walking distance to campus, and provide more on-campus services (varied land-uses within campus). Since campus pedestrian infrastructure is already high quality, improvements will not likely lead to a significant increase in the percentage of campus users that walk.
- *Bicycle:*
 - *Current Status:* Bicycles are common on campus and bicycling is a viable option for many trips. Bicycling promotes public health and reduces automobile trips.
 - *Possible Improvements:* Increasing the amount of campus users that bicycle to and from campus may be difficult due to the poor nature of external bike routes. Programs to encourage more users to bike could take the form of expanded and enhanced bicycle parking on campus, increased number of bicycle sharing stations, bicycle shower and storage facilities for commuter use, and bicycle subsidies for faculty/staff commuters.

Improving conditions along external bike routes, especially between the Main Campus, Tenley Campus and the Tenleytown Metrorail station would increase the attractiveness of cycling.

▪ *AU Shuttle Service:*

- Current Status: AU provides convenient and high quality shuttle service between campus and major off-campus destinations. The shuttles are an essential transportation service that significantly increase campus mobility and accessibility. Passengers ride free. The shuttle service also reduces private vehicle trips, parking demand, and is a low cost option available for all users.
- Possible Improvements: The existing shuttle service is of high quality; efforts to encourage more use would be to decrease wait times by using more shuttles and enhancing shuttle stops on campus with benches, shelters and other amenities.

▪ *Transit:*

- Current Status: AU is well served by a public transit system that links AU with the city and region; this is especially beneficial for faculty, staff, commuter students, and visitors. Transit reduces private automobile trips and is a low cost option that ensures access and mobility for all users. To encourage transit use by employees, AU operates a SmartBenefits program.
- Possible Improvements: AU is limited in how it can enhance the Metrobus and Metrorail service. The current SmartBenefits program already encourages transit use. One possible improvement would be to enhance the closest Metrobus stops to campus with benches, shelters and other amenities.

▪ *Traffic and Parking:*

- Current Status: On- and off-campus roadways are extensive and traffic operates with limited delay. There is also ample parking to accommodate demand, some of which is located in structured facilities beneath buildings, which reduce several of the negative impacts associated with parking. There are car-sharing vehicles on campus, which reduces the number of on-campus students that need to bring a car to campus parking space because they have access to a vehicle.
- Possible Improvements: The current AU traffic and parking system operates well; on a typical day there are many available parking spaces, and access points to campus operate efficiently. Enhancements to the traffic and parking system may be counter-productive for many sustainable initiatives, so no improvements to the traffic and parking system are recommended.

Conserve Environmental Resources

Transportation has an enormous impact on the environment. Transportation infrastructure consumes amounts of land, motorized vehicles consume enormous amounts of energy, and transportation is a major source of pollution.

▪ *Land Devoted to Infrastructure:*

- Current Status: Land is required for sidewalks, roadways, and parking facilities but efficiently managing the per capita land devoted to transportation facilities is essential for conserving resources. Efficient infrastructure design and land use management is important for conservation because infrastructure and land use impact the number of trips required and the duration of trips taken.

- Possible Improvements: In terms of land consumed by transportation infrastructure, the one area where AU could realize improvements is with its parking foot print. AU's surface parking lots, in particular the Nebraska lot, consume valuable land resources. If surface lots cannot be removed, reducing their impact by managing storm water run-off may be an option.
- Energy consumption:
 - Current Status: Transportation is responsible for 22 percent of global energy consumption. Energy consumption by campus fleets, commuting, and campus air travel are a major component of many institutions greenhouse gas emissions. Walking and bicycling are the most efficient modes in terms of energy consumption.
 - Possible Improvements: Continued efforts to encourage student, faculty and staff walking and bicycling use.
- Air pollution:
 - Current Status: Transportation is a significant source of air pollution, air toxics and greenhouse gases. The combustion and evaporation fuel produces 30 percent of global air pollution and green house gasses and is the primary cause of air pollution in many urban areas. AU traffic, shuttles and campus service vehicles generate air pollution through the combustion and evaporation gasoline.
 - Possible Improvements: AU can reduce pollution by promoting non-motorized options, alternative fueled vehicles, and efficient modes. It already pursues several of these options. While high transit usage reduces per capita emission of air pollutants and green house gases by decreasing vehicle trips, use of conventional energy sources generate air pollution and green house gases. Use of renewable resources at or below their rates of generation should be studied as an option for AU shuttles.
- Noise pollution:
 - Current Status: Roadway traffic is a major source of noise pollution. The main cause of noise pollution is noise created by engines and the friction of wheels on the road. The ambient noise created by cars, trucks and buses impairs the quality of life. Traffic noise within campus is generally low because vehicle volumes and speeds are low. Traffic noise is occasionally an issue along the adjacent roadways due to the high volume of traffic, prevailing speeds and volume of heavy vehicle traffic. The impact is limited to buildings located along the periphery of campus.
 - Possible Improvements: AU has limited options for reducing noise pollution along the periphery because most traffic is non-campus related. It may be possible to reduce the amount of noise generated by AU shuttles on campus through the purchasing of different vehicles, possibly implemented with the use of a renewable fuel source.
- Water Pollution:
 - Current Status: Vehicle exhaust, leaks, and wear and tear are sources of storm water pollution. During a rain storm, these pollutants leach into the ground or are washed from roadways and parking lots into the Chesapeake Bay through storm water drains.

- Possible Improvements: Reducing vehicle trips and treating storm water are two options for addressing water pollution. Thus, continued encouragement of alternate modes by AU could help reduce water pollution. Another is to create more permeable surfaces to help reduce storm water runoff. One possible location for this may be the Nebraska parking lot, through the use of low-impact design and/or permeable pavement.

Enhance Social Equity and Economic Vitality

Transportation has social and economic aspects that impact the university community. Social impacts of the transportation network include impacts on equity, health, livability and cohesion, accessibility of historic and cultural resources, and aesthetics. The economic impacts of transportation include congestion, infrastructure costs, user costs, resource depletion, mobility barriers, and accident damages. These costs limit economic development and can be a strain on individual and community resources.

As a community, AU addresses these issues in various ways. AU provides quality facilities and services for all users, regardless of mode choice, especially for those with disabilities or limited financial resources. The campus location, size and design contribute to low accident rates and high physical activity. Economically, AU benefits from limited traffic congestion and accidents, which would reduce campus productivity and safety.

- Proximity of Mixed-Land Uses:
 - Current Status: Having mixed land uses or diverse land uses within walking or bicycling distance can reduce the amount of vehicle trips and shorten travel distances for typical trips. Sprawling development and separate land uses require more vehicle trips and longer travel distances. More frequent and longer trips increase energy consumption and transportation pollution. AU has a compact campus, a good land use mix and is located in compact, urban location. This reduces the number of trips required and allows many to be made by walking, bicycling or transit.
 - Possible Improvements: There are two ways AU can increase the proximity of land-uses: (1) by encouraging more students, faculty and staff to live on or closer to campus, and (2) to increase the amount of services on campus. A user survey could help determine if additional trips could be reduced by adding news services on-campus or nearby.
- User Costs:
 - Current Status: AU currently offers a SmartBenefits program of up to \$230 for commuting faculty and staff, and the AU shuttle service is free. No parking is free on campus; all parking is by permit with varied costs per user.
 - Possible Improvements: Encouraging alternative modes can be done through increasing parking fees, although there is a limit to the amount of fees becomes too high for the campus to maintain competitiveness with other institutions. The University could also encourage alternative mode use through subsidizing bicycle commuting and car-sharing.
- Accident Costs:
 - Current Status: Transportation accidents on campus and on adjacent roadways have not been significant over the last three years of recorded accident data.

- Possible Improvements: Reducing vehicular speeds on and off campus may be the most efficient method to reduce accident rates where no particular problem is identified. The University may want to work with DDOT to examine speeds along Massachusetts and Nebraska Avenues.
- Mobility Barriers:
 - Current Status: There are several physical barriers surrounding the campus that may limit mobility. In order to minimize impact to local residents, the University does not encourage use of transportation infrastructure in these neighborhoods. The commuter roadways of Massachusetts and Nebraska Avenues also can be seen as a barrier to pedestrian and bicycle mobility. Although many crossings are made across these roadways, they can be seen as difficult due to high travel speeds, and because Massachusetts Avenue yields at Ward Circle (there is no Walk/Don't Walk sign for pedestrians). The high speeds combined with the narrow travel lanes and grades make bicycling difficult on these roadways.
 - Possible Improvements: Efforts to reduce travel speeds can be helpful in reducing the barrier that these roadways may present. In addition, examining pedestrian issues around Ward Circle (in conjunction with DDOT) may be of benefit if a potential solution can be found to enhance the pedestrian experience.

Recommendations

Overall, existing AU transportation programs, campus location, and compact design have led to many sustainable transportation practices. The following is a summary of the possible improvements discussed above:

- Incentives to encourage walking, bicycling and transit
- Expand bike sharing
- Increase Transportation Demand Management policies and programs
- Increase parking fees
- Reduce land used by surface parking lots
- Implement storm water management program, especially for surface parking lots
- Utilize alternative fuels for campus fleet
- Promote a diversity of uses on-campus or within walking distance
- Increase housing options on-campus or within walking distance

Transportation Document Review

American University 2000 Campus Plan

The most recent American University Campus Plan was completed and submitted in 2000. The following is a summary of the transportation findings contained within that report:

- A transportation mode choice survey was conducted during the study and found that 23% of students, 96% of faculty/staff, and 93% of visitors commuted to campus by automobile.
- All intersections operated at acceptable levels of service except the Reeves Gate and Cassell Center driveways egress from the University, and the Nebraska Avenue/Ward Circle East and Massachusetts Avenue/Wesley Circle East intersections. The Nebraska and Massachusetts Avenues intersections failed because of high commuter traffic.
- The study found that all intersections that operated at acceptable levels of service would continue to do so under future conditions.
- AU had an inventory of 2,523 parking spaces on-campus. A parking occupancy survey indicated that AU experienced a peak parking demand of 2,048 spaces (81%). The peak occurred at 1:00 PM on a Monday.
- AU operated two campus shuttle routes with 15-30 minute headways using six vehicles. The first route linked the campus with AU-Tenleytown Metro Stop and the second route linked the campus with Glover/Washington College of Law shuttle route.
- Pedestrians crossed Nebraska Avenue at a mid-block location between Massachusetts Avenue and New Mexico Avenue. These mid-block crossings were a very small percentage of the total number of pedestrians observed crossing Nebraska Avenue but were of concern because there is no pedestrian crossing at this location and there are high traffic volumes and speeds at this location.

The report made the following recommendations:

- Traffic related recommendations associated with the study included adding a left-turn lane on Nebraska Avenue at New Mexico Avenue and the proposed University driveway located across the street, and operating the Massachusetts Avenue/Glover Gate/Katzen Arts Center intersection with a split-traffic signal. These recommendations have not been implemented and the concerns identified at these locations have been mitigated somewhat by the reduced traffic volumes observed at these intersections during the Existing Conditions Assessment.
- The study suggested a campus parking inventory of 2,959 spaces to accommodate the maximum future population growth allowed in the campus plan. Parking demand may have decreased since the 2000 master plan due to increased transit usage.
- The study suggested studying safety measures to improve conditions at the mid-block crossing on Nebraska Avenue. One potential measure included the installation of pedestrian crossing warning sign along Nebraska Avenue. This recommendation not implemented.

2005 Parking Garage Study

The purpose of the study was to analyze potential traffic impacts of the proposed SIS parking garage on the existing street system. A supplemental report also reviewed the impact of the Katzen lot, which had not yet opened at the time of this report. The SIS lot, which is under construction now, will have a 350-space parking garage, below grade and under a new building. The parking facility will have a single vehicular access point on Nebraska Avenue that will be located opposite New Mexico Avenue. The SIS displaced the approximately 80 parking spaces currently on the site. The new garage will allow parking by permit only. The study projected a maximum occupancy of 90 percent of spaces.

The existing conditions capacity analysis showed that all study intersections operate at a level of service “B” or better at all study intersections. The future analysis showed a slight increase in intersection delay due to traffic generated by the SIS and the Katzen Arts Center. In most cases the level of service does not change. Acceptable conditions of level of service “C” or better were met at all studied intersections.

The report identified the following areas of concern.

- Traffic backed up from Ward Circle, interfering with operations at adjacent intersections. These queues were most prominently seen northbound on Nebraska Avenue and eastbound on Massachusetts Avenue.
- Traffic congestion also occurred in the peak periods due to queuing at Ward Circle and the intersection of Nebraska Avenue with Foxhall Road. However, computed level of service is acceptable at University-related intersections, even with high turning volumes.

On-street parking on New Mexico Avenue adjacent to the Nebraska lot interfered with vehicles entering and exiting the lot as well as with vehicles making a right turn at Nebraska Avenue. Illegal left turns into the Nebraska lot from Nebraska Avenue and into Glover Gate from Massachusetts Avenue were an annoyance to other drivers, but were few enough not to be a significant contributor to congestion.