University of Wisconsin – Madison

CAMPUS TRANSPORTATION SYSTEM EVALUATION

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NELSON
NYGAARD

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1 INTRODUCTION

The University of Wisconsin at Madison (UW) is the flagship campus for the University of Wisconsin System. The campus is located in downtown Madison, about a mile from the state capitol and is situated on the northwest corner of the isthmus between Lake Mendota and Lake Monona. The campus consists of 933 acres of land on a relatively long but narrow stretch of land laid out on a northeast to southwest orientation. Between 60,000 and 70,000 individuals, inclusive of students, faculty, staff and visitors, are on campus during a typical day during the academic calendar. As a result, in many ways UW functions like a small city – it has its own police force, food service, hospital, recreation facilities, botanical gardens, public artworks, power facilities, and transportation services departments.

The UW Transportation Services (TS) retained a team led by Nelson\Nygaard Consulting Associates and including Concentre Communications to conduct an evaluation of the existing transit services, including the fixed-route bus services. The goal of the project is to examine the overall transit network on campus to determine how well the existing routes are matched to needs. While the project is designed to take a broader and longer term view of the system overall, there is also a specific goal of understanding needs of people with disabilities and developing programs and services to address those needs.

This final report presents Nelson\Nygaard's analysis of both the UW accessible and fixed-route bus services. The evaluation of accessible services was developed using a combination of a review of existing services, stakeholder interviews, consideration of best practices, and focus groups with people with disabilities. The team developed a series of draft recommendations, which were shared with the UW community at a series of public meetings. Based on input and comments received at the meetings, recommendations were finalized.

The evaluation of the campus bus system was developed around three main pieces of analysis, each of which contributed to the development of potential service improvements:

- A technical analysis of existing conditions, which consisted of a detailed review of each of the individual bus services and their ridership patterns. The technical work included a "blank slate" analysis that involved mapping major destinations on campus as a way to understand the spatial relationship between key facilities and different ways of connecting these resources.
- Qualitative input on the campus bus system provided through stakeholder interviews, discussions with UW staff and students, and a series of community meetings.
- A survey of the UW community that was intended to collect travel pattern information and service preferences from students, faculty and staff, including students, faculty and staff at the UW Health facility.

The final report is organized so that the first chapter provides an overview of the transportation services available at the University of Wisconsin – Madison. The following section presents the analysis of accessible services, including recommendations and implementation options. The

analysis of the fixed-route services follows the accessibility section. This section includes the technical analysis, development of recommendations and an overview of implementation options.

2 CAMPUS TRANSPORTATION SERVICES

BACKGROUND

The UW–Madison campus is both compact and spacious, sitting on a relatively long and thin parcel that stretches approximately 2.6 miles between Memorial Union at the eastern edge and University Bay Drive in the west. The northern edge of campus is formed by Lake Mendota and at the western edge, by Eagle Heights and University Bay Drive. The southern and eastern boundaries of campus, however, are not clearly demarcated with campus facilities intermingled with the City of Madison. Regent Street broadly marks the southern boundary for the majority of the academic, housing and student activity buildings, while Lake Street roughly forms the eastern boundary. The density of campus facilities are greatest in the eastern end of campus with most of the new development, including the UW Hospital, Health facilities and Eagle Heights residential complex occurring on the western end of campus.

In addition to the main campus, UW – Madison also has an off campus facility, the University Research Park (URP) complex located about three miles southwest of campus. The URP complex is a managed as non-profit facility organization to support start-up company and incubate new ideas. Many but not all of the tenants are focused on biotechnology.

As the flagship campus of the University of Wisconsin system and one of the premier universities in the United States, UW – Madison is home to more than 40,000 students, including roughly 29,000 undergraduate, 8,700 graduate and 2,600 professional students. UW employees comprise a workforce of 16,000 employees, of whom approximately 2,200 are faculty, 6,400 are academic staff and the remaining are 7,400 staff. In addition, UW attracts some 5 million visitors annually, adding about an average 13,000 visitors per day[1].

With between 60,000 and 70,000 individuals traveling to, from and around the UW campus daily, managing local transportation is a major undertaking. Not including roadways, bike lanes, sidewalks, and paths, UW's transportation services include:

- 13,000 vehicle parking spots located at one of the roughly 100 parking facilities on campus[2]. All parking on campus is paid with rates reflecting the time of day, location and type of facility (covered, uncovered, etc.) Parking lots are broadly categorized by type of parking, use restrictions and enforcement.

[1] UW Website

[2] UW Website, Transportation services webpage. Note the number of parking spaces on campus reflects an approximate number available in 2012. The actual number of spaces on campus changes continually in response to campus development.

- Bicycle parking is available at nearly every building on campus. In addition, there are ten locations on campus with bike lockers and two locations with bike cages. Bike lockers are rented for $85 per year and cages rent for $65.
- Carpool programs available to faculty and staff that offer registered carpoolers (2+ individuals traveling to/from campus) special carpool parking permits (regular rates apply), plus three complimentary day parking passes and an emergency ride home program. UW faculty and staff also have access to vanpool services operated by the State of Wisconsin.
- Park and Ride options are available at the University Research Park ($250/annually), plus four park and ride lots operated by Madison Metro (North Transfer Point, Dutch Mill, Northside Towncenter, and American Center).
- Four on-campus bus routes (UW Routes 80, 81, 82, and 84) are available to anyone traveling around campus free-of-charge. Most of the daytime service is provided by Route 80 with Route 84 providing weekday afternoon express service. Routes 81 and 82 provide evening and late night service. Routes 80, 81, and 82 operate seven days a week.
- Madison Metro bus passes are available to UW students, faculty and staff at no charge to the individual. All bus passes must be picked up in person. Employees claim their bus passes at any TS office during normal business hours. Passes are issued annually and the pass is valid as long as the individual has a valid employment appointment. Students claim their bus passes from the Associated Students of Madison (ASM); bus passes are valid for the current semester and students are entitled to the pass as they are enrolled in the current semester. The bus pass can be used on all Madison Metro services.
- Demand response, door-to-door paratransit service to individuals with disability that prevents them from using fixed-route bus service. Paratransit service is free-of-charge and available on weekdays from 5:30 am to 11:30 pm, Saturdays from 7:00 AM to 11:30 PM and on Sundays from 7:00 AM to 10:30 PM.

Funding and Management

Transportation Services is the entity responsible for managing UW's campus transit systems, parking and related transportation programs. TS also funds the employee bus pass program. ASM is an important partner in the funding of the campus bus system. It also manages the student bus pass program and funds this program in its entirety.

TS is also responsible for managing and maintaining campus parking, including vehicles, bicycles, and mopeds and overseeing transportation services used by faculty, staff and visitors. Parking management is a major part of TS' core mission and is also a major source of funding for transportation services generally. As an auxiliary enterprise, TS does not directly receive public funding and instead raises revenues through parking fees, fines and miscellaneous sources. Parking fees must cover the cost of managing, maintaining and enforcing the campus' parking facilities, development costs associated with any new parking lots or structures and all costs associated with campus transportation services. Thus revenues from the campus parking system fund a portion of the costs associated with the campus bus system and bus pass program as well as the related transportation demand management programs (emergency ride home, carpool benefits, etc.) (see Figure 2-1).

ASM is the student government body of the University of Wisconsin Madison. It has a broad mission of maintaining and improving the quality of education and student life on campus, but

also has very specific responsibilities, including the distribution of segregated student fees that are a part of every student's tuition. Segregated fees are used to support a variety of programs, including both the cost of the student bus pass program, a portion of the campus bus system and student use of the accessible transportation services. Segregated fees raise more than $32 million annually; on a student basis, fees amount to about $555 per semester, or about $49 per credit hour. Of the $555 semester fee, roughly $54 is allocated to transportation services.

Figure 2-1 UW Transportation Program Costs and Funding Sources (FY12)

Program	TS and Housing	ASM	Total Program Costs
Campus Bus	$892,739	$781,459	$1,674,198
Bus Pass Program	$1,737,576	Not yet available	Not yet available
Accessible Transportation Services	$9,500	$8,400	$17,900
Total	$2,669,995	Not yet available	Not yet available

Source: UW data adapted by Nelson\Nygaard

Parking

TS manages on the order of 100 parking lots and garages, which combined include over 13,000 parking spaces[3]. Parking is categorized into a variety of different types, including stalls for public meters, permits, disabled/UW Disabled placards, and motorcycles. TS charges for all parking on campus and costs vary depending on type of parking, location, and time period. Rates for annual parking daytime permits range from $540 to $1,130 (approximately $45 - $95 per month). Day rates at metered parking is $1.00 for every 30 minutes up to 2 hours, then $1/hour up to $12 a day. Parking fees are set to cover the cost of TS operations and programs; in 2012, TS anticipates revenues of an estimated $9.8 m through its parking permit program, $6.4 m from visitor parking and about $1.3 m from fees and citations.

Persons with disabilities can park on campus using either a UW Disabled and/or a Wisconsin Department of Transportation (DOT) parking placard. Persons with a disability may purchase a UW Disabled (UW DIS) placard that gives them access to on-campus parking. The DOT disabled parking placard is geared toward campus visitors and allows for three hours of free parking. Disabled parking costs $540 annually and of the roughly 13,000 parking spaces on campus, 444 (3%) are reserved for individuals with disabled parking placards.

Campus Bus Services

In the spring of 2012, the UW campus bus system included five routes (see Figures 2-2 and 2-3) that provided connections between campus housing, major academic facilities and other campus resources. Service is available daily, although services operate on different scheduled according to weekdays, Saturdays and Sundays. The schedule also varies based on the academic calendar with less service available during the summer and academic holidays. Of the five services operating in spring 2012, two operated during daytime hours (Routes 80 and 85), three operated as evenings

[3] TS website. As mentioned, the number of actual parking space available changes in response to campus construction and development.

and late night service (Routes 80, 81 and 82) and one provided afternoon express service (Route 84 - Van Hise Hall to Eagle Heights).

Overall the UW campus bus routes system is highly productive as compared with other Madison Metro routes. In the spring of 2012, the five routes combined provide 364 trips that carry nearly 11, 400 riders per day, or each trip carried an average of 31 passengers per trip. The cost per riders is estimated at $0.57[4].

Figure 2-2 Overview of UW Campus Bus System – Spring 2012

Route	Overview of Alignment	Span of Service
80 UW Campus Bus Route – two versions 80 Long (80L0 and 80 Short (80S)	80L - Eagle Heights – Memorial Union via W. Johnson Street 80S Lot 76 – Memorial Union via W. Johnson Street	Weekdays 6:15 AM – 1:15 AM Saturdays 8:00 AM – 2:35 AM Sunday 8:00 AM – 1:15 AM
81 Lakeshore-Johnson	Lakeshore Residential Area– Memorial Union - Gorham St/Johnson St. via State Street	Evening Service Only Sunday – Thursday 6:40 PM – 1:40 AM Friday and Saturday 6:40 PM – 2:50 AM
82 Breese-Broom	Breese Terrace – Memorial Union – Broom Street	Evening Service Only Sunday – Thursday 6:20 PM – 1:50 AM Friday and Saturday 6:20 PM – 2:50 AM
84 Eagle Heights Express	Eagle Heights – Van Hise Hall	Afternoon Express Service Monday – Friday 4:40 PM – 6:40 PM
85 South Campus Circulator	Memorial Union – Camp Randall – Regent Street – Lake Street	Weekdays only 7:05 AM – 5:45 PM

Source: UW Madison data adapted by Nelson\Nygaard

Despite high productivity, campus budget constraints meant that the Transportation Service was forced to reduce campus bus service in the fall 2012. This service reduction was planned in the spring of 2012 with plans for implementation at the beginning of the 2012-2013 academic year (August, 2012). These service reductions were planned as part of a separate effort to this study. However, the Campus Transit System Evaluation study began in the spring of 2012 and data was collected shortly after the study began, before the service reduction was implemented.

The service reduction included a handful of changes to the campus bus network, the most significant of which involved combining Route 80 with Route 85, so the new combined bus route travels between Memorial Union and either the UW Hospital or Eagle Heights along Observatory Drive westbound and Linden Drive eastbound. The inbound trip also circulated along Charter and Dayton Streets, returning to Memorial Union via Lake Street. As a result of this change, Route 80's circulation pattern through the eastern end of campus is larger and longer.

Other main service changes associated with the service reduction involved the service schedule, and in particular the frequency of service. These changes primarily affect Route 80, which has frequency increased at some times and decreased at others and Route 81, which has service frequency reduced by half, so a bus departs every 30 minutes instead of every 15 minutes.

[4] Reflects data provided by Madison Metro and assumes a negotiated contract rate of $50.52.

Figure 2-3 UW Bus Routes – Daytime Service (After Service Change)

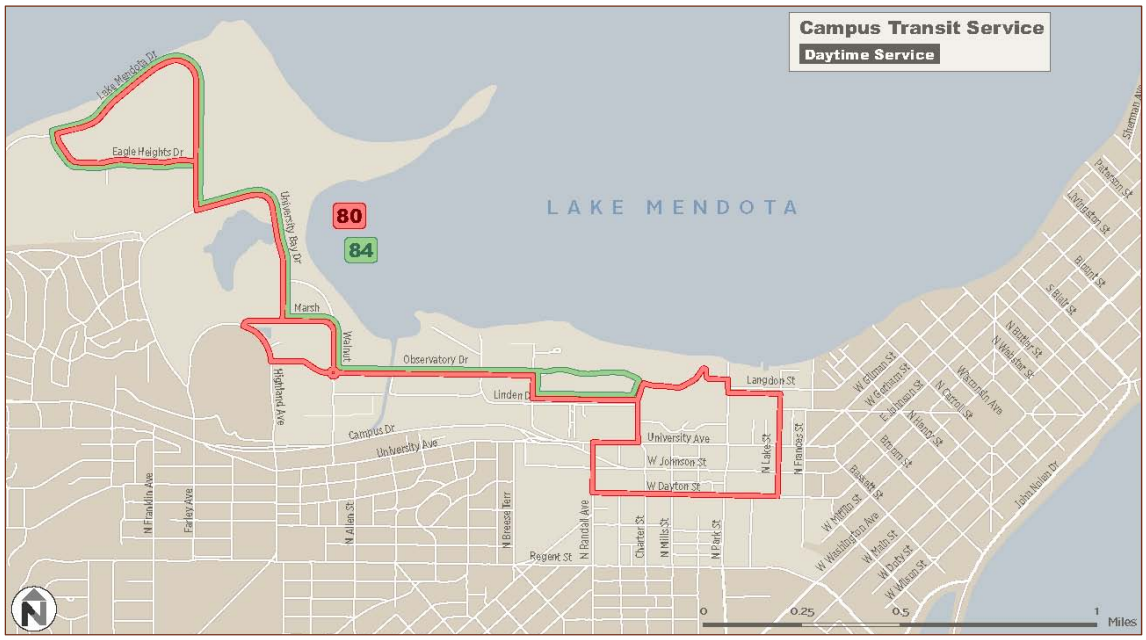


Figure 2-4 UW Bus Routes – Evening Service (After Service Change, but without Construction Changes)

MADISON METRO

Madison Metro is a municipal department of the City of Madison and provides local public transportation services within the City of Madison and parts of Dane County. This service includes approximately 56 fixed-route bus services and ADA complementary paratransit service for passengers unable to use fixed-route buses. Madison Metro has two major roles in the UW campus transportation system. Many of its routes travel serve campus destinations. In addition, Madison Metro is a major partner of the campus bus system. UW contracts with Madison Metro to provide fixed-route and paratransit service.

Fixed-Route Bus Service

Madison Metro's fixed-route bus network is organized as a transit hub and center model with service based around five Transfer Points (North, South, East and West, plus Middleton). In addition, although technically not designated as a Transfer Point, Capital Square has several locations around the Capitol Loop where significant transfers between routes are available. The UW campus also has several bus stops and locations that are served by multiple Madison Metro routes, although it is not formally designated as a transfer point.

The transit hubs and center system design means that nearly all routes begin and/or end at a transfer point. If a route does not begin and end at a transfer point, the route will typically connect to one of a handful of major destination such as Capital Square, the University of Wisconsin, major activity center (major shopping mall) or one Metro's park and ride facilities. Consequently, in most cases, transit riders can access the entire Madison Metro system by getting to a Transfer Point or other major activity center.

As discussed, the City of Madison, including Capital Square and most of the central business district (CBD) is situated on an isthmus between Lakes Mendota and Monona with the University of Wisconsin located at the northwestern portion of the isthmus. This relatively unique geographic layout creates a bottleneck that means that nearly all travel through town (northeast to southwest) and travel into the CBD from points west and many points south must travel by the University of Wisconsin. Consequently, about half of Madison Metro bus routes travel close to the UW campus (see Appendix A). Many of these routes travel on University Avenue (traveling west) or W. Johnson Street (traveling east), which is within walking distance of much of campus. University Avenue and W. Johnson Street also offer transfers to campus bus routes, including Route 80.

In addition, of the roughly 26 routes that pass close to campus, nine routes serve destinations on campus via either the east side of campus (Lake Street and/or Mills Street), northern portion of campus (Observatory Drive or Linden Drive) and/or the UW Hospital (Highland Avenue).

Consistent with the high level of service, Madison Metro and UW- Madison have a strong working relationship. UW – Madison contracts with Metro to operate the UW routes. This service agreement was valued at approximately $1.7 million in 2012.

ADA Complementary Paratransit

In addition to operating fixed-route service, Metro also operates ADA complimentary paratransit in accordance with the federal Americans with Disability Act (ADA). This service is available to individuals with a disability that prevents them from using fixed-route service. As part of ADA, the FTA also sets specific rules about how ADA service must be provided. While there are numerous specific service requirements, among the most salient are:

- The paratransit service area extends ¾ of a mile on each side of a fixed-route
- Service must be available during the same days and hours as the fixed-route bus system
- Trips must be scheduled at least 24-hours in advance and up to 14 days in advance.
- Paratransit rides must be provided no more than an hour before or after the requested departure time.
- Service may be suspected for riders who establish a pattern or practice of missed scheduled rides.
- Personal care attendants (PCAs) cannot be charged a fare, when traveling with an ADA-eligible riders.
- Additional individuals may accompany the customer if space is available and the inclusion of these individuals will not result in denial of service to another ADA-eligible rider.
- Fares may not be more than twice the fixed-route fare[5].

Metro also provides demand response paratransit service for people traveling to UW. As part of the bus pass program, UW pays Metro the fare for all trips made by a UW faculty, staff, or student. The fare is twice the fixed-route bus fare ($4.00 per one-way trip during peak periods and $3.00 per one-way trip during off-peak) but still significantly less than the cost of providing the trip. The system wide average cost to provide an ADA complementary paratransit trip is about $30, and although many trips on the UW campus are likely to cost less[6] than the system average, the fare also unlikely covers the full cost of providing the service.

PREVIOUS STUDIES

As part of understanding the existing transportation conditions at UW–Madison, the study team reviewed a number of campus and local transportation plans and studies. These studies were reviewed to help the team understand work completed to date and so that this study could build on previous work (see Figure 2-5). More detail is also available in Appendix B.

[5] ADA Essentials for Transit Board Members, Fundamentals of the Americans with Disabilities Act and Transit Public Policy, Easter Seals Project Action and American Public Transportation Association (APTA).

[6] On campus ADA paratransit trips are likely to be less expensive than the system overall because, on average, campus trips are shorter and are more likely to be shared.

Figure 2-5 Summary of Relevant Transportation Studies Reviewed

Study	Purpose	Key Findings
Long Range Metro Transit Planning Report (2008)	Set Metro's strategic direction and guide service development	Ridership is increasing but costs are also increasing while funding is decreasing. Existing funding structure is not sustainable and the agency faces pressure to do more with less. Recommendations call for improvements to marketing, fare media, customer service, partnership, vehicle fleets, routing, scheduling, bus stops and governance. A key recommendation also calls for formation of a Regional Transit Authority, but the state legislature did not back. Several recommendations have been implemented.
Metro Transit Annual Reports (2007-2010)	Ensure transparency and educate the public about agency initiatives, efforts and accomplishments.	Steady ridership growth, stronger in earlier years (2007 and 2008) but increase through 2010. 2010 also saw increase in revenue and addition of 14 more hybrid buses.
Metro Transit On-Board Survey of Passengers (2008)	Improve understanding of customers and use feedback for route and operations planning.	Responses suggest about half (53%) or Metro's riders travel for work or work-related reasons and about a third (32%) for education. About half (48%) of riders did not have access to a vehicle and 90% walk to/from the bus stops. Most (74%) also paid their fare with an unlimited ride pass.
University of Wisconsin Campus Master Plan (2005)	Guide development of the UW campus for next 20 years.	Includes plans to redesign streets to improve pedestrian, bicycle and transit circulation. Sets goal of creating a campus transit system that allows travel to anywhere on campus within 15 minutes.
University of Wisconsin Long Range Transportation Plan and Transportation Demand Management Plan (2007)	Sets vision and defines goals for campus transportation system	Divides travel into travel to/from campus and travel on-campus. Goal for travel to/from campus is to encourage alternative transportation. For travel on-campus, goal is to increase bus frequency, improve campus routes, build several miles of bike lanes and improve pedestrian infrastructure.
Fall 2010 UW Transportation Survey	Biennial survey on travel behavior. Includes students, faculty and staff.	40% of faculty and staff travel between 0 – 5 miles to campus. In good weather about half drive to campus, 20% walk or bike and 17% take a city bus. The share of biking and walking decreases in bad weather and more people drive or take the bus.
2012 On-board Campus Bus Survey	Designed to collect information on characteristics of transit customers.	82% of respondents were students; 14.3% staff 22% live in Eagle Heights/University Housings and 23% in university residence halls 56% of surveys were collected on Route 80 and 27% on Route 85

Study	Purpose	Key Findings
2011-2012 UW Transportation Services Business Manual	Guidelines for transportation options	Includes 43 policies focused on parking cars, bicycles and other vehicles on campus. Also includes information on bus pass program, carpools/vanpools and park and ride permits
Ridership an Service Hours Data (2008- 2011)	Tracks monthly service hours and riders of campus and employee bus pass program	Bus pass program riders program increased 9% per year between '08-'09 and '09-'10 and 7% per year between '10-'11. Ridership is highest January – April. Campus bus pass riders decreased over the same period by about 8.5%. Ridership on campus bus fluctuates with academic year.

3 TECHNICAL EVALUATION — ACCESSIBLE SERVICES

There are currently 700 employees and approximately 1,000 students (about 3% of the undergraduate population) with disabilities on campus. Of these, a relatively small percentage of students (4%, or about 40 students) and a likely equivalent number of employees use mobility aids. The low numbers are partially explained by a decision of the Wisconsin legislature to comply with the federal Rehabilitation Act of 1973 by focusing accessible resources on the Milwaukee and Whitewater campuses of the University of Wisconsin system. However, the University of Wisconsin – Madison offers several specialty programs that are not available at Milwaukee and Whitewater, and as the UW system's flagship university, is likely a preferred choice for many students. In addition, UW Madison hosts the Disability Studies Cluster, an interdisciplinary research and teaching program focused on disability studies. Therefore, ensuring the campus is accessible to all remains an important priority for the University.

OVERVIEW OF AVAILABLE SERVICES

UW offers a range of resources for individuals with disabilities. The focus of this analysis is on inventorying transportation services available for individuals with disabilities needing to travel to/from and around campus. In general, there are two types of transportation support: demand side strategies that work to manage the need for travel (i.e. giving students with disabilities priority for scheduling classes) and supply side strategies that focus on meeting the demand for travel (i.e. campus bus service). For individuals with disabilities who are affiliated with the Madison campus, demand side strategies include:

- Offering priority for class schedules and housing (for students).
- Ensuring a distribution of accessible parking spots and providing those spaces at a discounted rate.
- Creating a Disability Resources Center and Guide that provides information about navigating campus. The Resources Center is staffed by an American with Disabilities Act (ADA) Coordinator.
- Developing plans for students to help accommodate their disability, such as excusing some absences due to weather and harsh travel conditions and/or creating alternative ways of attending class, such as via online tutorials.
- Making transportation arrangements for employees to accommodate their disabilities, such as paying for private taxi service to transport employees to classes/meetings.

- Publishing[7] and maintaining a detailed map that indicates a variety of accessibility features, including accessible pathways by slope grade, the location of accessible parking, and certain accessible considerations such as the location of power doors, railroad tracks, etc. The accessibility map is also linked to the main campus map, so users can examine specific buildings or other facilities.

The supply side resources available for individuals with disabilities include a range of transportation services:

- **UW Fixed-Route Bus Routes (Routes 80, 81, 82, and 84)** – vehicles used on the UW bus routes are accessible and operate with a mix of low-floor (kneeling) and lift-equipped vehicles. The buses operate seven days a week with varying schedules and frequencies of service. UW bus routes are free to users; on-campus bus stops are accessible and most also include a shelter.
- **Madison Metro Fixed-Route Bus Service** – Roughly half of the fixed-route bus service operated by Madison Metro travels through or near the UW campus. These bus routes include commuter services that bring people to/from outlying areas and campus as well as all-day services between campus and major destinations and/or transfer points. Madison Metro buses, like the UW buses are fully accessible and use a mix of low-floor and lift-equipped vehicles. Free bus passes are available for enrolled UW students and faculty and staff. To receive a free bus pass, employees and students must pick up their pass on campus and confirm eligibility.
- **Madison Metro Paratransit Service** – Individuals with a disability that prevents them from using regular fixed-route bus service are eligible for door-to-door paratransit service. This service is available to anyone with a disability traveling within a ¾ mile of a fixed-route bus service. UW faculty, students, and staff can use the service on weekdays from 5:30 AM to 11:30 PM; on Saturdays from 7:00 AM to 11:30 PM and on Sundays from 7:00 AM to 10:30 PM. A key challenge with paratransit service is scheduling; the pick-up window for riders is up to 20 minutes after the scheduled trip time. To receive this service, individuals must register with Madison Metro and complete an eligibility certification process, all of which can be done remotely. UW students, faculty and staff who are eligible for a free bus pass and meet the ADA complementary paratransit eligibility requirements may use paratransit free-of-charge.
- **Intra-Campus Shuttle Service** – One of the ways Metro organizes paratransit service for on-campus trips is through an "intra-campus shuttle". Although technically not a shuttle, the service is intended to serve students traveling around campus and making regular trips that are anticipated well in advance (i.e. to meet class schedules). Although no trip requests are denied, most rides are subscription trips and the shuttle primarily serves a small number of individuals who make a lot of trips. The intra-campus shuttle is carefully designed to meet the needs of students traveling on campus – it offers a 20 minute travel window and operates with a slightly smaller vehicle that is more easily maneuvered around campus. Metro works with students needing the intra-campus shuttle to ensure the service meets their needs; otherwise, the shuttle is not widely advertised. Use of the service is free to eligible users.

[7] The map is published by the Accessibility Resource Center.

- **Disabled Parking** – Parking is highly constrained on the UW Campus and all faculty, staff and students are required to pay for parking on campus. People with disabilities can hold a UW Disabled and/or a Wisconsin Department of Transportation (DOT) parking placard. People with a disability may purchase a UW Disabled (UW DIS) placard that gives them access to on campus parking. Disabled parking is set at the lowest rate and costs $540 annually. Of the roughly 13,000 parking spaces on campus, Transportation Services designates 444 (3%) parking spaces for individuals with disabled parking placards. In 2011, TS sold 298 UW DIS placards and a similar number holds temporary placards.

  UW employees with a disabled permit from the DOT may purchase a University disabled permit, which allows parking in unreserved permit stalls, unreserved meters or designated disabled stalls anywhere on campus. In rare instances, parking stalls have been reserved for individual employees with disabilities, if no other options are available.

DEMAND ANALYSIS

A key part of understanding mobility needs is to understand the demand for existing services. While demand for some accessible services, such as paratransit, is easy to understand, estimating demand for other services is more difficult. For example, only limited data is available about how (and how many) individuals with disabilities use bus service on the UW campus, in part because the services are free and thus, trips that may be recorded through a special fare card are not captured. One indicator is how often a wheelchair lift or ramp is deployed. Data from Madison Metro shows that over 37,000 Madison Metro fixed-route trips (2010) involved a wheelchair boarding. Of these about 6% (2,300 trips) within campus involved deployment of a lift or ramp. These numbers only reflect wheelchair deployments on routes 80, 84, and 85, and do not include those on other Madison Metro routes that cross the campus or pass within the vicinity. It does suggest, however, that people using mobility devices are using the bus.

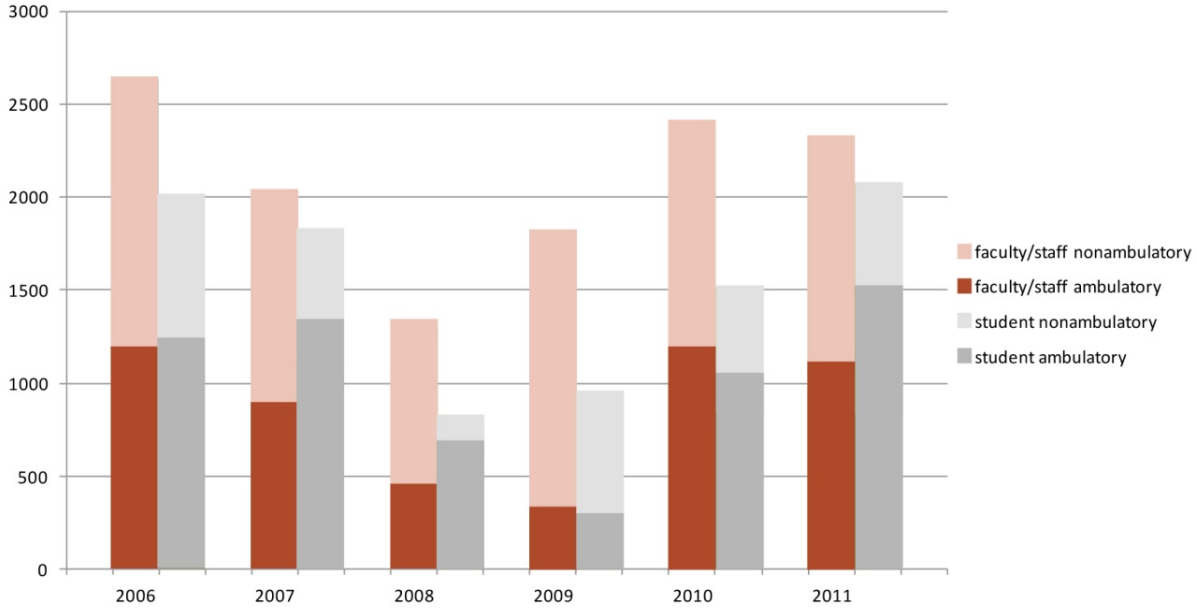
The focus of the next section is on understanding demand and trends associated with demand-response service (ADA complementary paratransit services and the intra-campus shuttle).

Overall Demand

In 2011, UW faculty, students and staff took over 4,500 one-way trips on ADA complementary paratransit. Historically, demand has fluctuated (see Figure 3-1) considerably, but remains fairly consistent between 4,000 and 5,000 trips per year. Data also shows that ridership by faculty and staff is consistently higher than usage by students.

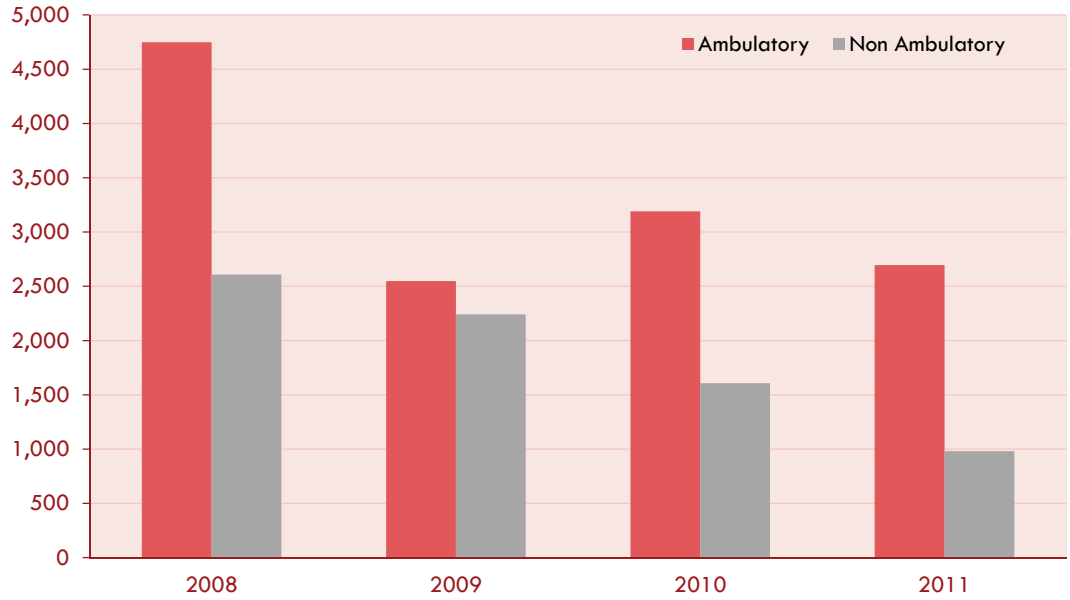
Roughly half of faculty/staff and nearly two-thirds of students using paratransit services are ambulatory. Indeed the trend for increasing demand appears to be largely driven by ambulatory riders. The proportion of wheelchair users on the paratransit program is much higher for UW-affiliated trips than the system as a whole – 48% over the past six years for UW trips as compared to 32% system-wide. Higher use of paratransit service by UW affiliates may be partially explained by higher trip making needs generally, especially by students who are regularly moving between buildings. For example, only 35 UW affiliates (including 20 students) took paratransit trips in 2011. Of these 35 individuals, two individuals accounted for over 450 annual trips each (900 total trips), or 20% of all trips taken.

Figure 3-1 Demand for Paratransit Ridership (UW Pass Holders) 2006 – 2011



The paratransit demand compares with demand for the intra-campus shuttle measured over the four year period between 2008 and 2011 (see Figure 3-2). In 2008, demand for the intra-campus shuttle was high, with nearly 7,400 trips. This compares with the demand for paratransit service in 2008, which is considerably lower than previous and subsequent years. After 2008, however, demand for the intra-campus service leveled off at around 4,800 trips and demand for paratransit returned to previous levels. Also consistent with the demand for paratransit service, overall demand is largely driven by ambulatory users, who typically have accounted for between 60-70% of all trips.

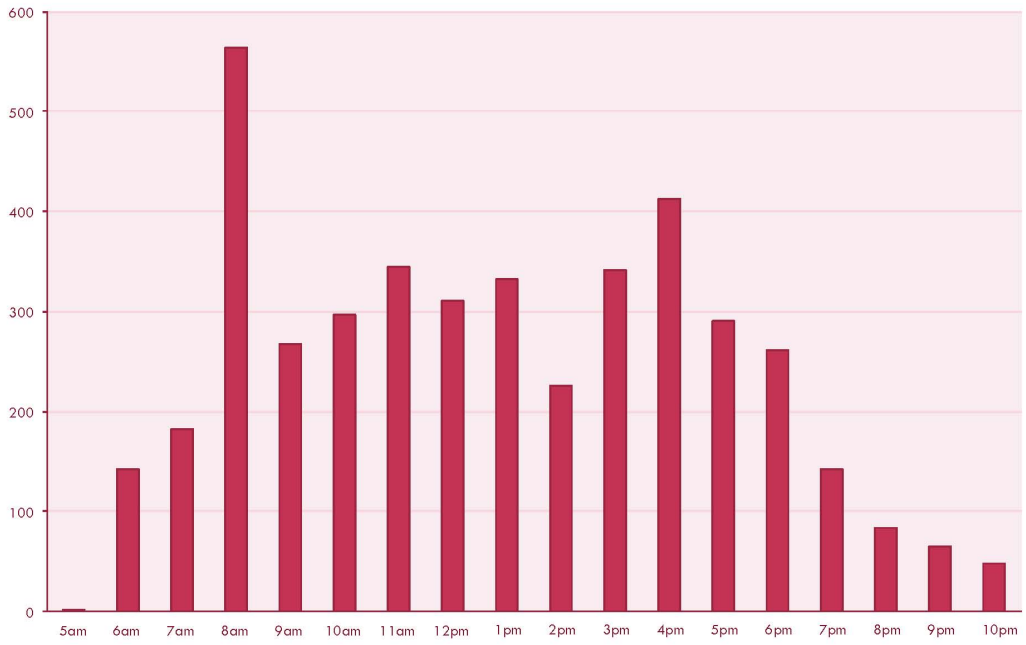
Figure 3-2 Demand for Intra-Campus Shuttle Service 2008 – 2011



Analysis by Time of Day

Paratransit demand by time of day (see Figure 3-3) shows strong demand between 8:00 AM and 6:00 PM, with spikes in demand at 8:00 AM and 4:00 PM. Spikes at 8:00 AM and 4:00 PM may well reflect use by faculty and staff commuting to/from work. Otherwise the demand curve follows the demand for the fixed-route, when demand is consistently strong throughout the day when activity on campus is also strong. Demand after 6:00 PM drops considerably.

Figure 3-3 UW Affiliated Paratransit Demand Trips by Time of Day



Demand by Location

Data from UW affiliates using paratransit services on the UW campus was evaluated to understand where riders are getting on and off the paratransit vehicles. The data shows some consistency with fixed-route ridership patterns but includes destinations not served by fixed-route bus routes (see Figures 3-4 and 3-5). High ridership paratransit locations that are along existing UW bus routes (Route 80 or 85) include:

- N. Park Street and Regent Street
- N. Park Street (two locations) between University Avenue and Langton Street
- N. Charter Street and Observatory Drive (Van Hise Hall)
- N. Charter Street and Linden Drive
- UW Hospital
- Memorial Union

Despite the similarities, there are also a handful of high ridership locations frequented by paratransit users that are not along the UW campus routes, including:

- The intersection of Babcock Drive and Campus Drive
- University Avenue (westbound) and W. Johnson Street (eastbound), between N. Mills Street and N Park Street
- W. Dody Street and S. Henry Street (off campus)

Figure 3-4 Trip Origins/Destinations for Paratransit Ridership (UW Pass Holders) May 2011 – May 2012 (Eastern Campus)

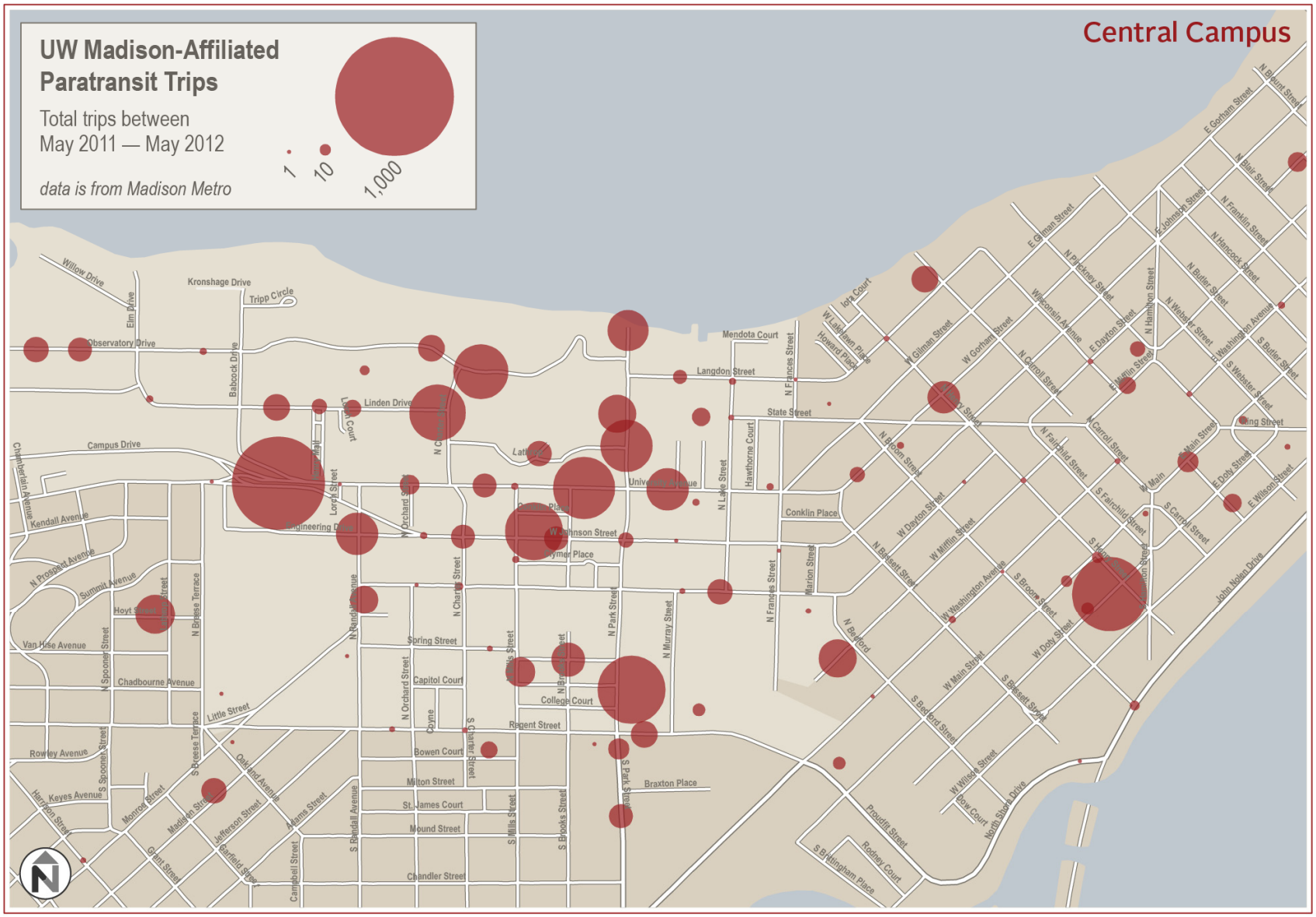
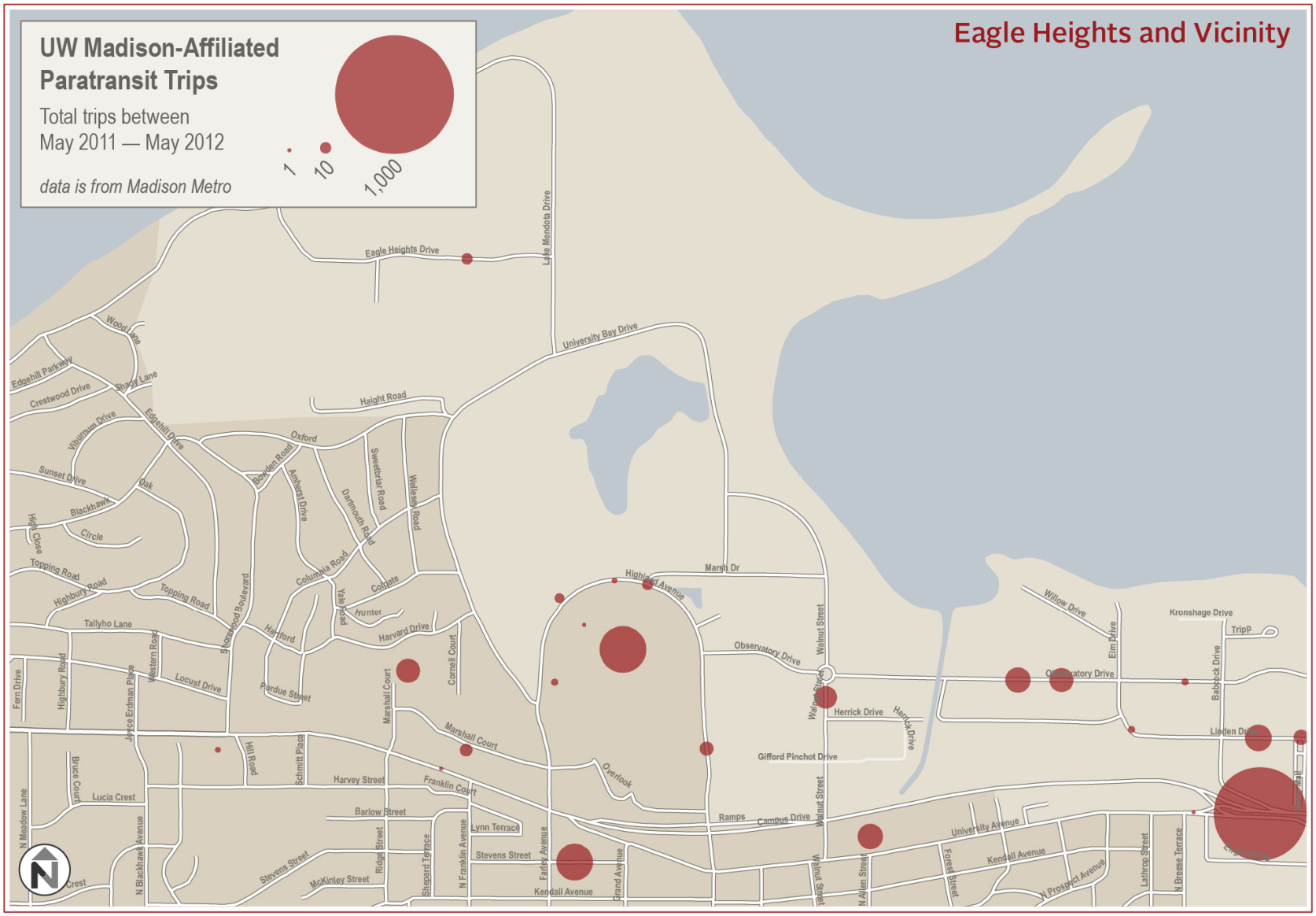


Figure 3-5 Trip Origins/Destinations for Paratransit Ridership (UW Pass Holders) May 2011 – May 2012 (Western Campus)



Cost and Productivity

In total, TS paid Madison Metro $9,510 for paratransit services, including the intra-campus shuttle. Although passengers did not pay any fares for these trips, the UW paid the fare ($4/per one-way trip in peak period, and $3/per one-way trip off peak) and the fee paid to Madison Metro reflects passenger fares. The actual fully loaded cost of these trips is approximately $30 per trip.

SUMMARY OF STAKEHOLDER INPUT

The consulting team conducted interviews with seven stakeholders to solicit input on the issues faced by people with disabilities on campus (see Appendix A for a list of interviewees). In addition to the information gathered from meetings with TS and other campus staff, this input was used as the basis for additional outreach through the subsequent focus group and on-line survey. Highlights from this input include:

- UW- Madison for the University of Wisconsin system is the flagship campus for the university. The fact that some people with disabilities are not able to navigate the transportation barriers (due to snow, distance, topography etc) or modify their class schedules to address access issues means that there is a cohort of disabled students who are not able to study in Madison. The steady expansion of classes to the west end of campus makes this even more problematic for some students.
- Almost one thousand students and a comparable number of faculty and staff have disabilities, but the vast majority does not have physical or cognitive disabilities that impact their mobility.
- On campus fixed-route service can be difficult for people with disabilities to use due to overcrowding. Bus stops are generally accessible and located in fairly close proximity to each other.
- Paratransit service is very limited on campus, and is primarily taken by students rather than faculty/staff – reasons include allowable trip time negotiations (i.e. Madison Metro can offer trips one hour before or after the requested time); on-time window (vehicles may arrive half an hour late and be considered on-time); getting between classes in 15 minutes is very difficult; new no-show policy can result in service suspensions; taking trips to multiple destinations can be challenging on paratransit
- The Intra-Campus shuttle operated by Madison Metro serves a relatively small group of students and is not well-known by people with disabilities on campus
- ADA paratransit eligibility through Madison Metro is currently based on a paper application, but the agency is exploring increasing the accuracy of the eligibility process by including an –person component – this could have an impact on the number of eligible students and faculty
- Drivers with disabilities have difficulty finding open spots near their destinations and are concerned about the level of annual parking fees
- At least one local taxi company has accessible vehicles, but this is a costly option for both consumers and university departments that reimburse trips on a routine basis as a job-related accommodation.
- Not only students move around frequently on campus during the day. Many employees also need to leave their offices for meetings. Planners often under-estimate the number of people with disabilities who remain on campus beyond the usual work/class hours.

PROPOSED AUGUST 2012 SERVICE CHANGES

In the fall of 2012, Transportation Services (TS) implemented service changes associated with the fixed-route bus network. While there are no proposed changes to accessible transportation services, alignment and schedule changes to Routes 80 and 85 may have impacts – including positive and negative – on persons with disabilities' ability to use fixed-route bus service. Positive impacts may result from changes to the schedule that increase service at key times and may make it easier for persons with disabilities to board/alight during the most congested times. Negative impacts include the decrease in service coverage resulting from combining the loop in the inner campus, especially moving service off of N. Park Street in favor of N. Lake Street.

ACCESSIBLE TRANSPORTATION AT UNIVERSITIES – BEST PRACTICES

As part of examining UW's accessible transportation services, the study team contacted a handful of universities to understand how they ensure the mobility of faculty, staff and students with disabilities. In total, the study team interviewed five universities (University of Vermont, University of Minnesota, University of Washington (Seattle), University of Michigan and University of Wisconsin – Milwaukee) (see Appendix B for more information). The "peer" universities were identified as such because they all located in northern climates with cold weather. We also selected large universities with similar student populations and/or campuses that have similar travel constraints in terms of geography.

In general, the set of services offered to students with disabilities is fairly consistent across universities and includes:

- Fully accessible facilities and services, including fixed-route shuttle buses used on campus.
- Access to paratransit services, typically through the local public transportation provider. Most universities do not subsidize this travel.
- Priority access to housing and class schedules to avoid cumbersome schedules and/or travel routes.
- Accommodation for missing class under extreme weather conditions.

SYSTEM STRENGTHS AND WEAKNESSES

Our analysis of the existing systems on UW-Madison's campus suggests the following in terms of strengths and weaknesses:

- Accessible transportation services have a very low rate of usage overall, especially given the size and stature of the university and the availability of resources on campus for individuals with disabilities.
- Low usage of the available services suggests that the existing services are either 1) not well promoted or understood and/or 2) are not meeting the needs of individuals with disabilities.
- Low usage of the available services means that interpretation of existing data should be cognizant of the limited sample size of users of accessible services.

- While only a handful of individuals use the available paratransit and intra-campus shuttle service, those who do use it frequently. This suggests that it is meeting some of their needs some of the time.
- There is a lot of fixed-route bus service on campus, all of which is accessible. However, crowding of these routes, especially at key times makes using the bus difficult for people with disabilities.
- As the campus stretches to the west, people with disabilities are going to face more challenges in terms of having access to the entire campus.
- Many faculty and staff members with disabilities face ongoing challenges associated with attending meetings and moving between buildings and facilities. Some of the short-term solutions designed to meet these needs include scheduling taxi rides. While they address the need, the solution is costly.
- Accessible transportation services offered by UW–Madison are roughly in line with other similarly sized and positioned universities. The missing service from the UW portfolio is a fixed-route, fixed-schedule circulator.

SERVICE IMPROVEMENT OPTIONS

As part of the initial analysis, Nelson\Nygaard identified some preliminary service improvement options that build on the strengths and correct weaknesses of the existing transportation options. These options were explored further in subsequent aspects of the analysis. Potential improvement options for improving campus accessible transportation services include:

- **Increase information about the Intra-Campus Shuttle –** The Intra-Campus Shuttle, while not technically a shuttle, is a critical strategy that helps people with disabilities, especially students, get around campus. One shortcoming of the service is that the details of the service are not widely known and individuals who do not directly work with UW's McBurney Center may never hear about it. For example, there is not information about the service on TS's webpage. Providing more information about the shuttle and making the information more readily available may help some individuals.
- **Formalize the Intra-Campus Shuttle –** the Intra-Campus Shuttle is flexible, demand responsive service with no published schedules, fixed time points or dedicated vehicle. One potential option would be to formalize the shuttle by creating a more formalized schedule that is created every semester (much like a traditional school bus) and is more widely distributed to the campus population. Formalizing the shuttle has some drawbacks, including that it may increase costs by requiring more dedicated resources. The benefit, however, could be that having a publicized and visible service may strengthen the perception that there is a system for individuals with disabilities to move around campus and increase accessibility overall.
- **Operate weekday evening and/or weekend daytime paratransit service as Flex-Service –** Demand for paratransit trips drops dramatically after 6:00 PM. Some of these trips may be accommodated through a Flex-Service that could accommodate both able bodied and individuals with disabilities. The service could operate with a handful of fixed time points (i.e. Memorial Union, Bascom Hall or Tripp Circle) but with no fixed alignment between time points. The vehicle would be able to bring riders directly to their destination. Many Flex Services successfully serve between 5 and 7 riders per hour and tend to work best when service areas are confined. A combined Flex-Service could help

substitute for some of the service reductions implemented in the fall. The Flex Service option is best implemented in the evening when few mainline Metro routes operate so it can meet the ADA service requirements.

- **Offer more travel training, especially for new students and faculty/staff –** Metro, through Dane County, offers travel training for individuals who are able to use fixed-route bus service after some training and guidance. The current travel training program is fairly small and is not extended to students. One potential low cost strategy to encourage use of the fixed-route bus service is to offer travel training on the bus. Travel training will not address all issues, but can help dispel some myths and challenges associated with using the UW and Madison Metro fixed-route service. Travel training may be particularly useful for faculty and staff, who mostly need to travel during the campus off-peak times (i.e. before 10:00 AM and after 4:00 PM).

4 CONSUMER RESEARCH — ACCESSIBLE SERVICES

Building on the analysis of existing conditions, Nelson\Nygaard conducted two focus groups and one large group meeting on the UW- Madison campus on October 2nd and 3rd, 2012 (see Figure 4-1). The purpose of the meetings was to solicit in-depth information about travel patterns and mobility barriers faced by employees, students and visitors with disabilities. Focus groups were also used to collect ideas for potential solutions to the challenges faced.

As part of advertising the focus group meetings, Nelson\Nygaard also suggested that individuals with ideas or suggestions about accessible transportation services on the UW campus, but who could not attend the meetings could post their comments on line. The comment board included a handful of brief questions in addition to providing space for comments. This comment board was posted on Survey Monkey between September 12 and October 23, 2012 and a total of 23 individuals' submitted comments through this medium. Copies of both the focus group moderator guidelines and the comment board are included as Appendix B.

Figure 4-1 Composition of Focus Group Attendees

Target Group/Composition	# Attendees	Mobility Devices Used	Transportation Mode
Large Group Discussion: Participants in the Department of Kinesiology Adapted Fitness and Personal Training Program – majority of attendees in their 20's, almost all live off-campus	42 for initial discussion, 20 stayed after exercise class started	12 of the 20 were wheelchair users	8 drivers, 5 driven, 4 paratransit, 3 bus
Focus Group: Students – 5 live on or very near campus	Seven	one wheelchair user, 3 use walkers and cane	2 drivers, one paratransit user, others primarily walk or bus (5 had used the bus in the previous week)
Focus Group: Faculty/Staff	Nine	Wheelchair user, two use walking sticks, crutches, guide dog, walker	5 drive, others use Madison Metro bus or get driven
Comments Posted On-line	23 respondents	n/a	13 drive, 5 walk, and the remainder use multiple modes

Source: Nelson\Nygaard

OVERALL CHALLENGES AND CHALLENGES BY MODE

Many individuals indicated that they use multiple modes of transportation and that cold weather is a factor in many people's mobility choices. For example, one person rides the bus regularly, rides paratransit for many trips during the winter months, sometimes gets driven to locations on campus, and often ambulates on her wheelchair over half an hour to get home at the end of a school day. Another individual drives regularly, sometimes takes the bus, and often uses her adaptive bicycle to get around campus.

In terms of access to information, participants indicated that the mobile application and the websites provided by Madison Metro are very useful in terms of providing accessible information, although one participant expressed concern that for those who do not use smart phones, information is not readily available after hours.

In addition, some participants indicated that staff at Transportation Services used to be quite rude whenever they'd ask a disability related question, giving people the 'runaround' when they didn't know an answer and not offering to help. By all accounts, the situation has improved in the last couple of years.

Driving and Parking on Campus

Many people drive because bus and paratransit isn't an option for them. Reasons include lack of bus and paratransit service in their areas; bus stops that are too far for them to reach; they can't do chain trips and reach any of their multiple destinations on time; the transit alternative would make it impossible for them to attend the on-campus program and continue to work full-time

The majority of faculty/staff indicated that they leave their buildings two or three times during the course of a workday, which makes access to a car very convenient. Others drive to campus and then use the bus during the day on campus.

The most common issues cited by drivers related to parking. While some concern was expressed about the charges that were implemented for disabled placard holders last year, even more commentary was submitted regarding the lack of disabled parking locations. Specific locations cited included:

- Bascom Hall
- Education building
- Humanities building
- Memorial Union
- Law School
- Lathrop Hall
- Pyle Center
- SERF building
- Natatorium
- Observatory Drive
- Grainger

During the winter snow often gets shifted from the streets to the sidewalks and often to disabled parking locations and curb cuts, which has an adverse impact on the mobility of people with disabilities.

Participants in the adaptive rehabilitation program objected to the fact that they have to pay $100 for parking when they believe they are providing a service to the university through their work with the rehabilitation and medical students.

Bus Riders

While some focus group participants regularly use the fixed-route buses on campus, others wanted to or tried to use the buses but found the service difficult. For some it was due to overcrowding and for others because the bus is "jerky" and uncomfortable. Some of the comments expressed include:

- The bus riders expressed different opinions about the bus drivers for both Campus and Metro buses. While there were some complaints from employees, many of the others expressed compliments.
- Most participants in the two focus groups indicated that they often stay on campus in the evenings, so transit options do not work well for them during those hours. Late night bus service is too infrequent to meet the needs of some students who are afraid to wait for long periods of time
- Bus stops outside of the core downtown/campus area are often spaced so far apart that many people with disabilities can't get to them
- Some participants reported statements made by bus drivers such as "why don't you use paratransit," "I have a dog boarding," "why can't you hook yourself into the bus?" Some drivers reportedly do not put the seat down after a wheelchair user has de-boarded, and some people with disabilities are not able to do this independently
- Some participants can't get to their final destination on campus because of slopes or slippery conditions

Paratransit Riders

Most participants do not use paratransit service on campus because of the long wait times and trip lengths, which make them impractical for campus travel and very few participants were aware of the intra-campus paratransit shuttle.

Pedestrians

Some participants indicated that the assumption that UW-Madison is a "walkable campus" fails to take into account the specific barriers presented by topography and campus layout faced by people with disabilities. Other comments include:

- More should be done about controlling the flow of pedestrians, as it negatively impacts the flow of bus and paratransit traffic.

SUGGESTED SOLUTIONS

Participants offered a variety of strategies to address the mobility problems cited above, including:

- Expand the number of accessible parking spots and locations where accessible parking is available.
- Establish a circulator route on campus designed for people with disabilities.
- Train students to provide basic travel training.
- Publicize a phone number to call when university vehicles block sidewalks and accessible entrances.

- Cover the grooves in the concrete on campus to facilitate better traction for wheelchair users.
- Ensure that sidewalks and curb cuts are cleared during the winter months.
- Prevent cyclists from blocking ramps with their bicycles.
- Make daily on-line announcements regarding construction areas.
- Establish a Disabled Advisory Committee to Transportation Services.
- Educate the public that accessible van locations should be left for those who drive vans as they do not have the option of using other parking stalls.
- Install "NextBus" signs that have an audio component.
- Create an on-line service in which people could input information about meetings they have to attend, and be able to reserve a car service for those times.
- Contract with a cab company to provide on-campus trips.
- Use the "Inside UW" e-mail list to provide information about accessible options, as non-students would not be aware of information disseminated by the McBurney Center.
- Establish shuttle services from satellite parking lots so that drivers don't have to search for parking on-campus (one person reported that there used to be such shuttles, but that they were poorly utilized).
- Provide more driver training to fixed-route bus drivers.
- Create pedestrian overpasses that are accessible in strategic locations, such as at the Charter/Johnson or Charter/University intersections

5 RECOMMENDATIONS — ACCESSIBLE SERVICES

MOBILITY NEEDS ADDRESSED

For the purpose of developing recommended strategies, the consulting team synthesized the input described in the previous section into a list of key mobility challenges:

- Paratransit does not work for some on campus for a variety of reasons, such as lack of service from outlying areas into campus, inability to transfer between classes within the 15 minute window, lack of same day service, the time needed for chain trips (multiple stops during the course of a day)
- Most people with disabilities are unaware of Madison Metro's Intra-Campus Paratransit service.
- Fixed-route buses are too crowded on campus, and cannot compete in terms of time with cars when needing to access multiple locations.
- Bus stops are too far for some people to access, particularly in hilly conditions
- Some people with disabilities who could functionally ride a bus are reluctant to do so due to lack of familiarity or other barriers.
- There is a lack of evening transportation service options in terms of bus frequency and spontaneous trips.
- Drivers are reluctant to give up their parking spots during the day when they have to visit different locations on campus.
- Drivers with disabilities find that there is a lack of sufficient parking spots on campus, and believe that the regulatory requirement for number of spaces on campus does not take into account that UW-Madison is set up to be a "transit first" campus (which means less parking spots for everyone, but for some with disabilities this is their only practical option)[8]; many of the disable parking locations included in the required number are concentrated at the medical center; and many of the disabled parking spots are not functional for people with specific disabilities.
- Parking charges are prohibitively expensive for some drivers with disabilities.
- During the winter snow often gets shifted from the streets to the sidewalks and often to disabled parking locations and curb cuts.

[8] People interviewed felt strongly about the lack of disabled parking spaces. However, as mentioned in Chapter 2, there are 444 parking spaces designated for people with disabilities, more than required by federal standards. Many of these spaces were also relocated to desirable locations with considerable planning and efforts. Thus, in some cases, the lack of parking may reflect perceptions rather actual circumstances.

- Accessible transportation decisions are made without sufficient and/or routine input from the disability community.

Nelson\Nygaard identified a series of eight strategies to improve campus accessibility, as described below:

ACCESSIBLE STRATEGY 1: CIRCULATOR SHUTTLE

Create a circulator shuttle that operates on a fixed-route, fixed schedule basis for people with disabilities on campus. In contrast to fixed-route service alignments which are intended to shorten the distance between key trip generators, this route will be designed to serve locations that are most likely to be used by people with disabilities, and to enter building driveways or other such locations in order to improve proximity to accessible building entrances. Service will be provided during weekday hours (e.g. between 8:00 AM and 6:00 PM).

Mobility Problem Addressed

The circulator shuttle will address the needs of students who cannot use paratransit because the service is not set up to get them between classes in the 15 minute available interval. The circulator will also address the problem of crowding on the regular fixed-route buses, as the latter will be more attractive to the general public in most instances due to the route alignment. In addition, it will address the needs of drivers with disabilities, primarily faculty and staff, who need to leave their offices during the day but are reluctant to relinquish their parking spaces.

Benefits and Costs

The circulator would provide substantial mobility benefits to people with disabilities on campus who currently have to design their class schedules around their ability to get to classes on time. It will also benefit drivers who need to move around campus during the day.

The cost associated with the circulator will vary considerably depending on the service parameters, such as service span (daily hours), frequency of service, type of vehicle used to provide the service. Capital costs would vary by the type vehicle used, although an accessible 30' vehicle may be the most appropriate. Depending on the operator, capital costs may also be incorporated into the hourly costs.

Implementation Challenges

One of the key challenges in considering this strategy, aside from funding availability, is determining the potential demand for such a service. Although stakeholders in the outreach process identified intra-campus trips as a significant challenge, whether these will translate into actual usage of the service is an open question. Another challenge will be developing a service alignment that serves the most important destinations and is frequent enough to meet riders' needs for getting to appointments on-time and in less time than it would take to walk or roll to their destination. If the frequencies prove to be insufficient, a second vehicle may be required. Finally, since the proposed route alignment will differ in some respects from the traditional planning for a fixed-route service, the circulator route will need to be carefully planned to optimize its ability to meet the disability community's needs – additional input from potential riders will be needed.

ACCESSIBLE STRATEGY 2: EVENING AND WEEKEND FLEXIBLE TRANSIT SERVICE

Flex service offers a potential solution to offer transportation choices outside of the campus circulator operating hours, on weekday evenings and on weekend days when school is in session. Under this model, certain key locations will be designated as bus stops where a bus arrives at a scheduled time, but the bus will not operate along a specific route between these stops. The bus will be required to arrive at those stops at designated times, but is free to travel anywhere on campus between stops. There are different ways for the service to be designed. For example, pick-ups and drop-offs at the stops could be open to the general public, but requests for door-to-door service will be limited to people with disabilities. Or, the service could be free to people with disabilities but a fare is charged to able bodied riders.

Mobility Problem Addressed

Flex service will address the lack of sufficient transportation options in off-peak hours when many students and staff are still on campus. In particular, the service would address the needs of those who are not able to ambulate to a bus stop due to slope, darkness, weather or other barriers.

Benefits and Costs

The Flex service will benefit people with disabilities by bringing them closer to their destination than is possible with fixed-route service, and by increasing their transportation options in evening hours. It will also benefit those who are ADA paratransit eligible but have not yet received their eligibility certification, particularly those with temporary disabilities.

The cost of the service will vary based on the hours of operation and number of vehicles deployed.

Implementation Challenges

One of the key challenges in implementing this program will be to educate those on campus regarding the difference in level of service available to the general public and those with disabilities. If the service available to riders with disabilities includes those who are not necessarily ADA-eligible, a separate certification will need to be set up, possibly in collaboration with the McBurney Center. Another concern will be to address the problem of split shifts for drivers when service is only being provided for three hours a night, and combining these shifts with other operations in the fixed-route system. An important decision that will need to be made early on in the implementation process will be deciding on whether this service should be operated by the university or through the existing agreement with Madison Metro. If Madison Metro is responsible for the operation, a closer examination of the funding sources used in the service will be required. This will determine if mixing ADA and non-ADA riders on the same vehicles is allowed under the funding agreements. Another issue will be to establish a realistic productivity goal which will justify continued operation of the service.

ACCESSIBLE STRATEGY 3: PROMOTION OF INTRA-CAMPUS PARATRANSIT SERVICE

Madison Metro currently provides on campus paratransit service to students and faculty. The service is primarily used by a small group of subscription riders, although it is available for casual trips by those individuals who call before 4:30PM on the day prior to their trip. However, almost all the stakeholders involved in this Plan were unaware of this program.

Mobility Problem Addressed

People with disabilities on campus are unaware of resources that are available.

Benefits and Costs

Many individuals on campus could benefit from the intra-campus paratransit service if they were aware of it. This would be particularly helpful for individuals who do not require spontaneous trips, or whose trips are not so time-sensitive that the maximum on campus ride time of 20 minutes could present a problem.

The cost implications of greater awareness of this program could potentially be relatively significant for Madison Metro, but minimal for UW-Madison. The reason for this distinction is that according to the current agreement, the university would only be responsible for the fares of the increased numbers of riders, whereas each of these additional trips would cost Madison Metro approximately $30.

Implementation Challenges

Promoting awareness of this service to potential beneficiaries has some inherent challenges, including that there is already substantial information about programs and services on campus, and the campus has a turn-over of students every year.

Existing paratransit service is currently listed on the Madison Metro link of the on-line Disability Resource Guide. However, it is buried under multiple layers for those who are seeking this information, which explains why so few people are aware of the program. Increasing the prominence of this program on-line, providing short articles/descriptions in McBurney Center informational materials, or advertizing the service as one of the key resources available to new students with disabilities could result in a higher profile for the service.

ACCESSIBLE STRATEGY 4: SUBSIDIZED TAXI PROGRAM

This program will be based on an agreement with a private taxi company to provide taxi service on campus for a reduced rate to the university, and a heavily subsidized rate to the student/staff person with a disability. The service would be provided by a taxi company that has accessible vehicles in its fleet, such as Union Cab Cooperative. Registered people with disabilities on campus will pay $3 for $10 worth of taxi scrip, and be responsible for all meter charges in excess of the $10 fare. The cab company will keep the fare and tip, and be compensated an additional $7 for every trip provided, regardless of trip length. This will ensure that drivers have an incentive to take these trip requests as many of the trips will be below the $10 fare.

Mobility Problem Addressed

There are multiple mobility problems that this strategy will address. These include the lack of real-time door-to-door service on campus (as opposed to day before reservations on paratransit), and the expense of private taxi service for those who choose this option, including for trips from/to outside of campus.

Benefits and Costs

The primary benefit of this strategy would be to provide an accessible, same day mobility option for people with disabilities associated with the campus. Some departments have entered into private agreements with taxi companies to provide on-campus trips for faculty, but these have cost in excess of $20 per trip, for trips that occur on a daily basis. This program would provide a cheaper alternative for those departments. Another benefit of this program is that it allows the university to provide a higher level of service than is available on the bus or paratransit, but with a predictable cost per trip.

The cost of this program will depend entirely upon usage, but UW-Madison could decide on a budget of say $50,000 per annum, which would allow for over 7,000 one-way taxi trips (this amounts to approximately four trips per person per year). In order to allow for wide usage, a trip limit per individual may be required.

Implementation Challenges

Implementation challenges include the following: entering into an agreement with a taxi company that can guarantee an adequate level of service quality (particularly with regard to wait times), and the availability of accessible vehicles in the context of fluctuating demand; establishing an individual trip limit that ensures widespread distribution, but can still be useful to those who need frequent service. Expanded intra-campus paratransit service may still be able to fill this gap for those who need subscription service that exceeds the taxi trip limit.

ACCESSIBLE STRATEGY 5: FIXED-ROUTE OPERATOR PASSENGER SENSITIVITY TRAINING

Passenger sensitivity training that incorporates the needs of riders with disabilities is routinely provided by Madison Metro. However, a refresher training that could also incorporate some of the specific needs of campus users should be provided on a periodic basis. This can be categorized as refresher training, rather than initiating a new training program.

Mobility Problem Addressed

Some potential bus riders are discouraged from riding the bus because of the attitudes of some operators. It should be emphasized that paratransit operators and most fixed-route operators received very positive assessments in the stakeholder outreach process. However, examples of inappropriate comments were also described, such as "you should take paratransit and not ride the bus," "everybody let the dog on the bus" (without mentioning the blind rider), and "you should be able to hook yourself in." Lack of sensitivity to the needs of riders with disabilities is the mobility need being addressed in this strategy.

Benefits and Costs

The benefits of this refresher training would be an improved ride experience for those people with disabilities who currently ride, and the potential to attract new riders who feel welcomed onto the bus. In addition, there may be some value in identifying the kinds of issues which are campus-specific, such as the need for students to get to classes on time multiple times during the day, in contrast to many of the usual disabled riders who use the bus service. The increased costs of a refresher training on a periodic basis would be nominal.

Implementation Challenges

Both management and the operators at Madison Metro may be resistant to implementing a refresher training, as they may feel that this is already being addressed within the current training requirements. Another challenge will be developing a curriculum that reflects the specific needs of people with disabilities on campus.

ACCESSIBLE STRATEGY 6: CAMPUS ORIENTED TRAVEL TRAINING

This strategy would expand the current limited travel training offered by Dane County Department of Human Services to create a program that specifically addresses on-campus transit travel. Some of these trainings could be provided by Transportation Services staff as an expansion of their current training offerings. These would most likely be those that do not require highly skilled individualized training such as for wheelchair users, and could possibly be advertized and coordinated with the McBurney Center.

Mobility Problem Addressed

While some students indicate that the fixed-route services work well for them, others express concern about the crowding on buses during certain times of the day, and the lack of frequency in the off-peak hours. New students on campus, and some of the older faculty and staff with disabilities, may have a difficult time taking the first step in trying out the bus service. Travel training programs are specifically set up to address this challenge and enable individuals to become independent bus riders.

Benefits and Costs

The primary benefit of this strategy would be to expand the mobility options of people with disabilities on campus, and to increase their ridership on the lowest cost transportation option.

The costs for a travel training program on campus would vary based on the level of participation. However, assuming that between 10 and 40 individuals would participate annually in the trainings, with a mix of one-on-one trainings, primarily for wheelchair users and those with visual impairments, to small group orientation trainings, the estimated cost for this program would be in the $10,000 to $15,000 range. The costs could be even lower if incorporated as part of the current travel training offerings. Some of the direct costs of this program would ultimately be reduced by the cost of providing paratransit service for equivalent trips on fixed-route.

Implementation Challenges

The main challenge in this strategy will be identifying potential trainees who currently do not ride the bus but would functionally be able to ride if fears or misperceptions about the service were addressed. It could be costly to set up the infrastructure for a travel training program which turned out to be poorly utilized. However, working in collaboration with the County would allow for a gradual expansion of the program to meet the volume of interested participants.

ACCESSIBLE STRATEGY 7: ESTABLISH AD HOC ADVISORY COMMITTEE ACCESSIBLE TRANSPORTATION

An ad hoc disability advisory committee should be established that will create an opportunity for routine consultation with the disability community on issues that affect their mobility, ranging from parking locations, snow removal, and sidewalk conditions, to creating new transit services that specifically address their concerns.

Mobility Problem Addressed

A significant amount of input received during the outreach effort focused on parking issues. The specific issues and evaluation of their merits are beyond the scope of this study. However, many of the concerns expressed by stakeholders appeared to be ones that may have been addressed more positively from the perspective of the disability community if there had been earlier input. The problem that would be addressed by this strategy would be a lack of routine consultation with the disability community, both real and perceived, and the missed opportunities for implementing service or policy changes that work better for all people on campus.

Benefits and Costs

The immediate benefit of this strategy would be to raise the profile of accessibility issues at Transportation Services, and allow consumers of those services to feel like they have a say in some of the issues that specifically pertain to the community.

There would also be benefits resulting from the input provided when designing new services or soliciting advice on how to prioritize various improvements that affect the community.

The primary costs associated with this strategy would be the increase in Transportation Services administrative staff time that would be required. The actual proportion of a full-time equivalent staffing person would depend on the responsibilities required, but would likely be less than a half-time position.

Implementation Challenges

One of the key implementation challenges could result from creating heightened expectations of what can be achieved in addressing committee members' concerns, given operational and fiscal realities. Another would be to balance representation on the committee to reflect the wide mobility interests within the disability community, from car drivers to paratransit riders, to those who primarily rely on well maintained sidewalks.

ACCESSIBLE STRATEGY 8: SEEK GRANT FUNDS FOR PILOT OR DEMONSTRATION PROJECTS

A slightly different recommendation from Accessible Strategy 8 involves seeking grant funds to support pilot or demonstration projects to improve accessible transportation services on campus. The advantage of seeking grant funds is that it allows the university to leverage local (university) funds with state or federal resources. Grant funds also allow UW and TS to 'test' or pilot new ideas without having to commit to full implementation and/or divert resources from existing programs. Grant funds could be used to support any or some of the recommendations identified through this analysis and/or other recommendations developed through discussions with the disability community.

Mobility Problem Addressed

This study identified a series of mobility challenges, some of which may be addressed through the introduction of new services, development of different service models and/or support programs. Grant funds can help get these programs started and allow for a demonstration and evaluation period.

Benefits and Costs

The availability of a discretionary fund would allow Transportation Services to leverage other funding to address accessibility issues and expand the amount of resources available, even if the resources may be for a specified time period. Depending on the grant program, there may also be opportunities to partner such as other campus organizations (McBurney Center) or local service providers (Madison Metro).

In many cases, grant funds require an evaluation of the effort. While evaluating the program may require resources, conducting an evaluation of a new program creates an opportunity to learn from the experience and potentially improve upon it if/when it is carried forward to full implementation. In addition, evaluation costs may be written into the grant application.

Implementation Challenges

There are typically two challenges associated with seeking grant funds. The first is identifying relevant grant sources and preparing the grant. The second challenge is securing local matching resources, which may be between 50% and 20% of the estimated program costs.

6 IMPLEMENTATION — ACCESSIBLE SERVICES

The objective of examining and analyzing UW-Madison's accessible transportation service was to determine how well the exiting services meet the needs of the UW community, including students and faculty/staff associated with both the main campus and health sciences. The analysis was also intended to identify opportunities that would strengthen existing services and meet needs on campus.

Our analysis identified clear needs on campus that focused on five main shortcomings with the existing system:

- **The fixed-route bus services largely do not meet the needs of people with disabilities.** The primary reason being that buses are overcrowded. There are also a host of secondary reasons including that drivers and other riders are not always accommodating to people with disabilities and people with disabilities are not always familiar with how to use the bus.
- **People with disabilities are unable to move quickly and efficiently between buildings on campus.** Students are unable to get between classes within the 15-minute window allocated to changing classes and faculty/staff are unable to get to their classes on time, attend meetings or address other campus business. Challenges for people with disabilities include short-distances that are associated with hilly terrain, crowded sidewalks and indirect paths as well as traveling longer distances to buildings on the southern and western ends of campus.
- **Existing transportation services lack flexibility.** ADA complementary paratransit and the inter-campus shuttle all require advance reservations and do not allow people to change plans quickly. Even driving lacks flexibility because parking spaces are in such demand; people are reluctant to give up a parking spot once they have one.
- **The ability to drive to campus is important to some people with disabilities.** This means it is also important to park on campus. A lot of people on campus, including students, faculty and staff feel parking spaces for people with disabilities are not well located or sufficient.
- **People with disabilities would like to have more input to decisions made about transportation services and resources**. People who participated in this research had a lot of small complaints about oversights that had significant impacts on their ability to move around campus. Including someone with a disability in the planning process might help address that problem.

These key needs and concerns guided development of the strategies listed in Chapter 4. These strategies were brought to the UW community as part of a series of public meetings held on campus November 13th and 14th, 2012. Two meetings were held each day, one in the afternoon and

evening of each day. Locations were all accessible, flyers were posted all around campus and invitations were sent out distribution lists used to find focus group participants.

Several people with disabilities attended the meetings as did individuals who work with people with disabilities. In general, people were very supportive of the potential solutions and in particular were very supportive of creating a forum where people with disabilities could be part of decision making and program design. They were also very supportive of creating a fixed-route, fixed-schedule circulator route and felt that such a route would help – at least partially – address the need to get around campus in a timely manner. Based on this feedback, all eight strategies were carried forward to implementation (see Figure 6-1). An overview of the relationship of the individual strategies to broader study and TS goals is mapped in Figure 6-2.

Figure 6-1 Summary of Strategies to Improve UW's Accessible Transportation Network

No.	Strategy	Estimated Annual Cost	Benefit
1	Circulator shuttle	$110,000 (one route)	Increased transportation options; Increased flexibility
2	Weekend and Evening "Flex" Service	$75,000	Increased transportation options; Increased flexibility
3	Better marketing/information about existing services	$20,000	Better use of existing services
4	Taxi Voucher Program	$50,000 Staff time	Increased transportation options; Increased flexibility
5	Fixed Route Operator Training	Staff time	Better use of existing services
6	Campus based Travel Training	$25,000 plus Staff time	Better use of existing services
7	Establish Ad Hoc Committee on Accessible Transportation	Staff time	Better design of existing services and better design of new programs
8	Apply for Grant Funds	Staff time	Opportunities to leverage resources as part of developing pilot or demonstration projects

CIRCULATOR SHUTTLE

The purpose of an intra-campus circulator shuttle would be to develop service that allows people with disabilities to move around campus quickly and efficiently. The approximate cost of a shuttle is estimated to be about $55 per hour, inclusive of capital costs but not marketing. Therefore, 12 hours of service (6:30 AM to 6:30 PM) would cost about $660 per day, or over a 160 day academic calendar, about $105,000 annually. The shuttle could be operated by Madison Metro or contracted through a private operator, which may lower service costs significantly.

Given the size of the UW campus and the diversity of travel patterns and needs, there are many ways the shuttle could be designed (i.e. designed within a 15 minute loop, longer loop that offers 15-minute travel between some segments, focus on housing to main part of campus, etc.). However, the shuttle is most likely to be successful if it is targeted towards a specific need and

market. Thus while the shuttle may have flexibility to change from semester to semester, it should be designed with a clear purpose, market and developed with a fixed-schedule and fixed pick and drop-off locations. If the service is effective, a second shuttle may be implemented at a later date.

Other considerations associated with implementation include:

- *Determining eligibility criteria*. Eligibility for the circulator may be limited to people with disabilities, or could also be available to anyone on campus, but designed specifically to meet the needs of individuals with disabilities (and marketed to this group only). A challenge associated with making the shuttle open to everyone on campus is that it is always easier to expand access, rather than reduce it. If the shuttle is limited to persons with disabilities, eligibility criteria may err on the side of inclusiveness, so people with 'hidden' or temporary disabilities can use the service. However, there should be some clear criteria for use of the service that can make the service easy to use and can be enforced with minimal oversight by the driver.
- *Creating and marking shuttle stops that are accessible and close to buildings*. The purpose of the shuttle is to provide flexible transportation, so people who may not feel well on a given day (or the weather is especially bad, etc.) can jump on and off the service. A critical part to making that happen is 1) marketing and information; and 2) clearly identified stops. UW already has a lot of street signage, bus stops and information on its streets and this is especially true for highly used locations, such as Memorial Union, Union South (etc.). Design of the shuttle stops, therefore, would need to balance some of these challenges to find locations that are accessible, recognizable and safe.
- *Marketing*. As a new service the shuttle will need to be marketed effectively so that people with disabilities or mobility challenges know about the service and understand how to use it.

WEEKEND AND EVENING FLEX SERVICE

The purpose of a weekend and evening flex service is to create travel options for people with disabilities. Transportation needs at these times of the day and days of the week are potentially more diverse but less stringent in terms of time sensitivity. Recommendations include flex service because it offers a hybrid approach – using a handful of fixed-time points so people can meet the bus as needed, but then offering flexibility to provide door-to-door service.

The flex service will have a cost structure similar to the circulator shuttle, plus an additional cost associated with the dispatch function. As a result, we broadly estimate the hourly cost at $60 per hour (including capital but excluding marketing) if operated by Madison Metro, but lower if operated by a private contractor. Assuming the shuttle is available 3 hours per day (6:30 PM to 9:30 PM) on weekdays and 12 hours on weekend days (8:00 AM to 8:00 PM Saturday and Sunday), costs range from $28,800 for weekday evening service (160 days) and $23,040 for Saturday (32 weeks) and another $23,040 for Sunday (32 weeks). Combined all three services would cost $74,880 annually, assuming one vehicle is needed to operate the service. Depending on demand, this could increase to two vehicles.

The service design is inherently flexible, so critical decisions including identifying the fixed time points (potentially Memorial Union, on the hour and Union South on the half-hour) and defining the service area (potentially Elm to Park to Dayton). Flex services are very successful in areas around the country (including the Connector service in Appleton WS), but do require some initial considerations to ensure the service works:

- *Service Monitoring*. A critical part of flex service is balancing the competing demands of ensuring the vehicle has enough, but not too much, time to bring people to where they want to go and get back to the scheduled fixed-time point. Factors that influence this balancing act include the number of users, their destinations, and the number of vehicles available for the service. All of these factors can be shaped:
  - Users of the locations other than time points should be determined through eligibility criteria (disabled only) and/or charging a fare (potentially to people without a disability only). Depending on demand, these requirements could be modified to allow all students to request specific locations between time points
  - Destinations are set by the service area. Riders may benefit from a larger service area but ultimately the area served is part of the service design.
  - If demand is strong at certain times, additional vehicles could be added to meet this demand.
- *Marketing*. Similar to the shuttle service, marketing is critical so that people with disabilities or mobility challenges know about the service and understand how to use. Flex service will be a different type of service for most users, so some education will be required.

MARKETING

Although there is a lot of information about transportation services available in printed formats and on UW web pages, there are many people with disabilities who do not have a solid understanding about what services are available and how they work. Part of making the campus more accessible, therefore, involves making sure everyone knows about what is available.

Marketing in a university setting can be challenging due to the large amount of turnover every year. Targeting persons with disabilities presents additional challenges, as some may be temporarily disabled, or have disabilities that limit travel in certain circumstances. The challenge, therefore, involves ensuring information is available in a variety of formats and is dispersed regularly.

For purposes of this project, we have budgeted $20,000 to develop a marketing campaign and tools. This budget assumes some effort is made to understand how to reach the target market, develop tools and resources that are easily accessed and accessible for people. Efforts to develop marketing systems should consider student and faculty/staff needs, as well as people working on the main campus and health sciences.

TAXI VOUCHER PROGRAM

UW can control the costs of a taxi voucher program by limiting the amount of scrip an individual is eligible to purchase on a per semester or annual basis so costs will fluctuate based on program rules. However, if 350 people registered for the program and each individual was eligible for 10 trips per semester the program could be funded with $50,000 and provide up to 7,000 trips annually.

Once funding is secured, UW would need to work with a cab company to set prices and expectations as well as set program rules for the consumer, including eligibility criteria, locations to purchase scrip and program monitoring systems.

FIXED-ROUTE OPERATOR TRAINING

The purpose of conducting fixed-route operator training is to remind drivers that there are a large number of people on campus with disabilities, both permanent and temporary, and visible and invisible. Enhanced operator training should increase the likelihood that drivers will provide boarding and securing assistance more effectively.

Madison Metro already conducts driver training on a regular basis. UW may confer with them to make sure sensitivity training is adequate and request follow-up training is available to drivers working on the UW campus bus routes. UW may also observe training sessions to make sure they address the special circumstances on campus, including crowding at key times.

Costs to UW for this recommendation involve staff time to make sure the program is implemented and meets UW standards and expectations.

CAMPUS BASED TRAVEL TRAINING

UW may develop a campus based travel training program as a way to encourage use of the fixed-route system and to create a program that specifically addresses on-campus transit travel. Some of these trainings could be provided by Transportation Services staff as an expansion of their current training offerings. These would most likely be those that do not require highly skilled individualized training such as for wheelchair users, and could possibly be advertized and coordinated with the McBurney Center.

The cost of the program would largely involve staff time, but additional resources of $25,000 are dedicated to the program so it can be designed to meet needs of students, faculty and staff and the specifics of the UW campus system, ensure the trainers are properly training and funding is available for marketing.

Challenges associated with the program include identifying and encouraging participation. Consistent with other strategies discussed in this draft report, identifying participants is an ongoing element of the program, as people pass through the university and have temporary disabilities.

ESTABLISH AD HOC COMMITTEE ON ACCESSIBLE TRANSPORTATION

As discussed, there are a number of existing transportation services and options for people with disabilities as well as several ideas for new programs. One of the challenges with the existing services is that people don't know about them and/or they were not designed with input from people with disabilities. A potential solution to this problem and to ensure any future programs do not also make this mistake, an ad hoc committee on accessible transportation may be formed.

The objective of this committee would be to review existing programs and services, consider how well they consider the needs of people with disabilities and adjust programs accordingly. The committee may also participate in the design and development (and marketing) of new accessible services. Costs of the program are primarily associated with staff time. Depending on existing workloads, additional staff may be needed or coordinated through other resources for people with disabilities, such as the McBurney Center.

One of the main challenges of the program would be ensuring the committee has a clear and well defined purpose that is meaningful to the participants and agreeable to staff at transportation

services, in terms of expectations for influencing programs and services. Several attendees at the public meetings expressed concern about the number of committees on campus and the need to sustain purpose and focus with any new committees. As a result, this new committee could potentially be set up to meet for a specific period of time in order to address specific service design questions. At the end of this time period, the committee (or UW) could chose to keep meeting or end the process.

PURSUE GRANT FUNDS TO SUPPORT NEW INITIATIVES

There may be some opportunities to pursue federal grant funds to strengthen programs and services for persons with disabilities. The new federal transportation bill, Moving Ahead for Progress in the 21st Century (MAP-21) consolidated some funding programs, including the New Freedom program (Section 5317). Under the previous legislation, the New Freedom program was administered as a grant program and set aside funds specifically designed to improve transportation services and facilities for individuals with disabilities.

Under MAP-21, New Freedom was consolidated with the FTA Elderly and Disabled Transportation Program (also known as Section 5310) and will be administered as a formula program. This program change eliminates one of the best sources of federal grant funding for programs and services for persons with disabilities. However, there may be opportunities to work with the State of Wisconsin and/or the Dane County Metropolitan Planning Organization to use any remaining funds available from the last federal bill (2012 funds were awarded on January 4, 2013) and learn about how the State intends to fund new projects and services through allocated programs.

In addition to federal funding opportunities, there may also be grant opportunities through private donor organizations. Pursuing these funds will require additional research and exploration, but could provide 'start up' resources for new programs or services.

Figure 6-2 Relationship of Strategies to Study Goals

Strategy	Increases Campus Accessibility Overall	Increases Accessibility for Students	Increases Accessibility for Faculty Staff	Moves People within 15 minute Window	Strengthens Accessibility of Existing System	Cost effective solution	Improves Safety
Circulator Shuttle	X	X	X	X (potentially)	X		
Weekend and Evening "Flex" Service	X	X	X			X	X
Better marketing/ information about existing services	X	X	X		X	X	
Taxi Voucher Program	X	X	X		X	X	X
Fixed Route Operator Training	X	X	X		X	X	
Campus based Travel Training	X	X	X		X	X	X
Establish Ad Hoc Committee on Accessible Transportation	X	X	X			X	X
Pursue Grant Funds	X				X	X	

7 TECHNICAL EVALUATION — FIXED ROUTE

OVERVIEW

One of the main goals of the UW Campus System Evaluation was to take a comprehensive look at the existing bus services to evaluate route effectiveness and determine how well they are matched to demand and need. This analysis was conducted through three main evaluation methods:

- Route Profiles, or route evaluations, which consider each route independently and look at ridership patterns by stop and by time of day. The analysis was based on ride check data that included a 100% sample of all UW campus bus routes that was collected in April, 2012.
- Online Surveys conducted with UW students, faculty and staff and UW Health employees.
- A "Blank Slate" analysis that identified key destinations on campus, broadly ranked them based on size, occupancy and importance in the university environment.

A summary of the findings from each of these three approaches is presented in the following text, with more information provided in the appendices to this report. The application of the findings in terms of service improvements is discussed in the next chapter.

CAMPUS BUS SYSTEM – SERVICE GOALS

UW Madison has made a clear commitment to alternative transportation modes and develops and maintains a multi-modal transportation system. This overall system is supported by an extensive network of sidewalks, bike paths, and bike parking; a paid parking system; unlimited access to Madison Metro buses; and an on-campus bus network. Within the multi-modal transportation system, campus bus services are designed to accomplish three goals:

- Connect housing to the academic buildings and facilities.
- Provide on campus circulation, including
  - Opportunities for people to move between academic buildings within the 15 minute window between class change times.
  - Connections between campus facilities on the eastern and western ends of campus.
- Support efforts to improve and maintain safe travel after dark.

Service improvement options identified in the subsequent chapter are tied back to these service goals as a reference.

ROUTE EVALUATIONS

The route evaluation process was intended to consider each route individually, including market served, role in overall system and relative productivity. The route level evaluations included a detailed examination by route of boardings and alightings by stop, ridership by time of day, and the accumulation of ridership over the course of the route (i.e., the load profile). This information helps with understanding how the individual routes and overall system is being used as well as individual route strengths and weaknesses. The evaluation was developed using ride check data collected in the spring of 2012, an effort that involved collecting a sample[9] of every weekday trip on each route in the system (see below).

Route productivity was included in the route evaluation process, including standard transit industry metrics such as passengers per hour and mile, operating cost per passenger, average speed and stop spacing. Our review of productivity, however, was intended to reflect the context of the campus environment, which includes a high density of potential riders, a high demand for travel and a free fare system. Thus, while each UW routes is very productive as compared to the overall Madison Metro services, our analysis focused on the relative productivity of each route. This analysis also has limitations because some UW routes, such as Route 80, which is the only route operating during the daytime should be expected to have higher productivity as compared with the evening services.

Data Collection (Ride Check)

A ride check survey involves recording both the time of day and the number of passengers boarding and alighting at each stop. This data provides a comprehensive picture of how riders use the existing system, with critical information such times of day when the buses are full and empty and the most heavily (and lightly) used stops. Nelson\Nygaard's ride check exercise involved collecting a sample of weekday service during the regular academic calendar. Given that the vast majority of the service hours in the campus bus system occur during the academic calendar and the cost associated with the ridecheck effort, the recess period was not sampled.

The Campus Transit System Evaluation study began in the spring of 2012. At that time, the campus bus system consisted of five bus routes, but plans were already in place to make changes to the existing system, including the elimination of Route 85 as well as frequency adjustments. Despite these planned changes, TS and Nelson\Nygaard decided to collect data from the bus system in the spring 2012, even if it meant data reflected a system that was in transition. Given the evaluation was not intended to guide changes planned for 2012, but rather influence a longer term strategy for providing bus service on campus, this approach was considered appropriate.

[9] Every trip on each of the UW campus weekday bus routes was surveyed (with riders counted as they boarded and alighted from the bus). As a result, each trip in system was counted one time. Weekend days were not surveyed, nor was recess service.

Individual Route Evaluations

Instead of presenting the entire route evaluations, this section summarizes the findings of the route evaluation by providing an overview of the service, its role in the overall system and key strengths and weaknesses. The full route evaluations are included as Appendix E.

Route 80 – UW Campus Route

Route 80 is the primary daytime route in the UW system. In the spring of 2012, Route 85 also operated during the daytime, but after the service reduction was implemented, Route 80 became the only daytime route other than express trips operated on Route 84. It operates daily and provides both daytime and nighttime service and while the schedule varies, weekday service is from approximately 6:00 AM until approximately 1:15 AM Sunday through Thursday with extended late night service on Friday and Saturday. It provides east-west connections between Memorial Union and the eastern end of campus and Eagle Heights via Lots 60 and 76 and the UW Hospital. The route operates with two alignments, long trips that travel all the way to Eagle Heights and short trips that turn at Lot 60 and 76 and the UW Hospital.

In the spring of 2012, Route 80 fulfilled main functions: 1) serving longer distance connections between the eastern and western end of campus; and 2) providing after dark safety oriented connections. Changes made in August 2012 added a third function to the route – providing circulation around the main UW buildings and academic centers on the eastern end of campus.

The route is very productive, carrying well over 100 passengers per revenue hour. Such high productivity means there are several trips a day, which carry more than a seated load and several which come close to a "crush" load with 60 or more passengers per trip. Many of the crush load trips occur at class change times; this is consistent with data that shows a clear spike during these times. Ridership is slightly lower in the first hour of service (6:00 AM until around 7:00 PM) and late in the evening (after 11:30 AM). Demand is also slightly stronger eastbound in the morning and westbound in the afternoon.

Route 80 has a fairly simple design, especially considering roadway constraints and operates with high frequency. Changes made in August, 2012 include adding frequency during most of the day, which should serve to strengthen the route overall. With the elimination of Route 85, Route 80 is designed to meet all daytime campus travel needs, including east-west travel and circulation functions. These changes weaken each of these two functions, the speed and directness of east-west travel is compromised by a longer and more circuitous routing and the circulator route is compromised because the western end of the loop is extended extensively (to the UW Hospital at least).

Route 81Lakeshore - Johnson

Route 81 is one of two routes that operate in the evening and late night only. Service begins around 6:30 PM and continues until approximately 2:00 AM, with extended evening service until 3:15 AM on Fridays and Saturday nights. The route is comprised of two out-and-back legs that connect at Memorial Union. The western leg travels to Elm Drive and serves the Lakeshore residential area, staying entirely on-campus, while the eastern leg travels off campus to the neighborhoods near downtown Madison, traveling almost exclusively off-campus. While each leg is a loop, the loops reflect one-way streets, or limitations in roadway design, thus in each case out-and-back travel is not possible or restricted.

As discussed, frequency on Route 81 was increased in August, 2012 from 30 minutes to 15 minutes. The service reduction reflects relatively low productivity overall. Route 81 has the lowest productivity in the UW system, carrying some 37 passengers per hour, which is about 40% lower than the other evening routes.

Route 81's strengths are that it provides a specialized service. Challenges include that parts of the alignment overlap with other routes, especially Route 80 and that the two service legs are only loosely related.

Route 82 Breese-Broom

Route 82 is the second routes that operate in the evening and late night only. Service begins around 6:20 PM and continues until approximately 2:00 AM Sunday through Thursday and on Fridays and Saturdays, service continues until about 2:45 AM. Route 82 consists of two loops that circulate through the southwest and southeast portions of campus, including both on-campus and off-campus destinations. It also connects the two main student unions, Union South at the corner of Campus Drive and Dayton Street and Memorial Union on Langdon Street. Route 82 operates with 30 minute frequency and there were no major changes to the route as part of the August, 2012 service changes.

Route 82 is a productive service carrying about 60 riders per hour, more than Route 81 and roughly consistent with Routes 84 and the former 85. The southwestern portion of the route carries slightly more riders than the southeastern portion, largely due to boardings along Park Street and Regent Street. Challenges with the service design include a fairly circuitous routing that creates long travel times between some destinations. In addition, the individual route legs are only loosely related to each other in terms of ridership.

Route 84 Eagle Heights Express

Route 84 provides express service between Eagle Heights and Van Hise Hall on weekday afternoons. The route was initiated in response to complaints from Eagle Heights' residents that they were not always able board or get seats on buses traveling outbound in the afternoons. As a result, the service is funded in part through an agreement with UW's Housing Department. Route 84 was not changed in August 2012.

Route 84 only makes five trips a day but is a fairly productive service with about 65 riders per hour. It benefits from a focused service design and by offering express service. Strengthening the route may involve balancing the service so it operates in the morning and/or in both directions during the afternoon.

Route 85 South Campus Circulator

Route 85 was eliminated as part of the August service changes. When it operated, it provided circulator service in the eastern end of campus and as compared with Route 80, traveled further south on campus to Regent Street and provides connections to the 21 Park Street, the Kohl Center and Lake Street. Route 85 operated on weekdays only between approximately 7:00 AM and 6:00 PM.

Route 85 was a productive and carried approximately 67 riders per hour. While quite productive overall, in the spring 2012, Route 85 was only half as productive as Route 80. The route also had a very slow operating speed of just over 7 miles per hour, which likely reflect lots of turning

movements and high numbers of passengers boarding at key stops, especially at Memorial Union, Bascom Hill, Union South and along Lake Street.

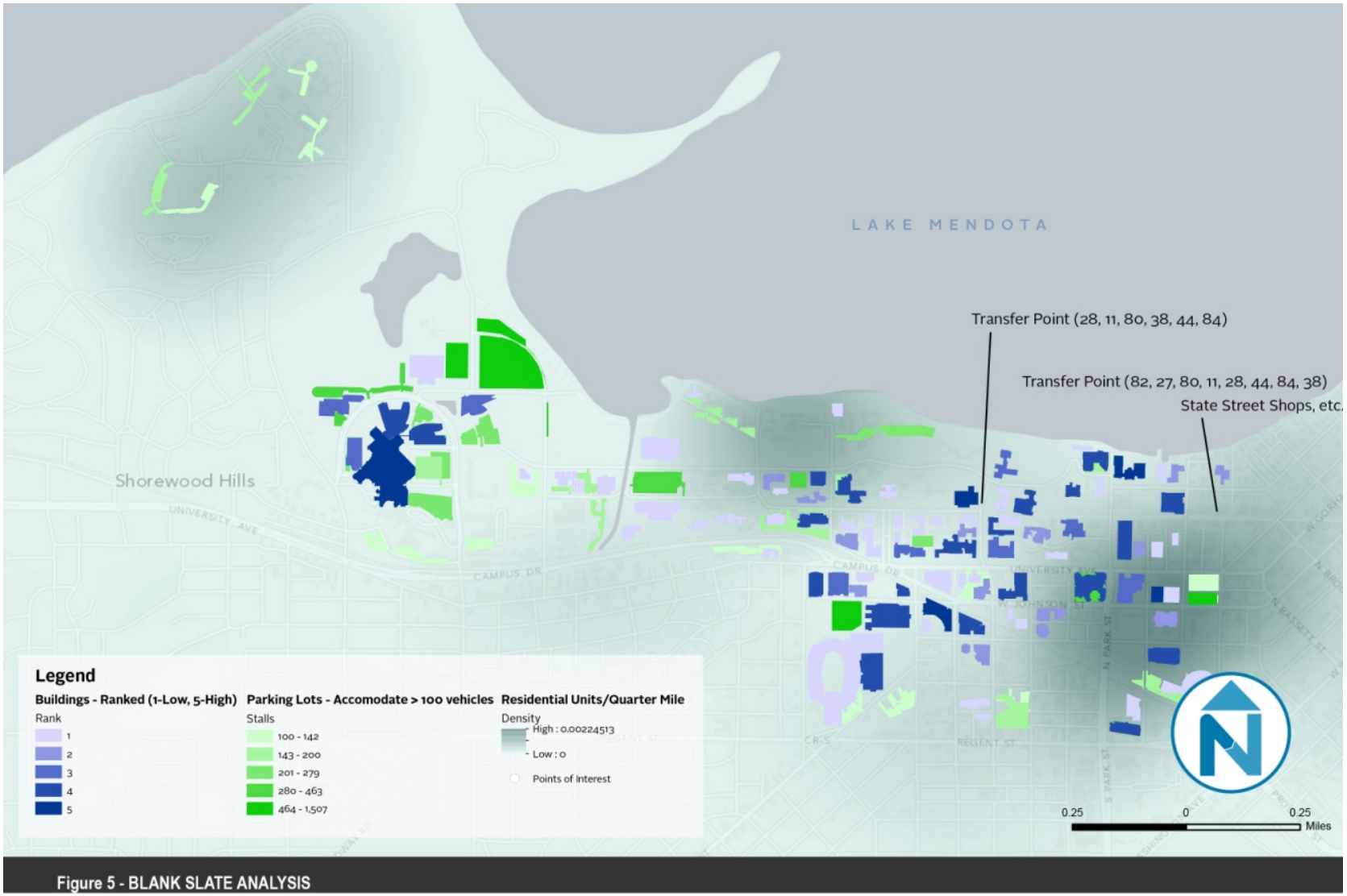
CLEAN SLATE ANALYSIS

The Nelson\Nygaard team also created an unconstrained or "clean slate" analysis that was intended to understand the spatial relationship between key destinations on campus. By understanding where and how major campus facilities and resources are laid out, the study team was able to consider alternative methods of connecting these resources without the influence of the existing system (thus the "clean slate" reference).

The analysis was crafted using available data including daily building occupancy, the number of parking spaces and density of student residences. As a first step, buildings with fewer than 100 daily occupants were eliminated as a major destination. The study team then reviewed the remaining list of buildings and created a broad ranking based on a combination of building function (i.e. athletic facilities ranked lower than libraries) and qualitative factors (input from students and knowledge of campus) and ranked each facility between one and five, with five being the most important. This process allowed to categorize and map the key destinations on campus and created a visual display of how the ranked facilities are laid out on the road network (see Figures 7-1 and 7-3).

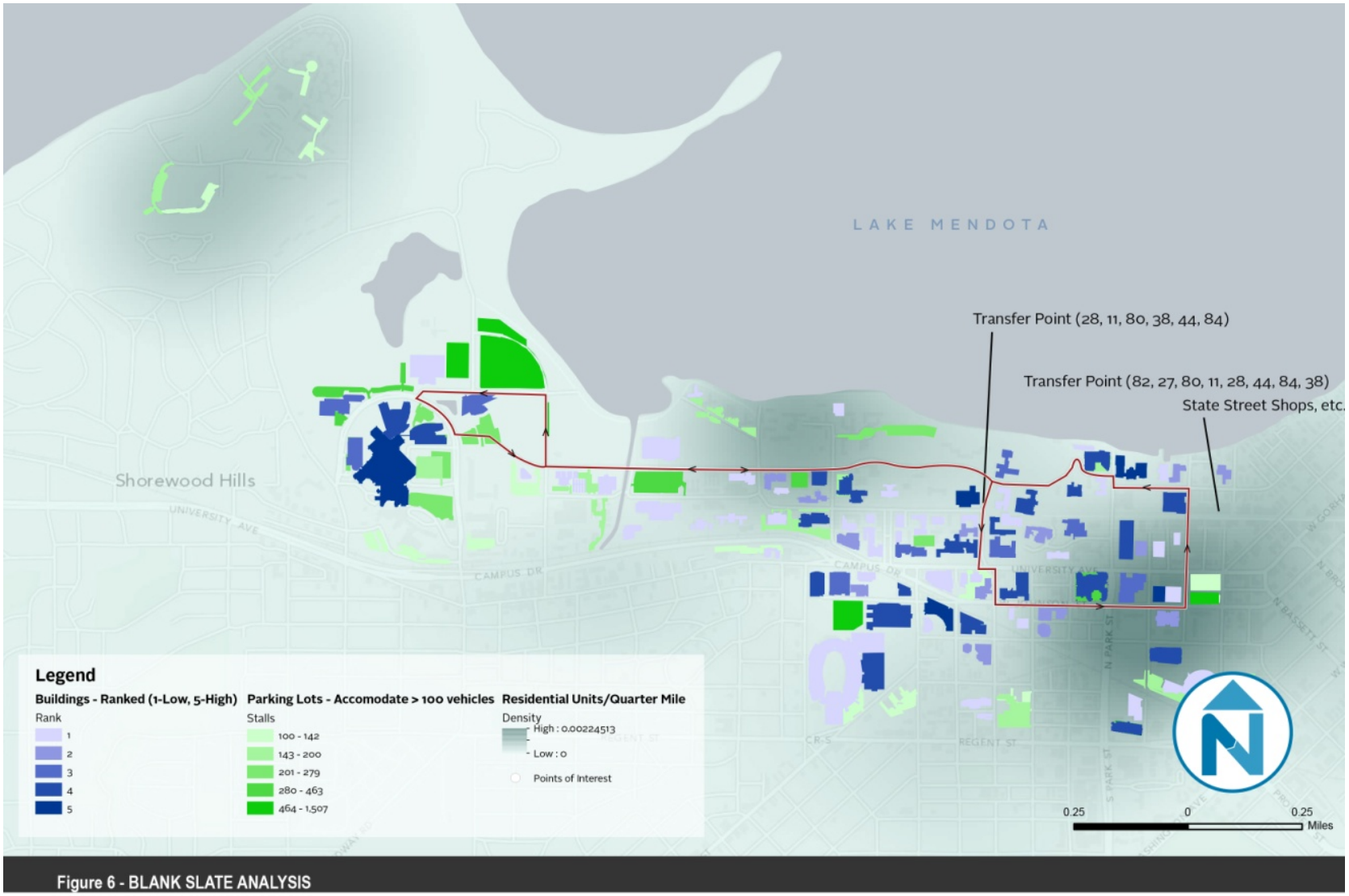
Once the facilities were mapped, the study team created different potential transit routes. The process involved some trial and error due to the limited road network on the UW campus and operating constraints in terms of one-way streets and roadways not suitable for full sized bus travel. Ultimately, the process produced an alternative of how transit services might be designed within the context of connecting the most critical buildings on campus, the highest density of students and key parking facilities (see Figures 7-2 and 7-4). This option was compared and contrasted with existing service; ideas developed through other analyses and ultimately evaluated as part of developing recommendations (see Chapter 5).

Figure 7-1 UW Campus – Key Transit Destinations



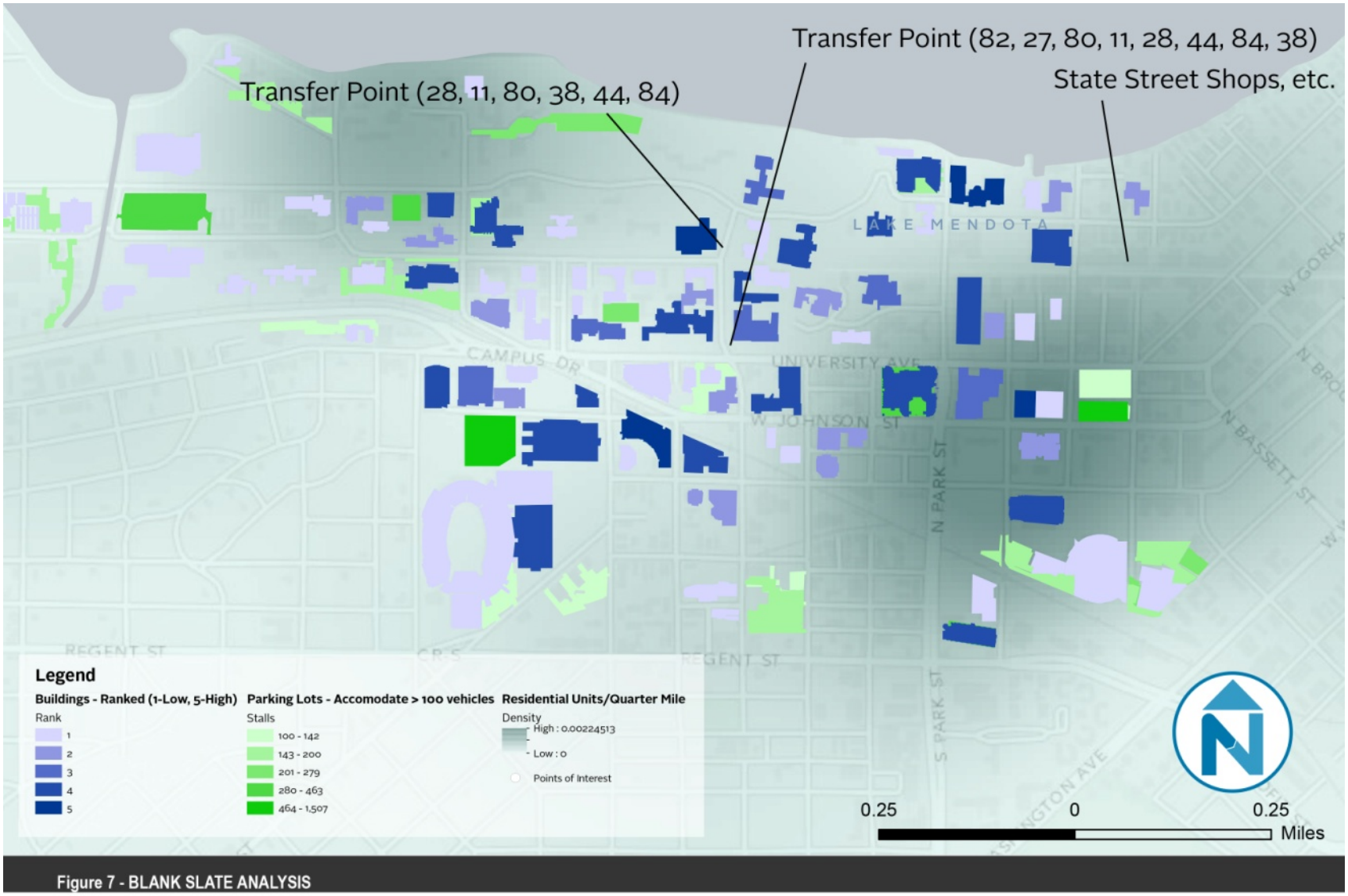
Data Sources: UW Madison Transportation Services

Figure 7-2 East End of UW Campus – Key Transit Destinations



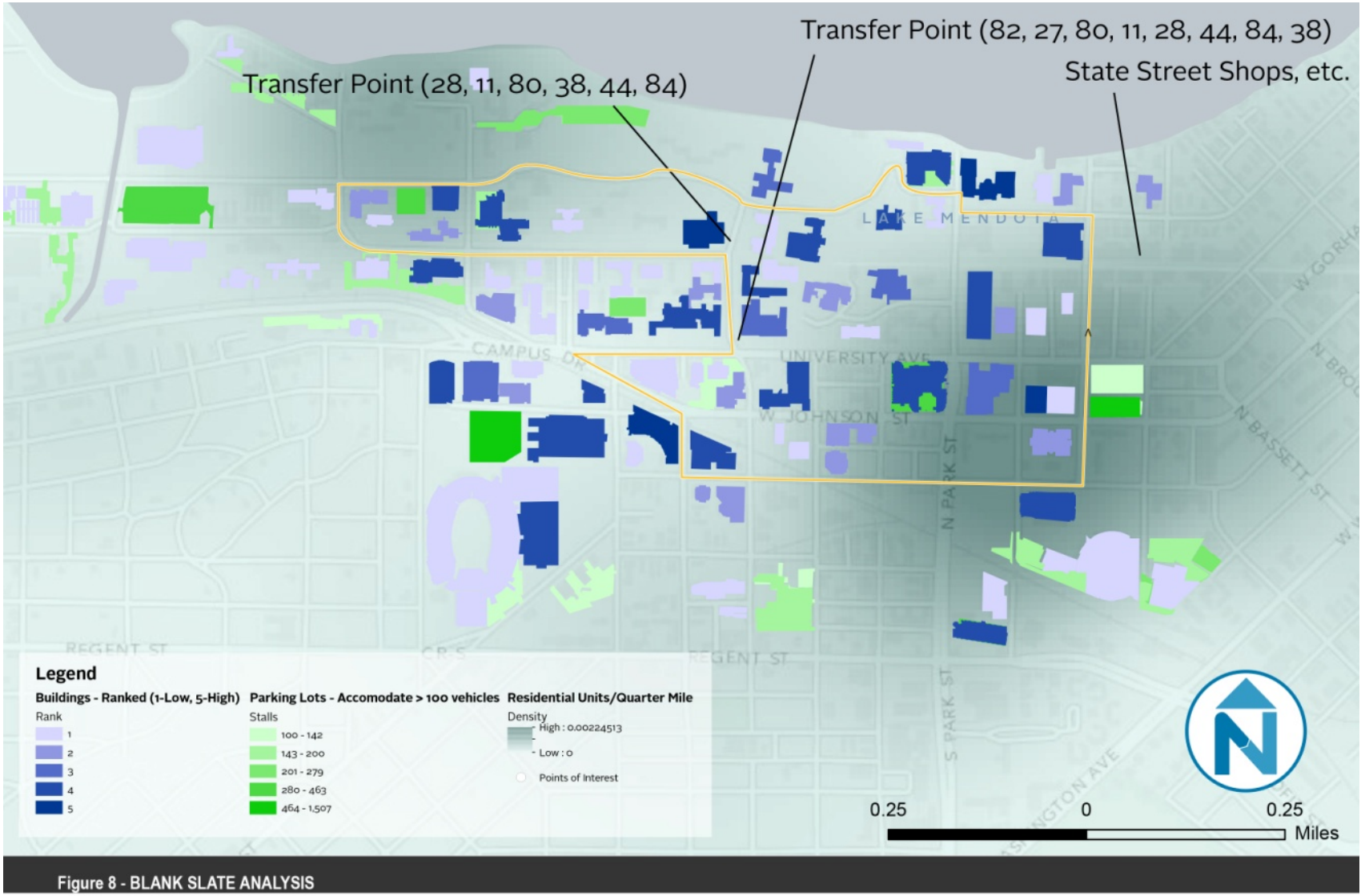
Data Sources: UW Madison Transportation Services

Figure 7-3 UW Campus – Transit Route Matched to Transit Destinations



Data Sources: UW Madison Transportation Services

Figure 7-4 East End of UW Campus – Transit Route matched to Transit Destinations



Data Sources: UW Madison Transportation Services

UW CAMPUS SURVEY

As part of the transit system evaluation, the Nelson\Nygaard team conducted a survey with the broader UW community. The survey was created iteratively, with comments provided by TS and ASM. Once finalized, the survey was developed into an online survey tool (Qualtrix Survey Hosting Service) and administered as an online survey; it was sent via email to registered UW students, UW faculty and staff and UW Health employees (including faculty, staff and students). The survey software allowed questions to vary depending on the responses to previous questions. This allowed the survey design to, for example, ask health science employees slightly different questions as compared with UW students, faculty and staff. In total, nearly 2,000 responses were received with at least 500 completed survey responses per population, which was the targeted response rate.

The purpose of the survey was to understand travel patterns by population and by type of trip (i.e. travel to campus and travel around campus) as well as changes in travel patterns associated with the weather. The survey also asked people about their preferences for different modes, with several questions focused specifically on the campus bus system.

Survey questions included a combination of multiple choice, ranking, trade-off and open ended questions. Each population was analyzed independently. Overall survey results are documented in a PowerPoint presentation that is available under a separate cover (see Appendix F). The most salient findings are listed here, followed by key findings grouped by population group:

- Survey respondents listed speed, reliability and flexibility as the most important factors when choosing a mode.
  - People who walked and biked also cited being active and exercising as important to their mode choice.
- Driving alone is an important mode choice for UW and UW Health employees, but not UW students.
- The survey suggests UW and UW Health faculty, staff and employees do not follow traditional commute travel times. People generally arrive and depart later as compared with traditional commuter times.
- Mode choice changes during the winter months. People tend to shift away from biking, walking and driving alone and use the Madison Metro and campus bus systems more.
- People who don't use the bus citied that it doesn't pick them up or drop them off where they need, the schedule doesn't meet their needs, as well as 'other' reasons.
- When asked to make trade-offs between different types of service, students expressed an interest for more service to off-campus areas. Given that students also reported living close to campus, this is interpreted as a desire for more service to areas just off of the main UW campus.
- Knowing the bus will come at a regular interval and/or at specific times was nearly always ranked as the top or second most important bus service attribute.
- There was a lot of conflicting information in the summarized results. For example, many people responded that they preferred short walks to the bus, even if it was slower but also ranked fast and direct service as a primary value and ranked door-to-door service as a low priority for service.

UW Health Employees

- Health employees spend long days on campus. About half of the employees leave home for work between 7:00 AM and 9:00 AM and two-thirds leave the hospital to go home after 10:00 PM.
- About 56% of Health employees travel alone when they travel to/from campus and 44% drive along when they travel around campus. For travel to/from campus, the next most frequently used mode is Madison Metro (20%) and for travel around campus it is walking (17%).
- Travel patterns change only slightly during bad weather.
- People drive because it is reliable, flexible and fast. This was true for trips to/from campus and around campus.
- People who don't use the bus citied that it doesn't pick them up or drop them off where they need, the schedule doesn't meet their needs, as well as 'other' reasons.
- When asked about their preferences between two different service types, UW Health employees favored:
  - Shorter walks to the bus, even if the bus is slower.
  - No transfers, even if it takes longer to make a loop.
  - Higher frequency, even if the bus goes to fewer locations, except if the location is off-campus. Health employees were willing to accept lower frequencies to get service to more off-campus locations.
- Ranking questions suggested that for daylight bus service:
  - The most important attributes are 1) fast and direct service; and 2) knowing the bus will come at regular intervals.
  - The least important attributes are 1) door to door service and 2) not paying a cash fare upon boarding.
- After dark rankings were very similar:
  - The most important attributes are 1) fast and direct service; 2) knowing the bus will come at regular intervals; and 3) knowing the bus will come at a specific time.
  - The least important attributes are 1) door to door service and 2) not paying a cash fare upon boarding.
- When asked about late night bus service, about one third said they were interested in a bus service that required calling in advance. Another third said they were not sure. Of the people who said yes, 58% said they would be willing to pay for the a reservation based night service.

UW Faculty and Staff

- More than half of the UW faculty and staff do not work a traditional commute pattern; most arrive on campus between 9:00 AM and 11:00 AM and leave between 10:00 PM and 12:00 AM.
- Important modes for traveling to/from campus include driving alone (36%), Madison Metro (26%) and biking (18%). Nearly half (49%) walk to get around campus. About 14% reported using the campus bus to get around campus.

- During bad weather, the number of people who drive along to/from work decreases and more people use the campus bus. Likewise, more faculty and staff reported using the campus bus to get around campus, when traveling around campus.
- People said they drive to/from campus because it is flexible, reliable and fast. People walk around campus because they want to be active, as well as because the mode is flexible and reliable.
- They don't use the bus because it doesn't pick them up or drop them off where they are going (travel to/from campus) as well as other reasons.
- When asked about their preferences between two different service types, faculty and staff reported favoring:
  - Shorter walks to the bus, even if the bus is slower.
  - No transfers, even if it takes longer to make a loop.
  - Headway based service.
  - Higher frequencies, even if the bus goes to fewer locations and more frequency, and even if there is less late night and evening service
- Ranking questions suggested that for daylight bus service:
  - The most important attributes are 2) knowing the bus will come at regular intervals; and 2) fast and direct service. These attributes were consistent for both daytime and evening services.
  - The least important attributes for daytime service are 1) getting dropped off at my door; 2) having a shelter; and 3) having a short walk to/from the bus.
  - The least important attributes for evening service are 1) getting dropped off at my door; and 2) a bus with no cash charge upon boarding.
- Only 19% of respondents were interested in a reservation based late night service and about a quarter of these respondents would be willing to pay for a service (62% were unsure).

UW Students

- Students tend to arrive on campus late (90% after 11:00 AM) and stay late (68% after 10:00 PM).
- Students tend to walk (37%), bike (23%) and use Madison Metro (19%) to get to/from campus. More than half (65%) walk to get around campus. About 8% reported using the campus bus to get around campus.
- Use of campus bus and Madison Metro increases when the weather is bad; this is true for travel to/from campus and travel around campus.
- Students like to walk because it s reliable, flexible and they like to be active.
- Students don't like to take the bus traveling to/from campus because the bus doesn't pick them up or drop them off where they are going. For travel around campus, they don't use the bus because it is crowded, the schedule doesn't meet their needs, pick-up and drop-off locations aren't convenient and service is slow.
- When asked about their preferences between two different service types, students reported favoring:
  - Shorter walks to the bus, even if the bus is slower.

  - No transfers, even if it takes longer to make a loop.
  - Higher frequencies, even if the bus goes to fewer locations. There were, however, two notable exceptions. Students reported being willing to trade frequency for service to more off campus locations and for service that lasts longer into the evening.
- Ranking questions suggested that for daylight bus service:
  - The most important attributes are 1) knowing the bus will come at regular intervals; and 2) fast and direct service. These attributes were consistent for both daytime and evening services.
  - The least important attributes for daytime service is getting dropped off at my door, followed by having a shelter and having a short walk to/from the bus.
- For nighttime service, knowing the bus would come at a specific time was the most important service followed by knowing the bus will come at regular intervals. The least important attributes were getting dropped off at my door and no cash charge upon boarding.
- Nearly half (48%) of students reported being interested in a reservation based late night service, although only 22% said they would prefer this type of service over the existing service. About a third (34%) said they would be willing to pay for the service and 40% were unsure.

Written Comments – All Markets

There were several places for respondents to provide comments, including as part of "other" choices in multiple choice questions, as well as an open ended comment form at the end of the survey. As part of the analysis, the Nelson\Nygaard team reviewed and summarized the comments:

- Positive comments about the campus bus system.
- Many people said they missed Route 85.
- People don't ride the campus bus because they live outside of the service area.
- Hospital workers say their shift times make using the bus difficult.
- Slow travel times and overcrowding on the bus (Route 80) are a deterrent to riding the bus.

8 KEY FINDINGS AND POTENTIAL OPPORTUNITIES — FIXED ROUTE

The objective of the Campus Transit System Evaluation is to understand where there are opportunities to improve the campus bus system and/or adjust the overall system to increase cost efficiency and service effectiveness. As part of identifying service improvement opportunities, however, the study process identified a series of key findings that shape the opportunities and potential for improving UW Madison's campus bus system. These findings are listed in the following section and incorporated into the development and articulation of potential service improvement opportunities.

SUMMARY OF KEY FINDINGS

Service Productivity

As discussed, the UW operating environment is more advantageous for transit service as compared with typical urban areas. These advantages include a relatively small service area, a high density of potential riders, a high demand for travel and a free fare system. Consequently, the UW routes are among the most productive routes in the Madison Metro system. Even taking these advantages into consideration, however, the UW campus bus system is a highly productivity network of service. This productivity is consistent across standards measurements, including passengers per hour, passengers per mile and operating cost per passenger. Indeed, the route level analysis shows that at several times per day, buses operate with 'crush' loads and carry passenger loads beyond the capacity of the vehicle.

This finding suggests considerations:

- There may be potential to operate some UW bus routes with larger buses. Larger buses will increase capacity and can increase service capacity without greatly increase service costs.
- There are no truly unproductive routes, route segments or trips. While some minor service tweaks may eliminate some of the least productive segments or trips, these reductions will affect relatively large numbers of passengers and will not likely result in significant improvements to service productivity.

Operating Environment/UW Road Network

The UW campus is shaped like a lollipop, with the greatest concentration of academic facilities and campus housing, primarily between Babcock Drive, University Avenue, Park Street and Observatory Drive on the eastern end of campus plus a series of destinations laid out along an

east-west corridor (Observatory Drive). Destinations along the linear corridor are considerably less dense as compared to the eastern end of campus, but this is the fastest growing part of campus. Development includes expansion to the Health facilities as well as general academic facilities.

Transportation needs, therefore, involve moving around the eastern end of campus, travel along the east-west corridor and a variety of connections between the eastern and western ends. These major travel patterns are constrained, however, by the campus road network that makes linking many of these patterns difficult. Observatory Drive, for example, is the primary east-west connecting roadway. However, a narrow section just north of Bascom Hill includes a tight turn that renders two-way bus travel impossible. Most riders want to be able to travel up hill, effectively limiting travel on this segment to a westbound direction. In addition, east-west access through the densest part of campus is limited. Linden Drive is limited because there are no roads through Bascom Hill or the East Campus Mall. The other east-west roads (University Drive, W. Johnson Street, and Campus Drive) are all one-way.

This finding has the following implications for campus bus service:

- The road network constrains transit service options and transit system development. As the university continues to grow and develop, it may be worth considering roadway improvements that make it possible for two-way bus service on Observatory Drive or transitioning some of the one-way roadways into two-way streets.
- The spatial distribution of buildings and facilities and the lack of connecting roadways means most transit routes must involve loops. Generally speaking, loops are not the preferred way to operate transit routes because they can be difficult to understand and are almost always inconvenient in one direction of travel.
- It is difficult to create fast and direct connections between some of UW's most important facilities, including 1) connections between the Lakeshore residential area and Bascom Hill/East Campus Mall; and 2) the Engineering Mall/Union South and the Library Mall/ Memorial Union.

Discreet Travel Markets

Survey results as well as discussions with stakeholders and people attending the public meetings confirm that the UW Madison campus bus system serves four distinct groups of travelers (students, UW faculty and staff, UW Health students, faculty and staff, and visitors[10]) and at least two different travel needs (travel to campus and travel around campus). There is a third travel need for students, and to a lesser extent UW Health affiliates, which reflects a need for safe travel after dark. Differences between the individual groups are highlighted in Figure 8-1.

Despite differences, there are some similarities among the three groups:

- Overall, demand for travel to/from the UW campus is later as compared with a 'standard' commute time.
- Everyone wants to be able to travel quickly and efficiently around campus.
- Travelers prefer having a service that arrives at regular intervals.

[10] Visitors were not included in the survey, thus their preferences are not reported here.

- All groups value speed, reliability and flexibility in their chosen modes. The groups were also consistent in their reasons for not riding the bus, namely that it doesn't go where they want to go and the schedule doesn't work for them.

Differences between groups, on the other hand, include different values for evening service, service to off campus areas close to the main campus, and the frequency of using Madison Metro among others. Combined these findings suggest the following:

- The need of the individual groups is sometimes in conflict with the other groups. Students in particular have slightly different preferences and needs as compared with faculty and staff and UW Health employees.
- There may be opportunities to shift service start and end times to better match service with demand.

Figure 8-1 Transit Service Values by Individual Campus User Group

Students	UW Faculty and Staff	UW Health
Have a high demand for travel throughout the day and evening	Use Madison Metro city routes to get to/from campus	Use the campus bus (and Madison Metro) bus services less than the other groups
Would like the campus bus system to serve more destinations off-campus	Expressed an interest in getting back bus service to 21 Park Street	Place a value on being connected to the eastern end of campus
Place a high value on having transit service after dark for safety reasons	Want to have service that gets them as close as possible to their door	Stay on campus later as compared with other groups

Attitudes about Transit Service

Survey questions that asked people about their attitudes revealed some conflicts in traveler's preferences and values for transit services and/or suggest misperceptions about the existing service. For example, all three groups ranked getting dropped off at my door as not important to effective transit system. This attitude was supported by a high number of individuals who reported walking, even in the bad weather. At the same time, however, one of the main reasons for not using the bus was that it didn't bring them to where they are going. Likewise, riders also valued service frequency very highly and ranked frequency as one of the most important service attributes. However, the UW campus bus system currently operates at a very high frequency, with departures scheduled approximately every seven minutes during the daytime. These finding suggest the following for service improvement opportunities:

- Many people do not fully understand the campus bus system, where it goes and how frequently it operates.
- There is a dramatic disconnect between travelers' expectations for service and what can realistically be provided.

POTENTIAL SERVICE IMPROVEMENT OPPORTUNITIES

As discussed, the UW campus bus system provides a variety of bus services and is highly productive overall. Working within the system's existing strengths and building upon the opportunities identified through the survey results and technical analyses, the study team

identified a series of service opportunities that include options for both the daytime and evening services. These needs primarily relate to improving the following connections:

- Around the eastern end of campus
- Along the east-west corridor (Observatory Drive)
- Between key destinations in the eastern and western parts of campus, including buildings and facilities located on the northern and southern side of University Avenue/W. Johnson Street.

Service improvement opportunities that reflect these goals were presented to the UW community at public meetings held in early November 2012 and updated to incorporate the comments and feedback received. In total, eight service improvement opportunities were identified. More information on each option is presented in the following text:

1. Separate Route 80 into an East-West Route and an East End Circulator
2. Operate Route 84 in AM and PM Peak
3. Operate Service on a Headway Based Schedule
4. Expand Service to Off-Campus Destinations
5. Consolidate Evening Routes (81 and 82)
6. Operate Flexible Evening Service
7. Reduce the Number of Bus Stops
8. Operate Midday Service with Larger Vehicles

OPTION 1: SEPARATE CIRCULAR AND EAST-WEST FUNCTIONS OF ROUTE 80

Background

Route 80 currently is the only daytime bus service on campus. As a result, this single route attempts to connect the eastern and western ends of campus and provide north-south circulation around in the eastern end of the campus. Consequently the route is intended to provide connections between/around:

- Residential facilities (Eagle Heights) on the western end campus with the main (eastern end) of campus.
- The UW Hospital and parking near the Hospital with the main (eastern end) of campus.
- The eastern end of campus, including between destinations north and south of University Avenue as well as east and west of Charter Street.

One potential strategy to improve campus circulation involves separating the east-west function of the existing Route 80 with the circulator function. Route 80 does operate with two different alignments, a "short" route that connections only to the hospital and a "long" route that connects to Eagle Heights. The long route to Eagle Heights is the primary alignment and the short route is an overlay that operates during the middle of the day only. This strategy helps balance service demand between Eagle Heights and the UW Hospital, but does not address the demand for circulator service.

Separating out the route functions would accomplish the following:

- Increase travel options and choices on campus both by providing service to more places and providing faster travel times between destinations.
- Provide more direct connections between key destinations in the eastern half of campus, specifically connecting Engineering Mall/Union South with Library Mall/Memorial Union.
- Improve the perception of service reliability by increasing the directness of travel on the east-west route and reducing the travel time.
- Allow more people to move around campus within the 15-minute window allocated to class shift changes.

Service Improvement Opportunity

Separating Route 80 into two routes, an east-west route that travels between Eagle Heights, UW Hospital and Memorial Union and a circulator route that makes north-south connections on the eastern end of campus would improve service for most people on campus. Potential service improvement opportunities include ideas for route alignments and ideas for saving costs to support expanded service coverage.

East-West Route – Use Route 80's Spring 2012 Alignment

Prior to the route changes implemented in late summer/early fall of 2011, Route 80 operated as a dedicated east-west route (see Figure 8-2). Similar to the existing route, the old Route 80 had long short and long variations, with the primary service offering service all the way to Eagle Heights and the overlay service providing extra trips during the middle of the day to Lot 76 and UW Hospital.

Several of the main differences between the new and old Route 80 alignments occur on the eastern end of campus. In the current route, the eastern end of the route travels further south to W. Dayton Street and travels further east to Lake Street. These changes were intended to accommodate the need for some circulation at the eastern end of campus. However, if the circulator function is separated out, these changes will no longer be necessary.

The study team considered different alignment opportunities for Route 80, including traveling east and west on Observatory Drive and traveling via Park Street instead of Lake Street. Given roadway constraints and travel patterns on campus, if a purely east-west route is developed, the study team recommends returning to Route 80's original (spring 2012) alignment shown in Figure 8-2 (for comparison's sake the existing Route 80 alignment is shown in Figure 8-3). Key advantages of this alignment include:

- Direct connections between Memorial Union and the academic facilities on Linden Drive.

- Direct connections between the Lakeshore residential area and the academic facilities on Linden Drive.
- Travel via Lake Street allows a stop directly in front of Memorial Union on Langdon Street, where travel via Park Street would not. The benefit of stopping in front of Memorial Union is balanced by a longer travel time.

Figure 8-2 Route 80 Alignment Spring 2012

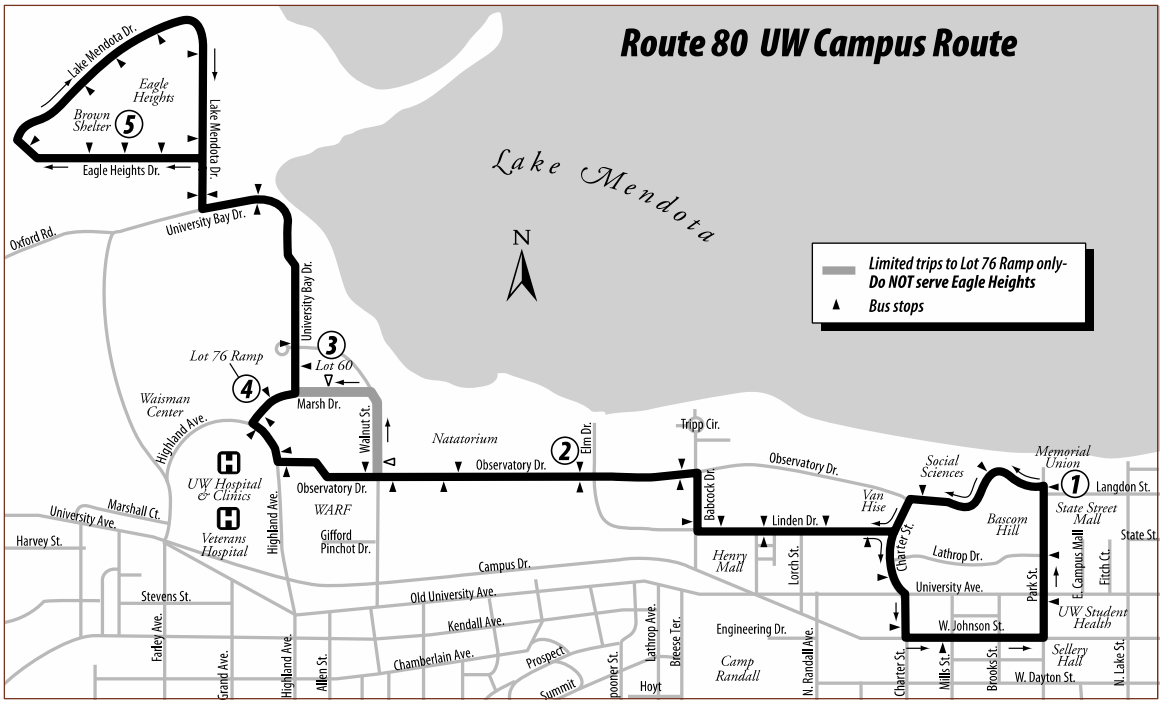
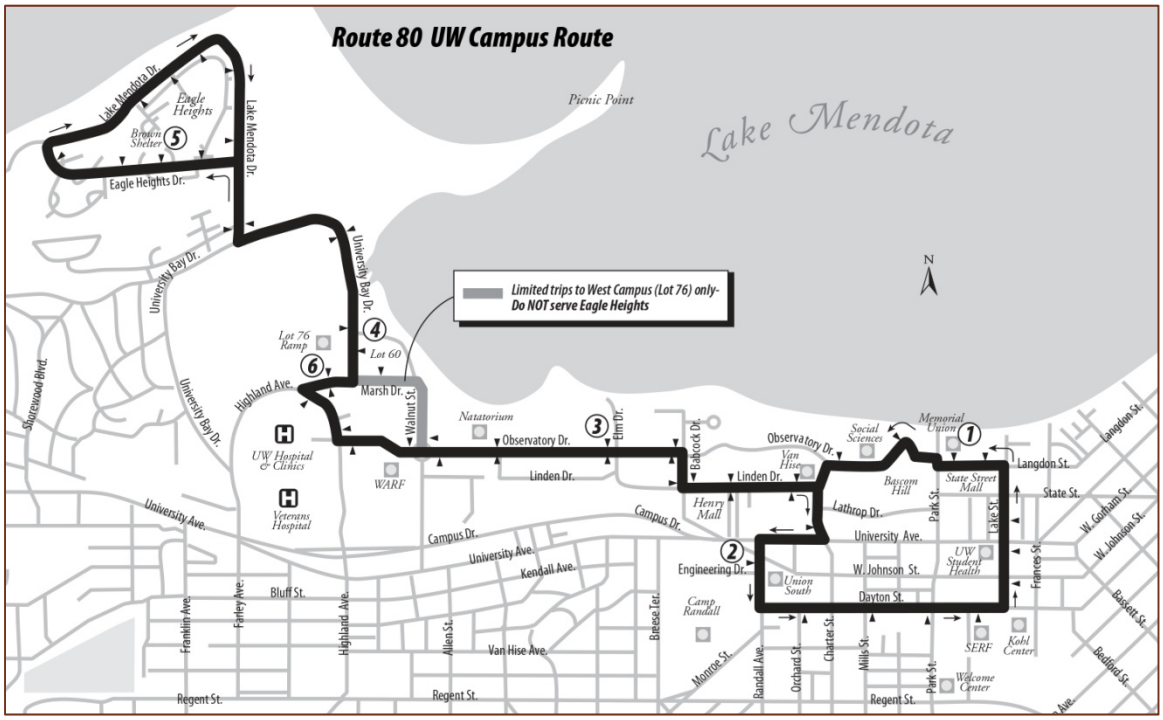


Figure 8-3 Existing Route 80 Alignment



Circulator Route – Alignment Options

The proposed east-west service would travel along the northern edge of campus along the main east-west corridor (Observatory Drive and/or Linden Drive), facilitating access to the east and west ends of campus. Under this arrangement the circulator route could provide the shorter distance connections and circulation around the eastern end of campus, including north-south connections. Data collected from ridership surveys, the 'clean slate analysis' and public comment suggest the most important daytime destinations include:

- Resources and amenities along Langdon Street (Memorial Union and Library Mall)
- Academic Buildings between Linden Drive and University Avenue
- Academic buildings and university resources around the Engineering Mall/Union South area along Randall Avenue
- Connections to Madison Metro service on University Avenue
- East Campus Mall

There are also large amounts of student housing at the Lakeshore dorms (Babcock Drive and Elm Street) as well as between Park and Lake Street, north of W. Johnson Street.

Finally, UW staff expressed a strong interest in ensuring service to 21 Park Street, which is the location of several university management and administrative functions (payroll and finance, benefits, business services, etc) and is near to parking (Lot 29). 21 Park Street is at the intersection of Park and Regent Street, at the southern end of campus.

The challenge with creating the circulator service is connecting enough of these critical destinations to meet the needs of as many people as possible, but also creating a fairly direct and

simple alignment that is efficient, easy to understand and offers fast service. The study team identified three potential opportunities for a circulator service, each with its own advantages and disadvantages (see Figures 8-4 through 8-7). The three options include:

- **Option 1: Lakeshore Dorms** – connects Memorial Union, the Lakeshore Dorms, Union south and Lake Street. This option is more oriented towards student needs by increasing service from key residential areas at both the Lakeshore dorms and housing along W. Johnson and Lake Street. It is a longer service, overall, however, which means travel times would be longer.
- **Option 2: Memorial Union to Union South** – creates the fastest and most direct connection between the two major campus centers possible given roadway constraints. However, the route would not serve as much student housing, nor would it meet employee need to get to/from 21 Park Street.
- **Option 3: South End of Campus** – improves access and connections between the northern and southern ends of campus, including to 21 Park Street. This option attempts to balance the needs faculty and staff and students and is very similar to the old Route 85.

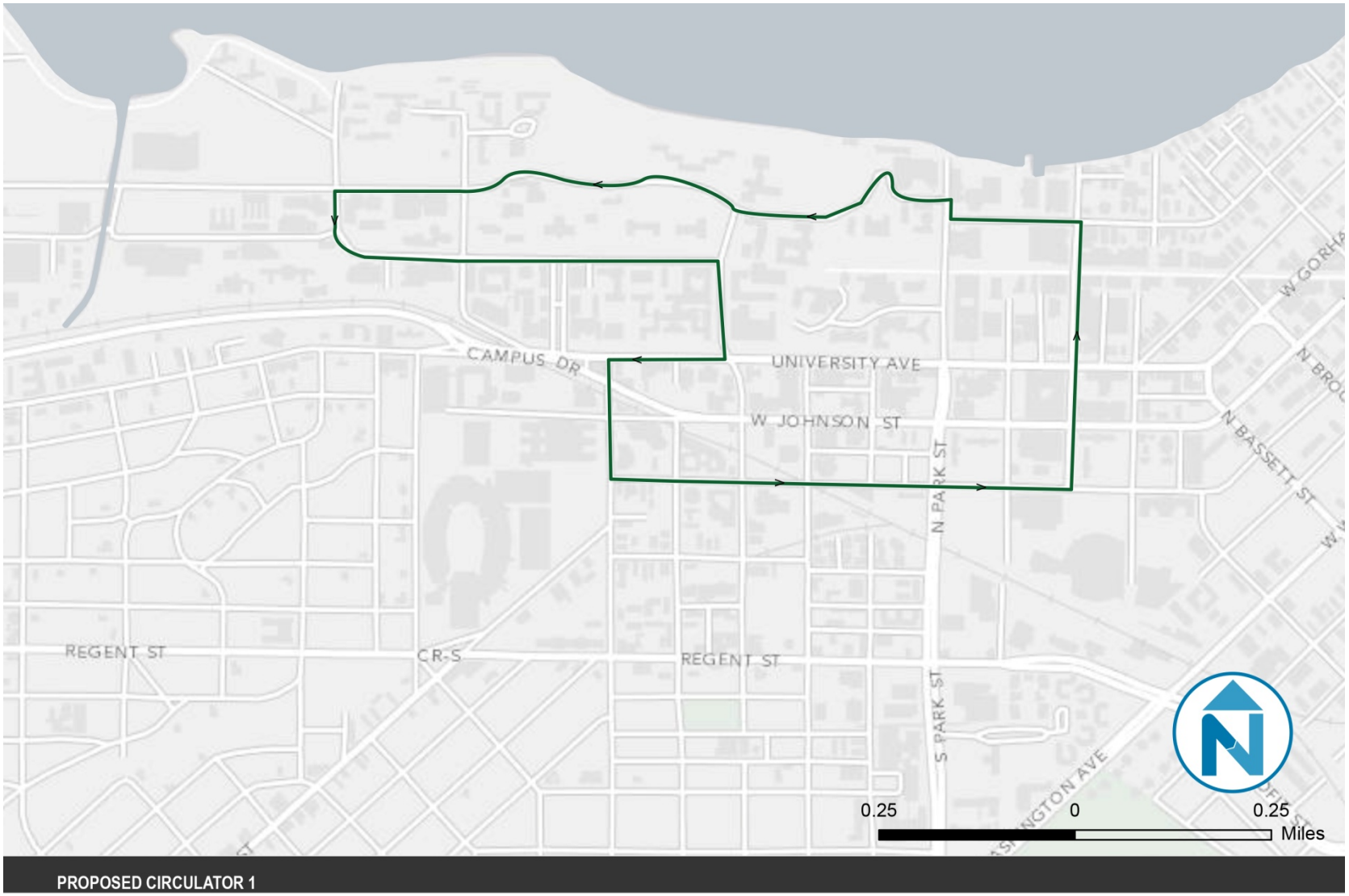
If a circulator service is added to the campus bus network,

Figure 8-4 Advantages/Disadvantages of Circulator Alignment Options

Option	Advantages	Disadvantages	Estimated End to End Travel Time
Option 1: Lakeshore Dorms	Serve Lakeshore dorms and dorms along W. Johnson Street Connect Lakeshore dorms with Union South and Memorial Union	Requires east-west deviation to serve dorms Does not serve 21 Park Street	30 minutes
Option 2: Memorial Union to Union South	Fast and direct connections Connects Memorial Union and Union South Serves housing along W. Johnson Street	Does not serve Lakeshore dorms or Linden Street Does not serve 21 Park Street	15 minutes
Option 3: South End of Campus	Serves 21 Park Street	Less direct path between Memorial Union and Union South	20 minutes

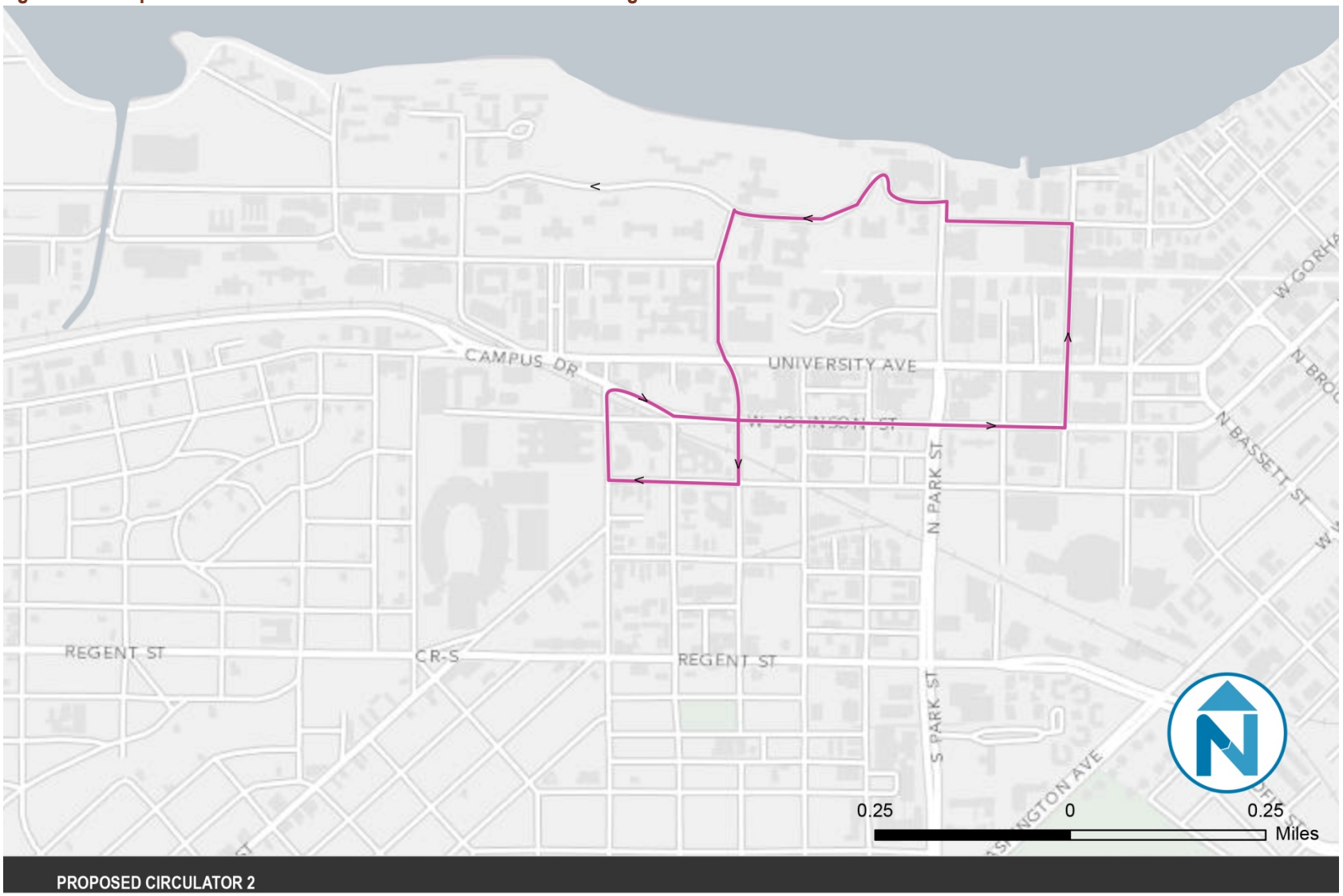
Source: Nelson\Nygaard Consulting Associates

Figure 8-5 Option 1: Lakeshore Dorms Circulator Alignment



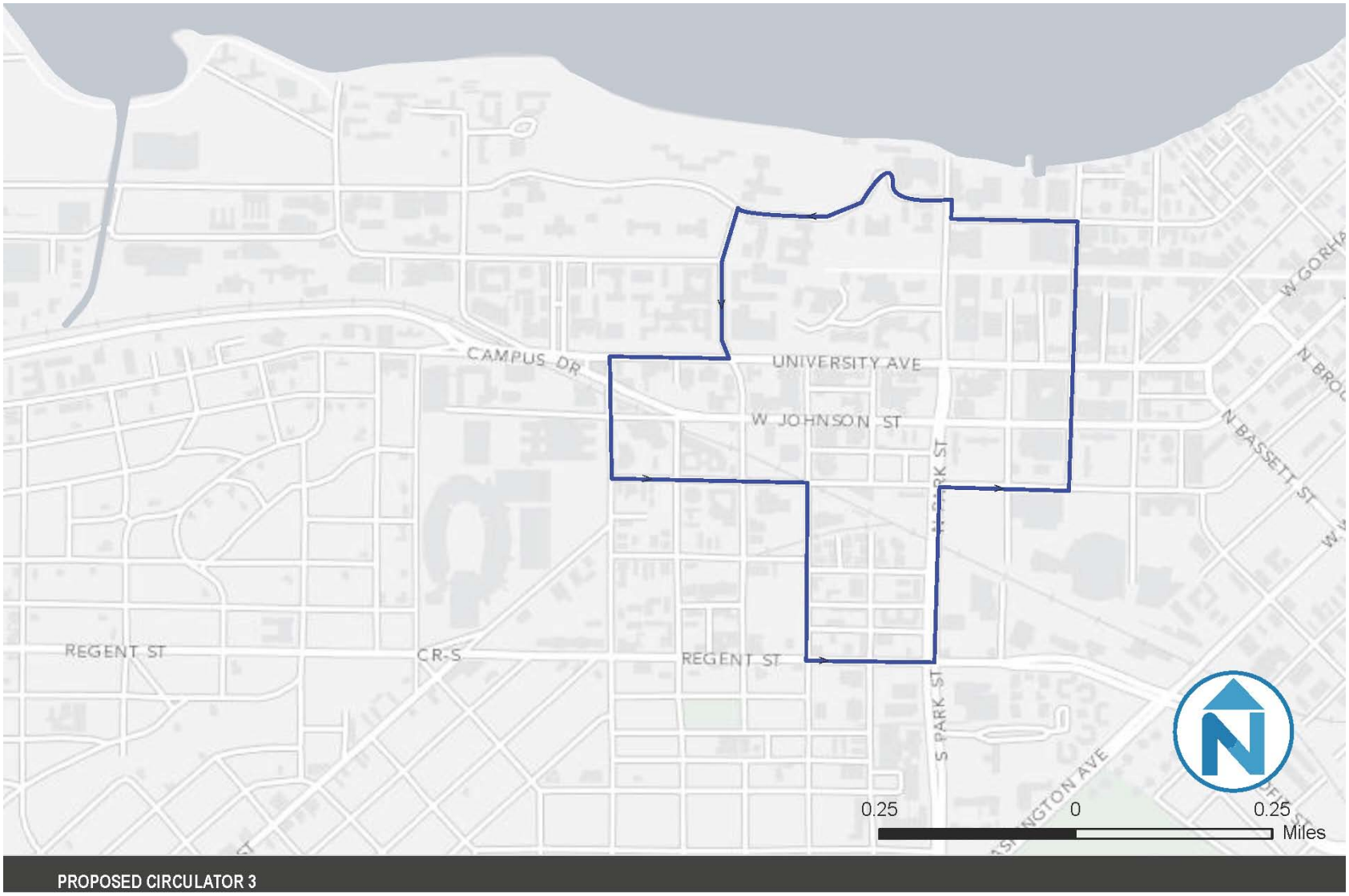
Data Sources: UW Madison Transportation Services

Figure 8-6 Option 2: Memorial Union to Union South Circulator Alignment



Data Sources: UW Madison Transportation Services

Figure 8-7 Option 3: South End of Campus Circulator Alignment



Data Sources: UW Madison Transportation Services

Benefits and Costs

Separating Route 80 has the potential to improve the overall campus system by creating two distinct services, each tied to a specific market and purpose. The change would also improve travel times, which would also at least partially address concerns about service reliability.

However, while creating two routes would reduce the travel time on the existing Route 80 slightly, savings would not be enough to compensate for the additional service hours required for an east end campus circulator. Theoretically, frequencies could be lowered on both routes in order to fund the two routes, but both routes have several trips per day that operate at capacity, thus reduced service frequency could likely lead to overcrowding of the existing services. Lower frequencies would also erode the system's function of transporting people around campus within a 15-minute window.

Instead it may be possible to reduce frequency on Route 80 somewhat and use a combination of travel time savings and additional resources to support the proposed circulator. Reducing frequency on Route 80 from every 7 minutes to 10 minutes would reduce costs by about 30%. Reinvesting these resources to create an east-west route and east end circulator would increase service operating costs by between 10% and 20%[11]. Service levels, however, would be improved for all and improved over the service available in the Spring 2012.

Figure 8-8 Estimated Cost Increase of Creating East-West and Circulator by Service Option

	Frequency	Trips per Hour	Estimated Travel Time	Buses per Hour	Cost per Day*	Increase over Base
Route 80 – Current Service*	7 min	9	33	5	$2,750	
Proposed East-West Route	10 min	6	30	3	$1,650	
Circulator Option 1	10 min	6	30	3	$1,650	20%
Circulator Option 2	10 min	6	15	1.5	$ 825	10%
Circulator Option 3	10 min	6	20	2	$1,110	15%

Source: Nelson\Nygaard Consulting Associates

Notes: Assumes an estimate of $55 per hour

Implementation Challenges

The idea of separating Route 80 into two routes was presented at a public meeting, but not the three detailed alignment options. The overall concept was met with a combination of interest, approval and disapproval. Individuals who approved of the option tended to be students, who were more interested in having more and faster options for traveling around campus. People who disapproved of the concept tended to be people working or studying at the UW Health facility. These people felt dividing the routes would make it more difficult for them to get to the eastern end of campus, especially if they were traveling to/from Madison Metro routes. There was also

[11] Theoretically this adjustment is feasible and time savings can be realized. However, the option is examined in more detail and inconsideration of other operational factors before the savings are real.

some sense that the concept was tried before but didn't work. However, given the UW campus is changing constantly, services that were not successful previously may be appropriate now.

One of the key challenges associated with this option, therefore, involves funding. While this option would increase service coverage and reliability and strengthen campus connections, it would also cost more. Some cost savings can be found by reducing overall frequency to about 10 minutes on both services. While 10 minute service is still a high frequency, it is marginally less conducive to meeting the 10 minute travel window and providing the type of service where people feel they can walk to the bus stop and catch the next bus. Other opportunities for achieving minor cost savings include:

- Start higher frequency service at 8:30 AM or 9:00 AM instead of 8:00 AM. Although ridership on the early morning services is strong, in spring 2012, Route 80 was able to accommodate demand with lower frequency service (15 minutes) and survey results suggest faculty, staff and students have later start dates than traditional commuters.
- Provide more short trips and fewer long trips. Currently the short trip overlay begins at 9:30 AM and ends at 3:00 PM. However, demand to Eagle Heights is less as compared with demand to the UW Hospital. Starting the short service earlier (say 8:30 AM) and ending it later (4:30 PM) could also help save service hours.
  - Reduced service to Eagle Heights may be more efficiently provided by adding a handful of AM trips on Route 84. (See Option 2)

OPTION 2: OPERATE AM PEAK TRIPS ON ROUTE 84

Background

Route 84 currently provides a handful of express trips in the afternoon only. These trips provide fast and direct service between the Van Hise Hall and Eagle Heights. As discussed, the service was originated because residents in the Eagle Heights were unable to board overcrowded buses heading west in the afternoon. The service is operated in the westbound direction only.

One potential service improvement opportunity is to balance the afternoon service with a similar of service in the morning peak. Adding a handful of express service would improve service for Eagle Heights' residents and would also support reducing trips on Route 80 to Eagle Heights as identified in Option 1.

There are currently five daily trips on Route 84 with departures scheduled every 30 minutes between 4:40 PM and 6:40 PM. The morning route could operate a similar level of service, also providing five trips scheduled every 30 minutes operated between 7:40 AM and 9:40 AM.

Benefits and Costs

As discussed, the primary reason for adding morning peak service on Route 84 would be to balance a potential reduction in service on Route 80. In addition, operating Route 84 in the morning may be well received by Eagle Heights' residents (depending on the funding arrangement). Ridership is strong in the afternoon (65 riders per hour) and should be likewise be strong in the morning.

Increasing service during the morning period, would cost an estimated $115 per day (based on a $50 per hour operating cost) or about $20,000 per year (assuming roughly 160 days of operation). The cost per passenger is about $0.80.

Implementation Challenges

This service option was not presented in the public meetings and therefore, did not receive any public comment. There are few challenges anticipated this service change, except for the additional operating costs. However, if the proposal is implemented together with reductions to the amount of Route 80 extended to Eagle Heights, there may be concerns.

In addition, the study team did not contact Madison Metro about implementation and there is potential that adding a route during the peak period could be challenged by the availability of vehicles.

OPTION 3: OPERATE SERVICE ON HEADWAY BASED SCHEDULE

Background

UW Campus bus service is currently a scheduled service, with arrival times at stops posted. Given the short spacing between stops, high ridership at many stops and ongoing campus construction it is very difficult for buses to stay on schedule. As a result, buses have a hard time keeping on schedule, frustrating riders and impacting the perceived service reliability.

One option to avoid this challenge is to adopt a headway based schedule , where buses are dispatched to leave Memorial Union (or other central location) on a regular interval, say every 10 minutes. Buses would not be scheduled to arrive at a stop at a particular time, but instead passengers would know that a bus would arrive at the stop in a certain interval.

Benefits and Costs

The main benefit from operating on a headway based schedule is the perception of service reliability is very different; riders would expect to wait a few minutes instead of timing their trip to the bus stop. A headway based schedule is also high compatible with the current level of service provided on Route 80; with frequencies scheduled every 7-8 minutes during the middle of the day, service levels are high enough to support a headway based system. This type of service is also compatible with “next bus” or bus tracking technology that shows riders where the bus is on its schedule.

Headway based schedules also allow operators to manage bus service so that when service is operating a high frequencies, if buses become congestion, the operator can hold up buses. Likewise, if the gap between services becomes too great, a bus can be dispatched earlier or later. Headway based service generally operates when service frequency is at 10 minutes or less, or possibly 15 minutes service. This means that on the UW campus, the headway based schedule would likely be implemented on Route 80 and during weekday hours only.

Operating headway based service typically requires more supervision from the operator, because the service must be managed so buses leave at regular intervals. It is unclear if Madison Metro is able or willing to this level of supervision or if it would result in a cost increase. Technologies such as Automatic Vehicle Locators (AVL) minimize some of this need.

Implementation Challenges

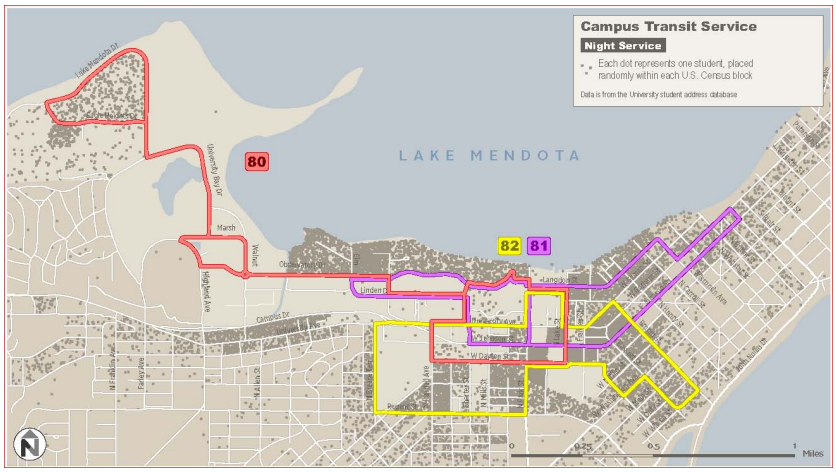
Ongoing construction on the UW campus may make transitioning to a headway based easier or more difficult. It may be easier because services can be more closely managed in cases where buses get held up due to congestion; this same reason also can make it more difficult – the same congestion can make maintaining a schedule with even intervals challenging.

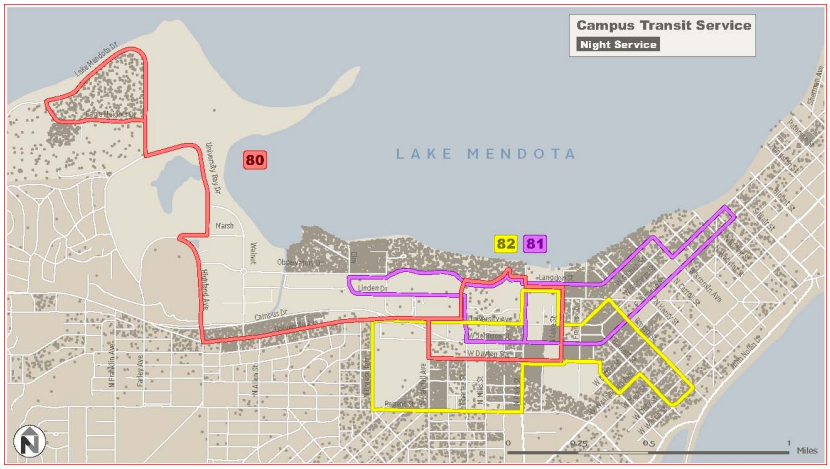
This option was presented in the community meetings; people were either favorably disposed to the idea, or had no opinion. There were few or no negative comments. In reality this change is not likely to be significant for the UW Campus service because buses already operate with very high frequencies. In addition, more and more riders are using the bus tracking technology which helps to make a timed schedule less relevant. Nonetheless, if UW opts to implement this service change, it should be accompanied by a marketing and public education campaign. Knowing a bus would arrive at a regular interval was one of the most highly valued service attributes in the survey and something many respondents did not recognize in the existing system.

OPTION 4: EXPAND SERVICE TO OFF-CAMPUS EVENING SERVICE TO OLD UNIVERSITY CORRIDOR

Background

Figure 8-9 Potential Re-alignment of Route 80 to Serve Old University





As part of the analysis, the study team mapped existing campus bus routes together with student residences. The data shows that while the highest concentrations of students (Lakeshore dorms), south of Dayton Street and east of Park Street are within a block or two of the daytime service provided by Route 80 or Route 84 (see adjacent map). Likewise, when student residences are mapped against the evening services, areas with the highest concentrations of students are within a block or two of a bus route (see second adjacent map).

However, surveys results suggested that students wanted more service off-campus, a sentiment that was underscored in the trade-off questions as well as reasons for not using the service. and community meetings currently provides a handful of express trips in the afternoon only.

Using the maps as a reference, the area with a fairly high concentration of students currently not being service is the area south of Campus Drive, known as "Old University". This area has a lot of student housing that is close to the university, but still technically off-campus and not served by the campus bus system.

Connections from "Old University" to the eastern end of campus are not available through the campus bus system. During the daytime there is a lot of Madison Metro bus service that operates along University Avenue (which is a two-way street in this stretch) and brings students into the east end of campus. The main demand for service, therefore, would be to add evening service. One potential service change would be to change Route 80's alignment so it traveled from Memorial Union out Charter Street heading west on University Avenue to Highland Avenue and accessing Eagle Heights via Highland Avenue to University Bay Drive (see Figure 8-9). Route 80 provides fairly limited service during the evening and the Lakeshore residential area is already served by Route 81. Thus redeploying these resources to the Old University Corridor may have some

benefit. However, the Lakeshore housing area is the highest user of the evening campus bus routes, thus any decision to change existing service would need discussion with students living in this area.

Benefits and Costs

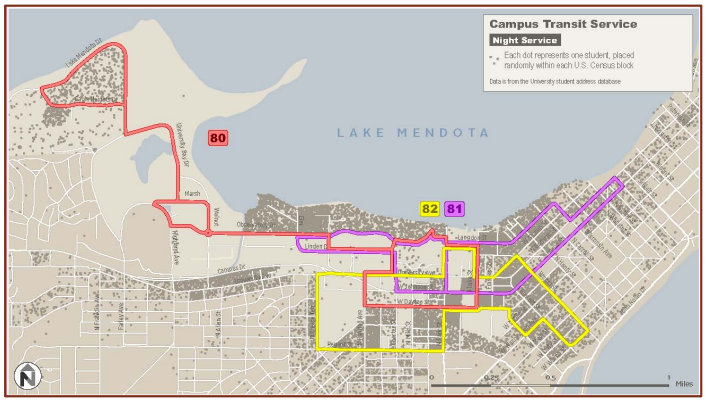
This service change would increase service coverage to areas with large amounts of student residences and reflect a slightly more equitable distribution of evening bus service. As discussed, the most cost effective way of providing this service would be to redeploy Route 80's evening service to travel via University Avenue instead of Observatory Drive between Memorial Union and Eagle Heights. This redeployment of service would provide some service to the Old University area, but ideally additional trips would be added so service could be available on a 30 minute schedule.

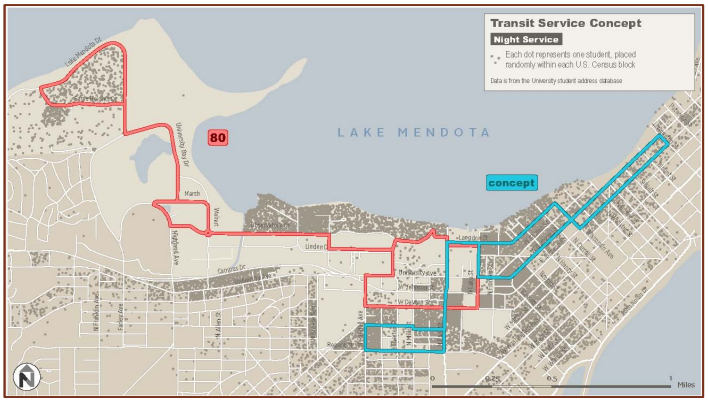
Route 80 could change its alignment at around 7:00 PM, roughly timed to change when Routes 81 and 82 start operations. Travel time is roughly comparable and no additional service would be required until 9:00 PM, after which the amount of service would need to nearly double for four hours, or until 1:00 AM. Adding four hourly trips (two-way) would cost approximately $220 per day, or about $35,000 annually (assuming $55 per hour and 160 days of service).

Implementation Challenges

This service option was not presented in the public meetings, but does reflect concerns about demand and need to service this area. There are two potential challenges associated with making this change. The first is cost and the second is the diversion of service from the Lakeshore residential area to Old University. Although Lakeshore will continue to have service via Route 81, service will be reduced, even marginally, thus there may be objections from residents of this area. One potential strategy for mitigating the objections would be the addition of flexible transportation options (see Option 6).

OPTION 5: CONSOLIDATE EVENING ROUTES (81 AND 82)





Currently, there are UW three routes operating in the evening and late night service (Routes 80, 81 and 82). Two routes, 81 and 82, travel east and west of Memorial Union, including areas that are off-campus; Route 81 travels further east off-campus, while Route 82 travels further south, also going off-campus (see figure to the right that shows routes with student residences). Ridership data shows that some parts of these two routes are not well utilized, suggesting that a combined route may provide the necessary coverage and allow this single route to operate with higher frequency.

A potential new route could provide service to the east end of campus, head south on Park Street and connect to the student residences along Regent Street. This proposal does provide door to door service between Memorial Union and Union South. However, some areas that currently have service, including segments that have ridership would no longer be served. There is potential to mitigate some of the concern raised by this reduction by adding flexible late night service (see Option 6).

Benefits and Costs

The advantage of this service change is that it would eliminates some of the less productive segments of Route 81 and 82 and remove redundancy between routes, especially along Langdon Street and Observatory Drive. In addition, by consolidating routes, there may be some efficiencies which could be re-invested in the new single route and allow the bus to operate with higher frequencies. This single route is also more simple and straight-forward as compared with Routes 81 and 82.

Consolidating service is expected to result in some overall cost savings. However, instead of realizing these cost savings, the study team recommends investing them into the single route so service can be provided with a higher frequency.

Implementation Challenges

This option was presented at the community meetings in November and was not well received by some groups, especially students. Some students suggested that having service, even if it is not frequent, is better than having to walk to more frequent service. Although this comment was expressed quite adamantly, it is not supported by findings in the survey results. In the surveys, students said getting dropped off at their door was not as important as knowing the bus will come

at regular intervals. If this change is carried forward, therefore, it would need to be implemented with considerable outreach and education.

It is also worth noting that this consolidated route would not work with Option 4, which calls for diverting Route 80 service along Observatory Drive to University Avenue. Instead, if the consolidated route option is carried forward it is likely Route 80 service alignment cannot be changed and service levels would likely need to be doubled, for a cost of about $200 per day or around $35,000 per year (see previous effort). The increased service levels are necessary to ensure Lakeshore continues to receive a high level of transit service after dark.

In addition, even though most of the service reduction is in areas where other service exists and/or services overlaps, the reduction in service coverage may be perceived as having a large impact on safety. Potential new demand response service may help alleviate some of these concerns.

OPTION 6: OPERATE FLEXIBLE EVENING SERVICE

Background

Another opportunity to improve evening service would be to implement flexible demand response service or "flex service". Flex service offers a hybrid type of service that includes some attributes of fixed-route service and some of demand response service. Flex service works in the following way:

- Service is available in a designated flex service area. All pick-ups and drop-offs must be within this service area.
- The service would be scheduled around a handful of bus stops (i.e. Memorial Union and Union South) where there would be designated bus stops and scheduled time points.
- Outside of these stops and time points, however, the bus is free to travel anywhere within the designated flex zone and provide "door-to- door" service.
- Flex service would be operated with smaller, cutaway vehicles that are more maneuverable than large transit vehicles (and thus may be able to travel on some roads not suitable to buses) and can accommodate wheelchairs.

This type of flexible service is also included as a potential service strategy for accessible transportation because using the service is less restrictive (i.e. you don't have to call 24 hours in advance) as compared with paratransit service.

The advantage of the flex service is that it provides a hybrid service – people can count on the bus to be at certain location at a scheduled times, but also have the flexibility to get door to door service. The disadvantage of this type of service is that it can be difficult to schedule for the operator, especially in the early stages of the service. In addition, if a passenger wants to be picked up somewhere other than the specified locations, this is possible but requires the passenger to call and request a pick up, similar to reserving a taxi cab. During busy times, passengers may need to wait.

The proposal to include flex service in the service options is based in analysis that suggests demand for the late night service, especially the last hour or so of the evening may not always be robust enough to warrant the amount of fixed-route service provided. Providing flex services helps keep some service available but at a lower cost. Given the importance of providing a safe transportation network, this strategy is recommended as a pilot program or demonstration project. This way, TS and users of the service could determine if the service meets riders' needs and helps address accessibility issues.

Flex service was tested conceptually in the quantitative survey administered as part of this study – the idea was presented very generally and then respondents were asked a series of questions. Findings suggest that about half of the students are interested in the service, but slightly less than a quarter thought they would prefer this type of service over late night bus service. About a third said they would be willing to pay a fare for using the service. However, because the service was presented briefly, it is not clear if respondents truly understood how flex service would work. Thus, the findings support the recommendation that flex service be implemented as a trial or demonstration project rather than full implementation.

Benefit and Costs

Providing evening flexible service offers three main benefits:

1. In the long run, it offers potential to substitute for very late night fixed-route service when demand is low. If this new type of service becomes acceptable, it would also reduce evening service costs.
2. The service has the potential to expand evening service coverage, such as the Old University area as well as other pockets of student residences. As the flex service shows demand, some areas could transition to fixed-route service.
3. Flex service should increase travel options for persons with disabilities who may need to travel in the evening but may find using Flex service easier than either fixed-route or paratransit.

Service costs would vary significantly in response to service design. Assigning two flex vehicles to the UW campus from roughly 9:00 PM to 2:00 AM, would cost about $550 per day, or about $70,000[12] assuming the service is available on Sunday through Thursdays only. Charging a fare may help recover some costs and may also help control demand.

Implementation Challenges

As discussed, safety is a critical concern for students on the UW campus and thus the flex service is proposed as an overlay service and travel option for people with disabilities. This option was presented as part of the community meetings; it was well received among people with disabilities and viewed favorably by other groups as long as it does not replace any existing service. Survey results echo this sentiment; many students are interested in the service but are not willing to replace the existing evening fixed-routes with flex service.

Implementing flex service also requires a lot of education and marketing because the service is substantially different from previous service models, including the late night cab ride service.

[12] Assumes 10 hours of service per day at $55 per hour and about 130 days per year (assuming service operates Sundays through Thursdays).

OPTION 7: REDUCE THE NUMBER OF BUS STOPS

Background

There are a lot of bus stops on the UW campus, reflecting the fact that campus is served by a number of Madison Metro bus stops as well as campus bus routes. Having a lot of bus stops is beneficial to riders because they don't have to walk as far to reach a bus route. However, having fewer buses also benefits the rider; although they will have to walk longer to the bus stop, bus service will be faster and more reliable.

The bus stops associated with the campus bus routes are spaced closely together, with many bus stops located within a tenth of a mile of each other. Industry best practices suggest spacing 4 to 5 bus stops every mile for local bus service[13]. It is also consistent with the rule of thumb that considers a reasonable catchment area for transit service to be within one quarter mile of a route. In many cases, campus bus routes are spaced at about 4 to 5 stops per mile; in some segments, stops are more closely spaced. The frequency of stops may reflect a high concentration of destinations in the campus environment. However, it may also be the case that stops were designated at different times and not readjusted as the physical layout of campus buildings changes. There may be potential, therefore, to look at each stop carefully, determine if it is needed and ultimately eliminate a handful of bus stops; this effort will help improve system speed and reliability.

Benefits and Costs

Increasing the distance between stops offers benefits but also challenges. The main benefit associated with reducing bus stops is improving overall service speed and reliability, attributes that are critical to attracting riders to the system. Data from the survey is inconclusive, however, a large portion of the results suggested that people, inclusive of students, faculty and staff and UW Health, did not value having a short walk to the bus even if it meant the travel time was shorter. Many of the same riders, however, also said they did not value getting dropped off at their door. This recommendation may work better with some service designs than others; for example, if routes are separated into one faster, more direct east-west route and one slower, circulator route, it may make sense to space stops further apart on the east-west route and keep the current spacing on the circulator route.

There are no ongoing costs associated with removing bus stops, once the signs and shelters are removed. There may be some resistance from riders, especially those who are accustomed to more frequent stop spacing (see below).

Implementation Challenges

The biggest challenge associated with reducing bus stops is resistance from passengers who use the eliminated stops. Most of this resistance would likely be reduced overtime, especially if the service quality improves overall. There may be some additional challenges from persons with disabilities. These challenges may be best met through improvements to the accessible transportation network overall. In addition, if the bus stop removal is done carefully, impacts even on people with mobility challenges will be minimal.

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[13] Benn, H (1995) Bus Route Evaluation Standards (TCRP Synthesis of Transit Practice No. 10) Washington DC Transportation Research Board

OPTION 8: OPERATE MIDDAY SERVICE WITH LARGER BUSES

One of the more frequently cited challenges to the campus bus system is overcrowding on the bus. Overcrowding discourages use from the student population, and is especially discouraging for people with disabilities. Given the high level of service frequency on campus, one strategy for increasing capacity would be to operate Route 80 with larger articulated buses.

Benefits and Costs

Operating larger buses would address issue of overcrowding and could create more space for individuals with disabilities.

However, there are several potential challenges to operating larger buses on campus, including safety concerns in areas where there is dense pedestrian, bicycle, and moped travel. Given the high volumes of travelers on several roadways and intersections, the ability of an articulated vehicle to safely navigate these locations needs to be considered. Other concerns related to vehicle maneuverability at some locations as well as the potential for increased operating costs.

Implementation Challenges

Madison Metro is currently conducting a bus sizing study that will evaluate its fleet composition. This study will examine the need for diversifying the vehicle fleet and the impacts of doing so. However, even if Madison Metro decides to diversify its fleet, it will likely take years for implementation.

9 IMPLEMENTATION — FIXED ROUTE

The objective of examining and analyzing UW-Madison's campus bus system was to identify strategies that offer potential to strength the system overall and increase system effectiveness and efficiency. The study team identified eight potential strategies (see Figure 9-1) that range in cost and address different goals and needs (see Figure 9-2). These potential service options are not delivered as recommendations, but rather reflect strategies that offer the most potential to improve the UW campus bus system.

Figure 9-1 Summary of Strategies to the Campus Bus System

No.	Strategy	Estimated Annual Cost	Benefit
1	Separate Route 80 into an East-West Route and an East End Circulator	+10% to 20% over existing costs	More effective transportation system; More closely matched demand with service
2	Operate Route 84 in AM and PM Peak	$20,000	Improves service to/from Eagle Heights; Supports Option1
3	Operate Service on a Headway Based Schedule	-	Improves service speed and reliability
4	Expand Service to Off-Campus Destinations	$35,000	Increases service coverage; Increases safety
5	Consolidate Evening Routes (81 and 82)	$35,000 (to expand service to Lakeshore)	More efficient, less redundant evening network; Could increase frequency
6	Operate Late Night Flex Service	$70,000	Increases service options; Improves safety
7	Reduce the Number of Bus Stops	-	Improves service speed and reliability
8	Operate Midday Service with Larger Vehicles	-	Increase system capacity (reduce crowding)

Source: Nelson\Nygaard Consulting Associates

Figure 9-2 Relationship of Strategies to Study Goals

Strategy	Improves connections between Housing and Academic Buildings	Increases connections within 15-minute Timeframe	Improves east and west connections	Improves Safety	Increases Service Efficiency
Separate Route 80 into an East-West Route and an East End Circulator	X	X	X		
Operate Route 84 in AM and PM Peak	X	X	X		X
Operate Service on a Headway Based Schedule		X	X		X
Expand Service to Off-Campus Destinations	X			X	
Consolidate Evening Routes (81 and 82)	X				X
Operate Late Night Flex Service	X		X	X	X (long run)
Reduce the Number of Bus Stops		X			X
Operate Midday Service with Larger Vehicles					X

Source: Nelson\Nygaard Consulting Associates

APPENDIX A

List of Stakeholders Interviewed

APPENDIX A: LIST OF STAKEHOLDERS INTERVIEWED

Stakeholders Interviewed for Accessible Transportation

- Barbara Lanser: Equal Opportunity Program Specialist, UW Madison, General Services Division, Office for Equity and Diversity
- Cathy Trueba: Assistant Dean, Director, UW Madison, McBurney Disability Resource Center
- Margaret Bergamini: UW Madison, Associated Students of Madison (ASM) Bus Pass Program Advisor
- Crystal Martin: City of Madison, Metro Transit, Paratransit Program Manager
- Timothy Gattenby: UW Madison, Coordinator Adapted Fitness, Personal Training and Risk Management, Department of Kinesiology
- Norah Cashin: Dane County Department of Human Services, Transportation Manager
- Vorakiat "Top" Tantivat, Facilities Access Specialist, University of Wisconsin-Madison

APPENDIX B

Peer Review

APPENDIX B: PEER REVIEW

As part of examining UW's accessible transportation services, the study team contacted a handful of universities to understand how they ensure the mobility of faculty, staff and students with disabilities. In total, calls were made to five universities considered to have similar operating environments and/or challenges (University of Vermont, University of Minnesota, University of Washington (Seattle), University of Michigan and University of Wisconsin – Milwaukee). The "peer" universities were identified as such because they all located in northern climates with cold weather. We also selected large universities with similar student populations and/or campuses that have similar travel constraints in terms of geography.

In general, the set of services offered to students with disabilities is fairly consistent across universities and includes:

- Accessible fixed-route shuttle buses.
- Paratransit services, provided either through the local public transportation provider or in-house. Most universities provide this service free-of-charge to users.
- Priority access to housing and class schedules to avoid cumbersome schedules and/or travel routes.
- There are no proposed changes to accessible transportation services.
- Accommodation for missing class under extreme weather conditions.

Fixed-Route Shuttle Buses:

At the University of Washington and University of Minnesota, all shuttles are wheelchair accessible and free. The University of Wisconsin contracts with Milwaukee County Transit System (MCTS) to provide transit services on campus. MCTS has upgraded many of its buses to make them more accessible for wheelchair users; these buses are either step-free or lift-equipped.

Paratransit Services:

Many schools provide a Dial-a-ride type service for limited mobility populations. The Universities of Minnesota, Washington, Minnesota and Michigan provide this service free of charge. Students generally need to register to access the service. At the University of Washington, students can use the service for four weeks without registration, but if they wish to use the service for a longer period of time they must register. Schools generally do the scheduling in advance – for example, the University of Washington recommends that students reserve rides on a quarterly basis but can accommodate requests one hour in advance if the space is available. The University of Michigan provides this service with between one and two vans, while the University of Michigan operates three to four paratransit vehicles.

Time Constraints:

Students using Dial-a-Ride and other service modifications due to mobility issues could have trouble getting to tightly scheduled classes. At the University of Washington, students that qualify for Dial-a-Ride can get a letter of accommodation that excuses occasional tardy class attendance. The University of Michigan employs on person whose sole job is to schedule students on paratransit. At the University of Wisconsin at Milwaukee, students meet with a representative from the disability office who, in addition to other services, can help students plan their routes around campus.

Weather Accommodations:

Weather, particularly snow and ice, can present a heightened challenge to those with mobility issues. Although neither the University of Washington nor the University of Michigan have formal services in place for students with disabilities who miss class due to weather, both offices for such students recommend that students follow up with professors or other students to make accommodations on a case-by-case basis.

The University of Michigan's Services for Students with Disabilities Office works closely with the Planning Department to keep the campus clear when it snows. The Planning Department keeps a list of crossings most prone to hazards and checks them frequently. However, they struggle to coordinate with the City in clearing City streets that cross campus, which can result in road blockages. To combat the snow problem, Michigan is in the process of developing a program that uses student volunteers and strategically placed shovels and salt supplies to clear important routes on campus for those with disabilities. The Services for Students with Disabilities Office also stated that they would pick up a student if necessary due to adverse weather.

The University of Washington has a "Barrier Report" program where students can call Disability Resources and let them know if a necessary route is blocked. Similarly, faculty and students can report snow or ice problems to Grounds at the University of Minnesota.

Priority Scheduling:

Mobility-impaired students have priority registration for classes at many schools, including the University of Washington, the University of Michigan, and the University of Wisconsin at Milwaukee. This allows students to schedule their classes in advance and around their mobility needs. While the University of Minnesota does not provide priority class scheduling, the Office of Disability Services can help students to move their classes if feasible and necessary.

Accessibility Map/Guide:

Most schools show disability parking at a minimum on their campus maps. However, others display accessibility in more detail. The University of Wisconsin at Milwaukee shows "Ground Level Power-Assisted Entrances" on its campus map. The University of Washington has a 300 page Accessibility Guide online and in print that is designed to help students, faculty, staff and visitors with disabilities locate appropriate routes on the Seattle campus and find appropriate entrances within buildings. This includes a "Mobility Route Map" that breaks down routes by some usability characteristics (i.e. handrails) and shows entrances and dial-a-ride pickup locations. Finally, the University of Minnesota provides "Pedestrian Maps" that show ramps, tunnel entrances and power doors during its current construction phase.

Disability Housing – Most colleges provide disability housing for those with mobility issues.

APPENDIX C

Focus Group Moderator's Guide

APPENDIX C: FOCUS GROUP MODERATOR'S GUIDE

Disability Focus Group Guide

Goal: To provide input on the nature and depth of mobility challenges faced by people with disabilities on the University of Wisconsin Madison (UW Madison) campus, and solicit recommendations for improvement.

Objectives: Specific and nuanced information on the needs of sub-groups within the disability population that can be used as the basis for developing strategies to enhance their mobility options

Key Questions/Topic Areas

- Current mode of transportation on and to/from campus
- Reasons for using/not using each of the modes
- Sources of information about different transportation options
- Issues related to weather
- Issues related to time of day
- Infrastructure barriers that impact mobility
- Assessment of campus bus service
- Assessment of Madison Metro bus service
- Assessment of Madison Metro Paratransit service
- Issues faced by drivers
- Specific destinations that are most difficult to access
- Willingness to consider travel training
- Suggestions for improvement
- Tradeoffs on service improvements

Responses to the following tradeoffs

- More stops with less frequent service OR more frequent service with fewer stops
- Time point scheduling (i.e." the bus will be here at 9:05" OR headway based scheduling (i.e. "the bus comes every 10 minutes")
- Faster service with fewer stops OR stops that are closer together but the bus stops more often
- A service that circulates around campus OR a service made up of several point-to-point routes
- AT NIGHT, faster and more frequent service that stops only at designated places OR slower and less frequent service that can take you closer to where you need to go

TOPICS SPECIFIC TO STUDENT

- Getting between classes
- Ways in which ADA paratransit minimum requirements don't need students' needs
- Networks for getting information out to students
- Others

TOPICS SPECIFIC TO EMPLOYEES

- Impact of new disabled placard policies
- Alternative arrangements that have been set up by specific departments
- Extent to which trips during the day are necessary
- Willingness to pay for premium type services instead of driving (e.g. taxis)
- Other

APPENDIX D

Online Comment Form and Responses

APPENDIX D: ONLINE COMMENT FORM AND RESPONSES

The University of Wisconsin Madison (UW Madison) is conducting a campus transportation study which includes a focus on the mobility needs of people with disabilities on campus. Could you please take a few minutes to fill out the comment card below in order to enhance our understanding of the transportation issues faced by people with disabilities on campus? Thank you.

1. **What is your association with UW Madison?**
    a. Choose best answer.
    b. UW Student
    c. UW Faculty/Staff
    d. UW Hospital/UW Health Employee
    e. UW Campus Visitor
    f. Other: _____

2. **How do you typically get around campus?**

3. **What problems do you have, if any, getting around campus?**

4. **How could the university make it easier for you to get around campus?**

If any of your responses require clarification, would you be willing to let us send you an e-mail seeking clarification? If yes, please provide your e-mail address below.

Thank you for taking the time to fill out this questionnaire

Summary of responses to 2012 UW Focus Group Survey

23 responses – 15UW faculty/staff, 3 UW Hospital/Health, 5 students.

Mode Choice – "How do you typically get around campus?"

The most common answers to this question were that the respondent drove or walked – 13 respondents said that they drove while five said that they walked. Two respondents get dropped off by spouses. Other respondents said that they took the 80 bus or a van, or used a combination of modes (bus/drive, walk/drive).

Problems – "Do you have any problems getting around campus?"

The most common respondent issue with getting around campus focused on handicap parking stall availability – seven respondents cited lack of handicap parking at their destination as a problem. Four respondents mentioned that Paratransit on campus was impractical due to long wait times. Three respondents mentioned issues surrounding Bascom Hill – ranging from a lack of bus service to maintenance of the walkways. Two mentioned that the 80 bus was too crowded or jerky for use as a person with disabilities.

Suggested Solutions - "Do you have ideas about how the university could make it easier for you to get around campus? If so, please explain."

Respondents provided an extensive list of ideas for how the university could make it easier for them to get around campus, listed below:

- Six respondents called for more handicapped spots on campus
- Two respondents suggested training student volunteers, either to help those with disabilities get around or to help teach them about accessible routes on campus.
- Two respondents also suggested a regular Paratransit route that would circulate on campus.
- Two respondents mentioned University vehicles blocking sidewalks, accessible entrances or convenient parking spots, and one suggested publicizing a number to call when this occurs.
- Two respondents mentioned that the grooves in the concrete on campus makes it difficult for wheelchairs etc. to maintain traction.

Other suggestions included making sure that sidewalks/curb cuts are clear in winter, better signage, enforcement of time limits, preventing bikers from blocking ramps with locked bikes, and announcing areas of construction online daily. Respondents also offered a variety of location-specific issues; transportation-related issues are listed below:

- Bascom Hill – lacking a handrail on one side, connections to Granger Hall
- Torn apart level walkway at UBOB
- Lack of convenient parking spaces near Union South and Discovery Center

APPENDIX E

Campus Bus Individual Route Profiles

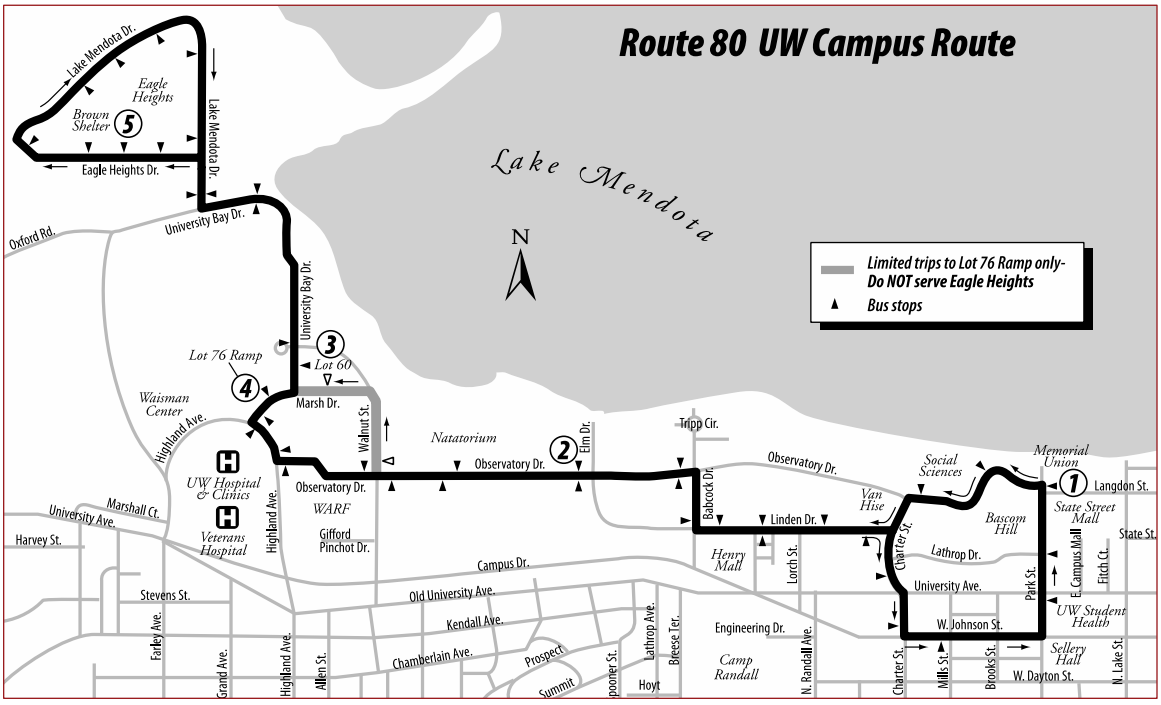
APPENDIX E: CAMPUS BUS INDIVIDUAL ROUTE PROFILES

80 | UW CAMPUS ROUTE

Route 80 is an out-and-back bus route that connects the western (Eagle Heights) and eastern (Memorial Union) ends of campus. The route is operated with two service alternatives; 1) the regular service that ends at Eagle Heights (Route 80L) and 2) a short trip that ends at campus parking facilities at Lots 60 and 76 (Route 80S). Eagle Heights is a campus residential complex that primarily caters to graduate students, international students, faculty and academic staff. The complex contains over 1,000 residential units with capacity for up to 1,850 individuals. Parking facilities at Lots 60 and 76 have 2,774 parking spaces; spaces are enforced on weekdays between 7:00 AM and 4:30 PM and free on weekends and after 4:30 PM until 7:00 AM.

Both Route 80 trips begin/end at Memorial Union and travel west via Observatory Drive to N. Charter Street, turning west on Linden Drive to Babcock Drive and back to Observatory Drive. Short trips turn north on Walnut Street and end at the Lot 76 Ramp and serve the UW Hospital via Highland Avenue. Long trips continue on Observatory Drive, turn on Highland Avenue past the UW Hospital to University Bay Drive and make a terminal loop at Eagle Heights. The inbound routes are identical to the outbound trip until the intersection of Linden Drive and Charter Street; at this location, Route 80 heads south on Charter Street, turning at W. Johnson Street and Park Street back to Memorial Union. This unique inbound alignment is necessary because geometric constraints make it difficult for buses to travel eastbound on Observatory Drive at Bascom Hill.

Figure 1 | Route Map



Schedule

Route 80's primary alignment travels to Eagle Heights and operates this alignment between 6:15 AM and 1:15 AM (see Table 1). The Lot 76 service is a peak service overlay that operates between 9:38 AM and 2:42 PM. During this time, departures are staggered so that every other trip travels to Eagle Heights and a bus leaves Memorial Union approximately every six minutes (see Table 1). Route 80's round trip to Eagle Heights travels 7.1 miles and requires 42 minutes. A round trip to Lot 76 travels 4.0 miles and requires 30 minutes.

Route 80 also includes late night service on Friday and Saturday nights. This service is comprised of two outbound (to Eagle Heights) and three inbound trips (to Memorial Union) and four inbound and outbound trips on Saturdays. Buses depart approximately every 40 minutes and run until 2:35 AM.

On weekend days and during the Recess schedule, Route 80 operates between 8:00 AM and 11:55 PM with service scheduled every 45 minutes for a total of 22 trips per day. Weekday service during the Recess schedule continues the long and short schedule with 15 minute service between 6:20 AM and 12:35 AM.

Table 1 | Route 80 Schedule Statistics

Service Day	Span of Service*	Frequency (min)	Trip Time (min)	Daily Trips
Standard				
Weekday	**6:15 AM – 5:45 PM**	**6-7**	**42L/30S**	**94**
	5:45 AM – 9:00 PM	**15**	**42**	**14**
	9:00 PM – 1:15 AM	**40**	**42**	**6**
Friday - Extended Evening	**1:15 AM – 2:35 AM**	**40**	**42**	**2**
Saturday	**8:00 AM – 2:35 AM**	**45**	**42L/30S**	**26**
Sunday	**8:00 AM – 1:15 AM**	**45**	**42L/30S**	**24**
Recess				
Weekday	**6:20 AM – 12:35 AM**	**15**	**42L/30S**	**55**
Weekend	**8:00 AM – 11:55 PM**	**45**	**42L/30S**	**22**

Source: route schedules; *Span of service is based on departure time from Memorial Union; trip time and daily trips are for round trips from Memorial Union and back.

Transfer Locations

Route 80 begins/ends at Memorial Union providing transfers to other UW Routes, including Route 85 (day time) and Routes 81 and 82 (evening). Riders can also use Route 80 to connect to/from several Madison Metro routes along Observatory Drive and/or along University Avenue.

Ridership

Average daily ridership on Route 80 is high with 8,757 weekday riders during the Standard weekday service. Ridership per trip is slightly higher on the long trips to Eagle Heights (36 riders per trip) as compared with short trips to Lot 76 trip (33 riders per trip).

Ridership by Stop

Ridership (including boardings and alightings) on Route 80S (Lot 76) are fairly well distributed throughout the alignment. Memorial Union has the highest number of riders getting on and off the bus, followed closely by the stops along Park Street and at Lot 76 (see Figures 2 and 3). Riders tend to get on and off the route throughout the alignment, however, and with the exception of stops along Walnut Street and Marsh Drive, most stops are used by 25 or more riders per day.

Route 80L to Eagle Heights shows a similar pattern. The individual stops with the highest ridership (on and off) are Memorial Union and the stops along Park Street. The segments along Linden and Observatory Drive also carry a lot of riders. These two segments combined are responsible for 42% of all activity on route. This compares with the Eagle Heights segment of Route 80L, which carries about 16% of all riders (see Figure 4).

Load profile data highlights this pattern as well; Route 80 has a lot of boardings at Memorial Union, and although there are several riders boarding and alighting there is a net loss of riders all the way to Eagle Heights. On the inbound trip, ridership builds slowly until Observatory Drive where it builds until the end of the route at Eagle Heights (see Figure 5). It is also worth noting that the inbound service carries more riders than the outbound trips and the peak load is most dramatic traveling inbound along Linden Drive.

Figure 2 | Route 80 SHORT Boardings and Alightings by Stop

Figure 3 | Route 80 SHORT Load Profile

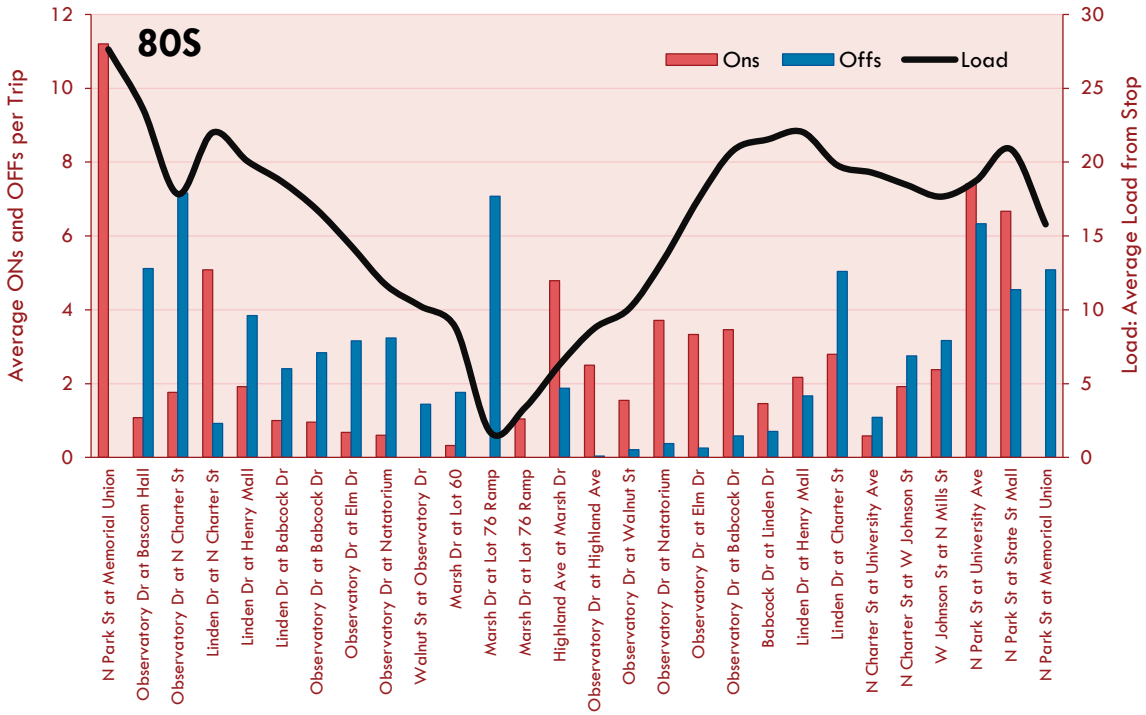
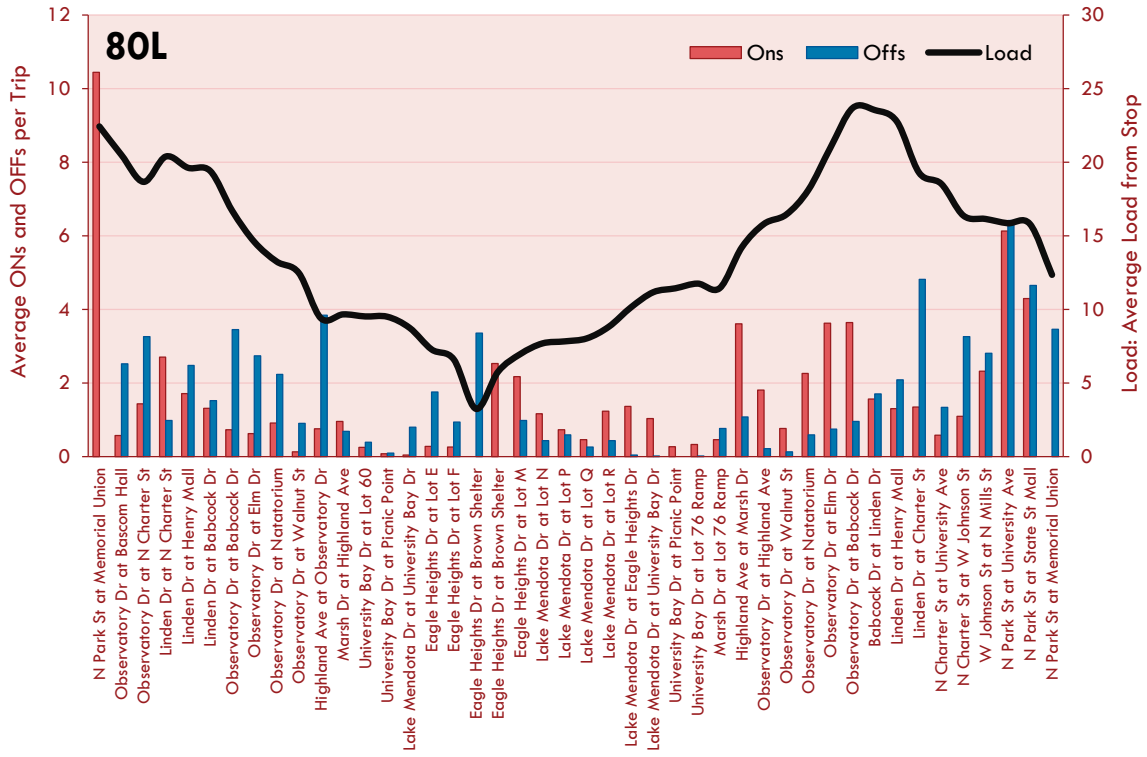


Figure 4 | Route 80 LONG Boardings and Alightings by Stop

Figure 3 | Route 80 LONG Load Profile



Weekday Ridership by Trip

Ridership on Route 80 starts out relatively low during the early morning trips, but by 8:30 AM Route 80 shows several trips with 50 or more riders (see Figures 6 and 7). Ridership is generally strong throughout the middle part of the day, from 8:30 AM until midnight.

Despite strong trends overall, ridership on Route 80 spikes considerably throughout the day. Some trips carry well over 100 passengers per trip and trips on the shoulders of these high ridership trips (i.e. one or two trips before or after) have fewer riders but are also high. A few trips before and after the spikes, however, have very low ridership. Spiking tends to be more dramatic on the eastbound (towards campus) direction than traveling westbound (towards Eagle Heights). This reflects higher ridership in the inbound direction overall and that the eastbound trips circulate through campus with high ridership stops along Park Street.

The trips with very high ridership tend to be concentrated during the changes in class shift times, which typically occur between the last 15 minutes of the hour (i.e. 9:45 AM to 10:00 AM). Consistent with other UW routes, variation in ridership may also be partially explained by the poor service reliability of Route 80 – bus are slowed by high boardings at a handful of stops, congestion in the center of campus, and campus construction projects. These delays can cause vehicles to 'bunch' so that two or more vehicles run right behind each other. When this happens, the first vehicle will have much higher ridership than normal, while the trailing vehicle will have much lower ridership than usual.

Figure 4 | Route 80 WESTBOUND Ridership by Trip

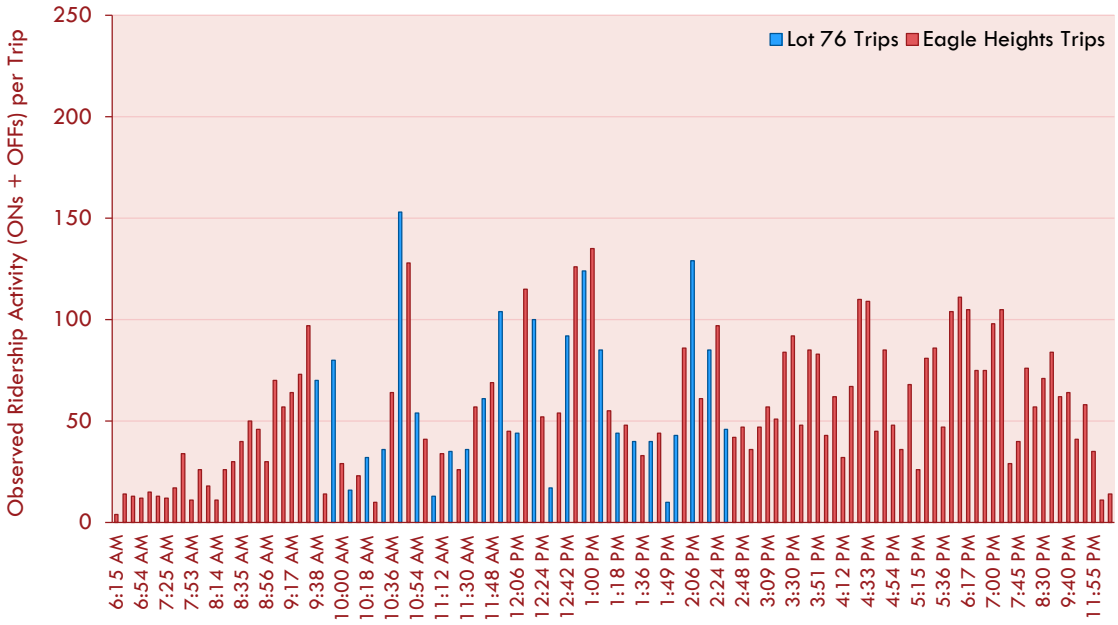
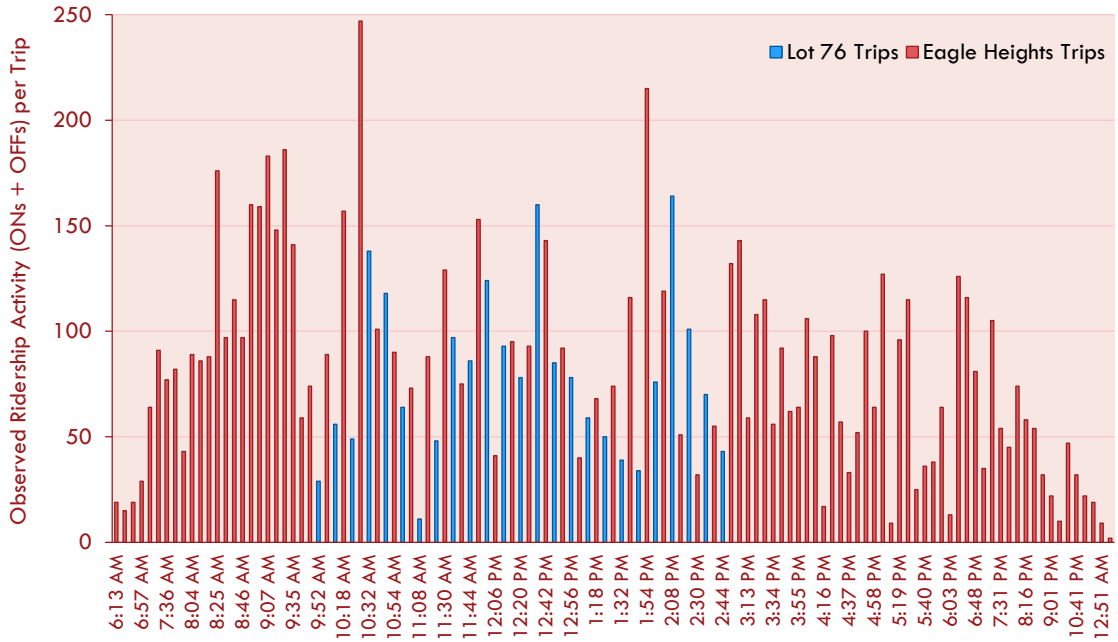


Figure 5 | Route 80 EASTBOUND Ridership by Trip



Weekday Maximum Loads by Trip

The UW routes are operated with 40-foot heavy-duty transit vehicles (buses) that have a seating capacity of about 35 individuals and a maximum capacity of 70 (the "crush load"). Looking at the number of riders on the bus at any one time shows there are 29 trips on the westbound trips and 29 trips on the eastbound direction where there are more riders than seats on the bus. Of these trips, only one operates with a crush load, but several have more than 60 riders on board at some point of the trip (see Figure 5). Overcrowding occurs throughout the day, but the greatest overcrowding tends to occur between 8:00 AM and 1:00 PM and closely correlates with class shift times. Overcrowding is uncomfortable for the riders and occasionally means full buses will pass them up, but disproportionately affects riders with mobility needs or challenges, as individuals may not easily be able to board or alight and buses may not be able to accommodate wheelchairs.

Figure 6 | Route 80 WESTBOUND Maximum Loads by Trip

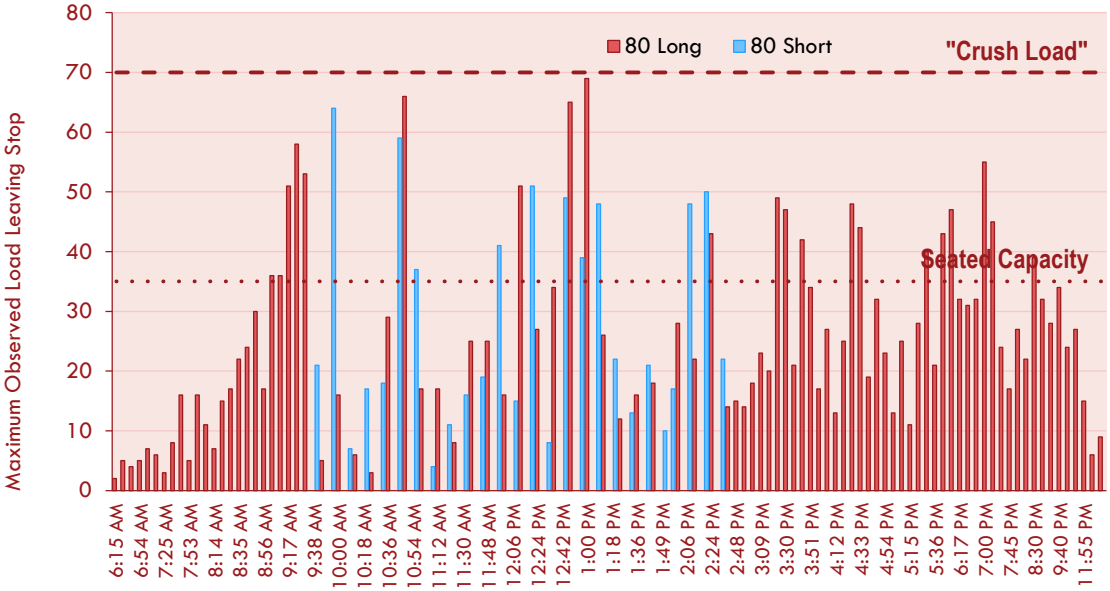
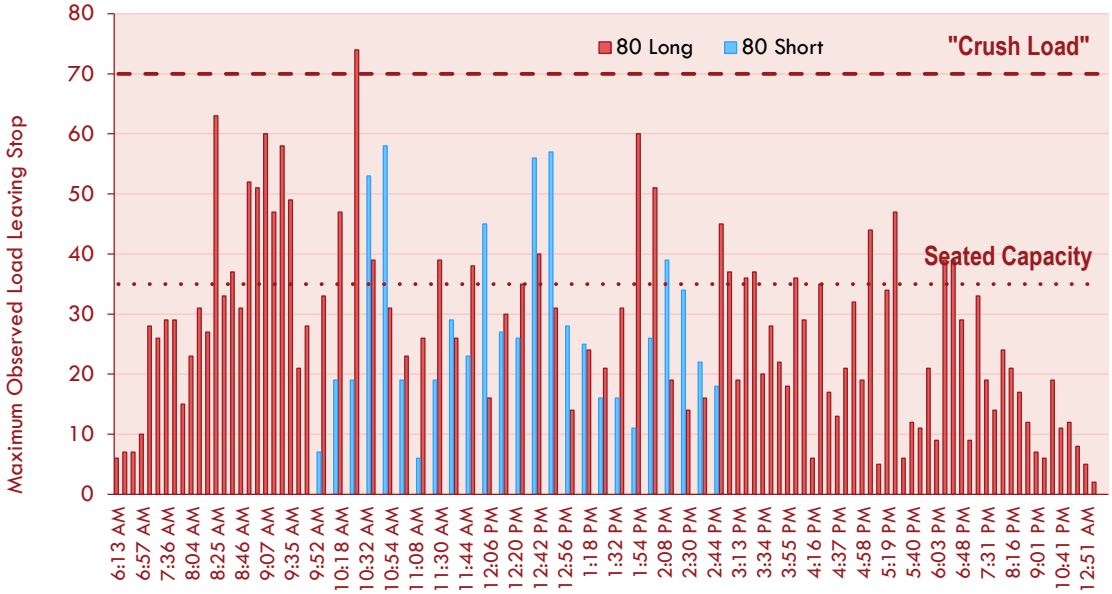


Figure 7 | Route 80 EASTBOUND Maximum Loads by Trip



Performance

Route 80 is a very high performing route with 109 riders per vehicle hour and an operating cost per passenger of $0.46 (see Table 2 and Figure 6). These productivity statistics are higher than the average for all UW routes. Despite such success, however, Route 80 has a very slow operating speed. Route 80S operates at 8 miles per hour and while Route 80L has a slightly higher overall operating speed, higher speeds likely reflect the relatively higher speeds achieved at the western end of the route. Bus stops are also very closely spaced and are more frequent than the average for all UW routes.

Table 2 | Route 80 Weekday Standard Performance Measures

Performance Measure	Route 80S	Route 80L	Route 80	UW System Average
Passengers per Revenue Vehicle Hour	132.4	102.6	**109.2**	88.9
Passengers per Revenue Vehicle Mile	16.5	10.2	**11.0**	9.4
Operating Cost per Passenger	$0.38	$0.49	**$0.46**	$0.57
Average Speed (mph)	8.0	10.1	**9.9**	9.4
Stop Spacing (miles)	0.15	0.16	**0.16**	0.19

Source: ridership data from April–May 2012 fareboxes, operating cost from Madison Metro.

Figure 8 | Passengers per Revenue Hour

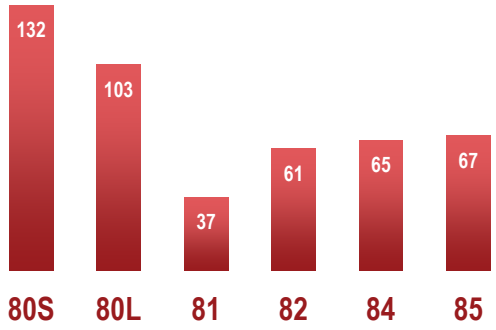
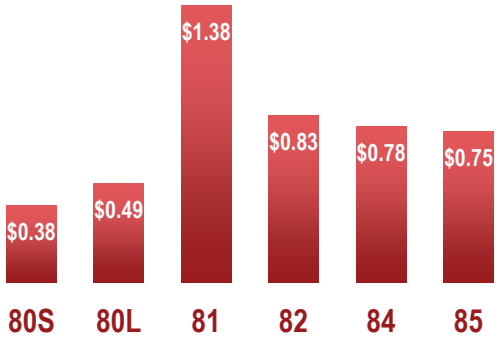


Figure 9 | Operating Cost per Passenger



Service Design

Route 80 fulfills two main functions. One on hand it circulates around the main UW buildings and academic centers, and on the other hand it provides slightly longer distance connections from the residential buildings on Eagle Heights, and parking facilities located at Lot 76 and Lot 60 with the academic buildings on the eastern side of campus. Route 80 is also complemented by Route 84, Eagle Heights Express, which provides limited stop express service between the main academic part of campus and Eagle Heights.

Proposed August 2012 Service Changes

UW Transportation Services (TS) has planned service changes scheduled for implementation on August 26, 2012. Some of the proposed changes involve combining Route 80 with Route 85, so the new combined service will travel between Memorial Union and either the UW Hospital or Eagle Heights along Observatory Drive and Linden Drive. The inbound trip will circulate along Charter Street, Dayton Street and Lake Street and return to Memorial Union on Langdon Street.

The main change to Route 80 is largely that the loop at the eastern end of the route will be larger and longer. Route 80 will also no longer serve Park Street, which is a major source of ridership, or West Johnson, which does not generate quite as many riders.

Another proposed change to Route 80/85 is to the service schedule. Currently Route 80L is scheduled every 15 minutes and Route 80S functions as an overlay, also operating every 15 minutes so the combined headway is 7.5 minutes (approximately). This schedule is available the entire time Route 80S operates. The combined Route 80/85 is designed to more closely match service with demand (see Table 2). As a result, during some time periods there will be more service than in the current schedule. The combined Route 80/85 schedule between 10:00 AM and 3:00 PM, for example, is such that either a bus is scheduled to depart from Memorial Union every 6 minutes. Between 3:00 PM and 6:00PM either a Route 80 or 85 bus will leaves Memorial Union every 7 minutes.

Table 2 | Route 80/85 Schedule Statistics

Service Day	Span of Service*	Frequency (min)	Destination
Standard			
Weekdays	**6:00 AM – 10:00 AM**	**7-25**	**Eagle Heights**
		7-15	**UW Hospital**
	10:00 AM – 3:00 PM	**12**	**Eagle Heights**
		6	**UW Hospital**
	3:00 PM – 6:00 PM	**7**	**Eagle Heights**
		7	**UW Hospital**
	6:00 PM – 1:15 AM	**12-45**	**Eagle Heights**
		12-45	**UW Hospital**

Source: Memo from Transportation Services, UW Madison to Student Transportation Board, Associated Students of Madison, dated May 23, 2012.

SERVICE IMPROVEMENT OPTIONS

There are several service improvement options for Route 80 that follow from this analysis that are consistent with TS's proposed service changes. These options include:

- **Reduce service to Eagle Heights and increase service to Lot 76.** Demand on the Route 80 is strongest in the middle part of the route, between Memorial Union and Observatory Drive. Re-scheduling trips so that more services are offered on the short trips as compared with the long trips could save travel time and operating resources.
- **Scheduling service frequency to match demand**. Currently, Route 80 provides 7-minute service for most of the day. While demand is high overall, there are some time periods where more service is needed and others where less would suffice. TS's proposed schedule will address this opportunity by providing more service during the middle of the day and less in the early morning.

Operate as a headway based schedule. Route 80 is operated with scheduled timepoints, so that riders expect the bus to be at a particular location at a specified time. However, given Route 80 has difficulty meeting this schedule due to congestion, construction and other travel delays and it runs very frequently, the route may be better operated as a headway based schedule – either all day or during peak periods. Under this option, passengers could expect a bus would arrive every 6-7 minutes during key times. Additional potential service improvement options for Route 80 include:

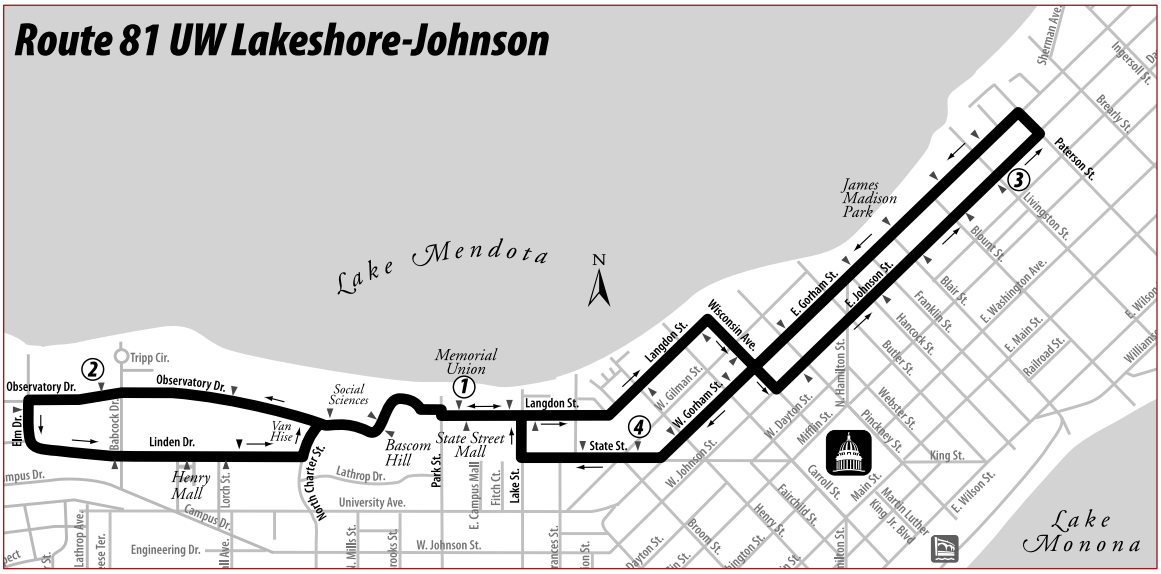
- **Schedule Route 80 more closely with Route 84.** Route 84 provides peak period express service between Eagle Heights and Van Hise Hill. The route currently operates five round trips on weekdays. Route 80 and 84 may be more closely coordinated so that the express service is timed to augment Route 80 trips to Eagle Heights and timed during periods of peak demand, potentially in the morning as well as the afternoon. Close coordination will be increasingly important as service to Eagle Heights is reduced as part of the service reductions.

- **Coordinate Route 80 with Routes 81 and 82.** There are currently three UW routes that operate into the evening (Routes 80, 81, and 82). Service levels on Route 81 will be reduced as part of the August service changes. Service on Route 80 will also be reduced slightly. As a result, there is an increased urgency to more closely consider the relationship between the evening bus routes, including route alignments and schedules so adequate service coverage is available and service frequencies are sufficient to meet demand and address travelers' safety concerns. Potential improvements to the evening service network are discussed in more detail in a separate analysis (see Evening Service).
- **Relign Route 80 into two routes: one that travels East-West spine of campus and a second that circulates around the eastern end of campus.** As it is currently designed, Route 80 provides two main functions – on one hand it provides transportation from the western end of campus (Eagle Heights) and the eastern end (Memorial Union), and on the other hand, it circulates around campus along Charters Street, Johnson Street and Park Street. These two functions are exacerbated by the route changes scheduled for the fall, which will consolidate Routes 85 (pure circulator) into Route 80. While the two pieces work together fairly well, separating them also brings benefits, including increased speed and reliability on the east-west segment and the ability to more closely schedule each of the routes to match demand.
- **Reduce the number of stops on Route 80.** Route 80 currently stops every .15 of a mile, which slows down the bus and contributes to over-crowding on the route, especially to accommodate short trips. One potential solution would be to eliminate stops that are very closely spaced. For example, Route 80 stops three times along Park Street between W. Johnson and Langdon Street, a distance of .3 of a mile, meaning the bus stops approximately every tenth of a mile. While the stops are used, they could be spaced so the bus stops twice without significantly inconveniencing most riders.
- **Operate Route 80 with larger (articulated) vehicles or buses with multiple doors.** Currently, the service is operated with standard 40' vehicles that have one door for passengers to get on and off. Congestion at key times means the buses are overcrowded and a single entry point increases the amount of time required to allow passengers to get on and off the vehicle. One potential solution is to operate the service with large articulated vehicles that can accommodate more passengers, or use vehicles that have multiple doors so passengers can board and alight from separate locations. Both types of equipment would help alleviate congestion and could speed up the service.

81 | LAKESHORE-JOHNSON

Route 81 is an out-and-back evening service that connects the University of Wisconsin (UW) campus with the neighborhood east of the main campus, along E. Gorham and E. Johnson Streets. The route consists of two legs that are joined at Memorial Union. The western leg of Route 81 begins at Memorial Union, travels west on Langdon Street to Observatory Drive, turns at Elm Street and heads back on Linden Drive to Memorial Union. The eastern leg begins at Memorial Union, travels east on Langdon Street to Wisconsin Avenue and E. Johnson Street. The route turns on Paterson Street and heads back to Memorial Union via E. Gorham Street, State Street, and Lake Street to Langdon Street.

Figure 1 | Route Map



Schedule

Route 81 operates daily during the evening hours with extended service on Friday and Saturday nights. Sunday through Thursday, Route 81 begins at 6:36 PM and ends at 1:58 AM; the extended evening schedule on Friday and Saturday nights continues until 3:13 AM. Bus service is available every 15 minutes throughout the schedule and the bus operates during the Standard period only, there is no service when school is not in session. Route 81 travels five miles from end to end and takes 30 minutes to complete one round trip.

Table 1 | Route 81 Schedule Statistics

Service Day	Span of Service*	Frequency (min)	Trip Time (min)	Daily Trips
Standard				
Sunday – Thursday	**6:36 PM – 1:37 AM**	**15**	**30**	**30**
Friday and Saturday	**6:36 PM – 2:52 AM**	**15**	**30**	**36**
No Recess service				

Source: route schedules; *Span of service is based on departure time from Memorial Union.

Transfer Locations

Route 81 begins/ends service at Memorial Union and offers connections with the other UW routes from this location. The alignment also overlaps with several routes, especially along Linden and Observatory Drives; thus there are several locations where riders can transfer between routes. Route 81's alignment also overlaps with several mainline Madison Metro routes, but as an evening and nighttime route, there are few opportunities for connections between Madison Metro and Route 81.

Ridership

Route 81 carries about 500 riders per day, or about 18 passengers per trip.

Ridership by Stop

The two stops at Memorial Union, by far, account for the most boardings and alightings on Route 81, with nearly 35% of all activity (see Figure 2). Accordingly, the bus is most full immediately before and after this location (see the route's load profile in Figure 3). The stop at Observatory Drive and Babcock Street is also a major location for passenger boardings and alightings, with about 15% of the entire route's activity. This stop is next to the Steenbock Memorial Library and within a short distance of the residential area at Tripp Circle.

Ridership is fairly evenly balanced between the eastern (43%) and western (57%) legs of Route 81. The western leg is shorter, but the high activity at Observatory Drive and Babcock Street helps ensure this portion of the route is well-utilized. Ridership along the eastern leg of Route 81 is more dispersed, with activity at several locations throughout the route.

Figure 2 | Route 81 Boardings and Alightings by Stop

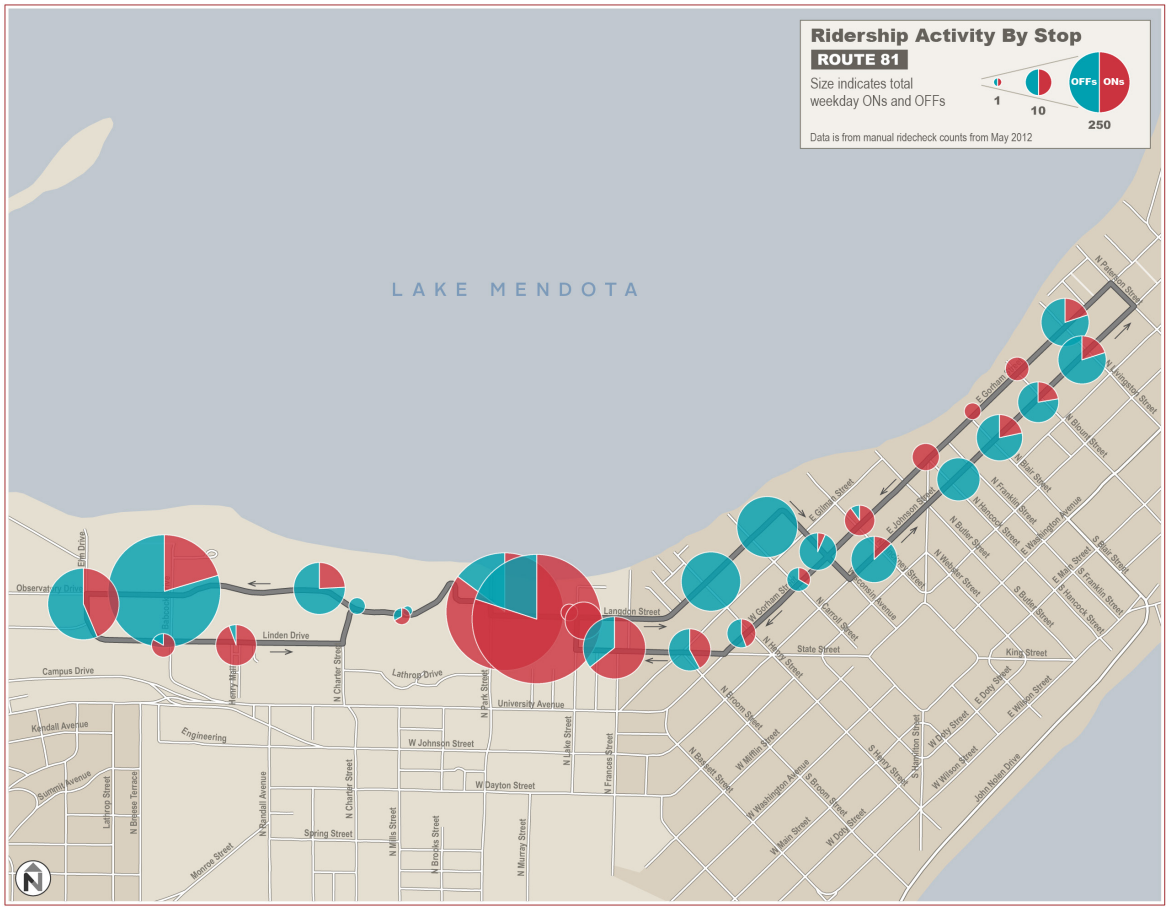
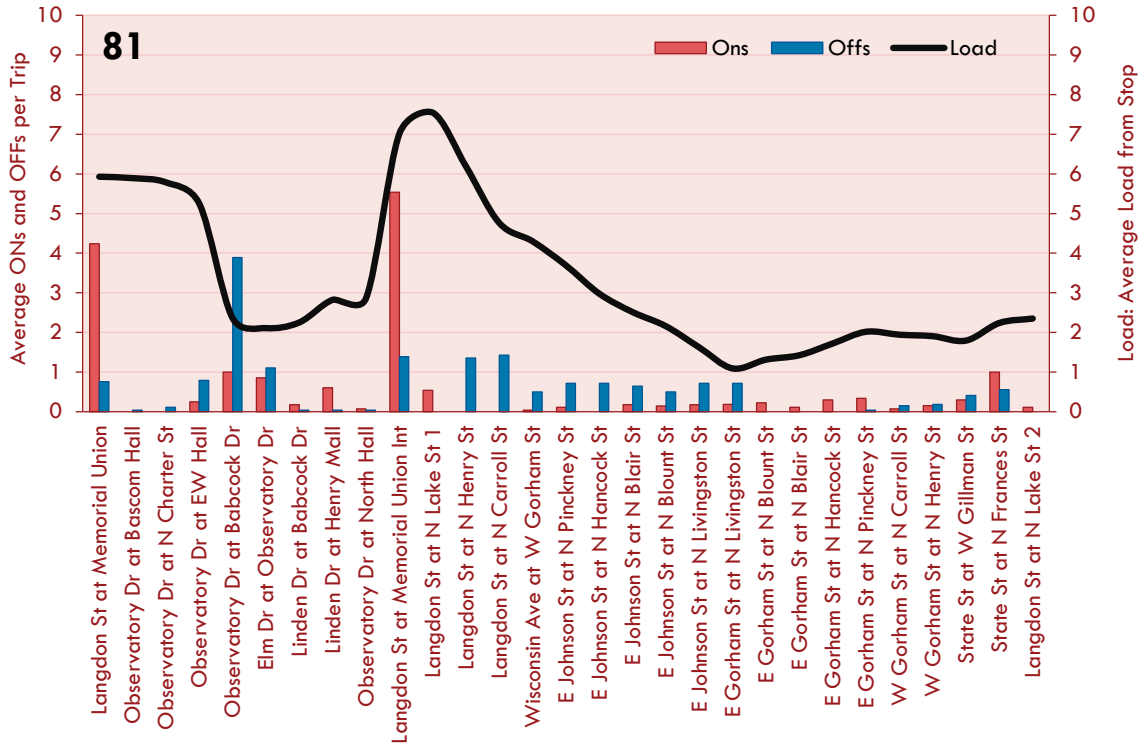


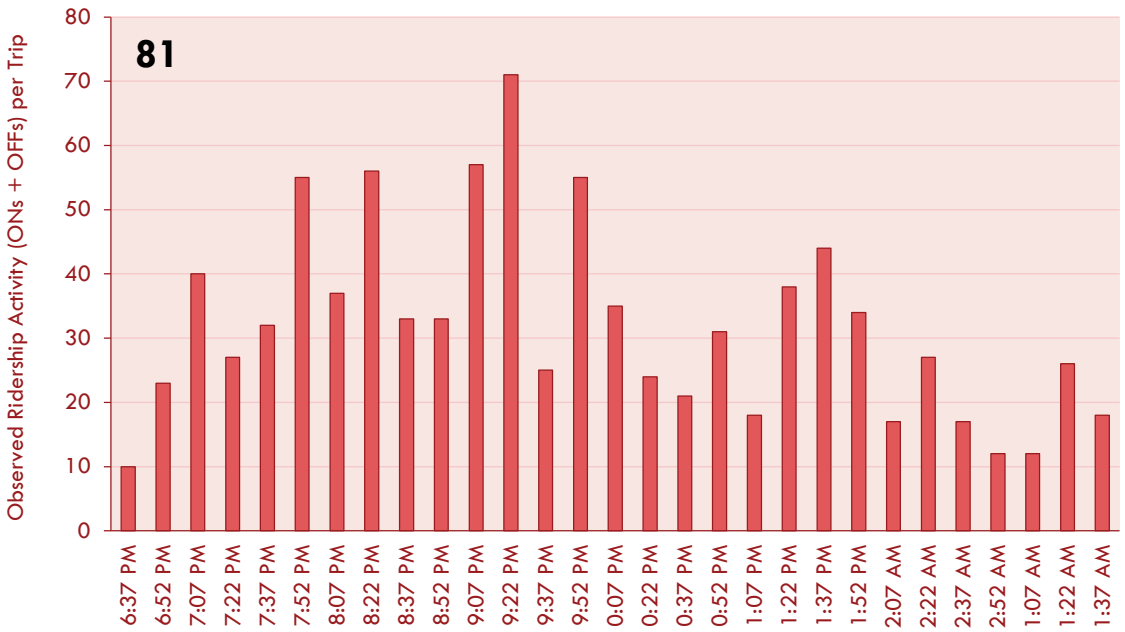
Figure 3 | Route 81 Load Profile



Weekday Ridership by Trip

Ridership on Route 81 is fairly evenly dispersed throughout the schedule (see Figure 4), with the largest number of riders using the service between 7:00 PM and 12:00 AM. The first trip of the day, plus a couple of the late night trips, has relatively lower ridership. These trips, however, still carry at least 10 riders.

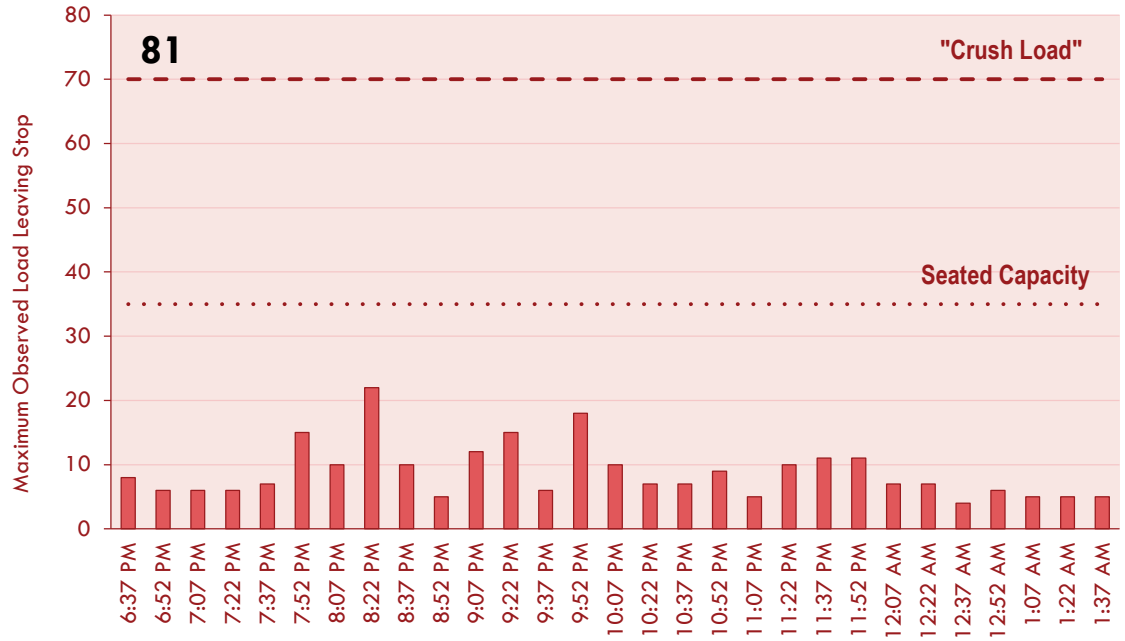
Figure 4 | Route 81 Ridership by Trip



Weekday Maximum Loads by Trip

There are no capacity concerns on Route 81 (see Figure 5). Even though some of the trips carry more than 40 riders per trip, data on ridership patterns demonstrate that the number of riders on the bus at any one time does not exceed about 20 riders. This reflects high turnover on the route and the fact that the route is designed with two loops connected at Memorial Union.

Figure 5 | Route 81 Maximum Loads by Trip



Performance

Route 81 carries nearly 37 passengers per vehicle hour and has an operating cost per passenger of $1.38 (see Table 2 and Figure 6). As such, Route 81 is the lowest-performing route of the five UW routes. Route 81 has a lot of stops, reflective of its design as a safety-oriented service. Despite having a lot of stops, Route 81 operates with a higher than average speed for the UW routes. This likely reflects the fact that the bus travels outside of normal business hours, when the roadways are less crowded.

Table 2 | Route 81 Weekday Standard Performance Measures

Performance Measure	Route 81	UW System Average
Passengers per Revenue Vehicle Hour	36.5	88.9
Passengers per Revenue Vehicle Mile	3.5	9.4
Operating Cost per Passenger	$1.38	$0.57
Average Speed (mph)	10.3	9.4
Stop Spacing (miles)	0.17	0.19

Source: ridership data from April–May 2012 fareboxes, operating cost from Madison Metro.

Figure 6 | Passengers per Revenue Hour

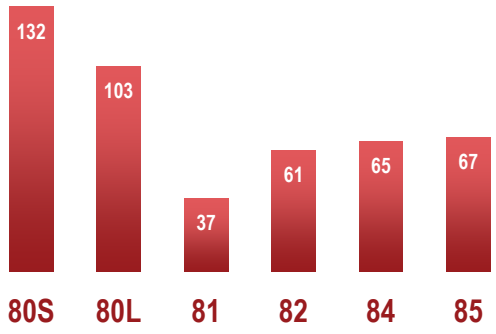
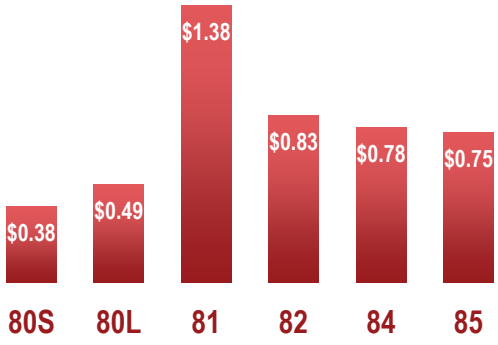


Figure 7 | Operating Cost per Passenger



Service Design

Route 81 appears to be primarily intended as an evening circulator that is designed to offer students safe transportation between UW's residential, academic and evening activity centers.

Proposed August 2012 Service Changes

Service changes proposed by TS for implementation on August 26, 2012 include a service reduction on Route 81. Citing relatively poor performance on Route 81, TS has recommended reducing service frequency from 15 minutes to 30 minutes. Construction on campus may result in some alignment changes, but there are no other routing changes suggested for Route 81.

SERVICE IMPROVEMENT OPTIONS

Route 81 plays a specialized role in the UW transportation network by providing evening and nighttime service between major residential, academic and social facilities.

As a specialized service focused on offering a safe nighttime ride, the bus stops where riders board and alight are also an important component of service. It may be beneficial to assess the route's bus stops for nighttime safety issues. Lighting and visibility, for example, become critical at night.

As the least productive route in the UW routes, service on Route 81 will be reduced by half in August of 2012. There are opportunities to improve Route 81 and/or strategies to reduce costs while maintaining service frequency. Some service improvement options identified as part of this analysis, which are consistent with TS's proposed service changes, include:

- **Increase coordination with Route 82.** Both Route 81 and 82 are designed to provide safe evening and night transportation within and around the UW campus. Both routes are designed as loops that converge at Memorial Union. Despite these similarities, the routes are primarily designed to increase coverage rather than as a coordinated system. Given the reduction of service on Route 81, developing a coordinated system will be essential.
- **Increase service coordination with Route 80.** Another potential way to alleviate the impacts of a service reduction on Route 81 is to more closely coordinate service on Routes 80 and 81. Route 80 provides 15-minute service along Linden and Observatory Drives until 9:00 PM and 45-minute service thereafter. If the routes are coordinated, the effective frequency on Linden and Observatory may be increased to a sufficiently frequent level of service.

Other potential service improvement options for Route 81 include:

- **Shorten Route 81 to reduce travel time.** An alternative to reducing the service frequency on Route 81 may be shortening the route on the eastern end by turning back at Blount Street. The reduced travel time, combined with other strategies such as eliminating bus stops, may allow Route 81 to retain more service frequency. Although there are boardings further east on both Gorham and Johnson Streets, the distance is less than one-quarter mile. Recognizing the safety focus of the service, this may or may not be a trade-off travelers are willing to make.
- **Operate out-and-back along Observatory Drive.** Route 81 currently travels outbound on Observatory Drive and inbound on Linden Drive. While there are boardings on Linden Drive, boardings are much higher on Observatory Drive. Route 81 may be simplified by operating out-and-back along Observatory Drive (provided the geometric challenges with traveling eastbound on Observatory Drive at Bascom Hill are overcome). With the reduced service schedule, the out-and-back alignment means a bus would pass stops along Observatory Drive every 30 minutes instead of once an hour. This would significantly increase access for people living near Tripp Circle. It would also make the route easier for people to remember where and when to catch the bus, although some riders may have to walk longer distances. Service could also be coordinated with Route 80 to maintain a 30 minute frequency.
- **Expand western loop to overlap with Route 82.** An alternative approach to the previous option would be to expand the western loop so that it travels outbound on Observatory Drive and inbound on W. Johnson Street. This would expand the route's coverage and offer two-way service on W. Johnson Street. Although ridership on Linden

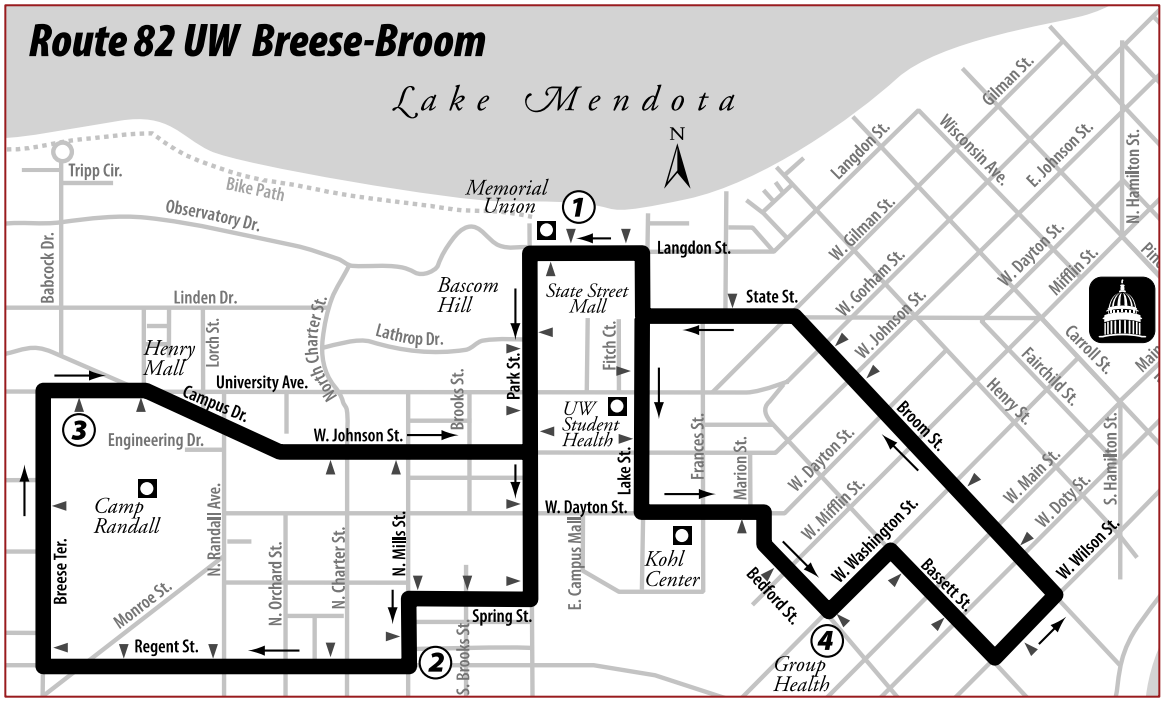
Drive is fairly low during the evening, ridership on W. Johnson is also low during the evening. The alternative does, however, strengthen the north-south connections and provides two-way service on Park Street where ridership is high.

- **Shortern eastern terminus of Route 81 to stay closer to campus.** Currently Route 81 travels east to Peterson Street, which is 1.5 miles east of Memorial Union and more than a mile east of most of the UW campus. Although there is demand along the corridor served, there are policy considerations associated with service so far off-campus. Not traveling so far east could also help increase service frequency on the main part of campus. One option would be to turn the bus at Wisconsin Avenue. This location incorporates some of the largest demand and balances the need to serve some off-campus locations.
- **Serve the UW Medical Complex and Lot 76 instead of turning at Elm Drive.** One potential improvement option could be to extend Route 81 further east to the UW Medical Complex and Lot 76. This could increase ridership on the route and provide important connections for workers at the UW Medical Complex.
- **Operate out-and-back along Langdon Street.** Route 81 currently travels outbound on Langdon Street to Wisconsin Avenue, heads east into the neighborhoods, returning to Memorial Union via Gorham Street and State Street. Route 81 may be simplified by operating out-and-back along Langdon Street, so that a bus passes a stop every 30 minutes (under the new schedule) instead of once an hour. This would make it easier for people to remember where and when to catch the bus, although some riders may have to walk longer distances. The width of Langdon Street, however, may not make this option feasible.
- **Replace Sunday – Wednesday evening service with demand response style Flex Service.** An alternative service design used for night service in other places, including at universities, is to operate late night service as "Flex" or flexible service, so that riders can board or alight from the route at fixed time points, but the bus is able to travel off-route to bring people to their particular locations. The current demand of about 15 passengers per hour is at the upper limit of operating a Flex service with a single vehicle, but given the compact service area and concentration of ridership around a handful of stops, it might be feasible. This service design has the advantage of offering increased safety and flexibility. However, the service may be more confusing for some riders.
- **Shorten service span.** Route 81 has fairly strong ridership throughout its schedule, but there are a handful of trips, especially at the beginning and end of the service span that carry fewer riders. There are also several other UW and Madison Metro routes operating during this time period making the Route 81 service less essential. One potential strategy to save resources may be to start service an hour or hour and a half later, at 7:30 PM or 8:00 PM and rely on Route 80 between 6:30 PM and 8:00 PM.

82 | BREESE-BROOM

Route 82 provides circulator service around the central part of the UW campus. The route operates with two one-ways loops that connect at Memorial Union. The western loop begins at Memorial Union, travels south on Park Street to Spring Street, turning west on Regent Street, north on Breese Terrace and east on University Avenue to Campus Drive and W. Johnson Street back to Memorial Union on Park. The eastern loop heads south on Lake Street to Dayton Street, Bedford Street, Washington Street and Bassett Street, turning east on W. Wilson Street, north on Broom Street, back to Memorial Union via State, Lake and Langdon Streets (see Figure 1).

Figure 1 | Route Map



Schedule

Route 82 is an evening service that operates daily during the academic calendar (Standard Schedule). Buses run on the half-hour between 6:19 PM and 1:49 AM Sunday through Thursday. There are extra trips scheduled on Friday and Saturday nights so service continues until 2:49 AM. Service is scheduled every 30 minutes throughout this time frame.

Table 1 | Route 82 Schedule Statistics

Service Day	Span of Service*	Frequency (min)	Trip Time (min)	Daily Trips
Standard				
Sunday – Thursday	**6:19 PM – 1:49 AM**	**30**	**30**	**16**
Friday and Saturday	**6:19 PM – 2:49 AM**	**30**	**30**	**19**
No Recess service				

Source: route schedules; *Span of service is based on departure time from Memorial Union.

Transfer Locations

Connections to the other UW campus bus routes can be made at Memorial Union. Route 82 also shares part of its alignment with UW Routes 80 and 85 along Langdon Street; Route 82 on State and Langdon Streets; and with Route 84 along Observatory Drive. As a result, there are several locations where riders can transfer between routes to get to other parts of campus.

Route 82's alignment also overlaps with several mainline Madison Metro routes, including Routes 11, 27, 28, and 38. However, these routes are all peak period commuter services and thus despite having similar alignments, because Route 82 is an evening service, there are few opportunities for connections between the Metro routes and Route 82.

Ridership

Route 82 carries about 480 riders per day, or about 29 passengers per trip.

Ridership by Stop

Much like Route 81, Route 82 is effectively two separate routes that connect at Memorial Union. The eastern and western loops are fairly well balanced; the western segment carries 59% of all riders and the eastern segment carries 41% (see Figures 2 and 3).

As such, Memorial Union is served twice during one round trip and, by far, sees the most activity with nearly 28% of all boardings and alightings. The stop at Regent Street and Randall Street also has a lot of activity (10% of all activity) with a higher proportion of alightings. Other segments with high activity are along Park Street, Lake Street, and Bassett Street. Outside of these two locations there are no other stops that carry a large number of riders. A handful of segments have relatively low ridership, including:

- Along W. Johnson Street (4%)
- Along Park Street between Johnson and Spring Street (4%)
- Along Broom Street (6%)
- Along W. Dayton, Bedford and Washington Streets (4%)

Figure 2 | Route 82 Boardings and Alightings by Stop

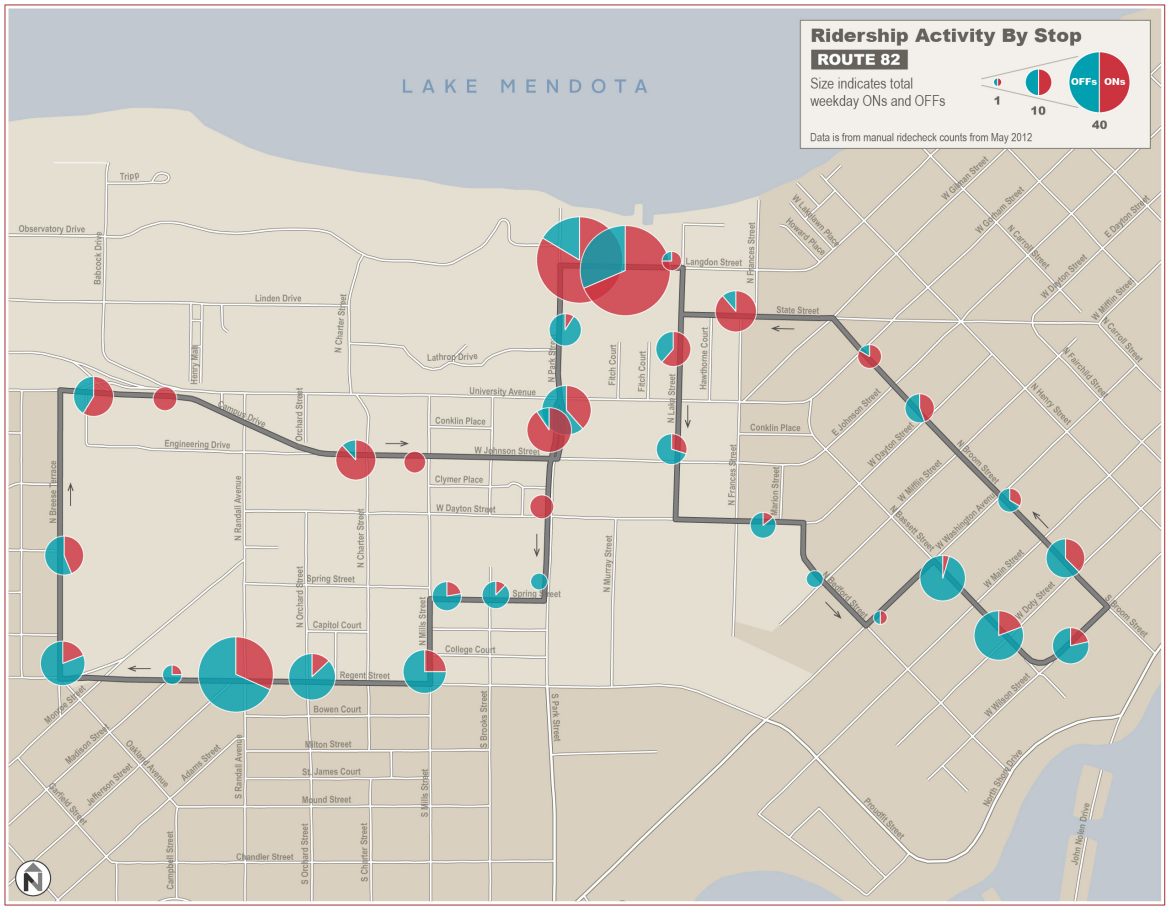
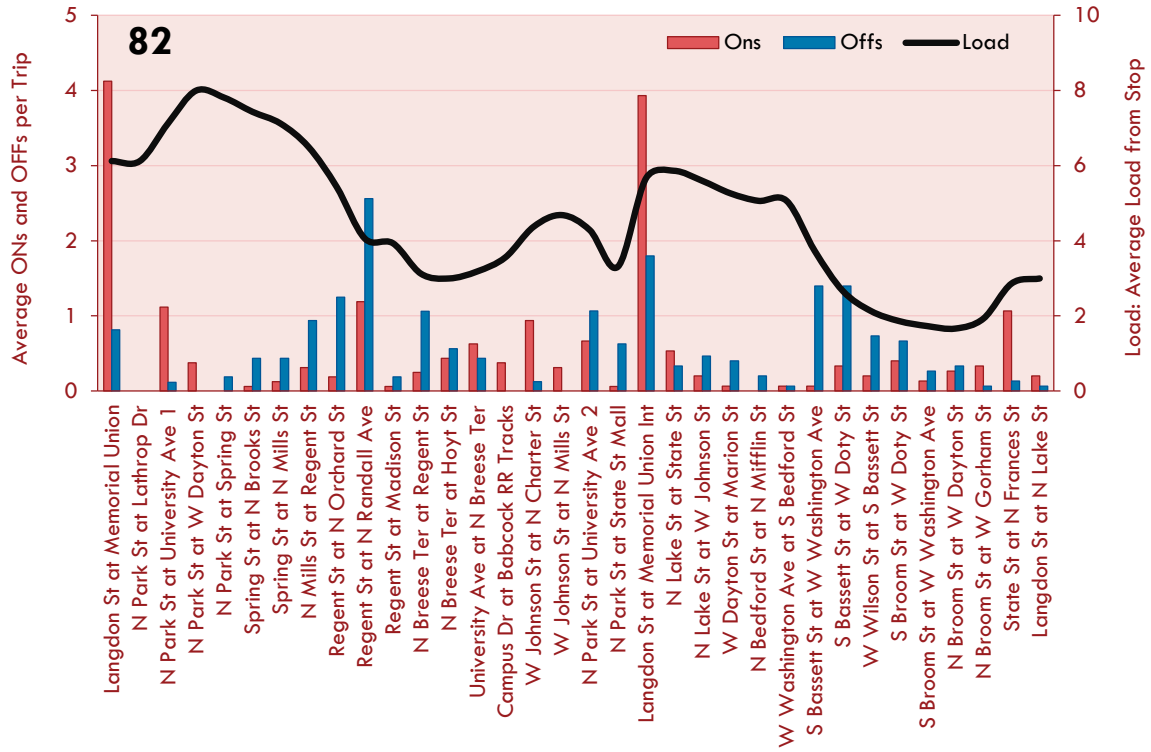


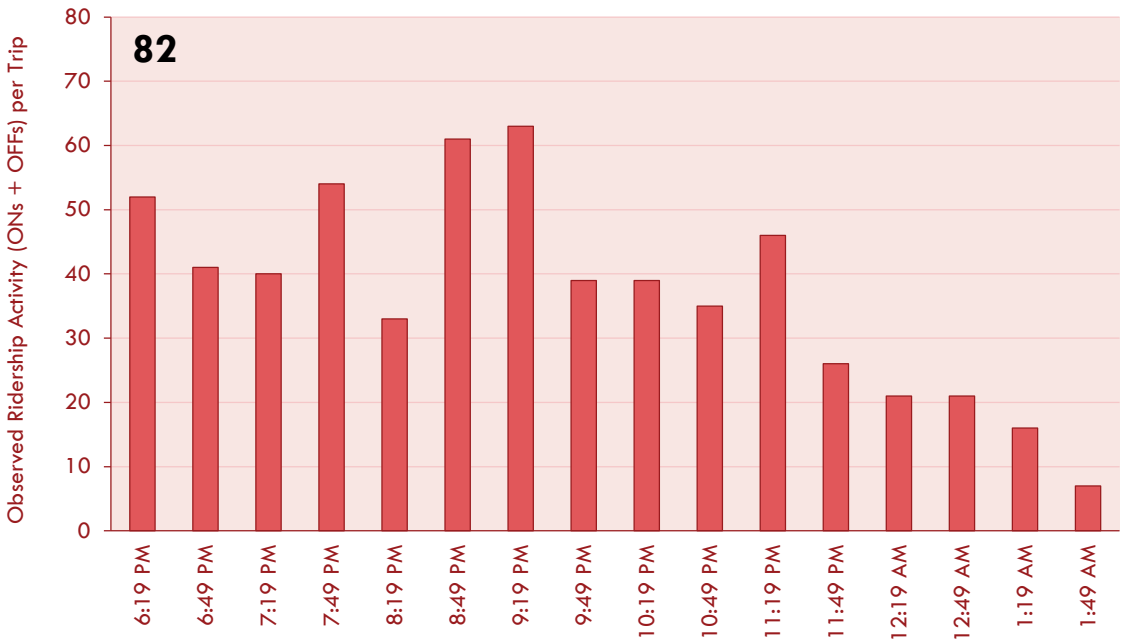
Figure 3 | Route 82 Load Profile



Weekday Ridership by Trip

Ridership throughout the day on Route 82 is quite strong in the early part of the schedule, with several trips carrying over 50 riders per trip (see Figure 4). After 12:00 AM, demand starts to slow, such that ridership drops off to about 20 riders per trip. The last trip of the evening, at 1:49 AM has the lowest demand with fewer than ten riders.

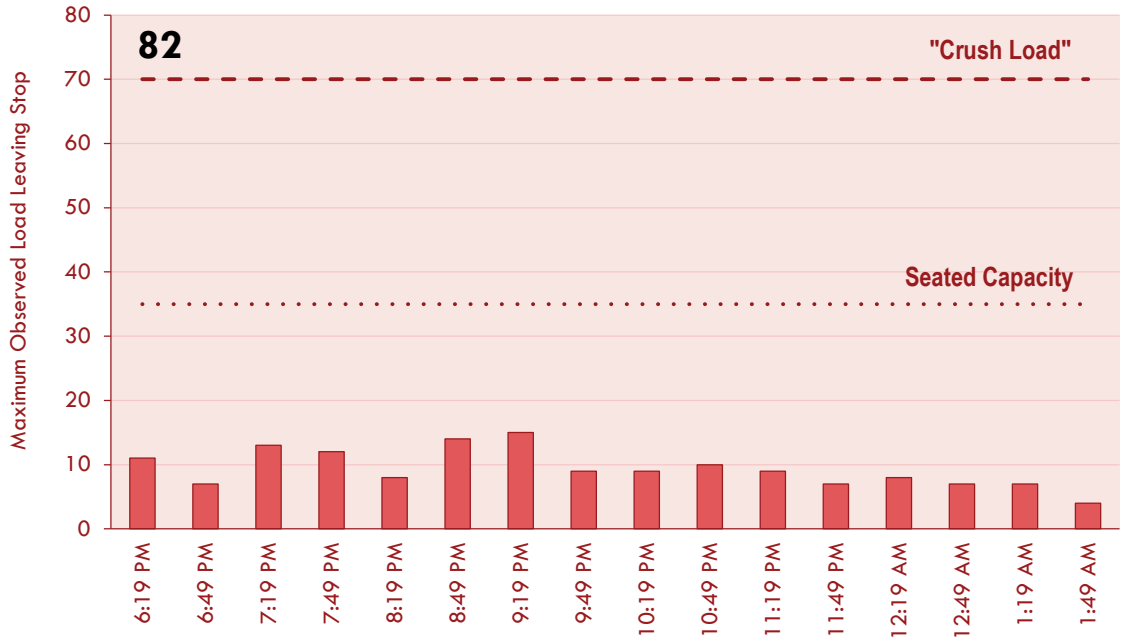
Figure 4 | Route 82 Ridership by Trip



Weekday Maximum Loads by Trip

There are no capacity challenges on Route 82 (see Figure 5). Even though several trips carry more than 35 passengers (seating capacity), there are no points where all these riders are on the vehicle at the same time. The lack of overcrowding is at least partially explained by the dual-loop alignment of the route and the high activity at Memorial Union, the mid-point in the route.

Figure 5 | Route 82 Maximum Loads by Trip



Performance

Route 82 is a productive route with just over 60 riders per vehicle hour and an operating cost per passenger of $0.83 (see Table 2 and Figure 6). These productivity statistics are below the average for all UW routes, but excellent as compared to nearly all other bus routes in the Madison Metro system. Route 82 does have a fairly slow operating speed (9.9 mph), despite operating at night when there is less congestion and few stops with extremely high boardings. There are also a lot of stops along the route (stop every .14/mile). The slow speeds and frequent stops may reflect the route's characteristics, namely operating at night, primarily to offer safe travel to students.

Table 2 | Route 82 Weekday Standard Performance Measures

Performance Measure	Route 82	UW System Average
Passengers per Revenue Vehicle Hour	60.5	88.9
Passengers per Revenue Vehicle Mile	6.1	9.4
Operating Cost per Passenger	$0.83	$0.57
Average Speed (mph)	9.9	9.4
Stop Spacing (miles)	0.14	0.19

Source: ridership data from April–May 2012 fareboxes, operating cost from Madison Metro.

Figure 6 | Passengers per Revenue Hour

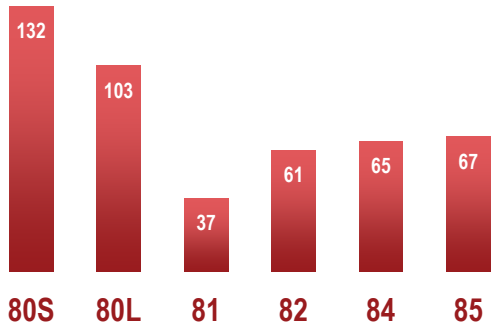
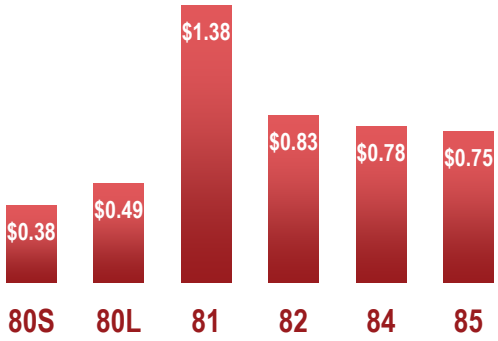


Figure 7 | Operating Cost per Passenger



Service Design

Route 82 is a night time circulator and is designed to offer safe transportation for students traveling between residential areas, academic buildings and libraries, and social/recreational areas. The route has a relatively long headway – service every 30 minutes – so riders must plan their travel to catch the bus.

Proposed August 2012 Service Changes

UW Transportation Services is planning service changes for implementation on August 26, 2012. There are no proposed changes to Route 82. However, service on the other night time circulator, Route 81, will be reduced. Recommendations also suggest that Route 81 and 82 will be more closely aligned so that some bus stops will have higher frequencies.

SERVICE IMPROVEMENT OPTIONS

As a specialized service focused on offering a safe nighttime ride, the bus stops where riders board and alight are also an important component of service. It may be beneficial to assess the route's bus stops for nighttime safety issues. Lighting and visibility, for example, become critical at night. Initial service improvement options for Route 82 include:

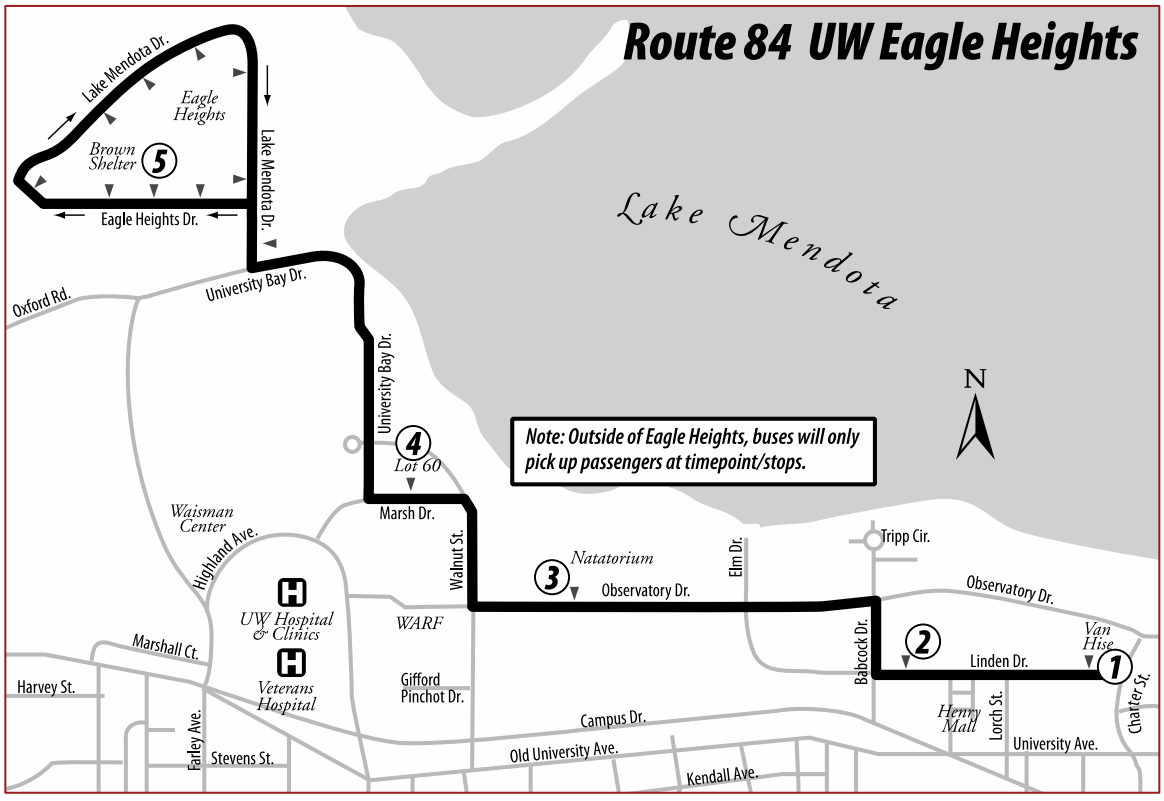
- **Coordinate service on Route 81 and 82.** Routes 81 and 82 are companion services; they both operate during the evening hours only and have circulator alignments that loop through the eastern and western sides of campus and converge at Memorial Union. The routes are not, however, well coordinated to maximize service coverage and frequency. Recommendations from the UW Transportation Services suggest that this will be part of the August 2012 service changes. As part of this analysis, opportunities to coordinate service were also explored (see analysis of evening service).
- **Consider realigning Route 82.** Ridership currently operates with two loops that connect at Memorial Union. While riders clearly appreciate the frequent connections to Memorial Union, the discreet loops create inefficiencies on other parts of the route. One potential alternative would be to realign Route 82 so that instead of traveling back to Memorial Union along Park Street, it continues along Regent Street to Washington Street and back to Memorial Union via Bassett Street to Lake Street. A loop along Bassett Street to W. Wilson Street and Broom Street may be needed to accommodate boardings in this area. The option would reduce service coverage in some areas, but may offer a more simple and straightforward service design.
- **Operate as "Flex Service" after midnight.** Ridership on Route 82 drops off considerably after midnight during weekdays. While there are advantages associated with operating fixed-route service, demand is sufficiently low that "Flex Service" may be a more efficient alternative. Flex service is a hybrid service similar to a 'super shuttle' type of service operated at some airports. There are fixed time points along the route where passengers can catch the bus, but outside of these fixed time points, the vehicle will bring people to their final destination as long as it is within a specified area.
- **Reduce service frequency after midnight.** Low ridership after midnight suggests that the frequency on Route 82 may be reduced to hourly for the late night trips.

84 | EAGLE HEIGHTS EXPRESS

Route 84 provides afternoon weekday express service between Eagle Heights and Van Hise Hall, at the intersection of Linden Drive and Charter Street. Eagle Heights is a major University residential complex that offers apartments and townhouses for graduate students, post-doc students, academic staff and faculty. In total there are 1,044 units in Eagle Heights with enough housing (i.e. bedrooms) for on the order of 1,850 people.

Route 84's alignment is fairly direct and operates (westbound) along Linden Street, Babcock Drive to Observatory Drive, Walnut Street, March Drive to University Bay Drive. From University Bay Drive, Route 84 turns on Lake Mendota Drive to loop around Eagle Heights via Eagle Heights Drive to Lake Mendota Drive and then heads back along the outbound alignment. The bus makes three stops between Eagle Heights and Van Hise Hall in the westbound direction only, at Lot 60, along Observatory Drive and Linden Drive.

Figure 1 | Route Map



Schedule

Route 84 operates weekdays during the late afternoon only, between 4:40 PM and 6:40 PM. A round trip on Route 84 travels 5.6 miles, takes about 30 minutes to complete and is operated with a single vehicle. The route provides 5 round trips with departures from Linden Drive and Van Hise Hill on the hour and half-hour (every 30 minutes) (see Table 1). Route 84 operates year-round with the same level of service regardless of the academic calendar.

Table 1 | Route 84 Schedule Statistics

Service Day	Span of Service*	Frequency (min)	Trip Time (min)	Daily Trips
Weekday – Standard	**4:40 PM – 6:40 PM**	**30**	**30**	**5**
Weekday – Recess	*identical to Standard service*			
no service on Saturday or Sunday				

Source: route schedules; *Span of service is based on departure time from Linden Drive and Van Hise Hill.

Transfer Locations

Route 84 operates along Observatory and Linden drives for part of its alignment and thus offers easy connections to several UW and Madison Metro routes, including UW Routes 80, 81 and 85 and Madison Metro Routes 11, 27, 28, and 44. In addition, the end point of Route 84 at Linden Drive and Charter Street is a short distance from University Avenue, where several other bus routes operate, including UW Route 82.

Ridership

Route 84 carries 145 riders on an average weekday, or about 29 riders per weekday trip.

Ridership by Stop

As an express route, Route 84 is designed to provide fast and direct connections from Eagle Heights and the main part of campus. Ridership patterns confirm that this is exactly how Route 84 is being used. Stops at Eagle Heights account for slightly less than half (46%) of all riders, while stops Linden Drive account for about half (48%) (see Figures 2 and 3). The two stops in between, at Lot 60 and on Observatory Drive, account for 3% of the average daily riders each.

Figure 2 | Route 84 Boardings and Alightings by Stop – Outbound Trip

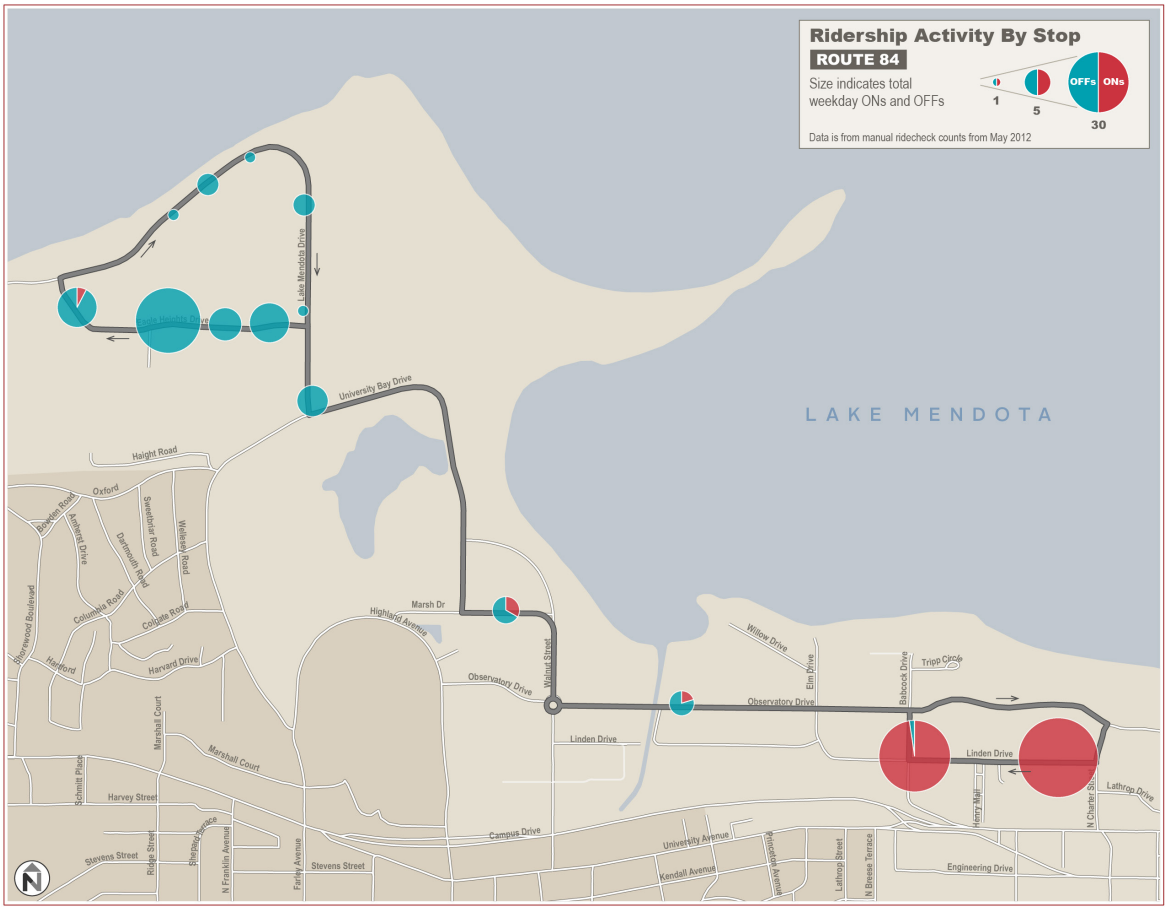
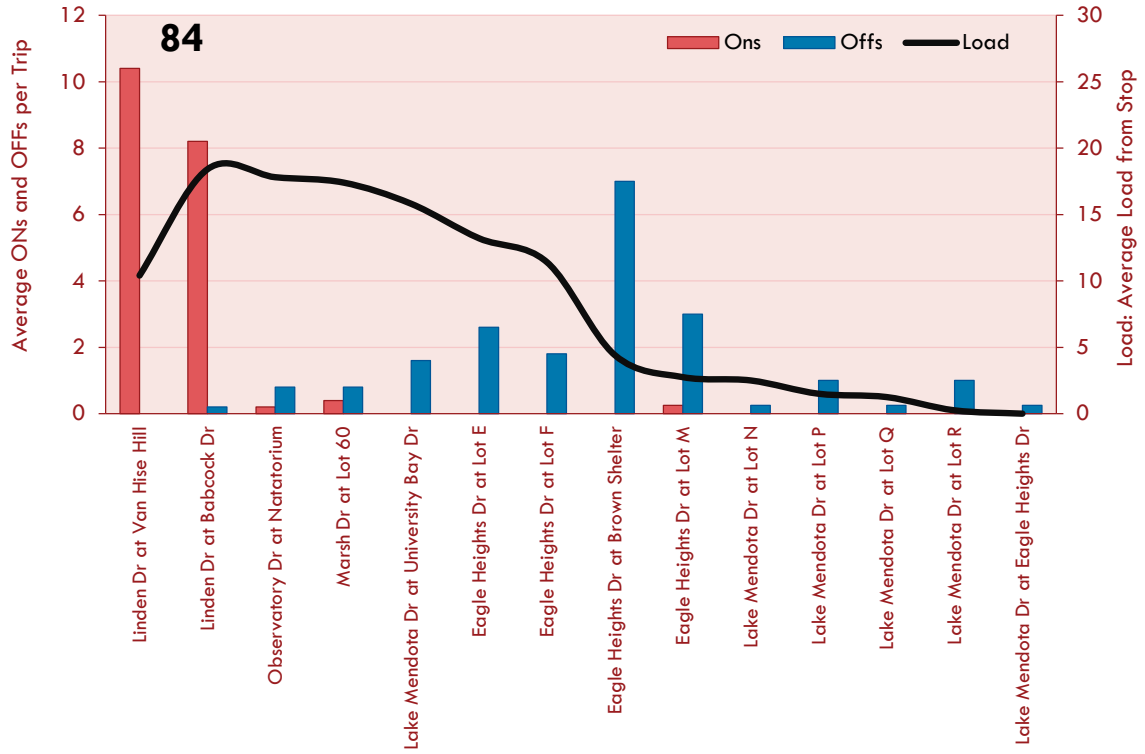


Figure 3 | Route 84 Load Profile – Outbound Trip



Weekday Ridership by Trip

Ridership is highest on the 6:10 PM trip, followed by the 5:40 PM trip (see Figure 4). All trips have fairly strong ridership with between 20 and 60 riders per trip. None of the trips, however, have capacity issues (see Figure 5).

Figure 4 | Route 84 Ridership by Trip

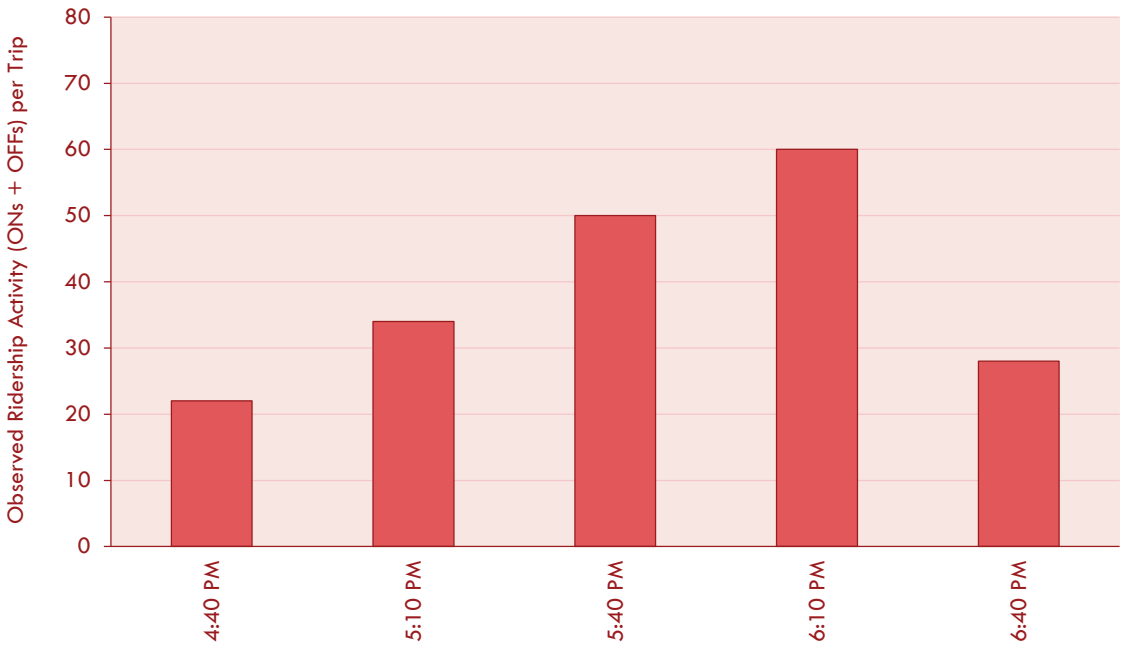
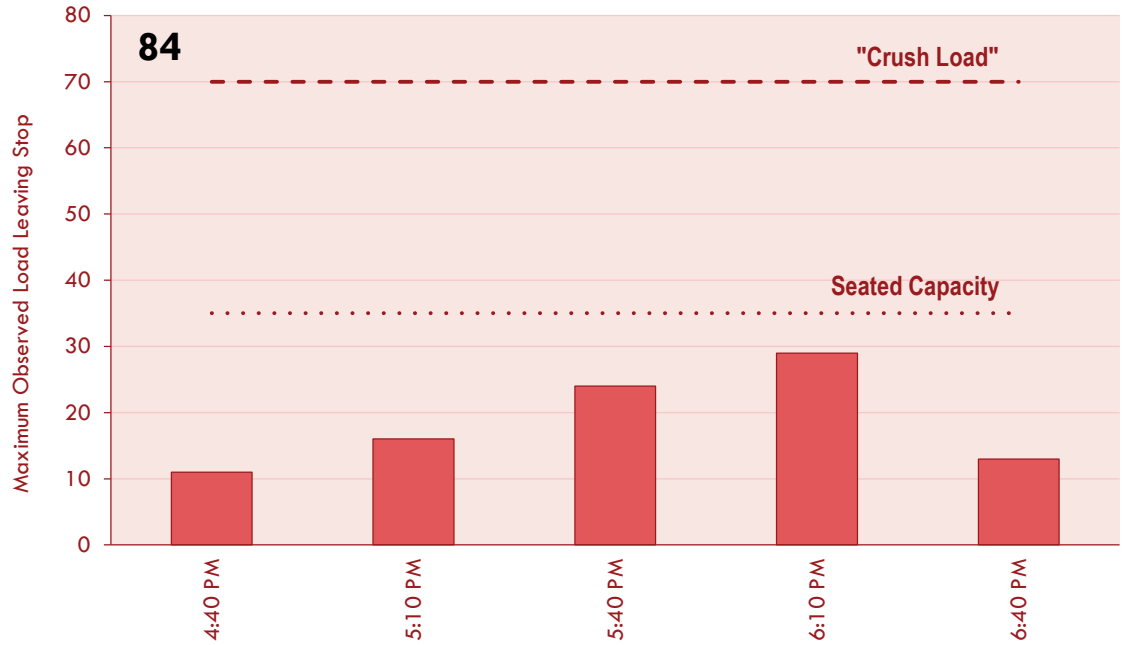


Figure 5 | Route 84 Maximum Loads by Trip



Performance

Route 84 carries 65 riders per revenue vehicle hour and has an operating cost per passenger of $0.78 (see Table 2 and Figure 6). These productivity statistics are slightly below the average for all UW routes, but excellent as compared to nearly all other bus routes in the Madison Metro

system. As an express route, Route 84 operates a speed that is higher than the other UW routes and has fewer bus stops per mile.

Table 2 | Route 84 Performance Measures

Performance Measure	Route 84	UW System Average
Passengers per Revenue Vehicle Hour	65.0	77.4
Passengers per Revenue Vehicle Mile	5.2	8.5
Operating Cost per Passenger	$0.78	$0.57
Average Speed (mph)	12.5	9.7
Stop Spacing (miles)	0.40	0.19

Source: ridership data from April–May 2012 fareboxes, operating cost from Madison Metro.

Figure 6 | Passengers per Revenue Hour

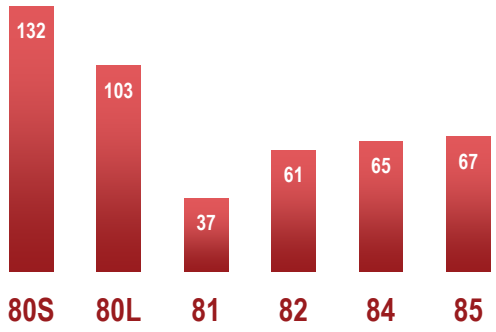
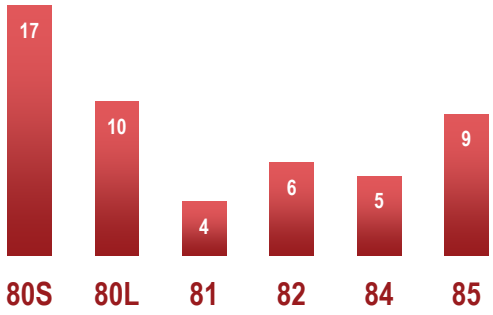


Figure 7 | Passengers per Revenue Mile



Service Design

Route 84 is partially funded by the UW Housing Department in response to Eagle Heights residents' reports that they had difficultly boarding Route 80 buses traveling westbound in the afternoon. Accordingly, the route was designed as an express overlay with direct service between Eagle Heights and Van Hise Hall. It operates during the afternoon only. The route is in addition to Route 80 which operates along a similar alignment as Route 84 but has more stops. Route 80 also travels beyond Van Hise Hall to Memorial Union via Charter Street, W. Johnson Street and Park Street.

Proposed August 2012 Service Changes

UW Transportation Services is planning service changes for implementation on August 26, 2012. No changes are proposed for Route 84.

There are, however, proposed changes to Route 80, the regular or "local" service between Eagle Heights and Memorial Union. The changes include combining Route 80 with Route 85 so that a single bus will travel between Eagle Heights and Van Hise Hill. From Van Hise Hill, the new route will incorporate part of the old Route 85 alignment and circulate along Charter Street, Dayton Street and Lake Street and return to Memorial Union on Langdon Street. The service headway for

the new combined Route 80/85 will be 12 minutes, which is slightly more frequent than the existing Route 80, which currently has a scheduled bus departing every 15 minutes. The impact of this proposed change is not expected to have a significant impact on Route 84.

SERVICE IMPROVEMENT OPTIONS

Initial service improvement options for Route 84 include:

- **Operate a Route 84 in the morning.** Performance statistics for Route 84 suggest that is a productive and fairly efficient method of serving the Eagle Heights community. Many of the residents in Eagle Heights appear to have fairly regular commute hours; it is likely that offering a similar level of service in the morning would be successful. Introducing morning express service also has the advantage of compensating some of the Eagle Heights riders for the loss of service associated with reductions to the Route 80/85 schedule.
- **Eliminate stops between Eagle Heights and Van Hise Hall.** Only a handful of riders use the intermediate stops at Lot 60, Observatory Drive and Linden Drive; they may be eliminated to reduce travel time, save operating costs and potentially add another trip to the schedule.
- **Re-align Route 84 to serve the UW Medical Complex.** Route 84 may also be improved by adding a stop at the UWMedical Complex, and potentially making this the only stop between Eagle Heights and Van Hise Hall. Ridership patterns from other routes suggest that the hospital is a more attractive and well-used stop as compared with the parking facilities at Lots 60 and 76. Adding the hospital as a stop may also help attract riders in the non-peak direction. It would also likely be attractive if morning trips were added.
- **Offer all-day service and eliminate long trips on Route 80.** It may also be possible to eliminate Route 80's long trips to Eagle Heights and operate less frequent but more direct express service between Van Hise Hill (or Memorial Union) to Eagle Heights. Some riders may be willing to trade-off frequent but slow service for less frequent service that is faster and more direct. This type of express overlay may also be attractive to individuals with disabilities who are currently prevented from using Route 80 because of overcrowding issues. For Route 84 to be attractive to individuals with disabilities, TS would need to develop some sort of exemption for individuals with mobility impairments that allows them to stop anywhere along the route. Offering an all-day express overlay would also likely be more successful serving the UW Hospital as compared with Lots 60 and 76.
- **Pick up riders on the eastbound trip.** Currently, Route 84 carries passengers on the west bound leg of the trip only. It travels back to campus with the doors closed and passes all stops. The route could be altered to pick up travelers or as "open door"service when it travels east to Van Hise Hall. While picking up passengers may slow the route somewhat, it would increase the productivity of the route, help alleviate congestion on Route 80 and increase service options for the Eagle Heights residents.
- **Consolidate stops along Linden Drive**. Route 84 stops at two locations on Linden Drive, the Brown Shelter and Van Hise Hall. These two stops could be consolidated at Henry Mall or Van Hise Hall, potentially saving travel time and improving route efficiency.

- **Realign Route 84's eastern terminus to Babcock Drive and encourage riders to connect to campus circulator routes.** Route 84 travels east along Obervatory Drive, turns at Charter and drops passengers off at Van Hise Hall and the Brown Shelter (at Babcock Drive). Rather than travel so far east, the bus could terminate at Babcock Drive, bringing passengers close to the eastern part of campus without traveling to the heart of academic facilities. Passengers wanting to travel further east could transfer to Route 80, or other bus route, to reach their final destination. The advantage of this strategy would be to reduce congestion in the eastern end of campus, reduce travel time and potential increase service levels.
- **Eliminate service.** Finally, it may also be worth considering elimination of Route 84. While productive, the route is redundant with existing services offered by the proposed Route 80/85. Eliminating Route 84 would save an estimated 520 service hours annually.

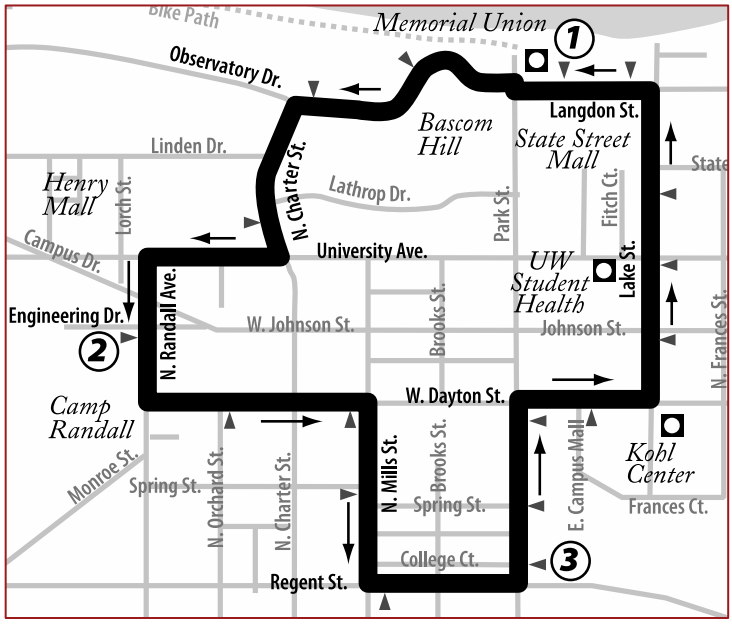
85 | SOUTH CAMPUS CIRCULATOR

Route 85 operates as a one-way loop providing circulator service in the southern and eastern core of the University of Wisconsin (UW) campus. As such, it links multiple major academic, housing and social buildings, including Memorial Union, Bascom Hall, the facilities at Randall Avenue and the southeast dorms (see Figure 1). Route 85's alignment starts on Langdon Street (Memorial Union), heads west to Observatory Drive, turns on N. Charter Street to University Avenue and N. Randall Avenue. The bus then heads east on W. Dayton Street to N. Mills Street, Regent Street, N. Park Street and N. Lake Street back to Langdon Street.

Schedule

Route 85 operates on weekdays according to a Standard and Recess calendar. The Standard schedule (when classes are in session) operates on weekdays between 7:05 AM and 5:45 PM. There are 65 daily trips, with a bus leaving Memorial Union every 10 minutes (see Table 1). The one-way loop travels 2.4 miles and has a scheduled travel time of 19 minutes and is allowed a recovery time of 1 minute (about 5% of the total trip time). Two buses are needed to operate the service and both buses are in service all day.

Figure 1 | Route Map



During the Recess schedule, Route 85 operates on weekdays between 7:25 AM and 5:05 PM, has departures scheduled every 20 minutes and provides 30 trips per day. The recess schedule requires one vehicle to operate.

Table 1 | Route 85 Schedule Statistics

Service Day	Span of Service*	Frequency (min)	Trip Time (min)	Daily Trips
Weekday – Standard	**7:05 AM – 5:45 PM**	**10**	**19**	**65**
Weekday – Recess	**7:25 AM – 5:05 PM**	**20**	**19**	**30**
no service on Saturday or Sunday				

Source: route schedules; *Span of service is based on departure time from Langdon Street and Memorial Union.

Transfer Locations

Route 85 is anchored at Memorial Union, which offers riders a transfer to UW Route 80 during the entire span of service. Riders can also use Route 85 to connect to/from Madison Metro routes including Route 27 North Transfer Point – Capital Square – UW Campus and Route 44 Fitchburg to South Transfer Point as well as the other routes that operate along University Avenue.

Ridership

Ridership on Route 85 is relatively strong with nearly 1,453 riders during the Standard weekday service, or an average of 22 riders per trip. Route 85 has the second highest ridership of the UW routes, behind Route 80; Route 85 also has the second highest level of service behind Route 80.

Ridership by Stop

Ridership on Route 85 is concentrated on the northern segments of the route, with most riders boarding along Lake Street and Langdon Street and then getting off the bus along N. Charter Street and N. Randall Avenue (see Figures 2 and 3). Consequently, the bus is most full along Langdon Street. This segment of the route carries about 1,107 daily riders, or about 64% of all passengers.

This compares with the southern half of the loop (between Engineering Drive/Randall Avenue and Lake and Johnson Streets) where ridership is considerably lower. The stops in these southern segment average 658 riders per day, just 38% of the route's ridership.

Figure 2 | Route 85 Boardings and Alightings by Stop

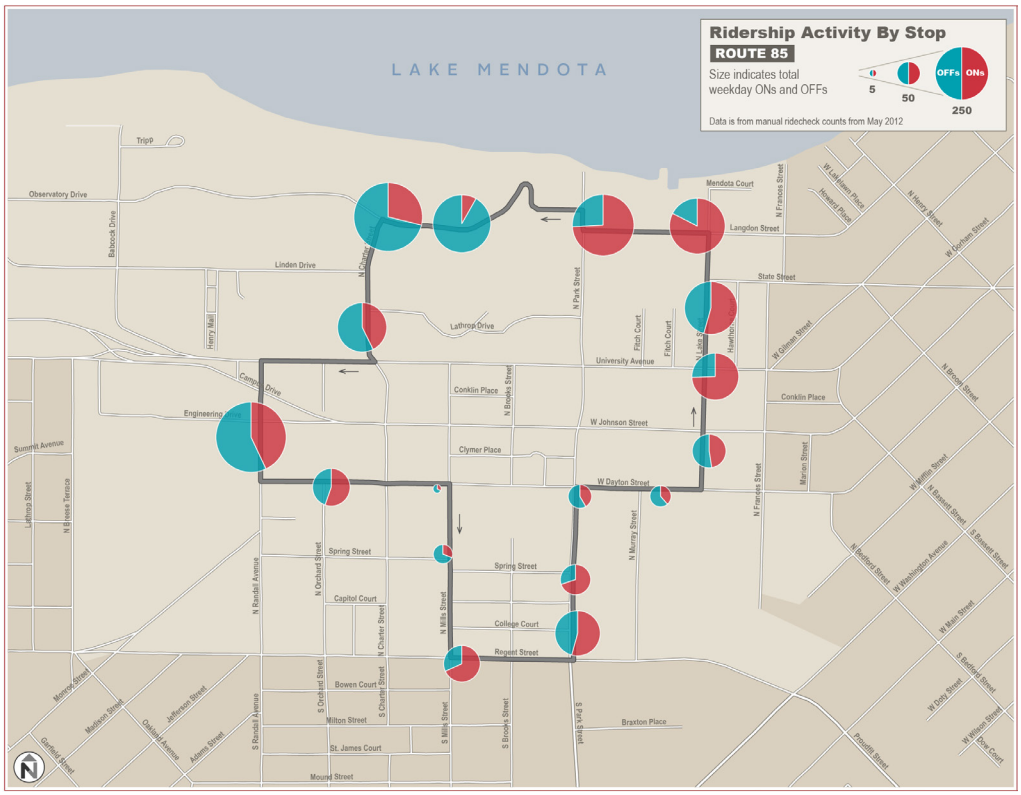
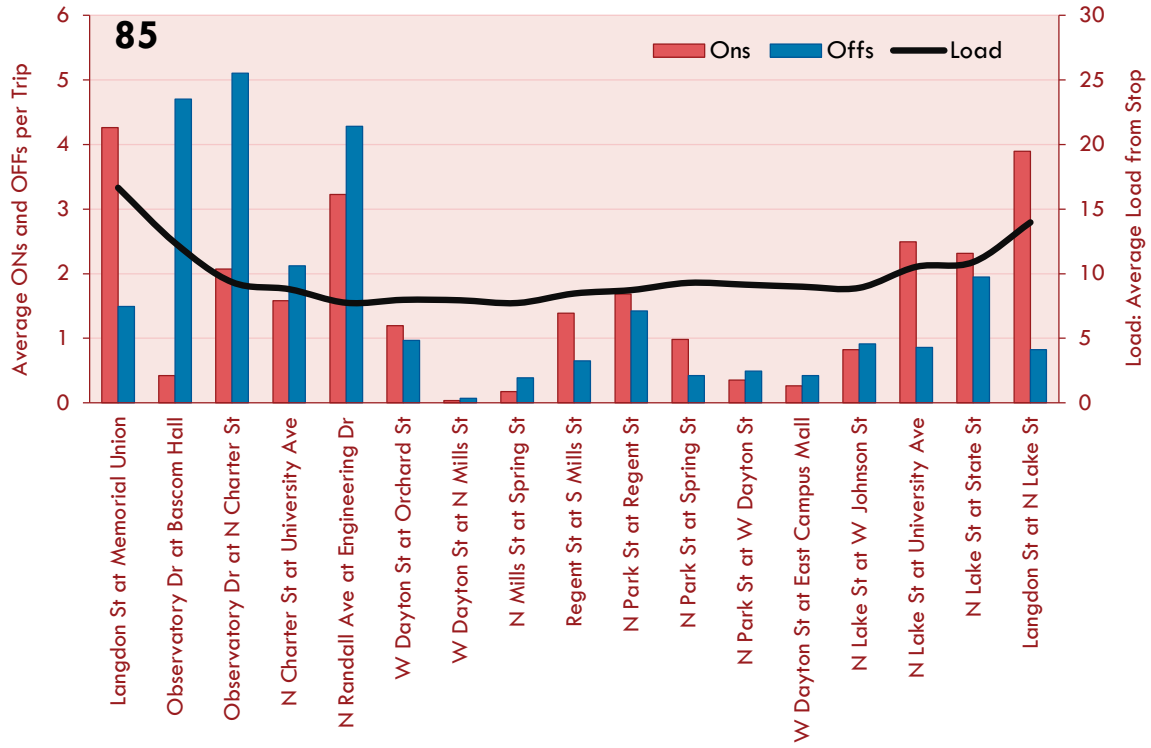


Figure 3 | Route 85 Load Profile

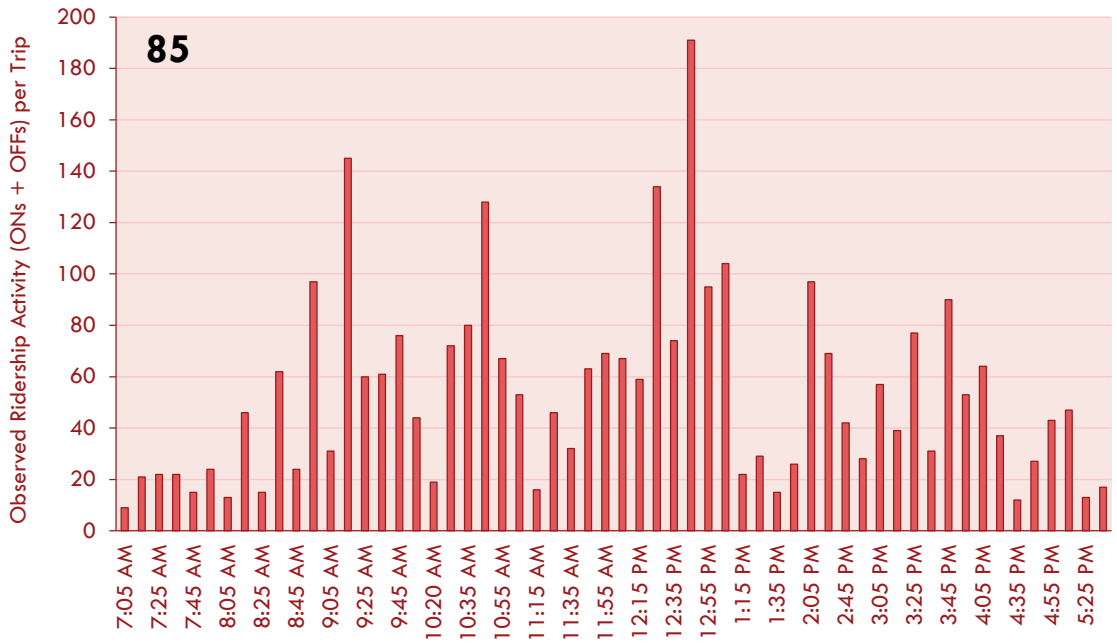


Weekday Ridership by Trip

Ridership throughout the day on Route 85 is strong with an average of some 22 riders per trip. Ridership is strongest between 9:00 AM and 4:00 PM (see Figure 4). The ridership by trip data also shows sharp spikes with several trips carrying over 80 riders and a handful with more than 100 riders per trip. The spikes mostly but not entirely line up with class shift times, which typically occur between the last 15 minutes of the hour (i.e., 9:45 AM to 10:00 AM). Class change times at least partially explain why some trips carry such large loads while trips just before or just after have dramatically fewer riders.

Another contributing factor to the significant variation in ridership per trip is the poor service reliability of Route 85 — vehicles on this route are often subject to significant delays due to the railroad crossing on Randall Avenue just south of Campus Drive, as well as multiple construction projects resulting in narrow right-of-ways. These factors often cause delays approaching and sometimes exceeding five minutes, which causes the two vehicles to "bunch up." When this happens, the first vehicle will have much higher ridership than normal, while the trailing vehicle will have much lower ridership than usual. (During the ridecheck collection effort, this happened twice in one day, and the second vehicle was taken out of service both times because it was immediately behind the first vehicle and carrying no riders.)

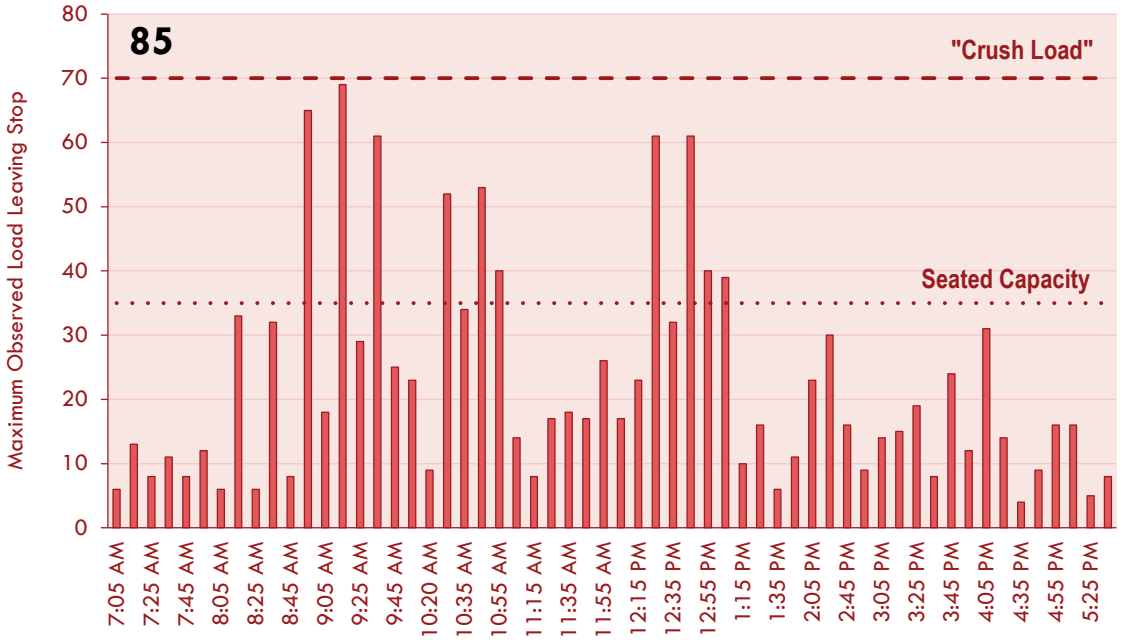
Figure 4 | Route 85 Ridership by Trip



Weekday Maximum Loads by Trip

The UW routes are operated with 40-foot heavy-duty transit vehicles (buses) that have a seating capacity of about 35 individuals and a maximum capacity of 70 (the "crush load"). Ridership patterns mean that despite high volumes of passengers on trips, there are only a handful of times during the day where there are more than 35 individual on Route 85 at any given time. There are, however, five trips where loads are very high on Route 85 and approach the crush load of 70 passengers, plus another five trips where loads are above seating capacity (see Figure 5). Overcrowding tends to occur between 8:45 AM and 12:45 PM and broadly correlates with class shift times. The overcrowding during this peak also affects riders with special mobility needs, as buses are often not able to accommodate wheelchairs due to overcrowding. Outside of this peak period, however, most riders should be able to find a seat.

Figure 5 | Route 85 Maximum Loads by Trip



Performance

Route 85 is a relatively productive route with just over 67 riders per vehicle hour and an operating cost per passenger of $0.75 (see Table 2 and Figure 6). These productivity statistics are slightly below the average for all UW routes, but excellent as compared to nearly all other bus routes in the Madison Metro system. Challenges associated with Route 85, however, include a very slow operating speed (7.2 mph, which is the slowest UW route — see Figure 7) and frequent bus stop spacing with a bus stop located every .14 of a mile.

Table 2 | Route 85 Performance Measures

Performance Measure	Route 85	UW System Average
Passengers per Revenue Vehicle Hour	67.2	88.9
Passengers per Revenue Vehicle Mile	9.4	9.4
Operating Cost per Passenger	$0.75	$0.57
Average Speed (mph)	7.2	9.4
Stop Spacing (miles)	0.14	0.19

Source: ridership data from April–May 2012 fareboxes, operating cost from Madison Metro.

Figure 6 | Passengers per Revenue Hour

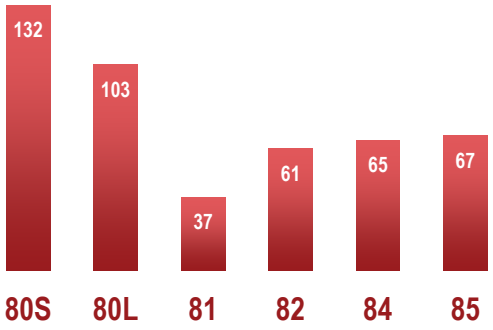
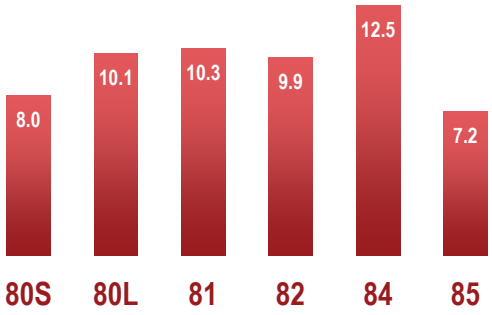


Figure 7 | Miles per Hour



Service Design

Review of Route 85 suggests that it is primarily intended as a circulator route and is designed to provide a way for students and faculty to move between campus buildings, especially Memorial Union and the academic buildings, but also to link housing on the southern end of campus with activity centers on the northern end of campus. Route 85 is a scheduled service, with clearly-scheduled timepoints and expected departure times. However, with a relatively short headway of 10 minutes, passengers may consider that they don't need to consult a schedule when they want to ride — they simply wait at the stop and expect a bus to come within 10 minutes. The route also offers connections between several of the Madison Metro commuter routes that bring people to/from the UW campus.

Proposed August 2012 Service Changes

UW Transportation Services is planning service changes for implementation on August 26, 2012. Proposed changes to Route 85 involve combining the route with Route 80 so that the new combined service will travel between Memorial Union and the UW Hospital along Linden Drive and Observatory Drive. The inbound trip will circulate along Charter Street, Dayton Street and Lake Street and return to Memorial Union on Langdon Street. This proposed service change offers advantages because most of the primary usage pattern on Route 85 is retained; namely riders will still be able to travel from Lake Street to Memorial Union, and Charter Street. Also, the northern half of the route, which carries the bulk of Route 85's ridership, is retained. The primary connection that will be lost by the new combined service is between Memorial Union and points further south on N. Mills, Regent, and Park Streets.

The service headway for the new combined Route 80/85 will be 12 minutes, which is pushing the upper limit of service designed for riders to use without a schedule. At a 12-minute headway, it may be difficult for some students to use the route to travel between classes, given the standard 15-minute window between classes.

SERVICE IMPROVEMENT OPTIONS

Initial service improvement options for Route 85 include:

- **Eliminate the segment of Route 85 that travels on Mills St./Regent Street/Park Street.** The vast majority of the riders using Route 85 use the northern

part of the route, north of Dayton Street. There is potential, therefore, to eliminate the southern loop that travels along Mills Street to Regent Street to Park Street. Eliminating this segment may sufficiently reduce travel time so that the round trip could be reduced from 20 minutes to 15 minutes, so that one bus could provide 15-minute service during off-peak times, such as before 9:00 AM and after 4:00 PM. With a shorter loop, operating two buses during the peak demand periods would also increase the frequency to operate 7.5-minute service, potentially eliminating some of the overcrowding issues and making service more attractive for travel between classes.

- **Reduce the number of bus stops.** Currently, Route 85 operates with 17 bus stops spaced over 2.4 miles, so that the bus stops every .14 of a mile. Stopping so frequently slows the bus down, increases operating costs and can make it difficult for the bus to stay on schedule during peak times. The data suggests opportunities to collapse bus stops may be along Lake Street and potentially Langdon Street; although these stops are well used, they are located fairly close to each other. Stops could be consolidated where possible in order to improve the attractiveness of service. Many city transit systems aim for one stop every quarter mile, which results in a good mix of service coverage and service efficiency.
- **Operate a peak period overlay between 8:30 AM and 12:30 PM.** Overcrowding on Route 85 exists with crush loads observed on a handful of trips. The overcrowding primarily occurs during a four-hour period in the morning (roughly 8:30 AM to 12:30 PM). Operating extra service during this four-hour peak period (when classes are in session) may alleviate much of the overcrowding issues. Funding for the service may be found by operating a shorter loop (see above). The peak period overlay could also be instituted as part of the August service changes by providing the additional service on a shortened loop that runs during this four-hour block only.
- **Retain Route 85 as a circulator service.** Service changes scheduled for August 2012 will consolidate Route 85 into Route 80. This change is motivated by a need to reduce costs and balance budgets. This current review of the routes, however, suggests that the campus bus network may be more efficiently designed if Route 85 is retained as a circulator service and other routes, namely Routes 80 and 84 are designed to meet connect to Route 85, This type of service design may mean some riders may need to transfer (or walk) to reach destinations on the western end of campus. Separating out the east-west travel from the campus circulator, however, may also mean that the individual services are able to provide more frequent and reliable service.
- **Operate as a headway schedule.** Route 85 is currently a scheduled service, meaning there are scheduled departure and arrival times for all major intersections along the route. The route operates on a 10-minute schedule so many passengers are not required to consult their schedule but instead may wait at the stop knowing that, on average, a bus will come in 5 minutes. One option, therefore, is to operate Route 85 as a "headway based" service, so that instead of developing a schedule with time points, buses depart from the route origin (Memorial Union) every 10 minutes, similar to subway service. This approach is worth considering for Route 85 because service is sufficiently frequent (every 10 minutes) and ridership patterns suggest many riders wait for the next bus. Headway based schedules tend to work best when the variation between trip times is limited and when the deployment of vehicles is closely managed (similar to a rail system). These factors ensure the time between vehicles is predictable and reliable to avoid vehicle stacking and long delays at the outer end of a route. UW, however, operates in a very congested environment where vehicles frequently get delayed due to a high volume of

boardings. That said, there is already considerable vehicle bunching on Route 85 and the relatively short distance (2.4 miles) of the route minimizes the impacts on the outer end of the route.

- **Shorten service span.** While Route 85 has relatively high overall ridership, some trips at the edges of the service span carry low ridership. These trips could be discontinued, perhaps as part of a strategy of conserving resources in order to maintain the attractive frequency on this route. Service could begin a half-hour later in the AM and end an hour earlier in the PM.

APPENDIX F

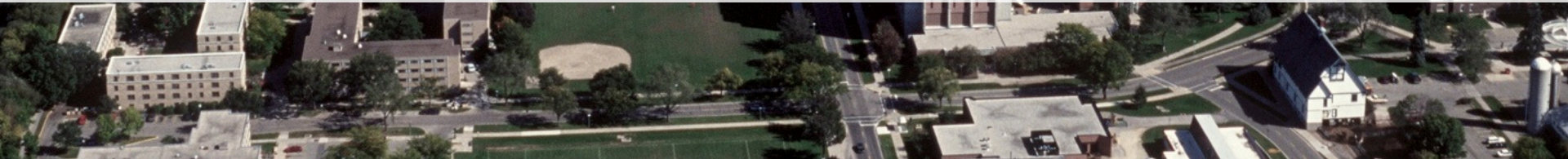
Summary of Campus Survey Results

Campus Transit System Evaluation

University of Wisconsin–Madison

NELSON NYGAARD

CONCENTRE® COMMUNICATIONS, INC



Campus Bus Survey - Overview

The Campus Bus Survey is a part of the overall **Campus Transit System Evaluation**, which aims to evaluate the effectiveness of current transit options in meeting the mobility needs of the University.

The survey gave insight into **how** existing transit services are being used today, and gave **current and prospective users** the opportunity to make **suggestions** for service improvements.

Campus Bus Survey – Goals

Understand *how* and *why* UW community makes different travel choices

- Around campus v. to/from campus
- Good weather v. bad weather
- Bus users v. non-bus users
- Time of day
- Service preferences

Campus Bus Survey – Table of Contents

- Slides organized by user group:
  - UW Health/Hospital
  - UW Faculty/Staff
  - UW Students
- Then follow this general outline:
  1. Respondent Group Profile
  2. Time of Demand
  3. Bus Pass Program
  4. Mode Choice
  5. Mode Choice Preferences
  6. Service Preferences
  7. Night Service

Campus Bus Survey – Methodology

- Qualtrics program
- Email **10,000** randomly selected respondents
  - 5,000 to **student** email addresses
  - 2,500 to **hospital** email addresses
  - 2,500 to **faculty** email addresses
- Survey open 10/2 – 10/16
- 1 reminder email sent out to chosen respondents
- 1,971 surveys containing responses returned
- Some respondents identified differently than the email list through which they were reached

Campus Bus Survey - Methodology

- Sample survey email:

From: UW Transportation Services [mailto:noreply@qemailserver.com]
Sent: Tuesday, October 02, 2012 2:39 PM
To:
Subject: Your Input Can Shape the Future of the Campus Bus

Your input is needed to shape the future of the University's Campus Bus! In order to do this, Transportation Services needs to understand your experiences and concerns. Please follow the link to complete a short survey about your transportation choices and preferences.
Follow this link to the Survey:
Take the Survey
Or copy and paste the URL below into your internet browser:
https://uwmadison.qualtrics.com/WRQualtricsSurveyEngine/?Q_DL=3rOeAFWA4ygtELH_d5TNtLrRjbZsfsN_MLRP_23iNEzR1AWpBk8t&_=1

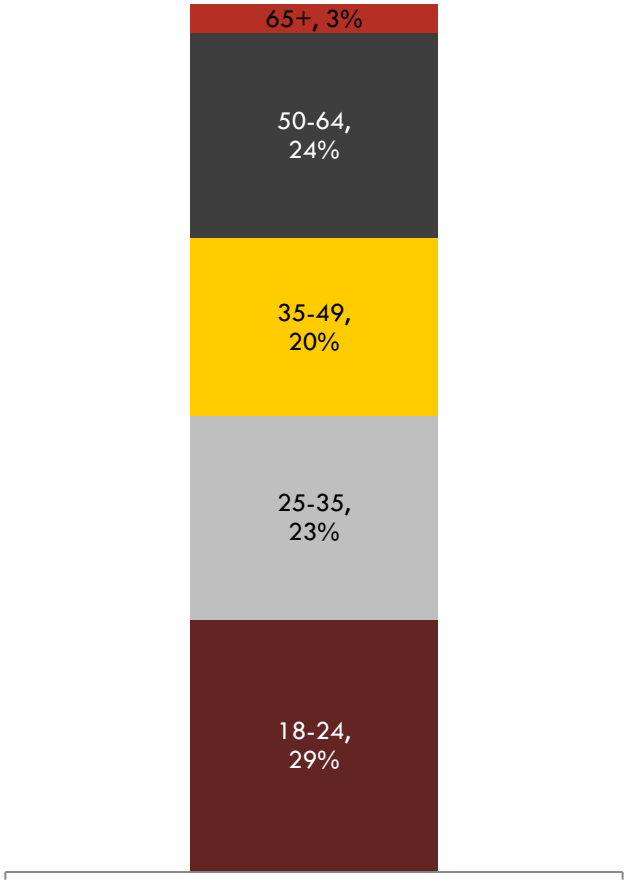
You are one of a sample of people chosen to participate. In order for the results to accurately represent the entire campus community, it is important that you complete your questionnaire. Please answer all the questions. You can be assured of complete confidentiality; your responses will not be individually identified.

If you have questions about the study please feel free to contact Liza Cohen at Nelson\Nygaard (email: UWCampusBus@gmail.com). Nelson\Nygaard is working under contract with UW Transportation Services to administer this study.

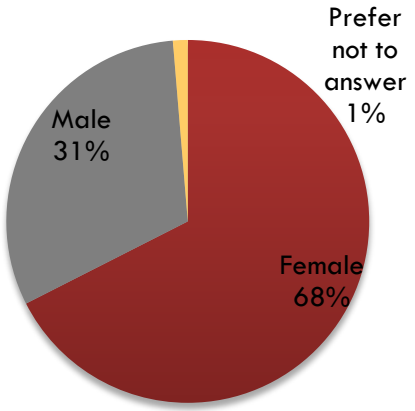
Thank you in advance for assisting us with this important study! We are eager to hear your views on transportation issues here at the UW-Madison. They will help us find better ways to serve campus transportation needs.
Follow the link to opt out of future emails:
Click here to unsubscribe

Respondent Demographics

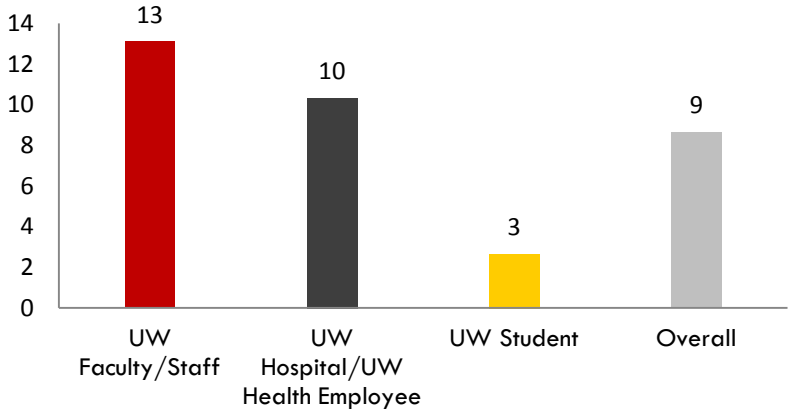
Respondent Age



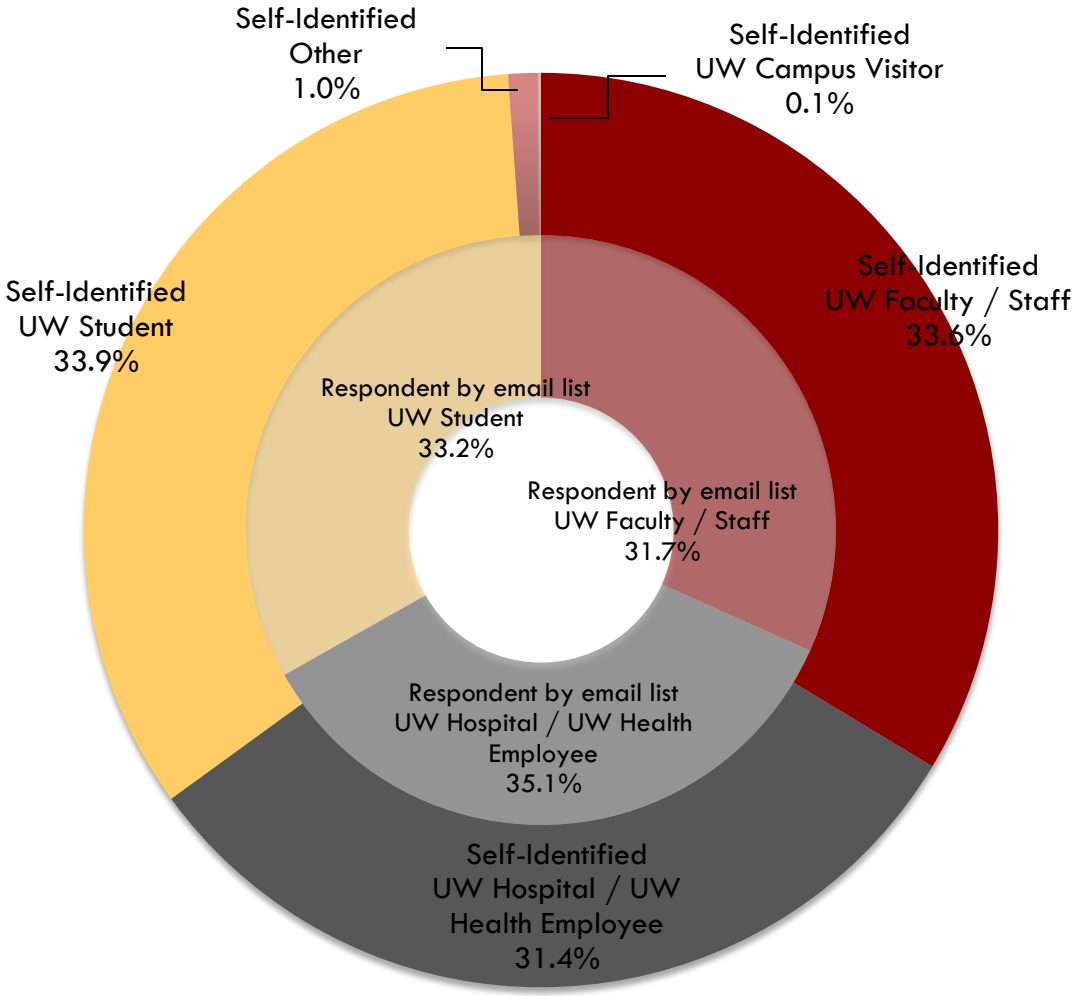
Gender



Years on Campus



Respondents by User Category



- Survey analysis used respondent-defined user categories (outer ring)

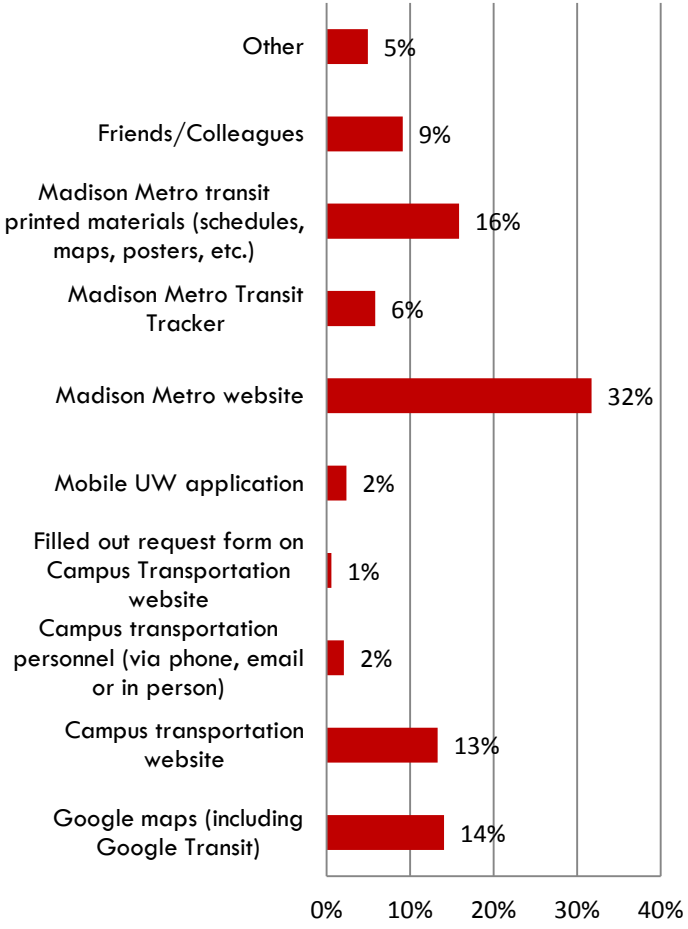
Comments Summary

- Several positive comments about Campus Bus Service
- Many respondents miss the previous route 80-85 configuration
- Many respondents do not use the bus because they live outside the service area.
- Hospital workers cited their shift times as a deterrent to riding the bus
- Respondents say that travel time on the campus bus is a deterrent to using the service
- Many respondents perceive the bus to be too crowded, particularly the Route 80 during the day

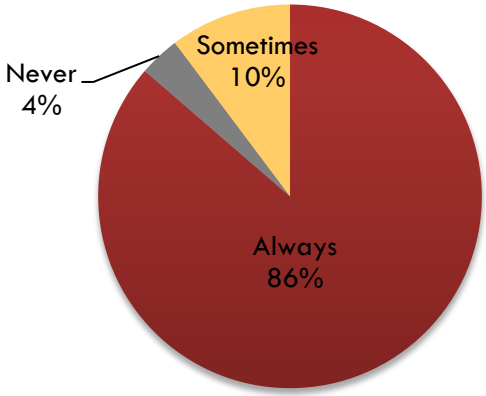
HOSPITAL

UW Hospital

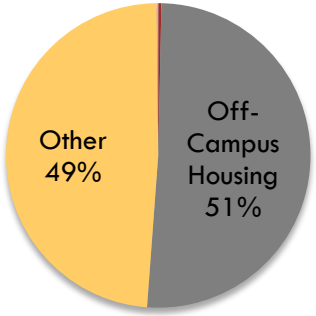
Main source of transit information



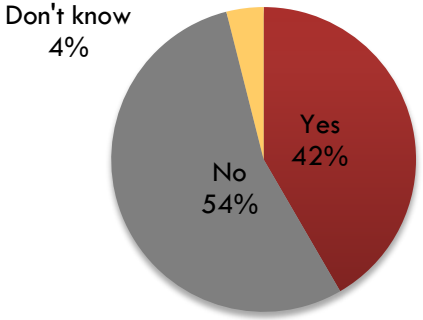
Access to a Car



What is your primary place of residence?



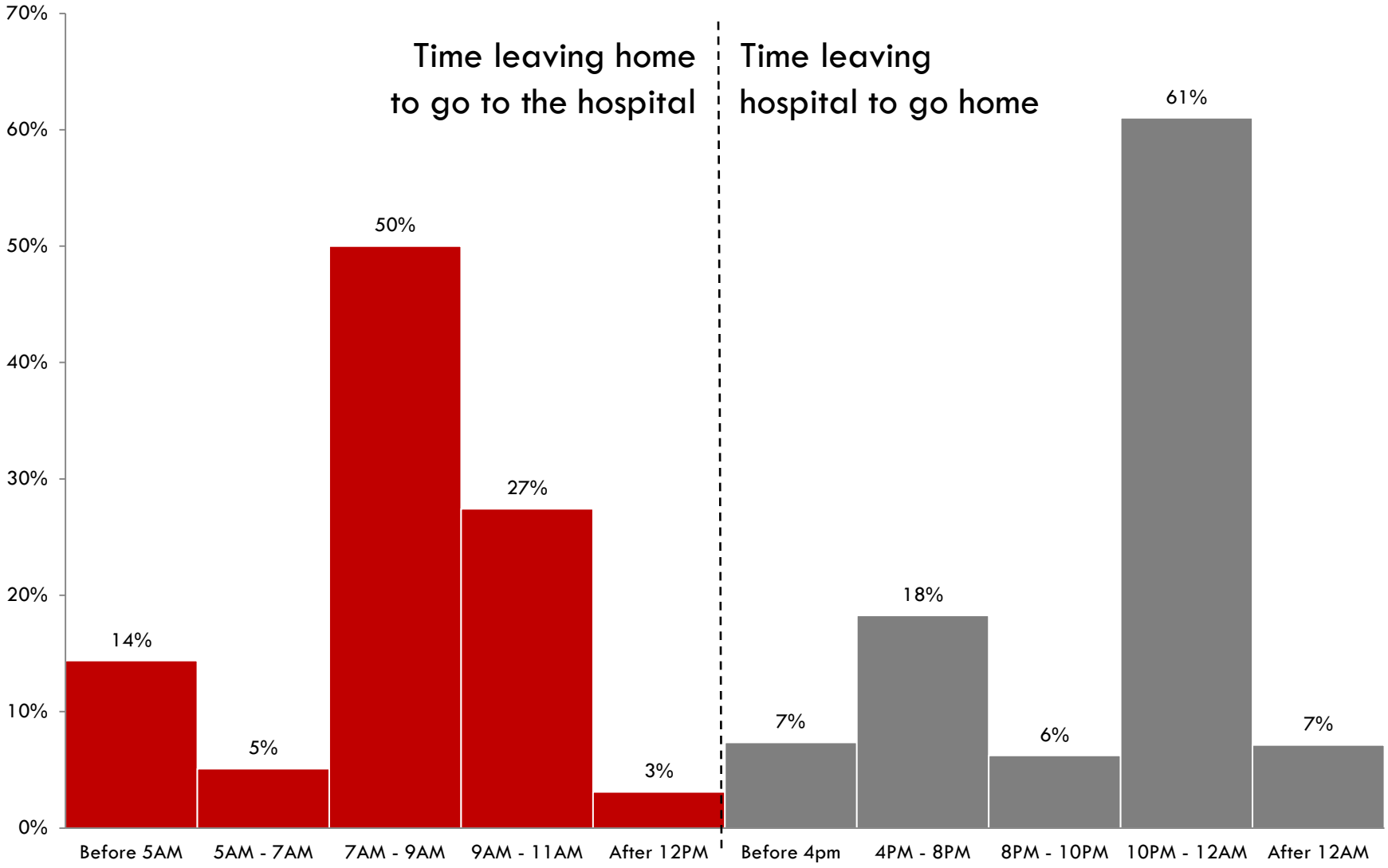
Do you live within 5 minutes of a bus stop?



Time of Demand - Key Findings

- Half of hospital/health employees leave home for work between 7:00 am and 9:00 am
- Over $^{2}/_{3}$ leave the hospital for home after 10:00 pm

Time of Demand

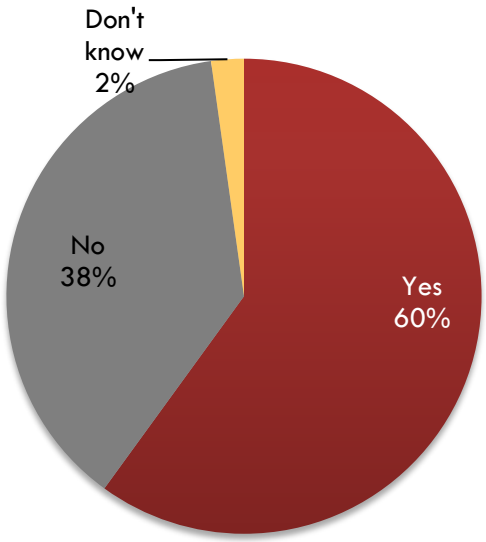


Bus Pass Program – Key Findings

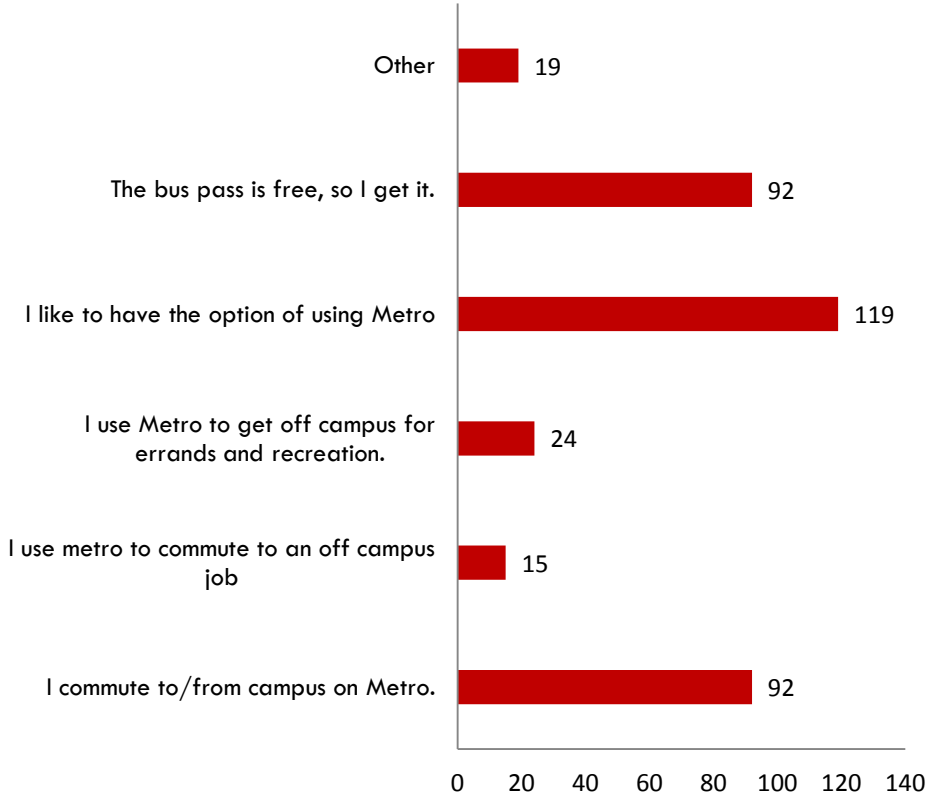
- 60% of hospital/health employees have a bus pass
- Many use the bus pass daily, or like to have the option of using Metro.

Bus Pass Program

Do you have a UW bus pass?



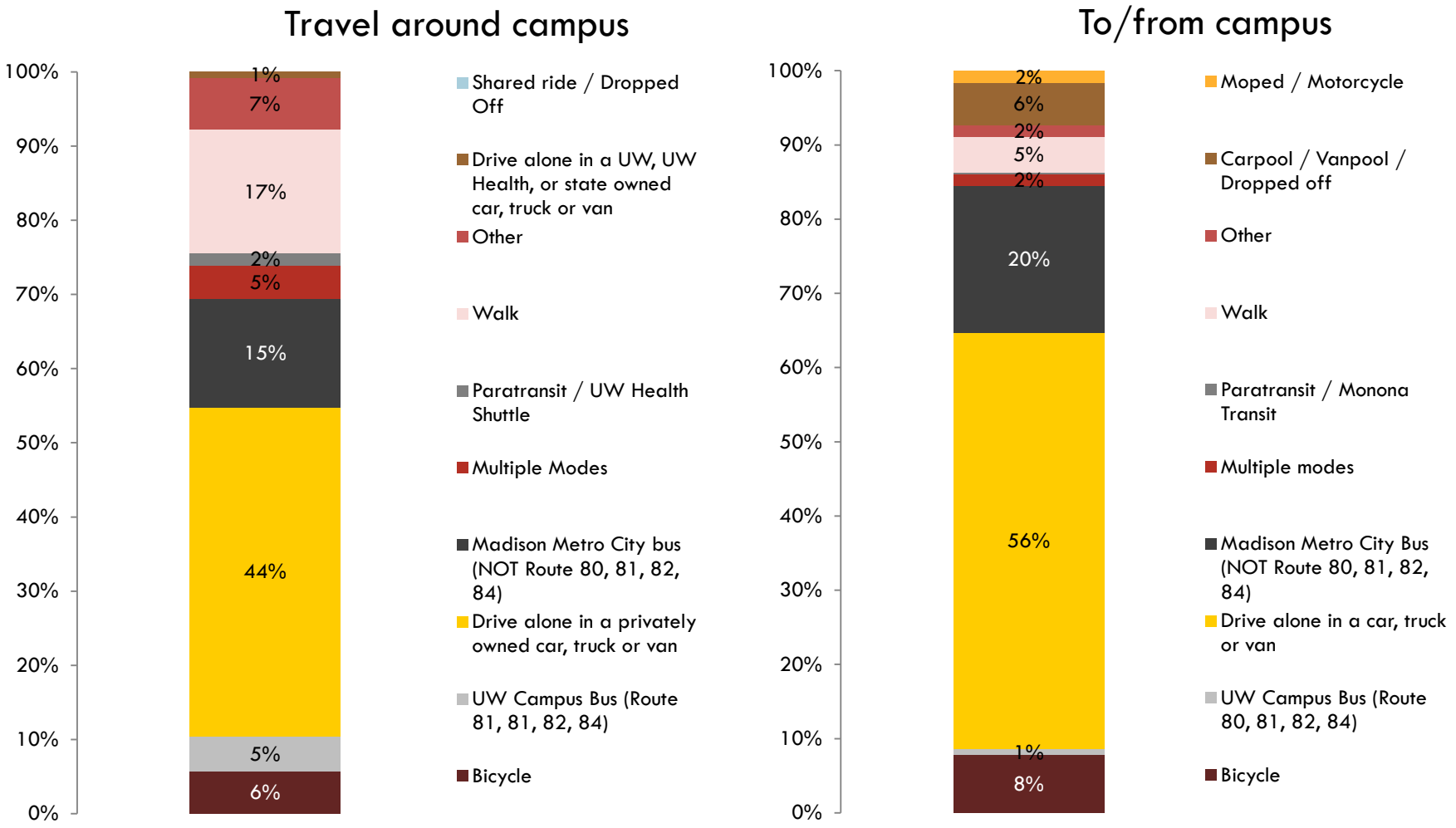
Reasons for having a pass
(multiple choices allowed)



Mode Choice – Key Findings

- Driving alone is the most common mode choice amongst hospital/health employee respondents
- Many walk or take the city bus around campus
- In inclement weather, a slightly higher percentage of respondents use the City bus
- In inclement weather, the percentage of those who use the Campus Bus does not change.

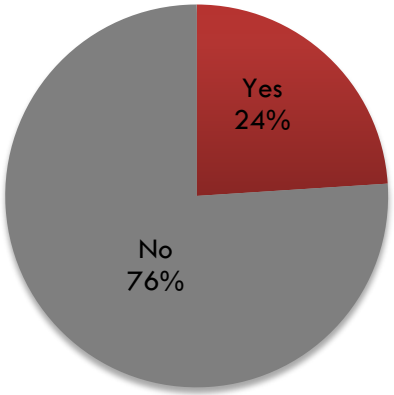
Mode Choice


Travel around campus
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1%
7%
17%
2%
5%
15%
44%
5%
6%
Shared ride / Dropped Off
Drive alone in a UW, UW Health, or state owned car, truck or van
Other
Walk
Paratransit / UW Health Shuttle
Multiple Modes
Madison Metro City bus (NOT Route 80, 81, 82, 84)
Drive alone in a privately owned car, truck or van
UW Campus Bus (Route 81, 81, 82, 84)
Bicycle
To/from campus
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2%
6%
2%
5%
2%
20%
56%
1%
8%
Moped / Motorcycle
Carpool / Vanpool / Dropped off
Other
Walk
Paratransit / Monona Transit
Multiple modes
Madison Metro City Bus (NOT Route 80, 81, 82, 84)
Drive alone in a car, truck or van
UW Campus Bus (Route 80, 81, 82, 84)
Bicycle

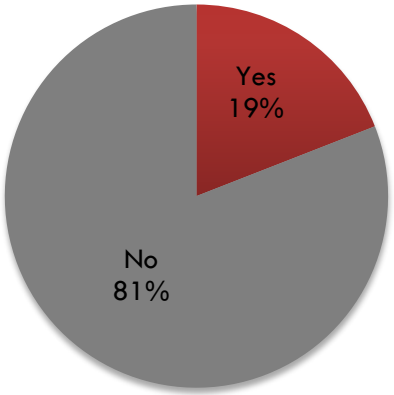
Mode Choice – Weather Changes

- 2 Questions:
  - Do you make a different travel choice in bad weather?
  - IF YES: What travel choice do you make?
- Results:
  - Mode choice of those who do not change modes in bad weather + mode choice of those who do

Different travel choice **around campus** in bad weather

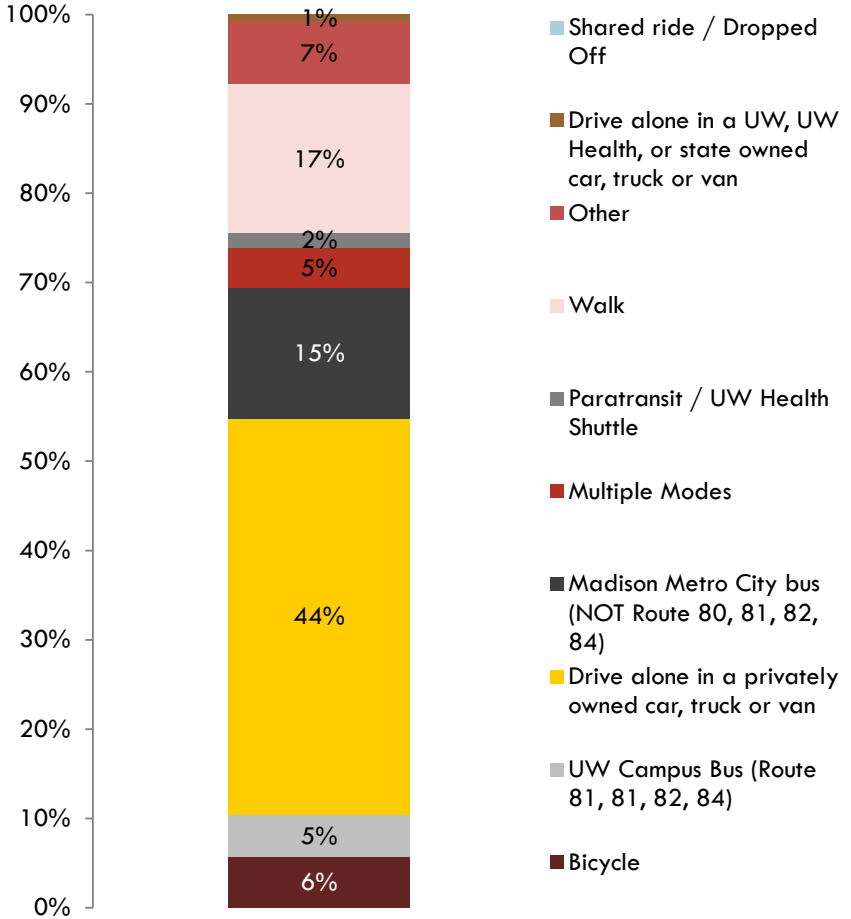


Different travel choice **to/from campus** in bad weather

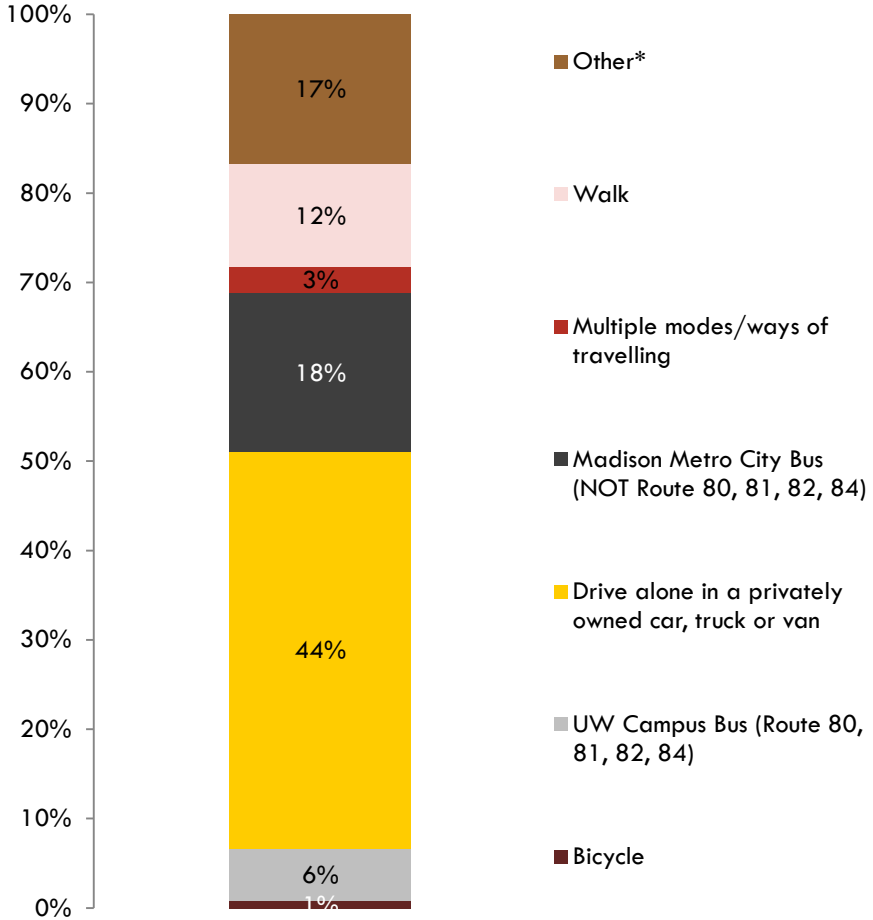


Mode Choice Around Campus – Weather Changes

Travel around campus – Good weather



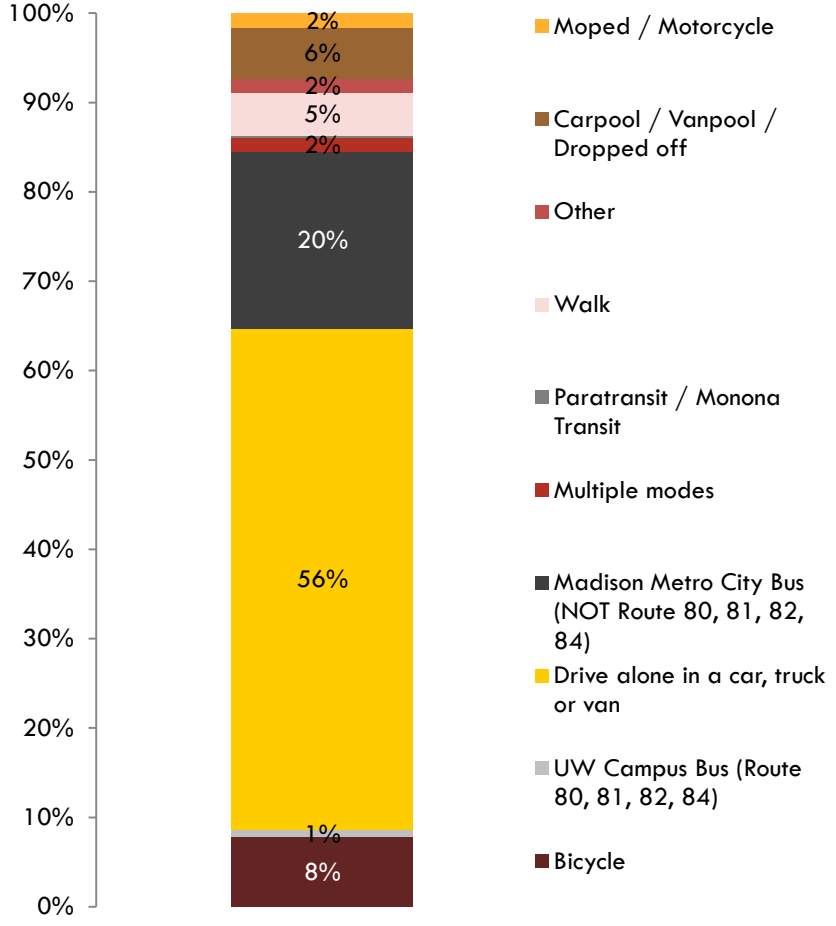
Travel around campus – Bad weather



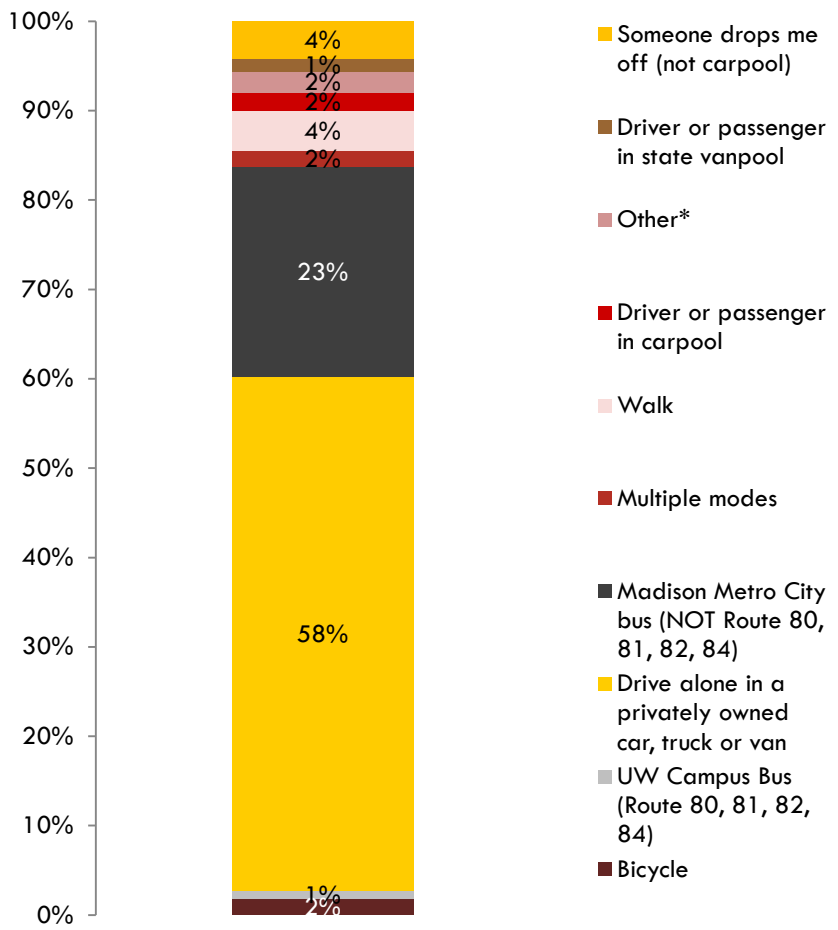
*Other: Drive alone/share ride in UW/UW Health/state owned vehicle, Moped, Motorcycle, Other, Paratransit, Share ride, Dropped off UW Health Shuttle

Mode Choice To/From Campus – Weather Changes

To/from campus – Good weather



Travel to/from campus – Bad weather

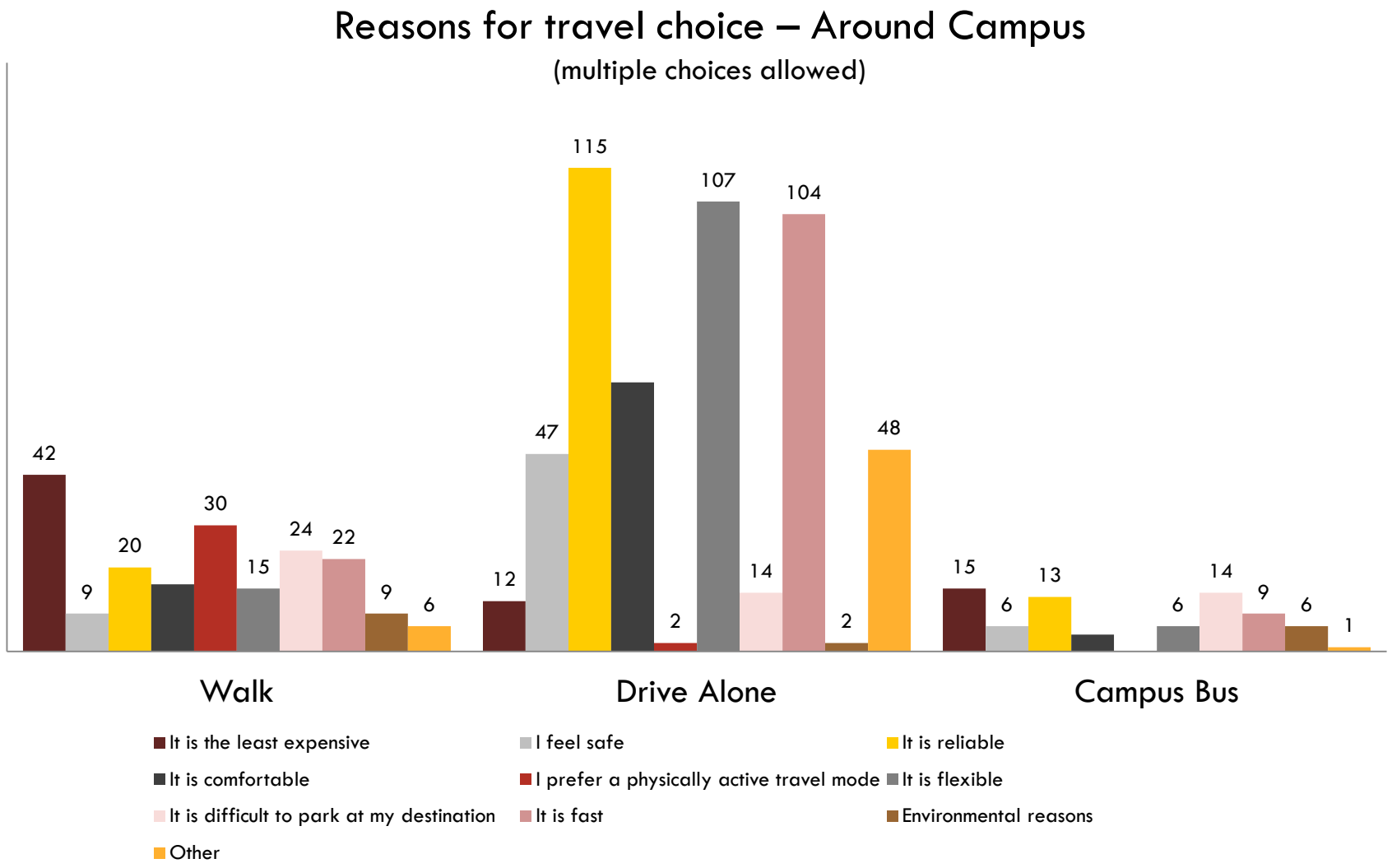


*Other: Drive alone or share ride in a UW/UW Health/state owned vehicle, Share ride in a private vehicle, UW Health Shuttle, Monona Transit, Moped, Motorcycle, Other, Paratransit

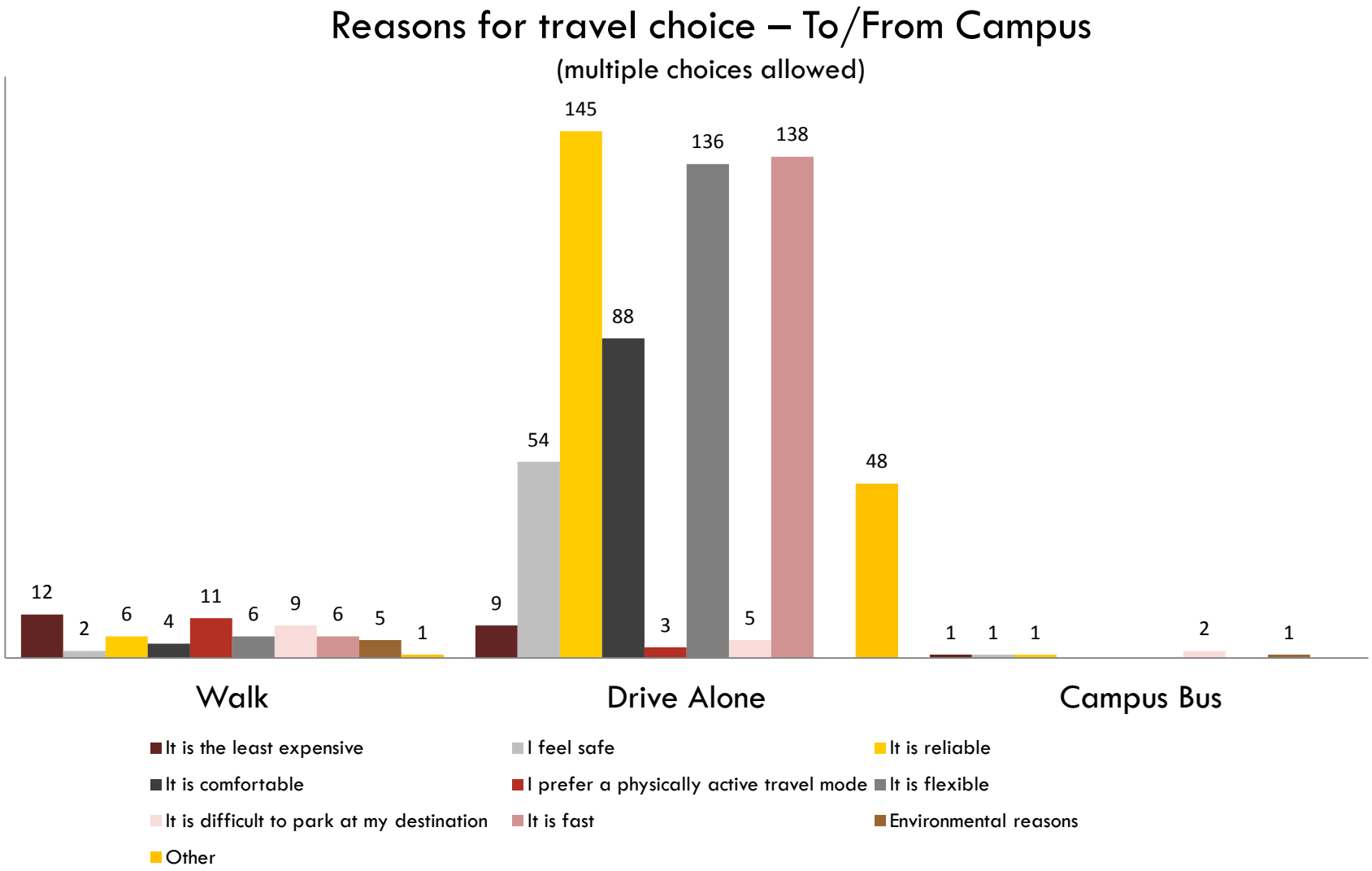
Mode Choice Preferences – Key Findings

- Respondents drive alone because they think it is reliable and fast
- Difficulty of parking leads many to take the campus bus or walk
- Many walk because it is the least expensive and/or because it is physically active
- Those who do not take the bus feel that the schedule and routes do not fit their needs

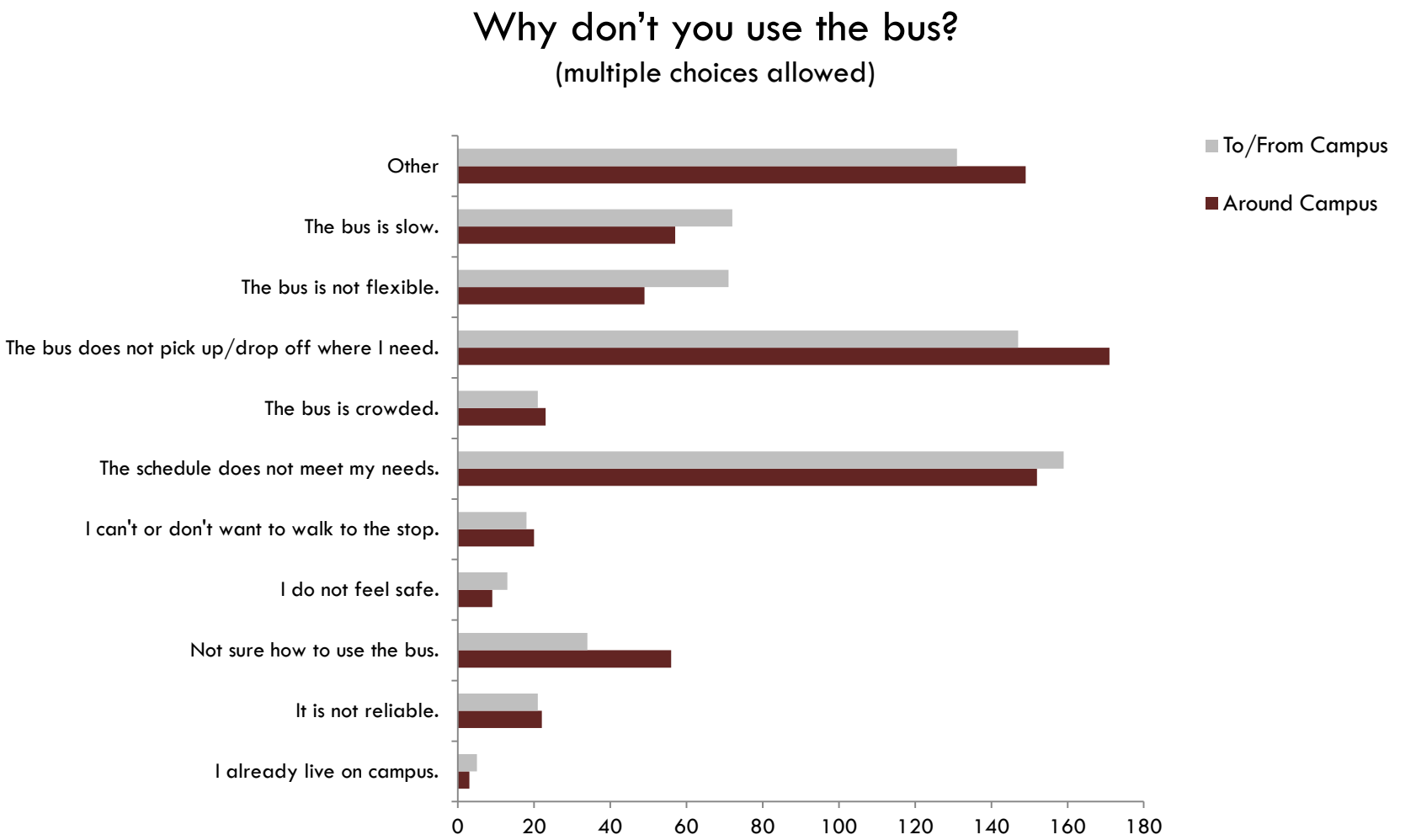
Reasons for Travel Choice



Reasons for Travel Choice



Reason for not using the bus

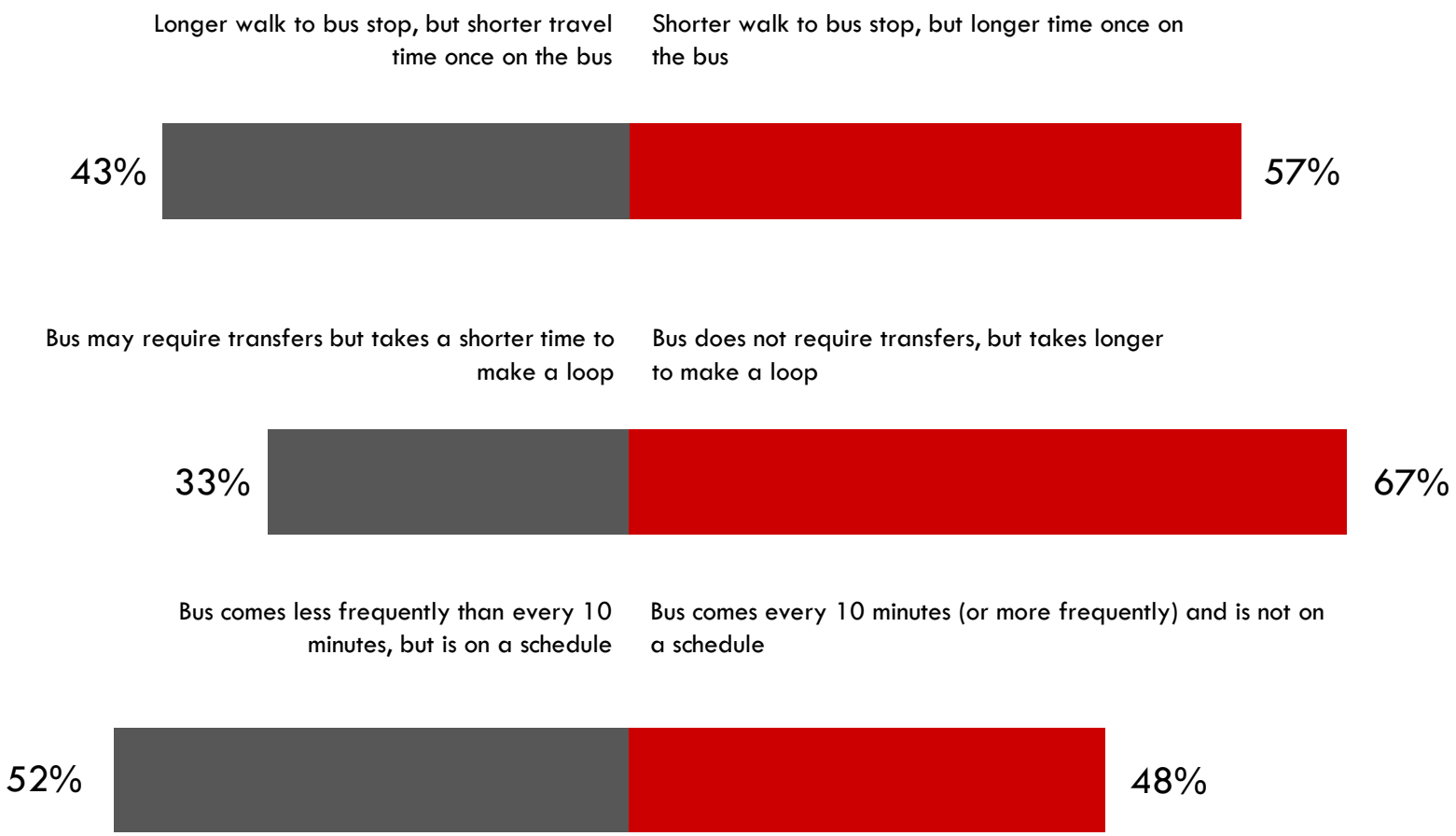


* Question only asked of survey respondents who never said that they used the bus

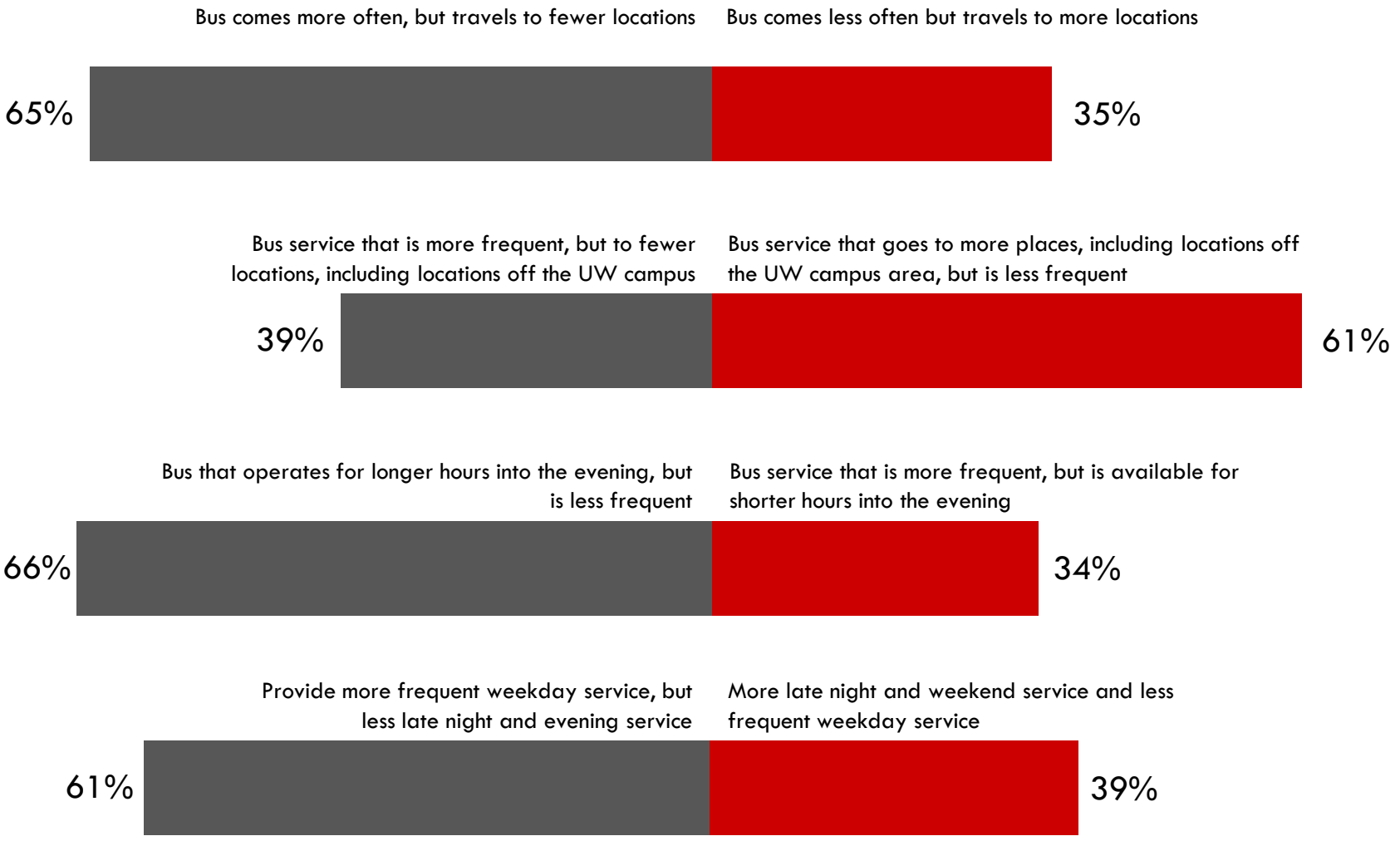
Service Preferences – Key Findings

- Hospital/Health employees would prefer not to transfer
- Respondents also favor frequency over extended service hours or locations on campus
- However, respondents preferred bus service to locations off campus to higher frequency
- Respondents were split on the idea of headway-based scheduling
- Respondents felt more strongly about service characteristics of night service
- About one third of respondents were interested in a late night bus service. Another third was unsure.

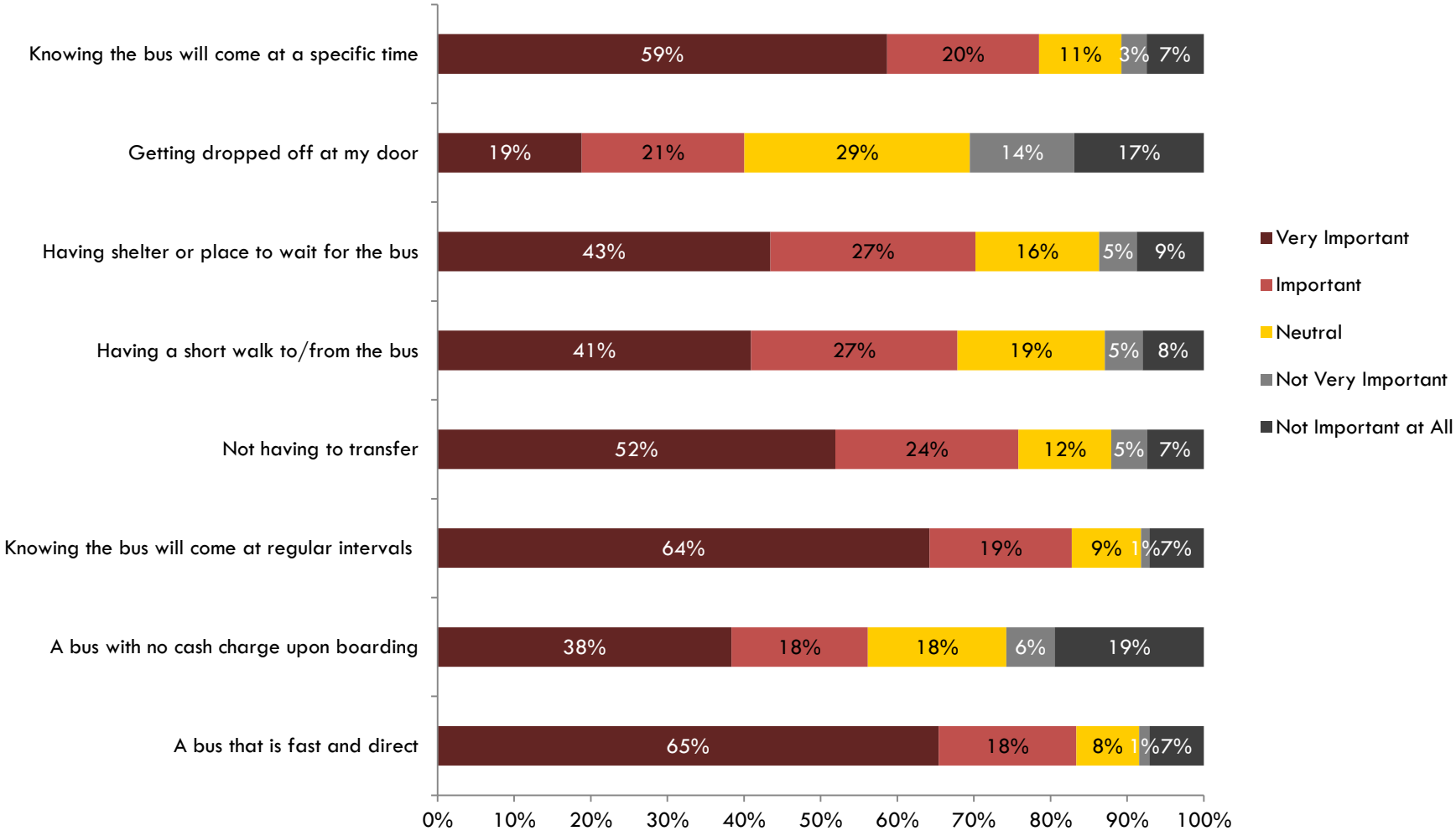
Service Choices



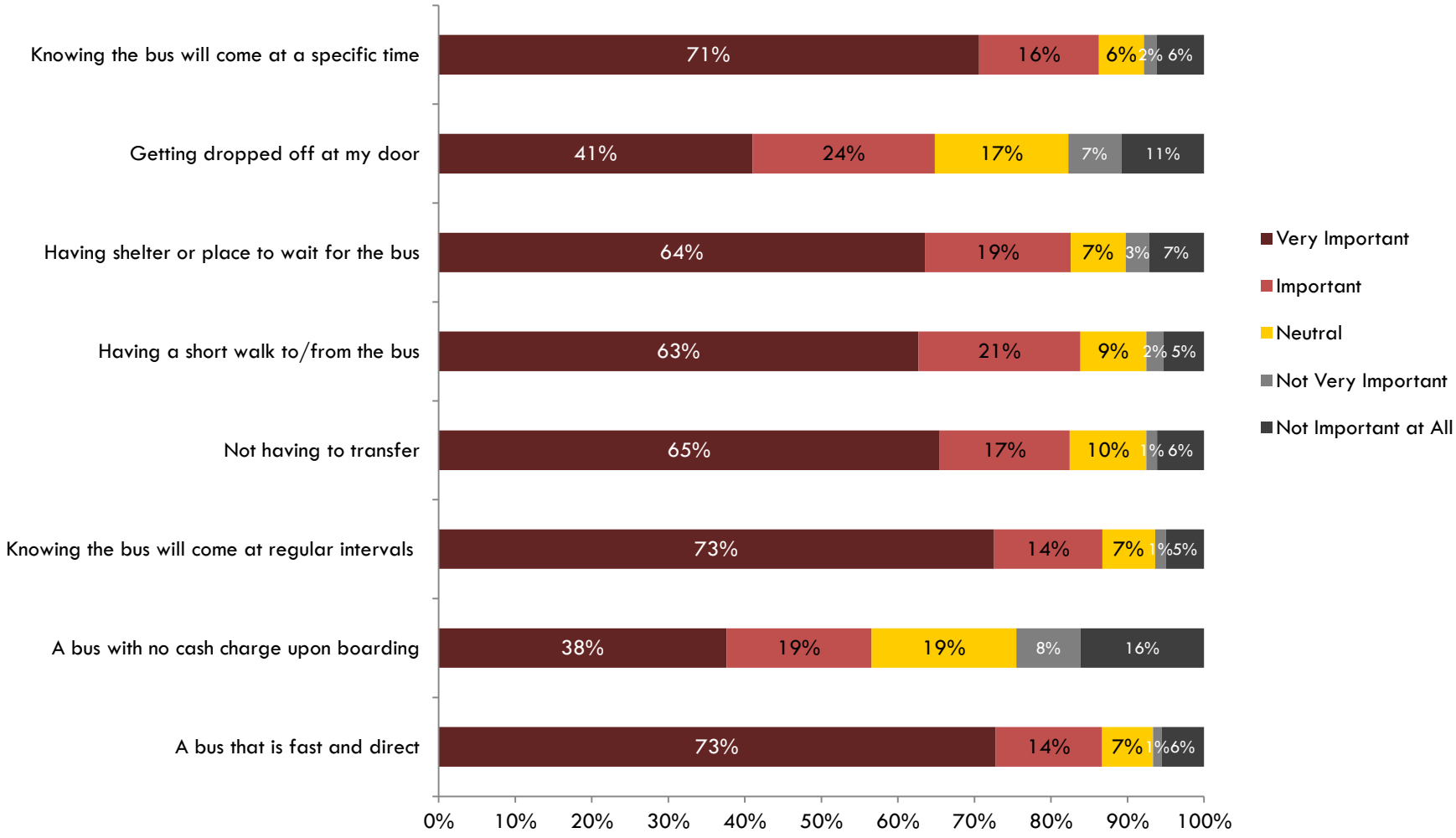
Service Choices



Rankings - Daylight

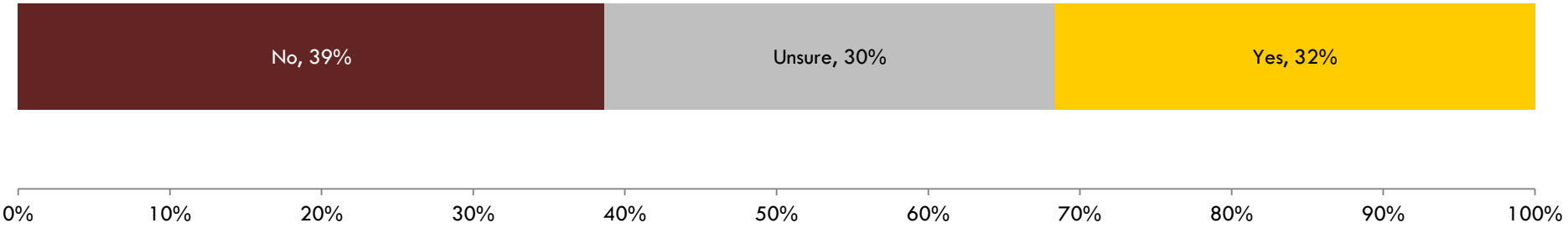


Rankings - Nighttime



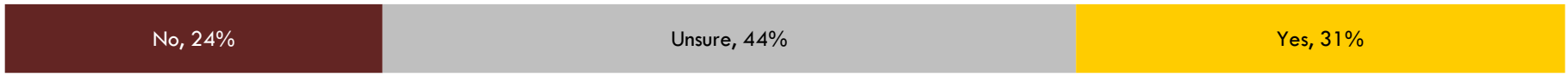
Potential for Late Night Bus Service

Would you be interested in a late night bus service that you call in advance to schedule?

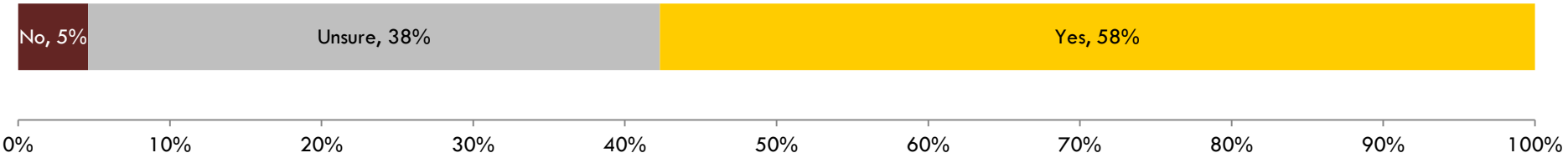


IF YES:

Would you prefer this over the current UW late night bus service that has a fixed schedule and fixed route?



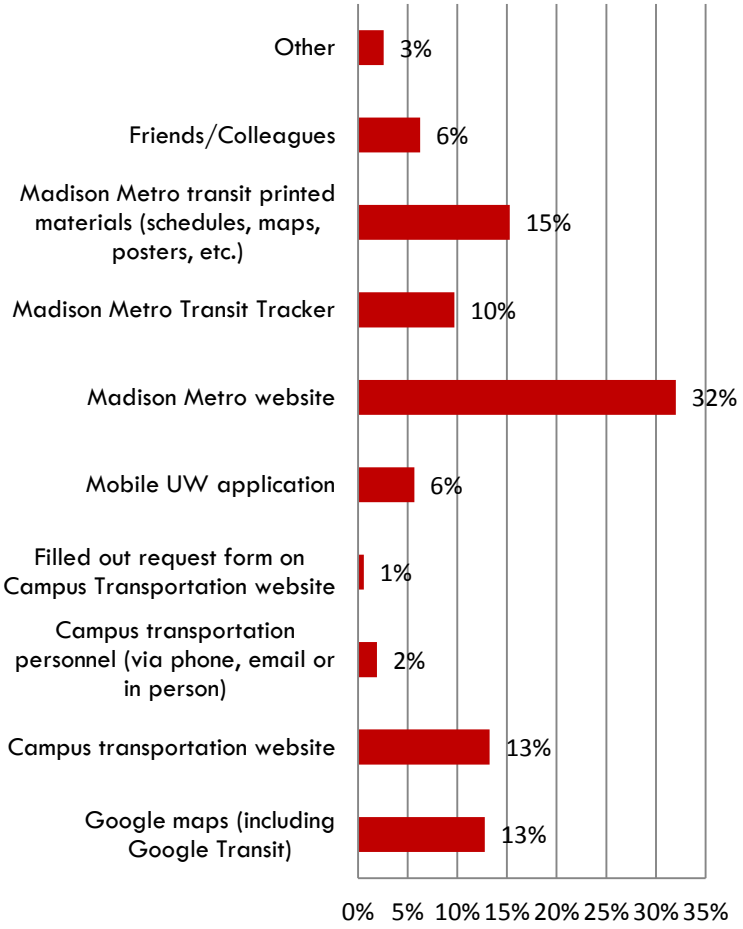
Would you be willing to pay for this service?



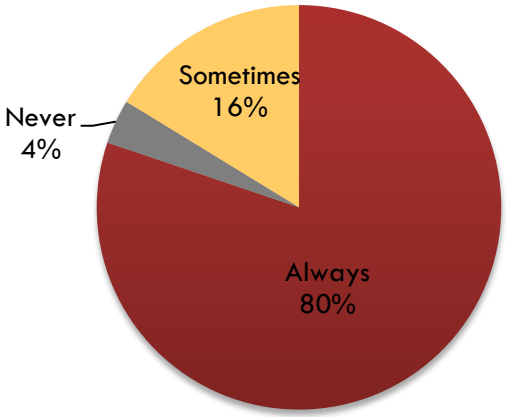
FACULTY/STAFF

UW Faculty and Staff

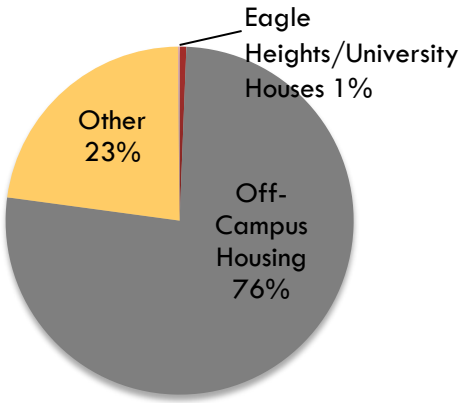
Main source of transit information



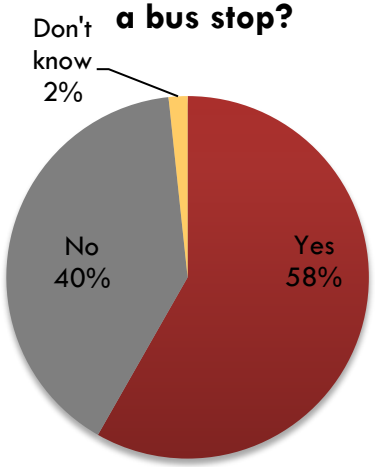
Access to a car?



Primary Place of Residence



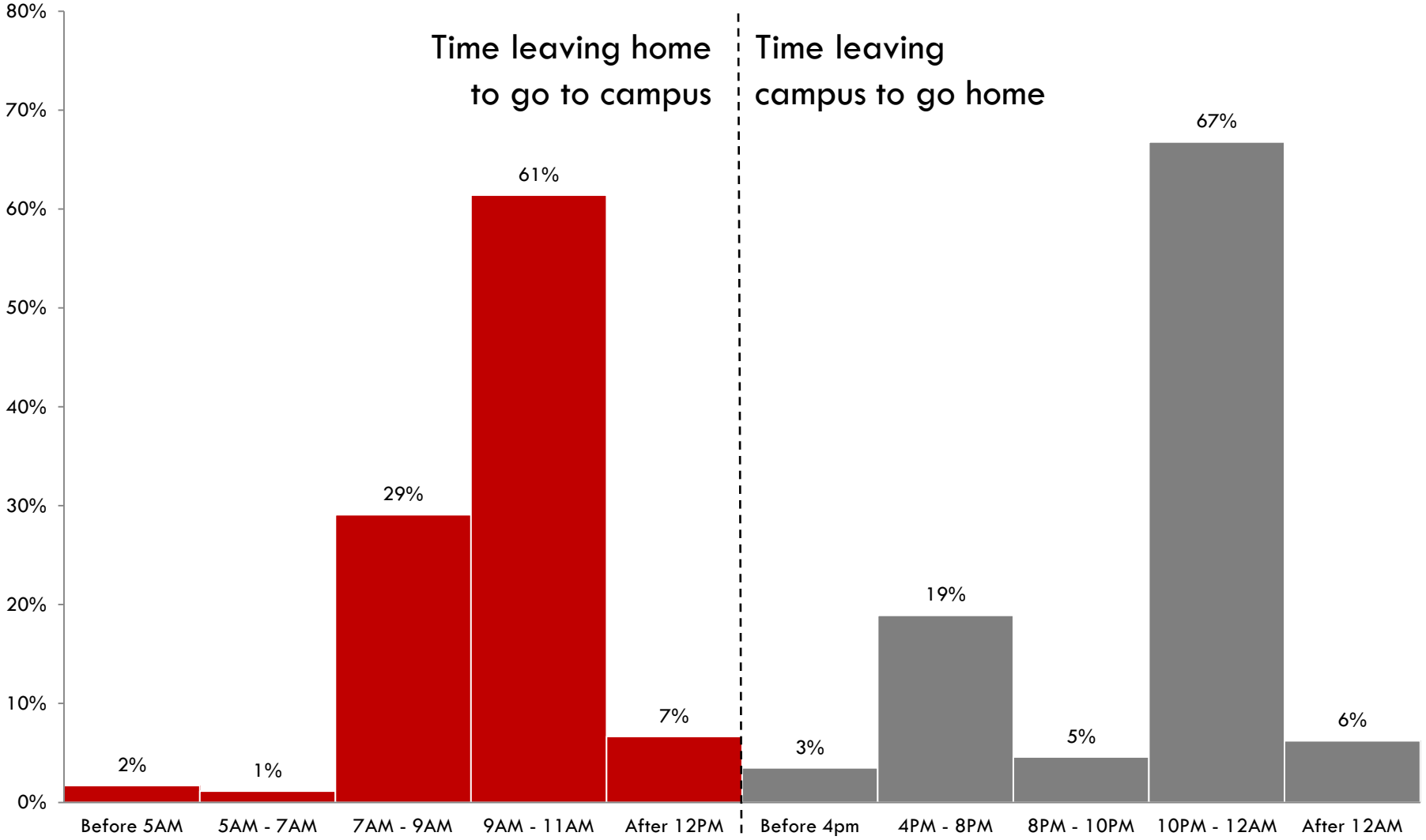
Do you live within 5 minutes of a bus stop?



Time of Demand - Key Findings

- 90% of faculty/staff leave home before 11:00 am, $^{2}/_{3}$ between 9:00 am and 11:00 am
- Over $^{2}/_{3}$ leave campus for home after 10:00 pm, while 20% leave campus between 4:00 pm and 8:00 pm

Time of Demand

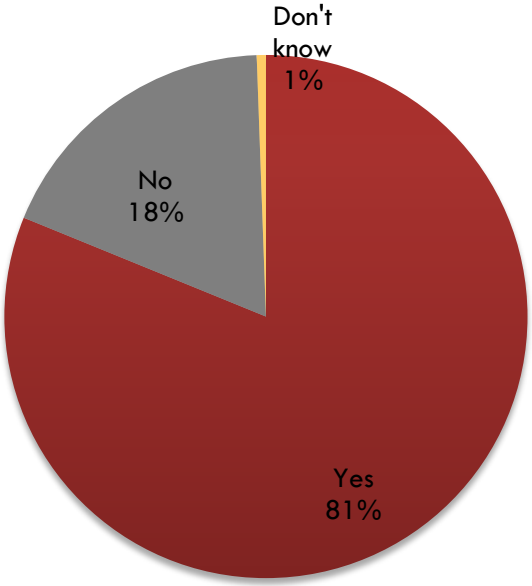


Bus Pass Program – Key Findings

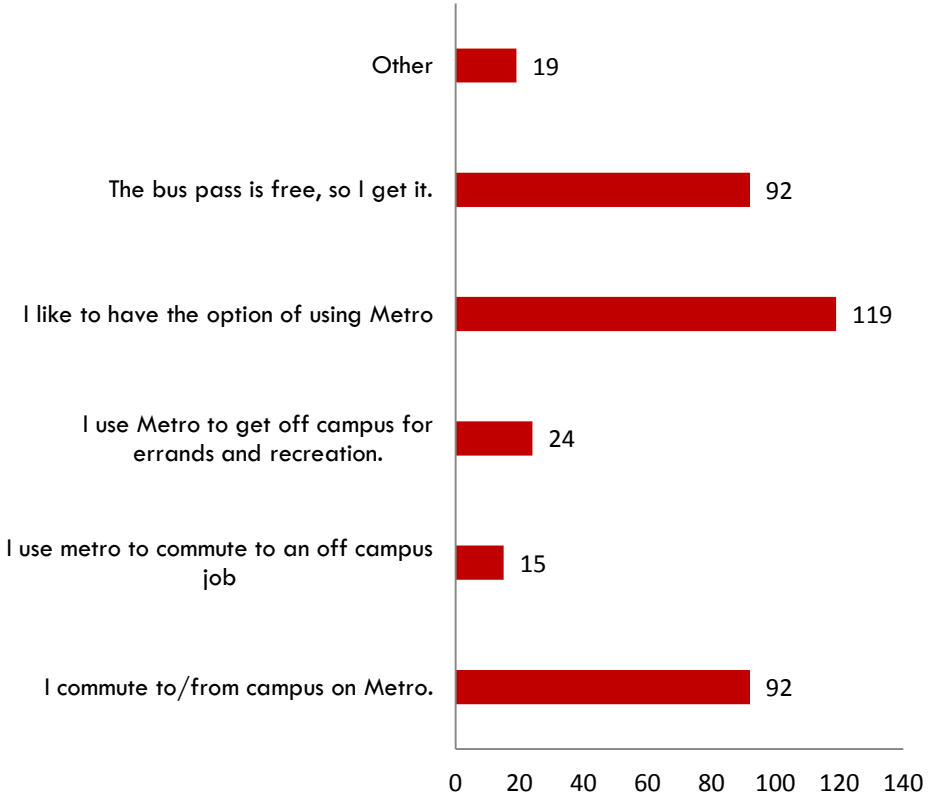
- Most (81%) of faculty/staff respondents have a bus pass
- Many get the pass because it is free
- A majority get the pass because they use or like to have the option of using Metro.

Bus Pass Program

Do you have a UW bus pass?



Reasons for having a pass
(multiple choices allowed)

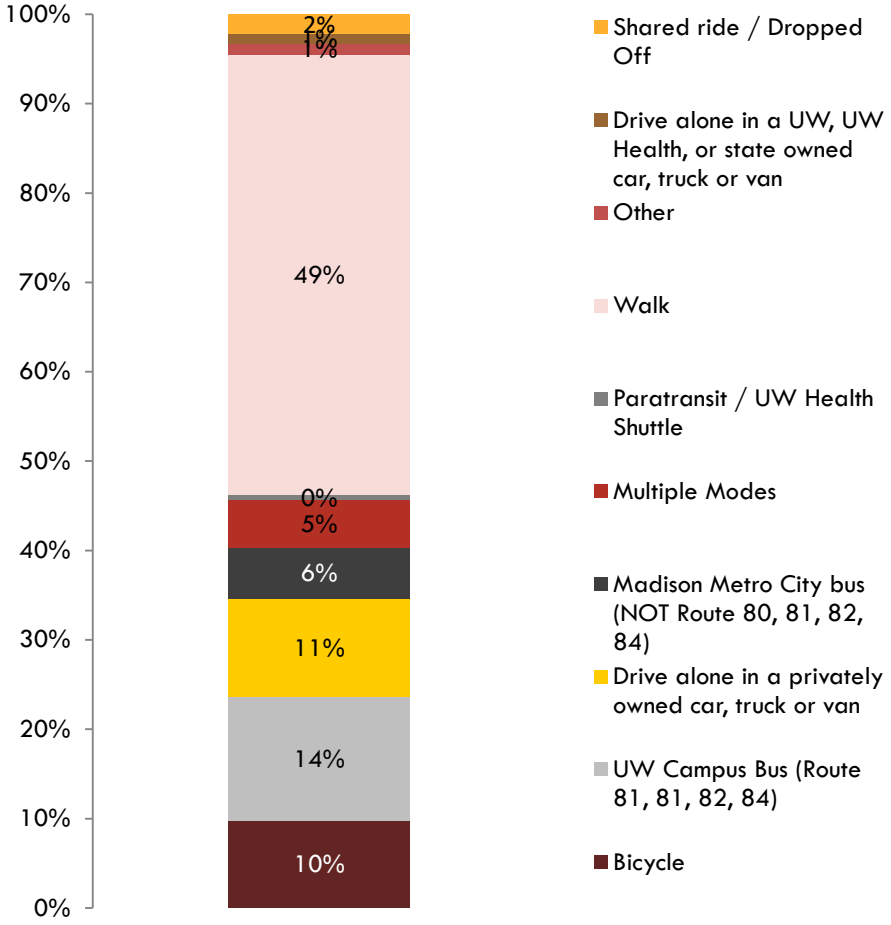


Mode Choice – Key Findings

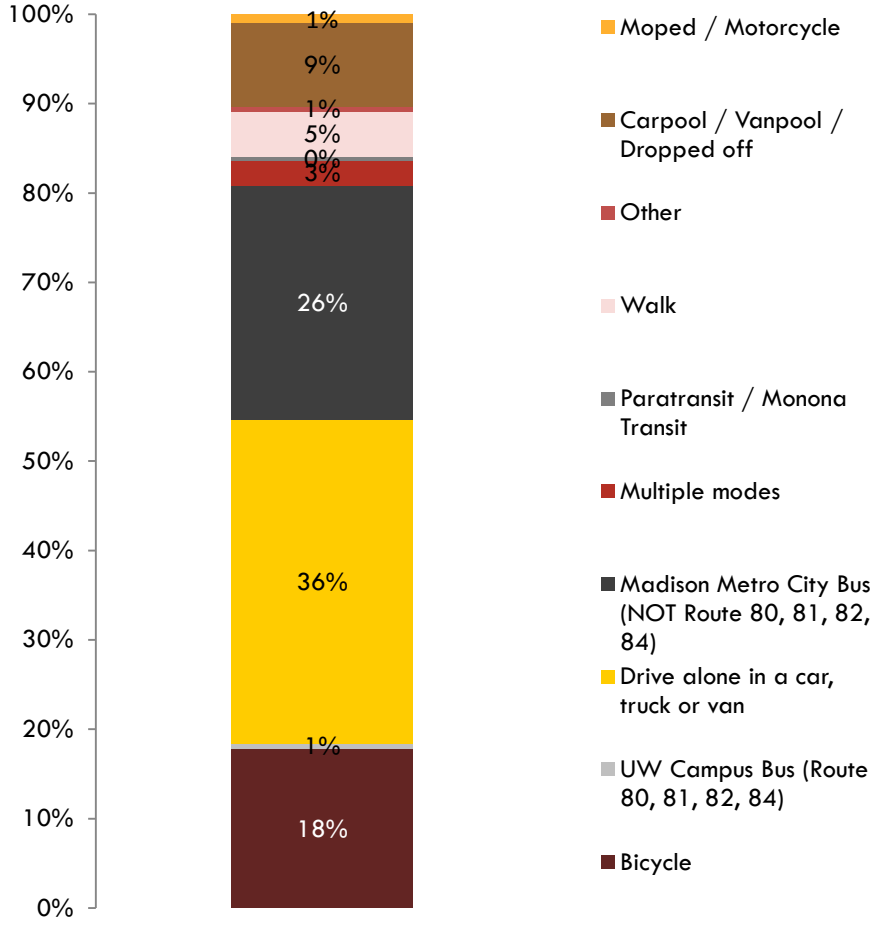
- $^{1}/_{3}$ of faculty/staff drive alone to campus
- 1% use the campus bus to get to campus
- Once there, $^{2}/_{3}$ of respondents walk to get around campus
- Faculty/staff respondent campus bus use increases significantly in bad weather

Mode Choice

Travel around campus



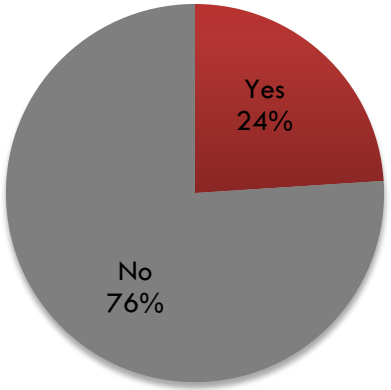
To/from campus



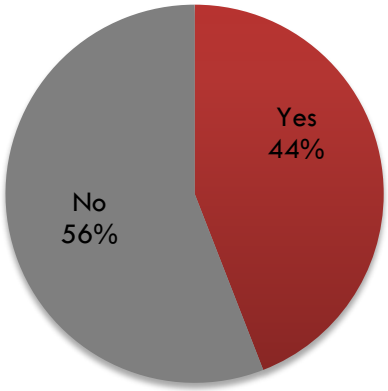
Mode Choice – Weather Changes

- 2 Questions:
  - Do you make a different travel choice in bad weather?
  - IF YES: What travel choice do you make?
- Results:
  - Mode choice of those who do not change modes in bad weather + mode choice of those who do

Different travel choice **around campus** in bad weather

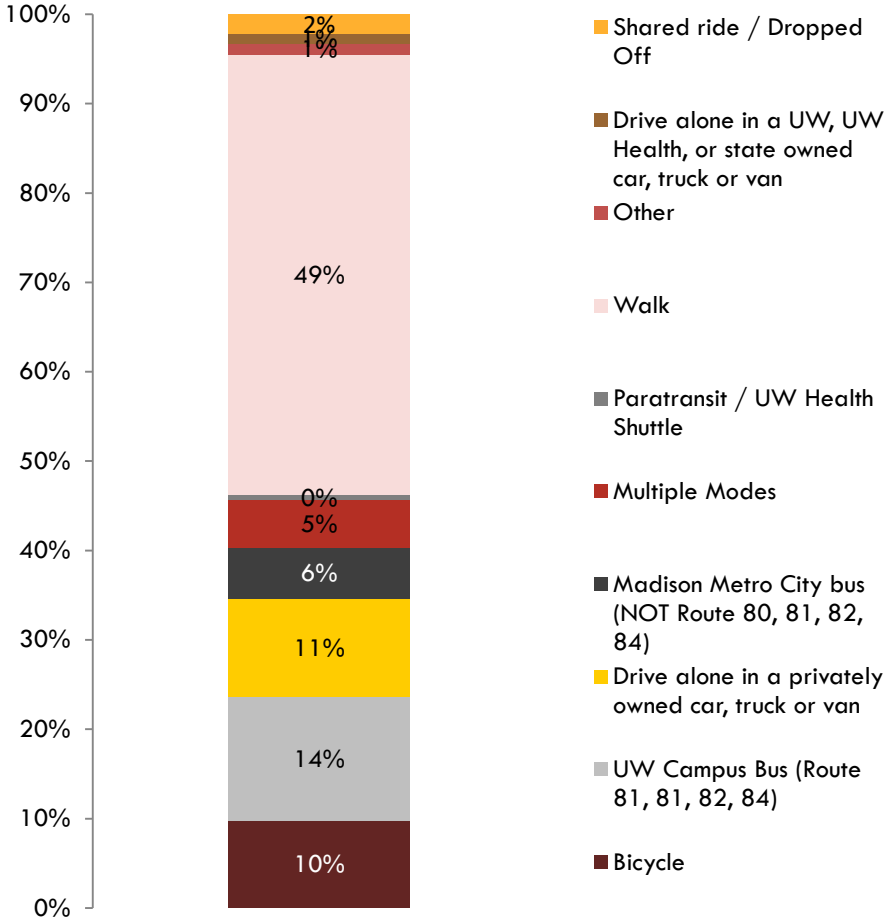


Different travel choice **to/from campus** in bad weather

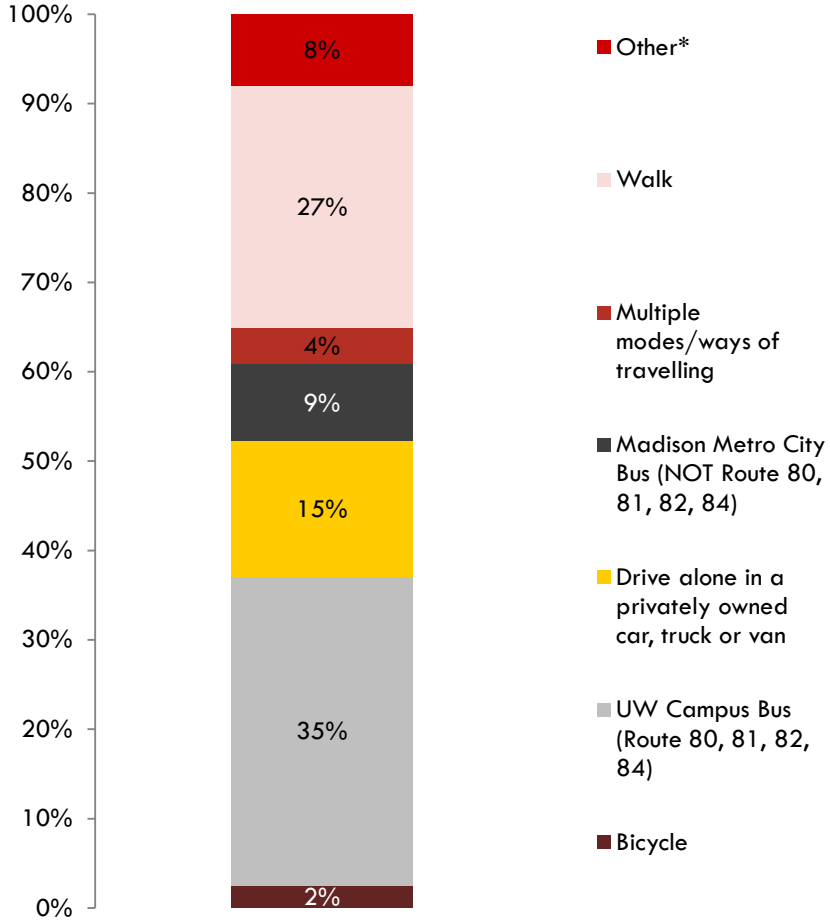


Mode Choice Around Campus – Weather Changes

Travel around campus – Good weather



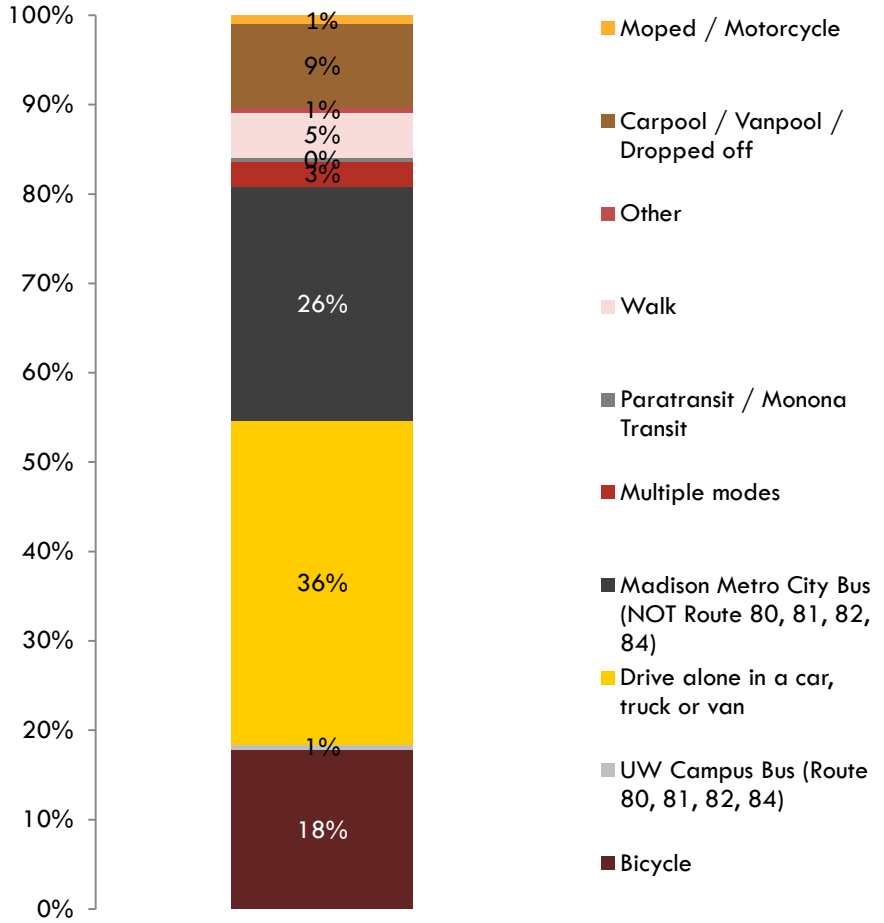
Travel around campus – Bad weather



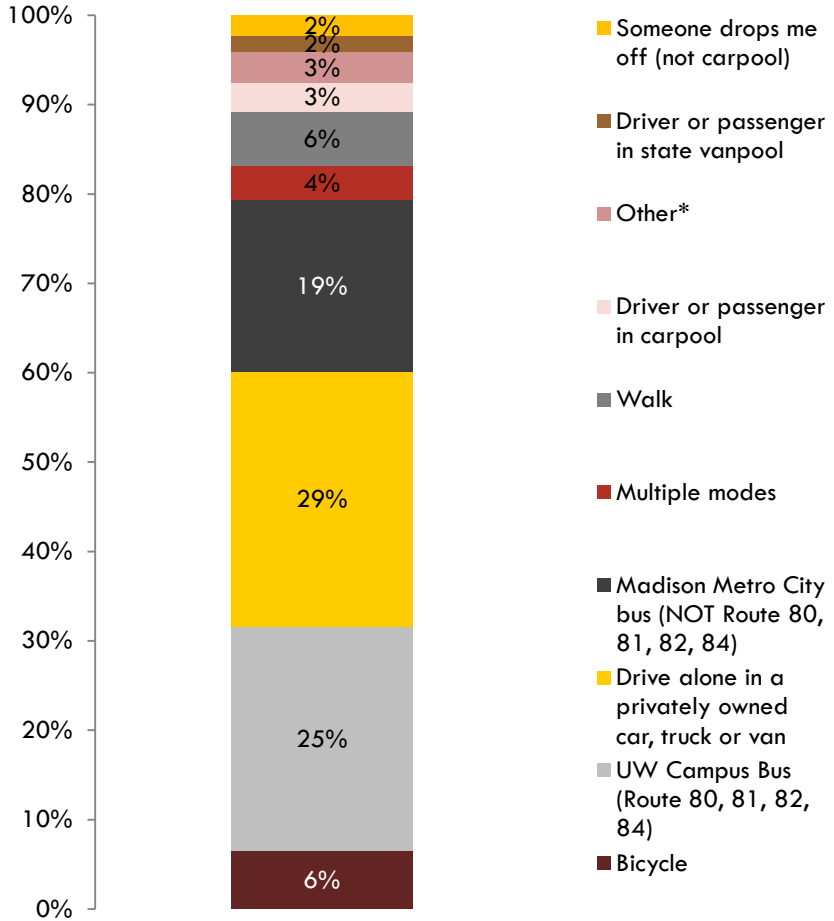
*Other: Drive alone/share ride in UW/UW Health/state owned vehicle, Moped, Motorcycle, Other, Paratransit, Share ride, Dropped off UW Health Shuttle

Mode Choice To/From Campus – Weather Changes

To/from campus – Good weather



Travel to/from campus – Bad weather

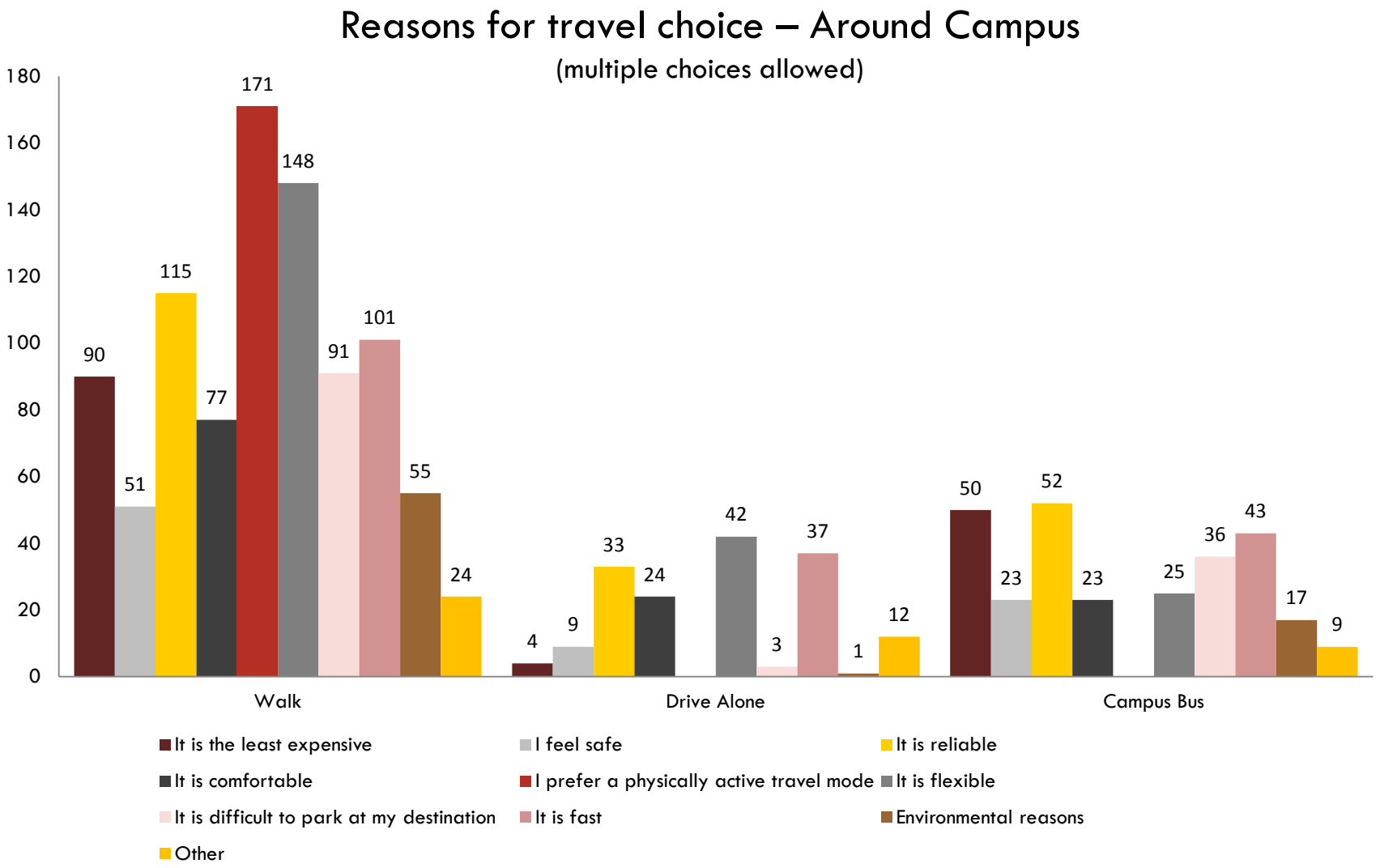


*Other: Drive alone or share ride in a UW/UW Health/state owned vehicle, Share ride in a private vehicle, UW Health Shuttle, Monona Transit, Moped, Motorcycle, Other, Paratransit

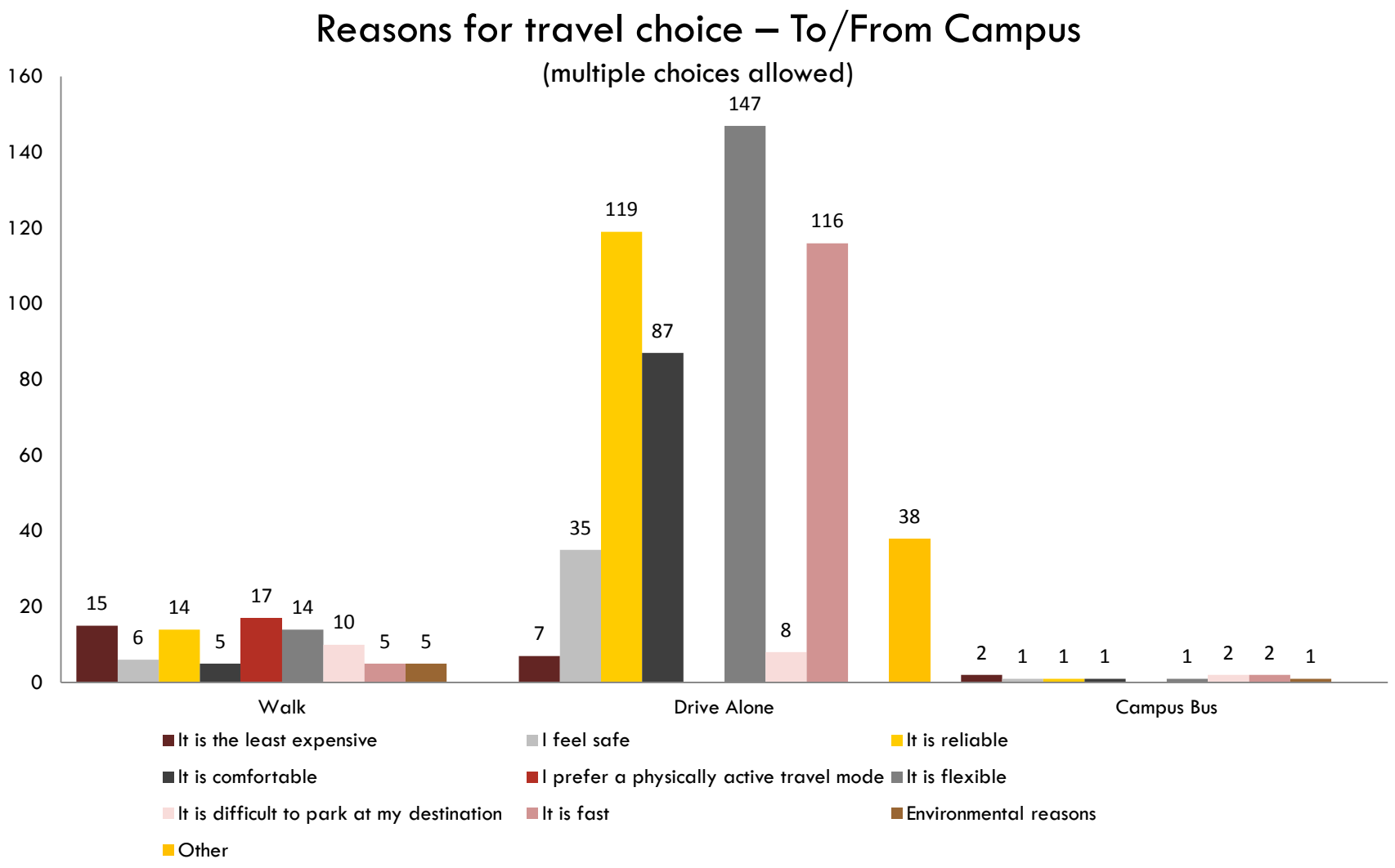
Mode Choice Preferences – Key Findings

- Many faculty/staff respondents walk around campus for fitness reasons
- Those who drive alone to campus do so because it is safe, comfortable and flexible
- Difficulty of parking leads faculty/staff respondents to walk or use the campus bus to get around
- Many of those who do not use the bus to get to campus say that it is because the bus does not serve their needs
- Others do not use the bus to get around campus because it is crowded

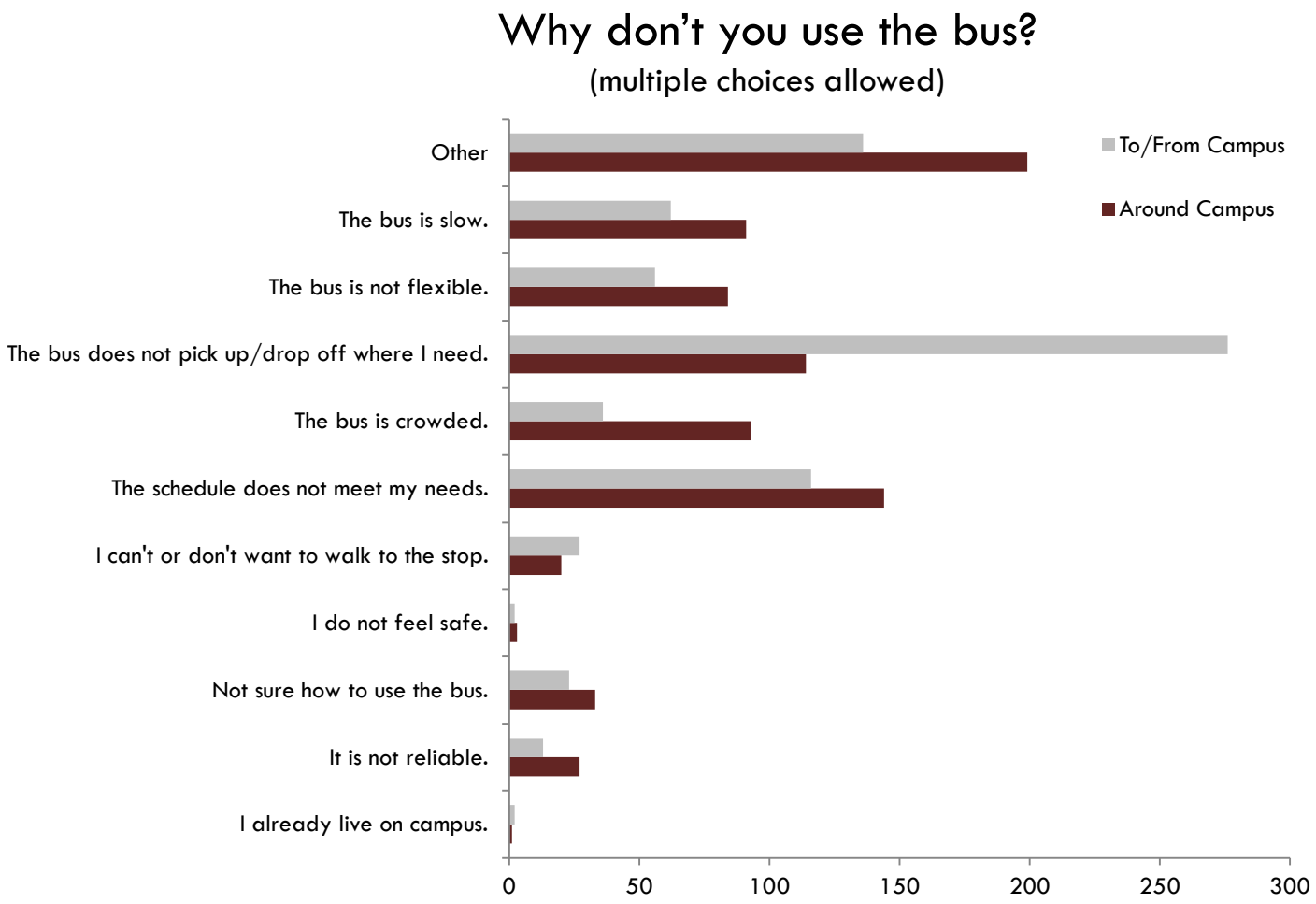
Reasons for Travel Choice



Reasons for Travel Choice



Reason for not using the bus

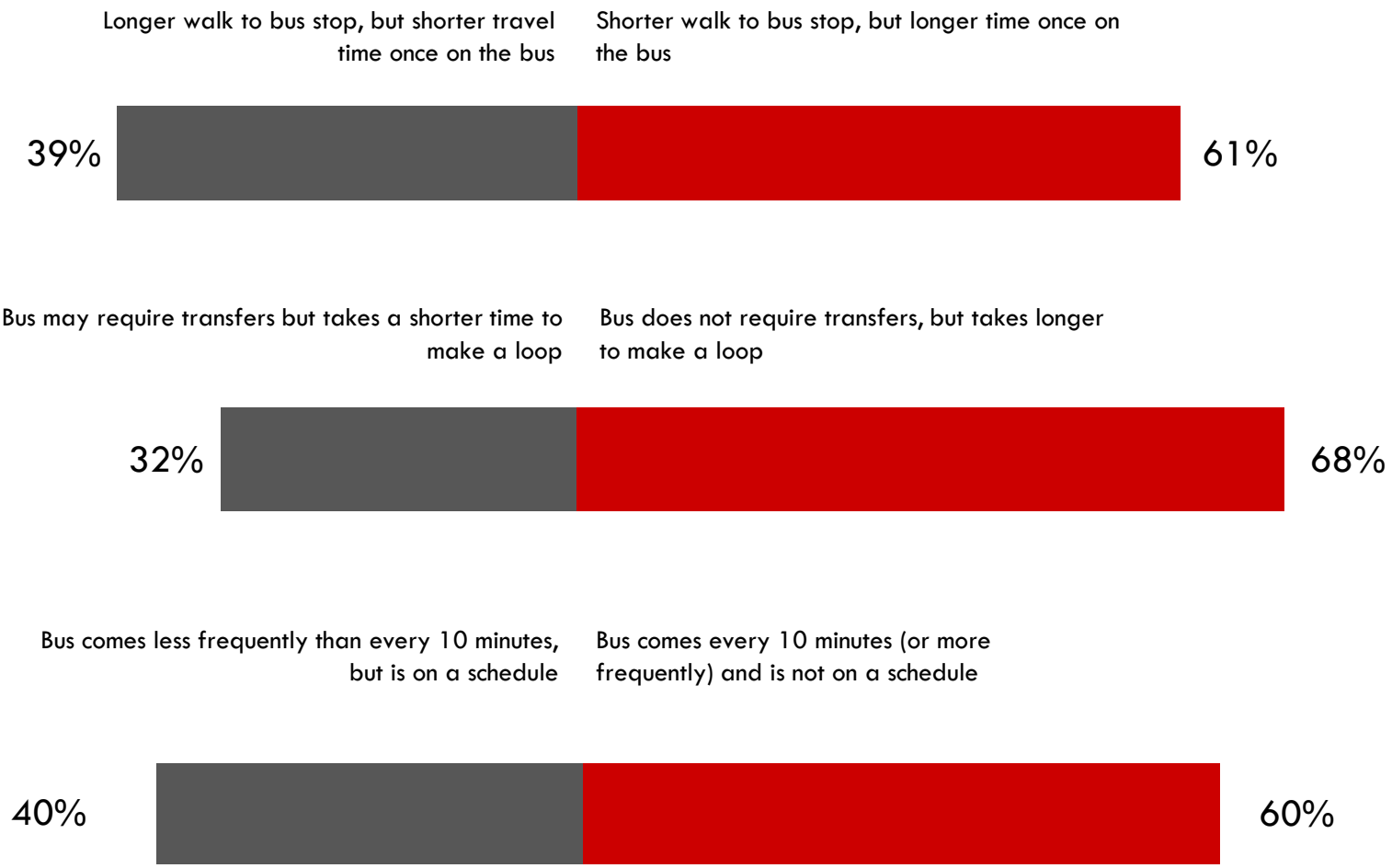


* Question only asked of survey respondents who never said that they used the bus

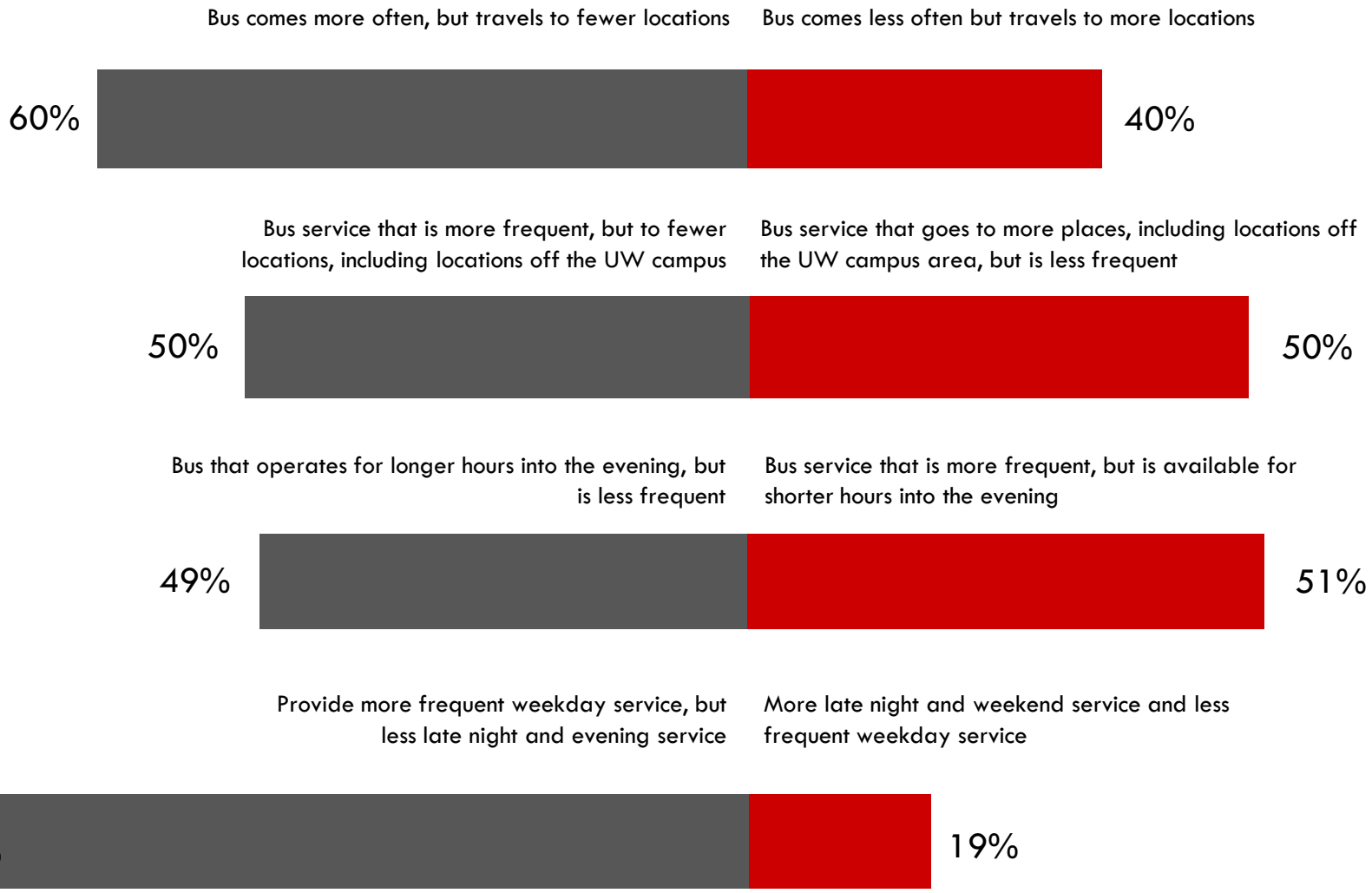
Service Preferences – Key Findings

- Faculty/staff respondents preferred longer travel times to transfers or longer walks to stops
- 2/3 of respondents liked the idea of headway based scheduling
- 81% preferred more frequent weekday service to extended night and weekend service
- Getting dropped “at my door” was not a high priority for faculty/staff respondents
- Knowing the bus will come at regular intervals was most important to faculty/staff respondents
- Half of respondents were uninterested in a demand responsive late-night bus service

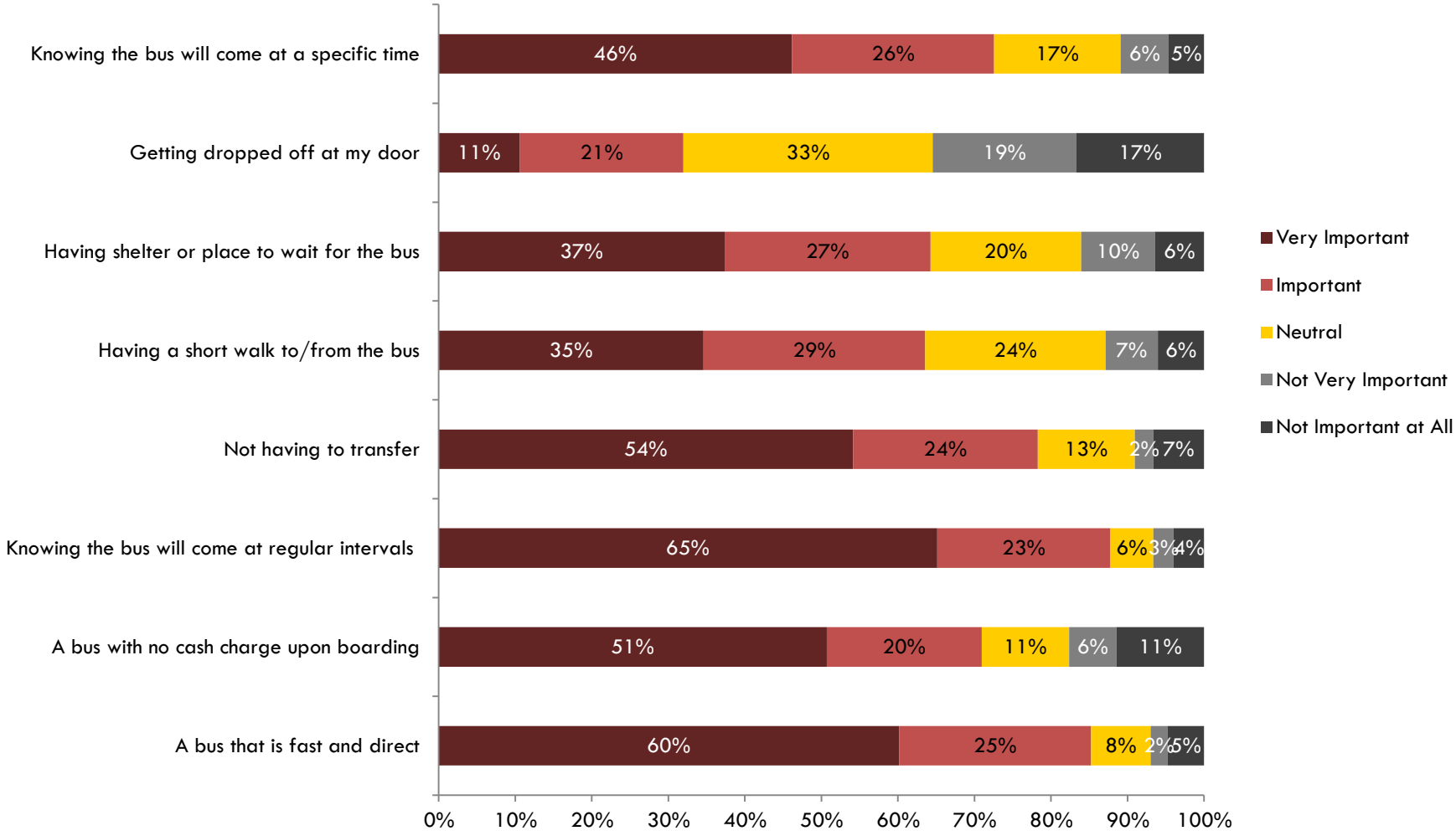
Service Choices



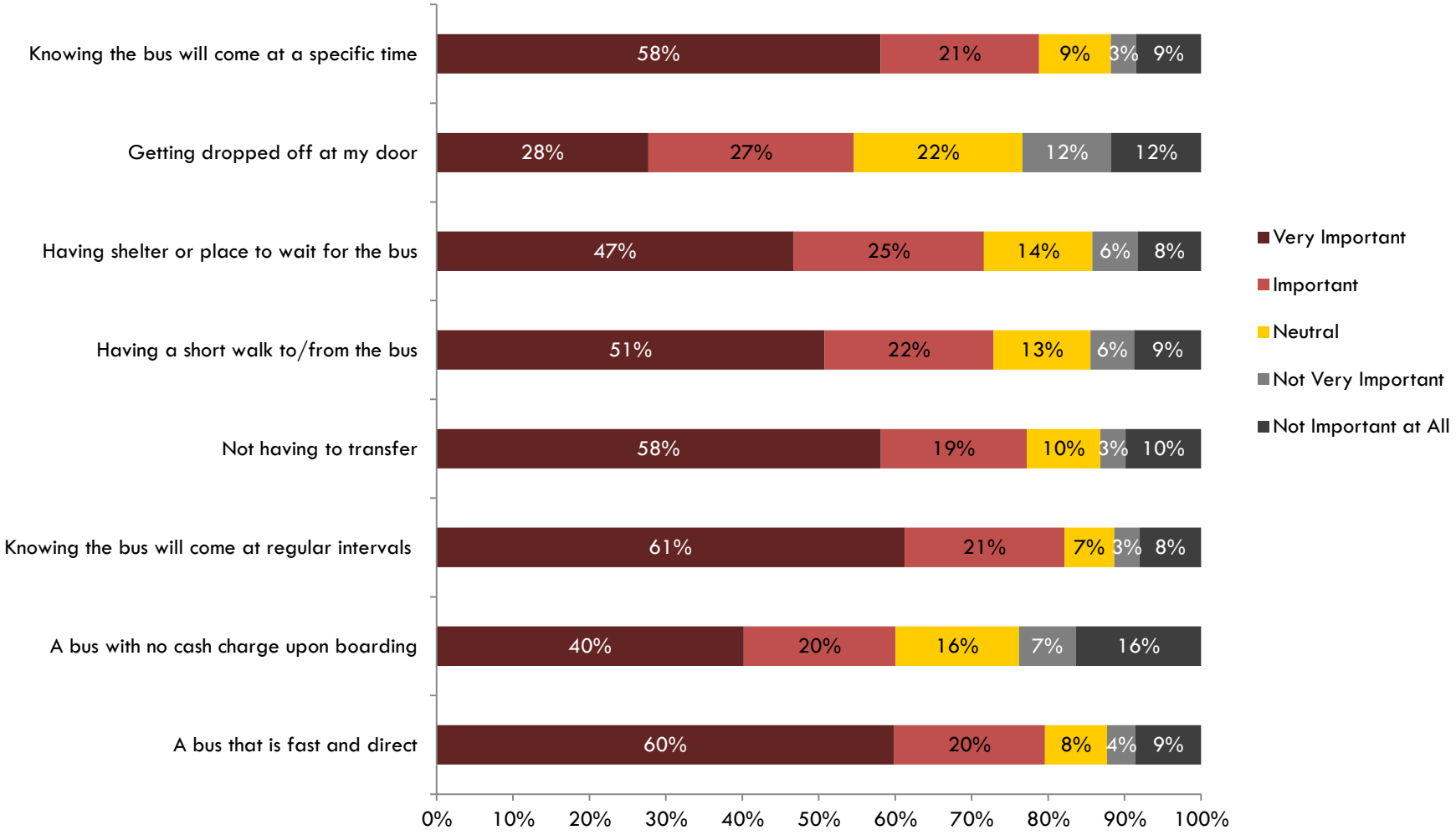
Service Choices



Rankings - Daylight

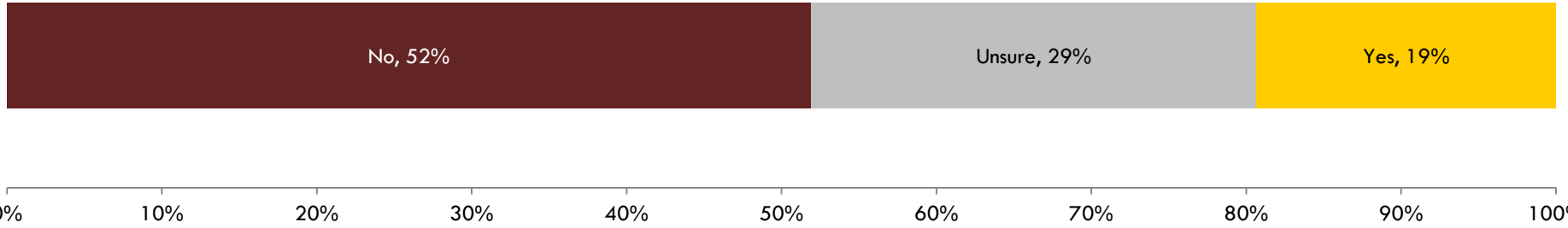


Rankings - Nighttime



Potential for Late Night Bus Service

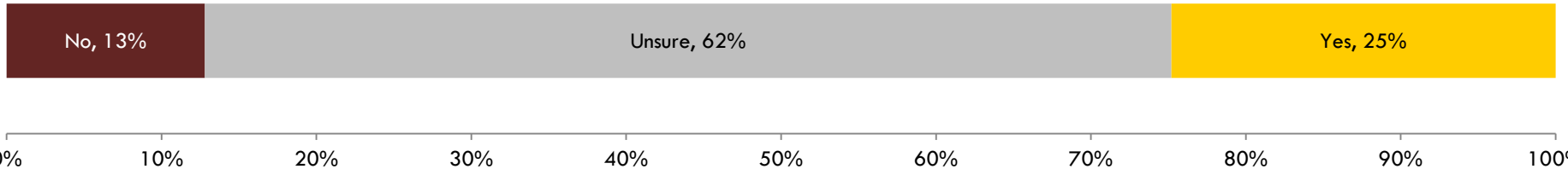
Would you be interested in a late night bus service that you call in advance to schedule?



IF YES:

Would you prefer this over the current UW late night bus service that has a fixed schedule and fixed route?

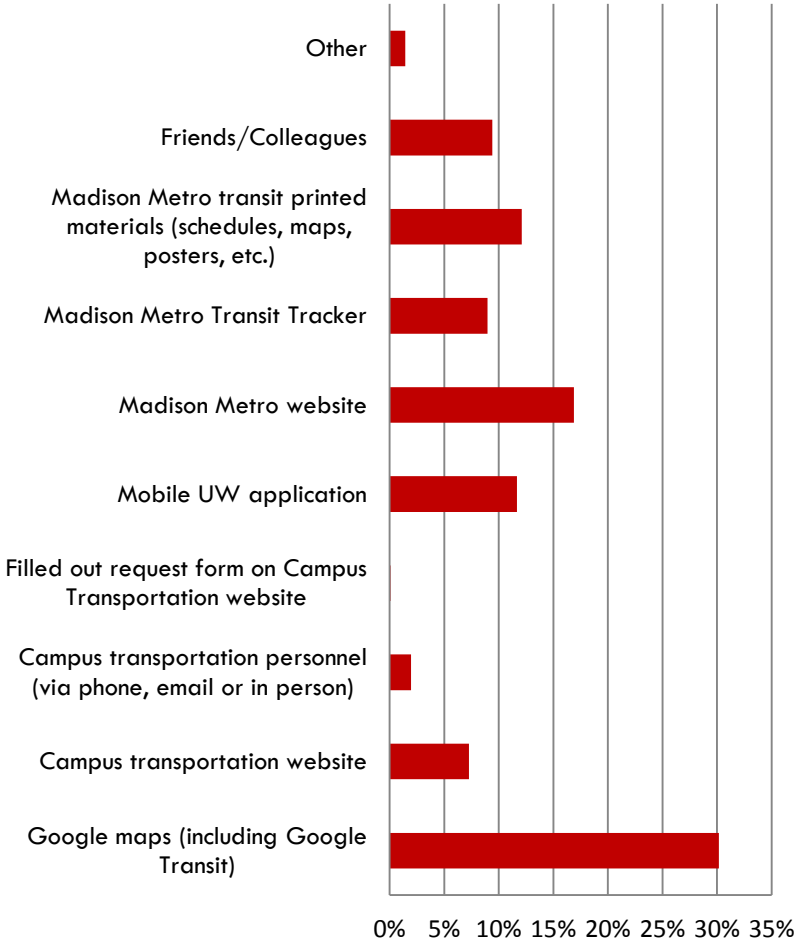
Would you be willing to pay for this service?



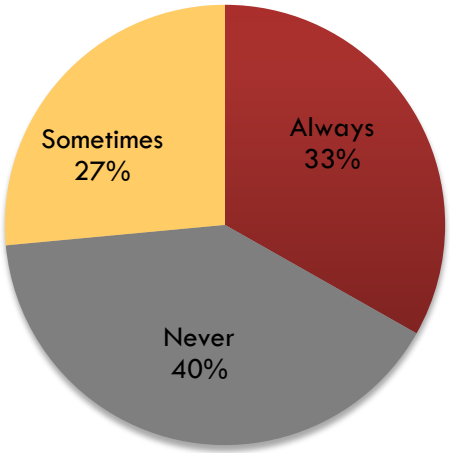
STUDENTS

UW Students

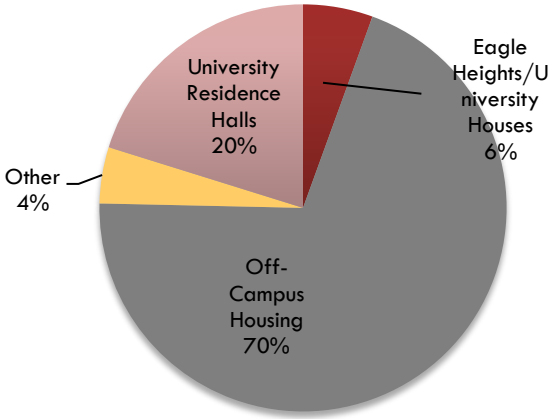
Main source of transit information



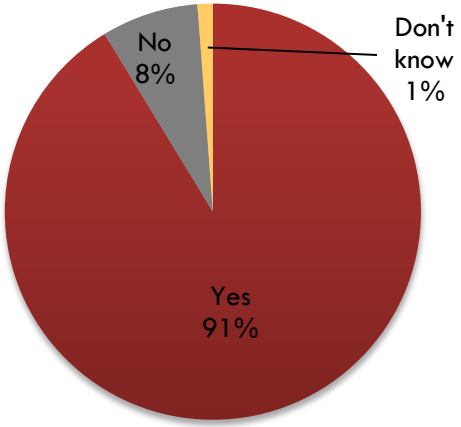
Access to a car?



Primary Place of Residence



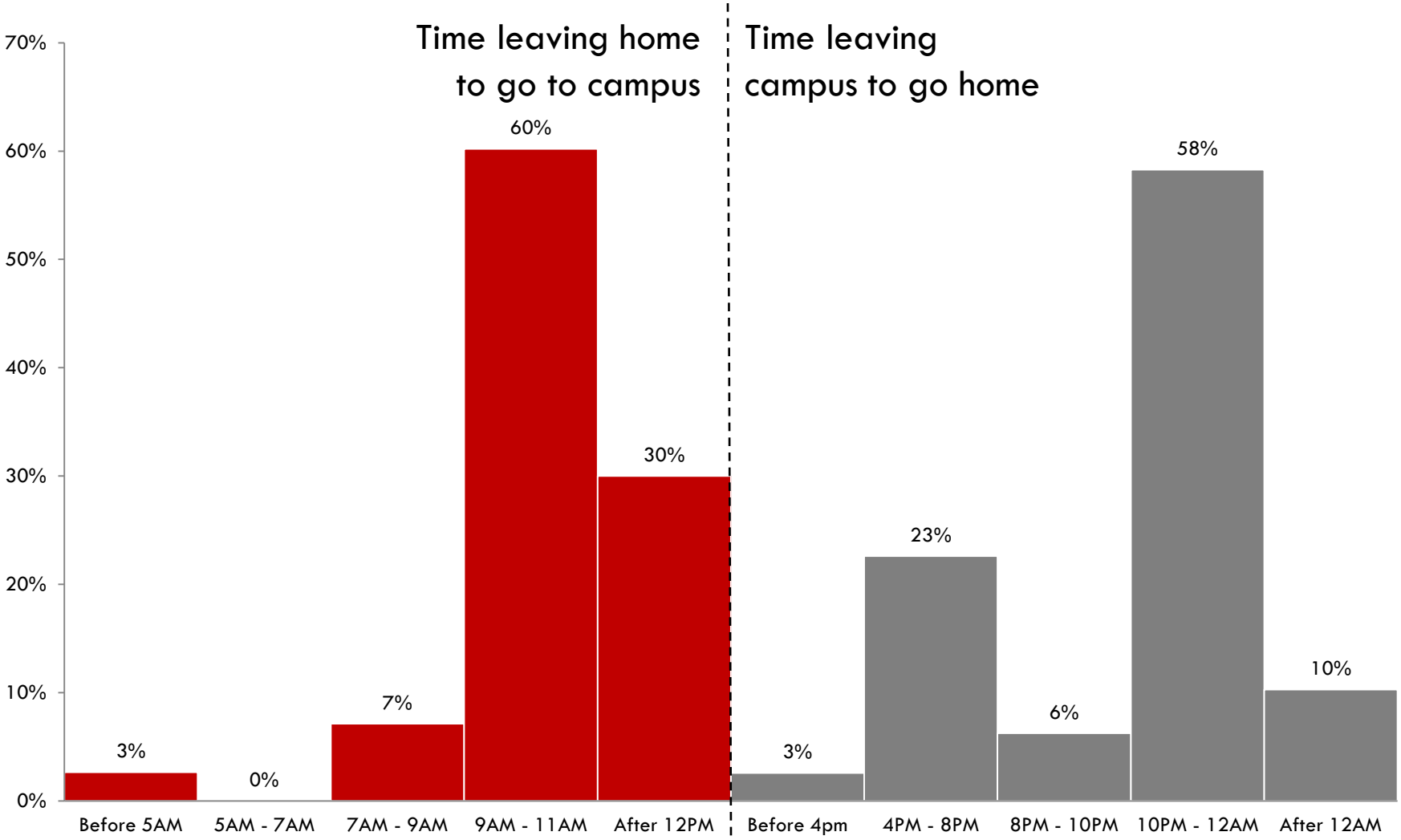
Do you live within 5 minutes of a bus stop?



Time of Demand - Key Findings

- 90% of student respondents leave home after 9:00 am, $^{2}/_{3}$ between 9:00 am and 11:00 am
- Over $^{2}/_{3}$ leave campus for home after 10:00 pm, while almost $^{1}/_{4}$ leave campus between 4:00 pm and 8:00 pm

Time of Demand

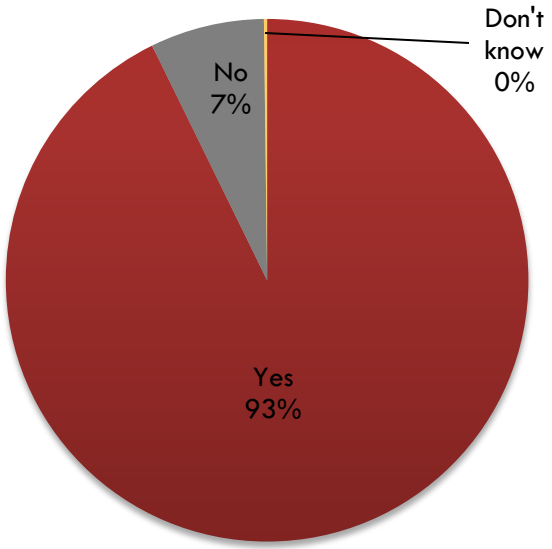


Bus Pass Program – Key Findings

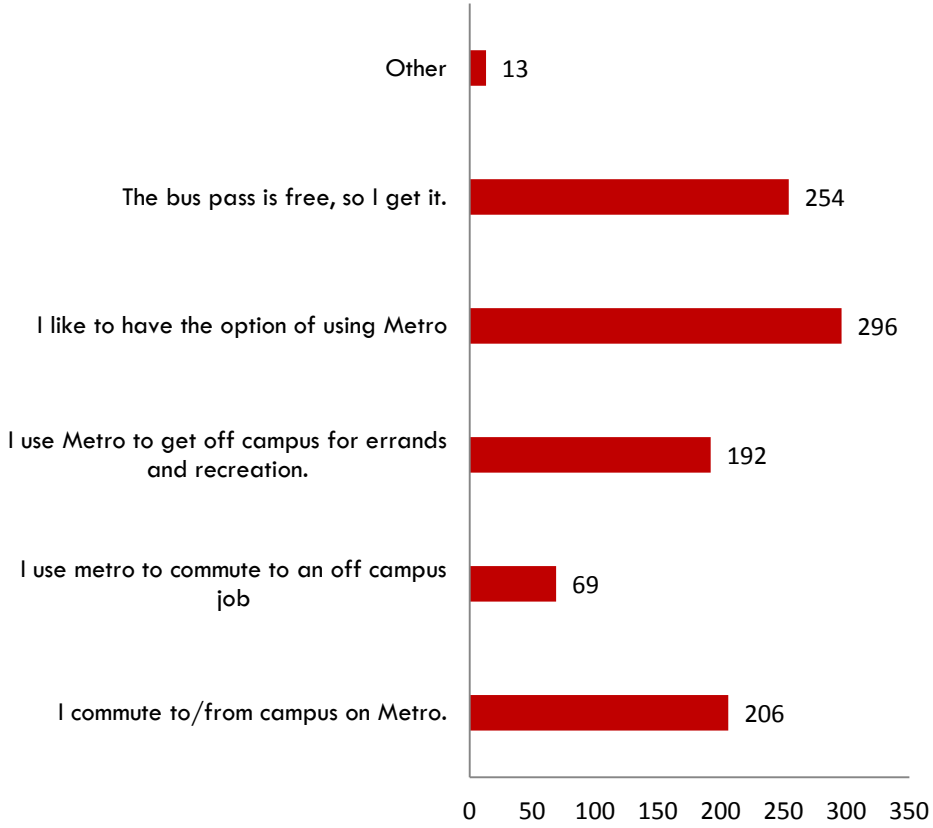
- Most (93%) of student respondents have a bus pass
- Many get the pass because it is free
- A majority get the pass because they use or like to have the option of using Metro.

Bus Pass Program

Do you have a UW bus pass?



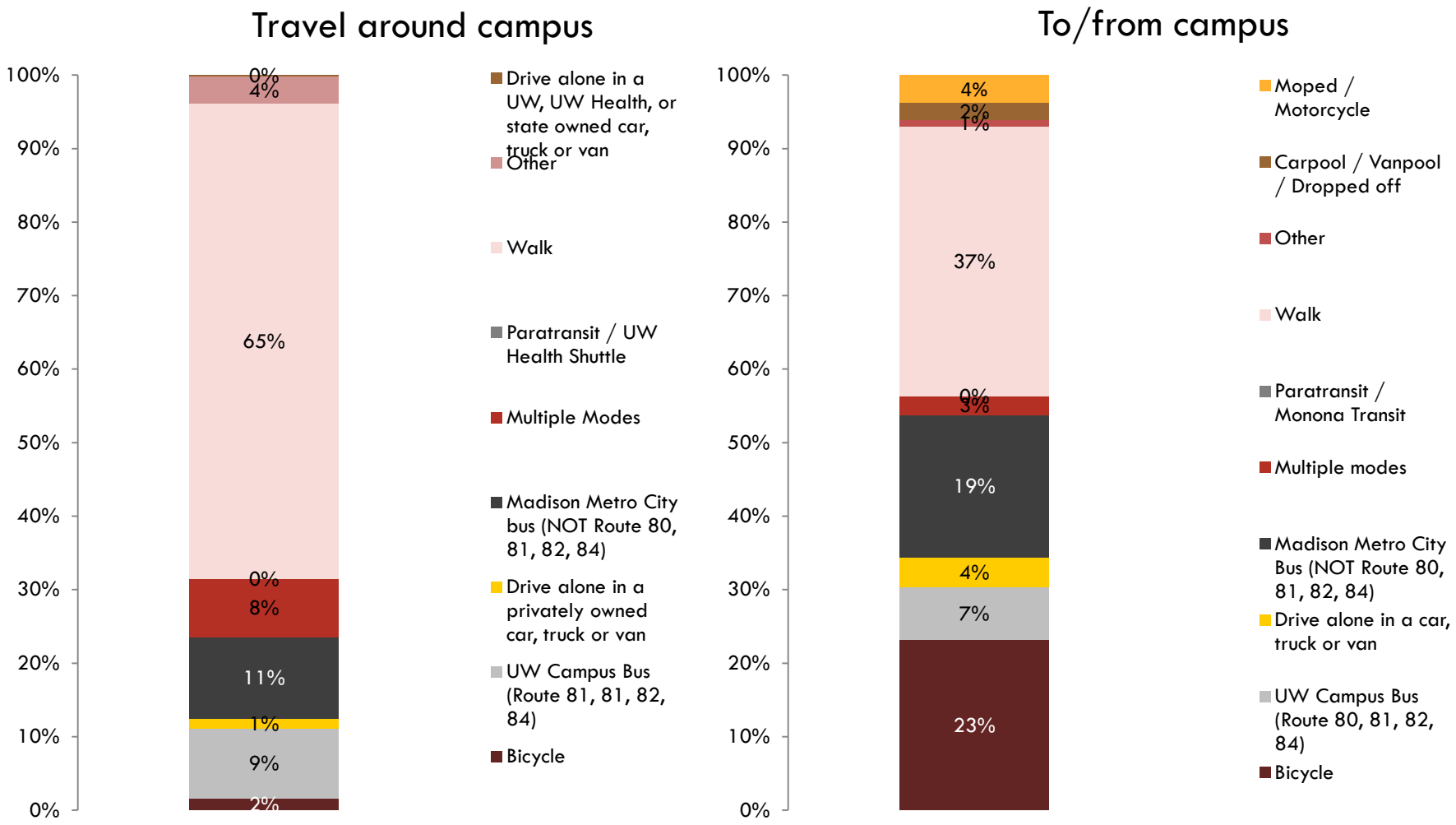
Reasons for having a pass
(multiple choices allowed)



Mode Choice – Key Findings

- Only 4% of student respondents drive alone to campus.
- Walking is the most common mode choice amongst respondents for both travel to/from and travel around campus
- 9% use the campus bus to get to campus, while 7% use it to get around
- Campus Bus use increases significantly in bad weather

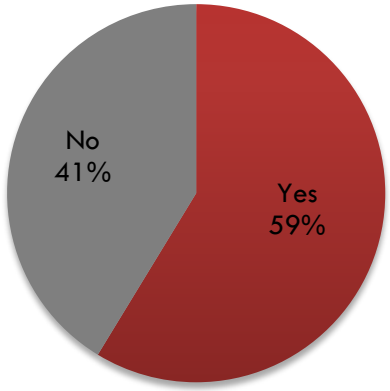
Mode Choice


Travel around campus
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0%
4%
65%
0%
8%
11%
1%
9%
2%
Drive alone in a UW, UW Health, or state owned car, truck or van
Other
Walk
Paratransit / UW Health Shuttle
Multiple Modes
Madison Metro City bus (NOT Route 80, 81, 82, 84)
Drive alone in a privately owned car, truck or van
UW Campus Bus (Route 81, 81, 82, 84)
Bicycle
To/from campus
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
4%
2%
1%
37%
0%
3%
19%
4%
7%
23%
Moped / Motorcycle
Carpool / Vanpool / Dropped off
Other
Walk
Paratransit / Monona Transit
Multiple modes
Madison Metro City Bus (NOT Route 80, 81, 82, 84)
Drive alone in a car, truck or van
UW Campus Bus (Route 80, 81, 82, 84)
Bicycle

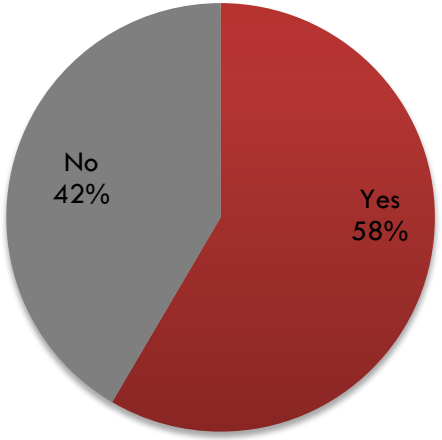
Mode Choice – Weather Changes

- 2 Questions:
  - Do you make a different travel choice in bad weather?
  - IF YES: What travel choice do you make?
- Results:
  - Mode choice of those who do not change modes in bad weather + mode choice of those who do

Different travel choice **around campus** in bad weather

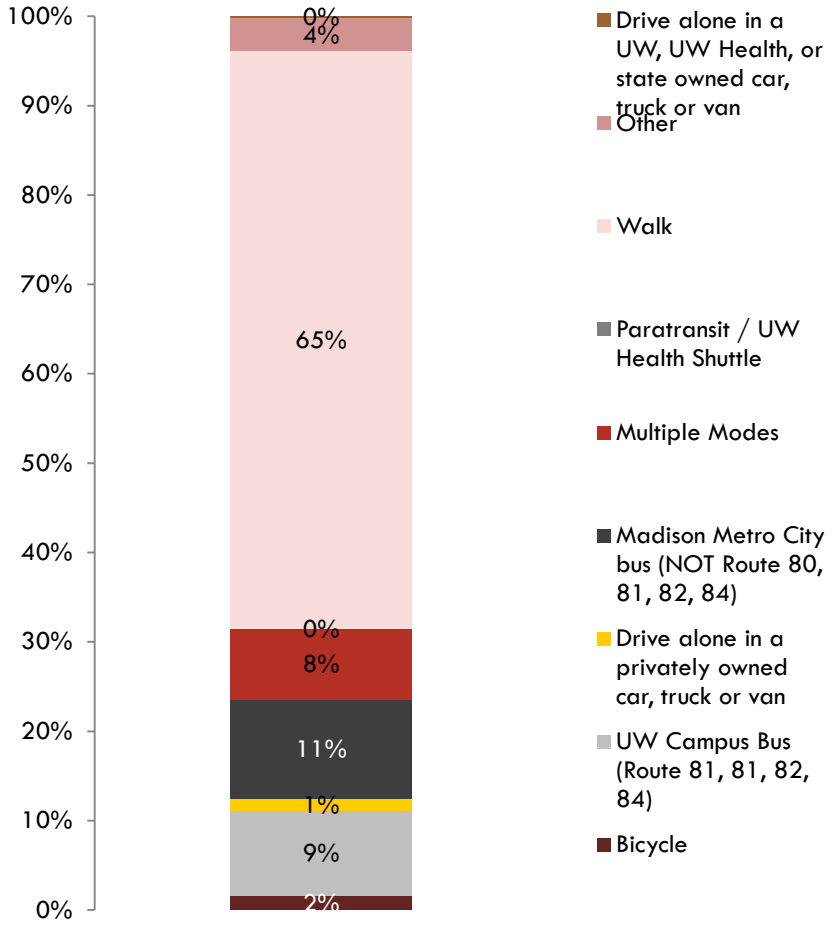


Different travel choice **to/from campus** in bad weather

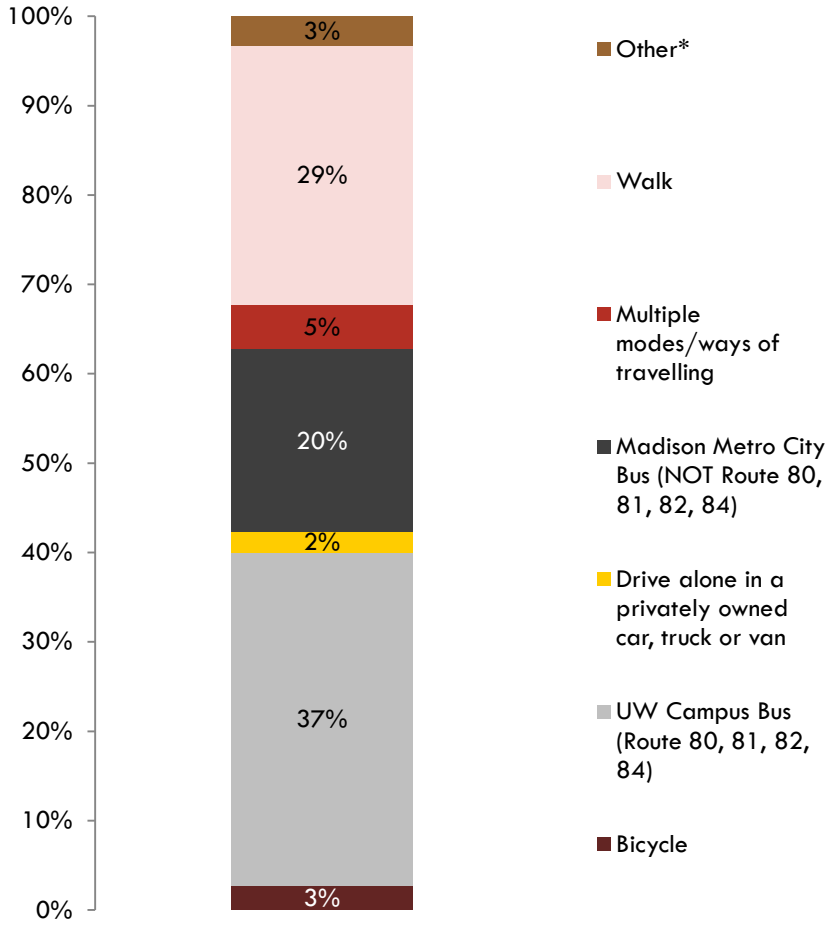


Mode Choice Around Campus – Weather Changes

Travel around campus – Good weather



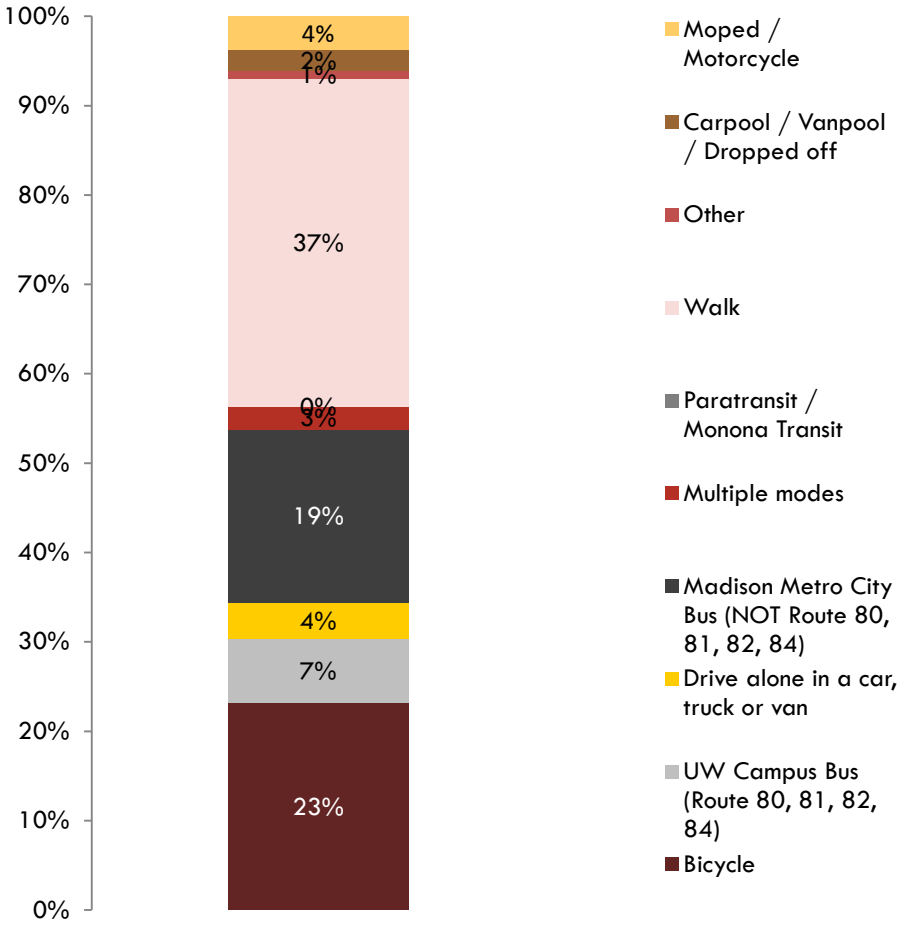
Travel around campus – Bad weather



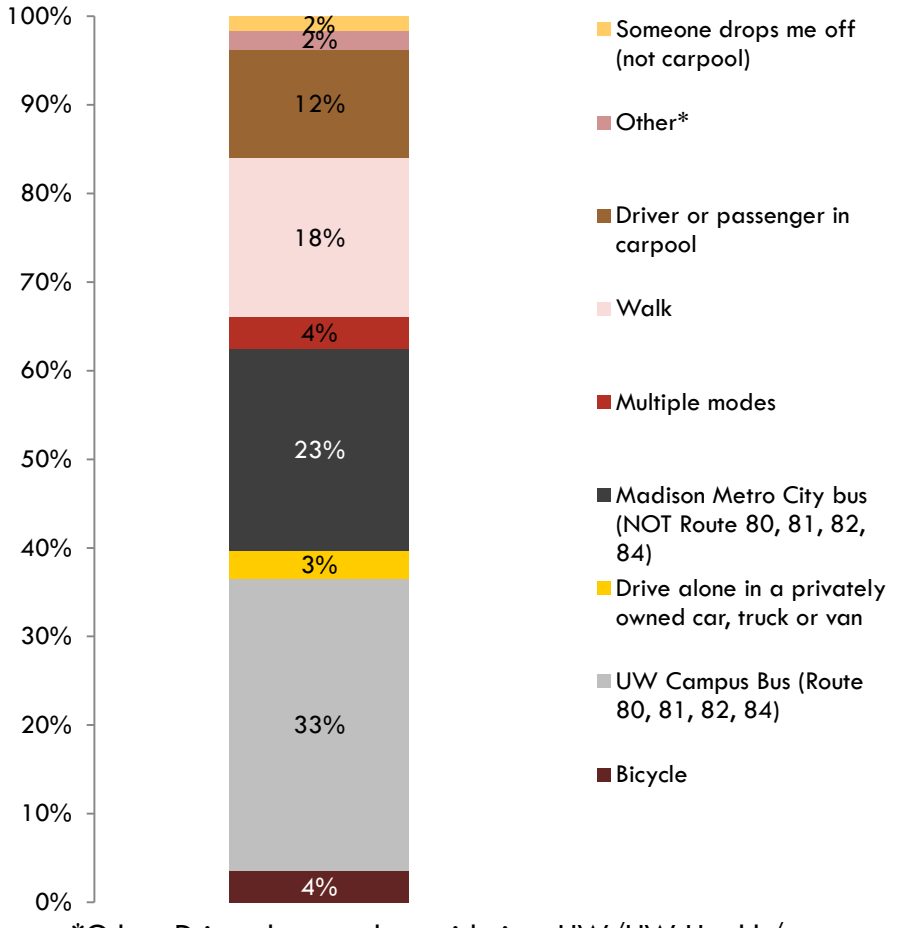
*Other: Drive alone/share ride in UW/UW Health/state owned vehicle, Moped, Motorcycle, Other, Paratransit, Share ride, Dropped off UW Health Shuttle

Mode Choice To/From Campus – Weather Changes

To/from campus – Good weather



Travel to/from campus – Bad weather

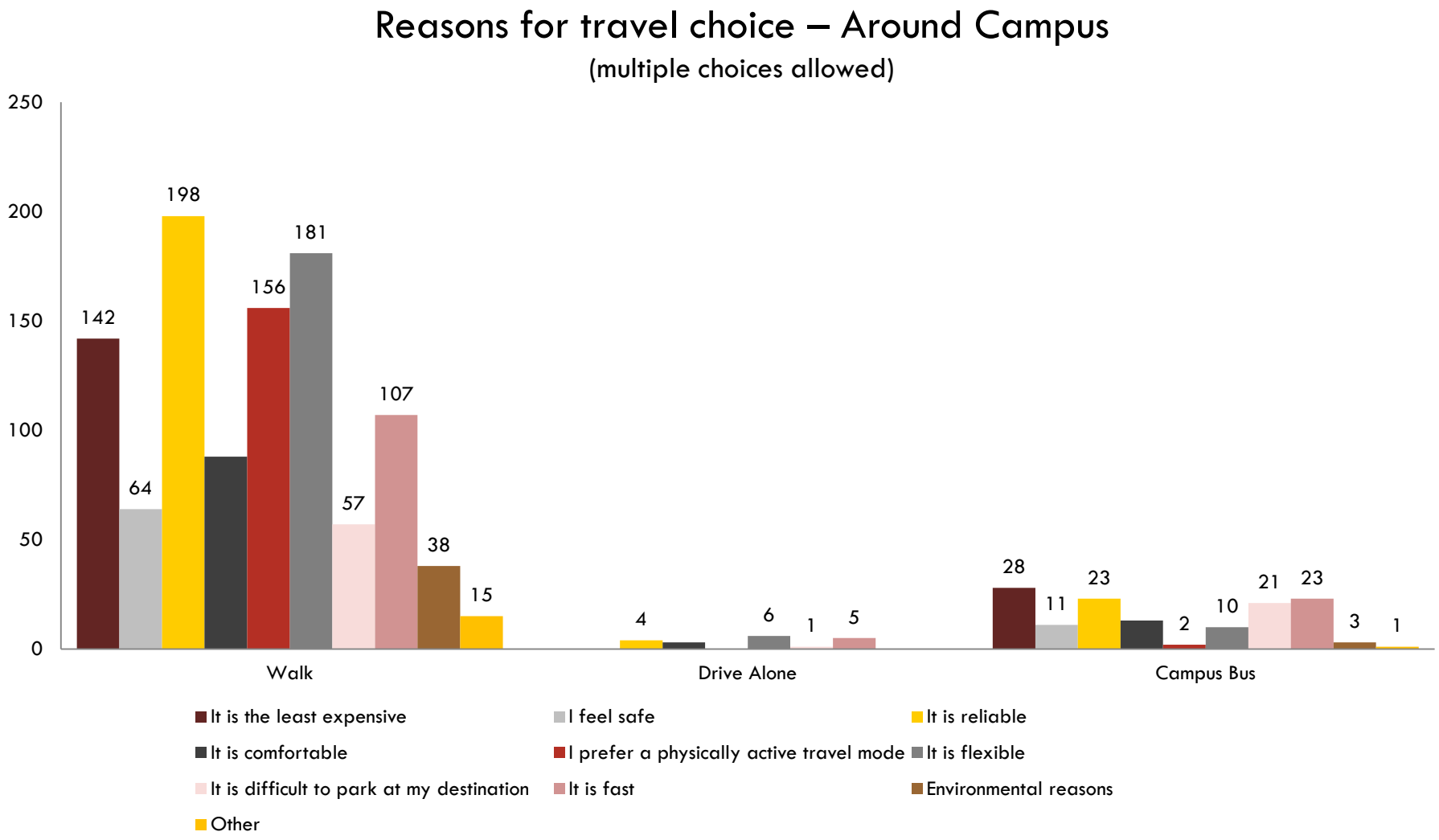


*Other: Drive alone or share ride in a UW/UW Health/state owned vehicle, Share ride in a private vehicle, UW Health Shuttle, Monona Transit, Moped, Motorcycle, Other, Paratransit

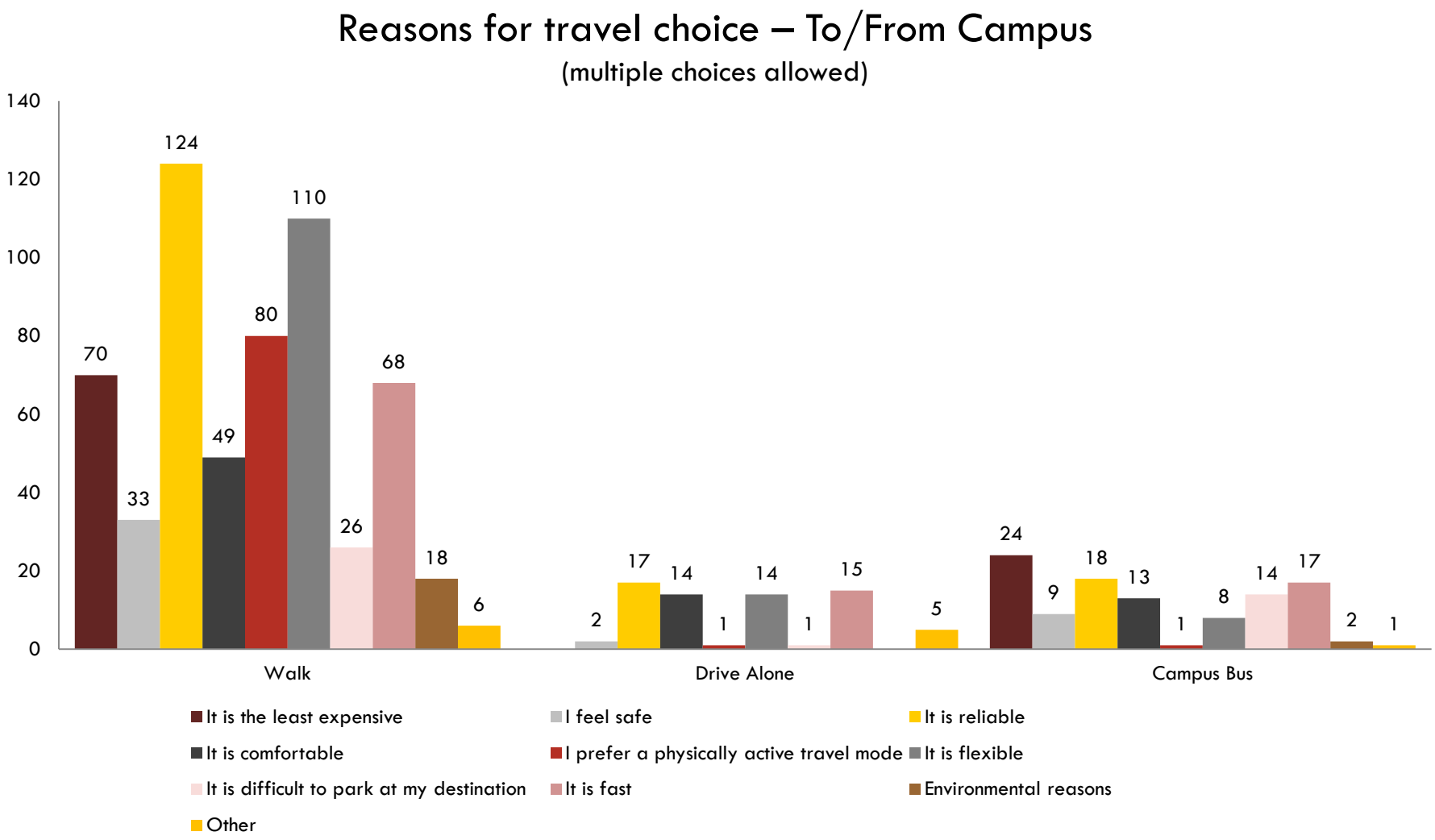
Mode Choice Preferences – Key Findings

- Many student respondents walk around and to/from campus for fitness reasons
- Difficulty of parking leads student respondents to walk or use the campus bus to get around
- Some student respondents say that they use the campus bus because it is fast
- Flexibility drives many to walk and some to drive alone, although bus riders see the bus as a flexible option as well.
- Crowding is a deterrent to bus use around campus
- Non-rider student respondents perceive the bus as a slow option for traveling around campus

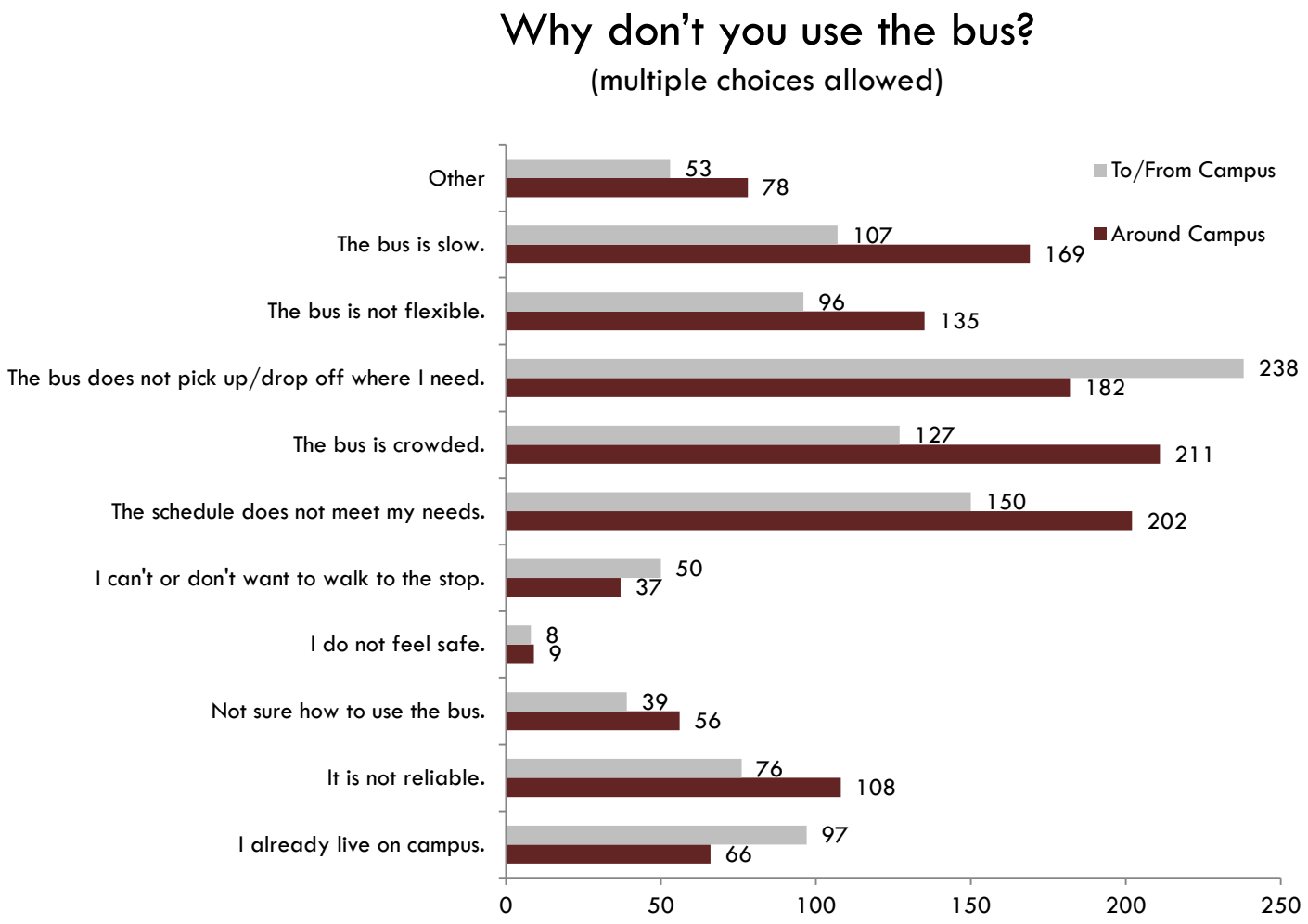
Reasons for Travel Choice



Reasons for Travel Choice



Reason for not using the bus

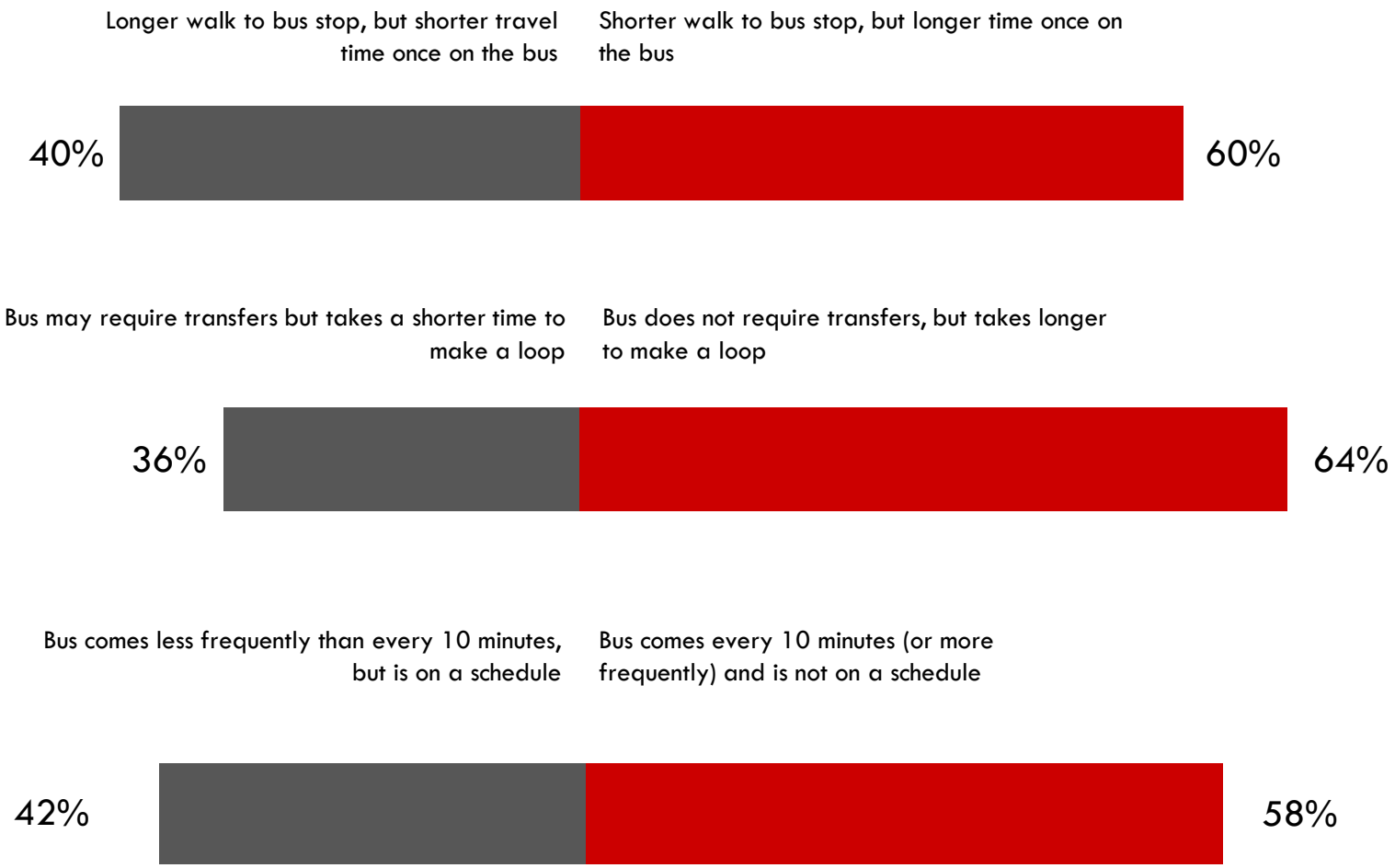


* Question only asked of survey respondents who never said that they used the bus

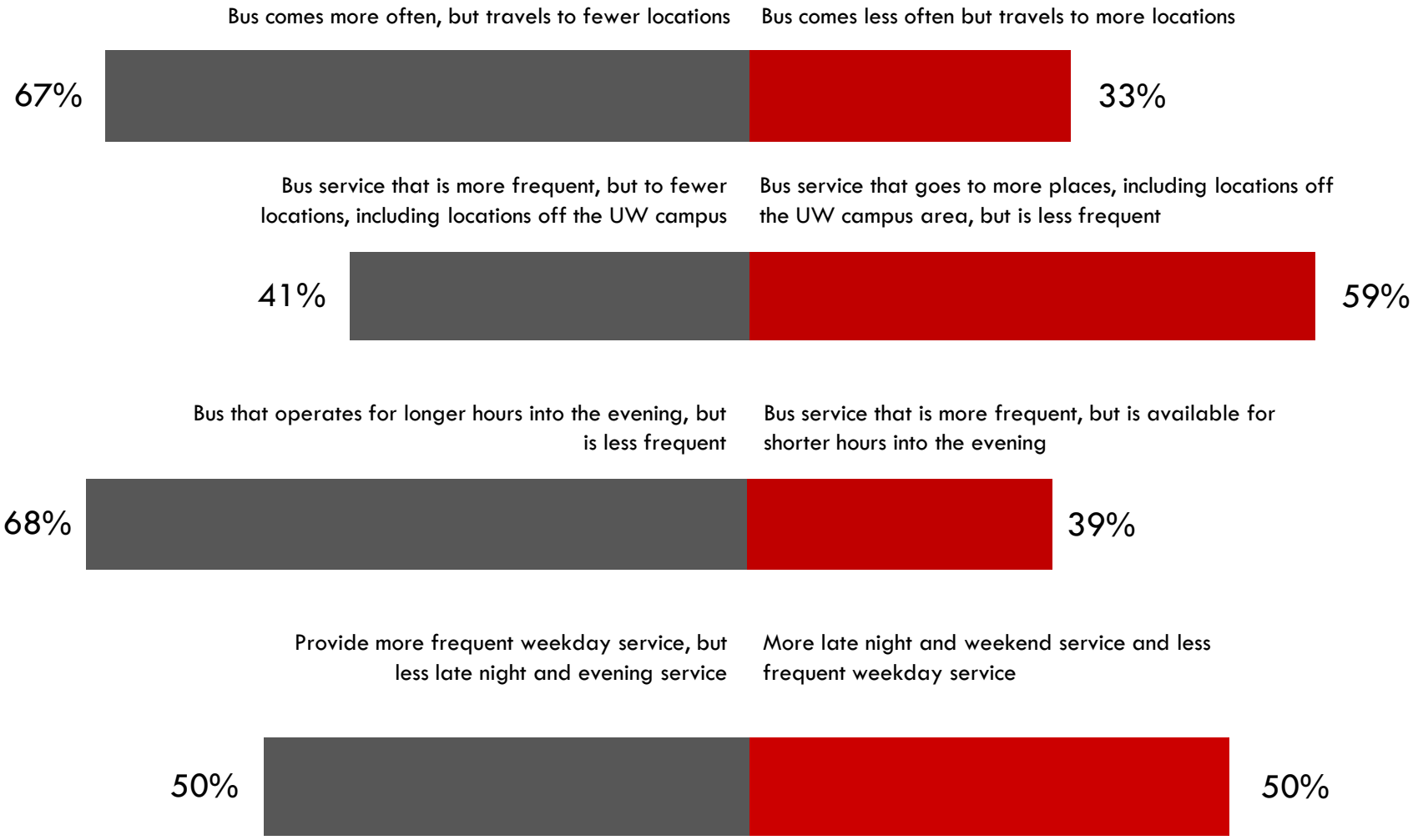
Service Preferences – Key Findings

- Student respondents preferred longer travel times to transfers or longer walks to stops
- 70% of student respondents preferred a bus that operates for longer hours into the evening, but is less frequent
- Getting dropped “at my door” becomes signifcantly more important when student respondents consider night service
- Student respondents also thought predictability was extremely important in bus service
- About half of student respondents were interested in a demand-responsive service at night

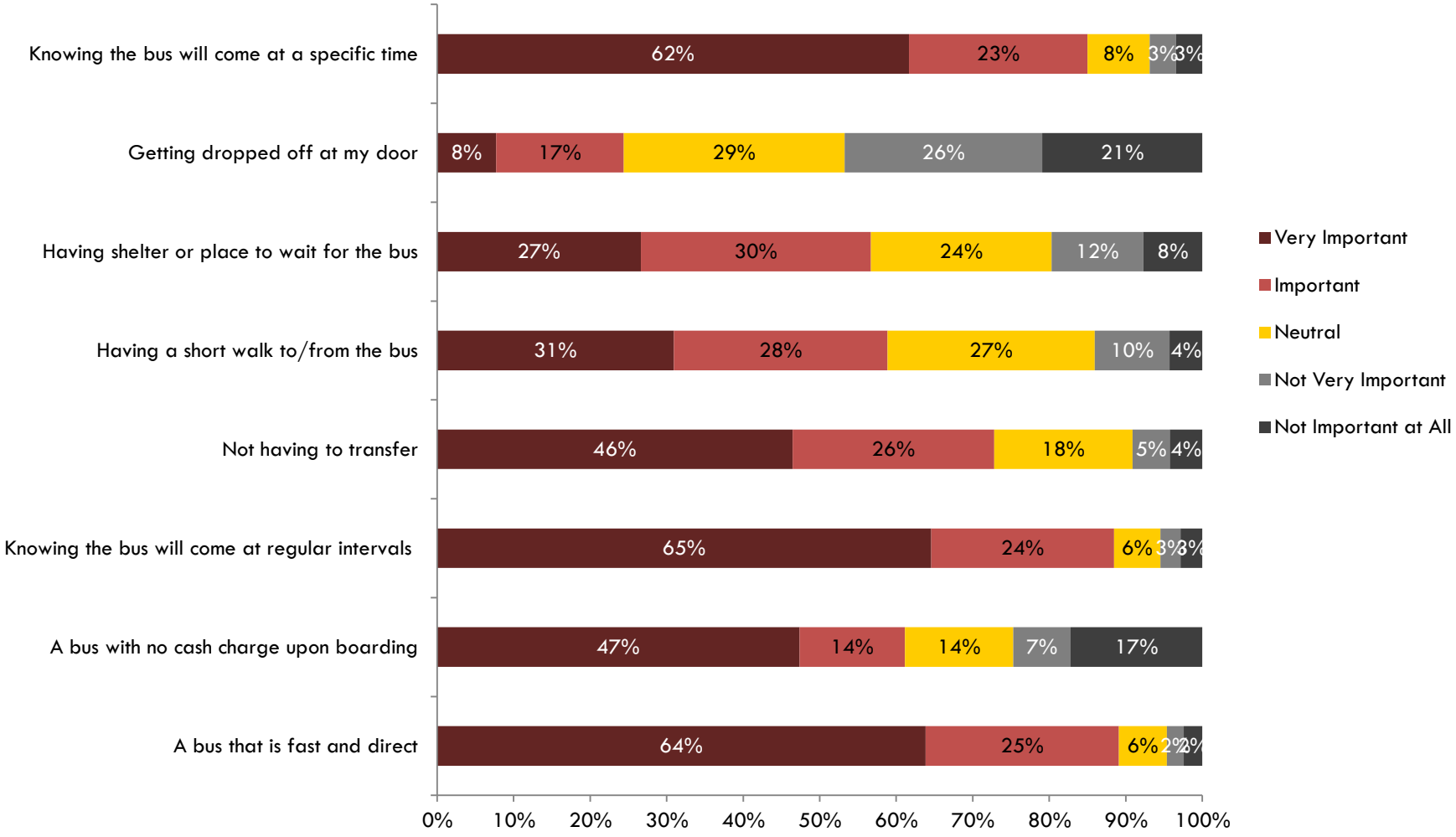
Service Choices



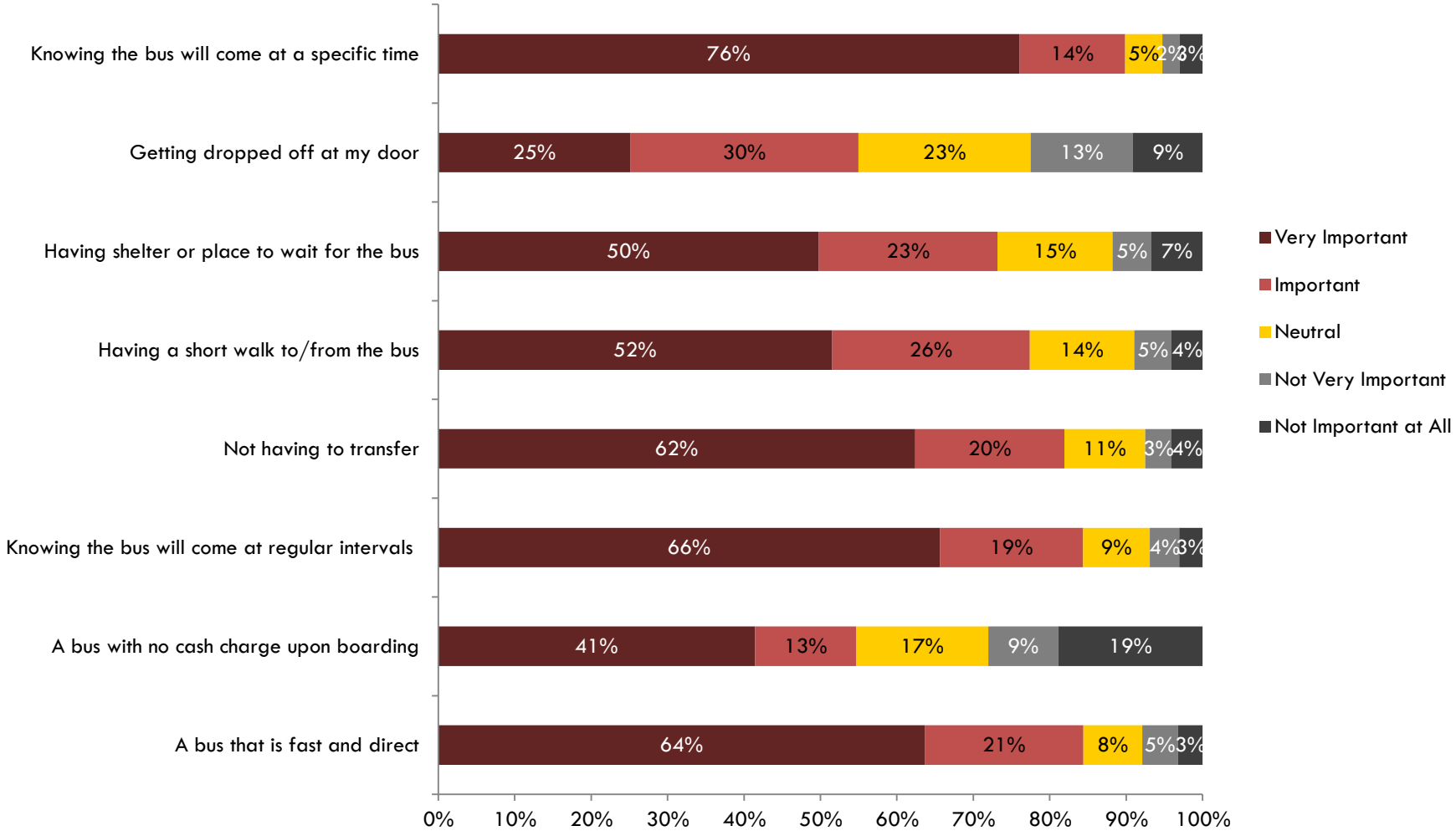
Service Choices



Rankings - Daylight

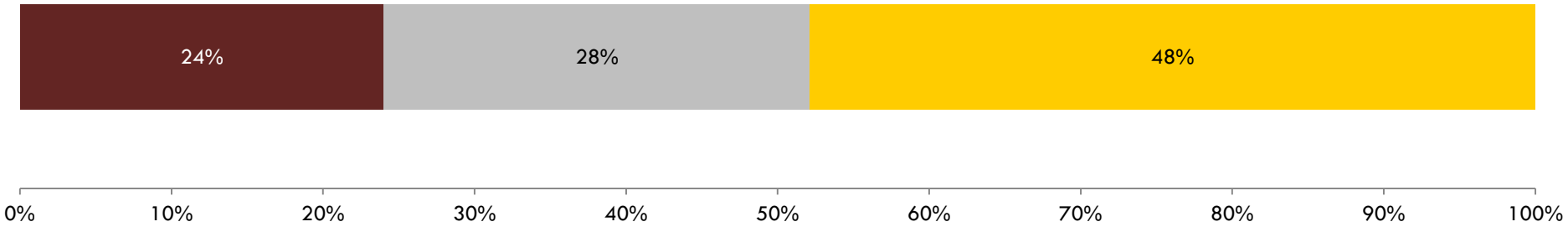


Rankings - Nighttime



Potential for Late Night Bus Service

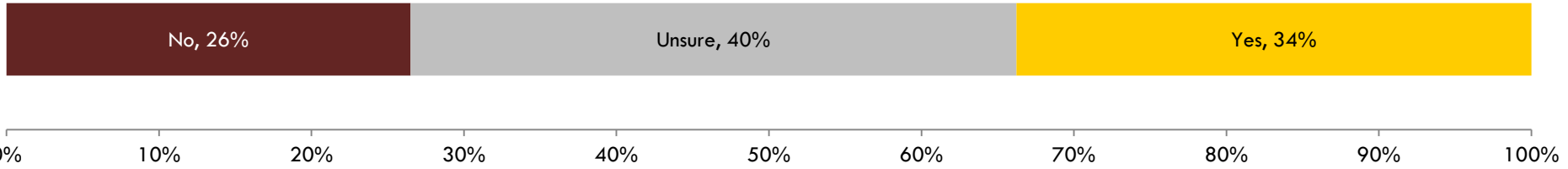
Would you be interested in a late night bus service that you call in advance to schedule?



IF YES:

Would you prefer this over the current UW late night bus service that has a fixed schedule and fixed route?

Would you be willing to pay for this service?



Comments Summary

- Several positive comments about Campus Bus Service
- Many respondents miss the previous route 80-85 configuration
- Many respondents do not use the bus because they live outside the service area.
- Hospital workers cited their shift times as a deterrent to riding the bus
- Respondents say that travel time on the campus bus is a deterrent to using the service
- Many respondents perceive the bus to be too crowded, particularly the Route 80 during the day

COMMENTS

Comments Summary

- Several positive comments about Campus Bus Service
- Many respondents miss the previous route 80-85 configuration
- Many respondents do not use the bus because they live outside the service area.
- Hospital workers cited their shift times as a deterrent to riding the bus
- Respondents say that travel time on the campus bus is a deterrent to using the service
- Many respondents perceive the bus to be too crowded, particularly the Route 80 during the day
- Many respondents choose their mode based on exercise

Comments – Sample

- Final question: "**If you would like to provide any further comments regarding UW Campus Bus service…**"
- 144 comments – recurring themes:
  - **13** requesting reinstatement of **Route 85**
  - **12** concerned about **crowding**
  - **8** requesting **more late night service**
  - **4 displeased with new Route 80** configuration

Contact Information

Bethany Whitaker
Project Manager, Nelson\Nygaard
bwhitaker@nelsonnygaard.com
Office: (802) 922-9760
Cell: (802) 922-8158

Appendix – Survey Questions

Intro Questions

1. What is your association with UW Madison?
Choose best answer:

- UW Student
- UW Faculty/Staff
- UW Hospital/UW Health Employee
- UW Campus Visitor
- Other:

2. What is your primary place of residence?

- Eagle Heights/University Houses
- University Residence Halls
- Off-Campus Housing
- Other:

2A. If you live off-campus, approximately how far away do you live?

- About one mile or less
- More than one mile but less than 3 miles
- More than 3 miles but less than 5 miles
- More than 5 miles

Travel Around Campus - Hospital

Desc.
We are interested in understanding how you travel around the UW campus as well as why you make certain travel choices. This section includes questions about how you typically get around campus, for example to get to a meeting or to run an errand. As you answer questions, please think about a typical day.

H3. How often do you usually travel around the UW campus area?

- I typically get to my office or classroom, spend the whole day there and leave from there.
- I typically get to my office or classroom, will leave once or twice for meetings, lunch (etc) but otherwise spend most of the day in one place.
- I make a lot of trips throughout the day, have lots of meetings and am moving around a lot.
- Other:

H4. During good weather, how do you typically get around the UW campus area during daylight hours?
Chose one:

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a privately owned car, truck or van
- Drive alone in a UW, UW Health, or state owned car, truck or van
- Someone drops me off (not carpool)
- Share a ride in a UW, UW Health, or state owned car, truck or van
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- Campus Bus (Route 81, 81, 82, 84)
- UW Health Shuttle
- Paratransit
- Multiple modes/ways of traveling
- Other

- Share a ride in a privately owned car, truck or van

H5. What is the primary way you travel around the UW campus area in good weather?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a privately owned car, truck or van
- Drive alone in a UW, UW Health, or state owned car, truck or van
- Someone drops me off (not carpool)
- Share a ride in a privately owned car, truck or van
- Share a ride in a UW, UW Health, or state owned car, truck or van
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- Campus Bus (Route 81, 81, 82, 84)
- UW Health Shuttle
- Paratransit
- Other

H6. What is the secondary way you travel around the UW campus area in good weather?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a privately owned car, truck or van
- Drive alone in a UW, UW Health, or state owned car, truck or van
- Someone drops me off (not carpool)
- Share a ride in a privately owned car, truck or van
- Share a ride in a UW, UW Health, or state owned car, truck or van
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- Campus Bus (Route 81, 81, 82, 84)
- UW Health Shuttle
- Paratransit
- Other

H7. Why do you make this travel choice?
(Check all that apply)

- [ ] It is the least expensive
- [ ] I feel safe
- [ ] It is reliable.
- [ ] It is comfortable
- [ ] It is flexible
- [ ] It is fast
- [ ] Environmental reasons.
- [ ] It is difficult to park at my destination.
- [ ] I prefer a physically active travel mode.
- [ ] Other

H8. Why don't you use the Campus Bus System (Route 81, 81, 82, 84) to get around the hospital?
(Check all that apply)

- [ ] I already live on campus
- [ ] It is not reliable
- [ ] Not sure how to use the bus.
- [ ] I do not feel safe
- [ ] I can't or don't want to walk to my stop.
- [ ] The schedule does not meet my needs
- [ ] The bus is crowded.
- [ ] The bus does not pick up/drop off where I need.
- [ ] The bus is not flexible.
- [ ] The bus is slow
- [ ] Other

H9. Do you make different travel choices during bad weather?

- Yes
- No

H10. When the weather is bad, how do you typically get around the UW campus area during daylight hours?
Choose one:

- Share a ride in a UW, UW Health, or state owned car,

- Walk
- Share a ride in a UW, UW Health, or state owned car, truck or van
- Bicycle
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- Moped
- Campus Bus (Route 81, 81, 82, 84)
- Motorcycle
- UW Health Shuttle
- Drive alone in a privately owned car, truck or van
- Paratransit
- Drive alone in a UW, UW Health, or state owned car, truck or van
- Multiple modes/ways of traveling
- Someone drops me off (not carpool)
- Other
- Share a ride in a privately owned car, truck or van

H11. When the weather is bad, what is the primary way you travel around the UW campus area

- Walk
- Share a ride in a privately owned car, truck or van
- Bicycle
- Share a ride in a UW, UW Health, or state owned car, truck or van
- Moped
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- Motorcycle
- Campus Bus (Route 81, 81, 82, 84)
- Drive alone in a privately owned car, truck or van
- UW Health Shuttle
- Drive alone in a UW, UW Health, or state owned car, truck or van
- Paratransit
- Someone drops me off (not carpool)
- Other

H12. What is the secondary way you travel around the UW campus area in good weather?

- Walk
- Share a ride in a privately owned car, truck or van
- Bicycle
- Share a ride in a UW, UW Health, or state owned car, truck or van
- Moped
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- Motorcycle
- Campus Bus (Route 81, 81, 82, 84)
- Drive alone in a privately owned car, truck or van
- UW Health Shuttle
- Drive alone in a UW, UW Health, or state owned car, truck or van
- Paratransit
- Someone drops me off (not carpool)
- Other

H13. Why do you make this travel choice during bad weather?
(Check all that apply)

- [ ] It is the least expensive
- [ ] It is fast
- [ ] I feel safe
- [ ] Environmental reasons.
- [ ] It is reliable.
- [ ] I prefer a physically active travel mode.
- [ ] It is comfortable
- [ ] It is difficult to park at my destination
- [ ] It is flexible
- [ ] Other

Bus Service Choices - Hospital

Desc. **The following questions offer you a series of choices about bus service. For each row, please decide whether you prefer the choice on the LEFT or the RIGHT and mark as appropriate.**

H14A.

Longer walk to the bus stop, but shorter travel time once on the bus.	Shorter walk to the bus stop, but longer time once on the bus
○	○

H14B.

Bus comes every 10 minutes (or more frequently) and is not on a schedule.	Bus comes less frequently than every 10 minutes, but is on a schedule that tells me when it is going to be at my stop.

H14C.

Bus does not require transfers, but takes longer to make a loop.	Bus may require transfers but takes a shorter time to make a loop.

H14D.

Bus comes more often, but travels to fewer locations.	Bus comes less often but travels to more locations.

H14E.

Provide more frequent weekday service, but less late night and evening service.	More late night and weekend service and less frequent weekday service.

H14F.

Bus that operates for longer hours into the evening, but is less frequent.	Bus service that is more frequent, but is available for shorter hours into the evening.

H14G.

Bus service that goes to more places, including locations off the UW campus area, but is less frequent.	Bus service that is more frequent, but goes to fewer locations, including locations off the UW campus area

Travel to/from Campus - Hospital

Desc.. We are also interested in understanding howyou travel between the UW Hospital and home.

*When you answer the questions, please tell us about a **typical day.***

H15. How many days per week do you usually travel from your home to the UW Hospital?

- Once or twice
- Three to five times per week
- More than five times per week
- N/A -- I am a visitor or rarely travel to the UW Madison campus

H16. What time do you typically leave home to go **to the hospital?**

- Before 5:00 AM
- Between 5:00 AM and 7:00 AM
- Between 7:00 AM and 9:00 AM
- Between 9:00 AM and 11:00 AM
- After 12:00 PM (afternoon)

H17. What time do you typically leave the hospital to **travel back home?**

- Before 4:00 PM
- Between 4:00 PM and 8:00 PM

- Between 8:00 PM and 10:00 PM
- Between 10:00 PM and Midnight (12:00 AM)
- After midnight (12:00 AM)

H18. During good weather, how do you typically travel to/from the hospital?
Choose one:

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a car, truck or van
- Someone drops me off (not pool)
- Driver or passenger in carpool
- Driver or passenger in state vanpool
- Madison Metro City Bus (NOT Route 80, 81, 82, 84)
- UW Campus Bus (Route 80, 81, 82, 84)
- Monona Transit
- Multiple modes/ways of traveling
- Paratransit
- Other

H19. What is the primary way you travel to/from the hospital in good weather?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a car, truck or van
- Someone drops me off (not pool)
- Driver or passenger in carpool
- Driver or passenger in state vanpool
- Madison Metro City Bus (NOT Route 80, 81, 82, 84)
- UW Campus Bus (Route 80, 81, 82, 84)
- Monona Transit
- Paratransit
- Other

H20. What is the secondary way you travel to/from the hospital in good weather?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a car, truck or van
- Someone drops me off (not pool)
- Driver or passenger in carpool
- Driver or passenger in state vanpool
- Madison Metro Bus (NOT Route 80, 81, 82, 84)
- UW Campus Bus (Route 80, 81, 82, 84)
- Monona Transit
- Paratransit
- Other

H21. Why do you make this choice?
(Check all that apply)

- [ ] It is the least expensive.
- [ ] I feel safe.
- [ ] It is reliable.
- [ ] It is comfortable.
- [ ] It is flexible.
- [ ] It is fast.
- [ ] Environmental reasons.
- [ ] It is difficult to park at my destination
- [ ] I prefer a physically active travel mode.
- [ ] Other:

H22. Why don't you use Madison Metro or the Campus Bus system to get to the hospital?
(Check all that apply.)

- [ ] I already live on campus.
- [ ] It is not reliable.
- [ ] Not sure how to use the bus.
- [ ] I do not feel safe.
- [ ] I can't or don't want to walk to the stop.
- [ ] The bus is crowded.
- [ ] The bus does not pick up/drop off where I need.
- [ ] The bus is not flexible.
- [ ] The bus is slow.
- [ ] Other:

- [ ] The schedule does not meet my needs.

H23. When you are traveling between your home and the hospital during bad weather, do you make different travel choices?

- ◯ Yes
- ◯ No

H24. When the weather is bad, how do you typically travel to/from the hospital?

- ◯ Walk
- ◯ Bicycle
- ◯ Moped
- ◯ Motorcycle
- ◯ Drive alone in a car, truck or van
- ◯ Someone drops me off (not pool)
- ◯ Driver or passenger in carpool
- ◯ Driver or passenger in state vanpool
- ◯ Madison Metro City bus (NOT Route 80, 81, 82, 84)
- ◯ Campus Bus (Route 80, 81, 82, 84)
- ◯ Monona Transit
- ◯ Paratransit
- ◯ Multiple modes/ways of traveling
- ◯ Other

H25. When the weather is bad, what is the primary way you travel to/from the hospital?

- ◯ Walk
- ◯ Bicycle
- ◯ Moped
- ◯ Motorcycle
- ◯ Drive alone in a car, truck or van
- ◯ Someone drops me off (not pool)
- ◯ Driver or passenger in carpool
- ◯ Driver or passenger in state vanpool
- ◯ Madison Metro City bus (NOT Route 80, 81, 82, 84)
- ◯ Campus Bus (Route 80, 81, 82, 84)
- ◯ Monona Transit
- ◯ Paratransit
- ◯ Other

H26. What is the secondary way you travel around the hospital in bad weather?

- ◯ Walk
- ◯ Bicycle
- ◯ Moped
- ◯ Motorcycle
- ◯ Drive alone in a car, truck or van
- ◯ Someone drops me off (not pool)
- ◯ Driver or passenger in carpool
- ◯ Driver or passenger in state vanpool
- ◯ Madison Metro City bus (NOT Route 80, 81, 82, 84)
- ◯ Campus Bus (Route 80, 81, 82, 84)
- ◯ Monona Transit
- ◯ Paratransit
- ◯ Other

H27. Why do you make this travel choice during bad weather?
(Check all that apply)

- [ ] It is the least expensive
- [ ] I feel safe
- [ ] It is reliable.
- [ ] It is comfortable
- [ ] It is flexible
- [ ] It is fast
- [ ] Environmental reasons.
- [ ] It is difficult to park at my destination
- [ ] I prefer a physically active travel mode.
- [ ] Other

Travel Preferences - Hospital

Desc.
These next few questions ask you about your preferences and priorities for bus service. The first set of questions asks you to rank the importance of each service characteristics on a scale of 1 (very important) to 5 (not important at all). This question is asked twice for different types of trips.

28. When you need to travel around the UW campus area (i.e. lunch, to get to meetings, etc) during daytime hours, how much do you value the following?

	1 (Very Important)	2	3	4	5 (Not important at all)
A bus that is fast and direct.					
A bus with no cash charge upon boarding.					
Knowing the bus will come at regular intervals (for example every 10 minutes).					
Not having to transfer.					
Having a short walk to/from the bus.					
Having a shelter or place to wait for the bus.					
Getting dropped off at my front door.					
Knowing the bus will come at a specific time.					

29. When you are traveling after dark, how much do you value the following?

	1 (Very Important)	2	3	4	5 (Not important at all)
A bus that is fast and direct.					
A bus with no cash charge upon boarding.					
Knowing the bus will come at regular intervals (for example every 10 minutes).					
Not having to transfer.					
Having a short walk to/from the bus.					
Having a shelter or place to wait for the bus.					
Getting dropped off at my front door.					
Knowing the bus will come at a specific time.					

30. Would you be interested in a late night bus service that you call in advance to schedule and that provides door-to-door service (like a taxi cab service)?

- Yes
- No
- Unsure

31. Would you prefer this over the current UW late night bus service that has a fixed schedule and fixed stops?

- Yes
- No
- Unsure

32. Would you be willing to pay for this service?

- Yes
- No
- Unsure

Unsure

Campus Bus System and Bus Pass Program - Hospital

Desc.
Please tell us a little bit about your experience with the Campus Bus system and bus pass program.

There are a few questions for you to answer even if you have never taken the bus or picked up your bus pass.

33. Which Campus Bus route (80, 81, 82 or 84) have you used in the past week?
(Choose all that apply)

- [ ] Route 80
- [ ] Route 81
- [ ] Route 82
- [ ] Route 84
- [ ] None

34. Do you have a UW-issued bus pass?

- ( ) Yes
- ( ) No
- ( ) Don't remember/Don't know

35. What are the main reasons you have a pass?

- [ ] I commute to/from campus on Metro.
- [ ] I use metro to commute to an off campus job
- [ ] I use Metro to get off campus for errands and recreation.
- [ ] I like to have the option of using Metro
- [ ] The bus pass is free, so I get it.
- [ ] Other:

36. Why do you not have a pass?
(Choose all that apply).

- [ ] I don't think I am eligible for a pass
- [ ] The places to pick up a bus pass are inconvenient.
- [ ] I don't want to carry another card.
- [ ] I did not know about or understand how this program works.
- [ ] I don't know how to use the bus and/or where it goes.
- [ ] I am not interested in riding the bus.
- [ ] Other:

General Information

Desc. Finally, please tell us a little bit about yourself.

37. What is your gender?

- ( ) Male
- ( ) Female

- Prefer not to answer

38. What is your age?

- 18-24
- 25-35
- 35-49
- 50-64
- 65+

39. How many years have you been working/studying on the UW Campus?
Fill in the blank here with a numeric answer (i.e. "3" not "three"):

40. Do you have access to a car?

- Always
- Sometimes
- Never

41. Do you live within four blocks or a five minute walk of a bus stop?

- Yes
- No
- Don't know

42. What is/are your primary source(s) of information about bus services?
Check all that apply:

- [ ] Google maps (including Google Transit)
- [ ] Campus transportation website
- [ ] Campus transportation personnel (via phone, email or in person)
- [ ] Filled out request form on Campus Transportation website
- [ ] Mobile UW application
- [ ] Madison Metro website
- [ ] Madison Metro Transit Tracker
- [ ] Madison Metro transit printed materials (schedules, maps, posters, etc.)
- [ ] Friends/Colleagues
- [ ] Other:

43. If you would like to provide any further comments regarding UW Campus Bus service please do so in the box below:

Travel Around Campus

Desc.
We are interested in understanding how you travel around campus (between on-campus locations) as

well as why you make certain travel choices. This section includes questions about how you typically get around campus, for example to class, to get to a meeting or to run an errand. As you answer these questions, please think about a typical day.

3. How often do you usually travel around campus (between campus locations)?

- I typically get to my office or classroom, spend the whole day there and leave campus from there.
- I typically get to my office or classroom, will leave once or twice for class, meetings, lunch (etc) but otherwise spend most of the day in one place.
- I make a lot of trips throughout the day, attend many classes, have lots of meetings and am moving around campus a lot.
- I don't work/take classes on campus.
- Other:

4. During good weather, how do you typically get around campus during daylight hours?
Choose one:

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a privately owned car, truck or van
- Drive alone in a UW, UW Health, or state owned car, truck or van
- Someone drops me off (not carpool)
- Share a ride in a privately owned car, truck or van
- Share a ride in a UW, UW Health, or state owned car, truck or van
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- Campus Bus (Route 81, 81, 82, 84)
- UW Health Shuttle
- Paratransit
- Multiple modes/ways of traveling
- Other

5. What is the primary way you travel around campus in good weather?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a privately owned car, truck or van
- Drive alone in a UW, UW Health, or state owned car, truck or van
- Someone drops me off (not carpool)
- Share a ride in a privately owned car, truck or van
- Share a ride in a UW, UW Health, or state owned car, truck or van
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- Campus Bus (Route 81, 81, 82, 84)
- UW Health Shuttle
- Paratransit
- Other

6. What is the secondary way you travel around campus in good weather?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a privately owned car, truck or van
- Drive alone in a UW, UW Health, or state owned car, truck or van
- Someone drops me off (not carpool)
- Share a ride in a privately owned car, truck or van
- Share a ride in a UW, UW Health, or state owned car, truck or van
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- Campus Bus (Route 81, 81, 82, 84)
- UW Health Shuttle
- Paratransit
- Other

7. Why do you make this travel choice?
(Check all that apply)

- It is the least expensive
- It is fast
- I feel safe
- Environmental reasons

- [ ] I feel safe
- [ ] It is reliable.
- [ ] It is comfortable
- [ ] It is flexible
- [ ] Environmental reasons.
- [ ] It is difficult to park at my destination
- [ ] I prefer a physically active travel mode.
- [ ] Other

8. Why don't you use the Campus Bus System to get around campus? (Check all that apply)

- [ ] I already live on campus.
- [ ] It is not reliable.
- [ ] Not sure how to use the bus.
- [ ] I do not feel safe.
- [ ] I can't or don't want to walk to the stop.
- [ ] The schedule does not meet my needs.
- [ ] The bus is crowded.
- [ ] The bus does not pick up/drop off where I need.
- [ ] The bus is not flexible.
- [ ] The bus is slow.
- [ ] Other:

9. Do you make different travel choices during bad weather?

- ( ) Yes
- ( ) No

10. When the weather is bad, how do you typically get around campus during daylight hours? *Choose one:*

- ( ) Walk
- ( ) Bicycle
- ( ) Moped
- ( ) Motorcycle
- ( ) Drive alone in a privately owned car, truck or van
- ( ) Drive alone in a UW, UW Health, or state owned car, truck or van
- ( ) Someone drops me off (not carpool)
- ( ) Share a ride in a privately owned car, truck or van
- ( ) Share a ride in a UW, UW Health, or state owned car, truck or van
- ( ) Madison Metro City bus (NOT Route 80, 81, 82, 84)
- ( ) Campus Bus (Route 80, 81, 82, 84)
- ( ) UW Health Shuttle
- ( ) Paratransit
- ( ) Multiple modes/ways of traveling
- ( ) Other

11. When the weather is bad, what is the primary way you travel around campus?

- ( ) Walk
- ( ) Bicycle
- ( ) Moped
- ( ) Motorcycle
- ( ) Drive alone in a privately owned car, truck or van
- ( ) Drive alone in a UW, UW Health, or state owned car, truck or van
- ( ) Someone drops me off (not carpool)
- ( ) Share a ride in a privately owned car, truck or van
- ( ) Share a ride in a UW, UW Health, or state owned car, truck or van
- ( ) Madison Metro City bus (NOT Route 80, 81, 82, 84)
- ( ) Campus Bus (Route 80, 81, 82, 84)
- ( ) UW Health Shuttle
- ( ) Paratransit
- ( ) Other

12. What is the secondary way you travel around campus in good weather?

- ( ) Walk
- ( ) Bicycle
- ( ) Moped
- ( ) Motorcycle
- ( ) Drive alone in a privately owned car, truck or van
- ( ) Share a ride in a privately owned car, truck or van
- ( ) Share a ride in a UW, UW Health, or state owned car, truck or van
- ( ) Madison Metro City bus (NOT Route 80, 81, 82, 84)
- ( ) Campus Bus (Route 81, 81, 82, 84)
- ( ) UW Health Shuttle

- Drive alone in a UW, UW Health, or state owned car, truck or van
- Someone drops me off (not carpool)
- Paratransit
- Other

13. Why do you make this travel choice during bad weather?
(Check all that apply)

- It is the least expensive
- I feel safe
- It is reliable.
- It is comfortable
- It is flexible
- It is fast
- Environmental reasons.
- It is difficult to park at my destination
- I prefer a physically active travel mode.
- Other

Bus Service Choices

Desc. **The following questions offer you a series of choices about bus service. For each row, please decide whether you prefer the choice on the LEFT or the RIGHT and mark as appropriate.**

14A.

Longer walk to the bus stop, but shorter travel time once on the bus.	Shorter walk to the bus stop, but longer time once on the bus

14B.

Bus comes every 10 minutes (or more frequently) and is not on a schedule.	Bus comes less frequently than every 10 minutes, but is on a schedule that tells me when it is going to be at my stop.

14C.

Bus does not require transfers, but takes longer to make a loop.	Bus may require transfers but takes a shorter time to make a loop.

14D.

Bus comes more often, but travels to fewer locations.	Bus comes less often but travels to more locations.

14E.

Provide more frequent weekday service, but less late night and evening service.	More late night and weekend service and less frequent weekday service.

14F.

Bus that operates for longer hours into the evening, but is less frequent.	Bus service that is more frequent, but is available for shorter hours into the evening.

14G.

Bus service that goes to more places, including off-campus locations, but is less frequent.	Bus service that is more frequent, but goes to fewer locations, including fewer off-campus locations.

Travel to/from Campus

Desc.. We are also interested in understanding how you travel between campus and home.

***If you live on campus**, please answer the question considering your trip from your residence to your first activity on a different part of campus.*

*When you answer the questions, please tell us about a **typical day.***

15. How many days per week do you usually travel from your home to the UW campus?

- Once or twice
- Three to five times per week
- More than five times per week
- N/A -- I live on campus
- N/A -- I am a visitor or rarely travel to the UW Madison campus

16. What time do you typically leave home to go **to campus**?

- Before 5:00 AM
- Between 5:00 AM and 7:00 AM
- Between 7:00 AM and 9:00 AM
- Between 9:00 AM and 11:00 AM
- After 12:00 PM (afternoon)
- N/A

17. What time do you typically leave campus to **travel back home?**

- Before 4:00 PM
- Between 4:00 PM and 8:00 PM
- Between 8:00 PM and 10:00 PM
- Between 10:00 PM and Midnight (12:00 AM)
- After midnight (12:00 AM)

18. During good weather, how do you typically travel to/from campus?
Choose one:

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a car, truck or van
- Someone drops me off (not pool)
- Driver or passenger in carpool
- Driver or passenger in state vanpool
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- UW Campus Bus (Route 80, 81, 82, 84)
- Monona Transit
- Multiple modes/ways of traveling
- Paratransit
- Other

19. What is the primary way you travel to/from campus in good weather?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a car, truck or van
- Someone drops me off (not pool)
- Driver or passenger in carpool
- Driver or passenger in state vanpool
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- UW Campus Bus (Route 80, 81, 82, 84)
- Monona Transit
- Paratransit
- Other

20. What is the secondary way you travel to/from campus in good weather?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a car, truck or van
- Someone drops me off (not pool)
- Driver or passenger in carpool
- Driver or passenger in state vanpool
- Madison Metro City bus (NOT Route 80, 81, 82, 84)
- UW Campus Bus (Route 80, 81, 82, 84)
- Monona Transit
- Paratransit
- Other

21. Why do you make this choice?
(Check all that apply)

- [ ] It is the least expensive.
- [ ] I feel safe.
- [ ] It is reliable.
- [ ] It is comfortable.
- [ ] It is flexible.
- [ ] It is fast.
- [ ] Environmental reasons.
- [ ] It is difficult to park at my destination
- [ ] I prefer a physically active travel mode.
- [ ] Other:

22. Why don't you use the Campus Bus system (Route 80, 81, 82, 84) to get to/from campus?
(Check all that apply.)

- [ ] I already live on campus.
- [ ] It is not reliable.
- [ ] Not sure how to use the bus.
- [ ] I do not feel safe.
- [ ] I can't or don't want to walk to the stop.
- [ ] The schedule does not meet my needs.
- [ ] The bus is crowded.
- [ ] The bus does not pick up/drop off where I need.
- [ ] The bus is not flexible.
- [ ] The bus is slow.
- [ ] Other:

23. When you are traveling between your home and campus during bad weather, do you make different travel choices?

- Yes
- No

24. When the weather is bad, how do you typically travel between your home and campus?
Choose one:

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a privately owned car, truck or van
- Someone drops me off (not carpool)
- Driver or passenger in carpool
- Driver or passenger in state vanpool
- Madison Metro City Bus (NOT Route 80, 81, 82, 84)
- Campus Bus (Route 81, 81, 82, 84)
- Monona Transit
- Paratransit
- Multiple modes/ways of traveling
- Other

25. When the weather is bad, what is the primary way you travel between your home and campus?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a privately owned car, truck or van
- Driver or passenger in state vanpool
- Madison Metro bus (NOT Route 80, 81, 82, 84)
- Campus Bus (Route 81, 81, 82, 84)
- Monona Transit
- Paratransit

- Someone drops me off (not carpool)
- Driver or passenger in carpool
- Other

26. When the weather is bad, what is the secondary way you travel between your home and campus?

- Walk
- Bicycle
- Moped
- Motorcycle
- Drive alone in a privately owned car, truck or van
- Someone drops me off (not carpool)
- Driver or passenger in carpool
- Driver or passenger in state vanpool
- Madison Metro bus (NOT Route 80, 81, 82, 84)
- Campus Bus (Route 81, 81, 82, 84)
- Monona Transit
- Paratransit
- Other

27. Why do you make this travel choice during bad weather?
(Check all that apply)

- [ ] It is the least expensive
- [ ] I feel safe
- [ ] It is reliable.
- [ ] It is comfortable
- [ ] It is flexible
- [ ] It is fast
- [ ] Environmental reasons.
- [ ] It is difficult to park at my destination
- [ ] I prefer a physically active travel mode.
- [ ] Other

Travel Preferences

Desc.
These next few questions ask you about your preferences and priorities for bus service. The first set of questions asks you to rank the importance of each service characteristics on a scale of 1 (very important) to 5 (not important at all). This question is asked twice for different types of trips.

28. When you need to travel around campus (i.e. between classes, to get to meetings, etc) during **daytime hours**, how much do you value the following?

	1 (Very Important)	2	3	4	5 (Not important at all)
A bus that is fast and direct.	○	○	○	○	○
A bus with no cash charge upon boarding.	○	○	○	○	○
Knowing the bus will come at regular intervals (for example every 10 minutes).	○	○	○	○	○
Not having to transfer.	○	○	○	○	○
Having a short walk to/from the bus.	○	○	○	○	○
Having a shelter or place to wait for the bus.	○	○	○	○	○
Getting dropped off at my front door.	○	○	○	○	○
Knowing the bus will come at a specific time.	○	○	○	○	○

29. When you are traveling around campus **after dark**, how much do you value the following?

	1 (Very Important)	2	3	4	5 (Not important at all)
A bus that is fast and direct.	○	○	○	○	○
A bus with no cash charge upon boarding.	○	○	○	○	○
Knowing the bus will come at regular intervals (for	○	○	○	○	○

at regular intervals (for example every 10 minutes).					
Not having to transfer.					
Having a short walk to/from the bus.					
Having a shelter or place to wait for the bus.					
Getting dropped off at my front door.					
Knowing the bus will come at a specific time.					

30. Would you be interested in a late night bus service that you call in advance to schedule and that provides door-to-door service (like a taxi cab service)?

- Yes
- No
- Unsure

31. Would you prefer this over the current UW late night bus service that has a fixed schedule and fixed stops?

- Yes
- No
- Unsure

32. Would you be willing to pay for this service?

- Yes
- No
- Unsure

Campus Bus System and Bus Pass Program

Desc.
Please tell us a little bit about your experience with the Campus Bus system and bus pass program.

There are a few questions for you to answer even if you have never taken the bus or picked up your bus pass.

33. Which Campus Bus route (80, 81, 82 or 84) have you used in the past week?
(Choose all that apply)

- [ ] Route 80
- [ ] Route 81
- [ ] Route 82
- [ ] Route 84
- [ ] None

34. Do you have a UW-issued bus pass?

- Yes
- No
- Don't remember/Don't know

35. What are the main reasons you have a pass?

- [ ] I commute to/from campus on Metro.
- [ ] I use metro to commute to an off campus job
- [ ] I use Metro to get off campus for errands and recreation.
- [ ] I like to have the option of using Metro
- [ ] The bus pass is free, so I get it.
- [ ] Other:

36. Why do you not have a pass?
(Choose all that apply).

- [ ] I don't think I am eligible for a pass
- [ ] The places to pick up a bus pass are inconvenient.
- [ ] I don't want to carry another card.
- [ ] I did not know about or understand how this program works.
- [ ] I don't know how to use the bus and/or where it goes.
- [ ] I am not interested in riding the bus.
- [ ] Other: