

Flex Parking  
and Transportation Demand Management:  
**Proposal for a Redesigned Biennial Transportation Survey**

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## **Executive Summary**

The Transportation Services Department at the University of Wisconsin-Madison requested help in assessing the fiscal impacts of implementing a pay-as-you-go (also known as flex) parking system for University employees.

The current demand for parking exceeds the supply of parking spaces. The waiting list for parking spaces for faculty and staff on campus currently numbers approximately 320. The number of people on the waiting list, and the length of time that people remain on the waiting list before receiving a permit, have both grown in recent years. Some departments on campus have begun to complain that they are losing employees because of inadequate parking. Excess demand is likely to increase. In 1979 only 35 percent of faculty and staff drove to campus alone. By 1999, it had risen to approximately 50 percent. Also, in the coming decades the suburbanization of the Madison metropolitan area will likely lead to more faculty and staff living farther from campus and needing to drive to work and park on campus.

Flex parking works to reduce the number of days people drive to campus by providing an economic incentive for changing parking behavior. However, because the Transportation Services budget is dependent on revenues from parking, implementing a flex parking system could pose a threat to future revenues. For example, people who are currently driving to campus fewer than five days a week using an annual pass could opt in to the flex program. They could then pay less for parking the same number of days, which would reduce revenue without reducing the demand for parking. A redesigned biennial transportation survey is an appropriate means for gathering the information necessary to assessing this risk before implementing a flex parking system.

Another barrier to implementing a flex parking system has been the lack of affordable technology to monitor the parking usage of flex permit holders. Under the current flex parking pilot program, parking usage is self-reported by the permit holder. Expansion of the program would require a more sophisticated monitoring system to ensure compliance with the terms of the permit, such as the in-car meters in use at UW-Milwaukee.

### ***Recommendations***

We believe that a flex parking system is an essential and effective part of a program to reduce the demand for parking on the UW–Madison campus. As one of a number of steps to reduce the demand for parking on this campus, we make the following recommendations:

- Administer the redesigned survey in the fall of 2001
- Implement flex parking in stages, analyzing each stage prior to expanding to the next
- Explore the use of in-car meters for monitoring the parking usage of flex permit holders

## **Acknowledgments**

We gratefully acknowledge the guidance and cooperation of Rachel Martin and Lori Kay from the University of Wisconsin-Madison Transportation Services Department, and thank Professor John Witte for his advice and support. Professor Sandra Hoffman provided practical advice early in the project, and Jim Marsho of the University of Wisconsin–Milwaukee Parking and Transit Department provided valued input on UW-Milwaukee’s use of in-car meters. Professor Donald C. Shoup, director of the Institute of Transportation Studies at the School of Public Policy and Social Research, University of California, Los Angeles, provided useful information on the demand for parking on university campuses.

## **Introduction**

The Transportation Services Department at the University of Wisconsin-Madison requested help in assessing the fiscal impacts of implementing a pay-as-you-go (also known as flex) parking system for University employees.<sup>1</sup> This system is being considered as one of a number of steps to reduce the demand for parking at UW-Madison. In a flex parking system, the fewer days an employee parks on campus, the less he or she pays. The intent of implementing such a system is to reward people for driving less, and thereby reduce the number of days per week that University employees drive to, and park on, campus. One problem is that because Transportation Services' budget is dependent on revenues from parking, implementing a flex parking system could pose a threat to future revenues. For example, people who are currently driving to campus less than five days a week using an annual pass could opt in to the flex program. They could then pay less for parking the same number of days, which would reduce revenue without reducing the demand for parking. It is for this reason that Transportation Services has asked for our assistance before they move forward with an expansion of the pilot flex program.

Another barrier to implementing a flex parking system has been the lack of affordable technology to monitor the parking usage of flex permit holders. Under the current flex parking pilot program, parking usage is self-reported by the permit holder. Expansion of the program would require a more sophisticated monitoring system to ensure compliance with the terms of the permit.

In this report, we provide some background on the severity of the demand for parking on campus. We then suggest changes to Transportation Services' biennial survey of faculty and staff that will capture the data necessary to assess the fiscal impacts of implementing a flex system. We also provide information on the in-car meters for monitoring parking usage in use at the University of Wisconsin-Milwaukee and elsewhere, and some tools for setting an hourly rate for the in-car meters. These in-car meters would allow Transportation Services to monitor the use of parking by flex permit holders. We conclude the report with a series of recommendations.

## **Background**

Demand for parking on the University of Wisconsin-Madison campus exceeds the supply of parking spaces. One indicator of the extent of the problem is that the waiting list for parking spaces for faculty and staff on campus currently numbers approximately 320. Growth on the west end of campus, particularly at the hospital, has placed a strain on parking there, and about half of the people on the waiting list have requested parking near the hospital. Some departments on campus have begun to complain that they are losing employees because of inadequate parking. While the total population of students, faculty and staff has been steady for the last ten years, campus population is projected to grow in the next decade, which can be expected to exacerbate the parking problem in the future.

A number of factors contribute to this excess demand for parking. First is a car-centric culture in the United States. People tend to view driving as a right, and they are therefore unhappy

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<sup>1</sup> The authors of this report are students at the Robert M. La Follette School of Public Affairs, and have prepared this report as a class project. The class, Public Affairs 869 – Workshop in Program and Policy Analysis, was taught by Professor John Witte in Spring 2000.

when a lack of parking restricts their ability to exercise this “right.” The fact that parking is in short supply can also be verified by comparing this campus with other Big Ten schools. UW–Madison has the lowest number of parking spaces per student and per employee among the Big Ten universities (TDM Committee 1996).

To make matters worse, competition is increasing for the available parking spaces. A large factor in this is the increase in the number of single-occupancy vehicles coming to campus each day. The number of faculty and staff driving to campus alone, rather than riding with someone else or in a car or van pool, continues to climb. In 1979, only 35 percent of faculty and staff drove to campus alone (TDM Committee 1996). By 1999, it had risen to approximately 50 percent (DTS Forthcoming).

In the coming decades, the Madison metropolitan area is expected to become increasingly suburbanized. The Dane County Regional Planning Commission (1997) estimates that by the year 2020 the population living in the outlying areas of Madison will have increased from 14 percent to 24 percent of the total population of Dane County. The number of housing units in these outlying areas is expected to grow from 25,826 in 1990 to 40,322 in 2020, an increase of 56 percent. This suburbanization will likely lead to more faculty and staff living farther from campus and therefore needing to drive to work, which in turn will lead to an even greater demand for parking on campus.

## **Reducing Excess Demand**

No solutions to the problem of excess demand for parking on campus are readily apparent. Other campuses do struggle with the same problem. As Patrick Cunningham (1999), director of Parking and Transportation Services at the University of Michigan puts it: “If [such a solution] exists, it is also transparent to the hundred or so universities represented at a recent national conference devoted to the subject.” Transportation Services must satisfy a number of competing constituencies with sometimes contradictory priorities, as well as contend with external forces over which they have no control.

One way to reduce excess demand might be to build enough parking spaces to satisfy the demand. Space on our campus is limited, however, and there is a strong sentiment that green space should be preserved. The only way to add parking without diminishing green space would be to build ramps on already-existing surface lots. This is prohibitively expensive, however, with estimates ranging from \$15,000 to \$25,000 per parking space for construction of new parking ramps.

Since it is neither environmentally nor fiscally feasible to increase supply to meet the demand, the only other alternative is to take steps to reduce demand. One approach would be to raise the price for parking. Economic theory holds that increasing the price for a good will decrease the quantity demanded. The demand for parking on university campuses, however, appears to be quite inelastic. The University of Michigan experienced no decrease in demand after raising prices for parking on campus (Cunningham 1999). Even if raising the price for parking did reduce the demand, it raises equity questions. As prices rise, those with lower incomes are priced out of the market. The Transportation Services mission statement clearly states that they are to serve “all campus users” (DTS 1998b).

Another strategy for reducing demand suggested by economic theory is to reduce the price of substitute goods. A substitute for driving to campus is riding the bus, and subsidizing either a portion or all of the cost of bus passes for employees would reduce the price. Currently, the price for an annual parking permit in some lots is less than a year’s worth of bus passes.

Reducing the cost of taking the bus relative to parking on campus might induce some people to switch to riding the bus. At this time, UW–Madison does not subsidize the cost of bus passes for employees.<sup>2</sup> They do allow employees to have money deducted from their paychecks on a before-tax basis for the purchase of Metro bus passes. Using before-tax funds provides a small subsidy by reducing the employees' income tax liability.

## **Flex Parking**

The UW–Madison currently has a program in place to try to reduce the number of people driving to campus alone, which will in turn reduce the demand for parking on campus. This program, called *Try a Different Mode*,<sup>3</sup> encourages people to come to campus using alternate forms of transportation (biking, car or van pool, bus). One of the more promising ideas that is being considered as part of the *Try a Different Mode* program is the introduction of a flex parking system.

Flex parking works to reduce the number of days people drive to campus by providing an economic incentive for changing parking behavior. Currently, except for the small flex-permit pilot program, only annual passes for parking are available for employees. With an annual pass, the employee pays the same fee without regard to the number of days parked on campus. Under a flex system, the employee pays only for the parking he or she uses. The employee can thus save money by reducing the number of days per week he or she parks on campus. Enlarging the flex program beyond its current pilot-program status presents Transportation Services with the potential to reduce significantly demand for parking. Enlarging the flex program, however, may also pose result in lower revenue, revenue that Transportation Services needs to providing parking services to increasing numbers of employees. If the only people who take advantage of the flex program are those who are currently driving to campus less than five days a week, and those people continue to park the same number of days with a flex permit as they did with an annual pass, revenues will be reduced with no reduction in parking demand.

## **Proposed Survey Redesign**

The purpose of the revised transportation survey is to provide an estimate of the effects of flex parking *before* the program is approved and put into operation. With questions regarding current and expected parking behavior, the survey is designed to compare demand in the existing annual fee system to demand in the proposed daily fee system. An accurate prediction of flex parking demand will enable Transportation Services to devise a rate structure that maintains their revenue stream and avoids the need for new stalls.

Expanding the flex program can only be justified if it both reduce the demand for parking on campus and is revenue neutral. Before Transportation Services can proceed with any expansion of the flex program beyond its current pilot status, the department needs information that will allow it to estimate whether expansion will meet these two criteria. We believe that the following recommended changes to the biennial survey will provide Transportation Services with the information necessary to assess the feasibility of

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<sup>2</sup> Donald Shoup of UCLA strongly argued for UW to pursue subsidizing bus passes for faculty and staff in a phone conversation with Melissa Fair, March 2000.

<sup>3</sup> The “Try a Different Mode” website is <http://www.fpm.wisc.edu/tdm/>

implementing a larger flex parking program that will reduce the demand for parking while maintaining current revenue levels. The recommended changes have been incorporated into the survey, which is contained in Appendix A. Changes are noted in italics.

Although Transportation Services also administers a similar biennial survey to students, we focus on the faculty and staff survey because students are not eligible for flex parking.

Previously administered biennial surveys were written so as to provide a snapshot of commuting and parking behavior, and were generally administered in the fall semester. It is possible, however, that commuters may park more frequently when the weather is cold as they switch from biking or walking to driving to campus. Also, many fewer cars are in university parking lots during the summer. This fluctuation in utilization of on-campus parking could also cause fluctuations in parking revenue in a flex parking system. It is important to know whose commuting behavior changes, and how it changes, before implementing a flex parking system.

Many of the recommended new questions will capture how commuting and parking behavior vary with the seasons (even the weather within seasons) and with the academic calendar. Some additional questions will assess whether people's commuting and parking behavior could be influenced to change by implementing a flex parking system. The following is a summary of the recommended changes to the survey.

#### *Questions 2 – 12*

This series of questions is designed to capture changes in employees' commuting behavior as a result of both changes in season and in the academic calendar. The behaviors involved are mode of transportation, duration of commute, and days of the week on campus.

#### *Questions 13 – 14*

For employees who drive to campus, these two questions will measure the difference in the number of days employees drive to campus during the school year and during the summer.

#### *Questions 17 – 18*

For employees who park in a permit lot on campus, these two questions will measure the difference in the number of days employees park in a permit lot during the school year and during the summer.

#### *Question 20*

Question 20 is intended to capture whether the respondent is on a waiting list for a parking permit. In addition to being useful information in and of itself, this information would be useful in conjunction with the information gathered in questions 24 – 27, to see if being on the waiting list makes a respondent more or less likely to be willing to participate in a flex parking system.

#### *Questions 24 – 27*

These questions will assess people's willingness to participate in a flex parking program; whether they would prefer being charged by the day or the hour; and how much change in their parking behavior is likely to result from participation in a flex system.



Question 24 examines incentives for changes in parking behavior, and asks respondents to rank a number of possible incentives on a scale from 1 to 5.

Questions 25 through 27 test respondents' preferences for a flex parking system with the fee based on number of hours parked or number of days parked. Because the actual flex parking fee schedule has not yet been determined, the survey explains that the daily fee for a given lot might be approximately 1/200<sup>th</sup> of that lot's annual fee.

## **General Survey Problems**

The recommended changes to the survey will allow Transportation Services to make informed decisions about how to proceed with a flex parking system. A few problems are inherent, however, in gathering information using a survey.

The most frequent problem with surveys is non-response. The return rates for the 1997 and 1999 surveys were generally good (about 70 percent for faculty). There is a possibility, however, that those who did not return the survey are systematically different from those who did. In general, someone who has strong negative feelings about the subject of a survey may be more likely to respond than someone who is neutral or positive about the subject. This may bias the result of the survey by having more people with negative feelings about instituting a flex program returning surveys than actually exist in the population of faculty and staff.

Another concern is the makeup of the sample. Is it mainly faculty and staff who already have permits, those without permits, or a combination of the two groups? Those who already hold permits may be less interested in decreasing the overall demand (waiting list) than people who have no permit. For instance, the responses may suggest that the yearly permit is the best option, yet this may not help serve the minority that is currently on the waiting list.

One should also be cautious when using survey questions based on hypothetical situations. The answers respondents give on a survey in such a situation may differ from what the same people would do in real situations. For example, Question 25 asks how parking behavior would change if the fee were based on the number of days parked, as it would be in a flex parking system. While this question is posed as a hypothetical, most people have parked in lots at airports or elsewhere that had fees based on a daily rate. This should help to alleviate some of the concern with using a hypothetical situation.

## **The In-Car Meter Program<sup>4</sup>**

One challenge in implementing a flex parking system is monitoring usage. The University of Wisconsin-Milwaukee was the first campus in the United States to institute what has come to be known as the "In-Car Meter Program." The In-Car Meter Program was implemented at UW-Milwaukee about two years ago. Before it was implemented, UW-Milwaukee's faculty and staff had two parking options: purchase expensive annual permits or search for public meter spaces at 50¢ per hour. Although both of these options remain available to Milwaukee's faculty and staff, the university now offers the in-car meter as a third option.

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<sup>4</sup> The information in this section on the UW-Milwaukee In-Car Meter Program was provided by the Parking and Transit Department at UW-Milwaukee, and in an interview with Jim Marsho, director of Parking and Transit at UW-Milwaukee, on March 28, 2000. Information on the UW-Milwaukee In-Car Meter program can be seen at <http://www.uwm.edu/Dept/Trans/UPMtr.html>.

The in-car meter is a calculator-like device that functions much like a debit card. Faculty and staff members purchase these meters from the parking department for approximately the same price per hour that they would pay for a permit parking space (30¢ per hour).<sup>5</sup> Unlike a permit parking space, however, money is deducted from the in-car meter only when the staff member uses it. For example, if a staff member drives to work on Monday, the parking cost will automatically be deducted from his or her balance on the in-car meter. If the staff member does not drive to work on Tuesday, no money will be deducted from the in-car meter balance. Because of the recent implementation of the in-car meter on the UW–Milwaukee’s campus, the university has yet to compile statistics as to how much the In-Car Meter Program has actually curbed demand. According to Jim Marsho, director of UW–Milwaukee’s Parking and Transit Department, the in-car meter has been an incredible success. While the permit system actually encourages employees to drive as much as possible so that they get more for their money, the in-car meter encourages employees to drive as little as possible so that they will save money; yet in-car meter rates are still subsidized, so it is still relatively inexpensive for staff members to drive to work. The program provides faculty and staff members with greater parking flexibility in that it benefits employees who are inclined to bike or bus to work in nice weather but would like to drive to work on occasion or during the winter months. It is also particularly advantageous for part-time employees. The in-car meter also provides faculty and staff with greater flexibility as to where they park on campus. Employees with in-car meters are permitted to park in any of the parking lots on UW–Milwaukee’s campus so long as they have paid for the appropriate amount of time on their meters. The only enforcement is to ensure that employees have their meters turned on with time running. Anyone who does not have time on his or her meter or does not have a meter displayed is ticketed.

Duncan Industries manufactures the in-car meters currently in use at UW–Milwaukee. The meters are a new form of technology and are constantly being improved. Duncan Industries was the first corporation to market the meters and functioned much like a monopoly at the time of the original contract. Each meter was expected to function for approximately three years and cost the university \$40 per unit.

When faculty and staff choose to participate in UW–Milwaukee’s In-Car Meter Program, they pay a \$15 administrative fee, a \$25 deposit, and a charge for pre-paid parking hours. The deposit is returned to them upon receipt of the meter, provided that the meter remains in good working condition. Because most of the meters originally purchased by Parking and Transit are currently in use, the In-Car Meter Program has not resulted in additional expenses to Parking and Transit. Instead, the meters serve to increase revenue through the \$15 administrative fee collected by Parking and Transit.

Duncan Industries recently decided to discontinue the model currently in use at UW–Milwaukee in favor of a newer model with greater technological capabilities. The newer model promises to function much like the older one, but will be marketed at double the cost. This model is expected to sell for approximately \$90 per unit and will have a replaceable battery. With the replaceable battery, the meter is expected to have a much longer life span. UW–Milwaukee’s Parking and Transit Department is currently negotiating with Duncan Industries regarding purchasing these newer in-car meters. Parking and Transit is also aware, however, that Duncan Industries is no longer the sole distributor of this product. Other corporations now produce multiple variations of the original in-car meter and seek to market

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<sup>5</sup>Plus a \$15 up front non-refundable administrative charge and a \$25 up-front refundable deposit.

these meters at multiple sites across the nation. Meters are currently in use at the University of Oregon; Aspen, Colorado; Seattle, Washington; and in various locations on the East Coast. In most of these locations, meters are used not only in parking lots, but also on actual city streets. In-car meters simply act as substitutes for traditional parking meters which require change to be deposited when parking, are less convenient, harder both to use and to maintain, and take up space on city streets.

Marsho expects to expand the campus's In-Car Meter Program so that it will include the use of in-car meters on the surface streets surrounding Milwaukee's campus. Marsho feels that such an expansion will improve the parking situation for all and could ultimately be expanded to encompass the entire city of Milwaukee. Although expanding the In-Car Meter Program to this extent will clearly take some time, such a bold statement from the head of UW-Milwaukee's Parking Department illustrates Marsho's faith in the program and his excitement about its implementation in Milwaukee.

According to UW-Madison's present parking guidelines, faculty and staff are assigned to park in specific lots. Lot assignments are based on a number of factors that vary by department and tend to rank faculty and staff by seniority and status. Attempts to change this system in the past have proven controversial. Therefore, if an In-Car Meter Program similar to UW-Milwaukee's is implemented at UW-Madison, the system of parking preferences and lot specifications will most likely need to remain in place.

The In-Car Meter Program can easily be operated with a system of lot specifications, although implementing it would be slightly more complicated. The UW-Madison Transportation Services Department could maintain the same set of preferences and criteria that currently determine lot assignments. In the early stages of implementation, however, Transportation Services would need to take precautions to ensure that faculty and staff members will not arrive at peak hours to find their lot filled to capacity. Patterns of use would have to be established so that lots do not overflow during peak hours. Once such patterns were established through survey responses, lot counts, and various adjustments, Transportation Services should ultimately be able to oversell the number of in-car meters per lot similar to the way airlines oversell seats per flight.

## **Hourly Pricing with In-Car Meters**

If a flex parking system is implemented using in-car meters, an hourly price for parking would have to be determined for each lot. The price charged will need to be set so that the flex parking system recovers an amount of revenue equal to that of the current system. Questions 7 through 18 and 24 through 27 on the redesigned survey would provide information that will be useful in establishing an hourly price based on estimated usage that should generate the same annual revenue for the same amount of usage as would an annual pass. We propose the following as a method for calculating the hourly price for use with the in-car meters.

### *Example using 1999 survey results*

To illustrate how to arrive at an appropriate hourly price, we used data from the 1999 faculty and staff survey to estimate the number of days an average person parks on campus and the average number of hours per day that an average person parks. The estimates we created from the 1999 survey results reflect parking behavior of the average employee during the fall semester. The redesigned survey would allow estimates of parking behavior over the course

of an entire year, since it collects data on how people's parking behavior changes over the course of a year.

Daily use was explicitly asked in the 1999 survey. The results show that days of use vary only slightly. Wednesday had the highest use rate at 94.3 percent, and Friday the lowest at 88.4 percent.

Determining the average number of hours parked required making a few assumptions. For example if someone reported arriving between 7:00 a.m. and 8:59 a.m. we estimated their arrival to be 8:00 a.m. We used 7:00 a.m. as the time of arrival for responses of "before 7:00 a.m.," and 7:00 p.m. for responses of "after 7:00 p.m." We used the percentage of respondents to give us a weighted arrival and departure time. We estimated the average arrival time to be 8:40 a.m. and the average departure to be 4:50 p.m. This gave us an average stay of eight hours and ten minutes. Given the conservative arrival and departure times it appears that use is fairly close to the eight and one-half hours of traditional jobs.

**Table 1**  
**Estimating Average Daily Hours Parked**

<b>Time</b>	<b>Arrival Weight*</b>	<b>Departure Weight*</b>
7 AM	1078	21
8 AM	4896	104
10 AM	1640	30
12 PM	192	192
2 PM	252	476
4 PM	336	6640
6 PM	72	7794
7 PM	190	1520
Total	8656	16777
Total in hours	8:40 AM	4:50 PM

\* **Weight** equals percent reporting that time (x 1000 for rounding) multiplied by the hour of the day.

*Creating an Estimate for Recovering Current Revenues*

Once estimates on how many people would use lots, including changes in seasonal use are computed, it is necessary to create a weighted number of recoverable days. For instance, we could estimate whether there are stalls that would have 100 percent use for 120 days; 75 percent use for 80 days; 10 percent use for 100 days; and no use in the remaining days.

$$(120 \times 1.0) + (80 \times 0.75) + (100 \times 0.10) = 190 \text{ recoverable days}$$

Next, we take the estimated average hours parked per day, and multiply it by the number of recoverable days. Using an eight-hour estimate we get the following results:

$$8 \text{ hours} \times 190 \text{ recoverable days} = 1520 \text{ recoverable hours}$$

The final step is to determine how much needs to be recovered per stall. Assume, for instance, we would like to recover \$600 per stall. Simply divide the dollar per stall by the amount of recoverable hours.

$$\$600.00 / 1529 \text{ recoverable hours} = \$0.395 \text{ per hour}$$

You would need to charge about 40 cents per hour to recover the desired amount of \$600 per stall. Table 2 gives a breakdown of several scenarios.

**Table 2**  
**Estimating Average Annual Hours Parked**

<b>Recoverable Days</b>	<b>Average Hours Parked Per Day</b>				
	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
<b>150</b>	750	900	1050	1200	1350
<b>160</b>	800	960	1120	1280	1440

<b>170</b>	850	1020	1190	1360	1530
<b>180</b>	900	1080	1260	1440	1620
<b>190</b>	950	1140	1330	1520	1710
<b>200</b>	1000	1200	1400	1600	1800
<b>210</b>	1050	1260	1470	1680	1890
<b>220</b>	1100	1320	1540	1760	1980
<b>230</b>	1150	1380	1610	1840	2070
<b>240</b>	1200	1440	1680	1920	2160
<b>250</b>	1250	1500	1750	2000	2250
<b>260</b>	1300	1560	1820	2080	2340
<b>270</b>	1350	1620	1890	2160	2430

If step 2 is eliminated, the estimate for the daily fee becomes:

$$\$600. / 190 \text{ recoverable days} = \$3.16$$

It would be necessary to charge at least \$3.16 in order to recover the desired \$600 per stall. Appendix B is a table for use in computing an hourly rate for parking. To use the table in Appendix B, find the number of hours parked in the first row, and the annual revenue that a flex permit needs to recover. The cell where the row with the number of hours and the column with revenue to recover intersect contains the hourly rate that needs to be charged.

## **Recommendations**

We believe that a flex parking system is an essential and effective part of a program to reduce the demand for parking on the UW–Madison campus. The following recommendations should serve as a guide to Transportation Services as they move ahead with the study and implementation of a flex parking system.

### *Administer the Improved Survey*

If the schedule remains the same as in the past, the next biennial survey can be administered in the fall of 2001. We recommend that the changes to the survey as described in this report be adopted, so that the information needed for implementation of a flex parking system can be gathered.

In analyzing the responses to the survey, we suggest examining the results by grouping of responses. Some of the questions that can be answered by grouping of responses include the following:

- Are employees more likely to carpool?
- Are people who arrive later in the day less likely to stay on campus for eight hours?
- What groups are more likely to use summer parking?
- How do wages influence transportation and parking decisions?

These and other combinations may be more important than any single answer. It may also be useful to develop simple and multiple regression tables from the survey data as a means of further refining the predictions of the survey responses.

### ***Implement Flex Parking in Stages***

Although we are confident that the redesigned survey will gather accurate and useful information, no survey can perfectly predict the behavior of people in real situations. Therefore, if the decision is made to implement a flex parking system, we recommend that it be implemented in stages. This is the approach that UW–Milwaukee used in implementing its In-Car Meter Program, and it makes sense. Each stage should be analyzed before expanding the program to the next stage. In this way, the risks to the parking revenue stream can be minimized.

### ***Explore In-Car Meters***

Before a flex parking system can be implemented, a means to monitor the parking usage of flex permit holders must be identified. In-car meters offer a low-cost alternative to installing access-control equipment at the entrance to every lot for which flex permits will be issued. If in-car meters are used, an hourly rate structure (as opposed to a daily or annual rate) would have to be developed.

**Appendix A**

**UNIVERSITY OF WISCONSIN-MADISON  
FACULTY/STAFF  
TRANSPORTATION SURVEY**

**2000**

*Please return this questionnaire within ten days in the envelope provided to:*

*Transportation Services  
142 WARF Building/610 Walnut Street  
Madison, Wisconsin 53705-2397*



## INTRODUCTION

As you are probably well aware, parking at the University of Wisconsin – Madison is a serious and contested issue. The university has a parking shortage, but also wishes to limit automobile congestion, preserve green space, maintain air quality, and prevent increased cost to customers.

Completing this survey will help the UW Transportation Services devise programs and policies that best fit the needs of the campus community and the environment. Thank you for your time.

## SECTION I: THE DAILY COMMUTE TO CAMPUS

1. How many miles is it **one way** from your current daily residence to campus? Circle one.

- |                      |                      |
|----------------------|----------------------|
| (1) Less than 1 mile | (4) 5 to 9.9 miles   |
| (2) 1 to 1.9 miles   | (5) 10 to 24.9 miles |
| (3) 2 to 4.9 miles   | (6) 25 or more miles |

*In questions 2-12, we want to know the effects of the changing of seasons and the academic calendar on your transportation behavior.*

2. What is your most frequent way of traveling to campus **from November 15 to March 15**? Circle one.

- |                        |   |
|------------------------|---|
| (1) Walk               | (6) Passenger in car/van/truck (not pool)     |
| (2) Bicycle            | (7) Driver or passenger in car/van/truck pool |
| (3) Moped              | (8) City bus (not L route)                    |
| (4) Motorcycle         | (9) Campus bus (L route)                      |
| (5) Drive alone in car | (10) Other, please specify _____              |

3. What is your most frequent way of traveling to campus **from September 1 to November 14 and March 16 to May 30**? Circle one.

- |                        |   |
|------------------------|---|
| (1) Walk               | (6) Passenger in car/van/truck (not pool)     |
| (2) Bicycle            | (7) Driver or passenger in car/van/truck pool |
| (3) Moped              | (8) City bus (not L route)                    |
| (4) Motorcycle         | (9) Campus bus (L route)                      |
| (5) Drive alone in car | (10) Other, please specify _____              |

4. What is your most frequent way of traveling to campus during the summer (**June 1 to August 31**)? Circle one.

- |                        |   |
|------------------------|---|
| (1) Walk               | (6) Passenger in car/van/truck (not pool)     |
| (2) Bicycle            | (7) Driver or passenger in car/van/truck pool |
| (3) Moped              | (8) City bus (not L route)                    |
| (4) Motorcycle         | (9) Campus bus (L route)                      |
| (5) Drive alone in car | (10) Other, please specify_____               |

5. How long does it usually take you to travel to campus **from November 15 to March 15**? Circle one.

- |                        |                        |
|------------------------|------------------------|
| (1) 10 minutes or less | (4) 31 to 45 minutes   |
| (2) 11 to 20 minutes   | (5) 46 to 60 minutes   |
| (3) 21 to 30 minutes   | (6) 61 minutes or more |

6. How long does it usually take you to travel to campus **from September 1 to November 14 and March 16 to May 30**? Circle one.

- |                        |                        |
|------------------------|------------------------|
| (1) 10 minutes or less | (4) 31 to 45 minutes   |
| (2) 11 to 20 minutes   | (5) 46 to 60 minutes   |
| (3) 21 to 30 minutes   | (6) 61 minutes or more |

7. Based on **this semester's** schedule, which days of the week are you normally on campus? Circle all that apply.

- |               |              |
|---------------|--------------|
| (1) Sunday    | (5) Thursday |
| (2) Monday    | (6) Friday   |
| (3) Tuesday   | (7) Saturday |
| (4) Wednesday |              |

8. Based on your **summer** schedule, which days of the week are you normally on campus? Circle all that apply.

- |               |              |
|---------------|--------------|
| (1) Sunday    | (5) Thursday |
| (2) Monday    | (6) Friday   |
| (3) Tuesday   | (7) Saturday |
| (4) Wednesday |              |

9. Based on **this semester's** schedule, during what time period do you most frequently arrive on campus? Circle one.

- |                              |                            |
|------------------------------|----------------------------|
| (1) Before 7:00 a.m.         | (5) 1:00 p.m. to 2:59 p.m. |
| (2) 7:00 a.m. to 8:59 a.m.   | (6) 3:00 p.m. to 4:59 p.m. |
| (3) 9:00 a.m. to 10:59 a.m.  | (7) 5:00 p.m. to 6:59 p.m. |
| (4) 11:00 a.m. to 12:59 p.m. | (8) 7:00 p.m. or later     |

10. Based on **this semester's** schedule, during what time period do you most frequently depart from campus? Circle one.

- |                              |                            |
|------------------------------|----------------------------|
| (1) Before 7:00 a.m.         | (5) 1:00 p.m. to 2:59 p.m. |
| (2) 7:00 a.m. to 8:59 a.m.   | (6) 3:00 p.m. to 4:59 p.m. |
| (3) 9:00 a.m. to 10:59 a.m.  | (7) 5:00 p.m. to 6:59 p.m. |
| (4) 11:00 a.m. to 12:59 p.m. | (8) 7:00 p.m. or later     |

11. Based on your **summer** schedule, during what time period do you most frequently arrive on campus? Circle one.

- |                              |                            |
|------------------------------|----------------------------|
| (1) Before 7:00 a.m.         | (5) 1:00 p.m. to 2:59 p.m. |
| (2) 7:00 a.m. to 8:59 a.m.   | (6) 3:00 p.m. to 4:59 p.m. |
| (3) 9:00 a.m. to 10:59 a.m.  | (7) 5:00 p.m. to 6:59 p.m. |
| (4) 11:00 a.m. to 12:59 p.m. | (8) 7:00 p.m. or later     |

12. Based on your **summer** schedule, during what time period do you most frequently depart from campus? Circle one.

- |                              |                            |
|------------------------------|----------------------------|
| (1) Before 7:00 a.m.         | (5) 1:00 p.m. to 2:59 p.m. |
| (2) 7:00 a.m. to 8:59 a.m.   | (6) 3:00 p.m. to 4:59 p.m. |
| (3) 9:00 a.m. to 10:59 a.m.  | (7) 5:00 p.m. to 6:59 p.m. |
| (4) 11:00 a.m. to 12:59 p.m. | (8) 7:00 p.m. or later     |

## SECTION II: DRIVING TO CAMPUS

13. On average, **this semester**, how many days a week do you drive a car/van/truck to campus? Circle one.

- (1) Never, I ride with someone else
- (2) Never, I do not commute to campus by car
- (3) Once per week
- (4) Two times per week
- (5) Three times per week
- (6) Four times per week
- (7) Five times per week
- (8) More than five times per week

14. On average, during the **summer**, how many days a week do you drive a car/van/truck to campus? Circle one.

- (1) Never, I ride with someone else
- (2) Never, I do not commute to campus by car
- (3) Once per week
- (4) Two times per week
- (5) Three times per week
- (6) Four times per week
- (7) Five times per week
- (8) More than five times per week

15. Where do you most frequently park when you drive to campus during the semester? Circle one.

- (1) Street
- (2) Lot on 600 block of University Ave. (daily fee)
- (3) Lake/France St. ramp
- (4) Private or city lot (other than above)
- (5) University metered lot
- (6) University Lot (permit required)
- (7) Other, please specify \_\_\_\_\_

16. Do you have a permit to park in a University lot, and if not, why not? Circle one.

- |  |                   |
|--|-------------------|
| (1) Yes, I have "UW" parking permit                                    | <b>GO TO Q 17</b> |
| (2) No, Unable to get permit   | <b>GO TO Q 20</b> |
| (3) No, Permit too expensive   | <b>GO TO Q 20</b> |
| (4) No, Convenient location not available                              | <b>GO TO Q 20</b> |
| (5) No, Do not drive enough  | <b>GO TO Q 20</b> |
| (6) No, I am employed part-time and don't want to pay full-time prices | <b>GO TO Q 20</b> |
| (7) No, I prefer another mode of transportation                        | <b>GO TO Q 20</b> |
| (8) No, Other please specify _____                                     | <b>GO TO Q 20</b> |

17. On average, **this semester**, how many days a week do you park in a permit lot? Circle one.

- (1) Once per week
- (2) Twice per week
- (3) Three times per week
- (4) Four times per week
- (5) Five times per week
- (6) More than five times per week

18. On average, in the **summer**, how many days a week do you park in a permit lot? Circle one.

- (1) Once per week
- (2) Twice per week
- (3) Three times per week
- (4) Four times per week
- (5) Five times per week
- (6) More than five times per week

19. What permit lot are you currently parking in?

\_\_\_\_\_

20. Are you currently on a waiting list for a UW parking permit? If so, for which parking lot?

\_\_\_\_\_

21. Thinking about the times when you come to campus by car/van/truck, **either as a driver or passenger**, and the vehicle parks at the university, how many people are usually in the vehicle (including the driver)? Circle one.

- (1) One, I drive alone
- (2) Two
- (3) Three
- (4) Four
- (5) Five
- (6) Six or more

22. Do you currently participate on a regular basis in a car/van/truck pool to campus, either as a driver or a rider? Circle one.

- (1) Yes, I car-pool **GO TO Q 24**
- (2) Yes, I van-pool **GO TO Q 24**
- (3) No, I do not car/van pool to campus **GO TO Q 23**

23. Which of the following are the **two most important reasons** why you are **not** currently participating in a car/van/truck pool? Circle two.

- (1) Live too close to campus to ride
- (2) Do not know how to get involved in one
- (3) I work irregular hours (i.e. I sometimes need to come in early or stay late)
- (4) Pool runs too early or late for my work schedule
- (5) It doesn't save me enough money to make it worthwhile
- (6) I need to get my kids to and from daycare
- (7) Generally more convenient not to car pool
- (8) Need transportation during the day to run errands
- (9) Other, please specify\_\_\_\_\_

**SECTION III: TRANSPORTATION ALTERNATIVES**

24. We would like to address ways in which it would be easier for you to reduce the number of days that you drive to campus. On a scale of 1 to 5, where **1 is a large incentive** and **5 is not an incentive**, how large would the following incentives be in reducing the number of days you drive to campus? Mark the most appropriate answer for each of the questions below.

	1	2	3	4	5
(A) Build park and ride lots at the Metro bus transfer points					
(B) Provide express buses from park and ride lots					
(C) Discount Madison Metro bus passes					
(D) 10 one-day parking passes per semester that allow you to chose when you use them					
(E) Parking permit where cost is based on the number of days that you park on campus					
(F) Parking permit where cost is based on the number of hours that you park on campus					

25. How would your parking behavior change if you were charged for **each day** you parked in university lots, instead of an annual fee? Although the exact daily rate has not yet been determined, assume that the per day charge of parking in a university lot would be approximately 1/200<sup>th</sup> of that lot’s annual charge. Circle one for each range of dates.

**A. From November 15 to March 15**

- (1) I still would not park on campus
- (2) I would park on campus more than I currently do
- (3) I would park on campus the same amount I do now
- (4) I would park one day less per week
- (5) I would park two days less per week
- (6) I would park three days less per week
- (7) I would park four days less per week
- (8) I would park five days less per week

**B. From September 1 to November 14 and March 16 to May 31**

- (1) I still would not park on campus
- (2) I would park on campus more than I currently do
- (3) I would park on campus the same amount I do now
- (4) I would park one day less per week
- (5) I would park two days less per week
- (6) I would park three days less per week
- (7) I would park four days less per week
- (8) I would park five days less per week

**C. From June 1 to August 31**

- (1) I still would not park on campus
- (2) I would park on campus more than I currently do
- (3) I would park on campus the same amount I do now
- (4) I would park one day less per week
- (5) I would park two days less per week
- (6) I would park three days less per week
- (7) I would park four days less per week
- (8) I would park five days less per week

26. If your current campus lot were selected as a test lot for flexible parking (cost based on number of days parked), would you be willing to participate?

- (1) No, I still would not get a campus parking permit
- (2) No, I would prefer to continue using an annual permit
- (3) Yes, I would be somewhat willing to participate
- (4) Yes, I would be very willing to participate

27. How would your parking behavior change if you were charged for **each hour** you parked in university lots, instead of an annual fee? Circle one.

- (1) I still would not get a campus parking permit
- (2) I would park in campus lots less than I park now
- (3) I would park in campus lots more often
- (4) I would continue to park the same as I park now
- (5) Due to special work needs, I have to drive 5 days/week or more regardless of price concerns

**SECTION IV: BACKGROUND QUESTIONS**

28. What is your university classification? Circle one.

- (1) Faculty
- (2) Classified
- (3) Academic Staff
- (4) Other

29. What is your employment status with the university? Circle one.

- (1) Full Time
- Part Time:
  - (2) 75 %
  - (3) 50 %
  - (4) Other; please specify \_\_\_\_\_ %

30. What is your gender? Circle one. (1) Male (2) Female

31. What is your current age? Circle one.

- |                      |                    |
|----------------------|--------------------|
| (1) 20 years or less | (5) 41 to 50 years |
| (2) 21 to 25 years   | (6) 51 to 60 years |
| (3) 26 to 30 years   | (7) 61 or more     |
| (4) 31 to 40 years   |                    |

32. What is your zip code? \_\_\_\_\_

33. Are you a resident of Eagle Heights? (1) Yes (2) No

34. What is the yearly income category for your household? Circle one.

- |                          |                          |
|--------------------------|--------------------------|
| (1) Under \$15,000       | (5) \$45,000 to \$54,999 |
| (2) \$15,000 to \$24,999 | (6) \$55,000 to \$64,999 |
| (3) \$25,000 to \$34,999 | (7) \$65,000 to \$75,000 |
| (4) \$35,000 to \$44,999 | (8) \$75,000 and over    |

35. Finally, are there any comments you would like to make about your transportation experiences in coming to and from your work at the University of Wisconsin-Madison?

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*Thank you for taking the time to complete this survey.  
Please return it in the envelope provided.*



## Appendix B

### Appendix B: Hourly Meter Pricing Table

#### Annual Revenue to Recover

Hours x Days	\$400	\$450	\$500	\$550	\$600	\$650	\$700	\$750	\$800	\$850	\$900	\$950	\$1,000
750	0.53	0.60	0.67	0.73	0.80	0.87	0.93	1.00	1.07	1.13	1.20	1.27	1.33
800	0.50	0.56	0.63	0.69	0.75	0.81	0.88	0.94	1.00	1.06	1.13	1.19	1.25
850	0.47	0.53	0.59	0.65	0.71	0.76	0.82	0.88	0.94	1.00	1.06	1.12	1.18
900	0.44	0.50	0.56	0.61	0.67	0.72	0.78	0.83	0.89	0.94	1.00	1.06	1.11
950	0.42	0.47	0.53	0.58	0.63	0.68	0.74	0.79	0.84	0.89	0.95	1.00	1.05
960	0.42	0.47	0.52	0.57	0.63	0.68	0.73	0.78	0.83	0.89	0.94	0.99	1.04
1000	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
1020	0.39	0.44	0.49	0.54	0.59	0.64	0.69	0.74	0.78	0.83	0.88	0.93	0.98
1050	0.38	0.43	0.48	0.52	0.57	0.62	0.67	0.71	0.76	0.81	0.86	0.90	0.95
1080	0.37	0.42	0.46	0.51	0.56	0.60	0.65	0.69	0.74	0.79	0.83	0.88	0.93
1100	0.36	0.41	0.45	0.50	0.55	0.59	0.64	0.68	0.73	0.77	0.82	0.86	0.91
1120	0.36	0.40	0.45	0.49	0.54	0.58	0.63	0.67	0.71	0.76	0.80	0.85	0.89
1140	0.35	0.39	0.44	0.48	0.53	0.57	0.61	0.66	0.70	0.75	0.79	0.83	0.88
1150	0.35	0.39	0.43	0.48	0.52	0.57	0.61	0.65	0.70	0.74	0.78	0.83	0.87
1190	0.34	0.38	0.42	0.46	0.50	0.55	0.59	0.63	0.67	0.71	0.76	0.80	0.84
1200	0.33	0.38	0.42	0.46	0.50	0.54	0.58	0.63	0.67	0.71	0.75	0.79	0.83
1250	0.32	0.36	0.40	0.44	0.48	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80
1260	0.32	0.36	0.40	0.44	0.48	0.52	0.56	0.60	0.63	0.67	0.71	0.75	0.79
1280	0.31	0.35	0.39	0.43	0.47	0.51	0.55	0.59	0.63	0.66	0.70	0.74	0.78
1300	0.31	0.35	0.38	0.42	0.46	0.50	0.54	0.58	0.62	0.65	0.69	0.73	0.77
1320	0.30	0.34	0.38	0.42	0.45	0.49	0.53	0.57	0.61	0.64	0.68	0.72	0.76
1330	0.30	0.34	0.38	0.41	0.45	0.49	0.53	0.56	0.60	0.64	0.68	0.71	0.75
1350	0.30	0.33	0.37	0.41	0.44	0.48	0.52	0.56	0.59	0.63	0.67	0.70	0.74
1360	0.29	0.33	0.37	0.40	0.44	0.48	0.51	0.55	0.59	0.63	0.66	0.70	0.74
1380	0.29	0.33	0.36	0.40	0.43	0.47	0.51	0.54	0.58	0.62	0.65	0.69	0.72
1400	0.29	0.32	0.36	0.39	0.43	0.46	0.50	0.54	0.57	0.61	0.64	0.68	0.71
1440	0.28	0.31	0.35	0.38	0.42	0.45	0.49	0.52	0.56	0.59	0.63	0.66	0.69
1470	0.27	0.31	0.34	0.37	0.41	0.44	0.48	0.51	0.54	0.58	0.61	0.65	0.68
1500	0.27	0.30	0.33	0.37	0.40	0.43	0.47	0.50	0.53	0.57	0.60	0.63	0.67
1520	0.26	0.30	0.33	0.36	0.39	0.43	0.46	0.49	0.53	0.56	0.59	0.63	0.66
1530	0.26	0.29	0.33	0.36	0.39	0.42	0.46	0.49	0.52	0.56	0.59	0.62	0.65
1540	0.26	0.29	0.32	0.36	0.39	0.42	0.45	0.49	0.52	0.55	0.58	0.62	0.65
1560	0.26	0.29	0.32	0.35	0.38	0.42	0.45	0.48	0.51	0.54	0.58	0.61	0.64
1600	0.25	0.28	0.31	0.34	0.38	0.41	0.44	0.47	0.50	0.53	0.56	0.59	0.63
1610	0.25	0.28	0.31	0.34	0.37	0.40	0.43	0.47	0.50	0.53	0.56	0.59	0.62

		<b>Annual Revenue to Recover</b>											
<b>Hours</b>	<b>\$400</b>	<b>\$450</b>	<b>\$500</b>	<b>\$550</b>	<b>\$600</b>	<b>\$650</b>	<b>\$700</b>	<b>\$750</b>	<b>\$800</b>	<b>\$850</b>	<b>\$900</b>	<b>\$950</b>	<b>\$1,000</b>
<b>x Days</b>													
1620	0.25	0.28	0.31	0.34	0.37	0.40	0.43	0.46	0.49	0.52	0.56	0.59	0.62
1680	0.24	0.27	0.30	0.33	0.36	0.39	0.42	0.45	0.48	0.51	0.54	0.57	0.60
1710	0.23	0.26	0.29	0.32	0.35	0.38	0.41	0.44	0.47	0.50	0.53	0.56	0.58
1750	0.23	0.26	0.29	0.31	0.34	0.37	0.40	0.43	0.46	0.49	0.51	0.54	0.57
1760	0.23	0.26	0.28	0.31	0.34	0.37	0.40	0.43	0.45	0.48	0.51	0.54	0.57
1800	0.22	0.25	0.28	0.31	0.33	0.36	0.39	0.42	0.44	0.47	0.50	0.53	0.56
1820	0.22	0.25	0.27	0.30	0.33	0.36	0.38	0.41	0.44	0.47	0.49	0.52	0.55
1840	0.22	0.24	0.27	0.30	0.33	0.35	0.38	0.41	0.43	0.46	0.49	0.52	0.54
1890	0.21	0.24	0.26	0.29	0.32	0.34	0.37	0.40	0.42	0.45	0.48	0.50	0.53
1920	0.21	0.23	0.26	0.29	0.31	0.34	0.36	0.39	0.42	0.44	0.47	0.49	0.52
1980	0.20	0.23	0.25	0.28	0.30	0.33	0.35	0.38	0.40	0.43	0.45	0.48	0.51
2000	0.20	0.23	0.25	0.28	0.30	0.33	0.35	0.38	0.40	0.43	0.45	0.48	0.50
2070	0.19	0.22	0.24	0.27	0.29	0.31	0.34	0.36	0.39	0.41	0.43	0.46	0.48
2080	0.19	0.22	0.24	0.26	0.29	0.31	0.34	0.36	0.38	0.41	0.43	0.46	0.48
2160	0.19	0.21	0.23	0.25	0.28	0.30	0.32	0.35	0.37	0.39	0.42	0.44	0.46
2250	0.18	0.20	0.22	0.24	0.27	0.29	0.31	0.33	0.36	0.38	0.40	0.42	0.44
2340	0.17	0.19	0.21	0.24	0.26	0.28	0.30	0.32	0.34	0.36	0.38	0.41	0.43
2430	0.16	0.19	0.21	0.23	0.25	0.27	0.29	0.31	0.33	0.35	0.37	0.39	0.41

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