



Princeton University
2016 TigerTransit, Parking and
Traffic Demand Management Report

For the academic year ending June 30, 2016

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TIGERTRANSIT ANNUAL REVIEW



*Prepared by:
Greater Mercer TMA*

July 2015 – June 2016

TigerTransit Annual Review

INTRODUCTION

Princeton University's Transportation and Parking Services department continued its proactive approach in operating TigerTransit by executing changes to the system that improved efficiency and system branding.

Last year, the University retained the consulting firm of Vanasse Hangen Brustlin Inc. to examine routes, operations and solicit consumer opinions. The fieldwork and subsequent report led to the realignment of some existing routes, introduction of new services and roll out of a new system wide communication package.

The service changes implemented resulted in an 11.3% decrease in overall miles traveled. This decrease improved overall system efficiency with an increase in passengers carried per mile. This held true even with Tiger Transit's 5% ridership decline from July 2015 – June 2016. TigerTransit provided 498,278 trips during this time. While system-wide ridership was lower, it was not the situation on all lines. Much of the reduction is attributed to the complete closing of Butler apartments and the cancelation of the route that served those apartments.

There were other changes to the TigerTransit system that are below.

SERVICE ADJUSTMENTS

- The East line was eliminated once the Butler apartment complex was vacated. The East line also provided service to parking lot 21. Service to parking lot 21 was added to the West Commuter.
- Service to the new Lakeside apartments was added to the Lawrence/Lakeside line (previously named Tiger line), the Forrestal/PPPL line; Evening Circulator, Summer Connection (August 2015) and weekend service lines. The added stop at Lakeside on those bus lines means a dedicated bus did not have to be deployed to serve the apartments. This efficiency means fewer buses on the street and eliminating duplication of service.

- Service to Stanworth/Merwick apartments was reduced to peak hours only during the academic year.

NEW BUS SERVICE

Customer service feedback received by the consultant, identified weekend service to campus as a needed service to the Tiger Transit system. The University introduced at the beginning of the summer of 2015 service, on Saturday and Sunday called the Weekender. The Weekender service circulates throughout campus to student housing locations.

COMMUNICATION PACKAGE

A notable change to the system was the rebranding of bus lines. The University adopted an identification package of assigning letters of the alphabet to each of the bus lines. The University also renamed a few of the lines to correspond with the destinations of the line. This, along with the “Letter” identification, makes it easier to communicate to a diverse population. The customer can easily identify which bus they see on the street, online and through other communication pieces. (More discussion in the Community section).

TIGER TRANSIT 2015–2016

Tiger Transit operated eight bus lines, Monday through Friday, during the academic year. This is a reduction of two bus lines from the previous year. During the summer break six bus lines serving students and faculty operate Monday through Friday¹.

The new service, the Weekender bus lines, operates year round.

Year round operation:

- 3 bus lines provide transportation from parking locations and offsite facilities¹.
- 3 bus lines serve housing and locations outside the immediate perimeter of campus².

¹ The East Commuter operates during the summer months. It is combined with the West Commuter during the academic year and the line is named the West/East Commuter.

² Merwick route did not operate July 2015; but became a year round route in August 2015.

- 2 Weekender routes
- 1 Saturday Shopper

During the academic year:

- 3 bus line provide transportation from parking locations and offsite facilities
- 5 bus lines serve graduate housing to campus locations
- 2 Weekender routes
- 1 Saturday Shopper
- On demand service – provides door-to-door after regular line service ends
- Holiday and weather related service is provided when needed

ENVIRONMENTALLY RESPONSIBLE

Carbon emissions from TigerTransit have been tracked for the last five years. Over this period, B20 has been used for most of the bus lines instead of diesel. This year First Transit, the service provider, added new cleaner burning diesel mini-buses to the fleet and retired the old diesel buses. The total carbon emissions savings from the use of B20 during this five year period is 1,398,713 pounds of CO₂. This savings is equivalent to the emissions from the electricity used by 67 homes per year (nonrenewable sources) or the emissions from consuming 71,390 gallons of gasoline. If the emissions had been released into the air from the use of diesel, it would have taken 601 acres of forest one year to sequester the carbon dioxide (EPA.gov).

OPERATING HIGHLIGHTS

TigerTransit days of operation throughout the year:

- The regular service lines operated on average 238 days
- Academic lines provided an average of 171 days of service, and
- Bus lines traveled 280,590 miles throughout the community, a reduction of 35,626 miles from last year.

Service hours for the system as a whole are from 5:00 AM to Midnight for both the academic year and summer service.

With the opening of the new Lakeside housing complex, a stop was added on the Tiger Line and the route was renamed Lawrence/Lakeside instead of dedicating another bus line to service the new Lakeside apartments. It became apparent that overcrowding was occurring during peak morning periods on the Lawrence/Lakeside line, therefore a lesser used bus (from the West/East commuter) was rerouted to tail the Lawrence/Lakeside buses to assure capacity was not breached.

Responding to customer comments, the University added additional courtesy services – the Saturday Weekender and Sunday Weekender – to provide students with access to campus locations on the weekend.

LOOKING AHEAD

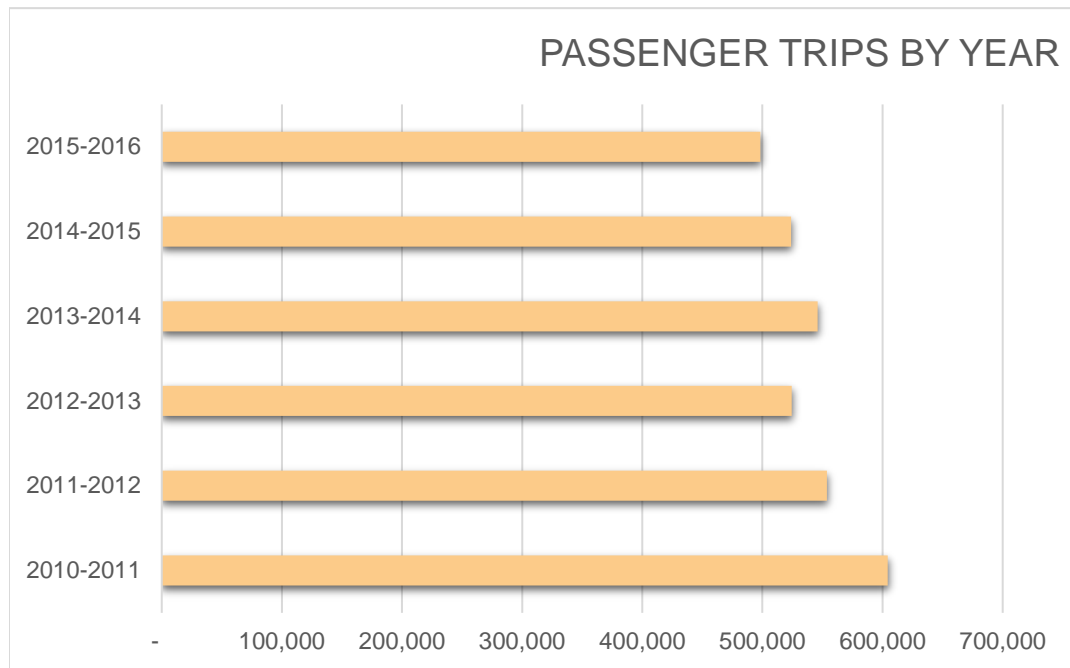
The University plans to participate in the GO PRINCETON project, which promotes improved connectivity and communication of transportation offerings in Princeton. One can expect that the University will evaluate service options to improve connectivity to other services and destinations and continue to monitor the bus service as it has always done to see which improvements will better serve the customer base and minimize their carbon footprint.

OVERALL SYSTEM PERFORMANCE

RIDERSHIP

The number of passenger trips provided from June 2015–July 2016 was 498,278. Although the number is lower than the previous year, most of the decrease can be attributed to the closing of Butler apartments, closer graduate student housing resulting in more pedestrian trips, increased use of the University’s Transportation Demand Management (TDM) offerings, and a less harsh winter. The University’s robust TDM program actively promotes carpooling, vanpooling, biking and walking as options for faculty and staff and mass–transit reimbursement of commuting graduate students. The creation of the University’s Bike Share system has also moved some automobile and bus trips to bike trips.

The chart below shows the total number of passenger trips for the first full six years of the TigerTransit system.



ENVIROMENTAL IMPACT

INTRODUCTION

The environmental impact of the University's TigerTransit bus system, provides an analysis of TigerTransit's impact on regional carbon dioxide (CO₂) emissions reduction. Sustainability starts with resource conservation.

Currently, the transportation sector's contribution to greenhouse gas emissions is slightly higher than 25% of the total United States Greenhouse Gas emissions. Given its dynamic functions, this sector can be influenced and altered, at a reasonably quick rate, to reduce its impact on the natural environment.

CARBON EMISSION SUMMARY

The carbon footprint is based on two fuel types B20 versus diesel and two commute

options; riders using TigerTransit buses and those using SOVs (single occupancy vehicles). The time period covered stretches from July 2015 through June 2016.

Most of the TigerTransit bus fleet are 30 passenger buses that run on B20 (a mixture of 20% Biofuel and 80% diesel) fuel. Two of the bus lines, 693/701 Carnegie and Forrestal/PPPL line, occasionally use smaller 20 – passenger diesel buses. The older 14–passenger buses that were used on the lines mentioned now serve as back-up vehicles.

TigerTransit saved 277,155 pounds of CO₂ from being emitted into the air in one year due to the use of B20 instead of regular diesel. Only the buses that run on B20 were included in the calculation. The decrease in CO₂ emissions from TigerTransit's use of B20 rather than diesel equates to 24% less carbon dioxide emissions. To highlight the savings from specific bus routes we chose the PTS/Equad Line and Lawrence/Lakeside Line. These lines saved 43,799 and 35,813 pounds of CO₂ respectively, by using B20 fuel instead of regular diesel.

PTS/EQUAD Bus Line		Lawrence/Lakeside Bus Line	
B20 versus Diesel CO ₂ Emissions		B20 versus Diesel CO ₂ Emissions	
B20	182,329 pounds CO ₂	B20	149,081 pounds CO ₂
Diesel	226,128 pounds CO ₂	Diesel	184,894 pounds CO ₂
Difference	43,799 pounds CO ₂	Difference	35,813 pounds CO ₂

To determine the amount of CO₂ saved by Princeton University affiliates using TigerTransit buses instead of single occupancy vehicles (SOVs), we hypothesized that the number of passenger trips of each bus line per month would complete 75% of one round trip. We believe it is reasonable to assume that the buses are used for longer trips, and for the most part people who have access to the buses would walk shorter distances and only wait for the bus if they are going a distance that is too far to walk in a reasonable amount of time. The CO₂ saving realized by providing TigerTransit and avoiding single occupant vehicle trips is in addition to the savings already achieved from using B20 fuel.

instead of diesel.

Tiger Transit Bus versus SOV CO₂ Emissions

Tiger Transit Buses	1,213,570 pounds CO ₂
SOV	1,566,517 pounds CO ₂
Difference	352,947 pounds CO ₂

ENVIRONMENTAL IMPACT CONCLUSION

The TigerTransit System has continued to perform at a high level of sustainability. Emissions savings have continued at a similarly high level as previous years with a small increase in percent of emissions reduced by using B20 instead of regular diesel. A major benefit of the TigerTransit bus system is the removal of almost 498,278 car trips that would likely have taken place within the confines of the University and downtown Princeton. Those additional car trips would have resulted in far greater traffic, lengthier travel times, increased gas consumption, higher pollution levels and increased demand for parking.

COMMUNITY

The University moved on recommendations from the consulting firm of Vanasse Hangen Brustin Inc. after their study revealed that students felt there could be improvements on how the service is branded and communicated.

A “letter “identification system was created where each line was assigned a letter of the alphabet (example: Merwick became identified as the M line). This method provides the consumer with easy identification of which bus is approaching when at a stop served by multiple lines.

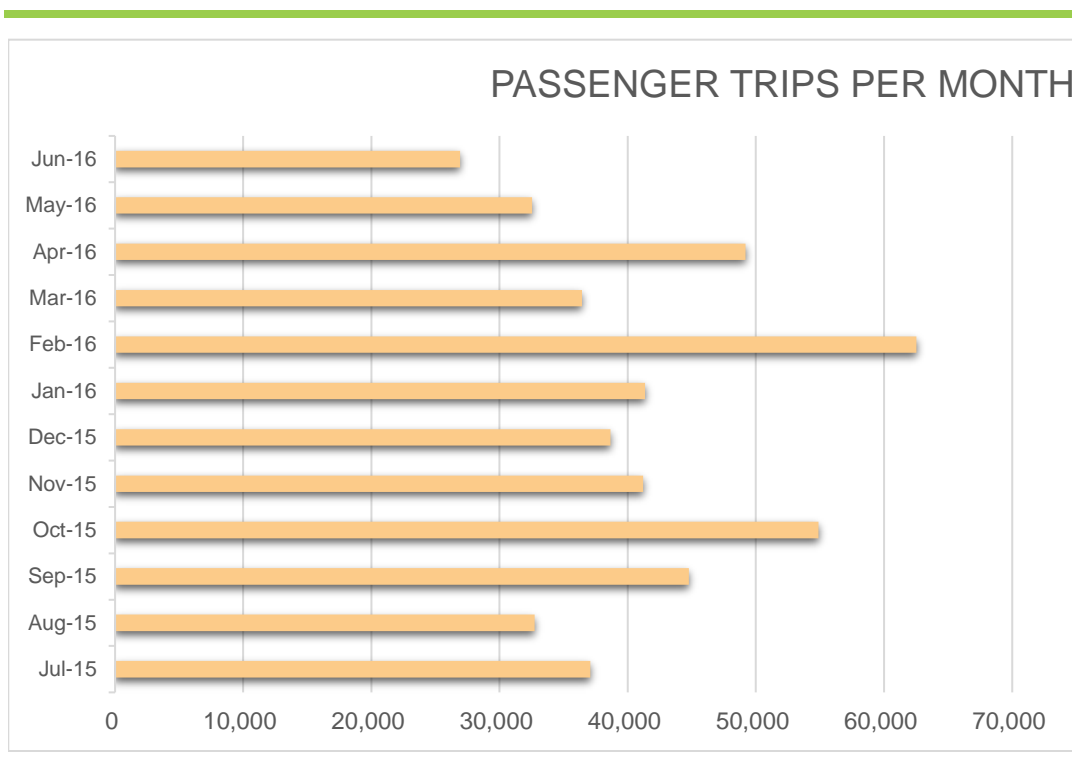
Readability of the bus destination sign, improves easy reference to schedule information and mapping. (see Appendix A).

In September 2015, NJTRANSIT's 655 bus line serving the University Medical Center of Princeton at Plainsboro was discontinued due to low ridership. TigerTransit's Forrestal/PPPL Line, which also serves the hospital, was rerouted to Nassau Street to allow for greater community access. From September 2015 to June 2016, a total of 2,676 boardings at the hospital were recorded. The University plans to continue its commitment to the community by participating in the GoPrinceton project.

OVERALL SYSTEM PERFORMANCE

PASSENGER TRIPS PER MONTH

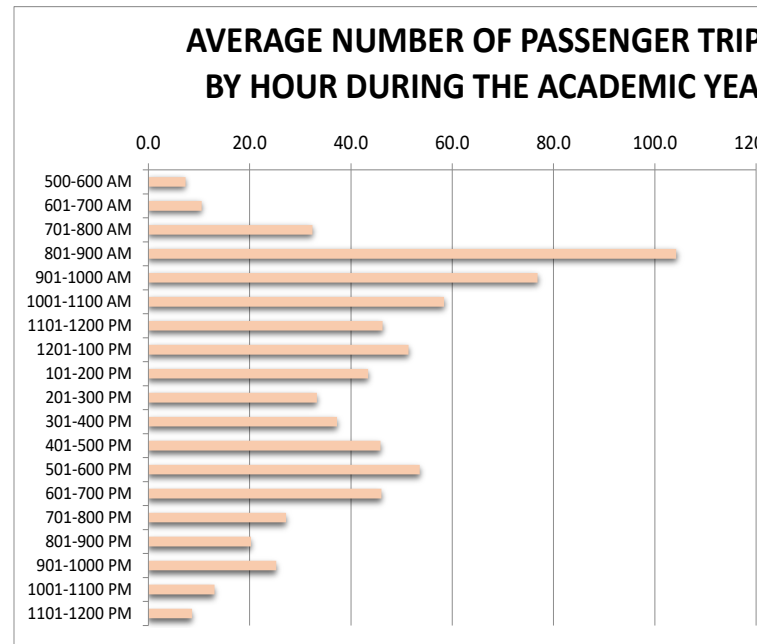
The performance standards that Greater Mercer TMA developed several years ago continue to provide data that helps to evaluate the system performance and adjust resources if necessary. The number of passenger trips per month shows the concentration of trips; aiding in the assessment of when and where vehicles are needed to meet demand.



The chart shows that the highest ridership occurred during the month of February, 2016. Understandably, the lowest ridership occurs when the students are not in session. The University reduces transportation service levels accordingly.

PASSENGER TRIPS BY TIME OF DAY

Lines are set up to move passengers at peak times to their destination. Princeton's graduate student housing is primarily on the edges of campus. (Though newer housing has been built closer to campus, increasing pedestrian and bicycle trips.) The same holds true for faculty and staff parking. Both create a "travel Influx" to and from campus at peak commute times, with lower ridership leaving the campus. This is typical of many transit systems.



As shown in this chart the heaviest volume of passenger trips occurs during the hours of 8:00 AM – 10:00 AM. After 10:00 AM the number of passenger trips drop dramatically as do the number of buses used until 5:00 PM – 6:00 PM. It appears that the number of passengers returning from campus are spread out throughout the day. This pattern is consistent with previous years. Of note, this year is a more than 30% increase in passenger trips by hour during the 8:00 AM – 9:00 AM time period compared to last year.

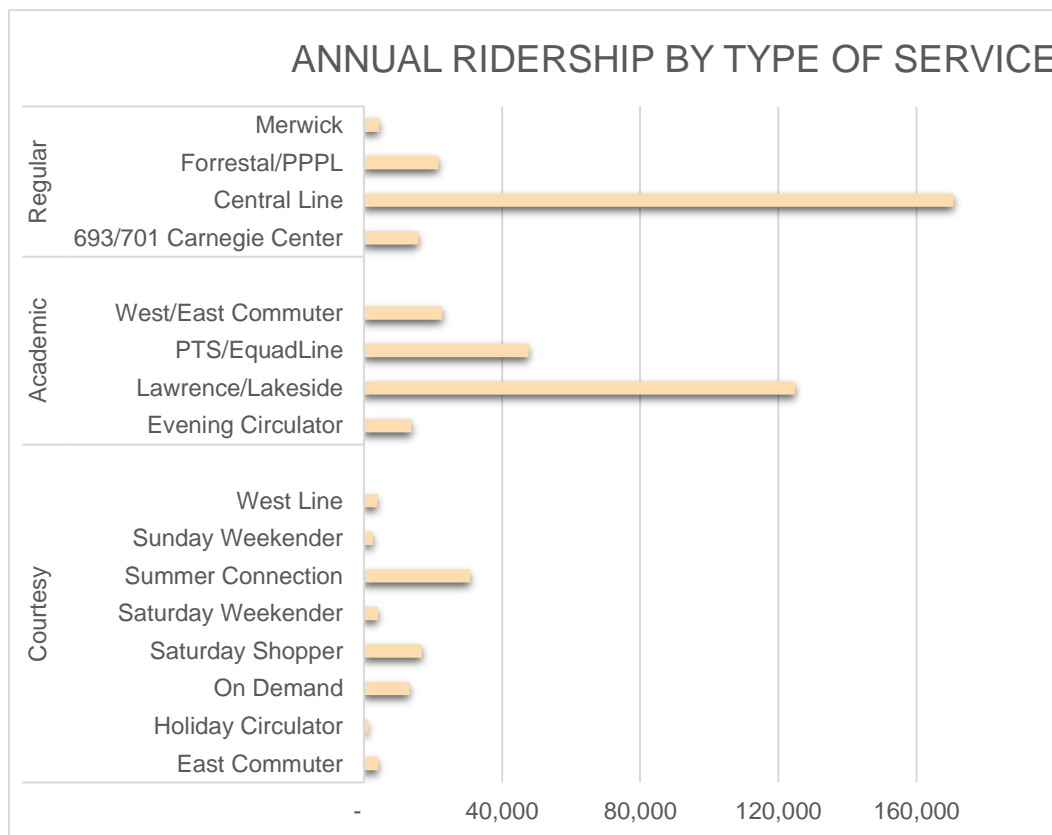
TYPES OF SERVICE

Princeton University offers three levels of transportation service through the year, they are

- **Regular Line Service** – buses operate throughout the calendar year.
- **Academic Year Bus Lines** – bus lines that only operate during the fall and spring semester.

- **Summer Lines Service** – one line replaces most of the academic year bus lines with the exception of the PTS/West line and the East Commuter.

In addition to the three types of bus services: courtesy services for shopping, weekend trips to campus, demand response and holidays complement the transportation network.

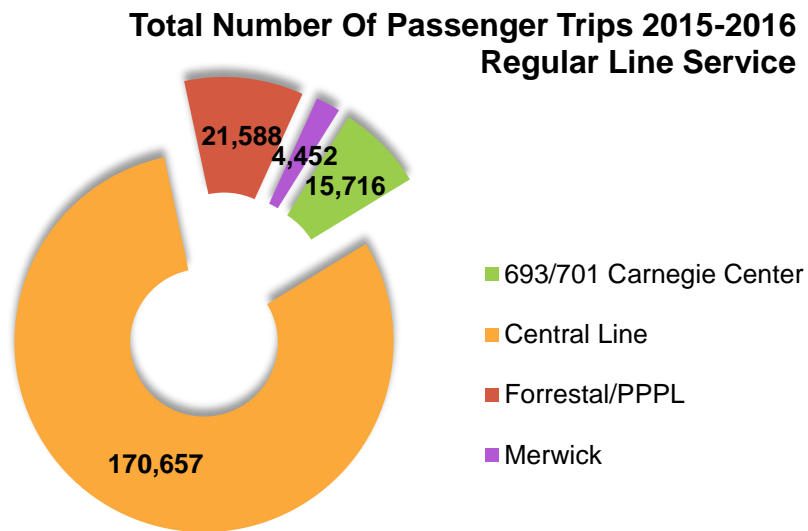


The Central Line provides the most passenger trips. After the Central line, the Lawrence/Lakeside line is the next top performer. If comparing the academic year daily number of passenger trips, the Lakeside/Lawrence line outperforms the Central line, by providing an average of 756 and 682 passenger trips respectively. The line that underperforms during the academic year is the Merwick line. Merwick II, when completed, will likely contribute some additional ridership.

REVIEW

The TigerTransit System continues to be a vital resource for the Princeton community. The review by the consulting firm hired by the University provided a road map for service and system improvements.

Individual Line Performance



693/701 Carnegie Center

Began serving Princeton Junction on limited trips
Piloted service to the Hyatt

15,716 – Total Yearly Ridership

247 – Service Days

7,355 – Yearly AM Rides

8,361 – Yearly PM Rides

9% decrease in ridership

Central Line

170,657 – Total Yearly Ridership

249.5 – Service Days

99,612 – Yearly AM Rides

71,745.5 – Yearly PM Rides

1% increase in ridership

Forrestal/PPPL

Rerouted to Nassau Street to provide the community access to the Princeton University Medical Center in Plainsboro
Lakeside apartments was added to this line.

21,588 – Total Yearly Ridership

243 – Service Days

11,786 – Yearly AM Rides

12,186 – Yearly PM Rides

17% increase in ridership

Merwick

(formerly Stanworth)

operated 11 months

Summer – 10 hrs

Academic year – 6hrs

(Previous year, operated 12 hours a day during the academic year.)

4,452 – Total Yearly Ridership

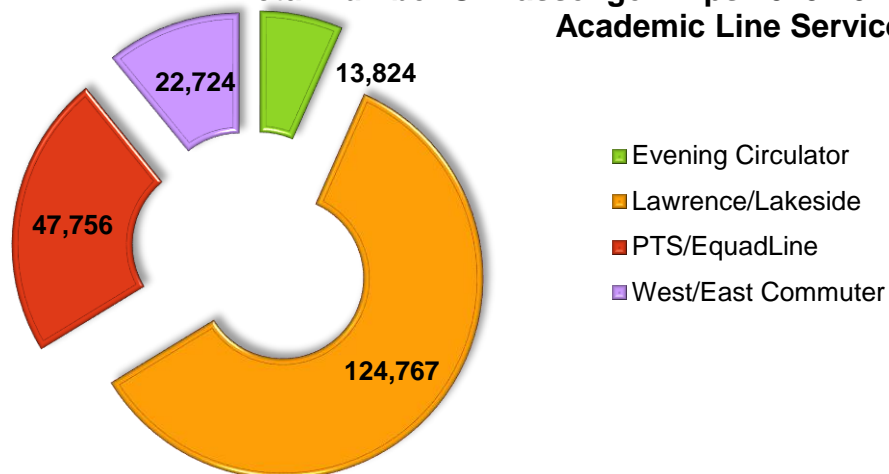
217 – Service Days

2,522 – Yearly AM Rides

1,930 – Yearly PM Rides

65% decrease in ridership

**Total Number Of Passenger Trips 2015-2016
Academic Line Service**



Evening Circulator
(formerly Campus Circulator)

13,824 – Total Yearly Ridership
164 – Service Days
0 – Yearly AM Rides
13,824 – Yearly PM Rides

53% decrease in ridership

Lawrence/Lakeside

(formerly Tiger Line)
Lakeside apartments added to the line.

124,767 – Total Yearly Ridership
165 – Service Days
74,631 – Yearly AM Rides
50,136 – Yearly PM Rides

65% increase in ridership

PTS/Equad Line

(formerly West Extension)

48,787 – Total Yearly Ridership
201 – Service Days
24,308 – Yearly AM Rides
24,462 – Yearly PM Rides

.03% increase in ridership

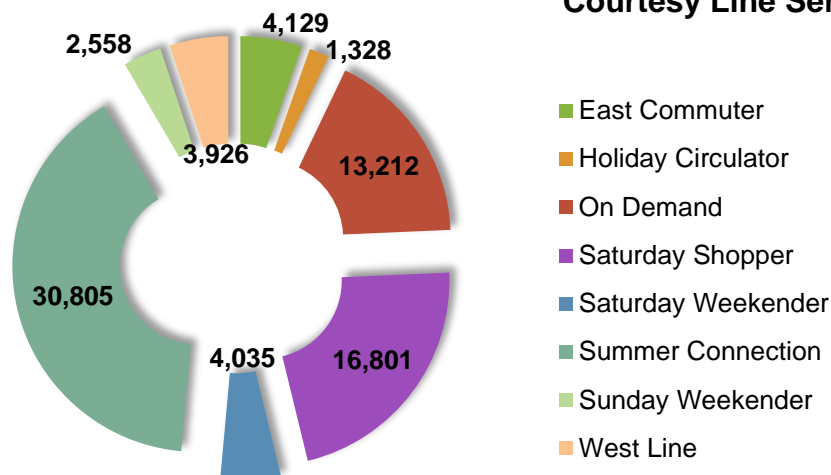
West/East Commuter

The East Commuter line was combined with the West Commuter service in the academic year.

22,724 – Total Yearly Ridership
176 – Service Days
14,051 – Yearly AM Rides
8,673 – Yearly PM Rides

48% combined increase in ridership

**Total Number Of Passenger Trips 2015-2016
Courtesy Line Service**



East Commuter

Operated the 2015 summer months on a rush hour schedule only.

Combined service with the West Commuter (West/East Commuter) for the academic year.

June 2016 operated on full schedule.

4,129 – Total Yearly Ridership

69 – Service Days

1,221 – Yearly AM Rides

734 – Yearly PM Rides

52% decrease in ridership

Holiday Circulator

Fewer service days then last year.

1,328 – Total Yearly Ridership

6 – Service Days

565 – Yearly AM Rides

763 – Yearly PM Rides

14% decrease in ridership

On Demand

13,212 – Total Yearly Ridership

205 – Service Days

5% increase in ridership

Saturday Shopper

Lakeside apartments added

16,801 – Total Yearly Ridership

48 – Service Days

7,549 – Yearly AM Rides

7,256 – Yearly PM Rides

22% increase in ridership

Saturday Weekender

New service

Lakeside apartments added

4,035 – Total Yearly Ridership

48 – Service Days

541 – Yearly AM Rides

3,485 – Yearly PM Rides

Summer Connection

Lakeside apartments added in August 2015

30,805 – Total Yearly Ridership

68 – Service Days

13,776 – Yearly AM Rides

17,029 – Yearly PM Rides

7% decrease in ridership

Sunday Weekender

New service

Lakeside apartments added

2,558 – Total Yearly Ridership

48 – Service Days

271 – Yearly AM Rides

2,276 – Yearly PM Rides

West Line

3,926 – Total Yearly Ridership

69 – Service Days

2,303 – Yearly AM Rides

1,623 – Yearly PM Rides

26% decrease in ridership

SYSTEM EVALUATION

Greater Mercer Transportation Management Association (Greater Mercer TMA) is the independent monitor of the TigerTransit service. As the independent monitor, Greater Mercer TMA conducts audits of the TigerTransit system throughout the calendar year. The system audits are preformed monthly, unless otherwise directed.

Greater Mercer TMA's field representative monitors passenger count verifications, on-time performance, service recommendations, driver performance, vehicle conditions, and passenger amenities.

A report is prepared and forwarded to the University's Director of Transportation and Parking Services. Once received and evaluated by the Director, the report, if necessary is forwarded to the service provider or University department for corrective action, investigation or recommendations.

DATA COLLECTION METHODOLOGY

The ridership numbers and usage data provided in this report are obtained from driver boarding reports and validated through random field inspections performed by department staff. Drivers of all services are required to count boardings at every stop, every hour throughout their shift. They submit daily ridership sheets to dispatch at the end of their runs. The dispatcher is responsible for reviewing the driver information and preparing weekly reports. The General Manager reviews the weekly report before it is submitted to the University's Director of Transportation and Parking Services.

CONCLUSION

Princeton University's continued desire to operate a dynamic system is one of its greatest strengths. The University proved once again that it is flexible and willing to make changes to better serve the market. Many of the changes this year were a direct response to feedback from its customers. The adjustments made during this year improved efficiency by reducing miles but not compromising service. The rebranding of the bus lines will serve to improve identification and clearly communicate the service being provided.

Throughout this year, the University has also shown its leadership in providing and encouraging other transportation options in the community. The addition of nine new stations to their bike share system, plans for further expansion, and the welcoming and encouraging of other business locations to join the Princeton Bike Share system will help to further reduce single occupant vehicle travel. The University's strong TDM program also encourages sustainable transportation options.

The University should continue its proactive approach to managing the TigerTransit system; looking for unserved and underserved markets in the community and looking for coordination opportunities whenever possible.

APPENDIX A

Parking in University Lots
Parking in Princeton University parking lots is by permit only. To obtain a permit, all vehicles must be registered with Transportation & Parking Services.

West & North Garages
Access to the West and North Parking Garages requires a University Transponder device. Transponders are only issued to permit holders who are assigned to the West and North Garages.

Prior to receiving a valid parking permit, applicants are responsible for reading Princeton University Parking Rules and Regulations, found online at www.parking.princeton.edu/important.

Violators to the Rules and Regulations are subject to fines and/or revocation of parking privileges.

Help us move towards a more sustainable campus environment!
Princeton University's Transportation and Parking Services offers several programs to promote a cleaner and more sustainable campus environment, along with incentives to actively participate in alternative modes of transportation to and from work.

- **Ridesharing (Carpool and Vanpool)**
 - \$50 gas card for all participants every 3 months
 - One-time introductory \$25 gas card when joining (carpool only)
 - Provided vehicle, inclusive of regular maintenance (vanpool only)
 - Dedicated campus parking spaces

- 50% reimbursement of monthly transit passes for graduate students and full-time benefits-eligible employees

Car Sharing
Car sharing provides convenient and affordable access to cars for short and extended periods of time without the expense of car ownership. Services are provided by Enterprise Car Share.

Bike Rental at Princeton Station
Bike rentals are available at Princeton Station and managed by Zagster. For more information, visit zagster.com/princeton.

To learn more about Transportation Demand Management programs and initiatives, or to sign up, visit www.unh.edu/transportation/info

Notice to All Permit Holders

Notice to All Permit Holders
Permit holders must park in the assigned lot and zone indicated on the vehicle hangtag. Parking in an unassigned lot within a designated zone is permissible ONLY when assigned lot is full.

After receiving your parking hangtag, consult the map on the back of this page to locate your assigned zone and parking lot.

Handtags must be appropriately displayed in vehicles when parking in University lots. Handtags should be removed when driving to avoid obstructed views.

[illegible][illegible]

Transportation Demand Management 2015/2016 Academic Year

Transportation and Parking Services (TPS) continues to be committed to providing parking and transportation services that promote sustainability, accessibility and mobility for the Princeton University community thereby keeping “Princeton in Motion”.

Transportation Demand Management (TDM) Program Mission

TDM provides information and education about travel options and offers incentives and programs that discourage Single Occupancy Vehicle (SOV) travel. TDM is an essential component of a comprehensive sustainable transportation solution for the campus.

Transportation & Parking Services continues to review how members of the University community and visitors access, park and move around campus.

The objective for the ongoing review is to facilitate the ease of access to campus while making the most efficient use of parking spaces. To that end, initiatives that are used to achieve this objective include:

- Parking optimization,
- Promoting transit programs,
- Focusing on existing car share, bike share and campus shuttle programs,
- Encouraging use of alternative modes of transportation, including improving bicycle and pedestrian experience.

Programs

The University continues to see growth in TDM programs. Even though gasoline prices continued to trend lower than in some past years, the department's marketing efforts, and participation at University benefits fairs, increase the number of program participants.

Carpools

Faculty and staff are able to search for potential carpool partners through an on-line rideshare database. Additionally, the University encourages undergraduate students to use the database to link them with other students seeking shared rides during university break periods. During the 2016 academic year, carpool participation had the largest gain in participants, adding 34 participants to the program.

Vanpools

There are now seven van pools in operation at the University including one for PPPL employees. A third party vendor, VRide, has been contracted to provide seven-passenger vans. Each van has a primary driver and an alternate driver. Individuals participating in the vanpool, with the exception of the primary driver, are responsible for fueling the van. All maintenance issues are handled through VRide. Below is their assessment of the environmental impact of the vanpool program:

- Environmental Savings 2015-2016

The chart below contains detailed statistics drawn from the vanpool program at Princeton University. While the vanpool driver rides for free, the remaining members offset some of their costs with a \$50 gas card, received quarterly from Princeton University in support of their decision to reduce SOVs onto campus.

Environmental Fleet Impact	
Princeton 2015-2016	
vRide Vanpool	
Daily Active Vanpools	7.0
Daily Seating Available	42
Occupancy Rate	83.3%
Average Daily Passengers per Vanpool	5.0
Commuter Trips per Day	70
Commuter Trips (Cumulative)	15,400
Parking Space Saved per Day	28
Cars Off Highway (Monthly)	582
Trips Eliminated per Day	56
Trips Eliminated (Cumulative)	12,350
Vehicle Miles Eliminated (Cumulative)	414,723
Fuel Saved (Gallons)	16,749
National Average Fuel Cost	\$2.40
Fuel Savings (Dollars)	\$40,198
Carbon Monoxide Reduction (Tons)	5.58
Carbon Dioxide Reduction (Tons)	149

Key program highlights accomplished by Princeton University's Vanpool Program include:

- ✓ vRide helped Princeton eliminate 149 tons of CO2 emissions. This is equivalent to the carbon sequestered by 141 acres of US forests and equivalent to the GHG emissions avoided by recycling 47.2 tons of waste instead of sending it to a landfill.
- ✓ vRide removed an average of 28 vehicles from Princeton's parking lots daily.
- ✓ vRide saved Princeton employees over \$40,000 in gas alone from July 2015 to June 2016.

Mass Transit

University employees can enroll in the HR pre-tax program that enables them to contribute money from their paycheck into a personal reimbursement account for commuting expenses. They pay no federal taxes on these contributions. Additionally, the University also provides a mass transit TDM reimbursement program providing a 50% reimbursement for all monthly transit passes. An employee can be enrolled in one of these programs, or can participate in both to receive the maximum financial benefit. These remain popular TDM programs.

Since July 1, 2011, commuting graduate students have been eligible to participate in the mass transit subsidy program, as an additional benefit program administered through TPS. This program offers the same 50% reimbursement on monthly transit passes for graduate students, as it does for faculty and staff, who commute to campus via public transit.

In addition to this program, graduate students are encouraged to participate in the NJ Transit 25% student monthly discount.

Biking and Zagster Bike Share

University community members continue to select biking as an alternative method to get to campus and travel around campus. In March 2016 Princeton University launched a bike share program that is operated by Zagster, a bike-share service based in Cambridge, MA. This bike share system was an addition to the successful bike rental program that had been launched in November 2014 at Princeton Station, also in partnership with Zagster.

In March, 2016 the University added 60 bikes at eight new bike station locations on main campus, and one on the Forrestal Campus in Plainsboro. The bikes provide convenient, healthy, and sustainable transportation options to students, faculty, staff and visitors.

Specifically, the program offers students the option to not bring a bike to campus when they move-in and provides a sustainable option to anyone looking for a way to reduce their carbon footprint.

Riders, must be at least 18 years old, can access the bikes by creating a Zagster account via the Zagster Mobile App, (available for iPhone and Android), or online at <http://www.zagster.com/princeton>. Riders will pay a \$20 membership fee that allows unlimited bike rentals for up to two free hours, with additional hours costing \$2 per hour.

Riders simply login to their account, enter the unique ID number of the bike they wish to use and the app provides an access code for the lock box mounted on the back of the bike. Riders can use the code throughout the duration of their ride, to lock and unlock the bike anywhere along their trip. Once the bike is returned to a Zagster location, the touch of a button ends the rental and releases the bike for the next rider.

All bikes come with spacious baskets perfect for books, briefcases, or goodies from the many merchants in Princeton. With an attached flexible lock, riders can park their bikes wherever they want, allowing the ultimate in convenience.

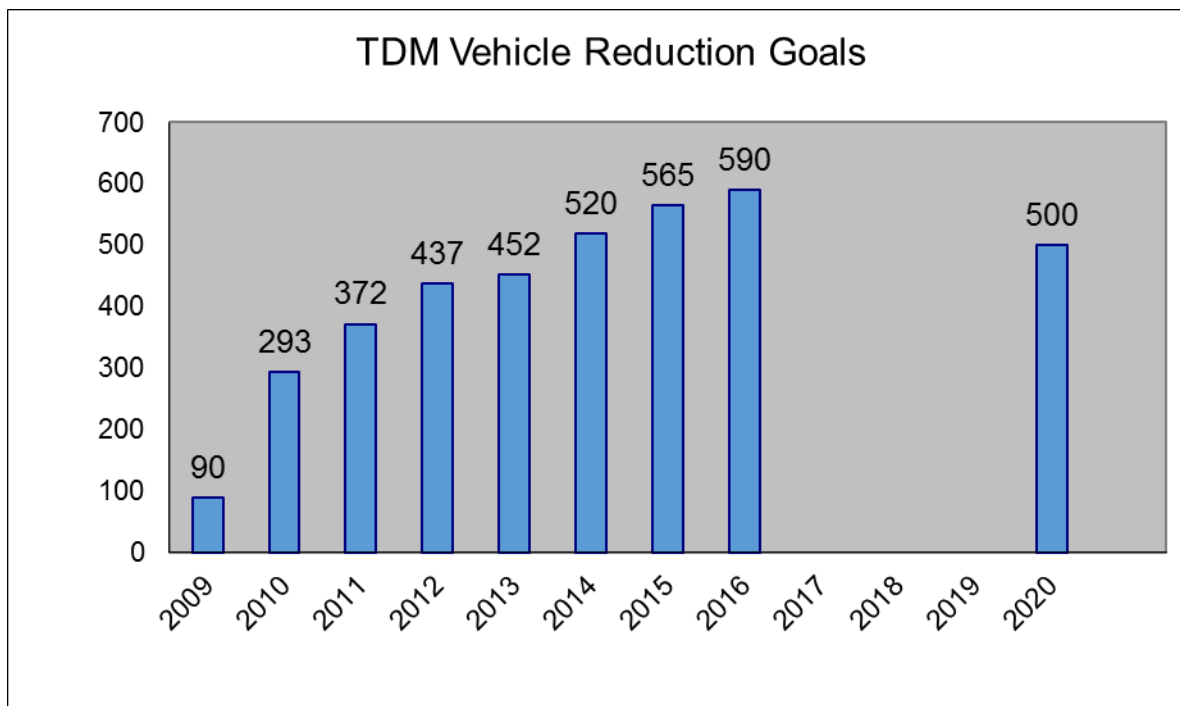
Bikes are now available in the following locations:

Firestone Library, Friend Center, Forbes Collage, Forrestal Campus, Frist Campus Center, Lakeside Apartments, Lawrence Apartments, Princeton Station, and by Richardson Auditorium for Rocky/Mathey student access.

Figures for TDM Program		6/30/2010	6/30/2011	6/30/2012	6/30/2013	6/30/2014	6/30/2015	6/30/2016
Carpools		Participants	Participants	Participants	Participants	Participants	Participants	Participants
	# of Individuals	57	140	126	149	142	143	174
	# of carpools	28	70	63	73	71	72	87
Mass Transit Prg.		Participants	Participants	Participants	Participants	Participants	Participants	Participants
	# of individuals	159	186	207	213	232	208	223
HR's Pre-Tax Reimbursement Prg.		Participants	Participants	Participants	Participants	Participants	Participants	Participants
	# of participants	117	117	155	154	150	158	
Graduate Student Mass Transit Prg.		Participants	Participants	Participants	Participants	Participants	Participants	Participants
	# of individuals			94	113	179	156	186
VanPools		Participants	Participants	Participants	Participants	Participants	Participants	Participants
	# of individuals	16	36	33	28	24	36	33
Cyclist		Participants	Participants	Participants	Participants	Participants	Participants	Participants
	# of Individuals	95	183	190	198	193	200	190

Source: Transportation & Parking Services, June 2016

Transportation Demand Management; 2016 Space Reduction Chart



2016 reduction goal of 420, and 2020 reduction goal of 500, is based on presentation to the Princeton Regional Planning Board in 2008

Car Sharing

Enterprise CarShare provides conveniently located sustainable vehicles on campus and are available 24 hours a day, seven days a week.

Car sharing at Princeton allows students, faculty and staff with a driver's license to rent a car for a short period of time. Car sharing provides convenient access to cars and helps to reduce congestion and traffic on campus while supporting the goals of the University's Sustainability Plan. There are 13 cars on campus with continued expansion based on demand.

What are the benefits of car sharing?

- Car sharing provides the convenience of a personal vehicle without the hassle of owning a car. An option for people who do not need a car on a daily basis.
- Addresses the need for a vehicle for University members who participate of in any of the TDM programs, such as the vanpool, carpool, and mass transit subsidy programs.
- Reduces demand for parking on campus and alleviates traffic and congestion.

Other TDM News

- For the eighth year in a row Princeton University received the New Jersey Smart Workplace Platinum Award for outstanding achievement in creating programs and promoting commuting options for its employees.

Parking Report 2015-2016 Academic Year

General Information

The Office of Transportation and Parking Services (TPS) is responsible for the management of the Princeton University parking and transportation operations, services, facilities, and programs. TPS is committed to providing reliable and safe service that enhances quality of life while promoting sustainability, accessibility, and mobility on campus for the Princeton University community. They are the campus advocate for accessing, identifying, evaluating, and recommending improvements for University parking and transportation, consistent with the Princeton University Campus Planning process, and in collaboration with other University constituencies and the surrounding community.

Similar to the format of prior reports, the 2015-2016 report incorporates all transportation programs, including the University's Transportation Demand Management (TDM) and campus shuttle systems.

Parking Management and Re-allocation of Parking Assignments

The annual vehicle registration process implemented in fall of 2008 continues to facilitate the monitoring of parking space utilization. An annual update of the database provides valuable and accurate information for TPS staff. Additionally, the system prevents employees from having multiple vehicles on campus at the same time, when only one member of the family is engaged in University business. The result of this system has been a reduced demand for parking spaces in previously overcrowded locations.

Methodology for Parking Report

Princeton University monitors its parking conditions systematically and uses a comprehensive methodology to monitor demand and supply. Based on current data, our traffic and parking consultants have advised that our parking demand per employee is less than the industry standard ratio of 0.8. There are multiple reasons that this ratio is less than 0.8. Not all eligible commuters apply for a parking permit as some commute by mass transit, bicycle, or walk, and not all who do have a permit drive every day. In addition, many faculty do not teach every day, and faculty and staff spend time off-site, travel, work part-time or on different shifts, are on sabbatical, vacation or are sick.

To monitor parking demand, the University tracks vacancies in all commuter and visitor lots on campus. To determine the campus parking demand for the 2015-2016 academic year, the University undertook parking occupancy counts during

the month of February 2016. This month was selected because this is typically the heaviest parking time on campus as the fewest number of commuters bike or walk to work due to the winter weather. To perform the occupancy survey, University staff count the vacant spaces and then subtract this vacancy number from the parking supply to determine the parking occupancy. Vacant parking spaces are counted twice a day (AM and PM) over several days. The lowest (AM or PM) vacancy number averaged over the counting days is used to establish the highest parking demand. Mondays and Fridays are excluded from this analysis since parking demands are generally lower and vacancy rates higher on those days.

It is important to note that the University does vacancy counts only in commuter and visitor lots that can have significant vacancies. These counts do not include vacancies that may exist in other smaller lots. The parking demand, and resulting parking ratio, is therefore slightly overestimated.

The denominator of the parking ratio, the independent variable to be used to project future parking demands, is the “commuting population on the main campus”. This includes all faculty and staff, full-time and part-time, and those graduate students who are not housed on campus. It excludes those employees that work and park at other locations off-campus (such as 22 Chambers Street, the Forrestal Campus, or at 701 Carnegie in West Windsor) and it excludes undergraduate students and graduate students who are housed on campus and have parking spaces assigned in special lots or at their residential complex (such as Lawrence Apartments). The University parking ratio is therefore calculated as the peak parking demand divided by the commuting population on the main campus.

2016 Commuting Population

Faculty and Staff Employees

Based on current data maintained by the Office of the Dean of the Faculty and the Office of Human Resources, the number of full-time and part-time, benefits-eligible faculty and staff employed by Princeton University (not including the Princeton Plasma Physics Laboratory) is listed below. Note that the 2016 data is taken from the spring semester which corresponds to the vacancy counts which were conducted in February, 2016. Typically, that month has the highest number of people commuting to campus and is therefore the baseline for this year's data.

	<u>Spring '16</u>
	<u>FT+PT*</u>
Faculty	1,031
Research & Technical Staff	<u>1,164</u>
Subtotal	<u>2,195</u>
Administration & Support Staff	<u>3,814</u>
Total	<u>6,009</u>

* FT = Full Time, PT = Part Time

To determine the actual parking requirements for the number of persons on the main campus in Princeton, several deductions are made from the total.

There are 621 persons included in the benefits-eligible employee count noted above that have parking assignments outside the Main Campus parking locations listed in this report:

169 Nassau St	4
179 Nassau St	2
194 Nassau St	29
199 Nassau St	16
201 Nassau St	10
22 Chambers St	60
693 Alexander St	92
701 Carnegie Center (West Windsor)	288
755 Alexander Rd (West Windsor)	8
Forrestal Campus (Plainsboro)	104
Lakeview Terrace	1
Lawrence Apartments	3
Lowrie House	1
Washington, DC	<u>3</u>
	621

$$\begin{array}{r}
 6,009 \\
 - \quad 621 \\
 \hline
 5,388 \text{ Faculty / Staff on Main Campus}
 \end{array}$$

Graduate Students

All graduate students who live in University housing are now expected to walk, use a bicycle, or take a shuttle to campus. They are only assigned permits at their residence.

$$\begin{array}{r}
 2,299 \text{ Graduate Students} \\
 - \quad 1,609 \text{ Graduates Housed On Campus} \\
 \hline
 690 \text{ Commuting Graduate Students}
 \end{array}$$

Commuting Population

$$\begin{array}{r}
 5,388 \text{ Faculty and Staff} \\
 + \quad 690 \text{ Commuting Graduates} \\
 \hline
 6,078 \text{ Commuting Population}
 \end{array}$$

Main Campus Parking Demand

As of Spring 2016, commuting faculty, staff, graduate students, as well as visitors, were accommodated in lots with a total of 4,190 spaces, per the attached spreadsheet.

Vacancies were averaged at 445.

$$\begin{array}{r}
 4,190 \text{ Spaces Provided} \\
 - \quad 445 \text{ Vacancies} \\
 \hline
 3,745 \text{ Peak Parking Demand}
 \end{array}$$

Parking Ratio

$$3,745 \text{ Demand} / 6,078 \text{ Commuting Population} = .62 \text{ Spaces / Person}$$

Conclusion

The University continues to carefully manage its parking supply. The consistency of the parking ratio to prior years demonstrates the continued impact of the TDM initiatives.

This past year, improvements were made to the West Garage to facilitate bicycle storage. Undergraduate parking was also reassigned and consolidated with other residential parking lots. The addition of the bicycle amenities in the garage continues to strengthen the biking culture on campus. These types of facilities, along with the Zagster bike share program help to encourage bike riding. Additionally, lot controls were installed and activated at the North Garage in spring 2016.

It is important to note that the data contained within this report is based on winter conditions when there is a higher percent of commuters driving, and therefore the parking ratio would be higher than in the fall semester. The University feels that the 0.62 ratio is an accurate, but also conservative, reflection of the peak parking demand on campus. By continuing to manage the surplus, parking assignments and visitor demands, the University will continue to balance the parking demand with the available supply.