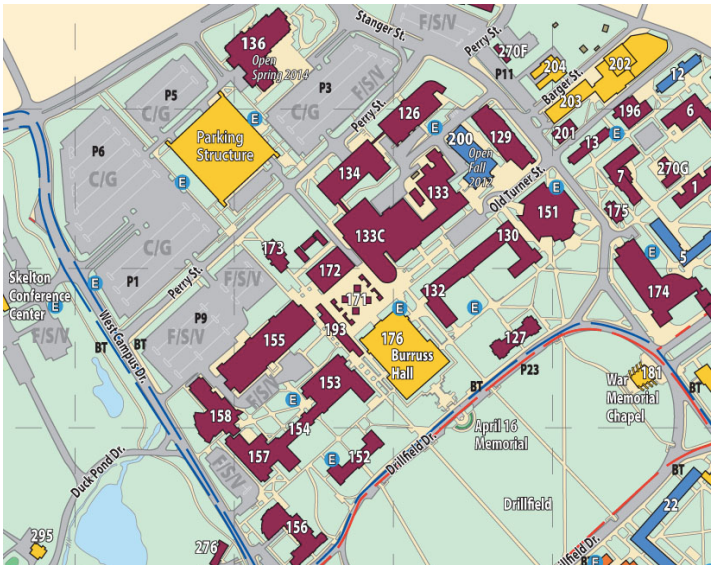
Hokie Parking: A Recommendation for the Sustainability of Virginia Tech's Parking System



An investigation into easing the impact of future parking developments and making parking easier on campus

Written by:
Tara Helms
Patrick Gatewood
Varun Kumar
Gabrielle Wilber

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Executive Summary

Change is coming. The next few years will mark the biggest expansion to parking and transportation at Virginia Tech in history. Parking lots are torn up almost every year to build new academic buildings, and the current Blacksburg Transit system will soon disappear in favor of a new Multi-Modal Transit Facility.

This facility will greatly reduce stress on Hokie parkers, drivers, and BT riders once complete. However, Hokie parking patterns must adapt during during construction. The current plans call for removing the Derring parking lot and offer no parking alternative. This will push parkers into other lots and cause chaos among drivers all across campus.

As Virginia Tech expands, the university needs plans to reduce the impact of expansion on the current student body. It is not ethical to disrupt the campus environment for the entirety of some students' educational careers in order to improve the lives of future students. This paper offers various solutions to reduce the Multi-Modal Transit Facility's impact on the current Virginia Tech parking system and improve the overall Blacksburg parking experience.

Our recommendation includes the implementation of a tiered parking system. This system will reduce stress on popular lots, save Hokies time, and generally improve the parking experience at Tech.

Introduction

Virginia Tech's future is expected to bring a bigger and more diverse student body, a change that could be a challenge to campus life. In a 2015 interview with the *Roanoke Times*, President Timothy Sands states, "He [Sands] and his team are looking at ways to continue increasing enrollment." Already with an undergraduate student body of 24,000, he's working towards a total increase of up to 5,000 students over the next six to eight years (Moxley, 2015).

With the student body expanding and no plans to reduce the amount projected to attend, Virginia Tech students are becoming concerned with the issue of campus parking. According to a survey of 178 Virginia Tech Students, problems with parking are causing students to be late for their classes and at times discouraging them from attending classes. To improve upon parking on campus, we conducted research through a survey with Virginia Tech commuters and interviewed Jeri. A Baker, the director of parking services. We focused on both sides of the situation and determined short term and long term resolutions that would improve the parking experience at Virginia Tech.

Our proposed changes are small and easy-to-implement. Because the majority of Virginia Tech and the BT's focus will be on the Multi-Modal Transit Facility, they may not be able to muster a large team to go about revamping the current Virginia Tech parking systems. With this in mind, our suggestions will only require a small team, a small budget, and a small time cost.

Primary Research

Survey

The primary form of research that the group conducted was a seven question survey that was aimed at anyone who parks on campus. The questions focused on how long the person on average would spend looking for parking, taking note of which parking lots they generally parked in and at what time they are commuting to campus.While the main focus of the survey is on how long it takes commuters to find parking, the survey also asked questions pertaining to how long commuters park for, how far away are the parking lots from their classes, and how many Faculty and Staff spots they see open on average.

The survey recorded 178 responses, with responses coming from everyday commuters, casual parkers who do not own a commuter pass, and faculty. A full set of the results from the survey will be shown in the Appendix and should be referenced for exact numerical results. For a list of questions and raw numbers, please reference that resource.

The first question quantifies the group answering the survey, showing that nearly 41% of the responses are coming from commuters who park on campus nearly every day, with an additional 39% coming from commuters who park two to three times a week. This shows that nearly 80% of the results from the survey come from commuters who experience these issues on a nearly daily basis and their answers have credibility in their answers as result.

The second question focuses on the main idea of the survey: how long does it take the commuter to find parking? Results for this question were varied, largely due to the wide diversity of participants. This can be seen best in the results to question three, where we find that the three main times commuters are parking are 7:00-10:00 am, 10:00-1:00 and after 5:00 pm. These three different times will obviously have big differences in demand for parking spots, with 10:00-1:00 being peak hours, and 7:00-10:00 am being the likely low of the three. 1:00-5:00 is an interesting time period, as it is the time block directly after rush, so commuters at this time should theoretically have the most difficulty in finding a parking spot.

This is especially true when considering question five of the survey, where we ask how long do commuters generally leave their car parked. 63% of the responses mention leaving their car parked for one to three hours, while another 23% leave their car parked for the entire day. Since parking is so hard, why would anyone give up a space once they worked so hard for it? In an article about the cost of parking, Donald Shoup writes, “Once drivers secure a space, they have no incentive to give it up in a timely fashion.” (Shoup 2005). Based off of this, it is important to consider if one is parking during or after the rush, as this can definitely account for the variance in answers to question two while also contributing to larger parking search times in general.

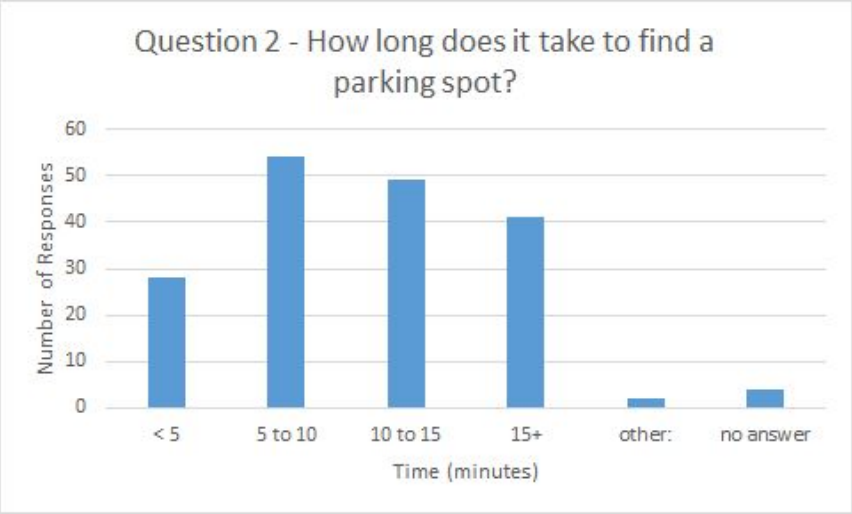


Figure 1: Results of question 2 from the survey

Looking at the results from question 2 nearly 81% of the participants, spend a considerable amount of time looking for parking. If one compares raw percentages, nearly 51% of participants spend either ten to fifteen minutes or greater than fifteen minutes looking for parking. This is interesting, when compared to the fact that nearly 54% of participants attempt to park between 10:00-1:00 and 1:00-5:00pm. Similarly, 46% of participants manage to find parking spaces in less than five minutes or between five and ten minutes. This correlates almost directly to the 42% of participants who park from 7:00-10:00 am and after 5:00 pm, which are theoretically the times when parking lots should be most empty as there are less classes centered around these times. In many ways, these results provide credibility to the survey, as the data is matching the trends hypothesized by the group.

It is also important to consider what parking lots commuters are using. As will be discussed later, the director of Parking Services mentions that there are more than one thousand empty parking spots everyday on campus, it is just a matter of these lots being very far from classroom buildings. Commuters are mainly parking in the Perry Street parking lots and the main parking garage near Goodwin, as seen in Figure 1.

This data can directly be compared to the results of question six from the survey. Given how classes are distributed across campus, this data is not the most indicative of the ideal location of lots, but it is still a good way to see the proximity of lots to campus. Based off of the survey, nearly 82% of participants find that it takes equal to or less than ten minutes to walk to class from where they parked their car. The group considers this an ideal walking time, as it is shorter than the time it would take to walk across campus. Only 12% of the responses record taking more than 10 minutes to walk to class from their parking spot, which also seems reasonable and suggests that no change needs to be made for this system. However, it is interesting to consider the location of these more than one thousand open parking spots and to see how far they are from campus.

The final question the group considered was the distribution of faculty and staff parking spots to commuter spots. Nearly 54% of participants state that they see on average five to twenty Faculty and Staff spots open on a daily basis while parking. An additional 33% of participants mention that they see more than twenty open Faculty and Staff spots. However, as mentioned below in the interview with Jeri Barker, the Parking Services Administration is not considering an immediate redistribution of Faculty and Staff spots as there are over one thousand open commuter spots free on a daily basis.

Virginia Tech has been very open to commuter responses over the past years, meaning that they are aware of the general consensus on the issue of parking. In the past the school has had many open forum town hall discussions on the issue, but publicity of these events are low, leading to the majority of students having the impression that Virginia Tech is not making an active effort to improve their system.

Interview With Jeri A. Baker - Director of Parking and Transportation

One researcher had the opportunity to interview Jeri A. Baker, the Director of Parking and Transportation here at Virginia Tech. While she has only been the Director here since early December, Ms. Baker has been working with Parking and Transportation for more than 10 years at various colleges around the country. She has already shown great enthusiasm and involvement in her position and plans to reshape the negative outlook that many have for Parking Services.

Those who utilize the current parking lots and garages here on campus often blame Parking Services when they are reprimanded for their misuse of permits, parking spots and other disregard for current policies. Even though she has only been here for almost a semester, Ms. Baker is very aware of the unfavorable opinion most have towards their department. However, few students are aware that Parking and Transportation at Virginia Tech is a self-funded entity entirely separate from the university. This means that they do not receive any backing from the university; for example, it costs about $6,400 per inch to fund the removal of snow in university lots.

With its main income source coming from permit sales, parking tickets, etc., Parking Services is often misunderstood. Ms. Baker shared that tickets are not administered to create revenue, but more so to educate those who utilize the parking spots here on campus. Those who work for Parking Services take their jobs very seriously, but we are reminded that they are still human and subject to mistakes or errors. Ms. Baker stated that many people who receive tickets realize that they are in the wrong, yet still blame Parking Services once they are caught.

When our researcher asked if their was any rule that she felt was unfair, the matter of visitor parking on campus was discussed. We learned that visitors to our campus, which are monitored by the university and not Parking Services, are allowed to acquire a permit for no cost. Visitors are granted access to park in any spot on campus, filling up parking spots that we pay for as commuters, faculty members, staff and so on. Although this is not seen as one of the major issues here at Virginia Tech, it does contribute to what appears as a lack of available spots on campus. However, it was noted that there are about 1,500 open commuter spots left unused throughout the school day.

It is human nature to circle a closer lot trying to find a place to park, rather than parking further away where you a guaranteed a spot, and walking to your desired destination. When asked about the possibility of the redistribution of spot assignments, Ms. Baker informed our researcher that due to positive supply, this was not a current concern. As noted in our survey responses (insert reference), many declared that the number of observed open F/S spots seen by C/G permit holders is significant. While this is the case, that is usually just seen in the most popular and convenient lots. Another alternative to this issue could be to implement more technology in parking lots, such as sensors that would notify parkers of which lots have empty parking spots, however this is a costly implementation cost and is a lower priority due to the aforementioned positive supply of parking spots.

At the conclusion of the interview, Ms. Baker was asked about any further changes she hopes to bring to the parking situation at Virginia Tech. The possibility of a tiered parking system being implemented could reduce competition and traffic flow for the more in demand lots and increase use of the lots further from campus, such as the Duck Pond Lot. This system would create a set scale for permit prices, where lots that are more in demand, such as the Perry Street Garage, would have the highest cost for a permit, while also only allowing them parking accessibility to that specific lot. Parking lots that are further from the academic and even resident sides of the campus, such as the Cage, would cost significantly less, but still guarantee you a spot.

Secondary Research

In order to determine whether our recommendation would be useful, more research was required. After surveying students and interviewing faculty, we began our secondary research. This included research on the new Multi-Modal Transit Facility and gathering sources from peer-reviewed articles about parking in general.

Multi-Modal Transit Facility

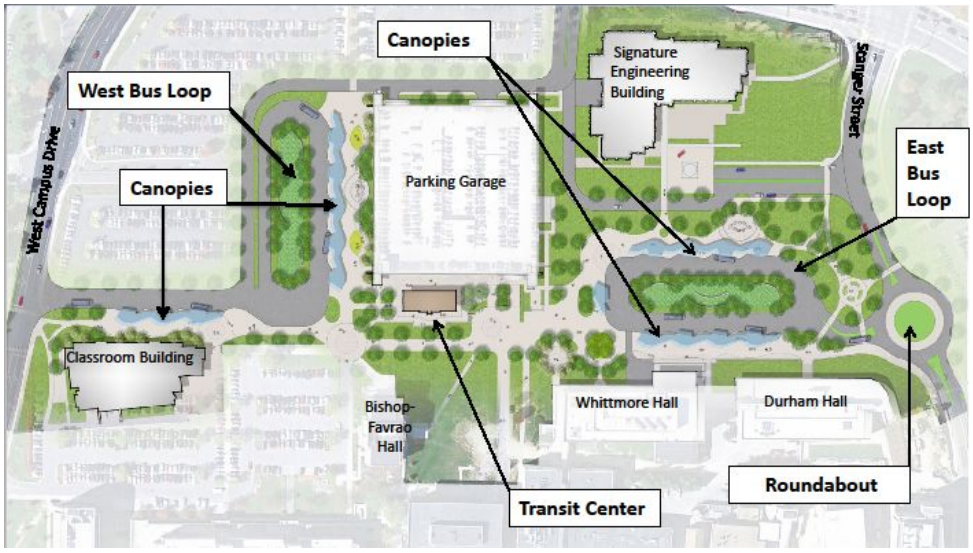


Figure 2 : **Proposed Multi-Modal Transit Facility to become the transit hub for campus**

According to Virginia Tech news article, in about 18 months, the north end of campus will become the main hub for all modes of transportation around the Virginia Tech campus and the Blacksburg community. The two-story Transit Center will become the core for all aspects of transportation, as well as provide a warm, dry place for students to wait for their desired ride, include meeting spaces and conference rooms, restrooms and other facilities to accommodate bike hub users. This multi-purpose, 12,000-square-foot building will be located in front of the Perry Street Garage where there currently is a small F/S assigned lot. There will no longer be a direct route to get from West Campus Dr. to Stranger St., as that will become a main region for pedestrian traffic to and from the Transit Facility. However, these changes will not restrict the passage for service and emergency vehicles. One of the main reasons this Transit Facility is being implemented is to reduce the traffic flow around the Drillfield and replace the current major bus hub in front of Burruss Hall. As seen in Figure 2, the new system will include 17 different bus hubs that are equipped with weather friendly canopies, as well as other environmentally savvy components. It is expected to reduce bus stop head times, cut down on bus overcrowding, and establish a set schedule and assigned hub for each bus that enters the facility.

These changes will better accommodate pedestrian and bus traffic, even if putting a temporary tension on campus parking. While this plan may not be accepted or well-liked at first due to the fact that the fight for parking is already a current irritant, it is said to be the optimum solution. After meeting with Jeri A. Baker, Director of Parking and Transportation, we found that there would not be any redistribution of assigned parking spots.

While the Blacksburg and Virginia Tech population is constantly growing, the campus must adapt to maintain efficient and adequate transit for it's residents and visitors. The multimodal solution will reduce the demand of parking, increase the student's housing and employment, help the university recruit and retain students, reduce the cost of attending college, but also increase transportation equity (Balsas, 2003).The Multi-Modal Transit Facility will be one of the first major changes the Virginia Tech campus will see to accommodate the overcrowding and expansion issue; however, it will not be the last.

Recommendations

Tiered parking

As Jeri. A Baker stated in the interview, there are over one thousand parking spaces that are not being used daily. This implies that there is not an issue with how many parking spaces are available, but with where commuters are deciding to park. Commuters are searching for parking where it is most convenient and the shortest walking distance to academic buildings, causing majority of them 10-15 minutes to find a parking space.

We recommend tiered parking, a system in which users pay more for more desired parking spots, to help redistribute the balance of parking at Virginia Tech. Tiered parking will change the cost to park depending on which lot you park at, and will reduce the time it takes to find a parking space. Commuters will be given a specific area to park, with limited or no oversell. The cost to park will be determined by

preference on how close or far the commuter decides to park. Commuters who park a shorter distance from the academic buildings would be charged more than the ones who park further away. The ones who park further away will be accommodated for the long distance with shuttle service or an improved BT service.

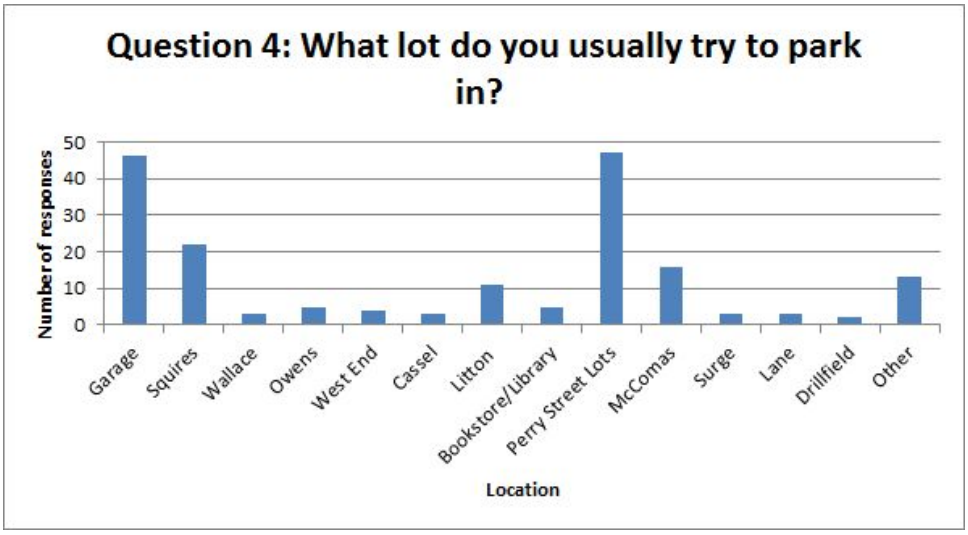


Figure 3: Results from Question 4. There were either one or multiple answers for this question. All answers were included in the figure.

Based on Figure 3, most of the distribution is centered around Perry Street and the parking garage as well as Squires. These areas are where commuters are taking the longest to find a parking spot. Looking at the campus parking map (Appendix B), Perry street, the parking garage, and Squires all are located the closest to the academic buildings. Parking lots such as Litton Reaves and around the Duck Pond are rarely used or even not at all. If parking were to be redistributed through tiered parking, lots such as Litton Reaves and around the Duck Pond would be cheaper than Perry street, the parking garage, and Squires.

Hokie drivers already follow a parking pattern, as noted in the survey results. Each response to Question 4 provided either one or two lots, suggesting that parkers have primary and backup lot in mind when searching for parking. Keeping this in mind, adding tiered parking will not change parking patterns, as parkers will only be allowed to park in their assigned lots. This means that the addition of tiered lots will not greatly impact the method drivers search for spots, but it will reduce the time it takes. Reducing the time spent circling the most desired lots will allow parkers to make better use of their time and may decrease the amount of time their cars occupy spots that other may be seeking.

Applying tiered parking will redistribute parking and will have the less frequent lots to be occupied. This in return would decrease the amount of time it takes to find a parking spot and will also reduce the amount of tardiness to classes. Arnott's analysis of tier parking describes the same effects it can have for commuters. The location-dependant parking fee by itself only partially eliminates queueing, but does induce commuters to park at the most remote spots first (Arnott, 1991). While assigning parking permits

for specific lots won't provide a full guarantee for a parking space, it will be a short term solution until the Multi-Modal Transit Facility can be implemented.

Appendix A: *VT Parking Services Survey Results*

Parking Services

Question 1: How often do you park on campus?

Daily	**73**	**(41%)**	
2-3 times a week	**70**	**(39%)**	
Once a week	**21**	**(12%)**	
Never	**8**	**(4%)**	
other:	**3**	**(2%)**	
no answer	**3**	**(2%)**	

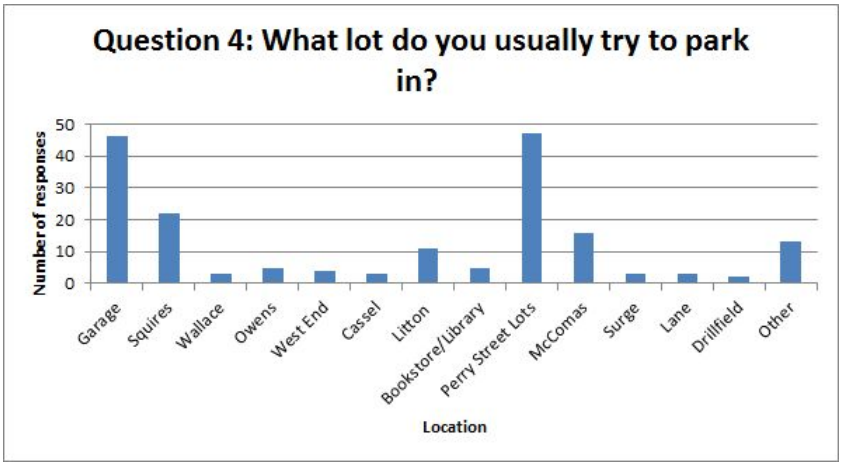
Question 2: How long does it usually take for you to find a parking spot?

< 5 minutes	**28**	**(16%)**	
5 - 10 minutes	**54**	**(30%)**	
10 - 15 minutes	**49**	**(28%)**	
15+ minutes	**41**	**(23%)**	
other:	**2**	**(1%)**	
no answer	**4**	**(2%)**	

Question 3: What time do you usually need to park?

7:00 - 10:00	**32**	**(18%)**	
10:00 - 1:00	**73**	**(41%)**	
1:00 - 5:00	**23**	**(13%)**	
After 5	**43**	**(24%)**	
other:	**3**	**(2%)**	
no answer	**4**	**(2%)**	

Question 4: What lot do you usually try to park in? If you don't know the name, give the closest academic building.



Question 5: How long do you usually leave your car parked?

< 1 hour	**18**	**(10%)**	
1-3 hours	**112**	**(63%)**	
All day	**41**	**(23%)**	
Multiple days	**2**	**(1%)**	
no answer	**5**	**(3%)**	

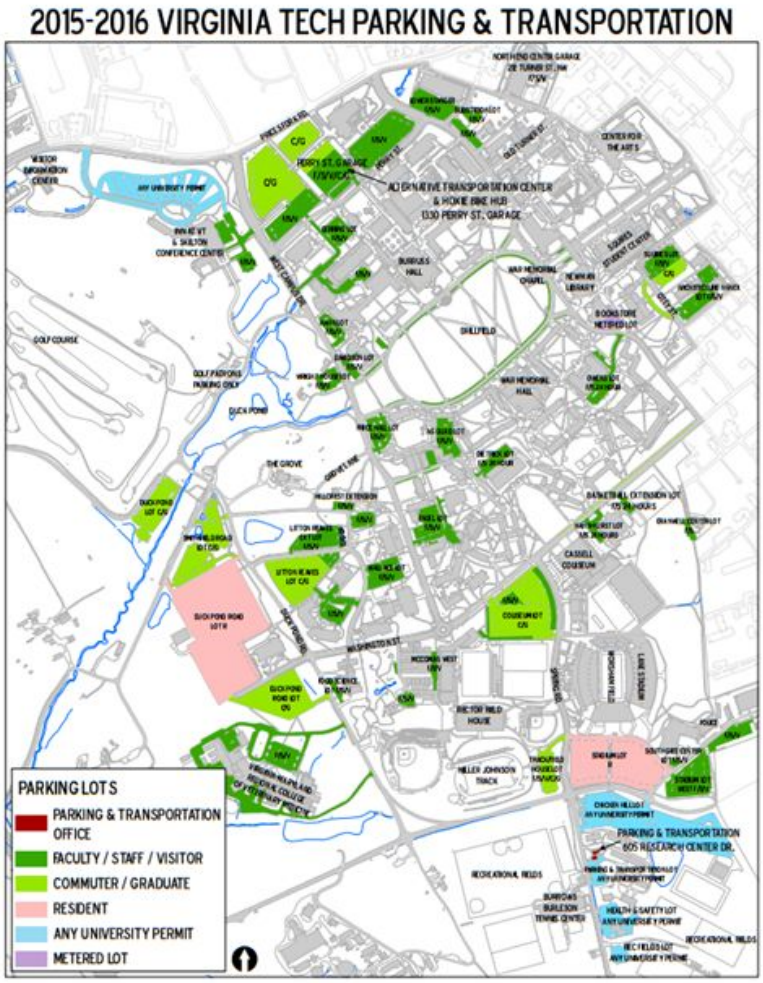
Question 6: How long does it usually take you to walk from your car to your destination?

< 5 minutes	**31**	**(17%)**	
5 minutes	**57**	**(32%)**	
10 minutes	**59**	**(33%)**	
10+ minutes	**22**	**(12%)**	
other:	**4**	**(2%)**	
no answer	**5**	**(3%)**	

Question 7: How many open restricted spots (F/S, Service, etc.) do you usually pass while looking for a spot?

< 5	**12**	**(7%)**	
5-10	**39**	**(22%)**	
10-20	**57**	**(32%)**	
20+	**58**	**(33%)**	
other:	**9**	**(5%)**	
No answer	**3**	**(2%)**	

Appendix B: *2015-2016 Virginia Tech Parking & Transportation Map*



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