

## Walkability

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### Abstract

*Millersville University is amid a planning phase for campus improvements and renovations which posed an opportunity to voice concerns about campus safety regarding the walkability of a busy section of campus. One of the areas of highest foot traffic at Millersville University is from the Southern residential core of campus, where residential and dining halls are located, to the Northern academic core, which contains most of the academic buildings. Roads outline the path of travel that the University intends students to take to walk between these cores. The shortest possible pathway—the grassy area and parking lot between the South and North end—was not designed for pedestrian travel. The University has designated crossing paths circumventing this section that were installed under the assumption that those are the pathways students will typically use. Student travel patterns were recorded to determine if this assumption was correct. By counting the number of students traveling through these areas at different dates and times, the study serves to track the volume of student foot traffic to verify if the walkability of the center of campus between the South and North end is suitable for the use it receives.*

### Introduction and Methodology

A campus-wide facilities master plan is currently in production to renovate the campus over the next 25 years. One of the goals of the master plan is to enhance campus walkability by “modifying vehicle and pedestrian circulation to improve campus safety, improving accessibility routes throughout campus, and deconflicting vehicle and pedestrian crossings.” A mockup of possible enhancements has potential to be finalized by Millersville University, shown in Figure 3 (Campus Facilities Master Plan, 2019). These upcoming changes provided an opportunity for the Millersville Student

Section of the American Society of Safety Professionals to voice concerns and recommendations to administration regarding proposed changes. The area of focus, highlighted in red in Figure 1 and viewed in detail in Figure 2, was chosen because it has a high volume of student traffic both by foot and by vehicle. Researchers counted the number of students who were crossing through the parking lot rather than traveling around or who were crossing the street outside of a marked crosswalk.

### Results

A total of 51 observations, detailed in Table 1, were collected over a five-week

period from October 21st, 2019, through November 25th, 2019. The total number of students observed during this time was 9863. An analysis of variance in Table 3 shows that the data for Time 3 and Location 3 are not statistically significant.

### **Discussion & Recommendations**

According to Millersville University enrollment data, fall 2019 had a total of 7817 students enrolled (2019-2020 Fall Enrollment Summary). Over the five-week study, the equivalent of 126% of the student body population was recorded walking in one of these three unsafe areas.

Some of the concerns include restriction of traffic flow to a single road, Frederick Street, which poses an issue not only to pedestrians crossing it, but also to the commuting campus body. In Spring 2019 there were 2726 registered commuters, and to restrict them to a single path will cause additional traffic and pedestrian conflict (Bourne, 2019).

A conceptual new parking lot on the left side of the mockup in Figure 3 does not eliminate the issue of poor walkability, but instead moves the problem from the middle to the left side. While the walking paths

through the center of the grassy area are an improvement, there will consistently be a pedestrian hazard while a parking lot remains in the path of least resistance from the South residential core to the North academic core.

The key recommendation is to engineer out the issue by closing the McComsey parking lot and avoiding the construction of parking lots in the central area of campus. Temporary accommodations could include the addition of signage and crosswalks in the parking lot. Millersville University and other college campuses should take considerations for walkability, particularly for student walking patterns outside of expected areas, when implementing new campus layouts to improve the safety for both vehicles and pedestrians.

### **Acknowledgements**

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Photos



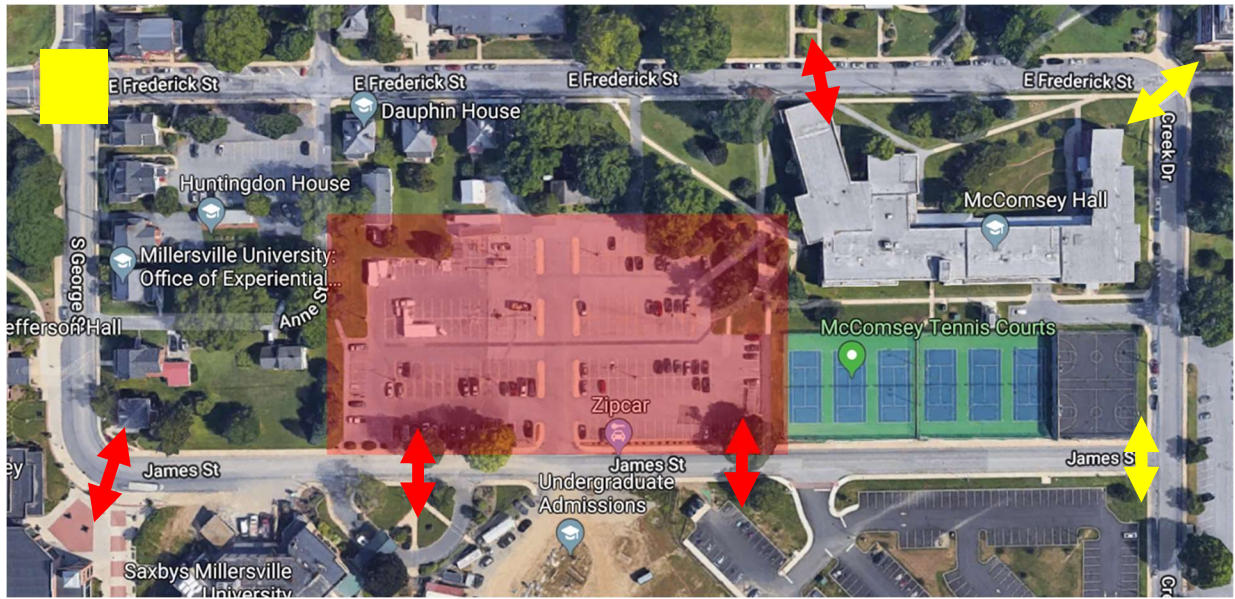
**Figure 1.** Campus layout. Residential facilities are in blue, and the observational area is in red.

**Number of Observations by Location and Time**

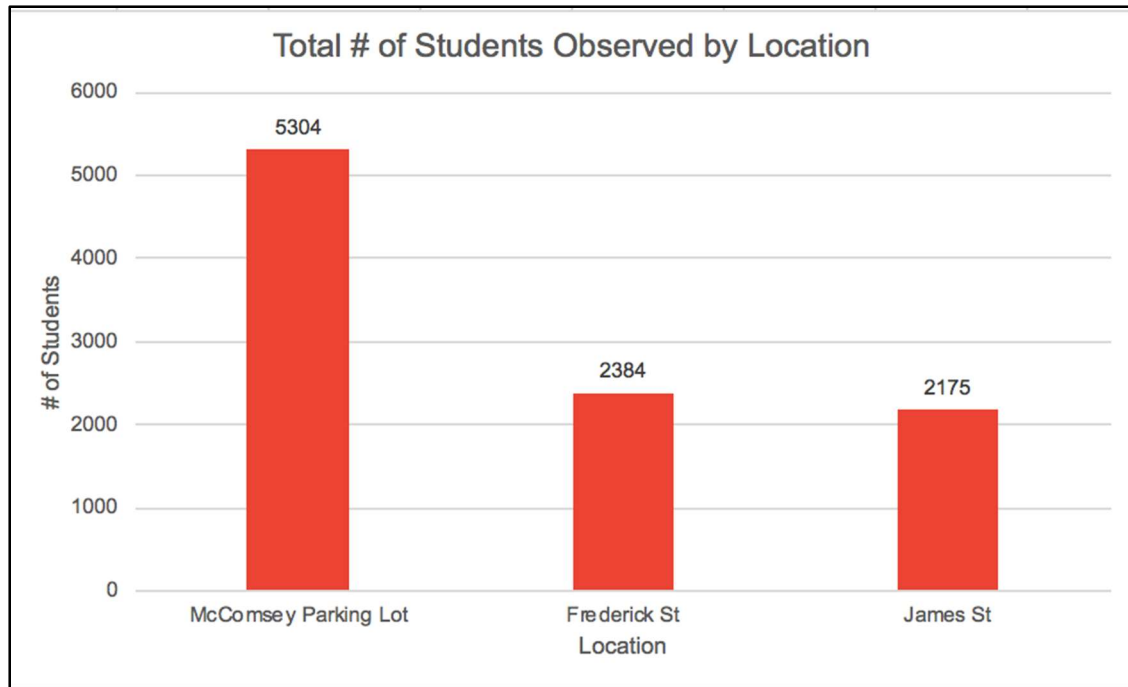
		Location			
		1	2	3	Total
Time	1	6	6	5	17
	2	6	5	5	16
	3	5	6	7	18
	Total	17	17	17	51

Location 1 - McComsey Parking Lot      Time 1 - 8:30am-9:30am  
 Location 2 - Frederick Street              Time 2 - 12pm-1pm  
 Location 3 - James Street                  Time 3 - 3pm-4pm

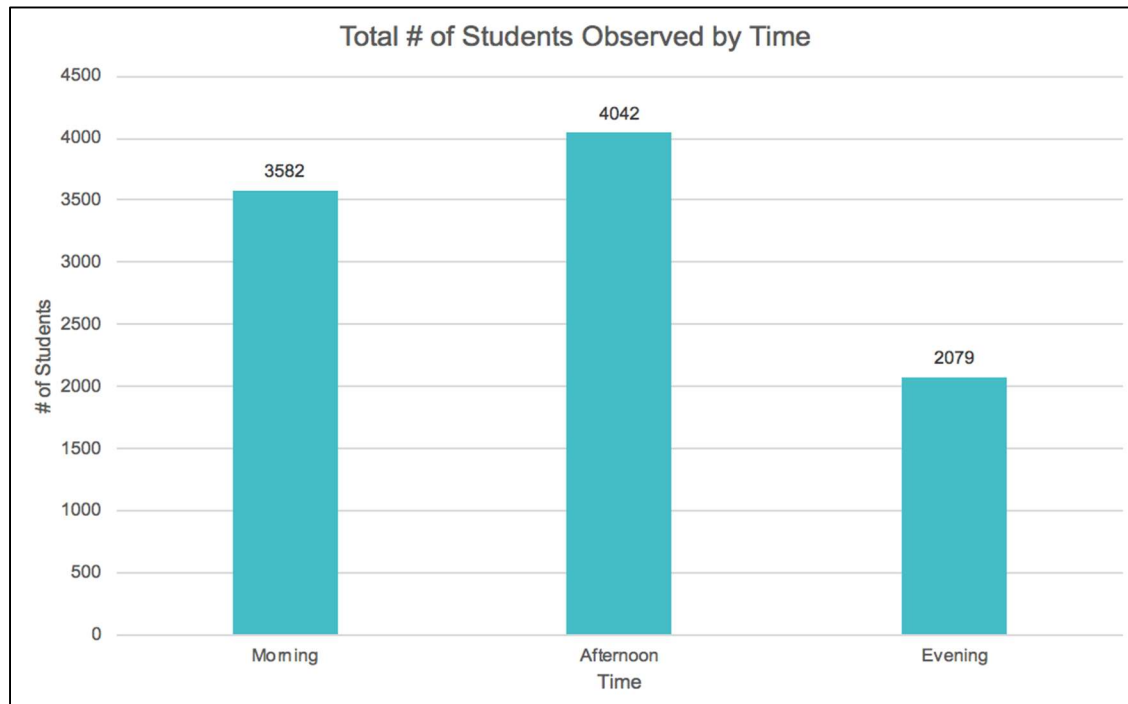
**Table 1.** Number of observations by location and time.



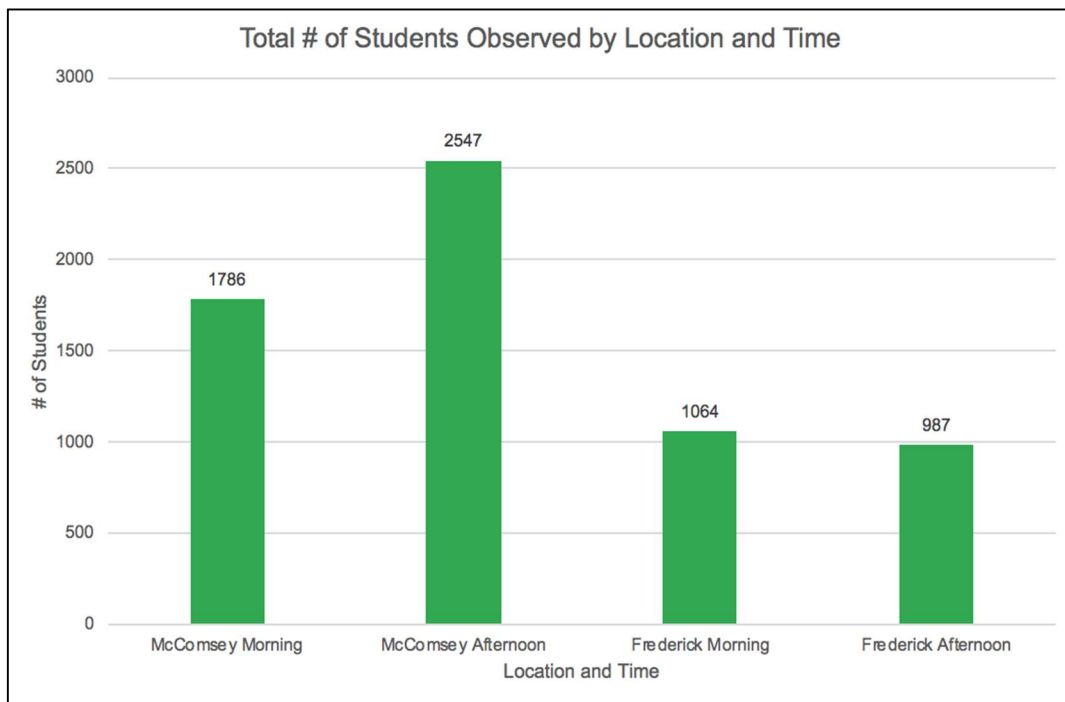
**Figure 2.** Campus crosswalks. Red arrows were included in the study, yellow arrows were outside the scope. The red box is McComsey Parking lot.



**Chart 1.** Total number of students observed by location.



**Chart 2.** Total number of students observed by time.



**Chart 3.** Total number of students observed by location and time.

McComsey Parking		Frederick Street	
n	12	n	11
Sum	4333	Sum	2051
Mean	361	Mean	186
Median	310	Median	189
Range High	712	Range High	207
Range Low	251	Range Low	148

Table 2. Measures of center.

### Factor Information

Factor	Type	Levels	Values
LOCATION	Fixed	3	1, 2, 3
TIME	Fixed	3	1, 2, 3

### Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
LOCATION	2	322317	161158	18.58	0.000
TIME	2	109241	54620	6.30	0.004
Error	46	398921	8672		
Lack-of-Fit	4	110385	27596	4.02	0.008
Pure Error	42	288536	6870		
Total	50	868176			

### Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	195.6	13.1	14.98	0.000	
LOCATION					
1	112.8	18.5	6.09	0.000	1.34
2	-52.4	18.5	-2.84	0.007	1.33
TIME					
1	11.6	18.5	0.63	0.534	1.38
2	50.0	18.8	2.66	0.011	1.38

Table 3. Analysis of variance.

LOCATION	TIME	# OF STUDENTS
McComsey	1	251
McComsey	2	263
McComsey	1	275
McComsey	2	300
McComsey	1	322
McComsey	2	350
McComsey	2	238
McComsey	1	298
McComsey	1	319
McComsey	1	321
McComsey	2	684
McComsey	2	712
W. Fredrick St.	1	148
W. Fredrick St.	1	183
W. Fredrick St.	1	201
W. Fredrick St.	2	202
W. Fredrick St.	1	159
W. Fredrick St.	1	175
W. Fredrick St.	2	176
W. Fredrick St.	2	189
W. Fredrick St.	1	198
W. Fredrick St.	2	213
W. Fredrick St.	2	207

Table 4. Observational data.



Figure 3. Master plan mockup.

## References

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