

Final report on strategies to make pedestrian and bicycling improvements in the Village of Potsdam, including facility modifications and positive town-gown relations

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I. Overview

In the first week of September, Fred Hanss, Will Siegfried and Erik Backus held a meeting with Greg Lang to discuss the Village's Comprehensive Plan of 2012-2022. As a student enrolled in an independent study at Clarkson University, I learned more about the needs of the village and how I could take a task to analyze for the semester. This document is the official report detailing research, survey results, and modeling, along with some comments about key areas of focus for the village to improve pedestrian and bicycle traffic to the core of the village, with an emphasis on university students.

II. Background

Village Comprehensive Plan

The Comprehensive Plan details the topic of this report:

T-15: The Village Board of Trustees should pursue efforts to reduce vehicular traffic and to promote pedestrian and bicycle oriented environment to make shopping in the Village more attractive and bring customers to Village businesses, including but not limited to:

- a. Pedestrian and bicycle routes from the two university campuses should be the focus of attention.
- b. Bicycle use should be encouraged by: the placement of bicycle racks throughout the Village; the designation of bicycle routes; the preparation of a bicycle route map; sponsoring "Bike to Work Days"; the creation of a bicycle system plan.

Project Structure

The project was split into three main methods to gather and analyze data:

1. Surveys
Surveys are administered to students at both SUNY Potsdam and Clarkson University to gain an understanding of the behavior of these students in regards to traveling around the village. The questions were designed to gather information on not only pedestrian and bike traffic, but also of vehicular traffic. By collecting this data, key information is imported into geographic information systems (GIS), as outlined below, to develop models on the effects of recommended modifications.
2. Geographic Information System (GIS) modeling
Software is used to map the village. Layers include roads and their average daily traffic count, location of bicycle racks, popular destinations, and areas for improvement. Data from the student surveys is used to gain deeper insight into how university students interact with the village, and which modes of transportation they employ in doing so. Feedback is also received regarding changes that students would like to see.
3. Case Studies

Literature and case studies are mentioned for the sake of pointing to municipalities which have faced similar scenarios. Articles have been helpful in discussing the issues these places have encountered as they've made changes to city layout, traffic flow, etc. Of course, it should be noted that the Village of Potsdam is unique in many ways, particularly with the great influx of college students during the fall and spring months.

Additional Goals

After meeting officially with the Planning Board, it became evident that some key issues would need to be addressed. Two main themes emanated the conversation:

1. Road and sidewalk conditions due to Potsdam weather
Emphasis was placed on the point that Potsdam receives strong winter weather. This issue is apparent along Pierrepont Avenue, where heavy snow falls cause high velocity plows to throw snow along the sidewalks and onto property. This is obviously problematic for pedestrian and bike traffic along this roadway. The report provides some references to snow management resources.
2. Students don't leave campus
A new paradigm of college living is causing universities to provide an ever-increasing list of amenities to students, ranging from dining services to mail, fitness, food shopping, and entertainment. As such, the necessity to travel to the village for goods or services has decreased, causing local businesses to lose out on customers. Even though the population of the area more than doubles with the income of thousands of college students, the village still faces trouble with student engagement. The report dedicates a section to this, albeit this area may be less objective.

III. Survey Results

I. Motive & Background

One key component of the project is to collect data from students regarding travel behaviors, their perceptions of traveling to the village, and other information that would help to make recommendations to the village. As such, surveys were distributed via campus-wide emails to both SUNY Potsdam and Clarkson students. Using Google Forms as the surveying tool, data was both summarized and imported into ArcGIS to create various models.

II. Student Engagement

As expressed by the Planning Board, one issue that is of concern to the village is that of students not getting out of campus enough. This could be due to a combination of factors

including the increased level of service provided by universities to their students, lack of ability to travel to the village center (or even inconvenience), and limited knowledge of what shops exist, among others.

The results of this survey will help to pinpoint concerns and opinions held by students, and potential solutions.

III. Methodology

IRB Approval In order to distribute surveys to students, approval had to be obtained from the respective institutional review boards of both universities. While this process did take some time to complete, exemption status was granted (as opposed to a full-review), allowing for an expedited process.

Campus-wide Emails To alert students to the survey, permission was obtained for either university to send mass emails to students. At Clarkson University, over 3,000 students were reached. SUNY Potsdam has stricter rules, and thus only allowed for a sample of 400 students to receive the email. This asymmetry of course has repercussions on the data obtained and is noted where appropriate.

Due to poor SUNY Potsdam 'turnout', I requested the email notification be sent again. This was done and a few more students responded to the survey.

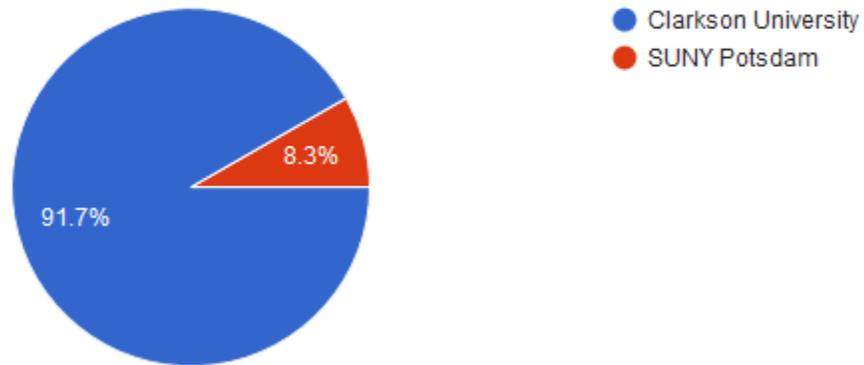
Survey Tool Google Forms was used to create the survey and collect results. The respondents visited the web page where the survey is located (link obtained by the email sent above) and completed the survey. Results are recorded by Google's systems and can be exported in tabular form to software such as Excel and Google Sheets.

IV. Student demographics

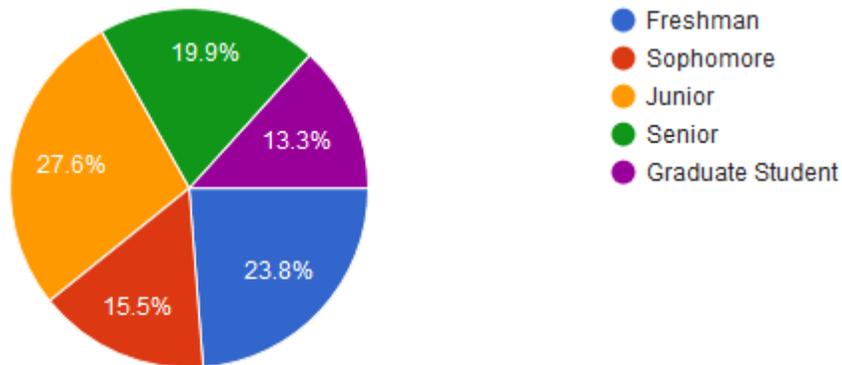
The vast majority of respondents attend Clarkson University. This has caused the survey results to be heavily biased toward Clarkson as opposed to balanced between the two universities. Even after the survey notification email was sent to the sample of 400 SUNY students again, response rate was markedly low.

Google Forms provides a small graph of the number of responses per day. It shows a large peak when the survey became available to Clarkson students, and quickly drops off to after day 2. A smaller peak occurs when the survey was made public to SUNY Potsdam students. However, summing the points around this 2nd peak yields roughly 30 responses, compared to less than 18 as indicated in the pie chart below. It could be that some SUNY Potsdam students accidentally marked 'Clarkson' or forgot to change the bubble to indicate SUNY.

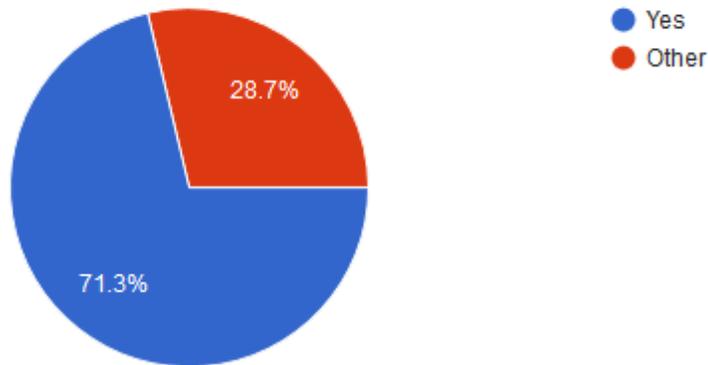
Which school do you currently attend? (181 responses)



Cohort identification (181 responses)

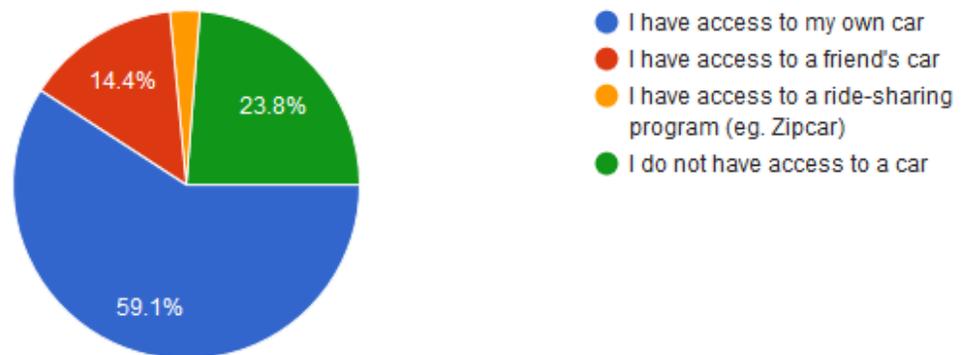


Are you living on campus? (181 responses)



About 52 students indicated they are living off-campus, with 129 living on campus.

Car access on campus (181 responses)



While the majority of students have access to their own car, or could have a friend drive them, a considerable portion (23.8%) said they have no access to a car. Some students in this category may be unaware of the Zipcars that are available to Clarkson students (note that the survey results skew toward Clarkson), or do not wish to join the program, so they may have indicated 'no access'.

The portion of students who indicate 'no access' are particularly important as they would then have to walk or use a bicycle both on and off campus. Improving walkability and bike travel between the campuses and the village could do much to capture this population.

V. Behavioral

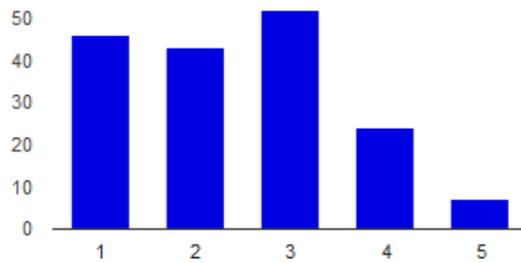
This section comprises the core of the survey. It seeks to gather data on how students travel on campus and around the village, as well as learning about their mode of transportation, popular destinations, suggestions for improvement, etc.

Students were asked to identify the primary purpose of their trips by both modes of transportation. Starting with cars, the primary purpose of most students' trips were to purchase groceries. This is supported by the locations most visited by students via car:

Popular destinations by car	
Walmart	475
Clarkson	362
Price chopper	121
Kinney's	82
TEP	60
SUNY Potsdam	47
Aldi	44

As shown, excluding trips to Clarkson University, the three most popular destinations by car are all locations to purchase groceries. It is also not surprising that these locations are located at some distance from either university, and thus require vehicular transportation to reach them.

There were no immediate concerns with the ease of transportation around the village by car. Only a very minute percentage of respondents stated their difficulty of travel was the most difficult option of '5 - Difficult, many conflicts and impediments'. The data appears left-skewed toward a relative ease of travel.



Easy, few conflicts or impediments:	1	46	26.7%
	2	43	25%
	3	52	30.2%
	4	24	14%
Difficult, many conflicts and impediments:	5	7	4.1%

The responses show a distinct difference between using a 'car' as transportation versus being a pedestrian.

Popular destinations for foot and bicycle traffic focused more on convenience stores and food, as opposed to groceries.

Popular destinations by foot/bike	
Clarkson University	368
Kinneys	156
Maxfields	120
Stewart's (combined)	74
SUNY Potsdam	47
IGA	32

Excluding Clarkson University again, the top three locations are smaller stores for purchasing a few items or meals. Note that there was ambiguity in the response of 'Stewart's', as most did not indicate which of the two locations. Thus they are combined in a single field to avoid misrepresentation of either shop.

Common in both these tables is that Clarkson University receives a large amount of foot/bicycle and vehicular traffic. However, the survey was skewed toward a larger sample size of Clarkson students who responded than SUNY students.

By combining the table for car trip-counts with the pedestrian trip-counts, a difference can be obtained. This quantity describes how much a particular destination is 'car-dominated' or 'pedestrian-dominated'. Shown are either ends of the table:

Destination	Car	Foot & Bike	Difference
Maxfields	14	120	106
Kinney's	82	156	74
Stewarts (combined)	39	74	35
Bagelry	12	29	17
Sergi's	4	17	13
Eben's Hearth	2	14	12
Little Italy	5	16	11
Between the Buns	14	9	-5
Lowe's	9	1	-8
Chilly Delight	12	3	-9
Hot Tamales	29	11	-18
Dunkin Donuts	39	6	-33
Aldis	44	1	-43
Price Chopper	121	3	-118
Walmart	475	15	-460

	Pedestrian dominated		Car dominated
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Locations where the difference is close to zero (roughly equal in car and pedestrian traffic) include the Thai Cuisine restaurant, IGA, Potsdam Food Co-op, and University Bookstore.

These would be prime locations to try to reinforce foot and bicycle facilities to sway traffic toward pedestrianism.

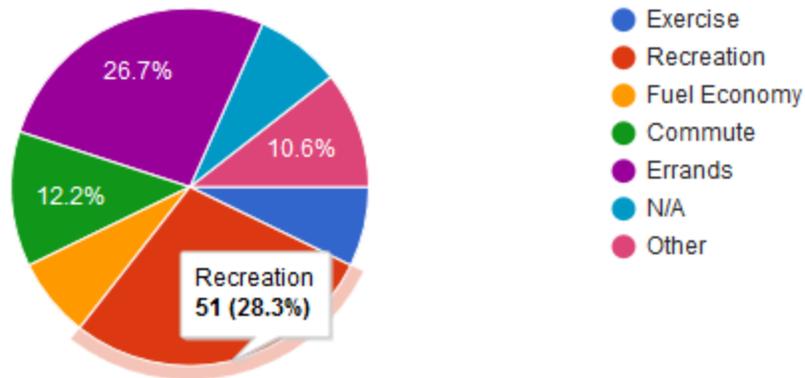
Differences in travel location was also analyzed based on on-campus vs. off-campus students. By summing the responses by those who indicated 'off-campus' on their survey, and subtracting this from the total, on-campus responses could be gathered. Now, the two columns could be compared. Shown are the results for both car travel and pedestrian travel:

Destination counts by car, divided by on-campus vs. off-campus			
Destination	Total	Off-campus	On-campus
Clarkson University	362	346	16
Walmart	475	129	346
Price Chopper	121	55	66
Aldi	44	36	8
Science Center (CU)	30	30	0
Kinney's	82	27	55

Destination counts by foot/bike, divided by on-campus vs. off-campus			
Destination	Total	Off-campus	On-campus
Clarkson University	368	312	56
Maxfields	120	79	41
Stewarts (combined)	74	49	25
SUNY Potsdam	47	36	11
"Market St. Apt"	30	30	0
Clarkson physical therapy building	30	30	0
Kinney's	156	17	139
Food co-op	17	11	6

The majority of those who walked or bicycled said their primary purpose of this mode of transportation was not commute, but rather recreation, followed by errands.

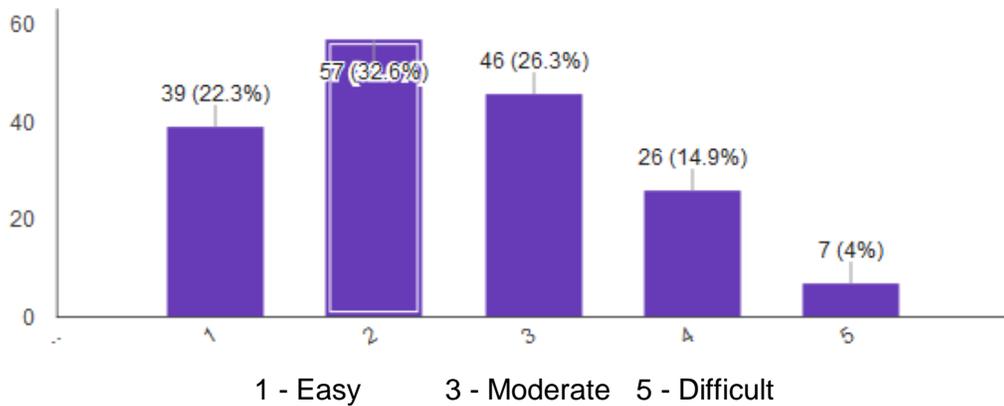
What is the primary purpose of your trips BY FOOT OR BIKE?



Additionally, there were no extreme concerns regarding difficulty of travel via foot or bicycle.

How would you rate your ease of travel BY FOOT OR BIKE to the destinations you've listed in the question above?

(175 responses)

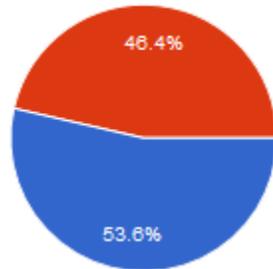


VI. Improvements

The next section of the survey sought to pinpoint students' concerns and possible improvements that could be made in the village and around campus to better facilitate non-vehicular traffic.

One area of interest was learning whether students felt there was a lack of bicycle racks around locations they frequently traveled to or would like to travel to, and if so, where they'd like to see more racks. The respondents were split on this matter.

Are there sufficient number of bike racks at off-campus locations?

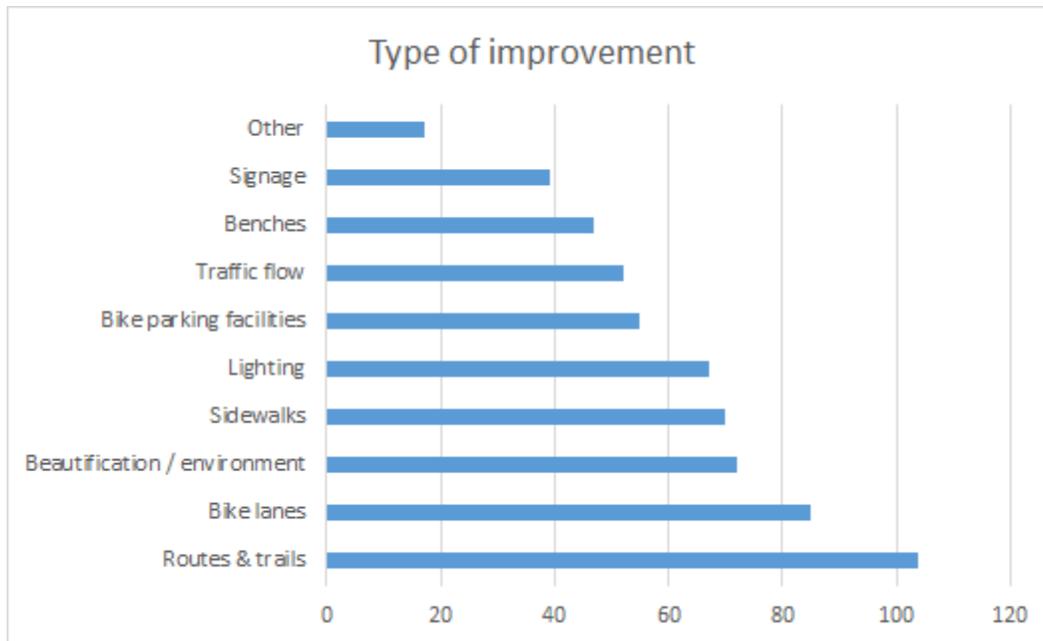


Yes 75 53.6%
No 65 46.4%

While the majority of those surveyed responded that there was a sufficient number of bike racks at off-campus locations, the margin is slim. Locations that students felt were in need of racks were ranked among popularity.

Most desired location of bike racks	
Market Street	8
Kinney's	6
Main street	6
Bagelry	4
IGA	4
Food co-op	2
Ives park	2
Maxfields	2
Post office	2
Roxy	2

Students were asked to identify improvements that they'd like to see in the village by checking as many options that applied.



Over 100 students were interested in seeing improvements to 'Routes and trails'. While the Clarkson campus has ROTC trails across Clarkson Avenue, there are no immediate bike trails dedicated for bikes.

The next most chosen category was for bike lanes. Funds received from the 2009 Recovery Act stimulus were used in part to finance the installation of bicycle lanes on either side of Clarkson Avenue. No such lanes exist along Pierrepont, or within the village itself, such as on Market St., Elm St., or Main St. Further analysis is performed on the demand for bike lanes and in which form they may come (e.g. conventional bike lanes, cycle tracks, buffered/non-buffered, etc.).

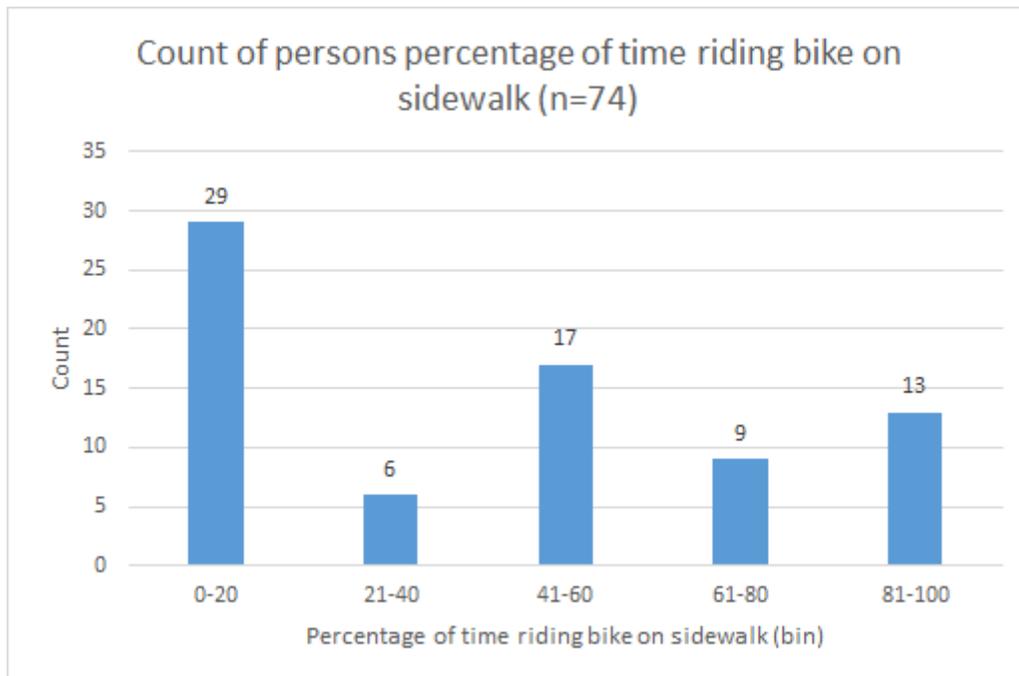
Interestingly, beautification ranked third on the result list. While efforts should be focused primarily on facilitating more bicycle traffic from either university campus to the village and improving connectivity, additions to the environment of these areas would fare well in providing a welcoming atmosphere for pedestrians and bicyclists.

Beautification is addressed in the recommendations section of the final report. There are great opportunities to engage college students and village citizens to improve the beauty of streets. Fred mentioned that heightened planting pots would allow older folk to plant trees. Environmental advocacy clubs on campus could also be engaged in this effort.

It is important to note that while respondents were asked to rank the need or desire for these improvements, they all go hand-in-hand. For instance, lighting is an important element for pedestrian safety, and thus would need to accompany any route or bike lane proposals.

Benches and bike-parking facilities would be recommended to support more travelers. Signage would play a key role in informing users of routes and destinations. Clearly, a great proposal would address most or all of these points.

Students were also asked about how much time they spend riding their bikes on the sidewalks. This question is meant to gauge whether there are adequate bike facilities available to riders. Of the 74 respondents, slightly less than 20% indicated that they ride on the sidewalk 81-100% of the time. The majority, on the other hand, only 0-20% of the time. Responses could be an indication that riders have safety concerns, and thus ride on the sidewalk to feel safer.

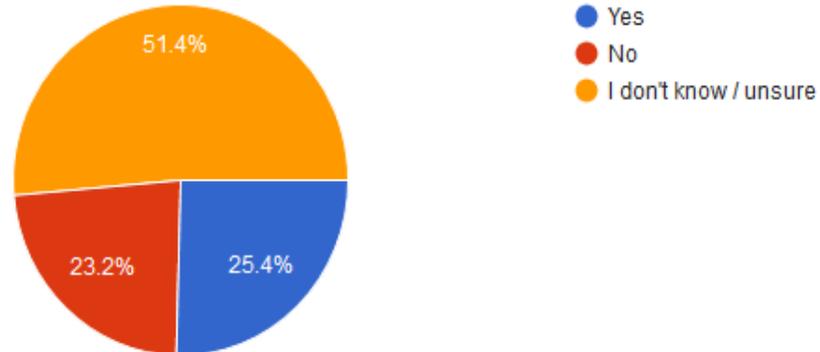


VII. Additional Information

Knowledge of university-sponsored bicycle programs was assessed.

To your knowledge, does your university have a bike renting/purchasing /lending program?

(181 responses)



"To your knowledge, does your university have a bike renting/purchasing/lending program?" response breakdown		
	Clarkson University	SUNY Potsdam
Yes	46	0
No	37	5
I don't know / unsure	83	10
Total	166	15

For either school, the majority of respondents (50% Clarkson, 66% SUNY) were uncertain whether or not their university offered a bike program.

Does the university offer a bike lending or renting program?	
Clarkson University	Yes ¹
SUNY Potsdam	No
SUNY Plattsburgh	Yes ² HYPERLINK "http://www.plattsburgh.edu/studentlife/recsports/bike-rental-program.php"

¹ Web reference (CU) available at <http://www.clarkson.edu/campussafety/knightrider/index.html>

² Web reference (Plattsburgh) at <http://www.plattsburgh.edu/studentlife/recsports/bike-rental-program.php>

Of the 166 Clarkson students, only 46 (27.7%) were able to correctly respond that the university does offer a bike lending program. The Knight Rider program facilitates bike rental for \$20/semester, including proper adjustment and repairs.

SUNY Potsdam does not have a bike lending or renting program, according to a response to an inquiry submitted on the 'Contact Us' form (http://www.potsdam.edu/about/contact_us.cfm). Therefore, only 5 of the 15 SUNY Potsdam respondents correctly answered the above question (granted that 15 total responses may be statistically insignificant).

While SUNY Plattsburgh is not in the scope of this research, for completeness, a link is provided to its bike rental program. It, too, offers bike rentals. There is no cost -- only a valid student ID is needed.

Finally, students were asked to list all of the events they have attended in the past 30 days, and which mode of transportation they used to get there. For the purposes of this data analysis, bus travel and carpooling were both counted as 'car'. The top few responses are shown below.

Popular events attended and mode of transportation indicated			
Event	Foot / Bike	Car	Not indicated
First Saturday	30	5	8
Sporting events (practices and matches)	16	9	4
Hockey games	8	4	7
Farmer's market	6	1	1
Greek life sponsored events	2	1	0
Fallfest (all campuses)	1	1	1

There were several other events which were attended only once or twice (at least according to the survey results) including CUOC Canoefest, a Crane music concert, a Real Rock Film Festival, etc.

This question in particular suffered from too many vague responses. For instance, some respondents wrote an event, but didn't include which mode of transportation they used to get

there as requested by the question. Thus, the table above has a 'not indicated' column to handle these responses. Others used the space to list places (but not *events*), they've been to, which is what the previous sections of the survey covered.

Overall, First Saturday is the top event, and it also receives significant foot traffic. Sporting events (excluding hockey), which is the sum of practices, matches, etc. is also a top ranking event.

Of the 182 responses received on this question, 53 of them (29%) indicated no events were attended in the past 30 days (ex. blank entry, "N/A", "nothing", "no events", etc.).

VIII. Summary and Future Improvements

Improvements to the survey structure

Some difficulties arose for crafting a survey format in Google Forms. The most notable issue was not being able to use the desired input structure for asking users to list the destinations they've been to in the past 30 days, and how many times, both by car and by foot/bike.

The only way this could be accomplished was by allowing a paragraph response. Because of this, the tally for each category had to be done by hand. This proved time consuming and hindered the ease of analysis.

Of course, with any survey, some responses were not as adequate as was desired. Specificity can be insightful, and unfortunately even for questions that asked for specifics, some responses were general. It could be the case that performing the surveys in-person (e.g. setting up a survey booth / table on campus) would lead to a greater dialog. This, too, would be time consuming.

Lastly, the survey did not provide a space for "general comments" at the end, in case a student had anything else to say that wasn't covered by the survey. Luckily, a few respondents indicated this in one of the last paragraph response sections and noted their comments anyway. Below are these comments:

You did not provide a section for comments so I will put this here. Cars driving on Clarkson campus are not considerate of bikers. Many times cars blow by me at speed (usually over 30 on campus) like I am not there. Sometimes there is no sidewalk and I feel unsafe near the roads because of the speeds drivers are going. I have a mountain bike and always wear a helmet but many times I will cut through grass and the middle

of campus just to avoid roads.

I only use a bike to travel during the summer because there is not enough space to store my bike on campus in the fall, winter, and spring months. Many individuals leave their bikes outside, but I am not a fan of this because it creates unnecessary wear. All events that I attend on campus during the academic months. I travel to by foot. I think that it would be great if sidewalks on campus were consistent for foot traffic. For example, when walking from Walker field to the quad, the side walk exists only 50% of the way up the hill into the lower quad parking lot. It would be more convenient, safer, and more ascetically pleasing for all if the side walk extended from the lower quad parking lot to the upper quad parking lot. Odd sidewalk gaps like this exist both on campus and downtown, such as in front of The Computer Guys and Kinney's. These gaps cause pedestrians to walk in the street which is dangerous and annoying for all.

I've used my car to get to all events I've attended in the past 30 days. I don't live in downtown Potsdam so I find it unreasonable to walk or bike other than for leisure, as there's nothing reasonably close to my house.

IV. Geographic Information System

Road data

New York State AADT data was plugged into ArcGIS to give a visual representation of the roads most frequently utilized by vehicles. An online service is provided to view the data in a web browser³. However, Clarkson has a local copy of the data in a GIS layer to quickly work on it. Presented below are analyses of different modifications the Village could make to improve pedestrian traffic in the downtown area, and models representing the changes that would occur.

Merge left/right lane on Market St. headed toward bridge

One modification the Village could make is merging the two turn-lanes on Market Street headed toward the bridge into one lane which permits turning in either direction.

Currently, drivers in the right lane must turn right over the bridge, while those in the left lane must turn left onto Main St. in front of the Clarkson Inn. Market Street, along with Elm Street and Main Street, all have four lanes of traffic with two going in both directions. By reducing the lane count on Market Street, at least on the block segmented by Main and Elm St., the Village can

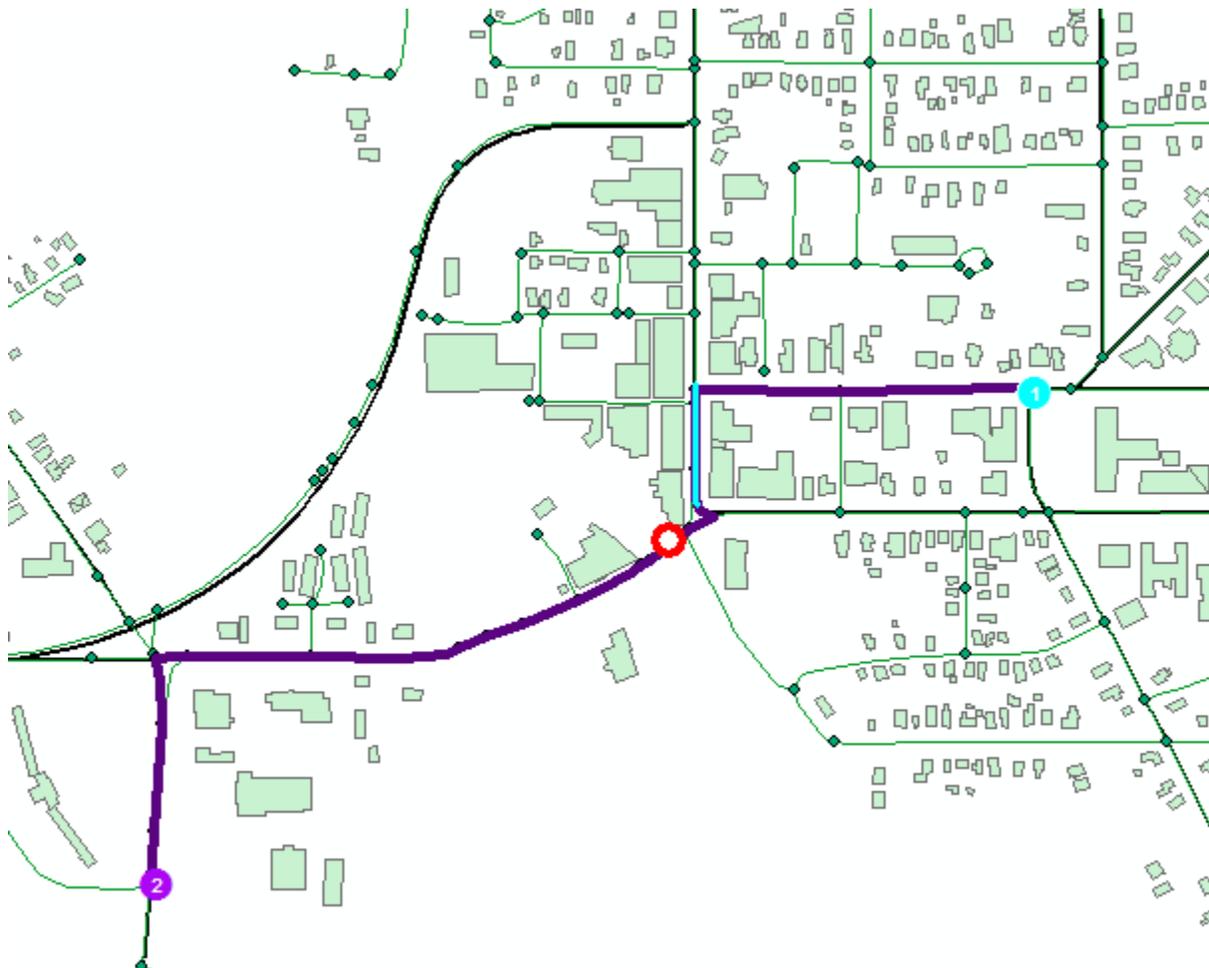
³ See <https://www.dot.ny.gov/tdv?nd=nysdot>

promote pedestrian traffic, particularly when coupled with the bike lane improvements recommended below.

According to NYS AADT data, there are on average 2,053 counts on this portion of Market St. per day, with the 'high hour' on a weekday at 187 counts⁴.

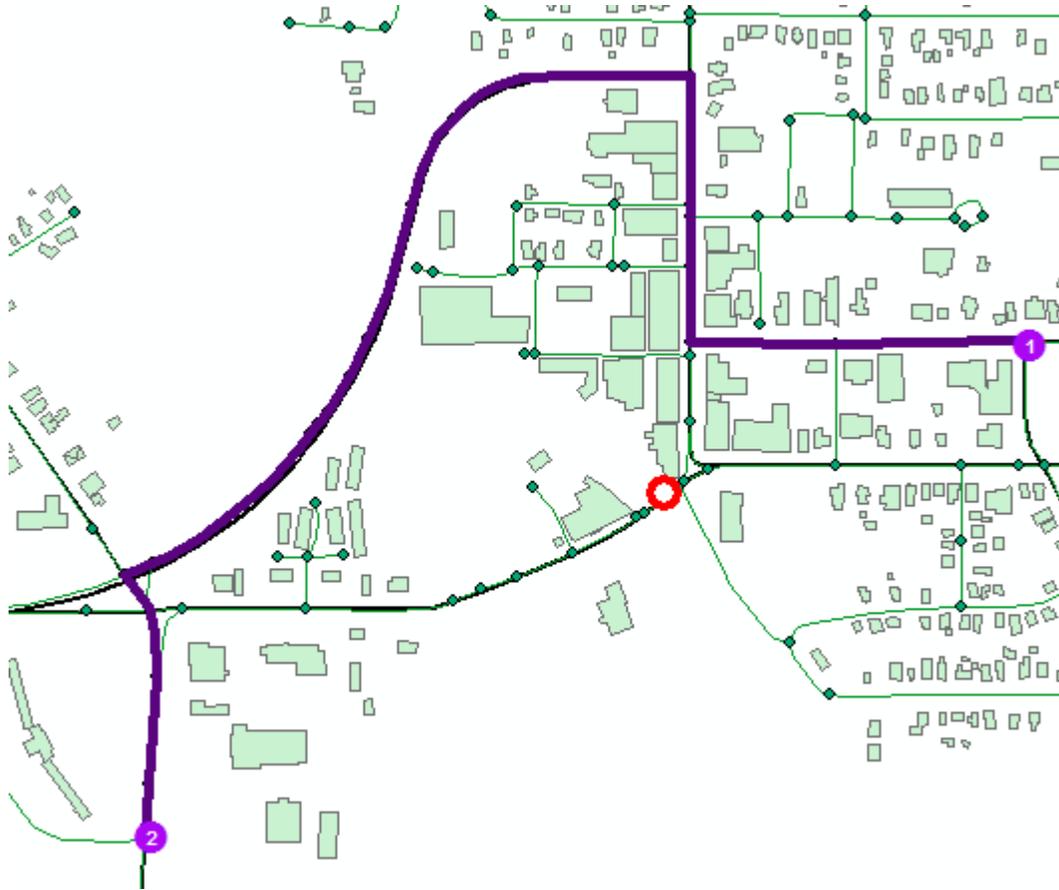
ArcGIS was used to analyze how routing would be affected based on changes to the roadway. To simulate the removal of one lane of traffic going toward the bridge, a time barrier was placed on the map. When the time barrier "blocks" a potential route, it adds a time penalty to that route's consideration when the algorithm attempts to find the shortest path.

Consider that the two turn lanes as is. An example route is shown with a source near Old Snell Hall, and a destination at Hamlin-Powers on Clarkson University's campus. With the time barrier (red circle) is set to 0, the route travels along Elm Street and crosses over the bridge.



⁴ See http://ftp.dot.ny.gov/tdv/YR2008/R07/75_St_Lawrence/75_0050.pdf

Now consider that the time barrier is set to 1 (minute). This delay is substantial enough so that the algorithm decides on a different route along Sandstone Dr. Clearly, it does not take much of a disturbance for traffic to be routed differently.



A delay of one minute was chosen to simulate an extra cycle of the traffic light; that is, a rough estimate is to imagine that by merging the left and right turn lanes into one lane that permits both turn directions, the line of traffic will be twice as long. Thus, two traffic light cycles must occur to accommodate what just one cycle could do previously. This assumes that both original directions are equal in traffic count.

Bike lanes on Market St.

The benefit of the consideration above is the ability to reclaim a lane of road (10 feet) and use it as bike lanes. Ten feet would allow for two 5-foot bike lanes on either side of the road. Another configuration would be to keep the bike lanes together, as shown below, but placing them on either side of Market St. would favor both Clarkson and SUNY Potsdam students, who will be approaching the street from either side.



A view of Market Street “as is” looking down from the Clarkson Inn. Four lanes of traffic over two directions, as well as the on-street parking (shown as bricks, although in reality the material does not differ from the regular lanes).

Made with Autodesk InfraWorks 360 using map data from Prof. Olsen.



A view of Market Street with proposed removal of one lane to add bike lanes on either side of the street. On-street parking (shown as bricks, although in reality the material does not differ from the regular lanes).

Made with Autodesk InfraWorks 360 using map data from Prof. Olsen.



An example of a bi-directional bikeway that the Village of Potsdam may consider if it reclaimed one lane of traffic on Market St. Another option would be to separate the bike lanes on either side of the road, which may favor bicyclists wanting to turn in either direction at the bridge.

Source: <http://www.fastcoexist.com/3050776/google-wants-to-make-silicon-valley-as-bike-friendly-as-copenhagen#2>

The added bike lanes would require consideration for snow removal processes, and literature is given below to briefly discuss sources on winter road maintenance.

An added benefit of bicycle lanes on Market Street is that the presence of an increased number of bikers has been found to increase safety for all road users. A biking study by Marshall and Garrick compare incident and fatality rates among bikers based on different network densities. They find that an increase in the number of bikers on the road correlates with a decrease in the number of conflicts with cars⁵.

Specific cities both nationally and internationally were examined. For example, Copenhagen found that a *40% increase in bicycle-kilometers traveled corresponded to a 50% decrease in*

⁵ Marshall pp 17. "... individual bicyclist is not constant; rather, individual risk seems to decrease with an increasing number of bicyclists. In other words, bicyclists can find increased safety in higher numbers."

*seriously injured bicyclists*⁶. Santa Barbara and Rialto were compared and the data shows that fatality rate is significantly less for Santa Barbara, which has many more cyclists and pedestrians.

Fatality rate by mode of transportation in two different Californian cities ⁷		
	Santa Barbara	Rialto
No. drivers	78,367	88,043
No. pedestrians	5,993	1,192
No. bicyclists	3,319	183
Fatality rate (avg. per year per 100,000 estimated drivers)		
Car	2.2	7.0
Pedestrian	21.2	284.3
Bike	10.8	165.2

Adding more bicyclists on the streets through the incentives provided by bike lanes, Potsdam’s roads can be safer for *all* road users. When a “critical mass” or threshold of cyclists is reached, drivers slow down, which makes any incident less of a danger to life.

Bike lanes on Main Street

A similar project could be undertaken along Main Street where road space is “reclaimed” as bicycle lanes. This would be especially important for connectivity from those coming from Pierrepont Avenue.

Consideration is needed to determine how extra road space would be claimed. A lane of traffic could be removed, although the merging yield coming from the bridge toward Main St. would prove a little more difficult traffic-wise.

⁶ Jensen, 2002

⁷ Summarized table from Marshall pp 24



Aerial view of Main Street at bridge intersection. The yield over the bridge toward the Clarkson Inn adds a bit more complication to the lane-removal process used to add bike lanes on Market Street.

Source: Google Maps

Reconciling bike lanes with curb-outs

If the Village does create curb extensions as proposed in the *Concept Plan for Streets Revitalization* and bike lanes are also installed, having both may require using chicanes.



Bulb-outs or curb extensions at an intersection.

Source: http://placemaking.pps.org/imagedb/image-display?image_id=19538&size=md&hs=24487325



An example of a chicane, where a small gap is left between the sidewalk and the feature in the street, which can allow drainage and cyclist through-traffic
Source: <http://www.danlockton.co.uk/research/images/chicane.jpg>

An intersection with curb extensions may disrupt bicycle lane traffic, so a chicane can be used. Chicanes leave a gap between the extension and the sidewalk to allow for better drainage. If this gap is wide enough it would allow bicyclists to pass through without weaving around the curb extension. This setup is also known as an “edge island”.

Snow removal considerations

Winter weather along Pierrepont Avenue has been problematic for pedestrians as heavy snowfall gets thrown onto the sidewalks, inhibiting or preventing pedestrian traffic. In addition, for the bike lanes suggested above, special operations would need to be developed to maintain those channels as well.

Strategies that the Village may be interested in are discussed in the Alta Planning + Design publication titled *Winter Bike Lane Maintenance: A Review of National and International Best Practices*.

For potential bike lanes along Market Street or Main Street, on-street parking can be halted during winter months to provide snow storage space. Since the bike lanes are recommended on the outermost edge of the road, regular street-plows may throw snow into the lanes; therefore, smaller snow removal vehicles such as those used for sidewalks would be beneficial.

V. Town-Gown Relations

With universities now providing an ever-increasing level of amenities to students, it is becoming less necessary to venture off the college campus. Tasks and errands such as purchasing groceries, exercising, or watching a movie can all be done on campus in lieu of visiting

specialized shops downtown. This has placed growing pressure on small businesses who, despite having much to benefit from the influx of thousands of college students during the academic terms, are unable to capture these potential customers.

Discussions with the Planning Board emphasized the need to get college students out into the public realm so that local businesses may thrive. The survey results have shown that big-box stores such as Walmart and Price Chopper attract a great deal of trips made by car, but the data also shows promise in that trips made by foot or bike are more likely to end up in the downtown area along Market St.

Where students' needs are unfulfilled on the campus, the needs are met using online shopping services. The Village Planning Board has expressed much concern over this matter, and it is a problem not unique to Potsdam. The ability to seek the lowest price for a given good, and the convenience of not having to make trips around town, have both led to a bane for local businesses.

With places like restaurants and serveries being where students have indicated they go to most often, there is a need to provide an experience rather than just selling goods. These destinations serve as a hub to share meals and spend time, whereas stores that only sell goods may face increasing pressure from online media.

In order to promote local shopping and foster community development between locals and college students, Potsdam should focus its efforts on medium-term improvements to pedestrian facilities to encourage the behavior that is evident in the survey results. Additionally, while online shopping may be here to stay, Potsdam can foster strong and positive town-gown relations and identify ways to invest in the experiential face of college life.

Experiential destinations

Online shopping may have changed the way people shop permanently. With Amazon and Ebay offering massively large selections and the ability to find the lowest price, local shops are at a great disadvantage to attract customers. To further this issue, large stores such as Walmart have also been popular destinations amongst college students via car.

From the survey results, the popular destinations via foot and bike ("pedestrian dominated") include Maxfields, the Bagelry, and Eben's Hearth, among others. It is clear that these, compared to the car dominated locations, tend to be on the side of restaurants and focus on experience, rather than the sale of a good. Eating a meal at a restaurant with friends may not be replicated via online shopping in the same manner as purchasing an item.

Indeed, efforts made to improve the experience and culture of the downtown area may prove worthwhile in the attempt to get students downtown, who are "*attracted to localities with an*

*abundance of cultural amenities and lifestyle options. This includes interesting cafes and restaurants and thriving music, art, literature, and design opportunities*⁸.

Of the events that survey respondents went to, First Saturday was the most attended, especially by foot and bicycle. Clearly this is a popular event which draws much pedestrian traffic as desired by the Village, and its successes should be played on.

Perhaps the two largest factors are that: (1) the block is closed off to vehicular traffic, and (2) many businesses participate in discounts and sales promotions. This combination allows pedestrians to casually promenade the local shops and take advantage of special offers. Further, since a 'passport' is handed out on which students can visit locations to collect stickers and enter a raffle with 8+ stickers, students are incentivized to explore the Village, visit stores for stickers, and learn more of the local shops, even if they don't intend to make a purchase.

Another event in which this portion of Market St. is closed off is the Halloween event named Fright-Night (sponsored for younger children). This pattern of closing off the block leads to a calmer and more inviting atmosphere to pedestrians. There is the suggestion in the GIS section above which would reduce this block by one traffic lane. While this is not the same magnitude as closing the entire section, it may still lead to the desired pedestrian-focused atmosphere that is much needed to bring people downtown.

Graduate retention

A study done at Queen's University analyzed factors that influence graduate retention, and more generally, students' perception of inclusion in the community. Their research, along with others, found that "students' sense of place affected their intention to seek graduate employment locally, and that a sense of place was constructed from their feelings of satisfaction with a community and of belonging."⁹ Graduate retention is important for the long-term development of Potsdam and the county, and while the purpose of this project is not to address retention, local employment is a key factor in strengthening the sense of belonging among college students to the area.

Key factors from the Queen's study that influence graduate retention and sense of belonging:

1. Summer job prospects and socioeconomic conditions
2. Perception of job prospects (whether accurate or not)
3. Satisfaction with area's sustainability initiatives, maintenance of road and path infrastructure, and snow and garbage removal

University public affairs offices

Both SUNY Potsdam and Clarkson University have public affairs offices whose task it is to manage information dissemination, but also work with the public and surrounding area to implement and execute key tasks which benefit the community.

⁸ Knox, 2005

⁹ Massey pp 156

In a way similar to how universities across the country have been implementing ‘climate action plans’ as a long-term framework toward making campuses sustainable, universities can also write outlines of key objectives to improving the area for the short- and long-term. The Planning Board can lead discussions on what changes they’d like to see in the Village, and how students can play a role in achieving these goals.

Volunteering and community service is a great prospect for getting students into the downtown area to improve it and increase its attractiveness. Students may have concerns particular to environmental health and sustainability, so outdoor work may be appropriate; this may also be beneficial to the ‘beautification’ improvement that was quite desired among the survey respondents.

Further, volunteering may be tied to academic learning objectives at universities. For instance, the University of Pennsylvania has created an academically based community service (ABCS) program, which integrates academic work with the needs of the community¹⁰. Working with the public affairs offices, the Village can leverage students’ interests and drive to benefit the area at large.

The City of Fairfax and George Mason University partnership is a great example of leveraging positive town-gown relations to develop a vision for the area. A comprehensive report was created to organize the community’s thoughts and concerns, propose facility modifications, and discuss the economic outcomes of revitalization¹¹.

VI. Future Work & Suggestions

Due to the fact that semesters are short and there is always more work to be done, a few points are outlined below which briefly describe room for improvement and future work that could be done, both by the Village and students.

Improved GIS Traffic Signal Analysis - Shown in section four of the report is a model of how a small time delay (additional waiting time) would change the behavior of drivers at the intersection on Market Street by the bridge. The GIS model didn’t take into account the waiting time at the other traffic lights as the driver traveled a different route. Further data collection would be required to grab the average light cycle time to provide a more accurate model. The provided model could be thought of differing only in the waiting time at the intersection, whereas all other waiting times are equal, and thus “cancel each other out”.

Surveys to assess student sense of belonging - As the Queen’s study found, students’ perceived sense of belonging (whether accurate or not) is a major influence on if the student will

¹⁰ Sungu-Eryilmaz pp 9

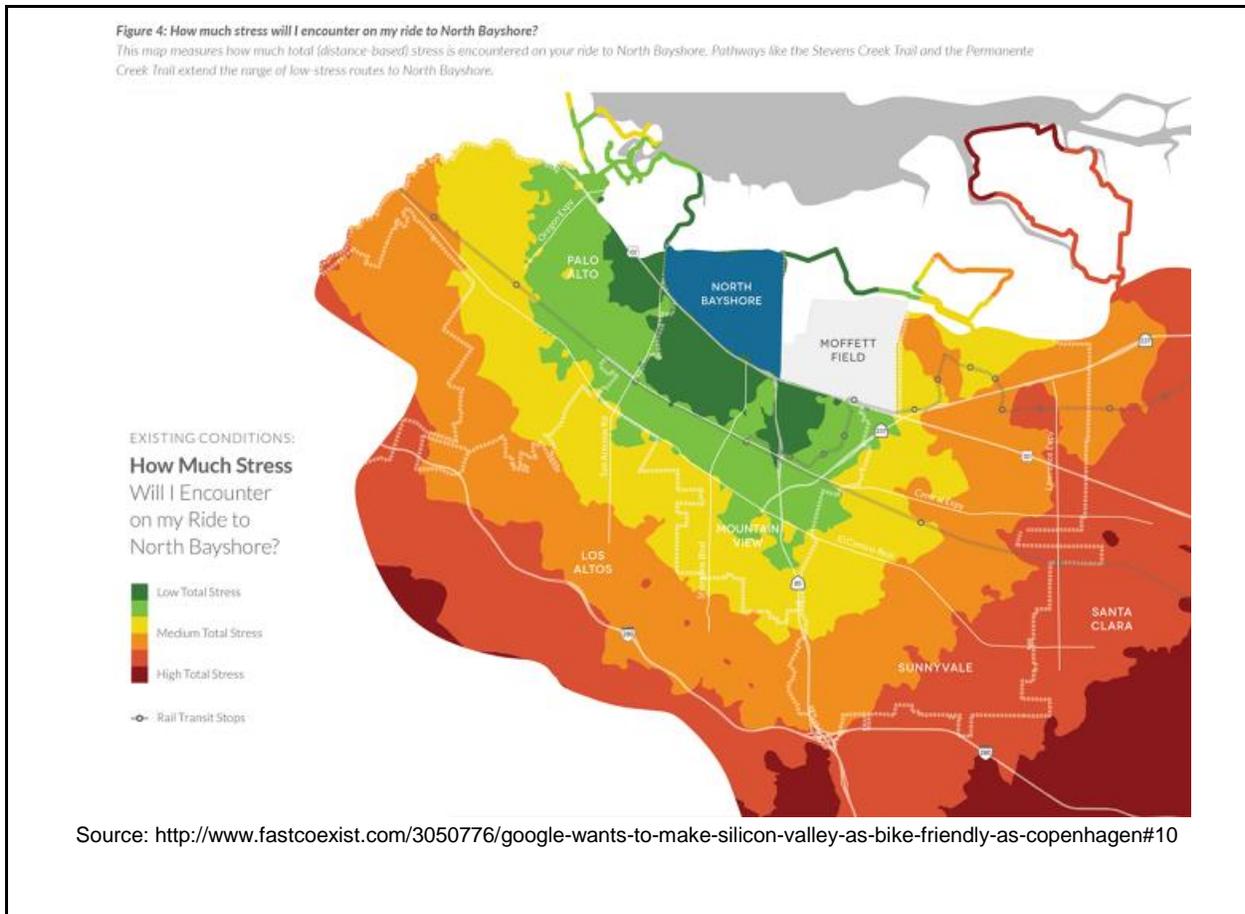
¹¹ Municipal website at <http://www.fairfaxva.gov/government/community-development-planning/visionffxmason>, and report is available for download (PDF) at www.fairfaxva.gov/home/showdocument?id=4679

seek employment locally. It is also plausible that this metric may affect whether or not the student will venture off campus and engage with the Village. A dedicated survey or analysis on this topic may grant the Village better insight on how students perceive the downtown area, local businesses, etc. and where best to make improvements.

Volunteer opportunity alerts - One way the Village can immediately make improvements is to alert students to volunteer opportunities. Students would subscribe to an email list or sign up for SMS notifications (text messages). For example, a desired improvement found by the survey results is beautification, and the Village could sponsor clean-up days, planting of trees, etc. Such work can make the downtown area more attractive to visit and improve the students' sense of belonging and community.

Stress map - Another GIS model that can be created is a stress map. This may use survey data, traffic counts, road speed, and other metrics to formulate the amount of stress one may encounter as a pedestrian or bicyclist commuting in the Village. Such a model was created by Google to map the Palo Alto and North Bayshore area in an effort to improve bikeability. A student project at Clarkson University found with ArcMap that the walkability of Potsdam was very good¹², so a stress map may address a possible shortcoming in pedestrian and bicycle infrastructure, as well as perceived dangers that would need to be mitigated.

¹² Walkability Study report and presentation by two Clarkson students to fulfill an assignment for CE301: Geographical Information System dated April 24, 2015. Available electronically, submitted to Planning Board upon report completion.



VII. Summary

The Village of Potsdam is facing issues with a decreased number of students visiting the downtown area which is negatively impacting local businesses. Other factors including winter weather and working with nearby universities also add to the trouble.

However, there is promise for improvement: students indicate that they travel to restaurants along Market Street, for example, and developments to pedestrian facilities may encourage more students to travel via a non-vehicular mode to the downtown area.

By considering facility improvements, cooperating with universities, and researching the ways other municipalities have dealt with similar problems, the Village of Potsdam and its Planning Board can revitalize downtown and make it a vibrant and attractive place for students and villagers alike.

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