Improvements to Infrastructure and Alternative Transportation Facilities in the Village of Potsdam

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Table of Contents:

Page Number

1. Introduction

A significant majority of the facilities used in the village of Potsdam are dependent on high volume of automobile traffic, while only select sections of the downtown area can accommodate for large amounts of pedestrian traffic. The downtown of Potsdam is influenced greatly on the surrounding University population from Clarkson and SUNY Potsdam schools, as well as thruway traffic from the main road network on Route 11. Potsdam has a long history as a cultural center for the North Country, and was around when use of the automobile was far less frequent than it is today, when the downtown area functioned as a central point for pedestrian traffic. With the growth of faster and more efficient transport, the advantages of a pedestrian based community have diminished. However, much of the original layout of Potsdam remains the same, and the opportunity to redevelop the area for shared roadways exists. Coupled with the principles of Smart Growth, A movement that structures a good complete streets template, Potsdam can accommodate higher concentrations of alternative transportation users with safer interaction with the roadway. A better functioning system of infrastructure will benefit surrounding businesses, provide a safer environment, and encourage future growth from previously unutilized locations. Local businesses profit better with an increased exposure to outside customers, and the quality of living in Potsdam altogether will increase. Local Universities as well, will have an increased benefit with an improved environment, and also aid in the increase of interaction with the downtown area. The purpose of this research will be to find solutions that provide such an environment, and accommodation for primarily alternative transportation.

2. Background

Repeated meetings were scheduled with the Potsdam Village board from September of 2016 to May 4th of 2017. Communication on what ongoing projects were and future planning therefore were clearly covered. The majority of the work and focus of the research is within the Village's jurisdiction and is also meant to fulfill goals set out for their complete streets plan.

Clarkson executives were consulted to get a stronger sense of what Clarkson's interests were for repurposing the downtown area.

3. Clarkson Redevelopment Plan

In the coming years, Clarkson will be renovating and repurposing much of their existing campus in the downtown area of Potsdam. Recent articles have shed new light on the progress and hopeful success of repurposing the downtown campus buildings. In particular, Old Snell will be the host for a 35,000 sq ft of museum gallery and art studio for interactive learning for kids, as part of the RAIL program. On the 3rd floor there will be available studio and apartment housing, and on the 4th floor lofts and larger apartments. These spaces will be open to Potsdam residents and will have market rates. Congdon hall, under supervision of OMNI, will be renovated into a fitness center for the village. Clarkson hall has already seen use and will be expanded for use by health professions. And Peyton Hall, which is also already used by graduate programs, will continue to provide space for business incubator programs fro graduates.

Another Applicable area to the course of this study is the renovations occurring on the waterfront by the Raquette River.

4. Village of Potsdam Downtown and Waterfront Development:

An ongoing issue for any project is to gain interest from the public in order to spur project implementation. The public must engaged to understand and appreciate the potential future value of the project. The public should also be allowed to have their own interests voiced so that their input can also be weighed in to potential economic gain. A good portion of this responsibility falls on the organizations fronting the effort, but stakeholders can also benefit by promoting how they will benefit as well.

The Village of Potsdam Board is actively seeking out new ways to improve current conditions of the waterfront and downtown area, and already has an agenda of goals based on short and long term expectancies to gain information and begin project developments. Clarkson too, as described in the previous section has also established a plan to revitalize their property in the downtown sector as well as along the west side of the Raquette River near their Athletic

complex and Riverside apartments. Provided within a tentative Ten Year plan, the remodeling and improvements have been accepted and are expected to begin work.

University students and Potsdam residents were thoroughly polled in 2015 and 2016 to gain information on what facilities that exist they were likely to use and what they would like improved. The data received also provides ample information on what should be considered and added during project design phases. Student organizations can also benefit upon completion of certain portions of projects based on specific facilities. For instance, Clarkson plans on building a permanent dock and boathouse on an existing earth pier on their campus which would be in the primary interest of CREW, the boating club, and outing club. Improvements to trail systems and parks would also be of benefit to team training, and local runners who would have new routes and safer spaces to travel and exercise.

Local businesses should also voice their concern on available space that they would like to see in order to see an increase in customers rather than a decrease. They should also seek out additions to downtown projects on Market St. as well so that there could be more visibility in pedestrian dominant areas. Visiting families and Children will have an increased interest to use the repurposed Snell hall to visit the __ center of learning. If facilities provide an easy means of walking into other areas such as Market St. then they most likely will. Organizations that are involved with the Clarkson Redevelopment plan should seek cooperation with downtown business owners.

Repeated meetings were scheduled with the Potsdam Village board from September of 2016 to May 4th of 2017. The majority of the work and focus of the research is within the Villages jurisdiction and is also meant to fulfill goals set out for their complete streets plan. Clarkson executives were referenced to get a stronger sense of what Clarkson's interests were for repurposing the downtown area.

5. Scope of Research Study

Of particular interest during this research were the intersections between Clarkson's hill campus and its university owned parcels downtown, especially in close proximity to intersections with high traffic counts. Closer to the waterfront, other analysis were performed on Market and Main, and the stretch of road on Market St. towards Route 11 and Elm St. A study of

existing road dieting was taken by using data collected from the Development Authority of NY's website, which provided peak flow traffic rates as well as average values for each week.

Besides roadways, finding an optimal route for a biking and walking path had to be mapped out to connect the two university zones. A key component of the pathway was that it maintains high visibility for downtown businesses on market, and thus needed to travel past or nearby this section of road. The use of existing trail networks, correct size of sidewalks and crosswalks, and other infrastructure was encouraged to reduce the overall expected cost to construct such a pathway.

A particular concern in Potsdam is the location of parking, which must remain central enough to service businesses in the downtown area, but not obstructive to the overall flow of traffic or cause a hazard to pedestrian dominant areas. Correct zoning of parking can also reduce the congestion in traffic routes, by prioritizing an alternative area to park in, and then walk to a destination closer into downtown.

Interaction between the alternative transportation trail and road users would be critical at intersections, and maintaining safety for crossing individuals conflicts with efficient road traffic at traditional stoplight intersections, especially at the Pierrepont – Main intersection. After review with outside educational sources, the feasibility of a roundabout was measured, the details of which can be found later in section____. Resultant effects due to modifications to the existing conditions of intersections and traffic routes were also taken into account.

6. Importance of growth

The increased incentive for cities and towns to improve their methods of interactions between business development and existing infrastructure stems from improved efficiency rates and studies. Potsdam has an ongoing conflict with how traffic is managed and its reduce pedestrian presence. Smart Growth principle highlight the potential for developed areas to continue improving the ways urbanized areas can profit solely based off of better efficiency rates. This study will look at what methods can be used to improve the pedestrian and traffic usage to benefit the downtown area of Potsdam.

7. Existing Village Projects:

The advisory committee for the village of Potsdam created to address redevelopment plans met frequently with focus groups and gained a significant amount of overall information from community input. With the data collected they were able to provide a market analysis, and a prioritized list of prioritized and complementary projects. Among these, are specific projects of importance for the application of this research study.

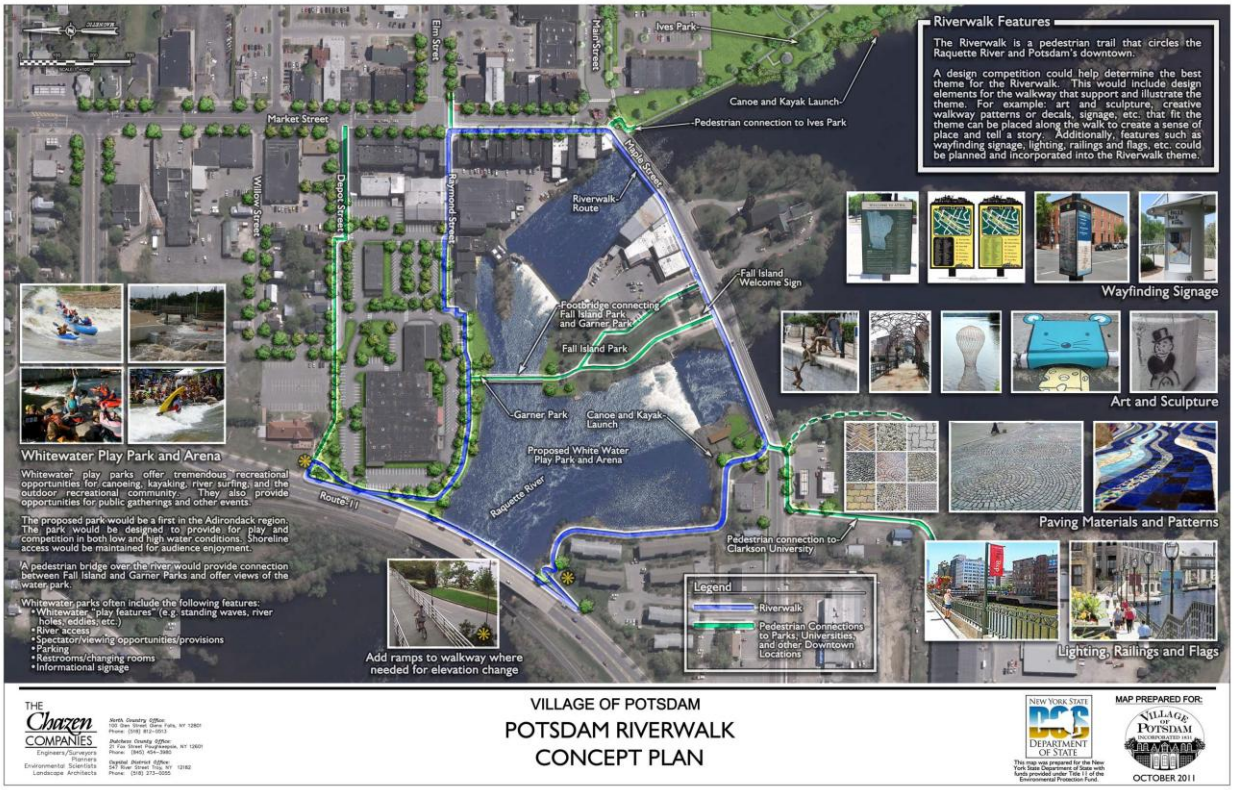
Timing	Complementary Projects	Implementation Steps	Leadership & Partnerships	Potential Funding Source
1	Enhance Ives Park	▪ Prepare local strategy (e.g. budgeting, capital improvement plan, etc.) to fund project components or grant match(s). Prepare and submit grant applications. ▪ Prepare design and engineering drawings for select improvements. ▪ Consult with local professionals regarding tree species and riparian vegetation. ▪ Select contractor and construct improvements.	Village of Potsdam, Potsdam Farmers Market, Outdoor Recreation Businesses, NYSDOS	Village Funds, NYS Department of State (NYSDOS), NYS Office of Parks, Recreation, Historic Preservation (OPRHP), NYS Department of Environmental Conservation (NYSDEC), Environmental Protection Fund (EPF)
2	Develop Raquette Riverwalk	▪ Prepare local strategy (e.g. budgeting, capital improvement plan, etc.) to fund project components or grant match(s). Prepare and submit grant applications. ▪ Consult with local Arts Council regarding art instillations. ▪ Seek public input on overall design and amenities. ▪ Prepare design and engineering drawings for select improvements. ▪ Select contractor and construct improvements.	Village of Potsdam, NYSDOT, St. Lawrence County, Local Landowners	Village Funds, NYSDOS EPF, OPRHP EPF, NYS Department of Transportation (NYSDOT)
Medium Term	Explore future opportunities to create a pedestrian connection along the waterfront behind Market Street	▪ Seek public and stakeholder input on overall design and amenities. ▪ Consult with design and engineering professional and prepare drawings for select improvements. ▪ Obtain necessary permits and approvals for in water and riparian work. ▪ Select contractor and construct improvements.	Village of Potsdam, Business Owners, NYSDOS	Village Funds, NYSDOS EPF

Short Term	Work with Clarkson University to formalize waterfront public access	▪ Coordinate with Clarkson University on identifying access issues and opportunities. ▪ Identify preferred public access locations. ▪ Develop relevant signage and informational material for public use.	Village of Potsdam, Clarkson University	Limited Village Funds
Long Term	Consider the use of roundabouts	▪ Prepare a traffic impact analysis and feasibility study and develop cost estimates for select roundabout locations (e.g., Main/Park/ Pierrepont and Maple/Sandstone/Pine/ Clarkson intersections).	Village of Potsdam, St. Lawrence County, NYSDOT	Village Funds, St. Lawrence County, NYSDOT

8. Increased Interest of Pedestrian Facilities

A prioritized project proposed for Potsdam involves the Riverwalk loop. In 2012, Potsdam performed a case study on the Waterfront and downtown section, specifically following the Villages municipal boundary on the Raquette River. This included the downtown business districts of Ives Park, Fall Island, Garner and Sandstoner Parks and the waterfronts of Clarkson and SUNY Potsdam universities. In conjunction with the remainder of this research, this project followed a similar vision of providing a heightened appeal to the village of Potsdam and a boost for local businesses. It would provide unique cultural, economic, and environmental resources.

Another potential advantage gained from these proposals is to have them connect with the potential University link trail from Clarkson's hill campus to downtown. If so, students and the community would be more expected to participate in the use of facilities on a larger scale.



9. Survey Data

In order to meet the demands of Potsdam's residents, careful consideration of where people want to go based on their mode of travel must looked at. It is important to separate the routes of motorists to those who prefer or are in close proximity to walking destinations. A reduction in the amount of overlap between pedestrians and vehicles can improve safety throughout the downtown area and improve the flow of traffic. It will also help on identifying where the best places to park are, and what the acceptable length of walking distance into the downtown area could be. Therefore, parking could be prioritized outside pedestrian dominant zones, and promote an increase in non-motorized locations. Survey data will also help route where the best bicycle route should go through in order that the majority of pedestrians and

bicyclists in town actually use the trail. The following data was collected from a majority of Clarkson students and some Potsdam residents:

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

The green boxes on the top represent pedestrian dominant destinations, while the blue represent car dominated destinations. From the data, the majority of pedestrians travel to locations on Market Street, while car users tend to go to areas farther outside of the downtown area. However, many of the car dominated destinations also require them traveling through market street, creating an overlapping area of pedestrians and motorists.

10.<u>Proposed Bicycle Route:</u>

As part of Clarkson University's Plan, the following existing and future planned routes are presented below. The use of the Munter trail system will be expanded following the

renovations made in the area. The proposed route for students into the downtown area will use the northernmost section of these trails from crossing Clarkson Avenue towards the Raquette River, and then up to the bridge near Stewarts Gas Station. Once there, it will remain on the right hand side of the road. An addition of a crosswalk could link this trail system with the proposed River walk project in the Fall Island Park.

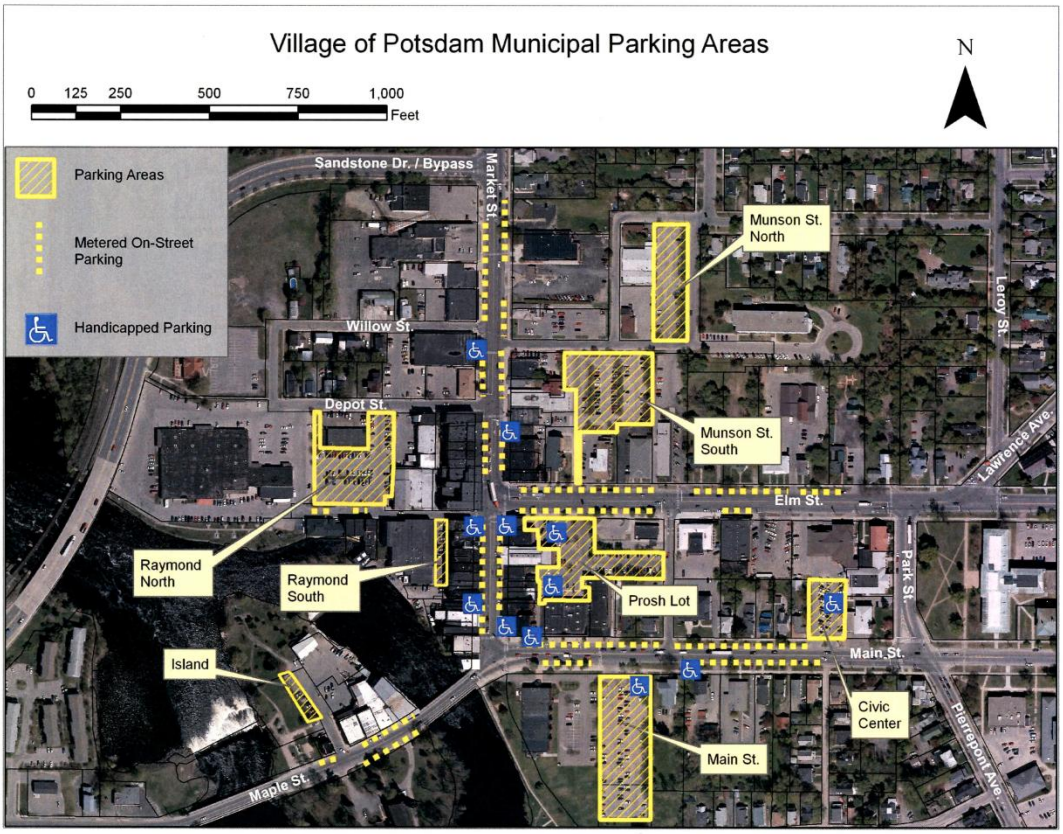
Munter Trail

Once at the intersection of Maple – Market, It would be preferred to consolidate bicycle traffic to the southern side of the road to avoid crossing multiple intersections. Having crosswalks located in such close proximity with bridges can be a potential risk, and the crossing already present at Maple – Market intersection is controlled by a traffic light.

Continuing on from the brides, If there are bike lanes on both sides of Main St, the northern side of the road will have to cross Market St. which is currently 3 lanes of traffic, and then Union St. arguably 2 lanes of traffic although it is a one way road. The southern edge conflicts with the exit lane of the Clarkson Inn, and the two lane enter/exit opening to the parking lot next to the Clarkson Inn. While the traffic for the exit lane of the Inn remains small, the parking lot is highly used, which poses several problems if both east/west bicycle routes will travel past it.

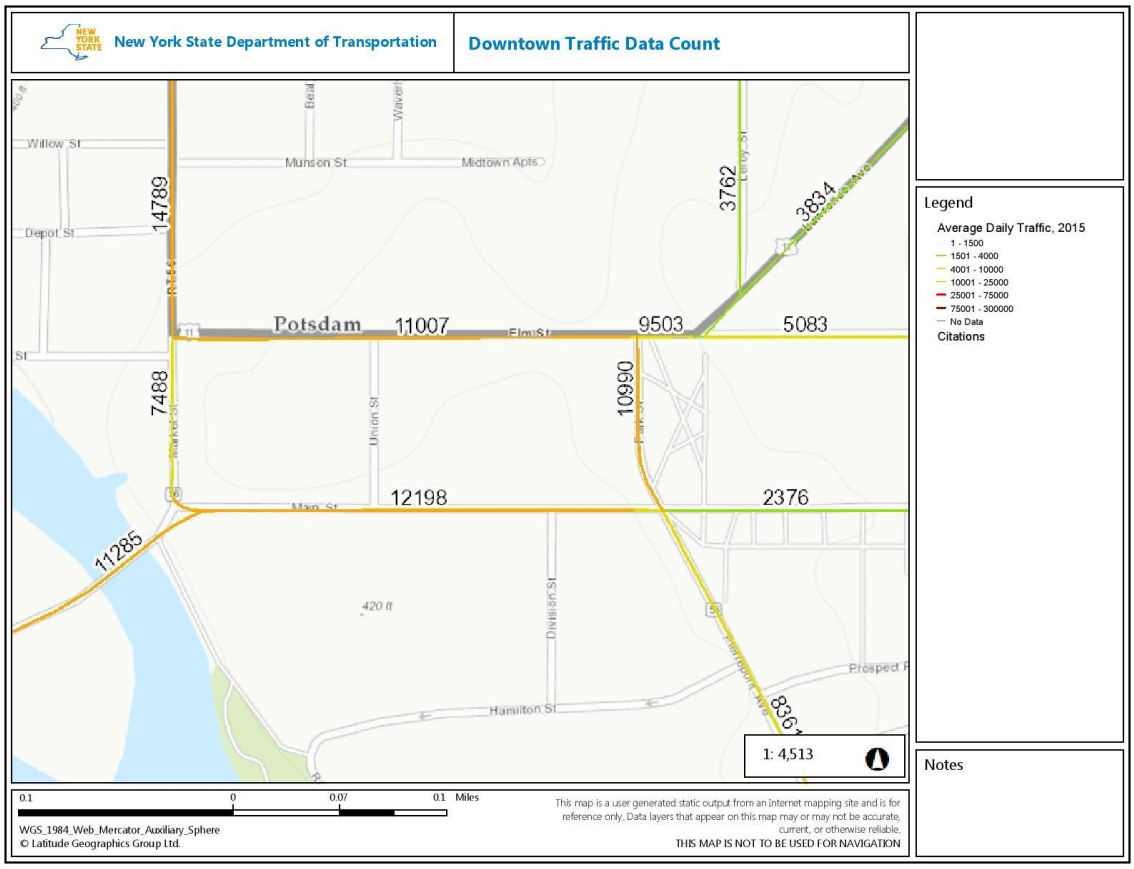
The appropriate response to high traffic density intersections for both bicyclists and automobiles is to add signage and right of way. The section of Main Street traveling east before the turn into the parking lot services parallel parking, and is also wide enough to contain two lanes of traffic. It would be possible to implement a right turn only lane for vehicles, and give right of way to pedestrians to cross before a car can turn in. Main Street traveling west is also the same case, but its close proximity to the Union street intersection may cause a traffic jam with cars waiting to turn into the parking lot with cars traveling east and trying to turn onto Union.

11. Vehicle Infrastructure



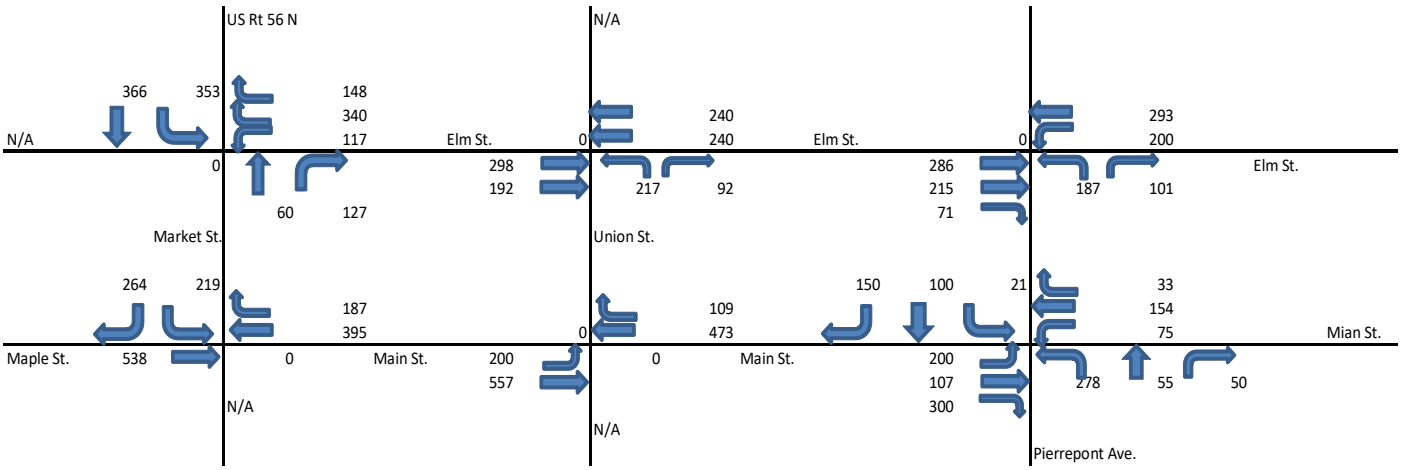
Routing for all non-vehicular transportation and pedestrian traffic should follow the quickest route, follow safe pathways, and travel past areas of high aesthetic appeal, link locations of importance. Following smart growth principles, it should also have a high volume capacity to support.

Based on data taken from the Development Authority of the North Country public records, the following traffic model can be seen through the downtown area.



The above picture shows average daily traffic counts for the downtown area. Data used ranged from 2014 to 2008 however the majority of the data was from 2014. Traffic counts on specific roads that dated to 2008, such as Main Street West past the intersection at Pierrepont, were increased to simulate a higher density of traffic that may occur in the more recent decade.

Shown below is a road diet map of the same intersection layout in graphical form, and lists specific hourly peak flow rates for the existing downtown area condition. Due to limited data, the peak rates on Union Street and parking for that area had to be estimated. Also, any traffic coming from Raymond Street was not considered in the diagram since it is not a thru road and mainly meant for parking access.



Important Considerations:

- Numbers are peak rates per hour.
- Total traffic in system is 2,395 vehicles per hour based off of 2008-2014 data.
- Maple Street forced to go straight causes a heavy traffic at following intersections.
- Three lanes of traffic at each road at Pierrepont/Main causes a longer idle times for traffic signal changes.

Exhibited from the model above, the intersections of most importance and complicated lane switches are at Pierrepont-Main, Elm-Park, and Elm-Market. A significant amount of traffic was calculated to travel on Union Street, along with a smaller amount of traffic expected traveling from Pierrepont, on straight to Park. These considerations and others can be cross represented with GIS modeling and traffic analysis tools in the program to see if these peak rates do in fact, follow optimal routes. It would be expected that people will travel through town on the fastest routes available.

Other Considerations represented by the graphic analysis are choke points, or areas where high amounts of traffic come into an intersection, and leave in a large majority in only one exit path. This occurs at Pierrepont Ave, where over 70% of all cars entering turn left onto Main St. It happens again on Elm St. with the majority of traffic traveling straight through the intersection continuing on route 11 in both directions. Little traffic turns onto Park Street from this intersection, suggesting that a high majority of cars trying to get to Pierrepont or Maple Street use Market Street.

12. Traffic Analysis

GIS modeling was used to test expected time durations while traveling on different routes through Downtown. Of Specific study was the intersection at Pierrepont Ave. and Main St., which handles the most congestion as part of the expected bicycle route. It also has the most lanes of traffic and the some of the longer wait times out of the intersections studied in the model.

In each Image, initial start points and destinations are color coded and numbered 1, 2 respectively. Red dots with X markers are restricted points where the traveling car cannot be routed through and intersection in a specific way. Red and White dots are added cost points at intersections which the traveling car must go through and wait the maximum amount of time at a traffic light. Traffic stop times are referenced at the bottom of each respective image.

Travel Speeds were set at 35 mph even though speed limits are set as low as 25, due to the fact that people do not always obey the law. It is better to assume the expected rate of travel to represent a more accurate model.

Elm St. to Maple St.

Elm to Maple		
Intersection	Direction of turn	Added cost (In seconds)
Elm to Elm (at Park)	Straight	20
Elm to Elm (at union)	Straight	10
Elm to Park	Left	30
Elm to Market	Left	30
Market to Maple	Right	10
Main to Maple	Left	20
Park to Main	Right	20

The fastest route time to travel from Elm St. to Maple St. was calculated at 1 minute and 26 seconds traveling while taking a right hand turn from Park St. to Main St. this was found to be 1 minute 41 seconds faster than traveling down elm and turning left onto Market St.

Compared to the graphic data, people prefer not to use this route despite the fact that it is faster, suggesting that they are uncomfortable with the intersections on Park St. or that they doubt the actual speed through the intersection due to the added traffic lights and complexity.

Maple St. to Elm St.

Maple Street to Elm		
Intersection	Direction of turn	Added cost (In seconds)
Main to Union	Left	10
Union to Elm	Right	10
Main to Park	Left	30
Elm to Elm (at Park)	Straight	20
Park to Elm	Right	20

The same Destinations but in reverse, it was found to be faster to travel on Union street rather than obey the traffic signals at Main St. and Park St. with a travel rate of 1 minute and 30 seconds. Traveling through park St would require an additional 15 seconds to reach the same

destination, clearly exhibiting a loss in time at this intersection specifically, since both routes require traveling through the Elm St. and Park St. intersection on protected turn signals.

Compared with graphical data, this supports what was seen, since a large majority of traffic does take Union St. as a shortcut, and being that it is a one way, people probably prefer the lower time it takes to cross one lane of traffic on Main St. than they do at waiting at a stop light.

Main St. to Market St.

Main Street to Market		
Intersection	Direction of turn	Added cost (In seconds)
Park from Main	right	10
Main from Main	Straight	20
Elm from Park	Left	30
Market from Main	Right	10
Market to Market	Straight	20
Elm to Elm	Straight	10
Elm to Market	Right	10
Union to Elm	left	20

The Final Route used in the study could use three different routes to travel from Main St. before the intersection at Pierrepont and Main, to Market St. above Elm. That is, the three parallel stretches of North/South Roads, of Market, Union and Park St. Expected time for using Union St. was the fastest at 1 minute 40 second, Market was 1 minute 55 seconds, and Park St, was calculated at 1 minute 50 seconds.

Again and surprisingly, it was fastest to use the lightly traveled on road of Union St. rather than the two routes that can handle a higher rate of peak flow traffic than Union St. Alternatively, if traveling straight on Main and turning right onto market, there is a long pause at the next intersection to pass by Elm St. as well as waiting for a left protected turn at Park St. to Elm, Whereas the first intersection for the optimal route is a clear right of way onto Union. If an advantage of clear right of way was given to the right hand turn at park, the time it would take could actually be faster than that of traveling on Union.

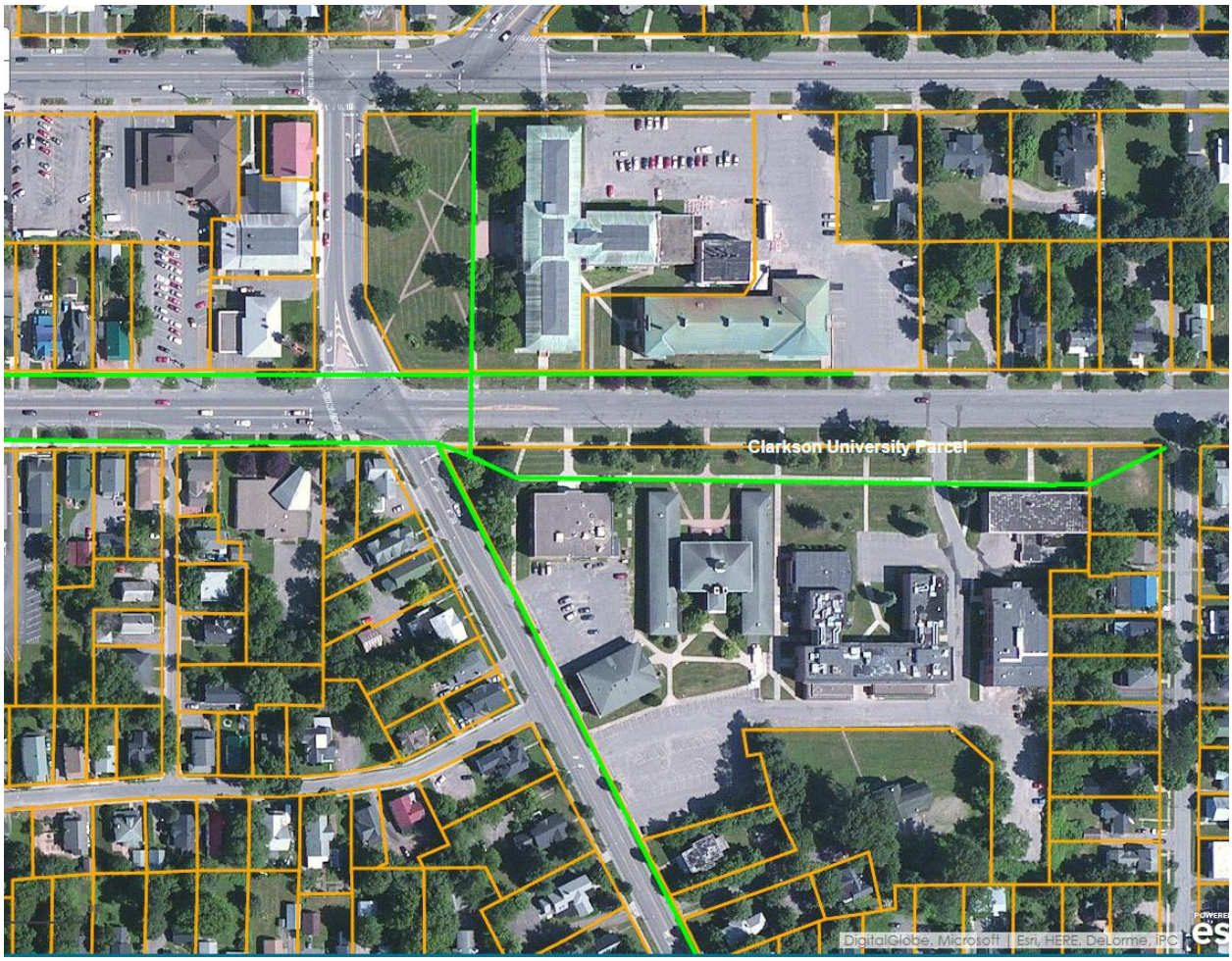
As demonstrated, at peak traffic volumes, it takes a longer time to use the Pierrepont – Main St. intersection to travel than it does to use Union Street from multiple directions. Suggesting that the area should be improved in order to reduce the congestion and improve faster traffic flow. However, there are many lanes of traffic entering the system and a limited amount of space.

From previous sections, this is also the prioritized location for a bicycle route to reach the downtown campus, and so, pedestrian traffic should be considered as a major concern when deciding how best to improve the intersection. Existing conditions also require pedestrians to cross three or four lanes of traffic at a time, and limits certain traffic flows from certain directions while the

13.<u>Pierrepont/Main intersection</u>:

Transportation throughout a downtown must be fluid and safe. Potsdam is dependent of multiple lanes of traffic to handle high traffic peaks at times of day, and Traffic lights at intersections to control high volumes of traffic flowing from main highways. Its downtown section uses the Racquette River for a western boundary, which has Market St. run parallel with. Currently, for any traffic traveling through on US route 11, before crossing the river on either of the two bridges, there are 2 high traffic locations. Forming an intersection with Rt. 56, and a

parallel route through town to Rt. 11 is Market St. In particular is the intersection of Main and Pierrepont on the SW corner of Old Snell Hall. While also being a critical junction for a complete route to campus, it is the first main junction for traffic from the south on Rt. 56 including Potsdam State and the occupants of the Old Snell campus. The traffic at this intersection is often congested here, and crossing the road is arguably unsafe.



In the above image, the green lines represent where existing crossing and crosswalks are located and have high traffic counts. Orange lines represent zoning spaces. From the image, it is clear there is abundant space for constructing a complete streets design plan that implements either a shared road space with a bicyclist or keeping the existing condition of usable sidewalk space. However, crossing the roads requires passing two or more lanes of traffic in different directions at a time, and must be modified if there are to be improvements to the shared roadspace.

14. Roundabout at Pierrepont/Main

- According to the Institute for Highway Safety and Federal Highway Administration, due to reduced travel speeds and vehicle and pedestrian access configuration, roundabouts have been shown to

  achieve:

  - A 37 percent reduction in overall collisions.
  - A 75 percent reduction in injury collisions.
  - A 90 percent reduction in fatality collisions.
  - A 40 percent reduction in pedestrian collisions.
- In addition, roundabouts typically reduce traffic delays, vehicle idling times, require less space, and cost less in long-term operations.

Seen above is a potential model for implementing a two lane roundabout in the available space provided for the intersection. The rate of traffic expected in this area is too great to only have one lane, due to the fact that it would add to congestion on entrance ramps rather than remove it. Two lanes also provide enough space for vehicles that require a large turning radius

such as fire trucks or tractor trailers. Although not rendered in the model, potential refuges in the medians for crossing spaces can be put in between on and off ramps at each road to provide safe crossing for pedestrians.

The Current sizing of the rendered roundabout model has an inner radius of 8 meters and an outer radius of 40 m. The lane width inside the roundabout can be reduced from its current size to match those of incoming roadways. Regardless, there is ample space if Clarkson agrees to forfeit some of the yard in front of Old Snell to construct this roundabout.

Roundabouts allow for an easier flow of traffic for both motorists and bicyclists. Because of their design, users only need to consider traffic flow in one direction and can easily avoid causing collision because of the added visibility. Bicyclists can use a roundabout the same way a motorist can, or an extra can be added on the outside of the design to provide a designated bike lane for extra precaution.

15. Modified Traffic Effects

Effects on the exits from the intersection are overall improved. The increased ability to provide a fast flow of traffic will remove the extra congestion in other roads like Union St. and Market St. It would expected that the number of users on Park street increases, which may cause congestion at the Elm – Park intersection. However, one advantage of a roundabout is that a user is not predetermined to enter a specific lane and can choose to remain on the roundabout if one of the roads has a high amount of traffic on it.

Roundabouts can be an effective way of reducing the number of accidents between alternative methods of transportation on shared roadways. A key advantage of roundabouts is providing crossers with a safety island in the median of the road so that they only have to cross one lane of traffic at a time.

16. Future Research Goals

Consulting of the department of transportation in professional consideration to required road crossings and intersection capabilities is a main concern if the Pierrepont-Main roundabout is to be considered.

The proposed bike route also only stops at the Clarkson owned parcels in the downtown area. If it is connected further to SUNY Potsdam, it would be expected that even more pedestrians would likely use the trail to businesses and parks, now more available to them in the downtown area. Additional routing and traffic flow data would need to be taken in order to consider any of the access roads and trails going to the university.

With the construction of a bike trail, the addition of bicycle infrastructure such as bike racks should be placed at areas along the trail where it would be expected for people to use them. Further study and design of how bicyclists would travel trough the roundabout and their overall safety regarding driver negligence and blind spots should be done.

Overall, the implementation of a roundabout would improve the way current Potsdam infrastructure functions and may spur further intersection development at Park St. and Elm St. as well as Market St. and Main St.