EAU CLAIRE BUS ROUTES

Redesign of Eau Claire's student bus routes

Abstract

Most UW Eau Claire students rely on the bus system. The busses are overcrowded during peak use and desolate during slow times. This project discovers the strengths and weaknesses of the bussing infrastructure and explores possible solutions.

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Background

The dominant issue of the bus routes in Eau Claire is that they are overcrowded during peak use times and deserted during other times. This topic is rather important because if students feel that the bus is the most convenient/ efficient way to get to class then there will be less demand for on campus parking. If the bus route is second class to driving to campus, the students will choose to drive rather than take the bus which increases our cities carbon footprint. By building better systems in our city, the citizens will naturally use the best system available (hopefully biking or bussing).

Typically, an urban planner would tackle this problem by looking at a few different factors. The amount of stops the bus will take, the number of busses needed and how long the routes will take are a few of these factors. With the increasing number of students, it is time to look at the routes again to see if there can be some improvement done to the current systems.

In order to optimize the current bus systems of Eau Claire, there will be a few factors to look at. First thing to pay attention is the cost of running busses. Busses cost anywhere from 50-195 dollars per hour to run (Makechnie). For a city the size of Eau Claire these costs can be very significant to the local economy. Any new system must be within a reasonably close margin to the original cost.

Adding a 3rd route to the student area of the city's bus routes may be a good way to divide the bussing load and to speed up the process entirely. By doing this, students that live downtown would be able to get to campus quicker and on less crowded busses. Alternatively, these new routes must be much more efficient to keep running costs at a minimum.

Methods

-Current Bus Routes-

The current student routes are the 9 and the 19 routes. These routes reach most of the student residential areas including the Randal Park district, university dorms, and the Metro Crossing Apartments.

Route 9 or the water street bus, services a large portion of students in downtown Eau Claire as well as the Randal park district. The main issue with the 9 route is that is becomes quickly overcrowded as it services most of the student housing areas. It is home to 3 busses

during peak use times and one during the evenings. Round trip for each bus on this route takes 18.5 mins (Double Map)

Route 19 otherwise know as the Stein Boulevard route, services the upper campus area where the dorms are located and the Metro Crossing apartment complex. This route is not as overcrowded; however, it travels a long way resulting in a slow 24 min round trip (Double Map).

Current Bus System	9	19
Stops	10	9
Route Distance	3.9 mi	5.5mi
Round Trip Time	18.5 mins	24 mins
Busses	4	2

-Digitizing the Current Routes-

The first step in this project was to digitize a map of the current bus routes as a starting point. This provided a good starting point for the analysis. This step was accomplished by using the Open Street Map data paired with the Double Map to digitize each stop and route manually.

-Route Analysis-

Next up in this process was to build a network by using the network analyst tool bar within ArcMap. After building this network it is time to run a route analysis. The route analysis function uses the current bus stops and runs an algorithm to determine the shortest possible route while still going through each point. This function separates each route based on the route name of each bus stop.

-New Route 9-

When designing a new bus route, it is important to take a few factors into account. The factors for route nine were: Distributing the load between routes, shorter route distances, less stops per route, all while still considering the current bus stops. Route 9 will be split into 2 routes to combat crowded busses. These 2 routes will be called route 9.1 (Randal Park) and 9.2 (Downtown). When digitizing these new routes, carful consideration of the old routes was observed in order to avoid missing important areas of service.

-New Route 19-

For this route similar considerations were observed. By cutting down on the stops, the students may need to walk further but the route times will be shorter. do we really need 3 bus stops on upper campus? Another change was to route the bus to go up and down the hill. This cut out the annoying state street hill loop and significantly shortens the ride time.

Results

-Map of Current Routes-

The resulting product of digitizing the current routes (seen right) was used as a visual aid through out this project. Take note of route 19 where it loops around by state street. Another note worthy point is looking at the amount of time spent on Clairemont (hwy 12) this road is notoriously slow due to the amount of lights and this effects the bus travel times.
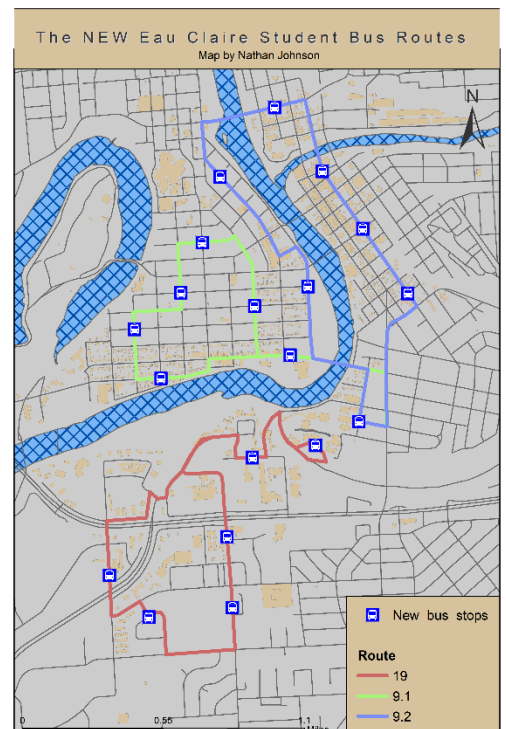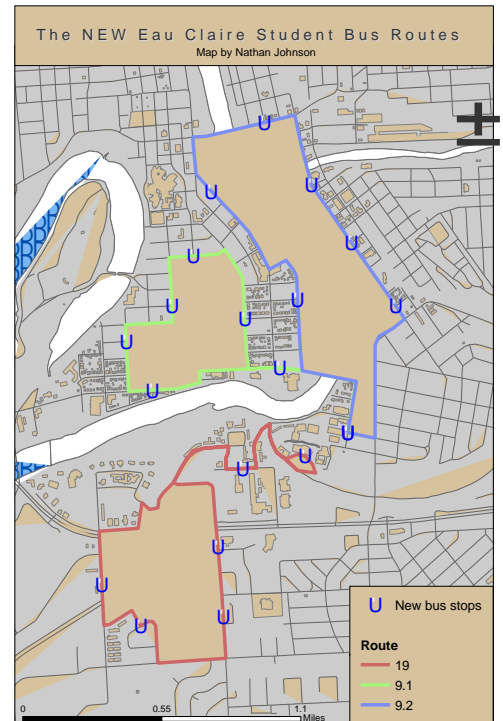
-Route Analysis-

The result from running the route analysis turned out to be rather unexciting. The program produced an optimal route which just happened to be the same as the current route. The only slight difference was that now route 19 utilized the campus hill and Garfield ave. Although bus travel on Garfield ave. is prohibited, the campus hill is open to university vehicles; aka busses.

-New Route 9-

By splitting route 9 into 2 separate routes, 9.1 and 9.2, the bus system will be more efficient and reach more students. With 3 busses running on route 9.1 and 2 busses running on route 9.2 the wait times at each bus stop will be approximately 5 and 9 mins respectively. This efficiency has been accomplished by shortening the route and removing unnecessary stops.

-New Route 19-

To optimize route 19, it seemed clear that running the busses up and down the campus hill was the best solution. Doing this would could be an issue due to the foot crossing at the bottom of the hill, however a simple crossing light would mitigate this issue. This new route is now an entire mile shorter than the previous version which makes running this route cheaper allowing the expansion of rout 9.

The NEW Eau Claire Student Bus Routes
Map by Nathan Johnson

U New bus stops

Route
— 19
— 9.1
— 9.2

The NEW Eau Claire Student Bus Routes
Map by Nathan Johnson

New bus stops

Route
— 19
— 9.1
— 9.2

NEW Bus System	9.1	9.2	19
Stops	7	7	6
Route Distance	3.5 mi	3.6 mi	4.5 mi
Round Trip Time	16 mins	17 mins	19 mins
Busses	3	2	2

Discussion

The next step in a project of this sort would be to present the research and findings to a city planner or at a city board meeting. For a project like this to work the city would need to work with the university to agree on letting the busses use the campus hill and to verify that the appropriate areas are being serviced. Additionally, even for this project to be approved one would need to provide enough reason to justify investing money into moving bus stops and such.

This project provides an introductory view on the concepts of route planning and a few of the strategies involved. It would be fun to explore these strategies within the programming realm such as R but it would be difficult to do with out a visual reference to start with.

Conclusion

The old bus system of Eau Claire is overcrowded and slightly inefficient. The route itself is the best optimized for the current stops. Without completely changing the bus stops there is no better way for the bus routes to exist. By modifying the routes completely and looking at out of the box ways to change them it is possible to obtain a more efficient system. This more efficient system utilizes more busses with less stops and less overall running time. The overall run time is what dictates the cost of funding a route and thereby is cheaper under the new proposed system. This new proposed system reaches a larger area of students and would be much less crowded as well as being more efficient with shorter wait times.

Even though this new proposed bus system may seem incredible and magically efficient, it would take time to be approved by the city and ultimately would most likely be shut down or not even considered. Until then though, a great way to avoid crowded busses and long wait times is to ride a bike. Biking in Eau Claire is easy and efficient. In most cases biking to campus from student housing areas is much quicker than taking the bus.

Ride a bike.

Sources

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