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A GIS Analysis of the USF Campus Bus Transit Stop Accessibility

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Walking, biking, using mass transit...these alternatives to driving were all explored as we celebrated "USF Transportation Day" on February 28th. This event, sponsored by Bike/Walk Tampa—as well as a number of related organizations, including SPA's own Student Planning Organization—was a great success as it promoted the need for multi-modal transportation systems, safer bicycle lanes, clean vehicles, and increased access to transportation systems in our community.

The USF campus remains quite automobile-dominated, but our campus does have the Bull Runner bus system that can help transport students, faculty, and staff willing to leave their cars at home. How easy is it to use the Bull Runner? Using Geographic Information Systems (GIS), we can evaluate our current access to the USF Buller Runner bus system as a case study.

The USF Tampa campus covers 1.5 square miles and includes over 200 buildings. However, we only have 13 roads that add up to 7.5 center line miles (all lanes) to traverse the campus. For comparison, a 1.5 mile area in Brandon averages to about 20 miles of roadway and about 40 miles in South Tampa neighborhoods. So, the limited roadways make it tough to get around campus and find a parking space close to your destination, but it also increases the distance one must walk to catch a campus bus.

This spatial analysis measures the walking time between all USF building entrances and bus stops using a pedestrian network. The GIS data layers include sidewalks/pedestrian paths, bus stops, and building footprints. The walk times are based off the average walking speed (4.6 ft/sec) and incorporates the campus terrain, where there is an elevation variation of 35 feet. The ability to cut through buildings was not considered because not all entrances and exits are accessible by the public. Figure 1 shows the bus route on the north side of campus. As you can see, the RLA building has the furthest walk to the bus stop.

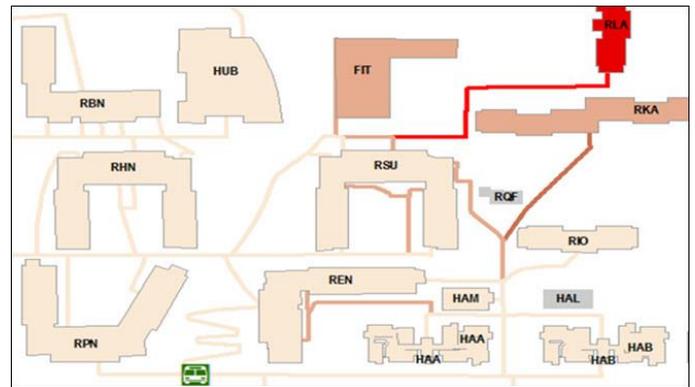
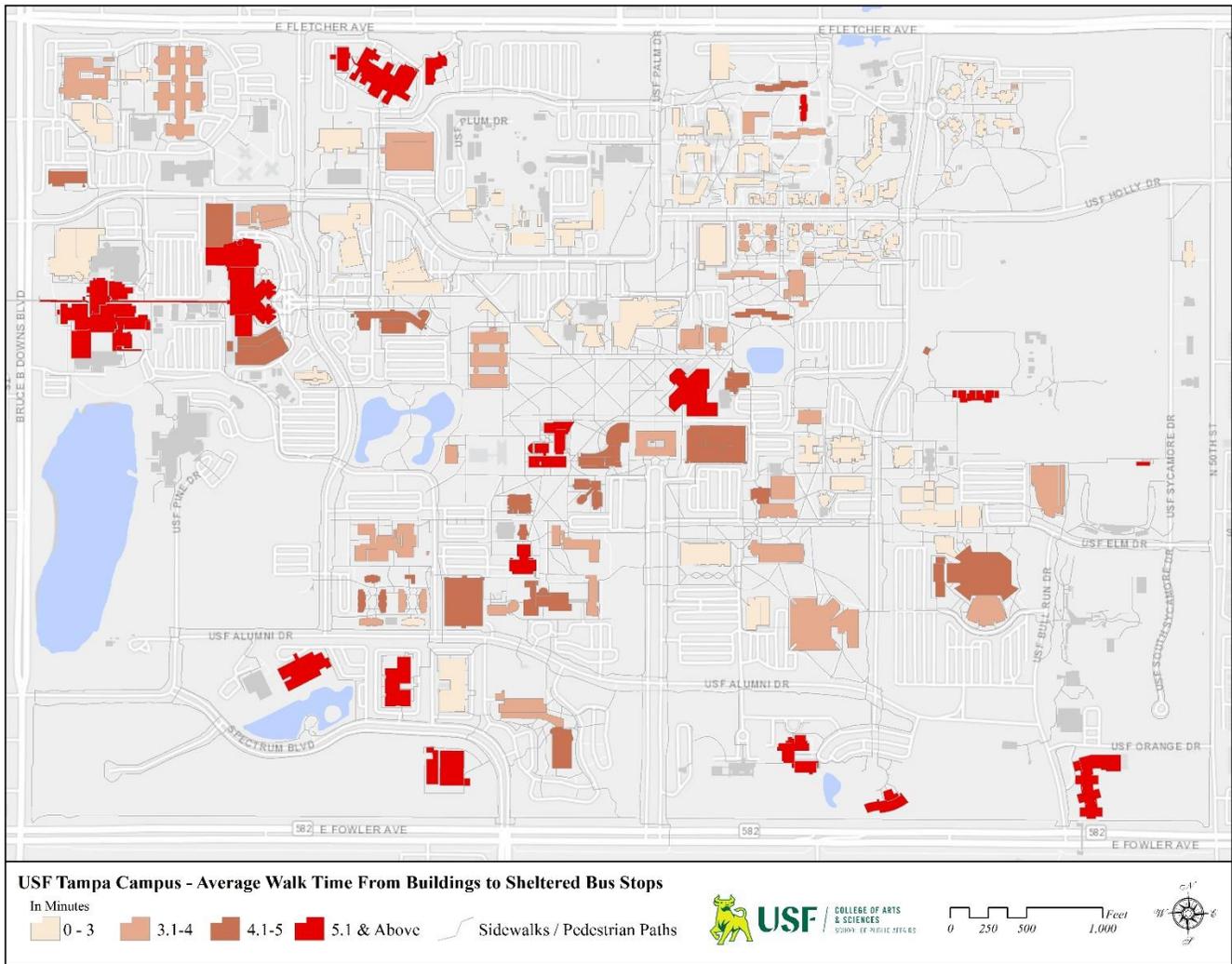


Table 1.

Bus Stop Type (Total Stops)	Average Walk Time to Bus Stop	Maximum Walk Time to Bus Stop
All Campus Stops (77)	2:26	6:06
Campus Stops with Proper Pedestrian Infrastructure (67)	2:30	7:06
Sheltered Stops (29)	3:23	8:10

The results in Table 1 indicate that, on average, we are about a 2.5 minute walk to the closest campus bus stop. However, the time increases based on the quality of the bus stop. There are 10 stops on campus that have no pedestrian infrastructure. They are dirt or grass stops without sidewalks. The average walk time was only 4 seconds more with them removed from the analysis; however, the maximum time (building with the longest walk) jumped a minute. As for sheltered bus stops, this is where there were significant increases in time. The average walk time increased by 57

seconds and the maximum time jumped another minute and four seconds. Over eight minutes to walk to a sheltered bus stop is significant when weather is a factor. The higher walk times to all types of bus stops belong to research, medical, and administration buildings.



The results so far have measured walk times to the closest bus stop, regardless of the bus route. Most routes on campus connect with each other at some point, so as long as you can access the system, you can get to your destination. However, many students commute to and from the many student housing complexes surrounding campus. Three routes extend off-campus: the C, D, and F lines. The C line does a loop north of campus, the D line extends west of campus, and the F line covers the areas south of campus. On average, it takes over twice the time to walk to an off-campus route stop than an on-campus route stop (see Table 2). The upshot? Bull Runner stops are abundant on campus, but walk times to stops with good sidewalks and bus shelters are harder to find. This might discourage Bull Runner use on very hot or rainy days, or for people with limited mobility.

Table 2.

Off Campus Route (Sheltered Stops)	Average Walk Time to Bus Stop
Route C	5:35
Route D	5:54
Route F	6:52

Network Analyses allow us to take a closer look at transportation systems by calculating travel times and potential routes. These tools are also essential in transit-oriented development planning. A spatial analysis of transportation networks relies heavily on the detail and accuracy of the network involved in the analysis. With a well-built network, service areas of transit options can be used to evaluate many socio-economic factors to assist in the planning process.