



## Introduction

- Florida State University (FSU) serves a large student population that often relies on public transportation provided by the Seminole Express and Star Metro bus routes for commuting.
- Limited access** to public transit in college-towns can have a large negative impact in student's academic performance.
- Geographic Information Systems (GIS) are a powerful tool for analyzing **spatial relationships** between residential areas and transit infrastructure.
- This project uses spatial data from Star Metro and **accessibility modeling** from GIS to analyze how well current bus stop locations serve student housing areas near campus.
- Finding these areas near campus that lack accessibility for students can help analyze the relationship between housing density and **transit accessibility**.

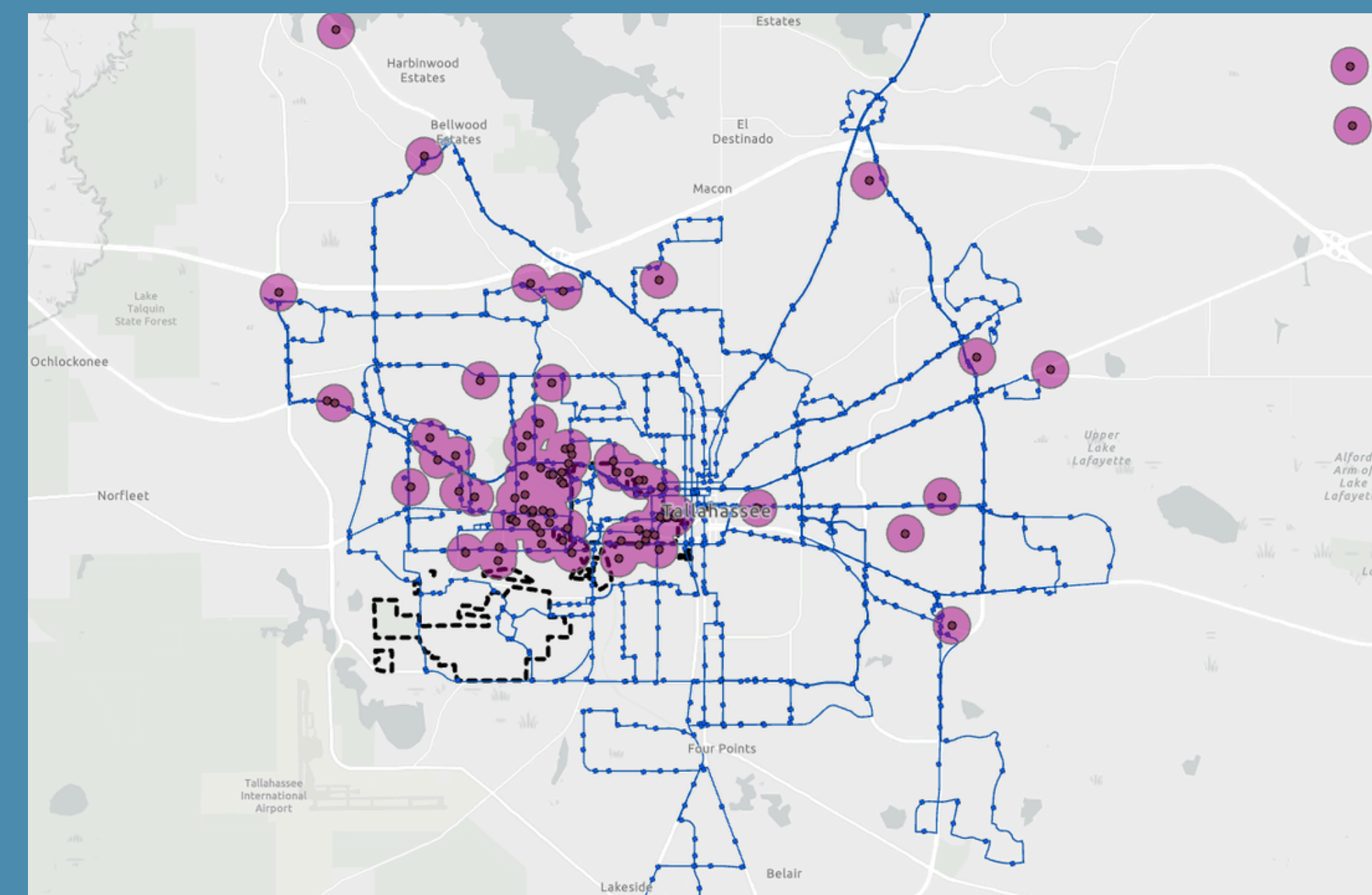


Figure 1: 400-meter walking distance buffer around housing complexes

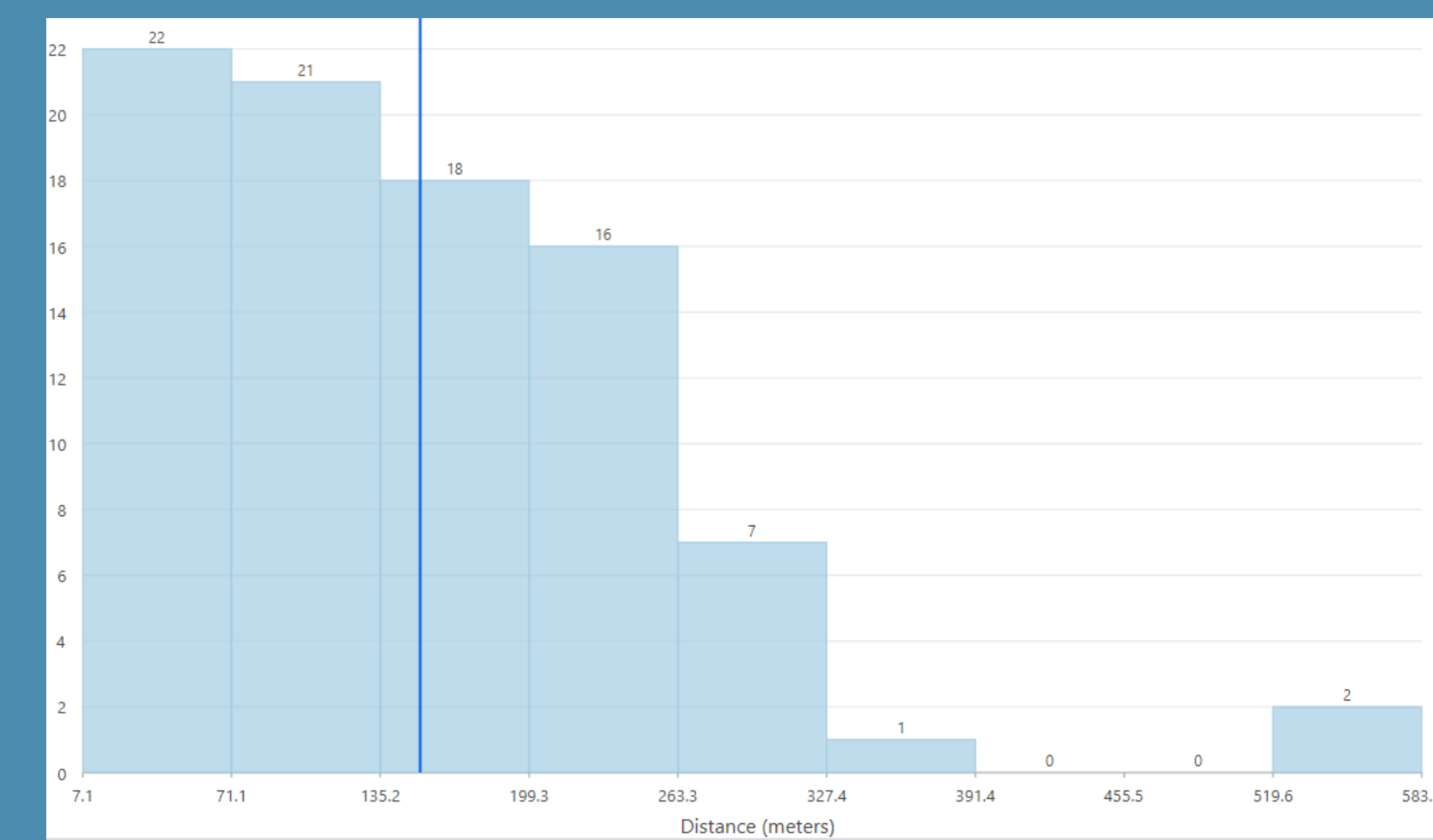


Figure 2: Distance statistics analyzing walking distances from bus stops to housing complexes

## Methods

### Data Collection

- Attain General Transit Feed Specification (GTFS) data for the Seminole Express Bus System from Star Metro
- Imported GTFS files (such as routes, trips, shapes, stops etc.) in the ArcGIS software to be analyzed
- Collected residential and demographic data for student housing blocks through FSU a provided website
- Acquired GIS-compatible shapefiles for campus boundaries and residential zones

### Data Processing

- Converted GTFS shapefiles into polyline route layers
- Created a bus stop point layer
- Joined trip and route tables to generate route-level attributes
- Projected spatial data into a consistent coordinate system

### Accessibility Analysis

- Generated buffer zones of 400 meters around apartments to represent walking distance to bus stops.
- Calculated the number of serviced areas within each buffer
- Identified housing areas outside walkable transit coverage

### Evaluation & Recommendations

- Compared student housing density with the distribution of bus stops
- Mapped underserved areas
- Analyzed on demand transit data to visualize opportunities for service optimization

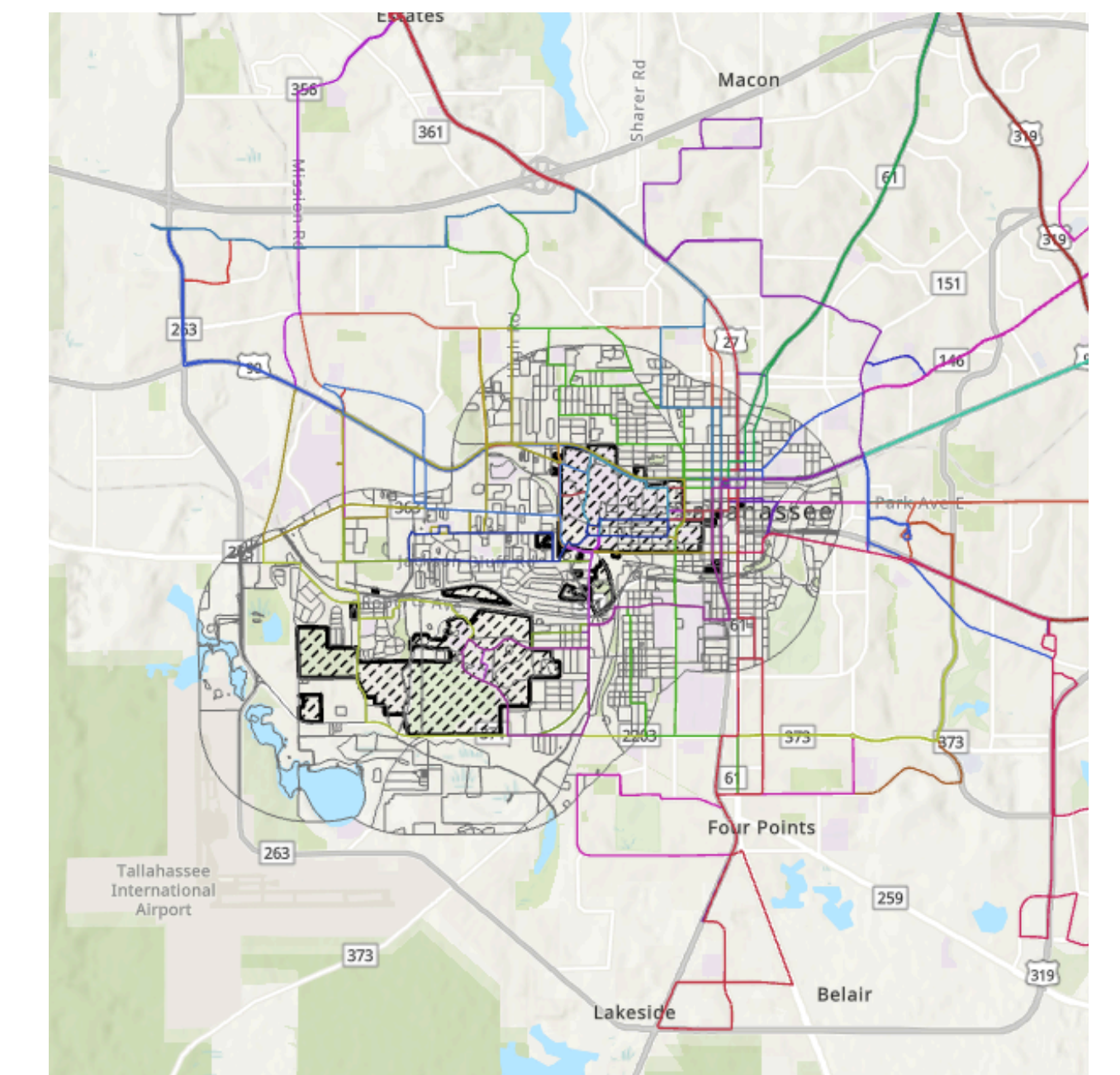


Figure 3: Tallahassee grid and routes

## Results

- The spatial analysis revealed that public transit access is generally strong for areas of high student density which surround FSU. The results indicate that approximately 92% of student housing complexes are within the measured walking distance threshold.
- The calculated minimum distance from a bus stop of 7.1 meters shows that there are apartments that are located directly adjacent to transit stops, providing convenient access.
- The graph of distributions is right-skewed, so many apartments are within a similar range of distance, with the mean distance being 362.5 meters (roughly a 5 minute walking distance).
- However, a few housing complexes fall out of this range, with the maximum distance of 8,116 meters highlighting that several housing locations are notably further from transit access. These locations typically occur in areas of lower student density.
- Spatial patterns observed in the maps indicate that housing located closer to FSU campus have higher transit accessibility, with more stops being located within the overlapping housing buffers.
- These patterns suggest that transit accessibility decreases with distance from campus, the analysis of student housing data displays a positive correlation between housing that is further away from campus and is more cost efficient.

### Key Findings:

- 92% of housing is within walkable distance to bus stops
- 400 meter accessibility buffer
- Minimum distance from bus stops is 7m
- Maximum distance is 8,116m
- Average distance from bus stop is 365.5m
- Higher housing density has more transit access

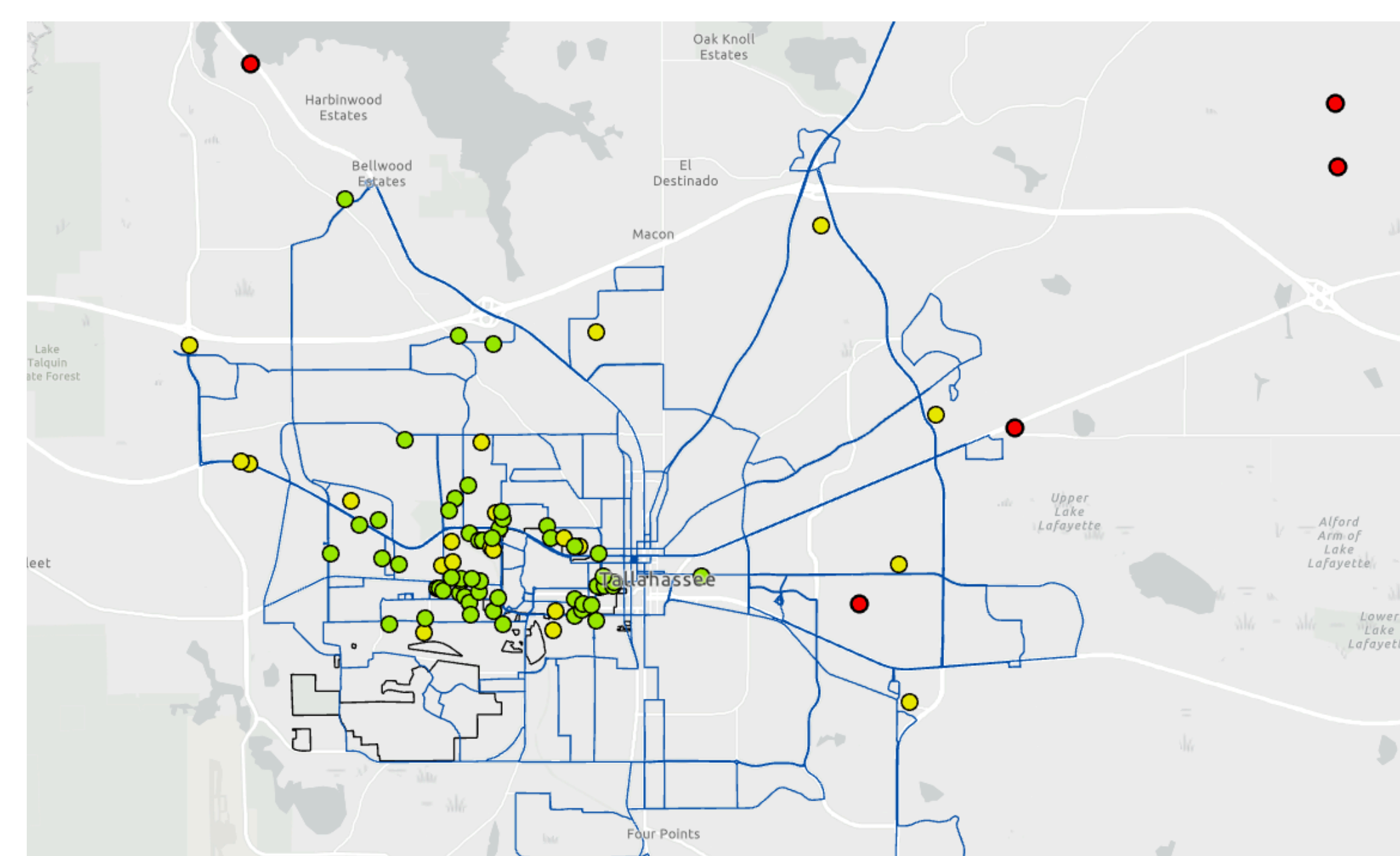


Figure 4: Distance from stops transit color analysis

## Conclusions

- The Seminole Express transit network provides strong **accessibility coverage** in student housing areas within a mile range of campus.
- The walkability analysis determines that most major housing complexes are located within walking range of at least one bus stop.
- Housing locations further from campus tend to have fewer nearby transit stops and longer walking distance, these areas correspond with more affordable housing options, suggesting that students living further from campus may experience reduced **transit access**.
- This research demonstrates how GIS based **spatial analysis** can support data based transportation planning decisions.

### Acknowledgements

Special thanks to my research mentors, Dr. Li and Dr. Guo, for their guidance and mentorship, as well as to Cassidy Kearney from StarMetro and the City of Tallahassee for providing the data for this project.

### References

