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METRIC CONVERSION CHART

U.S. UNITS TO METRIC (SI) UNITS

LENGTH

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km

METRIC (SI) UNITS TO U.S. UNITS

LENGTH

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi

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16. Abstract

The objective of this project was to develop and evaluate a Community-Based Participatory Research (CBPR) methodology for developing transportation mobility plans by assessing the needs of travelers in the community. The methodology was tested and refined at two Gainesville, Florida, neighborhoods: Duval Heights in the East Gainesville (EG) area and the Haile Plantation (HP) development. These two communities have contrasting demographics and transit usage characteristics and are therefore good case studies for this project. Using the Five A's (accessibility, acceptability, affordability, adaptability, and availability) framework to assess the transportation network for the two Gainesville communities, Duval Heights and Haile Plantation, researchers developed a CBPR methodology based on two types of public engagement. The first involved the engagement of a small group of people (called the community advisory board, or CAB) over the entire process. The second was the inclusion of an adequately large and representative subset of community members to provide data and opinions collected via qualitative methods (focus groups) or quantitative methods (surveys). Based on the data collection through focus groups and surveys, the research team concluded that participants from both neighborhoods desire more alternative transportation options and have concerns about the quality of transportation infrastructure. It was also concluded that facilitating the participation of people belonging to all income levels and from different demographics is crucial. Transportation mobility assessments influence transportation investment decisions. If these assessments are not comprehensive, then the transportation plan may not be comprehensive either.

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EXECUTIVE SUMMARY

Given the significant technological changes in transportation, it is essential that cities develop tools and methodologies to assess the transportation needs of the communities and provide suitable mobility solutions for mitigating congestion while increasing the availability and accessibility to a variety of transportation modes. The objective of this project was to develop and evaluate a Community-Based Participatory Research (CBPR) methodology for developing transportation mobility plans by assessing the needs of travelers in the community. The methodology was tested and refined at two Gainesville, Florida, neighborhoods: Duval Heights in the East Gainesville (EG) area and the Haile Plantation (HP) development. These two communities have contrasting demographics and transit usage characteristics and are therefore good case studies for this project.

A review of previous CBPR studies found that there is a need to assess transportation needs within community environments and include community engagement formally in the transportation planning process. With the use of a CBPR methodology, community members often became leaders and assigned themselves to meaningful actions to implement goals and plans. As equity has become the focus of public debates and policy discussions, the emphasis is on better engaging the public and better understanding their travel needs. This further supports the application of CBPR methodologies to engage the community and develop equity-based accessibility measures. A review of the mobility performance measures in the project study area of the two case studies, East Gainesville and Haile Plantation neighborhoods, found that most of the measures included in these plans are related to commonly used auto-based mobility, including vehicle miles traveled, LOS, and vehicle- or person-hours of delay. These measures reflect total car usage trends and road capacity conditions and are very useful to identify roadway projects that need improving, especially for long-term transportation plans. Transit-based mobility measures are provided, but they are much fewer and include ridership, revenue miles, and weekday span measures. These measures do not address frequency and coverage, which relate to accessibility and availability of transportation options.

Based on the conclusions of the literature review and review of local mobility performance measures in the study area, the project team used the Five A's of senior-friendly transportation identified by the Beverly Foundation and National Volunteer Transportation Center (NVTC), and translated them into the following transportation performance measures:

- Availability: Existence of transportation when needed
- Accessibility: Transportation is reached and used in light of riders' abilities and disabilities.
- Affordability: The costs are within the users' means or reimbursable.
- Acceptability: Meets standards of cleanliness, safety, and courteous and helpful operators
- Adaptability: Modification can be made for disabilities and special needs.

Using the Five A's (accessibility, acceptability, affordability, adaptability, and availability) framework to assess the transportation network for the two Gainesville communities, Duval Heights and Haile Plantation, researchers developed a CBPR methodology based on two types of public engagement. The first involved the engagement of a small group of people (called the community advisory board, or CAB) over the entire process. The second was the inclusion of an adequately large and representative subset of community members to provide

data and opinions collected via qualitative methods (focus groups) or quantitative methods (surveys). These persons, unlike the members of the advisory board, are not involved in all stages of the CBPR (for example, they do not contribute to designing surveys).

The methodology developed consists of the following five steps: (1) synthesis of secondary data for the neighborhood, (2) recruitment and engagement of the Community Advisory Board, (3) qualitative data collection and focus group surveys, (4) quantitative data collection and surveys, and (5) synthesis, close-out, and strategies for continued engagement.

Based on the data collection through focus groups and surveys, the research team concluded that participants from both neighborhoods desire more alternative transportation options and have concerns about the quality of transportation infrastructure. For the Gainesville metro area, in general, the obstacles to mobility for the studied neighborhoods include:

- Transportation user mistrust of agencies.
- Lack of a well-defined strategic plan for disaster management during critical times such as the COVID-19 pandemic
- Perceived insecurity and lack of safety
- Disconnect between the available transportation options and the various accessibility,
- availability, and affordability needs of the communities.

In order to overcome mobility obstacles in the two studied neighborhoods, the research team recommends implementation of the following steps:

- Value effective communication
- Ensure a strong transportation network of services
- Evaluate microtransit services and their consolidation with available paratransit options
- Investigate aging populations' needs and concerns.

The importance of creating a Community Advisory Board (CAB) before, during development, and after the needs assessment and survey cannot be underestimated. As shown in this research, the CAB can provide input into developing relevant methods for engaging each unique community. For example, one community may prefer email as the primary mode of communication, while another may prefer phone calls; one community may prefer formal interactions, another may prefer informal discussions; one community may have access to a private car, another one may require participants to carpool to a meeting site.

An often overlooked component of public engagement in transportation studies is the role of compensation for a person's time commitment. For this project, members were provided an honorarium for serving on the CAB. Yet once the payment requirement information was requested, the researchers found that some members were not willing to share their Social Security Number, which was required for payment by the University of Florida.

With transportation users mistrust of agencies identified as an obstacle to mobility, facilitating the participation of people belonging to all income levels and from different demographics is crucial. Transportation mobility assessments influence transportation investment decisions. If these assessments are not comprehensive, then the transportation plan may not be comprehensive either.

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1. PROJECT BACKGROUND AND OBJECTIVES

The United States Department of Transportation (USDOT) received proposals from 78 cities across the country in response to its "Smart City Challenge" in 2015[1]. These proposals revealed similar mobility challenges across the country, such as providing first-mile and last-mile service for transit users to connect underserved communities to jobs. It was found that the typical job is accessible to only about 27 percent of the metropolitan workforce by transit in 90-minutes or less. The cities had unique local challenges such as low-income residents moving away from areas of high-frequency transit areas due to an increase in the price of housing (Seattle) and land use patterns being heavily reliant on legacy transportation systems (Detroit).

At the same time, significant technological innovation (electric, shared vehicle use, autonomous vehicles, etc.) is driven by automobile manufacturers (Ford, GM, Volvo, etc.), transportation network companies (TNCs) (Uber, Lyft, etc.), and major technology companies (Google, Apple, etc.) (Golub & Serritella, 2018). However, it is not clear whether these technologies will help address the mobility challenges cities currently face. Given the potential of these innovations, there is a need to assess the current transportation needs and harness new technologies to improve the quality of transportation for a wide cross-section of travelers.

The University of Florida (UF) is the largest employer in Gainesville and hence numerous educational and employment opportunities are available in this area of the city[2]. Both UF and Santa Fe (SF) College students cluster around the southwest area in Gainesville. Since students make up the largest share of transit ridership, the highest service levels are located in this area[3]. Non-student transit utilization occurs predominantly in East Gainesville (EG), which has historically had lower incomes. Throughout this area, almost all census block groups (CBGs) consist of a minority majority with high levels of poverty, limited access to vehicles, and low educational attainment[4]. It is partially composed of the downtown area, which identifies in their strategic plan the desire to "re-center, unite, and sustain" through systematic infrastructure investments[5]. Southwest of Gainesville, Haile Plantation (HP) is an unincorporated community built on the "new urbanism" development concept, which combines principles of architecture and urban planning to create areas where people can live and work within their own neighborhoods[6]. This community is high-income, car-centric, and currently served by only one bus route from Regional Transit Service (RTS)[7].

The City of Gainesville (COG) participates in the Smart Cities Collaborative and has a strategic partnership with UF[8,9]. Current COG several smart city initiatives include the

[1] https://www.transportation.gov/sites/dot.gov/files/docs/78SCCApplicationsOverview.pdf
[2] http://www.gainesville.com/article/LK/20110509/News/604141452/GS/
[3] http://go-rts.com/files/ridership/September_17_Ridership.pdf
[4] https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml
[5] https://issuu.com/dumontjanks/docs/2016_1114_publicrollout_final
[6] http://www.webenet.com/HaileVillageCenter-NewUrbanism.mht
[7] http://go-rts.com/schedule-spring/pdf/2018_SummerShedule_web.pdf
[8] https://strategicdevelopment.ufl.edu/2018/04/gainesville-selected-to-participate-in-smart-cities-collaborative/
[9] https://www.guidetogreatergainesville.com/university-of-florida-and-the-city-of-gainesville-partnership/

Gainesville Mobility Autobus and advanced intersection data analytics.[10, 11] Both Uber and Lyft services are relatively new to the city and growing their ridership[12]. Gainesville is also serviced by "Zipcar", a car-sharing program, with several locations around the UF campus. Many of these technologies were introduced in recent years and there is potential for many more to be implemented in the near future.

Given the significant technological changes in transportation, it is essential that cities develop tools and methodologies to assess the transportation needs of the communities and provide suitable mobility solutions for mitigating congestion while increasing the availability and accessibility to a variety of transportation modes. The objective of this project is to develop and evaluate a Community-Based Participatory Research (CBPR) methodology for developing transportation mobility plans by assessing the needs of travelers in the community. The methodology was tested and refined at two Gainesville, Florida neighborhoods: Duval Heights in the East Gainesville (EG) area, and the Haile Plantation (HP) development. These two communities have contrasting demographics and transit usage characteristics and are therefore good case studies for this project.

The next chapter summarizes the literature review conducted to identify previous studies employing CBPR, and to assess transportation planning tools. The third chapter provides an overview of the two study neighborhoods including their socioeconomic characteristics and availability of transportation modes. The fourth chapter describes the conduct of focus group studies conducted at the two neighborhoods and summarizes the research team's findings. The fifth chapter provides the development and deployment of a survey conducted to obtain further feedback from the two communities. The sixth chapter summarizes the obstacles to mobility identified for the two neighborhoods, while the seventh chapter provides the methodology developed for communities interested in employing the CBPR methodology. The last chapter provides conclusions and recommendations from the research.

[10] https://strategicdevelopment.ufl.edu/2018/05/i-street-autonomous-bus-testing-on-local-streets/
[11] https://www.iteris.com/news/city-gainesville-chooses-iteris-vantagelive-smart-transportation-initiative
[12] http://www.gainesville.com/news/20140709/uber-taxi-service-looks-to-gainesville

2. LITERATURE REVIEW

This chapter provides an overview of the literature review conducted to identify mobility performance measures, past studies using CBPR, and transportation planning methods for a needs assessment. The literature review focused on three general topics: a) measurement of mobility and related concepts; b) CBPR studies related to transportation needs; c) transportation planning policies and processes for Gainesville and Alachua County. The research team developed search strategies and utilized bibliographic databases, reports, as well as plans available for the greater Alachua geographic region. More than 600 research papers and studies were considered, and 66 references were reviewed in more detail and are referenced in this document. This chapter provides a summary of the literature review findings to provide a foundation for the study. Because the literature review is very long and detailed, it is provided as supplemental documentation in Appendix A.

Several different definitions of mobility are provided in the literature. According to the HCM 6th Edition (HCM6), mobility is defined in four dimensions: the quality of travel, the quantity of travel, capacity, and accessibility. Elsewhere, mobility has been defined as the movement of people or goods from their origin to destinations (Litman, 2003), or as the cost and time needed to make trips (Norwood & Casey, 2002), or as the ability of a road network to enable people to reach shopping places, school, job and other opportunities with sensible level of service in terms of traffic conditions (El-Rashidy & Grant-Muller, 2015). Therefore, depending on the perspective, mobility is defined as relating to one or more attributes (efficiency, accessibility, fiscal attributes, and others).

Accessibility, or access, broadly reflects the availability and accessibility of destinations or transportation modes. The Beverly Foundation identified Five A's of senior-friendly transportation, which are also important in transportation regardless of the age, and National Volunteer Transportation Center (NVTC) translated them into Five A's of passenger-friendly transportation. They are:

i. Availability: Existence of transportation when needed
ii. Accessibility: Transportation is reached and used in light of riders' abilities/ disabilities
iii. Affordability: The costs are within the users' means or reimbursable
iv. Acceptability: Meets standards of cleanliness, safety, courteous/helpful operators
v. Adaptability: Modification can be made for disabilities and special needs

Table 2-1 summarizes the mobility-related performance measures identified in the literature. There are six dimensions of mobility and each one employs a different set of measures. There are also several different dimensions to mobility and each dimension is measured differently. Based on our literature review we conclude the following:

- Different studies measure mobility differently, and there are not necessarily clear distinctions between the different dimensions of mobility.
- In some studies, efficiency is included in the definition of accessibility.
- The research team did not find any studies that comprehensively examine all dimensions of mobility.

- There were no studies identified which explicitly measure mobility using CBPR. Many of the performance measures identified rely on traveler perceptions and traveler feedback. However, it is not clear whether all traveler needs and priorities are considered through the performance measures defined and used to-date.

Table 2-1 Summary of Performance Measures

Performance Measures	List of Measures
Efficiency	Travel speeds, travel time, and ton-miles, Travel surveys to quantify person-miles, Traffic data to compute the auto and transit vehicle average speed, Travel rate index, Average daily travel hours per person, and Average minutes of vehicle delay Capacity Demand to capacity
Accessibility	Land use accessibility and level of service (LOS) Connectivity Index, Proximity-based measures Cumulative opportunities measure, gravity-based measures Utility based measures
Availability	Daily service hours, Annual service kilometers per capita Destinations within 0.5km of transit service Availability of services for the disabled or disadvantaged people
Affordability	Transportation expenditures relative to household incomes Fares relative to average incomes, Household costs and transportation costs relative to total household incomes Travel costs
Acceptability	Benefit and comfort, Satisfaction and effectiveness, Simplicity or disagree of use Willingness to purchase a system, and the cost the people are ready to incur
Adaptability	Plans considering future changes in social, economic, environmental, and technological conditions.

There are limited CBPR studies pertaining to transportation. Therefore, there is a need for researchers and community stakeholders to partner, in order to assess transportation needs within community environments, and also formally include community engagement within the transportation planning process. For the few studies that were found to have focused on transportation, community stakeholder engagement guided data collection to be more thorough, population-centered, and directly related to project goals. Involvement from community members helped to ensure data and plans served the population or community needs. Consensual decision-making was reported as one of the most positive outcomes from all studies reviewed. With the use of CBPR methodology, community members often became leaders and assigned themselves to meaningful actions to implement goals and plans. While collecting data, researchers and stakeholders were able to identify needs in transportation planning to better serve the members of their community.

The research team reviewed several planning documents related to mobility in the City of Gainesville, including plans, reports, and studies at the state, regional, and local level. Based on these we summarized relevant information regarding the recommended performance measures related to mobility, accessibility and transportation needs in the study area.

Most of the measures included in these plans are related to commonly used auto-based mobility, including vehicle miles traveled, LOS, and vehicle or person-hours of delay. These measures reflect total car usage trend and road capacity conditions and are very useful to identify roadway projects that need improving, especially for long-term transportation plans. Transit-based mobility measures are provided but they are much fewer, and include ridership, revenue miles, and weekday span measures. These measures are not as specific regarding frequency and coverage, which are two essential parts of transit planning.

The transportation element in East Gainesville Plan is relatively old (developed in 2003), and some issues or proposals do not apply to the current conditions. However, we still found it very useful in that we have a better understanding of the context for the communities on the east side of the city. Many of the issues identified then still exist today.

In the transportation plans examined, there are some considerations for accessibility measures. For example, the FDOT Source Book includes two cumulative-opportunity accessibility measures (job accessibility by auto and job accessibility by transit) in the list of performance metrics. Notably, in the 2003 Plan East Gainesville Final Report, accessibility is among the major issues identified, including lack of transit access during non-peak hours, lack of accessible destination clusters, and poor accessibility for pedestrians and bicyclists due to crossing difficulties and poor infrastructure. While this plan is somewhat outdated, we believe that the major issue of low accessibility for non-driving modes still persists.

In terms of public involvement, a couple of plans laid out very detailed and comprehensive planning processes. However, the research team found limited discussions on incorporating insights from public engagement to measure mobility or accessibility in the process. Most of the public engagement activities focused on identifying areas or roadways of problems.

3. ASSESSMENT OF THE TWO STUDY NEIGHBORHOODS

This chapter describes the existing transportation system and the available transportation modes in the Duval Heights and the Haile Plantation neighborhoods. It includes maps of the highway system, bike trails and local streets, along with mobility-related information including travel times for major origin- destinations, and a summary of transit service to and from these neighborhoods. The chapter also provides GIS mapping and visualization data for safety/crash related metrics and highlights the quantitative and qualitative information related to the Five A's (Accessibility, Availability, Adaptability, Affordability, and Acceptability).

Duval Heights and Haile Plantation are neighborhoods of similar size, but they are significantly different in terms of their demographic and socioeconomic characteristics. Generally, East Gainesville is known to have higher rates of poverty and more no-vehicle households than the greater Gainesville area. The term East Gainesville is often equated with any area on the east half of the city possibly in need of redevelopment. East Gainesville has not had a legal boundary and portions of the urban area between downtown and Newnans Lake extend past the Gainesville city limits. In this project, we define the boundary of Duval Heights as shown below in Figure 3-1. However, when we use the census data to understand the demographic and socioeconomic characteristics of Duval Heights, we have also considered the portion of land between University Avenue and Hawthorne Road. This portion of land belongs to the same census tract as the Duval Heights neighborhood.

Haile Plantation, as a model of New Urbanism development, is a walkable neighborhood with a town center. The town center has shops, restaurants, townhouses, and a vibrant farmers market. The Haile Plantation boundary is on the following page in Figure 3-2.

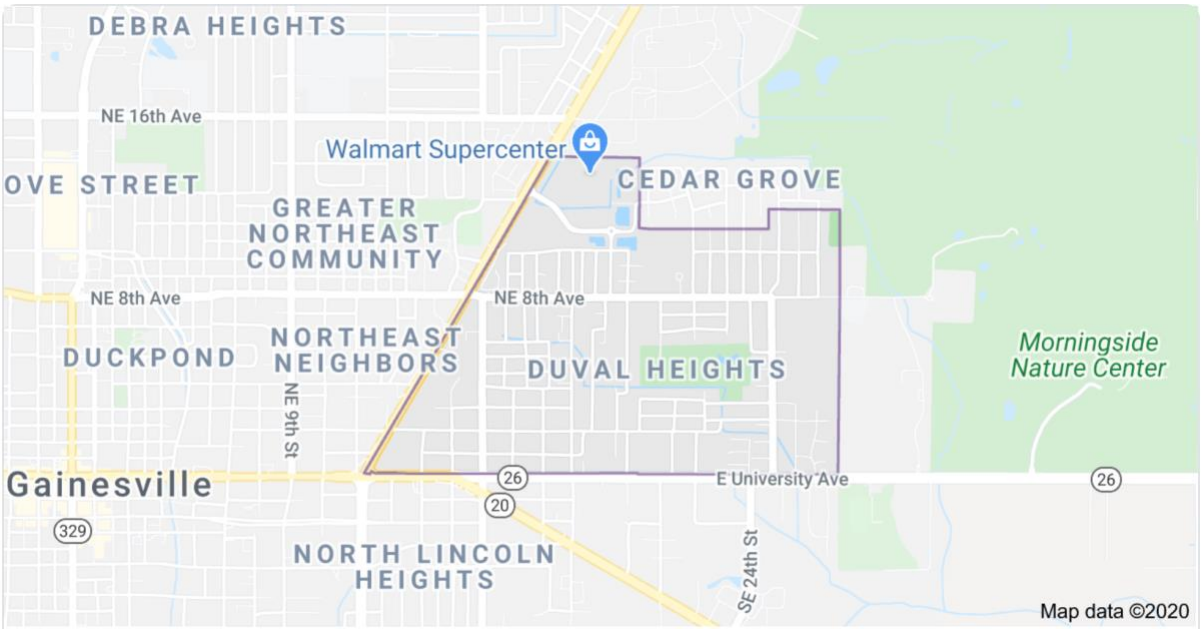

Figure 3-1: Duval Heights Boundary

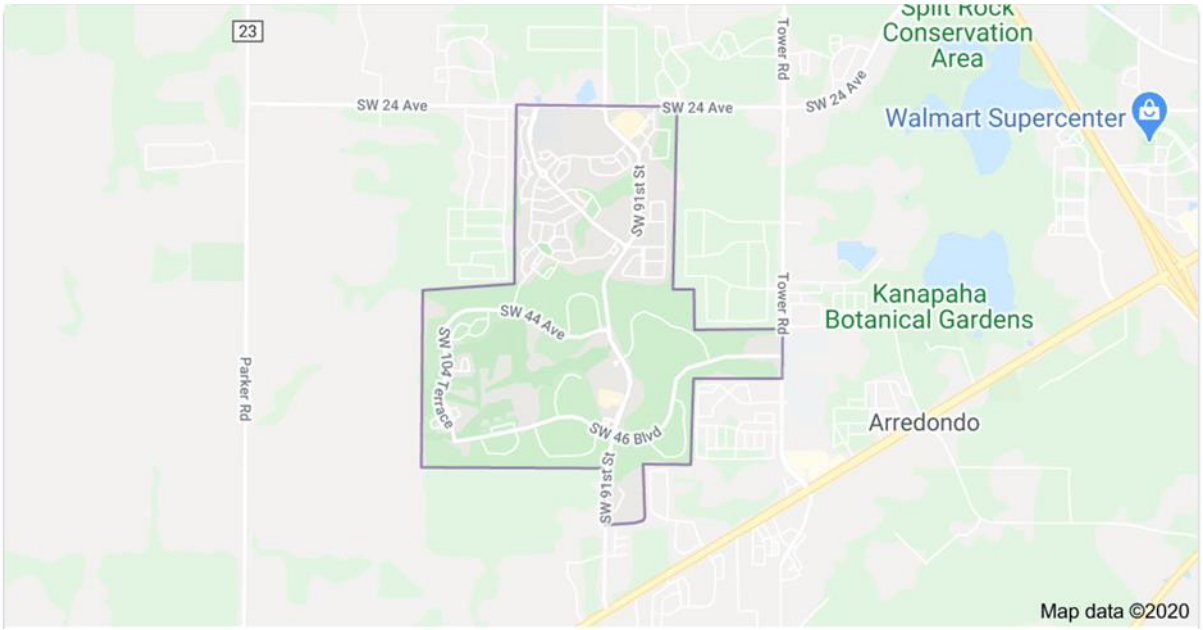

Figure 3-2: Haile Plantation Boundary

The average household income in Haile Plantation ($88k) is more than three times that of Duval Heights ($24k). The number of households without a vehicle in Duval Heights is a major indicator of the lack of mobility options. Most of the homes (98%) in Haile Plantation have a car, whereas in Duval Heights nearly a third of the homes (28%) do not have a car and are likely to lack convenient access to essential destinations such as job opportunities and hospitals.

The University of Florida and Shands Hospital are major employers in the city. Travel times from both neighborhoods during peak hours to and from these destinations are long and unreliable. Most employment opportunities for Duval Heights residents require one or more transfers in the bus system. In terms of street connectivity, Haile Plantation has a cul-de-sac design compared to Duval Heights' grid system. Most shopping destinations are a mile or more from these two residential areas and neither neighborhood is walkable.

Spatial accessibility indicates the potential or the convenience, to reach opportunities (e.g., people, services, amenities, and activities) from a given location. It is commonly operationalized as the number of destinations (e.g., jobs) reachable within a given time by a given travel mode. According to the 2017 data gathered by the Minnesota Access Observatory, the number of jobs accessible with a 30-minute commute (including access/egress time by walking, wait time, and in-vehicle travel time) by car in the morning between 7 and 9 am are the same for the two neighborhoods. However, based on the 2017 data, there is a difference when examining the information for people commuting by transit. As shown in Table 3-1, the number of jobs accessible to Duval Heights residents by transit is over ten thousand, whereas for Haile Plantation it is over 850 jobs (both for a 30-minute bus ride). Note that since August 2019, route 150, an express shuttle service, has been provided to Haile Plantation residents free of charge. Therefore, the number of jobs reachable to Haile Plantation residents within a 30-minute transit trip are likely to be much higher than 850. Nonetheless, job accessibility by transit is still expected to be lower for Haile Plantation residents than that for Duval Heights residents.

Table 3-1: Accessibility to Jobs within a 30-minute Commute (using 2017 data)

Neighborhood	By transit	By car
Haile Plantation	854	117,578
Duval Heights	11,295	117,575

Given these numbers, it is not surprising that fewer than 2% of the Haile Plantation residents walk, bike, or take public transit to work. By contrast, many jobs are reached by transit for Duval Heights residents. In Duval Heights, a quarter of all commutes travel by a non-driving mode. However, Duval Heights residents face availability issues with the bus system during evenings and weekends, as the bus service becomes infrequent during these times. Most bus stops lack shelter or lighting, which can be extremely problematic in areas with high crime rates.

Various safety indicators demonstrate that pedestrian and bicyclist safety is higher in Haile Plantation than in East Gainesville. High speed of vehicular traffic on some of the major roads surrounding the two communities are a cause of concern. Vehicle safety was found to be lower in Duval Heights. Many of the crashes occurred along the main thoroughfares, namely Waldo Road and University Avenue which have higher crash rates compared to Haile Plantation

Additional information regarding assessment of the two neighborhoods is provided in Appendix B.

4. FOCUS GROUPS

This chapter provides an overview of the development, administration, and results of focus groups in Duval Heights and Haile Plantation. The research team followed the Community-Based Participatory Research (CBPR) approach for both the development and administration stages. The focus group discussions centered around the Five 'A's of Transportation (Accessibility, Availability, Adaptability, Affordability, and Acceptability), discussed in the Chapter 2 of this report.

First, selected key members of the Duval Heights and Haile Plantation communities were identified and invited to be part of the two Community Advisory Boards, one for each neighborhood (Duval Heights and Haile Plantation). These members were community leaders such as elected officials, church ministers, youth group leaders, etc., and they helped craft the focus group process and questions such that it would be relevant and productive for their respective communities. Each of the two boards consisted of 2 to 4 members who were paid an honorarium to serve through the entire duration of the project.

The project team conducted four focus groups – two with Duval Heights residents, and two with Haile Plantation residents. At least one Community Advisory Board member was present to jointly facilitate the focus groups with one of the co-PIs. The focus groups examined travel patterns, typical origin-destinations, issues of accessibility and acceptability of various modes, affordability, barriers to various transportation modes, and willingness to pay. The focus group questions were reviewed by the Community Advisory Board members for sensitivity and applicability in their communities.

The next subsection provides background information regarding the two neighborhoods (Duval Heights and Haile Plantation), while subsection 4.2 summarizes the overall methodology. Subsection 4.3 provides the data and analysis for the Duval Heights focus groups, while subsection 4.4 summarizes the data and analysis for the Haile Plantation focus groups. The last subsection discusses conclusions and recommendations from the focus group study.

4.1 Background Information Regarding the Two Neighborhoods

East Gainesville generally has higher rates of poverty and more no-vehicle households than the greater Gainesville area. The term "East Gainesville" is often equated with any area on the east half of the city possibly in need of redevelopment. Duval Heights and Haile Plantation are neighborhoods of similar size, with Duval at three square miles and Haile Plantation at just over three and half square miles. The two neighborhoods are significantly different in terms of their demographic and socioeconomic characteristics. The project team extracted data from the American Community Survey 2014-2019 5-year estimates to report the socioeconomic status of the two neighborhoods. Duval Heights has a population density of 1,450 per square mile, while Haile Plantation has an average of 2,214 per square mile. In Haile Plantation, 83% of the 7,751 total population is white and 4% is black. The population size of Duval is 4,350, with 91% percent of residents being black and 6% identifying as white. For the last forty years, the black population in Duval Heights has made up at least ninety percent of the total. Though near the University of Florida, neither of the two neighborhoods have attracted large numbers of students.

According to the 2010 Census, only 4% in Haile Plantation and 7% in Duval Heights of the population has an age between 18 and 21, among whom only a fraction is expected to be college students. The retiree population is more than 14% in Haile and 11% in Duval Heights.

Duval Heights has experienced a gradual economic decline since the 1970s. A significant proportion (35.3% as indicated by the ACS 2014-2019 data) of the housing units in the neighborhood are vacant. There have been numerous reinvestment projects and failed hopes to strengthen East Gainesville. A major success was the result of a public-private negotiation to build a Walmart in Duval Heights. There is clear economic inequality between Haile Plantation and Duval Heights. The median household income in Haile Plantation is $93,514, while in Duval Heights it is $30,817. The median household income in Haile Plantation is much higher than the city average. By contrast, for the last thirty years, the median household income in Duval Heights has stayed around ten thousand dollars less than the city average. Unemployment rates are several times higher in Duval Heights (16%) than Haile Plantation (4%). About 20% of the population in Duval Heights has less than high school education, in contrast to a 2% in Haile Plantation. The proportion of renters who are rent-burdened (i.e., paying over 30 percent of their household income on rents) in Duval Heights (above 50%) is more than twice as high as that in Haile Plantation (23%), even though rents and property values are much lower in Duval Heights.

Duval Heights also has a lower number of vehicles available per household, with 0.8 vehicles compared to Gainesville's 1.7 available vehicles. A significant proportion of Duval Heights's population thus rely on public transit service to fulfill their travel needs, and the recent census data report about 10% of the workers living in Duval Heights use transit for commuting[13]. In the City of Gainesville, fare for riding the bus for adults is $1.5. Senior citizens over the age of 65, veterans and active duty military, and Medicaid and Medicare recipients can ride the bus for $0.75 while children and ADA certified persons can ride for free. The students at the University of Florida and Santa Fe have unlimited rides with their student ID because part of their tuition fees go to RTS. For a non-student, adult traveler, a monthly pass for the RTS bus system is $35[14]. Rates vary by disability and veteran status.

The number of households without a vehicle is a major indicator for lack of mobility options. In Haile Plantation, less than two percent of the 3,500 homes have no car. In Duval Heights, 28 percent of the 1757 households do not have a car. Therefore, many residents of Duval Heights are likely to lack convenient access to essential destinations such as job opportunities and hospitals. Table 4-1, on the following page, provides a comparison of the two neighborhoods based on their socio-economic characteristics.

[13] http://www.city-data.com/neighborhood/Duval-Heights-Gainesville-FL.html
[14] http://go-rts.com/fares-and-passes/

Table 4-1: Socioeconomic Characteristics for Duval Heights and Haile Plantation

Characteristics	Duval Heights	Haile Plantation
% Male Population	43.19	42.87
% Female Population	56.81	57.13
% White	4.55	81.22
Average HH size	1.55	1.35
Median Age	13.42	22.90
% HH Below Poverty	28.44	9.88
Median HH Income	$30,817	$93,514
% of HH own their home	59.78	74.75
% of HH rent their home	40.22	25.25
Average Vehicular Ownership	1.33	1.81

4.2 Focus Group Methodology

The research team developed a script for the focus groups and presented it to the two Community Advisory Boards for feedback, specifically evaluating the sensitivity and applicability of the questions to the respective communities. The script was revised based on feedback by the two groups, and the research team developed an Institutional Review Board (IRB) application and submitted it for approval by the University of Florida Institutional Review Board (IRB-02). After approval, the project team completed two in-person focus groups for Duval Heights in January and February 2020. However, once the COVID-19 pandemic started, the research team had to adjust the process. We submitted an IRB revision to continue the project by adapting the remaining two focus groups to an online format using Zoom videoconferencing. Prior to submitting the IRB revision, the team obtained Florida Department of Transportation approval to adapt the delivery of the project to a virtual format**.** Appendix C provides the focus group questions.

The project team conducted four focus groups: two for Duval Heights and two for Haile Plantation. As indicated earlier, individuals such as elected officials, church ministers, activity group leaders from Duval Heights and Haile Plantation were invited to form two Community Advisory Boards, one for each neighborhood. The purpose of these groups was to assist with the focus group development, recruitment, group moderation, and confirmation of group findings. Community Advisory Board members were paid an honorarium for serving on this project. City officials waived their honorariums.

4.2.1 Participant Recruiting

The project team used purposive sampling to recruit participants (ages 16-90 years old). Purposive sampling is a technique used to recruit participants with characteristic(s) that enable the project team to best answer the specific research questions (Patton, 2014). Snowball sampling occurred, as recruited participants mentioned they heard about the study from their

peers (Goodman, 1961). The project team distributed flyers at churches, community centers, and libraries. Team members attended community events to recruit participants, such as town hall meetings, food banks, and library classes. Additionally, the team used online sources to recruit participants, for example, emailing homeowner associations and posting on community social media platforms. Potential participants called the study line to complete a telephone screening with the project team. A pre-determined screening script was reviewed with each participant, outlining the purpose and research questions of the focus group, inclusion/exclusion criteria, and the study contact information.

Individuals in the community were eligible to participate if they:

1. Were 16 years and older
2. Had the ability to read, write, and speak English
3. Used a mode of transportation to access their community via a personal vehicle, shared mobility (e.g., ride-hailing like Uber or Lyft), public transit, or received rides from family/friends
4. Resided in Duval Heights or Haile Plantation for a minimum of a year
    a. Due to limitations with COVID-19, Haile Plantation residents needed internet access and Zoom (video and speaker) capabilities to participant in the focus group online.

If interested individuals did not meet these criteria they were excluded from this study.

4.2.2 Sample Size

According to Kitzinger and Barbour (1999), focus groups should include eight to 12 participants in each group. If the aim of the focus group is to allow participants to speak longer or offer more description, then smaller focus group numbers are more desirable (Morgan, 1996). Smaller focus groups were beneficial for this project, as they allowed each participant sufficient time to discuss their perspectives of transportation in the community. The purpose of the focus groups was not to reach saturation, but to understand the Gainesville residents' lived experiences (Saunders et al., 2018). Therefore, the team aimed to recruit a total of 24-32 participants, equating to six to eight participants in each focus group. Although the project team recruited a minimum of 6 participants per focus group, two Duval Heights participants and one Haile Plantation participant did not attend.

4.2.3 Data Management and Data Analysis

Responses to demographic questionnaires and informed consents were held in a password-protected system or locked cabinet in a private and secure locked office at the University. To maintain the participants' privacy, personal names or identifiers were not collected on the demographic questionnaires. Data that was de-identified were available to project team members as approved by the IRB.

After transcripts were checked and verified by the graduate research assistant, the transcript was transferred to NVivo Qualitative Data Analysis software (QSR International Pty Ltd. Version 12, 2018). The research assistant employed thematic and content analysis on each transcript, using the Beverly Foundation's Five A's for Transportation as a framework to

organize the results. The data were analyzed using codes pertaining the Five A's. In qualitative research, a code is defined as a word, and is the "critical link" between data collection and their explanation of meaning (Charmaz, 2001; Saldaña, 2013). The codes were derived from the definitions outlined in The Beverly Foundation Five A's. The number of codes for each of the 5 A were summed and are outlined in the results section for each neighborhood. The demographic questionnaires were analyzed using descriptive statistics.

4.3 Focus Groups and Results for Duval Heights

The project team held the Duval Heights focus groups at the Clarence R. Kelly Center which is in this neighborhood. The Community Advisory Board suggested the Clarence R. Kelly Center as it is a well-known location and conveniently on a bus route for residents of East Gainesville. The focus groups occurred in a small private room.

Each Duval Heights focus group consisted of a 1.5-hour meeting with six to eight participants, a moderator (the PI or Co-PI of the study), at least one Community Advisory Board member, and a graduate research assistant. The Duval Heights focus groups consisted of 15-minutes to welcome participants, sign informed consents and discuss ground rules, 60-minutes of a facilitated group discussion utilizing the focus group questions (see Appendix C), and 15-minutes to wrap up the discussion and distribute payment cards.

The content of each Duval Heights focus group was auto recorded using hand-held voice recorders. The graduate research assistant took field notes during each focus group to assist with filling in gaps or inaudible sections of the voice recordings.

4.3.1 Demographics of the Duval Heights Participants

Table 4-2, on the following page, summarizes the demographics of the Duval Heights participants. A total of 11 participants were included in the Duval Heights focus groups. There were twice as many females as males in the focus groups and ages ranged from 25 to 75 years old (M=60.1 years, SD= 12.62, Mdn= 61.5, Mo= 59 and 73). The descriptive statistics for gender and age were calculated using 10 participants, as one participant declined to share this information. Ten of the participants identified as African American/Black, and one participant was identified as Caucasian/White.

In addition to personal demographic information, the project team also collected transportation-related information for the participants, summarized in Table 4-3. Four participants stated they were satisfied with their current transportation, and nine participants stated they were not satisfied. Those who were not satisfied expressed concern that bus stops were not adequate for waiting in harsh weather conditions, individuals need to take multiple buses to get from one place to another, poor service on late nights and weekends, and no assistance to help people with special needs. Concerns stated by participants in the transportation-related questions were also discussed in the focus group and are reflected in the results.

Table 4-2: Demographics of the Duval Heights Focus Group Participants (N=11)

Demographic Characteristic	n (%)
Gender	
Male	3 (27.3)
Female	7 (63.6)
Decline to answer	1 (9.1)
Age (median)	61.5
16-30	0 (0)
31-45	1 (9.1)
46-60	4 (36.4)
61-75	5 (45.4)
76-90	0 (0)
Decline to answer	1 (9.1)
Highest Degree of school completed	
No high school diploma	1 (9.1)
High school graduate or GED	7 (63.6)
Some college credits	1 (9.1)
Associates degree	0 (0)
Bachelor's degree	1 (9.1)
Master's degree	0 (0)
Doctorate/Professional degree	0 (0)
Trade technical/vocational training	3 (27.3)
Marital status	
Single	3 (27.3)
Married or domestic partnership	6 (54.5)
Widowed	1 (9.1)
Divorced	1 (9.1)
Employment	
Part-time	1 (9.1)
Full-time	0 (0)
Student	1 (9.1)
Homemaker	1 (9.1)
Military	0 (0)
Retired	4 (36.4)
Unable to work	5 (45.4)
Household yearly income range	
Under $15,000	9 (81.2)
$15,000 to $24,999	0 (0)
$25,000 to $34,999	0 (0)
$35,000 to $49,999	0 (0)
$50,000-$74,999	1 (9.1)
$75,000 to $99,999	0 (0)
$100,000 and over	0 (0)
Decline to answer	1 (9.1)
Ethnicities	
African American or Black	10 (90.1)
Caucasian or White	1 (9.1)

Note. Some individuals answered more than one option for each demographic characteristic; therefore, numbers may equal more than 11 under some categories, or percentages may not equal 100%.

Table 4-3: Transportation-Related Information for Duval Heights Participants (N=11)

Demographic Question	n (%)
Do you have a valid driver's license	
Yes	6 (54.5)
No	5 (45.5)
Medical diagnosis impacting transportation use	
Spinal related injuries	1 (9.1)
Epilepsy	2 (18.1)
None	8 (72.8)
Current mode of transportation	
Personal vehicle	5 (45.5)
Shared vehicle/car sharing	3 (27.3)
Public transit (e.g., bus)	7 (63.6)
Ride-hailing or sharing	2 (18.1)
Micro-transit bus	1 (9.1)
Bicycle	1 (9.1)

Note. Some individuals answered more than one option for each demographic characteristic; therefore, numbers may equal more than 11 under some criteria or percentages may not equal 100%.

4.3.2 Findings for Duval Heights Focus Groups

During the focus group discussions, topics relating to the acceptability of transportation in Gainesville occurred most frequently. Specifically, 38% of the codes (175 out of 461 codes) pertained to transportation acceptability. The most prominent themes centered around the safety, cleanliness, and user-friendliness of bus stops and public buses.

The participants indicated unsafe conditions, such as the lack of streetlights or people sleeping at the bus stops. They also reported that without having adequate lighting and security measures in place, they had heightened anxiety about waiting for the bus, especially after dark. One participant shared a story about their unsafe encounter at a bus stop when two men forced him/her into the back of their vehicle. Three participants stated they have witnessed multiple riders being robbed at bus stops or while riding the bus, and the riders did not receive assistance from the bus operator. Four participants mentioned that their safety was jeopardized while riding their bike or walking on the low-lit sidewalks, as they encountered aggressive stray dogs. A participant, who often drives their personal vehicle, expressed concerns about their safety while driving next to young, distracted, or multitasking drivers, stating, "…they got their music on, they talking through their phones, and they are texting." One participant discussed a positive outlook with transportation safety stating, "I always feel safe…I was born and raised here…Everyone looks out for everybody". The participants identified safety as a basic need for transportation services.

Another fundamental need discussed during the focus groups was the cleanliness of transportation services. One participant reported that they were exposed to unsanitary conditions when they witnessed another rider urinating on the bus. Another participant discussed their concern about riding in the bicycle lane with debris, such as glass, as they were worried it would pop the tire or injure them.

User-friendliness was a prominent theme that emerged during the focus group discussions. Participants commented that the bus operators were not accommodating to persons needing extra time or in the case of an emergency. A participant reported that they often encounter bus drivers driving away from bus stops before riders are seated. The participant was concerned about the lack of safety, as he/she became dizzy or unsteady when not seated. Another participant shared their experience of being on a bus during a medical emergency. After the bus driver called for emergency help, the bus driver hesitated to call for another bus to provide transportation for the bus riders not involved in the emergency. Another participant stated that "they [bus drivers] don't have any, zero customer service…no conversation when you get on the bus...ain't no 'how is your day'."

The three major themes that emerged regarding transportation acceptability were safety, cleanliness, and user-friendliness. Many of the concerns regarding safety and user-friendliness pertained to the environmental aspects of public bus stops (e.g., lack of lights), roadways (e.g., glass on the sidewalk), or issues while riding the bus (e.g., bus operators not providing extra time for people to be seated before moving the vehicle). Individuals who use personal vehicles reported positive aspects of safety in Gainesville, except when younger or distracted drivers were near. Participants indicated there were areas for improvement to make transportation more acceptable. Transportation recommendations provided include improvements (lighting, cover, seating) to bus stops that enhance riders' experience.

Topics relating to availability were also often discussed. Twenty-four percent of the codes (111 codes out of 461 codes) were pertained to transportation availability factors. The lack of weekend and late-night services and the impacts that limited transportation in East Gainesville had on the residents' engagement in employment and community activities were common matters discussed.

Participants stated their dissatisfaction with the lack of public transportation options in East Gainesville. Five participants stated that they avoid commitments (e.g., employment or leisure) at night, knowing the transportation options are limited (fewer running times and lack of convenient routes). A participant indicated that they did not pursue a weekend employment opportunity because "they would barely be able to get home after the shift is complete." A participant's family member was laid off from his weekend job for being late due to delays with public transportation. Participants shared that limited services, such as only running one bus an hour and stopping the service at 5–6 PM, is a significant barrier for community engagement. A participant stated that they used their personal vehicle to provide rides to individuals because they do not "expect the public bus to take care of everyone's needs." Other participants stated that they would like to enjoy community events, such as entertainment at Bo Didley Plaza. However, they were not able to do so because they cannot get home or afford ride-hailing services (e.g., Uber). Participants reported that access to essential goods is limited due to inconsistent and unreliable transportation. Three participants expressed interest in grocery shopping or dining at restaurants in an area other than East Gainesville, yet access to those areas through public transportation is limited.

The prominent themes regarding transportation availability were the lack of weekend and late-night services. Transportation limitations had an impact on participants' employment,

educational, and leisure opportunities. Transportation recommendations included increased bus services on weekends and nights, and additional bus routes to connect East and West Gainesville.

Adaptability relates to meeting the needs of those with physical constraints or limitations. Fourteen percent of the codes (66 codes out of 461 codes) were related to transportation adaptability. Some participants discussed their fear of riding public transit because they have a medical condition or disability. Two participants indicated that the lack of a bench or overhead covering at bus stops made riding public transportation with medical conditions difficult. A participant stated they could not stand for long periods, so without a bench or shade, their ability to wait for a bus was limited. While riding on public buses, participants have reported that the bus operators often do not put restrictions or guidance on where to store walkers or canes. Therefore, when other riders enter the bus, the adaptive equipment becomes a fall hazard.

When discussing paratransit, participants reported that the service was not adequate. Half of the participants stated they have special needs for medical conditions or disabilities. One participant reported their "bicycle was a more reliable and [a] better form of transportation than using the paratransit services because they [paratransit] are continually late, and the setup is not convenient." Another participant stated that they stopped using the paratransit service after it arrived three-hours later than the expected time. Some participants were not aware of available paratransit services. Although paratransit services were offered, participants expressed concern that these services were insufficient to meet riders' needs (timeliness and reliability, particularly for medical appointments).

The two prominent themes regarding transportation adaptability were meeting the needs of riders with special needs and paratransit use. Participants discussed concerns of waiting at the bus stops without having a bench to sit on, or not receiving assistance with medical equipment (e.g., walker) while entering and exiting the bus. Additionally, those who use paratransit stated the lack of promptness limits their ability to engage in their community. Transportation recommendations included bus stop improvements and further training for bus operators.

A total of 18% of the codes (84 codes out of 461 codes) were related to accessibility. The main topics discussed were non-accessible bus stop locations and the inability to store bikes on the buses. Two heavily used bus stops, the Wal-Mart on the East side of Gainesville and the Rosa Parks transfer station, were noted to be inaccessible. According to one participant, the bus stop at Wal-Mart had an 8-minute walk to the front of the store. Participants discussed how it is physically draining to walk from the front door of Wal-Mart to the bus stop with multiple bags, and more challenging if accompanied by children. A participant discussed how they had limited access to transportation from their house to the Rosa Parks transfer station, which is the central hub for buses in East Gainesville. For older adults, especially those with adaptive equipment or special needs, this became a concern to access transportation. Distance coupled with inclement weather (e.g., too hot or raining) made it difficult for residents to use those bus stops.

Two participants discussed the use of multiple modes of transportation to get around the community. Participants stated they often waited for multiple buses until a bus arrived at the stop with the capacity to store the bicycle on the front rack. Another participant who experienced similar issues stated they limited the number of visits to family because they cannot count on the

bus having storage space for the bicycle. Participants who rely on multiple modes of transportation experienced decreases in quality of life (e.g., limitations to family visits, time management). Transportation recommendations include realigning bus routes closer to key destinations and providing more buses accommodating multiple modes of transportation.

The topic of affordability was the least discussed among the Five A's during the Duval Heights focus groups. Six percent of the codes (25 codes out of 461 codes) related to affordable transportation factors. Participants discussed the affordability of using public transportation, personal vehicles, and alternative transportation, such as ridesharing (e.g., Uber/Lyft). Participants had both positive and negative opinions regarding transportation costs. Three participants stated that the amount of a daily bus pass ($3) was feasible, and the free bus transfer was helpful. However, affording bus passes for an entire family (multiple people in the household) was a challenge. Others commented that they would like to have a personal vehicle, but in Gainesville, the maintenance and parking costs are too high. When asked about using alternative transportation, such as rideshare one participant remarked it was not an affordable option, as it is too expensive. The findings regarding affordability indicated that the bus fare is manageable for riders, but alternative transportation is too expensive.

4.3.3 Suggestions by Duval Heights Participants to Improve Transportation in Gainesville, Florida

Duval Heights participants shared the following suggestions to improve transportation in the City of Gainesville:

- Provide a safety button at the bus stops to call security or police for those who do not have cell phones.
- Install benches, adequate lighting, and shade coverings at bus stops.
- Offer more public bus routes and service times to improve access to employment/education, errands, and leisure, including to West Gainesville.
- Offer more weekend services for public transportation.
- Train bus drivers on public transit about the needs of those with medical conditions or special needs, and those who use medical equipment.
- Provide more space on public buses to store medical equipment.
- Relocate bus stops to be closer to the entrance and exit of commonly used shopping plazas/stores.
- Install more bike storage on public transportation (e.g., more than two bikes on a bus at one time).
- Offer additional alternative transportation options (e.g., micro-transit).
- Provide reduced costs for individuals with disabilities and/or low income.
- Reduce costs for older adults using transportation options (e.g., public bus, ride-hailing).

4.3.4 Duval Heights Focus Group Summary

In summary, the Duval Heights focus group participants indicated the following:

- Bus stations and buses do not meet their needs regarding safety and cleanliness.
- On occasion, bus drivers/operators do not provide a user-friendly experience.

- Community residents provide rides to those who do not have access to a vehicle or public transportation.
- Limited running times and lack of routes for public transportation are a barrier for engagement in employment, shopping, and leisure opportunities.
- Public transportation is unreliable, negatively impacting transportation in the community.
- Bus stop design (e.g., no shade or benches) and bus configuration (e.g., no place to store walkers) are challenging for participants with medical conditions or disabilities.
- Paratransit services are unreliable and/or inconvenient.
- Bus stops located at highly populated shopping centers (e.g., Walmart) are too far from the entrance of the store.
- Limited bike storage on buses are a barrier for participants who use multiple modes of transportation; participants had to wait for multiple buses for open bike storage.
- Costs of public transportation ($3) is feasible for some participants, but others stated the bus fare is too expensive, especially when considering the needs of an entire family.
- Ride hailing services or owning a personal vehicle are too expensive.

4.4 Focus Groups and Results for Haile Plantation

As indicated above, due to COVID-19, the project team held the Haile Plantation focus groups virtually through Zoom videoconferencing. The structure of the meetings was modified to accommodate time for technical issues and allow participants to log on to Zoom and become familiar with features used during the focus groups. As a result, the Haile Plantation focus group participants completed the demographic questionnaire and informed consent prior to the focus group. Additionally, a graduate research assistant offered a short Zoom training session with each participant prior to the focus group date, to ensure participants were confident with using the virtual platform. Each Haile Plantation focus group consisted of a 1.5-hour meeting with six participants, a moderator (the PI or Co-PI of the study), one Community Advisory Board member, and a graduate research assistant. The Haile Plantation focus group meetings included 10-minutes to welcome participants, review Zoom features, and discuss ground rules, 60-minutes of a facilitated group discussion using the focus group questionnaire (see Appendix C), and 15-minutes to wrap up the discussion and discuss the procedure for gift card distribution. Since the focus groups were held online, the research assistant mailed the payment cards to all attendees.

The graduate research assistant used the Zoom audio recording feature and a hand-held voice recorder as a backup. The graduate research assistant took field notes during each focus group to assist with filling in gaps or inaudible sections of the voice recordings. After each focus group, the graduate research assistant downloaded the recording to a secure file on the University's server. Two additional graduate project team members conducted the first round of transcribing each focus group recording. Then, the graduate research assistant, who was present at each focus group, completed the second review of each transcript to ensure completeness and accuracy. Transcripts were available to the broader project team for review.

1.1.1 4.4.1 Demographics of the Haile Plantation Participants

Table 4-4 summarizes the demographics for Haile Plantation participants.

Table 4-4: Demographics of the Haile Plantation Focus Group Participants (N=12)

Demographic Characteristic	n (%)
Gender	
Male	7 (58.3)
Female	5 (41.7)
Age (median)	53
16-30	0 (0)
31-45	3 (25.0)
46-60	6 (50.0)
61-75	3 (25.0)
Highest degree of school completed	
No high school diploma	0 (0)
High school graduate or GED	0 (0)
Some college credits	0 (0)
Bachelor's degree	1 (8.3)
Master's degree	5 (41.7)
Doctorate degree	5 (41.7)
Professional degree	1 (8.3)
Trade technical/vocational training	0 (0)
Marital status	
Single	0 (0)
Married or domestic partnership	12 (100.0)
Widowed	0 (0)
Divorced	0 (0)
Employment	
Part-time	0 (0)
Full-time	9 (75.0)
Student	0 (0)
Homemaker	0 (0)
Military	0 (0)
Retired	3 (25.0)
Unable to work	0 (0)
Household yearly income range	
Under $15,000	0 (0)
$15,000 to $24,999	0 (0)
$25,000 to $34,999	0 (0)
$35,000 to $49,999	0 (0)
$50,000-$74,999	0 (0)
$75,000 to $99,999	0 (0)
$100,000 and over	9 (75.0)
Decline to answer	3 (25.0)
Ethnicities	
Caucasian or White	10 (83.3)
Other: Did not specify	1 (8.3)
Decline to answer	1 (8.3)

Note. Some individuals answered more than one option for each demographic characteristic; therefore, numbers may equal more than 12 under some categories, or percentages may not equal 100%.

A total of 12 participants were included in the Haile Plantation focus groups. The groups consisted of more males than females (males = 7, females = 5) and ranged from 25 to 75 years old (M=53.1 years, SD= 11.92, Mdn= 53, Mo= 66). Participants identified as Caucasian/white (n=10) while some did not specify their ethnicity (n=1) or declined to state their ethnicity (n=1).

The project team also collected transportation-related information (Table 4-5). Participants were prompted to discuss whether they were satisfied with their transportation options in the community. Eleven out of the twelve participants stated they are satisfied. However, one participant said that they are not satisfied as there is a lack of safety in the community for biking and walking, as well as driving. The discussion summarized below elaborates on those concerns.

Table 4-5: Transportation-Related Information for Haile Plantation Focus Group Participants (N=12)

Demographic Question	n (%)
Do you have a valid driver's license	
Yes	12 (100.0)
No	0 (0.0)
Medical diagnosis impacting transportation use	
None	12 (100.0)
Current mode of transportation	
Personal vehicle	12 (100.0)
Shared vehicle/car sharing	1 (6.9)
Public transit (e.g., bus)	2 (16.6)
Ride-hailing	1 (6.9)
Micro-transit bus	1 (6.9)
Bicycle	2 (16.6)
Walk	2 (16.6)

Note. Some individuals answered more than one option per question; therefore, numbers may equal more than 12 under some categories or percentages may not equal 100%.

4.4.2 Findings for Haile Plantation Focus Groups

The topic of acceptability was one of the most frequently discussed during the Haile Plantation focus groups. Forty-five percent of the codes (56 codes out of 122 codes) related to transportation acceptability, focusing on safety and traffic congestion. Participants' safety was primarily associated with driving personal vehicles, biking and/or running on the roadways. All participants except one stated they typically did not have concerns about safety while driving their personal vehicles. However, some participants had concerns about safety at certain times, such as rush hour (7–8 AM and 4–5 PM) or during community events (e.g., football games). Participants voiced concerns about distracted driving (e.g., drivers on a cell phone and texting) or driving behaviors (e.g., tailgating, running red lights), especially among young drivers or the student population. One participant stated that he/she "has seen some horrifying things happen and some terrible accidents caused by that [texting and driving]." Six participants discussed their

desire to bike and run to their work location from their home but are not able to do so, often due to safety concerns on the road.

Participants expressed concern that on-going construction and the design of some roadways are creating traffic bottlenecks, which negatively influence traffic patterns and travel experience. Participants provided two traffic bottleneck examples in Gainesville: the entrances or exits of I-75 and SW 24th Ave. Nearly all participants described being frustrated by the heavy traffic in Gainesville, especially during rush hour times. Participants recommended better planning for roads to accommodate the growth of the city. Two retired participants stated they did not experience frustration by the traffic levels in Gainesville. However, they also mentioned they had the flexibility to travel in the community for errands and appointments at different times. Although many participants reported positive experiences related to transportation safety, some participants did raise issues regarding distracted driving, limited road space for biking and running, or heavy traffic. Recommendations included additional bicycle lanes and traffic lanes on major roads.

The availability of transportation was a highly discussed topic. Thirty-five percent of the codes (43 codes out of 122 codes) pertained to transportation availability, such as the use of the fixed-route bus from Haile Plantation to the University of Florida campus, personal vehicles, and public transportation. Nine of the group participants mentioned that they adjust their daily employment schedules and leisure activities based on the transportation and traffic flow occurring in Gainesville. Participants stated they avoid driving or running errands in the community during rush hour or on weekends. For example, multiple participants discussed leaving their home earlier in the morning, before rush hour, and leaving work earlier in the afternoon to avoid high traffic times. When using the fixed-route bus, participants commented that it was easier to manage traffic delays because they were able to engage in other tasks instead of driving. Two participants specifically talked about avoiding commonly populated shopping areas, such as Butler Plaza, during the weekends because of the heavy traffic. In addition to Gainesville traffic, participants also experience high traffic volumes while traveling to airports in neighboring cities (e.g., Orlando or Jacksonville). Participants suggested making faster routes or providing alternative transportation options to those destinations, such as a light rail, rather than driving a personal vehicle.

One participant stated they did not consistently use the public bus, because the times and routes offered were scarce. Additionally, the participant stated that the public bus had been unreliable, arriving to the bus stop late, and the schedule was difficult to understand. According to the participant, if more service times and routes were offered, use of the public bus may be more desirable. Based on the focus group discussion, the availability of transportation and traffic flow in Gainesville had an impact on the way participants scheduled their day to reduce their travel times. Transportation recommendations include offering additional times and routes on the fixed-route bus and increased public transportation services.

A total of 15% of the codes (19 codes out of 122) related to transportation accessibility and centered around the use of the fixed-route bus, personal vehicles, or parking. Many participants found the free fixed-route bus traveling from the Haile Plantation Village Center to the University of Florida campus to be convenient. Participants stated that they could easily access the bus stop by walking from their house or driving to a nearby parking lot. Additionally,

participants were inclined to use the fixed-route bus, as it eliminated the need to park a personal vehicle on campus or in the community.

Parking was a controversial discussion point. Participants who stated they are satisfied by the amount of available parking reported compared Gainesville to other high-density areas they lived, such as Miami and San Francisco. Conversely, some participants indicated that their participation in the community was limited because there were no parking spaces available once reaching their destination. To avoid parking in Gainesville, participants chose to use other forms of transportation (e.g., ride-hailing) to engage in leisure activities without the stress of finding parking. One participant, who was a local bakery owner, said that they had to shut down their business located in the downtown area because it became inaccessible due to city residents parking their vehicles in 2-hour parking spots all day, resulting in others being unable to use the parking spaces. Parking was a key factor that encouraged participants to use transportation modes other than a personal vehicle. Transportation recommendations include increased access to the fixed-route services throughout Gainesville because of limited parking options.

Affordability of transportation in Gainesville was one of the least discussed topics during the focus groups. Three percent (4 codes out of 122 codes) of the codes indicated transportation affordability regarding costs of ride-hailing services and public transportation. Two participants stated that due to the lack of parking they often are not able to drive their personal vehicles to downtown events. Some participants discussed how parking impacts their weekends or nightly activities. They rely on Uber or Lyft to and from their destination to avoid parking. In contrast, one participant stated they limit their use of ride-hailing services because of the high costs, as they were averaging 60 dollars roundtrip. Two participants suggested implementing a shuttle traveling between central locations in Gainesville for lower prices (e.g., 20 dollars per round trip). Another participant discussed using alternative transportation with a smartphone application that connects riders to a car-pool service for reasonable prices (e.g., 2 dollars). Overall, affordability was not a highly discussed topic as many participants in the focus group rely on their personal vehicles as their primary form of transportation. With the consideration that parking is limited, transportation recommendations include offering affordable transportation services (e.g., fixed-route bus or ridesharing) to limit the need to drive a personal vehicle throughout Gainesville.

During the Haile Plantation focus groups participants did not mention anything related to adaptability, which pertains to meeting the needs of riders with special needs.

4.4.3 Suggestions of Haile Plantation Participants to Improve Transportation in Gainesville, Florida

Haile Plantation participants shared the following suggestions to improve transportation in the City of Gainesville:

- Build more bike lanes and traffic lanes to reduce roadway congestion.
- Provide options for nearby city travel such as to the Orlando or Jacksonville airport (e.g., light rail or train).
- Provide more parking areas in highly populated areas (e.g., shopping plazas, downtown, University campus).
- Offer additional alternative transportation options (e.g., fixed-route buses).

- Provide reduced costs alternative transportation options for community events (e.g., football, concerts downtown).

4.4.4 Haile Plantation Focus Group Summary

In summary, the Haile Plantation focus group participants raised the following issues:

- Driving a personal vehicle is a safe form of transportation, except during rush hours (7–8 AM and 4–5 PM) or community events (e.g., football games).
- Limited road space is a safety concern for participants who enjoy running and biking.
- High levels of traffic are a barrier for participants to access the community or travel to work, except for participants with flexible schedules (e.g., retired participants).
- They adjust their daily schedules for employment and leisure activities to avoid high traffic times (e.g., rush hours or weekends).
- The fixed-route bus from Haile Plantation to the University of Florida eased their daily commutes.
- The location of the fixed-route bus stop was convenient and easy to access.
- Limited running times and routes of public transportation are a barrier to accessing several destinations.
- Lack of parking in Gainesville, especially on the University of Florida campus or downtown areas, influenced participants to use alternative forms of transportation (e.g., ride-hailing services, fixed-route bus).
- Cost of alternative modes (e.g., ride hailing services) is too high to use on a daily or weekly basis.

4.5 Conclusions and Recommendations from the Focus Group Study

The focus group discussions provided a good understanding of the similarities and differences of the two community needs such that the research team will be able to construct surveys that address the specific needs and desires of the two neighborhoods. The focus group discussions with the Duval Heights participants centered around public transportation and challenges for the medically disadvantaged. The participants stated concerns (e.g., safety, uncleanliness) at bus stations and buses. Limited service times and routes of public transportation impacted Duval Heights participants' travel. The Haile Plantation focus group discussions centered around use of personal vehicles and the fixed-route bus to access their community. Those who discussed public transportation also stated that the limited service times and routes were a barrier. Participants of Haile Plantation focus groups stated concerns of high levels of traffic in Gainesville. Participants of both the Duval Heights and Haile Plantation stated transportation limitations (e.g., lack of service, routes, or high traffic) impact their engagement in employment, education, and leisure activities.

The COVID-19 pandemic required the project team to reformat the focus groups for Haile Plantation (the Duval Heights focus groups were completed in February) from in-person to online. Therefore, the project team had to narrow the inclusion criteria for participants to include only those Haile Plantation residents with access to the internet. Although participants were offered technical support and training, online videoconferencing may have impacted rapport among participants.

Focus group study strengths include the use of an easily accessible location for the Duval Heights focus groups. Each Duval Heights focus group was held in a private room to secure privacy. With five-six participants in each focus group, there was adequate time for participants to share their lived experiences and stories and gain a deeper understanding of the barriers and/or facilitators for transportation in Gainesville. The rapport and support among participants in both the Duval Heights and Haile Plantation helped facilitate a deep and valuable discussion, in which all participants spoke and shared personal stories about their transportation in Gainesville.

5. SURVEY DEVELOPMENT AND ADMINISTRATION

This chapter discusses the development and administration of the survey. The survey was developed based on the discussions with the focus group participants and the Community Advisory Boards to reflect the concerns of the two communities. The focus groups provided insights on modes used, concerns of the two communities, and typical travel patterns. The research team consulted the literature to ensure the structure of the questions is unbiased. In addition, all members of the research team (who are also residents of Gainesville and thus very familiar with its transportation system) contributed with additional insights to develop a comprehensive survey. Once all questions were assembled, revisions were made to streamline the survey, avoid duplication, and minimize the number of questions while capturing all important aspects of travel for the two communities.

The research team submitted the first draft of the survey to the Community Advisory Board members of the two neighborhoods for review. The review aimed to ensure that the survey questions were easily understandable and captured every important aspect that had been discussed in the focus group meetings. Four members (two from each neighborhood) gave feedback which informed the final revision and prioritizing of the questions.

Most of the survey questions are the same for the two neighborhoods. Minor changes to the survey (bus route numbers and questions related to services only available in a specific area) are customized for the neighborhood. Both sets of questions are provided in Appendix D.

The survey contains the following sections: demographics, travel patterns, safety, accessibility, availability, affordability, acceptability, and adaptability. The introductory questions of the survey were included to collect demographic information (gender, age, and income) to relate the needs and desires expressed throughout the survey to specific groups of travelers within these neighborhoods. A question was also created to address COVID-19 and the impacts it has had on traveler perceptions and attitudes towards different methods of travel.

After the survey was reviewed and approved by FDOT, the research team submitted the final survey for approval by the Institutional Review Board (IRB) at the University of Florida. Prior to COVID19, the research team planned to conduct in-person surveys in both communities. The plan was to visit community centers, churches, and libraries to conduct these surveys. However, due to COVID19, the research team:

- Conducted on-line surveys for Haile Plantation, which has very high internet market penetration. These were conducted using Qualtrics.
- Conducted mail surveys for Duval Heights, as most residents do not have internet at home. To ensure a reasonable response rate, both online and mail-surveys were employed for this neighborhood.

The research team contracted with the Florida Survey Research Center (FSRC) to help acquire addresses in Duval Heights through an address-based sampling (ABS) company. The mail sent to these addresses included a cover letter, a printed copy of the survey, a return envelope for sending the response, and a QR code for the online survey.

In total, 39 and 85 surveys were received for Haile Plantation and Duval Heights, respectively. However, only those surveys that were compete were considered for further analysis. Thus, in the following sub-sections the descriptive summaries have been prepared based on 22 and 68 surveys for Haile Plantation and Duval Heights, respectively.

5.1 Socioeconomic Profile of Respondents

Table 5-1, on the following page, depicts the percentages of respondents based on socio-economic attributes such as gender, age, race/ethnicity, employment status, household income and vehicular ownership for both neighborhoods. The percentage of female (82.35%) respondents is much higher than that of male respondents (14.71%) for Duval Heights. However, in Haile Plantation, the number of male and female respondents are comparable (50% and 45.45% respectively). Only respondents of age 18 years or above were eligible to participate in the survey. The respondents from Duval Heights were, on an average older than those from Haile. Haile is dominated by Caucasians (90.91% respondents) while Duval Heights is dominated by African American residents (92.65% respondents). Based on the employment status in February 2020, approximately 50% of the respondents were fully employed and 31.82% were retired in Haile Plantation. In the case of Duval Heights, 26.47% of the respondents were fully employed, and 44.12% were retired. The percentage of unemployed respondents is higher in Duval Heights (7.35%) than in Haile (4.55%). Haile is a high-income neighborhood while Duval Heights is a low-income neighborhood. In Haile, 54.55 % of respondents have annual household income above $85,000 and 22.73% have income in the range of $55,000 to $85,000. For Duval Heights, 27.94% of the respondents have annual household income below $15,000, followed by 23.53% in the range of $15,000 to $35,000. In Haile all respondents have their own car. However, in Duval Heights 79.41% respondents have a personal car. The percentage of respondents that have smart phones and access to internet is 95.45% in Haile and only 66.16% in Duval Heights.

These trends in terms of ethnicity and income levels are consistent with previously obtained data regarding the two neighborhoods.

5.2 Travel Demand Profiles

Travel demand profiles of the residents were assessed through questions regarding modes used, and the frequencies, durations, and (trip) purposes of use. Respondents were asked to fill the questionnaire survey based on their travel behavior before the COVID-19 pandemic. The following subsections highlight the survey results based on modes, frequency, travel times, and trip purpose.

Table 5-1: Percentage Distribution of Respondents by Socioeconomic Characteristics

S. No.	Characteristics		Haile Plantation	Duval Heights
1.	Gender	Male	50.00	14.71
		Female	45.45	82.35
		Prefer not to answer	4.55	2.94
2.	Age (in years)	18-29	0.00	1.47
		30-39	9.09	1.47
		40-49	9.09	13.24
		50-59	31.82	11.76
		60-69	18.18	36.76
		70+	27.27	33.82
		Prefer not to answer	4.55	1.47
3.	Race/ethnicity	White	90.91	1.47
		Black or African American	0.00	92.65
		American Indian/Alaska Native	0.00	0.00
		Asian	0.00	0.00
		Native Hawaiian or Other	0.00	0.00
		Hispanic or Latino	0.00	2.94
		Other	0.00	1.47
		Prefer not to answer	4.55	1.47
		No Response	4.55	0.00
4.	Employment Status as of Feb 2020	Employed, full time	50.00	26.47
		Employed, part-time	9.09	5.88
		Self-employed	4.55	0.00
		Unemployed	4.55	7.35
		Student	0.00	0.00
		Retired	31.82	44.12
		Other	0.00	14.71
		No Response	0.00	1.47
5.	Household Income	Below $15,000	0.00	27.94
		$15,000 – up to $35,000	4.55	23.53
		$35,000 – up to $55,000	0.00	19.12
		$55,000 – up to $85,000	22.73	7.35
		Above $85,000	54.55	7.35
		No Response	18.18	14.71
6.	Vehicular Ownership	Personal Car	100.00	79.41
7.	Driver's License		95.45	79.41
8.	Smart Phones with internet access		95.45	66.16

5.2.1 Modes and Frequency

Tables 5-2 and 5-3 depict the percentage distribution of responses based on modes and their frequency of usage by the respondents for Haile Plantation and Duval Heights, respectively. In these tables each column provides the percent use of the respective mode, and thus the sum of the percentages along each column is 100%. The category labeled 'No Response' has been created to capture the proportion of respondents who did not provide an answer to the corresponding question.

In Haile Plantation (Table 5-2), the vast majority of respondents use a personal vehicle daily (54.55%) or several times a week (36.36%). Also, the vast majority of respondents (72.73%) never use public transit/bus for trip making. None of the respondents use bike, ride sharing options or take rides from friends or family on a daily basis.

Table 5-2: Percentage Distribution by Mode and Frequency for Haile Plantation

Frequency	Personal Car	Bike	Walk	Bus	Ride Sharing	Ride from friends or family
Daily	54.55	4.55	27.27	0.00	0.00	0.00
Several times a week	36.36	31.82	31.82	13.64	4.55	22.73
Once a week or less	4.55	40.91	22.73	4.55	22.73	27.27
Never	4.55	18.18	13.64	72.73	63.64	45.45
No response	0.00	4.55	4.55	9.09	9.09	4.55
Total	**100**	**100**	**100**	**100**	**100**	**100**

In Duval Heights (Table 5-3), again the majority of respondents use a personal vehicle daily (57.35%) or several times a day (17.65%). Transit usage is somewhat higher than that of Haile residents but still quite low. Only 2.94% of the respondents use the bus on a daily basis, and 61.76% of the respondents never use public transit/bus for trip making. Most of the respondents use biking and ride-sharing options only occasionally. Duval Height residents have an additional mode available, which is called 'Microtransit'. Microtransit shuttles are operated by the Regional Transit System (RTS) of Gainesville and offer on-demand service to the residents of East Gainesville. However, 66.18% of the respondents have never used these services and only 1.47% use them several times a week.

Table 5-3: Percentage Distribution by Mode and Frequency for Duval Heights

Frequency	Personal Car	Bike	Walk	Bus	Ride Sharing	Ride from friends or family	Microtransit
Daily	57.35	4.41	7.35	2.94	0.00	0.00	0.00
Several times a week	17.65	2.94	13.24	8.82	2.94	0.00	1.47
Once a week or less	2.94	10.29	33.82	5.88	10.29	7.35	0.00
Never	10.29	60.29	22.06	61.76	63.24	45.59	66.18
No response	11.76	22.06	23.53	20.59	23.53	47.06	32.35
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 5-4 summarizes bus trip usage for the two communities. As shown, the vast majority of respondents (81.82% and 76.47% of respondents from Haile and Duval Heights respectively) have not used buses in the past year. While the low rate of public transportation use is expected for Haile, the results are somewhat unexpected for Duval Heights. Low transit ridership may be because transit is very inconvenient (based on the focus group discussions reported in Task 2 it may take two-hours from origin to destination, transit service is not offered when needed, etc.) In addition, travel behaviors in the past year were significantly impacted by the pandemic. Lastly, the number of responses obtained is very low compared to the population size, and it is possible it is biased toward non-transit users.

Table 5-4: Bus Trip in the Past Year

Response	Haile Plantation (%)	Duval Heights (%)
Yes	18.18	22.06
No	81.82	76.47
No response	0.00	1.47
Total	**100**	**100**

Respondents were also asked about the perception of the society regarding usage of bus/public transit. As shown in Table 5-5, 54.55% of respondents from Haile Plantation said that they think the society looks down on people who ride buses. However, only 36.76% of the Duval Heights residents had the same opinion (Table 5-6). 18.18% of respondents from Haile Plantation said that their family and friends look down on people who ride the bus while 11.76% of Duval Heights residents felt the same.

Table 5-5: Do you think society looks down on people who ride the bus?

Response	Haile Plantation (%)	Duval Heights (%)
Yes	54.55	36.76
No	40.91	57.35
No response	4.55	5.88
Total	**100**	**100**

Table 5-6: Do you think your family and friends look down on people who ride the bus?

Response	Haile Plantation (%)	Duval Heights (%)
Yes	18.18	11.76
No	77.27	86.76
No response	4.55	1.47
Total	**100**	**100**

5.2.2 Modes and Travel Duration

Tables 5-7 and 5-8 depict the duration of trips taken using each of the modes for Haile Plantation and Duval Heights, respectively. Each cell provides the percent of respondents that use the respective mode for trips of a particular duration. The descriptive summaries in Tables 5-7 and 5-8 exclude the responses by those indicating they never use the respective mode (based on the usage frequency summarized in Tables 5-2 and 5-3). For Haile Plantation (Table 5-7) 85.71% of the respondents use their personal car for trips that last longer than 30-minutes; 62.50% of the respondents use ride-sharing options for up to 30-minutes on a daily basis; 72.22% and 73.69% of the respondents use bike and walk respectively for up to one-hour on a daily basis. Thus ridesharing, biking, and walking makes up for the shorter trips.

Table 5-7: Percentage Distribution by Mode and Travel Time on Daily Basis for Haile Plantation.

Travel Time	Personal Car	Bike	Walk	Bus	Ridesharing	Rides from friends or family
0 – 30 min	14.29	38.89	31.58	33.33	62.50	58.33
30 min – 1 hr	52.38	33.33	42.11	33.33	12.50	33.33
1 hr – 2 hr	28.57	11.11	15.79	0.00	0.00	0.00
More than 2 hr	4.76	11.11	5.26	0.00	0.00	0.00
No response	0.00	5.56	5.26	33.33	25.00	8.33
Total	**100**	**100**	**100**	**100**	**100**	**100**

For Duval Heights (Table 5-8), 80.33% of the respondents use a personal car for trips that are longer than 30-minutes. Thus, in this case as well, personal cars are the most frequent choice for longer trips. Also, 15.38% respondents use the bus for trips up to 30-minutes on a daily basis, while 24.53% walk and 7.41% use bikes. Thus transit, walking and biking are used relatively more for shorter trips by Duval Heights residents. Microtransit services are used by only 13.05% of the respondents.

Table 5-8: Percentage Distribution by Mode and Travel Time on Daily Basis for Duval Heights.

Travel Time	Personal Car	Bike	Walk	Bus	Ridesharing	Rides from friends or family	Microtransit
0 – 30 min	9.84	7.41	24.53	15.38	16.00	18.92	8.70
30 min – 1 hr	27.87	22.22	28.30	3.85	4.00	13.51	0.00
1 hr – 2 hr	27.87	7.41	7.55	19.23	0.00	8.11	4.35
More than 2 hr	24.59	3.70	5.66	7.69	0.00	13.51	0.00
No response	9.84	59.26	33.96	53.85	80.00	45.95	86.96
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

5.2.3 Modes and Trip Purpose

Tables 5-9 and 5-10 depict the use of each mode vs. trip purpose for Haile Plantation and Duval Heights, respectively. In Haile Plantation (Table 5-9), the personal vehicle is the preferred mode for shopping (50%) and work trips (36.36%) while bike, walk and ride sharing are used for recreation trips. 18.18% of the respondents use transit for work-related trips.

Table 5-9: Percentage Distribution by Mode vs. Trip Purpose for Haile Plantation

Trip Purpose	Personal Car	Bike	Walk	Bus	Ride Sharing	Ride from friends or family
Shopping	50.00	9.09	9.09	4.55	9.09	9.09
Work	36.36	9.09	0.00	18.18	0.00	18.18
School	0.00	4.55	0.00	0.00	0.00	0.00
Recreation	0.00	59.09	72.73	4.55	22.73	27.27
Medical appointments	9.09	4.55	0.00	0.00	4.55	0.00
No response	4.55	13.64	18.18	72.73	63.64	45.45
Total	**100**	**100**	**100**	**100**	**100**	**100**

In Duval Heights (Table 5-10), the personal vehicle is the preferred mode for shopping trips while biking and walking are used for recreation trips. Many respondents did not completely respond to this question (see large percentages in the 'No Response' category for both tables). It is possible that respondents use these modes for multiple-destination trips, and it is difficult to provide percentages separating these.

Table 5-10: Percentage Distribution by Mode vs. Trip Purpose for Duval Heights

Trip Purpose	Personal Car	Bike	Walk	Bus	Ride Sharing	Ride from friends or family	Microtransit
Shopping	33.82	2.94	5.88	2.94	1.47	10.29	0.00
Work	17.65	2.94	0.00	1.47	0.00	0.00	0.00
School	1.47	0.00	1.47	2.94	0.00	0.00	0.00
Recreation	2.94	14.71	22.06	0.00	2.94	7.35	0.00
Medical appointments	7.35	1.47	0.00	5.88	1.47	10.29	1.47
No response	36.76	77.94	70.59	86.76	94.12	72.06	98.53
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

5.3 Mobility Indicators Measured through the Five A's

The surveys included questions designed to measure mobility through five performance indicators (as discussed in Chapter 2 of this report): 'Availability', 'Accessibility', 'Affordability', 'Acceptability' and 'Adaptability' of transportation systems. The following sub-sections summarize the responses obtained that were focused on these performance indicators.

A five-category Likert scale was used for obtaining the response ratings. Broadly, the first category represented the best or favorable opinion, and the last category represented the worst or unfavorable opinion. The middle (third) category corresponds to the average/neutral case. An additional category (not a part of Likert scale) labeled 'No Response' was created to show the percentage of missing responses.

5.3.1 Availability

'Availability' refers to the presence of public transportation services at any place at a given time. Respondents were asked about the transit routes and bus stops available to them. However, 82% respondents in Haile Plantation and Duval Heights didn't respond to these questions, therefore the remaining few responses were not considered for further analysis.

The concept of "availability" was extended to multi-modal travel options in the survey. Tables 5-11 and 5-12 provide the percentage of respondents and their rating of satisfaction for the availability of: different driving routes during peak hours, sidewalks, bike paths, and different transportation modes for both neighborhoods.

For Haile Plantation (Table 5-11), more than 50% of respondents are extremely satisfied for the availability of sidewalks and bike paths. However, 27.27% respondents are somewhat dissatisfied with the availability of different routes for their daily commute during peak traffic hours.

Table 5-11: Satisfaction with Availability of Multimodal Travel Options in Haile Plantation

Scale	Different driving routes for daily commute during peak hours (%)	Sidewalks in neighborhood (%)	Bike paths in neighborhood (%)	Different transportation modes for daily commute (%)
Extremely satisfied	13.64	54.55	54.55	13.64
Somewhat satisfied	22.73	27.27	27.27	22.73
Neutral	9.09	4.55	4.55	27.27
Somewhat dissatisfied	27.27	13.64	0.00	9.09
Extremely dissatisfied	18.18	0.00	4.55	9.09
No response	9.09	0.00	9.09	18.18
Total	**100**	**100**	**100**	**100**

For Duval Heights (Table 5-12), 39.71% respondents are somewhat satisfied with the availability of different driving routes for their daily commute during peak hours. 29.42% and 38.24% respondents have below average satisfaction levels for sidewalks and bike paths in the neighborhood.

Table 5-12: Satisfaction with Availability of Multimodal Travel Options in Duval Heights

Scale	Different driving routes for your daily commute during peak hours (%)	Sidewalks in neighborhood (%)	Bike paths in neighborhood (%)	Different transportation modes for your daily commute (%)
Extremely satisfied	7.35	13.24	7.35	2.94
Somewhat satisfied	39.71	33.82	8.82	23.53
Neutral	22.06	10.29	26.47	26.47
Somewhat dissatisfied	11.76	16.18	20.59	16.18
Extremely dissatisfied	5.88	13.24	17.65	7.35
No response	13.24	13.24	19.12	23.53
Total	**100**	**100**	**100**	**100**

5.3.2 Accessibility

Accessibility to public transit is an essential component of mobility for any city. Respondents were asked to provide the duration for which they had to walk to the nearest bus stop to board the services. However, 81.81% respondents in Haile Plantation and 77.94% respondents in Duval Heights didn't respond to the question. Thus, the question is excluded from further analysis.

Based on the accessibility to shopping options, respondents were asked to rate their satisfaction levels (Table 5-13). 36.36% and 45.45% of the respondents from Haile Plantation reported that they are extremely satisfied and somewhat satisfied respectively with the proximity to shopping options. However, 25% and 19.12% of the respondents from Duval Heights reported that they are extremely dissatisfied and somewhat dissatisfied, respectively.

Table 5-13: Accessibility to Shopping Options

Scale	Haile Plantation	Duval Heights
Extremely satisfied	36.36	5.88
Somewhat satisfied	45.45	27.94
Neutral	4.55	8.82
Somewhat dissatisfied	4.55	19.12
Extremely dissatisfied	4.55	25.00
No response	4.55	13.24
Total	**100**	**100**

5.3.3 Affordability

Respondents were asked to rate their rating of affordability with respect to the commute cost of various modes available to them (Tables 5-14 and 5-15). In Haile Plantation (Table 5-14), the commute cost of a personal vehicle is extremely affordable to about 13.64% respondents and very affordable to 27.27% of respondents. For 45.45%, the commute cost of a personal vehicle is moderately affordable.

Table 5-6: Commuting Cost of Modes and Affordability in Haile Plantation

Scale	Personal Car (%)	Bus (%)	Ridesharing (%)	Rides from family or friends (%)
Extremely affordable	13.64	18.18	0.00	22.73
Very affordable	27.27	13.64	0.00	18.18
Moderately affordable	45.45	0.00	9.09	4.55
Slightly affordable	4.55	0.00	9.09	0.00
Not affordable at all	4.55	0.00	9.09	0.00
Do not know	0.00	54.55	59.09	40.91
No response	4.55	13.64	13.64	13.64
Total	**100**	**100**	**100**	**100**

In Duval Heights (Table 5-15), the commute cost of a personal car is extremely affordable to only 7.35 % respondents and very affordable to 14.71% of respondents. For 26.47%, the commute cost of a vehicle is moderately affordable.

Table 5-15: Commuting Cost of Modes and Affordability in Duval Heights

Scale	Personal Car (%)	Bus (%)	Ridesharing (%)	Rides from family or friends (%)
Extremely affordable	7.35	4.41	0.00	13.24
Very affordable	14.71	7.35	4.41	14.71
Moderately affordable	26.47	8.82	7.35	11.76
Slightly affordable	20.59	4.41	7.35	10.29
Not affordable at all	5.88	1.47	2.94	1.47
Do not know	2.94	47.06	42.65	19.12
No response	22.06	26.47	35.29	29.41
Total	**100**	**100**	**100**	**100**

In the case of affordability of other modes, the respondents could not effectively determine the costs, which resulted in a large proportion of “don’t know” or missing responses for both neighborhoods.

5.3.4 Acceptability

Acceptance to emerging modes such as self-driving cars and driverless shuttles was assessed by asking the respondents to rate their willingness to use these modes. Also, acceptance to emerging modes is reflected based on their willingness to share the road with driverless vehicles as either a driver or a pedestrian. Tables 5-16 and 5-17 summarize the responses for Haile Plantation and Duval Heights, respectively.

For Haile Plantation (Table 5-16), to emerging modes such as self-driving cars and driverless shuttles was assessed by asking the respondents to rate their willingness to use these modes. Also, acceptance to emerging modes is reflected based on their willingness to share the road with driverless vehicles as either a driver or a pedestrian.

Table 5-16: Acceptability for Emerging Modes in Haile Plantation

Scale	Self-Driving Car (%)	Ride a Driverless Shuttle (%)	Be a driver on the road with a self-driving vehicle (%)	Be a pedestrian crossing the road with a self-driving vehicle (%)
Very willing	45.45	40.91	45.45	27.27
Somewhat willing	18.18	27.27	18.18	18.18
Neutral	9.09	4.55	9.09	18.18
Somewhat unwilling	4.55	9.09	9.09	13.64
Very unwilling	9.09	9.09	9.09	13.64
Do not know	9.09	9.09	9.09	9.09
No response	4.55	0.00	0.00	0.00
Total	**100**	**100**	**100**	**100**

For Duval Heights (Table 5-17), the percentage of respondents that are very willing and very unwilling to use self-driving cars is the same (26.47%). 10.29% of respondents are very willing to use driverless shuttles in contrast to 29.41% that are very unwilling. The percentage of respondents willing to share the road with driverless cars is much lower than that for Haile.

Table 5-17: Acceptability for Emerging Modes in Duval Heights

Scale	Self-Driving Car (%)	Ride a Driverless Shuttle (%)	Be a driver on the road with a self-driving vehicle (%)	Be a pedestrian crossing the road with a self-driving vehicle (%)
Very willing	26.47	10.29	16.18	8.82
Somewhat willing	8.82	10.29	10.29	5.88
Neutral	14.71	22.06	19.12	17.65
Somewhat unwilling	5.88	5.88	8.82	13.24
Very unwilling	26.47	29.41	29.41	35.29
Do not know	8.82	11.76	5.88	8.82
No response	8.82	10.29	10.29	10.29
Total	**100**	**100**	**100**	**100**

Acceptance of conventional modes of travel depends on the quality of infrastructure and safety perceptions associated with them. Tables 5-18 and 5-19 indicate the levels of satisfaction of respondents with respect to the road quality and bike lanes for Haile Plantation and Duval Heights, respectively. As shown the majority of Haile residents are extremely satisfied or somewhat satisfied with both the road quality and bike lanes in their neighborhood. However, 32.35% of respondents are somewhat dissatisfied with the same in Duval Heights. 13.64% of the respondents are extremely satisfied with the bike lanes while 36.36% of respondents are somewhat satisfied in Haile Plantation. However, a higher percent of Duval Height residents are dissatisfied with both types of facilities.

Table 5-18: Satisfaction Levels for Infrastructure Quality in Haile Plantation

Scale	Road Quality (%)	Bike Lanes (%)
Extremely satisfied	18.18	13.64
Somewhat satisfied	36.36	36.36
Neutral	22.73	22.73
Somewhat dissatisfied	22.73	9.09
Extremely dissatisfied	0.00	9.09
No response	0.00	9.09
Total	**100**	**100**

Table 5-19: Satisfaction Levels for Infrastructure Quality in Duval Heights

Scale	Road Quality (%)	Bike Lanes (%)
Extremely satisfied	2.94	2.94
Somewhat satisfied	17.65	5.88
Neutral	14.71	16.18
Somewhat dissatisfied	32.35	22.06
Extremely dissatisfied	14.71	16.18
No response	17.65	36.76
Total	**100**	**100**

Tables 5-20 and 5-21 provide satisfaction levels related to safety for each mode for Haile and Duval Heights, respectively. Satisfaction levels were assessed on a Likert scale ranging from very safe (best scenario) to very unsafe (worst scenario). For Haile (Table 5-20) no respondents felt very unsafe for any of the modes, and very few felt not safe (and only for ridesharing and traveling at night). The vast majority of Haile respondents felt safe using any mode. 45.45% of the respondents did not select any options related to ridesharing. This can also be attributed to the fact that most of the respondents (63.64%) from Haile Plantation never use ridesharing (Table 5-2).

Table 5-7: Modes and Safety in Haile Plantation

Scale	Walk (%)	Ride your bicycle (%)	Drive (%)	Use Ridesharing (%)	Travel at night with any mode (%)
Very safe	81.82	50.00	59.09	18.18	13.64
Safe	18.18	18.18	36.36	18.18	45.45
Neutral	0.00	13.64	0.00	13.64	22.73
Not safe	0.00	0.00	0.00	4.55	4.55
Very unsafe	0.00	0.00	0.00	0.00	0.00
No response	0.00	18.18	4.55	45.45	13.64
Total	**100**	**100**	**100**	**100**	**100**

For Duval Heights (Table 5-21) safety is more of a concern and 10.29% of respondents indicate they feel very unsafe when they travel at night using any mode (compared to 0% for Haile residents). Also, there are relatively large percentages with no response for this set of questions (16.18-61.76%).

Table 5-8: Modes and Safety in Duval Heights

Scale	Walk (%)	Ride your bicycle (%)	Drive (%)	Use Ridesharing (%)	Travel at night with any mode (%)
Very safe	13.24	7.35	32.35	4.41	5.88
Safe	32.35	11.76	29.41	14.71	29.41
Neutral	26.47	16.18	11.76	10.29	19.12
Not safe	5.88	4.41	2.94	4.41	7.35
Very unsafe	5.88	4.41	2.94	4.41	10.29
No response	16.18	55.88	20.59	61.76	27.94
Total	**100**	**100**	**100**	**100**	**100**

5.3.5 Adaptability

Adaptability of transportation systems refers to the systems' ability to accommodate users with disability/special needs. Respondents were asked for their satisfaction levels with respect to accommodation of elderly and disabled people at the bus stops. However, 81.81% of the respondents in Haile Plantation and 83.82% of the respondents in Duval Heights didn't give any response to the question. Therefore, no further analysis was conducted.

Adaptability of transportation systems can also be viewed from the standpoint of the systems' ability to handle unpredicted patterns in social, economic, environmental, or technological aspects. The COVID-19 pandemic is one such condition where adaptability of transportation systems has played a vital role in their sustenance. The likelihood of continued usage of conventional modes amid the pandemic is reflective of the adaptability of travel modes with respect to health concerns of the users. The survey assessed the likelihood for the respondents to use different modes of travel as an after effect of the COVID-19 pandemic. Tables 5-22 and 5-23 summarize the results for Haile and Duval Heights, respectively.

Table 5-9: Impact of Covid-19 on Mode Choice in Haile Plantation

Likelihood	Driving (%)	Biking (%)	Walking (%)	Bus (%)	Ridesharing (%)	Rides from friends or family (%)
More likely to use	27.27	22.73	18.18	4.55	0.00	4.55
No change	63.64	63.64	68.18	31.82	40.91	45.45
Less likely to use	9.09	0.00	4.55	45.45	40.91	31.82
No response	0.00	13.64	9.09	18.18	18.18	18.18
Total	**100**	**100**	**100**	**100**	**100**	**100**

Table 5-23: Impact of Covid-19 on Mode Choice in Duval Heights

Likelihood	Driving (%)	Biking (%)	Walking (%)	Bus (%)	Ridesharing (%)	Rides from friends or family (%)	Microtransit (%)
More likely to use	27.94	7.35	7.35	4.41	0.00	7.35	0.00
No change	51.47	33.82	48.53	23.53	26.47	48.53	23.53
Less likely to use	5.88	29.41	25.00	48.53	47.06	23.53	44.12
No response	14.71	29.41	19.12	23.53	26.47	20.59	32.35
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

As expected, both communities are less likely to use transit and ride sharing as a result of the pandemic. Haile respondents are more likely to use biking and walking than the respondents from Duval Heights. However, biking and walking were more frequent activities for Duval Heights residents before the pandemic.

5.4 Conclusions

Overall, the surveys provide additional insights regarding travel patterns for Haile and Duval Heights residents. The data from each neighborhood have their own trends, and there are significant differences in the travel patterns between the two locations. This is expected given the differences in sociodemographic characteristics.

Haile residents generally have higher incomes, higher employment rates, and higher car ownership. A higher percentage of people have smart phones with access to internet. More than 50% of the respondents use a personal vehicle on a daily basis for work and shopping. The use of transit is generally lower than that of Duval Heights, but there are no data from similar neighborhoods to compare their transit usage. Respondents are generally satisfied with the neighborhood infrastructure as well as with overall safety while traveling. However, residents are generally not satisfied with the availability of driving routes for their daily commute.

Duval Heights respondents also primarily use personal vehicles, however, the percentages that use transit and biking are generally higher than Haile. A relatively large percent of respondents are not satisfied with the infrastructure in their neighborhood, nor with safety while traveling, particularly at night.

For both neighborhoods, as expected, the use of transit and ride sharing dropped as a result of the pandemic. Inferences about accessibility to transit could not be made as most respondents did not answer questions about transit access (possibly because most do not use transit). Based on the focus group results and the assessment of the two neighborhoods neither one of the neighborhoods has adequate transit service.

One of the significant differences between the two neighborhoods is the perception of transit. More than 50% of the Haile residents said that society looks down on people who ride buses. That number is 36% for the Duval Heights respondents. Regarding technology

acceptance, Haile residents are significantly more willing to use and interact with autonomous vehicles than Duval Heights residents.

It should be noted that due to the pandemic the response rate for the surveys was much less than expected. The research team was not able to visit the neighborhoods in person to solicit responses. Also, the data analysis was challenging as several survey questions were not completely filled. In particular, questions related to public transit services, available routes, location of nearest stops, waiting time, fare, and service coverage did not have enough responses. Hence, we could not use the surveys to determine behaviors related to transit as much as we would have liked.

However, the focus groups have provided complementary information to the survey. They also indicated that there is deep mistrust from the Duval Heights community, which likely leads to the low response rates. Communications and relationship building over a long time period would be extremely useful and important in making progress toward this goal. As it stands we may be missing responses from people who are most disillusioned about the transportation planning process.

6. IDENTIFICATION OF OBSTACLES TO MOBILITY AND PRELIMINARY RECOMMENDATIONS

This chapter summarizes the barriers to mobility and accessibility that communities face in Haile Plantation and Duval Heights. As defined by Litman (2021), a multimodal approach to transportation planning emphasizes the differing capacities of distinct modes, including their density, speed, availability, accessibility, limitations, and appropriate usage in different times and situations. Based on this definition, multimodality comprehensively addresses all Five A's (availability, accessibility, affordability, acceptability, adaptability) of senior-friendly transportation introduced by the Beverly Foundation, which have been addressed in previous tasks of this project and adds several more aspects of the transportation system.

This chapter discusses multimodality and unimodality to understand transportation users' needs and concerns in the two studied neighborhoods. The following subsection introduces a user typology and discusses users' perspectives about transportation systems for each neighborhood. To better understand the types of barriers encountered by the residents of the two neighborhoods, the research team conducted an age-related analysis (e.g., ADA access, economic constraints, built environment components) and a neighborhood-based analysis (e.g., safety and security, physical access). Next, the chapter discusses attitude and unimodality using the focus group and survey data discussed in previous chapters. The last subsection provides an overview of the barriers to mobility and accessibility for the two neighborhoods as well as short-term and long-term recommendations to ease access to resources and opportunities for the two neighborhoods.

6.1 User Typology for the Two Neighborhoods

The two neighborhoods were selected because they are representative of the larger communities in East and West Gainesville and reflect the respective sociodemographic characteristics. For example, East Gainesville's population largely consists of racial minorities, and the Duval Heights neighborhood provides a good example of the demographic makeup of East Gainesville. To illustrate how different East and West Gainesville are, we can examine the Center for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) for the entire metropolitan area. This index tracks 15 social factors such as poverty, lack of vehicle access, and crowded housing, and then groups them into four interrelated themes (socioeconomic, household composition/disability, minority/language, housing/transportation) (CDC/ATSDR, 2021). The SVI score ranges from 0 to 1, with 1 showing the highest vulnerability. Figure 6-1, on the following page, shows a map of the SVI for the Gainesville metro area based on 2018 data (the latest available data). Darker blue areas have an SVI ranging from 0.8127 to 0.8739, which indicates a high level of vulnerability compared to other parts of the city. East Gainesville in general has a higher level of vulnerability in comparison with the western side of the city. The Duval Heights neighborhood is in a census tract with an SVI of 0.8127. In contrast, the Haile Plantation neighborhood has an SVI of 0.2298, which indicates a low level of vulnerability considering the four interrelated themes as defined by the SVI (Figure 6-1).

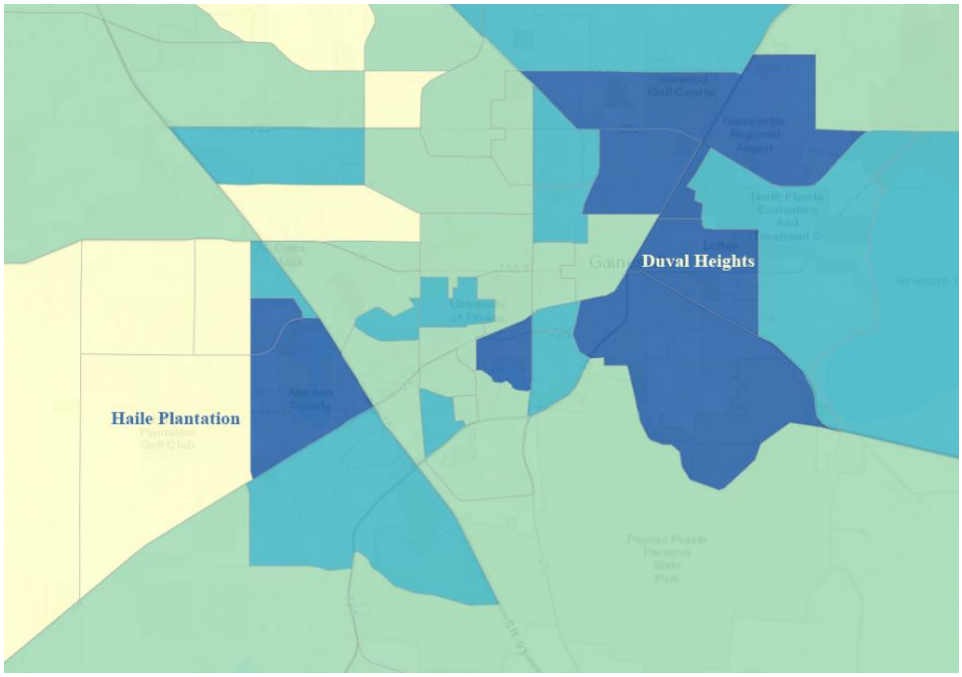

Figure 6-1: Social Vulnerability Index for Gainesville Metro Area

In addition to social factors evaluated by the SVI (such as economic inequality), the built environment of these neighborhoods presents two distinct movement patterns. The street layout of Duval Heights prioritizes cars rather than people, making it difficult for pedestrians to walk safely. Meanwhile, the Haile Plantation neighborhood enjoys a street layout that promotes connected and compact communities. Such a contrast leads to distinct transportation needs, accessibility issues, and other concerns for these two neighborhoods.

The focus group results showed a contrast between the types of transportation needs and concerns that residents in these two neighborhoods have. Duval Heights participants mainly discussed issues related to the reliability of public transit, poorly-maintained infrastructure, and expensive ride-hailing. Many residents in Duval Heights depend on transit services to access urban amenities and engage in community activities; therefore, the reliability and efficiency of the public transit system have significant influence on their personal and professional lives. Focus group participants from Haile Plantation also emphasized the importance of a reliable transportation system; however, they emphasized traffic congestion impacts, improving active transportation infrastructure, addressing parking issues, and the cost of alternative modes such as ride-hailing.

6.2 Mobility and Users' Attitudes

Mobility and mobility behavior are intertwined subjects in urban areas. A wide range of factors impacts an individual's mobility behavior - from available transportation options to infrastructure connectivity. On the other hand, an individual's perception of different transportation modes is strongly influenced by their gender, race/ethnicity, immigration status, their physical abilities, and other socioeconomic factors (Lee, Smart, & Golub, 2021) (Kielgast

et al., 2017). For instance, women generally adopt more environmentally-conscious mobility patterns (e.g., using public transit, walking, and bicycling) than their male peers (ITF, 2021). In addition to their green transportation choices, women take on household responsibilities more frequently than men. As a result, women's travel behavior is more complex than that of men and their mode choices differ extensively considering the types and lengths of a wide range of trips they take on a daily basis. This may include driving to the next town for fresher grocery options or transportation to and from childcare. Car ownership is another factor that must be considered. Using Singapore as a case study, Ibrahim (2003) found that because car ownership influences attitudes towards public transit, it's necessary to use different strategies for car owners and non-owners when encouraging the use of multimodal transportation (Ibrahim, 2003).

Taking a closer look at the two study neighborhoods, there are a plethora of unmet needs, many of which are unique to each area. Transportation planning needs to be redirected in order to meet these needs. Women are one of many groups who have been historically underrepresented in transportation planning. This is for a number of reasons, including the complexity of their daily travel behavior. For example, mobility patterns for care have not been thoroughly considered by transportation agencies. While these mobility patterns differ, they often include short, local, and frequent trips within a short time span, or crisscrossing town to make it to appointments and complete errands throughout the day. This is in contrast to typical male travel patterns, which are more straightforward and follow the shortest, most efficient routes. Considering that most caregiving tasks are on women's shoulders, women have a complex trip chain and many need to use local services for daily caregiving and their employment (Barnes, 2021).

Considering the built environment and socioeconomic characteristics of these two neighborhoods, the perspectives of transportation users reflect different sets of needs and concerns that must be addressed to achieve a sustainable and efficient transportation system. To understand different aspects of transportation for each neighborhood, the research team used a multi-method research approach that combines quantitative and qualitative data analysis (Berman, 2017). Data from focus groups and surveys were used to make recommendations towards improving mobility for residents in Haile Plantation and Duval Heights.

The next two subsections, discuss users' perspectives about transportation options in Duval Heights and Haile Plantation. As communities' needs and concerns in these two neighborhoods differ, their perception towards daily transportation choices represents two distinct - and in a few instances, overlapping - perspectives.

6.2.1 Users Perspectives for Duval Heights

From the Duval Heights' focus groups, it was observed that topics related to acceptability and availability are the most frequently mentioned transportation needs and concerns. Duval Heights focus group participants centered their discussion around public transit and vulnerable road users (e.g., medically disadvantaged). Both groups of participants from Duval Heights and Haile Plantation mentioned that transportation issues in the Gainesville metro area (e.g., lack of service, traffic, etc.) adversely impact their engagement in society, from employment to leisure activities. However, survey results show a different picture. Overall, the survey results seem to

underestimate the obvious differences in these two neighborhoods' mobility. Unfortunately, the surveys had a lower response rate than anticipated, possibly due to the pandemic, but also possibly due to chronic mistrust in surveys that did not make a significant difference in the daily life of the residents. Therefore, data analysis was made more difficult by incomplete answers. Questions regarding public transit services, route availability, locations of nearest stops, wait times, fares, and service coverage received low response rates. Thus, we could not draw conclusions regarding transit-related behaviors as reliably as we had hoped. Table 6-1 summarizes the themes mentioned for each of the Five A's categories during the focus group session in addition to survey respondents' overall satisfaction with each of the Five A's for participants from Duval Heights. List of measures and frequently discussed topics were extracted from focus group discussions, which are the source of qualitative data for this project. As participants in each neighborhood expressed different concerns related to Five A's, the list of measure is different for each neighborhood.

Table 6-1: Themes Related to Each Measure and Overall Satisfaction for Duval Heights

Performance Measures	List of Measures	Frequently Discussed Topics (Based on Focus Groups)	Overall Satisfaction (Based on Survey)
Accessibility	Land use Accessibility	Limited Bus Routes closer to Key Destinations	*Transit Accessibility:* Poor Response
	Utility-based Measures	Bus System Cannot Accommodate Alternative Choices • Insufficient Numbers of Rack-Equipped Buses • Lack of Additional Alternative Transportation Options (e.g., micro-transit)	*Accessibility to Shopping Options:* Dissatisfied (44.12%)
Availability	Annual Transit Service Kilometers per Capita	Limited Transportation Options in East Gainesville • Impacts residents' engagement in employment and community activities • Limits their access to essential needs	*Transit Availability:* Poor Response *Routes Availability during Peak Hours:* Satisfied (47.1%) [22% of responses were neutral]
	Daily Service Hours	Lack of Weekend and Late-night Services Unavailable Reliable and consistent Bus Routes to connect East and West	*Multimodal Availability:* Satisfied with the availability of sidewalks (47.1%) & Dissatisfied or Neutral with the availability of bike paths (65%)

Table 6-1: Themes Related to Each Measure and Overall Satisfaction for Duval Heights (Cont.)

Performance Measures	List of Measures	Frequently Discussed Topics	Overall Satisfaction (based on survey)
Affordability	Transportation Expenditures Relative to Household Incomes	Desire for Owning Personal Vehicle • Maintenance costs are often too high • Parking cost is a barrier	*Personal Car Affordability:* Overall Affordable (69.12%)
	Fares Relative to Average Incomes	Bus Fares are Manageable for Many Riders • Alternative transportation (such as ridesharing) is too expensive • Reduction in fare costs is essential for senior citizens, individuals with disabilities and/or low income (for public bus, ride-hailing, etc.)	*Multimodal Choices Affordability:* Poor Response
Acceptability	Benefit and Comfort	Disrupted Safety • Lack of streetlights • Presence of people sleeping at the bus stops	*Acceptability of Emerging Modes:* Very Willing (26% for using self-driving cars & 10.29% for using driverless shuttles) Very Unwilling (26% for using self-driving cars & 29.41% for using driverless shuttles)
	Satisfaction and Effectiveness	Unsafe Multimodal Choices • Safety while bicycling or walking (Low-lit sidewalks, aggressive stray dogs, etc.)	*Infrastructure Quality:* Dissatisfied (38.3%)
		Social Discomfort • Bus drivers' manner • Operators' customer service [experiences]	*Multimodal Choices & Safety:* Safe Walking (45.6%) + No Response for Biking (56%)
Adaptability	Technological Conditions	Lack of Properly-equipped Bus Stops • Especially for riders with medical conditions or special needs Paratransit System: • Lack of promptness	*Adaptability of Transit:* Poor Response
	Social and Economic Changes	Bus Operators' Lack of Knowledge for How to Accommodate Riders with Special Needs	*Unchanged Travel Behavior during Pandemic:* • Driving: 51.47% • Biking: 34% • Walking: 48.5% • Buses and ridesharing suffered most decline

6.2.2 Users' Perspectives for Haile Plantation

From the Haile Plantation' focus groups, it was concluded that affordability was one of the least discussed topics and many participants rely on their personal cars for their daily transportation. For Haile Plantation participants, topics related to acceptability and availability were the most frequently mentioned transportation needs or concerns. Under acceptability, concerns about distracted driving and safety while driving personal vehicles, biking and /or running on the roadways was discussed during the focus groups. Both groups of participants from the two neighborhoods mentioned that existing transportation issues negatively influence their access to resources such as jobs and community events. Commute to work on bike was mentioned as a central desire for Haile Plantation participants, as six participants in the focus group pointed their desire of biking or running to work, while emphasizing safety concerns on the road.

The availability of transportation options was highly discussed during the focus groups. Participants from Haile Plantation pointed out the importance of reliable options to access shopping centers and airports and suggested that faster routes or alternative modes such as light rail would be beneficial to the entire city. Table 6-2 summarizes the themes mentioned for each of the Five A's categories during the focus group session in addition to survey respondents' overall satisfaction with each of the Five A's for participants from Haile Plantation.

Table 6-2: Themes Related to Each Measure and Overall Satisfaction for Haile Plantation

Performance Measures	List of Measures	Frequently Discussed Topics (Based on Focus Groups)	Overall Satisfaction (Based on Survey)
Accessibility	Land Use Accessibility	No mention	*Transit Accessibility:* Poor Response
	Connectivity Index, Proximity-based Measures		*Accessibility to Shopping Options:* Satisfied (82%)
	Cumulative Opportunities Measure, Gravity-based Measures		
	Utility-based Measures		
Availability	Annual Service Kilometers per Capita	Limited Transportation Options • They adjust their daily employment schedules and leisure activities based on the transportation and traffic flow (leaving early to avoid traffic)	*Transit Availability:* Poor Response
			Routes Availability during Peak Hours: Dissatisfied (45.5%)
	Daily Service Hours	Unavailable Reliable and consistent Bus Routes to connect East and West • Did not consistently use public bus, because of scarce times and routes • Lack of faster routes (or providing alternative transportation options to destinations such as airports)	*Multimodal Availability:* Satisfied (81.77%)

Table 6-2: Themes related to Each Measure and Overall Satisfaction for Haile Plantation (Cont.)

Performance Measures	List of Measures	Frequently Discussed Topics	Overall Satisfaction (based on survey)
Affordability	Fares Relative to Average Incomes	Bus Fares are Manageable for Many Riders • They reply on expensive alternative transportation (such as Uber and Lyft) due to lack of parking for weekends or night activities • Reduction in costs is essential for senior citizens, individuals with disabilities and/or low income (for ridesharing or fixed-route buses) • Reduction in costs for alternative transportation options (for community events such as football, concerts downtown, etc.)	*Personal Car Affordability:* Overall Affordable (90.1%) *Multimodal Choices Affordability:* Poor Response
Acceptability	Benefit and Comfort	Disrupted Safety • Safety associated with distracted drivers while bicycling or running on roadways • Safety with driving during rush hours or special events	*Acceptability of Emerging Modes:* Very Willing (45% for using self-driving cars & 41% for using driverless shuttles)
	Satisfaction and Effectiveness	Unsafe Multimodal Choices • Isolated-safe bicycle lanes along major roads • Adding traffic lanes on major roads	*Infrastructure Quality:* Satisfied (50%)
		Social Discomfort • Bus drivers' manner • Operators' customer service [experiences]	*Multimodal Choices & Safety:* Very Safe (Walking: 81.82% & Biking: 50%)
Adaptability	Plans Considering Future Changes in Social, Economic, Environmental, and Technological Conditions.	No mention	*Adaptability of Transit:* Poor Response *Unchanged Travel Behavior during Pandemic:* • Driving: 63.64% • Biking: 63.34% • Walking: 68.18% • Buses and ridesharing suffered most decline

6.3 Multimodality and Five A's

This subsection explores the multimodality and unimodality behavior of the studied populations and barriers to multimodality. A multimodal approach in transportation planning emphasizes all 5As of senior-friendly transportation (Beverly Foundation, 2010). As defined by Litman (2021), multimodal transportation planning focuses on the differing capacities of distinct transportation modes, including their speed, density, physical accessibility, availability, costs, limitations, and appropriate usage in different situations. Combining the approaches of the Beverly Foundation and Litman offers a more robust understanding of multimodal transportation that is also accessible for people of all ages and abilities. Therefore, we applied this framework to our research process.

From the focus groups, the research team observed that residents in both neighborhoods desire access to additional alternative transportation options and improvements related to multimodal transportation infrastructure in order to enhance their mobility within the Gainesville metro area. The Duval Heights focus group demonstrated the importance of promoting access to transit while also improving the multimodal transportation required to bike or walk to bus stations, particularly for low-income and vulnerable road users. Haile Plantation focus group participants suggested building more bike and traffic lanes to promote safety and access throughout the city. From the focus groups and surveys, it can be concluded that multimodality is seen as the pathway to improve access and enhance mobility.

With the existing framework and data collection findings in mind, Table 6-3 relates each of the 5As to a definition of multimodal transportation planning (Litman 2021). In addition, as technology progresses, it is necessary to develop new models to predict the acceptability levels of innovative transportation options and to understand the impact on communities' mobility needs. For example, autonomous vehicles have the potential to enhance accessibility for people of all ages and abilities. However, in order to fully realize the potential of technology, new models are necessary to 1) understand different aspects of novel modes (such as the conditions of market penetration and operating costs); and 2) assess potential impacts on energy consumption, parking issues, and safety (Berrada & Leurent, 2017).

Table 6-3: Five A's and Definitions Related to Multimodality

Five A's	Definition from Multimodal Transportation Perspective
Availability	Existence of different transportation modes when needed
Accessibility	Access to different transportation options based on riders' abilities and desired destinations
Affordability	Account for differing capabilities of different modes, including their costs for riders and providers, etc.
Acceptability	Consider different types of travelers' needs and preferences such as "commuters, students, tourists, farmers, freight haulers and people with disabilities"
Adaptability	Ensure all modes encourage safe transportation in different situations and times

6.4 Multimodality vs. Unimodality

Transportation infrastructure is a means to connect people and places as well as provide potential opportunities for interaction and social activities. In addition to being a set of criteria to measure senior-friendliness of transportation systems, the Five A's can also be used in other contexts to address equitable access to resources and opportunities. Using multimodality as a strategy in urban contexts can help provide equitable opportunities to access essential needs. A multimodal behavior improves social mobility by easing engagement in the community for non-drivers and vulnerable road users. A well-designed multimodal system encourages people from all social strata to enjoy riding with others (Romero-Rodriguez, Civila, & Aguaded, 2021). Experiencing social differences within a community ultimately results in enhanced social cohesion and a strengthened sense of community among vulnerable segments of the population.

The car dependency of most American cities, which began in the early 20th century, has perpetuated divides. Driving cars typically reduces the wealthiest' exposure to diversity because they are traveling between homogenous destinations and interacting with homogenous groups. In this sense, a multimodal transportation approach is central to creating a transportation network in which personal vehicles are just one option among many. Working towards promoting multimodality will improve the overall transportation system when we accept that infrastructure is all about networks — whether it's roads, sidewalks, or bike trails (DuPuis, Martin, & Rainwater, 2015). Networks connect people to opportunities and invite them to choose multimodality over unimodality. A transportation system is an efficient and just system if it serves diverse demands. For instance, it is unproductive and counterintuitive when parents are forced to drive their children to a school within walking distance due to crumbling sidewalks and dangerous traffic crossings. In the context of this study, we refer to automobile dependency as unimodal transportation behavior compared to multimodalism, such as bicycling to bus stops and taking public transit.

A 2011 study by Arthur D. Little assessed the mobility maturity of 66 cities across the globe using 11 criteria, including their share of public transit, speed limits, GHG (greenhouse gas) emission, and the number of personal vehicles per capita (Lerner, et al., 2011). They discussed affordability challenges, accessibility, acceptability, adaptation to changing demands, and availability of different modes (the terms used were not exact, but their essence is similar to the attributes examined in this research). A total of 11 cities from North America (Boston, New York, Washington, Toronto, Philadelphia, Chicago, Los Angeles, Dallas, Miami, Houston, and Atlanta) were evaluated. Overall, North America had a below-average performance (global average of 64.4) and was far below Western Europe. The only North American city that stood out was Boston with a considerably higher score than other American cities (76.2 points out of 100). The report introduced three strategies (including establish sustainable core, rethink the system, network the system) to achieve high performance regarding mobility maturity (Lerner, et al., 2011).

The following sections discuss existing barriers to multimodality in the two neighborhoods by using the results of the focus groups and survey employed in this project.

Multimodality is the result of a multifaceted approach in transportation planning that fully considers various types of transportation and connections between transportation types. The

multimodal approach to transportation accounts for differing capabilities of different modes in different situations, which hints at the Five A's: accessibility, affordability, adaptability, acceptability, and availability. There are numerous population-based and built environment-based factors that impact the levels of access to multimodal choices, including residential segregation, street networks, and land use. The following sections employ the results of the focus groups and the survey to discuss population-based and built environment-based factors, emphasizing the age of residents and neighborhoods' physical characteristics.

6.4.1 Age-Related Analysis

Age is one of the major factors that impact an individual's access to essential needs and opportunities for a variety of reasons (e.g., affordability challenges, accessibility issues related to aging, individual's acceptance of the quality of services, and significance of reliability and timeliness for individuals with limited abilities). As has been made clear by previous research, it is imperative to ensure affordable options, accessibility, and equitable access in transportation for older adults. There is a wide range of affordable and user-friendly transportation options that ensure a socially-engaged life for people of all ages. Depending on the context, conventional transit provides an ideal option for some older adults. For others, personalized services such as microtransit are required, especially considering health status, land-use patterns of surrounding built environments, and physical ability. The majority of survey respondents for this project were more than 50 years old, comprising 82.34 percent and 77.27 percent of responds for Duval Heights and Haile Plantation, respectively. The focus group participants also reflected a similar pattern with regard to age, with 82 percent of participants above 46 years old in Duval Heights and 75 percent of Haile Plantation participants more than 46 years old. To better understand age-related transportation behavior of the two neighborhoods, the research team completed a survey analysis for responses provided by participants who are above 50 years old.

Affordable alternative transportation choices: Promoting community engagement through transportation helps older adults maintain independence, which ultimately contributes to their overall well-being (Dickerson and Davis, 2012). Because driving and public transit often cannot assist older adults in fulfilling their needs for community mobility, providing affordable and reliable alternative transportation choices is essential for this segment of the population. Providing additional alternative transportation choices was among the suggestions made by Duval Heights participants during the focus group. Haile Plantation participants also discussed the usefulness of existing shuttles that connect their neighborhood to central parts of the city and emphasized the necessity to expand such services. In addition, East Gainesville has microtransit services since 2019 through a pilot program. This provides limited services that connect riders to specific destinations. Further examination should be completed to evaluated alternative modes and address aging communities' needs.

6.4.2 Neighborhood-Related Analysis

Multimodal transportation emphasizes the different capabilities of distinct modes of transportation, including their affordability, availability, and uses. Table 6-4 provides mode profiles for Duval Heights and Haile Plantation based on the data collected through the focus

groups and surveys. The table was inspired by Todd Litman's recent report on multimodal transportation planning (Litman, 2021).

As shown in Table 6-4, based on survey responses, the transportation options used by Duval Heights residents are private cars, Uber/Lyft, and bicycles. Other modes of transportation have limited use due to lack of convenience, ability to use, or proper infrastructure. All three transportation modes used by Duval Heights residents are costly and/or require physical and/or mental ability to use them. For instance, driving is not an option for many residents regardless of affordability, as many people cannot or should not drive due to a wide range of reasons, including physical or mental disability. Lack of proper transportation options for non-drivers limits their engagement in the community and also places burdens on their family members. Considering the socioeconomic characteristics of the Duval Heights neighborhood and the findings of the focus group, limited availability of multimodal transportation options places a major financial burden on the community by decreasing citizens' abilities to access essential needs and making older adults socially isolated. In contrast, based on survey responses, Haile Plantation residents use various transportation options, only experiencing limited availability when it comes to microtransit and wheelchair usage. Haile Plantation residents have access to a shuttle that connects the neighborhood to the University of Florida. Considering the aging population in Haile Plantation, providing access to the downtown area is essential. Although driving is a widely available option for Haile Plantation, lack of roadway safety was mentioned by Haile Plantation focus group participants. Additionally, paratransit is a need for aging communities in the Gainesville metro area. The availability of paratransit was not specifically discussed during the focus group. Currently there is no partnership among different sectors that are involved in providing services for people with disabilities or older adults. Microtransit provides dynamic routing, while paratransit is known as community transport. For scheduling a ride with paratransit services in Gainesville, a person needs to call the day before a service is provided. Depending on their eligibility, individuals need to call different agencies to arrange a ride, such as MV Transportation (the Community Transportation Coordinator (CTC)) or ADA services. In addition to improving existing services, merging microtransit and paratransit services will foster convenience and efficiency of the transportation system (Holland, 2021).

Perceived crime and safety: Based on the survey results the research team determined that 3.57 percent of Duval Heights citizens over the age of 50 walk on a daily basis. This is lower than was demonstrated through the survey results for all ages (7.5 percent). Focus group findings showed the quality of sidewalks and lack of lighting are some of the issues Duval Heights participants face during daily transportation. Such issues are more critical for older adults, particularly as the risk of falls increases with age. Analysis of the survey responses from people over 50 for Haile showed that the majority (76.47 percent) of older participants were satisfied with sidewalk conditions compared to only 41.07 percent for older participants from Duval Heights.

The focus group discussion showed that safety perception is one of the major themes regarding transportation acceptability. Safety was also mentioned as a critical factor influencing focus group participants' walking and biking activities in the Duval Heights neighborhood. The current infrastructure in Duval Heights is discouraging participants aged 50 and older from

Table 6-4: Mode Profiles for the Two Neighborhoods

Mode	Availability (DH)	Availability (HP)	Density (space needed)	Cost (user costs)	Destinations Provided	Limitations
Walking	Limited Availability: 29.42% dissatisfied 10.29% neutral	Available: 54.5% extremely satisfied	High	Low	Limited destinations for DH Varied destinations for HP	Requires physical ability and short to medium distance (0- to ¼-mile (400 m), considering that ¼-mile is not a hard boundary). Safety is a significant barrier.
Wheelchair	Limited availability	Limited availability	Medium	Medium	Very Limited	Requires suitable sidewalk or path with limited distance and carrying capacity
Bicycle	Somewhat available: 38.24% dissatisfied 26.4% neutral	Available: 54.5% extremely satisfied	Medium	Medium	Very Limited for DH Limited for HP	Needs bicycle and capability; limited distance and carrying capacity
Uber/Lyft	Available	Available	Low/ Medium	High	Varied destinations	Limited availability and high cost
Fixed Route Transit	NA (poor response)	NA (poor response)	High	Medium	Limited	Limited availability and sometimes impossible to use due to lack of reliability
Paratransit	NA	NA	Medium	High	Very Limited	Limited available services and high cost for the city/providers
Microtransit	Limited availability (pilot program)	Limited availability (shuttle service)	Medium	High	Homogenous destinations	Limited available services and high cost for the city/providers for free services; high costs for travelers in other instances
Private Car	Available: 57.35% daily usage 18% several times a day	Widely available: 54.5% daily usage 36% several times a week	Low	High	Varied destination (traffic and roadway safety are barriers for both DH and HP)	Costly and requires ability to drive
Carsharing (vehicle rentals)	Somewhat available	Somewhat available	Low	Medium	Limited availability	Requires affordable and timely rental services

utilizing multimodal behaviors. Such findings are consistent with previous studies, as the presence of multiple favorable environmental factors (such as safety, street lighting, and pleasant streetscape) motivate older adults to walk medium distances to urban amenities and places (Van Cauwenberg, et al., 2013).

Acceptance of conventional transportation modes (for participants over the age of 50) as related to safety showed a similar pattern in the survey findings. For those older than 50 in Duval Heights, the percentage of participants who feel "very safe" while walking is considerably lower than that in Haile Plantation - 14.29 percent compared to 82.35 percent. Additionally, perceived crime and safety from traffic were centrally discussed during the Duval Heights focus group session. For Duval Heights participants in general, and older adults specifically, safety was identified as a basic need for transportation, which hints at the importance of: 1) promoting the quality of transportation infrastructure; 2) enhancing safety through design and maintenance; 3) elevating the quality of streetscape; and 4) creating places for social interactions and civic engagement as a part of street design to promote a sense of attachment and enhance perceived safety for travelers, specifically older adults.

6.5 Attitude and Multimodality

Studying individual and social attitudes towards transportation modes is an essential tool to understanding travel demand, as customer satisfaction is a critical piece of any service expansion plan (Diana, 2012). A 2011 study of City of Calgary residents captured reasons for using transit as functions of people's perceptions and attitudes towards the quality of public transit. They concluded that Calgarians value "reliability and convenience" over "comfort of the ride" (Nurul Habib, Kattan, & Islam, 2011). These findings can be used to inform policy, shifting focus to the importance of reducing scheduling delays and increasing convenience by complying with peak-hour demand to improve ridership. Another study on commuting to work by combining public transit and bicycles was conducted in the Netherlands. The results found that regardless of several socioeconomic characteristics and travel distance, individuals' attitudes play the most significant role in their decision-making processes about combining public transport with bicycle use for commuting to work. This subsection explores individual and community-related factors as well as the role of the Five A's in forming travelers' attitudes towards transportation modes in the two neighborhoods.

Individual attitude can be influenced by many internal (such as self-identity) and external (such as service quality) factors. Planned behavior theory describes attitude as an individual's beliefs about a behavior, which are formed by associating that behavior with other objects, characteristics, or events (Ajzen, 1991). In previous studies, users' attitudes were found to be significant in choosing transportation modes or shifting towards a multimodal behavior. A 2020 study on mass rapid transit in Kuala Lumpur, Malaysia, concluded that users' attributes (such as personal attitude) are important in encouraging modal shift among older adults and higher-income individuals. The study concluded that older age groups primarily focused on the quality of service, such as speed, flexibility, and convenience (Chen Kwan, Sutan, & Hashim, 2020). Their perceptions of service quality greatly influenced attitudes towards that mode. Another study on free bus policy (FBP) for older adults suggested that improving individual attitudes towards public transit could enhance the impact of FBP on communities and improve ridership,

specifically for ones who live close to transit routes. This study discussed the impact of external factors (such as wait time and spatial access to transit) on improving attitudes (Yang, et al., 2020).

In this study, survey results from both neighborhoods showed a negative social attitude towards public transit. In response to the question, 'do you think society looks down on people who ride the bus?' 37 percent of Duval Heights participants said "yes" compared to 55 percent of Haile Plantation responses. This finding may hint at different subjective norms for these two neighborhoods. Subjective norm is defined as the perceived social pressure to perform or not perform a specific behavior (La Barbera & Ajzen, 2020). The Duval Heights neighborhood, considering its sociodemographic and built environment characteristics, requires public transit to meet the needs of its residents. On the other hand, Haile Plantation has a more inclusive transportation system, as can be seen by the respondents' level of satisfaction with different transportation infrastructure. As indicated above, accessibility, affordability, acceptability, and availability of services contribute to individuals' attitudes towards a mode of transportation.

Regarding Regarding availability, higher levels of satisfaction with the quality of transportation infrastructure in Haile Plantation contribute to an overall positive attitude to the transportation system in the Gainesville area. However, the Haile Plantation focus group revealed dissatisfaction with traffic congestion and the quality of roadways. Access to essential needs is another factor impacting an individual's attitude toward transportation modes; based on the survey, a higher level of satisfaction was found in regard to access to shopping options among Duval Heights participants compared to Haile Plantation (81 percent satisfied vs 34 percent). This may be an artifact of expectations from the two communities. On the other hand, focus group results demonstrated a strong need to expand on transportation options for the Duval Heights neighborhood as these participants discussed a considerable lack in ability to access medical needs, jobs, and non-weekday destinations (such as community activities and late night or weekend jobs).

Acceptability of services also plays a critical role in forming attitudes toward transportation modes and the quality of infrastructure is a critical component of this equation. The majority of Duval Heights survey respondents were dissatisfied with road quality and bike lanes, which is consistent with the Duval Heights focus group responses. Despite the unreliable transit system in East Gainesville, Duval Heights residents had a positive attitude towards public transit. During the focus group, they thoughtfully considered public transit as their transportation mode and shared ideas to improve the system. Suggestions ranged from scheduling improvements to cost reduction, training bus drivers, and installing more bike storage on buses. In Haile Plantation, a positive attitude towards existing transportation options was observed; however, their main focus was on other issues such as providing bike lanes and traffic lanes to reduce roadway congestion, more parking at destinations, and reduced-cost, alternative options for community events.

Despite the limited mentions of public transit, Haile Plantation participants' suggestions demonstrated car-dependency for regular transportation needs and the desire of having exclusive services (such as the existing shuttle from Haile Village to the University of Florida) to other parts of the city. Such an attitude may be the result of a higher level of affordability which helps

them easily adapt in certain situations and provides an opportunity to take other transportation modes such as Uber when needed. All Haile Plantation focus group participants had a household income higher than $100,000 and the majority (55 percent) of survey participants in Haile Plantation had a household income higher than $85,000. Because the sample size was low, the survey responses are not necessarily indicative of the entire population of these neighborhoods. However, the findings reflect: 1) the importance of changing public transit perceptions by enhancing the efficiency of alternative modes; 2) the necessity of meeting the needs of aging populations in future transportation plans; and 3) the tangible adverse economic impacts of disconnectedness among varied social groups in the Gainesville metro area.

6.6 Conclusions

This section identifies obstacles to mobility and provides preliminary recommendations for the two neighborhoods studied in this project. The overarching lessons learned from this study can be extrapolated to other cities. The suggestions provided aim to meet the goal of safe and convenient mobility for all ages. These recommendations are provided from the perspective of multimodality that encompasses the Five A's (accessibility, acceptability, affordability, adaptability, and availability).

6.6.1 Obstacles to Mobility

Based on the data collection through focus groups and surveys, the research team concluded that participants from both neighborhoods desire more alternative transportation options and have concerns about the quality of transportation infrastructure. There were also safety concerns related to driving and multimodal choices such as biking. For instance, Duval Heights participants expressed their concerns about safety and security while using transit, driving, or biking. Safety in general was found to be a central concern for both neighborhoods.

General Obstacles: During the Covid-19 pandemic, transit-dependent communities suffered the most due to lack of services, lack of reliability in general, and health concerns related to public transit. Considering these lessons and findings from focus groups and surveys, the research team identified the following obstacles to mobility for the studied neighborhoods and the Gainesville metro area, in general:

- Lack of well-defined strategic plan for disaster management during critical times such as the COVID-19 pandemic
- Perceived insecurity and lack of safety
- Disconnect between the available transportation options and the various accessibility, availability, and affordability needs of the communities

The existing mistrust observed during this project demonstrates lack of clarity and disconnectedness between transportation agencies and residents. It is recommended that transportation agencies in the region build trust with members of the community, regardless of present transportation behaviors. For example, agencies running surveys aiming to evaluate their services, need to effectively communicate with non-users to identify why they are not using these services.

The COVID-19 pandemic revealed that cities are not prepared for such crises. It is recommended that transportation agencies develop a well-defined and frequently updated strategic plan for disaster management during critical times. For example, a decrease in the number of transit riders by 50 percent and a reduction in route offerings during the pandemic meant that transit-dependent communities, which include essential workers, lost connections to jobs, health care, and other essential needs or had very limited available options. Available alternative options such as the City of Gainesville microtransit pilot program warrants further evaluation for potential expansion or integration with transit services.

Lack of security and safety was widely mentioned by participants from both neighborhoods. That hints to the necessity for a transparent and updated crime prevention plan to decrease violent and nonviolent crimes and, specifically, enhance perceived safety for travelers. Such effort requires: 1) frequent communication with residents about their sense of security and safety while making a trip using different transportation modes; and 2) developing social programs to educate varied communities about the "sense of joint responsibility and positive ownership (Matijosaitiene, 2016).

The latter hints at the importance of thoroughly considering the Five A's as pillars of a multimodal approach to transportation planning. A functional and equitable transportation system is not only accessible, affordable, available, and reliable, but also safe - part of the system's acceptability. The research team concluded that acceptability of services plays a pivotal role in changing perspectives about available transportation options. Public safety is a big piece of the acceptability puzzle. A collaborative public safety program will maximize resources and expand communities' power to identify sources of insecurity and address it in a more effective and community-oriented manner. Therefore, a socially- and physically-connected transportation system should be the ultimate goal to address safety issues, enhance physical access to available resources, and decrease existing economic division for these two studied neighborhoods - and neighborhoods across the country.

Neighborhood-specific Obstacles: As the two neighborhoods have different demographic and transportation mode profiles, they have unique sets of obstacles to mobility.

For the Duval Heights neighborhood, considering its decline in population and the quality of existing infrastructure from, there are three main obstacles:

- Lack of transportation network: A connected transportation system would ease access to a variety of locations through alternative transportation modes, depending on individuals' abilities. The absence of a transportation network is prevalent in East Gainesville, pointing to a lack of availability and affordability of the few existing services.
- Mistrust between transportation users and agencies: The research team observed mistrust between transportation agencies and communities, which has gradually created a socially disconnected environment. For instance, a considerably high percentage of Duval Heights focus group participants indicated that they are not satisfied with the transportation infrastructure and are not optimistic about future efforts to make positive impacts on their daily mobility needs.
- Poor infrastructure quality: For Duval Heights participants, the main concern related to infrastructure was around the quality of existing roads and sidewalks. As discussed during

the focus group, this situation can lead to dangerous driving behaviors and discourage individuals to walk to nearby destinations, such as bus stops.

Haile Plantation, in contrast, enjoys a well-defined walking and biking trail system that is unfortunately not connected to other parts of the city. For Haile Plantation focus group participants, two main obstacles were mentioned:

- Disconnectedness between Gainesville and neighboring cities: Lack of alternative transportation options (such as light rail or train) that connect the city to close by metropolitan areas, such as Orlando, is prevalent for the whole city. However, for Haile Plantation residents, it seems to be an essential need that cover part of communities' trips to international airports.
- Disconnected trail system around the city that limits Haile Plantation residents' safe access to amenities and services in other parts of the city, through active transportation choices such as bicycling in suitable times of the year.

Clearly, both neighborhoods have concerns about existing transportation as well as recommendations for future projects. However, Duval Heights citizens are more focused on safety and everyday transportation uses while Haile Plantation is more focused on travel and other recreational uses. When considering the demographic profiles as well as the current transportation in both neighborhoods, this discrepancy makes sense. Differences such as these throughout larger metro areas will be vitally important for research teams and local agencies to fully understand.

6.6.2 Recommendations

Considering the low annual population growth rate (0.07%) for Alachua County over the last three years and, specifically, the gradual economic decline for the Duval Heights neighborhood, the following recommendations will eventually contribute to enhancing livability in east and west Gainesville. To provide background, a significant portion (35.3% as indicated by the ACS 2014-2019 data) of the housing units in Duval Heights are vacant. Additionally, for the last thirty years, the median household income has stayed approximately ten thousand dollars below the city average. Limited or nonexistent access to resources and opportunities (such as jobs) are among the contributing factors to such decline.

The 2009 Interagency Partnership for Sustainable Communities introduced the following six livability principles in transportation:

- Provide more transportation choices
- Promote equitable, affordable housing
- Enhance economic competitiveness
- Support existing communities
- Coordinate policies and leverage investment
- Value communities and neighborhoods (ICF International, 2010)

To create a livable environment through transportation, establishing a well-connected, multimodal, and functional transportation system is essential. Such a system is not achievable if communities are not considered as collaborators and key players in early phases of decision

making. The research team recommends the following steps to be taken by city and transportation agencies to overcome mobility obstacles in the two studied neighborhoods:

Value Effective Communication: Transportation agencies need to have a credible image in the eyes of community members. These agencies can gain trust by providing reliable services that meet the community's needs and address their concerns, which will likely also encourage non-users to rethink their daily travel behavior. Clarity and transparency are additional critical components of effective communication. Transportation authorities need to build long-term connections with community members and collaborate in making changes that impact availability, accessibility, and affordability of transportation services. Such effective communication helps cities see through the communities' lens in redefining existing services towards a more consumer- and sustainability-oriented system. Another aspect of effective communication relates to communication among key players. For instance, when a city works to enhance alternative modes of transportation, it is essential to partner with key employers to ensure ridership and financial stability of services. The microtransit program is an example of an alternative mode and was discussed briefly in focus group sessions with Duval Heights. Effective communication among communities, local officials, and key employers in the city is necessary to ensure the long-term stability of these services.

Ensure a Strong Network of Transportation Services: Pursuing sustainable mobility is essential to address present needs of the community and create a foundation for emerging transportation options. There are many steps that our cities can take to achieve the sustainability goal of transportation from encouraging policies that favor compact development to save costs and enhance efficiency (Litman, 1995) to connecting existing mobility options. Networking the system and connecting transportation modes is a potential pathway to meet the needs of users and non-users. When the community's needs are better met, non-users are more likely to convert to users, increasing the overall popularity of multimodal transportation. In the process of networking the system, assessing new alternative choices are critical. The microtransit program in East Gainesville is an example that has the potential to fill in the gap of reliability related to fixed-routes services. Besides, merging microtransit services and existing paratransit options will result in faster transit and reduced travel costs for those with accessibility needs, while enhancing ridership experience and increasing the number of overall riders. Further evaluation of such consolidation and potential expansion of microtransit services in other parts of the city is recommended.

Investigate Aging populations' Needs and Concerns: Older adults are backbones of our society and meeting their needs and addressing their concerns is central to provide acceptable mobility options for everyone. Further studies on aging populations in both neighborhoods should be conducted in order to better communicate the needs of that population in regard to public transit and additional alternative choices. The average age in Gainesville, and Florida as a whole, already skews older. As the entire nation's population ages, these discussions will become more important everywhere, but this makes Florida the ideal place to start the process.

7. COMMUNITY-BASED PARTICIPATORY RESEARCH (CBPR) METHODOLOGY AND APPLICATION

This chapter synthesizes the lessons learned to serve as a guidebook for transportation agencies aiming to involve their constituents (communities or neighborhoods) in developing multi-modal transportation plans. A second focus of this chapter is to provide recommendations to the City of Gainesville both from the standpoint of needs of the two communities studied, and the application of the CBPR for future efforts. The next subsection discusses this research project within the broader context of public engagement in transportation planning. The second subsection outlines the major steps of the CBPR process as employed in this study and is intended to serve as broad guidance for other agencies interested in using this approach. The last subsection presents the recommendations to the City of Gainesville.

7.1 Overview of Public Engagement

Federal legislation has recognized public involvement as an integral component of transportation planning. Presidential Executive Order 12898 directs federal agencies to recognize and address impacts of their programs, policies on minority groups and low-income populations (USEPA, 1994). Executive Order 13166 asks federal agencies to enhance access to services for populations that have limited English proficiency (USDOJ). Effective public engagement at all the stages of any project enhances its acceptance (FDOT). In the late 1960s, the Florida Department of Transportation (FDOT) was one of several state agencies that started to offer more public involvement opportunities in transportation decision-making in response to growing federal emphasis (Kramer et al., 2006). Transportation agencies often find it difficult to involve the public through traditional techniques (Aimen et al., 2012). 'Effective' involvement of public and stakeholders involved in any transportation project is still a challenging task for agencies at different levels (state or local). It is essential to acknowledge that public engagement is a complex process, and a single approach cannot be applied to all communities, projects, or case study areas. Communities have different cultural backgrounds and socio-economic characteristics. Meaningful involvement requires adoption of context-specific strategies that can overcome potential lack of trust among the participants and encourage them to take part in influencing the decisions taken by their government (Aimen et al., 2012).

In a recently completed study, Correia et al. (2021) identified several problems associated with citizen engagement. These include (1) Citizens not used to being involved, (2) Citizens not having the information to be involved, (3) Often only the more radical voices speak, (4) Lack of human resources, and (5) Lack of methodological standard approaches.

Public engagement takes place at different geographic scales according to the scope of project. Engagement of all citizens of a state is required to support the state's visioning and long-term planning goals. For example, FDOT's guiding principles for state-level public engagement are outlined in the Public Involvement Handbook (3). A metropolitan planning organization (MPO) conducts public engagement to develop and implement a region's long-range transportation plans. For example, Metroplan Orlando's public engagement procedures are outlined in "2045 Metropolitan Transportation Plan Public Participation Report" (MetroPlan Orlando, 2020). By federal law, each MPO must have a Citizens Advisory Committee and a

Technical Advisory Committee. A city or a local transportation agency (such as a transit agency) engages the public for local transportation projects. For example, the City of Gainesville's guidelines for public engagement are outlined in the Community Engagement Guidebook (City of Gainesville, 2021).

Public engagement also takes place at different temporal scales. Project-specific, short-term engagement at the local level would be limited to involving the public just before, during, and after the completion of the project. However, there is a recognition that agencies should have strategies and methods to continually engage the public (these are not project-specific) and build long-term relationships. Having such a positive relationship is important for the success of short-term project-specific engagements. On the contrary, a disconnect between an agency and the public it serves, and the associated distrust, can hamper effective deployment of projects and impact the active involvement of the public in subsequent projects. Some agencies in the country have dedicated staff and programs for such sustained, long-term engagement. For example, the City of Seattle has a dedicated department of neighborhoods that aims to improve quality of life of community peoples by making resources and opportunities available to them.

Finally, the nature of public engagement (who is engaged, how they are engaged, what data are collected and processed) can also vary based on the type and scope of each project. For example, engaging the public for longer-term visioning / planning efforts can be different from engaging people on a specific project. Strategies for short-term engagement include focus group meetings, surveys, interviews, flyers, video messaging and other similar strategies; longer-term engagement includes strategies such as recruitment of community coordinators and efforts to ensure effective, ongoing, and continued participation of community residents. Historically, the emphasis of public engagement has been on reaching and engaging minority / low-income / underserved communities. With the transformative changes taking place in transportation, it is very important to engage all sectors of society and consider all modes (shared mobility, micro-mobility, autonomous vehicles, etc.) in transportation planning.

The focus of this chapter is on short-term, neighborhood-level public engagement in the context of multi-modal transportation planning projects consistent with the overall scope of the research project. We employ the Five A's as a comprehensive framework of mobility indicators to support multi-modal transportation planning and "Community-Based Participatory Research" as an effective strategy for short-term, neighborhood-level public engagement to support such planning.

An overview of the Five A's along with the corresponding mobility indicators for multimodal planning is presented in Table 7-1. This framework explicitly addresses needs, opportunities, and constraints in shaping the travel outcomes. These indicators can be incorporated into qualitative (focus groups) and quantitative (surveys) data collection methods. Further, this framework can be extended to consider the new and emerging modes (shared mobility, micro-mobility, autonomous vehicles, etc.).

The "Community-Based Participatory Research" approach has been used widely in the medical field to examine health interventions (again in low income / minority / underserved neighborhoods) but not as much in the context of engineering decision-making by public

agencies. It is useful to acknowledge that existing models of public engagement in transportation decision-making do include some elements of the CBPR process. In the rest of this document, we present our recommendations for operationalizing the CBPR approach in the context of transportation planning in two very diverse neighborhoods of the City of Gainesville.

Table 7-1: Mobility Indicators to Support Multimodal Planning

Mobility Indicator	Description	Examples
Availability	Presence of public transportation services at any place at a given point in time.	Transit routes and stops from where services are available to the residents of the two communities.
Accessibility	Ability to arrive at intended services/activities.	Time spent in walking to/from bus stops.
		Satisfaction levels (rating on Likert scale) with respect to shopping options.
Affordability	Financial ability to use/ access a transportation service.	Rating levels for affordability with respect to the commute cost of various modes available.
Acceptability	Action of consent to receive or undertake a transportation mode.	Rating levels for willingness to use emerging modes such as self-driving cars and driverless shuttles.
Adaptability	Ability to accommodate users with disability/special needs.	Satisfaction levels (rating on Likert scale) with respect to accommodation of elderly and disabled people at bus stops.

7.2 Short-Term Neighborhood-Level Public Engagement: A Community-Based Participatory Approach

The main objective of a Community-Based Participatory Approach (CBPA) is to ensure that people within a community are involved in all project stages and developing outcomes for their community. “Community” refers to a group of people belonging to same neighborhood; “Community-Based Approach” is the one that is adopted for the community by using the resources from the community itself, and “participatory” refers to the engagement of the community in all the stages of planning and implementation. A Community-Based Participatory Approach requires iterative interaction between the project staff and community members for serving the project goals.

A combination of qualitative and quantitative data collection methods is recommended. Broadly, focus groups can help elicit detailed (semi structured / qualitative) insights from a small number of subjects while surveys can help elicit structured (quantitative) insights from a larger group.

In light of the overall philosophy of CBPA and the data-collection needs for multimodal transportation planning, there are two types of public engagement that may occur. The first involves the engagement of a small group of people (called the community advisory board, or CAB) over the entire process. The second is the inclusion of an adequately large and representative subset of community members to provide data and opinions collected via qualitative methods (focus groups) or quantitative methods (surveys). These persons, unlike the

members of the advisory board, are not involved in all stages of the CBPR (for example, they do not contribute to designing surveys).

The following paragraphs provide an overview of the CBPA steps required for short-term neighborhood level multimodal transportation projects. The discussion is organized into five sections: (1) Synthesis of Secondary Data for the Neighborhoods, (2) Recruitment and Engagement of the Community Advisory Board, (3) Qualitative Data Collection / Focus Group Surveys, (4) Quantitative Data Collection / Surveys, and (5) Synthesis, Close Out, and Strategies for Continued Engagement.

7.2.1 Synthesis of Secondary Data for a Neighborhood

The project team should first develop a descriptive summary of the neighborhood(s) using available data. For example, the following types of data may be included:

- Census provides data on socio-economic characteristics such as population by age/gender/ethnicity/income levels/ education level, etc.
- Acreage of land under various types such as residential, retail, commercial, recreational, industrial, and institutional can be obtained from land-use databases (in Florida, such information is available at the parcel-level from the Florida Department of Revenue).
- Transportation system characteristics such as lane-miles of roads by functional classification, network geometry, sidewalks, bike lanes, transit stops/routes/frequency should be obtained.
- If travel surveys, transit on-board surveys, or other mobility surveys were conducted in the recent past, data from these should be reviewed.
- Measures of safety can be obtained from police accident reports and crime databases.
- Recent transportation plans for the region must be reviewed.

Overall, these data provide a contextual description of the neighborhood(s) being studied. These data can be used to ensure that the advisory board is representative of the community and to develop the best strategies for the subsequent focus group and survey data collection efforts.

7.2.2 Recruitment and Engagement of the Community Advisory Board

It is recommended that 3-6 individuals (elected officials, church ministers, residents in general) from the neighborhoods are selected to form a Community Advisory Board (CAB). The members of the board should collectively bring a diverse spectrum of insights to the project. For example, one person may have knowledge about the working of local governments, another may be engaged in community activities. As such, the CAB can be collectively knowledgeable about the issues faced by the residents, and also bring their unique personal life experiences with the transportation system.

The CAB members should be chosen ensuring that they can stay engaged with the process for the entire duration. The members must be provided with a detailed list of expectations. Typically, their role includes helping design focus group interviews and surveys, disseminating information about the study to the community, assisting with the recruitment of participants, and reviewing the analysis of focus group and survey data. An initial ice-breaking session would be useful for the board members to become familiar with each other and their

roles. Appropriate protocols for engagement and communications (formal meetings, informal discussions, emails, phone, or Zoom meetings) should be agreed upon prior to the effort.

A significant time commitment is expected of the members over the duration of the project, and so they should be adequately compensated for their efforts. Mechanisms for compensation should also be explained up front (i.e., when would they be paid and what documents are needed to process payment). Simplified procedures for compensation are preferable (in our study, the need for CAB members to provide their social security numbers to be compensated was a significant deterrent to participation in the case of the Duval Heights neighborhood).

7.2.3 Qualitative Data Collection and Focus Groups

Next, the project team should develop an initial list of questions, referred to as the focus group guide, to solicit information about focus group participants' opinions and experiences regarding travel behaviors and challenges and/or opportunities of transportation. As indicated previously, the Five A's framework can be used to develop the guide so that an extensive set of mobility indicators can be assessed. The secondary data assembled in the first step can also help prioritize questions and structure the discussion plan.

The CAB members should review and provide feedback on a preliminary draft of the focus group questions. This feedback should be used to refine the guide (reframe, revise, remove, add questions) to ensure that the overall process is meaningful to the participants while also providing useful feedback to the team. The CAB can meet (in person or virtually) to review the draft as a team and provide feedback. Alternatively (or additionally), they can be asked to provide their responses individually via email or phone. As already discussed, the protocols for engagement and the expectations about participation should be agreed upon during the recruitment of the CAB members.

The study team should then revise the focus group guide based on feedback received and provide the final draft to the CAB for a final review and approval. It is expected that this last review will not result in major changes to the document and focus group procedures.

Multiple focus groups should be conducted at each neighborhood (3-5 focus groups with 7-10 participants each may be preferable)[15]. Participants can be recruited by advertising at churches, libraries, and community events in addition to online methods. The CAB members should be actively reaching out to the communities to recruit participants. The focus groups should be scheduled for a reasonable duration (approximately 1.5-2 hours), during times convenient to participants, and at easily accessible locations. The CAB members can provide insights on scheduling issues. Sometimes focus groups may have to be conducted virtually using video conferencing methods[16]. In the case studies for this project, focus groups at one location had to be conducted online because of the pandemic; it was, however, the research team's intent and preference to conduct all focus groups face-to-face.

[15] There is an extensive body of literature on appropriate conduct of focus groups, and so we do not go into details.
[16] This is a newly emerging approach, and its need has been amplified by the pandemic. While best practices for face-to-face focus groups have been long established, the protocols for effective virtual focus groups are emerging.

A variety of context sensitive strategies can be used to engage the public via focus groups. Several examples are available (Aimen et al., 2012) and some of these are highlighted here. In Minnesota, in focus group meetings aimed to assess mobility patterns of immigrant communities, participants were invited to share their stories about how people move around on a routine basis and the situations when participants found it difficult to make trips. In Idaho, the Community Planning Association of Southwest Idaho (COMPASS) realized that people do not like to attend large public events. In response, the agency started organizing "Community Café," or discussions with community representatives in popular cafeterias during the weekends. Another innovative technique that was used in Idaho was "Meeting-in-a-Bag", wherein, community leaders were given the responsibility to disseminate the information with their friends and peers. The information was collected in a 'bag' that included maps, draft plans, comment forms, markers, and other items to gather public opinion and return to the agency. Focus group participants must be appropriately compensated for their time and role. A common approach to compensation of focus group participants is through gift cards. Typical compensation rates are $50-$100 for a 1.5- to 2-hour engagement. In low-income neighborhoods, providing transportation to/from the venue would be desirable. If appropriate, one or two CAB members may attend the focus groups to facilitate the conversation and provide context.

Once the focus group data have been analyzed, the results should be presented to the CAB members to solicit their feedback on the data collected, analyses performed, and results generated. The CAB can either meet (in person / virtually) to review the results or they can be asked to provide their responses individually vie email or phone. The study team should then update the analysis based on the CAB feedback and final approval of this deliverable should be sought. It is expected that there will not be major changes to the document after this second review.

7.2.4 Quantitative Data Collection and Surveys

An initial draft of the survey questionnaire is to be prepared next considering the results from the focus group surveys. Questions should address mobility indicators represented by the Five A's, emphasizing those most suitable to the particular project. The secondary data assembled in the first step can also help prioritize questions.

The draft survey should be provided to the CAB members for feedback. Appropriate method(s) of circulation such as mail in /mail out and online should be agreed upon, and a target sample size determined[17]. The CAB feedback should be used to refine the survey (add/remove questions, rephrase questions and options, reorder the questions) to ensure that the questions are meaningful to the participants while also providing useful feedback to the team. The CAB should also provide feedback on survey methods and sample size. The CAB can meet (in person / virtually) to review the survey as a team and provide feedback. Alternatively (or additionally), they can be asked to provide their responses individually (by providing the document annotated with comments, or through a phone call). As already discussed, the protocols for engagement

[17] Statistical methods for sampling and best practices for designing and deploying surveys are well established in the literature.

and the expectations about participation should be agreed upon during the recruitment of the CAB members.

The study team then revises the focus group guide and provides the final draft to the CAB for final approval. It is expected that there will not be major changes to the document / procedures during this review.

The surveys are distributed using the methods chosen. Again, the CAB members should be engaged in disseminating / advertising the surveys and encouraging community members to participate. It is important to ensure that the diversity of the community is also captured in the sample of survey respondents. Incentives may also be considered to potentially increase response rates.

A variety of context-sensitive strategies can be used for maximizing survey responses. Several examples are available (Aimen et al., 2012) and some of these are highlighted here. In South Carolina, surveys were conducted to assess the working circumstances of Latin American immigrants. Surveys were conducted at soccer fields, restaurants, churches, and grocery stores. Surveyors explained the benefits of participation to the community and clarified concerns about privacy to the participants. In DeKalb County, Georgia, transportation planners distributed surveys to engage communities for the acceptance of a proposed project that aimed to enhance pedestrian safety. Surveys were conducted at locations such as shopping malls and grocery stores. Interpreters were used to facilitate the survey data collection. In Southwest Georgia, to assess the viability of new interstate connections, a survey was developed to identify daily problems related to transportation among the users of the roadway system. School students were engaged for reaching out more diverse groups of people. Students were invited to take the survey home for their parents to fill out.

Once the survey data have been analyzed using appropriate statistical methods, it is essential to solicit feedbacks from CAB on the data collected, analyses performed, and results generated. The CAB can either meet (in person / virtually) to review the results or they can be asked to provide their responses individually vie email or phone. The study team then updates the analysis based on the feedback and a final document is presented to the CAB for final approval. It is expected that there will not be major changes to the document after this second review.

7.2.5 Synthesis, Close-Out, and Strategies for Continued Engagement

The final step for the project team is to synthesize all the findings and share a draft final report with the CAB for review. This synthesis document should draw inferences from both the qualitative and quantitative data analyses regarding the mobility needs and constraints of the community people. The project team should also develop specific and general recommendations for the local agency to consider. Again, this report should be provided to the CAB for feedback before finalizing.

It is advisable for the project team to have a close out meeting with the CAB to review the administrative procedures and document best practices and areas of improvement. While

public involvement is often project specific, it is also important for a local agency to have a long-term relationship with all communities (including undeserved communities and minority groups) that is not limited to the scope of any project. A continued connection helps build trust and ensures effective and meaningful participation from community residents (while the lack of it can critically impair public engagement as CAB members, focus-group participants, and survey respondents). Seattle's "Community Liaison" program is an example of a successful strategy to effectively engage historically underrepresented communities (City of Seattle). Community Liaisons are leaders from different communities which include immigrants, refugees, people with disabilities, and other under-represented groups. They act as a neutral third party between the community and government officials. Liaisons ensure underrepresented groups are aware of and have access to local government information and other resources. More than eighty liaisons belonging to forty different communities were enrolled with the city of Seattle in 2018. In that year, the Community Liaisons participated in 48 public outreach and involvement projects with fifteen departments of the city.

7.3 Insights for the City of Gainesville

Haile Plantation, located in the southwest of the city, primarily consists of high-income people while Duval heights in the east of the city is characterized by low-income residents. Although both neighborhoods have comparable size (area in square miles), they vary significantly in terms of the socio-economics of the residents, infrastructure, and availability of transportation modes. For instance, the infrastructure of Haile Plantation promotes walking, but the infrastructure Duval heights does not. Only two RTS routes serves the Haile Plantation community. However, there are multiple transit routes serving the Duval Heights community. Microtransit services are available exclusively in east Gainesville.

In this project, a needs assessment of travelers belonging to both the neighborhoods was conducted based on focus group discussions and survey data collection. Mobility indicators were collected on all the Five A's (Availability, Accessibility, Affordability, Acceptability, and Adaptability). Thus, the data collected not only describe the current travel patterns (as a traditional travel survey would) but also seek to identify unfulfilled needs and constraints.

Stakeholder advisory groups (SAG) were formed for each of the two neighborhoods. Although the term "Community Advisory Board" is typically used in CBPR studies to describe such a group of advisors, the name "Stakeholder Advisory Group" was used here as the City of Gainesville already has a Community Advisory Board for a different purpose. While members of the Haile SAG preferred emails as the main mode of communication, those from Duval preferred phone calls. Over the length of this project, the time for responses, scheduling meetings, receiving feedback, etc. were generally high. The group interactions in the case of Haile were more formal compared to informal interactions in Duval. The members were paid an honorarium for serving on the SAG for this project. The University of Florida required that the SAG members provide their social security numbers to process their payment. Two members of the Duval focus group were unwilling to do so and declined further involvement. Explicitly outlining the responsibilities / time commitments to potential SAG members, providing an appropriate level of compensation, and a simplified procedure for paying the members would be useful steps for improving SAG participation in future CBPR studies. Further, it is also essential

to have a formal and sustained engagement of the local government with the communities so that the citizens have a greater level of interest in serving on advisory boards.

Four focus groups were conducted in total, two for Haile Plantation and two for Duval heights. Focus group meetings in Duval Heights were held in the Clarence R. Kelly Center with a total of 11 participants (before the pandemic). Flyers were posted at churches, community centers, libraries, and community events (e.g., town halls, community meetings). Additionally, the research team devoted time while recruiting to socialize and build a rapport with Duval Heights participants before the focus groups were held (e.g., play board games at the library). Two members of the SAG also personally reached out to community members to recruit them for the focus groups. The ability of participants to reach the location was also considered and those who could carpool were grouped together. The project team did not have the ability to pay for their Uber/Lyft trips; but it is the research team's understanding that participation could be further encouraged if transportation costs are reimbursed. Focus groups meetings in Haile Plantation (during the pandemic) were held though zoom video conferencing with total of 12 participants. Haile Plantation participants were recruited through online sources such as emails to the homeowner's organization and social media platforms.

Online and mail surveys were conducted for data collection. On-line surveys were a better fit for Haile Plantation, because of the higher internet penetration. For Duval Heights, surveys were mailed in addition to online surveys as most of the residents didn't have internet. No incentives were provided to the participants for the surveys. In total, 39 and 85 surveys were received for Haile Plantation and Duval Heights respectively, out of which 22 and 68 surveys for Haile Plantation and Duval Heights, were complete and processed further for analysis. The entire survey data collection was conducted during the pandemic and, clearly, this had a significant impact on the quantity of responses received. At the same time, we also believe that a general lack of engagement of the citizens with the local government processes resulted in limited interest in responding to our survey. A long-term strategy for public engagement is critical for success of project -level efforts. Given the small sample size, extensive statistical analyses, and stratification of travelers by socio-economic factors were not feasible.

Based on the focus group discussions and survey results, needs of the residents of Haile Plantations and Duval Heights can be summarized as follows:

Haile Plantation Recommendations:

- Improved access to multiple modes of transportation that are ADA accessible.
- Better connectivity to downtown Gainesville through alternate transportation.
- Enhanced safety while driving personal cars.
- Additional traffic and bike lanes to reduce traffic in the peak hour.
- Safety norms for transit travel post pandemic.
- More parking areas at the places that are most visited by the residents like shopping plazas, downtown, UF campus.
- Additional fixed route bus services.
- Alternative transportation options at a reduced cost to make travel easier for community events.

Duval Heights Recommendations:

- Reliable transit services for daily travel.
- Provision of safety button at the transit stops so that people without cell phones can reach out to police or security in case of emergency.
- Benches, lighting, and shade coverings at bus stops.
- Provision of more public bus routes and service times for improved access to different parts of the city.
- More transit services during weekend.
- Trained bus drivers to meet the needs of riders that have medical conditions.
- Alternative transportation options at reduced cost for senior citizens, individuals with disabilities and/or low income.

8. CONCLUSIONS

It is through the community's transportation network that residents experience their city. They may experience the city via the traditional home-to-work trip, to access medical and other services, and/or for recreation purposes. Every community has specific and unique transportation infrastructure characteristics and shortcomings. However, local agencies may often rely on data collection methodologies such as trip diaries, and traditional performance measures such as travel delays and throughput, to prioritize improvements. At the same time, automobile manufacturers, transportation network companies, and major technology companies are creating and deploying significant technological innovations that affect the transportation system. The potential to leverage technology to improve the transportation network for a wide cross-section of travelers is relevant to communities, especially communities with limited transportation options.

The purpose of this project is to develop new approaches for improving the quality of transportation through a Community-Based Participatory Research (CBPR) methodology. CBPR principles are commonly employed by researchers and professionals in the health and medical science fields, but there are very few applications of CBPR methodologies in the transportation field. This project developed and evaluated a CBPR methodology at two communities in Gainesville, Florida, and has produced guidelines for applying this methodology in other communities.

A review of previous CBPR studies found that there is a need to assess transportation needs within community environments and include community engagement formally in the transportation planning process. With the use of a CBPR methodology, community members often became leaders and assigned themselves to meaningful actions to implement goals and plans. As equity has become the focus of public debates and policy discussions, the emphasis is on better engaging the public and better understanding their travel needs. This further supports the application of CBPR methodologies to engage the community and develop equity-based accessibility measures.

A review of the mobility performance measures in the project study area of the two case studies, East Gainesville and Haile Plantation neighborhoods, found that most of the measures included in these plans are related to commonly used auto-based mobility, including vehicle-miles traveled, LOS, and vehicle or person-hours of delay. These measures reflect total car usage trends and road capacity conditions and are very useful to identify roadway projects that need improving, especially for long-term transportation plans. Transit-based mobility measures are provided but they are much fewer and include ridership, revenue miles, and weekday span measures. These measures do not address frequency and coverage, which relate to accessibility and availability of transportation options.

Based on the conclusions of the literature review and review of local mobility performance measures in the study area, the project team used the Five A’s of senior-friendly transportation identified by the Beverly Foundation and National Volunteer Transportation Center (NVTC), and translated them into the following transportation performance measures:

- Availability: Existence of transportation when needed

- Accessibility: Transportation is reached and used in light of riders' abilities/ disabilities
- Affordability: The costs are within the users' means or reimbursable
- Acceptability: Meets standards of cleanliness, safety, courteous/helpful operators
- Adaptability: Modification can be made for disabilities and special needs

Using the Five A's (accessibility, acceptability, affordability, adaptability, and availability) framework to assess the transportation network for the two Gainesville communities, Duval Heights and Haile Plantation, researchers developed a CBPR methodology based on two types of public engagement. The first involves the engagement of a small group of people (called the community advisory board, or CAB) over the entire process. The second is the inclusion of an adequately large and representative subset of community members to provide data and opinions collected via qualitative methods (focus groups) or quantitative methods (surveys). These persons, unlike the members of the advisory board, are not involved in all stages of the CBPR (for example, they do not contribute to designing surveys).

In summary, the methodology developed consists of the following five steps: (1) Synthesis of Secondary Data for the Neighborhood, (2) Recruitment and Engagement of the Community Advisory Board, (3) Qualitative Data Collection / Focus Group Surveys, (4) Quantitative Data Collection / Surveys, and (5) Synthesis, Close Out, and Strategies for Continued Engagement.

Based on the data collection through focus groups and surveys, the research team concluded that participants from both neighborhoods desire more alternative transportation options and have concerns about the quality of transportation infrastructure. For the Gainesville metro area, in general, the obstacles to mobility for the studied neighborhoods include:

- Mistrust between transportation users and agencies
- Lack of a well-defined strategic plan for disaster management during critical times such as the COVID-19 pandemic
- Perceived insecurity and lack of safety
- Disconnect between the available transportation options and the various accessibility,
- availability, and affordability needs of the communities.

In order to overcome mobility obstacles in the two studied neighborhoods, the research team recommends implementation of the following steps:

- Value effective communication
- Ensure a strong transportation network of services
- Evaluate microtransit services and their consolidation with available paratransit options
- Investigate aging populations' needs and concerns.

The importance of creating a Community Advisory Board (CAB) before, during development, and after the needs assessment and survey cannot be underestimated. As shown in this research, the CAB can provide input into developing relevant methods to engaging each unique community. For example, one community may prefer email as the primary mode of communication, while another may prefer phone calls; one community may prefer formal interactions, another may prefer informal discussions; one community may have access to a private car, another one may require participants to carpool to a meeting site.

An often- overlooked component of public engagement in transportation studies is the role of compensation for a person's time commitment. For this project, members were provided an honorarium for serving on the CAG. Yet once the payment requirement information was requested, the researchers found that some members were not willing to share their Social Security Number, which was required for payment by the University of Florida.

With mistrust between transportation users and agencies identified as an obstacle to mobility, facilitating the participation of people belonging to all income levels and from different demographics is crucial. Transportation mobility assessments influence transportation investment decisions. If these assessments are not comprehensive, then the transportation plan may not be comprehensive either.

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APPENDIX A: LITERATURE REVIEW

The literature review focuses on four topics: a) Measurement of mobility and related concepts; b) CBPR studies related to transportation needs; c) past studies on transportation needs of various populations; d) transportation planning policies and processes. Co-principal investigators (Co-PI's) developed search strategies and utilized bibliographic databases, reports and plans available for the greater Alachua geographic region. More than 600 studies were considered and 66 studies are utilized and referenced in this document. The literature review on each of the four topics is provided in the following sections. The last section provides conclusions and recommendations from the literature review.

A.1 Measuring Mobility and Related Concepts

Several different definitions of mobility are provided in the literature. According to the HCM 6th Edition (HCM6), mobility is defined in four dimensions: the quality of travel, the quantity of travel, capacity, and accessibility. Elsewhere, mobility has been defined as the movement of people or goods from their origin to destinations (Litman, 2003), or as the cost and time needed to make trips (Norwood & Casey, 2002), or as the ability of a road network to enable people to reach shopping places, school, job and other opportunities with sensible level of service in terms of traffic conditions (EL-Rashidy & Grant-Muller, 2015). Therefore, depending on the perspective, mobility is defined as relating to one or more attributes (efficiency, accessibility, fiscal attributes, and others).

Accessibility, or access, broadly reflects the availability and accessibility of destinations or transportation modes. The Beverly Foundation identified 5 'A's of senior-friendly transportation, which are also important in transportation regardless of the age, and National Volunteer Transportation Center (NVTC) translated them into 5 'A's of passenger-friendly transportation[1]. They are:

i. Availability: Existence of transportation when needed
ii. Accessibility: Transportation is reached and used in light of riders' abilities/ disabilities
iii. Affordability: The costs are within the users' means or reimbursable
iv. Acceptability: Meets standards of cleanliness, safety, courteous/helpful operators
v. Adaptability: Modification can be made for disabilities and special needs

These performance indicators are crucial in measuring and planning transportation facilities. The Intermodal Surface Transportation Act (ISTA) of 1991 marked a new era in transportation planning and shifted focus to using such performance measures to make transportation-related decisions (Pickrell & Newman, 2001).

Transportation network evaluations and the selection of alternative solutions are affected by the selected elements/variables to be measured, the mode of measurement and the way of data presentation. Litman (2003) indicates that measuring activity in different ways affects transportation planning decisions differently. For instance, when evaluating a congested lane

[1] https://ctaa.org/wp-content/uploads/2018/12/Exercise-Apply-the-Passenger-Friendliness-CalculatorLKD-1.pdf

during the peak hour, when focusing on traffic speed, adding an extra lane is a suitable solution. However, measuring the mobility by focusing on traffic speeds and multimodal level of service accounts for costs, delays, and risks to all travelers, and provides a wider range of solutions to improve connections for different modes.

As indicated above, mobility has an array of indicators, and providing a single measure is very challenging, if not impossible. Though many of the definitions of mobility refer to the movement of people and goods, most of the performance measures used in the literature and in practice pertain to vehicular traffic; transit and other modes are often not captured sufficiently. While measures of mobility may indicate how fast the transport system allows individuals to travel, it is also important to know how conveniently it connects people to their destinations.

The following subsections discuss mobility-related measures from the perspectives of efficiency, accessibility, affordability, availability, acceptability, and adaptability.

A.1.1 Efficiency

The HCM6 recommends several different performance measures to assess the quality of service. There are different ones recommended for different types of facilities. For example, for freeway analysis, the HCM6 uses density, travel time, and average speeds; for signalized intersections, it uses control delay, number of stops, and queue length for the automobile mode; for arterials, it uses a level of service (LOS) score for pedestrians, an LOS score for bicycles, and an LOS score for transit service. The LOS scores for pedestrians, bicycles, and transit, generally depend on quantitative variables that have been found to correlate with traveler perception of service. The HCM6 also quantifies the quantity of travel and the capacity of various facilities in terms of units of traffic per unit of time.

Litman (2003) outlines various measures of mobility related to efficiency, which include travel speeds, travel time, ton-miles, travel surveys to quantify person-miles, and use of traffic data to compute the auto and transit vehicle average speed. He indicates that higher vehicle speeds correlate to higher rates of mobility. Norwood and Casey (2002) further consider average minutes per mile, average daily travel hours per person, and average minutes of vehicle delay, and Travel Rate Index (TRI) which indicates the additional trip time compared to free-flow travel time, as measures of mobility. The TRI is similar to the Travel Time Index (TTI) as defined by the Federal Highway Administration (TTI is the ratio of the actual travel time to travel time in uncongested conditions). Another useful concept to measure efficiency is the Travel Planning Index (TPI) which is defined as the ratio of the 95% percentile travel time to free flow travel time. TPI shows the time needed to arrive on time 95 percent of the time[2].

Higher mobility is indicated by minimal travel costs, low variation in travel times, and low average travel times. Commonly used efficiency-related mobility measures include those evaluating transit performance through trip time, mode share, congestion-related (LOS and delay), and transfer time. The annual Vehicle Mile Travelled (VMT) can be obtained from the state Department of Transportation (DOT), and travel speeds from the National Performance

[2] https://ops.fhwa.dot.gov/congestion_report_04/appendix_C.htm

Management Research Data Set (NPMRDS) and Metropolitan Planning Organizations (MPO) (Vandervalk, 2018).

El-Rashidy & Grant-Muller (2015) combine the Traffic Conditions Attributes (TCA) (free-flow speed, travel speed, travel time, traffic flow, travel demand, and departure rates) and Physical Connectivity Attributes (PCA) (the link between origin and destination; travel distance and geo- distance) of mobility using fuzzy logic to establish a single measure of mobility that evaluates the level of mobility from a network perspective under different situations rather than focusing on one scenario.

A.1.2 Accessibility

Accessibility has been defined from different perspectives in terms of traffic operations, urban planning, public health and a combination of these as summarized in Table A-1. Litman (2009) defined accessibility as the ability to arrive at intended services/activities. Litman (2008) provided a connectivity index as a measure of accessibility, calculated by dividing the number of links by the total number of nodes in a road network. The index can be computed for both motorized and non-motorized travel. A higher index reflects the increased choice of routes, thus higher accessibility. He suggested that accessibility can be evaluated by land use data (network connectivity, density of people and opportunities per unit area, non-motorized conditions; the availability and quality of cycling and walking paths, and land use mix), and LOS in terms of vehicle speed (mi/h), traffic flow (veh/h/lane), and traffic density (veh/mi). In this case, accessibility incorporates the efficiency of travel through the use of LOS-related measures.

Ryus et al. (2000) developed the Transit Level of Service (TLOS) method that measures accessibility by considering the existence of connectivity of pedestrian routes to stops. This method measures transit accessibility by combining the job density and population with different temporal and spatial features. The TLOS indicator considers operation hours, frequency of services, coverage area, job densities, and population. The method allows for a quantitative comparison of alternate transit availability service plans, determining suitable locations where public facilities should be erected, and demonstrating the connection between land use and transit.

The Transit Capacity and Quality of Service Manual (TCQSM) outlines a method used to measure spatial accessibility, and temporal accessibility at the transit stops. Spatial public transit accessibility is estimated by determining the percentage of the area served by the transit mode (Kittelson, 2003). The temporal aspect of accessibility focuses on the ability to reach opportunities at different times of the year, week, day and seasons, and the period at which people take part in certain activities (Albacete, et al. 2017).

Polzin, et al. (2002) devised the Time-of-Day-Based Transit Accessibility tool. The tool computes a transit accessibility measure that combines the temporal and spatial coverage at the end of trips. The Time-of-Day-Based tool outputs are used to assess services, weigh ridership potential, and plan and improve service guidelines. Polzin, et al. (2002) indicate that it is easy to evaluate changing scenarios of service hours, frequency, and coverage since the tool provides a

quantitative measure of service performance based on exposure to trips, and the results are consistent with transit usage trends in the real world.

According to Biazzo, et al. (2019), accessibility can be described based on a context such as access of services for the disadvantaged, reaching activities such as shopping, travel times of different transportation modes, or spatial distribution of venues and commodities. They refer to accessibility as the ability of an urban area to allow people to move conveniently with the certainty of equity and equal access to opportunities. The article discusses the approach to measure accessibility using isochronic (travel time) maps to quantify travel times between places. The method involves a multimodal approach that combines walking paths and public transit. The population density represented as coarse-grained and the transit schedules are combined to compute travel times between contours. The authors indicate that the use of isochrones is favorable in determining accessibility in cities based on transportation data.

El-Geneidy & Levinson (2006) define accessibility as "the ability to reach something," in terms of how easy it is to get to activities or destinations. Levine et al. (2012) and El-Geneidy & Levinson (2006) argue that having high mobility (defined in their work as the ability to travel at faster speeds), does not reflect high accessibility, but high accessibility suggests the level of mobility is high. Similarly to the work by Litman (2008), this work incorporates efficiency in the definition of accessibility. The article further presents an accessibility matrix that shows how different people interpret and perceive accessibility. The matrix comprises different modes of transportation that people use and the various activities to be reached such as jobs, schools, and recreation. In this case, accessibility is defined differently based on each person's preference and priorities. The advantage of the matrix method is that it accounts for many features impacting the location of residence, and variables that influence land value. Also, the matrix can be extended to include more activities depending on the research goals and scope.

Table A-1: Accessibility Definitions, Measures, and Perspectives

Paper Authors (Year)	Definition	Measures	Perspective
Church, R. L., & Marston, J. R. (2003)	Availability of services for disabled or disadvantaged travelers	ADA (Americans with Disabilities Act) Compliances: ramps, parking, and wheelchair spaces in building facilities.	Public Health
Litman (2008, 2009)	The ability to arrive at intended services/ activities	Land use accessibility and LOS Connectivity Index	Urban Planning, Traffic Operations
Biazzo, Monechi, and Loreto (2019)	The ability of an urban area to allow people to move conveniently with the certainty of equity and equal access to opportunities	Travel times between places using isochronic maps.	Urban Planning, Traffic Operations
El-Geneidy and Levinson (2006)	"The ability to reach something," in terms of how easy it is to get to activities or destinations.	Cumulative opportunities measure and gravity-based measures.	Urban Planning

Commonly used accessibility measures in Urban Planning can be categorized into four groups: utility-based, proximity-based, cumulative-opportunity, and gravity-based (Geurs et al., 2004). Utility-based measures show the economic merits that people get from accessing spatially distributed activities. The two utility-based measures that have been used in written works include logsum which relies on random utility theory to show the appeal of a whole set of choices, and the doubly constrained entropy model. They are derived based on utility theory which focuses on the decision to select an item from a bunch of choices that serve the same need. Proximity-based accessibility measures refer to distance to essential destinations (someone's job, the central business district, downtown, the nearest park, etc.) or to transportation infrastructure such as highway entrance/exit and transit stops. Cumulative-opportunity measures count the number of opportunities (e.g., employment opportunities) reachable from a point within a given time or distance threshold. Gravity-based measures are similar to cumulative-opportunity measures except that they do not apply a fixed time or distance threshold (usually all destinations within the study region are considered) but weigh down the importance of destinations that are further away. Proximity-based measures are most suitable to use when the traveler has little choice about the destination (e.g., someone's workplace and or appointments for family members), and cumulative-opportunity and gravity-based measures are better applied where the traveler has a choice about the destination (e.g., a restaurant, a grocery store, and a park).

While accessibility refers to the ease with which one can use the transportation system in the transportation planning realm, in the field of public health it can refer to the availability of services to disabled people (Church and Marston, 2003). In this case, measuring accessibility is based on the Americans with Disabilities Act (ADA) compliance. The method involves checking parking lots, availability of ramps, special access to buses, and wheelchair spaces in building facilities. The method is simple and direct, and it assesses whether access is available or not.

A.1.3 Availability

Availability refers to the presence of transit service at a given place and time. Availability measures include daily service hours, annual service kilometers per capita, and destination portions within 0.5 km of transit service (TDM Encyclopedia, 2019). The daily operation hours can be determined based on public transit schedules that are obtained from Google General Transit Format Systems (GTFS) standard file (Biazzo, et al., 2019).

Local availability and network availability have been used to evaluate transit performance. Local availability refers to the presence of transit at the origin or destination of a customer whereas network availability refers to the ease of movement or the suitability of the transit (Bhat, et al., 2005). The ability of transit users to walk from their location to the bus stops and vice versa is the local spatial availability, which is measured based on the population that is served by the routes and stops within the area of study. Local temporal availability refers to the duration of transit services. It accounts for the ability to travel based on the frequency of transit service and hours of service (Polzin, et al., 2002).

Recently, a set of popular score measures are being used by the general public for finding apartments in accessible neighborhoods[3]. These score measures are intended to reflect the

[3] https://www.walkscore.com/

availability and accessibility of walking, biking, and transit. These scores are developed by an advisory board that includes urban planning, environmental and technical experts from institutions such as the Sightline Institute and the Brookings Institution.

The Walk Score aims to compute the walkability of a certain area. The Walk Score algorithm uses data from Google Maps and other publicly accessible sources of information to compute a Walk Score on a scale of 0 to 100. Walk Score measures transit availability, density of recreation space, subway stops, and residential and intersection densities. The Walk Score's algorithm assesses the proximity of these facilities and assigns points based on .25 mile and 1-mile distances (Duncan et al., 2013).

The Transit Score is measured by taking the nearest sixteen transit stops and totaling the distances from these stops to a point of interest. Other factors, such as transit frequency and priority, are also considered to form a Transit Score from 0 to 100. Similarly to the Walk Score, the Transit Score utilizes public transit information (Duncan et al., 2013).

The Bike Score assesses cycling infrastructure such as bicycle lanes as well as road accessibility. The Bike Score primarily focuses on three factors: bike lanes, hills, and connectivity. As for the previous measures, Bike Score ranges from 0 to 100 (Winters et al., 2016).

The methodology and the algorithms used to calculate these scores are proprietary. Moreover, the scores are calculated using generalized equations based on macro measures and lack internal and external validity (Hall and Ram, 2018). Hence, these scores are typically not used for research purposes.

A.1.4 Affordability

Affordability is a concept of mobility that is based on the financial ability to access transportation services in the form of bus fare, purchasing auto and other elements related to the movement of goods or people (Fan & Huang, 2011). Litman (2016) defines affordability as the financial weight that household members bear when acquiring transportation services to reach basic goods and services. Fan & Huang review two traditional metrics of transportation affordability. The methods calculate the Transportation Affordability index (TA index) as a percentage of transportation expenditures divided by the household income, or the percentage of transportation expenditures divided by the total household expenditures. According to the article, the limitation of these methods is that they only aim at assessing the financial capability to move through space.

Fan & Huang (2011) discuss the Housing and Transportation (H+T) index method of computing affordability, which is defined as:

$$H + T\ Index = \frac{Transportation\ cost\ \$ + Housing\ cost\ \$}{Household\ Income} * 100\% \quad (1)$$

The method incorporates the concept of location efficiency to demonstrate the true cost of housing, and to educate the policymakers and the community on the benefits of transit-supportive land uses and smart development. Similarly, Guerra & Kirschen (2016) and Litman (2016) use the affordability index as a way of determining affordability. The housing costs are derived from datasets available nationwide. The transportation cost is modeled based on auto ownership, transit use, and auto use as dependent variables, and the independent variables as household characteristics, and the neighborhood characteristics. Linear regression analysis is conducted to determine the best fit (CNT, 2017).

A.1.5 Acceptability

Acceptability in transportation has been viewed in terms of accepting new systems, new modes of transportation (for example, buses), and pricing strategies that cover congestion prices, parking fees, and fuel prices (Schade & Schlag, 2003). Van Der Laan, et al. (1997) highlight previous methods that have been used in measuring acceptance such as using basic questionnaires, conducting group or individual interviews, and gauging the public attitude towards a system through extensive questionnaires. Van Der Laan, et al. (1997) mention different perspectives of evaluating the acceptance of a system. These include examining the benefit and comfort of the new system, satisfaction, and effectiveness, the simplicity or difficulty of use, willingness to purchase a system, and the cost they are willing to incur. Schade & Schlag (2003) evaluate acceptability by conducting quota sampling of motorists and then issuing questionnaires that account for variables present in the acceptability model, to those who are willing to participate in the survey. Such studies could include variables such as the public perception of road safety, the adequacy of public transit, congestion, and air and noise pollution depending on the aim of the researcher.

Technology Acceptance Models (Davis, 1989) have been widely used to predict and explain user adoption of new technology. However they are not geared towards transportation. With innovations such as electrical, and autonomous vehicles it is necessary to develop models that could be useful in predicting the acceptability of commuters to innovations in the transportation system (Madigan et al., 2016). One of the UF groups involved in this study (Mason et al., 2019) have developed a survey instrument to assess user perceptions of automated vehicles. This instrument could be used as a model to develop questions to assess user perceptions of other types of modes and innovations in transportation such as bike sharing and microtransit.

A.1.6 Adaptability

Adaptability refers to the flexibility of the transportation system to accommodate people with disabilities/ special needs (Field et al., 2007). Gifford (1994) describes adaptability as a facility's ability to withstand future conditions. These future changes can include social, economic, environmental, and technological conditions. Gifford (1994) indicates that measuring future conditions is relatively difficult since they display a random pattern. A facility designed with these conditions in mind can ultimately have high adaptability and prevent future generations from conducting costly maintenance (Gifford, 1994). Previous studies do not provide information on quantitative measures of adaptability.

A.1.7 Discussion

A summary of mobility-related performance measures is provided in Table A-2. As shown, there are several different dimensions to mobility and each is measured differently. Based on our literature review we conclude the following:

- Different studies measure mobility differently, and there are not necessarily clear distinctions between the different dimensions of mobility.
- In some studies, efficiency is included in the definition of accessibility.
- The research team did not find any studies that comprehensively examine all dimensions of mobility.
- There were no studies identified which explicitly measure mobility using CBPR. Many of the performance measures identified rely on traveler perceptions and traveler feedback. However, it is not clear whether all traveler needs and priorities are considered through the performance measures defined and used to-date.

Table A-2: Summary of Performance Measures

Performance Measures	List of Measures
Efficiency	Travel speeds, travel time, and ton-miles, Travel surveys to quantify person-miles, Traffic data to compute the auto and transit vehicle average speed, Travel Rate Index/Travel Time Index, Travel Planning Index Average daily travel hours per person, and Average minutes of vehicle delay Capacity Demand to capacity
Accessibility	Land use accessibility and level of service (LOS) Connectivity Index, Proximity-based measures Cumulative opportunities measure, gravity-based measures Utility based measures
Availability	Daily service hours, Annual service kilometers per capita Destinations within 0.5km of transit service Availability of services for the disabled or disadvantaged people
Affordability	Household costs and transportation costs relative to total household incomes
Acceptability	Benefit and comfort, Satisfaction and effectiveness, Simplicity or difficulty of use Willingness to purchase a system, and the cost the people are ready to incur
Adaptability	Plans considering future changes in social, economic, environmental, and technological conditions.

A.2 Community-Based Participatory Research (CBPR) Studies

CBPR is defined as a partnership that integrates community members, organizational representatives, and academic researchers in all aspects of the research process (Israel et al., 2003). Researchers and professionals from the health and medical sciences field have employed

CBPR principles to enhance data validation, data interpretation, dissemination, and knowledge translation, and increase capacity for future action (Coghlan & Brydon-Miller, 2014).

The use of CBPR has grown globally, and various forms of the term have developed, such as action research, collaborative action research, community-based research, or participatory action research. Israel et al. (1998) established guidelines to assist researchers in conducting studies with communities to adopt an approach toward equitable community engagement. The recognized guidelines suggest that the study design is participatory; cooperative; equally engages community members and researchers; a co-learning process; involves systems development and community capacity building; an empowering process which participants increase control of their lives; and achieves equilibrium between research and action (Israel et al., 2018). Unfortunately, there is no clear distinction on whether a research study adheres to CBPR guidelines. Studies conducted with a CBPR approach may use some or all the guidelines listed above. Partnerships need to jointly decide which core values and guiding principles will be used, with inclusion of all those listed above being the ideal goal (Green et al., 2003; Israel et al., 2003).

The application of CBPR methodologies is limited within the transportation field. The aim of this literature review was to explore how CBPR approaches or strategies inform transportation planning to meet a community's needs. The studies reviewed here evaluate types of CBPR approaches used in prior research and themes that emerged from previous studies regarding transportation needs in a community. Given the scarcity of information on this topic, the research team and a health sciences librarian collaborated to develop a search strategy and conduct a literature search utilizing a total of five bibliographic databases. The search included the use of phrase-searching and relevant subject headings (Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Medical Subject Headings (MeSH)). CINAHL and MeSH keywords are retrieved from a bank of predetermined terms, including the subject areas of health sciences. Bibliographic references in the CINHAL, PubMed, and MEDLINE databases are associated with a set of headings that describe the content in an article (EBSCO Industries, 2019; National Library of Medicice, 2021). Example CINAHL and MeSH headings used for this literature search include "Community-Based Participatory Research", "Participatory Research", or "Transportation". Studies were exported from the database search (n= 572) results to Endnote Web. After removing duplicates, 537 studies remained.

A.2.1 Data Collection Methods

All studies identified administered a form of a survey to collect data from community members. The surveys used gathered information on the features of the built environment in which the study took place, travel patterns and preferences of community members, and general population demographics. One study evaluated active transportation using a student in-class travel survey to document children's mode of daily transportation to and from school throughout each season (Macridis et al., 2016). Likert-based surveys were used to examine the built environment and rate the attractiveness, accessibility, and safety for transportation and environmental factors (Brittin et al., 2015; Macridis et al., 2016). Hand et al. (2017) administered surveys face-to-face with community members to gather their perceptions on transportation

accessibility and its impact on social isolation. In the studies examined, surveys was the method utilized most often for data collection.

Pedestrian-traffic observation helped researchers capture daily and seasonal traffic trends, specifically around school zones (Macridis et al., 2016). Observers spent multiple days recording traffic patterns at five pre-determined observation points. Additional data were collected, such as traffic violations and types of road users. Data from the pedestrian-traffic observations were collected to assist community members better understand what policy and regulations need to be addressed to promote safer roadways.

Focus groups and semi-structured interviews were another commonly used form of data collection within the included studies (n=13) (Annear et al., 2014; Black et al., 2015; Brooks-Cleator, Giles, & Flaherty, 2019; Bryant et al., 2004; Cordova et al., 2015; Esienumoh, Allotey, & Waterman, 2018; Hannay, Dudley, Milan, & Leibovitz, 2013; Mann et al., 2016; Mohamed, Hassan, Weis, Sia, & Wieland, 2014; Nyamathi et al., 2011; Edmonds, Mogul, & Shea, 2015; Webber, Chirangi, & Magatti, 2018; Wieland et al., 2013). Some researchers preferred to use both focus groups and semi-structured interviews as part of data collection (Brooks-Cleator et al., 2019; Bryant et al., 2004; Mohamed et al., 2014). In the studies identified, more community members attended focus groups, with some attending more than one, compared to semi-structured interviews. Studies had pre-established, open-ended questions to prompt focus group discussions. Participants enriched the collected data by sharing stories of their experiences or perceptions regarding transportation in their community. For example, Nyamathi et al. (2011) explored transportation (and other) barriers to access and adherence to AIDS medication for rural-dwelling women. Participants stated the lack of access to reliable transportation is a significant barrier, often requiring 7-8 hours of travel time to-and-from medical appointments. The travel demands for these women are unrealistic, impacting their medical care and medication adherence. The use of focus groups and interviews helped researchers identify themes regarding community needs and guide decision making, specifically for transportation planning.

Unique to the Brooks-Cleator et al. (2019) study, some participants used photovoice as part of data collection. Photovoice is a CBPR method that enables participants to record and reflect community strengths and concerns, promote knowledge about community issues, and inform policymakers to bring change, through the use of photography (Liebenberg, 2018). The study organizers asked participants to take photos of how they felt supported or prevented from aging well in their community. One participant, who has a disability, highlighted how the built environment creates challenges for safe and accessible forms of transportation. For example, uneven sidewalks make it difficult to use a wheelchair or walk across the street without potentially falling. The technique of photovoice provides rich insight, perceptions, and experiences of engaged community members.

Walking audits in the community and route mapping was a unique form of data collection utilized by some studies (Green & Klein, 2011; Macridis et al., 2016). Green & Klein (2011) aimed to promote active transportation in the city of Columbus, Ohio. Researchers worked with community members to conduct walking audits, where residents would walk around the community and provide input of preferred locations to commute. Macridis et al. (2016) asked school-aged children to draw their walking routes from their home to school, helping researchers

determine preferences for transportation. For both studies, the need for active transportation in communities was apparent.

A.2.2 Findings from Transportation-related CBPR Studies

This subsection outlines the unique themes that emerged from previous studies related to transportation needs in communities and impacts on community planning.

Limited access to transportation was a reoccurring theme among the studies reviewed. Individuals who rely on social networks for transportation found it difficult to engage in their communities, as they have to rely on the availability and willingness of others (Black et al., 2015; Hand et al., 2017). Hand et al. (2017) reported that aging older adults feel more socially isolated, with less accessibility to transportation. There was no correlation between transportation and the size of the participants' close family network. However, there was a correlation between transportation and social isolation for participants who had a small friend network. Additionally, older adults who used walking as their main form of transportation suggest community officials install benches along major city roads. Benches allow individuals to stop and rest while walking from one destination to another (Brooks-Cleator et al., 2019). Bryant et al. (2004) studied Canadian seniors and their needs regarding quality of life. Participants stated they consider transportation as a critical factor for aging successfully and worry that limited transportation will result in difficulties staying engaged in the community or volunteering activities. With limited social supports and transportation options, community members fear becoming isolated from their community. Although older adults often own their own vehicles, many relied on public transportation or rides from friends/family for transportation (Brooks-Cleator et al., 2019).

Findings indicate that the availability and reliability of transportation is an important theme. Some community members felt restricted by the lack of available and reliable transportation throughout the day, thus negatively impacting individuals' ability to access work, school, and community needs (Esienumoh et al., 2018; Mann et al., 2016; Edmonds et al., 2015; Wieland et al., 2013). Esienumoh et al. (2018) shockingly found during a focus group meeting that a woman died in the process of waiting for transportation to the hospital while giving birth. Additional factors (e.g., limited bus or train routes, reduced running times) impact community members' engagement in society, employment, and educational opportunities.

Among all forms of transportation, safety emerged as a prominent theme (Black et al., 2015; Green et al., 2003; Hannay et al., 2013; Macridis et al., 2016). Both Hannay et al. (2013) and Macridis et al., (2016) explain that safety is a major consideration when determining a child's mode of transportation to-and-from school or after school activities. Parents were concerned the bus routes were not direct to the desired locations, possibly passing through unsafe areas. Other considerations include the distance of public transportation to the home. Community members voiced concerns about public transportation not being within a safe walkable distance (Black et al. 2015; Green et al. 2003). In the studies reviewed, community members mentioned street violence and gang activity as barriers for safe transportation, and the need to consider the time of day they plan to travel to ensure safety.

Walking, biking, driving a vehicle, and riding public transportation were the most prevalent modes of transportation among the studies reviewed. In the Macridis et al. (2016) study, parents and students were seven to eight times more likely to use inactive transportation (i.e., riding the bus or driven by a guardian) to travel to-and-from school. A total of 65% of the parents reported living at least 1 mile from their children's school, and 68% of parents responded that they would not feel safe with their children walking. Parents are more likely to allow their children to walk to school if a community "walking program" with specific routes and supervision was implemented. Understanding user patterns and transportation preferences, community stakeholders and researchers may be able to better identify community needs and create action plans.

Individuals of ethnic minorities experienced more barriers regarding access to transportation. For example, Brittin et al. (2015) found that African Americans seeking transportation to healthcare facilities experienced more of a barrier than Latinos. This may be attributed to lower income levels or lack of vehicle ownership.

A.2.3 Community-based Transportation Planning

Each study included in this literature review discussed ways to improve transportation planning and design of the built environment. Community members determined the need for improvements in the following areas: reducing traffic congestion, improving traffic and pedestrian safety, and increasing the number of individuals using active transportation (i.e., walking, biking) (Brooks-Cleator et al., 2019; Green and Klein, 2011; Hand et al., 2017; Macridis, 2016). Researchers note that the need for better community planning to improve the accessibility of public transportation is critical (Brittin et al., 2015; Brooks-Cleator et al., 2019; Hand et al., 2017). Established project goals led to the development of resources for community members (i.e., maps outlining safe pathways for travel) and installment of more safety infrastructure (i.e., signage or pathways for bikes) (Green and Klein, 2011; Macridis, 2016). The Columbus Health Places program research team reported that communities are voluntarily building more sidewalks, bike lanes, and environmental adaptions to assist with the accessibility of transportation among members (Green and Klein, 2011). Additionally, efforts made by the study committee and community members enhanced the awareness of the environmental and health benefits of transportation.

A.2.4 Discussion

There is limited community-based participatory research pertaining to transportation. Therefore, there is a need for researchers and community stakeholders to partner, in order to assess transportation needs within community environments, and also formally include community engagement within the transportation planning process. For the few studies that were found to have focused on transportation, community stakeholder engagement guided data collection to be more thorough, population-centered, and directly related to project goals. Involvement from community members helped to ensure data and plans served the population or community needs. Consensual decision-making was reported as one of the most positive outcomes from all studies reviewed. With the use of CBPR methodology, community members often became leaders and assigned themselves to meaningful actions to implement goals and

plans. While collecting data, researchers and stakeholders were able to identify needs in transportation planning to better serve the members of their community.

A.3 Past Studies on Mobility Needs

Larger cities with lower population density result in longer trip lengths for daily commutes and often have low public transport connectivity. In addition, low income communities with low affordability to own a car, face more problems with their routine travel needs. The percent of individuals below poverty level for the US is 14.6%. This figure is slightly higher for Florida at 15.5%. For the City of Gainesville the median household income is $34,004 with 33.6% of individuals below the poverty level (US Census Bureau, American Community Survey 5-Year Estimates, 2013-17). When the rest of the world is talking about autonomous and connected vehicle technologies, these transportation-starved communities are still struggling with basic mobility needs. Researchers have found that the poorest one-fifth (with annual income less than $14,000) of US residents spend approximately 39% of their income on transportation (Canby, 2003). Also, low income limits access to smart technologies such as Uber/ Lyft for shared rides. Whether urban or rural, low-income communities have a different trip and travel making behavior. This section presents a few case studies conducted recently for assessing the transportation mobility needs of low-income and transportation-disadvantaged communities. Several journal and conference articles and project reports were examined in order to identify these. The case studies included here were selected on the basis of their 'applicability at the community level' which relates to our project's scope. The case studies presented here were conducted to address and overcome the problems that transportation-underserved communities face with their daily travel.

A.3.1 Community Participation-Based Case Studies

Table A-3 summarizes the research studies identified that have studied the transportation mobility and trip making behavior of travelers in low-income neighborhoods. Some of the studies have made recommendations on how existing issues with low-income communities can be addressed and how connectivity for these communities can be enhanced.

Portland State University in collaboration with the OPAL (Organizing People/ Activating Leaders) assessed ftransportation mobility needs of low-income groups in the city of Portland (Golub & Serritella, 2018). Two low-income groups concentrated in the East Portland were targeted for the study. A total of 308 survey responses (online and in-person) were obtained to assess how smart mobility techniques can address the present and future needs of these communities, barriers that prevent them from accessing such technologies, and solutions for overcoming the barriers identified. The questionnaires examined issues such as access to public transport services, internet, banking and credit card facilities, and socio-economic characteristics and trip-making behavior of the respondents. Respondents expressed their concern over low frequency of public transportation buses and the amount of time and transfers they have to make to reach their respective work places. Regarding policy recommendations, availability of public Wi-Fi, charging station points

Table A-3: Overview of Case Studies Identified

Research Study	Authors/ Agency	Objectives	Data Collection Methodology	Approach to Community Participation	Recommendations
Community-based Assessment of Smart Transportation Needs in the City of Portland (April 2018)	Golub et al.	To assess how smart mobility technologies can address the current and future needs of transportation disadvantaged communities, what are the barriers faced by these communities and how these barriers can be overcome.	Total of 308 surveys; 155 online and 153 in-person. Quantitative assessment through statistical analysis.	Preliminary engagement of 12 members from 'Bus Riders Unite'. Initial discussion about the problems/ barriers and revision of survey questionnaire. Community specific cultural events/ festivities/ special days were used to ensure effective engagement of people of different color/race.	Share rides, public transportation, policy initiatives, Wi-Fi or free data access
Assessing the Transportation Needs of Low-Mobility Individuals: Case Study of a Small Urban Community in Utah (May 2013)	Jansuwan et al.	To assess transportation needs of low-mobility individuals using three dimensions: (1) travel characteristics, (2) social strength in terms of transportation assistance received from their social networks, and (3) accessibility to public transportation	Questionnaire (in person) and mail back survey for those who don't travel frequently. A total of 218 surveys were received (in person +mail). Data were entered into GIS database as spatial information.	Respondents (+18 year old) residing in the region for more than a year were consulted. In-person interviews were held at the sites of collaborative organizations. 25 USD gift cards as incentives to the participants.	Improvement of public transportation system.
Mobility Needs of Low Income and Minority Households Research Study (September 2006)	UrbanTrans Consultants, Inc. and RAE Consultants, Inc.	To identify future planning efforts that can address the mobility needs of the low income community.	Questionnaire survey for focus groups.	10 participants in each focus group, with different age, race and employment status. Incentive of $100 to the participants.	Safe pedestrian facilities and public transportation system, car-pool matching programs, telemedicine

and real- time information about public transport services were some of the highest priorities amongst the respondents. Findings of the study indicated that there is a need for share-ride services along with enhancement of transit services that can address the mobility of low-income communities.

Jansuwan et al. (2013) conducted a research study for "Assessing the transportation needs of low mobility (old, poor and disabled people) individuals" in Cache County (Utah). The study was conducted to assess travel characteristics and accessibility to public transit for low mobility individuals. Focus groups included the elderly, persons with disabilities and persons with low income. Respondents were adults (18+ years of age) who were familiar with the neighborhood, and with a minimum one year of residence. Respondents completed a questionnaire survey about their travel characteristics (frequency of travel, purpose, origin, destination, travel mode and cost), travel needs (expectations from the available transportation services), and demographic data (e.g., age, gender, race, income, educational qualifications and employment). Almost all the trips that were reported were home-based trips and private vehicles remained the main transportation mode, despite of the low income group. Data analysis has shown that the preference to use transit services decreases as the distance of the bus stops from the residence increases. The study concluded with the recommendation that the public transit network coverage for these areas must be enhanced.

The Colorado Department of Transportation examined mobility needs of low-income minority households (with income less than 150% of the poverty level), in 2006. Seven focus groups were held across 7 counties, with l 77 participants to identify the best ways in which the mobility needs of low-income communities can be met. Based on discussions with the participants, land use (biased towards automobile usage) and longer trip lengths were the main challenges. Poor pedestrian facilities and fewer public transit options on weekends were challenges cited. Carpool, vanpool and telemedicine were identified as enabling strategies to overcome daily travel challenges.

The methodology adopted in these case studies includes community participation in order to collect data. However, the main objective of CBPR is to involve the community at all the stages of the proposed research work, and not just for the collection of information. The CBPR method facilitates equal participation of all the stakeholders involved as previously described (Israel et al., 1998 and 2005).

A.3.2 Case Studies Without Community Participation

This section discusses selected studies conducted to address the transportation mobility needs of low-income communities when secondary data were used for analysis. In these, the communities studied did not participate in the gathering of information.

Reuscher et al. (2017) studied low income households in New York State. The authors studied travel behavior and challenges associated with the residents' mobility via the National Household Travel Survey (NHTS) 2009 survey data. The main purpose of the research was to identify unique characteristics of low-income household travel, and to determine whether there is a difference in these travel behaviors compared to the rest of the country. Their findings demonstrate that accessibility and availability of public transportation were the two major concerns. The Federal Transit Administration studied the transportation needs of the disadvantaged population of Miami Dade County. The study proposed innovative strategies for low income communities (annual salary $40,000 or less) in order to

improve their transportation options. The study highlighted the role of disadvantaged populations, their family background, transportation needs, mismatch between jobs and housing, transit usage, and accessibility analysis of transit services on a Geographic Information System (GIS) platform. The GIS-based spatial analysis indicated that most of the low income communities were located outside the walking distance to the nearest metro line. In addition, public transit availability was limited for work-home trips. The study suggested that improved pedestrian infrastructure will increase accessibility to the transit stops (within a 0.5 mile distance).

Advanced transit oriented strategies (with focus on affordable housing for the low income communities) and express transit services for connecting job locations to the residential areas of low income groups, were proposed as effective strategies.

Mattson (2012) analyzed the "Travel behavior and mobility aspects of the transportation-disadvantaged populations" via the NHTS. The main objective of the research was to quantify the differences in their trip making behavior based on age, income and disability. He used cluster analysis to identify transportation disadvantaged groups. Survey respondents were clustered into different groups on the basis of socio-economics. Respondents with low income and rural residence were less likely to travel, and the likelihood of making a trip increases if the respondent is a driver or transit rider.

A.3.3 Discussion

The studies examined assess the mobility needs and expectations of low income communities. The resulting assessments were largely generic and qualitative, with no context specific recommendations.

While some of the studies involve community participation in terms of focus groups or surveys, there does not seem to be community involvement in the design of the study or after the data gathering stage. Involving community leaders from the beginning of the study and before the design of data collection is critical for "participatory research". The research team did not find any literature involving the use of the CBPR method to assess mobility needs. Some studies focused on the demand side (i.e., consumers and surveyed commuters), while others focused on the supply side (i.e., transit agency services and transit data). In order to be comprehensive, mobility needs must be assessed from the perspectives of both demand and supply.

A.4 Policies and Planning Processes

The transportation planning practice in the US has traditionally focused on the goal of promoting mobility understood as efficiency, that is, to increase travel speed and to ensure smooth traffic. Thus, the common performance metrics applied to evaluate transportation investments and strategies include the level of service, travel speed, and measures of traffic congestion and delays as discussed in part (a) of the literature review (Table A-2). In recent years, however, a growing consensus has formed in the transportation field that argues for a shift from efficiency-based to accessibility-based performance evaluation (Handy, 2005; Martens, 2016; Levine et al., 2019). An accessibility-based transportation evaluation means that improvements are not measured by how fast the transport system allows individuals to travel, but rather how conveniently it connects people to valuable destinations. The need to focus on accessibility rather than mobility is compelling because people usually travel to

reach destinations rather than to enjoy movement per se. While increasing efficiency is expected to facilitate greater accessibility (i.e., higher travel speed makes it easier for people to reach destinations), in practice efficiency-enhancing strategies can often end up degrading accessibility (Levine et al., 2012). For example, residents often oppose infill, mixed-use development projects based on potential traffic delays. However, by bringing valuable destinations together and closer to where people live, these projects usually lead to great accessibility gains.

Extensive research has been undertaken to measure accessibility (see section A.1.2 on accessibility measures), but much less progress has been made on the policy and practice side. Two recent studies that examine regional transportation plans in the United States find that few metropolitan planning organizations have applied accessibility measures as the primary performance measures or to guide their decision-making process (Boisjoly & El-Geneidy, 2017; Proffitt et al., 2019). On the other hand, both studies have found that there is a trend toward greater integration of accessibility objectives in transport plans. As we will discuss later, Florida has also gradually incorporated several accessibility measures (i.e., accessibility to jobs by auto and by transit) to the list of performance measures in their transportation plans or transportation performance reports.

Since mobility and accessibility measurements are mainly developed to indicate the performance of the land-use and transport systems, public involvement has largely been neglected. As equity has become the focus of public debates and policy discussions, the emphasis is on better engaging the public and better understanding their travel needs. Incorporating these considerations into accessibility measurements has motivated some researchers to develop equity-based accessibility measures. Traditionally, accessibility measures have mainly focused on weekdays, peak-hour access to employment opportunities by auto or by transit. Recent advancements in equity-based accessibility measures have further considered destinations other than employment (Grengs, 2015), transport services during non-peak hours and weekends (Boisjoly and El-Geneidy, 2016), and other travel modes such as walking, biking, and more recently on-demand ride services (Bejleri et al., 2018).

The rapid rise of shared mobility options such as ride-sourcing (e.g., Uber, Lyft, and Via) is changing how people travel, and as such, transforming public transit. The significant equity implications of these services call for a need to incorporate them into accessibility measurements that seek to address community travel needs. On the one hand, these emerging transportation technologies have the potential to expand transportation services to lower-density areas which were inadequately served by public transit or other non-driving modes (Brown, 2019). Moreover, research has shown that if integrated with conventional fixed-route services, the new mobility options have the potential to help transit agencies reduce operating costs and consequently extend service hours and service areas (Yan, Levine, and Zhao, 2019). On the other hand, emerging transportation options may detract public transit riders, threatening the already struggling transit industry in the US. In addition, as some transit agencies have started to experiment with partnerships with ride-sourcing companies such as Uber and Lyft (sometimes by cutting fixed-route services), some fear that these services would remove wheelchair-accessible paratransit service, that many disadvantaged travelers rely on.

The above theoretical discussions provide a framework that guides us to examine the plans and policies developed by Florida, Alachua County, the City of Gainesville, and the

East Gainesville and Haile Plantation neighborhoods. Table A-4 summarizes the plans that we reviewed as a part of this project[4]. In each of these plans, we focus on whether and how these entities have incorporated mobility and accessibility measures, and how much they have involved the public to gauge their transportation needs. From these documents, we extracted valuable information regarding the measurement of mobility, accessibility and transportation needs in the study area. Not surprisingly, most performance measures considered in these plans are automobility-based (for example, vehicle miles traveled, LOS, and vehicle or person-hours of delay). These measures reflect total car usage trends and road capacity conditions and are useful to learn about the overall mobility performance, and to identify segments of roadways that need improvement. They also include considerations for transit-related measures, such as transit ridership, revenue miles, and span of service. These measures provide a general picture of the transit services availability in the study area. The remainder of this section reviews some of these key documents in greater detail.

Table A-4: Summary of Transportation Plans Reviewed for this Project

Agency	Transportation Plan	Element Reviewed
Florida Department of Transportation	Florida Transportation Plan (FTP)	Vision Element Policy Element Implementation Element
Florida Department of Transportation	FDOT Source Book, FDOT 2017 Performance Report, Performance and Production Review of the FDOT FY 2016/2017	
Gainesville Urbanized Area Metropolitan Transportation Planning Organization	Year 2040 Long-range Transportation Plan	Technical Report 5 Needs Plan Development
Alachua County Growth Management	Alachua County Comprehensive Plan 2011-2030	Transportation Mobility Element
City of Gainesville Planning Department	City of Gainesville Comprehensive Plan	Transportation Mobility Element
Metropolitan Transportation Planning Organization (MTPO) for the Gainesville Urbanized Area	Plan East Gainesville Final Report	Transportation Element
City of Gainesville	Regional Transit System Five-Year Major Update of the Ten-Year Transit Development Plan FY2020-FY2029	
Haile Plantation Development of Regional Impact Application	Notice of Proposed Change for the Previously Approved Gaines Plantation, Now Known as Haile Plantation	

[4]The Florida Transportation Plan (FTP), the Gainesville Urbanized Area Metropolitan Transportation Planning Organization, Alachua County Growth Management and the City of Gainesville are all in the process of being updated.

A.4.1 Florida Transportation Plan (FTP) [5]

The Florida Transportation Plan (FTP) is comprised of three elements: The Vision Element, The Policy Element, and the Implementation Element. The first two elements are formatted not as a traditional planning document, but as a document that can be easily understood by a general audience. The Implementation Element is presented as a website that is updated on a routine basis. The FTP is currently under revision. A kickoff meeting was held in May 2017 and the revisions are expected to be completed by the end of 2020.

A.4.1.1 The Vision Element

Informed by an analysis of current trends and a synthesis of recently developed state and regional visions and strategic plans, FDOT has developed five potential futures to help guide transportation planning: return to historic growth, rural rediscovery, global trade hub, innovation hub, and risks on the horizon. The public input gathered through workshops, briefings, and online surveys expressed great optimism toward these visions. To support these visions, FDOT has defined seven long-term goals to guide discussions about the state's future transportation needs and opportunities:

- Safety and security for residents, visitors, and businesses ("Safety and Security")
- Agile, resilient, and quality transportation infrastructure ("Infrastructure")
- Efficient and reliable mobility for people and freight ("Mobility")
- More transportation choices for people and freight ("Transportation choices")
- Transportation solutions that support Florida's global economic competitiveness ("Economic competitiveness")
- Transportation solutions that support quality places to live, learn, work, and play ("Quality places")
- Transportation solutions that support Florida's environment and conserve energy ("Environment and Energy")

[5] The FTP is undergoing revisions. For the purpose of this project, we reviewed the FTP published in 2015.

A.4.1.2 The Policy Element

To advance the long-term goals defined in the Vision Element, the Policy Element identifies objectives and strategies for Florida's transportation future. The Policy Element provides guidance to state, regional, and local transportation partners in making transportation decisions. All seven goals can to some extent benefit from defining and monitoring mobility and accessibility performance metrics, but two goals---"mobility" and "transportation choices" are most closely related to this project. For each goal, the Policy Element has defined clear objectives, recommended implementation strategies, and specified performance indicates. Table A-5 summarizes the goals, objectives, and indicators included in the FTP for these two goals.

The FTP development is a collaborative effort of state, regional, and local transportation partners, and members of public. These collaborative efforts include a 35-member steering committee, 4 advisory groups, and more than 15,000 public members.[6]

Table A-5: Goals, Objectives, and Indicators from the Florida Transportation Plan Policy Element

Goal	Objectives	Indicators
Efficient and reliable mobility for people and freight	• Reduce delays related to bottlenecks, gaps, and crashes and other incidents for all modes of Florida's transportation system • Increase the reliability of all modes of Florida's transportation system • Increase customer satisfaction with Florida's transportation system and regulatory processes for residents, visitors, and businesses • Increase the efficiency of the supply chain for freight moving to, from, and through Florida • Increase the efficiency and flexibility of transportation-related regulatory processes	Person- and freight-hours of delay, percent of passenger rail, and percent of commercial air departures occurring on time
More transportation choices for people and freight	• Increase the use of new mobility options and technologies such as shared, automated, and connected vehicles • Increase the share of person trips using public transportation and other alternatives to single-occupancy motor vehicles • Increase the number of quality options for visitor travel to, from, and within Florida • Increase the number of quality options for moving freight to, from, and within Florida • Increase the efficiency and convenience of connecting between modes of transportation	Growth in public transit ridership

A.4.1.3 The Implementation Element

The Implementation Element defines the roles of state, regional, and local partners in implementing the FTP, including specific short- and medium-term actions and performance measures. The FTP website lists examples of the implementation actions taken to advance each of the seven long-term goals mentioned above. For example, one of the actions taken to advance the "mobility" goal is to promote the innovation of urban mobility solutions. The

[6] More information regarding public involvement from FDOT can be found at: http://floridatransportationplan.com/planning-studies/HowDoWeInvolveThePublic.htm and https://www.fdot.gov/environment/pubinvolvement.shtm.

purpose of this action is to provide targeted support to MPOs and local governments to develop innovative solutions for moving people and freight, including expanding modal choices and deploying new technologies. The key partners involved in this action include the Metropolitan Planning Organization Advisory Council, Florida Public Transportation Association, Florida League of Cities, Florida Association of Counties, and Florida DOT.

A.4.2 FDOT Source Book, Performance Report, and Performance & Production Review

The FDOT Source Book is the major source for performance measures. We also reviewed two other relevant documents—the *2016 & 2017 FDOT Performance Report* and the *Performance and Production Review of the FDOT Fiscal Year 2017-2017.* Figure A-1 shows the performance measures for the people-related transportation measures identified in the *Florida Source Book*. For each mode – auto/trucks, transit, pedestrian and bicyclist, aviation, rail and seaports, the mobility measures are defined for quantity, quality, accessibility, and utilization. Note that this classification is very similar to that used by the HCM6 with the term "utilization" instead of capacity. The indicators identified by the FTP (e.g., persons-hours of delay, percentage of on-time arrival, and transit ridership) are all included in this matrix.

	MODE	QUANTITY	QUALITY	ACCESSIBILITY	UTILIZATION
PEOPLE	Auto/ Truck	• Vehicle Miles Traveled • Person Miles Traveled	• % Travel Meeting Level of Service Criteria • % Miles Meeting Level of Service Criteria • Travel Time Reliability: On-Time Arrival Planning Time Index • Vehicle Hours of Delay • Person Hours of Delay • Average Travel Speed • Number of Fatalities • Number of Serious Injuries • Rate of Fatalities • Serious Injuries Rate	• Job Accessibility: Auto	• % Travel Heavily Congested • % Miles Heavily Congested • Hours Heavily Congested • Vehicles per Lane Mile
	Transit	• Passenger Trips • Revenue Miles	• Revenue Miles between Failures	• Weekday Span of Service • Resident Access to Transit • Job Accessibility: Transit	• Passenger Trips per Revenue Mile
	Pedestrian & Bicyclist		• Pedestrian Level of Service • Pedestrian Fatalities and Serious Injuries • Bicycle Level of Service • Bicyclist Fatalities and Serious Injuries	• % Pedestrian Facility Coverage • % Bicycle Facility Coverage • % Population within 1 mile of Bike Lane and Shared-Use Paths	
	Aviation	• Passenger Boardings	• Departure Reliability		
	Rail	• Passengers	• On-Time Arrival		
	Seaport	• Seaport Passenger Movements			

Figure A-1: People-related Performance Measures in FDOT Source Book (FDOT, 2018)

In the accessibility category, the measures include job accessibility by auto, job accessibility by transit, resident access to transit, transit weekday span of service, percentage of pedestrian facility coverage, percentage of bicycle facility coverage, and percentage of the population within 1-mile of bike lane or shared-use paths. Table A-6 summarizes how these indicators are measured.

Table A-6: Accessibility-related Indicators

Accessibility Indicator	Definition	Measurement
Job accessibility	Uses basic cumulative opportunity method	The total number of jobs reachable by auto or transit within a 30-minute travel time threshold. Unit of analysis: census block
Resident access to transit		Percentage of the population within a half-mile of fixed-route transit
Transit weekday span of service	Number of hours that transit service is provided on a representative weekday	Number of hours between the time service starts and the time service ends for an average weekday
Percentage of pedestrian facility coverage	Percentage of facilities in urban areas (5,000+ population) that have sidewalks or shared-use paths available to pedestrians	Measured using centerline miles of non-freeway state highway system (SHS) facilities
Percentage of bicycle facility coverage	Percentage of facilities that have bike lanes, paved shoulders, or shared pathways available to bicyclists	Measured using centerline miles of non-freeway state highway system (SHS) facilities
Percentage of population within 1-mile of bike lane or shared-use path		The ratio of the population within one mile of bike lanes and shared-use paths to Florida's total population

Although most of the accessibility measures are very basic, they are easy to calculate and understand. The *Source Book* provides multiple perspectives of accessibility and enables decision-makers as well as the public to have a general understanding of how accessible facilities are and how easy it is to reach destinations.

The *2016 FDOT Performance Report* includes an additional accessibility measure that is also useful - Commute times greater than 30-minutes. It is measured as the percentage of people with commute times greater than 30-minutes.

In the latest 2016-17 *Performance and Production Review of the FDOT*, one of the measures most related to mobility and accessibility relates to transit capacity improvement. The primary measure is the public transit ridership growth rate compared to the state population growth rate. The goal is to increase transit ridership at twice the average rate of population growth. Florida's population growth rate for 2016 was 1.7%. Therefore, transit ridership growth would have to meet or exceed 3.4% in order to meet the objective. Florida's transit ridership growth rate for 2016 was negative 7.45%; thus, the objective was not met. In fact, transit ridership is undergoing a declining trend nationally, and researchers have attributed it to a variety of factors such as rising automobility purchases due to improved economic, competition from emerging travel modes such as Uber and Lyft, and service cuts (Graehler, Mucci, and Erhardt, 2019). In the absence of rigorous empirical studies conducted in the state of Florida, we cannot ascertain which of these factors are behind the declining transit ridership.

A secondary measure is annual growth in transit revenue miles. Revenue miles are the miles that transit vehicles travel while in service. An increase in revenue miles indicates that

transit agencies have increased transit-service frequency, or extended service hours, or extended service geographic areas. The goal of the state is to see an annual increase in revenue miles of service, although a specific annual growth rate has not yet been established. Florida transit revenue miles of service experienced an increase of 1.71% from 2015 to 2016. This number is consistent with population growth. However, the decreasing ridership indicates that the productivity of transit in terms of passengers transported per mile decreased.

A.4.3 Gainesville Urbanized Area Metropolitan Transportation Planning Organization (MTPO) Year 2040 Long Range Transportation Plan

The MTPO Long Range Transportation Plan includes several mobility measures in their Performance Measures Table. This plan identifies critical roadways expected to experience a some-to-severe degree of congestion based on current and expected volume-to-capacity ratios. It then develops three scenarios – "existing plus committed network," "new corridors emphasis," and "existing corridors emphasis," with different road projects and improvements proposed for each scenario. Based on the 2010 base data and travel demand modeling, it then generates the expected performance measures, including VMT, person minutes of delay on major corridors, commute mode shares, transit ridership, and transit trip miles on congested roads (as shown in Figure A-2). Lastly, it combines the best elements from the previous three alternatives based on the resulting performance measures and develops a hybrid scenario that is adopted in the final plan.

The Gainesville Urbanized Area MTPO has produced Technical Report 1: Public Involvement, Public Participation Plan, which is a very detailed and comprehensive public engagement plan. It includes digital access (project website, social media, and newsletters), both online and telephone surveys, committee and advisory meetings and presentations, community summit and workshops, and other activities. However, most of the activities focus on identifying emphasis roadways and proposing improvement, and it does not provide much content regarding the related mobility and accessibility measures.

A.4.4 Alachua County Comprehensive Plan 2011-2030

The Alachua County Comprehensive Plan Transportation Mobility Element includes a goal to establish a multi-modal transportation system that provides mobility for pedestrians, bicyclists, transit users, motorized-vehicle users, users of rail and aviation facilities, and is sensitive to the cultural and environmental amenities of Alachua County. This goal includes three mobility-related measures: 1) multi-modal LOS; 2) VMT; 3) mode share analysis. The Alachua County Comprehensive Plan also includes policies (Policies 1.1.4 and 1.2.1) that adopt a given LOS for various transportation facilities. Within the Urban Cluster, the County adopts multi-modal LOS standards as shown in Table A-7. Outside of the urban cluster, Alachua County only specifies LOS for motor vehicles. In general, the LOS for motor vehicles are lower in the urban cluster. The major exception is the LOS on segments of the two-lane roadway on parts of Archer Road, SR121, SR26, and CR 241.

Performance Measure	Year 2010 Base Network	Year 2040 Existing-plus-Committed Network	Year 2040 Initial Needs Networks Tested / Evaluated		Adopted Year 2040 Needs Plan Network
			Existing Corridors Emphasis Network	New Corridors Emphasis Network	
Total Daily Vehicle Miles Traveled	7,607,164	10,689,253	10,588,935	10,615,655	10,552,797
Daily Vehicle Miles Traveled Per Capita	30.76	35.00	34.67	34.76	34.55
Annual Hours of Delay Per Road Traveler- Alachua County	5.8	19.0	15.1	16.2	14.3
Daily Minutes of Delay Per Road Traveler- Major Corridors					
Archer Road (Tower Road to SW13th)	NA	3.48	2.58	2.81	2.81
Newberry/University (NW 98th to NW 34th)	NA	1.54	1.05	1.12	0.79
University Avenue (NW 34th to Waldo)	NA	0.51	0.52	0.60	0.53
SW 34th Street (Archer to University)	NA	1.00	0.91	0.88	0.91
NW 34th Street (University to NW 13th)	NA	1.23	0.81	1.11	0.77
SW/NW 13th Street (Archer to NW 34th)	NA	1.72	1.26	1.56	1.29
Williston Road (SW 62nd to University)	NA	1.78	1.55	1.59	1.08
Waldo Road (University to NE 39th)	NA	0.59	0.51	0.59	0.52
NW/NE 39th Avenue (NW 98th to Waldo)	NA	1.91	2.11	1.48	1.44
I-75 (NW 39th to Williston)	NA	N/A	N/A	N/A	N/A
Commute Mode Share - Drive Alone	71.0%	71.7%	71.3%	71.1%	71.3%
Commute Mode Share - Car Pool	12.3%	12.4%	12.3%	12.3%	12.3%
Commute Mode Share - Transit	8.5%	8.1%	8.7%	8.9%	8.6%
Commute Mode Share - Non-Motorized	8.2%	7.8%	7.7%	7.7%	7.7%
Total Transit Ridership	40,522	47,092	51,047	52,552	50,562
Transit Trip Miles on Congested Roads	2,904,744	4,667,256	4,366,800	5,083,623	4,998,769

Figure A-2: Performance Measures in Gainesville Urbanized Area MTPO Needs Plan

Table A-7: Multimodal LOS Standards in Alachua County Comprehensive Plan

	Level of Service (LOS)		Standard or Measure
	Inside Urban Cluster	Outside Urban Cluster	
Pedestrian	B	n. s.	Based upon the presence of a pedestrian facility
Bicycle	B	n. s.	Based on the presence of bike lanes/pave shoulders
Express Transit	B	n. s.	Based on peak hour frequency of 15 minutes or less
Motor Vehicle – Two-lane collector	D	C	Professionally Accepted Traffic Analysis
Motor Vehicle – Two-lane arterial	D	C*	Professionally Accepted Traffic Analysis
Motor Vehicle – Multi-Lane (4+ through lanes)	D	C	Professionally Accepted Traffic Analysis
Motor Vehicle * Strategic Intermodal System (SIS)	C	B	Professionally Accepted Traffic Analysis in consultation with FDOT

***Notes*:** n. s. – not specified
* LOS D for SR24 (Archer Road from SW 91st to Levy County, SR 121 (Williston Road) from SW 62nd to Levy County, SR26 from NE 39th (SR222) to Putnam county, CR 241 (NW 143rd from NW 39th Ave. to City of Alachua, SW 122nd (Parker Road) from SW 24th St. to SR 24 (Archer Road)

Source: Alachua County Growth Management (2011; pp. 170, 180)

These indicators are measured using the following methodology. In order to achieve the LOS standard for pedestrians and bicyclists, the facility shall run the entire length of the roadway segment. A pedestrian facility shall be either a multi-use path on one (1) side of the roadway or sidewalks on both sides of the roadway. A multi-use path along a roadway shall result in a LOS B for bicyclists.

Furthermore, within each Transportation Mobility District, the achievement of the LOS for all functionally classified County and Non-SIS State Roadways shall be based on an area-wide LOS. The area-wide LOS analysis shall be divided into north-south and east-west roadways. The area-wide LOS shall be determined by dividing the sum of total traffic by the sum of the total maximum service volume at the adopted LOS standard for all functionally classified County and Non-SIS State Roadways.

Alachua County's Comprehensive Plan also includes Policy 1.1.6.1 related to the annual update of the Capital Improvements Element (CIE). The update shall include a roadway LOS analysis that demonstrates that the area wide LOS for each Transportation Mobility District is being achieved. The annual update shall include an LOS analysis of SIS facilities and shall demonstrate consistency with the Strategic Intermodal System (SIS) Mitigation Plan. The annual update shall also demonstrate that progress is being made toward achieving the identified bicycle, pedestrian and transit LOS. To measure and evaluate the effectiveness of the Transportation Mobility Districts policies, the annual update of the CIE shall also include VMT and mode share analysis for each Transportation Mobility District and the Urban Cluster.

Alachua County's Comprehensive Plan does not have a lot of content regarding mobility measures, and it has almost nothing regarding accessibility measures. The most important measure in the plan is the multi-modal LOS and its proposed standards that apply to pedestrian, bicycle, express transit, and motor vehicles. It also indicates that an area-wide LOS analysis should be performed for each designated Transportation Mobility District. The area-wide LOS would be included for the annual update of CIE, along with VMT and mode share analysis.

A.4.5 City of Gainesville Comprehensive Plan

In the City of Gainesville Comprehensive Plan, we identified several elements related to mobility and accessibility analysis, as shown in Table A-8. This information is in the Data and Analysis part attached to the Transportation Element. It is divided by mode including walking, bicycle, transit, trail, and car. Most of the measures are similar to those included in other plans reviewed, such as percentage of walk/bike facility coverage, transit ridership, bicycle counts, car volume. Some of the measures that do not appear in other documents include city density, gas consumption, and parking spaces. These are useful indicators for mobility, especially for car travel. This may be due to the emphasis on sustainability. The resulting measures related to sustainability is often suitable in considering mobility as well.

Table A-8: Mobility-and Accessibility-related Indicators

Mode	Main Indicator	Supplementary Indicators
Walking	Miles of sidewalks on arterials and collectors	Identify important sidewalk gaps
	Percentage of arterials and collectors with sidewalks	
Transit	City density for transit threshold	
	Bus ridership	
	Population served by RTS	
	Modal Split: percentage of trips by transit and other forms of travel	
Bicycle	Annual bicycle counts trend	Identify important bicycle facility gaps
	Percentage of major streets within city limits that are designed for safe bicycling	
Trail		Identify trail network gaps
Car	Car traffic volume on major streets (the overall trend in car use)	
	Estimate gas consumption	
	Parking Spaces (UF Campus, City of Gainesville)	

A.4.6 Gainesville Regional Transit System Five-Year Major Update of the Ten-Year Transit Development Plan

The City of Gainesville is in the process of adopting their ten-year Transit Development Plan (TDP) that defines two major goals for the Gainesville Regional Transit System (RTS): provide an equitable, accessible, dynamic, safe, customer responsive, publicly engaged, and performance-driven transit system; and to be good stewards of public resources. To achieve these goals, the plan establishes several objectives and identifies a range of corresponding initiatives that can support these objectives. For example, a major objective is to develop a performance monitoring program that recognizes mobility demand, service design, service delivery, and performance metrics within the service area; one of the initiatives proposed to support this objective is to monitor and measure service performance metrics monthly using key operations performance metrics (e.g., revenue hours, revenue miles, ridership, riders per revenue hour, and cost per trip) to understand how well demand is being met and how well services are being supplied.

In order to monitor the performance of RTS over time (i.e., on a quarterly basis), this plan focuses on four performance indicators and measures: passenger trips, revenue miles, revenue hours, and passenger trips per revenue hour. Moreover, the plan compares the performance of the Gainesville RTS with several peer systems on a range of performance indicators, including general measures such as service area population, ridership, and revenue miles, effectiveness measures such as vehicle miles per capita and passenger trips per capita, and efficiency measures such as operating expense per capital and farebox recovery ratio. These comparisons inform the Gainesville RTS of the relative strengths and weaknesses of its transit operation.

In addition to focusing on the operational performance of the transit system, the Gainesville RTS also evaluates the performance of the transit system as experienced by the transit users. To measure and monitor customer service and opinions, the Gainesville RTS collected information regarding customer service preferences, customer transit-trip characteristics and travel behavior, and public opinion on potential service improvements. Such information was gathered from a variety of public engagement activities such as review committee meetings, public workshops, on-board passenger surveys, online non-user surveys, bus operator surveys, stakeholder interviews, group workshops, public presentations of the TDP, and social media advertisements.

A.4.7 Plan East Gainesville Final Report 2003

We reviewed the "Transportation Element" in this plan. Although the plan was developed more than 15 years ago, some of the challenges identified may persist (land use and transport systems change slowly) and are applicable today. The plan identified the following issues: (1) the high-speed, four- to six-lane highways in East Gainesville create crossing difficulties for people who want to walk or bike; (2) there is a lack of street interconnectivity due to the limited continuity of local roads; (3) public transit serves limited destinations, and bus frequency drops significantly in the evening; (4) there is a lack of activity centers and destination clusters in proximity to East Gainesville.

The main goals identified in this plan include: (1) enhance the multimodal mobility of East Gainesville by establishing premium transit service linking the area with key employment and commercial centers; (2) increase street connectivity; (3) promote high-quality accessibility for pedestrians and bicyclists to the built and natural lands within the area. A variety of strategies were proposed to advance these goals. These strategies include establishing high-frequency bus rapid transit services, establishing intermodal stations, facilitating new transit-oriented development, constructing new roadways, modifying existing roads, and creating interconnected multi-use trails to parks and mixed-use centers. It is not clear how much progress has been made with respect to these goals over the past 15 years, as the research team was not able to find recent related performance measures or surveys.

A.4.8 Haile Plantation Development of Regional Impact

The Development of Regional Impact for Haile Plantation was initially approved in 1979. A 1993 Notice of Proposed Change was filed wherein the project was renamed to Haile Plantation, the number of dwelling units was reduced from 3,530 to 2,686, four commercial and public institutional parcels were consolidated into an area designated for mixed use to create the Haile Village Center, an additional 607 acres were added to the project to bring the total to 1,673 acres, changes were made to the recreation areas including the golf course, and the schedule for buildout was extended (McPherson, Coffee, and Kalishman, 1993). The report includes revisions to the trip generation but does not include the types of performance measures included in a comprehensive plan. This focus on trip generation, which directly impacts road capacity and congestion levels, implies a policy attention on mobility. Thus while the Haile Plantation Development of Regional Impact was developed 40 years ago, it provides a historic perspective on the focus on mobility (as opposed to accessibility) as the transportation performance metric in the initial plan and other plans that were developed afterwards. At the same time, the 1993 amendment includes a greater mix of land uses that would improve the accessibility among land uses in the project.

A.4.9 Other Plans

The research team has also reviewed the Alachua/Marion County Regional Transportation Plan, Bicycle Master Plan (Bicycle Travel Latent Demand Technical Report), Gainesville MTPO Mobility Plan, Multimodal Level of Service Report, and Pedestrian Safety Assessment in Proximity to Transit Stops. This document does not provide a detailed review of these as they were developed nearly 20 years ago and therefore are too old to capture the existing conditions and trends.

A.4.10 Summary

The research team reviewed several planning documents related to mobility in the City of Gainesville, including plans, reports, and studies at the state, regional, and local level. Based on these we summarized relevant information regarding the recommended performance measures related to mobility, accessibility and transportation needs in the study area.

Not surprisingly, most of the measures included in these plans are related to commonly used auto-based mobility, including vehicle miles traveled, LOS, and vehicle or person-hours of delay. These measures reflect total car usage trend and road capacity conditions and are very useful to identify roadway projects that need improving, especially for long-term transportation plans. Transit-based mobility measures are provided but they are much fewer, and include ridership, revenue miles, and weekday span measures. These measures are not as specific regarding frequency and coverage, which are two essential parts of transit planning.

The transportation element in East Gainesville Plan is relatively old (developed in 2003), and some issues or proposals do not apply to the current conditions. However, we still found it very useful in that we have a better understanding of the context for the communities on the east side of the city. Many of the issues identified then still exist today.

In the transportation plans examined, there are some considerations for accessibility measures. For example, the FDOT Source Book includes two cumulative-opportunity accessibility measures (job accessibility by auto and job accessibility by transit) in the list of performance metrics. Notably, in the 2003 Plan East Gainesville Final Report, accessibility is among the major issues identified, including lack of transit access during non-peak hours, lack of accessible destination clusters, and poor accessibility for pedestrians and bicyclists due to crossing difficulties and poor infrastructure. While this plan is somewhat outdated, we believe that the major issue of low accessibility for non-driving modes still persists. We have requested copies of any more recent plans for East Gainesville and Haile Plantation, and we will update this technical memorandum accordingly once we receive them.

In terms of public involvement, a couple of plans laid out very detailed and comprehensive planning processes. But we found limited discussions on incorporating insights from public engagement to measure mobility or accessibility in the process. Most of the public engagement activities focused on identifying areas or roadways of problems. This clearly shows a need for the next phase of this research to closely engage with communities by conducting surveys and organizing focus group sessions, through which we aim to gain a comprehensive understanding of local travel needs. We will consequently propose a complete set of mobility measures that can better reflect these needs.

A.4.11 Conclusions

This technical memorandum provides an overview of the literature review related to mobility measurement and community-based participatory research for transportation planning purposes. Based on our research to date we conclude the following:

- There are several different dimensions to mobility, each addressing different aspects of the transportation system (efficiency, accessibility, affordability, availability, acceptability, and adaptability) and each is measured differently. The HCM6 and FDOT define mobility in terms of quantity, quality, accessibility and capacity/utilization. The research team did not find any studies that comprehensively examine all these dimensions of mobility.
- While some of the studies in transportation involve community participation in terms of focus groups or surveys, the community is typically involved after the design of the study/data collection. Involving community leaders from the beginning of the study and before the design of data collection is critical for "participatory research".
- There is limited Community-Based Participatory Research (CBPR) pertaining to transportation. Moreover, there were no studies identified which explicitly measure mobility using CBPR.
- Most CBPR research studies used surveys and focus groups, while a few studies used other innovative techniques such as photovoice and walking audits.
- A review of planning documents related to the mobility development in the City of Gainesville revealed that most of the measures currently used are related to auto-based mobility (such as vehicle miles traveled, LOS, and vehicle or person-hours of delay). These measures can be very useful to identify roadway projects that need improving. Transit-based mobility measures are much fewer, and include ridership, revenue miles, and weekday span. Additional measures such as frequency and coverage, would also be very useful in providing a comprehensive picture of the transportation network and related services.

In the 2003 Plan East Gainesville Final Report, accessibility is among the major issues identified, including lack of transit access during non-peak hours, lack of accessible destination clusters, and poor accessibility for pedestrians and bicyclists due to crossing difficulties and poor infrastructure. While this plan is somewhat outdated, we believe that the major issue of low accessibility for non-driving modes still persists.

References

See main body of this report.

APPENDIX B: SYSTEM STATUS ASSESSMENT

This report describes the existing transportation system and the available transportation modes in the Duval Heights and the Haile Plantation neighborhoods. It includes maps of the highway system, bike trails and local streets, along with mobility-related information including travel times for major origin- destinations, and a summary of transit service to and from these neighborhoods. The report also provides GIS mapping and visualization data for safety and crash related metrics and highlights the quantitative and qualitative information related to the 5 'A's (Accessibility, Availability, Adaptability, Affordability, and Acceptability).

B.1 Background of the Two Neighborhoods

East Gainesville is known to have higher rates of poverty and more no-vehicle households than the greater Gainesville area. The term East Gainesville is often equated with any area on the east half of the city possibly in need of redevelopment. East Gainesville has not had a legal boundary and portions of the urban area between downtown and Newnans Lake extend past the Gainesville city limits. In this task deliverable, we define the boundary of Duval Heights as shown in Figure B-1. However, when we use the census data to understand the demographic and socioeconomic characteristics of Duval Heights, we have also considered the portion of land between University Avenue and Hawthorne Road. This portion of land belongs to the same census tract as the Duval Heights neighborhood.

Haile Plantation, as a model of New Urbanism development, is a walkable neighborhood with a town center. The town center has shops, restaurants, townhouses, and a vibrant farmers market. The Haile Plantation boundary is shown in Figure B-2.

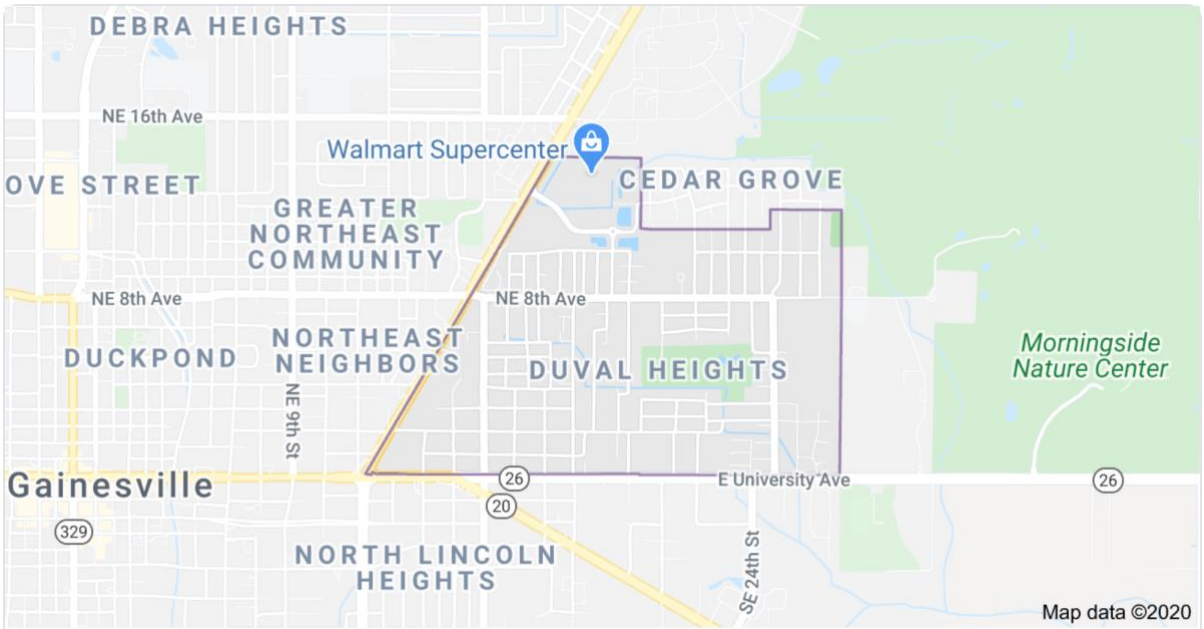

Figure B-1: Duval Heights Boundary

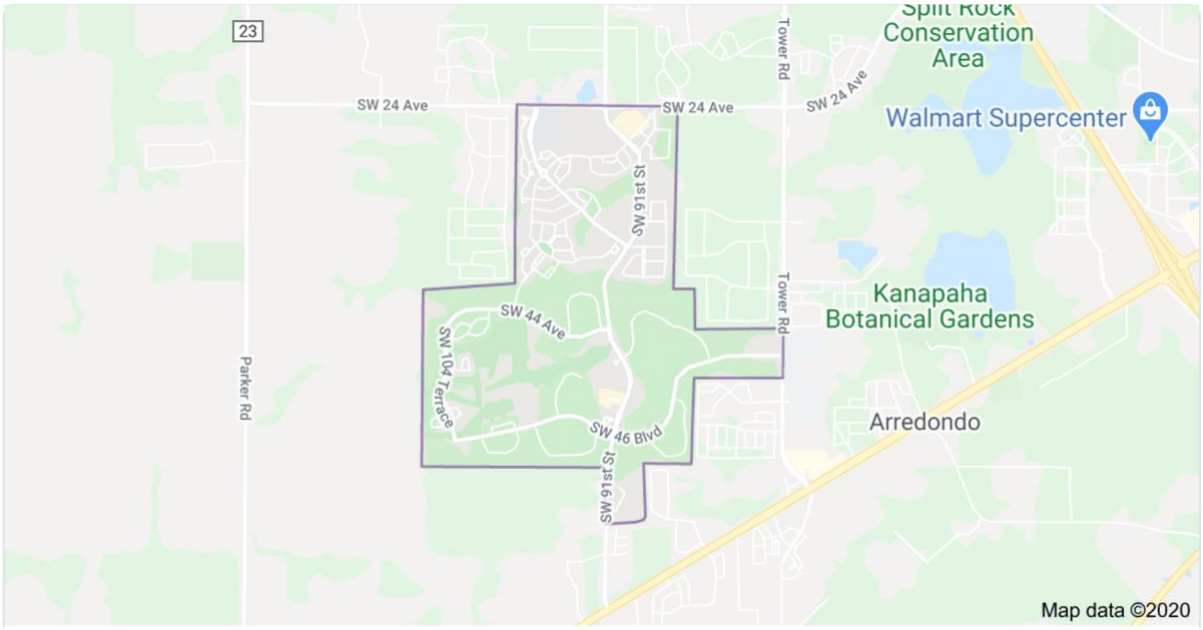

Figure B-2: Haile Plantation Boundary

Duval Heights and Haile Plantation are neighborhoods of similar size, with Duval at three square miles and Haile Plantation at just over three and half square miles. The two neighborhoods are significantly different in terms of their demographic and socioeconomic characteristics. We extracted data from the American Community Survey 2014-2018 5-year estimates to report the socioeconomic status of the two neighborhoods. Duval Heights has a population density of 1,450 per square mile, while Haile Plantation has an average of 2,214 per square mile. In Haile Plantation, 83% of the 7,751 total population is white and 4% is black. The population size of Duval is 4,350, with 91% percent of residents being black and 6% identifying as white. For the last forty years, the black population in Duval Heights is at least ninety percent of the total population. The Duval Elementary school was hence heavily segregated, until it was closed in 2018. Though near the University of Florida, neither of the two neighborhoods have attracted large numbers of students. According to the 2010 Census, only 4% of the population in Haile Plantation and 7% in Duval Heights has an age between 18 and 21, among whom only a fraction is expected to be college students. The retiree population is more than 14% in Haile and 11% in Duval Heights.

Duval Heights has experienced a gradual economic decline since the 1970s. A significant proportion (35.3% as indicated by the ACS 2014-2018 data) of the housing units in the neighborhood are vacant. There have been numerous reinvestment projects and failed hopes to strengthen East Gainesville. The major success was the result of a public-private negotiation to build a Walmart in Duval Heights. There is clear economic inequality between Haile Plantation and Duval Heights. The median household income in Haile Plantation is $87,900, where in Duval Heights it is $24,500. The median household income in Haile Plantation is much higher than the city average. By contrast, for the last thirty years, the median household income in Duval Heights has stayed around ten thousand dollars less than the city average. Unemployment rates are several times higher in Duval Heights (16%) than Haile Plantation (4%). About 20% of the population in Duval Heights has less than high school education, in contrast to a 2% in Haile Plantation. The proportion of renters who are rent-burdened (i.e., paying over 30 percent of their household income on rents) in Duval

Heights (above 50%) is more than twice as high as that in Haile Plantation (23%), even though rents and property values are much lower in Duval Heights.

A significant proportion of Duval's population rely on public transit service to fulfill their travel needs, and the recent census data report about 10% of the workers living in Duval Heights use transit for commuting[7]. In the city of Gainesville, the fare for riding the bus for adults is $1.5. Senior citizens over the age of 65, veterans and active duty military, and Medicaid and Medicare recipients can ride the bus for $0.75 while children and ADA certified persons can ride for free. The students of the University of Florida and Santa Fe have unlimited rides with their student ID because part of their tuition fees go to RTS. For a non-student, adult traveler, a monthly pass for the RTS bus system is $35[8]. Rates vary by disability and veteran status. Starting August 31, 2020, RTS introduced the passport transit app to enable customers to purchase the bus fare on their smartphones and simply show the pass while boarding[9].

The number of households without a vehicle is a major indicator for lack of mobility options. In Haile Plantation, less than two percent of the 3,500 homes have no car. In Duval Heights, 28 percent of the 1757 households do not have a car[10]. Therefore, many residents of Duval Heights are likely to lack convenient access to essential destinations such as job opportunities and hospitals.

B.2 Transportation Facilities and Connectivity

Figures B-3 to B-10 show maps of the arterials, bike trails and local streets in Duval Heights and Haile Plantation areas in Gainesville, Florida. Street connectivity is a measure of how paths directly lead to destinations. High connectivity increases the capacity of networks due to the existence of more intersection per unit area. The distribution of intersections result in uniform spreading of the traffic in the network thus an intersection will only have a fraction of the total traffic volume concentration (Alba et al., 2001). Great connectivity improves accessibility in neighborhoods and enhances mobility by allowing for more direct routes (Zlatkovic, Zlatkovic, Sullivan, Bjornstad, and Shahandashti, 2019). Arterials serve to distribute traffic within communities and their neighborhoods in smaller geographic areas (Findley, Schroeder, Cunningham, and Brown, 2015). In Haile Plantation, SW 91st Street and Tower Road allow access to the SW Archer Road, which is one of the main arterials in Gainesville that connects to major shopping centers such as Butler Plaza (Figure B-4). These roads provide access to the nearby banks, schools, and the Oaks Mall, a major shopping destination. In the Duval Heights area, the Florida State Road 24 (Waldo Road), and East University Avenue arterials provide access to major destinations such as the Gainesville Regional Airport and the University of Florida respectively (Figure B-3).

Street layouts affect the walkability and bike-friendliness of a region. Walking, as a transportation mode can be assessed by the number of meters of sidewalks available per block. Using data provided by the City of Gainesville, we calculated the total length of sidewalks in Duval Heights. However, the data packet did not contain sidewalk data for Haile Plantation. Therefore, we estimated this based on county street data, which indicated whether there are sidewalks on both sides of the streets, one side, or that are designated as

[7] http://www.city-data.com/neighborhood/Duval-Heights-Gainesville-FL.html
[8] http://go-rts.com/fares-and-passes/
[9] https://www.facebook.com/RegionalTransitSystem/
[10] https://data.census.gov/

multipurpose trails running parallel to streets. Sidewalks are often located along collectors and arterials in this neighborhood except for the Haile Village Center where most blocks have sidewalks close to the street, reminiscent of an urban character (see Figure B-9 and Figure B-10). Sidewalks in Duval Heights are somewhat more frequent on local streets than in Haile Plantation. The total lengths of sidewalks in Duval Heights and Haile Plantation are 19.26- and 17.39-miles respectively.

The potential to use bicycles is indicated by the availability of bike lanes. The bike trail maps for Duval Heights and Haile Plantation shown in Figure B-5 and Figure B-6 indicate there is lower coverage of bike trails and bicycle-friendly roads in Duval Heights than in Haile Plantation.

A well-connected street is one with few dead ends (cul-de-sacs), numerous intersections and many short links. High connectivity provides many route options, reduces travel distance ensuring direct connections between destinations, and establishes a more resilient and accessible network. The cul-de-sac arrangement tends to increase distance between destinations, which discourages bicycling and walking (Dill, 2004). The local streets of Duval Heights indicate a path network of short block lengths (grid pattern) in most of the area, a few dead ends, and several four-way and three-way junctions (Figure B-7). On the other hand, the streets in Haile Plantation have numerous dead ends due to cul-de-sac arrangements (Figure B-8). Therefore, Duval Heights has better street connectivity than Haile Plantation.

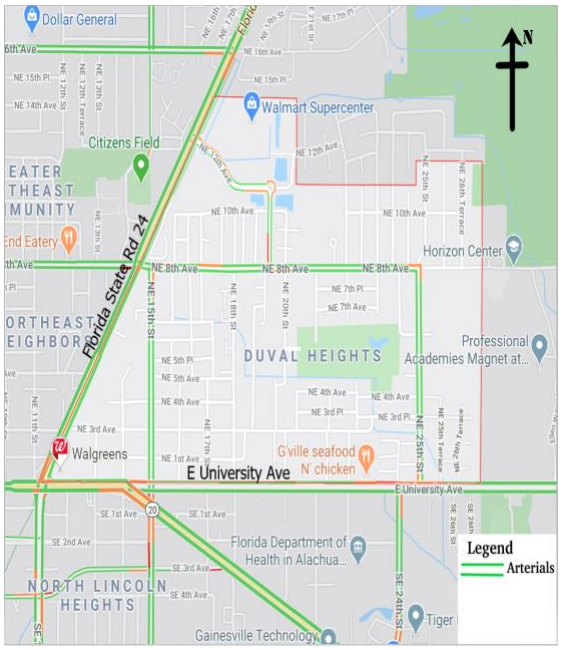

Figure B-3: Duval Heights Arterials

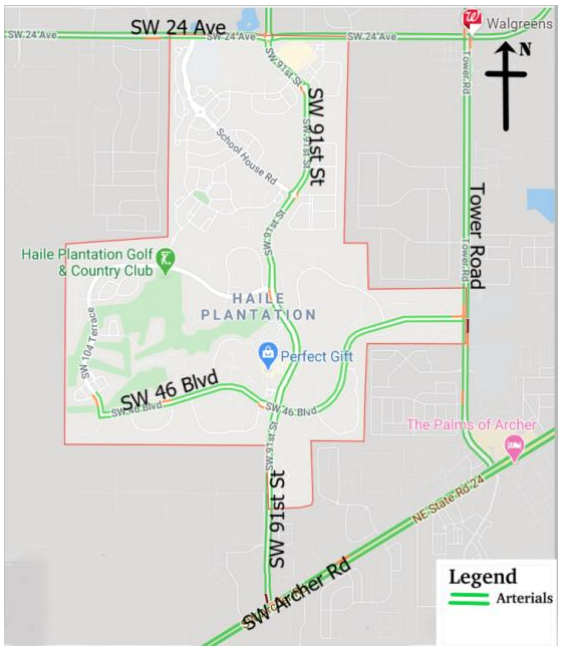

Figure B-4: Haile Plantation Arterials

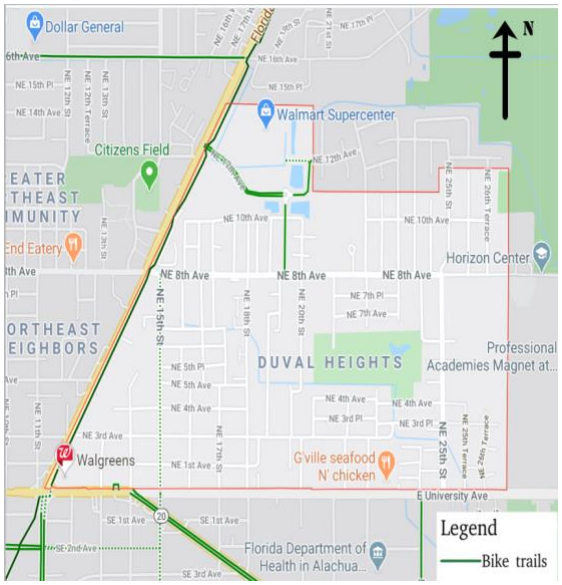

Figure B-5: Duval Heights Bike Trails

Figure B-6: Haile Plantation Bike Trails

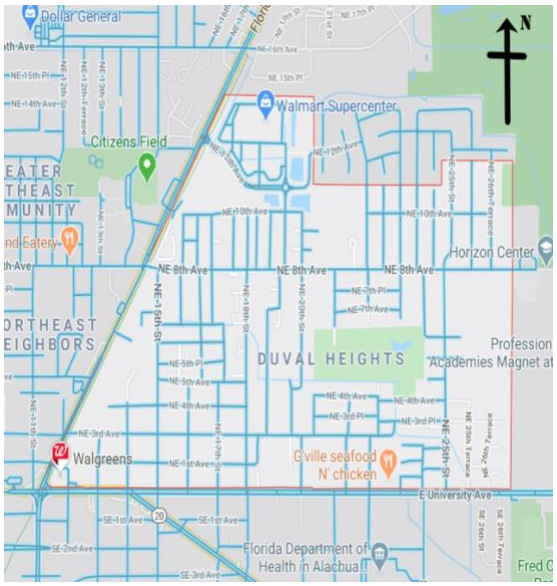

Figure B-7: Duval Heights Local Streets

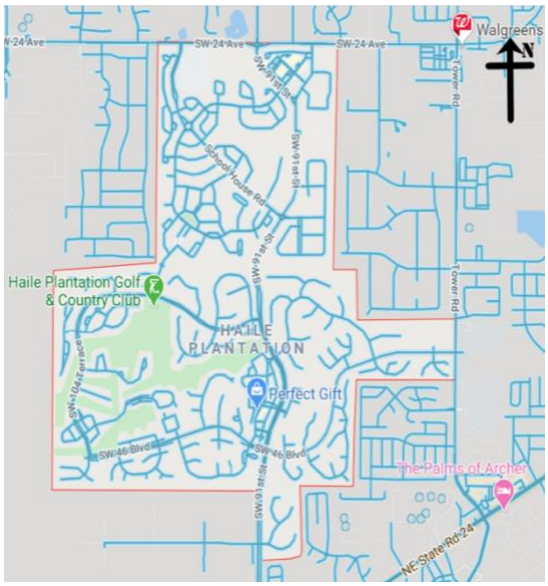

Figure B-8: Haile Plantation Local Streets

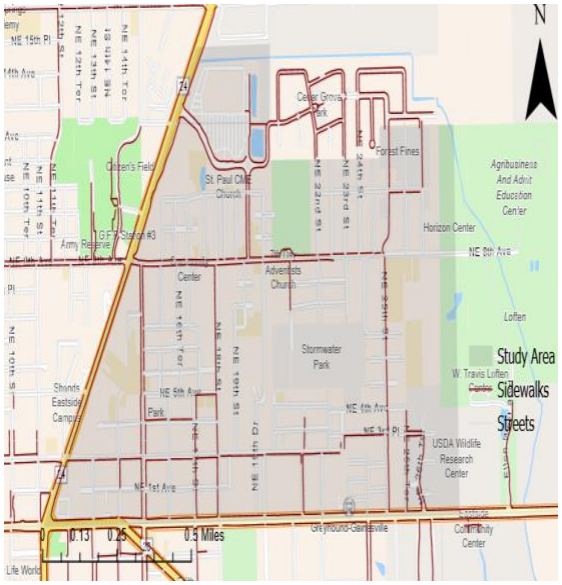

Figure B-9: Sidewalks in Duval Heights

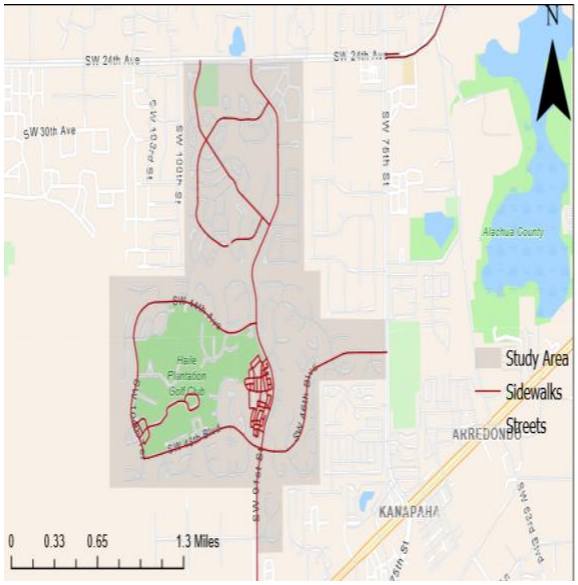

Figure B-10: Sidewalks in Haile Plantation

Traffic counts were obtained from the City of Gainesville for selected locations around Duval Heights and are shown in Table B-1 and Table B-2.

Figure indicates the data collection locations for these counts. Generally, NE 12th Ave (A), has higher traffic volumes, followed by location NE 8th Ave (B) and then NE 15th St (C). The NE 12th Ave (A) leads to and from Walmart Supercenter which is one of the major destinations for the Duval Heights residents, and this explains the high traffic volumes. PM peak consistently has higher volumes at all the locations.

Table B-1: Inbound Traffic Counts (Vehicle/Hour)

Time	NE 12th Ave (A)	NE 8th Ave (B)	NE 15th St (C)
AM peak (7 AM to 9 AM)	224	238	110
Off peak (11 AM to 1 PM)	295	254	127
PM peak (4 PM to 6 PM)	403	323	160

Table B-2: Outbound Traffic Counts (Vehicle/Hour)

Time	NE 12th Ave (A)	NE 8th Ave (B)	NE 15th St (C)
AM peak (7 AM to 9 AM)	241	193	106
Off peak (11 AM to 1 PM)	281	190	128
PM peak (4 PM to 6 PM)	302	230	151

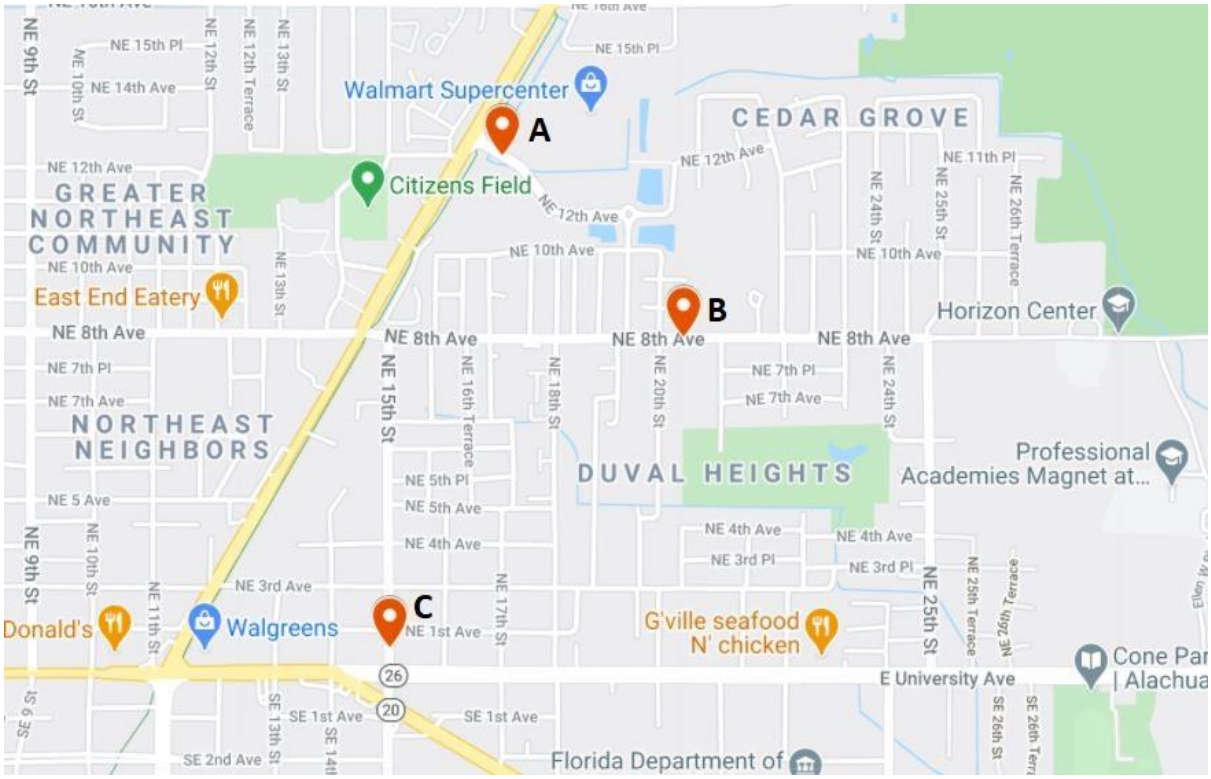

Figure B-11: Traffic Count Locations in Duval Heights

B.3 Transit Service

B.3.1 Routes and Coverage

According to the City of Gainesville bus stop information, Duval Heights has a total of 40 bus stops and six bus routes that serve the area. These routes are 2, 3, 11, 26, 27, and 711 as shown in Figure B-12 and Figure B-13 (also see Appendix B-1)

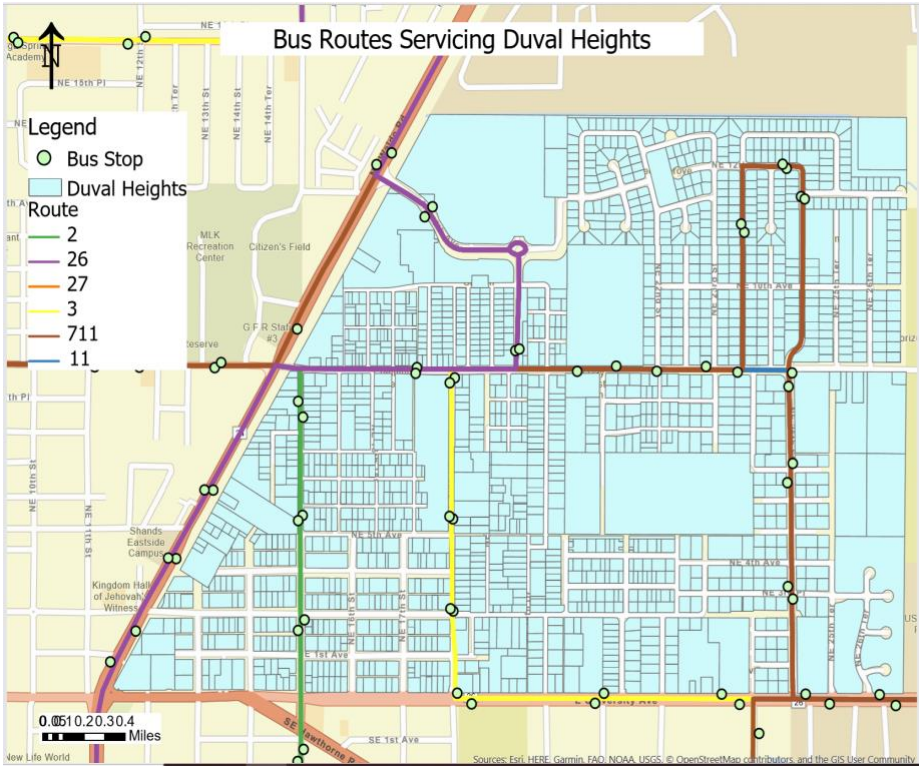

Figure B-12: Bus Routes and Bus Stops for Duval Heights

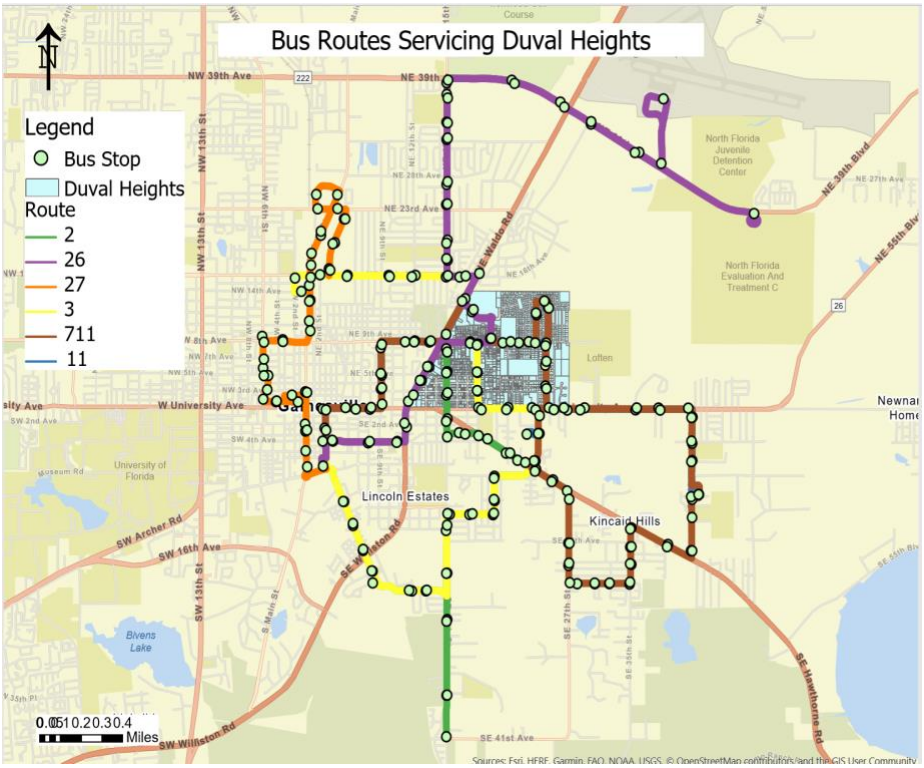

Figure B-13: Full Routes for Buses Serving Duval Heights (Routes 2, 11, 26, 27, 3 and 711)

Haile Plantation has six bus stops and the area is served by three main bus routes: 150, 75 and 76. These are shown in Figure B-14 and Figure B-15 (see also Appendix B-1). Route 150 is currently the most frequently used in the Haile Plantation area although the bus stop is not close to every resident. According to the Haile Plantation focus group meeting (2020) (held in April 2020), residents are pleased to have this new route, Route 150, that connects the heart of Haile Plantation directly to the University of Florida, a major destination (work and school).

Figure B-14: Bus Routes and Bus Stops for Haile Plantation

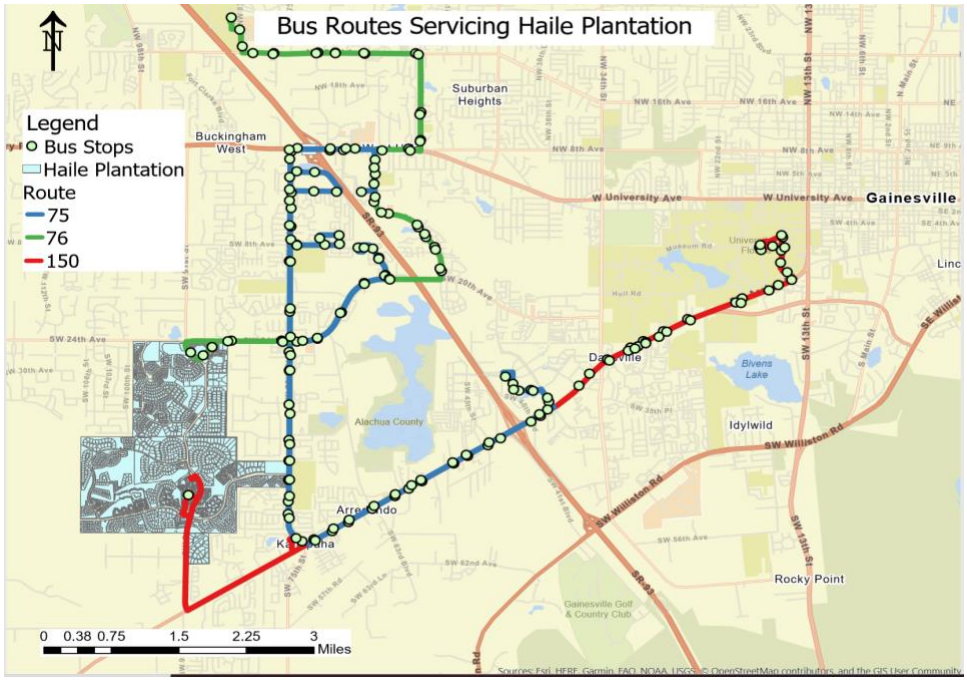

Figure B-15: Full Bus Routes for Buses Serving Haile Plantation (Routes 75, 76, and 150)

The bus route coverage and bus stops accessibility in Duval Heights are adequate based on the 0.25-mile radius buffer zones in Duval Heights as seen in Figure B-16. The figure shows that the bus stops are within physical proximity to most destinations, thus the neighborhood has reasonably accessible transit service. On the other hand, Haile Plantation has inadequate route coverage and bus stops accessibility within physical proximity as seen in Figure B-17.

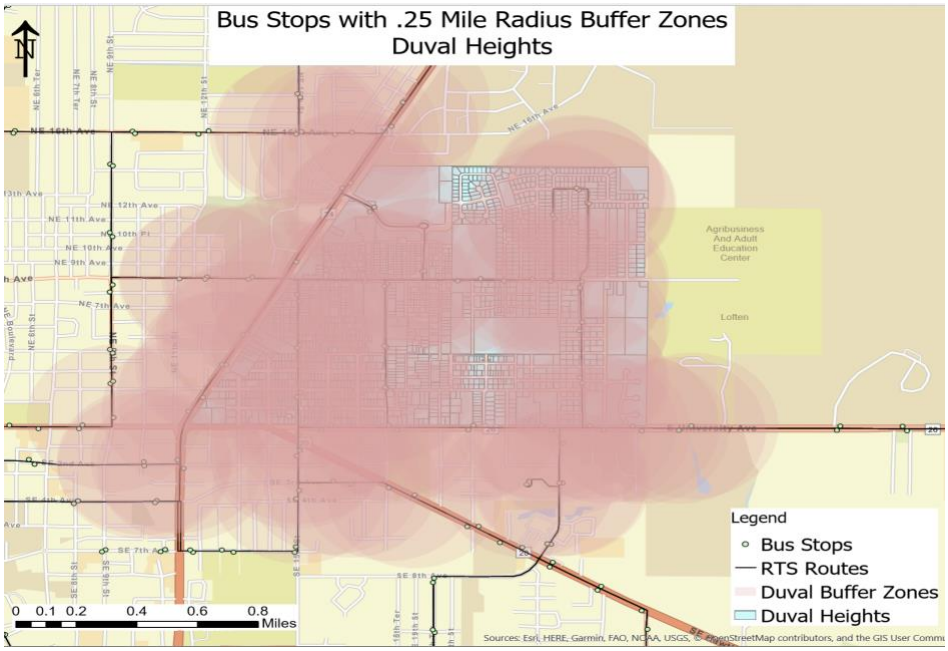

Figure B-16: Bus stops with 0.25-mile Radius Buffer Zones in Duval Heights

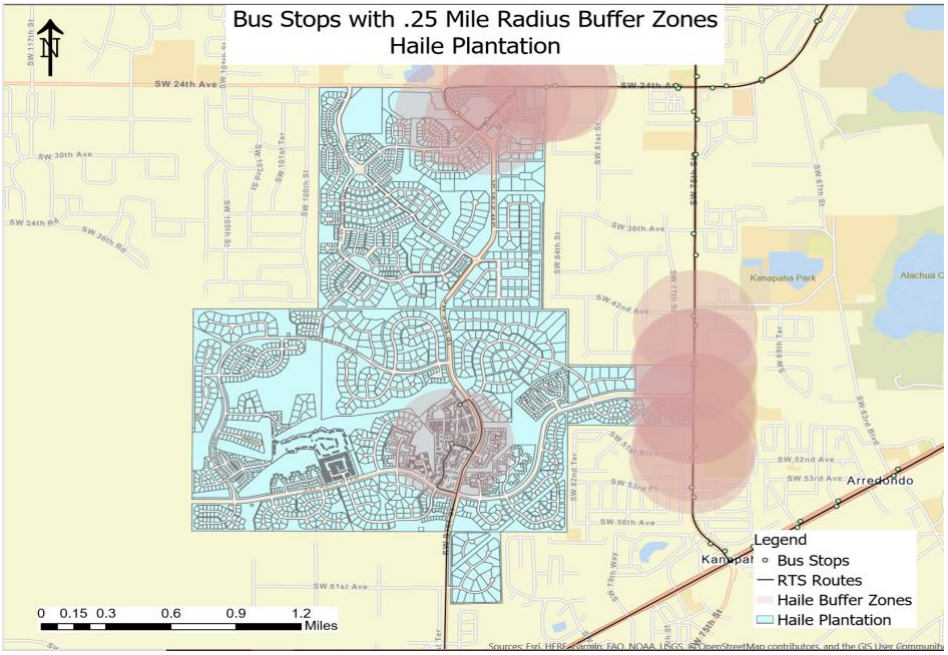

Figure B-17: Bus Stops with 0.25-mile Radius Buffer Zones in Haile Plantation

The transit routes coverage and service frequencies are indicators of transportation availability. Thus, transit coverage is adequately available in Duval Heights but not in Haile Plantation. However, the bus routes in Duval Heights do not adequately serve travelers in a time-efficient manner, especially during the weekends (where only routes 2 and 711 provide service with an average frequency of one-hour). For Haile Plantation, there is only one direct route, Route 150, which is immediately accessible to the residents living at the central part of the Haile Plantation.

B.3.2 Frequency of Service

The average weekday bus frequency in both Duval Heights and Haile Plantation is approximately 60-minutes. However, during the weekends, there is limited transit service with only two routes (2 and 711) serving the Duval Heights area and no service at all in the Haile Plantation area (see Appendix B-2). Compared to other areas that are primarily populated by University of Florida students (for instance, along 34th Street, Archer Road, 13th Street, and parts of University Avenue, where the bus frequency is around 10- to 15-minutes), Duval Heights and Haile Plantation have frequencies ranging between 30- to 60-minutes during weekdays and very limited or no service during the weekends.

B.3.3 Bus Ridership

The City of Gainesville RTS ridership data for Fall 2019 suggests that ridership in Duval Heights is much higher than in Haile Plantation. To understand the general level of ridership in Haile Plantation and in Duval Heights, we took the average of daily events (sum of bus boardings and alightings) in each neighborhood divided by the number of bus stops identified. The obtained measure (i.e., daily events per stop) would indicate the general level of demand in each neighborhood for public transit. Results suggest that there is a higher number of people accessing the bus stops in Duval Heights area than in Haile Plantation. The daily events are distributed at an average of 3.6 daily events per stop in Haile Planation. By contrast, Duval Heights has an average of 10 daily events per stop.

In Duval Heights, bus stops ID 1234 & 1235 located in Super Walmart @ NE 12th Avenue had the highest total number of on-board plus off-board events, that is, a daily total average of 236 (on-board plus off-board) and 158 (on-board plus off-board) respectively. Both stops have a shelter, one light fixture, a sidewalk, and 2 landing pads. The bus stop information shows that the stops are accessible for high demand or high ridership (see Appendix B-1).

The Duval Heights focus group meeting discussion held in March 2020 revealed that the bus stops at Super Walmart @ NE 12th Avenue are located far from the Walmart Grocery store and thus there is a long walking distance from the store to the bus stop (Duval Heights focus group meeting, 2020). Also, the sidewalks leading to these stops do not have shade to protect the commuters during rainy periods. Focus group participants indicated that placing the bus stops closer to major destinations like supermarkets would be much more convenient.

Different from other regular busses, the shuttle serving route 150 has a lower capacity (15 seats). In November 2019, a total of 2,128 passengers rode route 150. During this month, the

busiest day was Wednesday, with an average of 118 riders. Monday had an average of 92 riders, Tuesday had an average of 116 riders, Thursday had an average of 95 riders, and Friday had an average of 112 riders.

B.3.4 Spatial Accessibility

Spatial accessibility indicates the potential or the convenience, to reach opportunities (e.g., people, services, amenities, and activities) from a given location. It is commonly operationalized as the number of destinations (e.g., jobs) reachable within a given time by a given travel mode. According to the 2017 data gathered by the Minnesota Access Observatory, the number of jobs accessible with a 30-minute commute (including access or egress time by walking, wait time, and in-vehicle travel time) by car in the morning between 7 and 9 AM are the same for the two neighborhoods. However, based on the 2017 data, there is a difference when examining the information for people commuting by transit. The number of jobs accessible to Duval Heights residents by transit is over ten thousand, whereas for Haile Plantation it is 850 jobs (both for a 30-minute bus ride) (see Table B-3). Note that since August 2019, route 150, an express shuttle service, has been provided to Haile Plantation residents free of charge. Therefore, the number of jobs reachable to Haile Plantation residents within a 30-minute transit trip are likely to be much higher than 850. Nonetheless, job accessibility by transit is still expected to be lower for Haile Plantation residents than that for Duval Heights residents.

Table B-3: Accessibility to jobs within a 30-minute commute (using 2017 data)

Neighborhood	Number of Jobs by transit	Number of Jobs by car
Haile Plantation	854	117,578
Duval Heights	11,295	117,575

Given these numbers, it is not surprising that fewer than 2% of the Haile Plantation residents walk, bike, or take public transit to work. By contrast, many jobs are reached by transit for Duval Heights residents. In Duval Heights, a quarter of all commutes travel by a non-driving mode.

B.3.5 Transit Service Accessibility

Transit service accessibility can be determined based on pathways, bus stops and sidewalks that comply with the Americans with Disabilities Act (ADA). The RTS ridership data shows that the bus stops in the Duval Heights area do not have enough shelters or landing pads that are in good condition (see Appendix B-1). Only 12.5% of the bus stops in Duval Heights have shelters and only 37.5% have a bus pad that is in good condition. Most of the bus stops in Duval Heights have light fixtures (approximately 65%), and 87.5% of the bus stops in Duval Heights have a sidewalk that is less than 5 feet (see Appendix B-1). Figure B-18 show a representation of the bus stop information in Duval Heights.

Based on information obtained by the City of Gainesville, none of the bus stops in Haile Plantation have shelters (see Figure B-19). Only half of the bus stops have light fixtures. All the

bus stops in Haile Plantation have sidewalks. Five of the bus stops have sidewalks less than 5 feet, while only one bus stop has a sidewalk greater than 5 feet. Lastly, only one bus stop in Haile Plantation has a bus pad that is in good condition.

The RTS buses are accessible to riders in both Duval Heights and Haile Plantation. To use the bus services, the residents of these Gainesville neighborhoods can track the bus system using the RTS TransLoc Rider App from their phones or personal computers to get real time location and arrival times[11]. Although these buses are accessible to the riders, if residents in Duval Heights need to travel west of downtown, transportation is less accessible and requires transfers to other bus routes. For Haile Plantation, the RTS bus is accessible to and from the UF campus. If a traveler within this community wanted to travel elsewhere, accessibility is more challenging and requires transferring to other bus routes.

In 2019, RTS introduced micro transit service in East Gainesville at the Eastwood Meadow area to Rosa Park transfer station. The shuttles pick up customers from their homes to the bus transfer station in the morning and drop them back in the evening from the transfer station without incurring any costs to facilitate access to connecting bus routes services[12].

In addition to conventional transit, special services such as paratransit provided by MV Transportation, the designated Community Transportation Coordinator (CTC), are available to qualified individuals (seniors aged 65 years and above and people with a disability) living in both neighborhoods. MV Transportation provides a door-to-door mobility service with multiple type of vans such as ambulatory vans to get senior and disabled residents to their doctors' visits. Other private companies such as AA Taxi and Price Transportation provide the same type of service to both neighborhoods, but at higher costs.

B.3.6 Changes due to COVID-19

According to RTS, amidst the COVID-19 pandemic, since March 23rd, 2020, changes were made to the schedule and the operation of buses. The transit service hours were reduced to operate no later than 11 PM, and some routes including 9, 12, 13 and 33 experienced reduced service or frequency. Certain routes have been discontinued (for example, Later Gator, 19, 39, 800, and the route 76 that connects to the Oaks Mall, a major destination for many residents). Considering all the routes that are used by Haile Plantation and Duval Heights residents (75,76, 150, 2, 3, 26, 27, 11, and 711), only the route 76 service was affected as the service was halted.

Due to COVID-19, only 50% of the bus capacity is currently used with no more than 25 riders per bus. People above the age of 65, the sick and those with poor immune systems were encouraged to refrain from using the public transit[13].

[11] https://rts.transloc.com/
[12] http://go-rts.com/
[13] https://www.wcjb.com/content/news/RTS-Changes-Amid-Coronavirus-Concerns-569020661.html

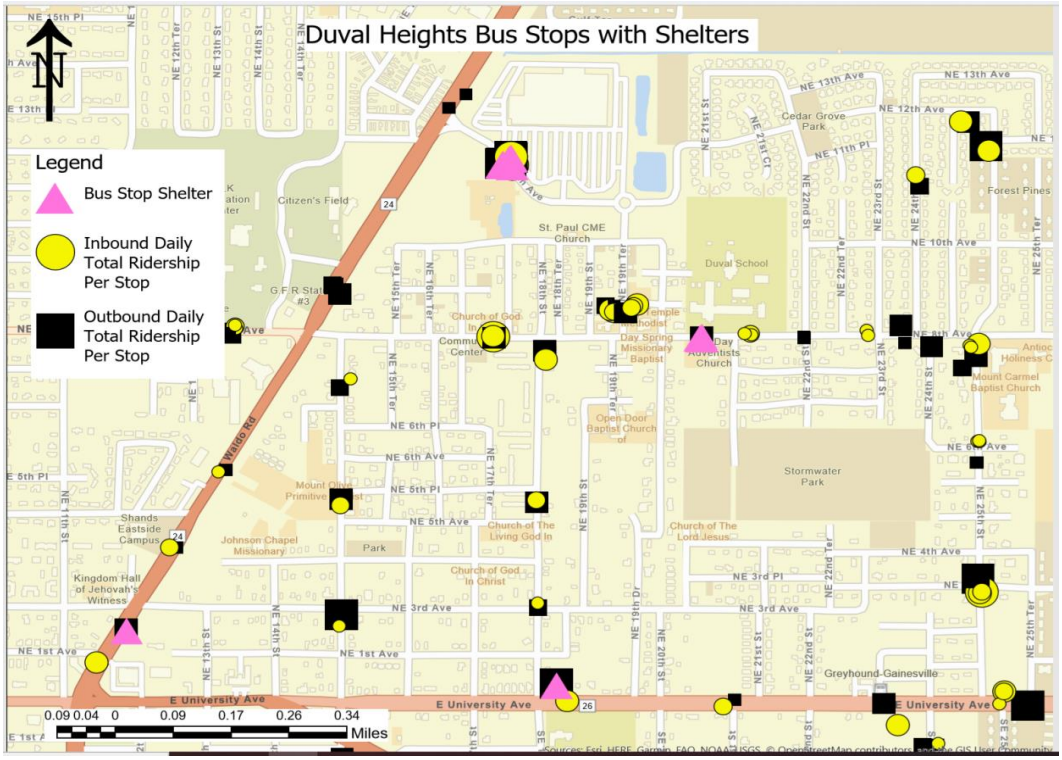

Figure B-18: Duval Heights Bus Stop Information

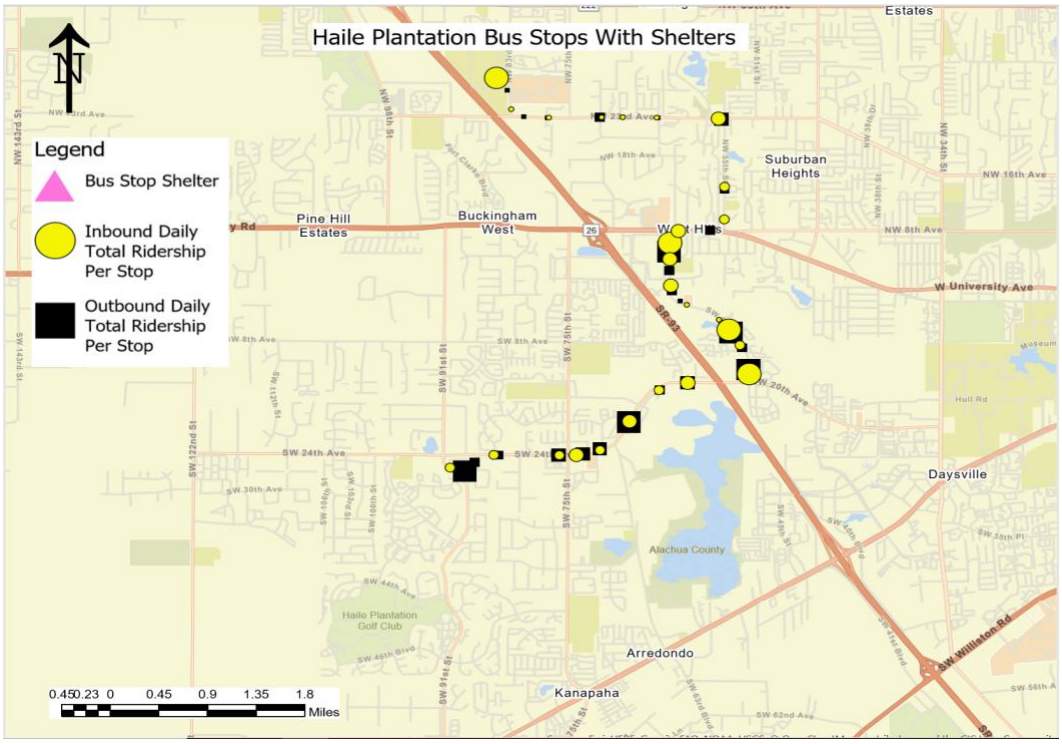

Figure B-19: Haile Plantation Bus Stop with Shelters

B.4 Travel Times

This section discusses estimated average travel time information for the two Gainesville communities, considering destinations such as schools, workplaces, and shopping destinations using transit, car, and bicycle as transportation modes. The travel times were estimated for the morning, midday, and evening hours (Travel Times

, Appendix B-3). These travel times indicate the most convenient and reliable modes of transportation for both Duval Heights and Haile Plantation, and they reflect the ease of accessibility to major destinations within 30-minutes.

B.4.1 Haile Plantation

The bus times for Haile Plantation were estimated based on the existing schedules provided by Gainesville RTS. These bus times were available for bus routes 75, 76, and 150 (see Appendix B-3 and Appendix B-4). The estimated times for travel by car, bicycle, and walking were given by Google Maps. Estimated times for bicycle and walking that exceeded one hour were not included because it is unlikely for the vast majority of the population to travel that long using these modes.

Travel times for work, shopping, and schools varied by mode of transport. Compared to cars and buses, walking takes the longest travel time to most destinations, including shopping, school, and work. Most major destinations in Haile Plantation require more than one hour of walking to reach, making this neighborhood less walk friendly.

Travel by car takes the shortest time to important destinations from Haile Plantation. In general, travel by car is the quickest mode of transportation. However, travel time reliability is a major concern. According to the Haile Plantation focus group meeting (2020), during peak hours, especially in the morning, leaving for work or other desired destinations a few minutes after 7 AM, can cause delay of up to 45-minutes due to traffic congestion. The 24th Avenue (two-lane road) and Archer Road that lead to major destinations from Haile Plantation are congested during peak hours (Figure B-4).

According to Meurs & Haaijer (2001), the modes of travel are heavily influenced by personal preferences and the planned environment, i.e., proximity to shopping and other recreational activities. Meurs & Haaijer (2001) also found that in areas with easily accessible daily shopping, there is an increase in trips by foot. Generally, there are limited shopping opportunities in the neighborhood, and therefore walking is not a popular method of transportation (See Appendix B-3 and Appendix B-4).

B.4.2 Duval Heights

The bus travel times for Duval Heights were estimated based on the existing schedules provided by Gainesville RTS. The Duval Heights bus routes considered include 2, 3, 11, 26, 27, and 711 (Figure B-12). The estimated times for travel by car, bicycle, and walking were obtained from Google Maps. Estimated times for bicycle and walking that exceeded one hour were not

included because it would not be a feasible means of travel for the majority of commuters (see Appendix B-5 and Appendix B-6).

Similar to Haile Plantation, Duval Heights' travel times for work, shopping, and schools vary by mode of transport. Duval Heights is not walkable as there are no key shopping destinations, work and schools in the vicinity. In addition, there is no frequent, reliable bus transportation. However, there are a few instances in which travel times by bike are within a few minutes of travel by car (for example, travel to Walmart at 1800 NE 12th Ave takes 4-minutes by both car and bicycle).

Duval Heights has satisfactory bus coverage in the East Gainesville area; however, travel to destinations west of the University of Florida campus requires one or two transfers. Many areas within Duval Heights are within reasonable biking distance. In this analysis, reasonable biking distance was limited to a travel time of less than 30-minutes. Very few locations in Duval Heights, however, are accessible by walking (see Appendix B-5 and Appendix B-6).

B.4.3 Changes due to COVID-19

The transportation network has been significantly affected by COVID-19. Travel times to destinations may have decreased due to low traffic resulting from lockdowns. However, the travel times used for this report were obtained from Google, which estimates travel times based on historic time-of-day and day-of-week traffic data. Thus, there are no major effects of COVID-19 on the travel times reported in Table B-4 and Table B-7. The estimated average travel time represents the average of the times obtained for the three periods examined.

Table B-4: Post-COVID Google Travel Times – Haile Plantation, Car (April 1, 2020)

Location	Distance (mile)	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	5.7	15	14	16	16
Santa Fe College	6.3	18	17	18	18
UF Health Shands	8.7	25	22	25	28
Gainesville Regional Airport	16.3	34	34	34	34
Greyhound Bus Station	11.3	31	30	31	33
Butler Plaza	5.9	16	15	16	16
The Oaks Mall	5.7	14	14	14	15
Downtown Gainesville	9.6	27	27	27	27
Market Square	1.4	5	5	5	5
N Main St - NE 39th Ave Car Dealerships	13.4	31	31	32	31

Table B-5: Pre-COVID Google Travel Times – Haile Plantation, Car (December 6, 2019)

Location	Distance (mile)	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	5.7	16	15	15	17
Santa Fe College	6.3	16	16	16	16
UF Health Shands	8.7	22	20	23	22
Gainesville Regional Airport	16.3	32	32	32	32
Greyhound Bus Station	11.3	30	30	30	30
Butler Plaza	5.9	15	13	16	16
The Oaks Mall	5.7	13	12	14	13
Downtown Gainesville	9.6	25	25	25	25
Market Square	1.4	5	5	5	5
N Main St - NE 39th Ave Car Dealerships	13.4	28	28	28	28

Table B-6: Post-COVID Google Travel Times – Duval Heights, Car (April 1, 2020)

Location	Distance (mile)	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	3.8	13	12	13	13
Santa Fe College	9.5	28	27	28	30
UF Health Shands	3.8	13	13	13	14
Gainesville Regional Airport	3.9	10	10	10	10
Greyhound Bus Station	2.8	10	10	10	9
Butler Plaza	8.5	23	21	23	26
The Oaks Mall	7.2	23	20	22	25
Downtown Gainesville	2.2	8	7	8	8
Walmart Super Center	0.7	4	4	4	4
Wards	3.2	11	10	11	11

Table B-7: Pre-COVID Google Travel Times – Duval Heights, Car (December 6, 2020)

Location	Distance (mile)	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	3.8	13	12	13	13
Santa Fe College	9.5	24	23	27	24
UF Health Shands	3.8	13	12	13	13
Gainesville Regional Airport	3.9	10	9	10	10
Greyhound Bus Station	2.8	9	8	9	9
Butler Plaza	8.5	22	19	23	23
The Oaks Mall	7.2	19	18	21	19
Downtown Gainesville	2.2	7	6	7	7
Walmart Super Center	0.7	4	4	4	4
Wards	3.2	10	10	10	10

B.5 Safety

Safety can be measured in several ways for various transportation modes. Pedestrian safety can be gauged by the number of pedestrian crashes, while motor vehicle safety can be measured by the number of total crashes. For bicyclists, the availability of buffered bike lanes and crash statistics are good indicators.

For this report, crash reports for five years (2014 to 2019) were obtained for both neighborhoods (Duval Heights and Haile Plantation) using the "Signal Four Analytics" database[14]. Figure B-20 provides the distribution of the number of crashes within the two neighborhoods for 5 years (2014-19). As shown, Duval Heights and Haile Plantation have comparable number of crashes for this time period. As a result, the yearly average for the number of crashes is also nearly the same for the two neighborhoods. However, considering the crash rate with respect to population (crashes per 1000 residents), Duval Heights has a higher number of crashes compared to Haile Plantation (see Figure B-21).

[14] https://s4.geoplan.ufl.edu/

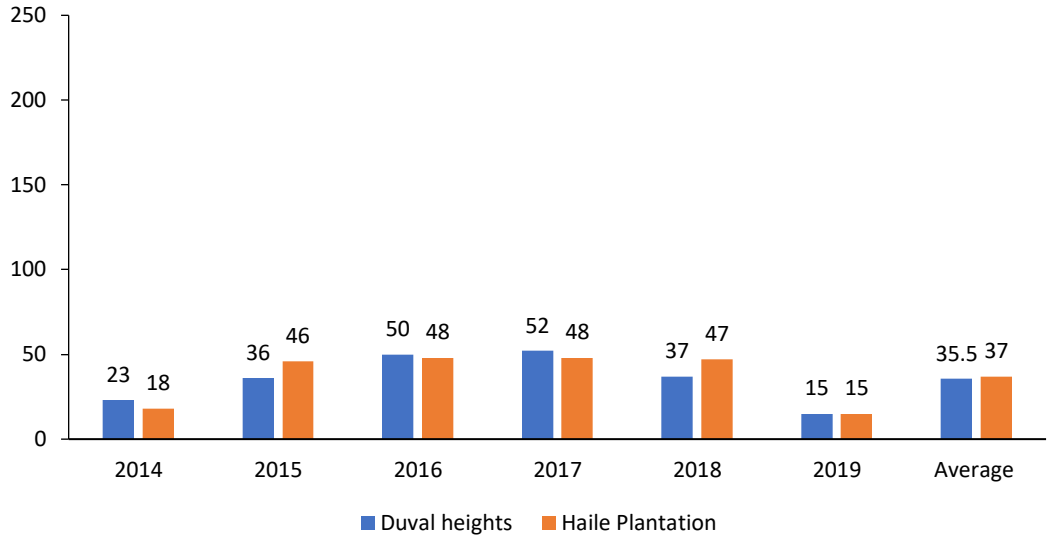

Figure B-20: Annual Number of Crashes for Duval Heights and Haile Plantation

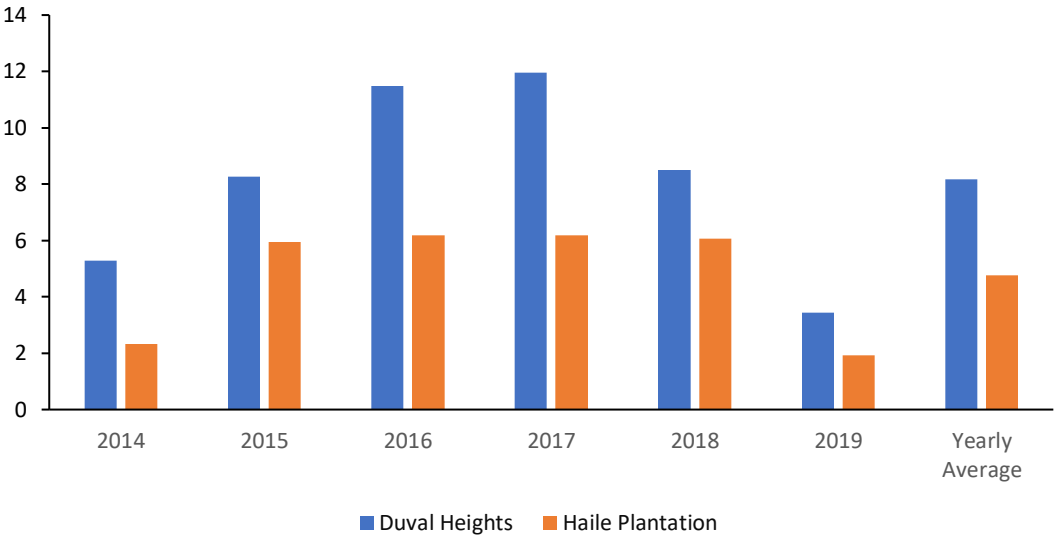

Figure B-21: Crashes per Thousand Population (without Bounding Arterials)

However, if the crash data include those along the arterials that serve as boundaries for the two neighborhoods (the data indicate that major crash locations are these arterials: East University Avenue and Waldo Road for Duval Heights; Tower Road and SW 24 Avenue for Haile Plantation), then the number of observed crashes are much higher. This is the case particularly for *Duval* Heights (Figure B-22). When the boundary arterial crashes are included, Duval Heights has significantly more crashes than Haile Plantation on a yearly basis. Also, when population is factored in the comparison of crashes (crashes per thousand population), Duval Heights still has a higher number of crashes as seen in Figure B-23.

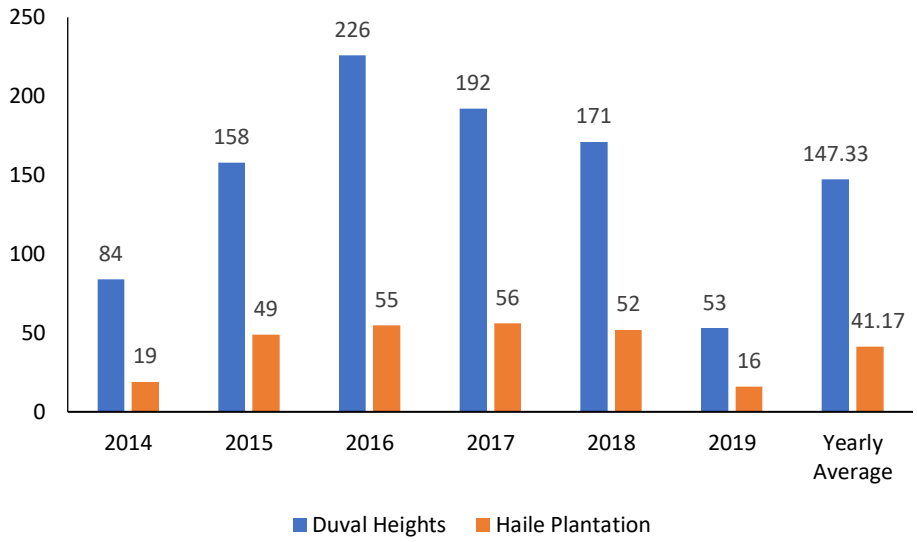

Figure B-22: Annual Number of Crashes for Duval Heights and Haile Plantation (including bounding arterials)

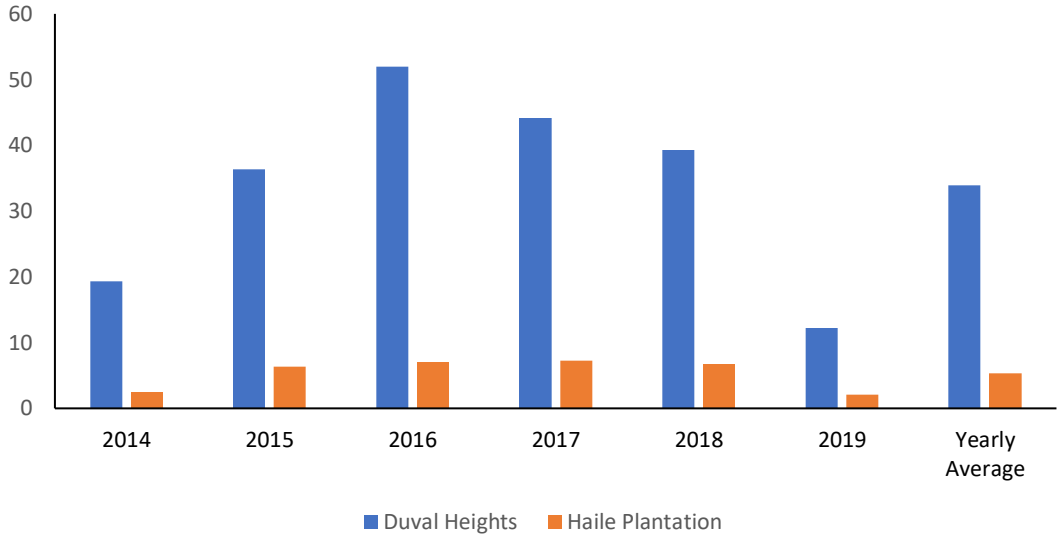

Figure B-23: Crashes per Thousand Population (with Bounding Arterials)

Figure B-24 shows the distribution of crashes based on severity for the City of Gainesville and the two neighborhoods. The majority of the crashes are property-damage-only (PDO) for the city and both neighborhoods. The graph shows similar patterns for the two neighborhoods and the city.

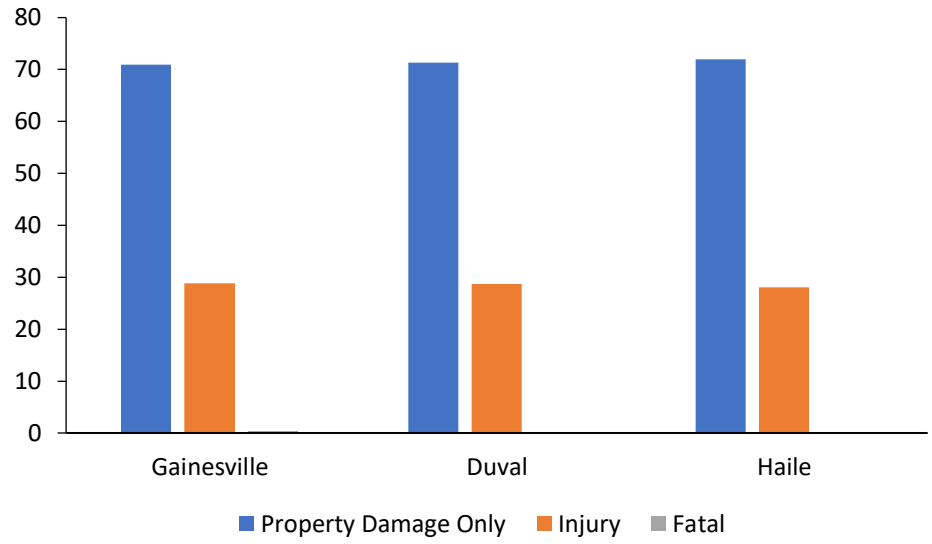

Figure B-24: Percentage Distribution of Crashes based on Severity.

Various safety indicators demonstrate that pedestrian safety is better in Haile Plantation than in East Gainesville. Haile Planation has a greater population size and hence likely more walking activities in total (i.e., greater exposure). Nevertheless, there have been zero crashes involving pedestrians in Haile Planation and five crashes involving pedestrians in Duval Heights in 2018. Three of these occurred along Waldo Road, within a half-mile of Wal-Mart. It is possible that high pedestrian activity is prevalent in the area, where striped crosswalks are minimal.

Regarding bike safety, the data in 2018 showed one crash involving bicyclists in Haile Plantation and three in Duval Heights. The latter three occurred within a quarter-mile of the intersection of Waldo Road and University Avenue.

Vehicle safety appears to be lower in Duval Heights. In the past five years, the yearly average of vehicle crashes on streets crossing or being adjacent to Duval Heights (over 100) is over twice as many as those in Haile Plantation (about 40). Many of the crashes in Duval Heights occurred along the main thoroughfares, namely Waldo Road and E. University Avenue as seen in Figure B-25. A combination of circumstances could explain the difference. First, Waldo Road and E. University Avenue are part of Florida's Strategic Intermodal System (SIS), and thus they carry a significant amount of through traffic, including a relatively high number of trucks. These two roadways adjacent to or crossing Duval Heights generally have higher speed limits than those in Haile Plantation. For instance, while roads in Haile Plantation often share the traveled path with golf carts, which indicates low speed, E. University Ave and Waldo Road have a posted speed limit of 35 mph. Second, the main arterials and collectors in Haile Plantation have fewer intersections, and thus fewer points of conflict, than in Duval Heights (see Figure B-25 and Figure B-26). Third, many roads in Haile Plantation are curved, effectively lowering speeds due to reduced sight distances and vehicle maneuvering. Finally, a higher percentage of heavy vehicles traverse Duval Heights than Haile Plantation, and the higher presence of trucks can lower perceptions of vehicular safety and cause more frequent re-pavements as heavy vehicles damage road surfaces.

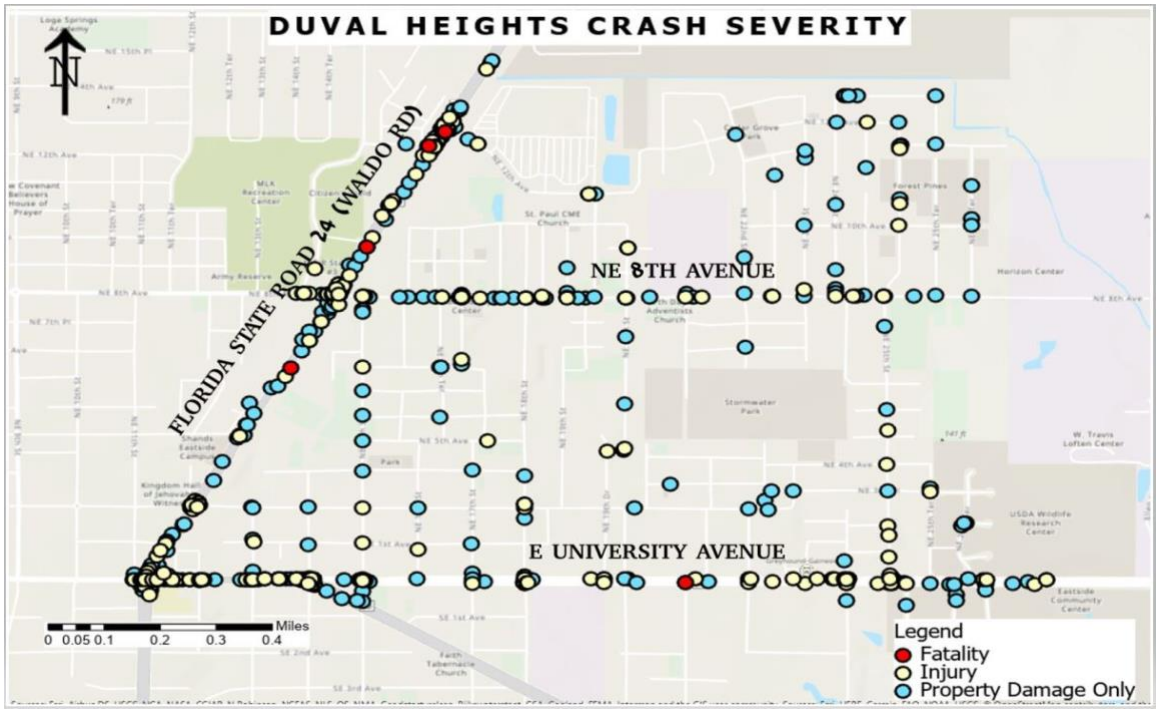

Figure B-25: Crash Severity in Duval Heights

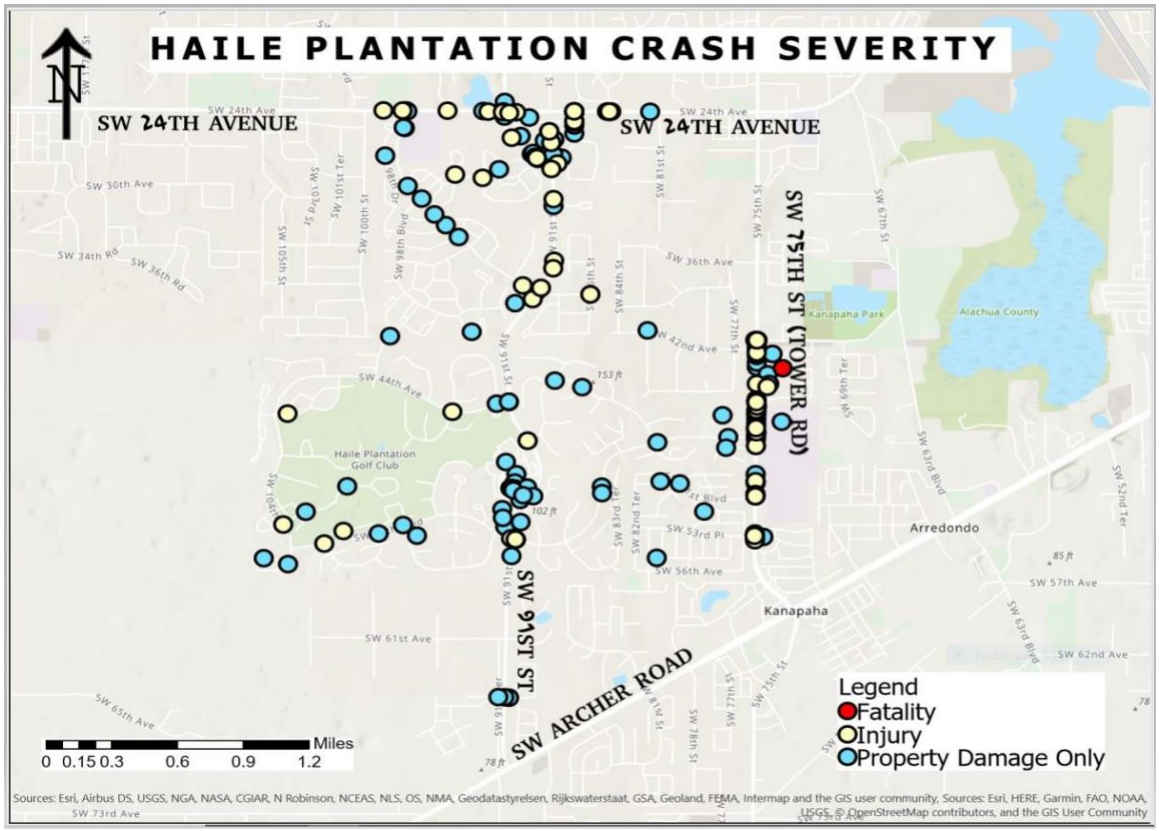

Figure B-26: Crash Severity in Haile Plantation

Further, crime incidents have been noted to occur near bus stops around Duval Heights. Figure B-27 shows crime events occurring within 50 feet of bus stops in Duval Heights. To visualize the individual incidents, they have been graphically spread apart, however, all of these incidences happen within 50 feet of a bus stop. A similar analysis could not be carried out for Haile Plantation as there are no available data from Alachua County.

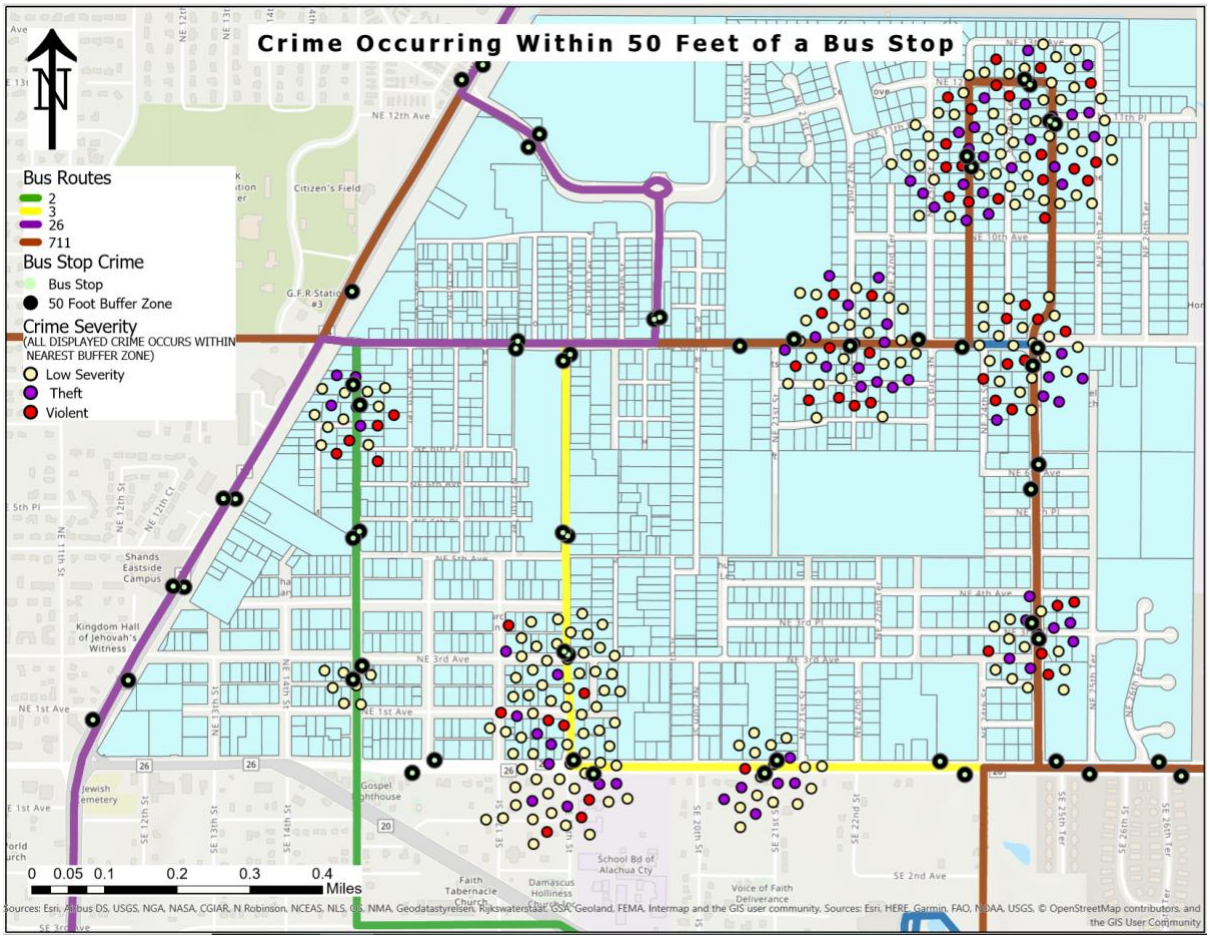

Figure B-27: Crime Incidents within 50-feet of Bus Stops in Duval Heights Area

From a transportation infrastructure perspective, much can be done to promote the safety of bicyclists and pedestrians in Haile Plantation and Duval Heights. Along the boundaries of these neighborhoods are primary highways or major roads with high speeds. These along with a lack of buffers between the road and the bikeway are likely to make biking and pedestrian crossings unsafe along Archer, Waldo, and Hawthorne Roads. Moreover, pedestrians, especially children, crossing Waldo Road face hazards from speeding cars because there is only one striped cross walk. More pedestrian facilities, lights, and better street lighting around sidewalks are likely to improve safety.

B.6 Conclusions

This report provides an assessment of the transportation network for two Gainesville communities, Duval Heights, and Haile Plantation. Duval Heights and Haile Plantation are neighborhoods of similar size, but they are significantly different in terms of their demographic and socioeconomic characteristics. Average household income in Haile Plantation ($88k) is more than three times that of Duval Heights ($24k). The number of households without a vehicle in Duval Heights is a major indicator of the lack of mobility options. Most of the homes (98%) in Haile Plantation have a car, whereas in Duval Heights nearly a third of the homes (28%) do not have a car and are likely to lack convenient access to essential destinations such as job opportunities and hospitals.

The University of Florida and Shands Hospital are major employers in the city. Travel times from both neighborhoods during peak hours to and from these destinations are long and unreliable. Several participants from the Haile Plantation focus groups remarked how biking sometimes can be faster than driving during peak hours. Most employment opportunities for Duval Heights residents require one or more transfers in the bus system. In terms of street connectivity, Haile Plantation has a cul-de-sac design compared to Duval Heights' grid system. Most shopping destinations are a mile or more from these two residential areas and neither neighborhood is walkable.

The bus system has better coverage in Duval Heights compared to Haile Plantation. With the introduction of the express shuttle (Route 150) Haile Planation residents seem very willing to use transit. Duval Heights residents face availability issues with the bus system during evenings and weekends, as the bus service becomes infrequent during these times. Most bus stops lack shelter or lighting, which can be extremely problematic in areas with high crime rates.

Various safety indicators demonstrate that pedestrian and bicyclist safety is higher in Haile Plantation than in East Gainesville. High speed of vehicular traffic on some of the major roads surrounding the two communities are a cause of concern. Vehicle safety was found to be lower in Duval Heights. Many of the crashes occurred along the main thoroughfares, namely Waldo Road and University Avenue which have higher crash rates compared to Haile Plantation.

References

See main body of this report.

Supplemental Information B-1: Bus Information

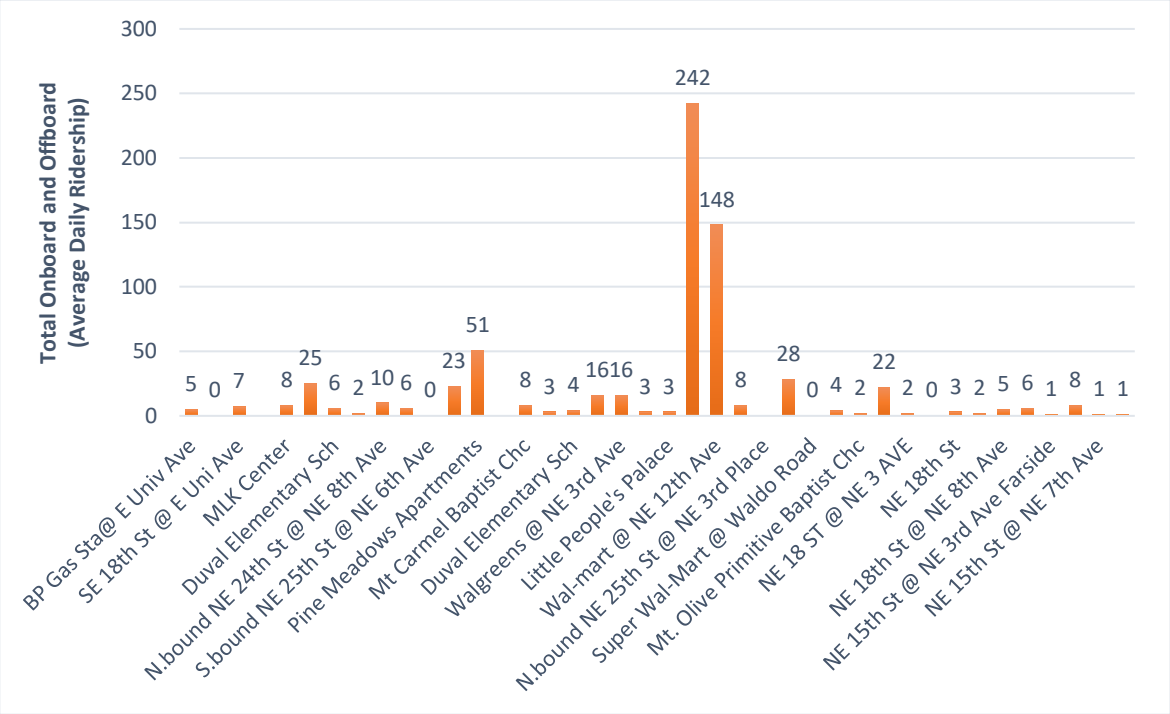

Figure B-1-1: Total On-board and Off-board by Bus Stop – September 2019

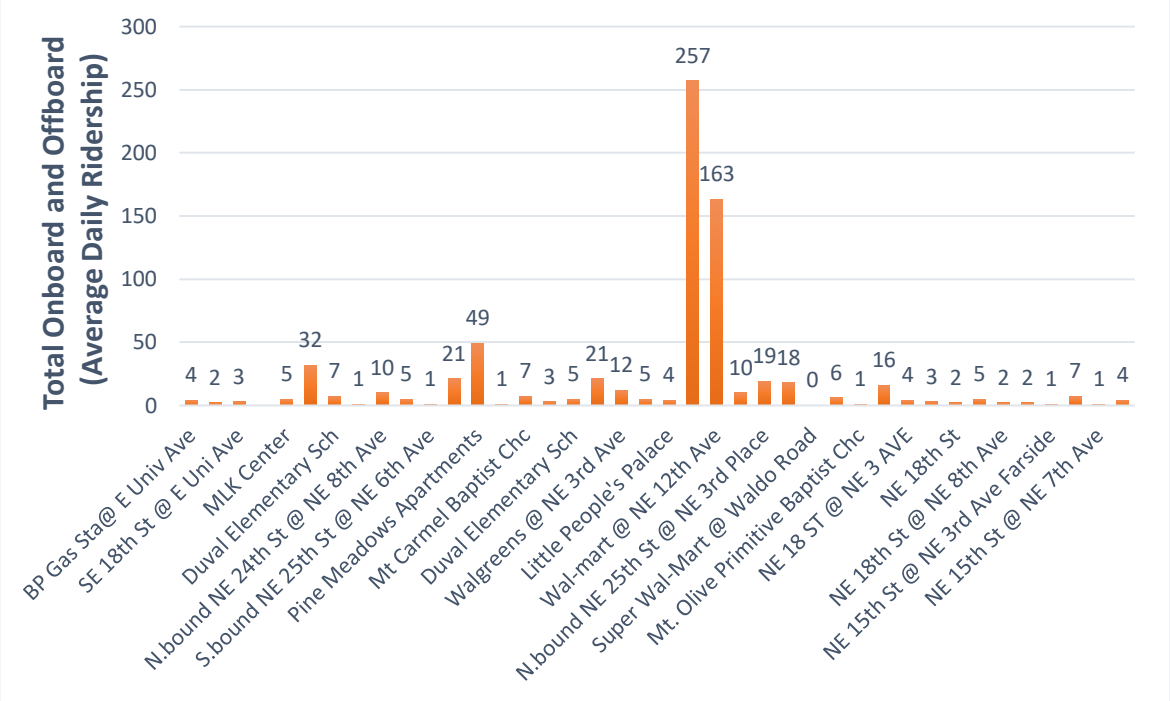

Figure B-1-2: Total On-board and Off-board by Bus Stop – October 2019

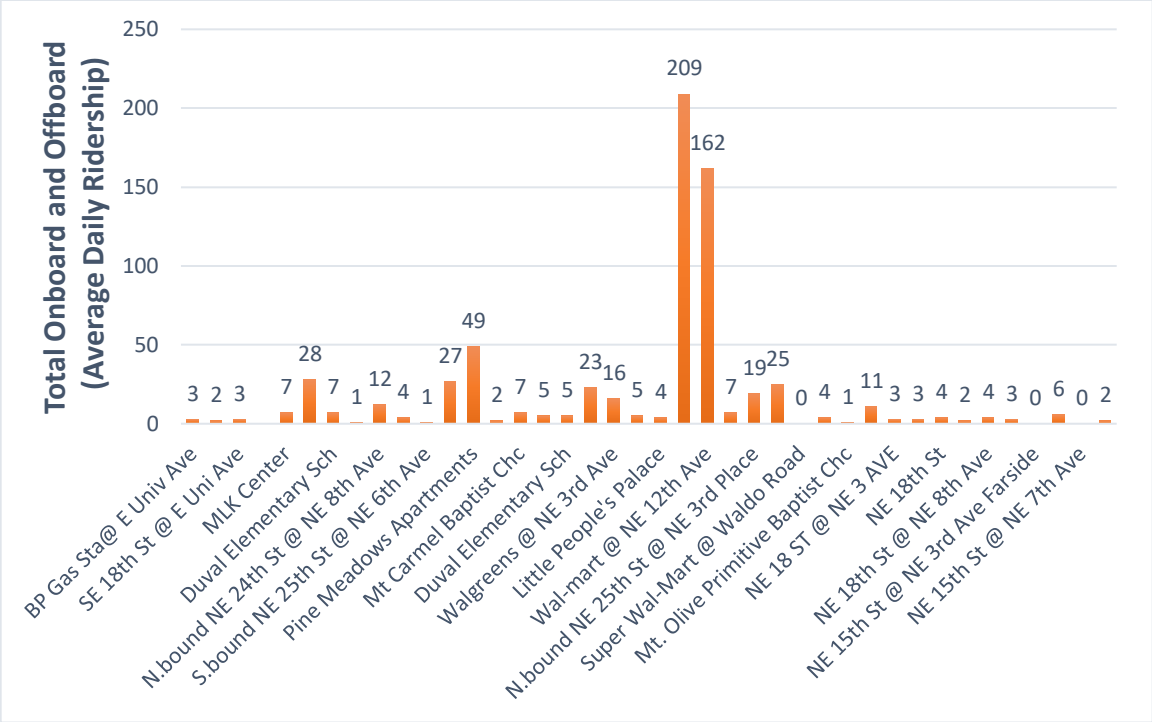

Figure B-1-3: Total On-board and Off-board by Bus Stop – November 2019

Table B-1-1: Duval Heights Bus Stop Information

Stop ID	Stop Name	No. of Shelters at Stop	No. of Light Fixtures	Sidewalk (1)	Landing Pad (2)
345	BP Gas Station @ E University Avenue	0	1	1	2
346	Westbound E University Avenue @ SE 21st Street	0	1	1	0
347	SE 18th Street @ E University Avenue	1	1	1	0
349	Westbound E University Avenue @ NE 16th Street	0	1	1	2
564	MLK Center	0	1	1	0
568	United Methodist Church	0	0	1	2
569	Duval Elementary School	1	1	1	2
570	Eastbound NE 8th Avenue @ NE 22nd Street	0	0	1	0
571	Northbound NE 24th Street @ NE 8th Avenue	0	0	0	0
578	Southbound NE 25th Street @ NE 8th Avenue	0	0	1	2
579	Southbound NE 25th Street @ NE 6th Avenue	0	1	1	2

Stop ID	Stop Name	No. of Shelters at Stop	No. of Light Fixtures	Sidewalk (1)	Landing Pad (2)
581	Southbound NE 25th Street @ NE 3rd Place	0	1	1	2
602	Pine Meadows Apartments	0	1	1	0
608	Northbound NE 25th Street @ NE 6th Avenue	0	0	1	2
609	Mt Carmel Baptist Church	0	1	1	2
617	Westbound NE 8th Avenue @ NE 23nd Street	0	0	1	0
618	Duval Elementary School	0	0	1	2
619	United Methodist Church	0	1	1	2
855	Walgreens @ NE 3rd Avenue	1	1	1	2
856	Westcoast Sea Food	0	1	1	0
857	Little People's Palace	0	1	1	0
1234	Super Wal-mart @ NE 12th Avenue	1	1	1	2
1235	Super Wal-mart @ NE 12th Avenue	1	1	1	2
1239	Caroline Manor Housing	0	1	1	0
1240	Northbound NE 25th Street @ NE 3rd Place	0	0	1	2
1261	Gardenia Garden Apartments	0	0	1	0
1315	Super Wal-Mart @ Waldo Road	0	0	0	0
1439	Cohens Temple	0	1	1	0
1440	Mt. Olive Primitive Baptist Church	0	1	1	0
1447	Gardenia Gardens	0	1	1	0
1462	NE 18th Street @ NE 3rd Avenue	0	1	0	0
1463	NE 18th Street @ NE 3rd Avenue	0	0	1	0
1464	NE 18th Street	0	1	0	0
1465	NE 18th Street	0	0	1	0
1466	NE 18th Street @ NE 8th Avenue	0	1	0	0
1467	NE 18th Street @ NE 8th Avenue	0	0	1	0
1498	NE 15th Street @ NE 3rd Avenue, Farside	0	0	1	0
1499	NE 15th Street @ NE 3rd Avenue, Nearside	0	1	1	0
1500	NE 15th Street @ NE 7th Avenue	0	1	1	0
1501	NE 15th Street @ NE 8th Avenue	0	1	1	0

Notes: (1) 0-No Sidewalk, 1-Less than 5-feet
(2) 0-No Landing Pad, 1-Non-compliant, 2-Good Condition
Source: City of Gainesville

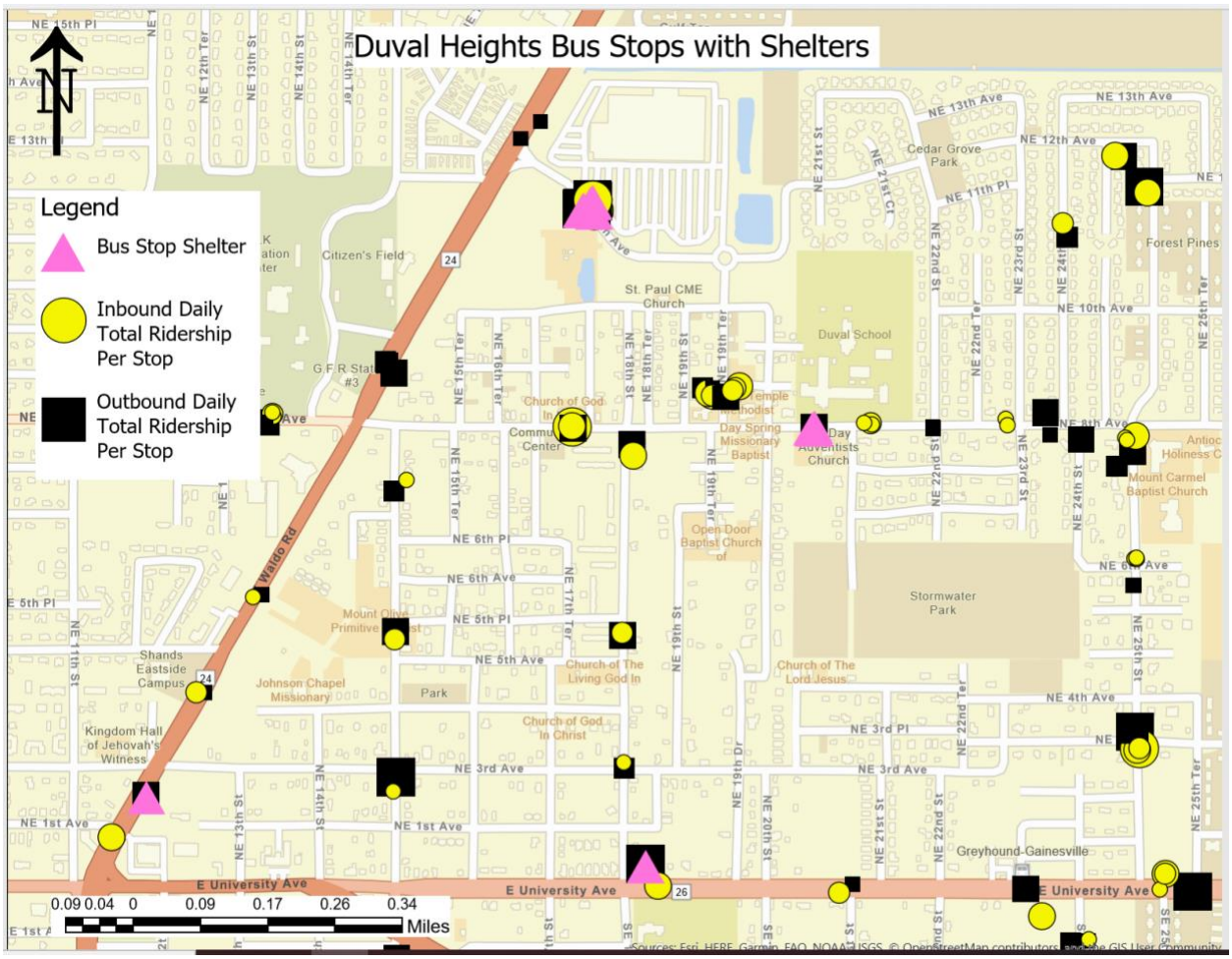

Figure B-1-4: Duval Heights Bus Stops with Shelters

Table B-1-2: Haile Plantation Bus Stop Information

Stop ID	Stop Name	Number of Shelters at Stop	Number of Light Fixtures	Sidewalk (1)	Landing Pad (2)
1113	Tower Village	0	0	1	0
1114	Haile Plantation Neighborhood	0	1	1	0
1401	Westbound 25th Lane @ SW 87th Drive	0	0	1	0
1402	Westbound SW 87th Drive @ SW 91st Street	0	1	1	0
1403	Haile Market Square	0	1	1	0
1563	Haile Plantation	0	0	2	2

Notes: (1) 0-No Sidewalk, 1-Less than 5-feet, 2-Greater than 5-feet.
(2) 0-No Landing Pad, 1-Non-compliant, 2-Good Condition
Source: City of Gainesville

Suppleental Information B-2: Bus Route Frequency

Table B-2-1: Duval Heights Weekday and Weekend Schedule Fall 2019

Weekday Schedule Fall 2019	
Route	**Frequency (min)**
2	60
3	60
11	30 to 60
26	60
27	120
711	60
Weekend Schedule Fall 2019	
Route	**Frequency (min)**
2	60
3	No service
11	No service
26	No service
27	No service
711	30 to 90

Table B-2-2: Haile Plantation Weekday and Weekend Schedule Fall 2019

Weekday Schedule Fall 2019	
Route	**Frequency (min)**
150	30
75	
Weekend Schedule Fall 2019	
Route	**Frequency (min)**
150	No service
75	

Supplemental Information B-3: Travel Times

The travel times for cars were obtained before the COVID-19 pandemic, i.e. 6th December 2019 and the bus travel times by time period were obtained during the pandemic, i.e. 1st April 2020. The starting point (origin) is a central point given in google maps, located around the junction of SW 91st St and SW 44th Avenue in Haile Plantation, Gainesville.

Table B-3-1: Haile Plantation Weekday Travel Times for Shopping

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
Celebration Point	6.0	Car	15	15	15	15
		Bicycle	30			
Haile Plantation Golf & Country Club	0.7	Car	3	4	3	3
		Bicycle	3			
		Walking	13			
Butler Plaza	5.9	Car	17	16	17	18
		Bus 75 (Veterans Memorial Park Stop)	19	19	19	19
		Bicycle	29			
The Oaks Mall	5.7	Car	15	15	15	15
		Bus 75	40	39	40	40
		Bus 76 (Veterans Memorial Park Stop)	23			
		Bicycle	29			
Downtown Gainesville	9.6	Car	29	29	28	30
		Bicycle	48			
Market Square Includes Publix, Wells Fargo etc.	1.4	Car	6	6	6	6
		Bicycle	8			
		Walking	28			

Table B-3-2: Haile Plantation Weekday Travel Times for Work

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	5.7	Bus 150	47	47	47	47
		Car	17	16	16	18
		Bicycle	29			
UF Health Shands	8.7	Bus 150	38	38	38	38
		Car	26	26	24	29
		Bicycle	43			
UF Health Family Medicine Haile Plantation Location	1.2	Car	4	4	4	4
		Bicycle	7			
		Walking	24			
UF Health Emergency Center Kanapaha	3.0	Car	7	7	7	7
		Bicycle	16			
		Walking	50			
Gainesville Regional Airport	16.3	Car	36	36	36	38
Gainesville Regional Utilities	14.1	Car	33	32	32	35
Alachua County Sheriff Office	13.2	Car	30	29	29	31
Gainesville Fire Rescue Headquarters	13.0	Car	29	28	28	30
		Bicycle	59			
Florida Department of Transportation	16.5	Car	37	36	36	38
Alachua County Public Works	15.0	Car	34	32	33	36
N Main Street @ NE 39th Avenue Car Dealerships	13.4	Car	32	31	31	34
Job Corps	16.5	Car	36	35	35	38
Greyhound Bus Station	11.8	Car	33	31	34	34
		Bicycle	59			

Table B-3-3: Haile Plantation Weekday Travel Times for School

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	5.7	Bus 150	47	47	47	47
		Car	17	16	16	18
		Bicycle	29			
Santa Fe College	6.3	Bus 76	23			
		Car	15	15	14	15
		Bicycle	33			
Gainesville High School	10.1	Car	30	30	30	30
		Bicycle	53			
Bronson Middle/High School	16.5	Car	24	24	24	25
Kanapaha Middle	2.4	Car	7	8	7	7
		Bicycle	13			
		Walking	36			
Kimball Wiles Elementary	2.1	Car	7	7	7	7
		Bicycle	12			
		Walking	34			
Lawton M Chiles Elementary	1.7	Car	6	6	6	6
		Bicycle	10			
		Walking	34			
Santa Fe Downtown Campus	10.1	Car	29	28	30	30
		Bicycle	49			

Supplemental Information B-4: Weekend Travel Times to and from Haile Plantation

Table B-4-1: Haile Plantation Weekend Travel Times for Shopping

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
Celebration Point	6.0	Car	14	14	14	14
		Bicycle	30			
Haile Plantation Golf & Country Club	0.7	Car	3	3	3	3
		Bicycle	3			
		Walking	13			
Butler Plaza	5.9	Car	15	13	16	16
		Bicycle	29			
The Oaks Mall	5.7	Car	13	12	14	13
		Bicycle	29			
Downtown Gainesville	9.6	Car	25	25	25	25
		Bicycle	48			
Market Square Includes Publix, Wells Fargo, etc.	1.4	Car	5	5	5	5
		Bicycle	8			
		Walking	28			

Table B-4-2: Haile Plantation Weekend Travel Times for Work

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	5.7	Car	16	15	15	17
		Bicycle	29			
UF Health Shands	8.7	Car	22	20	23	22
		Bicycle	43			
UF Health Family Medicine Haile Plantation Location	1.2	Car	4	4	4	4
		Bicycle	7			
		Walking	24			
UF Health Emergency Center Kanapaha	3.0	Car	7	7	7	7
		Bicycle	16			
		Walking	50			
Gainesville Regional Airport	16.3	Car	32	32	32	32
Gainesville Regional Utilities	14.1	Car	30	29	32	29
Alachua County Sheriff Office	13.2	Car	26	25	27	25
Gainesville Fire Rescue Headquarters	13.0	Car	26	25	27	27
		Bicycle	59			
Florida Department of Transportation	16.5	Car	32	32	32	32
Alachua County Public Works	15.0	Car	29	29	29	29
N Main Street @ NE 39th Avenue Car Dealerships	13.4	Car	28	28	28	28
Job Corps	16.5	Car	30	30	30	30
Greyhound Bus Station	11.8	Car	30	30	30	30
		Bicycle	59			

Table B-4-3: Haile Plantation Weekend Travel Times for Schools

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	5.7	Car	16	15	15	17
		Bicycle	29			
Santa Fe College	6.3	Car	16	16	16	16
		Bicycle	33			
Gainesville High School	10.1	Car	25	22	26	26
		Bicycle	53			
Bronson Middle/High School	16.5	Car	23	23	24	23
Kanapaha Middle	2.4	Car	7	7	7	7
		Bicycle	13			
		Walking	36			
Kimball Wiles Elementary	2.1	Car	7	7	7	7
		Bicycle	12			
		Walking	34			
Lawton M. Chiles Elementary	1.7	Car	6	6	6	6
		Bicycle	10			
		Walking	34			
Santa Fe Downtown Campus	10.1	Car	25	23	26	26
		Bicycle	49			

Supplemental Information B-5: Weekday Travel Times to and from Duval Heights

Table B-5-1: Duval Weekday Travel Times for Shopping

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
Walmart Super Center 1800 NE 12th Avenue	0.7	Car	4	4	4	4
		Bus 11 Stop at Duval Early Learning Academy	6	6	6	6
		Bus 3 Stop at United Methodist Church	9	9	9	9
		Bicycle	4			
		Walking	13			
E University @ NE SR 24 Shopping Area Includes Walgreens, Auto Repair, Dandy Market	1.3	Car	5	5	5	6
		Bicycle	8			
		Walking	26			
NE 31st Avenue @ NE SR 24 Shopping Area Includes Satchels Pizza, Alley Gator Bowling, and Gainesville Towing Service.	1.9	Car	6	6	7	6
		Bicycle	14			
		Walking	43			
Downtown Gainesville	2.2	Car	10	8	10	11
		Bus 2 Stop Before Lincoln Estates	14			
		Bus 3 Stop Before Walmart	31			
		Bus 7 Stop After Health Dept	57			
		Bus 11 Stop Before Walmart	18	18	18	18
		Bus 24 Stop at Duval Early Learning Academy	27	27	27	27
		Bus 26 Stop at Duval Early Learning Academy	20	20	20	20
		Bicycle	15			

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
Butler Plaza	8.5	Car	27	22	26	32
		Bicycle	38			
Gainesville Shopping Center Includes Publix, USPS, Wingstop	2.4	Car	9	9	9	10
		Bicycle	12			
Celebration Pointe	9.5	Car	26	22	26	29
		Bicycle	42			
Oaks Mall	7.2	Car	25	22	23	29
		Bicycle	43			
N Main Post Office	2.3	Car	10	10	10	10
		Bus 11 Stop Before Duval Early Learning Academy	31	33	30	30
		Bicycle	15			
Dollar General SE Hawthorne Road @ SE 24th Street	1.7	Car	6	5	6	6
		Bus 11 Stop Before Duval Early Learning Academy	21	21	21	21
		Bicycle	9			
		Walking	30			

Table B-5-2: Duval Weekday Travel Times for Work

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	3.1	Car	15	12	15	17
		Bus 25A Before Hippodrome Stop	32	32	32	32
		Bicycle	20			
UF Health Shands	3.9	Car	15	14	15	16
		Bicycle	24			
Greyhound Bus Station	2.8	Car	10	10	10	10
		Bus 24 Near Walmart Supercenter	33	33	33	33
		Bicycle	16			

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
Gainesville Regional Airport	3.9	Car	10	10	10	10
		Bus 25A After Hippodrome Stop	26	25	27	27
		Bus 26 After Downtown Stop	26	26	26	26
UF Health Family Medicine Eastside	1.1	Car	5	5	5	5
		Bicycle	9			
Gainesville Fire Rescue Headquarters	0.9	Car	5	5	5	5
		Bicycle	6			
Job Corps	4.2	Car	11	10	12	12
		Bus 24 After Downtown Stop	38	38	38	38
		Bicycle	20			
N Main Street @ NE 39th Avenue Car Dealerships	3.6	Car	11	10	11	11
		Bicycle	24			
Gainesville Regional Utilities	5.3	Car	13	12	13	13
		Bicycle	27			
Murphree Water Treatment Plant	4.7	Car	12	12	12	13
		Bicycle	29			
Alachua County Public Works	12.2	Car	25	23	24	27
Florida Department of Transportation	4.2	Car	10	10	10	10
		Bus 26 After Downtown Stop	34	28	28	48
		Bicycle	20			
Grace Marketplace	3.0	Car	9	9	10	9
		Bus 26 After Downtown Stop	25	24	24	27
		Bicycle	12			
Alachua County Sheriff Office	1.8	Car	7	6	7	7
		Bicycle	13			
Florence Recycling & Disposal	2.3	Car	8	8	8	8
		Bicycle	16			
Cone Park Branch Library	1.2	Car	5	4	4	5
		Bicycle	7			

Table B-5-3: Duval Weekday Travel Times for School

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	3.1	Car	15	12	15	17
		Bicycle	20			
Santa Fe College	12.0	Car	27	27	27	27
		Bicycle	50			
Santa Fe Downtown Campus	2.5	Car	10	10	10	11
		Bus 11 At Duval Early Learning Academy	30	31	28	31
		Bicycle	15			
		Walking	50			
Eastside High School	3.2	Car	8	8	8	8
		Bicycle	21			
Gainesville High School	3.9	Car	14	14	14	15
		Bicycle	23			
W. Travis Loften High School	1.1	Car	5	5	5	5
		Bus 11 After Walmart Supercenter	25	25	25	25
		Bicycle	6			
		Walking	22			
Howard W. Bishop Middle School	2.1	Car	7	7	6	7
		Bicycling	11			
		Walking	39			
Abraham Lincoln Middle School	2.2	Car	8	7	8	8
		Bicycle	13			
		Walking	44			
Joseph Williams Elementary	1.8	Car	7	7	7	7
		Bicycle	10			
		Walking	37			

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
W.A. Metcalfe Elementary	1.6	Car	6	6	6	6
		Bicycle	9			
		Walking	31			
Alachua E-School Horizon Center	0.7	Car	3	3	3	3
		Bicycle	4			
		Walking	14			
Dayspring Waldorf School	1.4	Car	6	6	6	6
		Bicycle	8			
		Walking	27			
Laniakea Montessori School	1.7	Car	6	6	6	6
		Bicycle	10			
		Walking	34			
Duval Early Learning Academy	0.3	Car	3	3	3	3
		Bus 11 After Health Dept	12	13	11	11
		Bicycle	2			
		Walking	6			
Agribusiness and the Adult Education Center	1.3	Car	5	5	5	5
		Bicycle	8			
		Walking	23			

Table B-5-4: Weekday Travel Times for Key Destinations based on Duval Heights Focus Group Interview

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
Wards	3.2	Car	13	12	12	14
		Bus 26 to Bus 6	36	35	35	37
		Bicycle	19			
Aldi	7.3	Car	25	22	23	30
		Bicycle	37			
Downtown	2.2	Car	8	7	8	8
		Bus 11	18	18	18	18
		Bicycle	16			
		Walking	44			
North Florida Regional Hospital	7.1	Car	23	20	22	28
		Bus 11 to Bus 5	55	55	55	56
		Bicycle	43			
UF Health Shands	3.8	Car	14	14	14	15
		Bus 11 to Bus 17	48	33	53	59
Walmart 1800 NE 12th Ave	0.7	Car	4	4	4	4
		Bicycle	4			
		Walking	13			

Supplemental Information B-6: Weekend Travel Times to and from Duval Heights

Table B-6-1: Duval Weekend Travel Times for Shopping

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
Walmart Super Center 1800 NE 12th Avenue	0.7	Car	4	4	4	4
		Bus 711 at Duval Early Learning Academy	5	5	5	5
		Bicycle	4			
		Walking	13			
E University - NE SR 24 Shopping Area Includes Walgreens, Auto Repair, Dandy Market	1.3	Car	6	6	6	6
		Bicycle	8			
		Walking	26			
NE 31st Avenue - NE SR 24 Shopping Area Includes Satchels Pizza, Alley Gator Bowling, and Gainesville Towing Service	1.9	Car	5	5	5	5
		Bicycle	14			
		Walking	43			
Downtown Gainesville	2.2	Car	7	6	7	7
		Bus 2 at United Methodist Church	36	36	36	36
		Bus 711 at Duval Early Learning Academy	20	20	20	20
		Bus 25 at UF Health Family Medicine Eastside	29	30	30	27
		Bicycle	15			
Butler Plaza	8.5	Car	22	19	23	23
		Bicycle	38			
Gainesville Shopping Center Includes Publix, USPS, Wingstop	2.4	Car	7	7	8	7
		Bicycle	12			
Celebration Pointe	9.5	Car	22	20	23	22
		Bicycle	42			
Oaks Mall	7.2	Car	19	18	21	19
		Bicycle	43			

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
N Main Post Office	2.3	Car	7	7	8	7
		Bus 711 to Bus 15 Before Duval Early Learning Academy	33	35	35	29
		Bicycle	15			
Dollar General SE Hawthorne Road @ SE 24th Street	1.7	Car	5	5	5	5
		Bus 711 Before Duval Early Learning Academy	12	12	12	12
		Bicycle	9			
		Walking	30			

Table B-6-2: Duval Weekend Travel Times for Work

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	3.1	Car	13	12	13	13
		Bus 25A Before Hippodrome Stop	40	46	37	37
		Bicycle	20			
UF Health Shands	3.9	Car	13	12	13	13
		Bicycle	24			
Greyhound Bus Station	2.8	Car	9	8	9	9
		Bus 711 to Bus 15	41	41	41	41
		Bicycle	16			
Gainesville Regional Airport	3.9	Car	10	9	10	10
		Bus 25A After Hippodrome Stop	25	25	25	25
UF Health Family Medicine Eastside	1.1	Car	4	4	4	4
		Bicycle	9			
Gainesville Fire Rescue Headquarters	0.9	Car	4	4	4	4
		Bicycle	6			

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
Job Corps	4.2	Car	10	9	10	10
		Bicycle	20			
N Main Street @ NE 39th Avenue Car Dealerships	3.6	Car	10	9	10	10
		Bicycle	24			
Gainesville Regional Utilities	5.3	Car	12	11	12	12
		Bicycle	27			
Murphree Water Treatment Plant	4.7	Car	11	10	12	12
		Bicycle	29			
Alachua County Public Works	12.2	Car	21	21	22	21
Florida Department of Transportation	4.2	Car	10	10	10	10
		Bus 25	50	50	50	50
		Bicycle	20			
Grace Marketplace	3.0	Car	8	8	9	8
		Bus 25	28	28	28	28
		Bicycle	12			
Alachua County Sheriff Office	1.8	Car	6	6	6	5
		Bicycle	13			
Florence Recycling and Disposal	2.3	Car	7	7	8	7
		Bicycle	16			
Cone Park Branch Library	1.2	Car	4	4	4	4
		Bicycle	7			

Table B-6-3: Duval Weekend Travel Times for School

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
University of Florida	3.1	Car	13	12	13	13
		Bicycle	20			
Santa Fe College	12.0	Car	24	23	27	24
		Bicycle	50			
Santa Fe Downtown Campus	2.5	Car	7	7	8	7
		Bus 711 At Duval Early Learning Academy	30	29	32	29
		Bicycle	15			
		Walking	50			
Eastside High School	3.2	Car	7	7	7	7
		Bicycle	21			
Gainesville High School	3.9	Car	12	12	12	12
		Bicycle	23			
W. Travis Loften High School	1.1	Car	5	5	5	5
		Bus 711 At Duval Early Learning Academy	19	19	19	19
		Bicycle	6			
		Walking	22			
Howard W. Bishop Middle School	2.1	Car	6	6	6	6
		Bicycling	11			
		Walking	39			
Abraham Lincoln Middle School	2.2	Car	7	6	7	7
		Bicycle	13			
		Walking	44			
Joseph Williams Elementary	1.8	Car	6	6	6	6
		Bicycle	10			
		Walking	37			

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time – 9 AM	Est. Time – 12 PM	Est. Time – 5 PM
W. A. Metcalfe Elementary	1.6	Car	6	5	6	6
		Bicycle	9			
		Walking	31			
Alachua E-School Horizon Center	0.7	Car	3	3	3	3
		Bicycle	4			
		Walking	14			
Dayspring Waldorf School	1.4	Car	5	5	5	5
		Bicycle	8			
		Walking	27			
Laniakea Montessori School	1.7	Car	5	5	5	5
		Bicycle	10			
		Walking	34			
Duval Early Learning Academy	0.3	Car	3	3	3	3
		Bicycle	2			
		Walking	6			
Agribusiness and the Adult Education Center	1.3	Car	4	4	4	4
		Bicycle	8			
		Walking	23			

Table B-6-4: Weekend Travel Times for Key Destinations based on Duval Heights Focus Group Interview

Location	Distance (mile)	Method	Est. Avg. Travel Time (min)	Est. Time - 9 AM	Est. Time - 12 PM	Est. Time - 5 PM
Wards	3.2	Car	10	10	10	10
		Bus 711 to Bus 6	34	34	34	34
		Bicycle	19			
Aldi	7.3	Car	20	18	22	21
		Bicycle	37			
Downtown	2.2	Car	7	6	7	7
		Bus 711	20	20	20	20
		Bicycle	16			
		Walking	44			
North Florida Regional Hospital	7.1	Car	19	17	20	19
		Bus 11 to Bus 5	55	55	55	56
		Bicycle	43			
UF Health Shands	3.8	Car	13	12	13	13
		Bus 711 to Bus 1	45	45	45	45
Walmart 1800 NE 12th Avenue	0.7	Car	4	4	4	4
		Bicycle	4			
		Walking	13			

Supplemental Information B-7: Additional Information for Haile Plantation

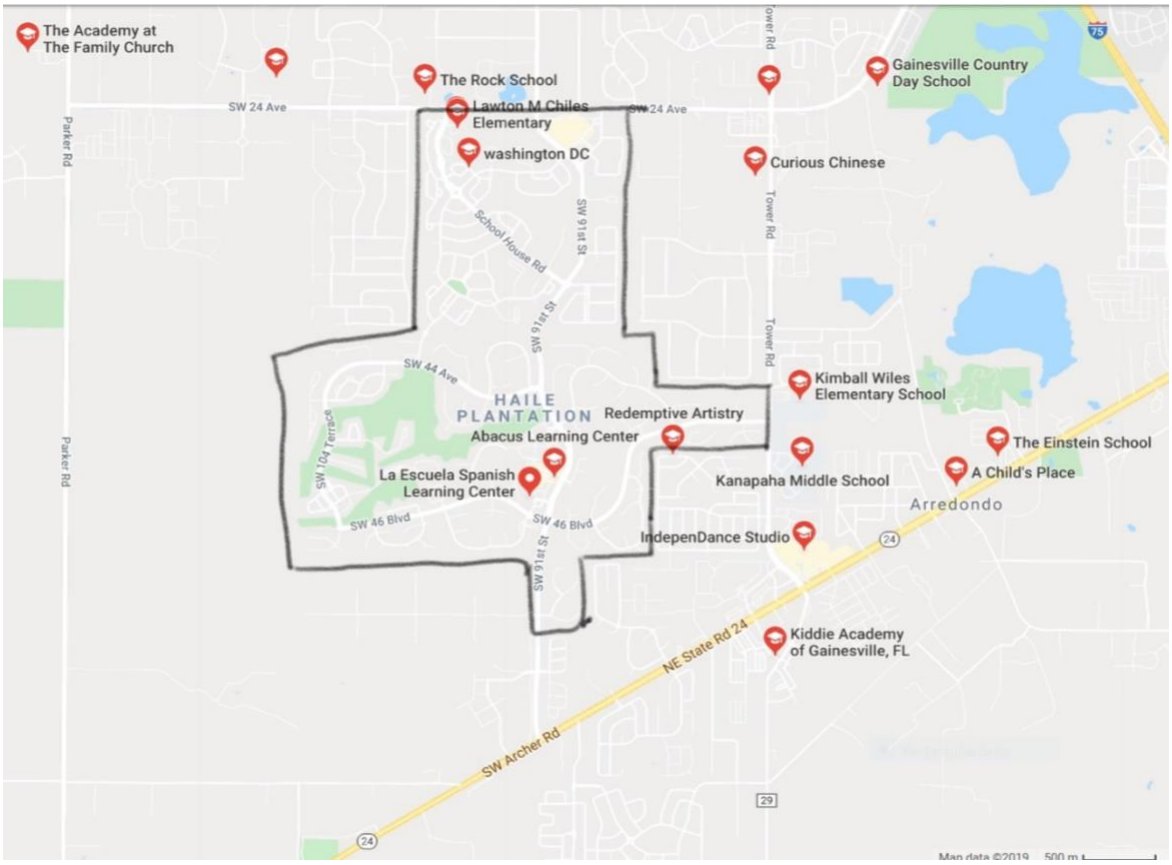

Figure B-7-1: Schools within and near Haile Plantation

Table B-7-1: Schools within the Haile Plantation Boundary

Name	Address
Lawton M. Chiles Elementary	2525 School House Road, Gainesville, FL 32608
Washington DC	9431 SW 30th Road, Gainesville, FL 32608
Redemptive Artistry	8207 SW 51st Boulevard, Gainesville, FL 32608
Abacus Learning Center	5205 SW 91st Drive, Gainesville, FL 32608
La Escuela Spanish Learning Center	5318 S W 91 Terrace, Gainesville, FL 32608

Table B-7-2: Other Possible Schools for Haile Plantation Residents Outside the Boundary

Name	Address
University of Florida	Gainesville, FL 32611
The Academy at Family Church	
The Rock School	9818 Southwest 24th Avenue B, Gainesville, FL 32607
Curious Chinese	
Gainesville Country Day School	6801 SW 24 Avenue, Gainesville, FL 32607
Kimball Wiles Elementary School	4601 SW 75th Street, Gainesville, FL 32608
The Einstein School	5910 SW Archer Road, Gainesville, FL 32608
A Child's Place	
Kanapaha Middle School	5005 SW 75th Street, Gainesville, FL 32608
IndepenDance Studio	
Kiddie Academy of Gainesville	6476 SW 75th Street, Gainesville, FL 32608
Oak Hall School	1700 SW 75th Street, Gainesville, FL 32607
Green Leaf	7715 SW 14th Avenue, Gainesville, FL 32607
Queen of Peace Catholic Academy	10900 SW 24th Avenue, Gainesville, FL 32607
The Premier Pre-school	10 SW 75th Street, Gainesville, FL 32607
Meadowbrook Elementary School	11525 NW 39th Avenue, Gainesville, FL 32606
Abiding Savior Lutheran Pre-school	9700 W Newberry Road, Gainesville, FL 32606
Sunshine Day Pre-school	10000 W Newberry Road, Gainesville, FL 32606
Medical Academy	3519 SW 86th Street, Gainesville, FL 32608
Gainesville Country Day School Early Childhood Enrichment Center	2304 Tower Road, Gainesville, FL 32607
Myra Terwilliger Elementary	301 NW 62nd Street, Gainesville, FL 32607
SIATech Gainesville Charter High School	7022 NW 10th Place, Gainesville, FL 32605
New Horizons Computer Learning Center	6026 NW 1st Place #20, Gainesville, FL 32607
Star Martial Arts	500 NW 60th Street, Gainesville, FL 32607
Salon Academy	6915 NW 4th Boulevard, Gainesville, FL 32607
Haile Equestrian LLC	7680 SW 46th Boulevard, Gainesville, FL 32608
City College	06655 060 007, Gainesville, FL 32607
Odyssey Learning College	Gainesville, FL 32607
Child Center SWAG	820 SW 62nd Terrace, Gainesville, FL 32607
Santa Fe College	2683, 3737 NE 39th Avenue, Gainesville, FL 32609

Table B-7-3: Workplaces within the Haile Plantation Boundary

Name	Address
Publix Super Market	2755 SW 91st Street, Gainesville, FL 32608
Haile Village Bistro	5323 Southwest 91st Terrace, Gainesville, FL 32608
Perfect Gift	5202 Southwest 91st Terrace, Gainesville, FL 32608
Sanders Jewelers	9119 SW 52nd Avenue #102, Gainesville, FL 32608
Sweet Paws Bakery	5212 Southwest 91st Terrace, Gainesville, FL 32608
Haile Jewelry & Loan	9116 SW 51st Road #102, Gainesville, FL 32608
Volcanic Sushi + Sake	5141 SW 91st Way, Suite I-101, Gainesville, FL 32608
Limerock Road	9158 SW 51st Road, Gainesville, FL 32608
Cacciatore Catering	9130 SW 51st Road, Gainesville, FL 32608
Patticakes in the Village	9124 SW 51st Road B-102, Gainesville, FL 32608
Fresco Pizza & Pasta	5212 Southwest 91st Terrace, Gainesville, FL 32608
Wells Fargo Bank	2605 SW 91st Street, Gainesville, FL 32608

Table B-7-4: Other Possible Workplaces for Haile Plantation Residents Outside the Boundary

Name	Address
Walgreens	2415 SW 75th Street, Gainesville, FL 32608
Oaks Mall	6419 W Newberry Road, Gainesville, FL 32605
CVS	2303 SW 75th Street, Gainesville, FL 32608
Butler Plaza	3910 SW Archer Road, Gainesville, FL 32608
Publix Super Market at Tower Square	5801 SW 75th Street, Gainesville, FL 32608
University of Florida	Gainesville, FL 32611

Table B-7-5: Shopping Places within the Haile Plantation Boundary

Name	Address
Publix Super Market	2755 SW 91st Street, Gainesville, FL 32608
Haile Village Bistro	5323 Southwest 91 Terrace, Gainesville, FL 32608
Perfect Gift	5202 Southwest 91 Terrace, Gainesville, FL 32608
Sanders Jewelers	9119 SW 52nd Avenue #102, Gainesville, FL 32608
Sweet Paws Bakery	5212 Southwest 91st Terrace, Gainesville, FL 32608
Haile Jewelry & Loan	9116 SW 51st Road #102, Gainesville, FL 32608
Volcanic Sushi + Sake	5141 SW 91st Way, Suite I-101, Gainesville, FL 32608
Limerock Road	9158 SW 51st Road, Gainesville, FL 32608
Cacciatore Catering	9130 SW 51st Road, Gainesville, FL 32608
Patticakes in the Village	9124 SW 51st Road B-102, Gainesville, FL 32608
Fresco Pizza & Pasta	5212 Southwest 91st Terrace, Gainesville, FL 32608

Table B-7-6: Other Possible Shopping Places for Haile Plantation Residents Outside the Boundary

Name	Address
Walgreens	2415 SW 75th Street, Gainesville, FL 32608
Oaks Mall	6419 W Newberry Road, Gainesville, FL 32605
CVS	2303 SW 75th Street, Gainesville, FL 32608
Butler Plaza	3910 SW Archer Road, Gainesville, FL 32608
Publix Super Market at Tower Square	5801 SW 75th Street, Gainesville, FL 32608
University of Florida	Gainesville, FL 32611

Supplemental Information B-8: Additional Information for Duval Heights

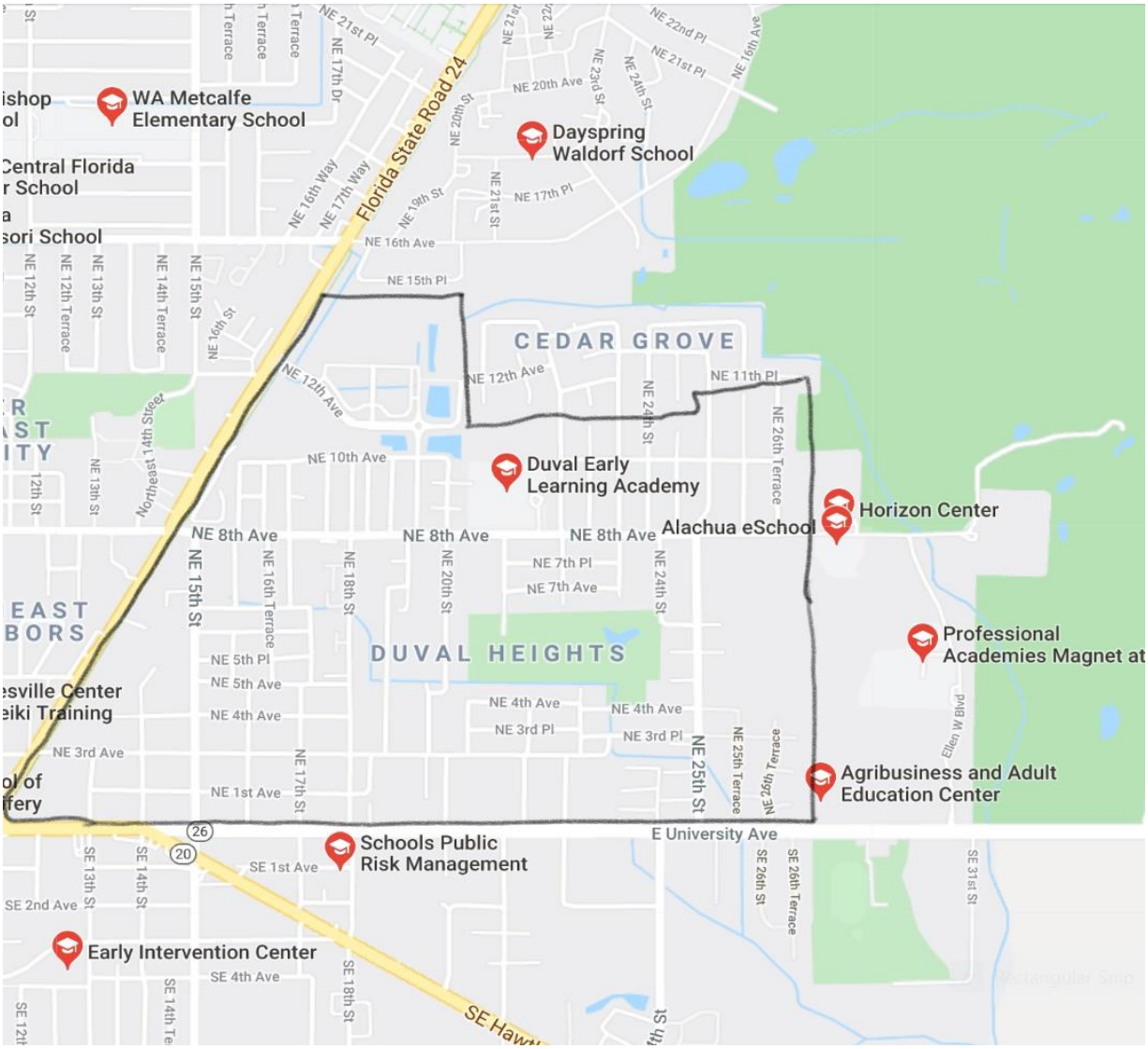

Figure B-8-1: Schools within and near Duval Heights

Table B-8-1: Schools within the Duval Heights Boundary

Name	Address
Duval Early Learning Academy	2106 NE 8th Avenue, Gainesville, FL 32641

Table B-8-2: Other Possible Schools for Duval Heights Residents Outside the Boundary

Name	Address
University of Florida	Gainesville, FL 32611
Howard W. Bishop Middle School	1901 NE 9th Street, Gainesville, FL 32609
Gainesville High School	1900 NW 13th Street, Gainesville, FL 32609
Marjorie Kinnan Rawlings Elementary School	3500 NE 15th Street, Gainesville, FL 32609
Eastside High School	1201 SE 43rd Street, Gainesville, FL 32641
Alachua County of Schools	620 E University Avenue, Gainesville, FL 32601
W. A. Metcalfe Elementary School	1250 NE 18th Avenue, Gainesville, FL 32609
Abraham Lincoln Middle School	1001 SE 12th Street, Gainesville, FL 32641
P.K. Yonge Developmental Research School	1080 SW 11th Street, Gainesville, FL 32601
Lake Forest Elementary School	4401 SE 4th Avenue, Gainesville, FL 32641
Professional Academies Magnet at Loften	3000 E University Avenue, Gainesville, FL 32641
A. Quinn Jones School	1108 NW 7th Avenue, Gainesville, FL 32601
Step Foster Elementary School	3800 NW 6th Street, Gainesville, FL 32609
Fearnside Family Services Center	3600 NE 15th Street, Gainesville, FL 32609
J. J. Finley Elementary School	1912 NW 5th Avenue, Gainesville, FL 32603
Sidney Lanier Center	312 NW 16th Avenue, Gainesville, FL 32601
Joseph Williams Elementary School	1245 SE 7th Avenue, Gainesville, FL 32641
Horizon Center	2802 NE 8th Avenue, Gainesville, FL 32641
Gainesville Center for Reiki Training	315 NE 10th Street, Gainesville, FL 32601
Westwood Middle School	3215 NW 15th Avenue, Gainesville, FL 32605
C. W. Norton Elementary School	2200 NW 45th Avenue, Gainesville, FL 32605
Idylwild Elementary School	4601 SW 20th Terrace, Gainesville, FL 32608
Angels Christian Academy	1907 SE Hawthorne Road, Gainesville, FL 32641
Agribusiness and Adult Educational Center	Gainesville, FL 32641

Table B-8-3: Workplaces within Duval Heights Boundary

Name	Address
Walmart Supercenter	1800 NE 12th Avenue, Gainesville, FL 32641
Boost Mobile	2302 E University Avenue, Gainesville, FL 32641
Walgreens	1120 E University Avenue, Gainesville, FL 32641
O'Reilly Auto Parts	1208 E University Avenue, Gainesville, FL 32641
Advanced Auto Repair	1224 E University Avenue, Gainesville, FL 32641
Metro by T Mobile	9111318 E University Avenue, Gainesville, FL 326416 SW 51st Road #102, Gainesville, FL 32608
Dandy Liquor	1308 E University Avenue, Gainesville, FL 32641
Dandy Market	1314 E University Avenue, Gainesville, FL 32641
K Beauty Mart	1324 E University Avenue, Gainesville, FL 32641
Hook Fish and Chicken	1340 E University Avenue, Gainesville, FL 32641
Sunrise Food Mart	2300 E University Avenue, Gainesville, FL 32641
8th Avenue Food Store	1634 NE 8th Avenue, Gainesville, FL 32641
The China House	1512 NE 8th Avenue, Gainesville, FL 32641
J & K Machine Shop	937 NE Waldo Road, Gainesville, FL 32641
Gainesville Housing Authority	2626 E University Avenue, Gainesville, FL 32641
Trademark Metals Recycling	817 NE Waldo Road, Gainesville, FL 32641
Labor Finders Gainesville	1001 NE Waldo Road, Gainesville, FL 32641
Clarence R. Kelly Community Center	1701 NE 8th Avenue, Gainesville, FL 32641

Table B-8-4: Other Possible Workplaces for Duval Heights Residents Outside the Boundary

Name	Address
University of Florida	Gainesville, FL 32611
Dollar General	1080 NE 16th Avenue, Gainesville, FL 32601 2400 SE Hawthorne Road, Gainesville, FL 32641
McDonald's	1030 E University Avenue, Gainesville, FL 32601
ABC Supply Co. Inc	3330 NE Waldo Road, Gainesville, FL 32609
Santa Fe College	2683, 3737 NE 39th Avenue, Gainesville, FL 32609

Table B-8-5: Shopping Places within Duval Heights Boundary

Name	Address
Walmart Supercenter	1800 NE 12th Avenue, Gainesville, FL 32641
Boost Mobile	2302 E University Avenue, Gainesville, FL 32641
Walgreens	1120 E University Avenue, Gainesville, FL 32641
O'Reilly Auto Parts	1208 E University Avenue, Gainesville, FL 32641
Advanced Auto Repair	1224 E University Avenue, Gainesville, FL 32641
Metro by T Mobile	9111318 E University Avenue, Gainesville, FL 326416 SW 51st Road #102, Gainesville, FL 32608
Dandy Liquor	1308 E University Avenue, Gainesville, FL 32641
Dandy Market	1314 E University Avenue, Gainesville, FL 32641
K Beauty Mart	1324 E University Avenue, Gainesville, FL 32641
Hook Fish and Chicken	1340 E University Avenue, Gainesville, FL 32641
Sunrise Food Mart	2300 E University Avenue, Gainesville, FL 32641
8th Avenue Food Store	1634 NE 8th Avenue, Gainesville, FL 32641
The China House	1512 NE 8th Avenue, Gainesville, FL 32641
J & K Machine Shop	937 NE Waldo Road, Gainesville, FL 32641
Gainesville Housing Authority	2626 E University Avenue, Gainesville, FL 32641
Trademark Metals Recycling	817 NE Waldo Road, Gainesville, FL 32641
Labor Finders Gainesville	1001 NE Waldo Road, Gainesville, FL 32641
Clarence R. Kelly Community Center	1701 NE 8th Avenue, Gainesville, FL 32641

APPENDIX C: FOCUS GROUP GUIDE

Study introduction: "A team at the University of Florida, the City of Gainesville and city stakeholders are addressing key elements of infrastructure in order to serve city residents with services such as transportation equitably. This study will include a total of four focus groups from two Gainesville areas – two focus groups from Duval Heights and two focus groups from Haile Plantation. Each focus group will last approximately 90-minute each. The focus groups discussions will target the following topics: For individuals residing in Duval Heights or Haile Plantation, what are the experiences and perceptions for the following: 1) Current travel patterns, including typical destinations and modes of transportation; and 2) Barriers and/or facilitators associated with transportation availability, accessibility, affordability, acceptability, and/or adaptability? As a reminder, all personal information will be kept confidential. Participants will be compensated with a $50 Visa gift card for their participation in the focus group."

Focus Group Questions		**Question Evaluation**	
		Rephrase, explain, or add?	**Changes/Comments**
Introduction. "Thank you for agreeing to participate in this focus group about transportation. For the first set of questions, we want you to think about your experiences with transportation in your community." 1) First, we would like you to share your experience with the transportation system in Gainesville. (Allow each participant to share their story)		☐ Yes ☐ No	
Probes:	a. Are you satisfied with your transportation in Gainesville? If so, please explain why?	☐ Yes ☐ No	
	b. If you are not satisfied, what would you change to make your experiences with transportation different?	☐ Yes ☐ No	
	c. Do you feel safe when you travel? Please explain why or why not.	☐ Yes ☐ No	
	d. Please comment on your quality of customer service while using transportation.	☐ Yes ☐ No	

Focus Group Questions		Question Evaluation	
		Rephrase, explain, or add?	Changes/Comments
"For the next set of questions, we want you to think about your travel patterns." 2) We would like you to share your experience of how you plan your travel. (Allow each participant to share)		☐ Yes ☐No	
Probes:	a. How often do you travel?	☐ Yes ☐No	
	b. What destinations do you travel to and from?	☐ Yes ☐No	
	c. What destinations do you travel to during the day? At night?	☐ Yes ☐No	
	d. Where do you travel on weekdays?	☐ Yes ☐No	
	e. Where do you travel on weekends?	☐ Yes ☐No	
	f. Do you travel by yourself or with kids, seniors, and others? Please comment on who you typically travel with?	☐ Yes ☐No	
"Next, we would like to talk about the modes of transportation you use." 3) What modes of transportation do you typically use (e.g., bus, bike, rideshare)? (Allow each participant to share)		☐ Yes ☐No	
Probes:	a. Do you use a single mode of transportation or multiple modes in one trip? Please explain.	☐ Yes ☐No	
	b. If you use multiple modes of transportation in one trip, what combination of modes do you typically use?	☐ Yes ☐No	
	c. How do your travel options allow or restrict your participation in the community? For example, do you feel the transportation options available to you impact your choice of employment?	☐ Yes ☐No	
	d. Are your family and friends aware of the facilitators and/or barriers you experience with transportation?	☐ Yes ☐No	

APPENDIX D: SURVEY INSTRUMENTS

D.1 Duval Heights Area

Survey for Transportation Mobility Assessment and Recommendations for Smart City Planning
Please answer the following questions based on your habits **before the COVID-19 pandemic.**

TRAVEL PATTERNS

Note- *Ride hailing and ride sharing refers to services like Uber/Lyft, Uber pool etc.
**The RTS Microtransit (last mile-first mile service) is a free-of-charge transit service offered to East Gainesville residents. The riders can call RTS to schedule pick-ups from their residences for this service.

Q1. How frequently do you use the following modes of transportation?

	Daily	Several times a week	Once a week or less	Never
Personal car	○	○	○	○
Bike	○	○	○	○
Walk	○	○	○	○
Bus	○	○	○	○
***Ride sharing**	○	○	○	○
Bike	○	○	○	○
****Microtransit**	○	○	○	○

Q2. How much time **per day (during weekdays)** do you spend on average using the following modes of transportation?

	0- up to 30-min	30-mins up to 1-hr	1-hr up to 2-hr	More than 2 hour
Personal car	○	○	○	○
Bike	○	○	○	○
Walk	○	○	○	○
Bus	○	○	○	○
***Ridesharing**	○	○	○	○
Ride from friends or family	○	○	○	○
****Microtransit**	○	○	○	○

Q3. For what trip purposes are these transportation methods your **primary mode** of travel?

	Shopping	Work	School	Recreation	Medical appointments
Personal car	○	○	○	○	○
Bike	○	○	○	○	○
Walk	○	○	○	○	○
Bus	○	○	○	○	○
***Ride sharing**	○	○	○	○	○
Rides from friends or family	○	○	○	○	○
****Microtransit**	○	○	○	○	○

Q4. In your household do you have children who cannot drive to school?

- ○ No
- ○ Yes

If yes, how do they travel to and from school?

- ○ Public Transit
- ○ School Bus
- ○ Rides from friends or family
- ○ Walking / Biking
- ○ Uber / Lyft / Taxi

Q5. In your household do you have adults who cannot drive to medical appointments?

- ○ No
- ○ Yes

If yes, how do they travel to and from medical appointments?

- ○ Public Transit
- ○ Rides from friends or family
- ○ Carpooling
- ○ Walking / Biking
- ○ Uber / Lyft / Taxi

In the next sections we would like to ask you about Safety, Accessibility, Affordability and Acceptability of transportation options in your neighborhood.

Q6. How safe do you feel in your neighborhood when you ….

	Very safe	Safe	Neutral	Not safe	Very unsafe
Walk	○	○	○	○	○
Ride your bicycle	○	○	○	○	○
Drive	○	○	○	○	○
Use ride sharing	○	○	○	○	○
Travel at night (using any mode)	○	○	○	○	○

Q7. During the months of January and February 2020 (before COVID 19), which of the following factors prevented you from taking trips outside your home? (check all that apply)

- ○ Do not have convenient bus services in my area.
- ○ Do not know who to call for transportation assistance.
- ○ Do not feel safe when travelling outside my home.
- ○ Not comfortable driving/cannot drive.
- ○ Cannot afford to take the bus.
- ○ Do not have someone to drive me.
- ○ Cannot afford gas, parking, or insurance.
- ○ Cannot afford taxi and or private transportation.
- ○ Not familiar with transportation options in my area.
- ○ Other (please specify)

Q8. How satisfied are you with the following?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
The conditions of sidewalks in your neighborhood	○	○	○	○	○
Proximity of shopping options to your home	○	○	○	○	○

Q9. How satisfied are you with the following?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
Availability of different driving routes for your daily commute during peak hours	○	○	○	○	○
Availability of sidewalks in your neighborhood	○	○	○	○	○
Availability of bike paths in your neighborhood	○	○	○	○	○
Availability of different transportation modes for your daily commute	○	○	○	○	○

Q10. How affordable do you find the daily commuting cost of the following modes of transportation?

	Extremely affordable	Very affordable	Moderately affordable	Slightly affordable	Not affordable at all	Do not Know
Personal Car*	○	○	○	○	○	○
Bus	○	○	○	○	○	○
Ridesharing	○	○	○	○	○	○
Rides from friends or family	○	○	○	○	○	○

*Includes cost of insurance, parking, gas, and maintenance

Q11. Do you think society looks down on people who ride the bus?

- ○ Yes
- ○ No

Q12. Do you think your family/friends look down on people who ride the bus?

- ○ Yes
- ○ No

Q13. If you answered yes to either or both of the above questions, does this affect your choice of transportation?

- ○ Yes. Please explain _____
- ○ No

Q14. How satisfied are you with the following in your neighborhood?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied	Do not know
Microtransit service	○	○	○	○	○	○
The level of traffic congestion	○	○	○	○	○	○
Road quality (physical condition of the road)	○	○	○	○	○	○
Bike lane quality (physical condition of the bike lanes)	○	○	○	○	○	○

Q15. How has COVID19 affected your perspective on transportation choices?

	More Likely to use	No Change	Less likely to use
Driving	○	○	○
Biking	○	○	○
Walking	○	○	○
Bus	○	○	○
Ride sharing	○	○	○
Rides from friends or family	○	○	○
Microtransit	○	○	○

Q16. If cost was not an issue, how willing are you to____?

	Very willing	Somewhat willing	Neutral	Somewhat unwilling	Very unwilling	Do not know
Use a Self-driving car	○	○	○	○	○	○
Ride a Driverless Shuttle	○	○	○	○	○	○
Be a driver on the road with a self-driving vehicle	○	○	○	○	○	○
Be a pedestrian crossing the road with a self-driving vehicle	○	○	○	○	○	○

In this section we would like to ask questions about riding the bus.

Q17. Have you taken a trip on an RTS bus in the past 12 months?

- o Yes, answer the following section
- o No, please skip to **Q31**

Q18. How much does reduced transit service during weekends and holidays affect you?

- o A lot
- o Somewhat
- o Very little
- o Not at all

Q19. How do you obtain information about the RTS operations and services?

- o RTS website
- o Information at the bus stops
- o TransLoc rider App (*TransLoc app is a smart phone application that tracks the bus and helps you find the bus stops and bus routes)
- o Other sources _____
- o Do not know

Q20. What is the location of the bus stop nearest to your home (Name of the cross streets)?

- o _____

Q21. Which bus routes stop nearest to your home (provide the route number)?

- o _____

Q22. Which of the following RTS bus routes do you usually use? (Select all that apply)

- o 2 (Rosa Parks Transfer Station - NE Walmart Super-center)
- o 3 (Rosa Parks Transfer Station - N Main Post Office)
- o 7 (Downtown station-Eastwood Meadows)
- o 11 (Rosa Parks Transfer Station - Eastwood Meadows)
- o 26 (Rosa Parks Transfer Station - Airport)
- o 27 (Rosa Parks Transfer Station - NE Walmart Super-center)
- o 711 (Rosa Parks Transfer Station - Eastwood Meadows)
- o None of these

Q23. How many transfers do you make for a typical bus commute?

- o No transfers
- o 1
- o 2
- o 3

Q24. How do you normally pay for bus fare?

- o Student ID / Staff ID
- o Daily / monthly passes
- o Cash
- o Other _____

Q25**.** How many minutes of walking does it take to get to the nearest bus stop from your home?

- o 0- up to 3-minutes
- o 3- up to 5-minutes
- o 5- up to 10-minutes
- o 10- up to 20-minutes
- o More than 20-minutes

Q26. How safe do you feel in your neighborhood when you_?

	Very safe	Safe	Neutral	Not safe	Very unsafe
Wait at the bus stop	◯	◯	◯	◯	◯
Ride the bus	◯	◯	◯	◯	◯

Q27. How satisfied are you with the following options?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
Proximity of bus stop(s) to your home	◯	◯	◯	◯	◯
Elderly/disabled accommodation at bus stops	◯	◯	◯	◯	◯
Lighting at bus stops	◯	◯	◯	◯	◯
Shelter at bus stops	◯	◯	◯	◯	◯

Q28. How satisfied are you with the following options?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
Availability of direct bus routes to your desired destination	◯	◯	◯	◯	◯
Availability of information at bus stops	◯	◯	◯	◯	◯
Availability of buses on weekends and holidays	◯	◯	◯	◯	◯
Availability of bus transfers	◯	◯	◯	◯	◯
Frequency of buses	◯	◯	◯	◯	◯

Q29. How satisfied are you with the following?
(*TransLoc app is a smart phone app that tracks the bus and helps you find the bus stops and bus routes)

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
On-time arrival of buses	○	○	○	○	○
Courtesy of bus drivers	○	○	○	○	○
Driving behavior of bus drivers	○	○	○	○	○
Cleanliness of buses	○	○	○	○	○
Identifying your destination bus stops	○	○	○	○	○
Requesting for stop before your destination	○	○	○	○	○
Accuracy of *TransLoc app for RTS buses	○	○	○	○	○
User friendliness of TransLoc app	○	○	○	○	○

Q30. If you are elderly or have physical limitations, do you think the following modifications have been considered to meet your needs?

	Yes	No	Not applicable
Wheelchair accommodation in buses	○	○	○
Availability of several bus stops in one trip	○	○	○
Bus stops with ramps for easy boarding and alighting	○	○	○

MICROTRANSIT SERVICES

Q31. Have you taken a trip using the microtransit service in the past 12 months?

○ Yes ○ No ○ Do not know about this service

If you answered No or do not know to the question above, please skip to **Q37**.

Q32. How do you compare your experience of using regular RTS bus versus microtransit?

○ _____

Q33. How do you access the microtransit services?

- ○ Phone call
- ○ Walk up to the microbus
- ○ TransLoc rider app
- ○ Online Booking

Q34. To what final locations do you travel using microtransit services? (For example, Rosa Parks Center)

- ○ _____

Q35. If both the RTS bus and microtransit service are available which one would you choose?

- ○ Bus
- ○ Microtransit

Please explain your choice _____

Q36. Are there other issues you experience regarding transportation that are not captured in the survey?

- ○ No
- ○ Yes
  - ○ Please explain _____

DEMOGRAPHICS

Q37. With which gender do you identify?

○ Male ○ Female ○ Non-Binary ○ Prefer not to answer

Q38. What is your age range?

○ 18-29 ○ 30-39 ○ 40-49 ○ 50-59 ○ 60-69 ○ 70+

○ Prefer not to answer

Q39. Which of the following best describes your race/ethnicity? (Please mark all that apply)

- ○ White
- ○ Black or African American
- ○ American Indian or Alaska Native
- ○ Asian
- ○ Native Hawaiian or Other Pacific Islander
- ○ Hispanic or Latino
- ○ Other _____
- ○ Prefer not to answer

Q40. How many people live in your household? _____

Q41. What was your employment status in February 2020?

- o Employed, full time (40+ hours per week) with internet acc
- o Employed, part time (up to 39 hours per week)
- o Self-employed
- o Other (Please provide your answer
- o Unemployed
- o Student
- o Retired
- o

Q42. What is your total yearly household income?

- o Below $15,000
- o $15,000 up to $35,000
- o $35,000 up to $55, 000
- o $55,000 up to $85,000
- o Above $85,000

Q43. Which of the following do you own? (Select all that apply)

- o Smart device (phone/tablet) with internet access)
- o Driver's license
- o Personal Car
- o Motorcycle
- o Bicycle
- o Other

Q44. Does anyone in your household have any of the following impairments/disabilities that impact mobility? Please select all that apply.

- o Physical (e.g. Spinal cord injury, cerebral palsy, epilepsy, spina bifida, etc.)
- o Vision (blindness, vision that cannot be corrected by lenses)
- o Cognitive (e.g. autism, dementia, traumatic brain injury etc.)
- o Psychological (e.g., anxiety in social situations)
- o None of these

Thank you very much for your time and participation. Please seal the completed survey in the enclosed envelope and send it back to us at your earliest convenience.

D.2 Haile Plantation Area

Survey for Transportation Mobility Assessment and Recommendations for Smart City Planning
Please answer the following questions based on your habits **before the COVID-19 pandemic.**

TRAVEL PATTERNS

Note- *Ride hailing and ride sharing refers to services like Uber/Lyft, Uber pool etc.

Q1. How frequently do you use the following modes of transportation?

	Daily	Several times a week	Once a week or less	Never
Personal car	○	○	○	○
Bike	○	○	○	○
Walk	○	○	○	○
Bus	○	○	○	○
***Ride sharing**	○	○	○	○
Bike	○	○	○	○

Q2. How much time **per day (during weekdays)** do you spend on average using the following modes of transportation?

	0- up to 30-min	30-min up to 1-hr	1-hr up to 2-hr	More than 2 hr
Personal car	○	○	○	○
Bike	○	○	○	○
Walk	○	○	○	○
Bus	○	○	○	○
***Ridesharing**	○	○	○	○
Ride from friends or family	○	○	○	○

Q3. For what trip purposes are these transportation methods your **primary mode** of travel?

	Shopping	**Work**	**School**	**Recreation**	**Medical appointments**
Personal car	○	○	○	○	○
Bike	○	○	○	○	○
Walk	○	○	○	○	○
Bus	○	○	○	○	○
***Ride sharing**	○	○	○	○	○
Rides from friends or family	○	○	○	○	○

Q4. In your household do you have children who cannot drive to school?

- ○ No
- ○ Yes

If yes, how do they travel to and from school?

- ○ Public Transit
- ○ School Bus
- ○ Rides from friends or family
- ○ Walking / Biking
- ○ Uber / Lyft / Taxi

Q5. In your household do you have adults who cannot drive to medical appointments?

- ○ No
- ○ Yes

If yes, how do they travel to and from medical appointments?

- ○ Public Transit
- ○ Rides from friends or family
- ○ Carpooling
- ○ Walking / Biking
- ○ Uber / Lyft / Taxi

In the next sections we would like to ask you about Safety, Accessibility, Affordability and Acceptability of transportation options in your neighborhood.

Q6. How safe do you feel in your neighborhood when you ….

	Very safe	Safe	Neutral	Not safe	Very unsafe
Walk	○	○	○	○	○
Ride your bicycle	○	○	○	○	○
Drive	○	○	○	○	○
Use ride sharing	○	○	○	○	○
Travel at night (using any mode)	○	○	○	○	○

Q7. During the months of January and February 2020 (before COVID 19), which of the following factors prevented you from taking trips outside your home? (check all that apply)

- ○ Do not have convenient bus services in my area.
- ○ Do not know who to call for transportation assistance.
- ○ Do not feel safe when travelling outside my home.
- ○ Not comfortable driving/cannot drive.
- ○ Cannot afford to take the bus.
- ○ Do not have someone to drive me.
- ○ Cannot afford gas, parking, or insurance.
- ○ Cannot afford taxi and or private transportation.
- ○ Not familiar with transportation options in my area.
- ○ Other (please specify)

Q8. How satisfied are you with the following?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
The conditions of sidewalks in your neighborhood	○	○	○	○	○
Proximity of shopping options to your home	○	○	○	○	○

Q9. How satisfied are you with the following?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
Availability of different driving routes for your daily commute during peak hours	○	○	○	○	○
Availability of sidewalks in your neighborhood	○	○	○	○	○
Availability of bike paths in your neighborhood	○	○	○	○	○
Availability of different transportation modes for your daily commute	○	○	○	○	○

Q10. How affordable do you find the daily commuting cost of the following modes of transportation?

	Extremely affordable	Very affordable	Moderately affordable	Slightly affordable	Not affordable at all	Do not Know
Personal Car*	○	○	○	○	○	○
Bus	○	○	○	○	○	○
Ridesharing	○	○	○	○	○	○
Rides from friends or family	○	○	○	○	○	○

*Includes cost of insurance, parking, gas, and maintenance

Q11. Do you think society looks down on people who ride the bus?

- ○ Yes
- ○ No

Q12. Do you think your family/friends look down on people who ride the bus?

- ○ Yes
- ○ No

Q13. If you answered yes to either or both of the above questions, does this affect your choice of transportation?

- ○ Yes. Please explain _____
- ○ No

Q14. How satisfied are you with the following in your neighborhood?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
The level of traffic congestion	○	○	○	○	○
Road quality (physical condition of the road)	○	○	○	○	○
Bike lane quality (physical condition of the bike lanes)	○	○	○	○	○

Q15. How has COVID19 affected your perspective on transportation choices?

	More Likely to use	No Change	Less likely to use
Driving	○	○	○
Biking	○	○	○
Walking	○	○	○
Bus	○	○	○
Ride sharing	○	○	○
Rides from friends or family	○	○	○

Q16. If cost was not an issue, how willing are you to____?

	Very willing	Somewhat willing	Neutral	Somewhat unwilling	Very unwilling	Do not know
Use a Self-driving car	○	○	○	○	○	○
Ride a Driverless Shuttle	○	○	○	○	○	○
Be a driver on the road with a self-driving vehicle	○	○	○	○	○	○
Be a pedestrian crossing the road with a self-driving vehicle	○	○	○	○	○	○

In this section we would like to ask questions about riding the bus.

Q17. Have you taken a trip on an RTS bus in the past 12 months?

- o Yes, answer the following section
- o No, please skip to **Q31**

Q18. How much does reduced transit service during weekends and holidays affect you?

- o A lot
- o Somewhat
- o Very little
- o Not at all

Q19. How do you obtain information about the RTS operations and services?

- o RTS website
- o Information at the bus stops
- o TransLoc rider App (*TransLoc app is a smart phone application that tracks the bus and helps you find the bus stops and bus routes)
- o Other sources _____
- o Do not know

Q20. What is the location of the bus stop nearest to your home (Name of the cross streets)?

- o _____

Q21. Which bus routes stop nearest to your home (provide the route number)?

- o _____

Q22. Which of the following RTS bus routes do you usually use? (Select all that apply)

- o 150 (University of Florida Reitz Union - Haile Plantation)
- o 75 (Oaks Mall - Butler Plaza Transfer Station)
- o 76 (Santa Fe College - Haile Market Square)

Q23. How many transfers do you make for a typical bus commute?

- o No transfers
- o 1
- o 2
- o 3

Q24. How do you normally pay for bus fare?

- o Student ID / Staff ID
- o Daily / monthly passes
- o Cash
- o Other _____

Q25**.** How many minutes of walking does it take to get to the nearest bus stop from your home?

- o 0- up to 3-minutes
- o 10- up to 20-minutes
- o 3- up to 5-minutes
- o More than 20-minutes
- o 5- up to 10-minutes

Q26. How safe do you feel in your neighborhood when you_?

	Very safe	Safe	Neutral	Not safe	Very unsafe
Wait at the bus stop	○	○	○	○	○
Ride the bus	○	○	○	○	○

Q27. How satisfied are you with the following options?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
Proximity of bus stop(s) to your home	○	○	○	○	○
Elderly/disabled accommodation at bus stops	○	○	○	○	○
Lighting at bus stops	○	○	○	○	○
Shelter at bus stops	○	○	○	○	○

Q28. How satisfied are you with the following options?

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
Availability of direct bus routes to your desired destination	○	○	○	○	○
Availability of information at bus stops	○	○	○	○	○
Availability of buses on weekends and holidays	○	○	○	○	○
Availability of bus transfers	○	○	○	○	○
Frequency of buses	○	○	○	○	○

Q29. How satisfied are you with the following?
(*TransLoc app is a smart phone app that tracks the bus and helps you find the bus stops and bus routes)

	Extremely satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Extremely dissatisfied
On-time arrival of buses	○	○	○	○	○
Courtesy of bus drivers	○	○	○	○	○
Driving behavior of bus drivers	○	○	○	○	○
Cleanliness of buses	○	○	○	○	○
Identifying your destination bus stops	○	○	○	○	○
Requesting for stop before your destination	○	○	○	○	○
Accuracy of *TransLoc app for RTS buses	○	○	○	○	○
User friendliness of TransLoc app	○	○	○	○	○

Q30. If you are elderly or have physical limitations, do you think the following modifications have been considered to meet your needs?

	Yes	No	Not applicable
Wheelchair accommodation in buses	○	○	○
Availability of several bus stops in one trip	○	○	○
Bus stops with ramps for easy boarding and alighting	○	○	○

DEMOGRAPHICS

Q31. With which gender do you identify?

○ Male ○ Female ○ Non-Binary ○ Prefer not to answer

Q32. What is your age range?

○ 18-29 ○ 30-39 ○ 40-49 ○ 50-59 ○ 60-69 ○ 70+

○ Prefer not to answer

Q33. Which of the following best describes your race/ethnicity? (Please mark all that apply)

- o White
- o Black or African American
- o American Indian or Alaska Native
- o Asian
- o Native Hawaiian or Other Pacific Islander
- o Hispanic or Latino
- o Other _____
- o Prefer not to answer

Q34. How many people live in your household? _____

Q35. What was your employment status in February 2020?

- o Employed, full time (40+ hours per week) with internet access
- o Employed, part time (up to 39 hours per week)
- o Self-employed
- o Other (Please provide your answer _____
- o Unemployed
- o Student
- o Retired

Q36. What is your total yearly household income?

- o Below $15,000
- o $15,000 up to $35,000
- o $35,000 up to $55, 000
- o $55,000 up to $85,000
- o Above $85,000

Q37. Which of the following do you own? (Select all that apply)

- o Smart device (phone/tablet) with internet access
- o Driver's license
- o Personal Car
- o Motorcycle
- o Bicycle
- o Other

Q38. Does anyone in your household have any of the following impairments/disabilities that impact mobility? Please select all that apply.

- o Physical (e.g. Spinal cord injury, cerebral palsy, epilepsy, spina bifida, etc.)
- o Vision (blindness, vision that cannot be corrected by lenses)
- o Cognitive (e.g. autism, dementia, traumatic brain injury etc.)
- o Psychological (e.g., anxiety in social situations)
- o None of these

Thank you very much for your time and participation. Please seal the completed survey in the enclosed envelope and send it back to us at your earliest convenience.