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Brian Vaughn

April 27, 2018

Prologue

Bench

a poem by Aisling Henihan

From this bench, I hold the whole city
in my head, inventing little stories
which could be true: trials and triumphs
of young mothers and old men, made possible

only by the never-knowing—what they hide
in their handbags or their hurrying,
what lurks in the crooked stoop of their gait,
who they love and what they've lost, who they'll be

tomorrow, when I see them again, new
now with aging dogs and sudden friends,
now with fresh freckles and laugh lines ever-
deepening, turning with the seasons, and

never thinking twice about my bench,
this anchor from my world to every world
they might have lived, other lives, other days,
each day closer and each day new, again, for me.

Introduction

An automobile-oriented urban form defines Southern cities of the United States today. Although some cities in the South constructed rail transit systems in the late 20th and early 21st centuries, the legacy of planning for highways and the prioritization of moving cars from suburbs to urban cores via highways has left a definitive mark on the built environment. This development pattern created cities with outsized carbon footprints, disjointed land use that is hostile to pedestrians and transit systems, to a significant extent, used only by people with no other means of transportation. Furthermore, highway building and suburbanization, along with urban renewal, have resulted in the decay or outright destruction of many neighborhoods of color and enforced a system of residential segregation that prevents upward economic mobility. Nevertheless, rail transit stations are nodes of urban activity in Southern cities. This thesis seeks to address the quality of public life around rail transit station in two metropolitan areas of the American South—Atlanta, Georgia and Charlotte, North Carolina.

In this study, I seek to answer the following research question: what is the quality of public life experienced in rail transit stations in the American South? To provide background to this question, I will consider the historical context of segregation and racial discrimination in these cities, and will investigate how history influences the perception of transit today. I will also consider the benefits of rail transit systems to create a more sustainable, low-emissions transportation system. I will also discuss how other regions of the United States and cities around the world have successfully developed them.

First, I will review the history and significance of the public life study as a method of urban design research. I will then provide background. I will contextualize the history of discrimination and oppression of African Americans with respect to public transportation, and describe the link between modern planning decisions and the American South's history of racial discrimination. I will review literature that links rail transit to land use and habitat conservation, avoided greenhouse gas emissions, benefits to pollution and public health, opportunities to create transit oriented development, and creating people-centric places. Next, I will describe my method for selecting which stations to conduct a public life study. I will then review the results of the public life studies I conducted, assessing each space's performance using Gehl's 12-criteria public space qualities checklist (Gehl & Svarre, 2013, p. 106-107). Finally, I will review my findings and conclude that the quality of public life in rail transit stations is severely limited. In a discussion section, I will review what makes these stations score poorly in a criteria checklist, and will discuss the limitations of studying public life as a researcher confronting both racial identity and applying this method to privately owned public space. I will finish with a brief set of recommendations to public space and transit stakeholders.

The Public Life Study: a Method of Urban Design Research

Very simply, public life is the optional and social activities an urban dweller in spaces performs between private buildings (Gehl & Svarre, 2013, p. 2). Public life takes place on sidewalks, in outdoor cafes, plazas, campuses, pedestrian bridges, and importantly for this research, in and around transit stations. Public life requires only two things: space and people. The activities that create the experience of public life follow from the qualities of the built environment.

Because humans have created the built environment for their societies for thousands of years, one would expect that the conventional approaches of architects, city planners, and other shapers of the public realm would be significantly involved with shaping spaces for people. Indeed, the professions of

the built environment have long been concerned with making spaces that accommodate the many needs of human beings. Contemporarily, this includes designing buildings that use only as much energy as they consume, limiting or increasing access to a public plaza to decrease crime, and making automobile transportation more efficient by creating a road network with volume hierarchy.

But the professions of the built environment focused so intensely on the questions of efficiency and sustainability that the human experience of the built environment has gone largely unconsidered. Take, for example, this bus loading area at a light rail station in Charlotte, North Carolina. A team of civil engineers and architects designed it to streamline the efficient movement of buses to pick up and drop

Figure 1.1 The bus bay at Archdale Station in Charlotte, NC.

off passengers, using angled parking and a bus-specific light at the intersection. A transportation planner likely conducted a study that found there was a demand for transit along the corridor that the planned light rail corridor could not serve, and directed the light rail project team to construct this transfer stop.

Consider how this space fails to address the needs of a human user. There is only a single shelter to seek refuge from a rainstorm or sunny day. A blank wall means there is little to look at or be distracted by while waiting for the bus. If your destination is across the street to the left, you must go to the designated crosswalk to cross legally. From this space, it is impossible to know when a light rail vehicle you would like to transfer to is departing from the platform above. In this paper, I will demonstrate how this space and three transit station areas in the American South fail to put the human experience of urban space above other, more functionalistic considerations. To understand how engineers, architects, and planners create such user-inconsiderate spaces, we must first consider the historical context of the public life study, and how it arose as a reaction to the Modernist Movement of city planning.

Modernism Supplants Urbanism

In the Early 20th century, cities were facing a crisis. Overcrowding and poor sanitation were rampant problems, and by many accounts, living in these places was a dirty, miserable experience for the common person (Taylor 2009).[1] As a reaction to this problem, a group of self-proclaimed urban idealists

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[1] Taylor's historical review of Chicago and New York found them incredibly filthy and overcrowded places to live. In 1891's Chicago, typhoid killed 178 of every 100,000 residents, a death rate about three 3 times greater than the drug overdose death rate from opioids in West Virginia in 2016 [52 per 100,000 deaths] (2009, p. 204; Centers for Disease Control and Prevention, 2018). By 1900, the Lower East Side of Manhattan in New York City had a

formed in Western Europe in the 1920s. They called themselves Congrès Internationaux d'Architecture Moderne (The International Congress of Modern Architecture, CIAM), and they were a group of visionary architects and urban planners. They believed that by thoroughly studying of cities and regions scientifically, they could propose improvements to transportation, housing, and recreation that would put the public welfare first, and private interests second (Mumford 1992, p. 392).

The functionalist mindset of the modernists led them to believe that architecture's scope extended from the minute of interior design to planning and designing for the regional scale (Gold 1998, p. 229). Using functionalism as a lens, CIAM thinkers understood that a city is reducible to the four functions it serves to society: dwelling, recreation, work, and transportation (Congress Internationaux d'Architecture Moderne, 1933). Within these categories, the Modernists recommended improvements for the physical form of the city: adequate and reasonable densities, spaces for recreation, separation of work and residences, hierarchical and grade separated transportation networks. None of their recommendations mentioned the basic human experience of public space.

Many city builders, in nearly every continent, were so taken with this idea that it became an encompassing approach to making cities. Land uses were separated so it was impossible to operate a business in residential areas, for example. Roadway networks were built in a hierarchical nature, connecting calm residential streets to interurban highways via arterial road networks [citations needed]. Architect Le Corbusier's "Towers in a Park" became a popular approach to housing massive quantities of people, lacking a consideration for the necessities of contact in urban life (2016, p.384). The Interstate Highway Act enabled highway building on an unprecedented scale in the United States, spreading a once dense urban population across newly constructed, use-segregated suburbs, where every residence had a front lawn and a driveway yet lacked the social connections of the urban neighborhood (Hayden, 2003, p. 128-153).
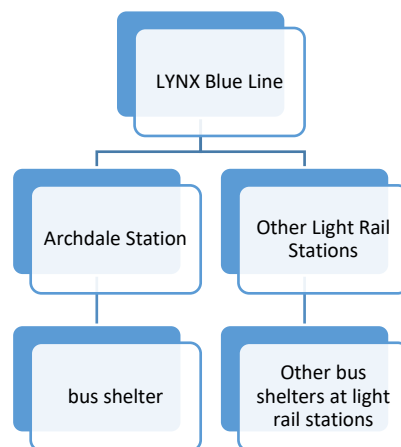
Figure 1.2. The bus stop as tree.

What modernists did not realize, or chose to ignore, is that people and the communities they form make cities. Transportation, housing, open space, and places of work are not individually conceived of or experienced, rather, they are dependent on the social networks and the complex and diverse

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population density of 300,000 per square mile (Taylor 2009, p. 208). For reference, an average density of 60,000 people per km^2 live in Nairobi's slums as of 2017 (Bird et. al 2017).

interactions of people in space. The Modernist perspective thought of cities as a tree, conceiving objects and experiences as parts of a whole, but otherwise unrelated to a greater structure (Alexander, 2013). Take, for example, the Archdale station bus shelter, considered as a tree.

Tree based thinking leads us to consider the Archdale Station bus shelter as a single element of a larger transportation network, which are categorized based on their relationship only to other elements of the transportation network. But this is not how people experience urban spaces. Christopher Alexander describes the city as having many units, connected to many other units. "The different units of the city do not coincide. Yet neither are they disjoint. They overlap." (2013) Consider, as an example, a semi-lattice of the urban experience of a Charlotte resident using the bus shelter (Figure 1.3) . A functionalist view of a transit stop does not consider other possibilities that might happen in this space, such as meeting, vending, eating, or performing.
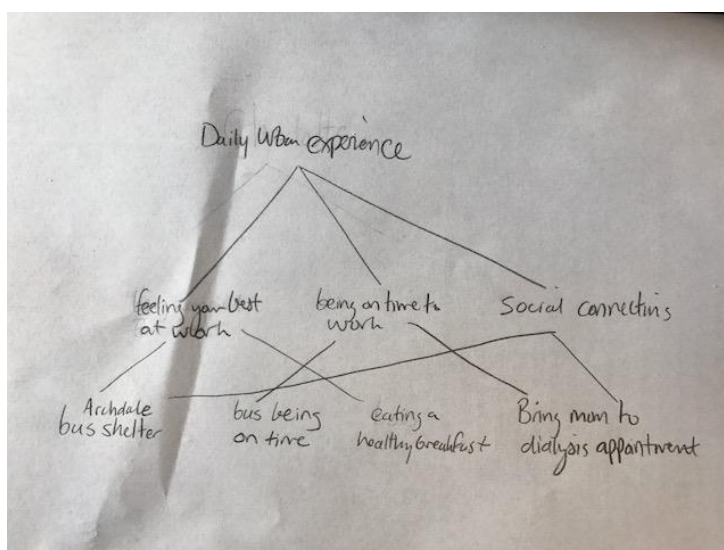
Figure 1.3. The bus stop as part of a complex semi-lattice of urban experience.

Modernism's Built Result

Although modernists sought to alleviate the crises cities were facing, the movement's regimented and segregated understanding of urban life, coupled with a revolution in transportation technology, had a stultifying and decentralizing effect on cities. Between 1900 and 1930, automobile registrations increased from 8,000 to 22 million in the United States (Brown et al 2009, 32). Distances, in terms of time, shrunk considerably. Commuters, especially the growing white middle class, were suddenly able to live in a society that effectively segregated home life from work from leisure.

Baum-Snow (2007) found that while population growth in metropolitan areas was 72 percent between 1950 and 1990, central cities experienced a 17 percent decline in population (p. 775). He estimated that had the Interstate Highway System not been built, the population of center city areas would have instead increased by eight percent (p. 776). Suburbanization and the upending of urban life, as Jane Jacob's calls it, "the sacking of cities" was not merely enabled by the car or by zoning alone, but by a total conception of the city as an efficient machine (1993).

The Counter Revolution to Modernism

The suburbanization of cities, and the Modernist-Functionalist approach to solving their problems, was deeply troubling to a set of counter-revolutionaries in the Mid-Twentieth Century. These urbanists viewed cities through the conception of Alexander's semi-lattice, inviting the complexity and interrelation of experience and space into their arguments for a city that was not a machine, but rather a collection of human experiences intersecting with a built form. Among these counterrevolutionaries were two New York journalists, MIT and Harvard-trained planners, and a Danish architect.

In 1961, Jane Jacobs published The Death and Life of American Cities, largely considered to be a foundational to the ideology from which public life studies developed (Gehl 2013, p. 50). Jacobs' principal argument against modernist city planning was its lack of consideration for human experience, and an overreliance on pseudoscientific research. She compared contemporary planning to bloodletting, and claimed it to "have arisen on a foundation of nonsense." (1993, p. 18) She argued instead that cities should be understood from a human perspective, that city people seek the company of strangers, and that a mix of land uses is essential to successful places (ibid, p. 34, 188).

Her mentor, William Whyte, was also a New York City journalist, and conducted one of the first direct observations of public life in any American city after winning a grant (1980). His team studied 16 plazas, three small parks, "and a number of odds and ends" to draw a series of conclusions about the built environment's influence on public life.

During the same period, the academy was developing research methods to understand the human perception of the city. At the Massachusetts Institute of Technology, Kevin Lynch developed a project that sought to understand how people recognize and categorize the visual image of the cities they live in. Though his research was not explicitly public life study, as he did not physically observe and record human behavior in space, his concern for the expansion of what he called a new functional unit, meaning the metropolitan region, is in line with contemporary concern that cities' physical expansion would be deleterious to the quality of urban life (Lynch 1960). At The University of California-Berkeley, Christopher Alexander argued that considering cities as trees sought only to trade the richness of city living with conceptual simplicity that was self-serving only to the professions of the built environment (2013, p. 166). He later developed *A Pattern Language*, which described that no element in built environment could be built in isolation, but that it had to fit into the context surrounding it (1977, p. xiii). Alexander's discussion of positive outdoor space, cars as a transportation technology, and parking are immediately relevant to public life research. With Alexander as the nexus at Berkeley, Marcus, Appleyard, Bosselmann, and Allan Jacobs developed public life studies as a field of academic research (Gehl 2013, p. 53-59).

Lastly, Danish architect Jan Gehl's academic and professional work established the lasting influence of the public life study as an academic endeavor, as a strategic tool to influence the creation of new spaces for people, and the mainstreaming of these approaches to understanding the built environment. In *Life Between Buildings*, Gehl established a framework for carrying out formal public life studies (2006). He advocated for categorizing activities as necessary, optional, or social, watching and observing spaces at different times of the day, and quantifying human behavior, whether by counting the number of pedestrians in a space, or by other means. Gehl argued that the two major developments in city development were the Renaissance and the rise of functionalism. In the Renaissance, the city had evolved from being an organic collection of building to something that a single entity or regime could

rationally plan and construct (ibid, p. 42-43). Functionalism was merely an extension of this movement, taken to the extreme. "If a team of planners at any time had been given the task of doing what they could to reduce life between buildings, they hardly could have achieved more thoroughly what has inadvertently been done in the sprawling suburban areas, as well as in numerous functionalistic redevelopment schemes."(p. 48).

Public Life Studies and their meaning today

The development of the public life study has progressed and been established in both the academy and professional practice. In 2001, Jan Gehl founded Gehl Studios, an architecture firm with a commitment to making places for people (Gehl 2013, p. 62). Public life studies today are characterized by their analytical approach, paired with writing that is more widely accessible than academic literature (p. 63). They also consider larger urban trends, such as for sustainability and the prioritization of space and energy efficient, non-motorized transportation modes.

Race, Space, and Transit in the South

In researching the historical roots of low transit ridership in the American South, I found it crucial to discuss the pattern of settlement, segregation, and attitude towards transit as it relates to race. In order to explain the public life study as a research method, I must explain the racial component of transit use and, by extension, the physical spaces transit exists in. That being said South and its cities are not the only places in the United States, or across the world, where transit use is associated with poor people of color.

Nevertheless, people of color overwhelmingly use transit in the South. A 2010 survey conducted onboard regional transit systems in Atlanta found that 70.8 percent of transit riders identify as African American (Atlanta Regional Commission, 2010, p.32). The same year, the Census recorded that the African American, Hispanic, and bi-racial population made up 34.81 percent of the Atlanta Metropolitan Statistical Area's population (Social Explorer, 2010). Why does the racial distribution of transit ridership not reflect these regions' racial populations, and why does this pattern repeat itself in Charlotte[2]?

Origins: Jim Crow and the Segregation of Public Transportation

It is impossible to consider the contemporary American South without first acknowledging the history of racial discrimination that manifested in many forms. When the Confederacy was defeated in 1865, Southern states began to enact discriminatory laws barring Blacks from fully and equally accessing transportation services provided by private railroads and steamships (Barnes, 1983, p. 2). In states across the South, Blacks successfully opposed these "separate but equal" affordances, winning court cases, benefitting from state laws prohibiting discrimination in transportation, and advancing a federal Civil Rights Act in 1875. But in some states in the Deep South did not enforce Federal law effectively, and as a result, Jim Crow practices persisted (Ibid, p. 3-4).

Early progress was soon erased by a series of Supreme Court decisions, the most notable being Plessy v. Ferguson in 1896. In this case, the Court ruled there was nothing unconstitutional in segregating races in railway facilities, setting a precedent for Jim Crow segregation laws that would legalize the segregation

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[2] 75 percent of Charlotte Area Transit System ridership identified as "minority" in a 2011 survey, though Charlotte has a 25.42% Black or bi-racial population, and only 9.13 of its residents are Hispanic or Latino (City of Charlotte, 2016, p. 10; Social Explorer 2010).

of many public and private facilities in the South for another half-century. Between 1891 and 1906 in cities across the South, Blacks mounted unsuccessful boycotts of segregated streetcars, (Ibid, p.9-10). It would take another 50 years for such a boycott to be successful.

In Atlanta, a pattern of racial violence on transit emerged as an alarming sign that the rights of black transit users were consistently violated or ignored. By the mid-1940s, transit operators harshly enforced a racial code forcing blacks to sit in the back of streetcars and buses. On one occasion, a streetcar operator beat a Black man over the head with a pipe. On two separate occasions in 1946, a conductor shot a Black person, and faced absolutely no retribution from the municipal court (Kruse, 2005, p. 108-110)

As progress on challenging these discriminatory laws lagged, a trend to abandon public transit emerged. Southern Blacks generally earned lower incomes, and tended to be more dependent on transit than whites. According to one anecdote, for a car-owning Black Southerner of means, claiming you had never experienced the humiliation of riding in a segregated streetcar or bus was a source of great pride (Barnes 1983, p. 18).

Explicit and Implicit Zoning, and Freeways as Racial Barriers

As Black population in Atlanta tripled from roughly 30,000 in 1890 to about 90,000 by 1930, the government sanctioned discrimination in housing and efforts to create racialized "boundaries" also became prominent. Atlanta's zoning regime overcame the spirit of a 1917 Supreme Court decision that ruled explicit segregation ordinances unconstitutional. The city zoned districts based on land use, building types, and tenant categories with the implicit intention to racially segregate neighborhoods and created physical buffers between them (Bayor, 1988, p. 2).

Atlanta also used the planning of federally-funded highways as a tactic to clear slums and Black neighborhoods near downtown in the name of "economic revitalization" (Ibid, p. 5). It is no mistake that planners separated the Sweet Auburn neighborhood, Martin Luther King Jr.'s birthplace, from downtown with the I-75/85 freeway. Many Southern urban neighborhoods faced this fate in the mid-20th century. In Atlanta, planners in the 1910s-30s created unrealized proposals for grand urban boulevards that separated white and Black residential areas, creating what was referred to as a "boundary line for Negro expansion" that would 'protect' previously white West Atlanta neighborhoods (Kruse 2005, p. 42-104). This normalized the idea that when Atlanta eventually build highways with federal funds, they could be built as a racial boundary. The head of the Metropolitan Planning Commission in the 1950s believed that stabilizing the racial boundary with a highway could allay the strained political and racial attitudes of an increasingly bi-racial city (Bayor 1988, p. 9).

A similar process occurred in Charlotte. As early as 1912, white city officials had identified the downtown-proximate Black neighborhood of Brooklyn as a prime opportunity for renewal. "This section, because of its proximity to the center city, must sooner or later be utilized by the white population," a report read (Hanchett 1998, p. 249). In the 1940s, some of the first actions taken by the newly appointed Planning Commission included designating the mostly white, wealthy suburban neighborhoods as single-family residential zones, while upzoning non-white areas to either industrial or "residence 2" designations. The all-white Commission also up-zoned black neighborhoods in the First, Second, and Third Wards (Ibid, p. 246-247).

Simultaneously, the city had successfully applied for planning assistance for a federally-funded urban highway. As planned, and later constructed, Independence Boulevard bisected the black Brooklyn and Cherry neighborhoods as it left downtown, while avoiding white Myers Park. The City Council's decision to approve the route was made not in a public meeting, but instead at a private dinner at the Myers Park Country Club (Ibid., p. 238-241). These decisions paved the way for even more highway construction that encouraged the flight of wealthy whites from urban neighborhoods, making traditional streetcar infrastructure obsolete.

With the mobility to the Southern city center by car achieved with the development of the urban freeway, a new trend was enabled that allowed and even encouraged whites to leave places that would soon be integrated thanks to the Supreme Court's decision in Brown v. Board of Education. The effect would leave drastic effect on the racial consistency of Southern cities, and the quality of transit that served its citizens.

The White Abandonment of Public Space and Transit

"We'll take every bus to the barn, if necessary."-
Rev. William Holmes Borders, organizer of desegregation of Atlanta's buses (quoted in Kruse, 2005, p. 113)

Blacks continued to win battle after battle in desegregating public space. But the effect was not racial harmony. In the case of Atlanta's newly de facto desegregated golf courses, parks, the outcome was instead a collective fleeing from these spaces by the white population (Kruse 105-130). For transit, this meant individual companies began to serve only white populations in outlying areas. Transit companies denied service to neighborhoods that transitioned from white to black for years (ibid, p. 111). The threatened challenge to Atlanta bus segregation in 1957 was enough to make white ridership plummet. It decreased seven percent by May, and 13 percent by November (ibid).

At the same time, federal aid to homebuyers in the form of Federal Housing Administration and Veterans Affairs loans enabled the purchase of new homes by those of the "same social and racial classes", de facto meaning whites only. By 1962, Charlotte had 15,000 VA mortgages, and large scale suburban builders in Charlotte constructed 150-250 lot neighborhoods. A radial pattern of race and income emerged, and streetcar companies that had once linked urban cores to urban neighborhoods began to go bankrupt. Even African Americans sought the prosperity promised in suburban residences, especially with the construction of West Charlotte High School (Hanchett 1998, p. 232-236).

Resistance, Abandonment and Flight

It Atlanta, whites put up a fight against what they viewed as an invasion of Blacks into their neighborhood. They petitioned for the closing of a neighborhood pool when it was legally integrated (Kruse, p. 124). Park officials and police denied enforcing segregation by law, and claimed separation was instead by "custom and practice" (p. 122). White residents believed that their tax burden paid for Blacks to have access to spaces paid for by "whites" (p, 126-127) That myth persisted into the era in which MARTA was founded. It is the only transit system in the United States that does not receive funding from its state government (Arbinder, 2014). Between 1962 and 1963, two bond referenda for municipal service improvements and a new civic center for recently integrated Piedmont Park fail miserably after "vote against bond" campaigns (Kruse 2005, p. 128-129)

All of these signs of resistance were harbingers for whites leaving Atlanta for northern suburbs, where they could use amenities such as golf courses, parks, and pools privately. When suburbanization had defined White settlement of the Atlanta metro area, suburban county governments campaigned against the expansion of MARTA to their municipalities (ibid, p. 248-250). With this wave of white flight—settlement of wealthy population in the suburbs—cities across the United States experienced what Banerjee described as the "decline of the public realm" and the subsequent "privatization of public life" (2001, p. 11-12). Concurrently, the wealthy and growing middle class abandoned the use of spaces such as public parks and transit stations in favor of more privatized options in their suburban communities, such as shopping malls and "urban" shopping districts monitored by private security guards and closed-circuit televisions. The outcome is a public realm that is feared, used only out of absolutely necessity, and policed so heavily that it is expected to be a dangerous place.

A Cultural Disposition Towards Public Life

Though the South has experienced a significant cultural shift towards creating private spaces and abandoning the public sphere, the public realm has a rich cultural and sociological history in the South. This is especially true in the liminal realm of the front porch, a place deeply rooted in the historical tradition of public life. In a review of a book titled *Swinging in Place: Porch Life in Southern Culture* by Donlon, Barnhart finds a comprehensive exploration of the porch and its function as a host to public life, though she employs a different vernacular to describe it (2005). The porch is used for a variety of functions. It is a place of "'socializing and relaxation' after a day of working away from home in the public sphere" and it hosts the public functions and interactions with life one the street, while the back porch is instead used for more private and familial purposes (ibid, p.246). Indeed, Gehl devotes a section of his chapter on methodological implementation of public life studies to "The Importance of Front Yards: Studying the connection between the design of residential streets and the extent and character of activities"(Gehl & Svarre 2013, p 98-100). He easily could have employed the method in Charlotte or Atlanta, though he chose Melbourne, Australia. The urban phenomenon of the front porch is also explored in the literature of African American writers, namely Zora Neale Hurston. After moving to Harlem and experiencing the culture of the urbanized Northern city, she explored her childhood experience in her native Eatonville, which she chronicled in *Their Eyes Were Watching God.* The novel notably begins on a front porch (Lenz 1981).

Historically, the experience of public life was not limited to front porches. Photographic evidence arguably documents optional and social activities in Southern train stations. In Figure 1.4, perhaps 100 people mill about, converse, and otherwise spend optional and social time outside the Davidson Train Depot in North Carolina. Figure 1.5 shows an equally bustling scene outside of Terminal Station in Atlanta, which was razed in 1972.

Figure 1.4. The Davidson Train Depot as photographed in 1912 (Howard).

Figure 1.5. Terminal Station in Atlanta in 1912 (Atlanta History Photograph Collection).

Contemporary Population Distribution

Appendix A visually describes the racial distribution of Atlanta and Charlotte populations. In every city, there is a pronounced pattern of racial segregation.

Sustainability and Rail Transit

Any broad discussion about the nature of urban space in the American South would be remiss to exclude an analysis of the environmental consequences of the effects of sprawl. In their comprehensive record of sprawl, which they synthesize from Richard Ewing's definition, Gillham and Maclean (2002) define sprawl with a primary definition:

> …a form of urbanization distinguished by leapfrog patterns of development, commercial strips, low density, separated land uses, automobile dominance, and a minimum of public open space.

And a secondary definition:

> Sprawl (whether characterized as urban or suburban) is the typical form of most types of late-twentieth century suburban development. (p. 8)

Gillham and Maclean are intent on providing a comprehensive review of the effects of a sprawled land use pattern in the United States. They categorize environmental effects into three categories: land and habitat, transportation and energy, & pollution and public health (p. 83-122). I intend to use these categories to describe the environmental effects of sprawl, and to substantiate these authors' claims with contemporary quantitative research focused in a Southern Context. In addition, I will cite research that describes the cascading environmental benefits of transit oriented development. I will then describe Jan Gehl's definition of public life in the context of sustainability, and make an argument for why public life as a method of research and critique of urban space is inherently related to the sustainability of rail transportation.

Land Use and Habitat

Auto-dependent suburban development at consumes open land an inconceivably rapid pace. According to the United States Department of Agriculture, undeveloped land in the United States, excluding Alaska, is developed at an average rate of 2 million acres per year (Gillham & Maclean 2002, p. 84). For reference, this is roughly 2,333.7 times the area of Wake County, North Carolina lost to development every year. Martinuzzi et al. (2015) estimated that in an assumption of "business as usual land use policies", the Southeastern United States was on track to lose nearly 50 and 25 percent of its pasture and range land, respectively, while growing urban land by about 60 percent. In the business as usual scenario, urban land conversation was the leading driver of habitat loss in both the Atlanta and Charlotte metropolitan areas (Figure 2.1).
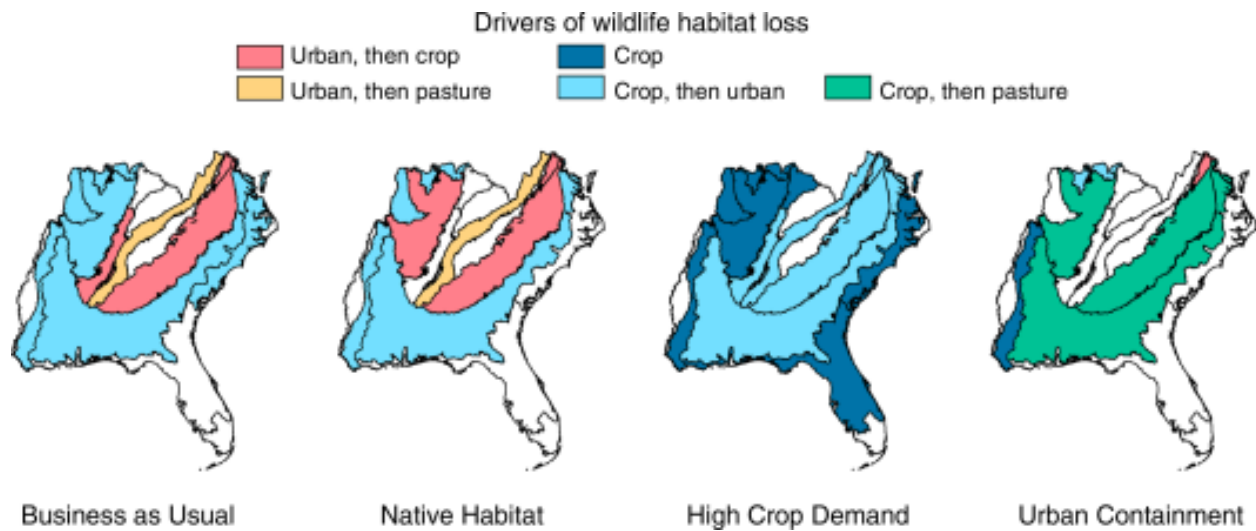
Figure 2.1 The Drivers of wildlife habitat loss in the Southeastern United States from a study by Martinuzzi et al. (2015).

The fracturing of native habitats is another concern raised by a sprawled land use in the Southeast United States. Leonard et. al (2016) concluded that habitat cores would decreased by as much as 62 percent in total land area by 2100, driven by changes in land use and the effects climate change in the region. Upon a brief review of connectivity in six target species, the lowest "quintiles of connectivity" among urban centers of development are concentrated in the urbanized areas near the Atlanta and Charlotte metropolitan areas (Figure 2.2).
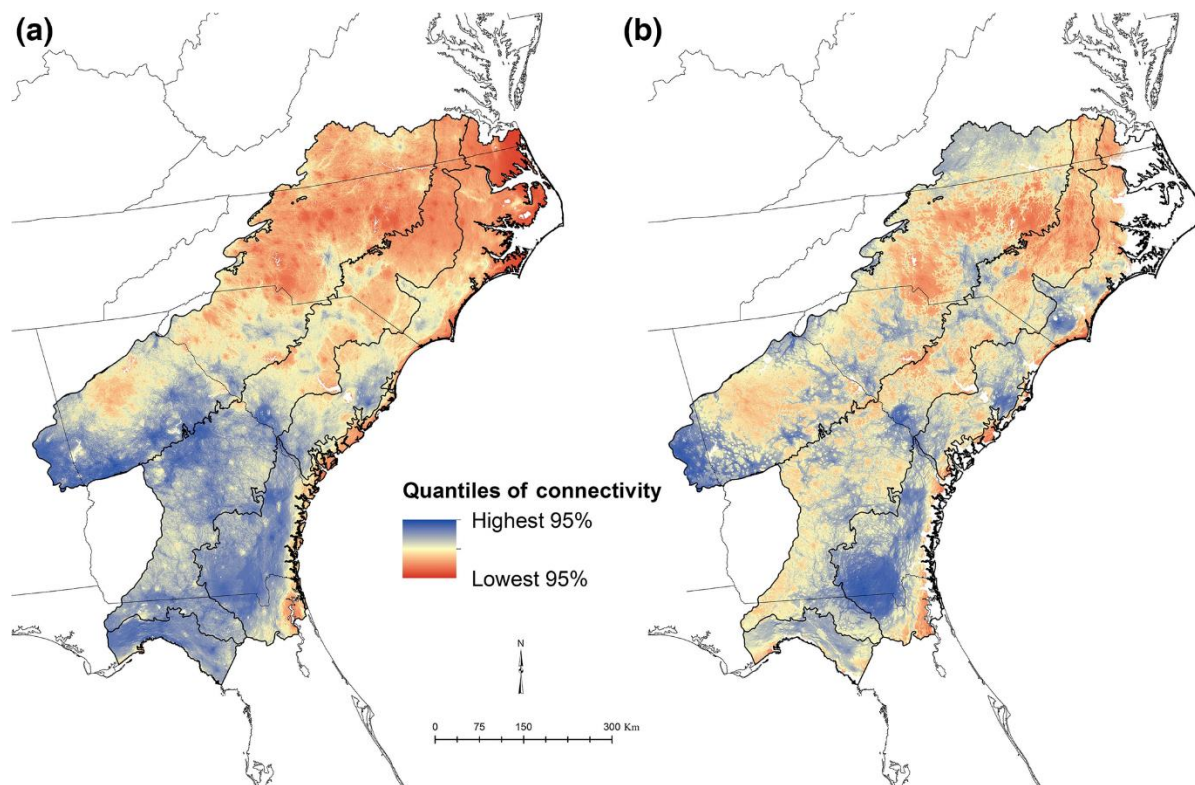

Figure 2.2. Connectivity of habitats in the Southeastern United States is expected to decrease to a greater extent near areas of suburbanized development, especially near Charlotte and Atlanta, according to Leonard et. al (2016).

There is a clear connection between a sprawled land use and the destruction of both ecosystem structure and the declining rate of growth of jobs that depend on rural farm and pasture land (Milesi et. al 2003; Rural America at a Glance 2017).

Greenhouse Gas Emissions and Sustainability

In February 2016, the United States reached an important milestone in the history of greenhouse gas (GHG) emissions sources. For the first time since the oil crisis of 1979, the country's transportation sector emitted more metric tons of carbon dioxide (CO_2) into the atmosphere than did its electric power plants (Plumer, 2016). Policy and business practices in the energy industry have grown the share of relatively clean burning fuels, while the fossil-fueled combustion engine continues to dominate the transportation sector. Even with increased fuel efficiency standards and fluctuations in the price of gasoline, GHG emissions from transportation have fluctuated between 1750 and 2,000 MMT (million metric tons) between 2005 and 2015 (Figure 2.3). Globally, researchers expect that emissions from road transportation will grow rapidly in the coming decades (Davis, Caldeira, & Matthews, 2010).
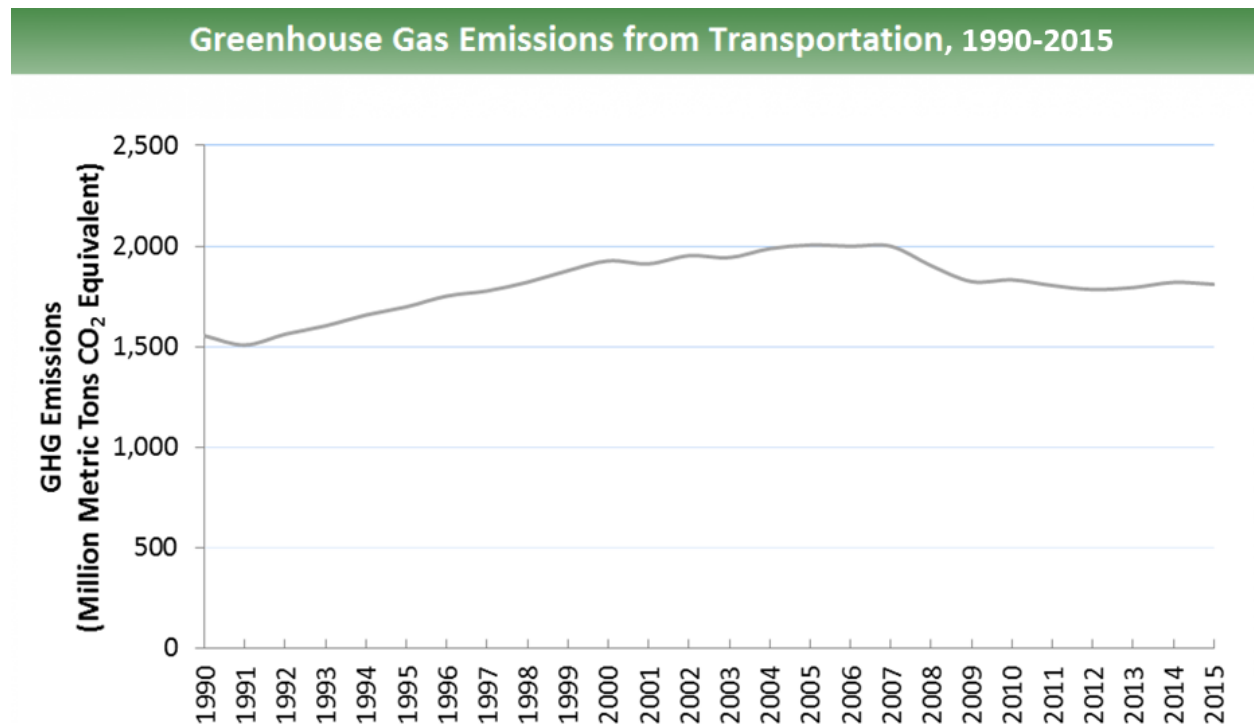
Figure 2.3. (US EPA, 2016)

What do researchers know about the relationship between emissions from transportation and rail transit? Academics have concluded that transportation emissions should be accounted for by quantifying the avoided emissions rail transit enables, in other words, the GHG not emitted by vehicles because passengers chose to use rail instead (Chang & Kendall, 2011; de Andrade & D'Agosto, 2011; Graver & Frey, 2016). Rail systems avoid a significant amount of emissions annually, regardless of their service type, including subway/heavy rail, light rail, and intercity high-speed rail (Figure 2.4). A study of a light rail line built in Los Angeles, California showed that households within a half mile radius of stations reduced their average emissions by 3,415 g CO_2 and reduced vehicle miles traveled (VMT) by 6.81.

Nearly all of the change in emissions accounted for came in the form of emissions avoided by a choice to not traveling by car, because the increase in transit-related emissions was statistically insignificant (Boarnet, Wang, & Houston, 2017).

Table 2. Emissions avoided by passenger rail systems.

Rail System	Avoided Emissions (t CO_2)	References
MTA-New York [a]	15,000,000/year	[29]
Los Angeles Metro	12,997,000/year	[26]
RENFE-Spain	2,460,488/year	[30]
Lisbon Metro-Portugal	130,275/year	[31]
Porto Metro-Portugal	46,996/year	[32]
Sao Paulo Metro-Brazil	820,000/year	[20]
California High Speed Rail (Project)	1,150,000/year	[33]
LGV Mediterranean (Valence-Marseille) (Project)	237,000/year	[34]
HSR-4500 km-France (Project)	1,000,000/year	[35]
Bangalore Metro-India (Project)	2200/km-year	[36]

[a] including the bus system.

Figure 2.4 (De Andrade & D'Agosto, 2016, p. 5).

Pollution and Human Health

Air Quality

The reliance on automobiles for transportation, which emit air pollution and rely on infrastructure that significantly increases stormwater runoff, is a significant feature of sprawl. The human health impact can be categorized into three further subcategories of environmental health: air quality, water quality, and obesity. Extensive research has found that cars as a dominant mode of transportation have had a negative impact on both, and by extension, a negative impact on human health.

Studies on transportation tend to use multi-variable modeling to make projections about future conditions using contemporary conditions. One such study by Stone et. al models multiple travel-related variables with a 2050 time horizon in every metropolitan statistical area (MSA) in Midwestern United States (2007, p. 405-408).[3] The researchers find that compared to the Business As Usual model of sprawled suburban and ex-urban growth, a case in which compact urban growth takes place in every MSA yields a related reduction in critical air pollutants (p. 413-414).[4] The Compact Growth model the researchers used to project future changes in emissions was modeled historical on land development trends in Portland, Oregon, largely regarded as one of the most exemplary success stories of transit-oriented development in the United States in the last 30 years. Two of the five "dimensions of land use

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[3] The MSAs that meet these requirements are Minneapolis/St. Paul, Milwaukee, Madison, Chicago, Grand Rapids, Detroit, Indianapolis, Dayton, Cleveland, Columbus, and Cincinnati. According to Census data, the only MSA with more than 10 percent of trips made on transit was Chicago (12.02 percent, ACS 2016 [5 year estimates]), which incidentally has more miles of rail transit in than any MSA in the country other than New York City (Wisniewski 2017).

[4] The Compact Growth scenario yielded reductions in emissions of Particulate Matter$_{2.5}$, Nitrogen Oxides (NOx), Carbon Monoxide (CO), Volatile Organic Compounds, and Carbon Dioxide (CO_2) by 6.0, 5.6, 5.6, 5.2, and 5.1 percent, respectively (Stone et. al 2007, p.413-414).

and urban form" cited by Stone et. al that inspired their research design are regional accessibility and proximity to transit (p. 405). Another study by Stone (2008) found that large metropolitan regions that rank highly on a multi-variable index of sprawl experience more days of ozone exceedance than more compact regions. Ground-level ozone formation is a significant threat to air quality in dense urban areas.

Water Quality

In a transportation system that builds infrastructure to accommodate the movement and storage of cars, vast swaths of permeable land are paved and made impermeable. It Atlanta and other growing cities building more car-dependent infrastructure, this issue will only worsen as more space is dedicated to pavement. Lee and French (2008) use GIS-based estimation to forecast that impervious surface area in metropolitan Atlanta will increase by 45 percent by 2030.

Aside from agriculture, municipal point sources, and hydromodification[5], the leading source of water quality impairment in the United States is urban runoff (Gillham & Maclean 2002, p. 117). Bullen and Stone (2006) suggest that land use regulations that encourage a less sprawled development pattern could decrease stormwater runoff, which is a significant determinant of pollutant load in local water bodies (Maharjan, Pachel, & Loigu 2017). As I previously explained in the air quality section, transit access and proximity are antithetical to sprawl, and complementary to compact urban development. Among the new and successfully planned urban developments that Barnett and Beasley cite in their book about eco-cities, all incorporate infrastructural accommodations to reduce stormwater runoff and prioritize access to transit (2015, p.21-62).

Obesity and Physical Activity

The effects of the sprawled urban environment on physical health and well-being is also striking. In a study assessing variations in demography, urban density, and physical activity across the United States, Congdon found that auto-oriented sprawl is positively correlated with obesity and inactivity regardless of region (2016). His data indicate that South Atlantic States, to which by his definition both of the MSAs I am studying belong to, exceed the national average in rates of both physical inactivity and obesity, while they feature lower compactness and healthy food access than the national average. Research has also suggested a positive correlation between Vehicle Miles Traveled (VMT) and obesity (Lopez-Zetina, Lee & Friis 2006). Of the two cities I am studying, both have VMT per capita greater than the national median.[6] Researchers at the University of Illinois concluded that had the average American metropolitan area avoided sprawling land use and retained population density over the last 30 years, the average rate of obesity in those areas would be approximately 13 percent less than present rates (Zhao & Kaestner 2010).

The health outcomes of compact, transit-oriented urban land use, are unsurprisingly opposite to that of sprawl. And interestingly, the effects of rail transit on obesity and inactivity are particularly pronounced. Public transit use is associated with higher rates of physical activity, and frequent users of transit had higher activity rates than did seldom-users (Saelens et. al 2014). A study modeling the health benefits of planned transit investments in Montreal, Canada found that in the inner ring suburbs, where a plurality

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[5] The Environmental Protection Agency describes hydromodification as activities that include channelization and channel modification, dams, and streambank and shoreline erosion (US EPA 2015).

[6] Atlanta (35.02), Charlotte (37.86), Miami (24.88), National Median (25.19) from 497 Federal-Aid Urbanized Areas, which is "an area with 50,000 or more persons that at a minimum encompasses the land area delineated as the urbanized area by the Bureau of the Census." (Federal Highway Administration 2016).

of planned public transit infrastructure was planned to be newly constructed, both transit mode share and average time spent using active transportation modes increased more than other studied sectors (Tétreault et. al 2018). Health benefits from transit also depend on other external factors. In a study of 18,326 commuters in metropolitan Atlanta, trips on transit were positively associated with being more likely to meet daily physical activity recommendations controlling for sociodemographic variables, access to a car, and the urban form of the commuter's residence. The study also found that access to an employer-sponsored transit pass was positively correlated with meeting the physical activity recommendation (Lachapelle & Frank 2009). Lastly, rates of walking to transit were correlated with the presence of a rail transit system. Those who walk to transit are 73 percent more like to walk for 30 minutes or more if their transit mode is rail of any category (Freeland et. al 2013). There is a clear trend of positive correlation between physical health and transit use, while a negative relationship emerges between health and driving.

Transit Oriented Development

In considering the sustainability of any human settlement, it is vital to consider the linkage between land use and transportation. Essentially, the more coordinated a land use is with a certain mode of transportation, the more likely that mode will be used. A meta-analysis of 54 published studies investigating land use and transportation linkages found that walking trips were encouraged by population density, street connectivity, and land use mix. And, unsurprisingly, transit trips are associated with access to transit, street connectivity, and land use mix (Ewing and Cervero, 2010, p. 275-276).

The use of urban land to serve transit can begin to address sprawl. The life-cycle environmental impacts of development that is oriented to transit stops (TOD) can be evaluated. One study focusing on potential infill development sites near light-rail in Phoenix, Arizona found that significant energy and environmental benefits will be reaped in the form of decreased energy use, smog, GHG emissions, and human respiratory impact (Chester, Nahlik, Fraser, Kimball, & Garikapati, 2013)

The best practices of capitalizing on rail transit investment with dense development, called TOD, is most well developed in Scandinavia and Southeast Asia. These places have successfully encouraged sustainable growth by developing around rail stations using different models and approaches, and in every case have achieved substantial benefits (Cervero 2016).

The link between building sustainable places and TOD is well established by multiple researchers, and is the experience of many global cities that have built rail transit systems. Rail transit can not only encourage density, but along with it lower energy intensity, reduced stormwater runoff, and physical health of TOD residents.

Public Life and Sustainability

When Gehl wrote his seminal book about how people use public space, *Life Between Buildings*, the word "sustainability" was not being used by professionals in the built environment. The term was not used popularly until the 1980s, when institutions such as the World Bank, the United Nations, and NGOs began involving it in major policy documents and campaigns (Kidd 1992). But there are very clear connections between what Gehl was writing about in 1971 and what we understand as "sustainability" today.

Gehl criticized what he called "post-war planning" for a functionalistic conception of urban space. He points how that the development of vast swaths of single-family housing, especially in the United States,

had reduced communal outdoor activities "to a bare minimum because of street design, automobile traffic, and especially the wide dispersal of people and events." (2006, p. 46-47). As the term caught on and began to be used widely and popularly, Gehl's aligned his writing about the built environment to include sustainability. In a section of his most recently published work, Gehl describes that the movement to encourage active modes of transportation, namely biking and walking, inherently involves understanding "the social and economic cohesion of public space." Health and the well-being of city denizens, he argues, is also part of the same physical framework of conceiving of urban spaces as sustainable (Gehl & Svarre 2014, p. 71-72).

What kind of activity and how frequently it takes place influences its long-term sustainability. Rail stations that serve a singular purpose, to move people from A to B, are inherently unsustainable. Mixing land use, encouraging densification around rail stations, and even using stations themselves for multiple purposes such as retail, performance art space, and programmable public space encourage social and optional activities with make a public space vibrant. Public life and measures to improve are aligned with rail transit's goals to be a sustainable method of transportation.

Method

Modernism may have been a European invention, but surely enough, its principles made their way to the American South.[7] And as these ideas about building cities took root, the population of these regions grew significantly. In 1950, not a single metropolitan area in the South had more than one million people. By 2000, 18 did, and Atlanta's metropolitan population exceeded four million (McDonald 2013). After railways and streetcars were abandoned, every metropolitan area in the South became heavily reliant on hierarchical roadway networks to move its goods and people. As of 2015, no metropolitan statistical area in the South with a city of more than 500,000 people had transit ridership above 5 percent (American Community Survey). In almost every metropolitan statistical area, driving alone was the means of travel to work for 80 percent or more of workers above the age of 16.

Despite this aversion to transit, eight cities in the Southeastern United States have rail transit systems. Of the MSAs with rail systems, the three highest shares of transit use are in Miami-Ft. Lauderdale-West Palm Beach (3.97%), Atlanta-Sandy Springs-Roswell (3.22%), and Charlotte-Concord-Gastonia (1.83%). The rail systems these cities have built were developed in different periods of transit construction in the United States, with Atlanta being the oldest, and Charlotte the newest.

Transit Space, Functional Space

If functional space alone cannot produce the sort of daily life Gehl holds in high regard, what can we use to define the ideal public space? In making the argument that planners and architects cannot evaluate spaces on the merits of functionalism alone, Gehl expresses the three broad requirements of public spaces:

- Desirable conditions for the necessary outdoor activities
- Desirable conditions for the optional, recreational activities
- Desirable conditions for the social activates

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[7] I define the South as Florida, Georgia, South Carolina, North Carolina, Alabama, Mississippi, Louisiana, Arkansas, Tennessee, Virginia, and Kentucky.

(Gehl 2013, p. 51)

In the scope of my research question, it would be nearly impossible to physically observe the thirty-plus transit stations to determine which were worthy of further investigation with an intensive round of direct observation. In order to choose which four stations, two from each transit system, I would consider, I devised a method with proxy variables to estimate the greatest expected public life.

Station Designation

I further devised a system of categorization for every transit station, defining them as either "urban core" or "urban village" to borrow Fink's phrases (1993). Simply, I defined every station with a transit authority-owned surface parking as an "urban village", and every station lacking one part of the "urban core". These definitions adequately reflected the stations in the context of the urban form—with nearly every urban village station outside of the city's downtown—and nearly every urban core proximate to the city's downtown. Below is a list of every station and its designation in the LYNX (Charlotte light rail) MARTA (Atlanta heavy rail).

MARTA	
Station Name	Designation (core or village)
Decatur Arts Center Georgia State King Memorial Bankhead Midtown Buckhead North Avenue Civic Center Peachtree Center Five Points Dome/GWCC/Philips/CNN Garnett Airport	Core
Avondale Chamblee Lakewood-Ft. McPherson Oakland City West End Lindbergh Center Kensington Inman Park-Reynoldstown Edgewood-Candler Park East Lake Indian Creek Vine City Ashby West Lake Hamilton E. Holmes	Village

Dunwoody Medical Center Sandy Springs North Springs Lenox Brookhaven Doraville College Park East Point	

LYNX	
Station Name	Designation (core or village)
Carson Charlotte Transportation Center/Arena New Bern East/West Bland St 3rd St/Convention Center 7th St Stonewall	Core
I-485/South Blvd† Sharon Road West Arrowood Archdale Tyvola Woodlawn Scaleybark	Village

Public Life Metrics

In order to estimate what quality of public life at each station area, I devised a Public Life Score with three equally weighed components. The components were:

Metric	Definition
Access to Park/Open Space	The % of land area, within ½ mile radius of the station, that was defined by the municipality as open space or parkland
National Walkability Index	The (1-20) walkability score (see metadata file) within a ¼ mile radius of the station
Median Daily Traffic Volume of Proximate Streets	The average annual daily traffic of all non-freeway roads within ¼ mile radius of the station in 2014 (year with most data points)

Each metric corresponds to some aspect of public life and the conditions that foment optional and social activities.

EPA National Walkability Index

We would expect that places that generate more walking trips would increase the propensity of public life in an area. The Environmental Protection Agency created an index that ranks block groups based on their walkability. They used inputs such as employment diversity, occupied housing units, street intersection density, and distance from the centroid of the census block group to the nearest fixed-guideway transit stop.[8]

Access to parks and open space

People need spaces for carrying out optional and social activities. Research suggests that informal social contact in public spaces is directly correlated with vegetation in common spaces (Kuo et. al, 1998). Thus we would expect stations with walkable proximity to open spaces to have a greater quality of public life.

Average Daily Traffic Volume

If traffic volume is higher near stations, it will be more difficult to safely carry out necessary activities such as walking to a proximate location, optional activities that would involve staying near loud cars emitting fumes, and social activities that necessitate comfortable physical space. "In other words, all 6 studies showed that with the increased traffic volume, the frequency of pedestrian traffic crashes also increases." (Moradi et al, 2016)

Station Ranking

I ranked every station on its performance in the public life metrics. I ranked the Park/Open Space and Walkability ratings in ascending order, and the AADT ratings in descending order. The more park space and higher walkability score, the better the rating. The higher AADT, the lower the ranking. If stations had no AADT data points within their buffer, or were located within ¼ mile of a freeway, I disqualified them from assessment.

I then combined the rankings from the three categories into a composite ranking, giving equal weight to every metric. I then considered highest rated station from the Urban Village and Urban Core categories for a public life study. Below is a table of the four stations that were considered for the public life study.

MARTA	
Station Name	Designation (core or village)
Peachtree Center	Core
East Point	Village
LYNX	
3rd St./Convention Center	Core
Archdale	Village

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[8] Specifically, a weighted formula was used to create an index from the following indicators, with an indexed rating for each block group: D2A_EPHHM (mix of employment types and occupied housing), D2B_E8MIXA (the mix of employment types in a block group), D3b(street intersection density), D4a(Distance from population weighted centroid to nearest transit stop). Source: (Ramsey & Bell, 2014, Smart Location Database User Guide Version 2.0)

Public Life Study

Evaluating Public Life in Rail Station Areas

To evaluate the quality of public life in spaces near rail stations, I employed a mixed-methods approach based on Jan Gehl's work (Gehl 2006; Gehl & Svarre, 2013, p. 21-35). I used manual registration methods to characterize, for each station area at various times of day, what Gehl would call "the complex interaction of life and form in public space" (Gehl & Svarre, 2013, p. 11). To do so, I used simple and accessible formats such as sketching a path, keeping a detailed diary, photography, and other appropriate and popularly used approaches. From this method, I drew a qualitative conclusion on the quality of public life, informed by a comparison of variable behavior at the site.

For all four station areas, I made a day long site visit to begin recognizing discernable patterns of public life, and decided to delineate the boundaries of the space I would assess. I chose to define a station's public space by measuring 325 feet (100 meters) in a concentric circle from the principal station entrance. I made this decision after consulting Gehl, who defines zero to 325 feet as "the social field of vision" (2006, p. 65). At one station, MARTA's Peachtree Center, I chose to study the station entrance closest to the public library, one of the city's tallest office buildings, a direct connection to a streetcar, and a small public plaza, rather than a smaller and less prevalent entrance 1000 feet away. At many stations, there were two principal entrances to the platform, so I chose to split my observation time evenly between each side of the site. For example, at the East Point MARTA Station, there are entrances at the north and south of the station area, roughly one block apart (Figure 3.1).

Once I had chosen the site boundaries, I established a schedule for site visits. I visited each station in the morning (7-11am), mid-day (11am-3pm), and evening (3-8pm) three times (n=9/station), using the same schedule on weekends, but visiting each station twice (n=6/station). I chose to not study a station on a day with inclement weather or if a nearby event caused an oversized crowd. Given my time constraints, this meant I did not study all stations the same number of hours. Additionally, I did my best to remain unassuming and undisruptive to the interactions around me. I wanted to ensure my presence influenced behavior of those around me as little as possible.

Within the public life study method, I used counting, mapping, tracking, looking for traces, photography, keeping a diary, and test walks to inform my evaluation of each station area. Below, I describe the methods and how they informed what I concluded about the interaction between people and the built environment.

1. Path sketching-I sketched where people walked over a site plan reveal temporal and spatial patterns of human movement, and how the urban form dictates movement.
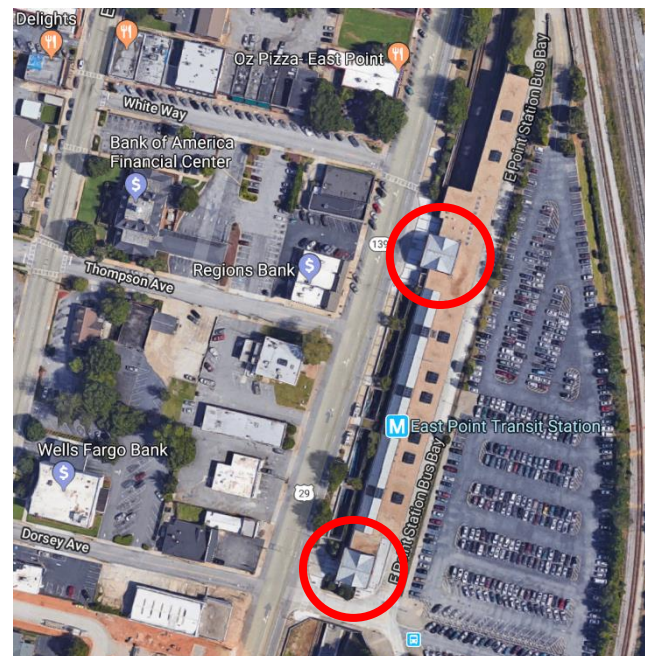2. Mapping-I showed where and for how long optional and social activities occured in public space.

Figure 3.1. The red circless indicate station entrances.

3. Photography-I visually documented the interaction between urban form and urban life. I used photography to illustrate the patterns I discovered.
4. Counting-I counted to create a quantifiable comparison between spaces. I used counting to measure pedestrian presence from hour to hour in the span of a day in a public space, and counted how many total minutes I observed optional and social activities in a station area.
5. Keeping a diary-I used a diary to account for qualitative observations, and keep track of what I mapped and counted.
6. Test walks-I selected routes that led up to the station area, and assessed walking time compared to the time spent waiting at to cross legally at crosswalks. Where appropriate, I also recorded how many people chose to cross at legally designated crosswalks.

(Ibid, p. 24)

I chose not to pursue one of Gehl's other suggested methods, called "tracking" or "shadowing", which dictates that the observer follows a person and takes not of their walking speed and direction or the social or optional activities that person does (ibid, p. 29). I chose not to pursue this method because I believed it would be impossible to carry it out inconspicuously. Some of the methods listed above were impossible to carry out in some situations, and I chose to use my judgement regarding when to refrain from them.

After reviewing the data I collected, I created a public life narrative for all four stations I studied. This included creating composite maps to illustrate physical concentrations of paths, social and optional activities, and strong sensory experiences. I used the observations I gleaned from this narrative to complete a checklist of 12 criteria of urban design, developed by Gehl when he taught at the Royal Danish Academy of Fine Arts in Copenhagen (Gehl & Svarre, 2013, p. 106-107). For every criterion, I subjectively assigned a rating from one to five, with five indicating the most favorable conditions for people, and one indicating the least. The subjective nature of the ratings was necessary because each station had unique features that prevented me from comparing them as equals. The sum of the 12 criteria allows me to rank each station area's public life, out of 60 total "points". The 12 criteria are:

Protection against…
1. traffic and accidents
2. Protection against crime and violence
3. Protection against unpleasant sense-experiences
15 points
Possibilities for…
1. Walking
2. Standing
3. Sitting
4. Seeing
20 points
And
1. Human scale services (friendly gestures)
2. Designing for enjoying positive climate elements
3. Designing for positive sense-experiences
15 points. Adapted from Gehl & Svarre (2014, p. 107)

Details and Figures

By hand, I sketched each station area site plan, in some cases two sub-sites (both MARTA stations, the 3rd St. Convention Center Lynx station) at a 1"=50' scale. I then made photo copies of these site plans, and used the copies to map social and optional activity, and traced the paths people walked or biked through the site, following the schedule I created (Figure 3.2; Gehl & Svarre, 2013, p. 26-28). I also used photography to capture typical social and optional behavior as it occurred (Figure 3.3). To keep track of what I noticed, I kept a detailed journal that recounts a minute by minute record of interactions, overheard conversations, and subjective conclusions I came to after hours of observation. I created illustrations to record the amount of time I waited at crosswalks during test walks, and described the types of buildings and activities I noticed in neighborhoods around each station.
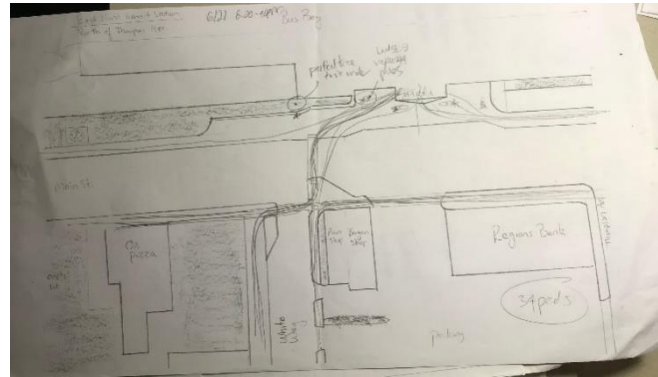

Figure 3.2. Path sketching at MARTA's East Point Station.

Figure 3.3. Photography to document public life.

The Social Science Approach to Public Life Study

In their research, natural scientists recreate a natural phenomenon in nature by changing an independent variable within a range and determine its effects on a dependent variable, comparing to a control. To recreate the conditions in which blue crabs (Callinectes sapidus) would experience hypoxia[9], Bell, Eggleston and Noga varied the concentrations of dissolved oxygen, water temperature, and water salinity in a controlled environment, and proceeded to record the crabs' behavioral responses (2009). Before they changed these variables, they observed the crabs under a normoxic condition in conditions typical of their habitats, recording the very same behavioral attributes of the crabs: movement rate, percent of time buried, and percent of time in the downstream area of the tank (ibid, p. 165). They concluded that increased rates of declining dissolved oxygen made crabs move faster, because crabs were searching for oxygen. I include this example to describe how my method differs from a classically scientific approach, and why a non-scientific approach is appropriate for a public life study method.

For one, quantitative assessment in public life serves as a point of comparison between studied sites, rather than a point of comparison between control and experiment group. While there is a normal condition of environmental variables that yield a "control" in crab behavior, urban design researchers do not seek to compare a control and experimental treatment, because they cannot and should not influence the many things that encourage optional and social activity in public space. Rather, they gather data in pursuit of revealing the quality and amount of time spent on such activities, and compare that data between studied spaces. For example, on visits to station areas, I counted how many people walked through a space in a twenty-minute interval, hourly. I then created a histogram comparing that

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[9] Hypoxia is defined by one ecology dictionary as "depletion of dissolved oxygen in water and sediments, relative to the needs of most aerobic species." (Park & Allaby, 2017)

pedestrian movement between the four studied stations. Informed by my data, I gave a ranking from 1 to 5 on in the "possibilities for walking" criterion.

Subjectivity and Public Life

There is no single figure that indicates ideal public life. Indeed, Gehl describes different situations in which counting how many people are doing an activity or passing through space is adequate, but there is no single ideal figure (2013, p. 13). This is in part due to the context specific nature of public space. A commuter in Beijing or Mumbai may characterize a "crowded" train platform differently than would an Atlantan. In New York City, one researcher found that the density of use in public space is positively correlated with perceived quality of public space. In a landmark study of 11 public squares in New York, Whyte found that the two with the greatest density of use, measured by number of people per 1,000 square feet of open space, were also the squares people revealed as "most pleasing" in interviews (1980, p.73). Perhaps if I had carried out a similar study in Atlanta or Charlotte, cities with a significantly lower population density than New York's, revealed preferences would vary. I use this example to illustrate that there is no universally optimal rating, description, or figure that indicates optimal public life, even though natural science concerns itself with changing experimental variables to find such optimal conditions.

My intention in using the methods I did was to capture the character of public life that was lived in each station area. Jane Jacobs, the urbanist who had an outweighed influence on Gehl and others who pioneered this method in the professional realm, put it most succinctly:

"…Please look closely at real cities. While you are looking, you might as well also listen, linger, and think about what you see." (Gehl & Svarre, 2013, p.4)

Results

In all four station areas, I used my direct observations to inform my ratings, which were based on Gehl's 12 Design Criteria (Gehl & Svarre, 2013, p. 106-107). The rating results for individual stations are in Appendix B. I will use the following sections to detail my findings in studying each station, and describe how what I observed informed the conclusions I reached.

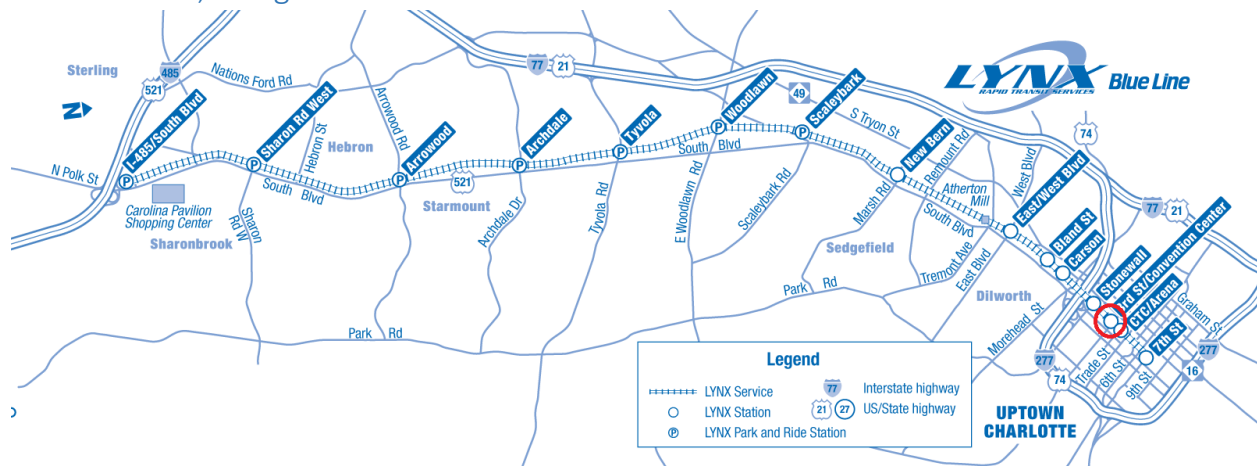### 3rd St. Station, along MLK and 3rd St.

Figure 4.1. The red circle highlights the 3rd St. / Convention Center station on the LYNX Blue Line. This map portrays the extent of the system as of May-June 2017 when I carried out the public life study. The transit agency has since extended the line to UNC Charlotte, adding 9.3 miles and 11 stations.

Station in Urban Context

The 3rd St./Convention Center station is located in the heart of Uptown Charlotte, North Carolina which is the largest center of commercial banking outside of New York City in the United States. The buildings surrounding the station are primarily used as office and other commercial space. Among them are One Wells Fargo Center, 300 S Brevard, The NASCAR Hall of Fame, and the Hilton Charlotte Center City. Multiple surface level parking lots border the station, which I have highlighted in yellow (Figure 4.2). I chose to study the life on both 3rd St. and MLK Jr. Blvd., because these streets that border either end of the station.
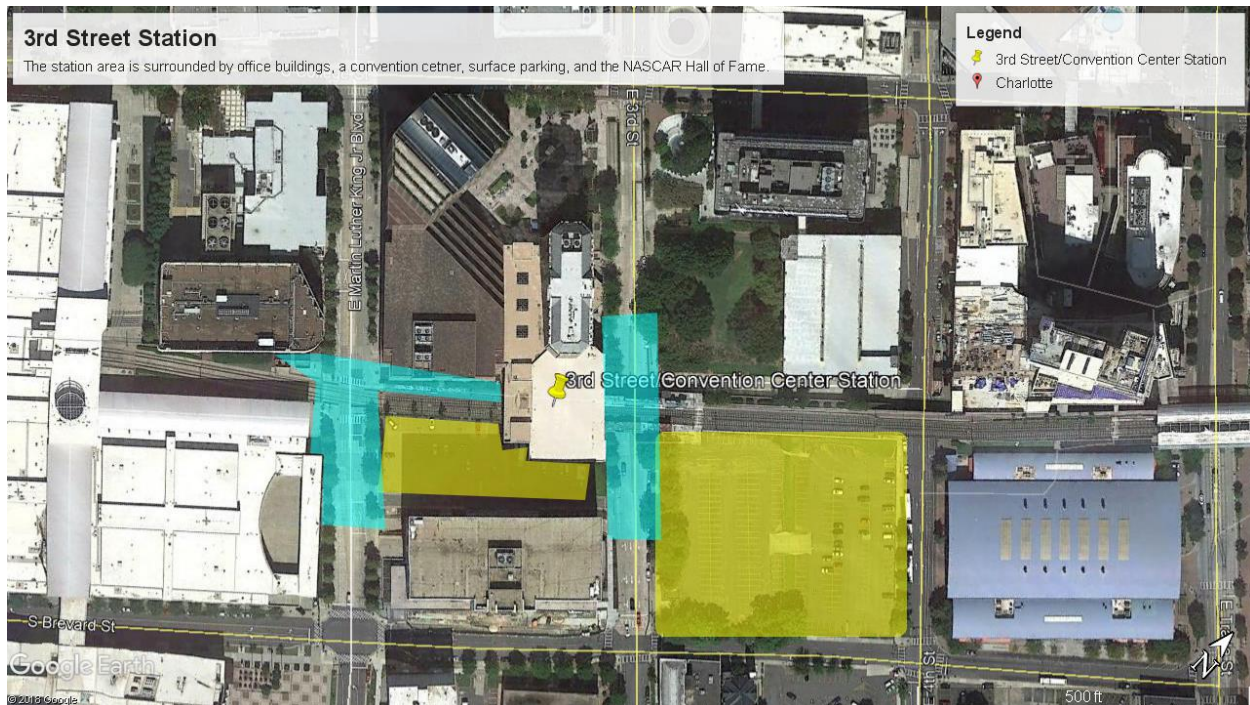

Figure 4.2. The 3rd Street Station in Uptown Charlotte. The yellow areas are surface parking, and the blue highlighted areas are where I carried out the public life study. For the purposes of the study, I consistently gathered data at the street level on both 3rd Street and MLK Jr. Blvd.

Figure 4.3. The station platform sits above 3rd Street.

3rd Street-The Pedestrian Experience

Where 3rd Street passes under the light rail station platform, it is a four lane, one-way street maintained by the City of Charlotte. Sidewalks on either side of the street are 15 feet wide, and are interrupted by six curb cuts to provide vehicle access to parking lots and the Hilton hotel. Access to the light rail station requires walking up stairs on either side of the street, or by taking an elevator. There are no benches or other places to rest, though Hilton employees tend to take smoke breaks under the rail station overpass, as shown in Figure 4.3. There are no opportunities to legally cross 3rd Street at mid-block.
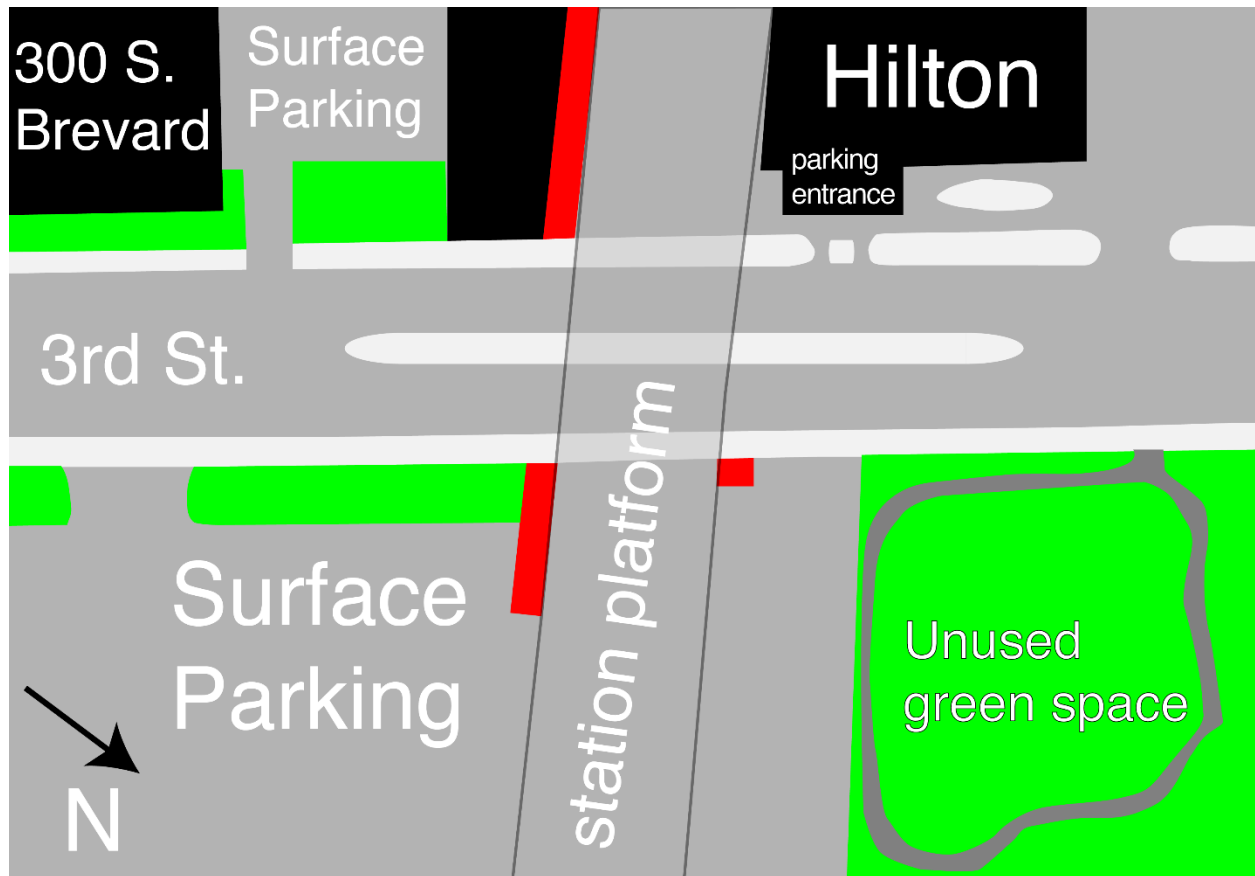

Figure 4.4. Labeled site plan.

Figure 4.4 illustrates how the street and its surrounding uses relate to the station platform. The red areas indicate stairs and an elevator that allows pedestrians to access the station platform. In multiple periods of observation, fewer than three people per hour accessed the station platform using the stairs or elevator here, on average. I found that fewer than five people per hour walked down the stairs or got off the elevator here. At peak evening, commute time (4-6pm), an average of 340 pedestrians passed through this space in an hour. At peak morning commute (7-9am), there were 408 pedestrians passing through here per hour. This leads me to conclude that a majority of the pedestrians do not interact with this space for any other reason than to pass through it, and that the presence of the light rail station has very little to do with activating activity on the street.

Figure 4.5 illustrates the composite intensity of pedestrian traffic along 3rd Street, with thicker lines indicating a heavier pedestrian flow, and thinner lines indicating fewer pedestrians. For the most part,

pedestrians move from south to north in the morning and north to south in the evening, with the majority walking the entire block without crossing. A handful access the space from the stairs, elevator, and surface parking entrances. Pedestrians sometimes also cross mid-block across the median. I noticed this happened more frequently when the sidewalk adjacent to 300 S. Brevard was closed for tree removal.
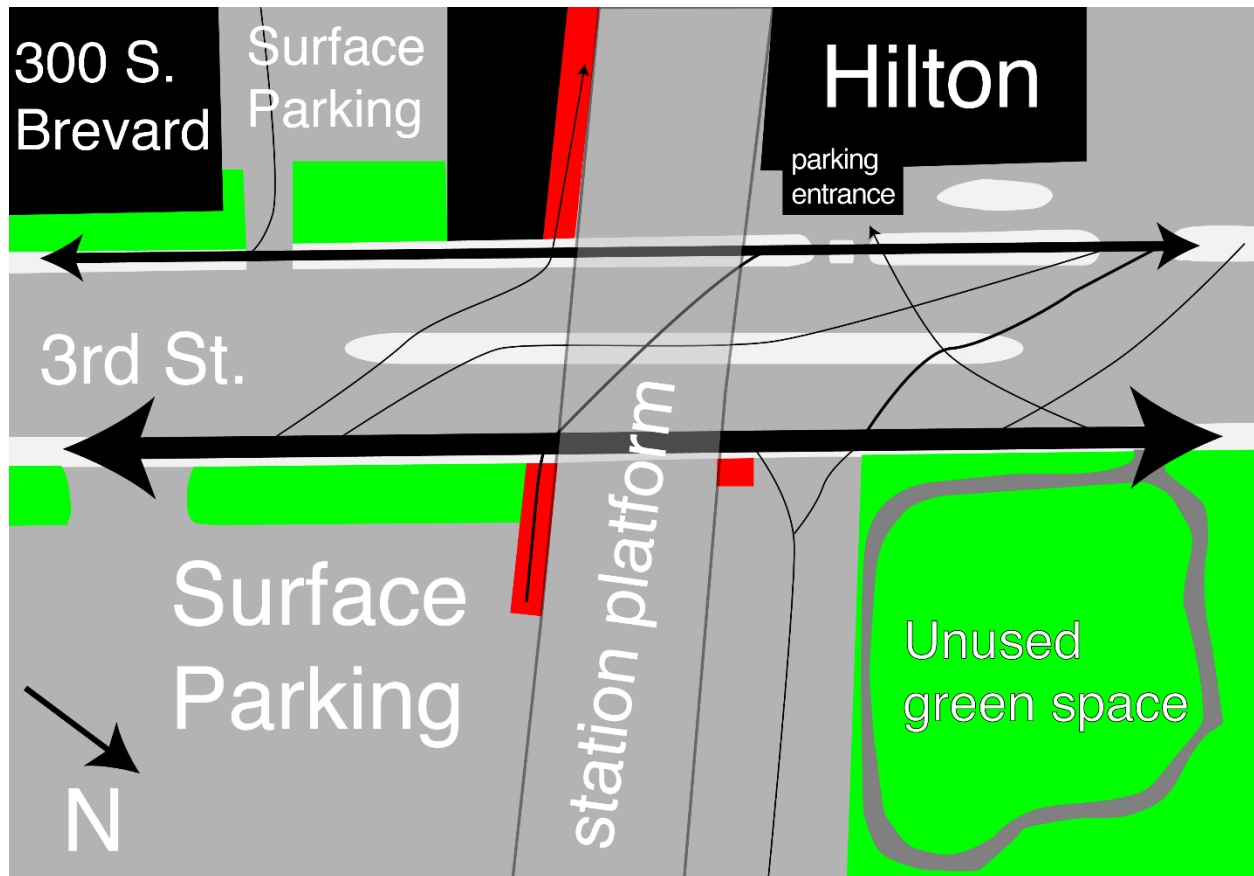

Figure 4.5. Path sketching.

3rd St-Quality of and Opportunities for Social and Optional Activities

There were very few optional or social activities taking place on 3rd Street at any given time of day. The only two that occurred with any frequency were Hilton employees taking smoke breaks under the platform overpass, and Hilton bellhops walking in and out of the front entrance to the hotel, conversing with one another and with other people approaching the entrance (Figure 4.6). I observed people sitting together during their breaks, but a majority of smoke breaks were solitary. Along 3rd Street, there are no primary seating options, nor other comfortable places to stand.
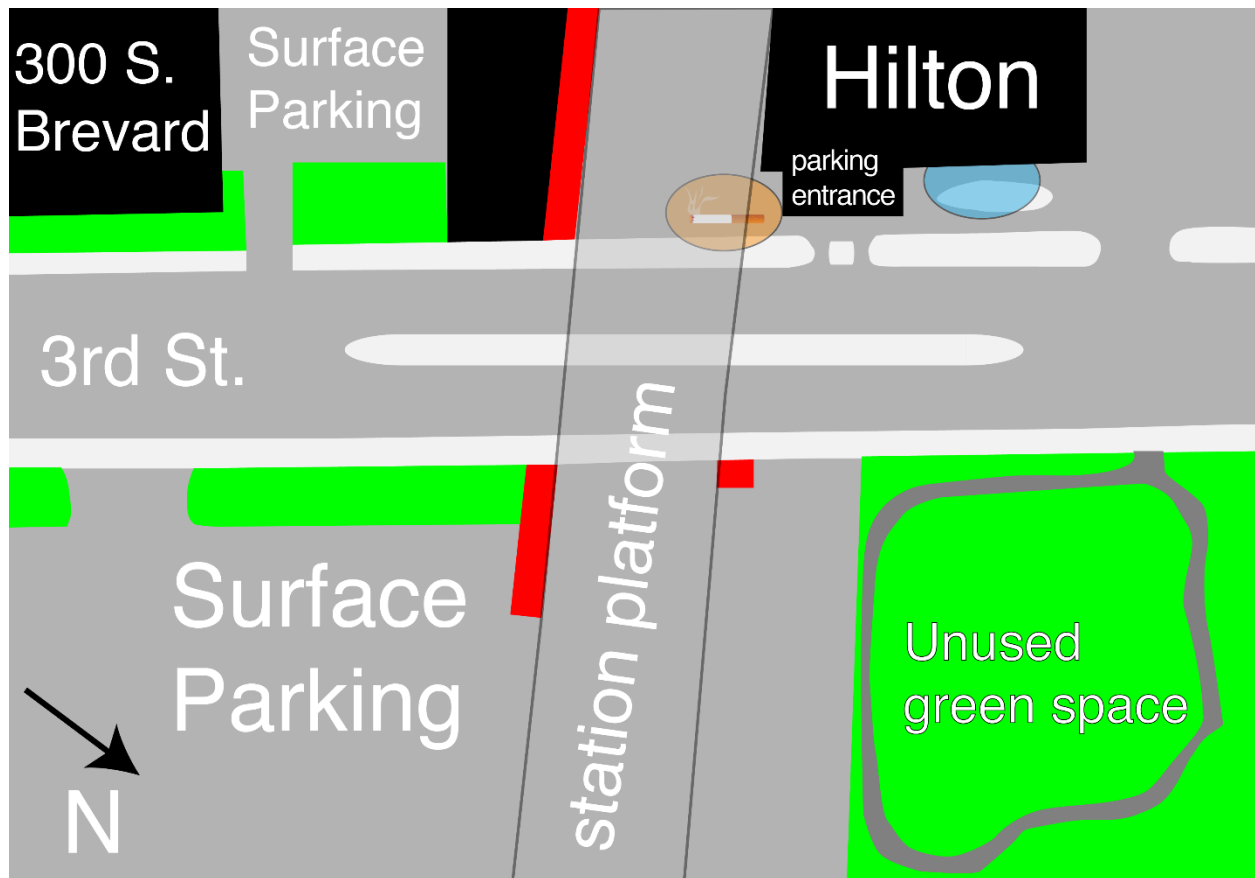
Figure 4.6. Activity map.

Other Findings

There is no regular use for the green space that is immediately north of the station platform (Figure 4.7). According to the Mecklenburg County Register of Deeds, the North Carolina Railroad owns the plot, likely a vestige of the era in which this corridor was used for freight rail traffic.

MLK Jr. Blvd-The Pedestrian Experience

MLK Jr. Blvd. is the only street in all four of my public life studies that is at grade with the rail infrastructure related to it. Where MLK Jr. Blvd crosses the tracks, it is a three lane, two-way street maintained by the City of Charlotte, as shown in Figure 4.8. Sidewalks width varies between 12 and 14 feet, and are interrupted by four curb cuts to provide vehicle access to parking lots and an alleyway the accesses 300 S Brevard. Access to the light rail station requires walking down the Charlotte Rail Trail, shown in Figure 4.9. There are two benches in front of the Charlotte Convention Center, and an HVAC vent at sitting height, where the person is seated in Figure 4.8. Two painted crosswalks provide legal mid-block crossing, shown in Figure 4.10. They are located on either side of the light rail tracks.

Figure 4.7. Large deciduous trees sit on a plot of land immediately adjacent to the 3rd St. station platform.

Figure 4.8. The light rail tracks at grade with the street. A trail to the left leads to the station platform.

Figure 4.9. The Charlotte Rail Trail provides access to the 3ʳᵈ St./Convention Center station.

Figure 4.10. A crosswalk provides access across MLK Jr. Blvd.

Figure 4.11 illustrates how the street and its surrounding uses relate to the station platform. The orange and yellow shape represents the rail trail, the dark green boxes indicate planters, purple lines indicate train tracks, and the light blue shaped represent benches. I found that about 1 of every 3 pedestrians passing through this space entered or exited via the rail trail, while most others tended to walk alongside MLK Jr. Blvd. Figure 4.12 provides a histogram of pedestrian activity in the space on an average weekday. Similar to my findings along 3rd St., a majority of the pedestrians do not interact with this space for any other reason than to pass through it. However, there are certainly more pedestrians accessing the platform from MLK Jr. Blvd than from 3rd St.
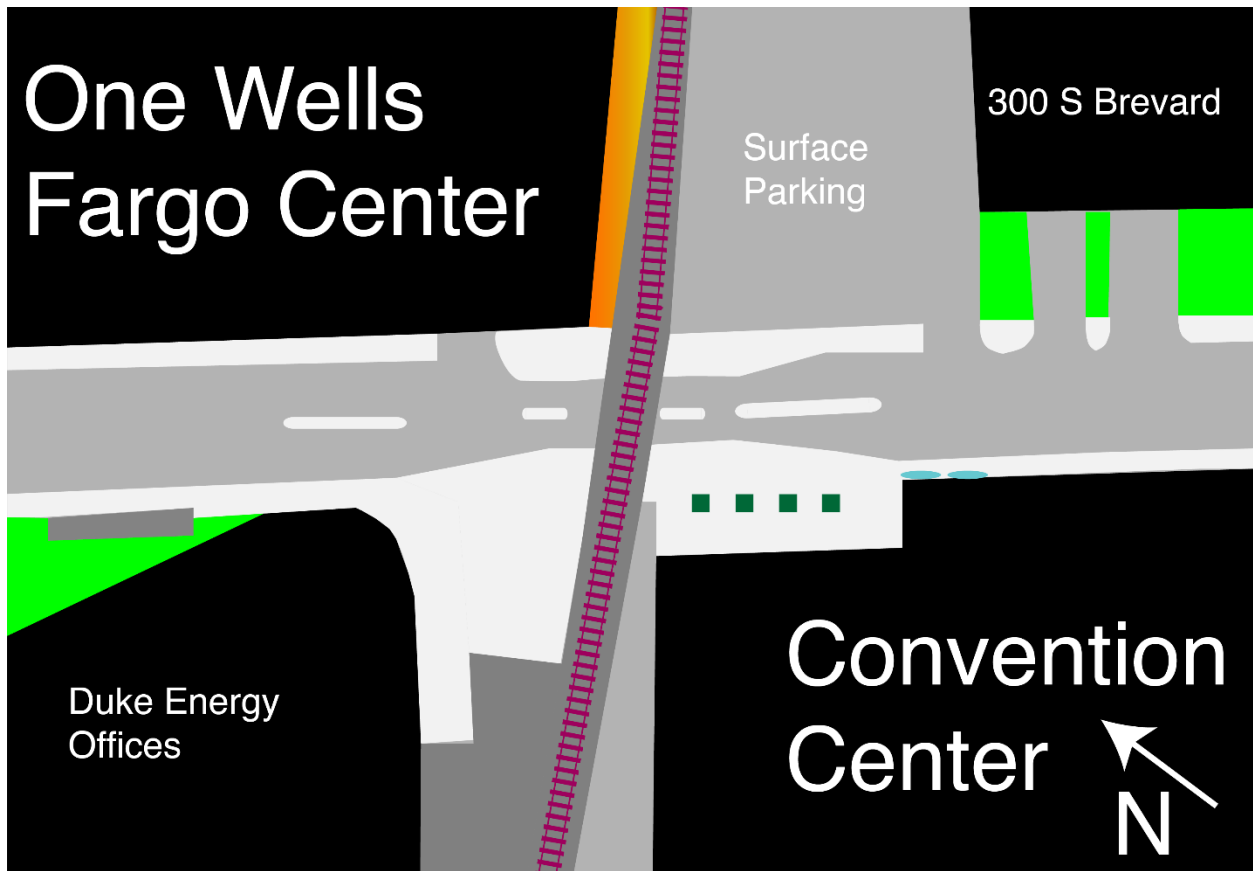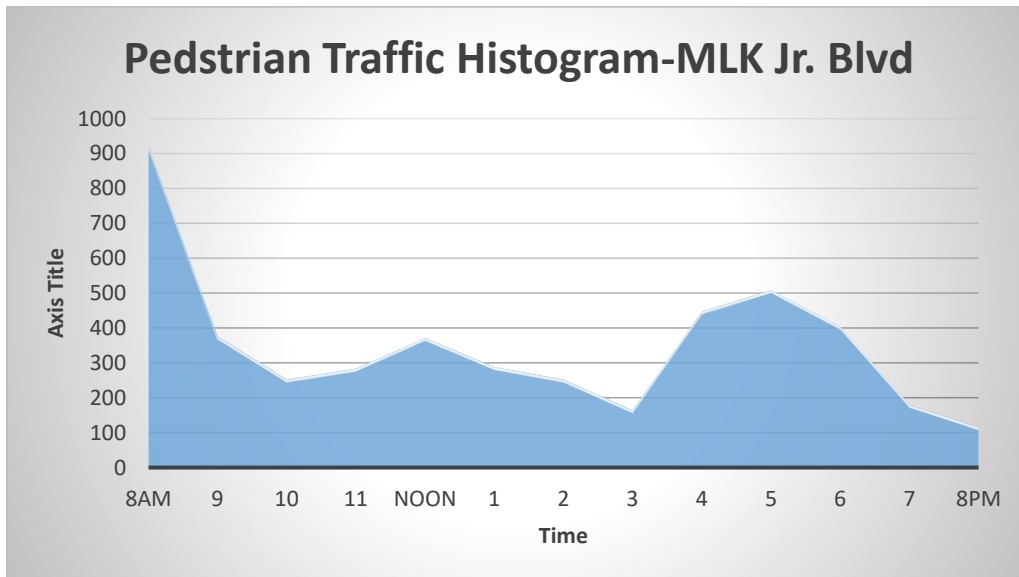
Figure 4.11. Map with labels of MLK Jr. Blvd.

Figure 4.12. Pedestrian Activity spikes during morning and evening commute hours, with a slight uptick at mid-day around lunchtime.

Figure 4.13 illustrates the composite intensity of pedestrian traffic along MLK Jr. Blvd., with thicker lines indicating a heavier pedestrian flow, and thinner lines indicating fewer pedestrians. For the most part, pedestrians move from south to north in the morning and north to south in the evening, with the majority walking the entire block without crossing. Almost all pedestrians crossing the street do so at the marked crosswalk. The only repeated engagement with any building I noticed were people entering and exiting the Convention Center.

MLK Jr. Blvd-Quality of and Opportunities for Social and Optional Activities

There were comparatively more and a greater diversity of optional and social activities along MLK Jr. Blvd. compared to 3rd St. Almost all of this activity, however, was concentrated at the small plaza in front of the Convention Center. In the mornings and at mid-day, I observed people standing and conversing outside next to the planters, or sitting on the benches. The people who tended to sit or stand and socialize tended to be more formally dressed, which led me to believe they were attending conferences at the Convention Center. Their stays lasted between 10 and 15 minutes, on average I also noticed people dressed in work uniforms unloading a van, and watering the four planters. These related activities tended to be shorter, 5 minutes or less on average. There were also solitary optional activities that took place here, including making phone calls and smoking cigarettes, which also lasted between 10 and 15 minutes. Again, conference goers performed these activities predominantly. Comparatively few activities took place here in the evening. Figure 4.14 illustrates these in an activity map.

MLK Jr. Blvd-Other Findings

I was wondering why, if I noted comparatively few pedestrians used the stairs along 3rd St., why I did not notice more pedestrians using the Rail Trail to access MLK Jr. Blvd. after they disembarked from the train platform and walked to their final destination. After observing activity on the platform, I realized it was because pedestrians were entering a door to the Hilton and walking through the lobby to their final destination (Figure 4.15). I noticed this trend only on weekday mornings. Many people exited the same door during the evening rush hour to board a southbound train.
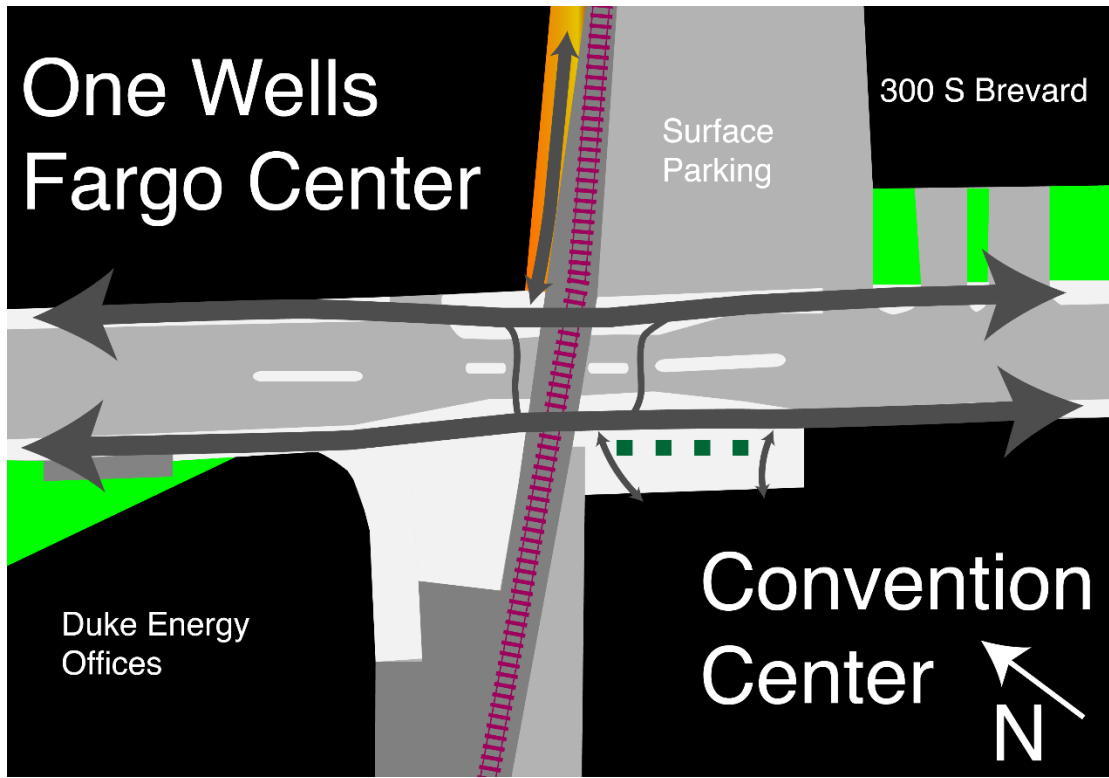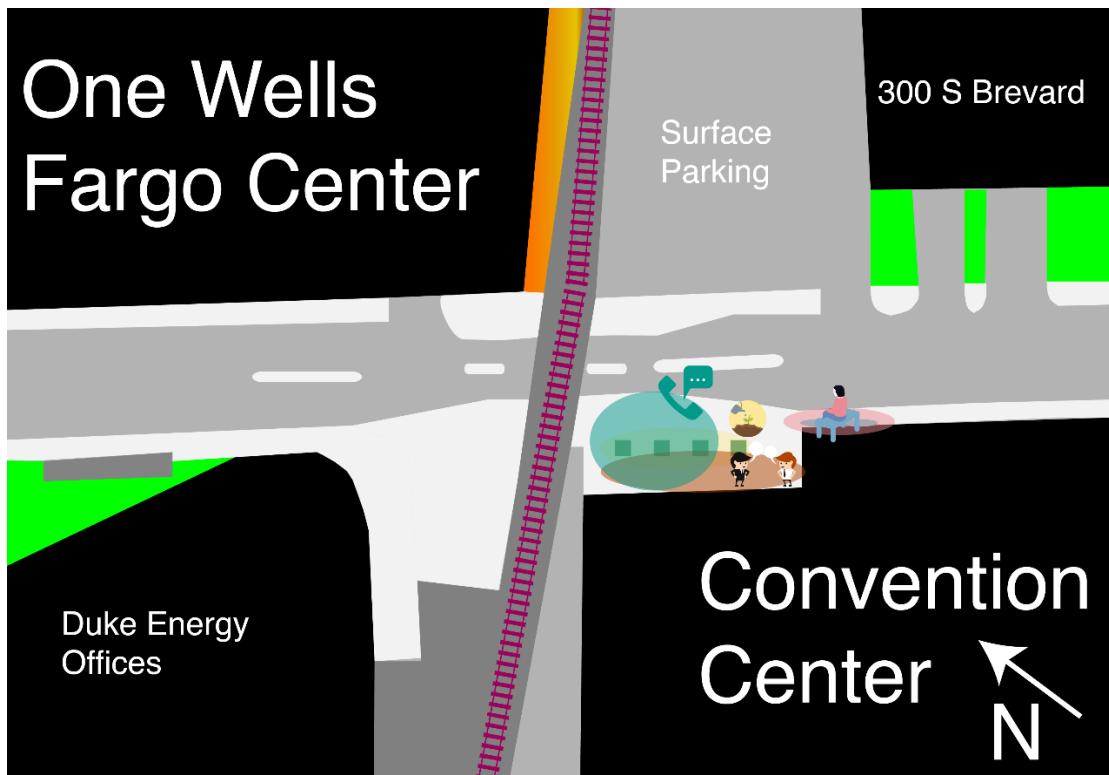
Figure 4.13. Path sketching.

Figure 4.14. Activity Map.

Figure 4.15. A queue of pedestrians who have just disembarked from a northbound light rail train wait to enter a small door to the Hilton lobby.
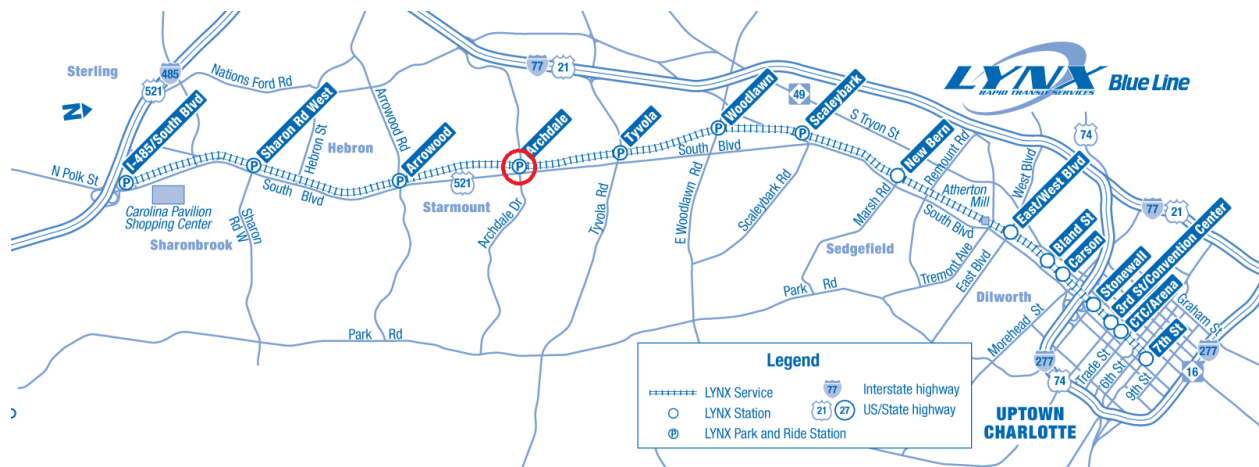
Archdale Station

Figure 4.16. The red circle highlights the Archdale station on the LYNX Blue Line. This map portrays the extent of the system as of May-June 2017 when I carried out the public life study. The transit agency has since extended the line to UNC Charlotte, adding 9.3 miles and 11 stations.

Station in Urban Context

The Archdale station is located about 5.5 miles from Uptown Charlotte, North Carolina in a neighborhood consisting of single-family homes, garden apartments, and the big box retail, drive thru restaurants, and surface parking lots that define this pattern of modern human settlement (Figure 4.17). It is a place defined by its burgeoning Latino identity: restaurants called Lempira, Burrito Factory, Dina's Taco Bar, and Comalapa line the shopping malls alongside an 8-lane arterial—South Boulevard. Billboard advertisements are in Spanish. Two gas stations, a veterinarian, a small strip mall with a convenience store and restaurant, and two garden apartment complexes border the station. Multiple surface level parking lots border the station, which I have highlighted in yellow. I chose to study the life within a social 325 feet radius field of vision, shown in figure 4.18.
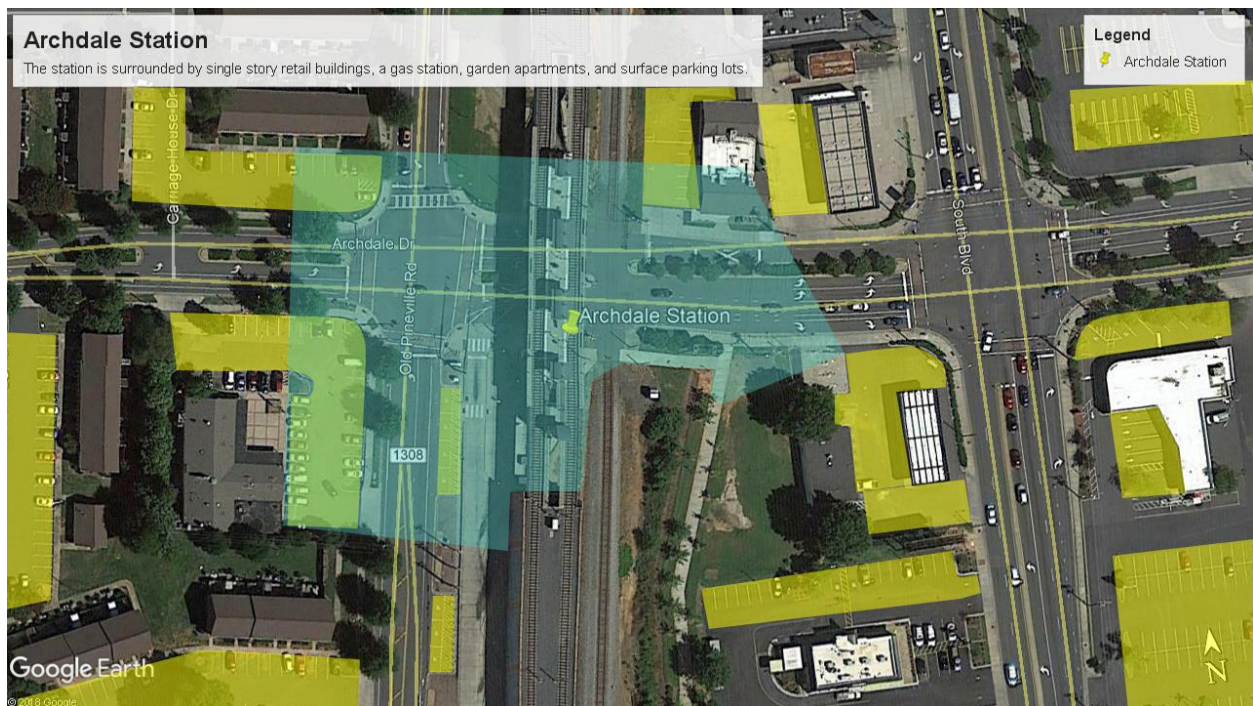

Figure 4.17. Archdale Station in suburban Charlotte. The yellow areas are surface parking, and the blue highlighted area is where I carried out the public life study at the street level.
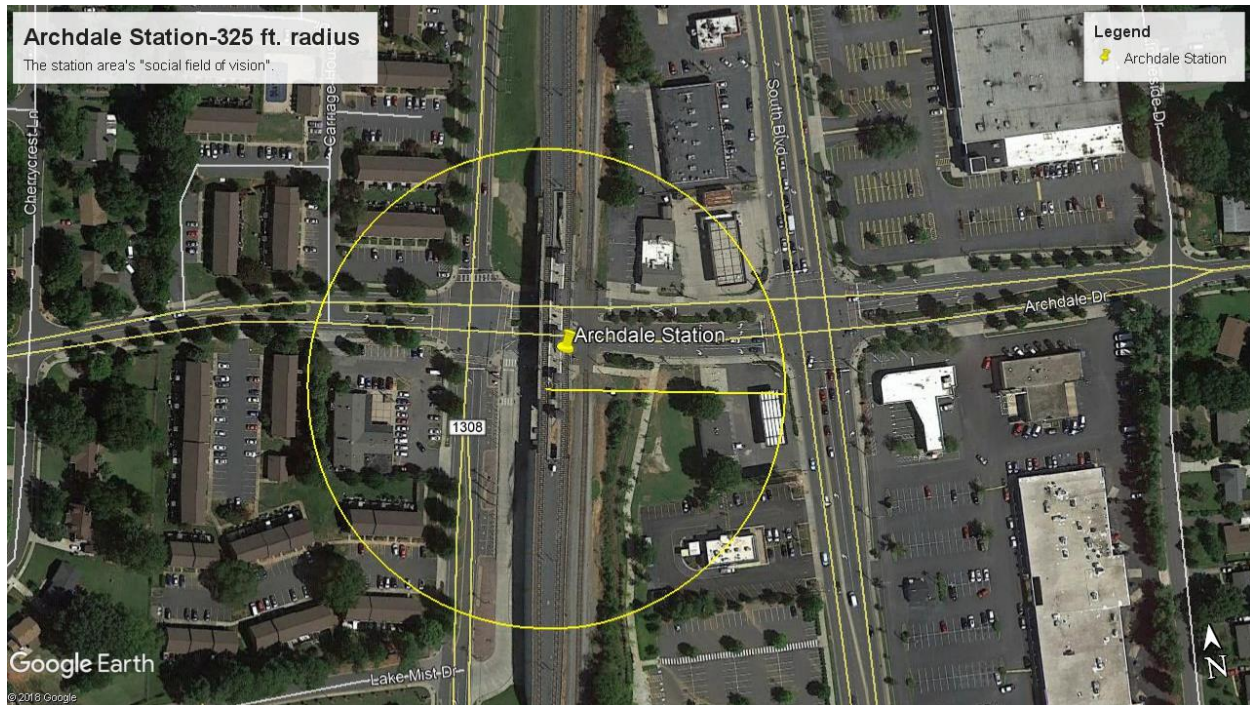
Figure 4.18 The Social Field of Vision of the station area. This radius was how I chose to define the extent of the area I studied.

Archdale-The Pedestrian Experience

The Archdale station area is an island of human-scale space in a sea of auto-dominated infrastructure. The roads bordering the station, Archdale Dr. and Old Pineville Rd. were built and maintained to a standard the prioritizes the movement of cars, though considerable attempts at making the station area pedestrian and bike friendly have been made (Figure 4.19 and 4.20). The study area has complete sidewalks, bike lanes, and signalized crosswalks, but the scale of the infrastructure, from intersections to surrounding buildings, were built well before the light rail system, and therefore are not oriented to a pedestrain experience.

Figure 4.19 Looking at Archdale Drive towards South Boulevard. Signalized crosswalks, a bike lane on Archdale Drive, and a median are attempts to make this space more pedestrian friendly.

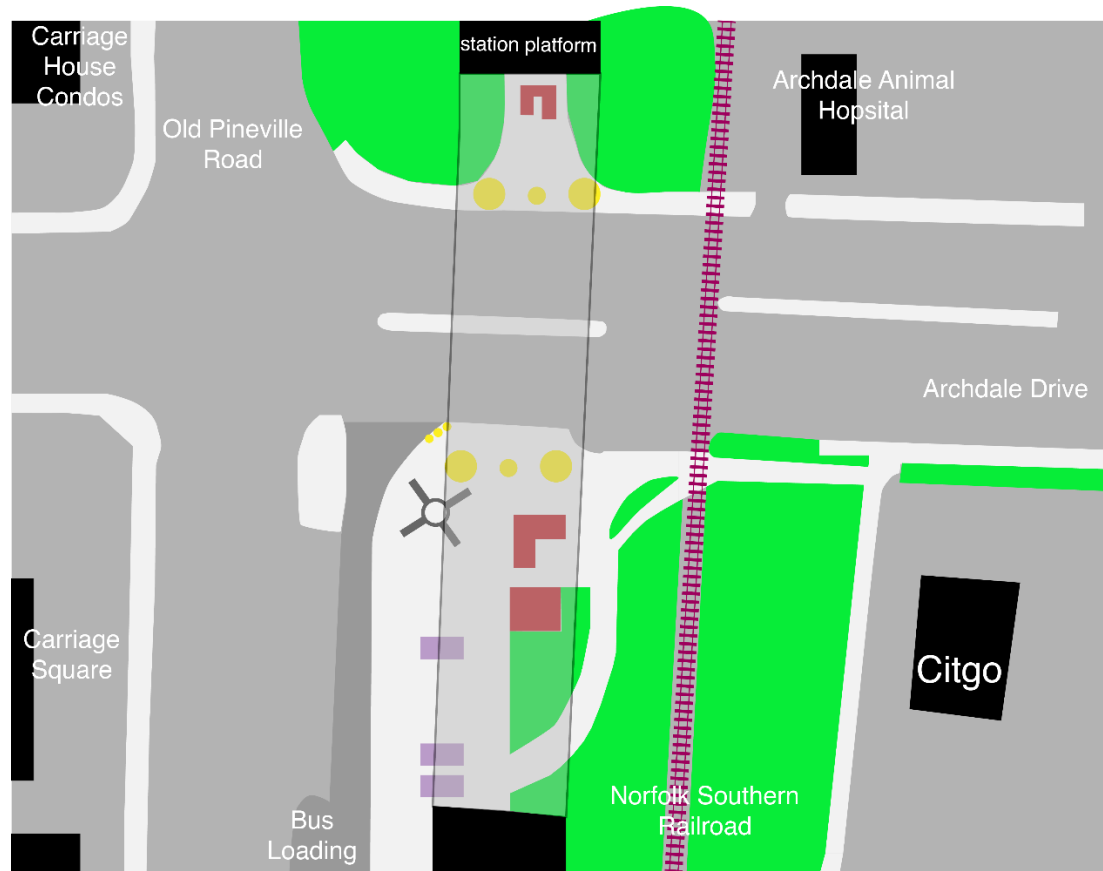*Figure 4.20. Old Pineville Road.*

Figure 4.21. Labeled Site Plan.

Figure 4.21 illustrates how the street and its surrounding uses relate to the station platform. The red areas indicate stairs and an elevator that allows pedestrians to access the station platform. The yellow shapes are concrete pillars that hold the platform above Archdale Drive. The purple train tracks are a freight railroad.

There is less intense pedestrian activity at Archdale station when compared to 3rd St./MLK Jr. Blvd. On average, at the AM weekday peak from 8-9am, only 232 pedestrians passed through the station. In three weekday morning counts, fewer than 7 percent of these pedestrian trips used the path to the Park & Ride lot, indicating to me that relatively few park and ride commuters are using the station. A majority of passengers who journey up the stairs or elevator to the platform arrive at the station on foot, bus, or bike, despite the station's many accommodations for auto access. Another interesting pedestrian pattern I observed was pedestrians crossing Old Pineville Road outside of the designated crosswalk. In four different periods of 20-minute observation, 53.7 percent of pedestrians crossing Old Pineville from the station side to the Carriage Square side did so about 50 feet south of the marked intersection. This could be related to the amount of time pedestrians are required to wait to cross legally and how long they have to cross (Figure 4.22). A significant amount of the pedestrians crossing Old Pineville Road from east to west walked to a convenience store in the Carriage Square strip mall. A significant amount of them were young men of color.
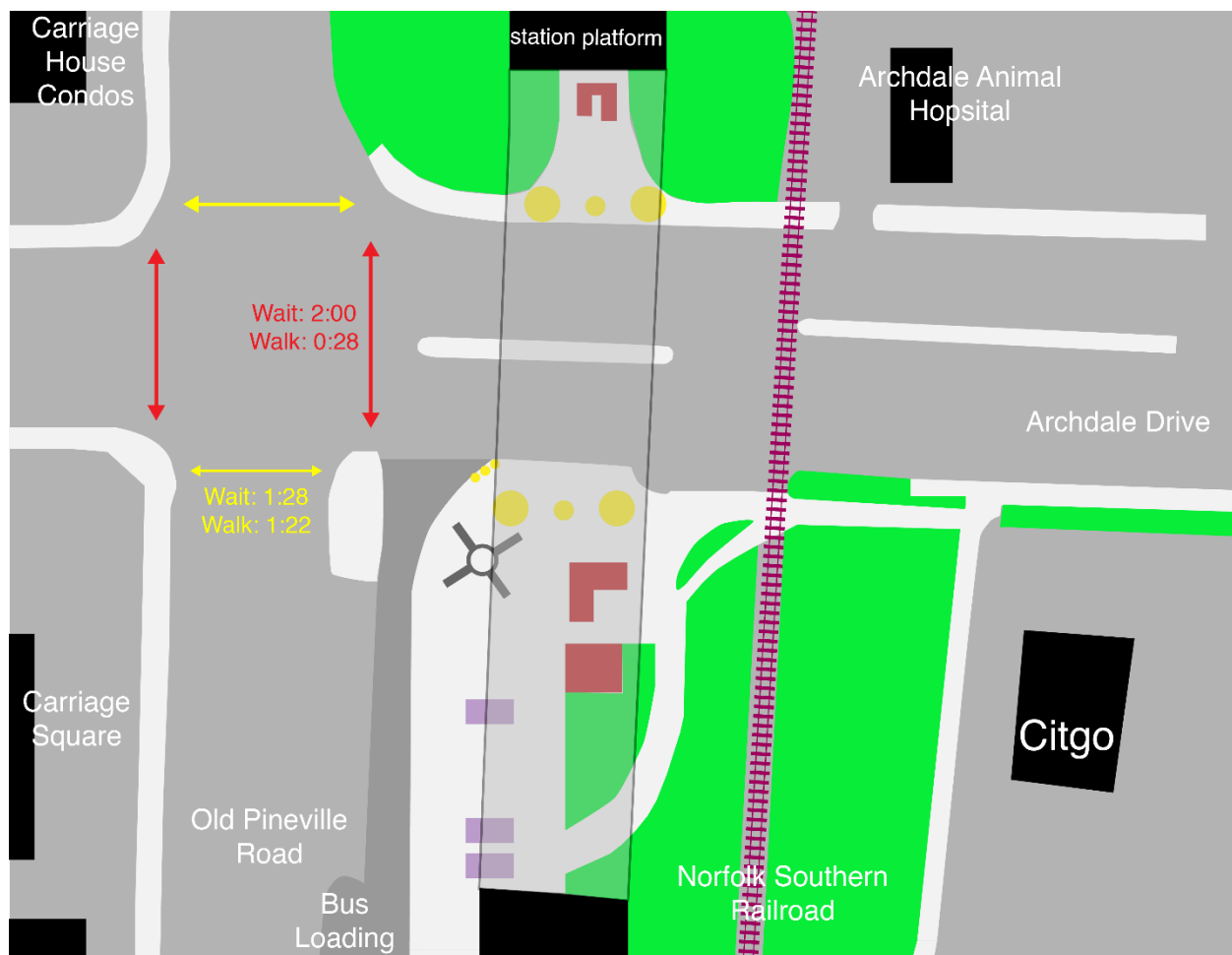

Figure 4.22. Test walk.

Figure 4.23 illustrates the composite intensity of pedestrian traffic at Archdale Station, with thicker lines indicating a heavier pedestrian flow, and thinner lines indicating fewer pedestrians. The main discernable patterns of movement are between west and east, with neighborhoods along Archdale Drive to the west, to the commercial strip along South Boulevard immediately to the east. Many pedestrians move to and from the bus loading area south and west of the station. Hardly any pedestrians use the north side of the station platform. When they do, it is usually to exit the station.
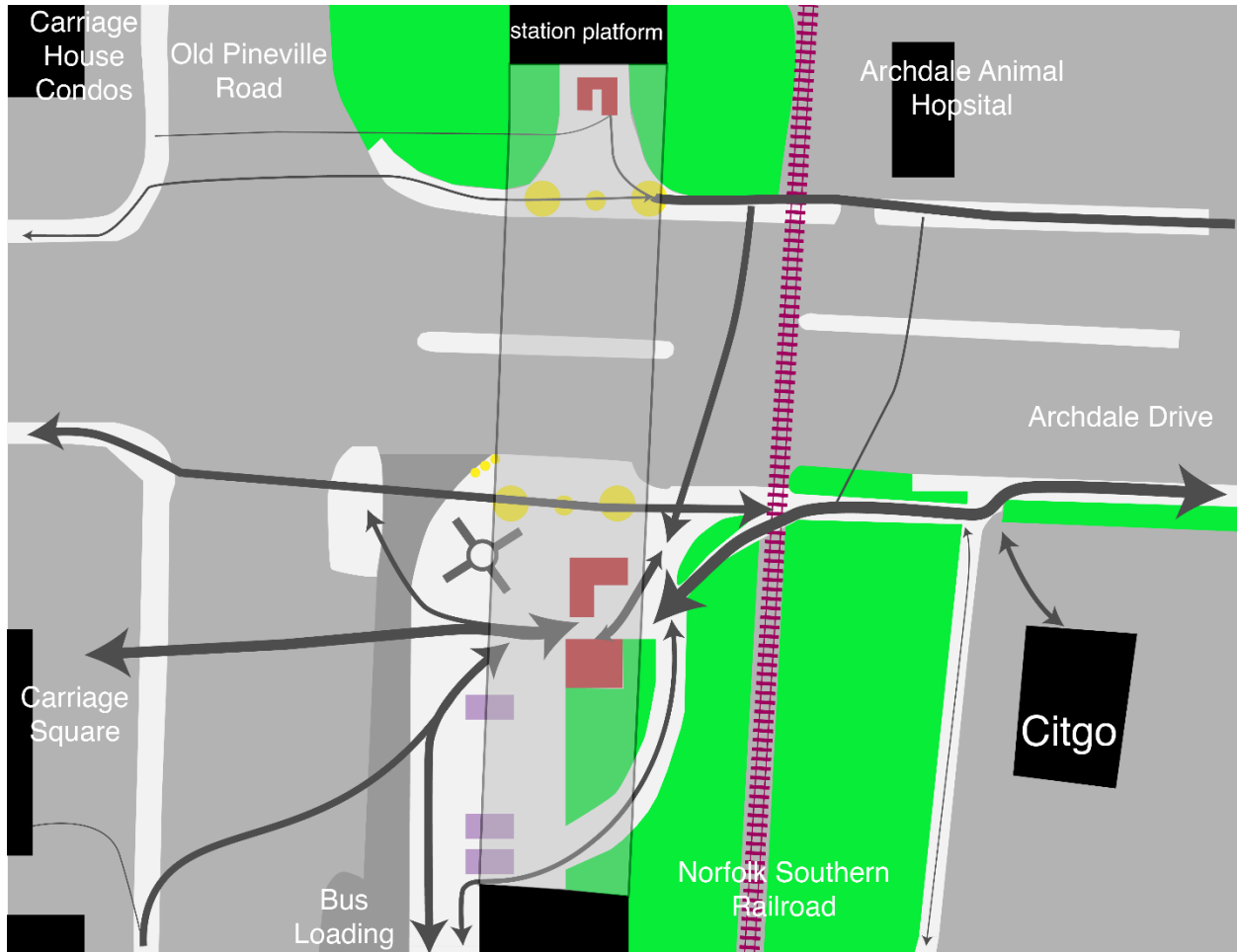
Figure 4.23. Path sketching

Figure 4.24 illustrates how the built environment is not conducive to the path of least resistance pedestrians want to take. A worn patch through the grass indicates the paved sidewalk near the north stairway to the platform is not aligned to the pedestrian traffic arriving from the east. Figure 4.25 shows three people crossing illegally at mid-block, taking the shortest route possible from the Carriage Square strip mall back to the station plaza.

Figure 4.24. Leaving a trace. This desire line is immediately west of the NS train tracks on the north sidewalk along Archdale Drive. This path is a physical trace of a human desire to take the shortest route possible.

Figure 4.25. Young men cross Old Pineville Road 50 feet south of the marked crosswalk. The wait time to cross is almost a minute and a half, and pedestrians are given 1:22 to cross.

Archdale-Quality of and Opportunities for Social and Optional Activities

There were comparatively more and a greater diversity of activities at Archdale compared to 3rd St/Convention Center. During the day, a man sought refuge on the side of the staircase on the south of the plaza, optionally sitting in the space. Intermittently, he would play a guitar he carried with him. With only two exceptions, he was in the space every time I was there to study it. There were also people who conversed as they stood along the back wall of the platform. They tended to be waiting for the bus, and chose to do so in a more climatically comfortable place in the station than alongside the bus loading area. I also heard and saw children playing on a Friday night and Saturday afternoon at the Carriage House Condos (Figure 4.26). The most constant activity I observed were people conversing and conducting social time outside of the shops at Carriage Square (Figure 4.27). On some weekday afternoons, the same group of people would sit on the bench together inside the station plaza (Figure 4.28).

Figure 4.26.

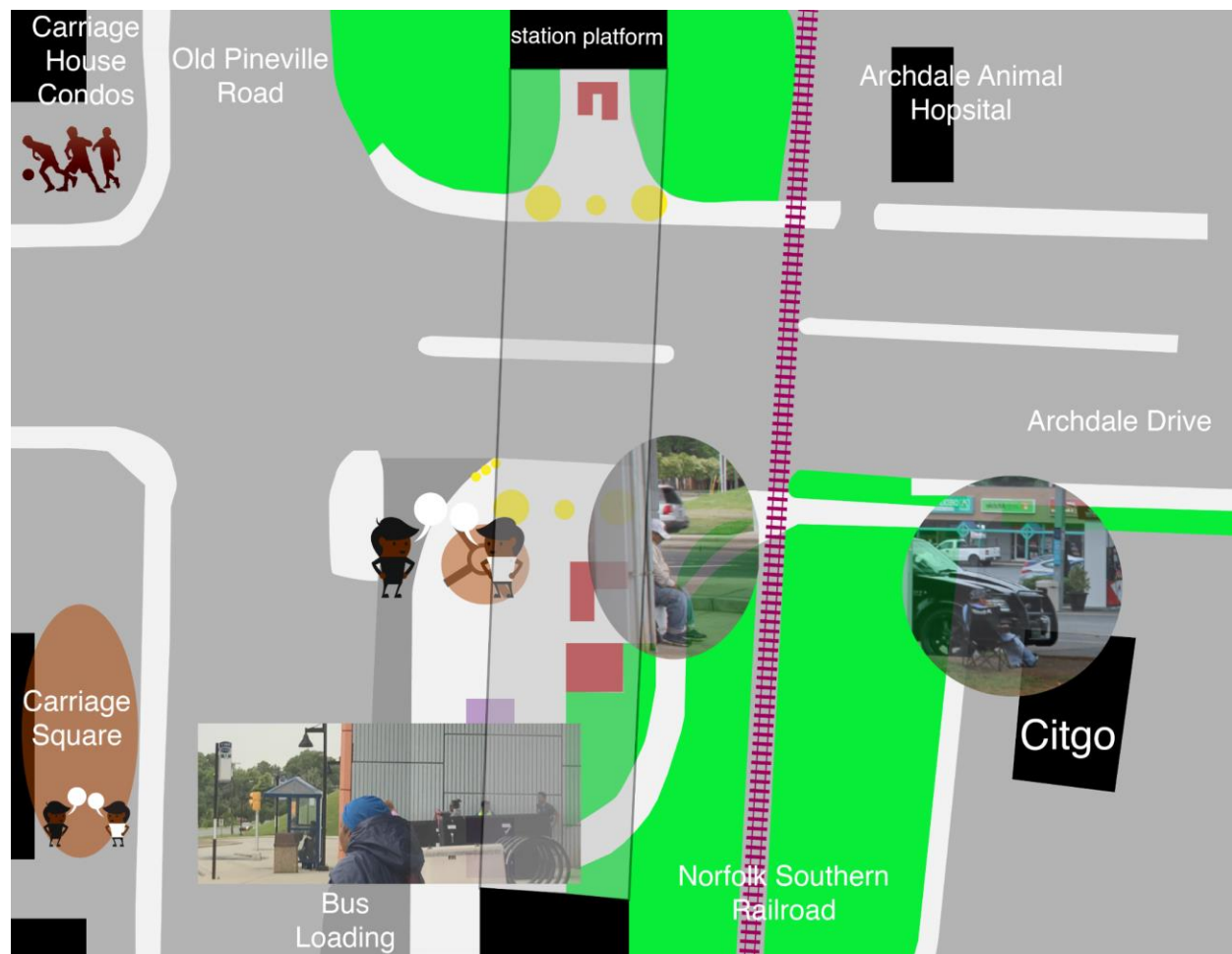*Figure 4.27.*

Figure 4.28

Archdale-Other Findings

Trains passed on the active freight railroad on almost every day that I conducted my observations. The noise was loud enough to leave my ears ringing for a few minutes after the passing train's horn blew.

The man playing his guitar was the only activity in a social distance I witnessed that I would categorize as "unwinding" or "performance.

At Archdale, I noticed a higher concentration of children, Latinos, and women at this station than I noticed at any other station where I conducted observations.

There were also traces left behind. I noticed a record of public life in the form of discarded tobacco butts left on the sidewalk. These indicated a possible trace of a conversation between two smokers waiting for a bus, or people gathered together on the bench, where there was a higher concentration of discarded butts.

Peachtree Center Station

Figure 4.29 The red box highlights Peachtree Center Station on the Red and Gold lines of the Metropolitan Atlanta Rapid Transit Authority's heavy rail system. The map portrays the extent of the system as of June 2017 when I carried out the public life study.

Station in Urban Context

The Peachtree Center station is located in the middle of downtown Atlanta, Georgia, and according to a 2016 report had the second-greatest ridership of MARTA's eight downtown stations (Central Atlanta Progress 2017, p. 31). The buildings surrounding the station are used for office space, hotels, and civic functions. Among them is the 52-storey Georgia-Pacific Tower, a Residence Inn, a Courtyard Marriott, The Ellis Hotel, and Atlanta Central Library. I chose to sit at the west entrance to gather data, because it had a clear vantage point of both entrances.
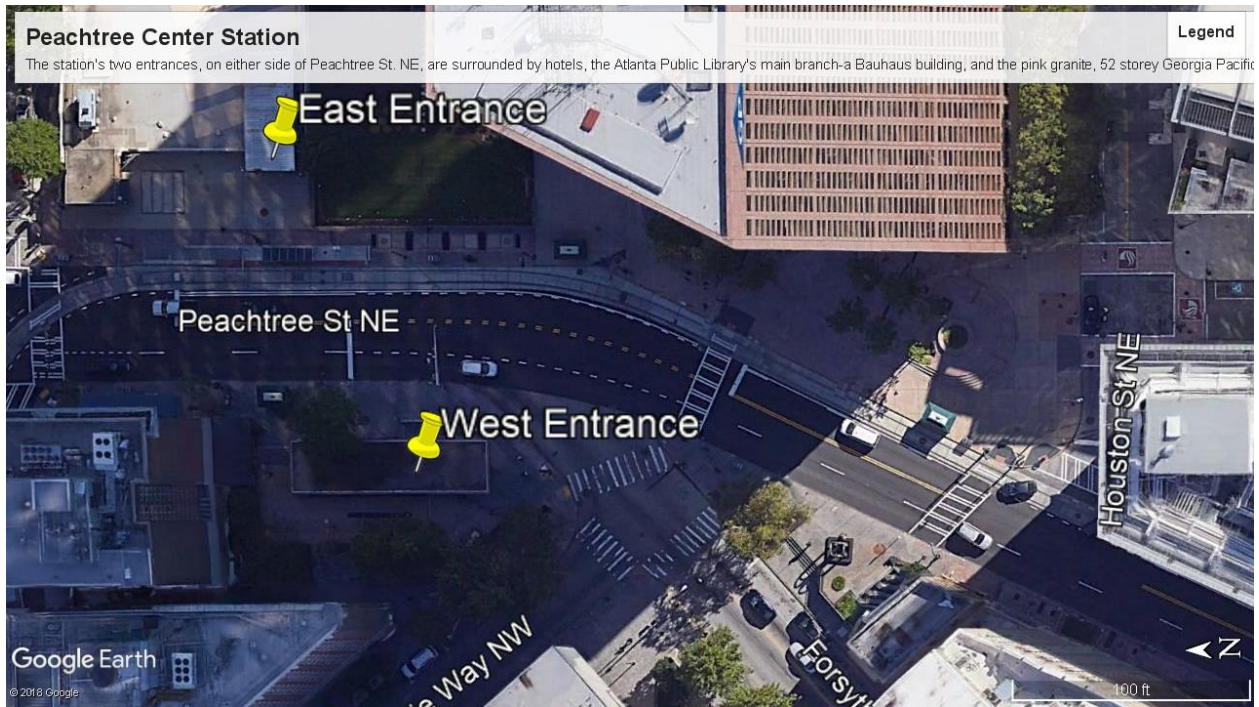
Figure 4.30. The East and West Entrances of the Peachtree Center in Downtown Atlanta. This was the only station I studied without any surface parking lots in the immediate vicinity. For the purposes of the study, I consistently gathered data at the street level at using the west entrance as a vantage point.
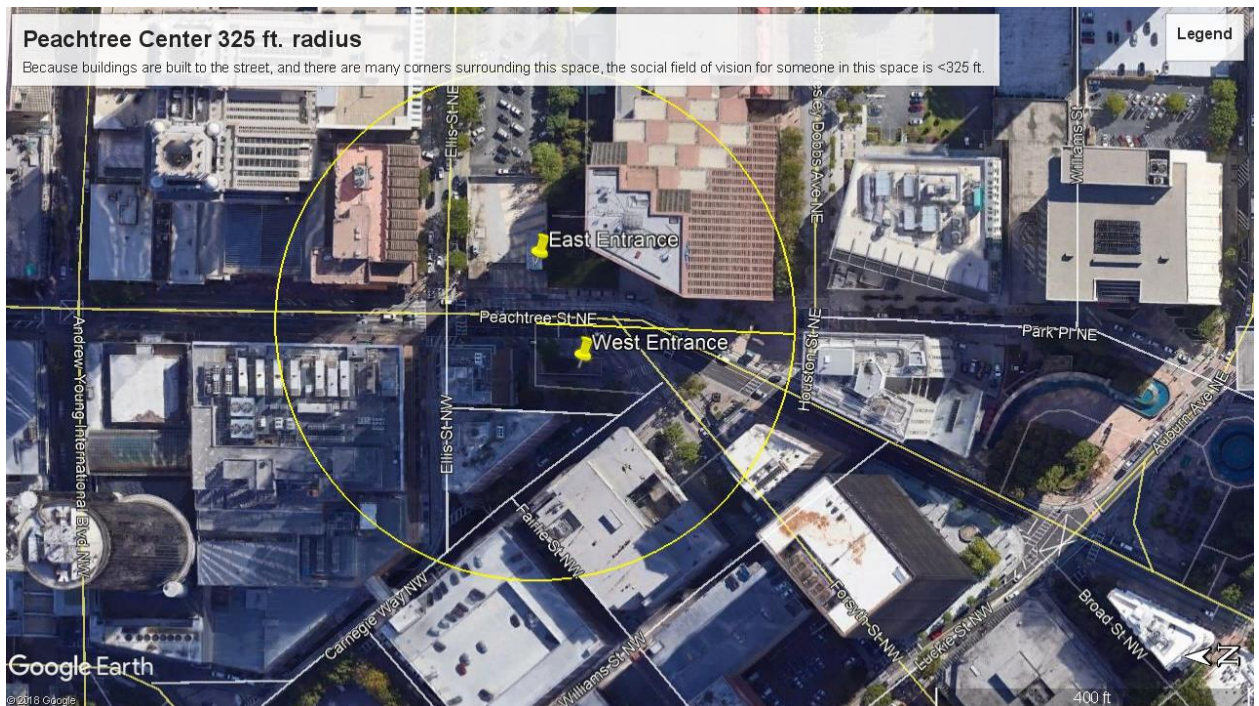
Figure 4.31 The perceptible social field of vision at Peachtree Center was reduced by the buildings, which created a kind of Lynchian edge to the space.

Figure 4.32. A view of both station entrances from the intersection of Forsyth Street and Carnegie Way NW.

Peachtree Center-The Pedestrian Experience

The Peachtree center station area is defined by the irregular and triangular intersection where Carnegie Way, Ellis Street, Forsyth Street, and Peachtree Street intersect. Of all of the stations I studied, Peachtree Center had the most intense and variable pedestrian activity, especially during the peak rush hours on weekdays. This is likely anchored by the density of buildings—namely offices—surrounding the station area. There is certainly more space for pedestrians here than at other sites I studied, with generous plazas such as Margaret Mitchell Square, the Georgia Pacific plaza, and the areas in front of both MARTA entrances making plenty of space for pedestrians. I also noticed that pedestrian paths tended to correspond to marked intersections, of which there are nine in this relatively compact space. Figure 4.33 illustrates an example of a human scale amenity—a newsstand—an exceedingly rare site both in 2018 and unique among all four sites I studied.

Figure 4.33. A newsstand directly adjacent to the west entrance of the Peachtree Center MARTA station. The stand was open every weekday I visited the site, from the beginning of morning rush hour (8am) until the end of the evening rush hour (6pm).

Peachtree Center-Quality of and Opportunities for Social and Optional Activities

Below is an excerpt of the diary I kept while observing the Peachtree Center site:

> At 4:45pm on a Monday, the station area has peds flowing from all directions. Good mix of office workers, visitors, hourly labors (judged by dress). Staying activities have been visible already. Many phone conversations.

I also took a census of staying activities the same afternoon and evening, which revealed a gradual decrease in quantity of staying activities from 18 in the 5pm hour to six in the 9pm hour. This is also the only station area in which I recognized a personal relationship between two different people who frequently inhabited the space. On multiple occasions, I observed the woman who worked at the fruit stand interact with the bellhop at the Ellis Hotel. This was a sign that this space had a sense of character, identity, and "ownership".

In Figure 4.34, I highlighted the areas in which I observed repeated optional and social activity with orange circles, and the paths that people tended to walk most frequently. Unlike in other sites, almost no one crossed the street outside the designated crosswalks.
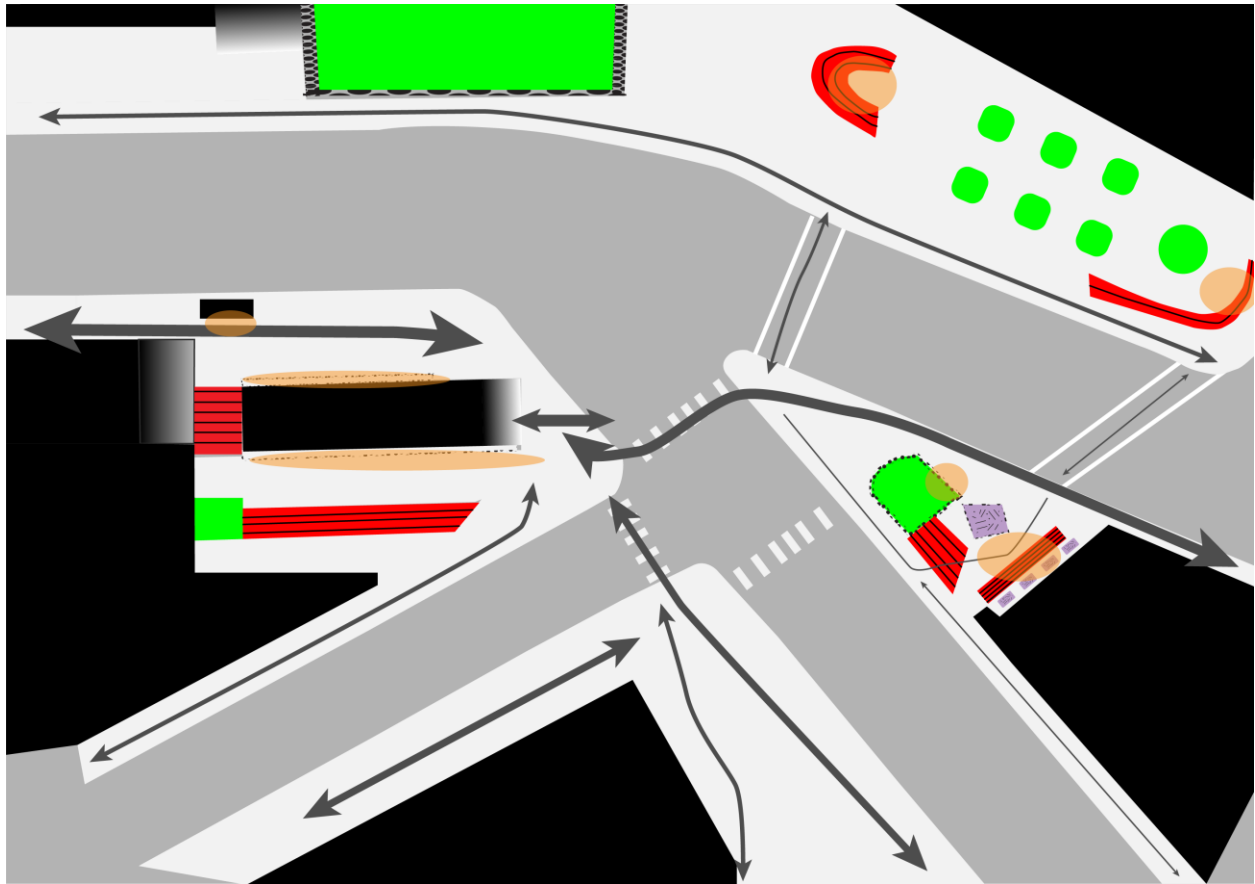
Figure 4.34. Grey lines with arrows represent paths people take, and transparent orange circles represent areas of social and optional activities.

East Point Station
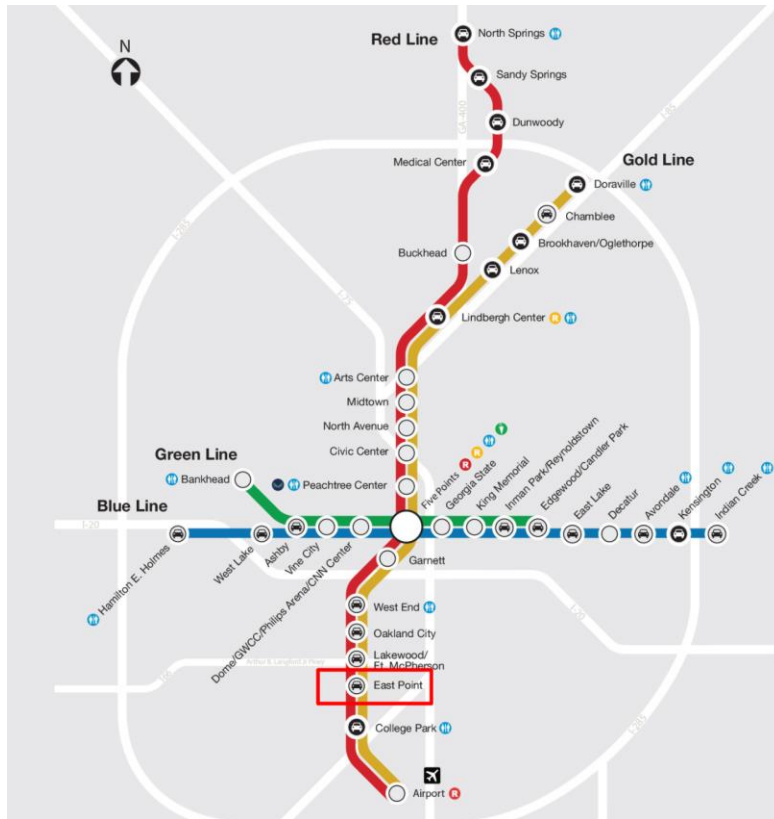
Figure 4.35. The red box highlights East Point Station on the Red and Gold Lines of the Metropolitan Atlanta Rapid Transit Authority heavy rail system.

Station in Urban Context

East Point station is located in East Point, Georgia, and incorporated city in Fulton County about six miles south of Downtown Atlanta, and about 2.5 miles north of Hartsfield–Jackson Atlanta International Airport. The station area is a conglomeration of urban typologies, owing to the city's history as a terminating point of a railroad in 1870, around which a small downtown and rail-dependent industries developed (East Point Government, 2018). Today, one and two-storey buildings home to restaurants, banks, and office buildings stand on the few blocks surrounding the station. The active freight rail line to the east of the station creates the edge of the downtown (Figure 4.38).
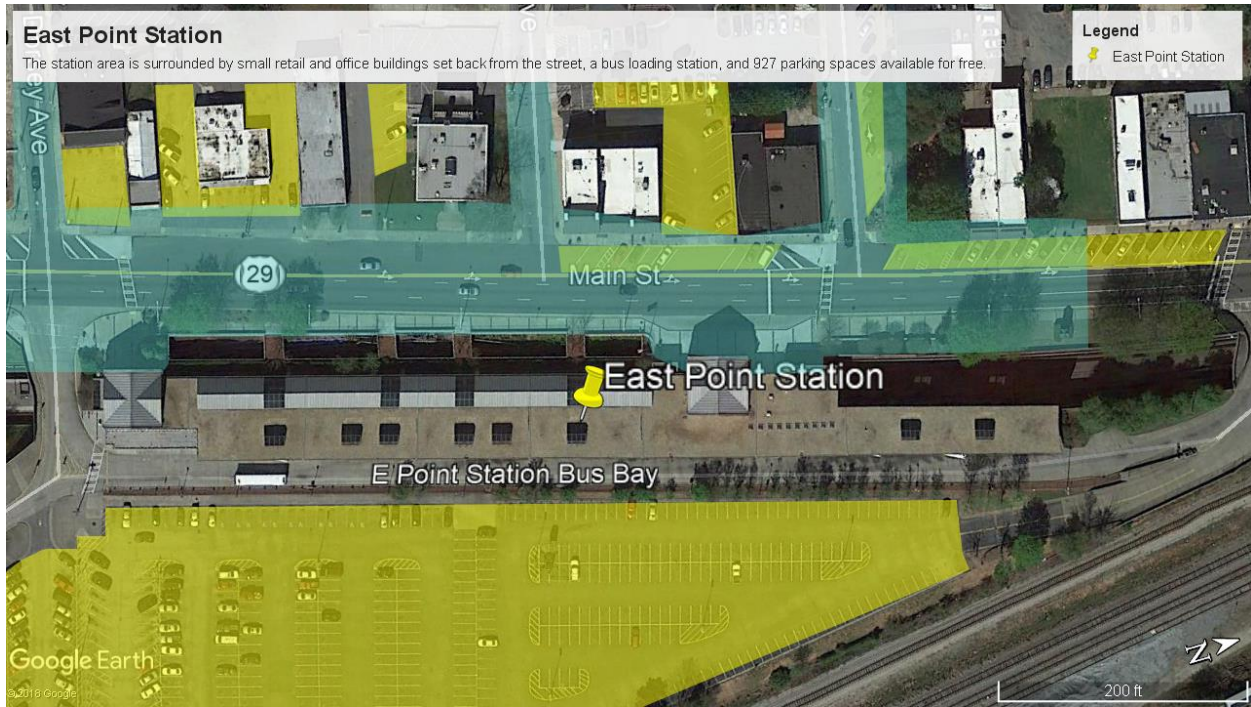
Figure 4.36. East Point Station in suburban Atlanta. The yellow areas indicate surface parking, and the blue highlighted area is where I carried out the public life study at street level.
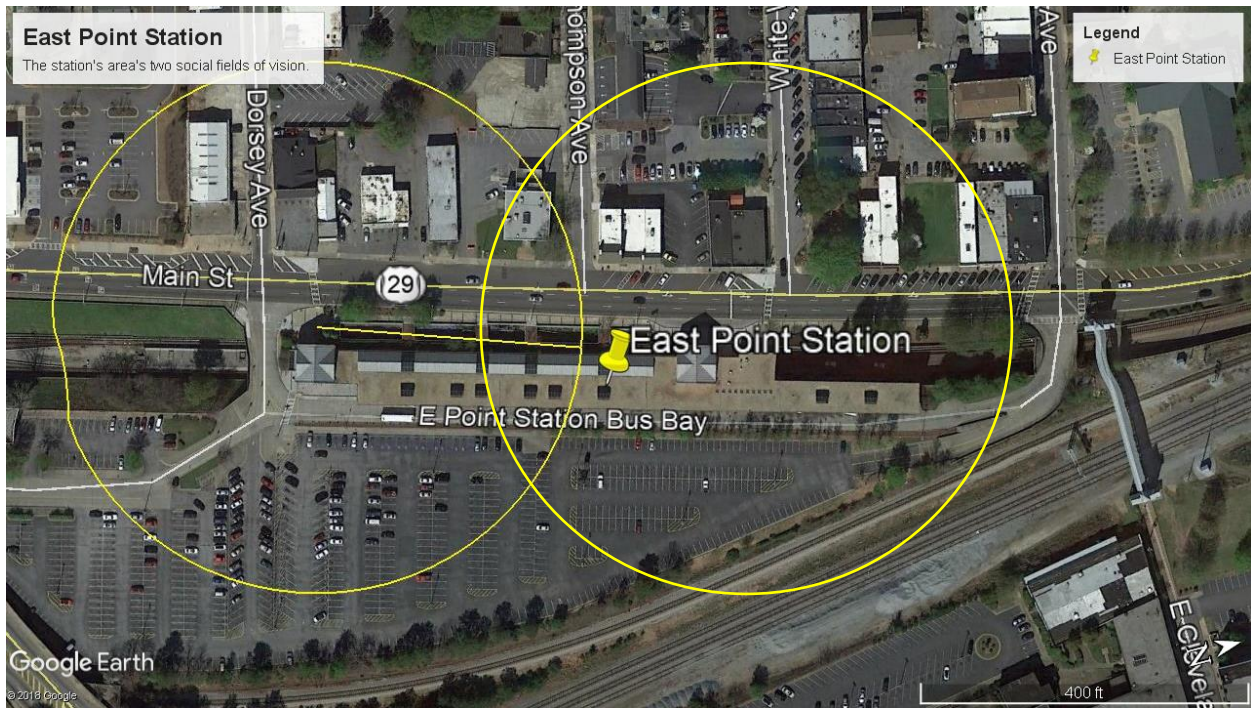
Figure 4.37. The Social Fields of vision at the North and South entrances to the station. The radius was how I chose to define the extent of the area I studied.

Figure 4.38. East Point's urban core is defined by the railroad to the east, Washington Avenue to the south, Church Street to west, and West Cleveland Avenue to the north.

East Point-The Pedestrian Experience

The station area at East Point is plagued with problems similar to those I observed at Archdale in Charlotte. The station area itself is relatively walkable, but the buildings and streets that surround it are built to prioritize the movement of automobiles.

Figure 4.40. Pedestrians wait to cross the marked crosswalk in front of the East Point Station. I observed many people crossing outside of the designated crosswalks, despite the signs warning against it.

Almost every building along Main Street, which is a one-way, three-lane road that prioritizes vehicle circulation, is set back from the street. There was significant pedestrian activity generated between the convenience store and the sidewalk on the station-side, as shown in Figure 4.41 and 4.42.

Figure 4.41. Pedestrian dash across Main Street to the adjacent sidewalk. I noticed many pedestrians do this while making a trip to "East Point Food Mart", pictured above. The repeated action of crossing here is also indicated in the trace of the well-trodden mulch between the bushes.

East Point-Quality of and Opportunities for Social and Optional Activities

Below, I show the major sites of social and optional activities with the orange circles in Figure 4.42. Immediately outside the station entrance, generously sized benches provide primary seating to station users. This is where I witnessed most social and optional activities take place, in addition to the parking lot in front of a convenience store, and almost identical situation to the one I observed at Archdale in Charlotte. There is still a sense of "hanging out" that takes place at primary and secondary seating. Because East Point station has a large bus transfer area, I witnessed many bus drivers taking breaks, chatting with one another while seated in the shade (Figure 4.43). Traces of human activity in the form of cigarette butts abound in these secondary seating areas.
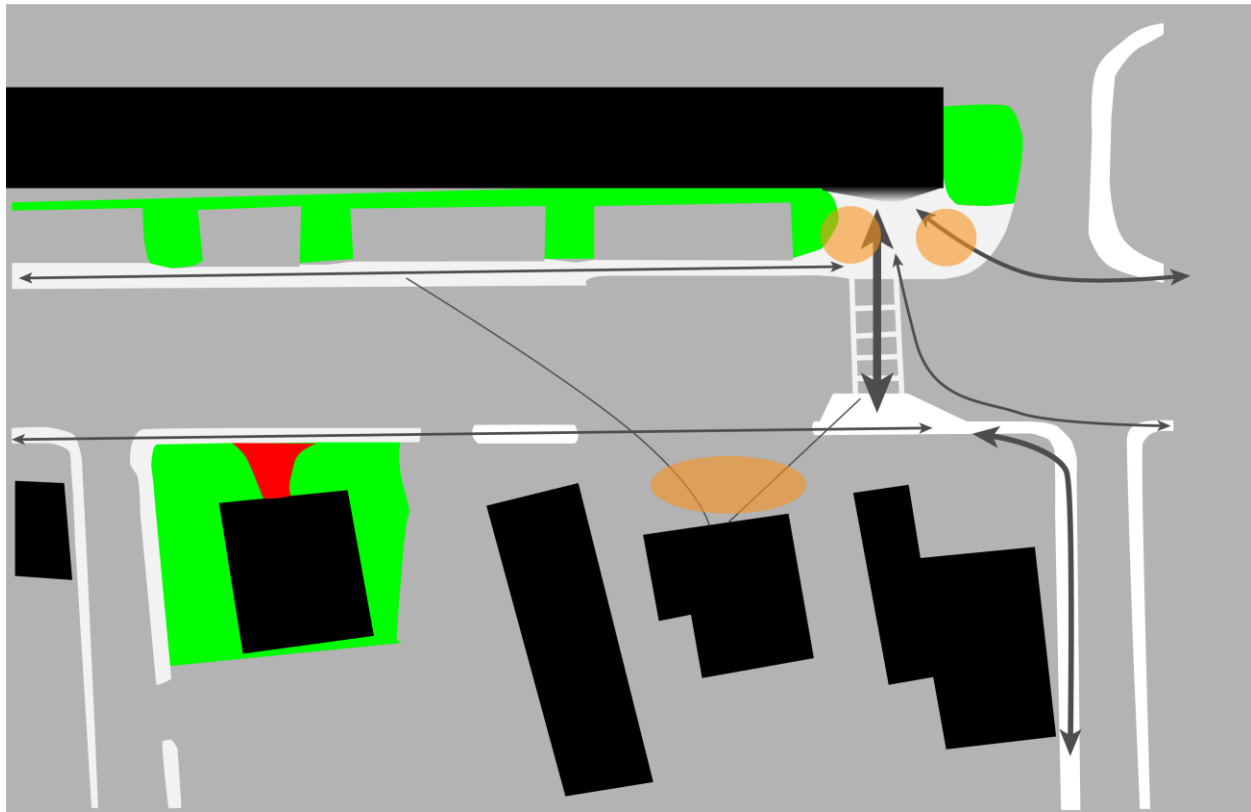
Figure 4.42. Grey lines with arrows represent paths people take, and transparent orange circles represent areas of social and optional activities.

Figure 4.43 A MARTA bus driver on break performs a social activity in the shade along a ledge—a ledge with a perfect height for secondary seating option.

Summarized Criteria Rating for all 4 Stations

MARTA		Public Life Score (X/60)
Station Name	Designation (core or village)	
Peachtree Center	Core	32.5
East Point	Village	24
LYNX		
3rd St./Convention Center	Core	28.5
Archdale	Village	29

Florida Brightline

I initially intended to repeat this study at two stations in South Florida, where Brightline opened in January 2018. Brightline is a privately owned and operated higher-speed rail system that will soon connect downtown Miami to West Palm Beach via Ft. Lauderdale. After traveling to Florida, I attempted to repeat the method at the Fort Lauderdale station. I was unsuccessful, in large part due to the fact I had no permission to be in a privately owned space. A security guard asked me to leave 20 minutes after I began my first session of observations.

I may not have been able to pursue the method, but I did come to some conclusions. My removal from the Brightline Station by private security is an indication that public life researchers are not welcome in "privately owned public spaces", of which Brightline's stations are an example. If researchers have to buy a product or service to justify legally occupying space, they cannot remain inconspicuous. It could also be dangerous or even illegal to attempt to occupy a private space without explicit permission.

Further, I believe the built form of the Brightline Station is evidence that creating a luxurious private space with convenient parking and amenities—that happens to be attached to a rail station—is of much greater of importance to Brightline than contributing to a seamless and sustainable regional transportation network or enhancing public life. In Fort Lauderdale, the Conceptual Station Plans that the project architect, SOM, showed that the station was to be co-located with an existing bus station adjacent to Broward Boulevard, near downtown (Figure 5.1)
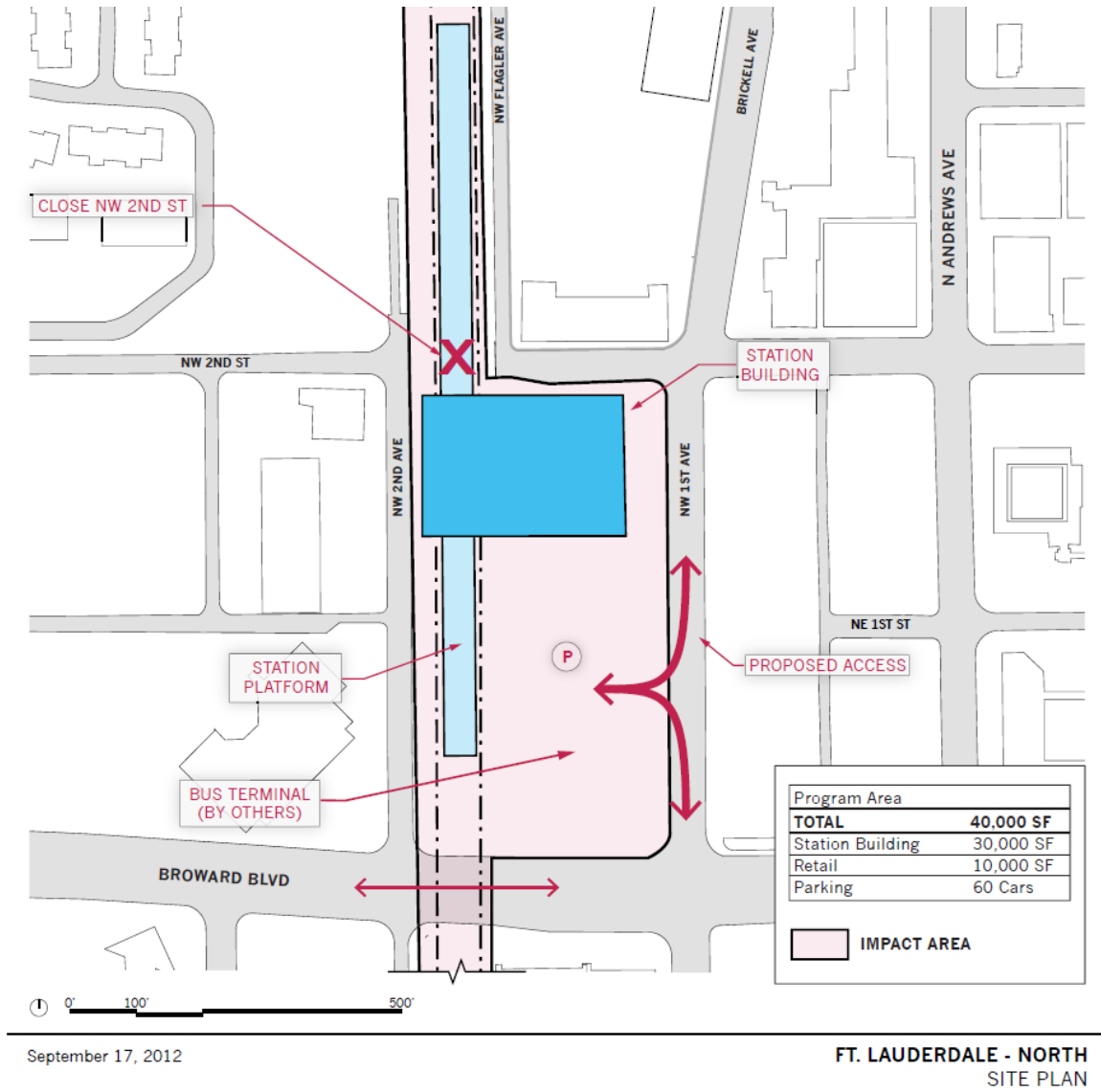
Figure 5.1 The Site Plan for Brightline's Fort Lauderdale station, as submitted to the Federal Transit Administration in October 2012 (Federal Railroad Administration 2012).

Below is an illustration of the station's site plan, as it appeared to me in March 2018 (Figure 6.2). The original concept of co-locating the bus station and the new Brightline station was abandoned.
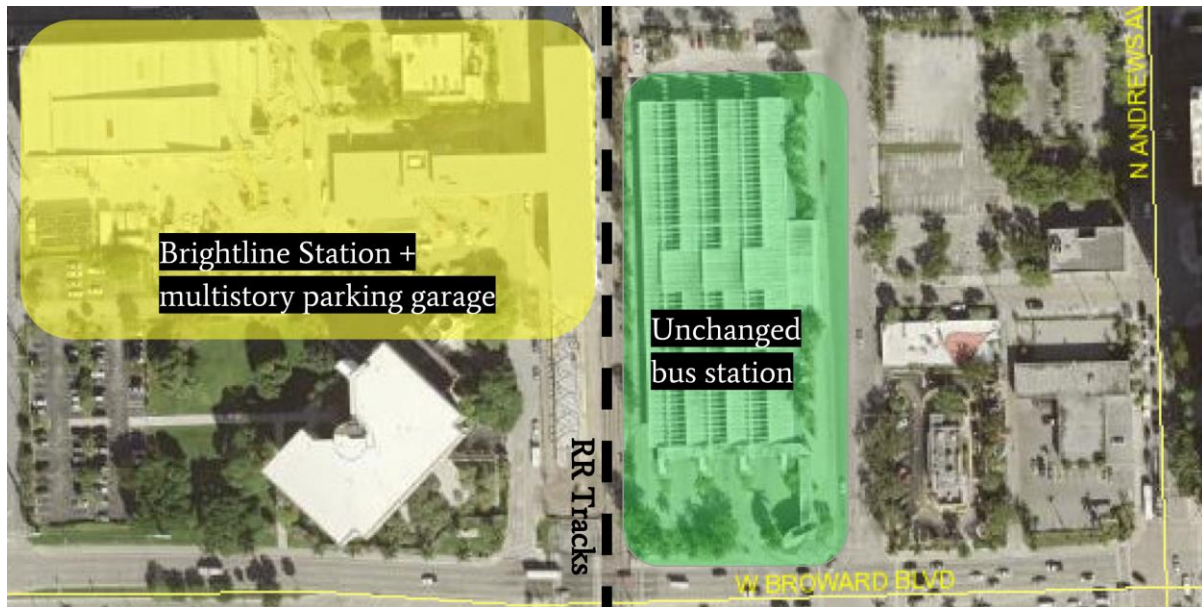
Figure 5.2. The site plan (with my annotated illustrations) as of March 2018. There is no way to conveniently access the bus station from the Brightline platform. A pedestrian must walk at least 200 yards towards Broward Blvd. I noticed no Brightline passengers disembarking from the train and walking to the bus station.

From the pedestrian perspective, this led to a dichotomy of experience, one that I characterize as "public" vs. "private", as illustrated with photographs below.

Figure 5.3. This is a photo of the private pedestrian experience at the Fort Lauderdale Brightline station. Comfortable seats and tables, shaded, well-lit entrance to the station. Modern amenities such as solar panels and pavers. A sense of security. Separation from cars.

Figure 5.4. The public pedestrian experience along Broward Avenue in Fort Lauderdale, immediately adjacent to the public bus terminal. Chaos and cones. "Sidewalk Closed", beg buttons, and an 8-lane stroad to cross. ADA-non complaint. Ignorant of the pedestrian experience.

Stripped to their most basic function, Brightline, the Broward County Transit Authority, and the city of Fort Lauderdale's sidewalks serve the same purpose: to move people efficiently and safely through space. But the nature of the experience each create are totally disjointed, and Brightline, through privatizing travel and privatizing a functionally "public" space, is clearly the most pleasant at a human scale. And yet it is still totally reliant on cars, given the station's distance from the sidewalk and its free-to-park deck. Does Florida Brightline foment public life—or does it create a private alternative?

Discussion

All four places I considered in public life studies scored low on the 12 Criteria of Public Life matrix. What were the common elements that made them lackluster public spaces? This in large part depended on whether the station was an "urban village" or an "urban center".

At urban village stations, buildings were mostly set back from the street with parking in front, had massive parking lots and bus loading stations, such as at Archdale and East Point. They also tended had very little residential or retail density around them, though Archdale's strip mall was an outlying exception. At urban center stations, buildings were too large to provide any amenities at the human scale, had very few facades or entrances with activity near the station, with the exception in Atlanta of the Central Public Library and the exception in Charlotte being the Convention Center. Even at urban stations, space for cars in the form of surface parking lots and multi-lane streets dominated the landscape. Even at peak periods of pedestrian travel, the number of passing cars usually outnumbered pedestrians by about 3:1 at urban center stations, and 10:1 in urban village stations. I suspect that most of the other stations in these transit systems suffered from similar problems to the ones I observed. These observations speak to the three aspects that make these spaces unsuccessful as sites of public life:

Lack of overlapping activity in space and time

In Life Between Buildings, Gehl devoted an entire chapter to a dichotomy between assembly and dispersal of human beings in public space (2006, p. 80-128). He concludes that properly assembling people and the events they bring, not merely assembling buildings, is the key to creating a rich public life in urban spaces. The spaces I studied violated the prescriptions he makes in this section, and I will use Archdale Station in Charlotte, NC to elaborate.

Gehl says that the usual radius of action for people on foot is between 400 and 500 meters per excursion, about ¼ mile. At Archdale station, a pedestrian could reach most of their daily needs within a quarter mile of the station area. There is a Food Lion Supermarket, a Credit Union, restaurants, and a couple of nearby apartment complexes. Nevertheless, the space is over-dimensioned, built in a sea of parking lots that clearly prioritize the circulation of the automobile. Gehl notes that the "overdimensioning areas for few people and few activities" is very straightforward way to disperse events (p. 91). Even though he was talking about pedestrian streets and plazas that were too wide, the same problem rings true at Archdale, where the pedestrian experience is an afterthought.

Another problem of dispersal unique to the Archdale station site deals with vertical separation. At Archdale station, the light rail station platform for loading and offloading transit vehicles is at least 20 feet above the ground plane (see Figure 4.19). Gehl notes that if any activities happen at a different level from the person experiencing it, their ability to experience activity is greatly reduced (ibid, p. 97). Dispersal of activity on the horizontal axis is already an issue of experiencing public life at Archdale, and separating the station vertically only seeks to exacerbate the problem of dispersal.

Lack of eyes on the street

In her book *The Death and Life of American Cities*, Jacobs made the claim that safety and security of urban space were chiefly important issues in the modern city. Namely, Jacobs condemned planners and city builders that sought to concentrate city residents in tall residential towers, buildings with little to no

relationship to the street (1993). Further, she noted that strangers in a city are actually a significant safety asset to an urban street, and that successful city neighborhoods do the following:

1. Provide clear demarcation from what is public space and what is private space
2. Encourage eyes upon the street, "eyes belonging to those we might call the natural proprietors of the street. The buildings on a street equipped to handle strangers…must be oriented to the street…
3. The sidewalk must have users on it fairly continuously, both to add to the number of effective eyes on the street and to induce the people in buildings along the street to watch the sidewalk in sufficient numbers."(ibid, p. 35)

Researchers have concluded that Jacobs' observations have laid the groundwork for an understanding of public safety in urban environments (Cozens & Hillier, 2012). It was clear to me that the perception of safety in the spaces I studied is jeopardized by an ignorance of the principles Jacobs expounds upon. In the station areas I considered, public and private space blend into one another, very few if any buildings are oriented towards the street, and the flow of people on the sidewalk is so limited at some points of the day that a pedestrian may feel as though no one is following her, except for a criminal. An example of a proper station area design that incorporates "eyes on the street" is seen in Figure 7.1.

Figure 7.1. A mixed use residential building stands adjacent to a light-rail stop. The passersby and the residents of the building provide the "eyes on the street". Photo: Vauban, Freiburg, Germany (by author)

Given what we understand about the historical context of porch culture and the public life that flourished around train stations in the early 20th century South, we apply Jacobs' prescription of eyes on

the street in a 21st century context. At the transit stations I studied, there was a notably lack of chance encounters or optional and social activities taking place. A contributing factor to this dearth of public life was an orientation of buildings and amenities that prioritized access to the automobile, rather than a supportive environment for the pedestrian scale. If public life can flourish in the South again, planners and real estate developers alike could reflect on the built form of Southern architecture that encouraged contact with the street, the very concept Jacobs described in *Death and Life of Great American Cities*.

Plentiful, free parking

Inherent in understanding the idiocy of free parking around transit stations is considering the concept of opportunity cost. Essentially, the opportunity cost of a parking space, lot, or structure is any other urban land use imaginable: park, 50 story tower, mixed-use neighborhood, public elementary school. Planners and real estate developers alike derive the value of urban land from many different variables. One of those variables is accessibility via a given mode of transportation. In the case of urban land proximate to rail transit stations, accessibility to other places is greater via transit than any other mode of transportation, especially in areas with lots of traffic congestion. Yet around all four of my studied station areas, planners have squandered valuable, transit-proximate urban land to store private automobiles, oftentimes at no direct cost to the person who parks it. As Donald Shoup chronicles in his paper about the costs of parking, parking requirements can raise housing costs, reduce the urban density that supports transit use, and subsidize the automobile trips that transit must compete with (1997). Simply put, lots of free parking is antithetical to any land uses that would support public life.
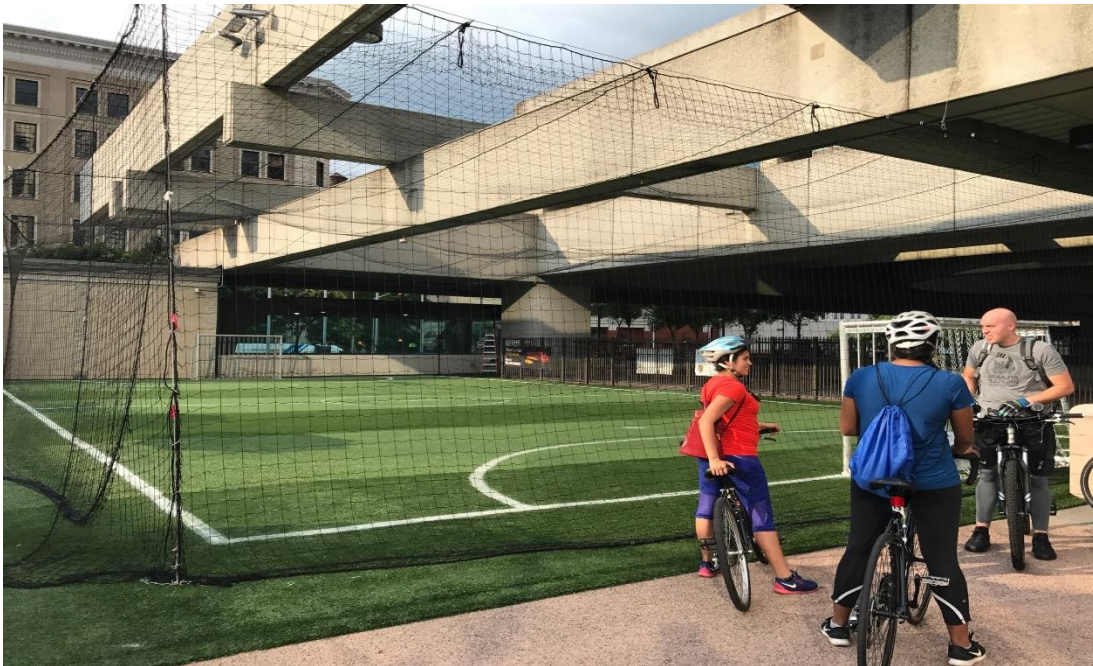
Figure 7.2 A soccer pitch in the Five Points MARTA station in Atlanta, Georgia provides opportunity for optional and social use of a public space.

Discussion Summary

These three factors have a significant negative impact on transit ridership. If cities in the South are to successfully decrease greenhouse gas emissions, stations have to be designed to encourage overlapping activity, activate eyes on the street, and get rid of plentiful and free parking, ideally converting it to

workforce housing. One agency I studied, MARTA, is already beginning to conceive of transit space as vibrant public space that can attract overlapping activity in space and time. The agency recently installed a miniature soccer pitch at its Five Points station (Figure 7.2).

 In addition, several problems with the research method arose over the course of my observations. To a significant extent, the perception of transit and urban spaces in the South is tied very closely to the history of racism and abandonment of public space (Kruse, 2005). Henderson (2006) tracked the history of the founding of MARTA and found that in predominantly white counties that bordered Atlanta, decision makers in these counties resisted joining MARTA or even establishing their own independent transit services "under a cloud of racialized rhetoric and considerable movements of middle-class whites away from proximity to blacks and to separate majority white suburbs." (p. 299). Arbinder (2014) chronicled MARTA's history, and concluded that it was never destined to be a comprehensive regional transit system, nor a system that met the needs of Atlanta's black communities (p. 53). Nearly forty years on, the consequences of transit abandonment and systematic oppression along racial lines has created station areas and urban neighborhoods that segregate along the lines of race and class.

The creation of a racialized space foments conditions in which the researcher's personal identity influences the method. There were many times during the study in Atlanta which passersby stared at me, called out to me, and asked me to describe my reason for being in a space. My presence could have influenced the optional and social behavior as a person of economic and racial privilege. A Dane (Gehl, 2006) pioneered the method of the public life study in racially homogenous Denmark and Italy. Though Gehl makes mention of gender and age in his instruction manual for public life studies, there is no mention of race or ethnicity (Gehl & Svarre, 2013). I found that this method is not well suited for studying spaces in which the researcher is of an identity group historically in conflict with those living in the observed space.

Nor is the method well suited for studying a space that, despite being pedestrian friendly and well situated to transit, is privately owned. I initially intended to study Brightline, a privately owned and operated intercity rail transit system in South Florida. As I soon learned, the consequences of treating private owned "public" space as I had the stations in Charlotte and Atlanta was expulsion. Brightline's model indicates that if less investment is made into creating publicly accessible transit, we could end up a relatively sustainable mode of transportation that adds little to no value to the public realm. We should consider the consequences of the privatization of transit space, and ask transit officials how to expedite their processes to build more rail transit, faster.

Conclusion

Automobile scale transportation infrastructure and buildings dominate the built environment of the American South. However, two rail transit systems in the American South capture a higher transit ridership than rail-lacking regional peers. What is the quality of public life in transit stations in an urban and suburban typology? To investigate this question, I tested proxy variables to estimate the highest expected public life, and then carried out public life studies in four rail transit stations.

Public spaces around rail transit in the South lack in public life because of an overprovision of parking, lack of intersecting activity in time and place, and a built form that fails to encourage eyes on the street. I also recognize the history of public space in the South, especially as it was related to transportation, and conclude that to build public space for all, the South must reckon with a history of racial oppression

that used transportation as a place of violence against and means of segregation of communities of color. Public life studies as a method of understanding urban design/human behavior connection should seek to address their own identities, and consider that this method may not be suited for a space based on ownership and the willingness to enforce loitering laws.

As a region, the South is already among the most car-dependent places in the United States, and few price-related barriers to driving make transit an attractive opportunity. Transit agencies will fail to contribute to regional and national air quality and greenhouse gas emissions standards if they do not address the qualities of the built environment in and around transit stations.

In the future, transit agencies in the South should reimagine and expand their role beyond building functional transit systems. They should mirror programs such as MTR Corporation's Rail & Property development model in Hong Kong. In this scheme, the transit agency finances its investments and costs related to maintenance and operations by leasing or selling land to private interests. As a result, the majority of MTRC's revenue sources between 2001 and 2005 were from property development, rather than from an increase in tax revenue or fares (Cervero & Murakami 2009, p. 2025). Florida's Brightline has already pursued a similar approach with its real estate investments. Its parent company has planned to develop more than 1,000 units of housing in towers, in addition to developing a mixed-use office and retail building at the MiamiCentral station (Satchell 2017). To their credit, both Atlanta and Charlotte have also made non-negligible progress in encouraging transit-oriented development, though notably not at the stations I studied (Kahn 2018; Portillo 2018).

Planners should commission public life studies to understand the qualities of public spaces in their cities. Academics should ask further questions using the public life study as a method, and seek to involve collaborators to coproduce public life studies with residents of marginalized communities. They could also study the link that I believe exists between the quality of public life in station areas and transit ridership.

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getting-around-20170604-column.html

Appendix A

 The racial distribution of Atlanta's population, using 2010 Census Data. Blue=White, Green=Black, Red=Asian, Yellow=Hispanic, Brown=Other/Native American/Multiracial (University of Virginia, 2013)
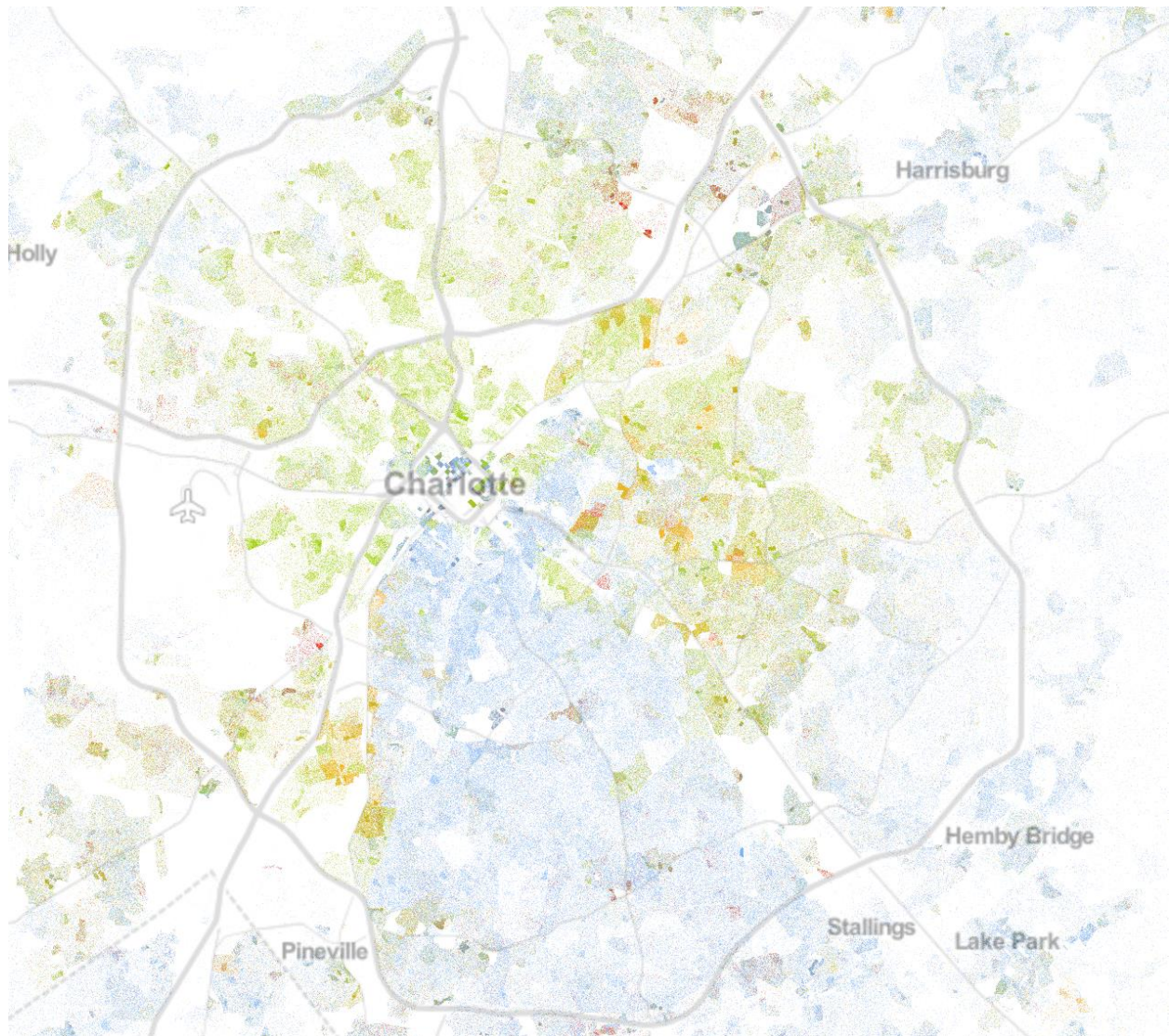
 The racial distribution of Charlotte's population, using 2010 Census Data. Blue=White, Green=Black, Red=Asian, Yellow=Hispanic, Brown=Other/Native American/Multiracial (University of Virginia, 2013)

Appendix B

3rd St-Criteria Rating

<u>Protection against…</u>

traffic and accidents	2 Though sidewalks are wide, there are many curb cuts to provide vehicular access, and traffic speeds faster than the posted 25mph speed limit.
crime and violence	2 The only regular eyes on the street are the smokers and the bellhops from the Hilton.
unpleasant sense-experiences	2 Cigarette smoke and food odor from an air vent above the station platform give this place and unwelcoming smell.

<u>Possibilities for…</u>

Walking	3 Wide sidewalks and clear and organized patterns of walking characterize this space.
Standing	1 There are no clearly defined spaces to stand, nor anything to lean against. None of the surrounding structures have walls that are comfortable to lean against.
Sitting	1 There are no primary seating options. The only sitting I observed occurs under the platform overpass, where smokers lean against a ledge.
Seeing	3 There are clear lines of site in all directions, and the street is well lit at night. The trees along the sidewalk are pleasant and create a sense of enclosure.
Hearing/Talking	2 At most times of the day, the street is quiet. But loud noises, such as trees being cut and cars leaving Uptown during the evening rush hour, make this a place where it is difficult to have a conversation

Play/Unwinding	1
	I witnessed no activity that could be construed as play or unwinding, save the Hilton employees taking their smoke break.

And

Human Scale Services	3
	There are a few signs on the street that show a small map of the Uptown neighborhood, as it relates to the LYNX station.
Designing for enjoying positive climate elements	3
	The area is well-shaded for hot summer days.
Designing for positive sense experiences	2
	Nature is a second thought along this street. While I was here, trees along the street were cut down. The informal green space is not used but it could be a way to incorporate positive sense experiences. Total: 25/60

MLK Jr. Blvd.-Criteria Rating

Protection against…

traffic and accidents	4 Sidewalks are broad, and I noted in my journal more than once that cars tended to yield to pedestrians in the crosswalk.
crime and violence	2 The only regular eyes on the street are the people outside of the Convention Center.
unpleasant sense-experiences	3 This space was relatively quiet. Passing trains were not piercingly loud, and generally blew a quiet horn as they passed.

Possibilities for…

Walking	4

	Wide sidewalks and clear and organized patterns of walking characterize this space. Crosswalks allowed safe and legal crossing.
Standing	3 There were pleasantly shaded places to stand outside of the Convention Center. Other areas along the street did not provide good standing opportunities.
Sitting	2 Two benches in front of the Convention Center provided primary seating opportunities. A ledge along an HVAC vent was at seating height and provides secondary seating.
Seeing	4 There are clear lines of site in all directions, and the street is well-lit at night. The trees along the sidewalk are pleasant and create a sense of enclosure.
Hearing/Talking	2 The plaza of the Convention Center was a space conducive to conversation, as were parts of the street. Other parts were not conducive to conversation, because there was nowhere to pause.
Play/Unwinding	2 The plaza could be a place for conference goers to unwind after a long day of sitting inside, but there are no possibilities for activity for play.

And

Human Scale Services	2 There are no building facades on either side of the street for the entire block, except for the Convention Center. The planters, map, and trash cans outside the Convention Center are in human scale.
Designing for enjoying positive climate elements	2 The area is somewhat well-shaded for hot summer days.
Designing for positive sense experiences	2

	The trees along MLK were the only positive sensory experience elements along the street. Total: 32/60 Average: 28.5/60

Archdale-Criteria Rating

<u>Protection against…</u>

traffic and accidents	2 Though sidewalks make good accommodations for pedestrians, there is lot of crossing outside of the marked crosswalks. Bicycle infrastructure could not accommodate an 8 and 80 year old. I witnessed a car crash at the intersection of Old Pineville and Archdale one night at dusk.
crime and violence	3 There are more eyes on the street here, because of proximate buildings and pedestrian activity are frequent.
unpleasant sense-experiences	2 There was no pleasant or unpleasant odor in the space, for the most part. Sometimes, people smoked in the station are.

<u>Possibilities for…</u>

Walking	2 Intersections are built to an automobile scale. Sidewalks often don't line up with desire paths. There were gaps in the sidewalk within a quarter mile walk from the station.
Standing	3 There were convenient places to lean against in the station area, such as on the bike lockers, or along the wall that supported the light rail track overpass.
Sitting	2 There is a single concrete bench at the site. No secondary seating opportunities.

Seeing	4 There are clear lines of site in all directions, and the street is well lit at night. One can see across Old Pineville and Archdale easily.
Hearing/Talking	2 At most times of the day, the street is too loud with passing car traffic to hear many natural sounds. Passing freight trains are deafening when they blow horn.
Play/Unwinding	3 Children were playing within sight of the station. Though guitar man's songs were sad, his presence was well intended.

And

Human Scale Services	2 All proximate infrastructure and buildings are at the car scale. Small affordances, such as bike lockers, a water fountain, and newspaper stands are in the plaza.
Designing for enjoying positive climate elements	2 The station platform casts a comfortable shadow on a warm day, but does little to keep the rain from drenching you.
Designing for positive sense experiences	2 Plantings in the median of Archdale Drive are a nice touch. Trees along Old Pineville also cast a comfortable shade. Total: 29/60

East Point-Criteria Rating

Protection against…

traffic and accidents	1 Located in a sea of parking, pedestrians most cross a 3 lane, 1 way street to get into downtown East Point.
crime and violence	2

	Street is very poorly lighted at night, and there are not many intersecting activities that put eyes on the street.
unpleasant sense-experiences	2 From a diary entry: "It smells so heavily of urine here that I need to leave"

Possibilities for…

Walking	2 Sidewalks exist, and there are marked crosswalks, but there is very little to walk to, and the station is closed in by parking and a freight railroad on one side.
Standing	3 There are convenient places to stand and wait to be picked up, and lean against a wall.
Sitting	3 There are >10 benches on the bus bay side, and more concrete benches on the street side. No secondary seating.
Seeing	2 Station is closed in by parking on one side. Line of sight is difficult because of station length.
Hearing/Talking	2.5 At most times of the day, the street is too loud with passing car traffic to hear many natural sounds. There are still conversations that persist
Play/Unwinding	1 I witnessed no relaxation, play, or unwinding here.

And

Human Scale Services	1.5 All proximate infrastructure and buildings are at the car scale. Small affordances, such as bike

	racks and vending machines for transit cards, exist.
Designing for enjoying positive climate elements	2 The station is built to protect large parts of the bus bay from rain.
Designing for positive sense experiences	2 Plantings along the main sidewalk are nice, but nothing exceeding the ordinary. Total: 24/60

Peachtree Center-Criteria Rating

Protection against…

traffic and accidents	3 Of all four stations, this area had the streets on which cars traveled most cautiously and slowly.
crime and violence	2 There are many dark corners, blank walls, near the space. It is surrounded by only one human scale building, the historic hotel adjacent to the head house.
unpleasant sense-experiences	3 There were no unpleasant sensory experiences in the site, but nothing that made the site more sensory friendly.

Possibilities for…

Walking	4 The most pedestrian oriented station I visited. Lots of pedestrians walking by, clearly marked crosswalks. Proximity to many places downtown. Pedestrians took clear and organized paths.
Standing	3 There were pla
Sitting	3 Primary seating in Margaret Mitchell Square, in small plaza in front of GP Tower. Secondary

	seating on the ledge alongside west entrance, and at the Atlanta Public Library steps.
Seeing	2 Many intersecting angles meant that lines of vision across space were very short, usually not more than 100 ft.
Hearing/Talking	4 Most times of day were quiet. You could hear conversations as people walked by. Sound of Atlanta Streetcar passing was pleasant compared to freight train.
Play/Unwinding	3 I noticed children skateboarding, and people playing Pokémon Go.

And

Human Scale Services	3.5 Margaret Mitchell plaza has fountain, statues, and benches. A small newsstand that sells cookies, ice water adjacent to west entrance.
Designing for enjoying positive climate elements	2.5 Completely ordinary in this regard.
Designing for positive sense experiences	2.5 A place lacking trees or drastic views in most directions. The way light bounces off the pink granite of the GP Tower at sunset is breathtaking. Total: 32.5/60