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The Red Line: An Examination of the Power Dynamics and Concepts Impacting the Bus Rapid Transit Plan for Marion County, IN

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Statement of Thesis:

I intend to apply critical theory to the relationship between historic Home Owner's Loan Corporation (HOLC) residential security maps and the Bus Rapid Transit (BRT) system currently being developed for Marion County, Indiana. This critical examination will aid in the visualization of current power dynamics contained within the Indianapolis city system, which are partial artifacts of the historic HOLC mapping of the city. Visualizing the Indianapolis city system from a critical perspective may in turn help to indicate who will be privileged by the structure and redevelopment of the Indianapolis city with the advancement of zero-emission and/or sustainable infrastructure in Indianapolis.

Introduction:

The construction of the United States has physically embedded systems of power that privilege people of white, European descent. Colonial powers such as France, Spain, and Great Britain began the process of mapping the American landscape prior to the United States' declaration of independence. The colonial mapping of the Americas served to (a) provide a basis for taxation, (b) survey parcels to be given or sold to new colonists, and (3) feed into the myth of white cultural and/or religious superiority by disregarding Indigenous presence on the land (Scott 1998, 49). Maps such as the "Join or Die" snake of 1754 by Benjamin Franklin regarding disunity among the colonies surrounding the French and Indian War (Kiger 2021) and of the Louisiana Purchase region following the exploration of Lewis and Clark have been constructed

by white people in power to unite the country. Much of this unity was manufactured to spread and unite white colonists under the premise of Manifest Destiny. The state-driven mapping of the United States also served to increase information on the US' access to natural resources as the country grew physically through Westward expansion and modernized into a neoliberal, capitalistic entity. During the period of Westward expansion, white people mapped Native American land protected by treaties to divvy it up into plots and disassociate the land from the communal territory it represented (Dunbar-Ortiz 2014). Intentional Indigenous land fragmentation continued to push the narrative of an uninhabited land designated for the new, white inhabitants.

In the 1930s, The Home Owners' Loan Corporation (HOLC) was created following the passage of the New Deal and Home Owners' Loan Act (1933). The HOLC's original goal was to provide emergency mortgages to homeowners at risk of losing their home during the Great Depression (Hillier 2005, 207). However, it's parent organization, the Federal Home Loan Bank Board (FHLBB) tasked the HOLC with the mission of creating the City Survey Program, which produced the HOLC residential security maps (213-214).

The residential security maps were passed on to the Federal Housing Administration (FHA) and private lenders who avoided the areas in red. The act of outlining (often in red), then avoiding, undesirable areas by lenders continued, and in the 1970s, community organizers noticed and pushed back against this practice until the Fair Housing Act of 1968 outlawed the practice (Hillier 2002, 80). The practice of outlining undesirable areas and preventing the procurement of loans for new homes or improvement projects in those areas became known as

"redlining" in the 1970s. "Redlining" has become a buzzword today in conversations surrounding existing inequalities within US cities.

In the face of climate change and other environmental challenges to city societies, planners are focusing on transitioning toward more sustainable and/or resilient cities. However, to understand the complexities of our cities and societies, it is necessary to conduct a critical analysis that delves into issues of power surrounding maps historically, presently, and in plans for the future of our cities. Examining how specifically redlining has impacted and shaped the modern city-state and existing inequality gaps between social classes and people of different races is a step toward understanding city-society complexities and power dynamics. Looking forward, the solutions of increasing cities' sustainability and resilience require additional examination into the power dynamics surrounding these concepts, which are often tossed around under the assumption that there is a universal understanding of their definitions.

In undergoing this analysis, I will be focusing on Indianapolis, IN as a geographic center. My primary research interest lies in resiliency planning as a tool to aid in mitigating and adapting to the effects of climate change, so, for this research, I aimed to narrow my focus topically and geographically starting with this interest. I lived in Indianapolis for the early stages of my life and have retained ties to the city, which have provided me with insight into new initiatives and developments the city has undertaken. Therefore, my proximity to Indianapolis logically led me to use the city as my geographic focus.

In narrowing my topical focus, I quickly keyed into an article by Donovan Moxley and Burnell Fischer titled "Historic HOLC Redlining in Indianapolis and the Legacy of Environmental Impacts" (2020). This article used a geographic information system (GIS) to

detect evidence of ecological legacies of redlining, including high-intensity development, low greenspace and forest cover, and disproportionately high incidences of brownfield, Superfund, and industrial waste sites (1). Since I have taken a GIS course and have applied that knowledge in some of my other courses and internships, I wanted to apply a similar method and look for any potential connections between climate change and redlining. I started by researching known effects of HOLC redlining in Indianapolis, but when looking up "Indianapolis redlining," most of the results pertained to Indianapolis' new Red Line Bus Rapid Transit (BRT) route rather than the actual HOLC maps themselves. This encouraged me to look up the BRT plan, and I found that it emphasized an all-electric, zero-emission fleet. I also learned that IndyGo, the transit provider for Indianapolis, uses solar panel arrays to generate the electricity to charge their fleet of electric buses (May 2020, Connect 2016, Hwang and Mack 2021). In this sense, it serves as a partial solution to climate change for the city of Indianapolis and piqued my interest even further.

I do not believe the search results to be an example of suppression of the HOLC maps, but rather user-error. Through my research I have realized the HOLC maps were *residential security* maps, while "*redlining* is the practice of not lending to certain areas based on their neighborhood characteristics, particularly their racial and ethnic composition" (Hillier 2005, 208). However, for other people that do not understand this nuanced difference, similar search result problems may also pop up.

When examining the paradox of my search results, I noted that it is common for bus routes to be given a color-name distinguisher, but I was intrigued by the fact that the first BRT line to be constructed in Indianapolis was named the "Red Line." This intrigue drove me to draw

connections between the Red Line, resiliency, power, and HOLC residential security maps, setting the foundation for this thesis.

Methods:

Now that I have introduced you some of the basic concepts and complexities that will be explored in this thesis, I wanted to lay out the general structure. I will continue by discussing the importance of exploring this research topic, including the HOLC security maps, assumptions surrounding mapmakers' authority, and ideas of resiliency in the face of current challenges to the modern-day nation-state such as climate change. I will then take the time to situate myself in the context of the power dynamics and histories I will be exploring. Following my statement of positionality, I will define resilient cities, resilience, and power, and will continue to discuss the ways in which maps exist as a constructed embodiment of the historical and current power dynamics at the time of the map's creation. I will then apply these concepts to the role the Home Owners' Loan Corporation residential security maps have played in the development of US cities, the grading criteria for the residential security mapping process, and the roles the Federal Home Loan Bank Board and the HOLC played in the creation of the residential security maps. I will then extend the critical analysis to the planning process and context surrounding the Red Line and Marion County transit plan. This is followed by an explanation a GIS data analysis, where I extracted data from a GIS correlating the BRT system in Indianapolis to the historic HOLC residential security map from 1937. I will finally list my conclusions from this thesis research investigation and provide potential avenues for future research this thesis has created.

Importance:

HOLC residential security maps contributed to the formation of redlining as an economic practice that still impacts the composition of cities today (Hillier 2005). Long-lasting effects of redlining in neighborhoods include negative environmental impacts (Moxley and Fischer 2020). Planners are pushing to intentionally increase cities' resiliency as a solution for combating climate change and other known and unknown challenges faced by city-societies today. As a society, we must analyze who has historically been displaced and who might continue to be displaced when shifting toward privileging resilient and/or zero-emission infrastructure in our cities. Whoever gains a designation of *planner* automatically also receives what is called rational-legal legitimacy in comparative politics (O'Neil, Fields and Share 2021, 39-41). This indicates that as a society we have constructed norms around certain positions, and those norms give the position legitimacy; therefore, when we hear that a planner is part of a design process, we associate the title as a form of legitimacy without feeling the need to independently vet the person or the historic processes that have created the position. A similar phenomenon occurs with maps and will be explored at greater depth.

However, since maps and planners have a sense of legitimacy wrapped around them, the larger society must push against those norms and question their legitimacy to gain a sense of how said legitimacy can perpetuate structures of power. The practice of redlining is one example of how the longstanding trust in lenders (or suppression of the disadvantaged people's power) allowed the city system to further ingrain inequalities into the structure and layout of redlined

cities. However, once people began question the legitimacy held by mortgage lenders, and were able to garner enough support and noise, they gained enough power to push the national legislature to illegalize the practice of redlining in the 1970s. While the solution was not perfect, as the effects remain ingrained in our city structure today, it provides a glimpse of hope and encouragement when it comes to questioning societal norms, positions, and structures we automatically grant legitimacy to.

When looking toward resilient and/or zero-emission solutions, we also need to question if the solution will continue to perpetuate the same power relations or if it will rework the system of power we are continually engaging in and inherently a part of. The question of resilience and power will be explored further in this paper, and, in doing so, this thesis will help serve as a partial toolkit toward asking critical questions, understanding structures of power within cities, and how tools (such as maps and infrastructure) propagate existing power dynamics. Approaching new and future challenges with this toolkit will increase awareness of methods of power propagation and potentially help find solutions that are more focused toward breaking these structures of power and allowing emergent, inclusive solutions to come to the forefront.

Situating Myself:

In High School, I became active with a community group in Muncie, IN called Reconciliation Achieved through Community Engagement (RACE). While I had already been exposed to concepts of race and class by living in Muncie and participating in the annual Dr. Martin Luther King Jr. essay contest, where I found older student mentors I could look up to and

learn from, the RACE group focused on community-wide education. The RACE group brought in sources and people from which we could listen to, then provided discussion questions that would spark partner, small group, and large group conversations that carried themselves beyond the doors of the community centers they were hosted in. There were three particular topics that have specifically stuck with me. The first one was a showing of a recorded "Doll Test" experiment, created by sociologists Kenneth and Mamie Clark, to study the psychological effects of segregation on African-American children (LDF 2022). While this was something I had been exposed to through my psychology class, watching the video and hearing what was actually said by some of the children was heart wrenching and has stayed with me. The second topic was a talk by Dr. Ruby Cain, a professor of education at Ball State University who focuses on "transformative and collaborative learning, racial equity, social justice, and community mobilization" (BSU 2018). Her talk spoke to the racial dynamics within the Muncie area, barriers to education of Black students within schools, and how we, as a community, could mobilize to make a difference. The third experience that informs many of my decisions, thoughts, and understanding of the world around me was a privilege walk. During the privilege walk, I saw community leaders I looked up to, some of my peers, and my parents standing way behind me. Realizing how far up in society I was able to reach with my privilege growing up while I watched my dad take a step back for food insecurity put the privilege I knew I had into an image that will never fade from my mind.

By applying these experiences to the concepts of globalization, immigration, access to education and STEM fields, and climate change, I have come to understand the importance of situating one's own identity in the context of an analysis. Without the context of an author's

positionality, part of the narrative gets lost. There are clear power dynamics associated with one's identity and lived experiences that enrich content conveyed through one's work.

As I am writing this, I am a 21/22-year-old senior undergraduate student at DePauw University. I am an Environmental Geoscience major and a Political Science minor who is pursuing a Master of Landscape Architecture for graduate school with an emphasis on climate mitigation and adaptation planning. And, I am a white, upper-Middle-class woman who has been raised in a cis-gendered household in Muncie, IN. Each of these identities are wrapped with their own assumptions and have helped to shape the way in which I view the world and approach complex topics. The way someone with a different positionality than myself may approach this same research topic may be from a completely different perspective, have different insights, or narrow in on different aspects of the data than I do here.

Muncie, cited as Middletown in US history, was once considered to be the most representative city in the United States because of the abundant jobs created by factories such as Borg Warner, the Ball Corporation, and General Electric. Muncie also has an associated HOLC map, which was created in response to the booming population created by the availability of factory jobs in the 1930s. However, with increased globalization, these factories have shifted their base of operations to other cities and expanded their manufacturing line overseas (Malone 2010). Following the relocation of most of the factory jobs, Muncie was left without much potential energy and began to stagnate. Today, Muncie's biggest employers are Ball State University and Ball Memorial Hospital, both of which were named after the Ball family of the Ball corporation. While their base of operations is no longer Muncie, the Ball family retains ties to the city, and the city continues to show respect and appreciation for their community-building

efforts in Muncie. Surrounded by predominantly white, rural communities, Muncie is a small city with a mixed-racial and ethnic composition. In attending public school in Muncie, I regularly engaged with people of Black, Latino, and Asian backgrounds, and many of my teammates had very different positionalities from myself. Through these relationships, I gained a better understanding of the social, racial, and class inequalities that existed within my city.

DePauw University is a predominantly white, private institution within the state of Indiana, and it exists on the homeland of the Miami, Wea, Piankashaw, Potawatomi, Kickapoo, Shawnee, and Delaware (Lenape) tribes. DePauw students Hannah and Holly Buchanan (’22) (members of the Miami Nation of Indians of Indiana) have drafted a land acknowledgement, but, as of May 2021, were still waiting to hear back from two nations before the land acknowledgment could receive official recognition (McArthur 2021). DePauw University exists as a product of colonialism, producing complex power dynamics within the campus community and between campus and the rural, white local community of Greencastle, IN.

The intersection of all my experiences, observations, and courses that have applied a critical analysis approach to topics such as education have allowed me to understand certain responsibilities I have as a white person with power. I have a responsibility to support, listen, and create space for Black and Indigenous voices, as well as to call out and question the norms that exist within society to perpetuate systems of inequity and colonialism. My thesis aims to question societal norms around mapping, planning, and transit that exist within Indianapolis, IN to push my readers to think beyond idealized solutions and towards a critical analytical approach.

Defining Resilience and Resilient Cities:

Cities are being faced with myriad modern-day challenges, including climate change, drought, famine, population growth, flooding, and the increased frequency of 100-year natural disasters such as hurricanes. Resiliency is about being able to survive crises and is based on hope; however, creating resilient cities requires cultural, economic, and lifestyle changes (Newman, Beatley and Boyer 2009, 1). Resilience is defined as "the capacity of a system to absorb disturbance and still retain its basic function and structure." Ecological resilience may then "be measured by the magnitude of disturbance the system can tolerate and still persist" (6). These broad, hopeful concepts have led planners and complexity thinkers to push for increasing the resilience of city-systems. Even in Indiana, organizations such as *Earth Charter Indiana* are working to create a plan and nudge the development of Indianapolis towards one of greater resiliency. However, before we can envision what a resilient Indianapolis might look like, we must first understand the ins and outs of resiliency and what a resilient city in general might look like.

First, I want to discuss what the proposed ideal resilient city looks like. While resilience is about making it through crises, a city also needs to last, be able to respond to crises, and adapt in a way that may cause them to change and grow differently. "Cities require an inner strength… as well as a strong physical infrastructure and built environment" in order to respond not only to natural disasters but also "natural resource shortages and the recognition of the human impact on climate change" (Newman, Beatley and Boyer 2009, 1, 6). As defined by Newman, Beatley, and Boyer, a resilient city is considered to be (1) powered by renewable energy technologies; (2) carbon neutral; (3) using small-scale, local sources of power, water, and waste systems; (4) able

to produce its own food; (5) operating in a closed-loop system where substantial energy and material needs are sourced from the waste produced; (6) proud of the place and jobs generated by renewable energy; and (7) largely walkable and transit-based" (2009, 55-56). However, it is important to keep in mind that this is the *ideal* resilient city. In 2013, the Rockefeller Foundation named 33 cities out of 400 applicant cities from around the world who "demonstrated a dedicated commitment to building their own capacities to prepare for, withstand, and bounce back rapidly from shocks and stresses" (Rodin 2013). These cities were named for their *plans* to build a resilient city, not for actually being one. Additionally, from a modern perspective it can be easy to conflate a resilient city as necessarily meaning a developed, modern city, especially given the magnitude of globalization that has occurred while preferencing the power held by Western, developed, capitalist nations.

It may be more likely for a developing city that is more disconnected from the developed world to meet the criteria given for a resilient city. However, even when pursuing such a perspective, it rapidly runs into issues when the extent of globalization is considered. International development organizations such as the International Monetary Fund and the World Bank, spearheaded by developed nations, have pushed development initiatives in underdeveloped countries. The IMF and World Bank both currently have 189 member countries, and there are only 195 total countries in the world, indicating the full extent of globalization that has occurred (The World Bank 2021). With respect to the distribution of waste, developing countries have created economies out of technological waste (Accra, Ghana), secondhand clothing (Kantamanto, Ghana), and recyclable waste (China, Turkey before bans on recycling imports), each industry of which has led to the pollution of these cities (Yeung 2019, Besser

2021, Tiseo 2021). These examples help us see just how extensively the world has globalized, even though they really only provide a glimpse into the interconnectivity of our economies and societies. Resilience will likely be difficult to attain without first fracturing some of these tightly woven global dependencies.

With respect to Indianapolis' inspirations as a resilient city, the prospects appear promising solely based on this definition and with regard to the proposed transit plan. (1) The Indianapolis Airport and IndyGo transit stations are already largely dependent on solar energy as a renewable energy source, but this paper lacks the scope to delve into a full city-wide analysis of renewable dependence (or lack thereof). (2) IndyGo is focused on remaining zero-emissions with their electric fleet of BRT buses. (3) On-site solar arrays for both ends of the Red Line and on IndyGo's bus shed help to localize the production of renewable electricity, but it is unclear how the transit plan or the city as a whole is dealing with the other aspects based on the scope of this research. It is also unclear how objectives 4 and 5 might fit into the proposed transit plan; however, objectives 6 and 7 are clearly embodied by the plan and the energy stakeholders and the community appear to be contributing to make the plan happen. Given the extensive media coverage, myriad detailed planning reports, and the grants they received for the Red Line ($75 million) and Purple Line ($80.975 million), IndyGo, the Central Indiana Regional Transportation Authority (CIRTA), and the Indianapolis Metropolitan Planning Organization (IMPO) are visibly proud of the all-electric BRT system they have proposed (Connect 2016, Black 2021). Finally, goal 7, to be largely walkable and transit based, is one of the primary goals of the creation of this transit system in Indianapolis and the wider Marion County. IndyGo aims to have an 80:20 ratio of ridership to coverage ratio, with the grid created by combining pathways for

walking and biking with local bus routes and the BRT lines aim to keep people within a 10-minute walk of bus stations (Walker and Associates 2015).

The current discussion, however, has maintained an ideal version of resilience in cities without allowing us to understand how resilience actually operates. In Walker and Salt's book *Resilience Thinking: Sustaining ecosystems and people in a changing world*, they acknowledge that most cities are focused on sustaining their economies by aiming to be more resource efficient; however, efficiency, by itself, "has the potential to actually work against sustainability because the more you optimize elements of a complex system… the more you diminish that system's resilience" (2006, 9). Therefore, while sustainability is not necessarily an inhibitor of resilience, efficiency is.

An analogy to understanding this is to think of the evolution of two different bird species, one that roosts in only one type of tree and has evolved to be really good at extracting a specific insect from the trunk of that tree, and one that prefers to roost in a variety of tree species and eats a variety of insects. Species 1 has developed a very efficient method for uncovering its preferred insect and has a highly interdependent relationship with the specific type of tree; they are co-dependent. Bird Species 1 eats the insects destroying the tree, allowing the tree to grow and remain healthy, and the healthy tree attracts the insects, providing a consistent food source for the bird species, thus allowing Bird Species 1 to also remain robust and healthy. Species 2, on the other hand, has learned how to catch flying insects, dig under objects to find burrowing insects, and peck at tree bark to find wood-eating insects. It is not overly dependent on any one food source or nesting habitat, although it may be less efficient at catching each respective insect or nesting in possible tree species. If there is then a disturbance, such as a large die-off of the

type of tree Bird Species 1 has become dependent on, the system's capability to absorb the disturbance and sustain itself is drastically reduced. With the die-off of its preferred type of tree, Bird Species 1 will find roosting more difficult and will likely have a harder time locating its insect of choice (which may also have been dependent on the type of tree). Species 1 is thus likely to go extinct in trying to sustain its evolved way of living. Species 2, however, while having had some roosting interactions with the type of tree that experienced the die-off and partially fed on the insect species also impacted, can adjust by using other tree and insect species to roost and feed respectively at a greater rate than before. In this manner, Species 2 can generally sustain its population and habits in spite of the disturbance in the system, thereby exhibiting resilience.

This analogy, however, falls short of the true complexity of systems. For the sake of simplification, we will assume that our global system is the largest system we can interact with. Within this larger system, there are smaller systems interacting with it and with each other, creating exogenous factors influencing each system at each level of scale. We know our global system is not the largest-scaled system we interact with because we are also affected by the Sun system regarding climate, light, and geographic position and other solar systems and galaxies. This helps us to understand that systems operate and interact with other systems at varying scales and context; therefore, "the response of any system to shocks and disturbances depends on its particular context, its connections across scales, and its current state;" in this way, resilience thinking is inherently systems thinking and requires thinking about those systems complexly (Walker and Salt 2006, 1). While this refers to the interaction between systems, individual

systems themselves are also multifaceted. For each system, there are different regimes in which it can operate, but it only operates in one regime at a time.

The different regimes can be envisioned as an egg carton, where the system is the egg, and the threshold between regimes exists as the high ridges dividing one egg space from the other (one regime from the other). Within the active regime, there is an equilibrium point at which the system aims to operate in (the base level where the egg sits within the egg space/regime); however, this point of equilibrium shifts in response to both endogenous and exogenous processes and forcings. This indicates that if a forcing pushes the system in a certain direction, it will compensate and move toward a natural equilibrium; if the system is left alone, it will also gravitate toward equilibrium. Over time, however, the point of equilibrium can also change and/or appear as a fluid point (30). Such fluidity would be analogous to our egg carton being rotated and tilted or the bottom or the egg space deforming nonuniformly while the system is operating within a specific regime. This concept is typically visualized through a "ball in the basin" model; however, for this paper I wanted to use a physical object that most people would be familiar with and adjust it from there (54-55). Each regime also has a certain amount of potential energy which corresponds to the size of the regime; the more potential energy, the larger the regime/imagined egg space. As the system familiarizes itself with the regime, it uses up potential energy contained within the system (shrinking the egg space) to become more efficient within the regime. Maximum efficiency would use up most of the potential energy contained within the regime, and the system would sit snuggly within it, as an egg would sit properly within the egg space of a carton. However, this also means the thresholds to different

regimes are closer, and, therefore, easier to cross and enter into a different regime if a disturbance occurs.

Within regimes, systems operate on a loop. The fore side of the loop is where development occurs through increasing efficiencies by consuming the potential energy of the system (81-85). In an operating system, this could mean that the system has optimized so that workers and capital are contained within the structures (businesses, housing, etc.) that have developed for the optimization of the system within the given regime. In other words, the system has absorbed the potential energy of its regime as it has developed and increased in efficiency. Meanwhile the back side of the loop is where the greatest potential exists for "destructive or creative change" in the system (82). This signifies the failure of the optimized system in a regime to be resilient in the face of a disturbance. The workers and capital previously being used in the optimized system are re-entered as potential energy into the regime, creating space for new innovation and reorganization of the system to occur (82-84).

The COVID-19 pandemic is an example of a large disturbance to the global economic and social systems we operate within. It caused many businesses to shut down, employees to be laid off, and a halt in the global supply chain of products. However, this release of potential energy allowed for the reorganization of society so that many individuals turned to social media as influencers, started their own businesses, returned or chose to further advance their education, and aimed to reconnect with long-distance family and friends. While I do not believe this resulted in a complete regime change, the point of equilibrium within which our system operates has certainly shifted.

With respect to Indianapolis' BRT system, it is unclear where it is now situated. The BRT system was envisioned with regard to the point of equilibrium that corresponded to the global economic and social systems prior to the COVID-19 pandemic. As a smaller system, reliance on Indianapolis transit was substantially impacted by disturbances within the global systems. As people began working remotely, there was less of a need to travel, so ridership dropped. This meant that the rate at which IndyGo anticipated breaking even was substantially reduced. IndyGo is now having to reassert the importance of transit in Indianapolis and once again increase ridership. While some of that happens naturally with the return of people to places of work, many jobs switched permanently to virtual settings, making this transition back to the pre-COVID "normal" difficult.

An additional complexity to systems lies in their ability to have multiple stable regimes. It is therefore critical in managing resilience to understand to the best extent possible (1) the complexities of these social-ecological systems, (2) what forces might cause the system to cross a threshold into a new regime, (3) where the thresholds are located with respect to the system and how much potential energy remains in the regime, and (4) how to enhance aspects of the system that enable it to be resilient (59). If it becomes clear that the system will cross into a new regime, it is ideal if we know which surrounding regime will also be stable (121). By having an understanding of other potentially stable regimes, we may be able to guide the system in that direction in the face of a disturbance, rather than enter a potentially unstable regime unknowingly.

Directing a system toward a specific new regime becomes complicated with regard to scale. When we consider a one-dimensional dot on a two-dimensional piece of paper, the paper

is aware of the dot, but the dot is only aware of itself. Likewise, a two-dimensional paper is not aware of the three-dimensionality of the notebook it is nested within. In applying this to our systems analogy, the system (egg) is operating in a three-dimensional space. As is moves through and around the regime, it is able to pick up and construct an understanding of what that particular regime has to offer; however, without exploring the regime, it cannot view the entirety of the regime, as the regime operates in a four-dimensional space. It therefore becomes even more difficult for the system to view what potential regimes may look like on the other side of thresholds and encourage forcings that will nudge the system toward a different stable regime in the face of substantial disturbance.

Systems are incredibly complex, making it hard to plan and react accordingly to disturbances. Most loss of resilience happens unintentionally and unknowingly to the system; however, "even when its loss becomes apparent (when thresholds are recognized), it is still usually ignored or downplayed" (120). We can see such a phenomenon happening today as climate change is allowing us glimpses of the thresholds surrounding the current regime our global social-economic systems are operating within. While some politicians, scientists, and planners have turned toward embracing resiliency, many politicians have clung even more tightly to sustaining their current norms, standard of living, and expectations with respect to emissions and the fossil fuel industry. In the attempt to sustain our current social-economic system, which has been organized and developed into one that emphasizes globalization, exploitation, and capitalism, state leaders and corporations are pushing the system closer to the thresholds, and the potential energy within the regime is dropping due to the over-emphasis on efficiency, making the system more sensitive to various forcings and disturbances.

In embracing resilience, we are thus embracing the dynamic nature of the world (140). A system that is resilient keeps future options open and deters the band-aid application of single-option solutions (such as the IMF and World Bank applying development theory to developing countries) that ignore the value of diversity (149). Finally, "resilience thinking needs to go beyond managing for specific variables and specific disturbances (drought, floods, climate change, etc.)… and towards general resilience, or the general capacities of a social-ecological system that allow it to absorb unforeseen disturbances" (121). Despite our scientific expertise, research, and innovators, we have no way of knowing every disturbance or forcings acting upon the systemic structure we wish to sustain.

Maps as a Constructed Embodiment of Power:

What is power? Ask someone scientifically inclined and one might get the response Power = Work x Time. Power is therefore a measure of both work and context, where "work is the application of a force through a distance and force is an action that one body exerts on another to change the state of motion on that body (Wood, Fels and Krygier 2010, 1). There exists an "omnipresence of power in all knowledge;" however, that power is often invisible or implied (Harley 2001, 152). The practice of deconstructing power therefore becomes a necessity when inequalities within the way systems operate become apparent.

The act of making power within maps visible requires deconstruction of the process through which maps became prevalent in society. Human societies existed without maps for the majority of our existence; people did not begin to use maps in the manner we use them today

until after 1500 (Harley 2001, 23, 25). Maps were not necessary when knowledge about a place was inherently local and personal. For example, when I was eleven my grandparents came to visit from out of state and I had to verbally navigate the route to take me from my home to my school since I had local, personal knowledge of my city. The route was simple, and I told them to drive down our long driveway, turn right, wrap around the church, turn left, go through the light after the church with the funny signs, turn right on the split after the house with giant cat statues, pass the stadium, and then turn left into my school parking lot (Figure 1). Without a standardized map, my grandparents had to rely on me as a local guide to the area and became frustrated with my use of landmarks over street names. This example aids in understanding that standardized maps increased the legibility of an area to people from outside of said area.

Conventional mapping, then, came about as a means to facilitate the policing and control of cities by state authorities (Scott 1998, 55). Local standards of measurement were tied to practical needs by members of the local community, thus varying with respect to the agricultural technology, climate, and ecology within regions (29). The standardization of measurements allowed the state to have more control over taxation with respect to the associated distribution of wealth and a better understanding of the distribution of crop yields throughout their country (32). By standardizing measures such as units of sale, currency, and distances, they could more easily be applied to the entire state instead of the ruler having to make measurement conversions for each city. In this sense, mapmaking was, "first and foremost, a highly utilitarian managerial activity and, second, a profoundly ideological one serving national identity-building, colonial, and other interests" (Wood, Fels and Krygier 2010, 22). It also allowed the state to interact on its own accord with vendors from each region, without the assistance of a local interpreter. Maps,

therefore, work by linking things in space (1), specifically for a non-local consumer of that region's space. By working, maps thus contribute to the power dynamics operating within the overarching social-economic systems.

Constructed maps rely on people perceiving them as accurate representations of the world and space it is displaying. When a published map is then viewed, it is taken for a description of the way things actually are and helps create a sense of legitimacy and perpetuity around the borders of a state. As described by Wood, Fels, and Krygier, an essential requirement of maps was to make states appear as "facts of nature, as real, enduring things, like mountains, and to obscure their origins in violence and tenuous holds on tomorrow;" in this sense, "maps are arguments about existence" (2010, 33-34). While sequential editions of paper maps allowed consumers to track the fluidity of state borders and the existence of countries over time, digital maps such as Google Earth make this much more difficult. Instead, the maps are evolving at a rate slightly behind that of the countries themselves, enhancing the idea of countries as enduring things by making the process of state disappearance and appearance invisible: it only shows what (supposedly) is.

The evolution of India is an example of state fluidity (Sahu 2022, lecture). Colonial India was united as a single governing entity. However, following decolonization, the Islamic population wanted to secede from the majority Hindu state of India, and created North and East Pakistan. The two Pakistans were separated by a large swath of India, and East Pakistani citizens held a different culture than that of West Pakistanis. This difference in fundamental goals of the state sectors then led to the separation of East Pakistan from West Pakistan and the creation of Bangladesh. Another example of state fluidity is the evolution of maps over the course of

Western exploration of North America. Maps are situated in "a particular set of competing interests, including cultural, historical, and political" and can be understood by what they "subjugate, ignore, and/or downplay," in this sense, representing power (Crampton 2001, 241).

North American maps, such as those depicting the Louisiana Purchase, visually emphasizes the large swath of land that helped double the size of the United States and encouraged Westward colonization (Figure 2). This particular figure also visually emphasizes the areas that were held by another state power, as if to indicate what states were inhibiting total Westward expansion. This allows for a visualization of the ploys for power happening between states with substantial power and global influence. However, it makes Indigenous territories invisible by failing to reference them, and thus signals a refusal in society to acknowledge Indigenous rights to their homeland. It also assumes a homogenous country, so that the viewer is assumed to be a white land owner with potential interest in Westward expansion or the funding of Westward expansion. It fails to depict plantations exploiting Black, slave labor and the sites of Indigenous genocide that were already carried out for US colonizers to forcefully assert their presence on North American Indigenous land.

Maps are models of the space they represent and are created based on the context of social constructions occurring at the time of their creation and the accumulated knowledge of 500 years of mapmaking (Crampton 2001; Wood, Fels and Krygier 2010). The process of constructing these models often requires myriad different thinkers and mapping experts, so authorship is typically very difficult, if not impossible, to assign (Wood, Fels and Krygier 2010, 54). The introduction of satellite mapping capabilities makes these questions even more complex as they appear to be rooted in genuine science and technology that is generating an accurate

model of our planet. When these technologies are creating the base maps for virtual mapping techologies, how do we assign authorship and how does that inhibit our critical analysis capabilities to continue to acknowledge the inequities propagated by the complex systems driving the creation of these maps?

Historical maps have been constructed to help the viewer conclude certain perspectives within reality as fact. This is communicative mapping, where the purpose is for the viewer to gain a specific understanding. However, a great deal of mapping occurs for exploratory and data collection purposes. These maps are highly fluid and are not typically published as a method of communication for outside viewers to consume (Crampton 238). This can be understood in the same way a field biologist might observe versus photograph an organism. The observation process is time-consuming and mainly serves to increase the biologist's understanding of how the organism operates. The process of observation is not often shared as a method of communication to individuals outside of the process, but it does serve an important step with respect to data collection. This is the format of most of my mapping for this project. While I do not have many formal communicative maps in my final thesis, I have the data I attained throughout the exploratory process and the conclusions and significance I gained by analyzing that data. While ArcGIS and other GIS technologies have increased access to mapping and claim to have democratized the process, many of the basemaps are still controlled or were created by systems of power. For example, the United States Census has evolved overtime toward Census Block data groups, which provide abundant data and statistics at a very small scale. While this information is helpful for different data analyses and comparisons (including that which I conducted in my research), its management by a governmental agency increases the ease through

which the United States can monitor specific trends and maintain control over the people within its borders.

Finally, maps can only be interpreted in their context (Harley 2001, 37). In breaking apart the context of maps, it is important to examine the context of the cartographer, of other maps, and of society (38). The context of cartographers often relates to their patron or sponsor. For example, with respect to the HOLC residential security maps, as I will discuss below, the mapmakers were serving the Federal Home Loan Bank Board. Similarly, the context of topographical and city maps was to create administrative records that could be used to direct economic development; after its creation, it became a "signifying system though which a social order is communicated, reproduced, experienced, and explored" (45). These maps have since been applied for other uses of planning and development, research purposes, and navigation purposes. As a model representing societal trends and perceived as representing the genuine state of things, it becomes even more important to make sure we are not divorcing a map from the social realities it is either embodying or silencing.

Separating maps from their historical and present-day contexts makes the map illegible. For example, when you open a fiction book, one of the first things you see is a constructed map of the fictional world. However, while you can look at it an infer where an important port city might be located, there is relatively little else we can gather from the map. Once we start thinking about the context of the mapmaker, we can start to understand that they created the map while also thinking about the world they have created as an author, and that the map was used to help clarify and inform the decisions the author took to describe travel distances and relationships between places within the book. Additionally, the map was created in relation to the

other fictional world maps and the maps that model our real world, which both function to convey power dynamics and indicate proximity to resources and topography. Then, when we start to consider the context of the maps, it is clearly associated with the book we have picked up to read, but since we have not yet started reading the book, our interpretation of the maps with only the other two contexts is superficial. It is only once we begin reading that we can start to understand the context of what is happening in the small town tucked away into the woods at the top of the map or why we need to know about the meandering river on the other side of the world.

The Home Owners' Loan Corporation and Residential Security Maps:

The Home Owners' Loan Corporation (HOLC) was created as a part of the New Deal by President Franklin D. Roosevelt in 1933. It was tasked with categorizing neighborhoods in cities to determine the areas that could be considered safe for banks to invest in and provide loans to; this led to the creation of HOLC residential security maps all throughout the US. The four grades assigned to neighborhoods were (A) Best, signified by green; (B) Desirable, signified by blue; (C) Declining, signified by yellow; and (D) Hazardous, signified by red (Figure 6) (Mitchell and Franco 2018). The grades were assigned based on demographics (race / class) and proximity to resources (parks / schools) around neighborhoods. The Indianapolis HOLC map was created in 1937, after which it was passed on to and used by local lenders, leading to the long-lasting effects of redlining, which have been studied and include city-wide environmental impacts such as discrepancies in vegetation (Moxley and Fischer 2020).

However, while we know that demographics and proximity to resources factored into the way in which grades were assigned, it remains unclear to what extent different factors impacted a grade and if there was a standard measurement system that could be applied to the grades for all residential security maps. The primary source that has aimed to address this is Amy Hillier's 2005 article, "Residential Security Maps and Neighborhood Appraisals: The Home Owners' Loan Corporation and the Case of Philadelphia." Although this article uses Philadelphia as a case study, it depicts and analyzes the evolution of Philadelphia's three sequential residential security maps from 1935, 1936, and 1937 with respect to the weight at which demographic and resource variables factored into the grades assigned (Figures 3, 4, and 5). In doing so, Hillier provides a framework detailing what data and processing steps would be necessary to apply a similar study to another city to see if the methodology of assigning HOLC grades became standardized or if it varied by city. In pursuing this for Indianapolis and/or other cities, we would gain a more comprehensive understanding of HOLC grading criteria across the country and would allow us to better understand if the process was standardized or varied broadly based on the specific mapmakers on the case. While a promising area of future research, it goes beyond the extent of this thesis. Additionally, all three Philadelphia maps were created prior to or in the same year as the HOLC map for Indianapolis, suggesting that the first two Philadelphia residential security maps may have served as a test case for the HOLC mapping process, which potentially set a precedent that would have been used in Indianapolis and for assignment of grades in the mapping of cities from 1937 on.

Examining Hillier's case study brings to light certain contradictions and conflicts of interest associated with the HOLC mapping process. While the term "redlining" has become

relatively well-known and widespread, its legacy overshadows the original role of the HOLC to provide new mortgages on an emergency basis to homeowners at risk of losing their homes during the Depression (2005, 207). In fact, Hillier argues, HOLC's rehabilitation work "went against theories of property valuation that considered neighborhood decline natural and inevitable" (210). The HOLC made a disproportionate number of loans to D-grade areas (red), so Hillier asks, "why did the HOLC—an agency created to make new loans to homeowners at risk of foreclosure—create maps of neighborhoods that disparaged the same areas to which it made most of its loans?" (208-209). This dichotomy appears to represent a societal conflict between providing opportunities and maintaining the discriminatory status quo within society.

By asking Hiller's question, it becomes possible to place the HOLC within the context of the Federal Home Loan Bank Board (FHLBB). The FHLBB was responsible for the creation of a City Survey Program, which aimed to map neighborhoods without being overt about its intentions or role in the mapping process. The FHLBB tasked the HOLC with carrying out the City Survey Program, leading to the construction of what eventually became known as the HOLC residential security maps. The security maps served the FHLBB's larger purpose of strengthening the savings and loan industry and promoting new appraisal standards it believed long-term loans required (207, 213-214). The desire for this initiative can be seen in the 12-part review series "Neighborhood Standards as They Affect Investment Risk" published by the FHLBB starting in August 1935. In the series, the FHLBB encouraged lenders to consider neighborhood conditions before making loans, included an article outlining the process of creating security maps, and encouraged all lending institutions to make their own maps of their own lending areas (212). Such encouragement represents a clear declaration of the FHLBB's

desire to protect the loan industry by grouping neighborhoods together, rather than assigning loans on an individual basis. The FHLBB's City Survey Program surveyed all cities with populations of at least 40,000. 239 cities met this requirement and were surveyed; however, as a federal institution, the FHLBB itself did not have employees stationed within all of these cities (214). The HOLC, on the other hand, had representatives already stationed in all 239 cities since its aims were to provide loans to people all over the country. Since the HOLC was also an emergency branch of the FHLBB, the FHLBB had authority over the HOLC and could direct it towards its own interests. The HOLC was formed in 1933, prior to the start of the Neighborhood Standards Review started by the FHLBB in 1935, so it was already established and had had a couple years to begin to give out loans and follow through with its main objective. It was also still new enough that it would remain established in cities for at least a few more years after that point. It therefore made sense for the FHLBB to add the surveying of cities to the tasks of the HOLC instead of creating new offices for the FHLBB in each city. In transferring the task of completing the City Survey Program to the HOLC, the FHLBB created highly detailed materials that instructed field agents to collect a large amount of very detailed data, but they did not explain how field agents were to convert the data into a grade (221). The lack of clear grading guidelines from the FHLBB produced mystery and disagreement surrounding significance of the factors determining HOLC grades.

Now that the HOLC took on the task of surveying cities and creating residential security maps, we need to understand how the survey and map-making process was actually carried out in order to determine the nuances of the grades, and how much individual power dynamics within cities impacted the grades or if a systemic grading rubric evolved to be applied across cities. The

structured appraisal form used by HOLC field agents requested information about neighborhood land use; quality of the residential district; neighborhood trends; age of housing; proximity to schools, stores, and transportation; racial composition; and new public improvements (209-210). General indicators of housing conditions included percentage of crowded units, residential structures needing major repairs, and residential structures without inside flush toilets. Neighborhood stability was then indicated by a measure of the median duration of residence (223, 224).

In Philadelphia, three different residential security maps were made. The first was in 1935 (Figure 3), but it was created without data from a survey. The next two, created in 1936 (Figure 4) and 1937 (Figure 5), are associated with two different Philadelphia surveys. These surveys provide context to the HOLC maps by providing detailed descriptions of the areas, breaking down the racial, ethnic, and socioeconomic makeup; sales and rental values; new construction; availability of mortgage funds; and trends of desirability within the neighborhoods (216). While the data was collected based on FHLBB recommendations, neither the FHLBB or HOLC had set aside guidelines to consider where each data variable should be ranked (210). In the case of the Philadelphia maps, out of 21 total consultants, only a few were listed as consultants for both the 1936 and 1937 maps and 14 already worked for the HOLC as real estate brokers or appraisers. For the 1937 map, more than half of the 19 consultants were realtors and two were lenders (214-215). These statistics provide insight into the context of the cartographers and the sponsors they clearly represented (the HOLC, FHLBB, realtors, and lenders).

With respect to the actual assignment of HOLC grades, first-grade A (green) areas were neighborhoods considered to be the lending hot spots that still had room for new residential

growth, were “homogeneous,” and were in demand regardless of the state of the economic housing market (216). Second-grade B (blue) areas were completely developed neighborhoods considered to still be a good investment but not what the people who can afford newer homes are buying today. Third-grade C (yellow) areas were older neighborhoods becoming obsolete and infiltrated by a “lower grade population.” Third-grade areas were considered to be poorly maintained and lacking homogeneity. Finally, fourth-grade D (red) areas, had lower homeownership rates, poor housing conditions, and the presence or infiltration of an undesirable population. The drawing of the residential graded areas did not rely on an existing set of boundaries because the graded areas were intentionally constructed to incorporate homogeneous groups and types of housing rather than coincide with existing political or administrative units.

The mapping process carefully excluded parks, industrial and commercial areas, and major streets and railroad corridors (217). This trend can clearly be seen in the HOLC residential security map for Indianapolis (Figure 6), which led to somewhat complex results from GIS analyses comparing the BRT Red Line route to the HOLC graded areas within this study.

The data collection and survey endeavors by the HOLC culminated into the series of three residential security maps for Philadelphia. A key finding of Hillier’s when looking at the evolution of the residential security maps was that:

> “More than half (54%) of the first map was colored green and less than one-fifth (18%) of it was colored red. On the second map, the green areas dropped to 13% and the red areas accounted for 31% of the graded area in the city. In the final map, only 8% was colored green, while red covered more than 34%... The increasingly dreary picture of real estate conditions in Philadelphia contradicts the actual economic trends. HOLC’s own

> reports indicate that Philadelphia's real estate market improved considerably between 1935 and the end of 1936, as the volume of new construction increased, the number of foreclosures decreased, and several banks started making a large number of FHA loans… Other economic indicators—employment rates, payrolls, and the numbers on work relief—also showed improvement" (218, 220-221).

The dichotomy in Philadelphia's three consecutive residential security maps between improving economic conditions and degrading HOLC grades over the same period of time suggests high variability and non-standardization in how HOLC grades are assigned. However, it also provides a range of values from which Hillier was able to analyze to maximize the validity of her results. Hillier analyzed the quantitative data using spatial statistics and a GIS to test the relationship between race and HOLC grade (208). In the actual assignment of HOLC grades, it is clear that (1) although some areas with no African American residents received fourth-grade ratings, "areas of the city with African Americans were consistently given a fourth-grade rating;" (2) the presence of "colored families" predicted worse HOLC grades; (3) areas with higher percentages of white immigrants had worse grades; and (4) areas with "poorer housing conditions" predicted worse HOLC grades (217-227). While the significance of these values varied across the three maps, in all three instances, "even when controlling for the value and condition of housing, race and immigrant status influenced the neighborhood appraisals" (227). Hillier's research therefore supports the assignment of HOLC grades as a practice that preferences people of white, European background, then white, Eastern European immigrant, then other communities of color and Black communities.

Hillier's research helps us understand the nuances and processes that actually went into the creation of the HOLC residential security maps. The inconsistent significance of variables in assignment of HOLC grades across the three maps displays a lack of standardized grading at the start of the City Survey Program. The secretive approach toward the City Survey Program by the FHLBB allowed for their use by lenders to continue without reproach until community organizers rediscovered the maps in the late 1970s, after which historians "connected them to what had become known as redlining—the practice of not lending to certain areas based on their neighborhood characteristics, particularly their racial and ethnic composition" (208). While the HOLC maps are now known as causing redlining, this definition helps make the distinction between the term and the change in loan culture from the FHLBB that led to the actual creation and use of the HOLC maps by the FHLBB. In this sense the survey guidelines set out by the FHLBB, "constituted federal endorsement of racially based appraisal standards" (227). While directly pertaining to Philadelphia, the later status of the creation of the HOLC residential security map for Indianapolis suggests that we may be able to tentatively apply these results to what is observed in the Indianapolis HOLC map.

In fact, my interest in the relationship between the BRT Red Line and the HOLC map for Indianapolis was brought about by the potential for the "Red Line" as a search term to unintentionally bury information about "redlining." Examining the potential for the unintentional burial of HOLC maps becomes even more interesting when considering that the FHLBB had previously hidden HOLC residential security maps from the public eye, even though the effects of these maps had permeated the structure of cities.

Further research will be necessary to determine if Hillier's findings for Philadelphia can serve as an accurate representation of the HOLC grading guidelines for Indianapolis, but Hillier does provide a breakdown of the acquired data for her Philadelphia case study, which included materials from HOLC's archives; real estate and appraisal journals from the 1930s; census tract-level housing and demographic data from Philadelphia; and literature on appraisals and federal involvement in real estate (208). This list provides a thorough starting point for where materials specific to the creation of the Indianapolis HOLC residential security map could be found. It also allows for the possibility of recreating a similar statistical analysis with respect to the data associated with Indianapolis to confirm the significance of race, value and condition of housing, and immigrant status on the assignment of HOLC grades.

The Red Line and Bus Rapid Transit in Indianapolis:

Indianapolis introduced the Red Line bus route in 2019. The Red Line was the first line in a proposed, all-electric Bus Rapid Transit (BRT) system in Indianapolis (Hwang and Mack 2019). BRT systems are considered to be more efficient than typical bus routes because designated lanes are set aside so only the BRT buses can travel in them, reducing overall travel time for riders. This way, even if there is vehicular traffic on the streets, such as during rush hour, the buses should maintain consistent travel times and should not be slowed (Newman, Beatley and Boyer 2009), (TFA 2016). In addition to the increased efficiency and more reliant travel times, the Indianapolis BRT lines are proposed to be all electric, shifting more toward perceived climate-friendly infrastructure. The end points of the bus lines will have charging pads

to ensure the buses can run all day, even in the colder winter months when electric charging ports do not work as efficiently (Hwang and Mack 2019).

Figure 6 shows the Indianapolis HOLC "redlining" map overlain on a street map of the city. On top of this layer are three electric Bus Rapid Transit (BRT) routes: (1) the developed Red Line, (2) the Purple Line currently undergoing the construction process, and (3) the proposed plan for the Blue Line to the Indianapolis International Airport. The Red Line debuted in 2018, while construction on the Purple Line began February of 2022 for completion by 2024. The Blue Line is still in early development stages, but there are goals to begin construction in 2028. The BRT lines have been proposed as a city-wide foray into climate-friendly infrastructure in Indianapolis (Dwyer Aug. 2021, Dwyer Nov. 2021).

Central Indiana has been under-investing in transit and now sits behind a lot of its competitor cities with regard to attracting students, new employees, and event-hosting honors. As the Crossroads of America, Indiana's lack of transit-oriented development (TOD) is surprising. The Central Indiana Transit Task Force was created in 2009 in response to the realization by Indianapolis' businesses and community and political leaders that the region needs to invest in TOD. TOD investment will help Indianapolis remain competitive with other US cities such as Charlotte, NC; Cincinnati, OH; Columbus, OH; Louisville, KY; Minneapolis, MN; Nashville, TN; Pittsburgh, PA; and Raleigh, NC, all of whom have "commuter, light rail or bus rapid transit systems in operation or final planning stages" (Metropolitan 2015, 1). This task force works closely with the municipal partners of Beech Grove, Carmel, Fishers, Greenwood, Indianapolis, Lawrence, Noblesville, Plainfield, Southport, Westfield, and Speedway (Connect 2016, 4). Since then, the task force has worked to identify how improvements in Indianapolis'

systems of mass transit can help “recruit and retain a diverse and skilled workforce, as well as provide increased access to jobs, health care, and recreation for at-risk populations” in Central Indiana (2-4). In 2014, by working with the state legislator and community partners, Indiana passed legislation to enable Marion, Hamilton, Hancock, Johnson, Delaware, and Madison Counties to pass referendums to create a stable, dedicated funding source for investing in transit. Through this legislation, Marion County had to pass a referendum before any of the other 6 counties could move forward with their own funding initiatives (4, 48). Since Marion County held a successful referendum, they were able to move forward with creating a transit plan; Hamilton County, in anticipation of being able to hold a successful referendum of their own, also created a preliminary Hamilton County transit plan that would connect with the detailed Marion County transit plan that has been proposed (4).

Some of the questions planners and stakeholders involved in the IndyConnect transit initiative for Central Indiana had to pose were what type of transit they wanted to invest in and if they wanted to emphasize ridership or coverage more. While they were limited in their transit choices, they looked at (1) local transit, (2) express transit, and (3) rapid transit (Figure 8). Local transit refers to transit that stops every two blocks, allows the most access but slowest trip time, and frequents stops every 15-30 minutes. Express transit has only a few stops at each end, thus providing the least access but shortest trip times, and runs during primary commute hours to and from work, rather than as all-day service. Express transit providing transit from Carmel and Fishers to downtown Indianapolis had previously been attempted with success, but it eventually had to be shut down as it could not sustain itself on ticketing funds once the original grant money

was used up (43). Rapid transit has stations spaced every half - 1 mile for walkable access, frequents stops every 10-15 minutes, and makes good trip time (8).

Meanwhile, the desired ratio of ridership to coverage would determine what mix of transit styles would be helpful to improve the existing transit network. Ridership refers to connecting people to the densest employment centers and ensuring the transit network can appropriately reach people's place of work. Coverage, on the other hand, refers to the amount of people that have access to transit. Coverage ensures that everyone has access to transit while ridership ensures that the people with access can reach their places of employment. By hosting community engagement sessions, IndyGo, the region's largest transit provider, found that most people (46%) wished for a 90:10 ridership to coverage ratio. IndyGo was operating on a 60:40 ratio at the time, and only 10% of the population supported maintaining this balance, with another 10% supporting a ratio favoring even more coverage. In response to this feedback, IndyGo aimed for a 75-80% ridership to 25-20% coverage ratio as they moved forward in developing the IndyConnect and Marion County transit plans (Connect 2016, 9; Walker and Associates 2015).

While there are a lot of different directions one can go with building systems of mass transit, the options are somewhat limited in Indiana. For example, the construction of railways and light rail has been banned by the Indiana State Legislature because of the high cost per mile of track it takes to lay down (24, 26). A study done by students at Ball State University found that every $1 invested in transit yields a $3 economic benefit, which encourages the state and communities to be willing to invest in regional efforts to improve public transit today and may lead to overturn the ban on light rail construction if it can gain enough support moving forward

(4). By answering which type of transit is most economically viable and fits into the ridership to coverage ratio the best, the IndyConnect partners that have worked to create the IndyConnect transit plan were led to focus on the use of 3-5 bus rapid transit lines supplemented with local bus lines; the grid space in between the bus routes will be reinforced with improved walking and biking corridors to increase coverage of the lines as much as possible (Metropolitan 2015, iii). The Central Indiana Regional Transportation Authority (CIRTA), the Indianapolis Metropolitan Planning Organization (IMPO), and IndyGo are the IndyConnect partners that represent the State of Indiana and businesses within the state. In these roles within our society, they are expected to focus on the economic aspect of transit development (Connect 2016, 8). A market-driven and cultural shift has occurred, moving society away from personal transit and toward systems of mass public transit. Indianapolis is also being driven to rebuild their transit network to ensure IndyGo's success as a business and the economic success of the state by keeping jobs in Indiana; this shift toward public transit is partially fiscally driven as the 2008 recession caused communities to run into issues with maintaining costly infrastructure and public services amid declining tax revenues following the recession (Metropolitan 2015). The investment in transit is believed to stabilize property values, aid in redevelopment efforts, and attract investment in neighborhood redevelopment (Connect 2016, 14). This language clearly indicates a focus on economic growth for the state of Indiana in the redevelopment of public transit. While this language sounds positive in the global capitalist society we currently exist in, it may also serve to invite gentrification of nonwhite and poor neighborhoods.

The Indianapolis Department of Metropolitan Development (DMD) has a policy that requires all federal affordable housing subsidies to be spent on projects within a half mile of

existing or proposed transit lines (Connect 2016, 54). This policy ensures that people who meet the qualifications for and choose to live in affordable housing units will have access to transit, but it does not ensure that the remaining housing and rental costs will remain stable and prevent the gentrification of poorer and more diverse neighborhoods. Along the Red Line, the 34th street station, which has one of the highest proportions of communities of color in the corridor and of the population with incomes less that 150% the federal poverty threshold, as well as the areas south of Broad Ripple, are most at risk for potential gentrification with the investments being made in transit along this route (IMPO 2018, 54, 63). IMPO environmental justice policies also required planners of the proposed transit infrastructure to consider minority and low-income populations, comply with Title VI, and develop a public involvement plan that included a specific and separate strategy for engaging low income and minority populations (Connect 2013, 184). While an incomplete list of the environmental justice strategies transit planners had to consider, the language comes across as very loose and superficial. It requires planners to consider minority populations and have a separate community engagement strategy for communities of color, but it does not require the final plan to prioritize the interests of these communities and does not intentionally work to correct historic inequities creating by redlining practices within Indianapolis.

The various stakeholders also played a role in the planning of the IndyConnect and Marion County transit plans. Not only are CIRTA, IMPO, and IndyGo partners, the public a stakeholder, and cities affected by the BRT lines municipal partners to IndyConnect and the Central Indiana Transit Task Force, but many other community organizations and businesses were consulted and considered in the planning of the transit plan. For example, the IndyConnect

planning process included interviews with CIRTA, IndyGo, the Central Indiana Corporate Partnership, the Indianapolis Department of Metropolitan Development, the Indianapolis Department of Public Works, the City of Southport, Hamilton County, the City of Carmel, the John County Highway Department, and the City of Greenwood. It also considered the locations of Ivy Tech Community College, Eli Lilly, the Indianapolis Children's Museum, IU Health, IUPUI, Butler University, and the University of Indianapolis. It also worked with various neighborhood and community development organizations (Connect 2013, 103). The variety of stakeholders consulted in the planning process makes it extremely difficult to say who actually held power in constructing the BRT transit plan to look like it does today. Within this collaboration, however, Hamilton County, which includes Carmel, Fishers, and Noblesville, displayed an eagerness to create their own transit plan alongside the one for Marion County that likely impacted the choice to prioritize the construction of the Red Line first, connecting into Carmel.

The originally proposed plan extends the Purple Line to the West of downtown Indianapolis and includes an orange line running parallel and to the East of the Red Line and a green light rail line cutting northeast to Castleton, Fishers, and Noblesville from downtown (Figure 9). The updated map shows the projected IndyGo system map for 2023, which features the shortened Purple Line and the extensive local transit network forming a transit grid to connect people between the BRT lines (Figure 10). These maps are very difficult to assign authorship to because the mapping of the transit system was such an intensively collaborative process.

When fully implemented, the Marion County transit plan with provide transit access (1) within walking distance for 75.8% of minority people, 84.6% of households with incomes below the poverty level, and 83.8% of jobs; (2) along local bus routes for 38.2% minority people, 45.6% of households with incomes below the poverty level, and 45.1% of jobs; and (3) along the Red Line to 15.8% of minority people, 28.9% of households with incomes below the poverty level, and 54.8% of jobs (Connect 2016, 36). Within the Red Line corridor specifically, there were more than 20,300 public administration jobs in 2016, and both the State Government Center and the City-County building will be served (IMPO 2018). In general, the demographics around the Red Line do not accurately represent Marion County as a whole. According to the Indianapolis Metropolitan Planning Organization: (1) the median value of residential parcels in the Red Line Corridor was $98,800 in 2016, 1% greater than Marion County as a whole; (2) the median total assessed value for residential properties was greatest in the northernmost station areas and in downtown; (3) the Red Line corridor is overall less diverse than Marion County as a whole, particularly in the station areas at the northern end of the corridor around Broad Ripple and in the southern end of the corridor near the University of Indianapolis; and (4) median household income is highest in the northern end of the corridor, where the median income exceeds $75,000 (IMPO 2018, 43-44, 54, 77). These statistics indicate a prioritization of official structures of government and stakeholders with money over poor, minority communities that are more likely to be displaced due to gentrification along the corridor.

Figure 7 depicts the proposed BRT lines for Indianapolis on a map displaying the per capita income distribution for Indianapolis by Census blocks from the 2010 Census data (McNally 2018, HUD 2018. The darkest areas show where per capita income is the highest, and

they are primarily concentrated to the North of the endpoint of the Red Line BRT route. The areas of lowest per capita income are concentrated around downtown Indianapolis, on either side of the Red Line corridor where many businesses are concentrated. The proposed BRT lines each appear to be connecting across the Census blocks with low per capita income to connect each endpoint to Census blocks with a medium to high per capita income designation. When comparing Figures 6 and 7 side-by-side, the long-lasting effects of redlining within the city are apparent. The empty, white areas on Figure 7 corresponding to a low per capita income correlate to the HOLC grade-D areas in red on Figure 6. Additionally, the dark corridor through downtown Indianapolis on Figure 7 corresponds to the unmapped, business district that was intentionally excluded from the HOLC mapping process of residential areas. Finally, the northernmost part of the Red Line BRT route travels through one of the only HOLC grade-A areas on Figure 6 and correlates to the dark black strip at the northernmost portion of the Red Line on Figure 7.

Riding the bus is often associated with people of lower socio-economic status and can be looked down upon by people with the means to afford a car and provide their own personal transportation. However, in the face of climate change and a social push to reduce emissions, it is becoming important to make public transit attractive for people that have the power to choose their method of transportation. Within the structure of a BRT system, the route can be open or closed. An open BRT would allow the buses on the route to continue beyond the infrastructure of the designated bus lanes and convert into a local bus system (Walker 2021). However, Indianapolis opted for a closed BRT system, that requires the BRT designated buses to remain with the BRT infrastructure. Closed BRT allow for tighter control of operations, maximum

capacity, and minimum waiting time between buses. Closed BRT systems are more common than open BRT systems in the United States, however, because the goal is often to "make BRT appear special and different from regular buses. This goal is muddied if BRT buses run outside of the infrastructure or if local buses run within it" (Walker 2021). This is achieved through Indianapolis' BRT by electrifying the BRT buses so they cannot power themselves beyond the BRT designated route and by not allowing local buses in the BRT designated lanes. The construction of the Red Line corridor also did not expand the width of the streets downtown, so, while the Red Line bus could travel efficiently in the designated lane, it increased local traffic as the cars and local buses had to compete for two lanes rather than three. By increasing traffic, the goal is to push more people to use the BRT system to a greater extent, but through my conversations with Indianapolis residents, it seems as though some people instead find it frustrating. Since the Red Line is the first BRT and the Marion County referendum set the precedent for transit infrastructure in Indiana, a negative perception of the system could lead to the failure of future referendums by other counties for transit funding.

HOLC Areas vs. BRT Lines Data Analysis:

Now that I have critically analyzed the contexts surrounding historical HOLC maps and the new Marion County and IndyConnect transit plans, I have used a geographic information system to analyze the spatial relationships between the 1937 HOLC residential security map for Indianapolis and the Red, Purple, and Blue BRT lines for Indianapolis.

I used the ArcGIS online feature "Calculate" to determine the overlap between BRT lines and HOLC graded areas. I took the three accepted BRT lines and calculated the number of stations and miles of route that passed through each HOLC graded area, as well as those that passed through ungraded regions. The number of stations and miles of route served as two different measurements to relate new land use planning to the historic inequities of the HOLC maps. Additionally, a discrepancy between stations and miles of route could indicate a discrepancy between who is being moved through an area versus who is being serviced within that area. I also separated the data into being based off only what was within HOLC graded areas and within the entire route. Finally, I looked at it on the scale of each individual route, up to all three routes together. Within these categories, I looked at the percentage of stations or route mileage through each grade in comparison to the total area of Indianapolis that had been given an HOLC grade, as well as the for the total route, including the ungraded regions of Indianapolis.

In organizing the data, I found the best way to display it was through a double bar graph that shows the percent stations and percent miles associated with each HOLC grade for each line. The Red Line data is displayed in Figure 11. The Purple Line data is displayed in Figure 12. The Blue Line data is displayed in Figure 13, and the data for all three lines together is displayed in Figure 14. Each BRT has a majority of stations and mileage falling into the HOLC ungraded sections of Indianapolis, but the overall HOLC trend is for the Red Line to fall more in the A & B graded areas, with a shift toward predominantly B & C grade areas for the Purple Line and C & D grade areas for the Blue Line. This progression indicates that early infrastructure initiatives being created today will continue to favor the people demographically representative of HOLC

grade A and B areas, while the latter initiatives to increase infrastructure reach and decrease the appearance of inequities will be delayed.

The pie chart of Figure 19 visualizes the percentage of land in Indianapolis falling into each respective HOLC grade, while Figure 20 is a table that indicates the numerical breakdown in square miles and percent. When comparing Figure 19 to Figure 14, it becomes clear that the BRT routes are not representative of the distribution of land in Indiana. While 66% of the total land area is ungraded, less than 50% of the BRT lines fell into ungraded land. Additionally, while 2% of the land area has an HOLC grade of A, 6% of total BRT stations and mileage was in grade A areas. While only 3% of the total land area is grade B, 18% of total BRT stations and mileage was in grade B areas. 20% of the total land area had a C-grade, which was relatively representative of the 21% of total BRT stations and 25% of total BRT mileage in grade C areas. Finally, only 9% of Indianapolis' land distribution has a D-grade, and 10% of all BRT stations and 15% of all BRT mileage passes through D-grade areas. The values for stations and mileage for A and B graded areas suggests both are accurate measures to correlate BRT lines with HOLC grades; however, there is a dichotomy between the station and mileage values for C and D grade areas. This is a 4-5% discrepancy that suggests that people are being moved through those areas at a greater rate than the residents of those neighborhoods are being serviced by the BRT systems.

Figure 15 is a chart containing the data for the Red Line, which has a total of 28 bus stations and is 12.9 miles in length, with 17 bus stations (60.7%) and 8.1 miles (62.9%) occurring within HOLC graded areas. When looking at the bus stops, 5 (29.4% / 17.9%) are in HOLC grade A areas, 7 (41.2% / 28.6%) are in HOLC grade B areas, 1 (5.9% / 3.6%) is in

HOLC grade C areas, and 4 (23.5% / 14.3%) are in HOLC grade D areas, where the first percentage relates to the stations confined to HOLC areas and the second relates to the total stations along the route. As in Moxley and Fischer's 2020 report, "Historic HOLC Redlining in Indianapolis and the Legacy of Environmental Impacts", where they grouped A & B and C & D grades together, I do the same in this analysis to see if it impacted the way in which trends were distributed across the grades. 12 stations occurred in the A & B areas (70.6% / 46.5%), while 5 stations occurred in the C & D areas (29.4% / 17.9%). When looking at the miles of route for the Red Line, 2.3 miles (28.6% / 18.1%) occurred in A, 3.6 miles (44.1% / 27.7%) occurred in B, 0.4 miles (4.7% / 2.9%) occurred in C, and 1.8 miles (22.6% / 14.2%) occurred in D. This corresponded to 5.9 miles (72.7% / 45.7%) occurring in the A & B areas and 2.2 miles (27.3% / 17.1%) occurring in the C & D areas. As the first established BRT line in Indianapolis, the Red Line sets a precedent for how zero-emission infrastructure may be tested out as it is implemented. In this case, there is a positive correlation to HOLC grade assigned and number of bus stations / miles of route; HOLC areas with A grades see the most BRT infrastructure, whereas HOLC areas with D grades see the least BRT infrastructure. However, part of this trend may be skewed based on what was excluded as business or downtown districts on the HOLC map, making it equally important to examine the other two proposed bus lines.

Figure 16 is a chart containing the data for the Purple Line, which has a total of 31 planned bus stations and 15.2 planned miles of bus route, with 16 bus stations (51.6%) and 8.2 miles (54.1%) occurring within HOLC graded areas. Again given that the first percent relates to stations or bus route confined to HOLC areas and the second relates to the total stations or bus route along the entire route, 0 bus stations (0.0% / 0.0%) were in HOLC grade A areas, 5 bus

stations (31.3% / 16.1%) were in HOLC grade B areas, 10 bus stations (62.5% / 32.3%) was in HOLC grade C areas, and 1 bus station (6.3% / 3.2%) was in HOLC grade D areas. This corresponds to 5 bus stations (31.3% / 16.1%) in the HOLC A & B grade areas and 11 bus stations (68.8% / 35.5%) in the HOLC C & D grade areas. With respect to bus route, 0 miles (0.0% / 0.0%) are in HOLC grade A areas, 2.4 miles (29.2% / 15.8%) are in HOLC grade B areas, 5.5 miles (66.9% / 36.2%) are in HOLC grade C areas, and 0.3 miles (3.9% / 2.1%) are in HOLC grade D areas, corresponding to 2.4 miles (29.2% / 15.8%) in the HOLC A & B grade areas and 5.8 miles (70.8% / 38.3%) in the HOLC C & D grade areas.

Figure 17 is a chart containing the data for the Blue Line, which has a total of 39 planned bus stations and 24 miles of bus route, with 20 stations (51.3%) and 17.2 miles (71.7%) occurring within HOLC graded areas. With respect to bus stations, 0 bus stations (0.0% / 0.0%) were in HOLC grade A areas, 5 bus stations (25.0% / 12.8%) were in HOLC grade B areas, 10 bus stations (50.0% / 25.6%) was in HOLC grade C areas, and 5 bus station (25.0% / 12.8%) was in HOLC grade D areas. This corresponds to 5 bus stations (25.0% / 12.8%) in the HOLC A & B grade areas and 15 bus stations (75.0% / 38.5%) in the HOLC C & D grade areas. With respect to bus route, 0 miles (0.0% / 0.0%) are in HOLC grade A areas, 2.2 miles (12.9% / 9.3%) are in HOLC grade B areas, 8.3 miles (48.0% / 34.4%) are in HOLC grade C areas, and 6.7 miles (39.0% / 28.0%) are in HOLC grade D areas, corresponding to 2.2 miles (12.9% / 9.3%) in the HOLC A & B grade areas and 15 miles (87.0% / 62.4%) in the HOLC C & D grade areas.

Figure 18 is a chart containing the data for all three lines together, which have a total of 98 bus stations and 52.1 miles of route, with 53 stations (54.5%) and 33.5 miles (62.9%) of route occurring within HOLC graded areas. This breaks down into 5 bus stations (9.8% / 6.0%) in

HOLC grade A areas, 17 bus stations (32.5% / 19.2%) in HOLC grade B areas, 21 bus stations (39.5% / 20.5%) in HOLC grade C areas, and 10 bus station (18.3% / 10.1%) in HOLC grade D areas. This, in turn, corresponds to 22 bus stations (42.3% / 25.1%) in the HOLC A & B grade areas and 31 bus stations (57.7% / 30.6%) in the HOLC C & D grade areas. With respect to bus route, 2.3 miles (9.5% / 6.0%) are in HOLC grade A areas, 8.2 miles (28.7% / 17.6%) are in HOLC grade B areas, 14.2 miles (39.9% / 24.5%) are in HOLC grade C areas, and 8.8 miles (21.8% / 14.8%) are in HOLC grade D areas, corresponding to 10.5 miles (38.3% / 23.6%) in the HOLC A & B grade areas and 23.0 miles (61.7% / 39.3%) in the HOLC C & D grade areas.

The data analysis I conducted for this thesis clearly indicates that the historic inequities ingrained in the HOLC mapping process, which have become a distinct component of the structure of US cities, including Indianapolis, have not faded. In fact, these inequities are continuing to be propagated as newer design initiatives are being introduced into our cities. While the BRT system and the new transit plan sounds inventive, progressive, and as though it serves to decrease inequalities within our cities, it is actually moving us away from resilience. The heavy emphasis by planners on the economic benefits this transit system will bring in to help Indianapolis compete with similar cities fails to consider the ways in which the construction of the BRT system uses up potential energy existing within the Indianapolis city-system. Without inputting resources from another source, it is likely that this transit initiative may make Indianapolis less resilient in the face of disturbances. Already, the COVID-19 pandemic has challenged the BRT system by altering the habits of people living in and around Indianapolis to be less reliant on transportation and increasing our dependence on electronic forms of communication and work.

Conclusions:

White, middle-to-upper income people have historically been prioritized in the redlining of cities and continue to be prioritized when looking at the regions in which the Red Line services with per capita income values and that contained a historical HOLC grade of A. While there is no data available from IndyGo indicating the current ridership breakdown of the Red Line, the demographic trends indicated by the per capita income in comparison to the BRT and HOLC maps suggest that modern day demographic trends are representative of those that existed when the 1937 HOLC map was made for Indianapolis. The Red Line continues to perpetuate inequities ingrained within the Indianapolis city-system, but it is unclear to what extent planners aimed to overcome such inequalities. The language contained within the IndyConnect and Marion County transit plans focused on the economic advantages of transit and simply acknowledges IndyGo's reach with respect to various demographics and income levels. Nowhere in the plans was an explicit declaration of intent to dismantle current inequities within the Indianapolis city-system, suggesting that, while planners may be required to consider the location of Black and poor communities, they are not necessarily obligated to prioritize the needs of Black and poor communities over communities with higher incomes that have the means to ensure the success of their transit business. This is an example of examining the silences within the narrative surrounding the BRT plans.

The Red Line route is an electric BRT (Bus Rapid Transit) system designed to increase the competitiveness of Indianapolis, but it is also seen by some groups in Indianapolis as a foray

into zero-emission infrastructure within Indianapolis and part of a resilient plan for the city (Thrive 2019). While there are plans to implement additional routes, there will be additional financial barriers associated with the implementation of those passing through areas that do not connect as much with the business corridors of downtown Indianapolis and correlate to areas with an HOLC grade of C or D and (Figure 9).

Since Indianapolis has not experienced substantial gentrification in comparison to other HOLC-graded cities such as Minneapolis, comparing historic HOLC maps with modern-day infrastructure initiatives is logical and retains compatibility (Moxley and Fischer 2009). This produces a greater sense of permanence in demographics from 1937 to present day and allows us to accurately predict a similar sense of demographic constancy in the face of climate change/looking towards implementing additional zero-emissions infrastructure in the future.

HOLC redlining maps still impact the composition of cities today, as redlined neighborhoods feature long lasting, negative environmental impacts. BRT routes are not representative of the distribution of land in Indiana, as more miles of route exist in HOLC grade A areas than is representative for the distribution of HOLC across the Indianapolis region.

I have worked to dismantle the structures of power existing within the Marion County transit plan and examine their relationship with the 1937 HOLC map for Indianapolis, making it apparent that power dynamics within the city are being propagated through the use of tools, such as mapping and infrastructure, in the face of new and future challenges. The language used in the planning documents is very positive and suggests that an effort is being made to create an inclusive plan, but the actual analysis of land use distribution with respect to the current demographic distribution in Indianapolis shows that these efforts are not doing enough to

deconstruct historic inequities within the structure of the city. Now that this has been made visible, we can start to question the legitimacy held by maps and transit planners and organize as a community to create a grassroots approach to planning that intentionally de-prioritizes businesses, economic growth, and white, wealthy communities with privilege.

Significance:

This thesis helped to break down the complex interactions between resiliency, power, HOLC residential security maps, and Indianapolis' new BRT initiative. While providing a strong foundation for which research can be pursued, it also introduces a lot more questions.

The first critical research avenue to be explored moving forward is to apply Hillier's methodology for her Philadelphia case study to Indianapolis. It is also important to conduct a study of the demographic breakdown of the Red Line ridership and how BRT ridership will evolve with the introduction of the Purple and Blue Lines. Additional interviews with people involved in the planning process of the BRT routes and a better understanding of the impact Hamilton County's proposed transit plan had on the preference of the Red Line for the first route would help clarify where power dynamics between communities in Central Indiana lie. Planning documents, including community meeting minutes would be helpful to see how the transit planning partners organized community meetings and responded to feedback. IMPO, IndyGo, and CIRTA argued that the Red Line was the first line to be constructed because of the grant funding they received from TFA, but it would be informative to know if they applied for grants for all three lines at the same time and only had funding approved for the Red Line or if

IndyConnect partners chose to request funding specifically for the Red Line as the first BRT to be implemented.

With respect to climate change technologies, future research could explore how the implementation of climate-friendly energy technologies may also work to recreate the structures of power ingrained in the layout of Indianapolis. For example, where are electric vehicles (EVs), home solar panels, solar panel fields, and geothermal energy systems more likely to be concentrated? Who is it that actually uses and benefits from that energy? Is there a discrepancy or is the benefit distributed equally across Indianapolis? Moving forward, as the resiliency of cities is being pushed as a solution for combating climate change and reducing emissions, and Indianapolis is aiming to increase its economic competitiveness with other comparable US cities, it is critical to analyze who has historically been displaced when looking at resilient solutions, as well as who is prioritized in the quest for resiliency. Another avenue of research is to look into how cities can switch to renewable energy sources and put forth resilient plans without promoting the gentrification of neighborhoods, especially with respect to improved transit networks and rising costs of living.

It would also be interesting to create similar follow up studies in other cities to see the current transit infrastructure in other historically redlined cities and determine if the effects of redlining are still ingrained in the total US city network. By drawing these connections, we can gain a better understanding of the power dynamics operating on a national versus state level and hopefully locate cities that have intentionally fought to dismantle the hold redlining has on the structure of our cities.

Figures:

Figure 18 – p. 68

"Table of Bus Station and Mileage Distribution through HOLC Graded Areas for all BRT Lines" (McNally 2018, Clavery 2021).

Figure 19 – p. 69

"Percent Sq. Miles in HOLC Graded Areas" (Clavery 2021, m_kern 2021).

Figure 20 – p. 69

"Indianapolis Area Breakdown" (Clavery 2021, m_kern 2021).

Figure 1.

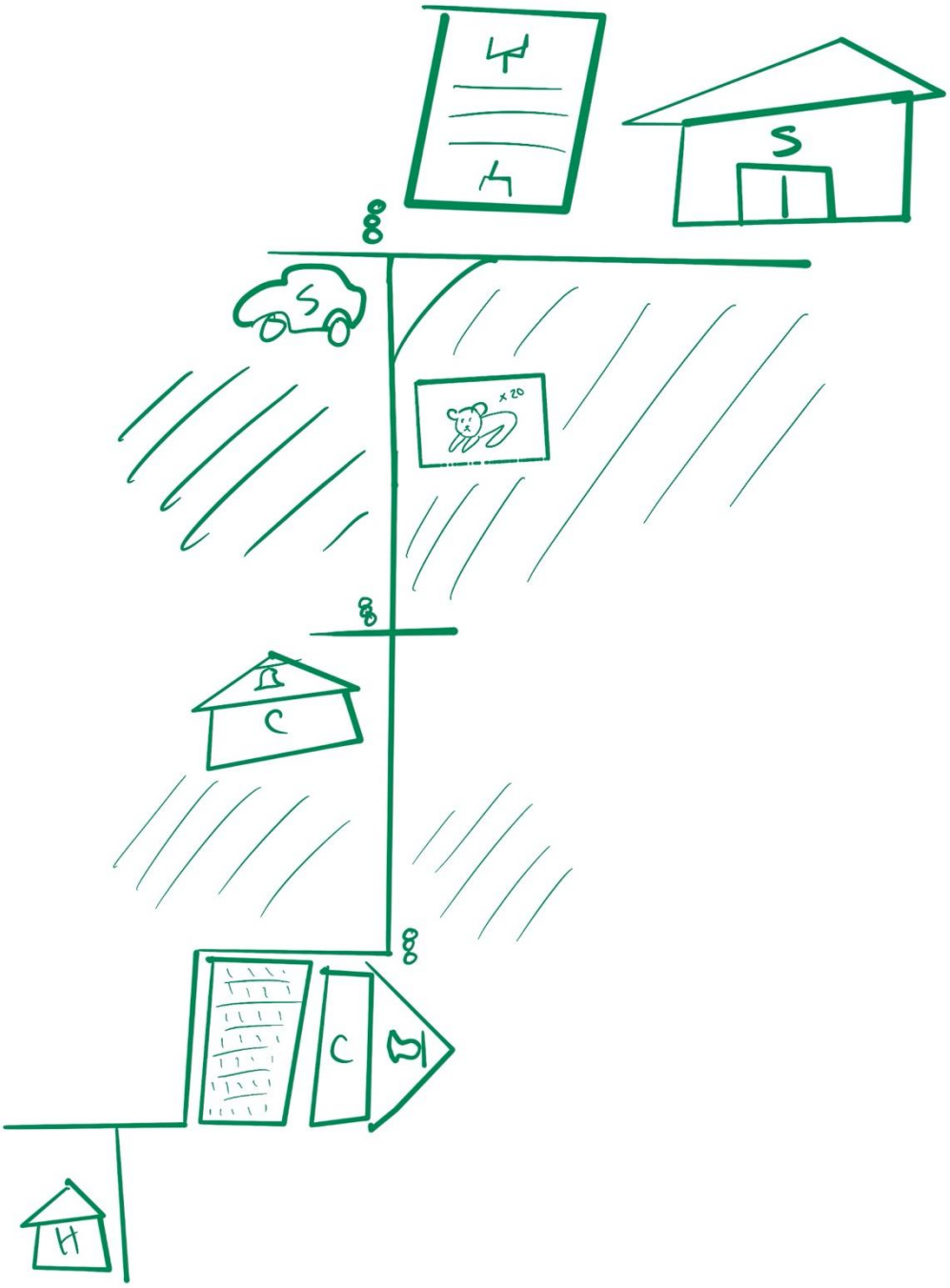

Figure 2.


LOUISIANA PURCHASE, 1803, FLORIDA PURCHASE, 1819.
OREGON COUNTRY
LOUISIANA PURCHASE 1803
SPANISH POSSESSIONS
TEXAS
MEXICO
UNITED STATES 1803
FLORIDA
BOUNDARY LINE 1818
BOUNDARY LINE 1819
LOUISIANA PURCHASE, 1803.
FLORIDA PURCHASE, 1819.

Figure 3.

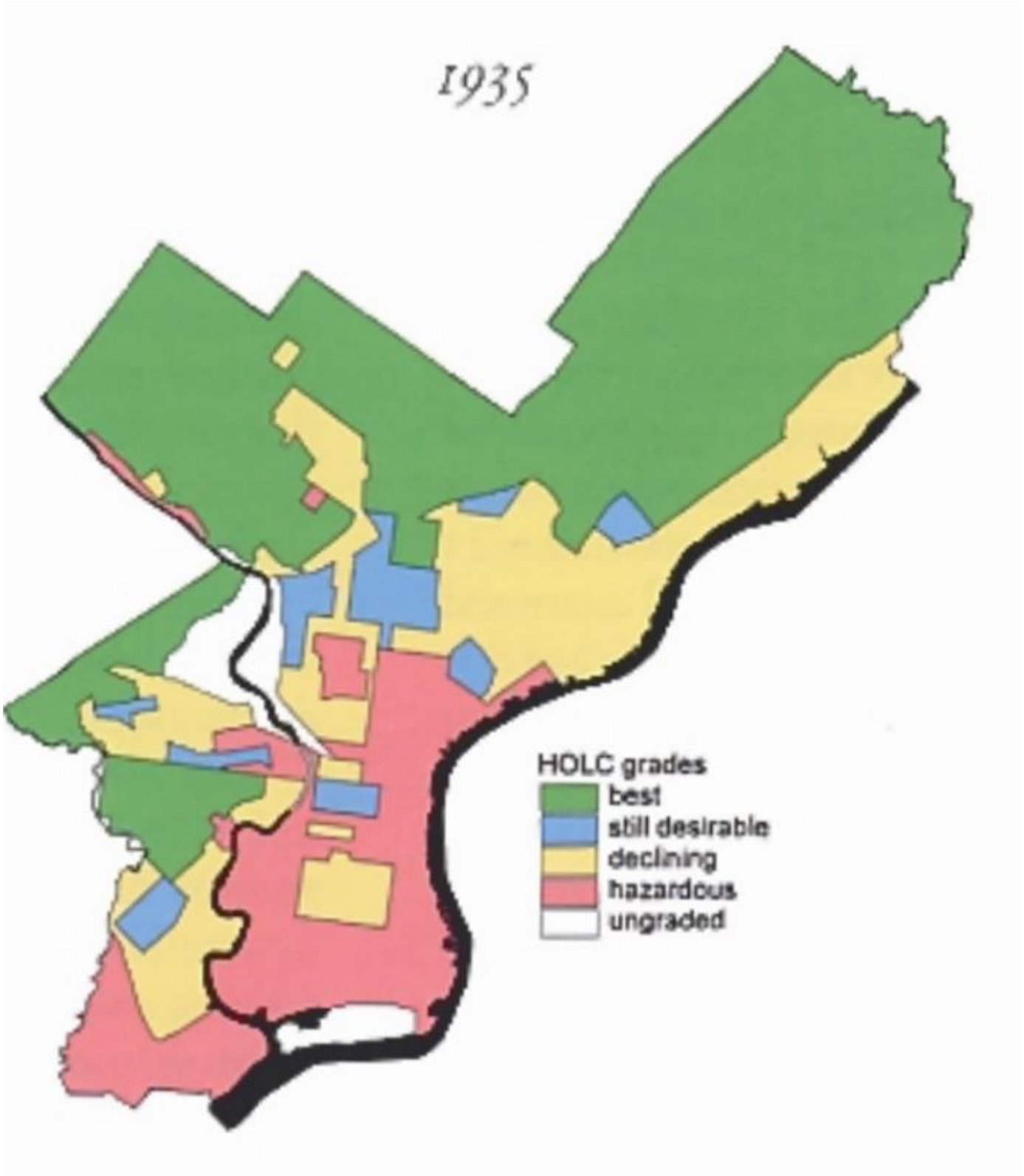
1935
HOLC grades
best
still desirable
declining
hazardous
ungraded

Figure 4.

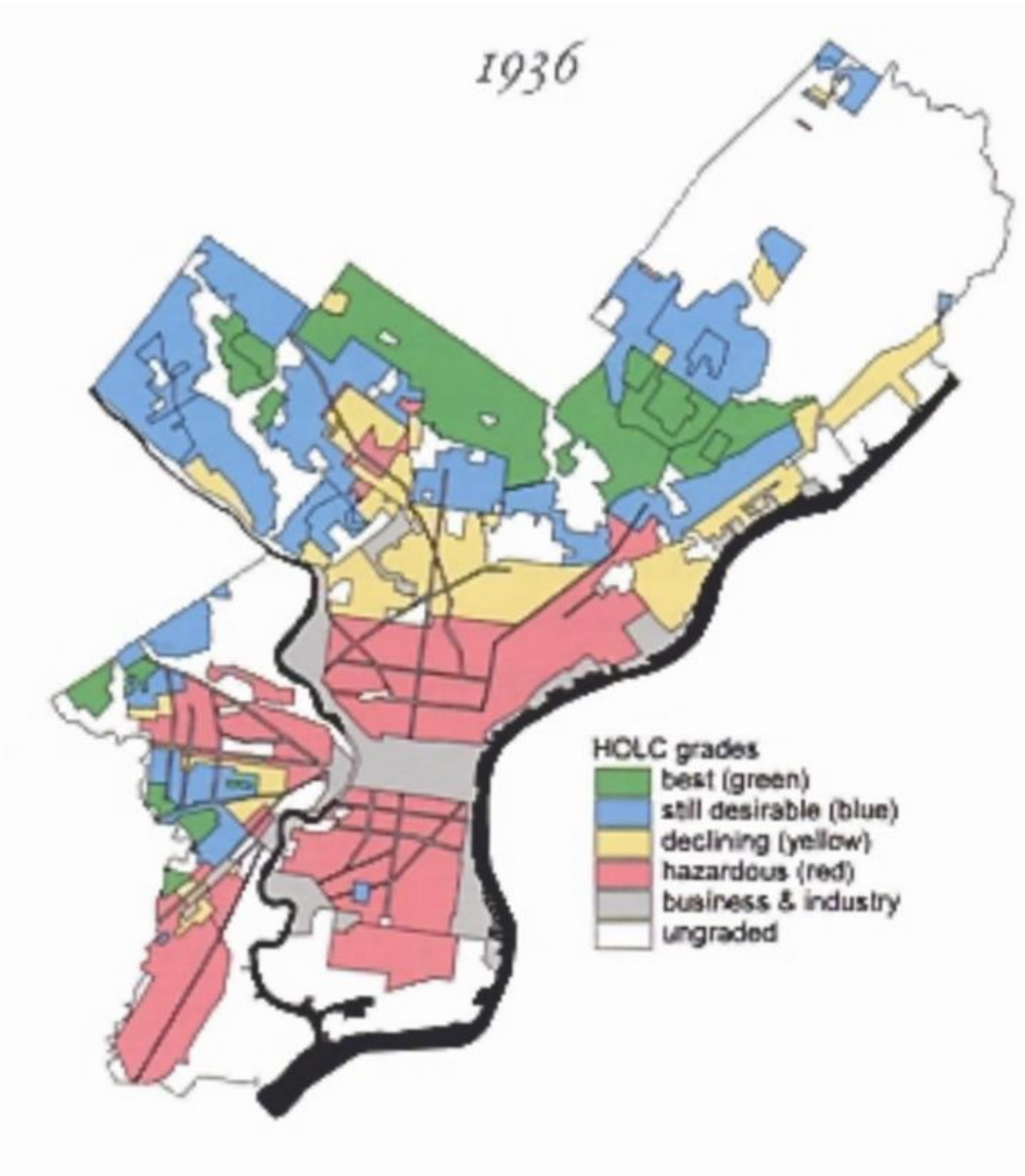
1936
HOLC grades
best (green)
still desirable (blue)
declining (yellow)
hazardous (red)
business & industry
ungraded

Figure 5.

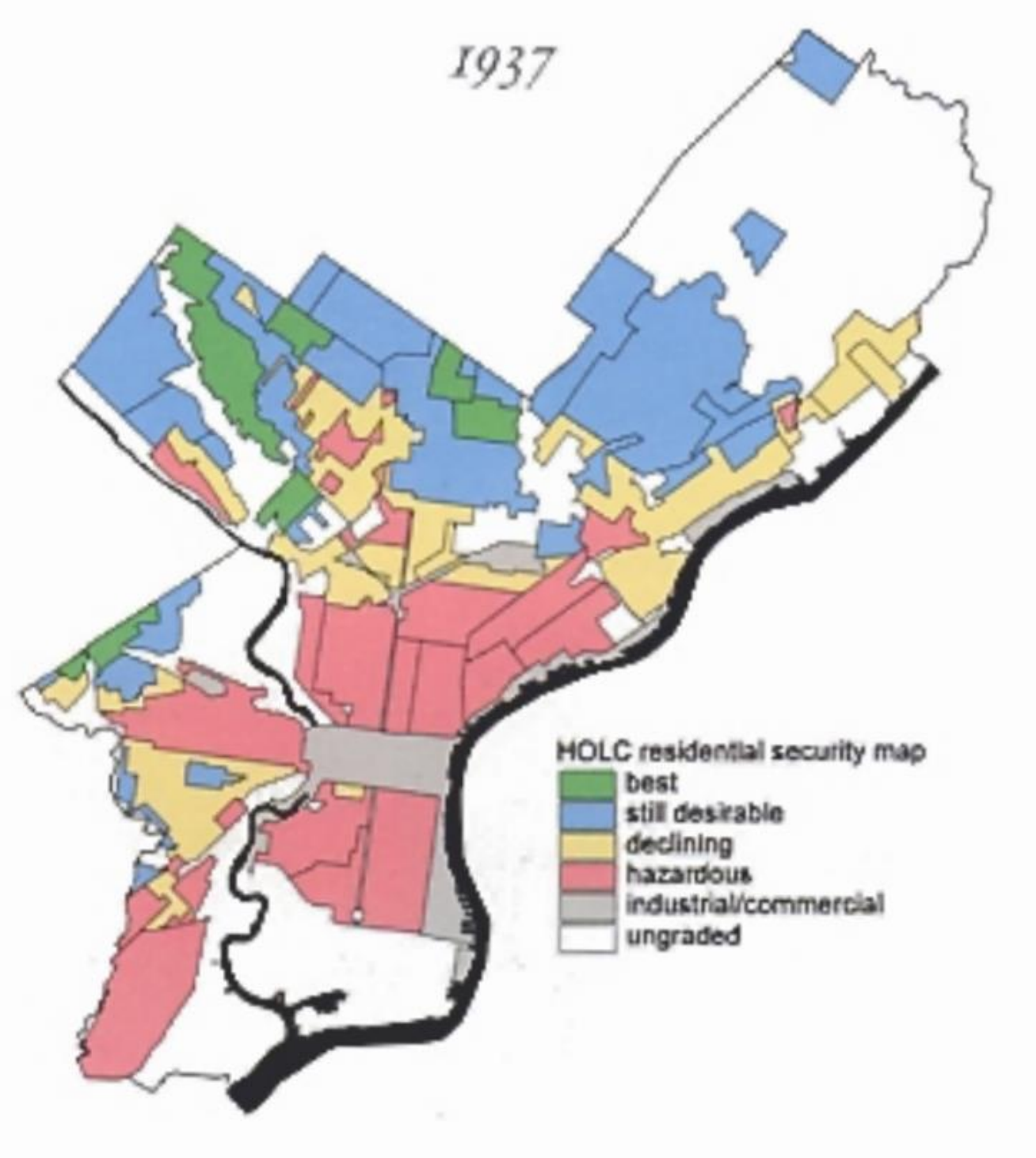
1937
HOLC residential security map
best
still desirable
declining
hazardous
industrial/commercial
ungraded

Figure 6.

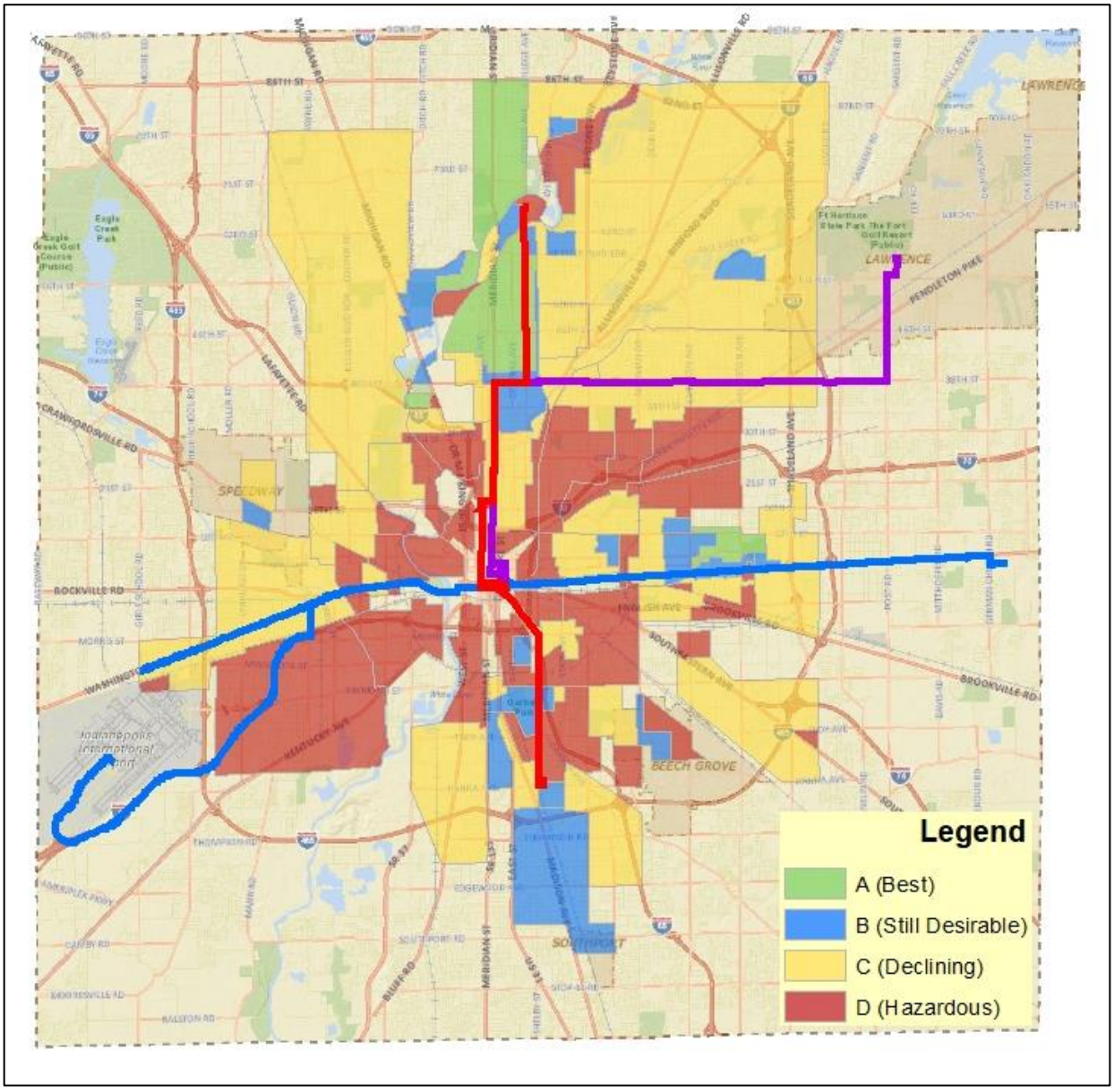
Legend
A (Best)
B (Still Desirable)
C (Declining)
D (Hazardous)
LAWRENCE
BEECH GROVE
SPEEDWAY
SOUTHPORT
PENDLETON PIKE
ROCKVILLE RD
BROOKVILLE RD
CRAWFORDSVILLE RD
LAFAYETTE RD
MICHIGAN RD
MERIDIAN ST
EMERSON AVE
KEYSTONE AVE
INDIANA AVE
ENGLISH AVE
SOUTHEASTERN AVE
Eagle Creek Park
Indianapolis International Airport

Figure 7.

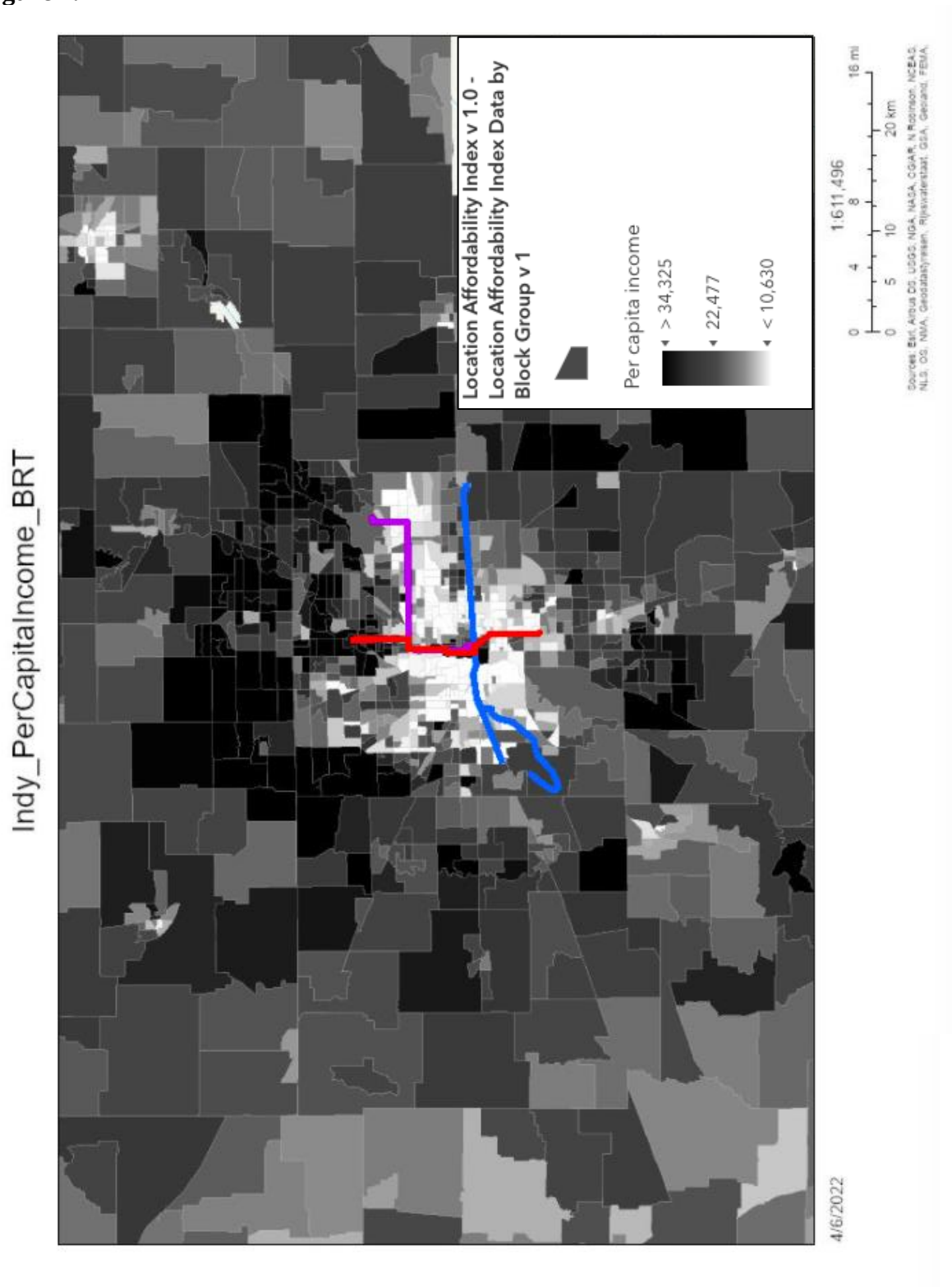
Indy_PerCapitaIncome_BRT
Location Affordability Index v 1.0 - Location Affordability Index Data by Block Group v 1
Per capita income
> 34,325
22,477
< 10,630
1,611,496
0
4
8
16 mi
0
5
10
20 km
4/6/2022

Figure 8.

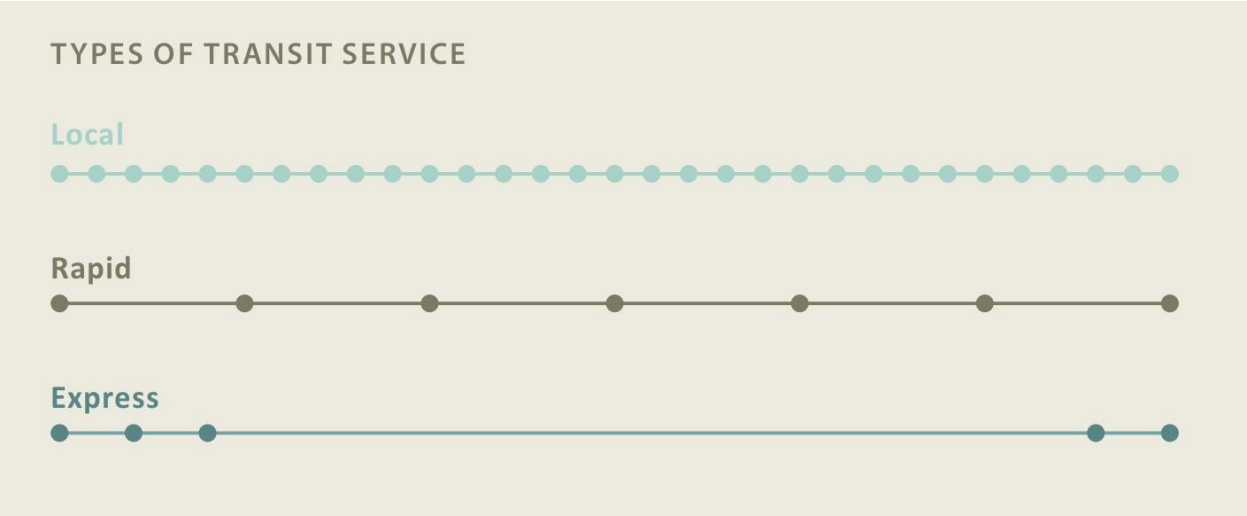

Figure 9.

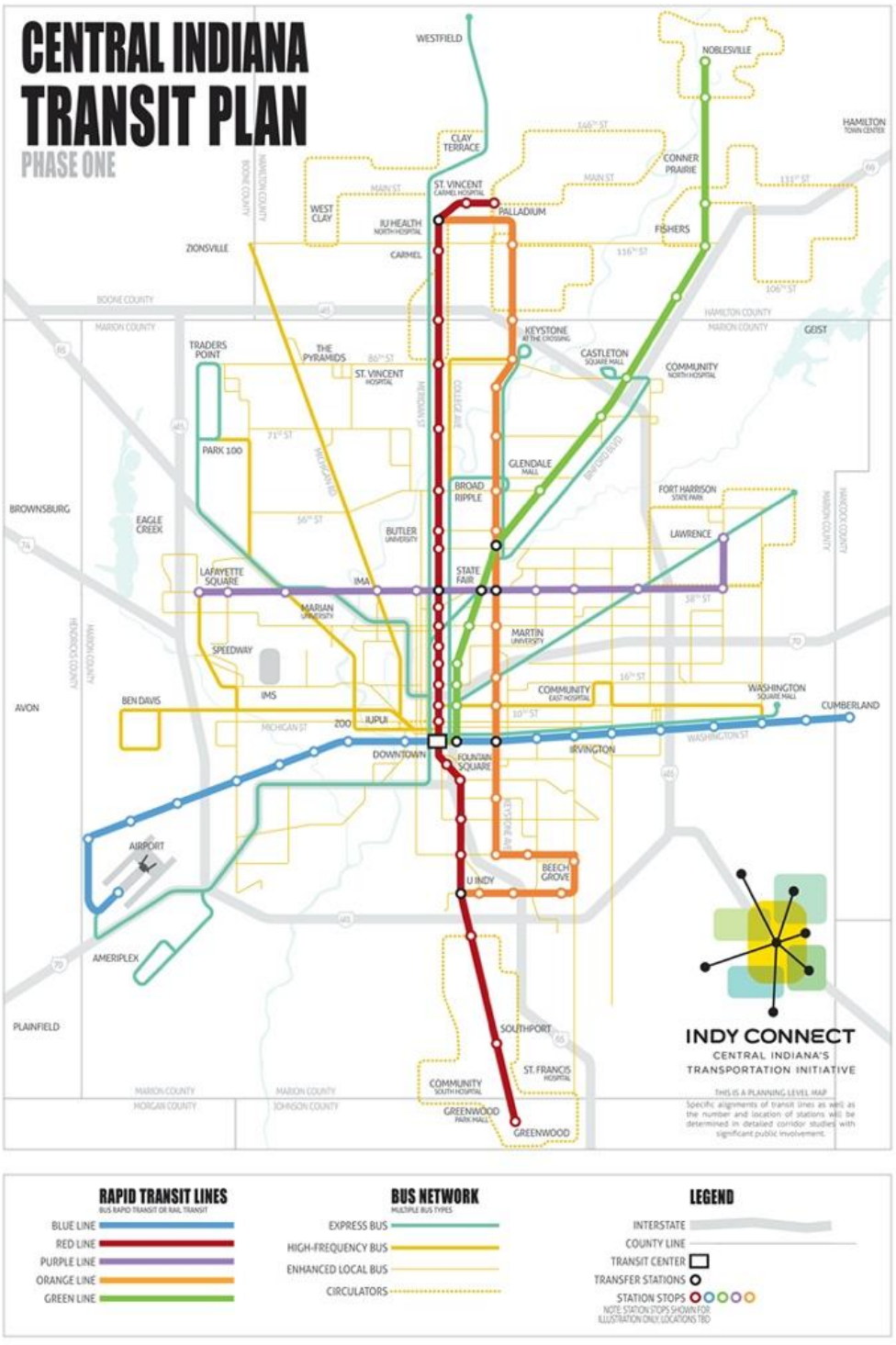
CENTRAL INDIANA
TRANSIT PLAN
PHASE ONE
WESTFIELD
NOBLESVILLE
HAMILTON TOWN CENTER
CLAY TERRACE
CONNER PRAIRIE
ST. VINCENT CARMEL HOSPITAL
PALLADIUM
WEST CLAY
IU HEALTH NORTH HOSPITAL
FISHERS
ZIONSVILLE
CARMEL
KEYSTONE AT THE CROSSING
CASTLETON SQUARE MALL
COMMUNITY NORTH HOSPITAL
TRADERS POINT
THE PYRAMIDS
ST. VINCENT HOSPITAL
PARK 100
GLENDALE MALL
BROAD RIPPLE
FORT HARRISON STATE PARK
BROWNSBURG
EAGLE CREEK
BUTLER UNIVERSITY
LAWRENCE
LAFAYETTE SQUARE
IMA
STATE FAIR
MARIAN UNIVERSITY
MARTIN UNIVERSITY
SPEEDWAY
IMS
COMMUNITY EAST HOSPITAL
WASHINGTON SQUARE MALL
CUMBERLAND
AVON
BEN DAVIS
ZOO
IUPUI
DOWNTOWN
FOUNTAIN SQUARE
IRVINGTON
AIRPORT
BEECH GROVE
U INDY
AMERIPLEX
PLAINFIELD
SOUTHPORT
ST. FRANCIS HOSPITAL
COMMUNITY SOUTH HOSPITAL
GREENWOOD PARK MALL
GREENWOOD
INDY CONNECT
CENTRAL INDIANA'S TRANSPORTATION INITIATIVE
THIS IS A PLANNING LEVEL MAP
Specific alignments of transit lines as well as the number and location of stations will be determined in detailed corridor studies with significant public involvement.
RAPID TRANSIT LINES
BUS RAPID TRANSIT OR RAIL TRANSIT
BLUE LINE
RED LINE
PURPLE LINE
ORANGE LINE
GREEN LINE
BUS NETWORK
MULTIPLE BUS TYPES
EXPRESS BUS
HIGH-FREQUENCY BUS
ENHANCED LOCAL BUS
CIRCULATORS
LEGEND
INTERSTATE
COUNTY LINE
TRANSIT CENTER
TRANSFER STATIONS
STATION STOPS
NOTE: STATION STOPS SHOWN FOR ILLUSTRATION ONLY. LOCATIONS TBD

Figure 10.

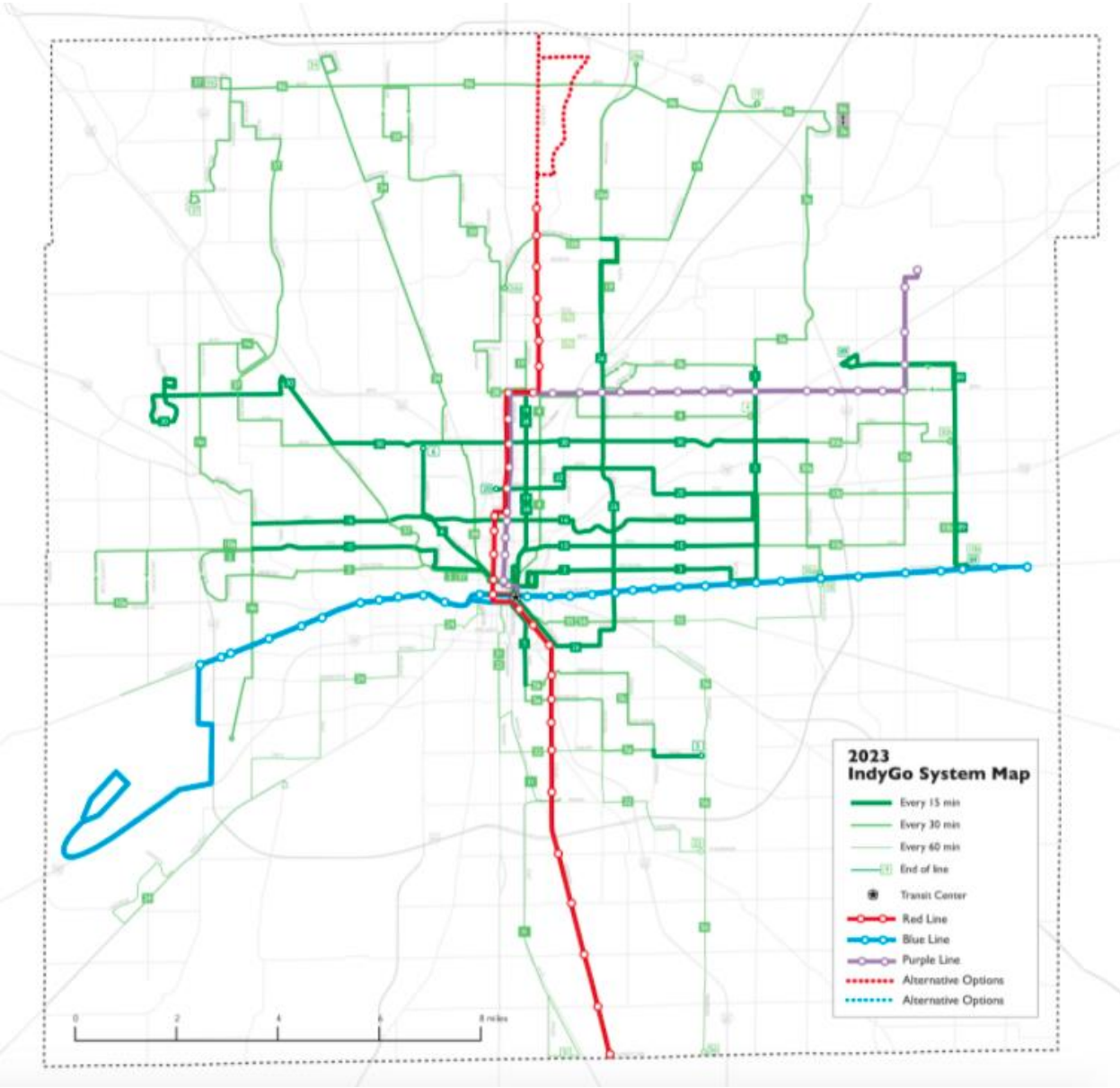
2023
IndyGo System Map
Every 15 min
Every 30 min
Every 60 min
End of line
Transit Center
Red Line
Blue Line
Purple Line
Alternative Options
Alternative Options

Figure 11.

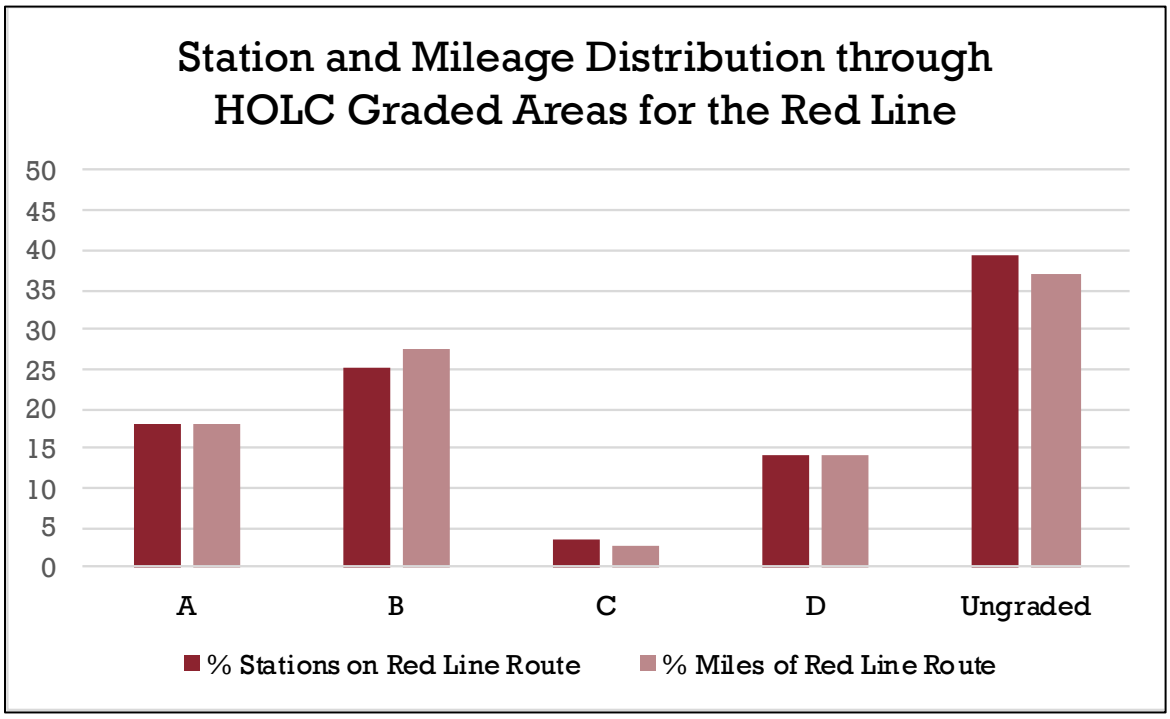

Figure 12.

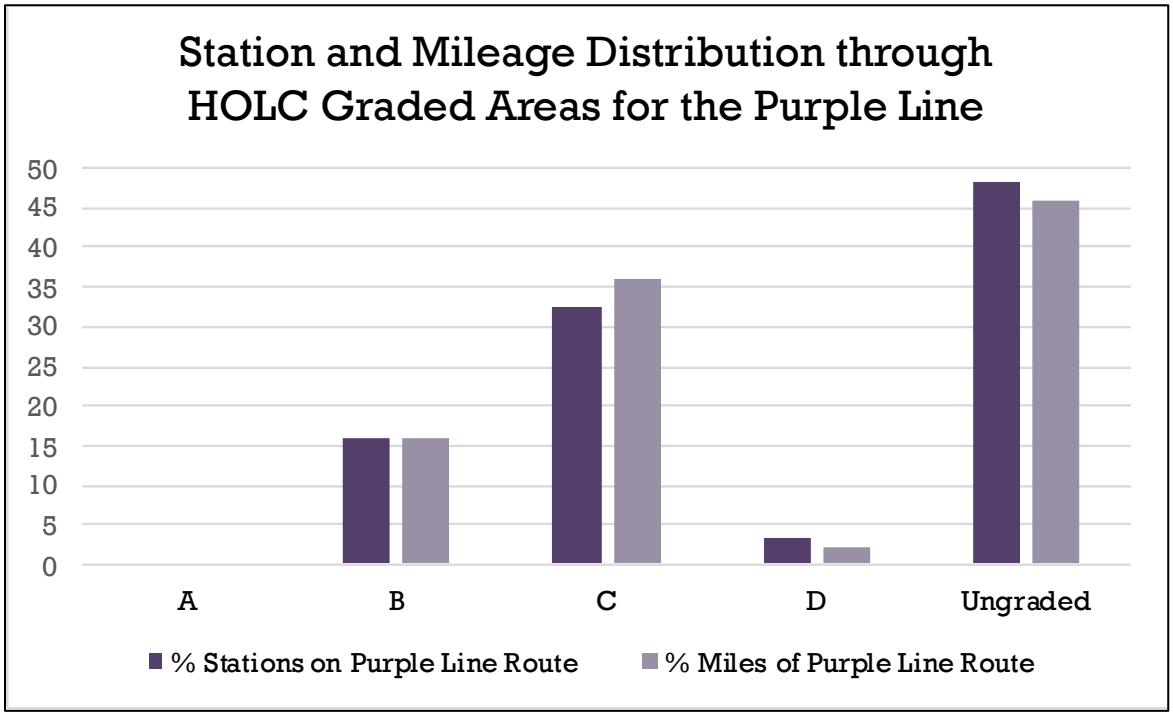

Figure 13.

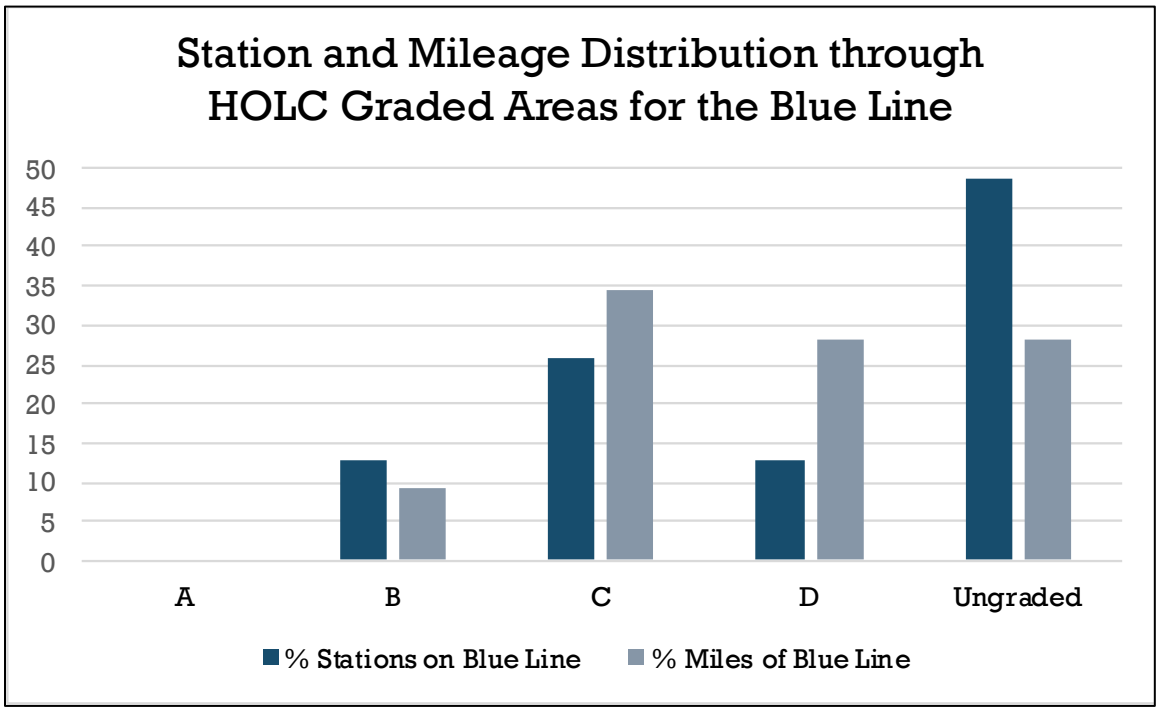

Figure 14.

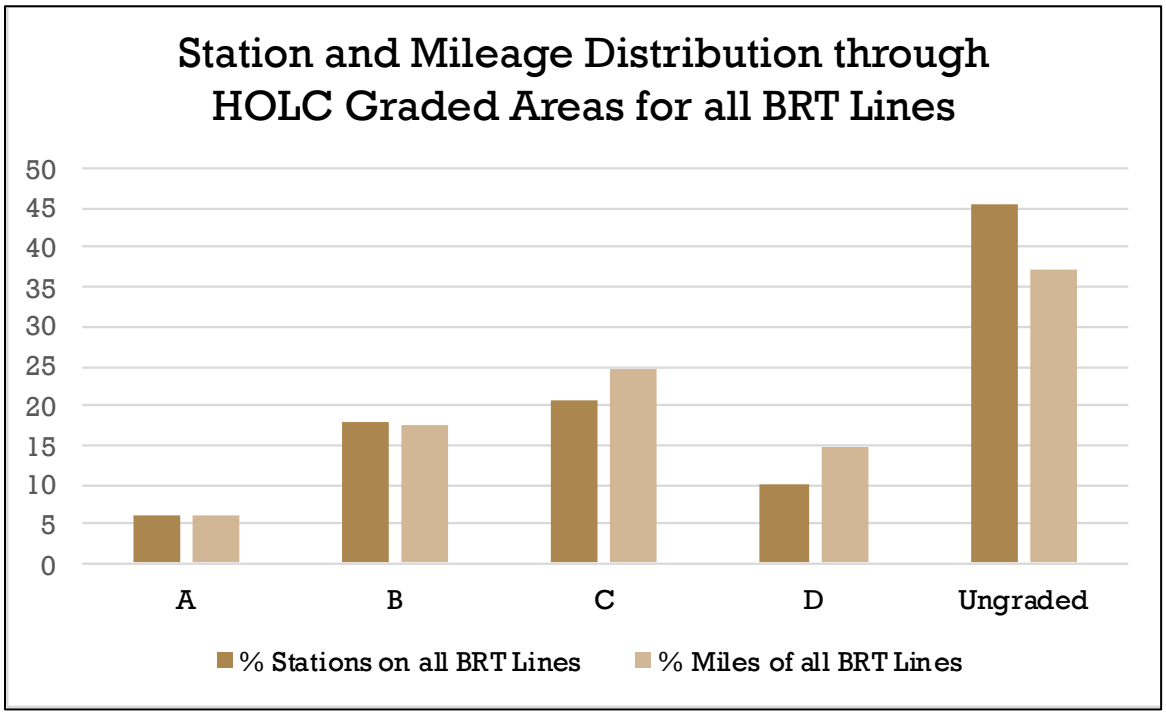

Figure 15.

Red Line						
HOLC Grade	No. of Stations	% HOLC Total	% Route Total	Miles	% HOLC Total	% Route Total
A	5	29	18	2.3	29	18
B	7	41	25	3.6	44	28
C	1	6	4	0.4	5	3
D	4	24	14	1.8	23	14
HOLC Total	17	100	61	8.1	100	63
Route Total	28		100	12.9		100
Ungraded	11		39	4.8		37
A + B	12	71	43	5.9	73	46
C + D	5	29	18	2.2	27	17

Figure 16.

Purple Line						
HOLC Grade	No. of Stations	% HOLC Total	% Route Total	Miles	% HOLC Total	% Route Total
A	0	0	0	0.0	0	0
B	5	31	16	2.4	29	16
C	10	63	32	5.5	67	36
D	1	6	3	0.3	4	2
HOLC Total	16	100	52	8.2	100	54
Route Total	31		100	15.2		100
Ungraded	15		48	7.0		46
A + B	5	31	16	2.4	29	16
C + D	11	69	36	5.8	71	38

Figure 17.

Blue Line						
HOLC Grade	No. of Stations	% HOLC Total	% Route Total	Miles	% HOLC Total	% Route Total
A	0	0	0	0.0	0	0
B	5	25	13	2.2	13	9
C	10	50	26	8.3	48	34
D	5	25	13	6.7	39	28
HOLC Total	20	100	51	17.2	100	72
Route Total	39		100	24.0		100
Ungraded	19		49	6.8		28
A + B	5	25	13	2.2	13	9
C + D	15	75	39	15.0	87	62

Figure 18.

All BRT Lines						
HOLC Grade	No. of Stations	% HOLC Total	% Route Total	Miles	% HOLC Total	% Route Total
A	5	10	6	2.3	10	6
B	17	33	18	8.2	29	18
C	21	39	21	14.2	40	25
D	10	18	10	8.9	22	15
HOLC Total	53	100	55	33.5	100	63
Route Total	98		100	52.1		100
Ungraded	45		45	18.6		37
A + B	22	42	24	10.5	38	24
C + D	31	58	31	23.0	62	39

Figure 19.

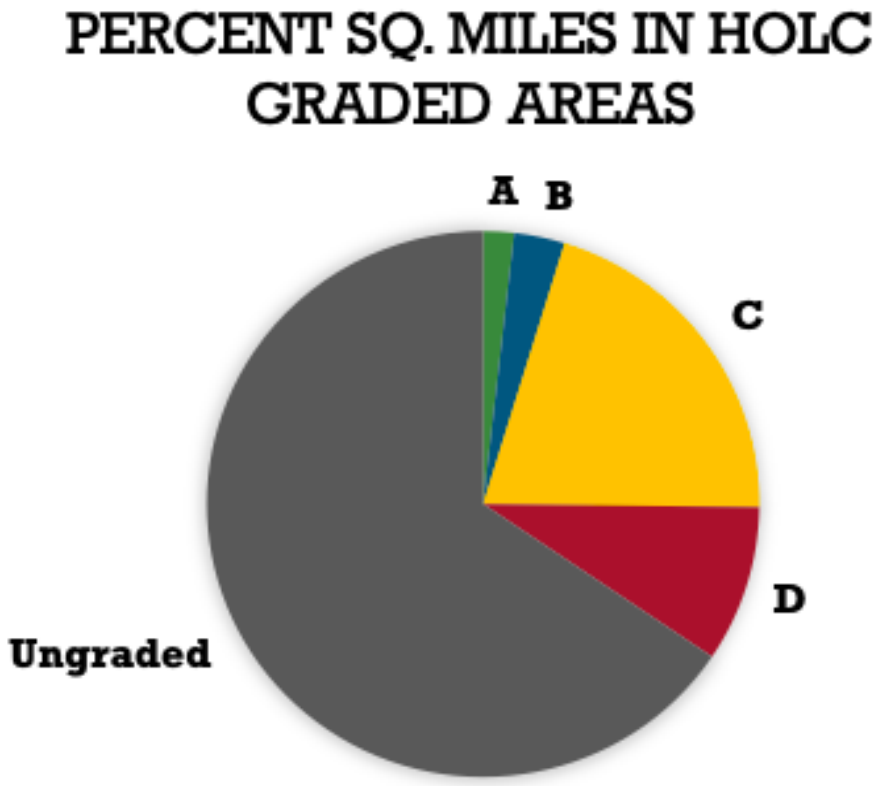

Figure 20.

Indianapolis Area Breakdown		
Grade	**Sq. Miles**	**Percentage**
A	7	2%
B	12	3%
C	82	20%
D	37	9%
Ungraded	264	66%
Total Area	403	

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