THE ROLE OF THE AMERICAN INTERSTATE SYSTEM IN REINFORCING RESIDENTIAL SEGREGATION IN URBAN AREAS

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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Across the nation, America's infrastructure is in urgent need of revitalization and repair. The American Interstate System is overcrowded and desperate for restoration due to lack of funding. The American Society of Civil Engineers (2017) estimated that "more than two out of every five miles of America's urban interstates are congested" (p. 1). These extreme levels of congestion cost the average American driver over 97 hours and $1,348 a year (INRIX, 2019). To mitigate the impacts of congestion, many state and local governments are seeking creative solutions to assist the drivers across their region. Several states have established safety patrol programs which navigate major roadways to assist with scene clearance and traffic management in the event of an incident. As traffic incidents are one of the predominant causes of congestion, programs like these have been proven particularly effective in reducing congestion when implemented properly. The Virginia Department of Transportation (VDOT) established the Safety Service Patrol (SSP) program in the late 1960s. Advised by Associate Professor Michael Porter of the Department of Systems Engineering, the team of Bunny Campbell, Emma Chamberlayne, Julie Gawrylowicz, Colin Hood, Allison Hudak, Matthew Orlowsky, and Emilio Rivero has developed an optimization system for the SSP program to guarantee optimal resource allocation. This system will ensure VDOT's efforts to combat congestion and help drivers in need are as successful as possible.

The local and state governments of today, like VDOT, are being proactive in their quest to alleviate the problems created by traffic congestion. Additionally, the federal government under the Trump administration is furthering this goal by providing new funds for the revitalization of America's infrastructure (Thompson & Matousek, 2019). In many cases, however, the governments of the past shoulder much of the blame for the levels of congestion that modern Americans face. During the construction of the Interstate System in the late 1950s,

local and state governments were able to leverage wide public support for the transcontinental highway network to quickly build the system without input from the public and therefore prioritize social objectives over productivity and efficiency. The rapid construction of the system resulted in the residential segregation of most major metropolitan areas. Thus, it is significantly more likely for a poor, black person to live in an area of concentrated poverty than a white person, especially in areas near freeways, in modern American cities (Jargowsky, 2015). Using the theories of Langdon Winner and Leo Marx, the loosely coupled the STS research outlines how these discriminatory design choices were able to come to fruition and examines the lasting impact that these choices have had on Syracuse, New York.

THE CONSTRUCTION OF THE INTERSTATE SYSTEM AND ITS AFTERMATH

With the expansion of the automobile industry and the rise of the suburbs in the late 1930s, Americans pushed for new infrastructure that would allow them to freely commute to the cities (Simek, 2016). The federal government soon backed the idea and provided funds to support the construction of the Interstate System with the Federal-Aid Highway Act of 1956 (United States Department of Transportation, Federal Highway Administration [FHA], 2018). The construction of the highway system constitutes one of the largest public infrastructure projects that the federal government has ever accomplished. On the surface, the idea of a long-distance transportation network was novel. However, many city planners took advantage of the influx of funds to achieve a more ill-intentioned goal. Simek (2016) explained that the engineers of these highway networks used them to change the urban landscape and resulted in the "displacement, demolition, and economic disenfranchisement" of black communities (para. 3). Metropolitan neighborhoods around the country still deal with the ramifications of these choices.

Winner (1980) described cases "in which the invention, design, or arrangement of a specific technical device or system becomes a way of settling an issue in the affairs of a particular community" (p. 3). In the case of the Interstate System, local governments and engineers deliberately leveraged the highway system as a means to reinforce existing residential segregation or to create a newly segregated society. To understand the ways in which local governments were able to arrange the transit system as a racial barrier, this paper will further analyze the context in which the system was built and define residential segregation.

THE HISTORY OF THE INTERSTATE SYSTEM

The Interstate System is our nation's largest transportation network; it is the central artery of the country's economy. When construction officially began in 1956, Secretary of Commerce Sinclair Weeks called the Interstate System, "the greatest public works program in the history of the world" (Morris, 1956, p. 1). However, this program was the result of decades of hard fought negotiations. The Federal Highway Administration's (FHA) official historian, Richard Weingroff, provided an in-depth description of the journey to the Interstate System for the anniversary of the Federal-Aid Highway Act of 1956 in a series of articles which served as a basis for this section, for more information these articles can be found on the FHA website (FHA, 2019). The journey toward the Interstate System began in the early twentieth century. Before this period, most Americans believed that the maintenance and construction of roads was the responsibility of the state and local government (Weingroff, 1996a). However, four factors led to a shift in public opinion in favor of the involvement of the federal government in the development of a robust road system. This shift in public opinion became known as the federal road movement. The first factor was the increased support of farmers for federally funded roads.

After the establishment of Rural Free Delivery in 1912, farmers became more invested in the construction of safe, reliable roads as they were a critical method of connecting their rural businesses to urban centers (Gladwell, 1999). The second factor was the growing number of drivers in America. In 1908, Henry Ford released the inexpensive Model T (History.com Editors, 2009). The Model T transformed the automobile from a luxury item only the wealthy could afford to an essential means of transportation for all. The overall increase in the number of drivers in America during this period led to wider support for federal intervention in road construction as more people moved to suburban areas and commuted to the cities. One of the greatest obstacles that proponents of federal-aid road systems faced was the question of constitutionality. Many opponents argued that it was not within Congress's jurisdiction to construct interstate road systems. However, in 1907 the Supreme Court ruled that Congress had the power to construct interstate highways by the commerce clause (Weingroff, 1996a). This decision was a major breakthrough for the federal road movement. The final factor that provided for a transition toward federal highways was the establishment of the American Association of State Highway Officials (AASHO) in 1914 (Weingroff, 1996a). This organization served as an authority on local issues involving roads in the process of designing and constructing federal roads. The combination of these four factors helped to sway public opinion in favor of federal aid for highway construction.

Ultimately, the Interstate System is a result of a series of federal laws that incrementally provided for construction costs and designated the plans for the network. Due to the rise of the federal road movement during the early part of the twentieth century, Congress passed the first federal act supporting highway construction in 1916. The Federal Aid Road Act of 1916 provided modest federal funds to states for road construction and established state highway

agencies to oversee these projects (Weingroff, 1996a). While states were ultimately responsible for the execution of the construction projects, the Secretary of Agriculture had to approve plans for new roads before construction could officially begin. Additionally, the Federal Aid Road Act prioritized rural roads over long-distance highways. This decision sparked a debate that would continue throughout the process of shaping the Interstate System. Following the passage of this act, road construction slowly began and the vision for the Interstate System became a reality. However, this progress was halted in 1917 when the United States entered World War I. Wartime mobilization created a labor and material shortage which inhibited further construction of the roads. Furthermore, the added transportation of military personnel and equipment highlighted the poor quality of many of the current roadways and the complex nature of travel with the current system. It was during this time period that Americans began to call for more extensive federal intervention.

The difficulties faced on the current roads during World War I emphasized to President Harding that the nation desperately needed an innovative transportation solution both for the nation's defense and economy. The Federal Highway Act of 1921 became the cornerstone of that solution. This act authorized a limited system of federal aid highways, codifying the transition toward a more comprehensive, transcontinental system (Weingroff, 1996b). When the Great Depression stunned the country in the 1930s, Congress diverted funds away from highway construction. This national tragedy further stressed the importance of a more convenient, national transportation system for the country's commerce as spatial isolation increased the burden of the crisis on many Americans. Once the nation began to recover from the economic crisis, President Franklin D. Roosevelt underscored the importance of highway construction by passing the Federal-Aid Highway Act of 1938 (Weingroff, 1996b). The act directed the chief of the Bureau

of Public Roads (BPR), the predecessor to the FHA, to investigate the feasibility of a large scale toll network. The federal agency's conclusions were summarized in a 1939 report known as *Toll Roads and Free Roads*. In this report, the agency recommended an over 25,000 mile national highway network (Weingroff, 1996b). This report constitutes the first formal mention of the Interstate System (Stromberg, 2016). In response to the findings of the BPR, President Roosevelt commissioned the National Interregional Highway Committee to further evaluate the feasibility of a national highway system (Weingroff, 1996c). The committee released their findings in a 1943 report entitled *Interregional Highways*. The group recommended an approximately 40,000 mile system and included additional details about the necessity of highways in urban areas (Weingroff, 1996c). To enact this recommendation, the Roosevelt administration passed the Federal-Aid Highway Act of 1944. This act authorized the construction of a "National System of Interstate Highways," but the new legislation did not include federal funds (Weingroff, 1996c). By 1945, the American Association of State Highway Officials had finalized a set of standards for interregional roadways which allowed for the designation of the majority of the road system to be completed by 1947 (Weingroff, 1996c). At this point, the nation was prepared for a more aggressive federal policy toward highways.

The Truman administration recognized the necessity of federal funds for the highway construction project. In 1952, the administration passed another iteration of the Federal-Aid Highway Act. This version authorized federal funds for the construction of an interstate road system on a 50/50 matching basis with state governments (Weingroff, 1996c). This conservative funding plan was the beginning of what would become a large scale intervention by the federal government in highway construction. President Eisenhower assumed office in 1953 and reinvigorated the fight for the Interstate System (Weingroff, 1996c). In 1954, President

Eisenhower signed another iteration of the Federal-Aid Highway Act. This act increased the amount of federal funds available for highway construction on a 60/40 matching basis with state governments (Weingroff, 1996c). As the construction of the highway network progressed, the Bureau of Public Roads published *General Location of National System of Interstate Highways*, also known as The Yellow Book (Weingroff, 1996c). This document contained general plans for the entirety of the Interstate System. The Yellow Book specifically included plans for road construction in urban areas which were left out of the 1947 designation plan. At this point, the majority of Americans recognized the importance of the Interstate System and state and local officials were eager for large scale construction to begin. However, funding for the project was still limited. All this changed on June 29, 1956 when President Eisenhower signed the Federal-Aid Highway Act into law. The final iteration of these funding acts authorized funds for the entire public works project and declared that the federal government would provide 90% of the construction costs (Weingroff, 1996c). The passage of this act officially committed the federal government to the construction of the Interstate System and allowed the network to be built rapidly once funds were appropriated.

The passage of the Federal-Aid Highway Act of 1956 marks the end of an over 40 year battle to create a transcontinental highway system. As much of the United States was in flux due to war, economic hardship, and industrialization, Americans were able to agree upon the necessity of a reliable, long-distance transportation system. The rapid evolution of the vision for a federal highway network illustrates the changes that were taking place in the country at the time.

However, many Americans underestimated the impacts that this system would have. Due to the wide public support for the construction of the system and the influx of federal funds

during the 1950s, the construction of the Interstate System proceeded largely unchecked by individual communities, particularly those that were dominated by minorities. Many local officials viewed the construction of the Interstate System as a method to further discriminate against minority groups. These discriminatory design choices have resulted in a shocking level of residential segregation in metropolitan areas across the country that persists today.

RESIDENTIAL SEGREGATION IN MODERN AMERICA

Residential segregation is a well-established practice throughout the United States that began long before the vision for the Interstate System. Armstrong-Brown, Eng, Hammond, Zimmer, and Bowling (2016) defined residential segregation as "the physical separation of races in a residential context" (p. 2). Starting in the early 1900s, city leaders began using land use regulations such as racial zoning and redlining to divide American cities on the basis of race. To quantify the degree of residential segregation as a result of these practices, demographers use index of dissimilarity (Logan & Stults, 2011). Index of dissimilarity refers to the spread of groups across census tracts within a city with a scale between zero and one hundred (Logan & Stults, 2011). Logan and Stultz (2011) explained that the value of index of dissimilarity can be thought of as the "percentage of one group who would have to move to achieve an even residential pattern" (p. 25). Regions with indices of dissimilarity above 60 are highly segregated (Logan & Stults, 2011). In 1910, the year the first racial zoning ordinance was passed, the national average for index of dissimilarity in urban areas was 56 (Massey, 2001). In 1940, this average rose to 78 (Massey, 2001). The increase in index of dissimilarity supports the claim that residential segregation became a defining feature of American cities in the early 1900s. A study by the U.S. Census Bureau in 2002 found that these trends still persist. Among African

Americans, the average level of dissimilarity was approximately 64 (p. 60). This average was even higher, approximately 70, in urban areas where the population was over one million (United States Census Bureau, 2002). These figures illustrate that residential segregation remains a critical issue in modern America.

The deliberate separation of races has profound impacts of the socioeconomic status and overall wellbeing of racial minorities in the United States. According to Armstrong-Brown et al. (2016), this practice often leads to "differential access to resources and societal opportunities" (p. 2). Residential segregation has in many cases led to the neglect of black communities, contributing to high concentrations of poverty in these neighborhoods (James, 1994). According to the Director of the Center of Urban Research and Urban Education at Rutgers University, Paul Jargowsky (2015), a recent study found that "a black poor person is more than three times as likely… to reside in a neighborhood with a poverty rate of 40 percent or more than a white poor person" (Jargowsky, 2019; p. 6). This evidence supports the idea that black communities are more isolated and live in higher concentrations of poverty than white communities. Residential segregation has also contributed to fewer opportunities for upward mobility. Massey (2001) argued that "the way a group is socially incorporated into society" has significant impacts on how the group is included in the labor force (p. 392). By separating black communities from other parts of society, African Americans are often placed at a significant disadvantage when it comes to access to high-quality jobs and to labor organization opportunities (Massey, 2001). Additionally, the systematic separation of races contributes to decreased overall living conditions. James (1994) explained that African American neighborhoods with high concentrations of poverty experience "poor infrastructure, inferior schools, large numbers of single-parent families, and high exposure to crime and physical violence" (p. 408). These

surroundings threaten the health and safety of those who live there. Further, there is evidence to suggest that residential segregation can limit outlets for physical activity which contributes to higher levels of diabetes (Armstrong-Brown et al., 2016). These findings demonstrate that residential segregation has profound negative impacts on African American neighborhoods.

INTERSTATE POLITICS

The passage of the Federal-Aid Highway Act of 1956 ushered in an era of remarkable change in the nation's urban landscape. The act tasked highway engineers to complete the ambitious 40,000 mile project by 1969 (Brinkman & Lin, 2019). The idea for the Interstate System was widely popular during the early twentieth century, as many prominent leaders and city planners believed highways were the key innovation to revitalize urban centers and construction in the early 1950s proceeded quickly (Brinkman & Lin, 2019). Brinkman and Lin (2019), two senior economists at the Philadelphia Federal Reserve Bank, point out that despite this early support, the massive infrastructure project soon garnered public skepticism and opposition. Citizens were outraged over the level of destruction that accompanied the construction. The U.S. House Committee on Public Works estimated that over 62,000 housing units were destroyed annually for highway construction (Mohl, 2004). In response, Poon (2019) reported that in the late 1960s there were approximately "123 separate highway revolts and road-related protests" (para. 3). These protests became known as the "freeway revolts" (Poon, 2019). The discontent overwhelmed at least 50 cities across the country, leading to major work stoppages in San Francisco, Washington D.C., and many others (Brinkman & Lin, 2019). In response to these revolts, local, state, and federal policy leaders enacted several pieces of legislation to aid communities in their battle against the "housing demolition…, destruction of

entire communities, severe relocation problems, and subsequent environmental damage" that followed the construction of the Interstate System (Mohl, 2004, p. 674).

NATIONAL ENVIRONMENTAL POLICY ACT

In 1970, President Nixon signed the National Environmental Policy Act (NEPA) into law (Lane, 2020). This environmental protection law was one of the most significant pieces of legislation to emerge from the era of the freeway revolts. The goal of the act is to "encourage productive and enjoyable harmony between man and his environment" and "assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings" (National Environmental Policy Act of 1969, p. 1). The federal legislation serves as a barrier between the rapid pace of industry and the surrounding environment. According to Eilperin and Dennis (2020), the act "requires federal agencies to assess the impact of a major project before a spade of dirt is turned and to include the public in the process" (para. 5). The policy asks agencies to provide environmental impact statements which analyze the impact of proposed projects on both the natural environment and the social landscape (Lane, 2020). These environmental impact statements must detail the effects of the proposed action and ways to mitigate this impact. The act also created a new agency, the Council on Environmental Quality (CEQ), which manages these impact assessments (Council on Environmental Quality [CEQ], n.d.). Overall, NEPA formalized and expanded the federal government's ability to intervene on behalf of the citizen through the CEQ and environmental impact statements. Inspiration for these changes is rooted in the iterations of the Federal-Aid Highway Act that were passed in the late 1950s into the 1960s. These bills were designed to erode the power of highway engineers to unilaterally construct highway networks without public input (Brinkman & Lin, 2019). The

Federal-Aid Highway Act of 1958 required that project managers "hold public hearings and consider economic effects in advance of construction" (Brinkman & Lin, 2019, p. 10). Congress advanced this initiative with the Federal-Aid Highway Act of 1962. The new law required collaboration between highway construction teams and local organizations (Brinkman & Lin, 2019). Additional iterations in 1966 and 1968 further codified the necessity to consider environmental, social, and historic factors during interstate construction (Brinkman & Lin, 2019). The passage of the National Environmental Policy Act in 1970 expanded these protections to all federal construction projects and formalized the impact assessment process for future Interstate System construction.

One of the primary benefits of NEPA is that the environmental impact statement process requires administrative agencies to open their decision-making process to the public and formally defend their choices to the impacted individuals (Cramton & Berg, 1973). However, a significant level of community organization is required to stop or alter a project. For example, in Washington, D.C. during this time period, there was a large scale controversy over the Three Sisters Bridge which would connect a planned portion of Interstate 66 to another planned portion of Interstate 266 (Schrag, 2004). Citizens of the surrounding areas in Arlington, VA and Washington staunchly opposed construction of highways in their neighborhoods and believed that the bridge would obstruct scenic views of the Potomac River (Schrag, 2004). Anti-freeway activists were highly organized and led a grassroots campaign leveraging NEPA provisions that stunned the federal government and highway engineers alike. Their efforts resulted in the cancellation of the project altogether (Schrag, 2004). This example illustrates the power that NEPA extends to everyday citizens, but also underscores the importance of community organizing and influential advocates. The resources that led to the eventual success of the

citizens of the National Capital Region are not available in more marginalized communities. Additionally, as explained by Mohl (2004), "virtually all of the powerful interests involved in urban America" firmly believed that the Interstate System was a key mechanism in ushering a new era of progress and innovation for the country (p. 678). This meant that most often revolts led to highway rerouting rather than project cancellation, thereby increasing construction in marginalized neighborhoods. According to a study by Brinkman and Lin (2019) on the impacts of the freeway revolts, "completed freeways were increasingly located in black neighborhoods" as compared to the original plans outlined in the Yellow Book (p. 16). This finding supports the conclusion that the freeway revolts and the legislation that followed enabled local officials and community organization to target minority communities and to erect transportation systems as racial barriers.

In order to make the protections available under NEPA more accessible to minority communities, President Clinton issued Executive Order 12898 in 1994 (United States Environmental Protection Agency [EPA], 2018). The purpose of this executive action was to direct federal agencies to "identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations" (EPA, 2018, para. 2). Through this order, President Clinton sought to more formally safeguard minority and low-income communities. The primary enforcement mechanism for this action was the environmental justice portion of the NEPA procedural process. The environmental justice portion of an environmental impact statement "must consider both impacts on the natural or physical environment and related social, cultural, and economic impacts" (CEQ, 1997, p. 8). Executive Order 12898 furthered this provision to more explicitly protect minority communities, in order to avoid further reinforcing issues like residential segregation through federal

construction projects. The combination of this executive action with NEPA has created an effective protection for minority communities.

An example of the effectiveness of the combination of Executive Order 12898 and NEPA can be found in Charlotte, NC. In 2008, the Charlotte Area Transit System (CATS) was debating several proposals to extend its light rail system known as the LYNX Blue Line (Protect NEPA, 2018). The initial plan for the rail system "included 13 stations, extending 10.6 miles northeast from downtown" (Protect NEPA, 2018, para. 7). However, after the environmental impact assessment was completed, CATS chose a more modest alternative. Demographic analysis, as required by the environmental justice portion of NEPA, revealed that the initial plans would disproportionately impact low-income and minority regions of the city (Protect NEPA, 2018). The chosen alternative mitigated these impacts by collaborating with the community and developing the new routes in order to virtually eliminate impacts on these groups (United States Department of Transportation, Federal Transit Administration & Charlotte Area Transit System, 2011). This recent example of NEPA's environmental justice section being used to protect a minority community illustrates the power that NEPA extends to individual communities to take control of their built environment.

THE BUILDING A STRONGER AMERICA INITIATIVE

In February 2018, President Trump released his new legislative initiative focused on rebuilding America's infrastructure, specifically roads and transportation infrastructure (United States Office of Management and Budget [OMB], 2018). The goals of the Building a Stronger America initiative are to stimulate investment into infrastructure projects, modernize rural infrastructure, empower state and local governments to make decisions regarding their

infrastructure, and eliminate bureaucratic red tape (OMB, 2018). To achieve the goal of eliminating bureaucratic red tape, the Council on Environmental Quality proposed changes to the procedural regulations of NEPA (Eilperin & Dennis, 2020). The proposed changes will provide time and page limits on the environmental impact statements and will exempt certain projects from NEPA regulation (CEQ, 2020). These proposed limits on environmental impact statements would severely restrict the ability of federal agencies to comprehensively evaluate the potential effects of construction projects. Eilperin and Dennis (2020) explained that under current regulations, "environmental impact statements for major projects can take three times [the new limit] and can span hundreds of pages" (para. 13). Additionally, restrictions on the review process will include shortening the window in which the public can offer feedback to project managers, severely hindering the ability of the community to voice their concerns about potentially unanticipated consequences of new construction (Eilperin & Dennis, 2020). All together, these changes curb the ability of the federal government to intervene on behalf of the community and the environment during major construction projects.

The proposed changes to the procedural regulations of the National Environmental Policy Act will make it easier for federal agencies to begin new construction projects, such as interstates, quickly and without input from the public. Limits on the extent of environmental impact statements could also prevent agencies from fully exploring environmental justice impacts, which often requires considerable public input in order to ascertain (CEQ, 1997). The combination of Executive Order 12898 and NEPA serve as the best protection currently available for minority communities against new freeway construction. By weakening the ability of federal agencies to exhaustively explore the impact of their construction work and

emphasizing the construction of new highways, the Trump administration is risking repeating the mistakes that were made during the initial construction of the Interstate System.

THE RELATIONSHIP BETWEEN RESIDENTIAL SEGREGATION AND THE INTERSTATE SYSTEM

The passage of the Federal-Aid Highway Act of 1956 marked the beginning of a period of incredible change for the United States as the federal government embarked on a journey to construct the largest public works project ever attempted (Mohl, 2004). After years of struggle towards comprehensive federal road legislation, the act stipulated that the government would be responsible for 90% of the construction costs for the remaining portions of the highway system (Stromberg, 2016). This was a massive investment on behalf of the federal government and it encouraged states to swiftly begin construction on their portion of the transportation network. Peter Simek (2016), a journalist for D Magazine, reported that the rapid construction of the Interstate System and the subsequent citizen organization against the planned routes in several major cities disproportionately impacted "poor, often racially segregated" neighborhoods ("Peter Simek", n.d.; para. 3). Highway engineers viewed the construction of the Interstate System as a method to hasten the removal of urban blight, meaning the deteriorating areas of major cities that minority communities were relegated to as a result of discriminatory housing and zoning practices (Simek, 2016). These policies had disastrous impacts on the growth and development of America's cities. A 2019 research project by Brinkman and Lin for the Federal Reserve Bank of Philadelphia observed "large declines in population and income in central neighborhoods near freeways" (p. 45). The decline in population and income was caused by the majority of white, wealthy citizens fleeing to the suburbs, a trend that was only reinforced by the new transportation

system (Stromberg, 2016). This so called "white flight" left minority residents behind without accessible housing options due to the demolition caused by the Interstate System and with decreased access to quality jobs as more business moved from the central city limits and tax revenues plummeted. Minority communities still feel these impacts today. Jargowsky (2015) reported that it is more than three times as likely that a black poor person will live in an area of concentrated poverty than a white person (p. 6). The drastic impacts of the prejudiced design of the Interstate System cause many to question the lack of government intervention on behalf of these communities. In the late twentieth century, there was an expansion of policies that endeavor to protect against further damage to these marginalized citizens, however new developments in infrastructure revitalization threaten these protections. In order to prevent further reinforcement of these discriminatory barriers, this paper will answer the following question: what tools did highway engineers wield in order to arrange the Interstate System as a means to reinforce residential segregation?

THE INTERSTATE SYSTEM AS A POLITICAL TOOL

In the early twentieth century, American life was fundamentally transformed by the introduction of Ford's Model T (History.com Editors, 2009). Before the release of this more accessible model, Americans viewed cars as a luxury item reserved only for the rich. The Model T was affordable enough for the average individual due to Ford's revolutionary assembly line system (History.com Editors, 2009). The result was a society which favored "zipping to and from suburban homes and downtown offices on ribbons of concrete" (Simek, 2016, para. 2). After the tumultuous years of the Great Depression, Americans in the late 1930s were yearning for a sense of stability and economic independence. These hopes manifested in the idea of the

suburb (Kalan, 2010). Capitalizing on this popular notion, General Motors in their 1939 New York World's Fair exhibit entitled Futurama made the connection between suburban life and the Interstate System (Baker, 2010). By linking the concepts of suburbia and the technological innovation that was the Interstate System, General Motors exemplified the technocratic ideals of progress that were characteristic of the time period. Professor of the History and Philosophy of Science, Emeritus at Massachusetts Institute of Technology Leo Marx (1987) explained the technocratic concept of progress as the "belief in the sufficiency of scientific and technological innovation as the basis for general progress" (p. 37). The technocratic idea of progress is steeped in the understanding that advancements in science and technology are sufficient means in themselves to achieve social and political progress (Marx, 1987). General Motors's vision for the future epitomizes technocratic beliefs by suggesting that a vast highway network was sufficient measure to achieve the idyllic, suburban future that Americans dreamed of after the challenges of the Great Depression. The industrialization and rise of mass production of the late nineteenth and early twentieth centuries resulted in the technocratic ideal of progress becoming the prevailing viewpoint of Americans (Marx, 1987). Therefore, this new idea about the relationship between the suburban dream and the Interstate System became widely popular. Further, inherent to the belief that "technologies are in themselves a sufficient and reliable basis for progress" was an "unwillingness to name the social ends for which the scientific and technological instruments of power are to be used" (Marx, 1987, p. 40). This collective understanding discouraged the investigation into the impacts of interstate construction and allowed the planning and early construction to proceed unencumbered. Therefore, the popularity of the technocratic idea of progress made this time period ideal for leveraging the Interstate System to reinforce residential segregation.

The technocratic view of progress was essential in popularizing the concept of the Interstate System and aided in the rapid expansion of the role of the federal government in its realization. However, the use of the Interstate System as a racial barrier was not simply an unfortunate result of technocratic beliefs. The government and highway engineers deliberately wielded the Interstate System as a tool to achieve political and social goals. This practice is the manifestation of a concept known as technological politics. Professor of Science, Technology, and Society Langdon Winner (1980) described technological politics as a theory which focuses on the "ways human ends are powerfully transformed as they are adapted to technical means" (p. 3). Winner (1980) argued that technology impacts the way that certain groups control the environment and there are cases "in which the invention, design, or arrangement of a specific technical device or system becomes a way of settling an issue in the affairs of a particular community" (p. 3). This theory suggests that whether intended or unintended, technological innovations and advancement alter the order of the world and from this human activity is forever changed (Winner, 1980). In an era of unfettered progress as a result of technocratic beliefs, the government officials and highway proponents who championed the construction of the Interstate System possessed a greater level of power and awareness surrounding the arrangement of the network and were able to leverage this power to restructure society in their favor. The object of this restructuring in many cases became deteriorating minority communities in metropolitan areas.

During the early 1900s, progressive politics gained significant popularity. One of the core goals of progressive politics was to cure "the ills of an increasingly industrialized and urbanized society" (Harold, 2020). Through organization and study, many progressives documented the abhorrent conditions that were common in urban areas (Harold, 2020). These progressive

initiatives sparked urban renewal projects across the country. However, oftentimes these initiatives were, in reality, excuses to demolish and displace minority communities. As a result of racial zoning practices and redlining, minorities were often relegated to the worst neighborhoods in the city. Now that progressive initiatives had brought the poor conditions characteristic of urban life to the forefront of national attention, government leaders saw the opportunity to arrange the highway system such that they could remove the "urban blight" that was plaguing their city (Mock, 2017). In *Toll Roads and Free Roads,* the BPR's 1939 report which formalized the concept of the Interstate, this goal of urban restructuring is clear: "it is apparent that the whole interior of the city is ripe for…major change" (p. 99). Further, the BPR (1939) discussed how "possible courses of major new radial arteries" could overlap with slum-clearance projects (p. 99). This report illustrates a clear link between the Interstate System and the removal of "blighted" minority neighborhoods. Mohl (2004) explained that this report solidified the idea "that proper planning of highways would facilitate slum clearance" (p. 677). The connection between these ideas is further reinforced in the BPR's second report on the Interstate System, *Interregional Highways*. In this report, the interstate authority described route selection criteria for the highway network. When discussing route selection in urban areas, the BPR (1943) acknowledged the transformative power of the roadway system:

> The interregional routes, however they are located, will tend to be a powerful influence in shaping the city. For this reason they should be located so as to promote a desirable development or at least to support a natural development rather than to retard or to distort the evolution of the city. (p. 71)

This acknowledgement supports the idea that the arbiters of the highway system envisioned it as a political tool to revitalize and reshape urban centers. These reports from the premier authority on the construction of the Interstate System illustrate how the highway network was

conceptualized as a means to "[settle] an issue in the affairs of a particular community" from the inception of the project (Winner, 1980, p. 3).

In an age of remarkable change, proponents of the Interstate System advertised it as the means to transition the nation into the future. The technocratic idea of progress which emphasized the positive, transformative properties of technological innovation and minimized the negative effects allowed the Interstate System to quickly evolve from a futuristic idea in the 1930s to a harsh reality by the 1960s. Government leaders and highway engineers took advantage of the positive connotation that accompanied technological innovations as a result of technocratic beliefs and arranged the highway system in order to "enhance the power, authority, and privilege" of the white, ruling class over marginalized communities (Winner, 1980, p. 5). This prejudiced agenda was able to quickly advance through the legislature as a result of a lack of impact analysis, as shown in Figure 2. Therefore, the industry leaders and government officials who supported the construction of the Interstate System did not have to justify their design choices to other federal agencies or the communities that were impacted by the project.

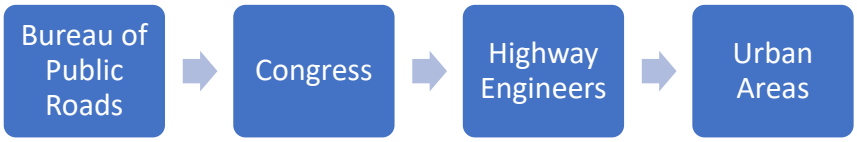

Figure 1: Interstate Construction Process as a Linear Handoff Model: The process to design, approve, and ultimately construct the Interstate is shown as a handoff model. (Adapted by Emma Chamberlayne from W.B. Carlson, 2020a).

Even once the adversary culture of the 1960s manifested in the freeway revolts and NEPA was passed, these marginalized communities were often still not able to access the resources necessary to curb the progress of the Interstate System. This resulted in high concentrations of poverty among minority communities that persists to this day. A startling example of this process is Syracuse, New York.

SYRACUSE, NEW YORK

In 2015, a new report on poverty in American shocked the local government in Syracuse by providing new insight into the issues with concentrated poverty in the city. As reported by Weiner (2015), the study found that "Syracuse has the highest rate of extreme poverty concentrated among blacks and Hispanics out of the nation's 100 largest metropolitan areas" (para. 1). This new report illustrated to local government leaders that they had a unique and extremely serious problem in their town. Semuels (2015) explained that in Syracuse "almost two-thirds of the black poor people" and "sixty-two percent of Hispanic residents" live in areas of concentrated poverty (p. 1). Further, Sirwatka and Rhodes (2019) reported that "white households make nearly double the income of non-white households" (para. 3). Semuels (2015), an awarding winning journalist who specializes in reporting on issues at the intersection of public policy, economics, and technology, described that these levels of poverty present a wide array challenges including decreased graduation rates, decreased levels of intergenerational mobility, decreased access to quality education, and increased violence (https://www.alanasemuels.com/). The problems that Syracuse faces are complicated by the fact that the concentration of poverty has only increased over the past ten years (Semuels, 2015). These issues with residential segregation and concentrated poverty that Syracuse residents currently face are a result of the discriminatory choices that were made during the construction of Interstate 81 that runs through the central portion of the city.

After World War II, Syracuse was a destination for many African Americans who left the South in search of better opportunities in northern cities (Semuels, 2015). The city was rife with opportunity and had a relatively low poverty rate compared to other cities of the time (Semuels, 2015). Exclusionary zoning and housing policies resulted in the majority of these black migrants

settling in an south-east neighborhood of the city known as the 15th Ward (Sirwatka & Rhodes, 2019). Mrs. Luana Adams described her experience moving to the 15th Ward: "When I first came here it was just as bad as it was in Georgia. Here, the colored lived nowhere but in the colored town. And they didn't want you no place." (as cited in Onondaga Historical Association, 2018, para. 6). The Onondaga Historical Association (2018) reported that "in 1950, almost 4,000 African-Americans, eight of every nine in Syracuse" lived in the 15th Ward (para. 11). To further exacerbate the systematic disenfranchisement and exclusion of the African Americans in Syracuse, the local city government blatantly neglected the deteriorating conditions of many of the homes in the 15th Ward. The 15th Ward became known as "slum land" and a progressive movement to clear the area began (Semuels, 2015). The Syracuse Urban Renewal project proposed constructing Interstate 81 through the center of the city (Sirwatka & Rhodes, 2019). This proposal was based on the route selection criteria included in *Interregional Highways,* as it went through the central area of the city. Therefore, the proposed path of I-81 would result in the "destruction of the [15th Ward] and displacement of 75% of the local black community" (Sirwatka & Rhodes, 2019, para. 5). City leaders and white residents believed that by advancing the freeway infrastructure in the area that a new era of progress would clearly follow. This technocratic belief became sufficient justification for the construction of the I-81 and black residents were left without any avenue to protest the design. Following the construction of the interstate, many black residents did not have the financial resources to move out of the city, so they were largely relegated to the south side of Syracuse (Semuels, 2015). In response, the white citizens of Syracuse migrated to the suburbs. To further reinforce the new distribution of residential segregation, city leaders and the remaining white residents continued to take steps to restrict the economic mobility of the black population. African Americans faced difficulties in

securing home loans, accessing affordable housing opportunities, and competing for jobs (Semuels, 2015). Further, Semuels (2015) demonstrated how zoning laws and the lack of government intervention on behalf of the black community in housing policy provided for the creation of these areas of concentrated poverty. Together, these obstacles reinforced the high levels of poverty among the black community and virtually eliminated opportunities to better their financial situation as residents were prevented from moving to other areas of the city.

Local leaders in Syracuse were able to leverage the absence of federal oversight and the widespread popularity of urban renewal projects in order to destroy the 15th Ward. The lack of federal oversight is rooted in the technocratic idea of progress. Since technological advancement at the time was a sufficient justification for new projects, local leaders were not required to perform any sort of impact analysis or provide for remedies for the problems caused by the construction. Many believed that the progress achieved through technological advancement would provide for the solutions for these problems. However, in a deeply segregated society, African Americans could not enjoy the fruits of these advancements. Further, the progressive emphasis on urban renewal allowed local leaders to easily transform the purpose of the Interstate System from a transportation network to a tool for destruction and demolition. Guidance from the federal government in *Toll Roads and Free Roads* and *Interregional Highways* reinforced the connection between slum clearance and highway construction. Together, these two ideas provided for the disenfranchisement of black residents impacted by the construction.

A NEW FUTURE FOR HIGHWAYS

In conclusion, the technocratic idea of progress and the relationship between urban renewal and highway construction provided local officials and highway engineers with sufficient

resources to systematically reinforce residential segregation in American cities. Across the country, years of discriminatory housing policies and racial oppression prohibited marginalized communities from voicing their concerns about new construction projects or deliberately excluded these groups from the decision making process. The adversary culture of the 1960s that gave rise to the freeway revolts created several policy initiatives that serve to protect against this trend being repeated.

However, recent initiatives by the Trump administration threaten to weaken the protections provided by NEPA and allow discriminatory construction projects to proceed. To prevent against these policy relaxations, this analysis recommends two changes. First, the proposal to modify the terms of the National Environmental Policy Act discussed previously in this paper should be rejected. As illustrated through the Three Sisters Bridge example, NEPA protections and the environmental impact statement process allow communities to hold the government accountable, voice their concerns about proposed projects, and create new recommendations for construction. Without exhaustive impact analysis, these protections and the success seen in cases like the Three Sisters Bridge would not be possible. The Council on Environmental Quality should be able to carry out impact assessments for as long as necessary in order to fully evaluate the environmental and social impacts of proposed construction work and engage with the public. By maintaining the current environmental impact statement process, the current strength of NEPA will be preserved and federal agencies will be able to evaluate the impacts of potential construction to the fullest extent necessary. Second, the National Environmental Policy Act should be amended to evaluate the impact of construction projects in terms of residential segregation and impact on poverty levels. Figure 3 illustrates how the construction of new interstates might look once these changes are enacted. These changes

should expand upon the initiatives outlined in Executive Order 12898. The National Environmental Policy Act, particularly the environmental justice portion, has proven to be an effective tool for citizens to voice their concerns about the impacts of interstate projects, when given the right resources as seen in the example from Charlotte, North Carolina. Currently, project managers are required to conduct demographic analysis as well as analyze the socio-economic conditions in the area surrounding the construction project. If project managers were additionally required to forecast changes in index of dissimilarity and create solutions for mitigating these impacts, marginalized communities would be better protected against exclusionary projects. By bringing additional groups into the decision making process as a result of new types of required analysis, there will be more opportunities for minority communities to be involved in construction project decisions and fewer chances for

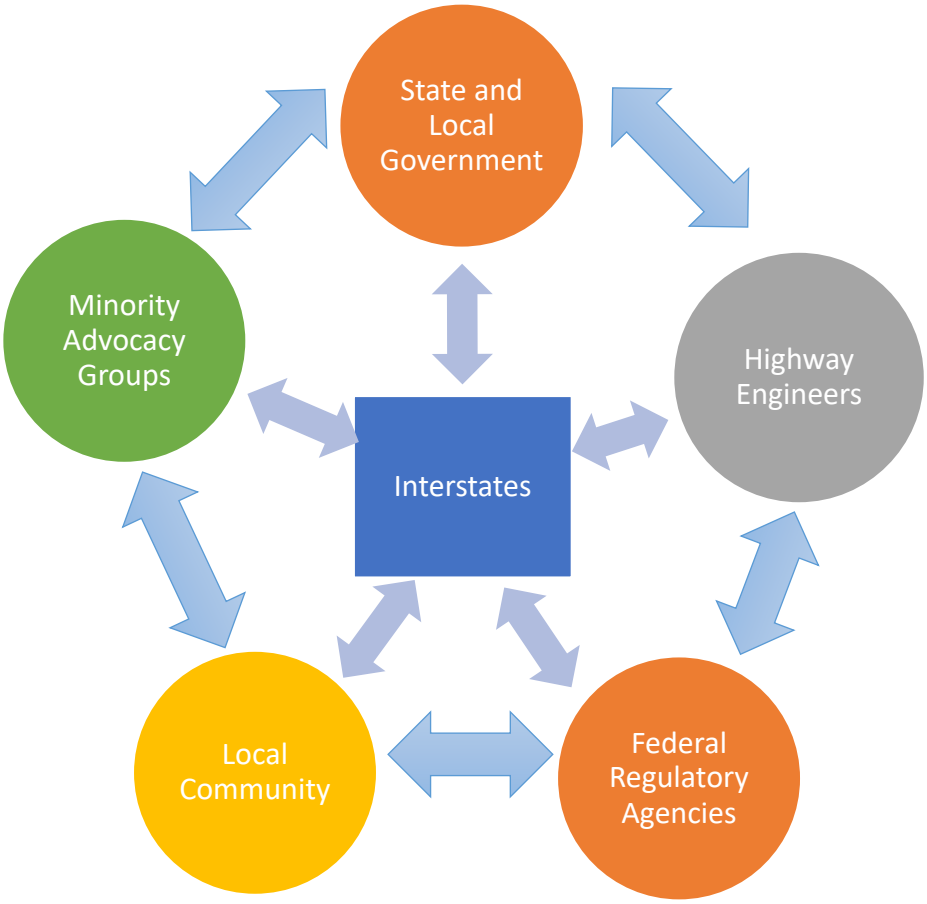

Figure 2: Interstate Construction as a Social Construction Model: With new provisions added to NEPA to provide for better minority and community protections, the process of constructing new interstates would follow a social construction model (Adapted by Emma Chamberlayne from W.B. Carlson, 2020b).

destructive projects to be approved without suitable mitigation strategies. Together, these two changes preserve and extend the role that minority communities have in evaluating the impact of new construction projects. This ensures that the federal government will no longer be able to proceed with new projects unchecked by the impacted communities as they were during the initial construction of the Interstate System.

The Interstate System began as a revolutionary idea to connect the nation for defense, travel, and commerce. Years of debate about the extent of the project and the level of federal involvement culminated in the Federal-Aid Highway Act of 1956. Initially, the project had wide public support as many saw the transportation network as a necessary innovation to achieve the idyllic suburban future that many Americans desired after the tumultuous years of the Great Depression. The belief that the transportation innovation alone would cure many of the ills that society was facing was a result of the technocratic idea of progress. This belief encouraged Americans to believe that the technology itself would lead to universal social progress. However, the government took advantage of these technocratic ideals and transformed the Interstate into a political tool. Constructing the Interstate System became a method for the federal government to exert control over minority communities and reinforce residential segregation. By creating an association between slum removal and highway construction, highway engineers were able to restructure the urban landscape in their favor. These discriminatory practices resulted in extreme levels of residential segregation and concentrated poverty in America's cities, severely limiting the upward mobility of these residents. Policy initiatives in the late twentieth century looked to right some of these wrongs. The National Environmental Policy Act combined with Executive Order 12898 became the most effective protection against new discriminatory construction projects. Recent initiatives by the Trump administration threaten to weaken these protections. By

tracing the origins of the use of the highway system as a racial barrier, this analysis recommended two changes to prevent the persistence of construction projects that could reinforce issues like residential segregation and concentrated poverty. An understanding of the context that enabled the highway system to be used as a political tool in conjunction with these policy recommendations can help prevent repeating the mistakes that were made during the initial construction of the Interstate System.

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