

THE INTERSTATES AND THE CITY
AN EXAMINATION OF INTERSTATE HIGHWAYS AND THE
PERCEPTION OF SLUM CLEARANCE IN AMERICAN CITIES

by

Miles Miller

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ABSTRACT

The following paper looks at the way in which interstate highways in five eastern-American cities were used to displace inner city residents under the guide of slum-clearance and urban renewal. The paper uses 1950 census data to examine these five areas across several variables in establishing whether they were in fact slums. This is done to determine the validity of slum clearance and urban renewal as the justification for the destruction of homes and communities for the purposes of highway construction. The paper also examines the cost-reduction logic of interstate highway construction as well as the ethical standards of engineers as practitioners, in considering the legitimacy of routing interstates through the inner-city neighborhoods of downtown America in the first place.

Chapter 1

THE HEART OF THE CITY

A trip from the University of Delaware to the heart of the city of Wilmington takes about twenty to twenty-five minutes when using the interstate-95. The Martin Luther King Boulevard offramp allows traffic to exit the highway and arrive at the Riverfront, or perhaps the financial district, or even the city's resident baseball stadium, in mere minutes. Turn left at the traffic light on the same offramp, and one is able to access the residential district immediately. And, by chance, your final destination is not within the urban boundaries of Wilmington, traversing the city via interstate takes no more than 5 minutes. Interstate-95 has forever changed the way, and ease, of interaction with the city of Wilmington, as interstates have done with countless cities across the country.

Many of the roads run through the very heart of the city, bisecting the downtown area in a very apparent way (Mohl, 2002). High value urban land is taken up by these roads as they stretch the length and breadth of the metropolis. In some cases, highways have had detrimental effects on the price tags of adjacent buildings. In Miami, FL, for example, critics have claimed that the raised highways that run along the water's edge cut off the city from its connection with the sea, lowering the property values of what would have been bay-front apartments (Mohl, 1989). It is puzzling that interstates would take away from the value and potential of the urban cores of cities in such an unforgiving manner, especially when alternatives existed as opposed to routing highways straight through cities. In Wilmington, DE, Interstate-

495 runs almost parallel to Interstate-95, and traffic can achieve exactly the same destination on either highway in comparable times. Yet I-495 runs around the city, and I-95 directly through it. Given the negative effects that an urban highway has on its surrounding environment, how might one explain the placement of the road?

There is a prevailing rhetoric across literature of the history of highways that route placement was more than simply a result of transportation decisions, or even poor planning with regards to route placement. Beginning in the 1930s, at least two intervening issues modified highway policy: the impact of transportation infrastructure upon the urban form, and the impact of public expenditure on the economy (Edner and Weiner, 2018). These two factors were to steer the influence of interstates on the urban fabric of the United States for decades to come, and in an exceptionally controversial manner - prominent authors in the subject, such as Raymond A. Mohl, have propagated the idea that route placement was purposeful and intentional in the negative effects on urban cores of cities. The goal of interstates placed along certain corridors of the inner city was to remove a specific population demographic from the urban core itself, that of low-income and working-class blacks, under the guise of slum clearance and urban revitalization.

This paper examines the validity of that claim. That is, were interstates, in their routing and construction, actually ridding the city center of slum neighborhoods? Five study areas are identified and described, using census data from the 1950's, to determine whether the affected neighborhoods fit the criteria for "slum" (according to

the United Nation's definition of the word), and if not then what possible motives and explanations could exist for neighborhood clearance and interstate construction.

Chapter 2

LITERATURE REVIEW

The Dwight D. Eisenhower National System of Interstate and Defense Highways is no doubt one of the monumental feats of our time (Bruce-Biggs, 1977). Built in what the Federal Highway Administration (2017) calls the “Greatest Decade” – the period of 1956-1966 - it is a web of controlled-access interstate roads that crisscross the United States as part of the National Highway system (Wickman, 1978; Federal Highway Administration 2015; Karas, 2015). The estimated price tag for the interstate highway system in its entirety and up to the present is placed at around \$499 billion (in 2016 dollars), with a total length of 47,856 miles, spanning both rural as well as metropolitan landscapes (Federal Highway Administration 2016).

The Idea for the Creation of National Highways

Though the idea for an interregional system of national roads had existed since around the start of the 20th Century, the idea for an interstate highway system was only formally presented to Congress in 1939. This was done through two reports, namely “Toll Roads and Free Roads”, and “Interregional Highways”. They were to be the first genuine effort in interstate highway planning. The reports recommended construction of what they called a "system of direct interregional highways, with all necessary connections through and around cities, designed to meet the requirements of the national defense in time of war and the needs of a growing peacetime traffic of longer range" (Federal Highway Administration 2017). That is, the roads were built to facilitate large scale evacuation of cities – approximately 70 million people - in the event of atom bomb or hydrogen bomb attacks, as well as to curb the mounting social and economic cost of lives lost in road accidents (which had reached around 40,000

annually in 1954, with an additional 1.3 million people injured) (Federal Highway Administration 2017; Rogers, 2003).

The ability to get residents out of city centers en masse in the event of a catastrophe was of great concern to many bureaucrats, seen in the comments of city officials such as Mayor Ben West of Nashville, TN, who fully endorsed highway plans for his city at a hearing for the National Highway Program in 1955. West emphasized the importance of city-based highways with regards to evacuation routes to avoid “millions of casualties” (Weingroff, 2017 p.8). This sentiment was echoed by others at that same meeting - Mayor William E. Kemp of Kansas City, MO, and Mayor Albert E. Cobo of Detroit, MI, for example. There was also a push to cut down on the number of work-hours wasted as a result of ineffective transport measures, traffic congestion and traffic-related civil suits clogging up court time (Brown, 2006; Weingroff, 2017), something that interstate and urban highways were seen to be key solving. It was a public-works project on a massive scale - certainly one of the largest in history and had the added benefit of putting millions to work in a country still feeling the effects of economic depression and war. Jobs would be created by the thousands. The revitalization of cashflow as a result of highway construction and investment in the automobile industry would once again give private consumers and the public as a whole confidence to pursue the American dream, leaving the agony of war-era fiscal conservatism and economic oppression through economic depression, in the distant past.

Both reports - “Toll Roads and Free Roads”, and “Interregional Highways” – were created at the request of the Roosevelt administration, and originated in a branch of the federal government, namely the Bureau of Public Roads (BPR), an agency founded in 1919 (Mohl, 2002) and now known as the Public Roads Administration. The BPR was headed from its founding until 1953 by Thomas H. MacDonald, a highway engineer from Iowa who relentlessly promoted the agency’s vision for an interstate highway system. MacDonald realized that a declining railway system, coupled with a decrease in use of systems of urban public transportation and rising popularity of private automobiles, left unfulfilled a large demand for hard-surfaced highways, and supported the stance, originally held by Eisenhower in his pre-presidential years, in connecting rural areas to urban centers via reliable, durable, weather resistant roads. The automobile industry too, was eyeing the untapped market for private transportation. In order to make cars for private ownership (and sales) feasible, there needed to be justification to their purchase and use – in other words, it would be pointless to buy and own a car if one was unable to use it because of the poor state of the roads. As a result, automobile manufacturers had massive stakes in highway legislation. In 1939, car manufacturer General Motors commissioned its Futurama exhibition that saw a scale-model depiction of what cities could look like when highways were incorporated into their design. The exhibition did exceptionally well to capture the imagination of the public and boost popularity and support for the construction of a national highway system (Giedion, 1962).

The Notion of Using Interstate Highways to Clear Slum Housing

The reports made clear the connection between highways and urban reconstruction and made the case that highway planning should take place within the context of urban redevelopment and slum clearance (Mohl, 2002). Roosevelt's Secretary of Agriculture, Henry A. Wallace, supported the notion of this urban redevelopment in stating "There exists at present around the cores of the cities, particularly the older ones, a wide border of decadent and dying property which has become, or is in fact becoming a slum area" (Powell, 2015, pg. 5). Wallace continued in saying that acquiring land in these areas for highway construction would lead to the "elimination of unsightly and unsanitary districts where land values are constantly depreciating". The advocates of highway building, states Mohl (2002), operated on the basic premise that the existence of American slums was in essence a problem of deteriorated buildings, rather than a problem of the low incomes of those building's inhabitants. Addressing both the transportation needs of the country while reclaiming valuable urban land was appealing to say the least.

The sentiment of slum clearance through highway building was widespread, prominent amongst urban planners and major interest groups. The Urban Land Institute (ULI), an influential lobbyist group founded in 1963 to serve interests of downtown real estate owners and developers in American cities, pushed heavily for redevelopment of city centers to counter the adverse economic effects of suburbanization on cities, with its council focused on the salvation of the central business district. In the mid-1950s, respected urban planner and architect Victor Gruen put that "the rotting of the core has set in in most American cities, in some cases progressing to an alarming degree." (Mohl, 2002 p.25). James W. Rouse, a prominent

real estate developer from Baltimore involved with the ULI proffered that the solution for downtown America was the need for "Major expressways (to) be ripped through to the central core" (Mohl, 2002 p.25). Another urban developer, James H. Scheuer, in a ULI newsletter envisioned inner-city highways cutting through "great areas of our nation's worst slums" (Mohl, 2002 p.25). The newsletter itself urged governments to survey "the extent to which blighted areas may provide suitable highway routes" (Mohl, 2002 p.26). ULI consultant James W. Follin stated that he saw interstates as an opportunity to eliminate blighted areas from downtown districts. (Mohl, 2002). The American Road Builders Association (ARBA) served as the major trade association for America's highway construction firms and defended the use of interstates in slum clearance in a letter to President Harry Truman in 1949. Highways, it said, would provide an effective means for transportation, but if used properly could also "contribute in a substantial manner to the elimination of slum and deteriorated areas." (Mohl, 2002 p.26). The elimination of urban slums, said the ARBA, would not only stimulate downtown businesses and contribute to an appreciation of property values, but also counter threats posed by slums to public health, safety, morals and welfare of the country. The American Concrete Institute (ACI) was yet another organization that called for the use of highways in the "elimination of slums and blighted areas" (Mohl, 2002 p.26) (the ACI, like General Motors, had direct financial interests in highway construction). The Automotive Safety Foundation published a pamphlet assuring readers that highways were the best way to "prevent the spread of blight and...slums", and that progressive societies would use the potential of highways to "speed redevelopment of run-down sections along sound lines and to prevent deterioration of desirable sections" (Automotive Safety Foundation, 1956 p. unknown). In 1962, the

Highway Research Board contended that urban highways were "eating out slums", "reclaiming blighted areas" and represented a social good especially if routed through blighted slum neighborhoods (Theil, 1962. p.19). The list goes on and on – organization after organization, city after city, highway official after highway official. Mohl (2002) does well to detail further instances of the belief that highways were in fact clearing slum areas.

The Displacement of Residents as a Result of Slum Clearance Through Interstate Construction

Through the 1940's and 50's, while in office, Macdonald had campaigned for the use of interstates to clear what he referred to as "blighted districts". His solution to displaced residents would be that they would relocate to the suburbs and commute to work in private motorcars on newly built highways. To this end, Macdonald pushed for local planning policies and congressional legislation that would see new housing built for displaced people (Mohl, 2002). Macdonald did seem to understand the importance and urgency of housing those displaced by the roads, and in the 1940s steered the BPR in working with planning, housing and relocation agencies in several major cities to ease the social fallout of interstate construction. Despite his efforts, however, little attention was paid to issues of relocation prior or even during highway construction. There seemed to be no consolidation, nor consistency, across federal and state agencies with regards to agreement about who's responsibility it was to see to the housing needs of affected residents. Even at the highest levels of the level of the Eisenhower administration, financial responsibility had been shirked to cut costs of the interstate project - despite the looming mass relocation of residents, the office of the president and its republican allies in the senate rejected the inclusion of relocation

expenses in the final highway bill for fear of excessive costs at a time when the country was battling decade-long inflation and recession. Increasing federal debt would not do his administration any favors - Eisenhower had campaigned on a platform of cutting federal spending. In fact, he only shifted full support to highway building when the investment in the Highway Trust Fund removed construction costs from the federal budget (Moynihan, 1969). As for those displaced residents themselves, they had few allies in the federal road-building agencies. The BPR believed that its business was road and highway construction only, and that the task of dealing with the social consequences thereof fell to other agencies. The feeling was similar within engineering circles, where practitioners conceived of their role as one of, again, road-builders only. In 1957, one federal housing official noted that “It is my impression that regional personnel of the Bureau of Public Roads are not overly concerned with the problems of family relocation” (Mumford, 1958). Mohl (2002) reiterates this in stating that little was done to consolidate highways building with public or private housing construction for displaced families, businesses or community centers. Displaced residents comprised of around ten percent of the total population in some cities. Brown (2005a) too, speaks of how highway engineers approached interstate building with exclusive focus on the facility’s traffic service capabilities. That is, their only concern was designing and routing freeways so as to safely move large volumes of individual vehicles at high speeds at a low cost to the public treasury.

The Disunion of the Highway and the City

The name “interstate highways” is a bit of a misnomer, as on the surface it sounds as though these roads only served to connect one state to another, perhaps suggesting that they were located in the no man’s land between the economic or

political centers of various states. In reality, highways accomplished much more. True to their name, they did indeed connect one state to another, and in fact one state to all others. This is most easily seen when highways are viewed on a national level. When viewed on a regional level, the ways in which various counties are connected within states becomes apparent. Zoom in further still, and highways facilitate travel between rural areas and suburban residential districts, and the urban cores of major cities. It is this last point that is of greatest importance, and concern, in this study. With regards to major American cities, highways were retrofitted. Cities themselves were not designed to accommodate these mega structures in their conception nor their construction. Yet the mid-20th century saw road infrastructure not only lead into the hearts of cities, but run through them, allowing users to disregard the urban center entirely.

Connecting urban cores via highways to those who would enter them, or indeed bypass them, meant that sacrifices would have to be made in terms of finding the space to do so. This was because the tightly knit buildings of the American city's downtown did not afford even the slightest flexibility when it came to space, and rightly so. These were heavily occupied neighborhoods (Mohl, 2002), wherein lay homes, schools, churches, community centers, businesses. Some city communities were homogenous in their people and their culture – it is well-established that many black families, immigrating from the South in search of work, made their homes in the downtown districts of many major cities (Frey, 2004). Others were more ethnically and culturally diverse. Lupo, Colcord and Fowler (1971) set the scene in Jamaica Plain, a downtown-adjacent neighborhood of Boston, MA, as a melting pot of people, backgrounds and traditions. These attributes did not deter highway enthusiasts,

however, who maintained that roads would be built through the city regardless of those that would oppose them. It was an unsustainable stalemate, and one that would be short-lived. Whether the home or the highway, something had to give.

A Question of “Why”

The fact that cities and highways did not seem to complement each other, as described in the above paragraph, leaves unanswered one crucial question: Why would highways ever be even conceived to be routed through spaces where they were not practically capable of doing so without leaving large amounts of destruction and controversy? The answer was “slum clearance”. As mentioned under the subheading “The notion of using interstate highways to clear slum housing”, highwaymen saw interstates as an opportunity to both solve the need for interregional roads and at the same time clear the inner city of what they believe to be the extreme living conditions of slum communities.

An Interpretation of Slums Through the Years

A Modern Definition

A slum, by definition of the United Nations (2007), is an impoverished, densely populated urban residential area with poor quality of housing, and without basic water, electricity, law enforcement or sanitation services. Slums, no doubt, contain some of the most abhorrent living conditions known to humans.

Modern slums

In the modern city, slums are areas with little or no planning to support its inhabitants they require to meet the most basic standards of living (Davis, 2006). From

the mid-20th Century onwards, urban slums across the world were observed to be growing at a colossal rate and often times informal additions to housing would be built to accommodate the massive influx of new -comers. Ratcliff (1945), Kristof (1965) and Mandelker (1969) too, say that a classic characteristic of a slum is its decaying housing infrastructure, often built with materials unable to withstand the elements, and without attention to engineering principles. Overcrowding is another definitive mark of a slum. Single rooms see high occupancy rates, with densities sometimes as high as ten people sharing one room (Kundu, 2003). Bathrooms and water sources, as opposed to being private, may serve dozens of families at time (Kimani-Murage and Ngindu, 2007; Garside, 1988; Wohl, 1977). Low income of residents is a hallmark of slum conditions, with inhabitants making housing location decisions based upon factors such as proximity to work or water, as opposed to quality of housing (Davis, 2006). Crime is apparent in slums and, despite indications that crime is a symptom of slums dwelling, crime being more closely linked with power struggles over illicit economies with slums often containing more victims of crime than perpetrators (Slater, 2009; United Nations, 2007).

The Image of Slums Prior to Highway Construction

We now move further into the past, from modern, perhaps more liberal visions of slums to those that existed prior to interstate construction - that of the 1800s. If the descriptions of the 19th Century had any sway over images invoked when federal, state and city officials and the public thought of slums only a few decades later (and by the words used to describe downtown neighborhoods of American cities by city planners, they did – see Victor Gruen’s “rotting of the core” description in paragraph two, under the subheading “The notion of using interstate highways to clear slum housing”), then

downtown was a wretched place – a haven for criminals and prostitutes and rapists and savages; Such descriptions as “war-whoops and clubs very much the same, and garments as fantastic and souls as brutal as any of their kindred at the antipodes.” (Chapin, 1854 p. 36) abounded. It is not difficult to see where the propaganda posters of the 1950’s may have gotten their ideas for the words and imagery they used to promote slum clearance. The public images of slums were harsh, to say the least, and perhaps extremely effective at creating a sense of emergent fear and loathing amongst the public at large during a period of highway building.

Political Response to Inner-City Slums Through Interstate Construction in the Early 1900’s

In the early and mid-1900’s, in reaction to the perceived conditions of the inner-city, federal agencies like the US Housing Authority circulated slum-propaganda posters stating that “Slums breed crime” and “Cross out slums” and launched media campaigns to garner public support for slum clearance initiatives (Byrnes, 2011). The public depiction of slums became one of a place where “an incorrigible and feral social ‘residuum’ rots in immoral and often riotous splendor” (Davis, 2006 p. 22). Not at all becoming of the American values of peace, safety, productivity and prosperity.

Of course, such villainy and lawlessness in modern America simply wouldn’t do. The breeding grounds of immoral behavior needed to be dealt with, and the clearance of downtown land was packaged as inner-city urban revitalization programs (Williams, 1961; Ghans, 1968; Schwartz, 1976; Connerly, 2002; Mohl, 2002). Highway officials campaigned tirelessly for the removal of what they deemed blighted districts (at the same time, the forced relocation of downtown residents, the majority

of whom were black, triggered a spatial reorganization that spurred suburbanization - increasing pressure to find new housing for displaced families meant that black residents pressed further and further into neighborhoods of transition, generally working-class white neighborhoods, accelerating white flight into the suburbs (Mohl, 2002). Mass exodus of those who could afford it from the inner city into the suburbs was encouraged by slum propaganda. Meanwhile, in the downtown districts, communities fell to the bulldozers, and swaths of inner-city territory were claimed in the name of transportation progress and urban revitalization (Mohl, 1989). Plans to use urban highways to rid the inner-city of slum housing were not new, originally dating back to the late 1930's, but were not implemented until the period of highway construction in the 1950's and 60's (Mohl, 2002). By the 1960's, around 37,000 homes were being demolished each year for highway construction purposes – mostly low-income units of the inner-city. As one highway redeveloper put it, affected areas were being put to “higher and better uses” (Moynihan, 1969). The fact that urban highways (or “freeways”) stimulated the creation of downtown shopping districts and office parks at the expense of low-income, predominantly black homes begs the question “revitalization for whom?” This question hints at the dominant theories of previous literature that urban interstates were purposefully used to clear city centers of black occupants. Highways proponents, however, maintained that no racial prejudice was present in deciding where and how to route urban interstates (Karas, 2015).

Paying for the Road. The Financial Obstacles to Interstate Construction

The Roosevelt Administration needed a way to fund highway construction. The funding debate was not new, and discussions on how highways would be paid for date back to the earliest conversations on highway building of the 1930s. The

Roosevelt administration (1933-1945) proposed toll facilities along highways routes to derive revenue from users, described in the BPR's report "Toll Roads and Free Roads". The report found that toll facilities alone would not be sufficient to pay for the construction, operating and maintenance costs of highways, and that at present there was not enough traffic to even warrant such toll facilities (studies have since shown that toll facilities in many sections is more than sufficient to justify their use). The arrival of World War II placed a hold on the funding debate, only to be resumed in 1952, when congress finally authorized and issued an extremely limited amount of financial assistance to states – twenty-five million dollars a year, for two years, for the purposes of bringing all existing roads that would be eventually incorporated into a final interstate highway system up to acceptable standard (Hall and Hall, 2006). Though it was a start, it was nowhere near enough to guarantee the success of the project over the long term. More was needed to secure the amount of money necessary to see the fruition of the interstates on a national level.

Eisenhower's Successes

After Roosevelt's death in 1945 and the subsequent election of President Dwight Eisenhower, the new presidential administration doubled down on highway efforts, and continued to put pressure on congress in tackling the financial road blocks to the interstate highway system. At the suggestion of the Secretary of the Treasury, Congressman Hale Boggs of Louisiana, Eisenhower accepted a "pay-as-you-go" system. Boggs proposed taxing products used by highway-goers, such as gasoline and tires, and depositing the revenues in a new Highway Trust Fund. That money would then be dispersed to repay states for building highways within their borders, as well as be used for other federal-aid highway projects. The plan was incorporated in the

Federal-Aid Highway Act of 1956 (formally known as the National Interstate and Defense Highways Act). The House bill passed by a vote of 388 to 19, and the Senate version passed by a voice vote.

Even with efforts to minimize costs, the price tag on the interstate highway project was in the billions, nationally. On a more localized level, no single state had the funds to cover all highway costs within their borders, yet the federal government still needed state support in order to keep the interstate project alive. As a solution, the federal government made highway construction extremely appealing to city officials and statesmen in that it would be funded to extent of ninety percent, with individual states covering the remaining ten percent, as dictated by the Federal-Aid Highway Act of 1956, signed into law by President Eisenhower on June 29th, 1956 (Weingroff, 1996).

“There will develop forces to oppose it”: Resistance to Highway Construction

Even after legislation was ratified by congress, a persisting problem was still the attainment land in cities upon which to build these roads (Weingroff, 2017; FHA, 2015; Karas, 2015; Mohl, 2002) - there were homes in the way of the roads. The loss of these homes would ultimately be for the greater good, maintained the BPR - highways through cities would “invigorate blighted urban areas, reverse suburbanization, and restore city tax bases by revitalizing residential areas and business districts” (FHA, 2017). The agency had also urged states to concentrate on highway construction in urban areas, as that was where the need for traffic relief was greatest. The decongestion of inner city roads was one of the ways in which states hoped to, as mentioned, cut down on wasted work hours, thus improving the efficiency and productivity of their local economies.

Public Critique of Urban Routing Plans for the Interstates

In the late 1950's, then-administrator for the BPR, Bertram D. Tallamy (who held office three administrations after Macdonald) stated in reference to interstate highways, that "there will develop forces opposed to it". He was not wrong. As the public realized the implications of interstates to cities, resistance flared, manifesting itself protests (Lupo, Colcord and Fowler, 1971), court battles (Connerly, 2002) and public and academic critique (Mumford, 1958). Nevertheless, Tallamy was confident that those who criticized the program would "probably be pushing the real supporters of the program in the background at the finish so they can cut the ribbons and take the credit they do not deserve", later adding that "these wonderful highways (we) are developing will actually stimulate metropolitan development as it should be stimulated." (FHA, 2017). Albert M. Cole, administrator of the Housing and Home Finance Agency, supported Tallamy's views, and added that improving the life of urban dwellers could not be separated from the difficulties of moving people and goods – the struggle was one and the same.

Critics of the views of Tallamy and Cole, including the nationally regarded social scientist Lewis Mumford, warned of the unforeshadowed social implications of highway construction, as a result of legislation that had quickly been pushed through congress (a full commentary can be read in Mumford's "The Highway and The City", 1958). The critique made headlines and drew public calls for the suspension of the interstate highway project until comprehensive land use plans could be created in order to facilitate the proper placement of the looming roads. In response, then-president of the American Association of State Highway Officials (AASHO) and Director of the Washington State Department of Highways, William A. Bugge, rejected the suggestion that the State highway officials needed "some expert assistance

from outsiders", saying that if an urban area had not engaged in prior planning with regards to future land use development "it is doubtful that time can be afforded in an urban area to develop such plans". The idea of a moratorium was "ridiculous (because the) economic penalties for delaying already vitally needed facilities for another two years would be tremendous." (FHA, 2017). The sentiment expressed by Buggee was in direct contrast to Macdonald's calls for careful evaluation and planning with regards to housing those displaced by the highway construction made several years earlier, as described in this paper, in the first paragraph under the sub-heading "The displacement of residents as a result of slum clearance through interstate construction". Despite the predicted social shortcomings of the road by critics and public, highway advocates ended 1957 in celebration, with almost \$4.6 billion dollars in investment for interstate construction.

Those implications of highway construction that Mumford predicted were (and still are) exceptionally noteworthy. Fears of urban disruption put forth by the public were not misplaced as routing decision were revealed with regards to where urban highways would be placed – and what as to become of those areas that fell into the path of the road. The ability of a highway to move through urban cores of cities required, as mentioned, large amounts of space, non-existent in downtown America. The solution was found in the establishment of right-of-way (or ROW - the ability of a State to claim private land, in exchange for compensation, for public benefit) passages through eminent domain procedure. That is, individual states invoked their right to acquire private land for public use. The opportunity to have roads built with minimal impact to state coffers was too good to pass up, and metropolitan areas relinquished control of route placement to state and federal planners in exchange for federal

funding (Sherman, 2014). The fate of local communities now lay in the hands of state and federal agencies, disconnected spatially and socially from the areas they would affect.

Social Fallout and Perceived Racial Bias in Interstate Highway Construction

The 1950's and 1960s saw mass housing destruction and the displacement of residents from their homes (Biles et al, 2014; Mohl, 2002; 2004), and it quickly became apparent that highway building was having a disproportionate and negative effect on communities of color (Connerly, 2002; Mohl, 2002, 2004; 2012; Karas, 2015). The dominant conclusion within existing literature is that highway routing and the effects of subsequent construction purposefully targeted predominantly low-income black communities, and that states used road building to reclaim urban space from a black population as residents were displaced through ROW procedure (Bayer, 1988; Mohl, 2002; Connerly 2002; Karas, 2015). Though Sherman (2014) states that patterns of interstate highway locations are not as general or coherent as initially suggested by the literature, he does agree that in localized cases minorities seemed to have borne the effects of highway building more than their white counterparts, where race is reached through proxies such as property prices. In other words, in certain areas non-whites felt the effects more than whites because those non-white areas were poorer. It should be noted that the idea that disproportionate effects on people of color were reached *through proxies* does stand in contradiction to the position of some highway advocates who made it clear they did indeed intend for highways to be used to displace black residents. To this point, in one instance the director of AASHO described that many city officials viewed interstates as a good way to “get rid of the local niggertown” (Schwartz, 1976). Theoretical contradictions aside, the effects of

highway building were all too real. The mass demolition of communities and displacement of people is a legacy that stands alongside interstates to this day.

An Error in Judgement: Teardown Projects in American Cities

Over time, city officials and statesmen would come to see the error of their predecessors. Recently, politicians and the public alike have become taken with the concept of highway teardown projects, essentially recapturing urban space that once housed urban interstates in the hearts of cities. Karas (2015) describes how more and more American cities are undergoing studies about the feasibility and benefits of tearing down urban interstates to undo the negative impacts that they have on downtown districts. Akron, OH, is conducting a \$2 million study on the possibility of removing the innerbelt freeway to promote urban economic development. In Cleveland, OH, the “Connecting Cleveland 2020” city-wide plan calls for the Cleveland Shoreway to be converted to a boulevard, removing the barrier between Cleveland and its Lake Erie waterfront. The New Orleans draft master plan for the city proposes removing the elevated Claiborne Expressway (I-10) between the Pontchartrain Expressway and Elysian Fields. Nashville's fifty-year plan, adopted in 2004, calls for gradually removing the eight-mile downtown loop made up of three interstates - Interstate 65, Interstate 40 and Interstate 24 - and replacing it with parks, boulevards and mixed-use communities to reconnect downtown with adjacent neighborhoods (Preservation Institute, 2018). San Francisco is considering demolishing a 1 mile stretch of I-280 highway in the Mission Bay neighborhood in favor of a rail transit system, boulevard and bicycle path (Rodriguez, 2016). Interestingly, this plan is very similar to the original design for the Detroit urban interstate system as seen in figure 4 of Brown’s “Planning for Cars in Cities: Planners,

Engineers, and Freeways in the 20th Century” (2009), as well as to Turner’s early description of the impending Detroit urban super-highway:

“The Super-Highway is unique. It is a new and necessary departure in transportation planning for the modern city. Not only does it provide for a cheaper form of rapid transit on rails and for the ordinary highway motor-traffic of today, but it will also do something never before proposed—it will furnish an express motor traffic highway upon which automobiles can travel continuously at a maximum speed with safety, because all grade-crossings will be eliminated. In other words, the Super-Highway will become the major traffic artery of the future city, for both rail and automobile rapid transit services.” (Turner, 1925 p.373)

In some major cities these are more than just studies – Boston, New York and Portland have already replaced formerly elevated routes with a variety of alternative routes and designs ranging from tunnels to a park (Mohl, 2012).

Current Academic Opinion of Past Interstate Policy

The interstate highways themselves exacerbated the need for high speed highways, in that they increased the pace at which suburbanization was occurring (Kuswa, 2002). The need to be able to travel at high speeds of long distances in short amounts of time was increasing as a result of interstates allowing people to live further and further away from the cities, aided by the call for a minimization of lost work-hours as a result of distance and traffic congestion (Weingroff, 2017). The sentiment of slum clearance is blatantly stated and defended by numerous highway officials, yet Mohl (2002; 2004; 2014) Connerly (2002), Karas (2015) and numerous others propose that this was simply a more productive way of saying that it was the hope and wish of state and federal administrations that inner-city neighborhoods be cleared of their black occupants so as to reclaim the urban space for whites. Rabin (1973) offers that these processes would essentially reap the rewards of the inner city while excluding

minorities from them. The idea of racial prejudice is prominent in the literature, as authors argue that patterns of interstates through black neighborhoods in the inner-city are too numerous to ignore. For example, Sherman (2014) highlights these patterns in what appears to be the first use of a mixed methods approach seen in the literature. However, he does argue that these patterns are not as prominent, nor as general as suggested, and says that each case needs to be examined individually in order to determine the presence of racial prejudice with regards to highway routing decisions.

Individual examinations and critiques of urban interstate construction are certainly common. Connerly (2002) focuses entirely on neighborhood-level instances in the city of Birmingham, AL, to show how routing decisions, both in route design and route location, seem to have purposefully targeted black neighborhoods in the inner-city region. Mohl (1989) details the effects on the “Harlem of the South” in north-west Miami, formally known as Overtown, by interstate-95, describing the movement of the original highway route so that the road would completely bisect the heart of the predominantly black neighborhood. Karas (2015) tells of the Nashville experience that saw the interstate-40 temporarily halted in its construction as a result of local opposition to its routing through the city’s black community, and then resume, to demolish homes, schools, churches and community centers. The argument of the opposition - that of discrimination – was denied at the level of the 6th Circuit Court, which held that “no discrimination is charged or shown” (Karas, 2015). Black, inner-city neighborhoods in Detroit faced a similar fate at the hands of interstate-375 (Biles, 2014), where yet again thousands were forced from their homes by highway construction.

The argument that highways were motivated by factors outside of transportation, such as race, is taken up by Aman (1970), who states that the decisions of route location – even the decision to build a road in the first place – was a political one, rather than a process of scientific objectivity and a product of expert opinion, and that highway departments subverted this fact by saying that they were acting in public interest. This is echoed by Rogers (2003), who says that even at present, highways and highway construction are functions of political processes as much as transportation needs. The process is politicized because the answer to questions of what the best use of public land would be is based on the values of the decision makers (Rogers, 2003) – often bodies operating at the federal level that do not accurately represent public opinion, and subject to the influences of lobby groups and political agendas. Schwartz (1976), through anecdotes of racially prejudicial statements made by politicians and highwaymen, shows evidence of some these values being based on race, where highways appear to purposefully target low income inner-city neighborhoods with majority black populations. On the opposite end of the road – that of suburban America - Nall (2010) supports Kuswa’s argument and laments the political use of interstates in facilitating the creation of majority white, republican suburbs. Nall, like Aman, sees the decisions behind the creation of highways first and foremost as political in nature, as opposed to being based in transportation efficiency. Federal policies, such as those regarding interstate construction, can change politics not only by influencing the welfare of individuals, but also by influencing residential choice and spatial relationships amongst citizens (Nall, 2010). In other words, using his data driven conclusions Nall goes one step further in arguing for the use of interstates not

only as political tools, but specifically to maintain the like-mindedness and homogeneity of a certain demographic of people with regards to voter support.

Lewis Mumford (1958) approaches the critique of interstate highways systems with similar vigor to that of his colleagues, but from an angle of urban disruption as opposed to racial prejudice. Mumford argues that highways were built with the mindset of promoting the culture of the individual motorcar, and as a result undermines the very point of efficient transportation systems themselves – to minimize reliance on unnecessary and inefficient forms of transportation. That is, in highway culture, moving across great distances at high speeds over shorter amounts of time becomes an end in itself as opposed to a means an end. Diffusion and concentration are the two key elements in transportation logic; the first is characterized by the methods of transportation, like roads, rails, etc., and the second by their destinations such as towns and cities (Mumford, 1958). Whatever the type transportation, or destination, the two should inherently complement each other. In this case, interstates should improve a person’s experience with the city, and not rely on the destruction of it for their existence. The two should not be forced together in unsustainable cooperation. Mumford lays partial blame upon engineering as a profession, as opposed to Aman (1970) and Nall (2010) whose focus was predominantly political, in saying that the field itself is self-servient because its practitioners regard their work as more important than the human functions it serves. Every urban transportation plan should put pedestrians at the center of all its proposals (Mumford, 1958).

Brown, Morris and Taylor (2009) echo Mumford’s comments (that of how interstates did not benefit efficient transportation) in saying that factors not directly

related to traffic efficiency maximization were not taken into account. Sensitivity to the city as a separate entity, argue the authors, was not of primary concern. Routes were drawn with scant concern for existing neighborhoods, and land use considerations were largely ignored (Brown and Morris, 2009) – the latter being something that the teardown projects, noted under the subheading “An Error in Judgement: Teardown Projects in American Cities”, have come to espouse as one of the main reasons behind removing urban highways, that of inefficient urban land use. These points run parallel to Mumford’s claim that engineers were self-servient, in that the construction of interstates was for the sake of the interstates, and not the public. “Construction of interstates was for the sake of the interstates” can perhaps be seen in the renegeing on plans for interstates to be part of a larger system of multimodal transportation methods, something that would have benefitted public mass-transit transportation more readily. Brown (2005b) and Rose (1990) explain this dismissal of multimodal plans in saying that the reason was because of the prevailing belief that since the system was funded by fuel taxes, motorists should be the only beneficiaries. In minimizing costs through cancelling plans for integration of interstates into a system of multimodal transportation, the interstates would be kept alive at the expense of transport efficiency and general urban wellbeing – the very thing roads were purportedly being built for.

The Misclassification of Inner-City Neighborhoods

Though the belief that inner cities were slums was prominent in the early years of interstate planning and building, that idea maintains today, even within research that rejects the clearance of urban neighborhoods via highway construction. There is

no examination of the state of those communities to determine whether that belief was in fact true and has led to their continuing classification as slum areas.

Research conducted by the Program for the Advancement of Research on Conflict and Collaboration (PARCC) on areas of highway bifurcation in Syracuse, NY, too, does not reject the idea of these neighborhoods as slums, instead suggesting that this may have been the case as there were numerous houses that did not have access to indoor plumbing (PARCC, 2014).

An examination of the same area by Renckens (2012) found that large numbers of homes were in state of dilapidation or had limited access to sanitation services but stops short of practically showing that that this was a slum - rather, that the area had the potential to become one. While access to private sanitation services is a variable that is looked to in slum classification (and one that is used in this paper), it needs to be viewed in conjunction with many others, as stated in the UN definition of what constitutes a slum.

Dutta (2017) states outright that inner-city neighborhoods of US cities in the mid-20th century succumbed to falling housing prices due to the increasing prevalence of slums and the criminal conditions they inspired - interstates in terms of an urban-policy approach, were an attempt to prevent the growth and spread of these slums, and in terms of reviving the central business district, slum clearance was key.

Colean (1953) states that the woes of the American inner-city, from urban sprawl and downtown congestion to a variety of economic problems were all related to the presence of slums and urban blight that existed as a result of the presence of inner-city homes, and that their removal was of pivotal in reclaiming valuable urban land,

As described in Hall and Hall (2009, p. 2), in his publication “The Freeway in the City” Bridewell (1968) writes that “Some internal freeways have been deliberately located through the worst slums to help the city in its program of slum clearance and urban renewal. The federal government has greeted the concept with enthusiasm.”

Student (2014) posits that while highways were damaging to the urban fabric of cities in their destruction of inner-city neighborhoods, they did indeed clear urban cores of slums. Student builds upon Harrington’s (1993) argument to make his case - Harrington states that many poor, rural citizens made their way to the inner city in search of manufacturing jobs in post-World War II America and stayed long after the jobs had vanished. Student argues that this, in turn, helped to create and perpetuate slums and slum-like conditions in inner-city neighborhoods, the presence of which triggered efforts at urban renewal through processes such as interstate highway construction.

The above descriptions of inner-cities as slums do not make use of methodologically sound data to justify the description of inner city areas as slums. That is, all classifications of inner city areas as slums by the authors are a product of the assumption that poverty and confined areas of dilapidation or poor sanitation services automatically constitute “slums”. These descriptions are indirectly challenged by Connerly (2002) who, in his description of the effects of interstate construction in Birmingham, AL, shows how these urban renewal projects were in truth attempts to reinforce the pre-existing racial barriers of the city. Connerly also does well to describe the state of well-to-do black neighborhoods on the city’s west side that felt the effects of demolition and interstate construction, such as Smithfield, in doing so dispelling the idea that all areas were slum neighborhoods in need of rejuvenation.

Lupo, Colcord and Fowler (1971) too describe the city-adjacent neighborhood of Jamaica Plains as, prior to housing demolition, being an heterogenous area in terms of both ethnicity as well as wealth. Mathew Desmond (2012) in his critique of the residential mobility of the urban poor, also does not question whether or not the areas about which he speaks are in fact slums by definition. Desmond certainly means no harm in his use of the word, but his assumption in its accuracy bears hallmarks of similar assumptions made by the highwaymen who would have had those same slums removed for the purposes of routing roads through residential areas.

Chapter 3

METHODOLOGY

The study aims to fill the gap of knowledge with regards to quantitative-data based evidence about the factors that lead to the routing of highways through urban neighborhoods. By embracing this underused approach to studying highway routing decisions and implications, this paper hopes to strengthen the findings of previous work, and address areas of weakness.

A Strong Case: Evidence for the Impact of Highway Building in Previous Literature

The strength of previous work in looking at the impact of urban highways in undeniable. Anecdotal evidence is extremely detailed, especially in the works of Connerly (2002). This gives incredible depth to the experiences of individual residents and communities and allows for better insight into the specific traumas of residents as a result of highway building. The description of these traumas on a personal level also make these experiences far more relatable.

Previous work has done well to establish national patterns of highway-related neighborhood demolition along lines of race, and then relate these patterns to the socio-political climate of the time. That is, previous literature links demolition of predominantly black housing to policies and laws that discriminate against black populations, and state that highway construction was simply an extension of these policies (Karas, 2015; Mohl,2004; Connerly, 2002). Connerly (2002) shows the parallels between the struggle of residents of Smithfield in Birmingham (a study area of this research) and the KKK, and the struggle of those same residents and road builders who routed I-20/59 highway through the neighborhood.

Finally, existing literature establishes a good base from which to further address the issue of the perceived discriminatory practices of highway building. Much has been done, in many locations, to examine patterns of biased highway routing policy. It is the strength of the patterns, however, that need further support.

Identifying Limitations in Previous Literature

Previous literature is limited in explaining the inconsistencies between the logic of highway placement - as given by highway planners like Scheuer and Follin, officials such as Macdonald, prominent trade association groups such as the ARBA, etc. - and the actual placement of interstate highways. This is because previous studies predominantly base their arguments upon anecdotes and patterns with only qualitative measurements. That is not to say that there is no value in these works, however they lack the strength that could be provided by also using of quantitative data to support their claims.

Connerly (2002) does well to show that many interstates in Birmingham bisected black neighborhoods or reinforced pre-existing racial barriers, but only has his case studies alongside anecdotal evidence, and a racialized history of the city to make his case for the racial prejudice of interstate placement in Birmingham. Mohl (2002; 2004) too, bases his conclusions of racial bias of interstate highways upon a series of case studies where he shows several instances of interstates running through predominately low-income neighborhoods of color in numerous cities. The strength of his work however, is based solely on patterns of interstate placement across these cities and the justifications of that placement as given by past high-ranking politicians, highway officials and lobbyists (that of slum clearance). While it has great validity, it fails to present a “smoking gun”. That is, he does have definitive evidence alongside

his own interpretations that interstates in general were used to effect demolition of neighborhoods and mass displacement as a result of racial prejudice.

Sherman (2014) presents the first quantitative analysis as part of a mixed methods approach to interstate highway placement. Though extremely expansive in scope (over ninety cities examined), Sherman's analysis by his own admission only looks at the propensity of interstates to be placed within communities of color. He does not delve into why that may have been the case. Sherman's work in itself, however, provides valuable support to those more speculative arguments about highway placement made by others, etc., in that it provides the hard data that is often lacking in studies of highway routing decisions, and perceived bias thereof.

Karas (2015) examines a range of published reports on America's interstate highway system and assesses its purpose and impact on urban spaces across the country. He too makes the case for the discriminatory effect of highway construction on low-income, inner-city neighborhoods using single instances of discriminatory impact of highways and anecdotal evidence and uses these patterns to argue for racial prejudice in highway routing and construction. Bayor (1988) describes instances of roads being used to reinforce racial boundaries and maintain racial segregation in Atlanta, GA. His evidence, too, is anecdotal and rests wholly upon political comments and perceived patterns of highway development through low-income areas. Once again, the arguments that rely on case-studies and historical data have great importance in their evidence for racial prejudice in highway construction but lack the strength that use of statistical data may provide.

Addressing Previous Research

Slum Clearance

This paper examines the strength of the justification used by highway advocates in defending highway placement through inner-city neighborhoods, that of slum clearance. That is, was there justification behind that claim that interstates would be clearing slum areas from the inner city? Did the demolished areas constitute slums, and if not, was there a common variable that may go some way in explaining why these areas were targeted for highway construction even though they did not fit the logic of slum clearance? If another variable did exist, could it support the argument made by the majority of previous work that interstates were racially motivated in their placement, and indeed targeted minority communities? The strength of this examination is derived from the use of census data used to look at the relationship between interstate construction and slum clearance. The census data gathered for the five study areas for the year 1950 gives a snapshot of what the physical and financial state of those particular communities was at the time highway routes were put into practice.

By comparing the state of the study areas to the definition of a slum, this paper is able to search for inconsistencies in the logic of highway proponents beyond the qualitative data and anecdotal evidence that is found in much of the existing literature.

Engineering Policy

The examination of ethical principles and policies within the field of engineering is to shed light on the mechanisms that enabled the clearance of inner-city neighborhoods. Previous research examines the propensity of highways to be routed through low-income urban neighborhoods of color, and discusses the potential reasons

behind this, but does not delve into why, practically, this was allowed to be done, given the predicted social fallout of displacing residents and destroying homes. Engineers gave those political decision makers the ability to act on those decisions, and therefore directly contributed to the consequences thereof. This is in spite of an engineering code of ethics that attempts to guide practitioners in their work to avoid social harm and honors the importance of protecting public health and wellbeing. This paper looks at whether or not engineers, as practitioners, failed in their duty as public guardians against questionable political decisions (such as routing practices). This is done by looking at key points in the engineering code of ethics as set out by the American Society of Civil Engineers (ASCE) and comparing that code to the actions taken by highway engineers in assessing where, if at all, that code was violated by the practical construction of interstate highways.

Cost Reduction

This paper also looks for the presence of cost-reduction inconsistencies from both a political and engineering point of view. Keeping costs low was of great importance to highway advocates and was indeed one of the reasons that relocation costs were kept out of the budget for highway construction (Mohl, 2004). Turochy et al notes the factors that affect highway construction costs from a practical point of view, where the primary elements in a highway project cost estimate can be broken down into three sections, namely: preliminary engineering costs; ROW & utilities (that is, property accumulation costs) and; construction costs (Turochy et al., 2001), all of which contribute to a final overall cost. Another area that impacts cost of highway construction are the designs of the highways themselves, as different designs have different price tags attached to them (Sherman, 2014).

This research looks for variances in both the primary elements of highway construction costs as well as highway design that may be indicative of inconsistencies in the cost-reduction narrative. Highway construction designs, highway routing decisions and the presence of factors that would negatively affect costs with regards to those primary elements are useful in determining whether or not interstate highways practically abided by the sentiment of keeping costs to a minimum. Inconsistencies in any – for example, interstates that did not take the shortest routes possible, thus saving on construction costs, or variations in design types despite cost implications – may go to support the existence of other variables in determining the true reason behind the roads.

By examining highway routing practices via these constructs – the conceptual elements of the clearance of inner-city homes, cost-reduction and ethical standards in engineering - this paper is able to look at the validity of urban highway construction that includes the social costs of that construction. In other words, the validity of urban highways is now a function of a calculus that is more inclusive, and indicative, of the true costs of urban interstate highway construction – that of the costs on the coffers of the state, on the fabric of the city and on the lives of an affected population.

Data limitations

There is a significant amount of missing data with regards to the description of the number of non-whites living in each of the study areas, despite the total number of respondents being high. Unfortunately, there is no way to reclaim this data given that the areas in question have since been destroyed. Furthermore, those highwaymen involved in the decision-making process of interstate highway placement are inaccessible for data gathering purposes.

The data for housing dilapidation and the data for housing units with access to running water and private bathrooms has been consolidated by those who constructed the original survey. There is no way to separate this data, and no way to attain new results as the areas in question have since been destroyed.

Research Question

This paper looks to examine the relationship between the belief that inner city neighborhoods were slums on the part of highway advocates, and the actions and implications of urban highway construction. Attempting to examine this relationship through a hypothesis would require the opportunity to speak directly with those decision makers responsible for things like route location and policies of urban renewal through highway building, as described in the reports of “Toll Roads and Free Roads”, and “Interregional Highways” (see the subheading “The notion of using interstate highways to clear slum housing”). This is not possible, and indeed exists as one of the limitations of this study. For that reason, this paper makes use of a research question in place of a hypotheses, which is as follows:

“Did a relationship exist between urban highways and slum clearance policy during the period of interstate highway construction?”

Scope of Study

This paper looks at five study areas across five cities that range from the north-east to the south-east of the country. These study areas are examined at the census-tract level for the year 1950 along the variables listed below. The paper also looks at engineering logic in order to determine whether or not there are inconsistencies in highway design and route design with regards to the cost-reduction narrative of

highway advocates. Finally, the paper examines case study data to look for evidence of inconsistencies in cost reduction and evidence of racial prejudice amongst highway officials with regards to routing decisions.

The study areas are compared to their corresponding cities to determine whether or not they could be seen as slums in the context of the city. The units of analyses – that is, the study area and the city - were defined, and geographical limits placed upon. The unit of “city” encompasses a given metropolis as surveyed by the US Census Bureau in 1950. Though data existed for adjacent, and indeed connected suburban areas for each city, constraints were needed so as to avoid an overly extensive review of city data. That is, if limits on what constituted data for “city”, there would be no way to state where data collection should stop.

Study areas were defined by census tracts, as surveyed by the US Census Bureau in 1950, through which interstate highways were routed and built. Limits to the study areas, too, were necessary, and defined by the limits of the census tracts for which data was gathered.

By placing limits on both “city” and “study area”, data could be compared and tabulated in order to allow of comparison between the two. Limits on “city” also allowed for analyses to take place purely in the context of the city. This is necessary given that this paper examines the relationship between city- based interstates and city-based neighborhoods.

Research Design

Choosing the Cities

Cities were chosen based on their location in attempting to achieve an even north-south spread of cities along the East Coast of the United States. The most northern city is Boston, MA, and the most southern is Birmingham, AL. Cities were also chosen as a function of availability of literature on controversial highway routing decisions within them. Birmingham, for example, has much written about highway routing decisions given the part they play in the city's heavily racialized past. In Wilmington DE, access to information is seen in the availability of all of the original 1950 interstate progress reports, written by the Chief Highway Engineer for the Delaware Department of Transportation. Within the chosen cities, highway routing decisions lead to the demolition of inner city communities. For that reason, Cities used in this study needed to have discernible downtown neighborhoods with an urban highway that is seen to bisect it

Cities used in this study needed to have census data available for the Housing Census of 1950 as conducted by the US Census Bureau.

Choosing the Study Areas

The 5 study areas – one per city – are chosen as inner city residential neighborhoods that have had highways routed through them. The borders of each study areas are defined by the borders of census tracts used in the census data gathering process. The sizes of the study areas were a function of the ability to process the data in the given time frame for this study.

Choosing the Variables

The seven variables that are used are:

- Average median income
- Housing units owned
- Non-white occupants
- Value per housing unit (1950 US \$)
- Rooms with 1.5 person per room or more
- Vacant housing units
- Dilapidated housing units

These variables examine the state of each study area as follows: Median income, number of housing units owned and value per housing unit speak directly to the financial state of the study area; number rooms with 1.5 persons per room and vacant housing or more speaks to population density; number of non-white occupants speaks to the racial balance of the study area and; Dilapidated housing (where dilapidated is defined as “no running water, no private bathroom or dilapidated”) speaks to the infrastructural condition of a study area, and the availability of running water and private sanitation services to housing units. Excluding “Non-white occupants” and “Vacant housing units”, these variables are indicators in determining whether or not study areas were in fact slums at the time that highway routing decisions were made, based on the definition of what slums are as given by the UN (2007). “Non-white occupants” allows for insight in the racial composition of neighborhoods in examining the validity dominant theories of the existing literature – that of racial prejudice in urban highway routing practices. The amount of vacant housing is an indicator for the demand for shelter in an area, and data for “Vacant housing units” allows for the examination into the ethics of demolishing homes in

relation to the severity of that demand. If these study areas were in fact slums, then in comparison to their surrounding cities, they would exhibit (extreme) indicators of poverty, high density living, poor quality urban housing and lack of basic water or sanitation services.

Location of quantitative data

Methods of data collection for quantitative data are wholly based on archival research. There is no way to obtain the quantitative data used besides historical records, such as past census data, given that the areas no longer exist. The data is relevant to the research despite its age (68 years between publication and 2018) in that the research looks at the basis upon which routing decisions were made during the time period of interstate construction. Data was gathered by means of city-wide census by the United States Census Bureau. Statistical data is derived from the data tables for the 1950 Census for Housing, and the data tables for the 1950 Census for Population (the latter for median income information only), as found on the website of the United States Census Bureau at <
<https://www.census.gov/library/publications/1953/dec/housing-vol-05.html>>. In full, the data describes the following on the level of census tract:

Description of quantitative data

In total, the census data available describes the following for cities at the census tract level:

- Census tract number
- Total housing units
- Number of units owned by occupants

- Number of units rented by occupants
- Number of units standing vacant, non-seasonal in use, not dilapidated, or not for rent/sale
- Other vacant/not dilapidated
- Existence of private bathroom/dilapidation
- Existence of running water/dilapidation
- Number of persons per room
- Units occupied by non-whites
- Contract monthly rent
- Value of one-dwelling unit structures
- Median income per census tract and per city

For the purposes of this study, only the seven variables described under the subheading “choosing the variables” were used. It should also be noted that that for this paper, the variables “Number of units standing vacant, non-seasonal in use, not dilapidated, or not for rent/sale” and “Other vacant/not dilapidated” were consolidated into a single variable - that of “vacant housing”. The variables “Existence of private bathroom/dilapidation” and “Existence of running water/dilapidation” were consolidated into a single variable - that of “dilapidated”.

Location of Highway Design Data

Highway design types were observed in each of the five areas. That is, highway design data is found in the designated study areas of the cities of Baltimore, MD, Birmingham, AL, Boston, MA, Detroit, MI and Wilmington, DE. Highway designs types were gathered using Google Earth satellite imagery, to determine whether highways were depressed (sub-surface), at grade (surface level), elevated

(above ground) or a mix of thereof. As mentioned, different highway designs have different associated costs, and patterns of similarity or inconsistency of highway design may speak for or against a cost-reduction narrative. Highway design images were collected in November of 2017.

Description of Highway Design Data

Highway design data used in the paper is qualitative in nature. The data is gathered by visually observing the design of the segments of interstate highway within the given study areas. Highway are observed to be elevated (above ground), at-grade (at ground level) or depressed (below ground level).

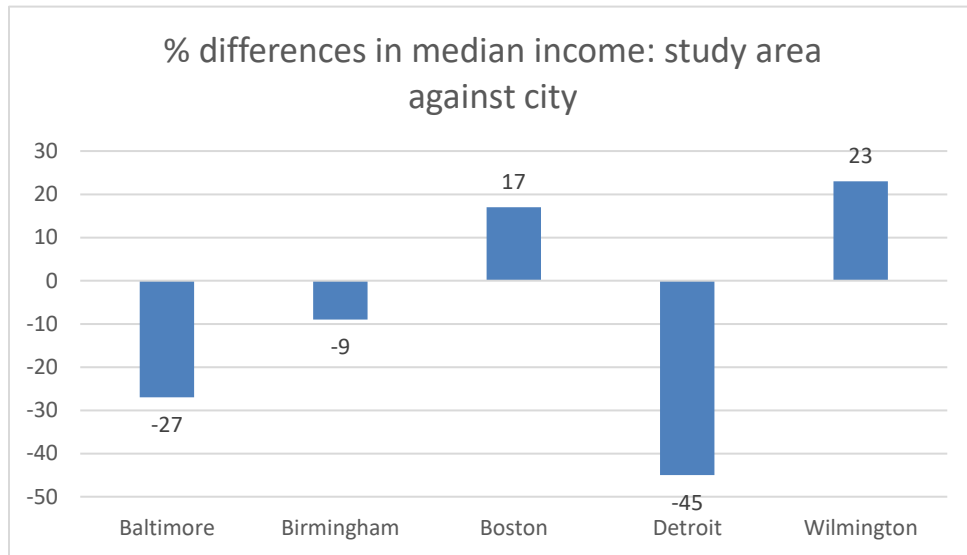
Chapter 4

FINDINGS

Numerical data (that is, 1950 census data) is standardized by converting the numbers for all variables into percentages. Percentage data is analyzed by comparing percentages for each variable of each study area with that study area's corresponding city. That is, Baltimore study area is compared with Baltimore city, Birmingham study area is compared with Birmingham city, and so on. Each study area-city comparison excludes study area values from overall city values. For example, median income for the city of Baltimore does not include values of median income for the study area of Baltimore. The differences between study areas and cities are displayed graphically across seven charts, each pertaining to an individual variable. Analysis is made on the basis of patterns (or lack thereof) of these differences.

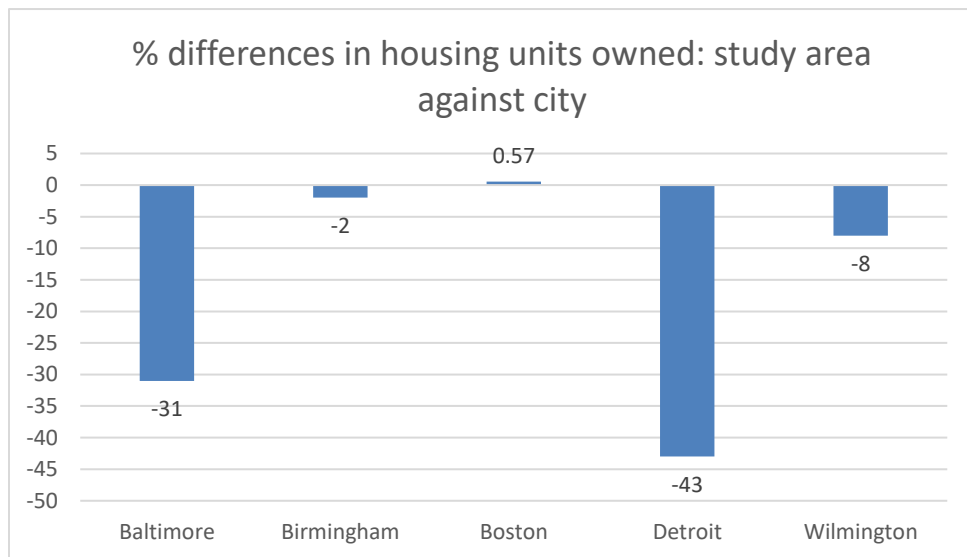
Highway design data is tabulated to show what highway design type exists in which study area, and whether there is a dominant design type present across the study areas, indicating adherence to a cost reductionist narrative.

Figure 1



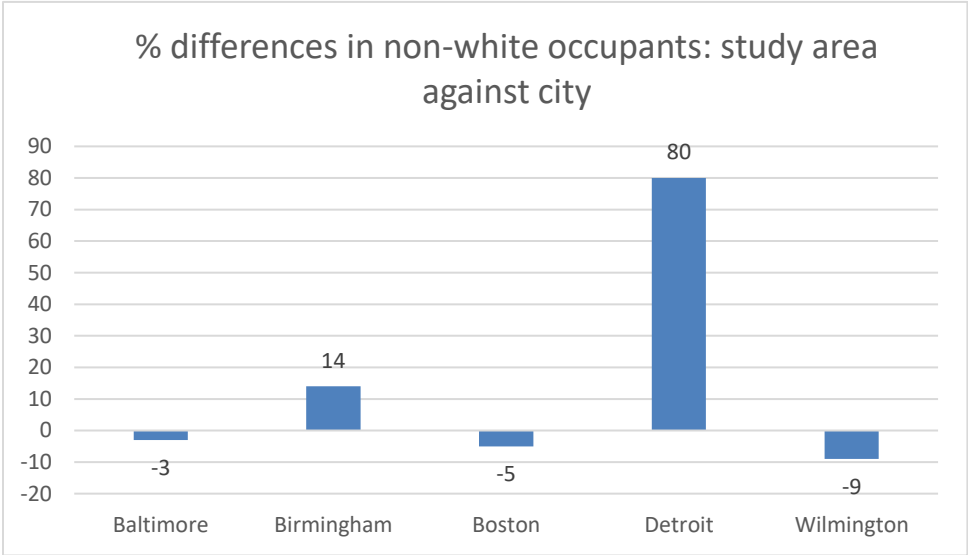
(Figure 1) In the year 1950, the study areas of Boston and Wilmington saw median incomes higher than those of their surrounding cities. The study areas of Baltimore, Birmingham and Detroit saw median incomes lower than those of the surrounding cities. Baltimore and Birmingham both averaged about one-fifth lower, while the Detroit study area had median income less by almost half.

Figure 2



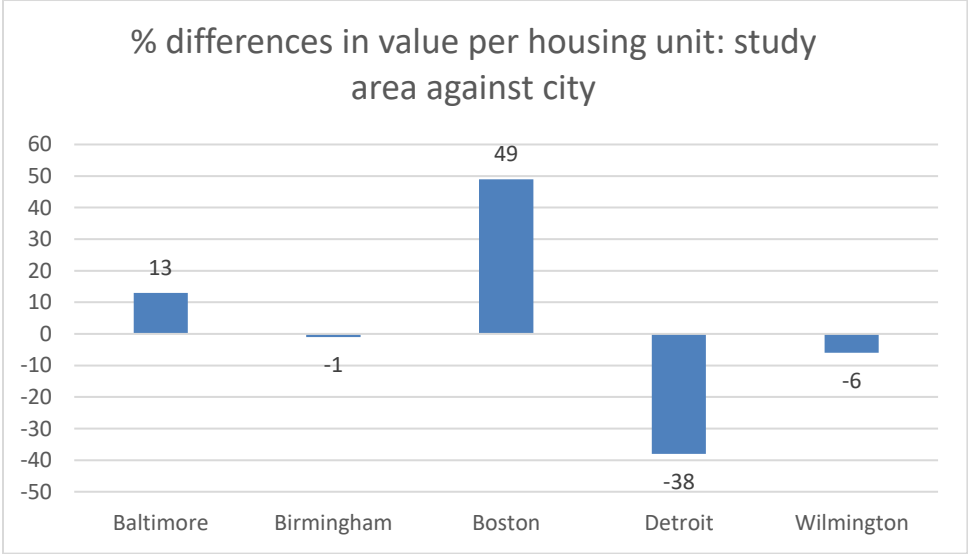
(Figure 2) In the year 1950, only the study area of Boston saw more housing units owned by their occupants than rented in comparison to their surrounding cities. The study areas of Baltimore, Birmingham, Detroit and Wilmington saw fewer housing units owned by their occupants than rented in comparison to their surrounding cities. Significant are the values of Baltimore, with 31% less housing units owned, and Detroit, at 43 percent less housing units owned.

Figure 3



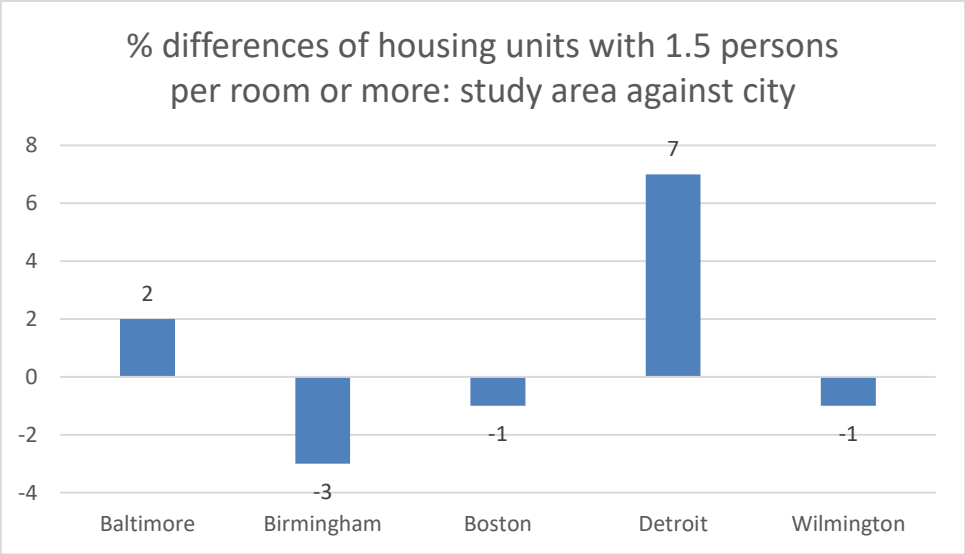
(Figure 3) In the year 1950, the study areas of Baltimore, Boston and Wilmington saw fewer non-whites living in the area in comparison to their surrounding cities. The study areas of Birmingham and Detroit saw more non-whites living in the area in comparison to the surrounding cities. Significant is the value for the Detroit study area, which sees 80 percent more non-whites living in the area in comparison to the surrounding city.

Figure 4



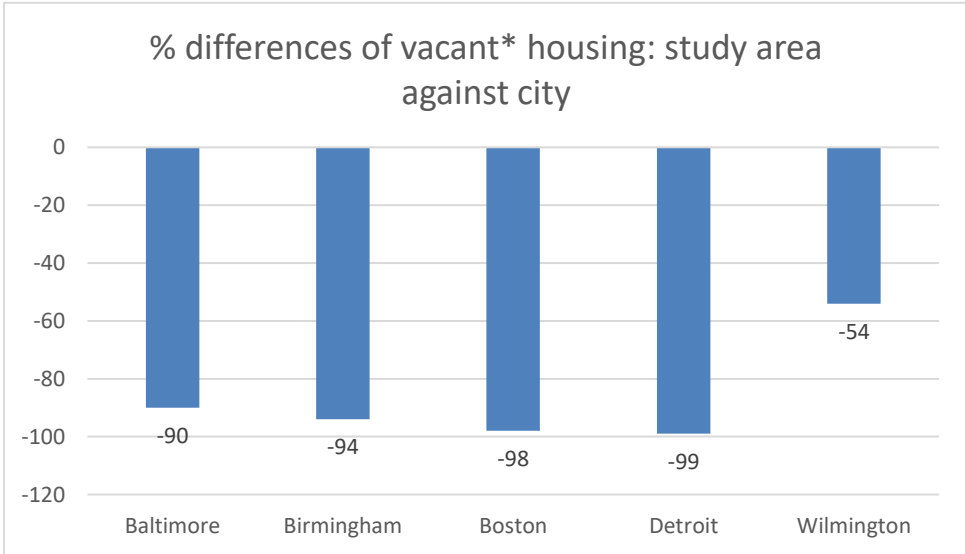
(Figure 4) In the year 1950, the study areas of Baltimore and Boston saw the average housing unit price as greater than the surrounding city. The study areas of Birmingham, Detroit and Wilmington all saw average housing unit prices as below those for the surrounding city. Detroit had the largest difference, with housing units in the study area 38 percent less expensive than the surrounding city.

Figure 5



(Figure 5) In the year 1950, the study areas of Baltimore and Detroit had higher numbers of housing units with 1.5 persons or more per-room in comparison to their surrounding cities. The study areas of Birmingham, Boston and Wilmington had fewer houses with 1.5 persons or more per room in comparison to their surrounding cities. The study area of Detroit stands out as having the highest difference, with 7 percent more housing units than the surrounding city.

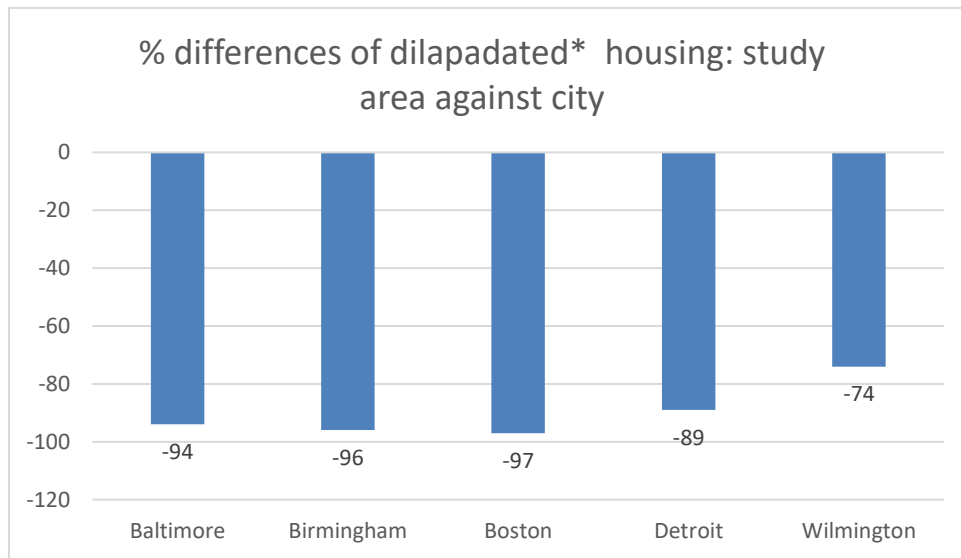
Figure 6



(*Vacant=non-seasonal but not dilapidated, for rent or sale, non-resident and other vacant)

(Figure 6) In the year 1950, all study areas in all cities had fewer vacant housing than their surrounding cities. The Wilmington study area had the lowest difference, with just over half its city's average. The Detroit study area had the highest difference, with almost no vacant housing in the area.

Figure 7



(*dilapidated=no running water, no private bathroom or dilapidated)

(Figure 7) In the year 1950, all study areas in all cities had fewer dilapidated housing units in comparison to their surrounding cities. The study area of Wilmington had the highest number of dilapidated housing of all study areas at 16% (74% lower than the surrounding city). Baltimore, Birmingham and Boston had almost no dilapidated housing in comparison to their surrounding cities.

The following table illustrates the type of highway design used in each study area:

Table 1

Study area Location	Highway design			
	<i>Depressed</i>	<i>At-grade-level</i>	<i>Elevated</i>	<i>Mixed (depressed+elevated)</i>
Baltimore	x			
Birmingham	x			
Boston				x
Detroit	x			
Wilmington			x	

An Engineering Perspective to Highway Construction

Cost Reduction in Highway Design and Route Placement

In looking to route design with regards to cost reduction from an engineering standpoint, the primary elements in a highway project cost estimate can be broken down into three sections: preliminary engineering costs; ROW & utilities and; construction costs (Turochy et al., 2001). They are described as follows:

- Preliminary engineering is the development of a project, and projected expenses for when a project moves from the planning stage, to the design stage, and finally to when project design is completed. This includes all aspects of designing a project, excluding right-of-way and construction costs.

- Right of way (ROW) is defined as the purchase of land from a landowner, which provides the available space needed to properly and safely build a road. This is pursued once the route is set and the information about the needed plots of land is at hand.

- Construction costs are the expenses incurred during the construction process from project bidding to purchasing materials to the completion of construction.

Furthermore, these expenses are functions of project features ranging from paving width and length (wider, longer roads are more expensive) to number of lanes, to location (urban vs. rural, with rural roads being cheaper). Because these features vary from one project to another, construction costs are often estimated using cost-per-mile and cost-per-item tables.

Turochy et al (2001) also describe several obstacles to highway construction, the three of which are relevant to this study listed below

- Cost overruns: Cost overruns generally occur when there are flaws in initial designs and/or changes in the scope of the project as it progresses. Flawed initial design means insufficient or incorrect allocation of funds from the onset of a project.
- Planning and/or skewed conceptualization: For each dollar that is spent over the initial cost projections for one project, the same amount must come out of funds allocated for another. The result of a project that has gone over budget may be a shortage of funds and/or possible cancellation or delay of one or many other projects. If this continues for a period of time, cost overruns could affect numerous projects, resulting in budgetary mayhem and the deterioration of infrastructure.
- Schedule delays: In short, the time extended from the original projected completion date of a construction to the actual date of completion. Schedule delays can result from numerous factors and can happen at any time during the

construction process. These problems may range from any number of factors, for example faulty designs or ROW complications, to problems occur during the construction phase itself. Schedule delays are time constraints that may cause increases in cost, either through imposed penalties, wasted time and effort, or both

- Change of scope: additions and/or amendments to the initial plan or concept for a project not initially discussed or considered part of the original plan or concept. For example, an intersection, a left-turn lane, or 2 more miles of roadway may be added to a project. This, of course, adds more money and time needed to complete each project, resulting in increased costs and schedule delays.

In the both these lists (in the third point for either list), we see that the length of a road has a direct impact on costs, in that the longer the stretch of road to be built, the higher the overall project costs. In the obstacles described by Turochy et al (the fourth point), amendments to initial plans and schedule delays also contribute to higher project costs.

Despite the increased construction costs of longer highways, highway routes often seemed to forgo straight-line paths and shorter distances in favor of longer routes. This is seen in the case of Birmingham, Al, as described in the case study section of this paper, under the sub-heading “Birmingham”, and discussed under the sub-heading Highway Design and Route Length”.

Delays to projects are also present in several instances, in the form of legal battles and the resultant moratoriums, and even cancellations of projects. The tolerance of these delays varies, sometimes being suffered, other times being quashed. The fact that tolerances to delays were present in spite of the idea of cost minimization indicates that highway routing was subject to something other than cost. This is discussed further under the sub-heading “Schedule Delay and Associated Costs”.

Ethics in practice

The American Society of Civil engineers adopted a code of ethics in 1914, several decades prior to the construction of the interstate highways system (Layton, 1986). There are four fundamental principles, and seven fundamental canons in the code of ethics for American Society of Civil Engineers (the canons are revised from an original nine, which emphasized the engineer’s business obligations to clients and employers, to seven, where focus shifts to service to the profession and the general public. This shift is most noticeable in the four fundamental principles). The four principles state that engineers will:

- Use their knowledge and skill for the enhancement of human welfare and the environment
- Be honest and impartial and serving with fidelity the public, their employers, and clients
- Strive to increase the competence and prestige of the engineering profession
- Support the professional and technical societies of their disciplines

The seven canons state that:

- Engineers shall hold paramount the safety, health and welfare of the public and shall strive to comply with the principles of sustainable development in the performance of their professional duties
- Engineers shall perform services only in areas of their competence
- Engineers shall issue public statements only in an objective and truthful manner
- Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest
- Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others
- Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession and shall act with zero-tolerance for bribery, fraud, and corruption
- Engineers shall continue their professional development throughout their careers, and shall provide opportunities for the professional development of those engineers under their supervision

(ASCE, 2012).

According to the ASCE, public health and welfare is the framework within which all civil engineering projects should take place, including the largest in history - that of the construction of the interstate highway. However, the ASCE admits that there are countless potential circumstances faced by engineers with regards to upholding these objectives. In navigating these objectives, the ASCE suggests various tests to apply to an action to determine whether or not that action is ethical. Some of

these tests, from Davis' "A Format for Ethical Decision Making" (2010) are described below:

- Harm Test: Does this option do less harm than the alternatives?

Publicity Test: Would I want my choice of this option published in the newspaper?

- Defensibility Test: Could I defend this choice of option before a committee of peers, or a Congressional committee, without appearing self-serving?
- Reversibility Test: Would I still think this choice of option was good if it were applied to me instead of others, especially if some of the effects are adverse?
- Colleague Test: What might my profession's governing board or ethics committee say about this option?
- Organization Test: What does my organization's ethics officer or legal counsel say about this?
- Virtue Test: Would a virtuous person do this? What kind of person does this? What kind of person would I become if I did this kind of thing all the time?
- Case Studies

Case Studies

Four case studies are highlighted below, which look at interstate construction in Birmingham, AL, Nashville, TN and Memphis, TN, respectively. The case studies detail what appear to be construction and routing practices that go against the logic of cost-reduction and adherence to ethical practices within the engineering community.

Birmingham, AL

In the 1950's and 60's, on the west side of Birmingham, AL, Smithfield was one of the city's historically affluent African American neighborhoods, where Birmingham's black elite lived in ranch style, free-standing, single family homes. This higher income area for people of color is described to have been located between approximately the 1000 and 1100 city blocks of North Centre Street on the western edge of downtown Birmingham. The neighborhood was also home to Civil Rights movement supporters such as John and Dreenie Drew, and at times played host to visitors such as Martin Luther King.

The part of the neighborhood that lay between 10thCt West and 11Ct West streets was obtained by the state through ROW acquisition procedure and demolished for the purposes of routing the Interstate20/59 through the area. It was particularly difficult for residents of Smithfield to find suitable housing to replace the homes they had lost given the vast differences between Smithfield and other areas that had been zoned for a black population at the time, the latter of which did not offer single family homes, were of poorer quality, and always seemed to be located near industrial sites (Connerly, 2002). John Drew petitioned:

“...we are land-tight and have not found suitable replacement areas for our homes. My problem, together with many other Negro homeowners, is not prevention

of this worthwhile highway, but to ask consideration for more time in which to find other locations.” (Drew, 1963).

John Drew’s comments are supported by the facts. Ninety percent of housing units that had been taken from residents of inner-city neighborhoods for the purpose of highway construction was never replaced (Lipsitz, 2000).

Then-U.S. senator John Sparkman replied to Drew, saying:

“The present location (of the highway) was proposed by the State and approved by the Bureau of Public Roads based on a thorough evaluation of all engineering, economic and sociological factors involved” (Whitton, 1963).

On Birmingham’s east side, the same road was routed through the predominantly black neighborhood of East Lake. While it did bisect the community, the road also mirrors Birmingham’s historical zoning laws of the early 20th century that spatially separated blacks and whites. The impact of the highway’s path as described by one undated newspaper article quoted by Connerly (2002) says the highway “would almost completely wipe out two old Negro communities (in) eastern Birmingham with their 13 churches and three schools”. This route was not the one initially recommended by the Alabama Highway Department and the U.S. Bureau of Public Roads - the original path of the highway would have sacrificed a recreational area called Wahouma Park. The park was seen as a marker for the borderline between black and white neighborhoods. The original route plan would have been approximately 1.25 miles shorter have less route curvature (that is, it would have been a straighter path) than the route that was finally selected (Connerly, 2002). The road that was built is seen to curve northwards in its NW to SE trajectory, effectively lengthening the total length of the highway.

Boston, MA

In the mid-1960's in Boston, MA, the ethnically diverse neighborhood of Jamaica Plains faced housing demolition as a result of the construction of I-95 (Lupo, Colcord and Fowler, 1971). In response to the State's decision to route the highway through the area, an organization called the Urban Planning Aid, or UPA, was formed. The aim of the organization was to advocate on behalf of those who could not afford private consultants. The UPA was the culmination of a grassroots movement to prevent the I-95 from bisecting Jamaica Plains, and as part of its work highlighted factors that were not readily advertised to the public with regards to how decisions were made, in alongside a Jamaica Plains local resident's committee, producing a critique of the proposed I-95 highway. The report described how weaknesses in the construction process of the proposed road did not result merely from the road itself, but rather were rooted in the organizational structure of state and regional planning agencies and their decision-making processes and concluded by calling for massive overhaul within these institutions (Lupo, Colcord and Fowler, 1971). Planning processes, the report stated, were not inclusive of and responsive towards local communities, where land-use and transportation planning were more sensitive to the needs and wants of residents. Organizational flaws and bias can be seen in, amongst other things, the disconnect of government agencies with the areas they would influence through highway construction. One example is then-head of the Department of Transportation John Volpe and the Department of Public Works (DPW) having sole power to name the consultant responsible for the study of the most viable inner-city belt routes for highway construction in Boston without public consent or participation. Impartial service to the public, and indeed "good urban development, aid urban renewal, and be of great over-all benefit to the community" is called into question

when looking at the UPA's critique of how state and regional planning agencies went about the decision-making process, which they claimed lacked sufficient transparency and sensitivity to the communities they affected.

Nashville, TN

In 1967 in Nashville, TN, the I-40 highway was to bisect North Nashville, a predominantly African American community of the city. Residents formed an organization in opposition - the I-40 Steering Committee - which engaged the state in a legal battle to halt the project (Karas, 2015). The committee argued that the highway would isolate black-owned business from their client base as well as devalue property prices of surrounding black-owned homes. Furthermore, it was stated that the community had not been given adequate notice of the impending route (Mohl, 2014). The group brought their concerns to the General Sessions Court of Davidson County, Tennessee, and managed to win a temporary restraining order in their favor – it was the first time in history a highway construction project was halted as a result of racial discrimination claims (Mohl, 2002). However, the court eventually ruled in favor of state officials. State proponents for the highway had argued that the committee had exaggerated the impact the project would have in the community. The committee appealed the court's decision to the U.S. 6th Circuit court, which held that the hearing had been conducted similar to those in other areas of the state, and also stated that no discrimination was present in the final decision. The court suggested that hardships would be imposed on any community that a highway was routed through, and further asserted that “such weighing of hardships in road design is a task for engineers rather than a judicial body (U.S. 6th Circuit Court of Appeals, 1967).” Though the steering

committee appealed the decision to the U.S. Supreme Court, the case was denied, and construction continued as planned (Karas, 2015).

Memphis, TN

A polar opposite outcome is seen in the planned routing of the interstate-40 highway and Overton Park. Around the same time to the Smithfield case, citizens of Memphis, TN, waged a similar battle. From its conception, the interstate 40 (I-40) highway was set to bisect Overton Park, a green space in the heart of the city's then-white midtown district as part of its northeast-southwest trajectory. Overton Park exclusively served whites, with non-whites allowed to visit on select days of the week. The Memphis Chamber of Commerce had high stakes in the project as the city lacked any circumferential road system - indeed any highway system at all (Strauss, 2004). The east-west wing of the expressway was one section of the proposed highway system and cut directly through Overton Park. The proposed route for I-40 was first printed in Memphis newspapers in 1957, alongside a notice that indicated that citizens would be given a chance to voice their concerns. A meeting of the public and City Commissioners culminated in the formation of the group Citizens to Preserve Overton Park (CPOP). State highway officials were adamant that I-40 proceed through Overton Park, as it was the cheapest route and from an engineering point of view, the most direct path serving the most traffic (Strauss, 2004).

Then-Memphis mayor Henry Loeb met with CPOP and endorsed I-40 as the route that would "Help Memphis more than any other expressway segment." (Strauss, 2004. p. 20). This sentiment rang hollow with CPOP, and a month later the city agreed to build the controversial segment last to determine if it would actually be needed. CPOP began extending its political efforts beyond the scope of city government, seen

in state highway commissioner David Pack's response to the group that his office would study all possible alternatives before proceeding (Pack had reportedly been acting under instruction from Tennessee Governor Frank Clement, who had been seeking re-election at the time).

In 1967, newly elected governor for Tennessee Buford Ellington and newly elected highway commissioner E. W. Speight doubled down the commitment to have I-40 run through Overton Park. State highway officials continued to push for the original route through the park, a move characterized by the state purchase of 26 acres of park land for \$2 million. In an effort to appease the public, the state explored alternative highway designs, such as depressed and subterranean roads that were described to minimize any disturbance to the park. These were all rejected by CPOP, and the citizen's organization filed its lawsuit a month later, with the issue moving from the district level, to the 6th Circuit, and eventually to the Supreme Court, in the landmark case "Citizens to Preserve Overton Park v Volpe". After much litigation, CPOP emerged victorious and in 1987, the State of Tennessee returned its purchased parkland to the city. Overton Park remains untouched road-free today.

Chapter 5

DISCUSSION

The Logic of Slum Clearance

There exist variations in financial power of study areas, in that some study areas were wealthier, and some were poorer than their surrounding cities. There is variation in overall financial power of the study areas (seen directly in median income, number of housing units owned and value per housing unit). There is no definitive pattern with regards to median income, which not only sees a large range for median income itself across all study areas, but also describes the study areas of Boston and Wilmington as having higher median incomes than their surrounding cities.

There exist variations in average value of housing units across all the study areas, in that housing units in some study areas were more expensive, and in other study areas far less so, than their surrounding cities. “Value per housing unit” also holds the largest range between any two variables areas across all study areas, that of 87 percent difference between the average price of a housing unit. This is seen in the difference between the study area of Boston, where the average price of a housing unit is forty-nine percent greater than that of the surrounding city, and Detroit, where the average price of a housing unit is 38 percent less than that of the surrounding city.

There exist variations in home ownership, in that some study areas, home ownership was higher, and in other study areas lower, in comparison to their surrounding cities. The number of housing units owned per study area also has great variation, with the study areas of Birmingham and Boston having almost no difference between the numbers of homes owned in comparison to the surrounding city.

There exist variations in living density, in that in some study areas living density was higher, and in other study areas, lower, in comparison to their surrounding cities. The study area of Detroit is the only study area that stands with a higher population density that is higher than that of its surrounding city, through the variable that describes housing units with 1.5 persons or more per room. The study areas of Baltimore, Birmingham, Boston and Wilmington are all shown to have lower population densities than their surrounding cities.

There exists consistency in number of dilapidated housing, in that in all study areas housing existed in a less dilapidated state in comparison to their surrounding cities. Both the number of dilapidated housing units and the number of housing units that are vacant are vastly different between all study areas and their corresponding cities. That is, all study areas had almost half the number of dilapidated housing units than their surrounding cities, except of the study area of Wilmington, which had roughly a third of the number of dilapidated housing units in comparison to the surrounding city.

The same graph indicates that there exists consistency in access to running water and private bathroom facilities, in that in all study areas, more housing units had access to water and sanitation services in comparison to their surrounding cities. The number of houses with access to running water and private bathroom facilities differ greatly between the five study areas and their surrounding cities. All study areas have far more access to running water and private bathrooms than the rest of the cities they reside in, with the study area in Boston almost double that of the surrounding city. Once again, the results of this particular data set should be taken under review due to the consolidation of data on housing dilapidation with data on access to running water

and private bathrooms. This is discussed earlier in the paper, under the subheading “weaknesses”.

There exists consistency in lack of housing vacancy, in that in all study areas, there were less housing units that stood empty in comparison to their surrounding cities. All study areas have almost half the number of vacant housing units in comparison to their surrounding cities, except for the study area of Wilmington, which had roughly a quarter of number of vacant housing units in comparison to the surrounding city.

The Mantra of Cost-Reduction

There are differences across the study areas in terms of purchasing the cheapest tracts of urban land upon which to construct a highway. The study areas of Baltimore and Boston have higher property values than that of their surroundings cities. The city of Wilmington has almost identical property values, with a one percent difference between the study area and the city. In following the regulations of ROW procedure in attaining land, where fair compensation is needed in exchange for that land, it was more expensive to use these particular tracts of inner-city neighborhoods than it would have been to use other area within the city boundaries (where city boundaries are dictated by the census bureau).

Turochy et al (2001), and Hall and Hall (2009) describe that ROW land purchase is a significant factor in the cost of highway construction. However, the variation in property value of the study areas does not indicate policy to find tracts of urban that would minimize cost of construction for interstates.

There is also variation in the tolerance of schedule delays, something else held by Turochy et al (2001) as having a meaningful impact on construction costs. In some

cases, such as that of Birmingham as described in the case study section of this paper, petitions by members of the public to halt highway construction had no effect on slowing or halting highway construction whatsoever. Another example of informal public opposition having no effect is the unknown Detroit resident who wrote then-Governor Gerhard Mennen Williams of Michigan, asking that highway construction be reconsidered (detailed below). Residents of the city were subject to evictions as a result of the construction of interstate 375, approximately 9000 housing units were demolished, displacing around 1100 families (Buss, 2008). Those affected struggled to find new forms of accommodation, further hindered by then-Mayor Albert Cobo speeding up I375 construction while at the same time halting public housing projects (Goodspeed, 2004). Interestingly, opposition to highway construction this time came from both residents, but also from urban planners, who stated their beliefs that highways should “avoid carrying heavy traffic through residential neighborhoods...” (Detroit Planning Commission, 1946). One resident wrote then-Governor Gerhard Mennen of Michigan:

“Governor Williams, is it more human to build highways so people can kill themselves faster than it is to give people decent places to live?...Please Governor Williams, if you haven’t already signed the bill permitting Mr. Cobo to get the money don’t until he agrees to see that the people who are here being put out of their homes be given someplace to go.”

To which the reply from his office was:

“Almost inevitably when a public construction is planned some individuals must suffer inconvenience, and unfortunately in this situation you happen to be one of those who apparently must bow to the need of a greater number of people”

In both these cases, there was no schedule delay to highway construction.

In contrast to the zero-tolerance policy in the case of Detroit, the I-40 Steering Committee of Nashville, TN, had some success in temporarily halting the construction of the interstate 40 highway as described in the case study section of this paper, but that success was short lived, and any further legal opposition was denied in the 6th Circuit court upholding the decisions of the General Sessions Court of Davidson County. In this case, there was some schedule delay to highway construction.

The case of Overton Park in CPOP v. Volpe sees outright victory for those opposing the construction the same highway (that is, I-40). In this case the project was massively delayed as litigation travelled to the US Supreme court. A change of scope – another factor in overall construction costs (Turochy et al, 2001) – was also present, seen in both the changes to highway designs offered by the State in order to keep the project alive, as well as in the cancellation of the initial routing plans of the project as a whole.

The above depicts three cases that occupy different positions on a spectrum of delay tolerance. On the lower end, the cases of Birmingham and Detroit had absolutely no success in delaying highway construction. Towards the middle, Nashville saw some tolerance through the works of the I-40 steering committee in temporarily delaying highway construction. At the upper end, CPOP had absolute success in delaying, and eventually preventing highway construction along the original route through overtone park. This shows a lack of consistency with regards to cost reduction through tolerance of schedule delays.

Route Design and Highway Design

Turochy et al (2001) describe the impact that road length has on construction costs in saying that, logically, the longer the road, the more expensive it will be to build. All else held equal, the shortest distance between two points (a straight line) is then the cheapest option with regards to route design. In all study areas, highways take the straightest path possible. This follows a cost saving logic in that it minimises road length reduces costs, and thus minimises costs.

It should be noted, however, that the limitations of the study area boundaries mean that areas of inconsistency with this straight-line logic, as identified by the literature, are not included in the analyses. For example, evidence of cost-reduction in using the straightest possible route stands in contradiction to the case of Wahouma Park on Birmingham's east side, as described in the case study. Here, Connerly (2002) describes the curve of the around Wahouma park, increasing distance (and therefore construction costs) at the same time as seeming to reinforce pre-existing racial barriers.

Highway designs themselves vary – Baltimore, Birmingham and Detroit see the segment of highway that runs through the study areas built entirely as depressed highways. Wilmington sees the segment of highway that runs through the study area built entirely as an elevated highway. Boston sees a mix of depressed and at-grade-level (i.e. at-ground-level) highway designs through its study area. Given that that depressed highways are not the cheapest option with regards to highway design (Samuel, 2006), all else held equal the highways design types of four of the five study areas contradict the cost saving sentiment expressed in the stated concerns of cost-reduction as described by highway advocates throughout the literature. Elevated highways are seen as the cheapest to build (Samuel, 2006), yet only one study area

makes use of the elevated highway design. This shows a lack of consistency with regards to cost reduction through highway design

It should be noted that factors such as topography may also influence route decisions and highway design type in certain areas (Easa, 2003). Further research into whether or not any topographical features were a factor within the 5 study areas is needed, though none of the literature has thus far indicates that topography was of any influence in urban highway design choices. In support of the literature not stating that topography was an issue, there is evidence that highway engineers in some instances were indeed able to apply a variety of highway designs regardless of the terrain upon which roads were built – in the case of Tennessee, where the CPOP were battling against the construction of I-40 through Overton Park, in an effort to find compromise highway officials proposed different highway design types – namely at-grade (ground level) and sub-surface designs - that could be built in allowing them to continue with construction along the original route.

Ethics in Engineering

The engineering code of ethics is inherently subjective and therefore left to the interpretation of the individual practitioner (ASCE 2012). That is, the code of ethics as described by the ASCE is not meant to be a hard-and-fast set of rules to be followed to the letter, nor a political tool. It is rather a guiding document to be interpreted by its users so as to most effectively and efficiently apply an alternative once all of the issues at hand have been evaluated. (ASCE, 2012). This makes the job of concluding whether or not actions taken in highway construction within the five study areas were ethical slightly more challenging. However, it is still possible to identify and examine areas of contention.

The literature describes inner-city neighborhoods as some of the most densely populated in cities. The data gathered for this paper supports this, in showing extremely low housing vacancy rates for study areas in comparison to their surrounding cities. The act of routing highways through these areas then had an extremely high risk of disrupting large number of families through housing demolition. This is supported by Mohl (2002) who offers the number of 37,000 homes demolished annually. When viewed in a localized context – that is, outside the proposed benefits of slum clearance and solutions to inner-city traffic problems – this could be seen to stand against the first of the four fundamental principles of the code of ethics as put forward by the American Society of Civil Engineers - that of using knowledge and skill for the enhancement of human welfare and the environment. The dislocation of tens of thousands of residents occurred in the context of both lack of financial assistance (relocation costs) at State or Federal level as well as a shortage of viable options in terms of finding replacement housing. The oppression of inner-city dwellers came concurrently from multiple sides, was preconceived, and deaf to the protests and pleas made by those affected by highways. Ongoing hardships faced by massive numbers of people does not hold true to the spirit of enhancing human welfare.

The action of highway construction through inner-city neighborhoods also stands opposed to the first of the seven canons of the code of ethics offered by the ASCE, that of holding paramount the safety, health and welfare of the public and striving to comply with the principles of sustainable development in the performance of their professional duties. There is contradiction to this policy in looking to the damages caused by the highway construction process in demolition of religious,

educational and communal centers. These damages affected both a physical community (seen in destruction of infrastructure), as well as a psychological one. Community, say Omoto and Snyder (2002) extends beyond physical boundaries, and takes on a psychological dimension, encompassing feelings of membership, influence, integration, need-fulfilment and shared emotional connection. As a result, the demolition of physical infrastructure may have resulted in psychological trauma of residents. Destruction of churches had political implications attached to it. Religious institutions play a significant role in effecting political participation in predominantly black neighborhoods (Assensoh & Assensoh 2001). Blacks who consistently attend church belong to a larger number of politically relevant organizations, harbor more positive political and racial attitudes, and vote at higher levels (Reese and Brown 1995; Tate 1993; Verba, Schlozman and Brady 1995; Verba and Nie 1972; Dawson, Brown and Allen 1990). Wilson (1987) and Wacquant (1989) state that, increasingly, low-income urban blacks face more and more challenges in being able to attend church services and reap the political benefits of doing so. The demolition of East Lake's churches provides one such challenge and may have aided in reducing the ability of residents to oppose future political decisions. Demolition of these neighborhoods then affected resident's practical quality of life, but also their education, psychological wellbeing and political engagement and efficacy.

The policies of the American Association of State Highway Officials as described by John Volpe run parallel to the sentiment of the ASCE code of ethics. Volpe emphasized the correct location of highways so as to further "good urban development, aid urban renewal, and be of great over-all benefit to the community" (Lupo, Colcord and Fowler, 1971) - mantras congruent with the ASCE code of ethics.

In practice however, it would appear that these policies, as laid out by the AASHO and by Secretary of Transportation Volpe, had been violated.

With regards to the tests proposed by the ASCE, the first of these – the harm test - poses the question of whether or not an option causes more harm than any alternative. Since this question is posed from an ethical standpoint and taking into account that in any situation one alternative will always be to continue with the status quo (do nothing), it is possible to say that not routing highways through high-density urban centers at all would have done less harm. The third of these tests, the reversibility test, may provide a more straightforward contradiction of the ASCE code of ethics. The question “Would I still think this choice of option was good if it were applied to me instead of others, especially if some of the effects are adverse?” holds a more immediate and apparent answer. This is underscored by the understanding of the adverse effects shown by Governor Gerhard Mennen of Michigan in his response to the letter written by an unknown resident of an area designated for demolition in the city of Detroit, as detailed under the section heading “The mantra of cost reduction”.

Interpretation of Findings

Slum Clearance

The justification of slum clearance through highway construction, within these five study areas, holds no weight given the inconsistencies, as well as the consistencies, outlined by the data. That is, no study area, around the time of demolition, wholly fit the definition of “slum”. That is, taking into account what is considered to be slum conditions – impoverished, densely populated urban residential area with poor quality of housing, and without basic water, electricity, law

enforcement or sanitation services (UN, 2007) – it would appear that, according to the variables used, there is no consistency across the five study areas in fitting that definition of slum with regards to poverty, living density, quality of housing and access to water and sanitation services. These were not “impoverished, densely populated urban residential area(s) with poor quality of housing, and without basic water, electricity, law enforcement or sanitation services”.

By virtue of the data, we see that many of the areas affected by highway construction allowed a higher quality of life than other parts of the surrounding city. Highways did not remove slums, but rather functioning if sometimes poorer, inner city neighborhoods.

Cost reduction

There exist inconsistencies in the highway design type used in each of the five study areas with regards to cost reduction. This paper finds that, in the case of the five study areas examined, money was not a defining factor in the calculus when choosing highway designs for these particular study areas.

There exist inconsistencies in the routing of urban highways through low-value areas of housing in reducing the costs of ROW land purchases. Areas with the lowest value housing are not used in two of the five study areas. The study area of Boston is almost 50% more expensive than the surrounding city.

There exist consistencies in highway route design in each five study areas with regards to taking the straightest possible path, with regards to cost reduction. Cost-reduction sentiment was adhered to in choosing route design, if not location, in the construction of interstates within the five study areas.

Ethics in Engineering

The ethical conduct of highway engineers was, at least to some degree, sacrificed for the practical survival of the project of interstate highways through the five study areas. The decisions made by engineers may have not been purposeful in the displacement of residents and destruction of homes, however, the apparent lack attempts at understanding the effects of highways construction on the welfare of the public – despite the provision of guild lines and tools as outlined in the ASCE code of ethics – does not speak to concern to the mantra of the importance of societal health as emphasized in the ASCE code of ethics. This is also seen, very prominently, in the shrugging off of responsibility by engineers with regards to finding replacement housing for those that interstate highways would displace (see paragraph two under the heading “The displacement of residents as a result of slum clearance through interstate construction”).

Chapter 6

CONCLUSION

The five inner-city neighborhoods that made up the study areas of this paper were in fact not slums, but rather functioning communities. The inaccurate belief that the inner-city study areas bore squalid conditions as a result of decrepit housing, no access to water or sanitation services and vast overcrowding was buoyed by both propaganda campaigns and lack of data and data gathering processes to provide accurate descriptions for what the inner-city actually looked like, and how it functioned as a physical neighborhood. As a result, images of failing infrastructure, dirt, disease general unsanitary conditions abounded in circles of urban planners, lobbyist groups and politicians at State and Federal level. There is no literature that states that any of those conclusions were based upon research of any kind, except for the descriptions of cities in the late 1800's (see paragraph four under the heading "introduction").

The use of infrastructure to clear slums may have been controversial in itself, but its use as a reason to route highways through these five study areas was completely invalid. Inner-city neighborhoods in the five study areas did not meet the criteria for slums, and in several cases and across several categories, outdid other areas in their city in those criteria. The study areas of Baltimore and Boston both had properties of higher average value than their surrounding cities. All study areas had fewer dilapidated housing units than their surrounding cities. All study areas also had higher access to running water and private bathroom facilities than their surrounding cities. The policy of slum clearance, then, should have lead route decisions to avoid these areas altogether. For the reason that highways were nevertheless routed through the

five study areas, it would appear that either slum clearance was not as great a concern as highway officials would have had their investors and the public believe, or that motives more significant than slum clearance were at play.

Cost reduction is seen to have not been as important as portrayed in highway construction by state and federal officials and lobbyist groups. Routing interstates through some study areas that increased property prices in comparison to the surrounding city, the tolerance of schedule delays and changes to route design (as in the case with CPOP v Volpe, as seen in the case study of Tennessee) and the use of more expensive highway designs in some study areas when cheaper options were available all speak to the fact that money was less of defining factor in highway construction than highway officials, and indeed the Eisenhower Administration (in not signing off on the interstate project until relocation costs were removed from the budget) would have had the public believe.

Despite this perceived lack of importance, cost reduction is a prominent theme throughout formal discussions on the feasibility to highway construction, and indeed one that highway engineers were required to work towards and value in the work on interstate highways. Previous work details numerous instances of the efforts to keep costs at a minimum – from the Chief Engineer for Delaware’s highway administration (Delaware State Highway Department, 1956) to Eisenhower’s reluctance to sign off on interstate highways at all until relocation costs were removed from the budget (Moynihan, 1969), to arguments against alternative routes for reasons of costs in the case of Tennessee’s battle to have a road run through Overton Park (Strauss, 2004). It makes sense then that efforts would be made to have highways routed through areas with lower ROW costs as a result of lower property values (Hall and Hall, 2009)

(though not the case for study areas of Baltimore and Boston). However, this decision is indicative of the fact that, in terms of a cost-benefit analysis, social costs may not have been incorporated into the calculus (this is seen in, again, the removal of relocation costs from the initial highway budget given to Eisenhower). From an engineering standpoint, this should not have been the case, given the profession's duty to the public – and indeed these failings are discussed below – yet the separation of the public from the narrative of transportation, as Mumford (1958) has gainfully critiqued, had allowed the idea of “cost-reduction over all” to be taken as unfettered logic. In other words, the best option was the financially cheapest option, once again showing Federal and State sacrifice of every other variable that may have been considered for the sake of financial savings, something that was surely encouraged by Eisenhower's campaign policy of cutting down on federal expenses (Moynihan, 1969). In disregarding the impacts to the public, and in channeling those impacts to the most economically marginalized citizens of urban areas, it was unavoidable that decisions took on a racialized component given the relationship between race and economic power (this is yet another indication of the failures of engineers in their duty to the public)

The importance in looking at engineering logic alongside socio-economic attributes and consequences in the construction of the interstates should not be underestimated. Qualitative studies - historical reviews and anecdotal evidence – tell of the trauma undergone by those who lost their homes, churches, schools and communities to the road. The fact that these were well-functioning communities, beneficial to its residents, is supported by census data. The ASCE itself describes the importance of the practitioner's pursuits being, at the end of it all, for the benefit of the

public they serve. Engineering and social welfare, then, are inextricably linked, and separating the two as was done within interstate construction, seen in the social casualties of neighborhood destruction, invalidates both the very purpose of the engineer and the public's need and want for what is being created. There is strong advocacy in the ASCE code of ethics against agenda-based policies, yet despite this, city, state and federal officials – servants of the public – sought to use highways as an alternative solution to dealing with what they deemed undesirable areas.

But perhaps worse than a politician's motives, is the fact that they were allowed to act upon them by those who were integral to a vision of slum clearance. The claim that engineers were simply innocent bystanders (Mumford 1958) falls flat in face of human suffering. Engineers may be described to be complicit in causing displacement of thousands from their homes. The inconsistency of highway engineer's actions relative to the values that they are claimed to uphold culminated in the destruction of the inner city by rivers of concrete and steel. In looking at engineering logic and values alongside societal impact, the latter done by numerous authors thus far, a new piece of the tale is illuminated – that of the failure of engineers to the standards of their profession, and the resultant catastrophic fallout. The majority of past literature places blame of the detrimental effects of interstates at the feet of politicians, advocacy groups, presidential administrations and racially motivated individuals, and in doing so continues to provide a scape goat for those as responsible as any.

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