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Space, Place and Infrastructure: Designing an Integrated and Efficient Highway System for Hartford, CT

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Introduction

As the United States exited World War II a new global superpower, New Deal policies provided the nation with a wealth of infrastructural blessings like the Tennessee Valley Authority, the Hoover Dam and countless other projects that strengthened the nation's functional backbone. The projects from the New Deal were the largest publicly funded infrastructure projects since the restructuring of so-called "U.S. routes" and once again confirmed the narrative that great improvements in efficiency, integration and national strength could be made through federal government initiatives. In the postwar era, Americans, more than ever, relied on the automobile for the transportation of goods and people, and the U.S. highways of the prewar era were unable to meet the growing demand (Urban Issues 121-124). As a result, the Eisenhower Administration pushed for and passed the Federal-Aid Highway Act of 1956, otherwise known as the National Interstate and Defense Highways Act. The Highway Act of '56 was designed to alleviate congestion and to provide 41,000 miles of first-class highways, the most traveled of which were constructed in rapidly expanding metropolitan areas in order to provide transportation from suburban residences to downtown sites of employment. These highways cut across urban landscapes, carving up both space and place within American cities (Xiangming Chen 1-6). In effect, many of these highways served as concrete chokeholds, destroying inner-city communities and often isolating them from wealthier downtown districts (Urban Issues 121-124, Jacobs 127).

The top-down nature of the Interstate Highway Act meant that policymakers often proposed highways without taking into account the potential spatial and "placial" consequences of how and where freeways, exits, and interchanges were and were not built. As such, there are several pieces in the National Highway System – the term used for the combination of Interstates highways and U.S. routes – that cut across existing grains within urban landscapes. As a result, some urban scholars have stated that the Federal-Aid Highway Act has been the most harmful federal policy aimed at American cities. The highway's attack on urban areas was detrimental in two important manners. First, it allowed for middle-class whites to flee from

declining urban cores to homogeneous suburban communities outside of the central city's tax base. Secondly, and perhaps more importantly, freeways became concrete barriers that divided cities, destroyed existing neighborhoods and brought tremendous amounts of auditory, visual and environmental pollution to urban communities.

Given the National Highway System's harmful impact on cities during its construction and its first half-century of use, it is difficult to predict the consequences of allowing what was once the largest public works project in American history to decay. The majority of the nation's interstate highways were built in the first twenty-five years after the act's passage, but sufficient funding was not provided for the future maintenance of the roadways. Across the nation, freeways, exits, bridges and other aspects of the National Highway System are falling into disrepair (Urban Issues 118). Consequently, they will likely not survive as long as initially planned because of this lack of upkeep. In spite of these harsh realities, policymakers at both the state and federal levels continually fail to develop a sufficient mechanism for highway maintenance. While some federal funds are provided for highway repairs from a gasoline consumption tax, and while even more funds were provided in the American Recovery and Reinvestment Act of 2009, the percentage of federal funds devoted to interstate infrastructure today is ten percent below its peak levels in the 1980s (Urban Issues 116). As a result, the fiscal onus has progressively fallen on the states; the percentage of state funds devoted to highway maintenance has steadily increased from its lowest years in the 1980s. As such, states commonly view highway maintenance as an unfunded mandate provision in the original 1956 act and its subsequent reauthorizations (Urban Issues 116). In the wake of Hurricane Katrina, with the I-35 bridge collapse in Minneapolis, the focus on "shovel-ready projects" in the Stimulus Bill of 2009 and the partisan bickering within the 112th Congress over transportation appropriations, there are bright political and media spotlights on the nation's aging infrastructure (Urban Issues 113-114). In addition, President Obama recently gave a major speech pushing for economic legislation with a decaying Brent Spence Bridge on the Ohio River as his chosen backdrop (Kuhnhenn). As deterioration becomes an increasingly salient issue, policy actors at all levels of government will have to recognize the importance of providing significant funding to repair and replace highways across the nation, perhaps even reaching the 35 percent of federal expenditures allocated to infrastructure in the 1980s. Borrowing New Jersey sewerage director Robert Ville's description, America's 41,000 miles of highways are like "old cars with bad transmissions" (Urban Issues 127). Some might be better served by getting repaired, but others should be replaced rather than fixed (Urban Issues 127).

In the near future, the slow-growing disaster that is the nation's highway system will get enough public and political attention to warrant significant

federal funding, more than the limited funds from the 2009 Stimulus Package. Therefore, policy actors at the local level need to research and develop plans now to make the new National Highway System more efficient, ensuring that its design will not cut against the existing grain of urban landscapes and communities. Policy actors must also have plans ready and must use a forward-looking approach so that the nation's highways can be fixed and improved from both efficiency and integration standpoints. This strategy must also include obtaining local community input, since these highways have a large effect on urban and suburban neighborhoods. There are numerous ways to involve the community in determining the nature and placement of future highways, from open forums and town-hall style meetings to voting sessions. Considering that the Interstate Highway Act of 1956 failed to include bottom-up input in what was a project mostly driven from the top-down, it is critical that this same exclusion does not occur again.

Ultimately, the existing state of American transportation infrastructure can be described by one word: decay. When it comes time to repair or replace highways in urban areas, policymakers must insure that they do not fall victim to the same mistakes and assumptions that their predecessors committed. Specifically, urban policy actors need to improve transportation infrastructure so that it is better integrated with surrounding landscapes and communities, so that it allows for more efficient movement of traffic in, around and through metropolitan areas, and so that adequate funds are provisioned for infrastructure maintenance.

Infrastructure Issues in the Hartford Context

Hartford, the capital city of Connecticut, provides an interesting case study for both examining the scars left by transportation infrastructure projects and for looking into the state of decay of the National Highway System. Hartford is a city of almost 125,000 people situated in the Connecticut River Valley in Southern New England. The city is home to two major interstate highways and trucking routes that funnel traffic between the New England region and the New York metropolitan area to the south. Interstate 91, a north-south highway extending from the Canadian border in Vermont to the Long Island Sound in New Haven, CT, cuts across the eastern portion of municipally defined Hartford, and runs parallel to the Connecticut River throughout the majority of its route through the state. Interstate 84, an east-west highway beginning in Scranton, PA and ending at the Massachusetts Turnpike in Sturbridge, MA, runs directly through the middle of municipally defined Hartford. From a spatial standpoint, I-84 runs through the western portion of the city on a viaduct (i.e., as an elevated highway) and cuts through the eastern portion of the city – through the prosperous downtown neighborhood – as a sunken highway and a tunnel-like section known as the "Yankee Expressway." Turning to a placial description of the freeway, I-84 effectively separates the city's poorer North End neighborhoods, home to the majority of the city's African

American and Afro-Caribbean population, from both the downtown area and the southern half of the capital city. In particular, the viaduct section of I-84 serves as a visual and physical barrier between north and south. The viaduct itself is the fifth most heavily trafficked section of highway in the United States and is fast approaching the end of its lifetime due to the physical beating it has taken over the years (Painter 11). I-84 exits Hartford by crossing over the Bulkeley Bridge, a structure built at the turn of the century with the intention of carrying non-automobile traffic (Kurumi). The bridge's initial design and construction emphasized strength and longevity over aesthetics, and it was deemed strong enough in the 1920s to carry US-6 and US-44 across the river. Later in the Interstate Highway era, the bridge was still considered structurally sound enough to carry I-84. These two interstates, well-traveled by city residents, metropolitan area commuters, thru-traffic and trucks, intersect just east of downtown Hartford near the Connecticut River in a tangled mess of on and off-ramps that creates an infrastructural concrete jungle on what could have been highly-demanded land between downtown and the riverfront.

While Hartford's contemporary infrastructural lynchpins are aging, the city and its roadways bear the old scars of countless failed infrastructure projects – especially ring road proposals – that only add to the detrimental impact that the freeway era has had on the city and its residents. Highways like the Woods River Expressway (CT-189), I-284, the western half of I-291, I-491, and I-484 all were all either proposed or partially started and later abandoned (Kurumi). As Hartford continued to grow at the beginning of the Interstate Highway era, policymakers estimated that the metropolitan region would reach two million people and planned an elaborate highway system to meet such a high level of expected travel. Those policymakers, at both state and federal levels, could never have imagined the full of deindustrialization and its detrimental effects on the region. The predicted rate of growth was far too ambitious, and the Hartford metropolitan area currently holds just under 1.2 million people (Wolfram Alpha). As a result, planners have abandoned highway projects once deemed necessities, sometimes during the early stages of their construction (Kurumi). Their remnants, signs of what could have been an efficient highway system typical of many other American cities of its size, instead form on/off ramps taking up tremendous tracts of land, underutilized bridges, and two interstate highways that carry more far more traffic than they should. In looking at the historical plans for Hartford's freeways, one can find important lessons as to how future infrastructure projects should and should not be planned and how to better integrate the metropolitan area with its center (Painter 15-23). In addition, by looking at the consequences of existing freeway placement, policy actors can better formulate plans to improve, rather than simply repair, decaying infrastructure to make it more efficient and to more seamlessly integrate it with the surrounding area. There are two important ways these lessons can be applied to improve Hartford's infrastructure in the future. First,

the city must renovate, rather than simply fix, the I-84 viaduct, and must turn its attention towards the aging Bulkeley Bridge. Secondly, the city and its suburbs must work together to provide strategically located ring roads around the city so as to better integrate the metropolitan area with the central city and to allow for the efficient deferment of thru-traffic and 91/84 interchange traffic to areas outside of downtown Hartford (Wolfram|Alpha).

Improving Hartford's Decaying Infrastructure

In looking at the decaying nature of Hartford's transportation infrastructure, two foci are evident – the Bulkeley Bridge and the I-84 viaduct – as candidates for immediate repair, renovation and improvement. The viaduct, one of the most traveled sections of highway in the entire nation, is both inefficient and poorly integrated into the surrounding urban landscapes and communities (Painter 15-23). While the Bulkeley Bridge – the longest stone arch bridge in the world – has dutifully served the city and the region since 1908, it was designed neither to last one hundred years nor to carry the tremendous amount of traffic it currently supports (Kurumi). While subsequent improvements have enabled the bridge to last as long as it did with such a difficult task, it is clear that this one-hundred-year-old structure should not be responsible for the lives of countless motorists and that I-84 should span the river on a new bridge as soon as possible. Furthermore, with advances in engineering and architecture, Hartford could replace the Bulkeley Bridge with a structure that is both durable and aesthetically pleasing. If Hartford is to consider itself a first-class city, then having infrastructure that embodies both qualities goes a long way towards solidifying that reputation.

When Hartford's decaying and subpar infrastructure, the viaduct section of I-84 is and has always been of particular emphasis by policy actors from local to federal levels (Painter 1-5). The viaduct, an aging structure that divides the North End from the more prosperous southern half of the city and Downtown areas, is unsightly, and its congestion brings about tremendous amounts of environmental pollution, including noise. Furthermore, the land near and underneath the viaduct forms a stretch of "no man's land" that cuts across the middle of the city through viable and valuable real estate. The three-quarter-mile viaduct, constructed in 1965, also accounts for "a significant amount of regional congestion" which any resident will agree commonly reaches levels usually evident in cities of far greater size (Painter 3). A 2010 study determined that even with substantial improvements in public transportation, the viaduct would still face increasing transportation demand, and that consequently the viaduct should be replaced and improved rather than simply repaired (Painter 46-51).

Given that the viaduct corridor should be improved, the question becomes how to improve the structure to more efficiently move traffic and to better integrate the roadway into its urban surroundings. In doing so, it helps to look at a similar case in Boston, MA. Before the famed "Big Dig" project that turned I-93 into a tunneled highway, the city had built the infamous I-93 viaduct

(Painter 11-13). This structure carried 190,000 vehicles per day and inundated the surrounding environment with noise and exhaust pollution. Furthermore, its construction completely destroyed Boston's West End neighborhood. While the West End was deemed a blighted and impoverished neighborhood, it was a relatively safe and tightly knit community; the viaduct, therefore, erased a city district with a strong definition of place. There are many similarities between the Boston Viaduct and Hartford's. The I-84 viaduct carries 175,000 vehicles per-day, and serves as a barrier between neighborhoods in Hartford, essentially eliminating any potential "midtown" district in the city's western half (Painter 11). Plus, as previously stated, the viaduct creates tremendous amounts of environmental problems.

Boston's response to its own viaduct problems was to bury the entire highway within the city limits in a now infamous project known as the "Big Dig." The project, while fraught with corruption and cost issues, did in fact successfully divert traffic below the city. Consequently, Boston was able to construct a series of parks, homes and business buildings in the space where the viaduct once stood. A 2010 viaduct study determined that Hartford's best option was to undertake a similar project, but on a lesser scale (Painter 46-51). While Boston's size and wealth allowed for the entire section of roadway to be buried, Hartford has little political pull, especially at the federal level, and even fewer funds. Consequently, the city would have to execute a hybrid project in order to save costs. The proposal advocated by the study included a partial tunnel underneath the area between Asylum Street and the Armory, exiting past Union Station and continuing as an at-grade/sunken roadway for the remainder of the former viaduct stretch (Painter 38-41).[1] The proposed improvements would not only allow for large plots of valuable land to be reclaimed in the Asylum Street and Union Station areas but would also shorten exit ramps at the Sisson, Sigourney and Broad Street exits. Additionally, the project would enable the North End to be reunited with the rest of the city by improving visual and pedestrian experiences (Painter 38-41). In terms of the proposal's integration with its urban surroundings, the study gave it a "Good/Very Good" grade, citing possible mixed-use development projects on reclaimed lands at the aforementioned sites, lower noise levels, and improved visual and pedestrian experiences on the north/south streets that formerly cut underneath the viaduct through the "no man's land areas" (Painter 38-41). In addition, the study gave the plan a "Very Good" economic assessment, as it would provide more land for future projects and would better integrate the downtown area with the rest of Hartford (Painter 38-41). Most importantly to policy actors, the surveyors' calculations state that this particular set of improvements would cost about the same as it would to just replace the extant decaying viaduct (Painter 38-41). This proposal offers a more balanced, beneficial and cost-effective solution.

Another important aspect of any plans to improve the viaduct section of I-84 is how it integrates with surrounding neighborhoods and communities.

One of the biggest problems with both Boston and Hartford's viaducts were how they detrimentally affected and/or destroyed particular neighborhoods – mostly poor ones – in each city (Painter 11-13). Too often, infrastructure planners draw the lines wherever they see fit without taking into full account the impacts such projects will have at the local level. As such, there should be tremendous input from community groups in the planning stages of Hartford's project, as advocated by the 2010 viaduct study. Since its initial construction, neighborhood groups in Hartford's North End have criticized how the viaduct cut off the city's poorest and predominantly African American districts from the prosperous downtown and what was – at the time of the viaduct's construction – a relatively white section of the city to the south. In addition, there are significant avenues for housing advocates to impact how the land reclaimed by this project is used so that the city's housing stock is improved in both efficient and equitable manners. For instance, if mixed-use development is the route the city should take when developing reclaimed lands, advocates at the local level should insure it remains truly mixed with regard to function (commercial/residential) and accessibility for diverse socioeconomic and ethnoracial groups. Any improvements, therefore, should be vetted by neighborhood groups in the affected areas so that policymakers can avoid the same mistakes they made in the Interstate Highway era in cities like New York, Boston, Hartford, and countless other urban landscapes.[2] When it comes time to improve the National Highway system, policy actors need to make sure they draw the lines so as to minimize the impact their concrete chokeholds will have on surrounding communities.

Ring Roads and the Hartford Metropolitan Area[3]

In looking at transportation infrastructure in the Hartford metropolitan area, political fragmentation, Connecticut's use of "home rule" for municipalities, and the subsequent lack of county governments have produced a unique phenomenon for a city with more than 100,000 people lying at the intersection of two major thru-traffic corridors. It is particularly evident when examining a road atlas of the city that Hartford lacks the "ring roads" typical of most American cities in similar situations. Because surrounding suburbs consistently block the funding and the placement of ring roads through their territory, traffic moving from Waterbury to Boston, for instance, must travel directly through downtown Hartford. This is the only viable option for the Hartford area, but other regional cities have alternate routes. For example, if one wanted to travel from Framingham, MA, to Portsmouth, NH, without having to travel through the Massachusetts Turnpike (I-90) and transfer to I-95 in downtown Boston, the person could avoid the heavily congested city center by taking I-495 (a beltway running from Cape Cod to I-95 in Amesbury, MA), or even MA-128 (a state route and one of the nation's first ring roads) around Boston to points north. Because Boston has ring roads, the majority of thru-traffic finds it far more efficient to travel around the city. In contrast, Hartford's thru-traffic

seeking to interchange from I-91 to I-84, or vice versa, must travel directly through downtown Hartford, mingling with existing inter-city and inter-metro area traffic.

As with the I-84 viaduct, it is useful here to do a comparative study of highway systems in various cities of similar size to Hartford. Each year, the Texas Transportation Institute publishes its "Annual Roadway Congestion Index," a table of 85 cities and an index of their yearly amount of time lost to congestion. The cities are listed by size categories, and Hartford is in the "Medium" category (TTI). Choosing the best test cases from the medium category, Richmond, VA, Toledo, OH, and Albany, NY, were selected. Each city has a beltway system that Hartford lacks, and consequently, each city had lower levels of congestion (TTI). Each city also was a part of highway corridors with large amounts of both local and thru-traffic, just like Hartford. The congestion indexes and populations are listed in the table below.

City	Ring road(s):	City Pop.	Metro Pop.	2006	2007
Hartford, CT	I-291 (partial), CT-9 (partial), but no complete ring system	124,775	1,196,000	0.96	0.97
Albany, NY	I-787, Berkshire Connector, NY-7	97,856	857,592	0.82	0.83
Richmond, VA	I-295, VA-288, US-360, VA-2, VA-150	204,214	1,238,000	0.83	0.83
Toledo, OH	I-280, I-90 (bypasses city), I-475, US-23	287,208	672,220	0.87	0.84

Table 1: Comparing similar cities with ring roads versus Hartford with regard to traffic congestion levels. *Sources: Wolfram Alpha (population data), Texas Transportation Institute Index (traffic data).*

After examining the data, it is absolutely clear that cities with ring roads, even ones with larger urban and metropolitan area populations, have lower congestion levels than Hartford. The results are logical because ring roads allow for more efficient transportation for several types of travelers. First of all, ring roads bring limited-access roadways to the suburbs, decreasing congestion on "secondary" roads like the Berlin Turnpike (CT-15) for southern suburbs or US-5 in East Hartford. This increases efficiency and decreases the time it takes to go from one suburb to another or to move throughout one suburb. Secondly, beltways allow thru-traffic to pass around rather than through the center of the city, especially during peak hours. It would be quicker to go from Waterbury to the Bradley International Airport in East Granby by traveling on a ring road connecting I-84 and I-91 northwest of the city as opposed to traveling to downtown Hartford, transferring to I-91 and then traveling northward. The beltway would be the more efficient option, but Connecticut's reliance on home rule for suburbs means that the state must undertake strong-arm measures to approve highway projects without their permission. As such, no such rings currently exist around Hartford, even though they do exist around cities of similar size, scope and function.

Figure 1: Map of Original Proposed Highwy System (Kurumi). I-491, I-291 (in its fully planned state) would have formed a complete outer ring system and the combination of I-484, I-284, CT-189, CT-2 and old CT-9 would have formed an inner ring system. This 1960's-era proposal anticipated a metropolitan area with 2 million people (currently it is less than 1.2 million). The plan suffered from population, environmental, usage and integration concerns (this is a classic example of drawing the lines with regard to space but not place).

It is not as if policy actors in the Hartford area, however, have been ignorant of the benefits of ring roads. In the initial era of interstate highway planning from the late fifties to the eighties, Hartford city planners drafted a map of ring roads and connecting highways that would have truly integrated the metropolitan area, lessened traffic in the city's core, and improved the efficiency of automobile travel. Unfortunately, these proposed highways were abandoned either in the planning stage or during the early stages of construction due to lack of funding, political pressures – including suburban resistance – environmental concerns and the economic and population size declines that occurred with deindustrialization (Kurumi). The map of proposed highways (Figure 1) includes two highways of analytical importance for modern-day Hartford. The first is I-291, which currently exists as a connecting road that allows suburbanites living north of Hartford to travel to the Buckland Hills Mall in Manchester and to points east along I-84 and I-384 without going through downtown Hartford. The highway was initially planned as the northern section of Hartford's ring: it would have gone from I-84 just north of where CT-9 now runs south of

I-84 and would have intersected I-91 on the other side of modern-day I-291 (Kurumi). It would have allowed residents in towns like Farmington to travel to in and around the region without adding to the traffic in downtown Hartford. In addition, I-291 would have traveled south to intersect I-91 in Rocky Hill, CT, allowing for transitions to points south as well. The second road of focus is the I-491 proposal, which would have been a two-part improvement allowing suburbanites from, for instance, Berlin to travel to Manchester and Vernon without moving through downtown (Kurumi). Similarly, the southern portion of I-291 would have allowed these same travelers to move to points east with the same ease.

In modern-day Hartford, these roads would have formed a clear system of four quarter-rings that would have fully integrated the metropolitan area and reduced traffic at the city's center by diverting thru-traffic and circumferential traffic out of the chronically congested downtown. The original highways plans abandoned due to lack of funding, changes in planning designs and suburban pressures, including the fact that some portions of the highway would have cut through existing suburban and urban neighborhoods (Kurumi). Furthermore, in response to the cancellation of these projects, Hartford and the state of Connecticut formed a system of unconnected partial rings that serve limited traveling purposes and complicate any future plans to form a fully integrated beltway system. For instance, after the cancellation of I-291's southern and western portion, CT-9, which was designed as an inner-ring road, became the city's southwestern quarter-ring, traveling just south of the planned route for that segment of I-291. In addition, after I-491 was cancelled, the state constructed CT-3 and the Putnam Bridge, which was part of the I-491 corridor, to direct some of the traffic through a partial southeastern quarter-ring corridor (Kurumi). This segment, however, does not extend to I-84 at a point far enough eastward for it to really have any beneficial impact on the city's central congestion issues. As for the northwestern quarter-ring segment, the cancellation of that part of I-291 did not lead to any semblance of a ring road. As such, a firm wishing to move freight from New Britain to the airport still has to travel through downtown Hartford, or take back roads like Mountain Road and CT-218 up to I-91, a lengthy and inefficient process. The current ring road system in Hartford only covers two of the four quarter-rings that the city needs. I-291 fills the northeastern corridor and CT-9 covers the southeastern corridor that would have been covered by I-291 as originally planned. In addition, CT-3 and the Putnam Bridge form the beginning of a southeastern corridor, but it is far from being a complete beltway.

Because of the cancellation of past projects, it is important that policymakers look at why and how these projects were not completed, and how the partial projects impact future plans. As mentioned in the previous section, it is important for planners to examine where they want to draw lines for future ring roads so that they minimize the impact these tremendous structures have on the

surrounding landscapes and neighborhoods. After examining the neighborhoods and land tracts where the two remaining beltways should be constructed (the northwest and southeast quarter-ring corridors), it is easy to see why some initial road plans were abandoned. The southeastern corridor, as originally drawn-up, would have cut right through the quiet, family-oriented Oak Street neighborhood of Forbes Village, destroying a quaint suburban community. As had occurred in Boston with the upheaval of the West End, the planned I-491 would have destroyed a great community with a strong sense of place. Rather than simply abandon the project however, policymakers should have looked for better options. Just east of the planned Oak Street corridor is a large expanse of vacant land at the border of East Hartford and Manchester that mostly contains large-scale power lines typical of inter-municipal tracts of land in the state. Clearly, a limited-access highway could be constructed so as to take advantage of this relatively empty land and successfully incorporate the power lines. By extending CT-3 past its current terminus at CT-2, moving it south of Griswold Street, past Oak Street and into the vacant land between Oak Street in East Hartford and Hillstown Road in Manchester, planners could have built I-491 without destroying the entire neighborhood northwest of the Oak/Griswold corridor. Furthermore, this project – an extension of CT-3 to I-84 at the I-291/I-84/I-384 interchanges – would form the southeastern quarter-ring that was the abandoned I-491 project (see Figure 3). Therefore, it would allow for the more efficient movement of goods and people through the region without the use of crowded downtown roads or the crowded CT-2 while minimizing the new highway's impact on the surrounding area.

Looking at the northwestern quarter-ring, the planned I-291 extension would have been placed near what is today CT-218: Cottage Grove Road (see Figure 2). A four-lane road now serves this area, and a highway cannot be constructed in its current place without first acquiring significant funding and then solving integration and destruction issues. Furthermore, building a highway south of CT-218 would cut through Matianuck State Park, two country clubs, and the suburban campuses of Cigna and MetLife. After an examination of the area north of CT-218 however, it was determined that ample space exists in the area just north of CT-178, around the insurance companies, and far enough around Hartford's six reservoirs cutting vertically through the most eastern portions of Farmington (Figure 3). These tracts are ripe for highway placement because they are mostly vacant tracts of land that are not already parkland and would be inexpensive to claim using eminent domain. Furthermore, by cutting far enough west of the reservoirs into Farmington, planners can avoid tainting the city's water supply with the environmental runoff from the freeway. As such, policymakers and planners should advocate a new I-291 extension traveling from the CT-178/I-91 interchange around the CT-218 corridor, around the reservoirs and interchanging with I-84 near where CT-9 already intersects I-84. Furthermore, should this project be completed, there is the potential for CT-9

Figure 2: Only CT-9 and I-291 exist as ring roads in the traditional sense. They only capture two of the necessary four quarter-rings to fully integrate the metropolitan highways.

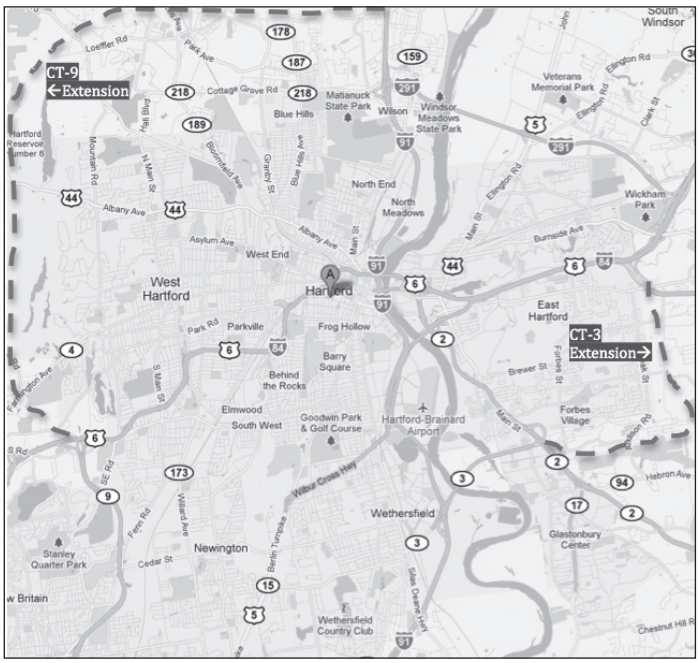

Figure 3: Proposed I-291 and CT-3 extensions fill the remaining two quarter-rings, integrating the metropolitan area while minimizing neighborhood and environmental impact. Extant I-291 and CT-9 (which intersects I-91 just south of this map in Berlin, CT) complete the ring system.

to be upgraded to interstate status as an extension of I-291 close to how it was originally planned. Not only would this enable CT-9 to potentially receive federal funding, but this would also form the northwestern quarter-ring, and improve travel efficiency while limiting the environmental and community impact of the highway. Furthermore it would allow suburban commuters to access the gigantic MetLife and Cigna campuses at the intersection of Hall Boulevard and Cottage Grove Road via a limited access expressway.

After examining the planned map of Hartford's highways (Figure 1), the current layout (Figure 2) and the map including the beltways proposed in this paper (Figure 3), five key analytical points stand out. First of all, the original planners had great dreams in planning a full ring system (see Figure 1); it would have been efficient, integrated the metro area and would have reduced downtown congestion. Secondly, it would also have cut through the existing suburban framework and would have had incredible communal and environmental concerns, something the planners failed to fully account for. Thirdly, the current map of Hartford shows that the existing highway system is incredibly inefficient through its lack of ring roads, a phenomenon that is the main cause of downtown congestion issues. In addition, the fourth point is that the current system only has two quarter-rings, but existing neighborhoods and highways will most likely prevent a fully integrated ring system from ever being implemented. The fifth and most important point is that the map of proposed highways cuts around existing neighborhoods and environmental danger zones and provides a full ring system in a manner that, quite frankly, is as good as Hartford can do given the current highway system, the existing neighborhoods, and the reality that it lacks the funding and political systems necessary to draw and implement the same system in the first map. Therefore, policy actors should follow the proposed highways in the third map when it comes time for Hartford to plan cost-effective, efficient ring roads that would have minimal impacts on neighborhoods and the local environment.

Conclusion

The last great public works project in the United States, the 41,000 miles of interstate highways authorized through the Federal-Aid Highway Act of 1956 and its subsequent reauthorizations, are beginning to rapidly age. In the very near future, the decaying state of the National Highway System and infrastructure across the United States will gain significant public focus, very likely – and unfortunately – through a tragic event such as another bridge collapse or, more hopefully, through a great piece of investigative journalism policy writing. As this issue gains saliency, federal and state governments will have to appropriate the large amount of funds necessary to repair, improve and/or replace parts of the National Highway System. As such, policy actors at all three levels of government should prepare for infrastructure improvements by studying alternative policies and insuring that they take into account the

effects these projects will have on their surrounding environments. Rather than wait for our infrastructural "day of reckoning," planners should take necessary action now so that implementation can occur as soon as funds are appropriated, eliminating much of the post-funding planning that commonly delays an important process such as this. In addition, policymakers should examine the potential costs of each alternative and weigh it against its effectiveness, costs, community impacts and environmental impacts in order to select the best option in each case.

In the Hartford context, city officials need to work together with suburban officials and community groups with the goal of constructing a regionally integrated highway system. Because of the state's use of home rule, this has always been difficult, but given the congestion issues of downtown and the difficulty of suburb-to-suburb transportation, this issue has the potential to unite city and suburban officials to improve the metropolitan area's infrastructure in a cooperative manner. Furthermore, neighborhood and community groups can work with policymakers at local, state and federal levels to lessen the impact that infrastructure would have on surrounding metropolitan landscapes and neighborhoods. After all, if localities come up with well-drawn plans that emphasize minimal local impact, it will integrate the region more than a top-down plan by federal officials could ever hope to accomplish. In addition to building an efficient ring road system, Hartford needs to prepare plans to replace, repair and/or improve aging infrastructures like the Bulkeley Bridge and the I-84 viaduct.

In the end, while funding today might not be sufficient for these plans to be implemented, the work done by policy actors now could lessen the temporal and fiscal costs of actual projects that will arise when necessary infrastructure funding is allocated in the near future. It is time for planners to take a carpe diem approach to today's infrastructure problems. Rather than use funds to simply repair the nation's aging highway system, policy actors should improve it in a manner that integrates automobile transportation into the urban fabric and makes traveling by car more efficient. In the Hartford metropolitan area, this means replacing the I-84 viaduct with an at-grade highway and tunnel to improve its integration and efficiency, replacing the Bulkeley Bridge with a wider, more aesthetically pleasing and durable bridge, and working to complete and integrate the final two pieces of its beltway system.

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ENDNOTES

1. At-grade: intersecting at the same vertical level. A four-way stop is an at-grade intersection, while a highway overpass would be off-grade.
2. See anything written about the infamous Robert Moses, but especially Jane Jacobs's *The Death and Life of Great American Cities* and *The Power Broker* by Robert A. Caro.
3. All map data comes from GoogleMaps, which is cited in the bibliography.