

Isochronic Mountain: Mapping, Modeling, and Materializing Urban Inequities

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The Isochronic Mountain project is a series of “landscape” models that offer the public a physical manifestation of the invisible infrastructures and inequities that shape everyday life in their contemporary cities, refiguring and recasting the sprawl of the global city through the historical technique of ceramic casting. These mountains render GIS and demographic data apprehensible and productive inside contemporary debates concerning the right to the city. Specifically, by visualizing time spent on public transit as the z-height, the Isochronic Mountains offer an intuitive understanding of the “uphill climb” necessary to move through the city without a car.

Isochronic maps were developed in the late 19th century to quickly visualize the extent and efficacy of transportation

networks and they soon became a favored tool of transit planners. If one were to walk from the city center outward, and there were no geographic barriers, we can imagine a circle that would demarcate the area one could access within a five-minute walk in any direction. Another larger concentric circle would indicate the distance one could cover in ten minutes. Of course, the moment that one arrives at a river and is forced to find a bridge to cross, this simple nesting of concentric circles quickly deforms into a much more complicated set of outlines. Factoring in faster modes of transportation, such as trams and bus lines, would start to extend the distance one could access in a given time, but only along even more specific trajectories through the city. The network of transit lines would begin to prioritize certain areas of the city, connecting them to the downtown

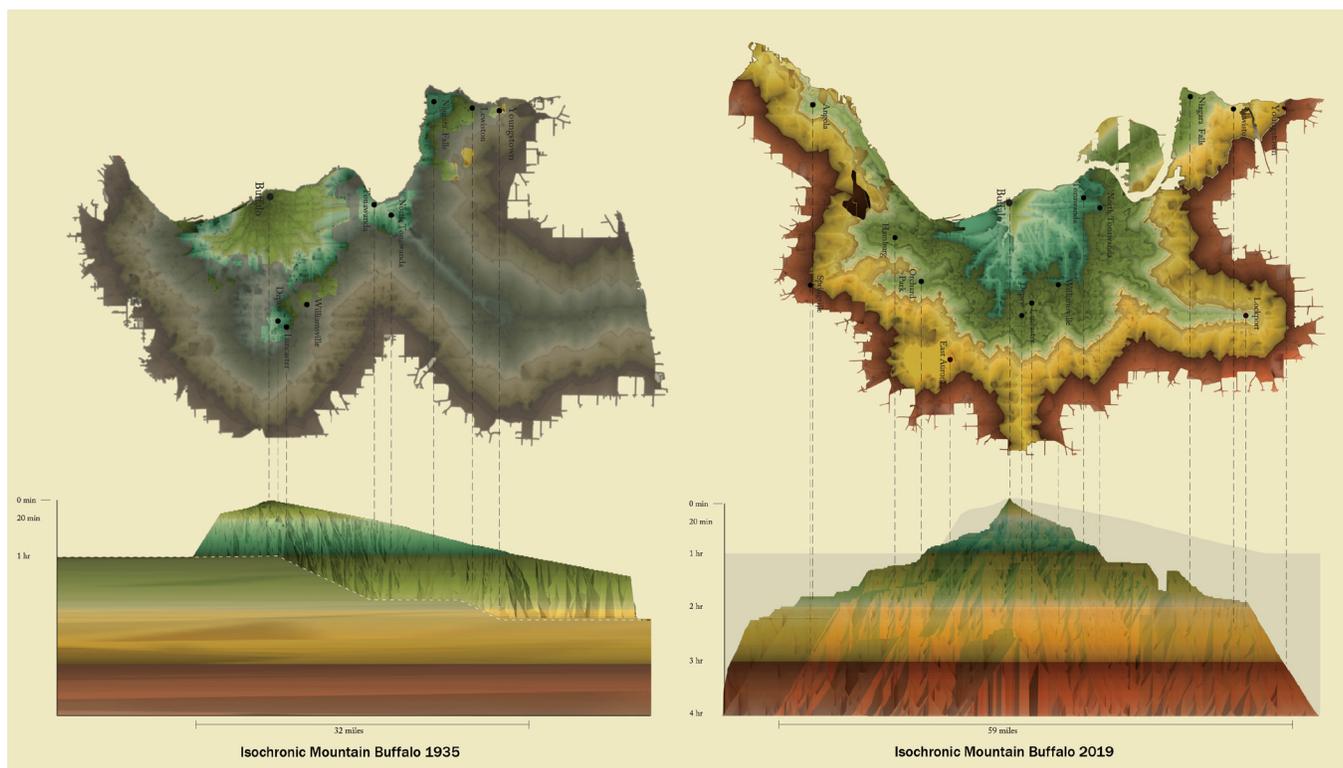


Figure 1. Isochronic Mountain Buffalo 1935 and 2019. Comparative map and elevations. Image: Joshua G. Stein.

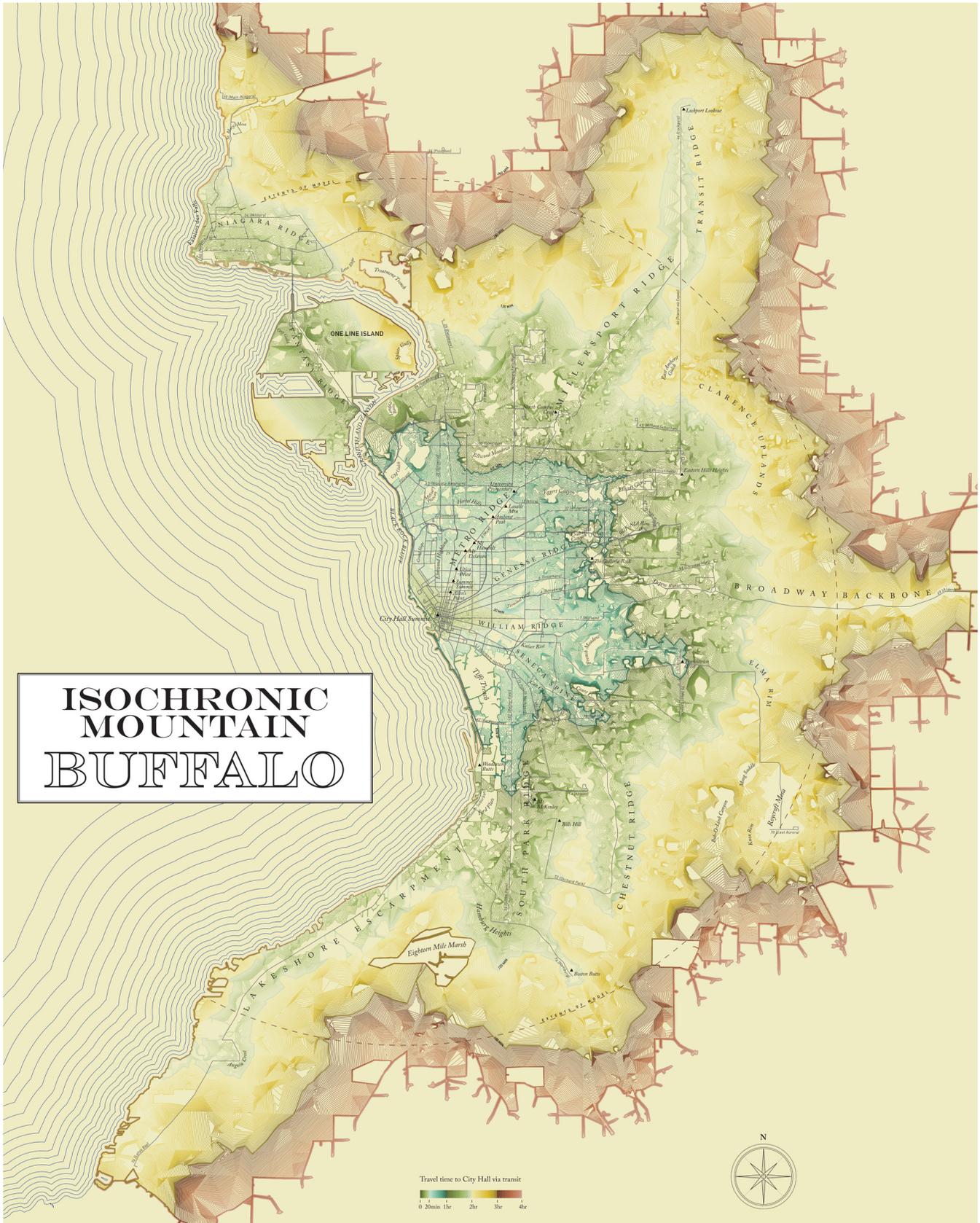


Figure 2. Isochronic map of Buffalo transit 2019. Each isochronic lines represents one minute in time traveled on transit to or from the mountain peak, City Hall Summit. The map reveals areas underserved by bus or rail, transit valleys, as well as well-connected ridges. Image: Joshua G. Stein.

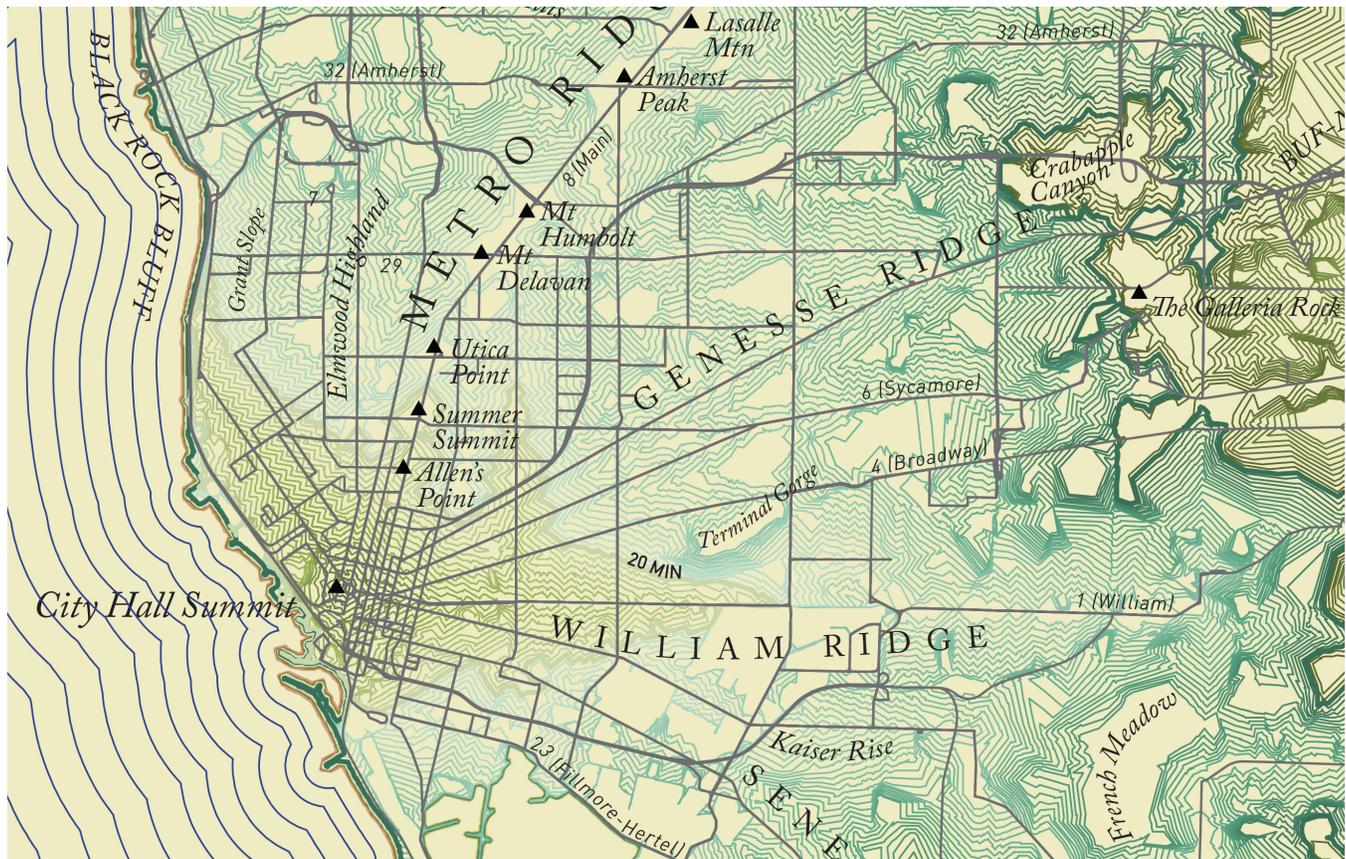


Figure 3. Isochronic map of Buffalo transit (detail). While each bus line creates ridges that radiate from downtown with underserved valleys in between, the city's one subway line creates a string of well-connected peaks arcing north and east out of downtown. Image: Joshua G. Stein.

area by distorting and extending the initially concentric circles to include some neighborhoods rather than others.

Initiated with a comparative study of São Paulo's transit network both past (1939) and present (2013), the Isochronic Mountains dramatically yet accurately demonstrate the struggle to move through the city by transit (Figs. 4-6). Each landscape reveals the neighborhoods that are infrastructurally underserved, "transit valleys" where the uphill climb to reach the city center is more intense. Viewed comparatively, the geological metaphor also visualizes how this struggle has intensified over the last 75 years due to the "erosion" of transit infrastructure in relationship to the growing urban megalopolis. While many streetcar networks were dismantled in the 1940s, 50s, and 60s, even as cities continued to expand, the destruction of these public infrastructures produced a growing mountain of time heaped onto the back of each citizen.

The most recent Isochronic Mountain study examines similar issues in Buffalo, NY through a collaboration with GIS analysts the University at Buffalo Regional Institute (UBRI) and local transit advocates (Figs. 1-3). The geospatial data underlying the material mountains was derived from historical maps and timetables for Buffalo's pre-war streetcar system operated by the International Railway Company and contemporary

data made publicly available by the region's current operator, Niagara Frontier Transportation Authority (NFTA). Since isochronic models require a single destination point and a single moment in time, the geographical point of desire was set as Buffalo City Hall (the ultimate location of the topographic model) with a start time of 9:15am, avoiding the anomalous spikes of morning rush hour. Though Buffalo has a pattern of job distribution that it not solely focused on a downtown financial district, City Hall as a destination point offers a fixed point from which to compare the extents of the historical transit network (1935) with its current incarnation (2019). These snapshots as data sets cannot fully describe the complexity of commuting patterns in the city or region, but they illustrate a general trend while providing a very accurate and in-depth representation of one aspect of a difficult contemporary reality.

While the erosion of Buffalo's once great transit network has had repercussions for the entire city and region, the impact has not been equal across all of the city's inhabitants. Perhaps most significantly, the demise of the streetcar network, along with other related factors, would help to segregate the city in a structural way that remains in place today. Buffalo's inhabitants with no access to cars are three times more likely to spend 1.5 hours per day commuting. This translates to significant economic segregation, which reinforces Buffalo's extreme



Figure 4. Isochronic Mountain São Paulo, 1939. Image: Joshua G. Stein.

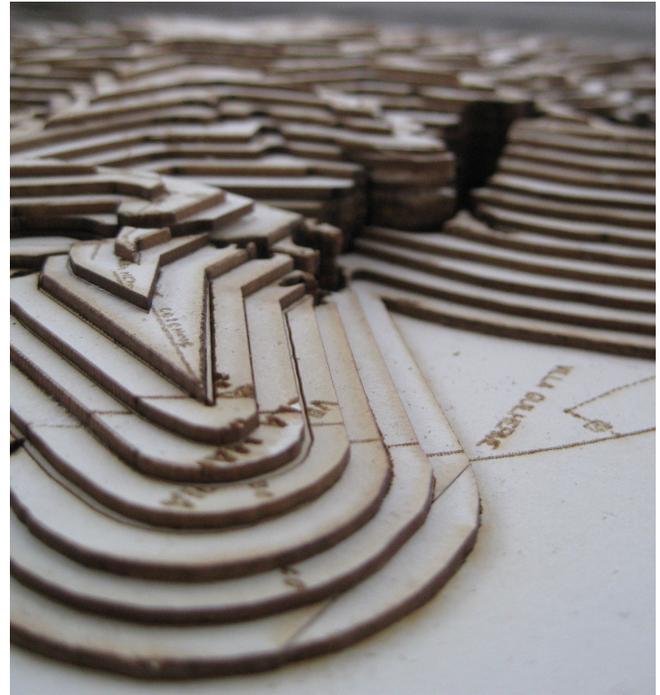
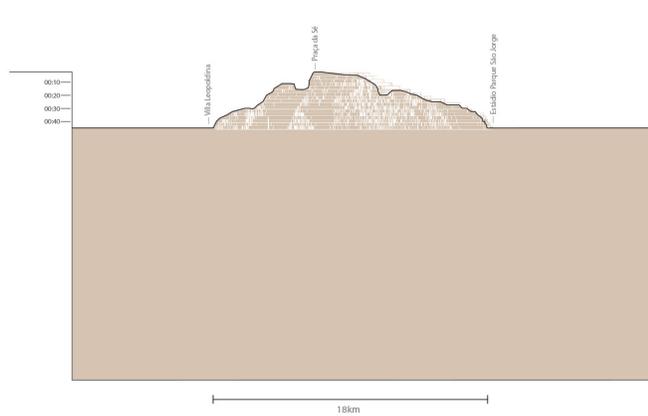
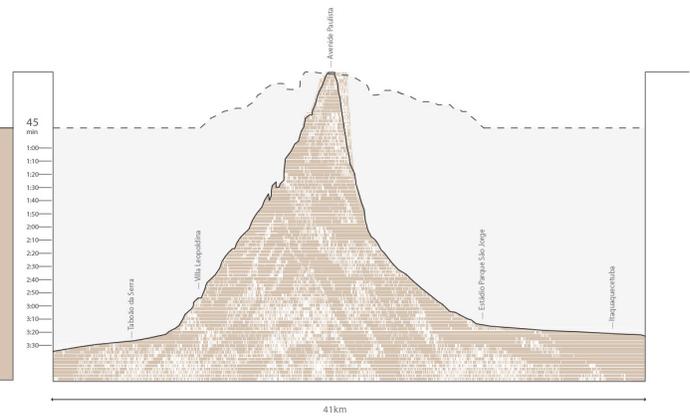


Figure 5. Isochronic Mountain São Paulo, 1939. Image: Joshua G. Stein.



O Morro da Esperança Paulista 1939



O Morro da Esperança Paulista 2013



Figure 6. Isochronic Mountain São Paulo. Comparative time graphs (above) and ceramic casts (below) demonstrate the erosion of transit infrastructure between 1939 and 2013 resulting in increased transit time to move through the megalopolis. Images: Joshua G. Stein, Eda Yetim.

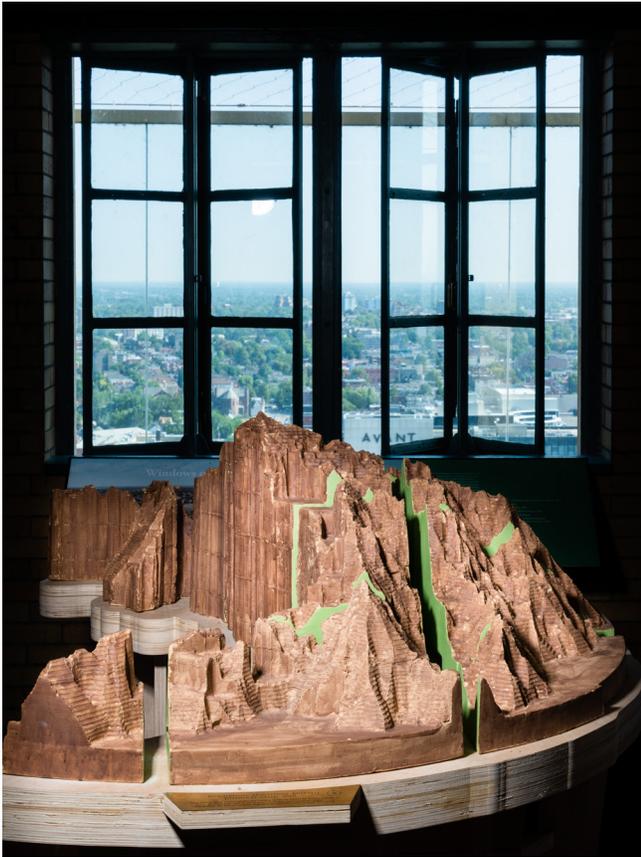


Figure 7. Buffalo City Hall Observation Deck installation with city beyond. Image: Nando Alvarez.

racial segregation. As public funding shifted from streetcars to arterials and freeways, only a certain portion of the population was able to take advantage of this new infrastructure. According to the *One Region Forward* study by the UB Regional Institute, “across the US, workers who use public transit earn almost as much as workers who drive alone, but in Buffalo Niagara, workers who use public transit earn only half as much as those who drive alone.”¹

The project’s geological metaphor culminates in the form of a five-foot diameter terra cotta model of the contemporary Isochronic Mountain Buffalo and its corresponding isochronic map, installed on the Observation Deck of Buffalo City Hall (Figs. 7-10). From here, 28 stories above the city, visitors can compare the physical topography of the Buffalo visible from the balcony with the more experiential landscape of the city described in the model. The map helps visitors locate their home or place of work on the model, which then allows them to calculate the time it takes to reach the center of the city without a car. Each “step” climbed in the mountain indicates two minutes of time spent on transit or walking.

The project seeks to translate “dry” GIS data and archival research into a material artifact that expressively conveys the geological metaphor of difficulty and loss while accurately



Figure 8. The peaks and ridges in Isochronic Mountain Buffalo indicate neighborhoods easily accessible by transit. Image: Nando Alvarez.

representing the experience of the lived city. As planners currently debate outsourcing certain transit services to private operators such as Uber and Lyft, the Mountain serves as a touchstone to guide the public through the history of the policy decisions that have culminated in today’s predicament.

ENDNOTES

1. University at Buffalo Regional Institute, State University of New York at Buffalo, School of Architecture and Planning, *One Region Forward: A New Way to Plan for Buffalo Niagara* (2014): 68.



Figure 9. Buffalo City Hall Observation Deck installation. Image: Justina Dziama.



Figure 10. Each step up the mountain equals two minutes in time on Buffalo public transit. Image: Nando Alvarez.