Perception in Motion: Video as a Design Tool for Honolulu’s Transit System

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We certify that we have read this Doctorate Project and that, in our opinion, it is satisfactory in scope and quality in partial fulfillment for the degree of Doctor of Architecture in the School of Architecture, University of University of Hawai'i at Mānoa.

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This doctoral project introduces perception in motion as a design method for grounded transport networks – roads, pedestrian/bike paths, and rail systems. To design for circulation networks that dictate the layout and lifestyle of a city, architects and planners need to understand the affects of current mobilescapes, which are environments that evolve from transport networks. In order to identify current issues of mobility this project documents a particular mobilescape in Honolulu, Hawai‘i – the elevated condition.

I refer to the elevated condition as a type of transport system - such as the elevated highway, elevated mass transit system, and skyway - composed of two or more levels of movement. The strategy of overlapping is used to separate various modes of mobility that travel at different speeds and in different directions. Although the elevated access network can be an effective solution to organizing mobility, there is a modest understanding of the “experience” of moving through an elevated condition. Because Honolulu will begin to construct a 20 mile long elevated rail system in 2009, I wanted to understand what the experience
could be. What will rail riders see and feel? How will the speed of the rail affect what riders perceive? How will an understanding of the rail experience alter the way designers approach mobilescapes?

In order to develop further understanding of mobilescape design, this project investigates mobility in two parts. Part one is a historical critique that explores the evolution of mobility in architecture and planning; inquiring about the effects that the automobile and other modes of surface transport have had on the urban environment. The goal is to understand how past approaches to mobilescapes have benefited or hindered the experience of urban cities. This exploration is not intended to address the issues of mobility within virtual space, vertical circulation in high-rise developments, nor does it include non-grounded transportation types such as air and sea travel.

The findings in the evolution of mobility supplement the second portion of this project that focuses on Honolulu’s elevated rail proposal. The elevated condition, within the existing context of Honolulu, is analyzed and documented in video format. The video is intended to be a simulated understanding of Honolulu’s transit experience; capturing the perception of the elevated condition at both upper and lower levels. The video documentary also highlights the issues of the projected experience and begins to introduce design suggestions that could enhance the elevated condition. The goal of the film is to present planners and architects with a design tool, based on perception in motion, that can inform and influence the Honolulu rail system.
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Kevin Lynch, in his book *The Image of the City*, states that “moving elements in a city, and in particular the people and their activities, are as important as the stationary physical parts.”¹ As an architecture student, I was drawn to the design determinants of circulation, inspired by the way people traverse. Like Lynch, I believe that “paths, the network of habitual or potential lines of movement through the urban complex, are the most potent means by which the whole can be ordered.”² As human beings, we are compelled to move, it is a part of our everyday lives; we travel from place to place, and need a means of doing so. The way in which we travel: walking on sidewalks, driving cars on roads, and riding transit systems largely impact the design of a city. Often, transit networks set up the parameters upon which designers and planners organize the rest of the city. As significant factors of urban design, circulation networks have the potential to change the way people experience a city.

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2 Ibid., 96.
In 2007 I lived in Shanghai, China for five months. While there I was intrigued by the numerous movement types occurring along the street. The streets of the city were constantly packed with multi-modal activity – people walking, biking, riding the bus, catching the metro etc. It was a wonderful sight, yet the design of the city’s circulation networks didn’t seem to support a long term vision of a favorable multi-modal city. Although Shanghai was developing wide roadways and more metro lines, the city wasn’t providing effective environments for the large amounts of pedestrians and cyclists.

In order to be more sustainable and provide richer experiences of the city, transport design should support and respond to all modes of movement. I believe that an alternative method for designing circulation networks can address the various needs of multi-modal activity. In Shanghai, as well as in Honolulu, the designs of transport networks are largely determined by the experience and speed of the automobile. This must change. The design of mobilescapes should consider the pedestrian experience, the bicyclist experience, the rail experience, and so on. Therefore, understanding the different speeds of transport modes and recognizing the perception and experience of travelling at different speeds is essential.

As multi-modal activity has increased due to the demands for alternative mobility, intersections of movement have become more complex. In the case of urban Honolulu, the issue of traffic congestion has led to mass transit proposals of an elevated rail structure running from west O‘ahu to downtown Honolulu. The proposed transit system will introduce an elevated condition within the landscape. In order to understand the elevated transit experience in the existing context of Honolulu, this proj-
ect will explore the intersections of the Highway 1 (H1) Freeway over Pi’ikoi and Pensacola in Makiki, the H1 over Kapahulu and Kapi’olani in the Market City area, and the H1 over Nimitz near the Honolulu International Airport.

How will the speed and direction of rapid transit affect the way riders experience the city? How does Honolulu respond to the pedestrian experience? What kinds of visual elements are missing in the elevated condition? What are the opportunities that exist in the current perception of moving through elevated conditions in Honolulu? Each site will capture, in video format, the current perception of the elevated condition and a projected mass transit experience. Ultimately, the video is intended to provide an understanding of perception in motion and can be used as a design tool for architects and planners developing Honolulu’s transit system. The video is a design tool because one is able to begin understanding perception in motion of a specific experience, potential strengths and weaknesses of the surrounding environments, current conditions of Honolulu’s elevated systems at upper and lower levels, visual elements of the city, and the perception of different speeds. Designers can use the video to implement design decisions for the proposed rail in Honolulu.

There is much more to be explored in the area of mobility and how we traverse upon the surface of the earth. Anthony Hoete, in his book *ROAM*, has stated, “today we live, work, and roam in a world of perpetual motion. The mobility of people, goods, information and services confronts, permeates, and saturates our everyday existence.”3 If mobility is such an integral part of our

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lives, why don’t transport networks and mobilescapes respond to movement and the experience of being in motion?

The document analyzes the elevated condition, the potential Honolulu rail experience, and introduces perception in motion as an alternate method for designing transport networks. The project’s product is a video design tool and this document is also reflection of the video process.
Since the emergence of the car in the early 20th century, the automobile has altered cities and lifestyles. “For many of us it provides ‘normal spatial mobility’, the type of spatial mobility routinely exercised day after day.”4 The car and other types of motorized transport systems have determined the way people choose to move through landscapes and the way urban networks are designed. As passages are largely influential in determining urban parameters, it’s hard to imagine that the organizational strategies of transport networks have hardly changed within the past century. Since the mass production of the automobile in the 1920’s, there have been two significant shifts in road planning.

The first urban revolution occurred during the height of modernism in the 1960’s. A few decades later, in the early 1990’s a

counter revolution to modern planning strategies affected urban street patterns.\textsuperscript{5} Despite these transformations, the approach to designing circulation networks and its adjacencies has remained quite unaltered – consistently relying on the separation of movement types and speed.

In addition to exploring the evolution of mobilescapes, this historical portion introduces the problems and potentials mobility has posed to the designers of urban cities – architects, planners, engineers, developers etc. The significance of mobile needs is apparent in the amount of space dedicated to transport land-use. According to Steven Marshall, “the amount of urban land occupied by transport-related land uses, including streets, lanes, car parks, highway intersections, railway yards, and so on, can easily account for a third of the total land area of cities.”\textsuperscript{6}

As transport networks take up vast portions of horizontal space, the understanding of design approaches induced by automobility and other forms of grounded transport systems is crucial to the development of future circulation networks. By understanding the effects of historical approaches to the design of transport networks, the problems and strengths of mobilescapes are made clearer.

\textbf{1900-1950: Introduction of the Automobile and Road}

One of the greatest impacts to the pattern of the urban environment has been the car. With the introduction of Ford’s assembly line in 1914, the automobile became available for mass consumption and marked a significant turning point in the evolution of the car and the road. The demand for automobiles in the

\textsuperscript{6} Ibid., 11.
1920’s increased dramatically. By 1916, 370,000 cars were sold at $400 USD each compared to 6,000 cars sold earlier in 1908 at a price of $850 USD. The rapid increase in the ownership of personal cars during the early part of the 20th century meant that circulation networks needed to expand to accommodate the growing popularity of the automobile.

One of the first designers to elaborate on the significance of the automotive vehicle in the planning of a city was Le Corbusier. In 1925 he unveiled his Plan Voisin which consisted of a series of cruciform towers set in-between a freeway system running through the middle of Paris, France. The project was largely criticized and was never built. Later, in the early 1930’s Corbusier began his Plan for Algiers. The Algiers’ city plan proposed an elevated highway system with housing, office, and paths distributed underneath the roadway. The project was a reflection of Corbusier’s belief that the city of the future “consisted of large apartment buildings isolated in a park-like setting on pilotis.”

Corbusier’s approach to mobility was based on dealing with two types of movement, human and motor. In his Plan for Algiers he designated two separate zones - one for man and one for motor. Although these areas were separated, the two appeared to be integrated in an overall urban plan. His vision for man and motor was an elevated condition where all functions stacked into layers - highway over residential, office, and commercial. Le Corbusier’s solution was quite architectural, yet did his layered strategy take into account the actual human experience of mobility and movement? Eventually, like Plan Voisin, his Plan for Algiers fell through, but Corbusier’s strategies for city and

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transport design provided precedence for future planning ideals applied throughout the modernist movement post 1950’s.

Slightly prior to the introduction of Le Corbusier’s response to the automobile in planning, artists and designers in Italy drew inspiration from the dynamism of the car and the technologies of the industrial age. The Italian Futurist Movement [1909-1940’s] was based on the interconnection of art, action, and life. Futurism was a revolt against the past, spearheaded by a writer named Fillipo Tommaso Marientti. He and his followers believed that, “the products of the industrial revolution embodied the promise of a new model of life.” The technologies of interest to the futurists included streetcars, railway networks, airplanes, and telecommunications; those that were changing both the appearance and perspectives of the city. Accordingly, Futurist architecture and city planning neglected traditional forms and ideals of the past and responded to the current technical advances of the times including the automobile and railway networks.

Antonio Sant’Elia, the primary advocate for Futurist architecture, saw the Future City as incorporating “new forms, new lines, and a new harmony of profiles and volumes...We have lost our taste for the monumental, the heavy, and the static, and we now prefer what is light, ephemeral, quick.” Sant’Elia was a critic of early 20th century city design taking place in America and Northern Europe that supported the development of traditional streets and transit facilities. In contrast to the planar cityscapes

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9 Bell, *Carchitecture*, 31-32.
11 Ibid., 8.
12 Ibid.
of the past, Sant’Elia’s vision of the Futurist city was one that incorporated “the skyward development of buildings that revealed the absurdity of a single street surface. There were to be two or three levels to suit the various kinds of locomotion and the different needs of the flanking structures. The construction of these layers of highways and their connections with the houses, the rolling sidewalks for pedestrians and the escalators would create exciting problems for the architect.”

Sant’Elia’s interest in responding to movement and passage is clear in his city plans. His sketches and thoughts of the Futurist City, through the introduction of multilevel circulation networks connecting landscapes and buildings, reveal his belief that circulation and the needs of mobility are fundamental to the organization of a city. Similar to Corbusier, his plans introduced the elevated condition as a means for physically connecting architecture and mobility, while still providing the distinction between mobile types (i.e. pedestrian, car, and rail). His approach to mobility was one based on a layered organization that integrated multiple modalities. However, as an advocate for Futurism – where speed and motion are at the core of design – his approach lacked a response to one’s perception within these various modes of travel. His response to mobility may have transformed the industrial cities of the early 20th Century; however, his projects were never built. The critics of his time were largely opposed to his position regarding the temporality and transiency of building structures. Ultimately, Sant’Elia was convinced that a city needed to replace its architecture every 30 years or so and not many people were willing to support and sponsor such ideals. Although Sant’Elia was unable to construct his city plans

14 Ibid., 118.
15 Ibid., 120.
conceived in the 1920’s, like Le Corbusier, his intentions were later suggested in modernist plans of the second half of the 20th century.

**1950-1990: Influence of Modern planning**

“As the car and the modern highway took a grip on urban design, city form underwent perhaps its most dramatic transformation in thousands of years.”16 Before the introduction of the modern highway, buildings and roads were closely connected. Streets formed grid-like patterns and were outlined or bordered by buildings. Therefore, mobility and urban place were interconnected and the street was where all types of movement, life, and architecture coexisted. What modern planning did was separate the road and the building. In order to organize the city, the fast moving traffic indicated by the car was separated from urban places for pedestrian movement and living. By physically disconnecting movement types, built form, and open space, there was a destruction of the street.17 The automobile allowed a random pattern to develop where roads and building frontages no longer needed to be connected or adjacent. One could drive from building to building or destination to destination without having to leave the car; not experiencing the spaces in-between destinations. As a result, roads became free forms flowing through open landscapes, and buildings were stand alone objects spanning large distances; scattered within the landscape.

In addition, the roles and responsibilities of street designers were disconnected, further enhancing the disjointedness of urban cities. This meant the modern architect focused on built

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16 Marshall, Streets & Patterns, 3.
17 Ibid., 6.
form, the landscape architect on the open space, and the transport engineer on the movement channels. “The result was that street design became subsumed within the rather specialized discipline of road design – based on the scientific considerations of traffic flow and the kinetics of vehicular motion, practiced by engineers trained in hydraulics and mechanics, rather than architects trained in spatial form and aesthetics, or planners versed in the arts of the public realm.” According to Marshall, the split in design responsibilities led to what he refers to as disurban creation - the design of dull and dysfunctional layouts that are deprived of identity, vitality, or urbanity. While a number of highways and roadscapes of industrialized cities fell into the hands of engineers and perhaps led to a “disurban creation”; modern architects and planners also contributed to the disconnected pattern of urban cities with proposals based on organizational strategies that ultimately separated road and building.

In the 1960’s Geoffrey Jellicoe took a cue from Le Corbusier’s Plan for Algiers with his design of Matopia. The organization of Matopia was based on the idea that major highways could run atop buildings and their functions. Therefore, residential, office, and commercial spaces were all located underneath an elevated highway. In addition to a layered building – path relationship, the city was laid out in a grid pattern formed by elevated viaducts. In between the grid system there were to be large, park-like open spaces. Although Jellicoe’s plan included building, road, and landscape, into a physically integrated unit, the spaces for transition (i.e. roads and paths) did not provide vi-

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18 Ibid., 7.
19 Ibid., 9.
20 Bell, Carchitecture, 32.
able connections to the spaces for living. Similar to modern city planning of Jellicoe’s time, the experience of pedestrian-scape, road-scape and building remained disjointed.

One of the fundamental strategies of modern planning is illustrated in a statement said by Le Corbusier, “a city made for speed, is made for success.”21 In modern planning, buildings and open spaces were for people, and roads were for motorized vehicles, hence the two were treated as separate elements within the city. Le Corbusier’s city planning concepts were praised by architects of the modern era, and as a result, the disconnected pattern of cities flourished throughout industrialized cities and is still a part of today’s urban experience. However, the influence of the automobile in modernism proved to put a strain on the social and experiential quality of cities. Planners and architects thought it necessary to turn buildings away from the road in combination with the sudden need to accommodate the popularity of the automobile as a dominant mode of travel in Europe and North America, the street as a public space became less frequented by pedestrians. The street lost its vitality ultimately because it was no longer multi-modal.

The primary consequence of modern planning was that urban cities were unable to effectively accommodate multiple modes of movement. Places for walking became overshadowed by the effects and abilities of the motor vehicle. Because planners and designers were responding to the physical capabilities and constraints of the automobile, the human connection to mobilescapes was neglected. It is the person, not the car, who experiences motion.

21 Dirk Meyhöfer, Motortecture: Architektur Fur Automobilitat = Design for Automobility (Ludwigsburg: AVerdition, 2003), 20
Although the effects of modernism exist in our 21st century landscapes, contemporary designers began revolting against modernist ideals in the early 1990's. One of the movements that make an effort to reclaim the street back to the pedestrian includes New Urbanism.\textsuperscript{22} New Urbanism is an international movement that advocates place-making within our cities, towns, and villages through the promotion of ten principles which include: \textit{walkability}, \textit{connectivity}, \textit{mixed-use & diversity}, \textit{mixed housing}, \textit{quality architecture and urban design}, \textit{traditional neighborhood structure}, \textit{increased density}, \textit{smart transportation}, \textit{sustainability}, \textit{and quality of life.}\textsuperscript{23}

With the introduction of New Urbanism, the organization of the street started to revert back to the grid system apparent prior to modernism. The width of the street became more compact to encourage denser, sustainable, mixed-use developments. In addition, buildings were placed adjacent to roads and turned their fronts back to the street to encourage pedestrian use and safety. Open spaces were then placed within and in-between buildings to formulate more courtyard settings.\textsuperscript{24} Although New Urbanism has attempted to provide more walkable and connected communities to support sustainable living, the movement tends to supplement car-oriented developments. Opponents of New Urbanism argue that the approach supports suburban development and sprawl composing cities of segregated neighbor-

\textsuperscript{22} Marshall, \textit{Streets & Patterns}, 8-10.
\textsuperscript{24} Marshall, \textit{Streets & Patterns}, 8-10.
hoods. As a result, New Urbanism encourages high car usage over more sustainable transit options.25

While New Urbanism is occurring on the planning end, architects and designers of the 21st century have also addressed mobility. Contemporary projects that respond to mobility largely deal with three issues of disconnection: the building-path relationship, multimodal coexistence, and multi-level access. In order to accommodate these issues, current mobilescapes tend to use intertwining, weaving, and overlapping as a primary design strategy.

**Building - Path Relationship**

Similar to their modern predecessors, today’s architect is confronted with the building-path relationship and how the two – architecture and mobility – interact. Unlike the street patterns reminiscent of the 1960’s where building and road are largely separated, contemporary proposals are exploring how transport modes can overlap and intersect with architecture. In a project proposed in 1995 by NL Architects, a car park in Amsterdam is intertwined with building. The road-scape and parking is layered on top of the architecture consisting of restaurants, shops, hotels and housing.26 The idea is similar to Le Corbusier’s concept of placing building function underneath movement systems, but this scheme alternates the levels and positions of the building. Unlike Le Corbusier’s and Jellicoe’s schemes, this project offers diversity in space and movement by ramping the road and the

building up, down, over, and under. The intertwining doesn’t completely isolate the different modes of movement, perhaps offering a viable relationship between movement types and building.

Another project that redefines the building-path relationship of the past is a conceptual design developed by Monolab, an architecture firm located in the Netherlands. The design is a reversal of the modernist scheme presented by Jellicoe in the 1960’s. Instead of elevating the road, the open spaces are elevated, and the rest of the city is positioned under an ‘envelope’ of open public space.27 The layers of the city are stacked upon each other – parking, shops, and homes – in-between a series of atrium that let in air and light.28 Despite the openings for light and air, the scheme underneath the open space may be difficult to navigate and highly encourages indoor living. The environment is comparable to an underground development where one can become easily disoriented and unaware of one’s location in relation to the primary surface. In addition, the design completely separates open space from the rest of the city. The scale of the topmost layer looses the opportunity to provide intimate spaces. Will the large open space above the development really be used, or will it become a vacant feature that raises concerns about safety issues? While the concept does integrate the car with architecture as seen in the previous project, the car has to navigate through an underneath maze, disconnected from the outside world.

27 Ibid., 153-156.
Multi-modal Coexistence

The second issue of contemporary urban designs responding to mobility is the coexistence of multi-modal transportation types that accommodate pedestrians, motorists, cyclists, mass transit riders, skaters and so on. The aim for sustainable communities within the past decade has encouraged the use of various types of transport other than the automobile. “The focus is now on creating “pacified” public spaces, where all types of transportation can coexist harmoniously.”29 In a city plan designed by Dutch architects Cie, a “green sheet” of open space, landscape, and paths, overlaps a major highway. Once a physical barrier for pedestrians and cyclists, the layered network allows for multi-modal movement within this particular section of the city. The project includes a 3,000 space car park and a weaving of circulation types that allow motorists, cyclists, and public transport users to travel together.30

Monolab also invests interest in the organization of infrastructure. Many of their projects propose a layering of multi-modal movement where paths overlap, intersect, and undulate. Their design of Delft South Station is intended to link highway, public transport, local traffic, and cycle routes – what resulted was a multi-level circulation network. The same is true of their other designs Infrascape Breda Sands and City Center Leidsche Rijn. The projects layer the various modes of movement to organize the site and create a sense of order. In the proposal for Infrascape, the first level consists of circuitry for pedestrians and cyclist, the second level is dedicated to faster moving traffic – freeway, highway, and railway. The topmost layer of landscape

29 Mouvement, Architecture on the Move, 152.
30 Ibid., 158.
“oozes” into the sub-layers, separating yet connecting the various types of movement.\textsuperscript{31}

The projects that have evolved from tailoring the needs of multiple transport types suggest layering and overlapping for reasons of safety and convenience. What is happening again is a separation of path types. Although strategies of modernism included the unsuccessful separation of vehicular road and pedestrian path, contemporary strategies separate and reconnect paths through weaving and intertwining. The process of weaving/intertwining does not completely sever the relationship between pedestrian-scape and road-scape, but really aims to alternate their coexistence where necessary.

\textbf{Multi-level Access}

With the need to accommodate multiple-modalities, 21\textsuperscript{st} century architects and planners are also faced with the issues associated with multi-level access routes. In an attempt to organize movement types (i.e. the car and the pedestrian) and direction, roads and other forms of transport systems tend to evolve into overlapping, layered networks. The concept of overlapping isn’t new. In the late 15\textsuperscript{th} Century, Leonardo da Vinci envisioned an ideal city that promoted safety and efficiency by incorporating elevated pedestrian walkways over service streets.\textsuperscript{32} This planning strategy has evolved into the modern day skyway – elevated pedestrian networks, the elevated highway, and other types of elevated movement systems.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{green_belt.png}
\caption{“Green Belt”, a conceptual model proposed by the Dutch firm Cie. Source: Architecture on the Move [Institute of Movement, 2003].}
\end{figure}

\textsuperscript{31} Reader on the Aesthetics of Mobility, 120-127.
Despite answering safety and convenience issues, elevated alternatives have created additional city planning problems. Although the skyway is useful because its pathways connect destinations without the disruption, discomfort, and danger of motorized transport and vice versa, the problems of the street go unresolved and the second level results in a “second city”. This “second city” can threaten activity on the primary street level, create social stratification, and prohibit public access when owned by private entities. The prosperity along the street is questioned as commercial activity decreases and the alternative level becomes the major focus. As the “second city” prospers, property value of the alternative routes goes up and may initiate a division in social class. Wealthier businessmen and support staff will primarily use the skyways while street people, teenagers, and members of the lower class not interested in retail and commercial activity will be restricted to the street.  

The reverse situation, where roads and transport are the elements elevated, has not been thoroughly analyzed. In trying to resolve the issues of multi-modal needs, multi-level environments have become commonplace to urban cities, yet its effects are still unclear. As a result, the second portion of study is dedicated to the investigation of what I term the elevated condition - an understanding of overlapping intersections of movement. A brief look at environments like the Motorway Operations Center in Nanterre, France and a bicycle service station in Plaisance, France illustrate some of the opportunities and issues proposed by the elevated condition.

The first project, the Motorway Operations Center in Nanterre, suspends a building underneath an elevated highway. The
building functions as a facility for motorway maintenance. Below the building there is room for pedestrian access, vehicle access, and parking. The second project in Plaisance, France is a cycle service point. The 550 square meter site is comprised of a tiny building that stores bikes for cyclist that use the Regional Express Network (RER), a form of rapid transit in France that connects Paris to peripheral suburbs. “Housed under an imposing viaduct, this light, low-cost public amenity brings life to space that is often put to no purpose at all.” Both these projects reveal a few questions regarding the elevated condition that are briefly addressed in the second part of this project: what types of uses are developing in these spaces, how does the project respond to multi-modal access, and is the scale conducive to multi-modal traffic?

Summary

The evolution of mobility has brought up several issues. One, cities are still facing the challenge of how to organize and design for the circulation networks of multiple-modalities. Two, multi-level systems are a direct result of multi-modal issues that have resulted in overlapping conditions. And three, there is more to evolve in terms of design approaches to mobilescapes.

As I sort through the evolution of mobilescapes, I have concluded that the design of circulation networks is largely a by product of urban organizational strategies that tend to separate architecture, path, car and pedestrian. In many cases this disjointed ap-

34 Meyhöfer, Motortecture, 51.
approach to transport planning has resulted in multi-level solutions that introduce thoughtless elevated conditions. Although only a portion of transport networks, the elevated highway or elevated condition is a significant component of the urban landscape. It serves to organize intersections of movement and is an efficient solution to urban density as elevated systems minimize buildable footprints. Although a valid solution, what are the key design issues of overlapping networks? How will the current conditions of elevated systems affect the future development of overlapping junctions?

This project will explore the opportune and problematic characteristics of the elevated condition. In addition to identifying significant issues of multi-level networks, this project questions the approach to designing for mobility. Since the advent of the car, road designers have relied on organizational strategies to implementing transport networks within the urban plan. Le Corbusier and Sant’Elia both recognized the opportunity and importance of the automobile in the design of cities. However, both men proceeded to approach city planning by exploring the relationship between architecture and roadscape. As a result, their design proposals were based on organizing those functions. Le Corbusier placed architecture beneath highway and Sant’Elia used highways to intersect into building. What both strategies lacked was a reaction to the experience of mobility. Their designs were about locating architecture and road, rather than understanding movement.

Modern planning also relied on bifurcated organization to formulate urban transport networks. Buildings and roads were completely separated because the car allowed it. Buildings didn’t need to be connected by pedestrian paths; restricted by one’s
walking radius. Modern planning let the car’s capabilities and constraints determine the organization and pattern of the city. As a result, the safety and life along pedestrian streets became overshadowed by the fast paced highway. But what did traveling at higher speeds mean? What were people experiencing while in transit? Were designers of transportation networks and urban cities aware of the mobility experience?

While contemporary projects have illustrated an improvement in developments responding to multi-modal needs, the strategies for mobility continue to rely on the organization, location, or placement of circulation. Twenty-first century designs for transportation networks tend to use weaving and carpeting as an approach to a more complex organization. The affects of undulating, overlapping, and intertwining does more than separate modal types, but also allows physical and experiential connections between multiple modes and functions to occur. Weaving as an organizational approach to designing circulation networks starts to address the issue of the human experience while in transit. Networks that weave increase the proximity of bodies and modes of transit; creating more interactive experiences for moving along a path. In addition, the view of weaving routes can aide in orientation. As one travels through intertwined spaces, there is a response to perception – what one sees and feels while moving through a space. This project recognizes the importance of perception and looks to expand on contemporary design strategies that address the human experience of movement and mobility.
Modern and contemporary urban design strategies introduce the elevated condition – a series of overlapping circulation networks - and with questions of how to utilize, deal with, and plan for these spaces. The complexity of multi-modal connectivity is evolving in Honolulu, Hawai’i. The city is in the process of developing an elevated rapid transit system within its landscape and many are unsure of its physical and social impacts. How will planners approach the design of the elevated system? What are the issues and conditions of existing overlapping intersections that will be critical to new circulation networks? The goal of this project is not to discredit the proposed elevated rail system, but to provide insight to how Hawai’i can utilize an alternate design tool by understanding one’s perception in motion.

**Honolulu Transit Proposal**

The new rapid transit will be a 20 mile long route running from the city of Kapolei to the Ala Moana shopping complex, following a linear route comprised of 19-23 stations. Its structure will be elevated 30 feet for most of the way and held up by a sin-
gular concrete column system. The tracks are proposed to be elevated for several reasons. First, the cost of superimposing a transport system over an existing context is less than constructing an on-grade or underground system. Second, an elevated system is considered to take up a minimal amount of footprint compared to rail situated at ground level. Third, an elevated system ensures that the rail will not be affected by roadway traffic.36

Given that the system will be elevated for a span of 20 miles, the rapid transit will be a visible part of O'ahu’s landscape. But what will be visible from the rapid transit? What will the perception be riding along the transit path, above the cityscape? In order to understand the elevated condition introduced by the new rail plans, I have composed a video that illustrates and simulates the elevated condition of the mass transit experience. The purpose of the video is to provide planners and architects with a design tool that captures an awareness of perception in motion.

Capturing the conditions of the overlapping highway led me in two directions. At some point in the project’s process I was interested in the spatial issues that would be set forth by the new transit system. I was concerned with addressing the physical characteristics of the elevated condition, exploring the opportunities and weaknesses of lighting, scale, structure, and use. I later began to question the design determinants of mobilescapes. Historically, planners, urban designers, and architects have used hierarchy of speed and the separation of modal types to layout a city and its infrastructure. Is there another means of designing for places of transition and mobility? Progressively,

I became interested in understanding the perception of the elevated rail experience in order to develop a design tool for the Honolulu transit system.

Before discussing the issues of perception in motion and the details of the film, I will introduce several spatial qualities suggested by the elevated highway. The physical issues are worth mentioning as they are important design factors to consider, and further emphasize this project as a design tool for the development of the mass transit system.
I started off this project searching for sites that would be appropriate for my research and film documentation. There were six sites that I investigated, all overlapping highways within the context of Honolulu. The sites included the intersections of the H1 Freeway over Pi‘ikoi and Pensacola in Makiki, Ke‘eamoku over the H1 in Makiki, the H1 over Kapahulu and Kapi‘olani in the Market City area, the H1 over Palama Street in Kalihi, the H1 over Nimitz near the Honolulu International Airport, and Pu‘uloa Road over the H2 along the Moanalua Freeway. Although these sites will not be potential station stops along the proposed route, they are examples of how Honolulu has dealt with the elevated condition. This section includes information from an earlier version of my video process and is intended to compliment the final product discussed in the following chapters.

**Video Documentation 1**

This first inquiry revealed several issues and design questions regarding the spatial components – **structure, scale, lighting, and use** – of overlapping circulation networks. This portion in-
troduces the design issues of the spatial components and is followed by images from the video that provide a visual illustration of the potential problems and opportunities of existing elevated conditions.

**Structure:** First, the **structure** of the elevated condition can be broken down into four necessary elements: the overhead planes, the highway, the columns, and the walls. The overhead component, resulting from the elevated highway, provides a form of shelter protecting the environment below it; blocking out outdoor elements such as sun and rain. At the same time, the elevated highway, in conjunction with the columns, produces a porous condition where light, air, and movement can permeate through the space under the elevated transport route. Because the structure in its most basic form serves as a shelter, is there a way to enhance this opportunity? In addition, how can the natural permeability of the structure be taken advantage of in future development?

Other design decisions regarding structure that should be considered include:

- Enhancing the overhead feature for optimum multimodal usage
- Addressing large, blank walls
- Reinforcing or limiting the structure’s role as a barrier or divider

**Scale:** The second physical component analyzed was the scale of existing elevated conditions. After visiting all the sites and walking through the lower portions of the overlapping condition, the scale from within the covered space is quite intimate. How-
ever, when viewed from a distance, the elevated condition is often perceived negatively as massive, cold, and heavy.

The considerations I found relative to scale consist of:

- The width and height relationship of the underneath space
- The length, linearity, and breakdown of the site
- The adjacencies perceived when travelling above

**Light:** Light was an additional component of the elevated condition investigated. The important design factors relating to lighting are:

- Addressing the transition from adjacent areas where light is glaring to the surrounding underneath space, where light is dim
- The integration of artificial lighting
- The incorporation of slits, gaps, and apertures that allow light through

**Use:** The most obvious features of the overlapping condition are the uses that have developed. The various overlapping conditions analyzed how various types of use, both planned and unplanned, that could be included in the design of the future transit system. The opportunities presented by the structure provide favorable conditions for use. The six instances surveyed in Honolulu pointed out several uses that have evolved within the overlapping condition:

- Building
- Recreation
- Parking
- Storage
• Shelter
• Landscape
• Vacancy

As the uses evolved as part of the elevated condition, will they also develop within the design of the proposed mass transit system?

The proceeding images illustrate the existing issues of structure, scale, light, and use.
Figure 19. Because the overlapping structure presents a form of shelter, the city’s homeless also utilize the spaces underneath highways. By day, the sites may be used by the public at large, but by night the homeless also become a part of the elevated condition. Is this a function that can be included into the future elevated transit system?
Figure 20. (light) Nimitz area illustrating the porous quality of the elevated condition. How can gaps and apertures be used to strengthen the experience of the elevated condition?
Figure 21. In Makiki, the storage located across the post office consists of a pile of shipping containers blocked off by flimsy, green fencing. In the Market City area, storage and parking are shoved to the side, partially hidden from view. If that’s what the space wants or needs to be, why not express it? How can the storage be a part of the structure instead of being thrown under the highway and neglected? How can the future development incorporate storage and parking?
Figure 22. [structure] Overhang in the Makiki site that has not been used to its potential. The sidewalk ends and limits pedestrian access in order to accommodate vehicular circulation.

Figure 23. [structure] At a distance, the elevated condition divides and separates space. Should this feature be enhanced in terms of planning for adjacencies?
Figure 24. [structure] In Kalihi where the H1 extends over Palama Street, the walls that support the highway above go unnoticed when driving by, but as one passes through at a slower speed, the obtrusiveness of the walls become more apparent.

Figure 25. [scale] Both the Kahala overlap and the Nimitz overlap consist of two layers of highway moving parallel, resulting in a long corridor for the car underneath. Therefore, the scale is more conducive to the speed of the automobile rather than to the human scale of the pedestrian.
In Makiki and Kalhi, artificial lighting is placed onto the structure’s ceiling, but appear as afterthoughts. There is an opportunity to make use of artificial lighting at night to make the site safer and visually interesting. How can the lighting be more integrated into the site?

In Moanalua where the H2 runs under Pu‘u‘uola Street, the leftover space is designated for tennis, basketball, and park activities. The openness of the structure, in combination with the permeability of the overlap provides an ideal condition for outdoor activities in Hawai‘i. In addition, the state can double up its land use by providing municipal activities parallel to state highways.
Summary

The existing physical characteristics of the elevated condition that have been captured in Honolulu, offer insight into what may become of the elevated transit system. In addition, the study provides a reference to what characteristics and components can be beneficial or disadvantageous to the new development.

The physical components of overlapping intersections provide ideal conditions for use. The structure’s overhead elements that provide shade, and the intimacy indicated by scale, reveal the potential of the underneath spaces. The challenge is to find ways to incorporate this knowledge into the overlapping transit system. How can the porosity of the structure be enhanced, how can the concept of the overhang be taken advantage of? If the new development does not take advantage of the spatial qualities inherent in the overlap, then the same types of uninviting and under utilized spaces will continue to permeate through O‘ahu’s landscape. Why not take advantage of the opportunities? How can the system be more than just a route running through Honolulu? The various uses of the elevated condition suggest what may develop within the overlapping spaces. Because the common uses are known, is there a way to include them into the design? If so, how can recreational areas, storage areas, and temporary shelter be integrated in the design?

An attention to the physical attributes within the elevated condition raises valid questions that can enhance overlapping experiences. While the physical components of these junctions affect the experiential quality of a space, I feel there is more to be uncovered about the elevated condition. As thoroughfares,
the existing elevated conditions in Honolulu do not account for
the experience of movement, speed, and motion.
While developing a sense for the common spatial qualities of the elevated condition, I began to consider the organization and content of the film. The video’s intention was always to be a design tool. Essentially, I wanted to offer a new way of approaching the design of the rapid transit for Honolulu. I began by analyzing the sites’ physical components. The study helped me to isolate issues of structure, scale, lighting, and use. However, the analysis did not provide the additional design method I was looking to establish, nor did the content of my research validate the use of film.

As I composed the video, I questioned the use of the medium; why was I using film to capture what a still image is capable of illustrating? The fieldwork that I had done thus far concentrated on static components of the elevated condition. I could take a picture or draw a diagram of the issues I was addressing. What was the point of utilizing film? My initial interests for the D. Arch project were based on the organization and experience of movement, mobility, speed, and transition paths. Reevaluating my initial concerns supported the use of video. The video could be
a means to illustrate the experience of transitioning from one destination to another. More specifically, the film could document and capture perception while moving at various speeds.

The study of perception in motion focused on the potential experience of the elevated condition brought forth by Honolulu’s transit proposal. I believe understanding the experience of mobility can lead to a change in design strategies for transport networks. Design approaches for transport systems are inspired by organizing various movement types; using speed requirements to determine the layout and modal interaction of an urban city. This strategy is a two-dimensional approach that separates modes of varying speed rather than supporting and responding to the experiential needs of multi-modal environments. Therefore, this project attempts to understand and illustrate the experience of the elevated condition by capturing and documenting one’s perception in motion through the use of film.

The video makes use of three elevated conditions to project the Honolulu rail experience. The sites used are not potential stops along the proposed route, but are elevated conditions that help to illustrate elevated experiences in urban Honolulu. The film follows the sequence of movement between stops and simultaneously points out the underlying issues of each elevated condition. The simulated rail experience begins with a stop in the Nimitz area. The overlap of H1 with Nimitz highway is used to illustrate the integration of the built world with the green world. The sequence moves southeast to the intersection of H1 over Pi'ikoi and Pensacola in Makiki in order to reveal the integration of light and dark. The final stop within the video’s rail experience is Market City where H1 overlaps the cross streets of Kapi'olani
and Kapahulu. This area highlights the conflict between human activity and transportation.

In order to highlight a specific comparison, I used each site to illustrate each theme: the natural and built, light and dark, and human and motor. I chose these comparisons because they are the primary visual elements of a city. In addition, each site showed potential strengths and weaknesses of each theme.

The video simulates the experience moving along the rail at the elevated level and highlights the condition underneath. Understanding the differences of perception in motion at the top and bottom levels is an important part in establishing design strategies for the various modes of mobility (pedestrian, bicyclist, car, rail etc.) moving at different speeds. The film distinguishes between the two levels by establishing a split screen divided horizontally; the upper level is shown above and the lower level corresponds to the bottom portion of the screen. The film demonstrates the two simultaneously at certain points to compare the rail experience occurring above with the motor or pedestrian experience below.

In addition, the film compares the current experience of 2009 with simulated clips of the projected experience twenty years down the road. The 2009 footage is displayed first to expose the current perception in motion within the context of Honolulu. The current experience illustrates potential opportunities of landscape, lighting, and human activity that have been discounted. The 2030 simulation begins to address these potentials by suggesting design options that respond to the perception of the 2009 experience. The suggestions are meant to inspire alterna-
tive strategies for dealing with the natural/built, light/dark, and human/transport relationships.

The following section looks at the film in greater detail. It incorporates the video sequence with analytical descriptions of the current and the projected elevated experience. The goal of the video is to encourage designers to address the experience of moving along mobilescapes. In addition, the film introduces the study of perception in motion as a means to inform design.
1. Current Condition 2009

- Site 1 [natural + built]: domination of built, cold, repetitive, monotonous
- Site 2 [light + dark]: dark, speckles of light
- Site 3 [human + transport]: lack of pedestrian environment, primarily for car

2. Rewind/ Fast Forward

3. Future Projection 2030

- Site 1 [natural + built]: alternate more landscape, warm
- Site 2 [light + dark]: alternate lighting, increase visibility, highlight elements
- Site 3 [human + transport]: increase pedestrian-scapes, multi-modal condition, pedestrian accessibility
Figure 28. Site 1 is a commercial and industrial zone in the Nimitz area.
Figure 29. Site 2 is a residential district in the Makiki neighborhood.
Figure 30. Site 3 is a commercial area in Kapahulu.
Figure 31. This video compares the elevated rail experience by foot...
Figure 32. On rail.

Figure 33. By car...
Figure 34. Site 1, the overlap of H1 over Nimitz Hwy, focuses on the relationship of the natural and the built.
Figure 35. The experience below is cold, repetitive, monotonous, and filled with columns.

Figure 36. Above, the view is dominated by the built environment of low-lined industrial buildings. The projected experience is cold and dull.
Figure 37. The 2009 experience I envision integrates the natural with the built.
Figure 38. Alternate green blur with built environment to frame views.
Figure 39. Insert green below between structure to soften hard-scape and add interest to repetitive nature of columns.
Figure 40. Site 2, where H1 overlaps Pi'ikoi and Pensacola, illustrates the relationship of light and dark.
Figure 41. Underneath, the experience is confusing and disorienting as it is hard to see the surroundings or activities going on.

Figure 42. Current 2009 above condition is dark, with a hint of light emanating from buildings in the distance. The experience is disorienting.
Figure 43. Alternate blur of light to add visual interest. Light can highlight points of interest, events, stops, and time of day.

Figure 44. I see the 2030 experience incorporating more innovative lighting techniques.
Figure 45. Insert lighting below to make pedestrian environment more visible and safe.
Figure 46. Site 3, where H1 overlaps Kapahulu and Kap'olani, highlights the conflict of human and transport.
Figure 47. The elevated experience at Market City lacks human activity, disconnecting the rail experience from the city.

Figure 48. Below the experience accommodates the car. The sidewalks are vacant because pedestrian environments are limited.
Figure 49. The 2030 experience needs to incorporate more human activity around the transit network to sustain rail ridership.
Figure 50. Alternate human activity above by introducing skate parks and bike paths, putting the city's residents on display.
Figure 51. Insert more accessible paths for walkers, joggers, cyclists, and skaters.
Figure 52. The projected experience makes one feel uninterested, disoriented, and disengaged. The faster we go, the less engaged we become with our surroundings. Our perception changes as we travel at different rates of speed and face different directions.
Figure 53. The simulated rail experience introduces a blurred effect. The position of an object in the landscape determines whether one’s view is in focus. Elements in close proximity become blurred while objects at a distance are in focus. How can this phenomenon be incorporated into the rail experience?
Figure 54. Traveling by car and by foot beneath elevated systems has many interruptions: stoplights, intersections, bus stops. How can design respond to the perception of stopping, pausing, and starting?
Figure 55. Alternating moments of blur with clear distant views could frame distinct elements of the city and engage riders with their surroundings. The proximity of blurred objects creates an environment for the rail experience.

Figure 56. Incorporating more landscape lighting and human activity increases human activity that helps to sustain rail ridership.
Conclusion

The project illustrates two major points. The first is that an alternative concept to transport network strategies can influence design decisions. Second, the use of video as a design tool in architecture suggests another method by which a designer can understand the complexities of urban cities in real time, in real environments, and with real people.

Perception in Motion

The final video product focuses on the movement, interaction, and speed of people with transport systems and within transport systems, in order to understand human perception in motion. The exploration of human perception in motion addresses three comparisons regarding the elevated experience. One of the comparisons highlighted in the film was the distinction between different rates of speed – on foot, by car, and by rail. The second comparison addressed in the video is the current 2009 experience with a projected 2030 vision. Lastly, the video documentation compares three themes that introduce the key issues
in designing for perception: **natural and built, light and dark, human and transport.**

**Rates of speed:** Portions of the film demonstrate how human perception, at different rates of speed, provides different experiences. The rail experiences by foot and by car primarily occur underneath Honolulu’s elevated transport paths. In contrast, the speed of the elevated rail above is simulated. The speed of cars and pedestrians at the lower level has many interruptions – stoplights, intersections, bus stops. Therefore, the experience of movement at ground level is one that is in a constant state of stopping, pausing, and starting. In contrast, the rail experience is less interruptive. While there will be stations every one third of a mile to two miles, the journey at rail level is projected to be quicker and more continuous, compared to car and pedestrian movements occurring below.

The rail system alters one’s experience of the city. Travelling at faster and more continuous speeds while looking perpendicular to the direction of movement changes one’s perception of the landscape. The position of an object in the landscape determines whether one’s view is in focus. Alternating between clear and blurred moments responds to perception at the speed of rail. The variation between views that are in focus and those that are out of focus heightens one’s awareness of activities taking place both near or far. Alternating the depth of visual elements also has the potential to indicate and highlight distant vistas of the city to the rider. In contrast, creating blurred environments engages the rider with activities and surroundings occurring at closer proximities.
Below, where movement on foot and by car is more interrupted, there is an opportunity to address the perception of pausing and hesitation. Currently, the conditions at ground level are reflective of a transition space. These areas beneath elevated systems are not places that respond to people waiting for the bus or people looking to take an afternoon cycle. Instead, they are thoroughfares - conduits that allow vehicles to move - and don’t take into account the multiple speeds and perception of other modal activities like walking, running, skating and biking. By inserting visual elements, such as landscape, lighting, and people, designer can begin to address the stop and go action of the underneath condition. Inserting elements in response to the perception of various modes of movement provides environments that suit the needs of people stopping and waiting for the bus or people walking/riding and pausing at intersections.

**2009:** In addition to encouraging design that responds to the different rates of speed, the film also establishes the current conditions of Honolulu’s elevated networks as it were to be experienced in 2009. The imagery from the video documentation reveals that the current elevated condition discounts three interactions that supplement richer experiences: the *natural and the built, the light and the dark, and human and transport.*

The *natural and built* theme is reflected at the Nimitz site where the H1 freeway overlaps Nimitz Highway. The existing experiences, both above and below, are largely dominated by the built environment. Below, the structure of the elevated system is repetitious and monotonous revealing column after column a cold, hard-scape. Above, the similarity of the low-lined grey industrial buildings becomes a cold, mundane image. Both are uninviting.
The lack of integration between light and dark is documented at the overlapping intersection of H1 with Pi‘ikoi and Pensacola. The current projected perception at the elevated level appears dark and disorienting with speckles of light occurring within buildings adjacent to the elevated highway. As one passes through the underneath portions of the Makiki site at night the experience can be quite dark and disorienting. In both cases, it is hard to make out the surroundings and activities taking place. Although the visual experience of darkness can create mystery, interest, even calmness, continuous or extensive moments of darkness can be perceived as dangerous or confusing.

The Market City area, where H1 intersects above Kapi‘olani and Kapahulu, illustrates the conflict between human and transport. Current overlapping conditions are primarily designed at the convenience of the automobile. Because the area is mainly for passing through in a car, where drivers are focused on the road and other cars, there is little attention paid to the visual experience of walking through the current elevated condition. There is a lack of consideration for other modes of mobility. Walking, cycling, skating, and jogging access is limited and the site does not respond to the perception or experience of these modes of movement. With a lack of pedestrian activity and movement, the underneath space is vacant, cold, and uninviting. The upper level, at its current state, also shows no sign of human activity.

The problem of each site is that there has been limited response to one’s perception in motion. This is mainly because the car, as the dominant mode of transport in Honolulu, doesn’t address changes in perception. The automobile experience is forward focused on the road. As a result, the visual elements that surround these transport networks have been neglected. The land-
scape is lacking, lighting is scarce, and human activity is low; contributing to the cold, mundane, uninviting perception of the elevated condition. Twenty years from now I envision a transport network that responds to perception in motion; integrating natural and built, light and dark, and human and transport. All are visual elements that make up a city, and all have the potential to alter the experience of a city.

2030: The elevated condition could be enhanced by integrating the natural and the built. Above, the landscape, in the form of a linear park or green belt, can appear as a green blur that alternates with the built environment. The rider experiences an understanding of the surrounding activity occurring in close proximity; the green blur as a park beneath the transit system. At the same time, the clear distant view of buildings and landscape provides an overall orientation of where the rider is situated. In addition, the alternating green blur has the potential to frame distinct views unique to the city and can outline major points of interest; becoming a three-dimensional map of sorts.

While the rail experience above suggests alternating views of the natural and the built, the underneath condition, experienced by car, foot, bike etc., also needs more landscaped areas. Integrating more areas of green within the structure softens the coldness perceived below and creates more areas conducive to pausing, stopping, and waiting. Inserting green between built elements starts to integrate the natural with the built, but I believe more innovative relationships between the natural and built can be applied to provide a richer experience for people moving through or waiting for the transit system.
The elevated condition at night is dark, disorienting, and blank. Incorporating more lighting techniques at both levels can alleviate the issues of light and dark. In terms of perception in motion, lighting dramatically contrasts with darker night-time conditions and can be irritable when up close and constant. Therefore, lighting techniques should be used appropriately. For example, the alternating blur of light I suggest at the upper portion of the elevated system can be a sensor that signals a stop is approaching, it could be a series of lights that turn on for specific events in the city, it can be a sequence of spotlights that highlight major points of interest, or it can be an art installation that occurs every hour to announce the time of day. All are suggestions that don’t require a constant state of light. These suggested lighting additions will not only provide visual interest, but will allow a rail rider to be engaged and more oriented with the surroundings. A richer experience of the rail can mean knowing where the next event is, what time of day it is, when one needs to prepare to exit the train, or simply where one is in the city.

Inserting lighting at the lower level responds more to the perception of pedestrians, bicyclists, and skaters who need light to move through the space. Below, lighting is more of a safety issue. Currently, there is not enough lighting underneath the overlapping networks to supplement large amounts of foot traffic. Just as the lighting above could signal a station’s stop, the lighting below could indicate a train’s approach, or the lighting can be a more permanent feature of the underneath experience. For example, the lighting can be used to highlight a specific path that leads to a significant point of interest. In another instance the lighting can border a path; adjusting its intensity depending on the amount of people passing through. Imagine walking along a path or observing a path from a distance that changes
lighting intensities indicating when a large mass of people or a single person will be passing. Currently, the lighting below is quite dull and modest; there needs to be more innovative lighting applications that address experience and one’s perception in motion.

The major element missing from the elevated condition in Honolulu is human activity. While the lack of landscape and lighting contribute to the domination of transport over human activity in Honolulu. There needs to be more accessible paths for walkers, bikers, joggers, and skaters. The paths of Honolulu are secondary to the car, therefore, the majority of Hawai‘i residents choose to drive rather than to walk, bike, or catch the bus. With the introduction of the elevated rail, the city will be perceived from a higher level, making roof-top activity visible. Perhaps buildings that develop near the system can incorporate human activity on the roof. The building could be a gym that advertises its services by having its members do yoga on the roof, a house that likes to have family pot lucks, or a school utilizing its rooftop garden.

In addition to rooftop visibility, the elevated rail perception can include blurred moments of cycling and skating. In 2030 there could be a bike path that runs alongside the transit network, where cycling and skating activity would be on display. Being exposed to human activity while on the elevated rail provides an option that engages the rider with objects in motion and makes them aware of the types of activities taking place adjacent to the rail. This can also signal potential on and off points to a rider.

The new rail system also suggests movement between levels as pedestrians will need to ascend to the platform and descend back to grade. Therefore, there is a need to incorporate more
accessible pedestrian paths and encourage more human activity at the lower levels. Below, pedestrian paths can begin to separate from the path of the car and overlap with the road. Weaving or overlapping of pedestrian paths not only provides more accessibility, but also serves as a visual tool that directs movement and potentially establishes significant points of interest. For instance, a diagonal ramp with people moving upward indicates something of importance happening at the top level, signaling others to follow. Creating more pedestrian inspired environments means there will be more opportunities to engage in social activity, ultimately providing a richer transit experience.

**Summary**

The rail will alter the perception at the elevated level because one’s focus will be shifted away from the road and cars, requiring our surroundings to be more informative and visually interesting. In addition, the video illustrates that the faster people move, the less they are engaged with their surroundings. The 21st Century is a mobile one. As transportation modes evolve, how can designers respond to the changes in speed of both current and future transport systems?

Designing in response to perception in motion can enrich the experience of the city. The rail project is an opportunity to engage the rail rider with surroundings specific to Honolulu, essentially putting the story of the city on display. Riding along the transit route in 2030 I see Diamond Head framed by trees and I am aware of my location, I see my friend inducing an intensity of light - riding her skateboard with a bunch of others, and I see flashes of light indicating the annual open house event in Chinatown. I no longer see row after row of grey columns, I am no
longer disoriented, lost, or fearful in the dark, and I no longer walk alone. The experience of moving through Honolulu is enjoyable and intriguing even if I’m not engaged in conversation or reading a magazine. Overall, the integration of landscape, lighting, and pedestrians will create more awareness of the activities and surroundings engaging riders in the experience of the city. At the same time, these additions provide environments below that are more conducive to the stop and go rhythm of walking, biking, running, and skating.

Ultimately, sustaining the transit system will depend on successful pedestrian environments that work in conjunction with the rail. Therefore, responding to perception in motion will not only provide richer experiences for the end user, but will be of value to the state of Hawai‘i. Integrating more landscape, lighting, and human activity within the elevated condition, introduces additional values of safety, sustainability, and identity. Integrating more areas of green will not only frame important views, but will also provide public parks doubling the transit’s usage. Incorporating innovative lighting solutions will create safer pedestrian environments for the public. More landscape and lighting will increase pedestrian activity that will help to sustain the rail’s ridership.

Although the integration of more landscaping, lighting, and pedestrian-scapes will enhance the rail experience, other types of movement within the experience still need to be further explored. Currently, the elevated conditions in Honolulu do not incorporate much vertical pedestrian movement. The transit system will consist of masses on foot moving between levels, how can there be a richer experience of the escalator, elevator, ramp, and stair? How will designers respond to human perception on
the diagonal? Another portion of the mass transit experience includes the act of pausing. Riders will find themselves engaged in stopping and waiting for the system. How can designers provide richer environments for waiting?

The focus of this project is perception in motion. The film and analysis introduced visual elements of a city and the feeling of viewing the city in motion. However, the term perception also encompasses how sound can affect one’s experience. The further investigation of how humans experience sound while travelling at different speeds could potentially inform the design of mobi-lescapes.

**Video as a Design Tool**

The final video product is a design tool for planners, architects, and urban designers. It suggests an alternative approach to designing transport networks. Instead of focusing on organizational strategies based on speed, the film introduces perception based on speed to inform design decisions. Design methods for transport networks tend to use hierarchy strategies that separate modal types or encourage more car dominated environments. In order to integrate the experience of multiple modes of movement, understanding what people experience while in motion is necessary. Each mode of transport – walking, driving, jogging, biking, skating, and rail – moves at a different speed, allows people to experience the city in different ways, and requires different needs.

This project, in the form of video, brings designers a step closer to understanding human perception in motion. The film has rec-
reated the potential experience of the Honolulu rail system and allows the viewer to witness the perception of the rail experience. Designers can ask: what do I focus on, and how does it make me feel? Based on what is a potential benefit or a possible disadvantage, a designer can then choose to enhance the opportunity or remedy the problem.

I used the video myself to understand the different rates of speed and what that suggests. This observation led me to a rail experience that alternates between the clear and the blur; a phenomenon of perception travelling at the speed of rail. In addition, the film has inspired my suggestions of integrating more landscape, more light, and more pedestrian activity because I initially observed that the elevated experience in Honolulu is lacking in visual interest, yet has beautiful views to offer. Although the video is basic in its proposal to alternate visual elements at the elevated level, and insert visual elements at the lower level, I believe that designers are capable of applying more innovative strategies that integrate the natural and built, light and dark, and human and transport.

In addition, this video can be used by planners and architects who develop further away from the transit system. It is an opportunity for them to see how their properties will be perceived from the rail. Perhaps this project will inspire better planning and better architecture as clients may want their building to be a highlight within the rail experience.

The experience of motion is important for designers to understand as movement is inherent in our nature. The use of video as a medium allowed me to capture human perception. Often, architects and planners resort to drawings, still imagery, and
three dimensional software programs to inspire and produce a design, but this project offers an additional design tool – video. A drawing or photo cannot easily grasp the complexity of perception in motion. Even a computer simulation wouldn’t be able to replicate the reality of the surrounding environment unless footage of the real location is superimposed.

Overall, the use of film as a design tool for architects and planners can help to better understand the experience of a city by car, by foot, or by rail. In addition to further developing awareness for the way people experience a city, film can also be used to supplement other areas of design. For instance, it is an efficient tool for documenting and engaging in site analysis as the site is always at hand. Film can also document the design process to communicate the value of design services to the client. After a project has been completed, video can capture the success or failure of the development. The information can be used to improve on the failures or can be used to promote and market the project’s success. Filming a project after completion can also be used to illustrate the types of environments designers are able to create.

I believe that designers should be constantly engaging in new mediums like film to gain more understanding of the human environment. It is the responsibility of architects and planners to be knowledgeable about how humans interact with and respond to their surroundings. By doing so, designers can provide the public with richer experiences.


