

**On the Right Track: Reinterpreting the Abandoned Railway In the
Arbutus Corridor With Mobile Architecture**

by

Nathaniel J Alkana

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ABSTRACT

This thesis proposes a mobile architecture that moves along an abandoned rail system in Vancouver to provide its neighbouring areas with improved access to amenities and to provide a sense of uniqueness to the Arbutus Corridor. This investigation addresses the corridor's urban value and uses design to test how mobile interventions may enrich the Arbutus Corridor for residents. Re-using existing railway undercarriages, it proposes nine new vehicles that travel along the corridor and serve as catalysts for urban events throughout the year.

ACKNOWLEDGEMENTS

I would like to thank my supervisor Steve Parcell and my advisor Roger Mullin for their insight and support. I would also like thank my external advisor Rory MacDonald for his countless hours of dedication throughout my thesis year. Thank you to my friends Tyler Hall, Bardia Tajik, Will Green, Marc Holland, Aleasha Carr, Rebecca McEachern and Mohammed al-Shafie for your support in the final push of this endeavour. Thank you Nanxi for reminding me of what is important in everything architecture and not. Your support pushed me through the seemingly impossible.

CHAPTER 1: INTRODUCTION

The value of permanence must be proven not merely assumed.¹

Brief History

The Arbutus Corridor is eleven kilometres long, ranging in width from fifty to sixty feet, and sits on roughly forty-five acres of land with minimal topographical variance. It runs north-south through residential neighbourhoods, from north to south: Kitsilano, Arbutus Ridge, Kerrisdale, and Marpole.

1. Cedric Price, *Re: CP*. (Basel: Birkhauser, 2003), 86.



Arbutus Corridor at 16th Ave during the summer looking south



The Arbutus Corridor, Vancouver, BC. City Engineering Department. City of Vancouver British Columbia. Scale 1:15000. 1978.

In 1902 the Canadian Pacific Railway (CPR) began construction on the Arbutus Corridor Line. Both passenger and cargo trains were scheduled to run on it. Electric passenger trains, called interurbans, were discontinued in 1954; freight trains continued to run until 2001.



An interurban streetcar crossing the street, highlighted in yellow. West 41st Avenue looking east toward West Boulevard, ca. 1920. Dunbar History Project. From City of Vancouver Archives. AM1533-S2-4-: 2009-005.255.



Partially constructed B.C. Electric Railway Company streetcar, 1914. Major James Skitt Matthews. From City of Vancouver Archives, AM54-S4-: LGN 914.

In 2000 Vancouver city passed the Arbutus Corridor Official Development Plan which states that the land may only be used for transportation, parks or green-way.² After 2001, when the freight trains ceased running, local residents began using small portions of the corridor for gardens, which were removed by CPR in August 2014.

2. Rebecca Blissett, "City Living: A walk down the Arbutus Corridor," Vancouver Courier, May 20, 2014, <http://www.vancourier.com/community/city-living-a-walk-down-the-arbutus-corridor-1.1067837#sthash.dvhtGOEH.dpuf>.



In 2001 community gardens began to appear.



In August 2014 the gardens were removed by CP Rail for potential track reactivation. "Community gardens ripped up along Arbutus corridor," *CBC*, 14 August 2014.



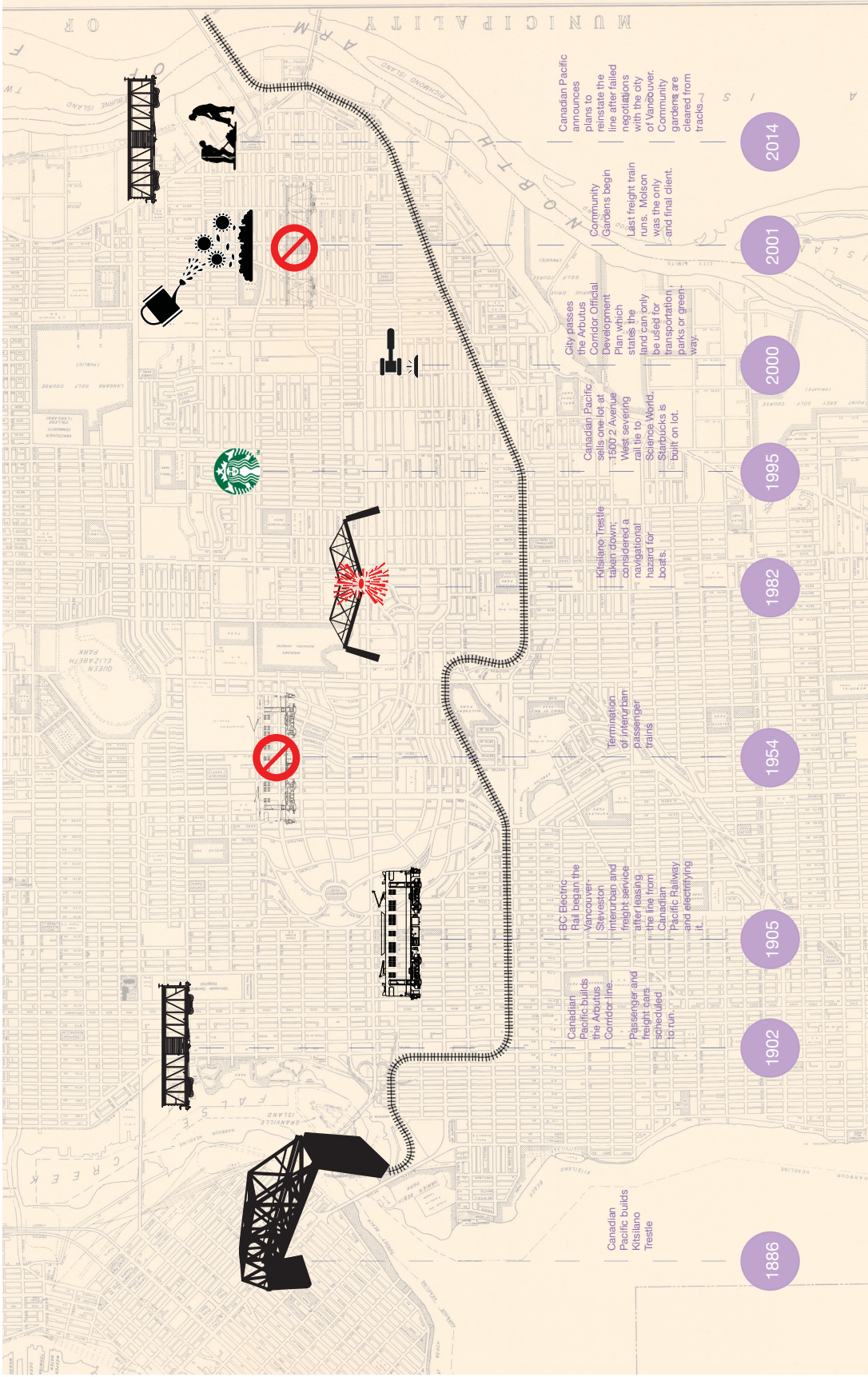
The corridor exists in an in-between area, surrounded by industry, roads and housing. It is unofficially used as a green-way.



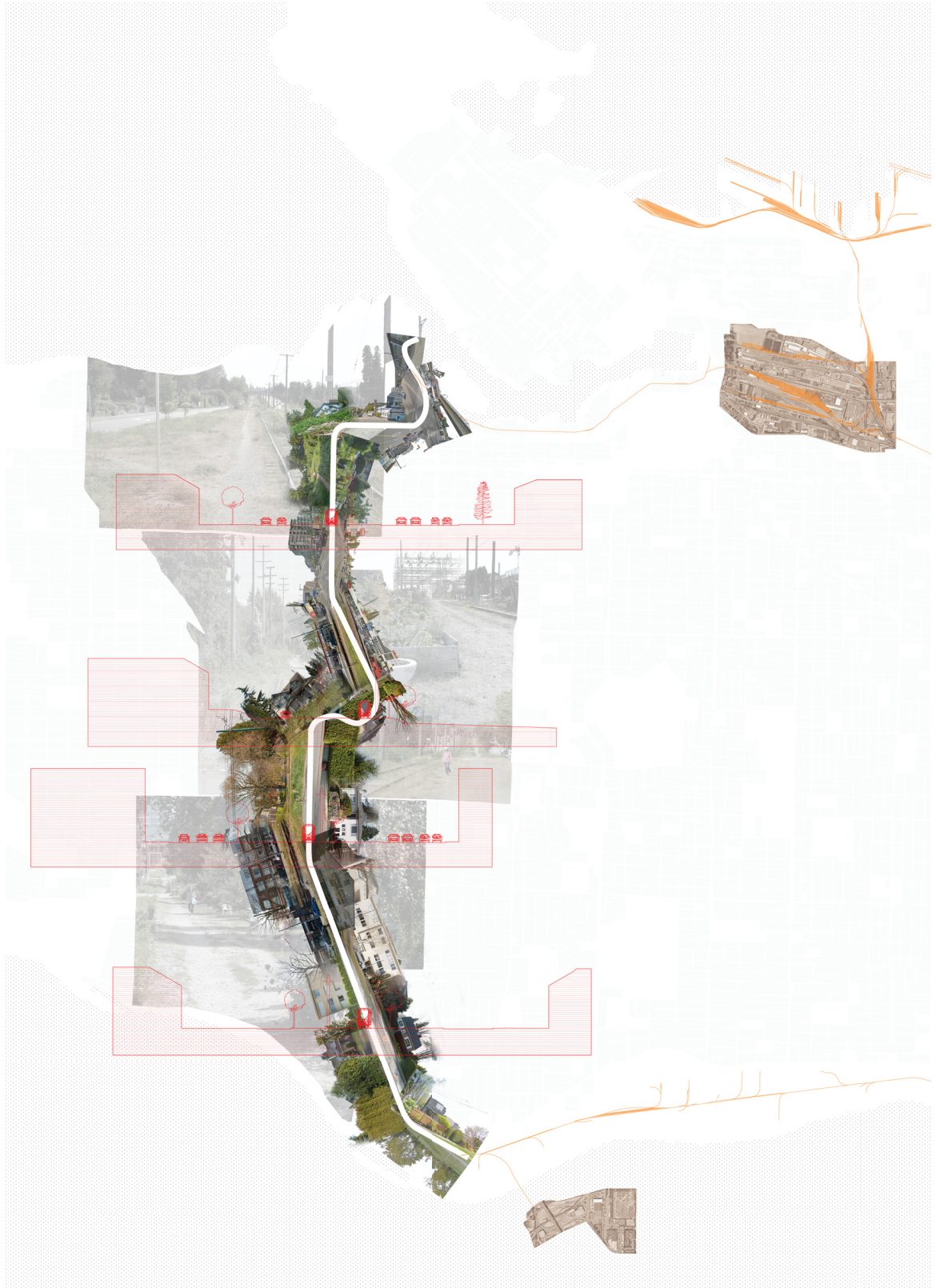
The Arbutus Corridor currently provides nothing more than an abandoned strip of land with an unused railway for its local residents.



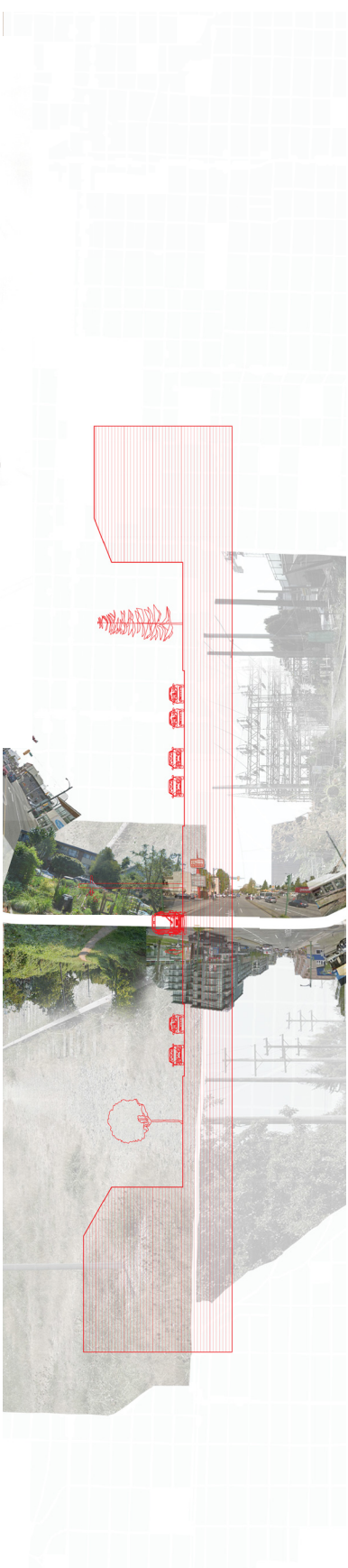
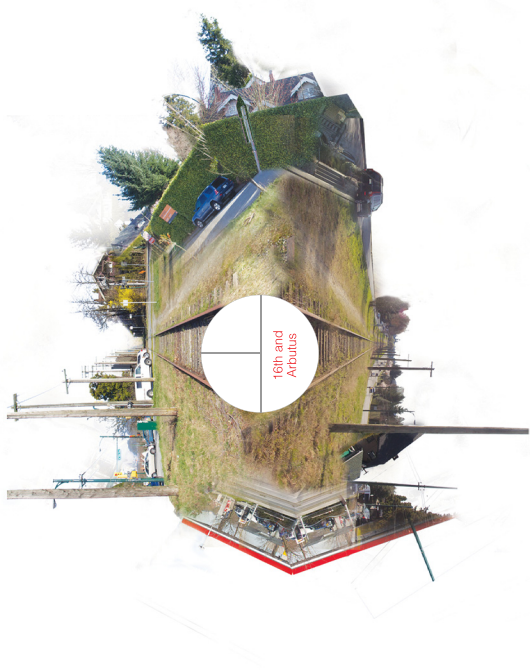
The corridor's future is currently at a crossroads without a clear direction.



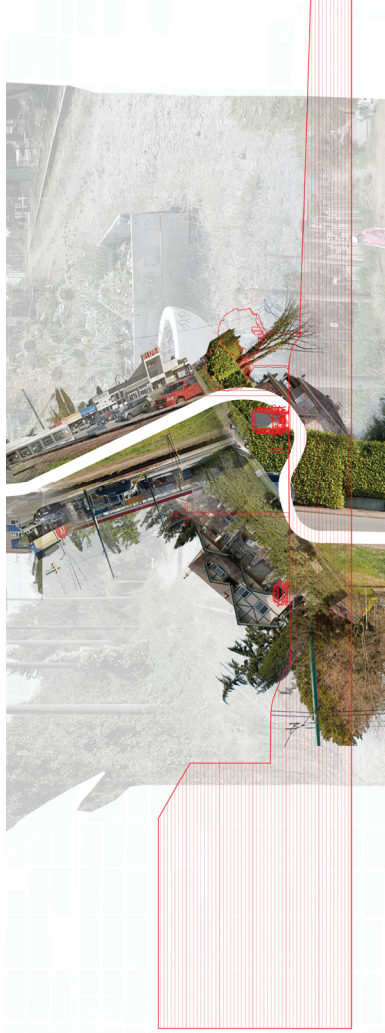
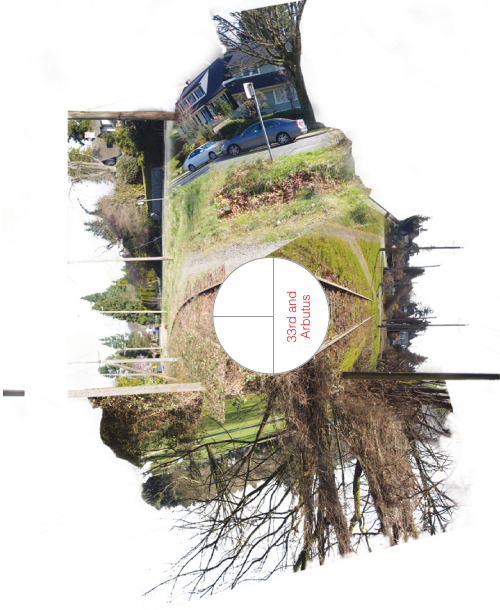
Timeline of events on the Arbutus Corridor



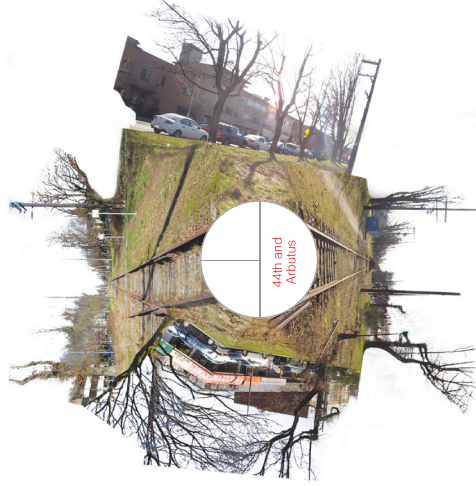
The corridor was studied from 6th Ave to SW Marine Drive. The strip has minimal grade change and is flanked by homogeneous suburban fabric. Four primary points of interest were identified, for their spatial variance. These spaces also correspond with past interurban stops from the 1950s.



The corridor at 16th Ave and Arbutus is flanked by roads, without trees or shrubs. Commercial activities take place north and south of the site. A intervention would bridge the gap between these two areas, connecting segmented sections of the neighbourhood.



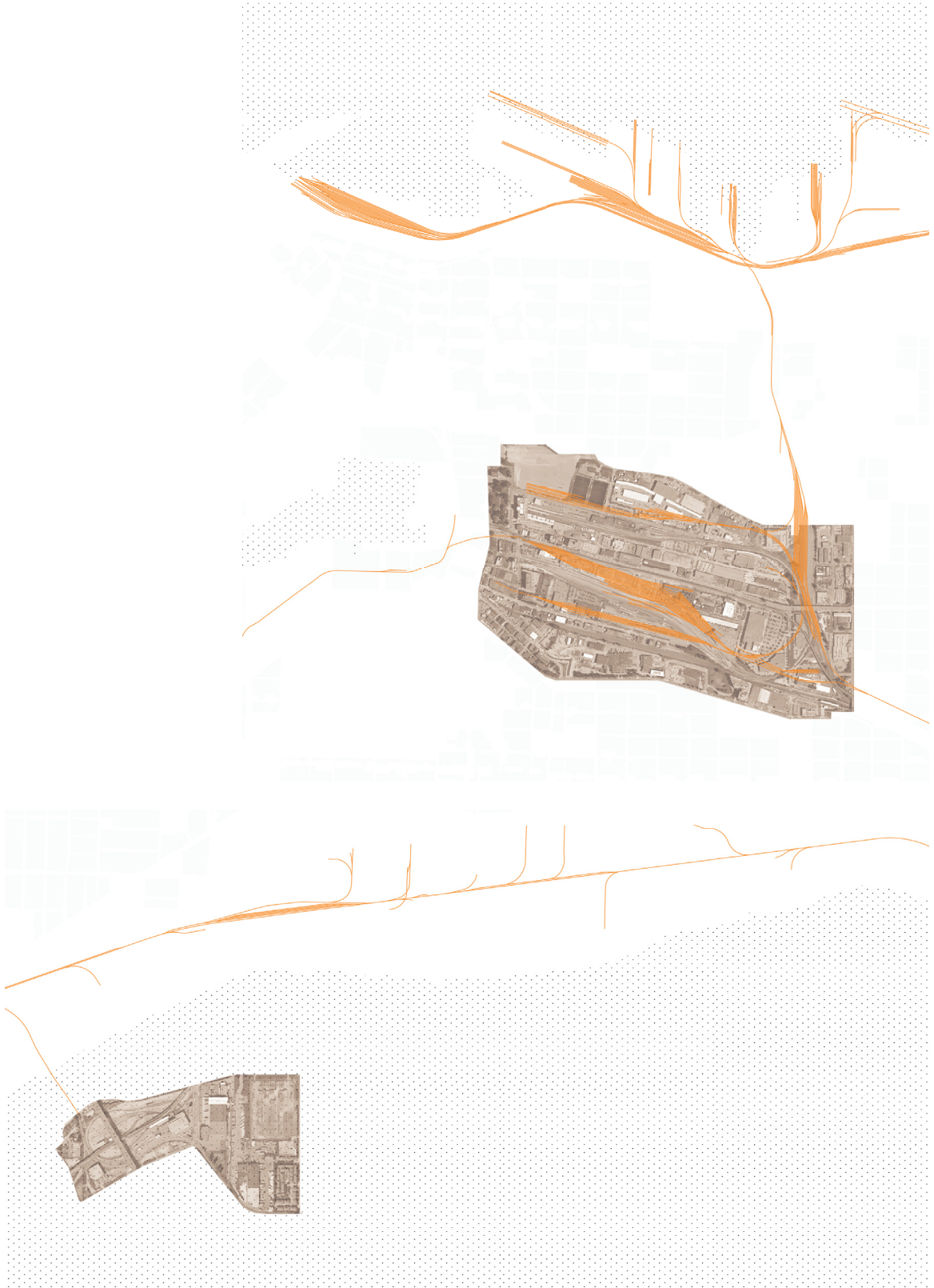
The corridor at 33rd Ave and Pine street sits between a residential street and Quilchena Park. The currently unused transition space between the park and the street has the potential to provide value for both the users of the park and the neighbourhood.



At 44th Ave and Arbutus there is well grown foliage, with trees on both sides of the rail. The streets are lined with residential and commercial buildings. The site's central location in Kerrisdale make it a candidate for events to take place.



At Angus Street and 61st Ave a fork condition exists, which opens the site up spatially for many opportunities.



The proposed project capitalizes on the Arbutus Rail's access to the northern rail yard in False Creek Flats and southern rail yard in Richmond. These rail yards would be used for maintenance, storage and construction of the interventions.

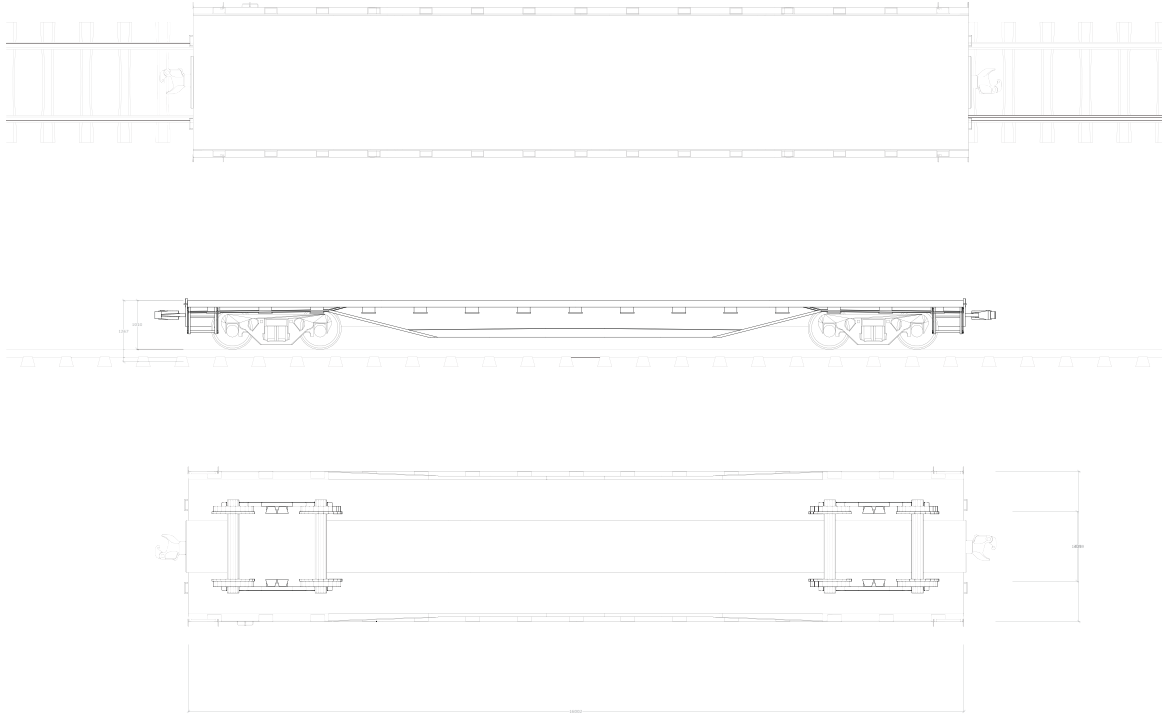


Signage is posted along the Arbutus Corridor, stating its inaccessibility

Currently the rail exists on the corridor without train use and remains inaccessible to the public.

Existing Rail Conditions

The Arbutus Corridor's track is standard gauge, 1435.1 mm wide. A fleet of cars, currently available, can be used on standard gauge track, as shown in the following images.



As-built drawings of a 53' flatbed rail car. This car was chosen for most of the interventions.



CN 187002 Covered Coil Steel Car. Photograph by David Graham, 2006, from Canadian Freight Railcar Gallery.



CN 235098 Mechanical Refrigerator. Photograph by Marty Cybulski, 1981, from Canadian Freight Railcar Gallery.



CN 665002 53' Flatcar . Photograph by Earl Minnis, 1978, from Canadian Freight Railcar Gallery.



CN 609011 51' Bulkhead Flatcar. Photograph by Chris VanderHeide, 2007, from Canadian Freight Railcar Gallery.



CN 615281 51' Pulpwood Flatcar. Photograph by Chris VanderHeide, 2008, from Canadian Freight Railcar Gallery.



CNA 623052 Centre-beam Flatcar. Photograph by Chris VanderHeide, 2008, from Canadian Freight Railcar Gallery.

The above six images are a sample of the cars available for use on the rail. For the remainder of the researched catalogue please see Appendix.

The Ideal Candidates: Neighbourhoods

West Fourth Avenue in Kitsilano is a significant and memorable area in Vancouver. It provides access to a variety of amenities for lifestyle-focused people. Many of the businesses are run by long-time local entrepreneurs. These local businesses rely on community support.

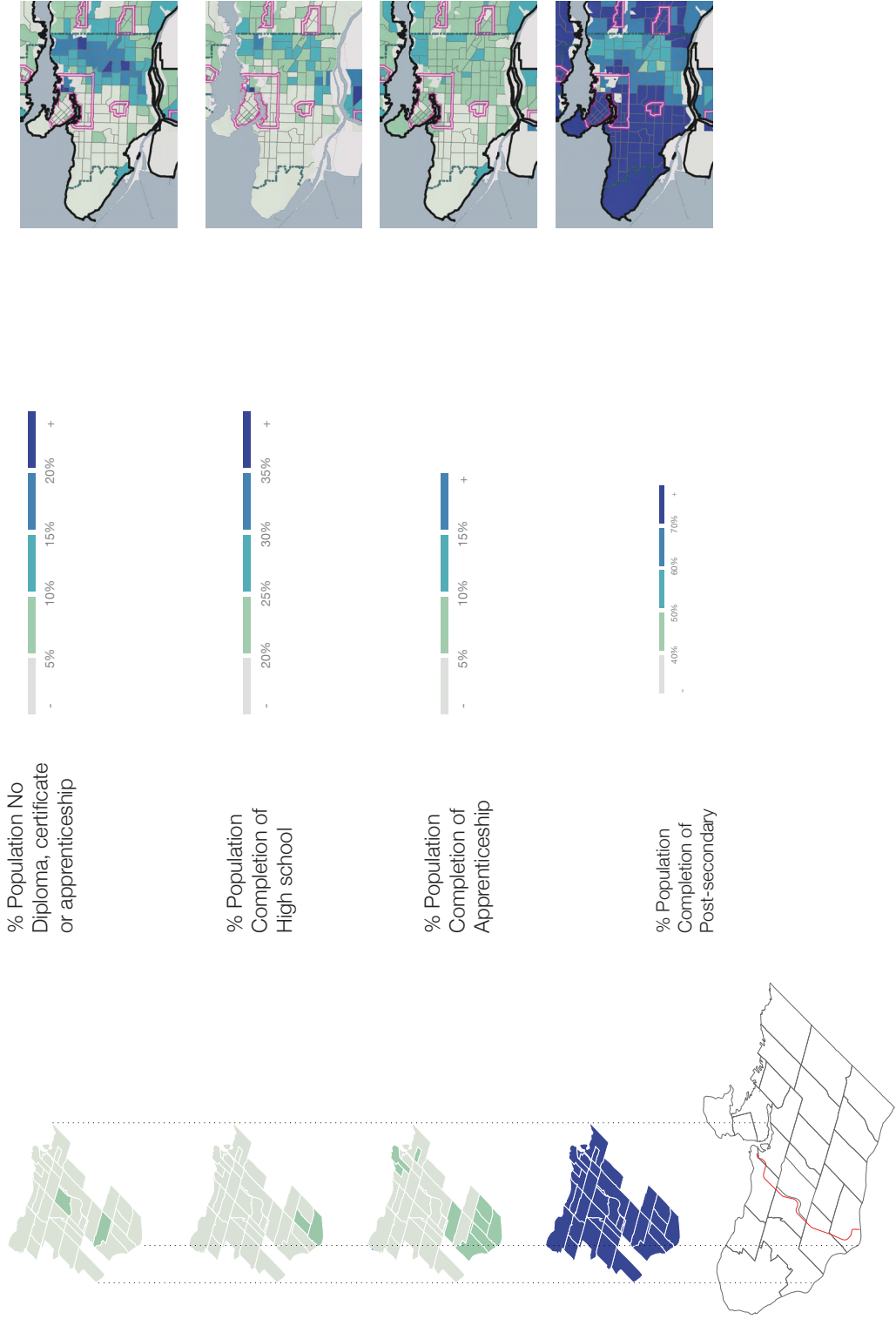
West Fourth is the most developed commercial street in the area. Kerrisdale, Arbutus Ridge and Marpole also showcase communities with many locally run businesses and organizations. All of these neighbourhoods embrace entrepreneurship, unique lifestyles and new ideas, which make them ideal candidates for this new to Vancouver project for the Arbutus Corridor.

The Discrepancy In the Arbutus Corridor's Value

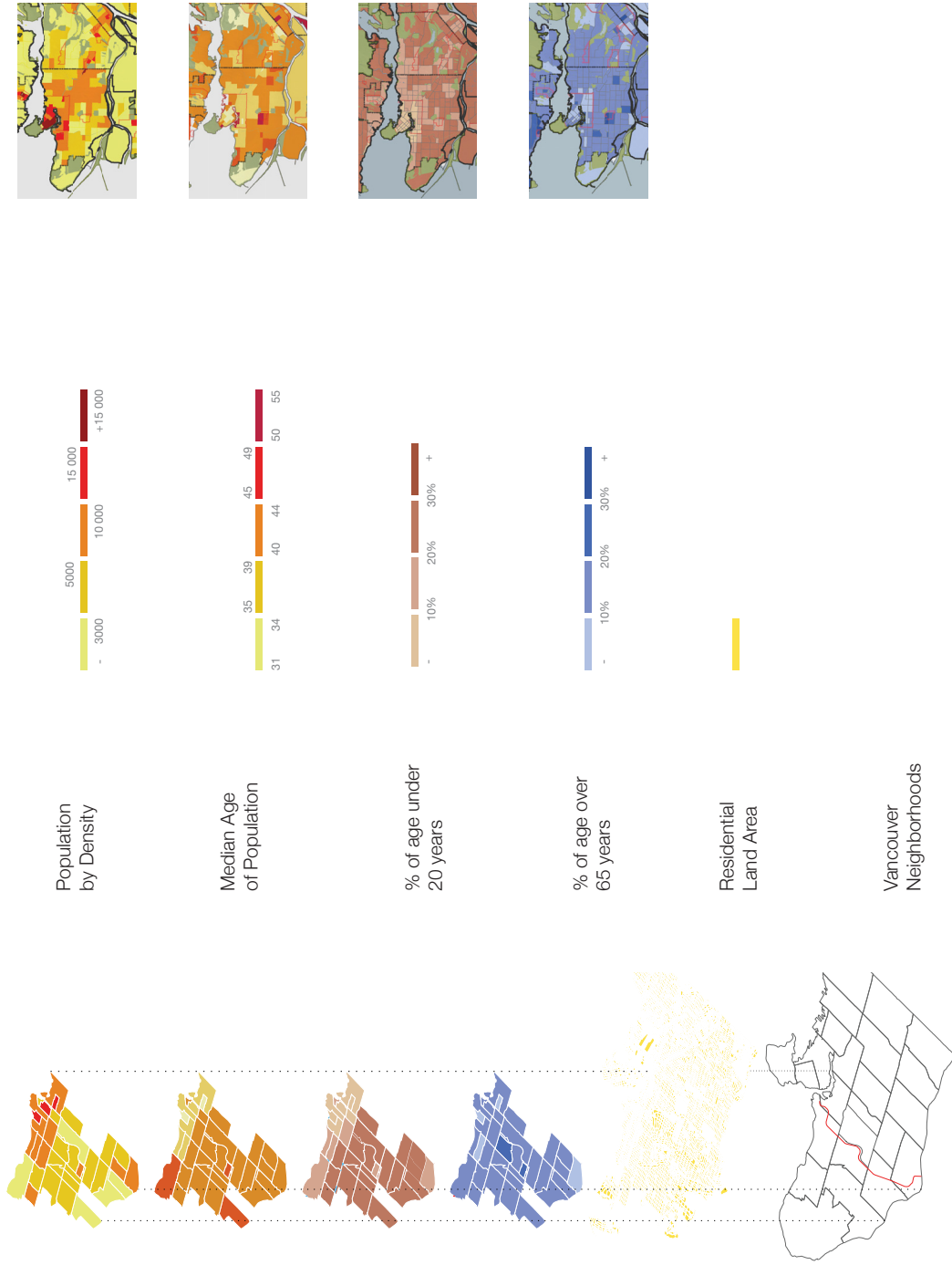
The current value of the Arbutus Corridor is unclear and varies culturally, socially, and economically, depending on who is evaluating it. The lack of clarity in value stems from a variety of factors which include use, access, and image.

Use

The rail's original use, the transportation of freight and people, was a value to the people, businesses it served, and CPR when these actions brought in revenue. As the area surrounding the corridor began to be filled with residential projects, the railway began to cause problems due to noise and its interference with cross streets. This divided the two parties.



Education demographics. The majority of the population in the western neighbourhoods have post-secondary or higher (70% +). The age is evenly distributed, with median age of 40-44 in the central area which also corresponds to a low density area. Kitsilano shows an increase in density and the median age goes down slightly to 35-39. The area consists of 20%-30% people under 20 and 10-20% over the age of 65.



Age demographics and residential land area. This analysis suggests programs which move according to the range of constituents in the area. The difference in lifestyles may allow for complementary scheduling: e.g., senior day scheduling may not interfere with after school scheduling for children.



Kitsilano has diverse cultures and amenities, which make it one Vancouver's defining areas.

Access

The railway and the land itself are private property. If a person walks along the railway or crosses it at an undesignated area, it is deemed trespassing.³ When trains do not run, no income is generated for the rail company and citizens do not benefit either.

Image

It is difficult to give an accurate assessment of value to something that does not have a clear image. An image of a place is based on how the memory and imagination engage the subject's perception of the place in reality. It is the strength, frequency, or duration of this image-generating process that will determine the understandability of the place. Once an understandability exists, a level of clarity develops. The definition of an individual's image can be scaled to the level of building, neighbourhood, and city. As the memorability of the image persists, the object becomes better understood by the observer.⁴ Residents struggle with the Arbutus Corridor in terms of image, which may in part contribute to its lack of consensus in evaluating its value.

Value: Conclusion

Vancouver has some of the highest real estate values in North America. The West Side, through which the Arbutus Corridor runs, has some of the highest real estate values in all of Vancouver. Currently the average value of a de-

3. "Crossing and Trespassing," CN, <http://www.cn.ca/en/delivering-responsibly/safety/safety-guidelines/crossing-and-trespassing>.

4. Kevin Lynch, *The Image of the City* (Cambridge, Massachusetts, and London, England: MIT Press, 1960), 10.

tached single family home in this area is \$1.26 million.⁵ The Arbutus Corridor is approximately eleven kilometres long. If one were to divide it into single family lots, ten meters wide, the estimated residential value of the corridor would be \$1.4 billion. This year the City of Vancouver offered to buy the land from CPR for \$25 million, stating that the land is currently zoned for rail use but would remain as a greenway, as it has been used unofficially for the last fifteen years.

In 2009 the Canada Line was constructed to run from downtown Vancouver to the Vancouver Airport, at a cost of \$2.1 billion.⁶ The route for this line was debated and the Arbutus Corridor was considered a good fit, given that the basic conditions for a rail line were already in place. While there are many reasons why it should have been located in the corridor, and many why it was not, this shows that the Arbutus Corridor project is worth at least \$2.1 billion.

The strong yet indirect significance placed on the land highlights its worth in economic terms but also alludes to its exceptional worth in terms of value to the city. An artery that runs the length of the city has the potential to significantly enrich the lives of its residents by improving connectivity between areas of the city. The connections can enhance the exchange of information, services, and amenities through improved access to education, health

5. Iain Marlow And Brent Jang, "Vancouver's real estate boom: The rising price of 'heaven' ," *The Globe and Mail*, Oct. 10, 2014, <http://www.theglobeandmail.com/report-on-business/vancouver-real-estate-boom-the-rising-price-of-heaven/article21071391/>.

6. Frances Bula, "Light rail showdown: Vancouver versus Seattle ," *The Globe and Mail*, Aug. 13, 2010, <http://www.theglobeandmail.com/news/british-columbia/light-rail-showdown-vancouver-versus-seattle/article1319451/?page=all>.

care, community development, leisure and entrepreneurial activities.

With multiple factors contributing to the convulsion of the corridor's value, a solution is perhaps not in trying to make all the pieces fit, but rather looking differently at the common factor in all the equations: the rail. A reorganized perspective of the rail could provide a platform for an architecture to take place which may not only clarify the value of the area but also increase it.

Roadway Opportunities

Within the System: Entertainment within Transport

In both developed and developing areas of the world, street performers use the roadway network as their stage to earn a living. This seizes the opportunities within the intended use of the system. In the street system there will always be moments of pause, where performers have an audience for their work.



A street performer in Bogota, 2013

Swapped Use: Event Instead of Transport

Vancouver has many festivals and parades throughout the year; some of the larger events occur on Fourth Avenue and Commercial Drive. The occupation of the street by a festival temporarily stops the intended use of the system. The reorganized portion of the street becomes a place of community gathering, with no vehicular movement.

Hybrid: Swapped Use Within the System, Playing with Lulls in Transport

When the street system is not being used in suburban streets of Canada many boys and girls rethink the street as their arena for hockey. By cohabiting the street both activities can occur. Simply yelling “car!” is the signal for



Children reinterpreting the roadway system. Photograph by Rick Eglinton, from “Game off: Councillor backs away from road hockey exemption plan”, *Toronto Star*, 24 May 2012.

the street to be taken back by its primary user. This takes advantage of the lulls in the system.

Transportation systems also can be changed from car transport to pedestrian walkway, or from rail lines to bike lanes.

The above examples highlight the additional discovered

uses for the road network. New opportunities also exist in the rail network; however, it is a matter of looking at the system through a reinterpetive lens to discover them.

Case Study: Potteries Thinkbelt

A Rail Reorganizational Response

A set of conditions usually needs to exist for a formal or attitudinal reorganization to be considered. This can stem from leisure, pleasure, distress, failure, etc. In the United Kingdom in the 1960s a need for reorganization stemmed from severe national distress. The country found itself with decreasing industry, increasing unemployment, and a growing uneducated population. The British also found themselves losing the global technological race. Working hours were being cut drastically across the nation, energy consumption was limited, and the nation was facing a huge recession.

Cedric Price observed these conditions and responded with a proposal for the North Staffordshire area's railway to be repurposed as an avenue for a university on railcars. This response was carefully prescribed for the problems of the nation. The project was to take place on the railway which ran through the area of highest unemployment due to changes in industry, with its coal and ceramics factories. Ceramics was in severe decline due to Asian manufacturers who used cheaper and faster methods of production. The ceramics industry relied entirely on coal for its energy source. With the fall of ceramics came the fall of the coal industry, with both sharing real estate along the rail line. The former employees in these industries also lived along the rail lines.

The architect responded to this distress by promoting education. This would benefit the UK while increasing employment and job quality.

At that time the British university system was focused primarily on the liberal arts, with little emphasis on applied sciences and technology. There was also very little educational opportunity in the sciences. The small percentage of science graduates in the United Kingdom had far more rewarding job prospects outside the country, further stifling industrial advancement in the UK.

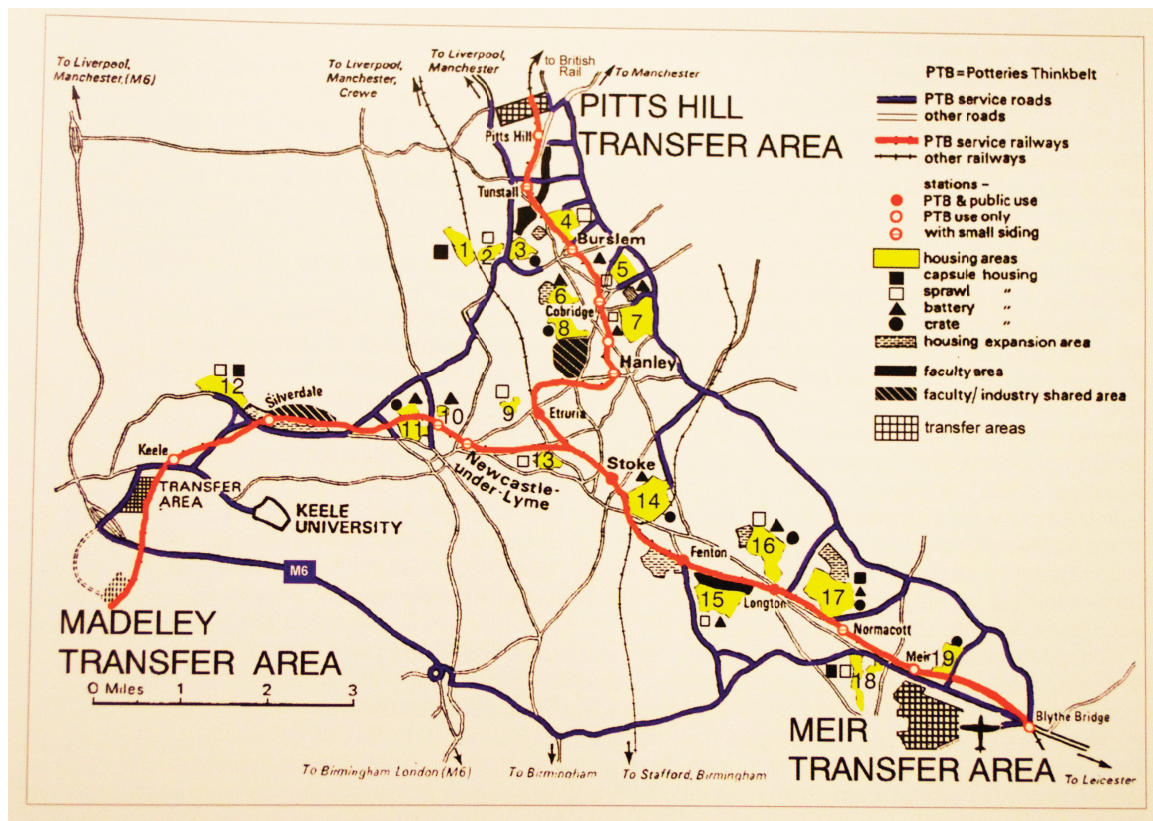


Cedric Price photo of the devastated landscape of the North Staffordshire Potteries, ca 1963. From Stanley Mathews, *From Agit-Prop to Free Space: The Architecture of Cedric Price* (London: Black Dog Publishing, 2007), 201.

Price's proposal was to reorganize the railway and introduce a university for the newly unemployed, supplementing the brick and mortar campus by offering applied science training on the rail campus.

The Potteries Thinkbelt (PTb) was contested by architects and others because the project challenged cultural norms and architectural symbols. The university's traditional symbolism was meant to instill traditional values in students. Some believed that these values would be lost if the image of the nation's universities was altered, thus pushing the United Kingdom into an even deeper low.⁷

7. Stanley Mathews, *From Agit-Prop to Free Space: The Architecture of Cedric Price* (London: Black Dog Publishing, 2007), 195-230.



Site plan of the Potteries Thinkbelt, 1965. Stanley Mathews, *From Agit-Prop to Free Space: The Architecture of Cedric Price*, 207.

The PTb addressed a problem, while this proposal for the Arbutus Corridor aims to capitalize on an opportunity. The Arbutus railway is inaccessible to citizens, an abandoned infrastructure, and a physical barrier between neighbourhoods. A new mobile system overlaid onto a reinterpreted railway that provides access would allow mediation between the track and neighbourhoods.

Mobile Architecture

Mobile design addresses dimensionality, adaptability, and temporality differently than non-mobile design. The solutions it can generate through buffering, mediating, and transitioning between conditions gives us access to use the in-between creatively. Seeing design in this manner allows for the usual constraints of static design to be shed, unveiling new opportunities for engagement with our built environment.

Mobile Architecture and the Human Condition

People are in a constant state of change with their moods, ideas, and attitudes. Architecture is for people and it should be able to respond to the changes in the people that it serves. The proposed mobile architecture responds to the changeability in human nature through its ephemeral presence on a site, moving when and where it is needed, with its operable components adapting to each site.

Mobility and Architecture

Dimensionality

All objects can be described dimensionally at a moment in time. Most buildings are fixed, designed and built to occupy the same footprint for their lifespan; however, oppor-

tunities exist for an alternative to fixed architecture.

A railway provides a platform for unfixed architecture to thrive. Architecture that is not fixed can find value through temporarily interfacing with a place rather than being part of that environment's permanent structure.⁸ Non-movable architecture engages site with permanence. Movable architecture is semi-transparent, sometimes to be seen and sometimes not. It relies on qualities of impermanence and program to form its relationship with place.

Mobility, Multiplicity, and Combinations: A Generator of Value

Mobility allows an object to be impermanent at a location, which provides value by allowing multiple uses of the rail at different times by multiple mobile architectures.

Mobility also allows for temporary combinations of programs, producing an added level of customizability. The rail allows for cars to exist individually or to be clustered together like beads on a string with the option to add or remove cars. With customizability comes considerations of: the number of vehicles, sequencing, scheduling, configuration, and interconnectivity.

8. Vladimir Krstic, "About Other Constructs and Space.", *Transportable Environments 2*, edited by Robert Kronenburg, Joseph Lim, Wong Yunn Chii (New York: Spon Press, 2003), 25.



possess

Characteristics

- Flexible
- Adaptable
- Transformable
- Mobile
- Temporary
- Interactive
- Adjustable

create

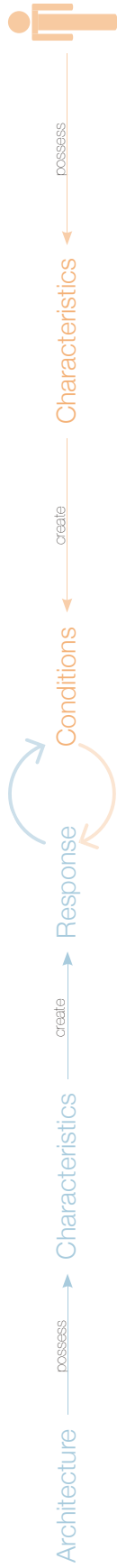
Conditions

- Attitudes
- Necessities
- Desires
- Trends
- Moods

People create conditions which are in a constant state of change.



Architecture can have characteristics which allow for multiple responses.



Data Attitudes
 Data Moods
 Values Needs Attitudes
 Data Values
 Function Desires
 Values Function
 Weight Trends Desires
 Function Needs
 Program Moods
 Weight Program Attitudes
 Configuration Moods
 Program Configuration Trends
 Form Configuration Moods
 Placement Trends Desires
 Placement Needs
 Structure Moods Trends
 Placement Structure Moods
 Size Attitudes Moods
 Structure Size
 Size Desires

Architecture creates value when it can update its response to conditions that are constantly changing.

CHAPTER 2: DESIGN

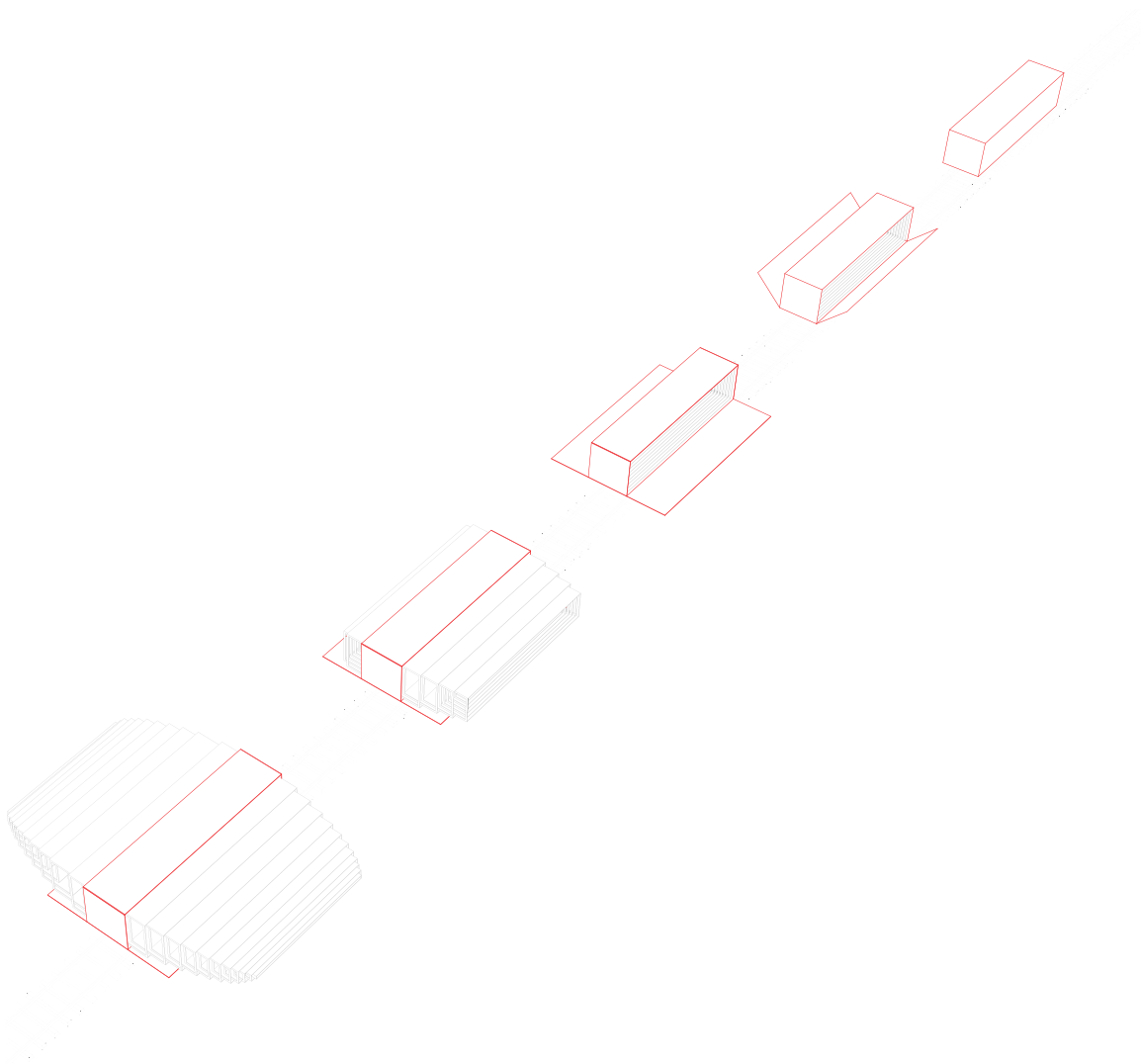
The Arbutus railway is dormant but could support an architecture with the mobility of a train that engages and activates the areas it travels through. This design proposal focuses on creating value in the Arbutus Corridor by responding to image, access and use by providing mobile architecture that can stop and engage local communities anywhere along the rail.

New Value In an Existing Railway

The railway is designed to move rail cars along the track but also to allow rail cars to remain stationary anywhere along the line. This proposal assumes the same capabilities of the system but with more frequent stops to engage the surrounding fabric. This approach aims to unveil a new value of the Arbutus railway as a means for a mobile architecture to be implemented.

Mechanisms

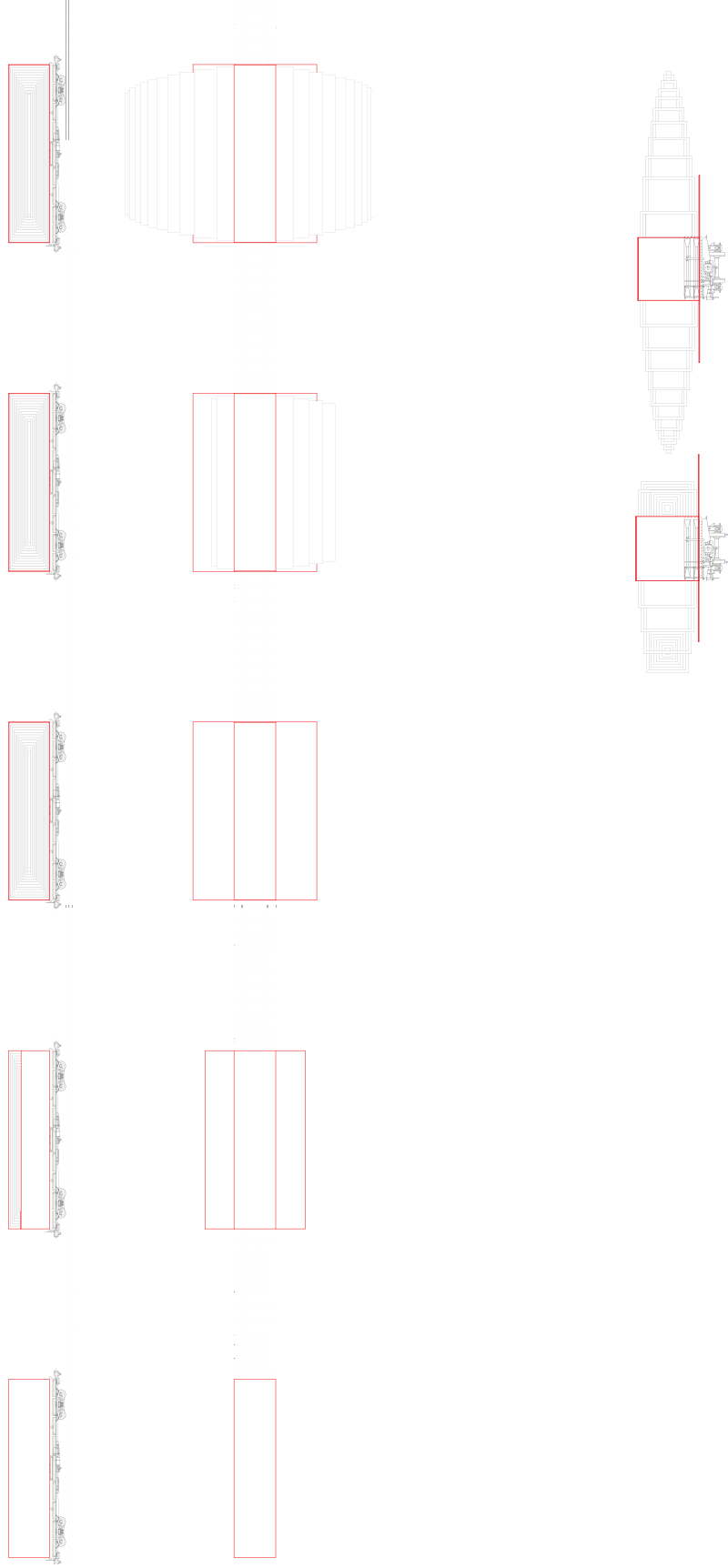
The railway provides the means for the architecture to arrive at a site. The intervention's mechanisms allow it to configure uniquely to a site's conditions and community's needs. Investigations began with mechanisms that could extend from the rail cars vertically, laterally and along the rail to respond uniquely to different site conditions. A 53' flatbed car was chosen as the foundation for the mechanisms.



Telescoping sequence

Telescoping

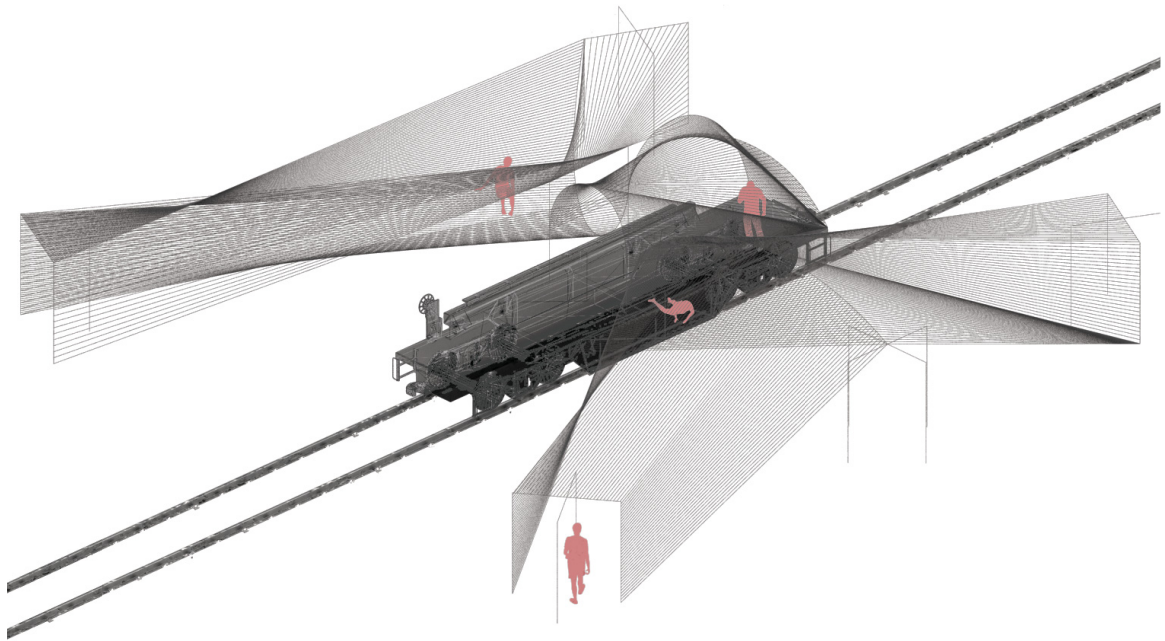
This study explores how the dimensions of a rail car could be extended laterally, in one or both directions. The mechanism, when packed to move, requires all the space on the car.



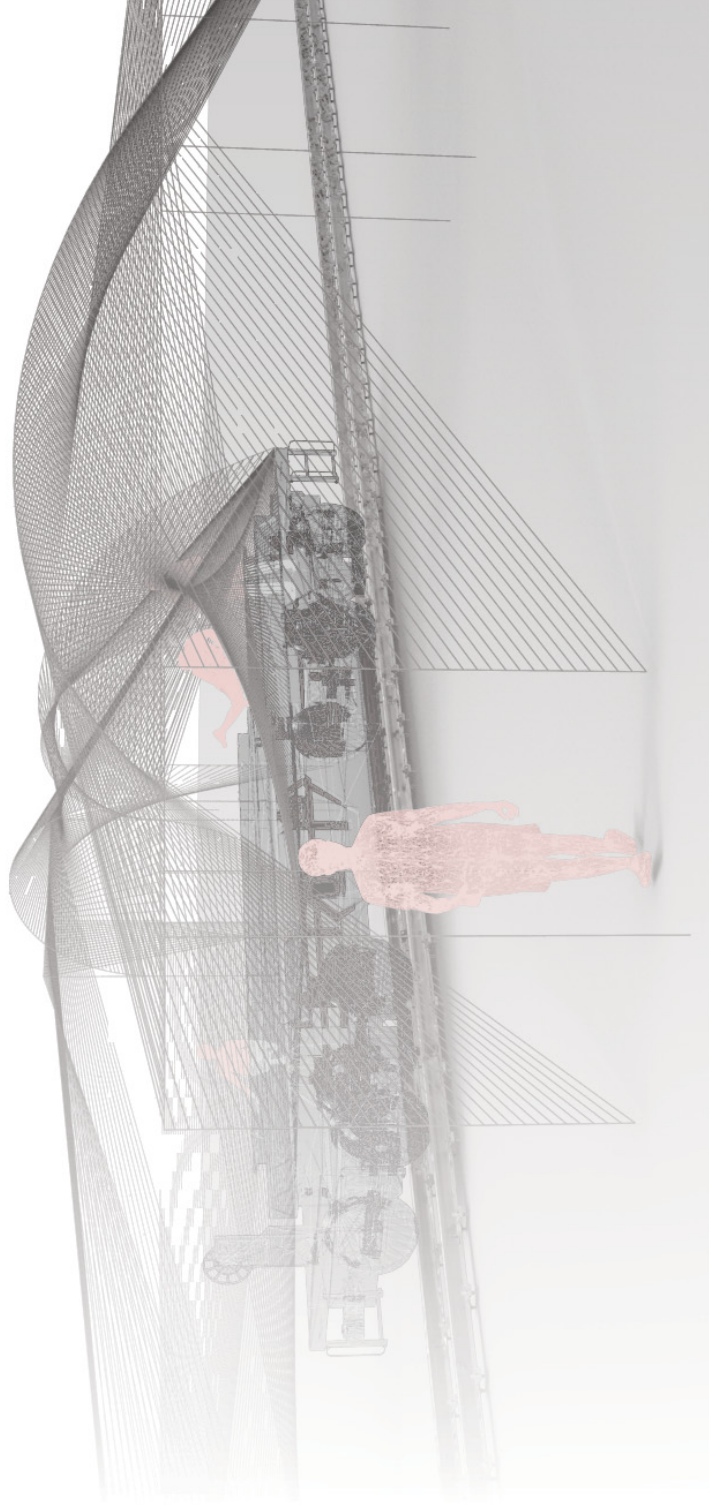
Orthogonal telescoping

Netting

An investigation of lightness and transparency was carried out to react to the barrier condition created by the rail. A mechanism that can blur the rail's barrier through its formal presence while also creating engaging space would aid in uncovering new value for the rail.



Netting can be used as buffer between the railway and the site, inviting new opportunities for engagement with the community. The netting's lightness creates a blurred delineation of space while also formally expressing its impermanent relationship with the site.



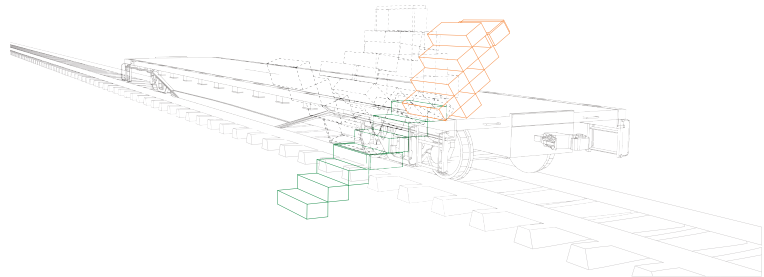
The netting material is an exploration in transparency, attempting to erase the barrier the track creates along the corridor.



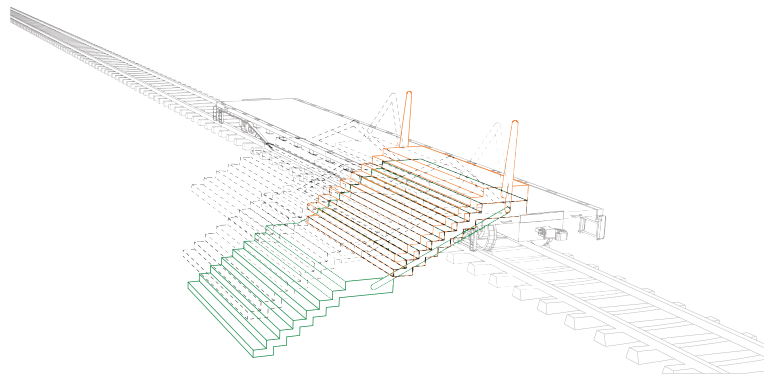
Transparency concept model

Folding

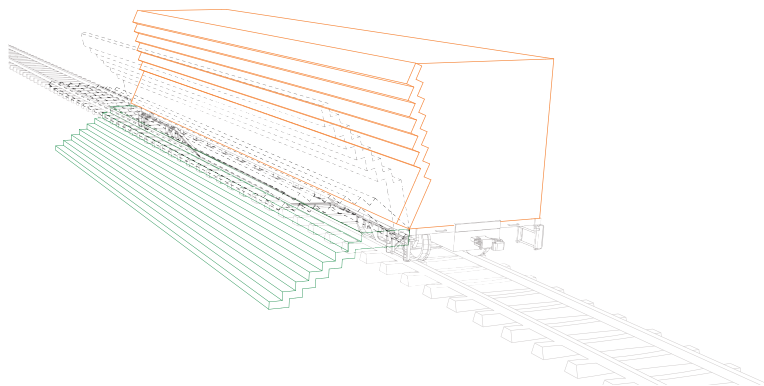
Access to the top of the flatbed car, 1.25 meters from the ground, initiated experimenting with folding steps.



Stair fold study 1



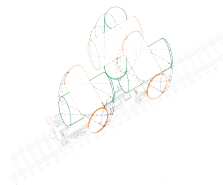
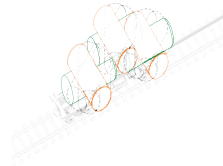
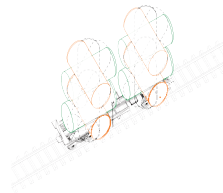
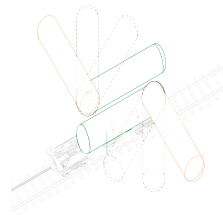
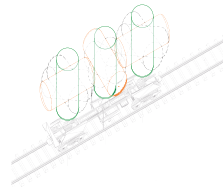
Stair fold study 2



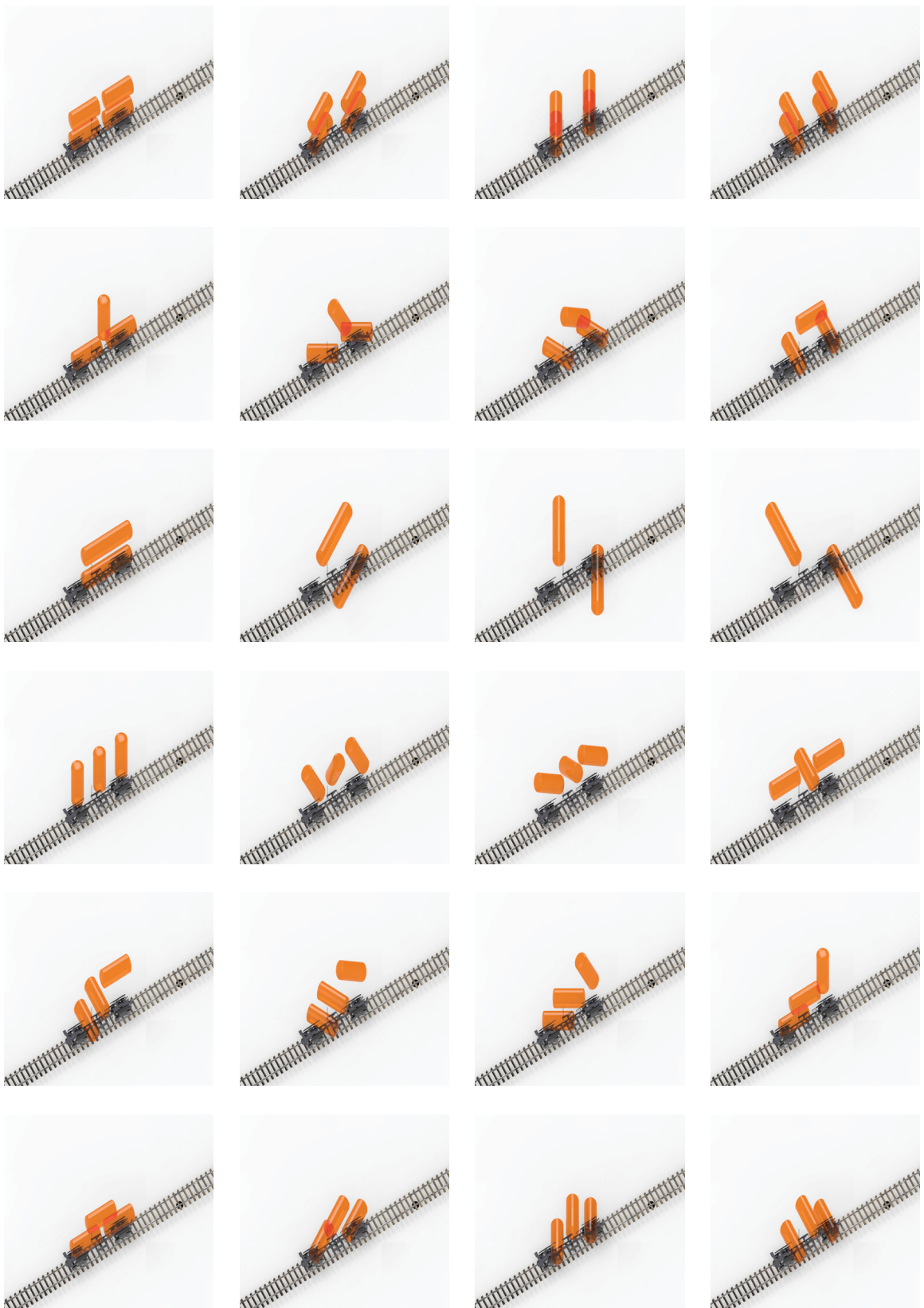
Folding staircase into wall

Pivoting

This study focuses on the tanker form and how it could be reinterpreted to expand from its car onto the site. Studying different configurations led to considerations of what could be housed in the tanks and for what purposes.



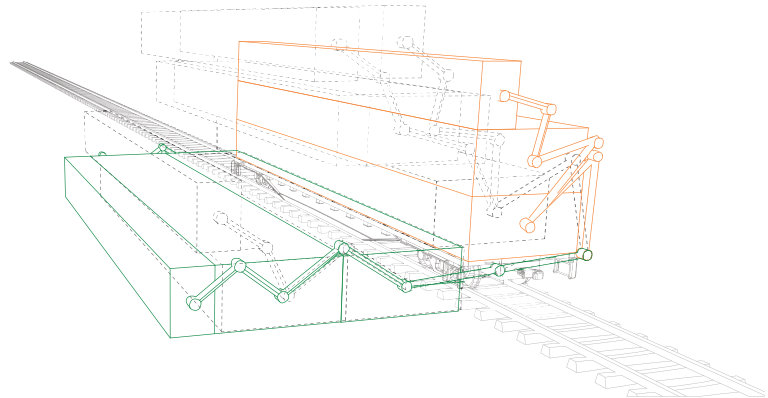
Using tanker forms to explore pivoting with lines.



Pivoting study

Stacking

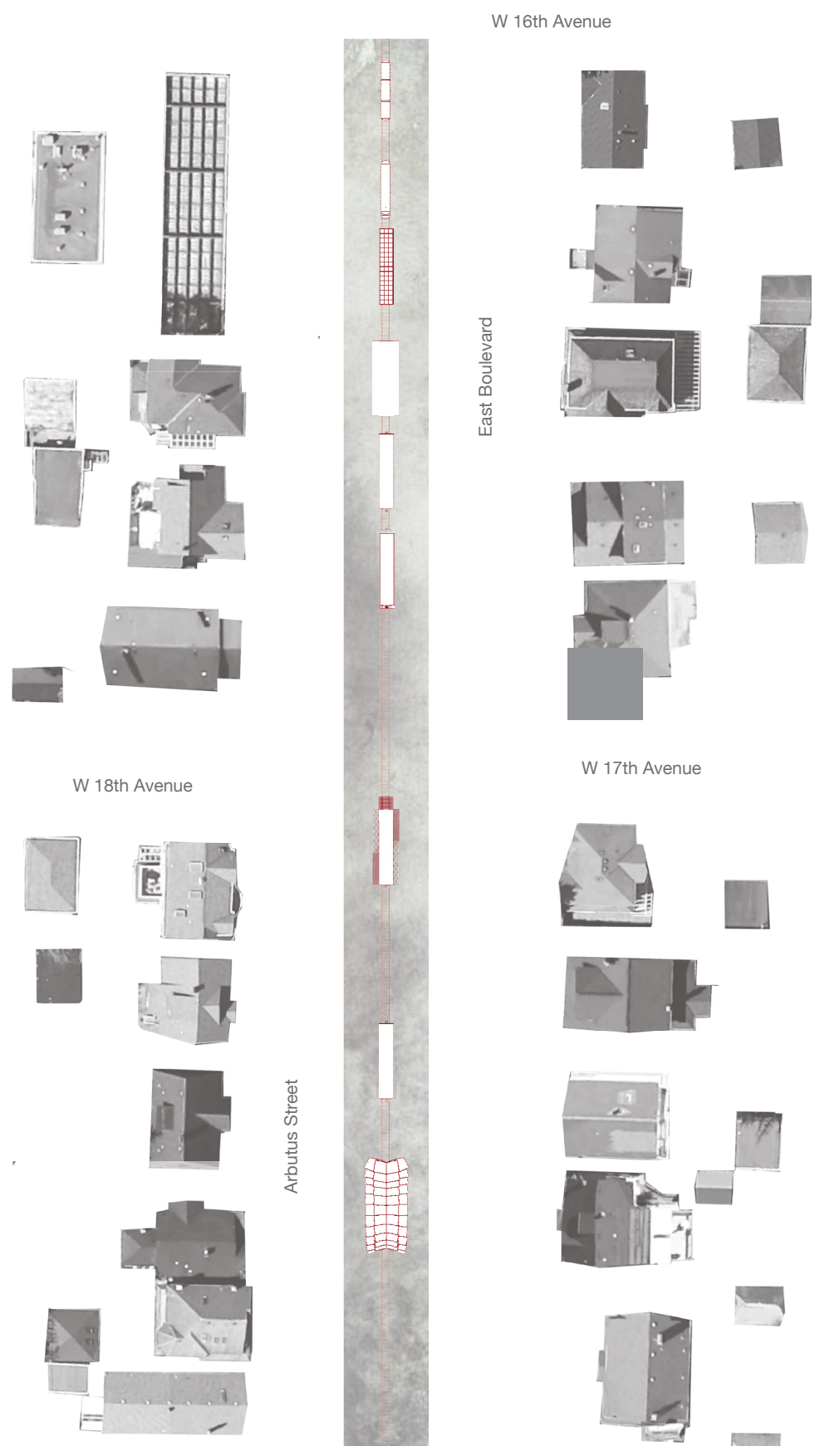
This study explores how a mechanism can move from the car to meet the ground plane.



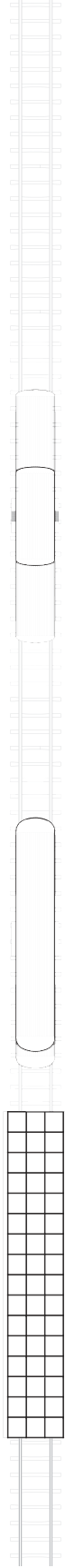
Stacking study

Program: Five Cast Members

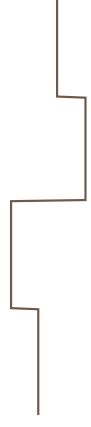
All five of the proposed programs share in one locally directed initiative; their presence is not to compete with existing business but rather supplement them. Each program has been considered for its unique relationship with movement and the local community. The proposed mobile programs are: satellite natural history museum, skateboard and BMX summer camp, energy car, market car and event car. Program-specific mechanisms are contained in all of the cars, to enable them to adapt to the site.



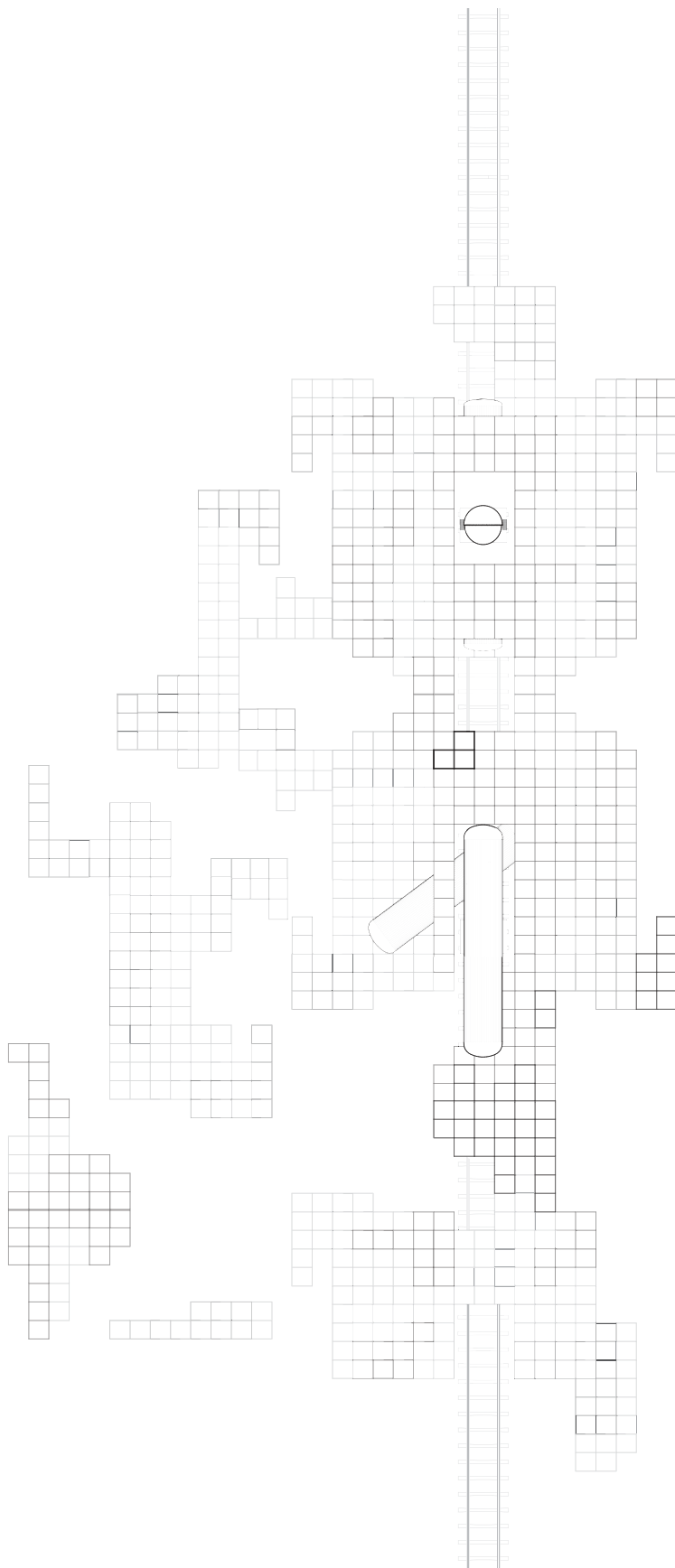
Interventions in a packed configuration along Arbutus Street.



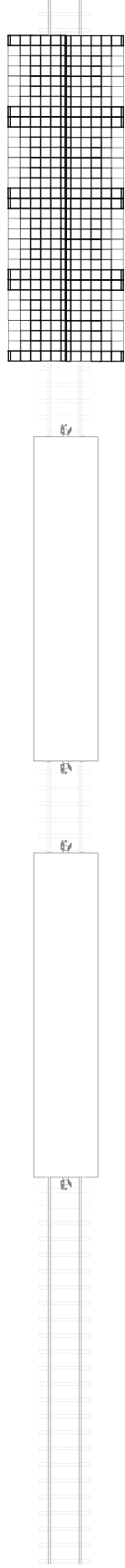
Program: Satellite natural history museum
 Number of cars: 3
 Number in operation: 1
 Present year-round: yes
 Mechanism: stack module
 Movement driver: seasons
 Maximum lateral extension: site boundary
 Annual movement pattern:



Satellite natural history museum: packed configuration



Natural history museum: unpacked configuration



Program: Skateboard and BMX summer camp

Number of cars: 3

Number in operation: 1

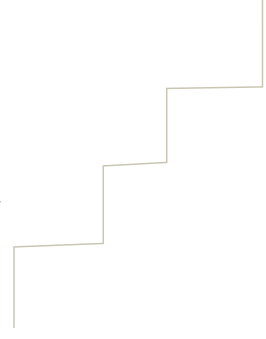
Present year-round: no

Mechanism: foldable elements

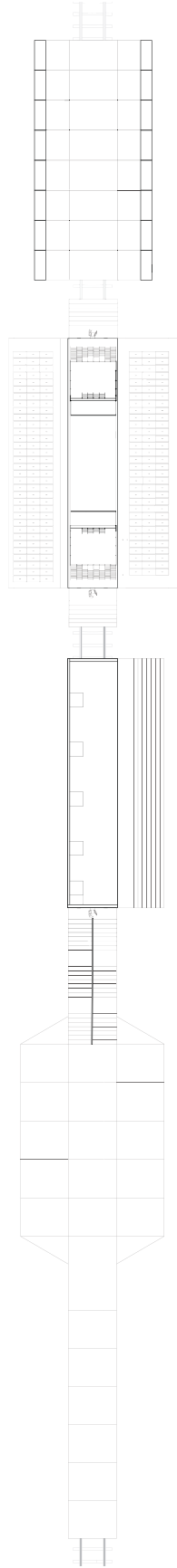
Movement driver: program duration

Maximum lateral extension: 5.54 meters

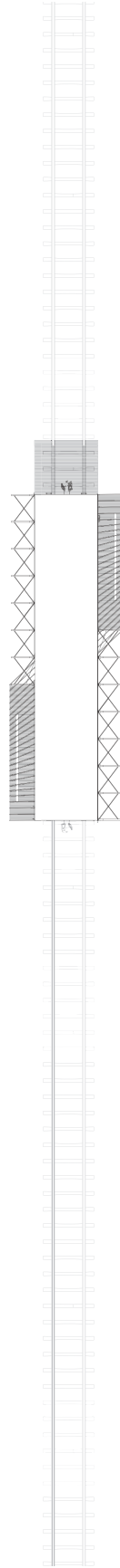
Annual movement pattern:



Skateboard and BMX summer camp: packed configuration



Skateboard and BMX summer camp: unpacked configuration

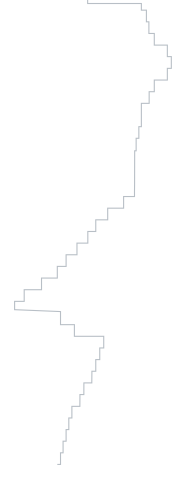


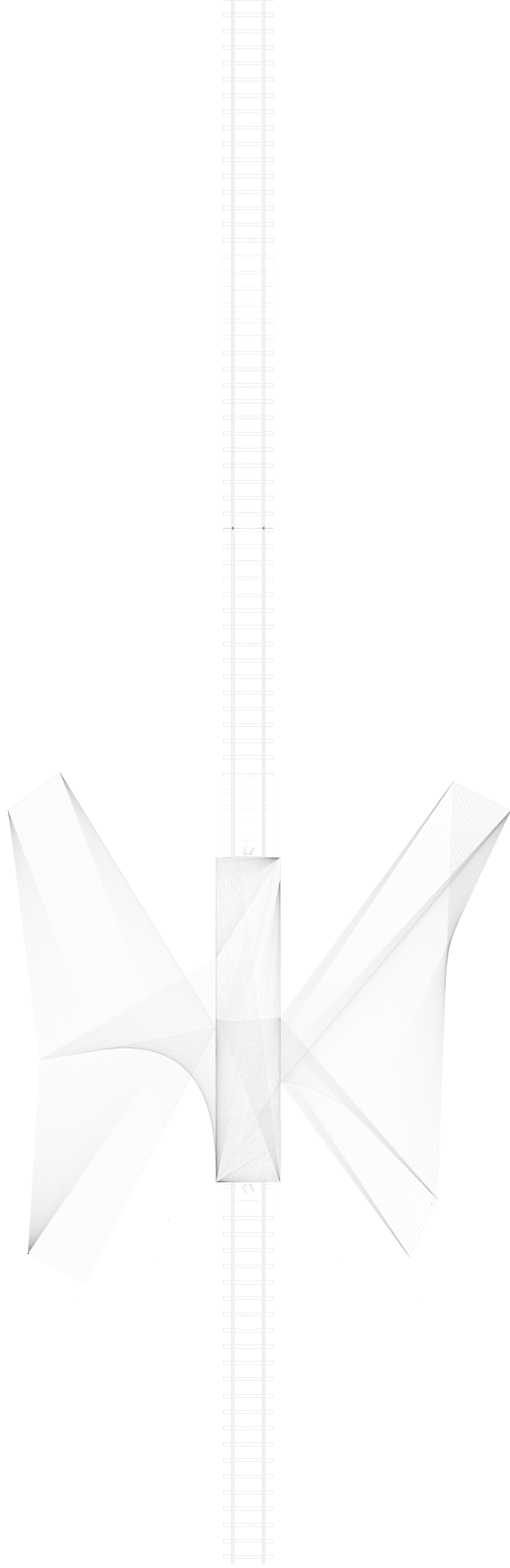
Program: energy car
 Number of cars: 1
 Number in operation: 2
 Present year-round: yes
 Mechanism: marsupian
 Movement driver: human engagement
 Maximum lateral extension: 2.86 meters
 Annual movement pattern:



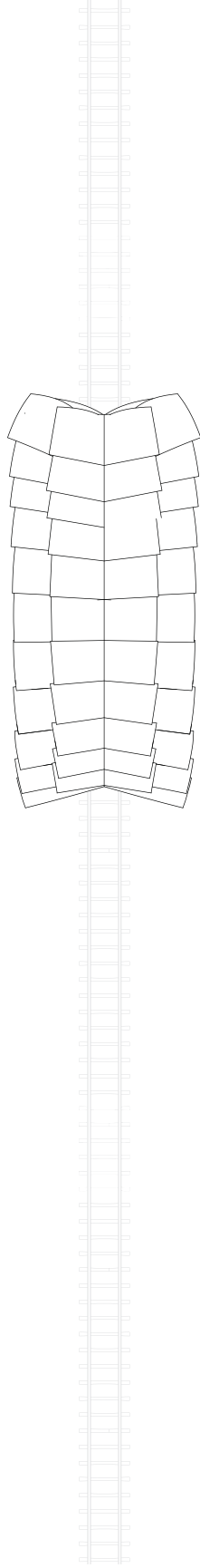


Program: market car
 Number of cars: 1
 Number in operation: 2
 Present year-round: yes
 Mechanism: netting
 Movement driver: weekends
 Maximum lateral extension: 11.28 meters
 Annual movement pattern:



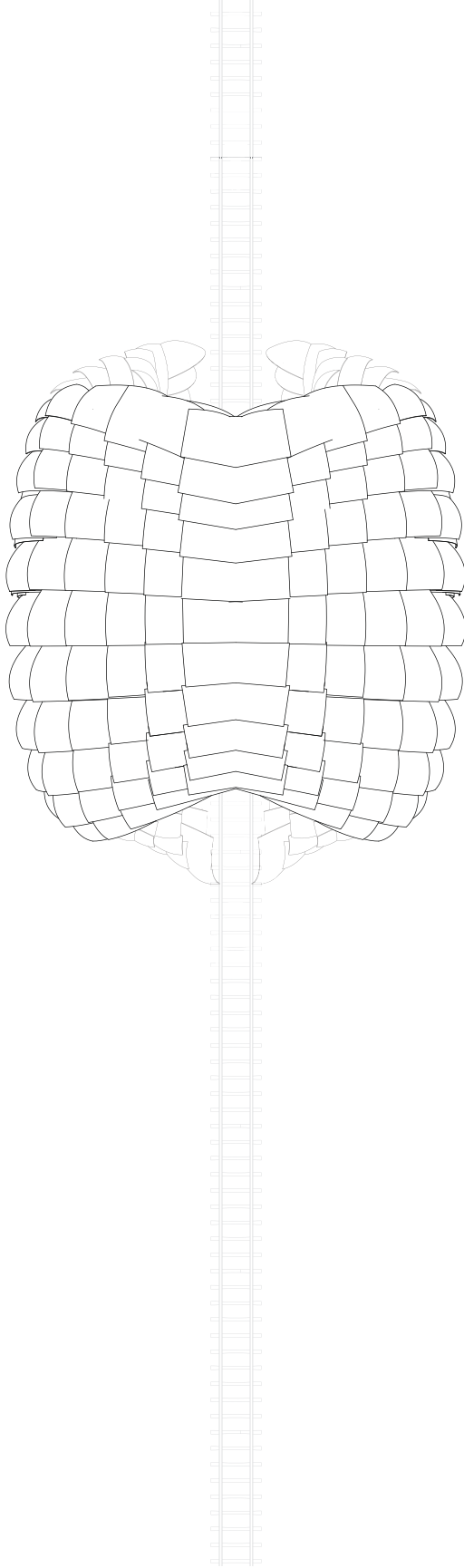


Market car: unpacked configuration



Program: event car
Number of cars: 1
Number in operation: 2
Present year-round: yes
Mechanism: expandable shell
Movement driver: special events
Maximum lateral extension: 9.21 meters
Annual movement pattern:

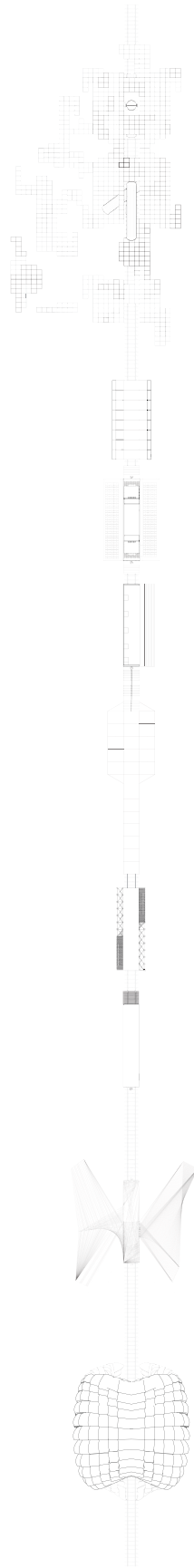




Event car: unpacked configuration



packed



unpacked

Entire cast

Program 1: Satellite Natural History Museum

Vancouver's natural history museum is located on the University of British Columbia's main campus, a remote location of the city. The proposed satellite natural history program responds to this condition by having mobile exhibitions on the Arbutus Railway, also promoting the exhibits at the brick and mortar location.



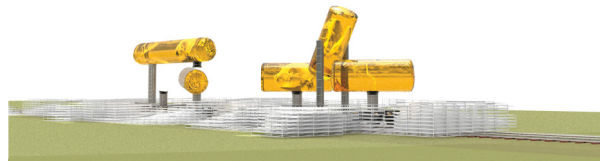
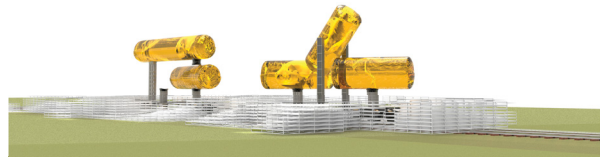
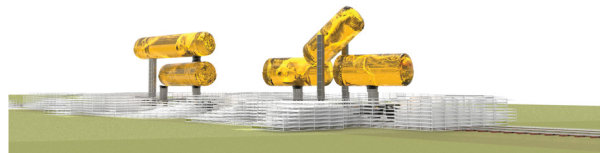
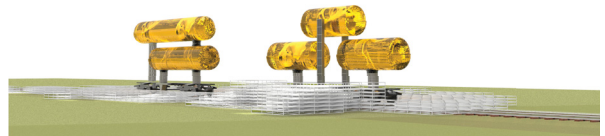
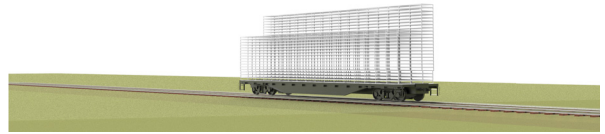
The water tank form was used as a starting point for the satellite natural history museum. CN 80350 Water Tank Car. Photograph by Marc-A. Hudon, 2014, from Canadian Freight Railcar Gallery.

Mechanism

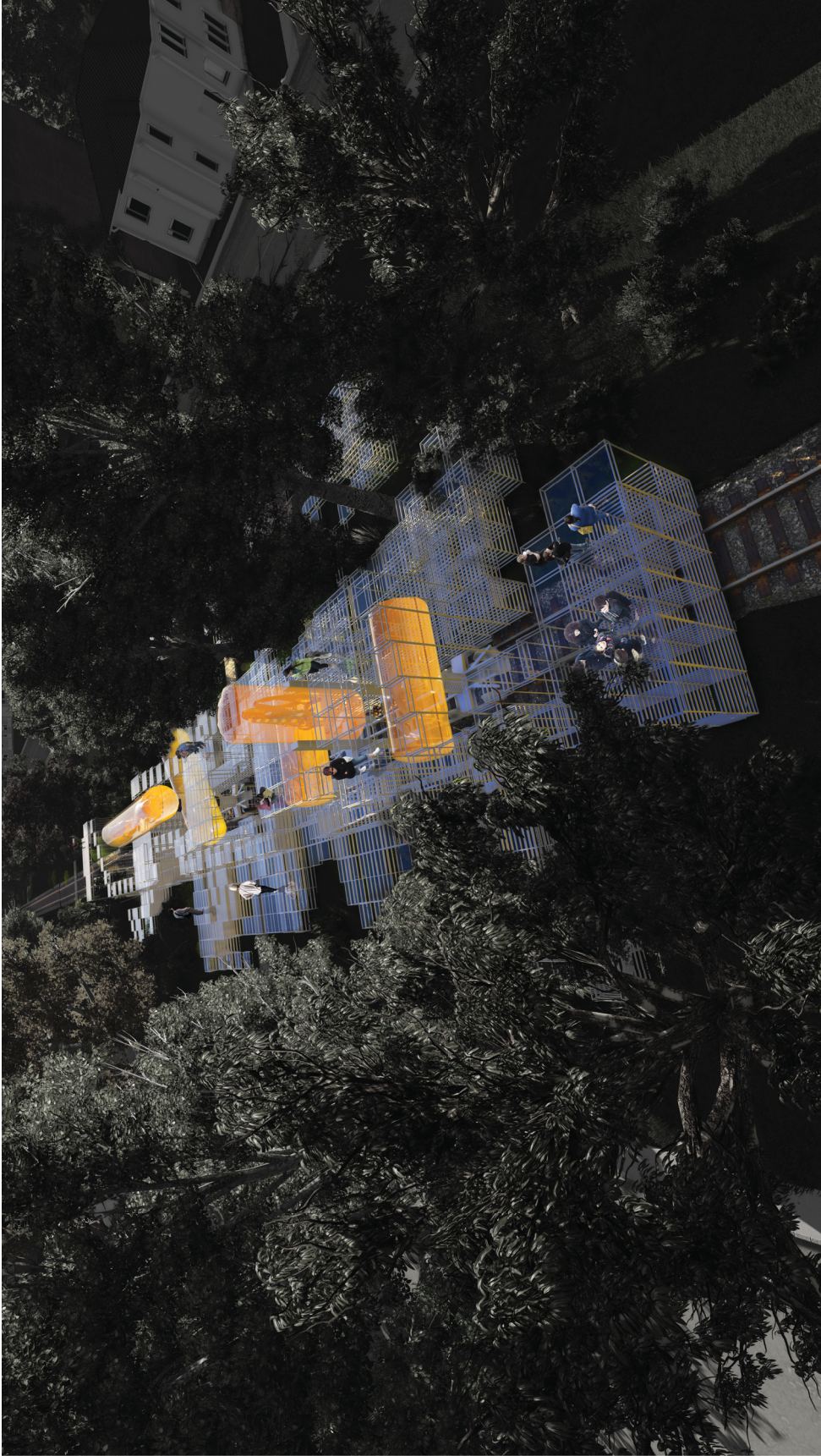
The museum sequentially employs two mechanisms, stacking and pivoting. The assembly process begins with a rail car carrying a stack of the step modules which are placed on the site to be configured laterally and vertically. Once the modules are in position the exhibition car rolls into the centre of the configuration and pivots its tanker forms to integrate with the module lattice completing assembly.

The museum works upon a basic human scale element, the step: a 7" high, 1 meter square metal frame with a translucent tread. The modules, when configured, provide a terrain for people to move about, exploring the exhibition as well as the Arbutus Corridor.

The museum acts as a magnet for people from all of Vancouver. This provides local businesses with increased exposure to their services. Offering no goods and services, the natural history museum is an ideal neighbour for the businesses in the neighbourhood.



Satellite natural history museum, stacking and pivoting



The module, when multiplied, occupies the corridor, encouraging discovery of the exhibit as well as the site. The structure nestles in the corridor's vegetation, creating places amongst the trees.



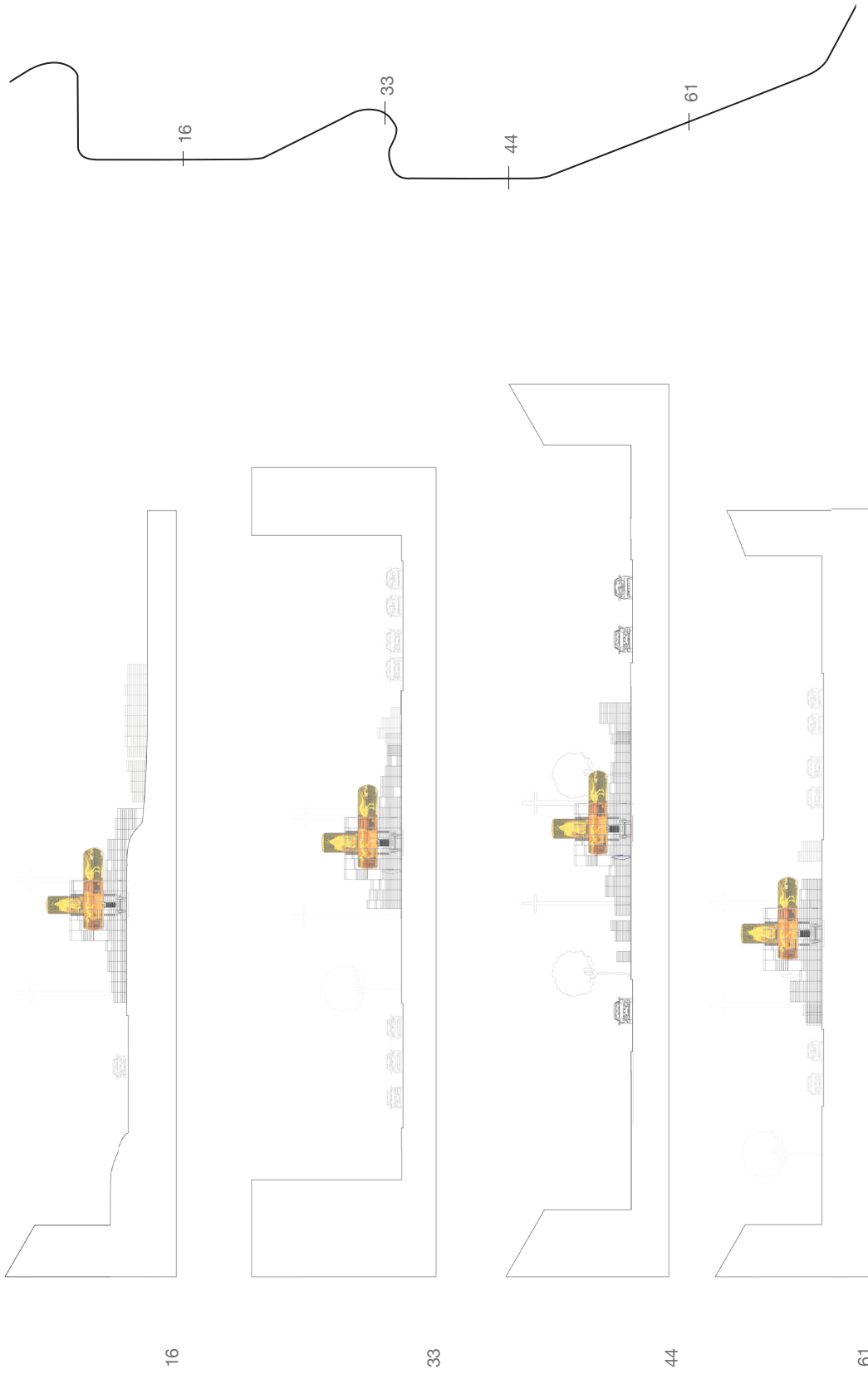
The step module's light structure maintains transparency across the corridor and encourages connections between the two sides.



The museum is designed to be enjoyed in the rainy Vancouver climate. The transparency and color of the module with the resin tanks react to the overcast lighting, providing a vibrant visual experience in the otherwise grey weather.



The verticality of the module structure responds to the foliage growth, placing people above traffic amongst the tree tops. The museum provides engaging places for contemplation and pleasure in a usually inaccessible space.



The step module allows for unique configurations at every site it engages. It also allows for different configurations responding to seasonal, climatic, event, or community requirements.

Program 2: Summer Skateboard and BMX Camp

This program looks to leap from an existing cultural condition which exists two blocks from the Arbutus Corridor. West Fourth Avenue has been home to a portion of Vancouver's skateboard culture for over twenty years, with a full block of stores dedicated to skateboarding, surfing, and snowboarding lifestyles. Vancouver was home to one of the largest skateboard competitions, Slam City Jam, until 2006, when it was postponed indefinitely. Since then, Vancouver has not had a significant international skate event to satisfy its ever-growing community of skateboard enthusiasts. The summer skate and BMX camp responds to this circumstance by offering a summer-long program led by international professionals which provides instruction to local residents and concludes with an international competition.



The flatbed car is used as the base for all of the summer skateboard and BMX camp cars. CP 315247 65' Flatcar. Photograph by Chris Vander-Heide, 2008, from Canadian Freight Railcar Gallery.

Transparency of Culture

Extreme sports, specifically skateboarding and BMX, have their roots in a closed counter-culture. In the past these activities have had very little formal instruction, and usually relied on a learn-it-yourself mentality. With the popularity of these activities increasing yearly, placing them into mainstream culture, instruction has also increased. A summer camp providing instruction in these activities would be open to anyone who would like to take part.

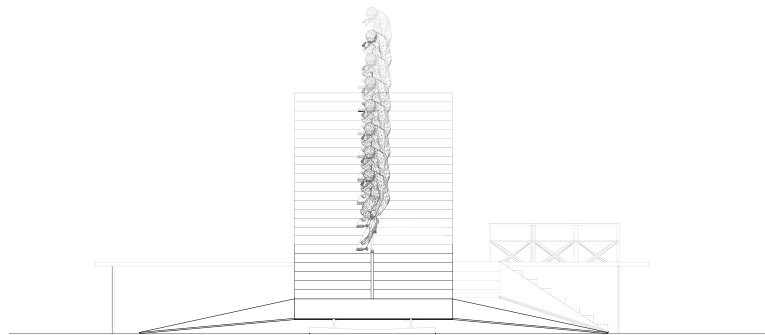
Mechanisms

Skateboarding and BMX require obstacles which include stairs, curbs, handrails, and ramps to grind, slide or catch air. These requirements led to the implementation of fold-

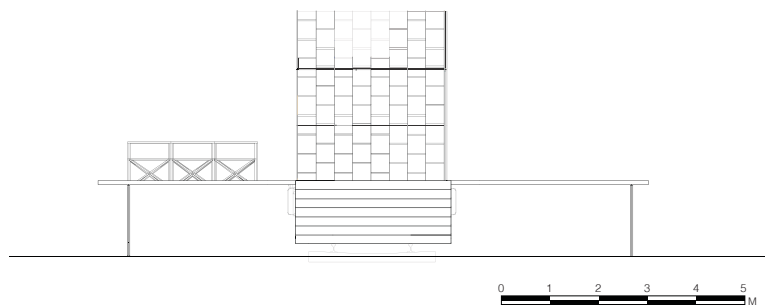
ing mechanisms into the summer camp cars. The unfolding obstacles, let athletes practice their skills, provide access to cars, and provide areas for gathering.

Finding New Use for the Rail: Access to the Eleven Kilometer Grind

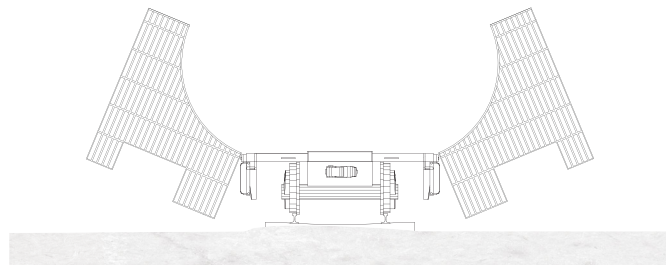
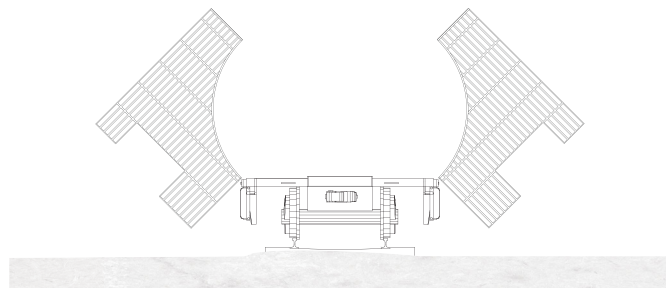
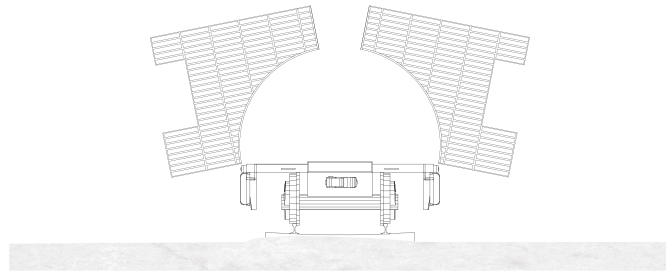
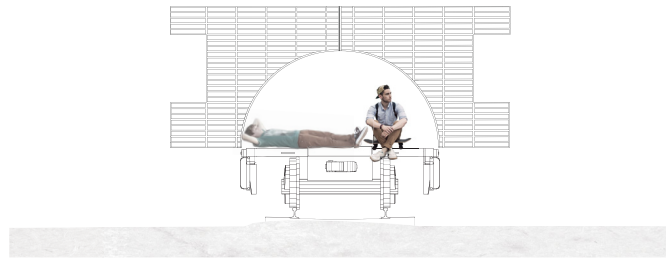
The actual rail's material, height, and length make it ideal for skaters to grind and slide; however, the surrounding ground condition rail ties and gravel do not allow access. A truss and plane system was developed to interface with the track, exposing the rail while supplying a surface adjacent to it on which skateboards may easily roll. As in the road hockey example, this system provides skateboarders access to an eleven kilometre rail, swapping its use while the system is not being used.



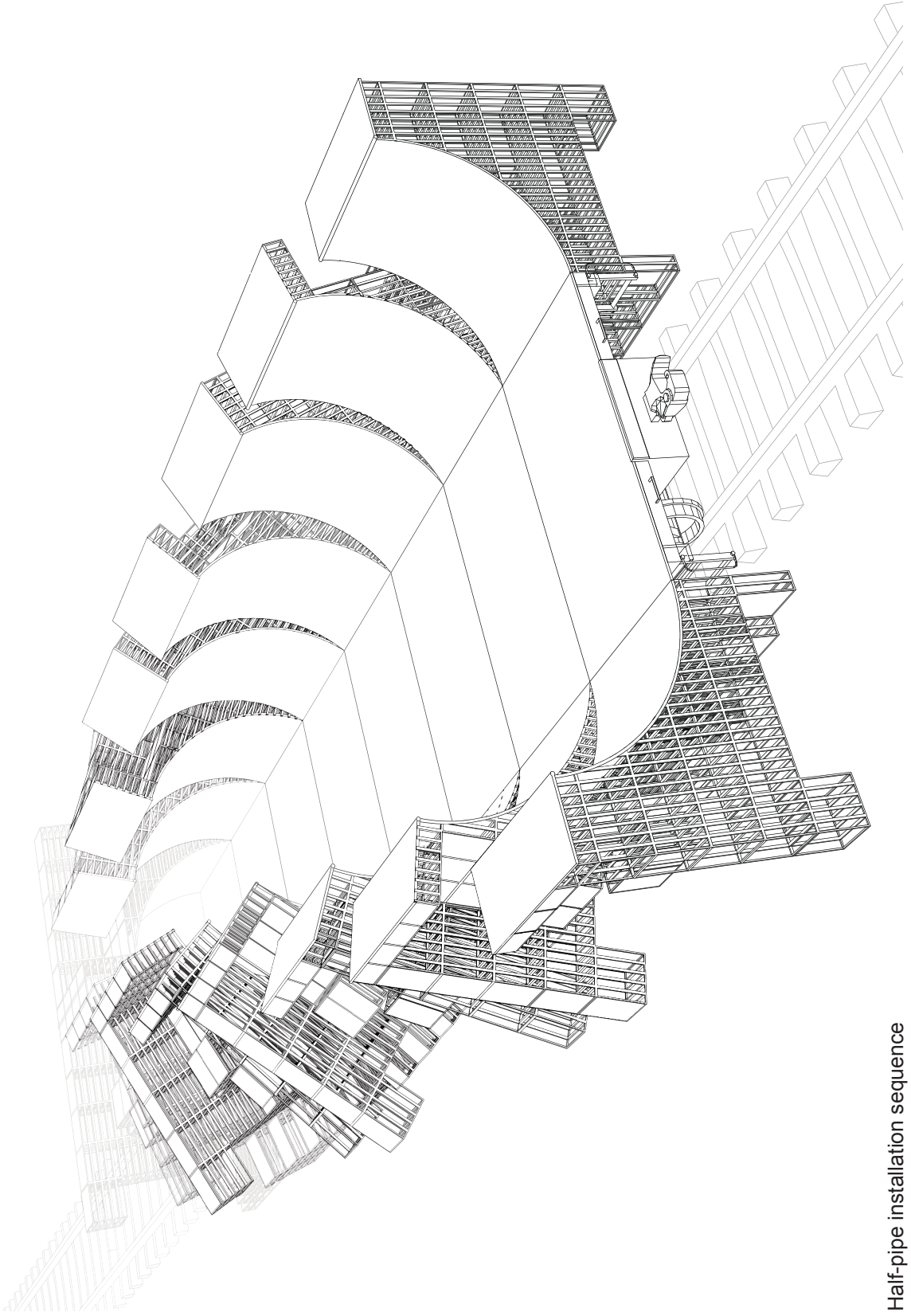
Rail cabin elevation



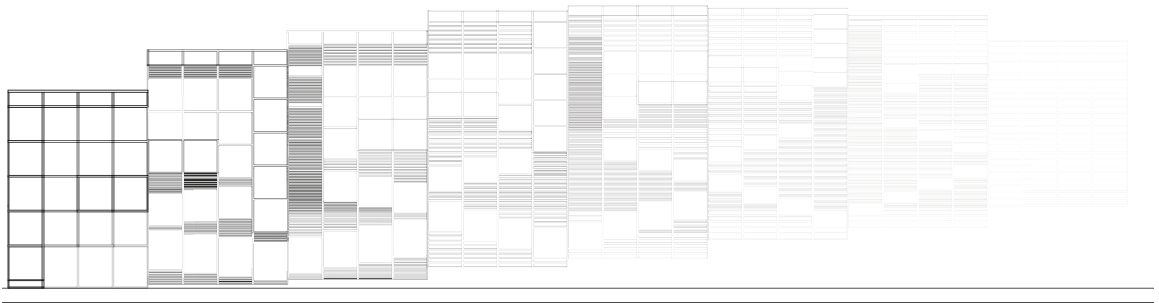
Dining ramp elevation



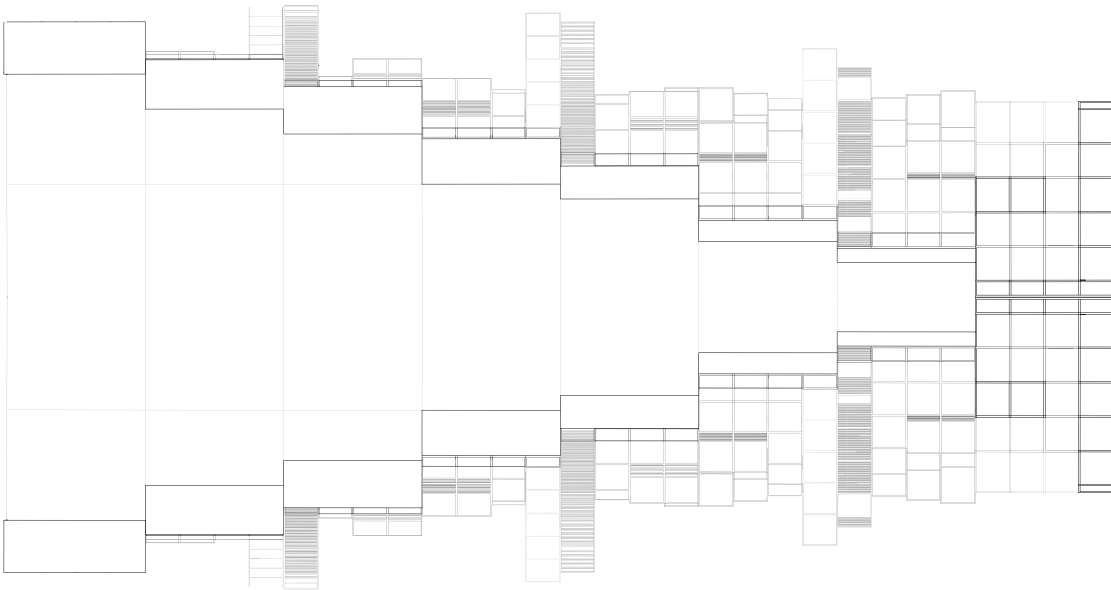
Half-pipe installation sequence



Half-pipe installation sequence



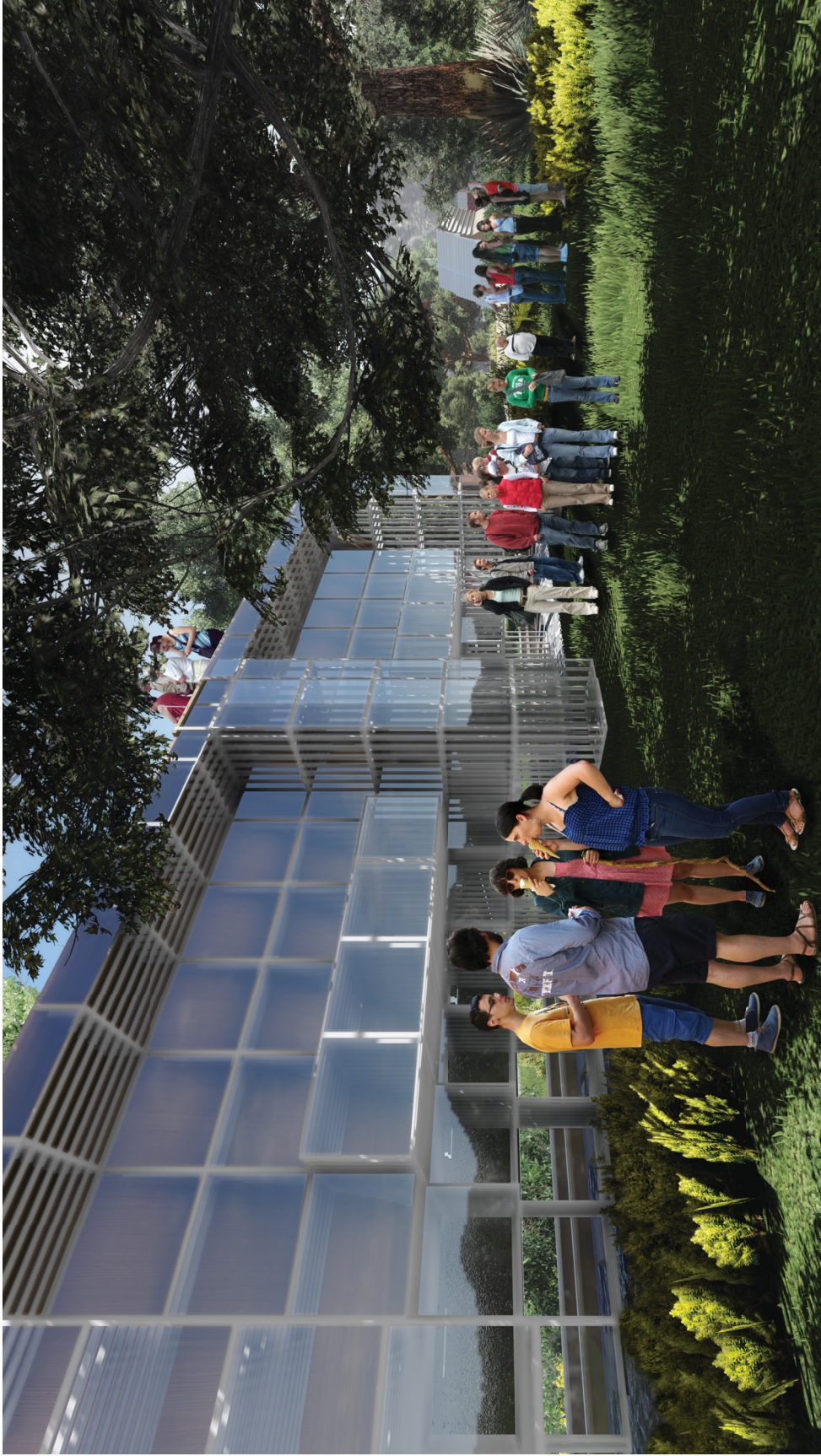
Elevation of half-pipe installation



Plan of half-pipe installation



The folding half-pipe has multiple uses. In its packed configuration, the ramp acts as shelter for campers gathering on the deck. The packed configuration also showcases the structure of the half-pipe and allows access on top of it, offering another place of refuge.



When the half-pipe is in its unfolded configuration it serves as a ramp for the campers. Its modulated structure also provides shelter for casual gathering and for camp leaders to give lessons away from the active ramp surface.



The ramp and its riders present an entertaining spectacle for those from afar.



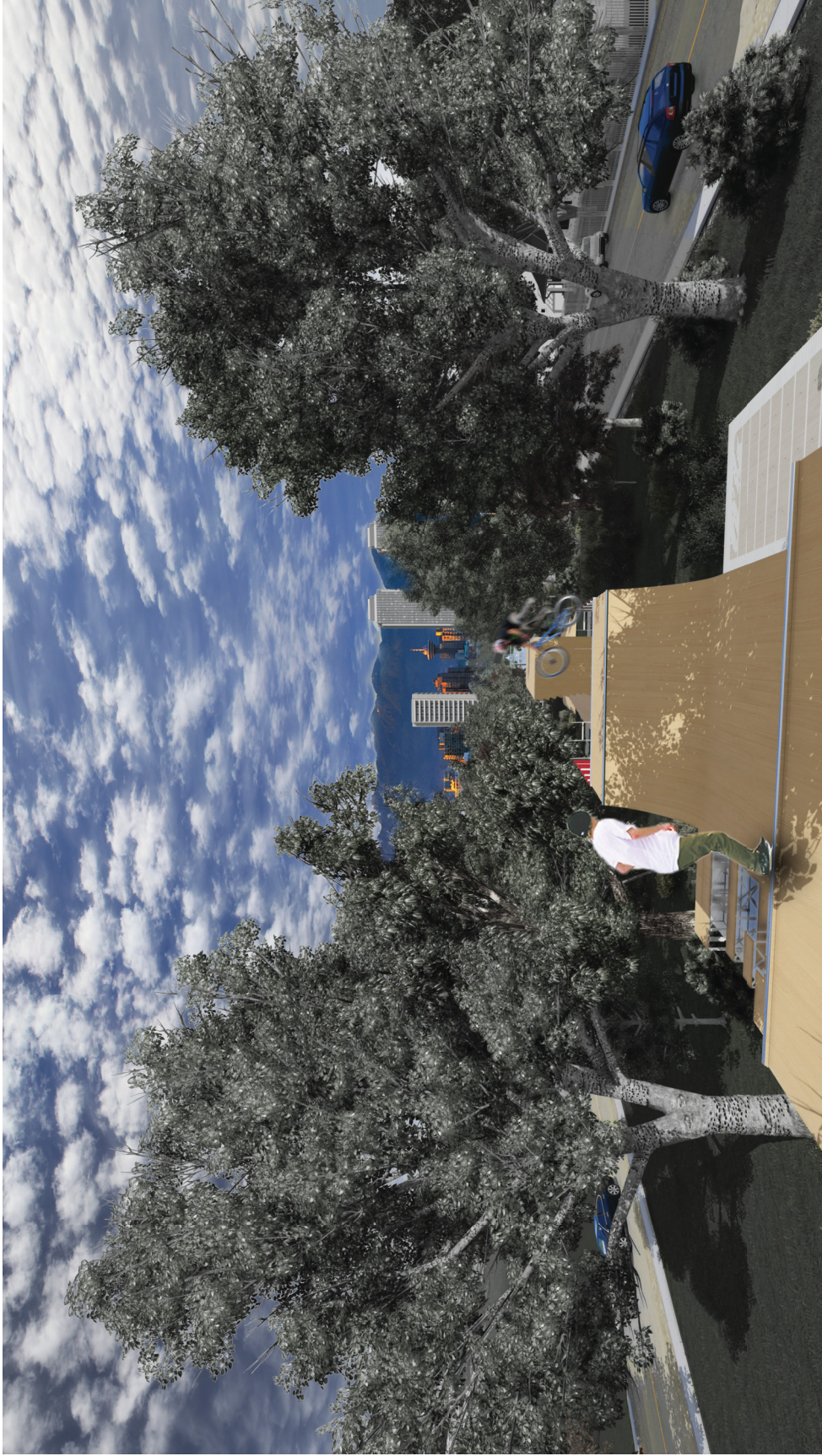
On the flatbed deck level the dining car has a kitchen which is flanked by washrooms. Seating areas open laterally from the track. The seating area is comprised of surfaces which can remain at floor level or extend vertically to seat or table height.



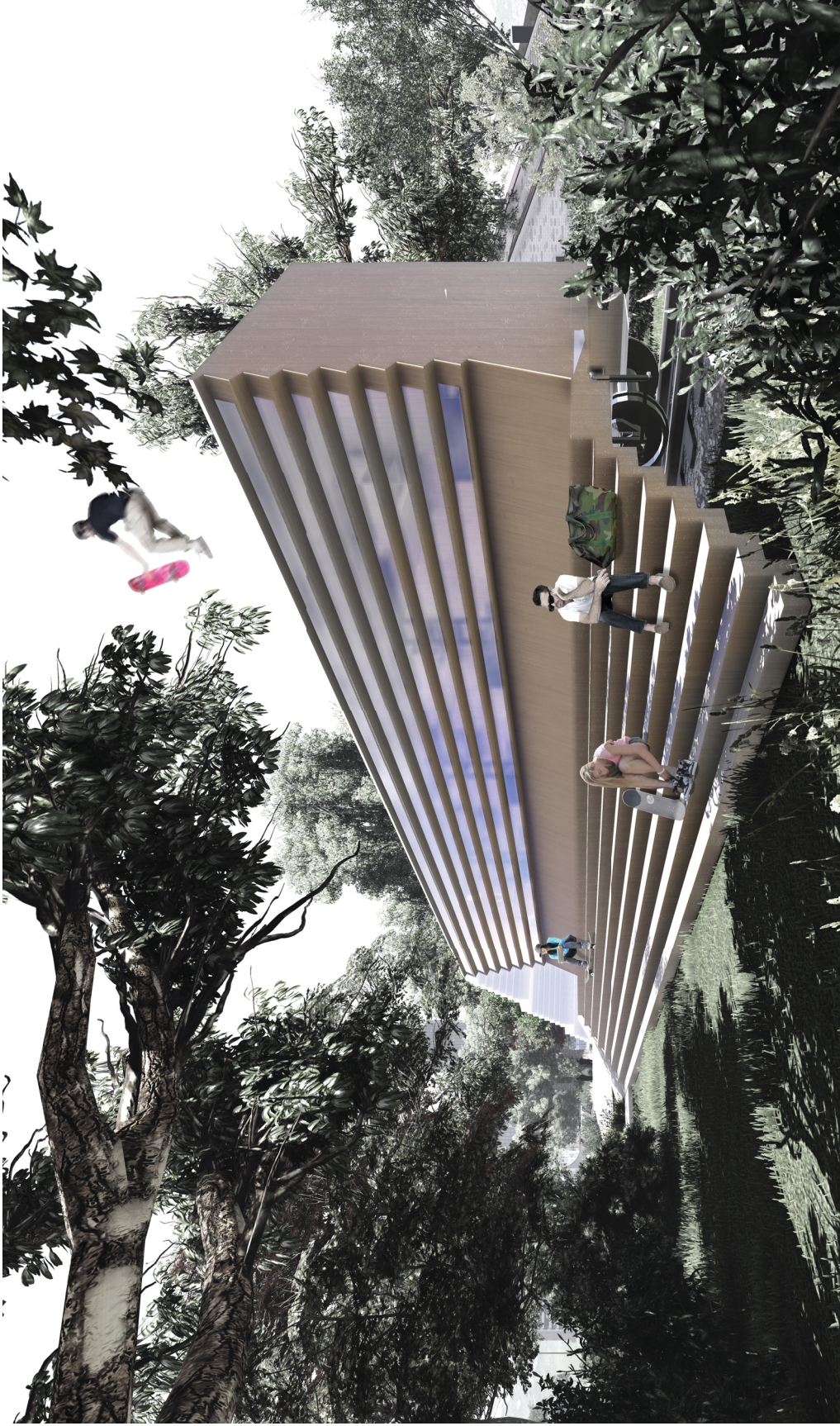
The kitchen is open to both sides of the corridor and is sheltered by the second floor mini-ramp. The car is used primarily to serve the camp and the local community during the summer. The car can also be moved along the rail to events in non-summer months if an event requires its services.



On the outside wall of each washroom a ladder leads to a secluded area above, where the mini-pipe doubles as the kitchen's roof.



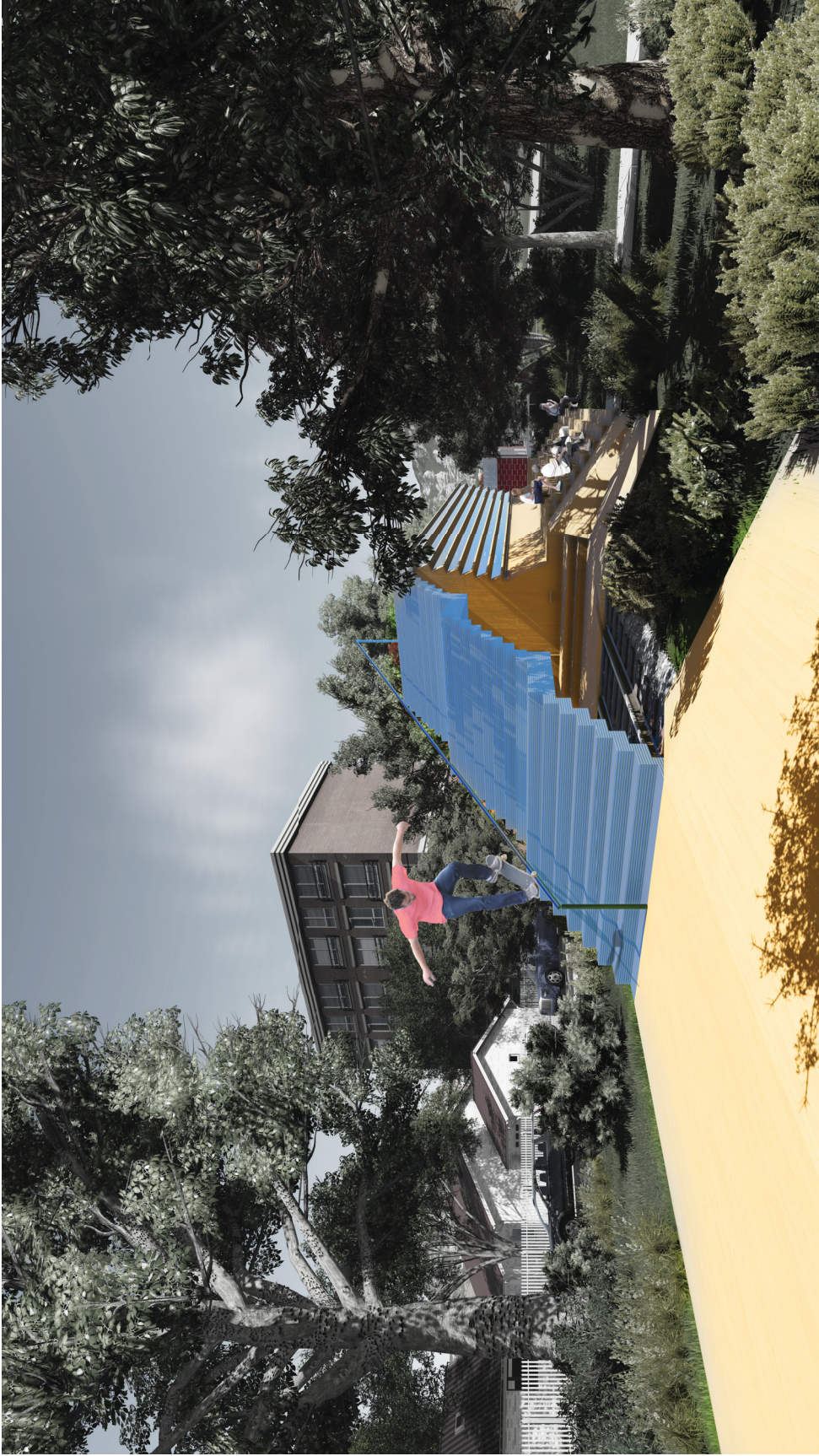
Riders receive a new perspective from the mini-ramp ceiling above the kitchen.



The rail cabin provides access to the roof, where a handrail for sliding runs down to the track. The foldout stairs protect the louvered facade while travelling and act as a place of gathering, an obstacle for skating, and access to the cabins.



Cabin section perspective. Each cabin has ten beds with matching storage.



The cabin integrates with the rail to complete a set of obstacles on which campers can practice.

Program 3: Energy Car



The three story automobile car was used as a starting point for the energy car. The CN 700652 Open Trilevel Autorack. Photograph by Brian Switzer, 1998, from Canadian Freight Railcar Gallery.

Vancouver residents have limited access to sunlight due to the cloudy Pacific Northwest climate. People who live in an environment which is sunlight-deficient can develop Seasonal Affective Disorder. Treatment for this disorder usually consists of exercise and sun lamp exposure.⁹ The proposed energy car program responds to this regional concern by providing people with access to exercise and sun-lamp exposure. Powered with renewable human energy, sun lamps under an undulating glass skin on two floors provide therapeutic light treatment. People are given access to the energy car, which also houses stationary bikes, pulleys, and other apparatus that are connected to a system which converts the participant's pedalling and pulling into power for the lamps.

The energy car moves along the rail and is powered by a battery that is primarily charged also by pedalling and pulling. For the car to move at its top speed, it requires the majority of the movement stations - pulleys, stationary bikes, and rowing machines - to be used daily. If these stations are not used to full capacity, the car will travel at a reduced speed. As a secondary option, the battery can be charged along the rail at charging stations which use the 1950s interurban electrical infrastructure.

Mechanism: Deployable Mobile Station Points

The energy car has the ability to deploy its "rail level floor" while leaving the second story as a station point. The second story allows other cars to pass under it, allowing circulation to remain continuous. The rail story is able to



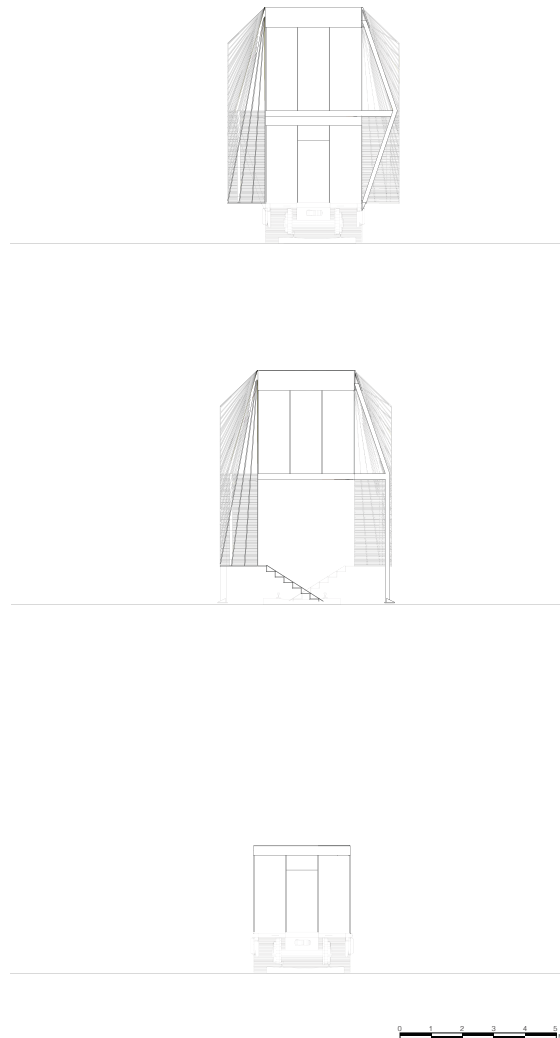
A girl using her stationary bike to power a lamp. Photograph by Wingsinger, 2012, from "Turn an exercise bike into an energy bike".

9. Melisa McCarty, "Natural Medicine: Natural Treatments for Seasonal Affective Disorder", *Seattlepi.com*, January, 2008.

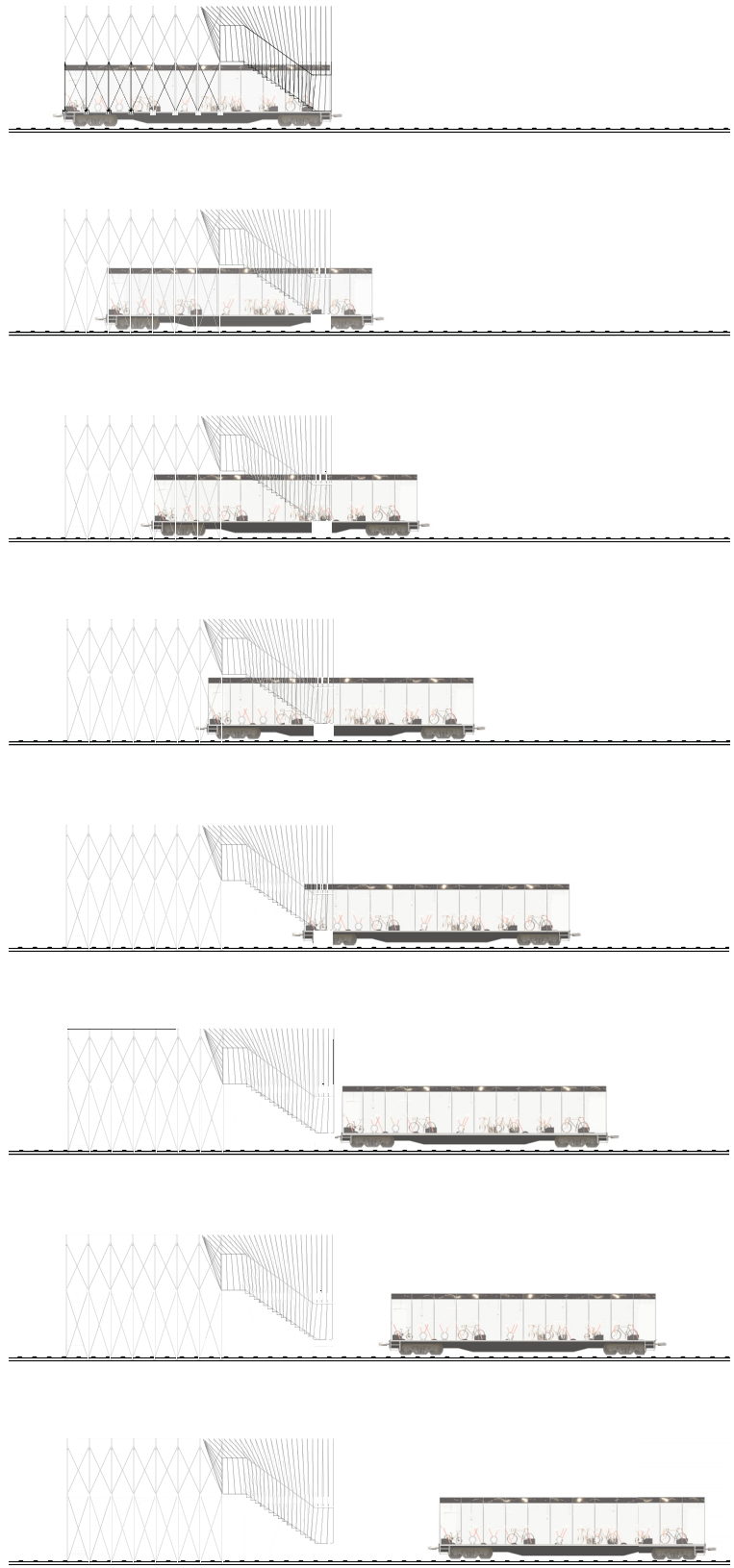
be deployed at any site, allowing for the function of the car to be at two places simultaneously.

Finding New Use For the Rail: Contributor to Community Health

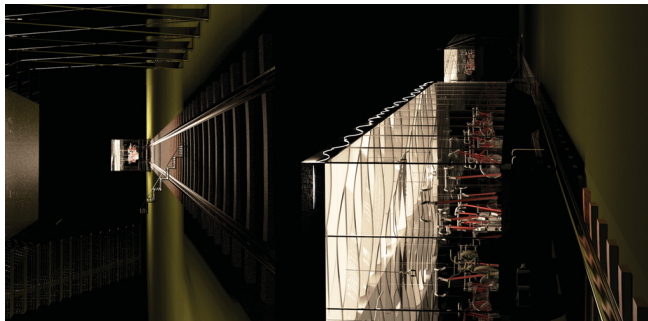
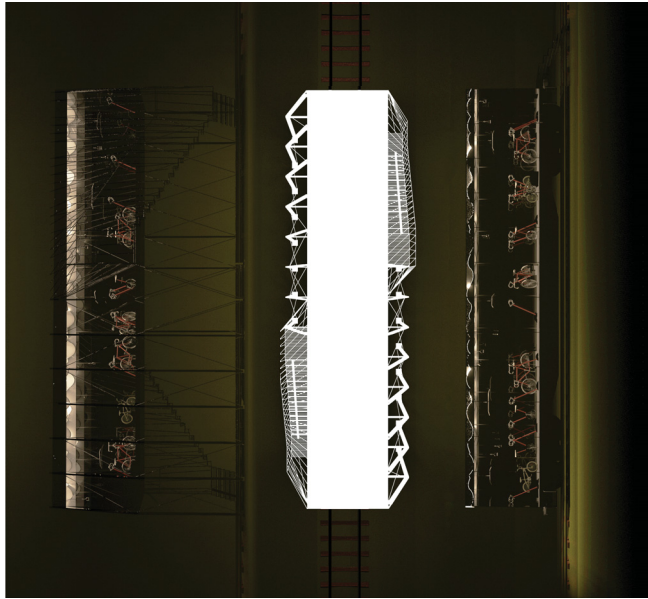
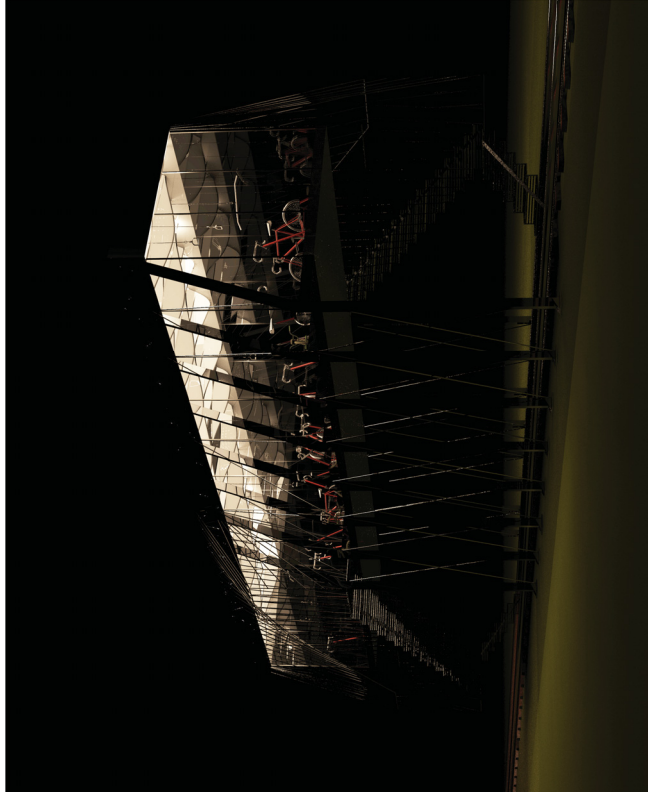
The program uncovers a new value for the rail, swapping its usual use with access to treatment for a common disorder shared by the community. Value is two-fold, providing not only access to treatment for the disorder but also to preventative health care measures.



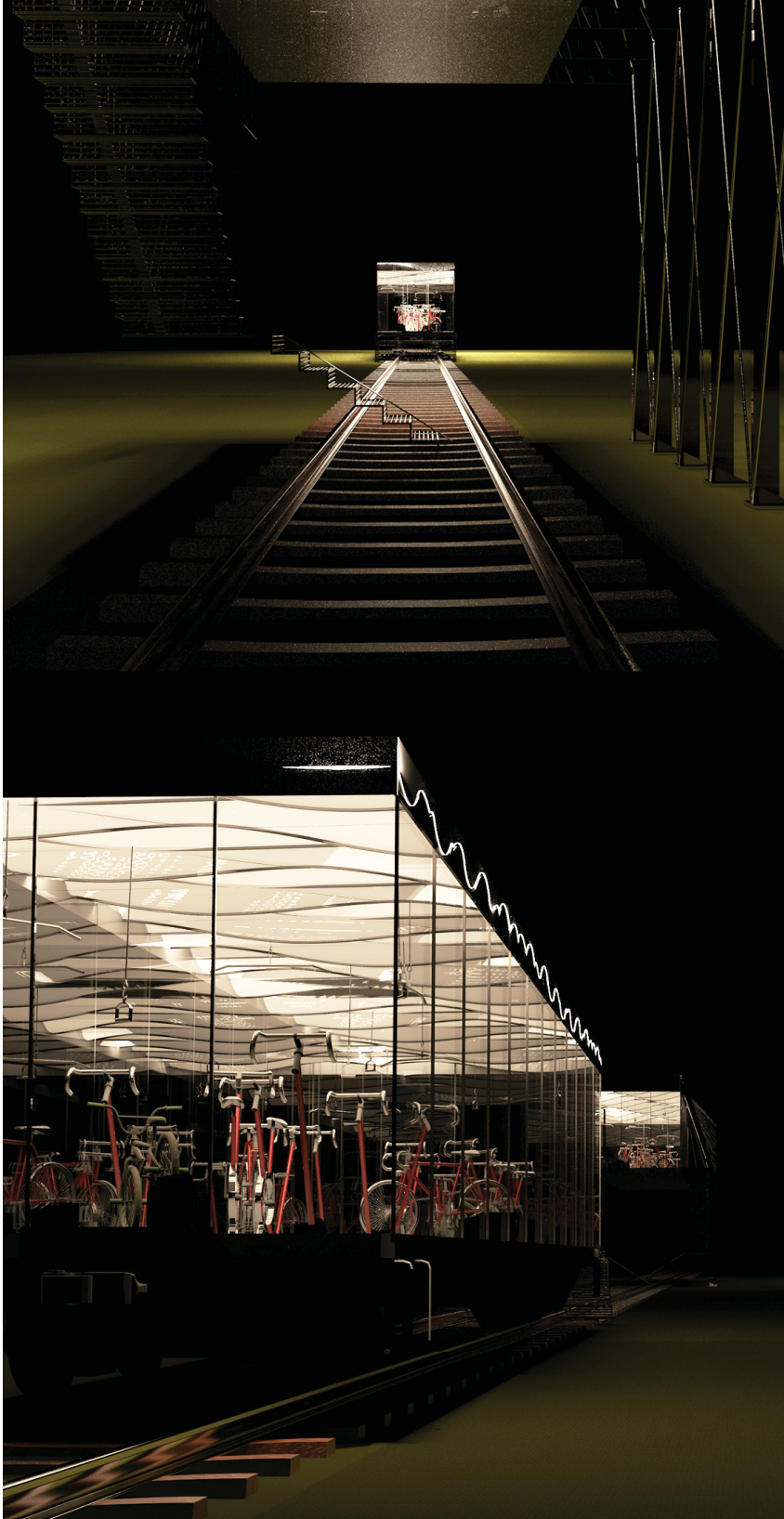
Energy car combined, second floor, and rail floor elevations



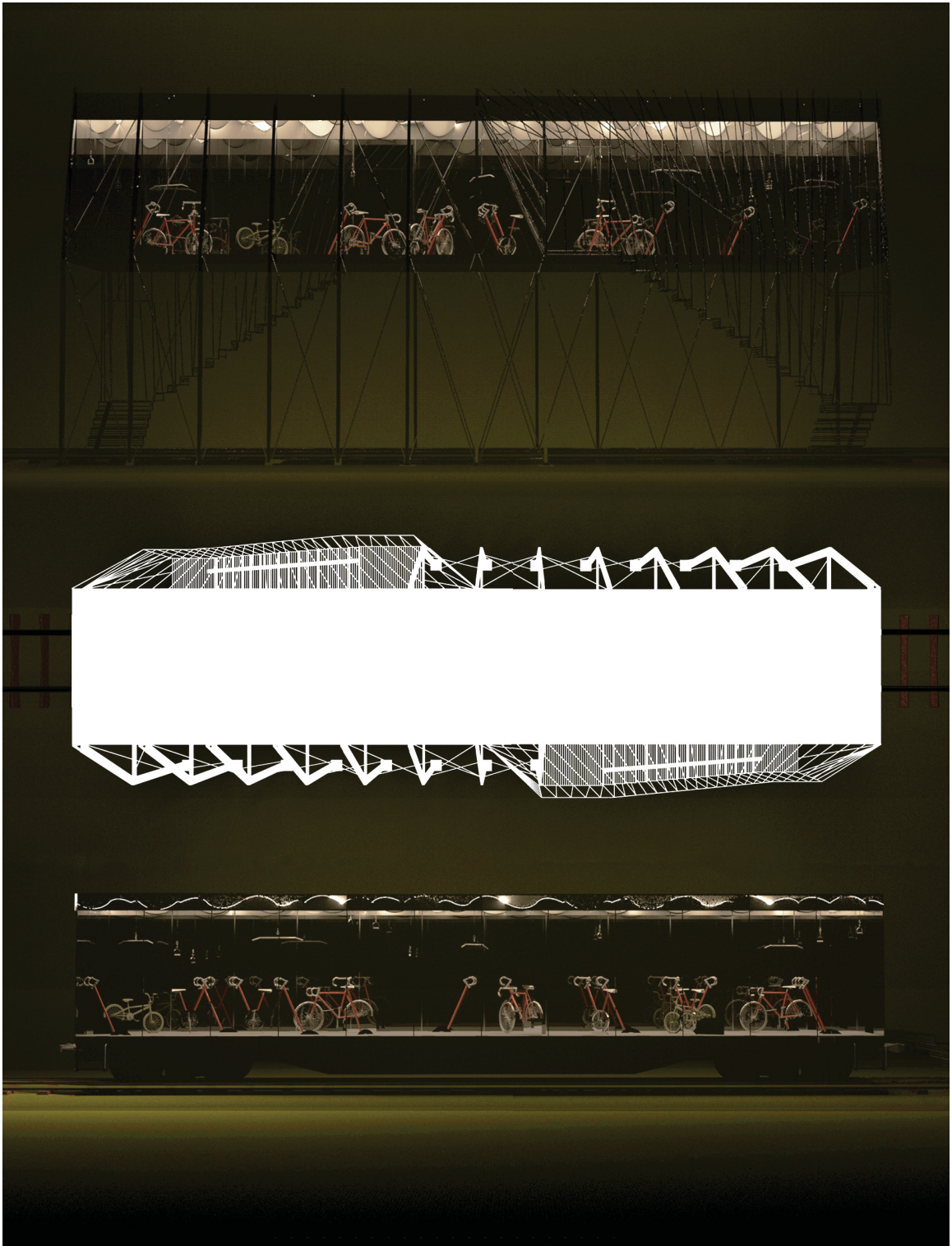
Energy car installation sequence



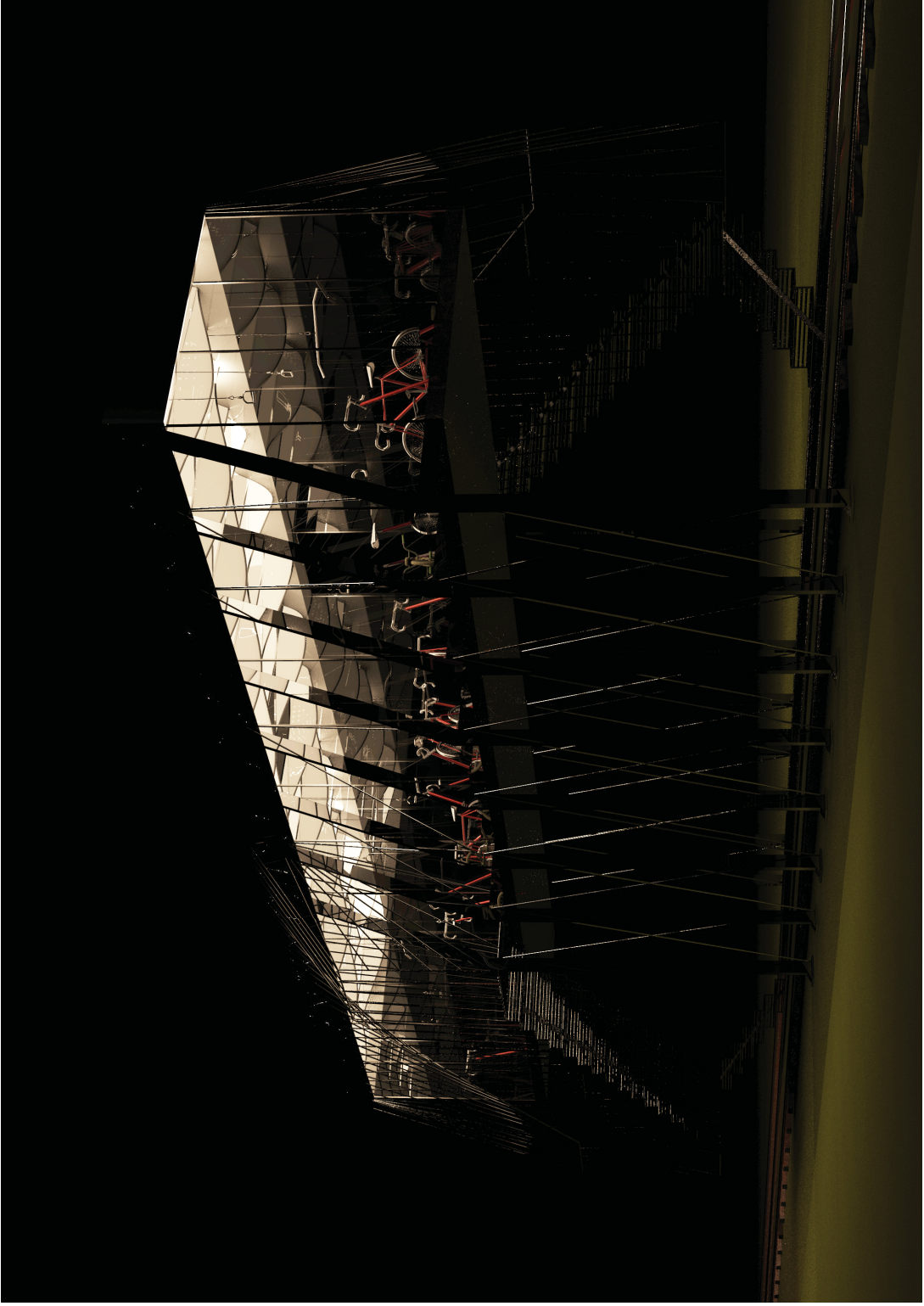
Energy car



The lower story of the energy car separates from the second story, expanding its access to the local constituents.



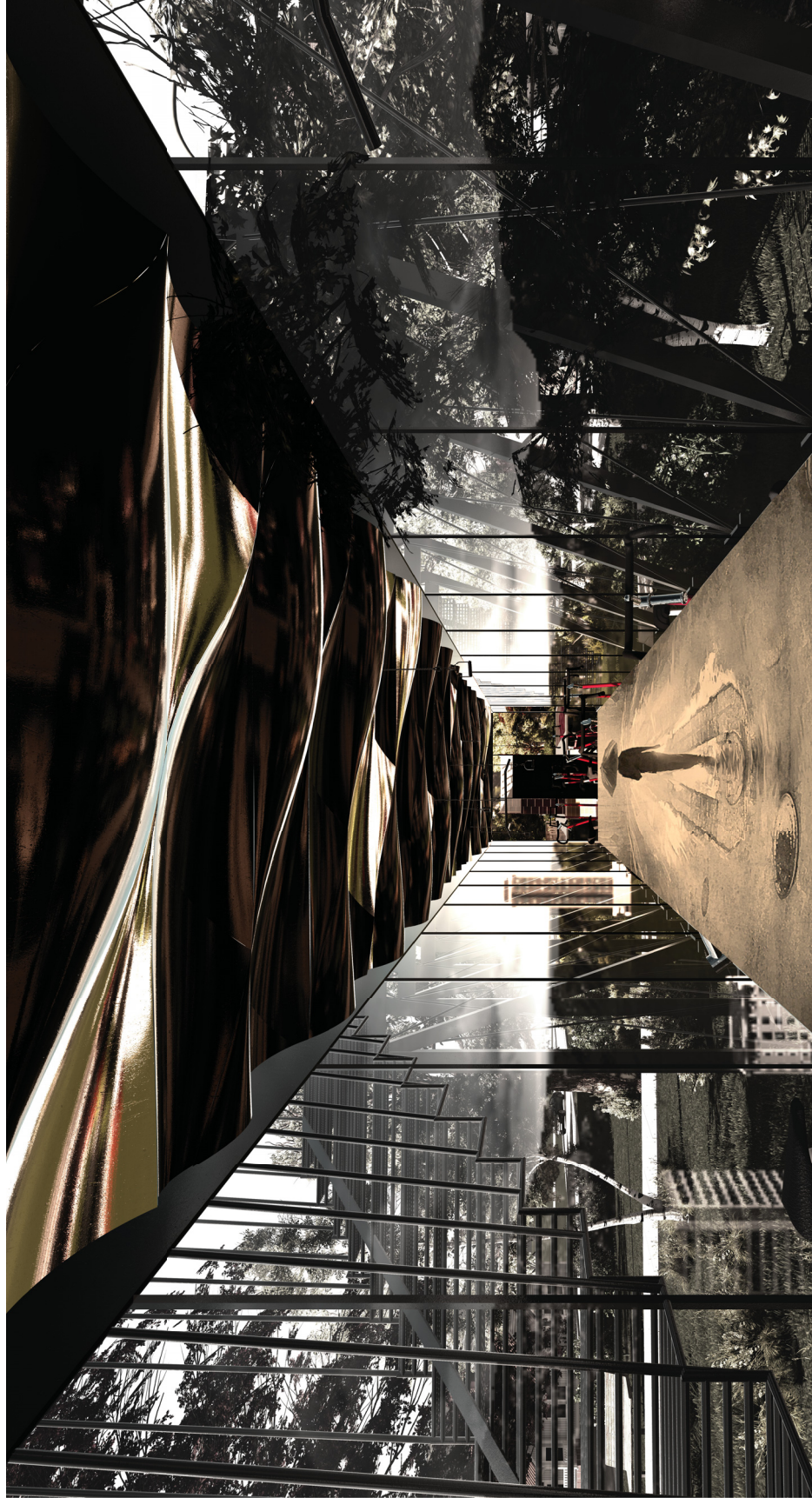
Both portions of the energy car act as beacons of light, providing space for residents to gather, to exercise and to gain access to sun lamp exposure.



The second floor of the energy car has foldable stairs which descend to the ground.



The energy car finds inspiration for its form from two-story rail cars; however, unlike past cars, the energy car defines space on the track that benefits local residents.



The energy car seeks new ways of responding to the overcast, rainy environment.



The energy car complements the Arbutus Corridor, celebrating the vibrancy between human and machine.

Program 4: Market Car

The market car provides space for vendors to sell goods to the community during the weekends. During the week the car is used as a pavilion.

Program 5: Event Car

The event car moves to areas for special events such as: film viewing, concerts, plays or any event which requires shelter. When not in use, the event car remains at the end of the rail, to be used as a pavilion.

Annual Calendar

The five programs work together to engage numerous sites along the rail with varying combinations of programs at different times of the year. This provides a multiplicity of uses for the Arbutus Corridor, which results in a multiplicity of engagement for local residents. Each program has a unique time-space-movement relationship that corresponds to an annual event schedule which informs their location on the track. When multiple cars are placed on the track their time-space-movement relationships interact, creating a complexity of movement and combinations of cars.

Natural History Museum: Seasonal Change

This car operates at the four major sites. It arrives prior to each festival for maintenance and setup. The car is made operational for the first day, the seasonal festival. It remains there until it moves to the next site for the next seasonal festival.

Due to the complexity of the natural history museum car it moves the least of the programs. This requires some of the

other programs to have two cars, one serving north of the museum and one south.

Summer Camp: Single Season Use

This set of cars is used in the summer. The camp begins on the first day of summer, as part of the seasonal celebration. The camp moves four times throughout the summer, with its last location corresponding to the autumn festival. After the festival, the camp continues to one of the rail yards flanking the rail, either for storage or to be moved via the rail network to a southern area where the climate is appropriate for continued use. If the cars are to remain in storage, both the dining car and the cabin could be deployed for special events.

Energy Car: Continuous Use and Movement

The movement of the energy car is directly correlated with the level of physical engagement it receives from people. It is expected that, during cloudy times, the car would be used more, which would therefore move it further along the track. Communal participation moves the car through various neighbourhoods, providing the entire corridor with access.

Two energy cars exist, serving the north and south. These cars are present at events along the rail which require power and also move the other cars to their locations.

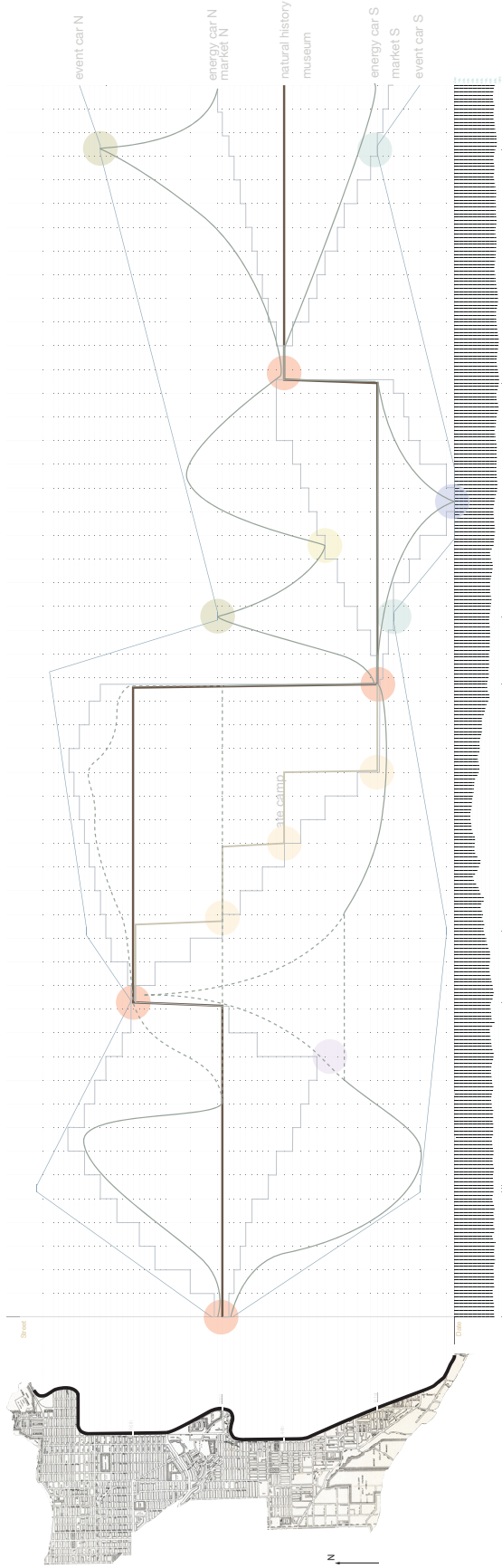
Market Car: Weekend Use

Markets are made operational for weekend events, offering space for vendors to sell goods. These cars are also used at events with multiple cars throughout the year. During the

week the markets are moved to their next location and prepared for the following weekend market. North and south market cars serve the corridor.

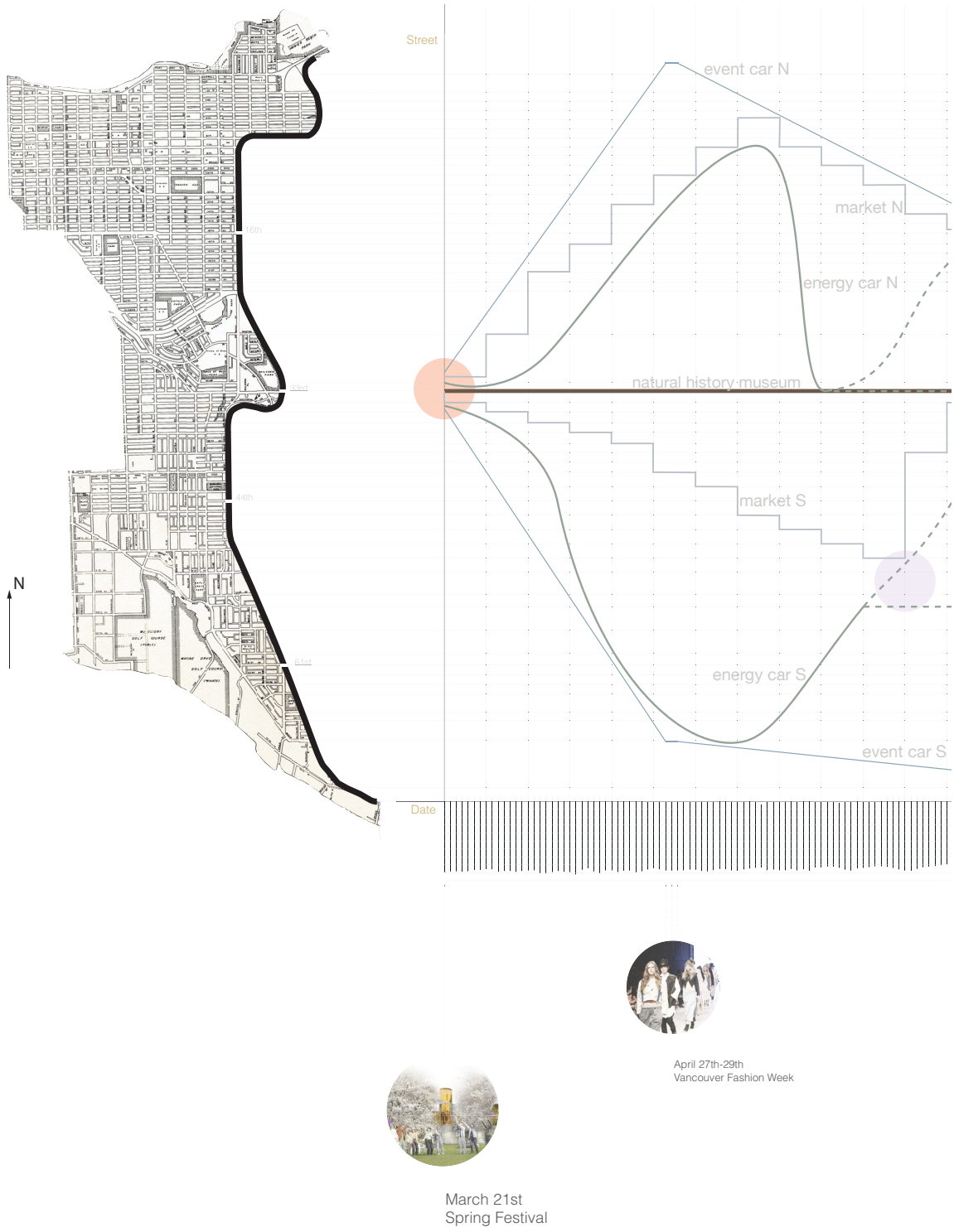
Event Car: Specific Single and Multiple Day Use

When needed for an event on the rail, the car is moved to the location and set up for events such as public film viewing, seasonal festivals, and concerts. When the cars are not required at an event they reside at their respective ends of the line, as pavilions. North and south event cars serve the corridor.

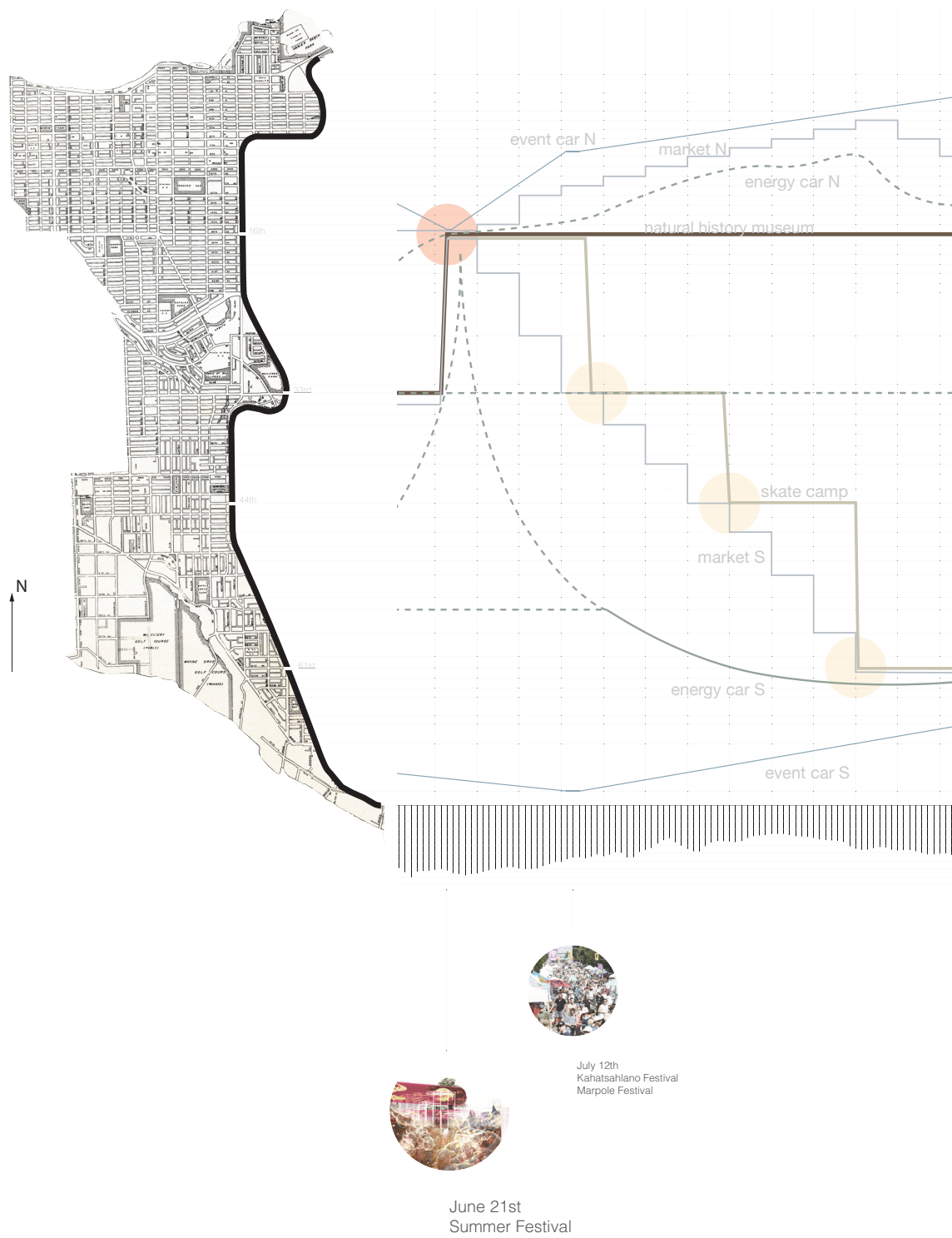


Graph of annual time-space movement, starting on March 21. Each wave form represents the movement of one of the five cars along the Arbutus Corridor. Horizontal lines show when a car is stationary; lines moving along the y-axis show a car in motion. The colored circles highlight when cars come together for a local community event.

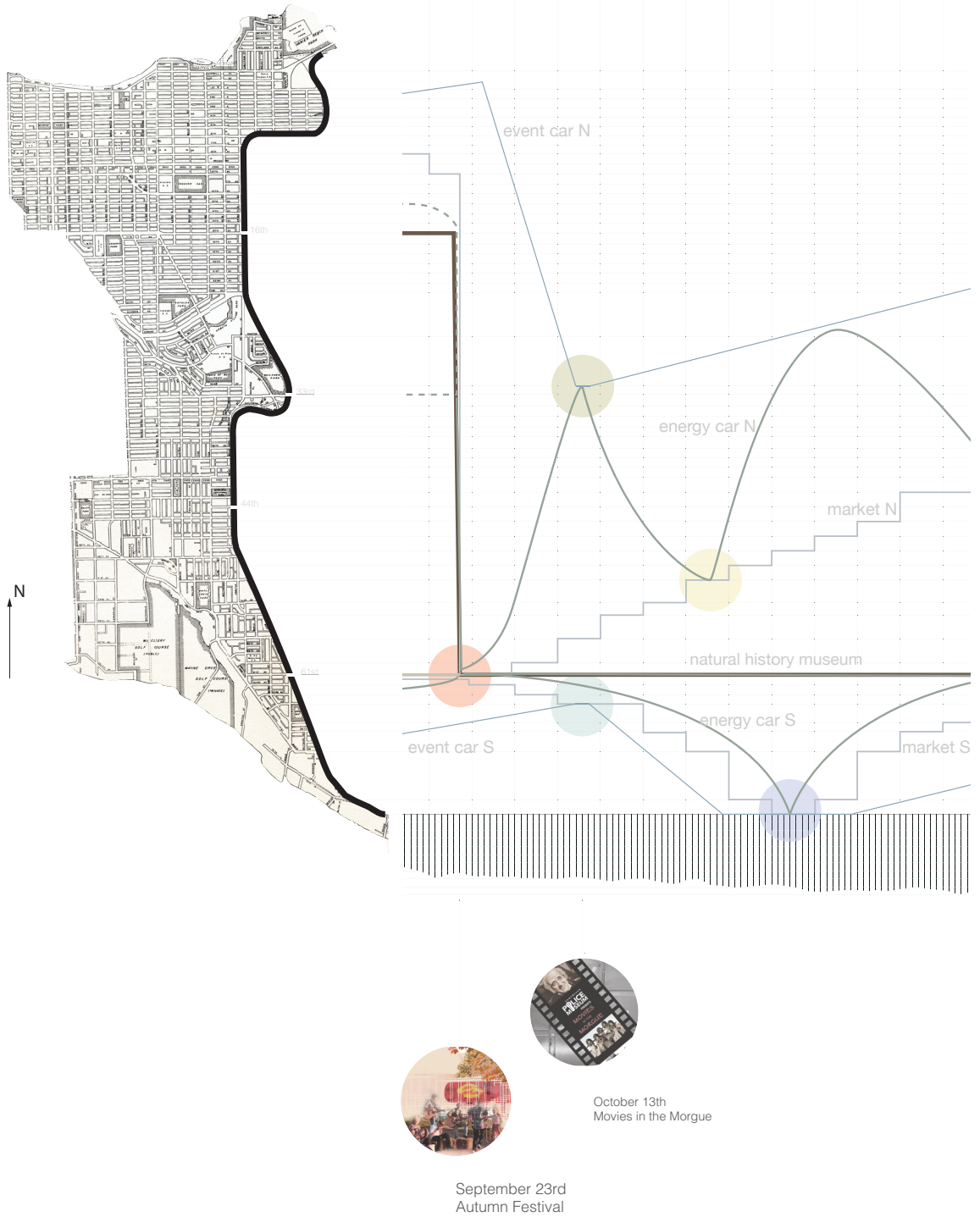
The energy car's curvilinear line differs from the other cars' lines because its continuous movement is not predetermined but depends on how much people use it. Cloud data is plotted along the x-axis. A steeper energy car wave form is seen on cloudier days, assuming higher use. The horizontal portions of the energy car line show when the car comes apart into two pieces, leaving one stationary and the other mobile.



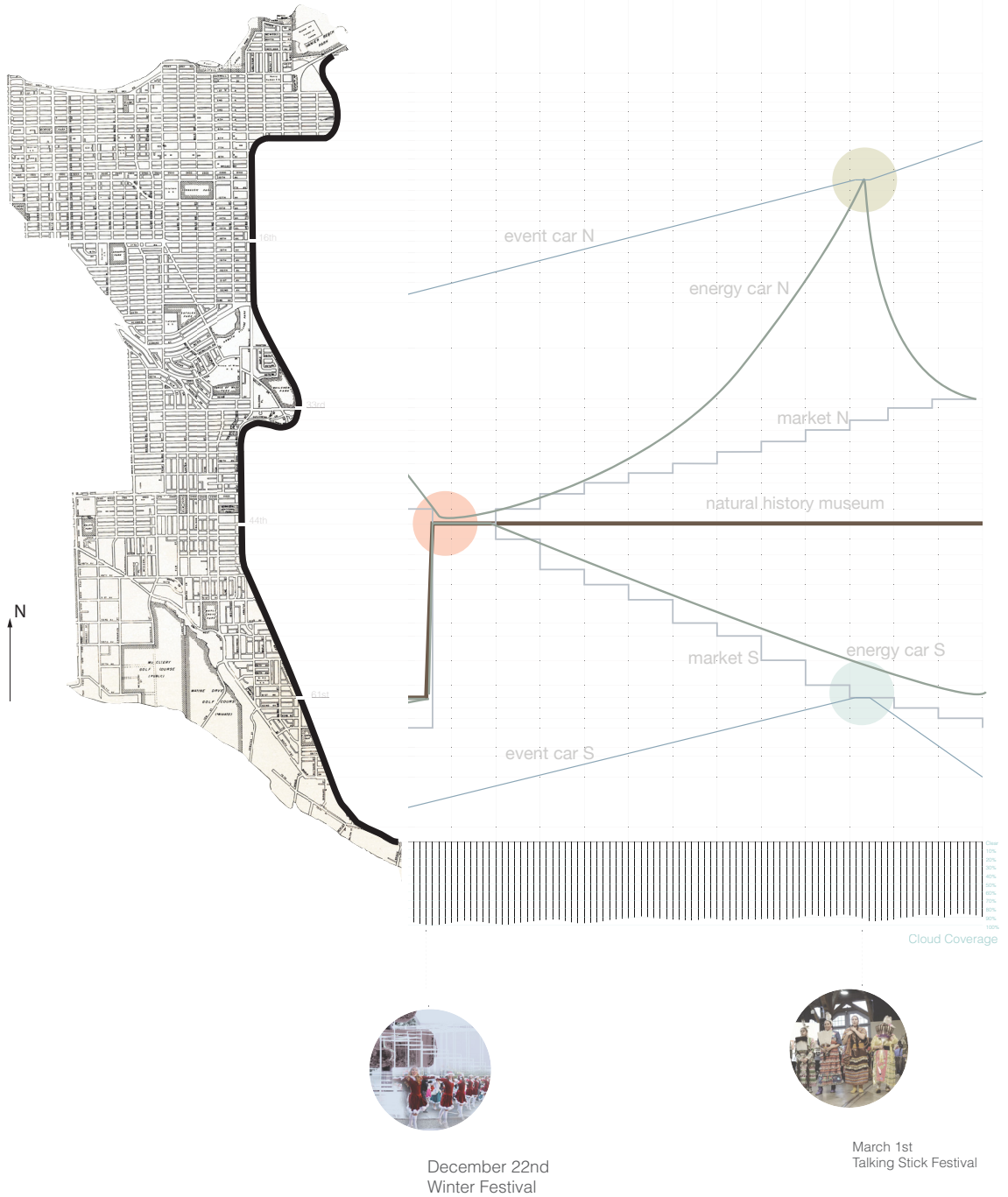
Movement of cars and events during the first quarter of the year.



Movement of cars and events during the second quarter of the year.



Movement of cars and events during the third quarter of the year.



Movement of cars and events during the fourth quarter of the year.



March 21st
Spring Festival



April 27th-29th
Vancouver Fashion Week



June 21st
Summer Festival



July 12th
Kahatsahlano Festival
Marpole Festival



September 23rd
Autumn Festival



October 13th
Movies in the Morgue



December 22nd
Winter Festival

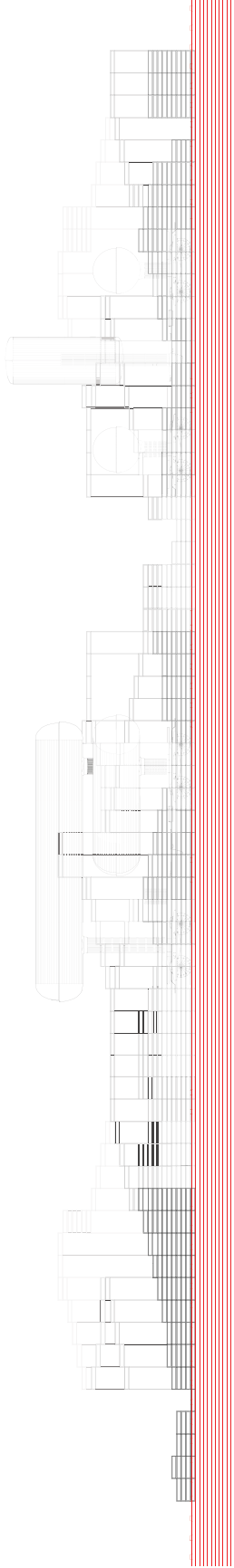


March 1st
Talking Stick Festival

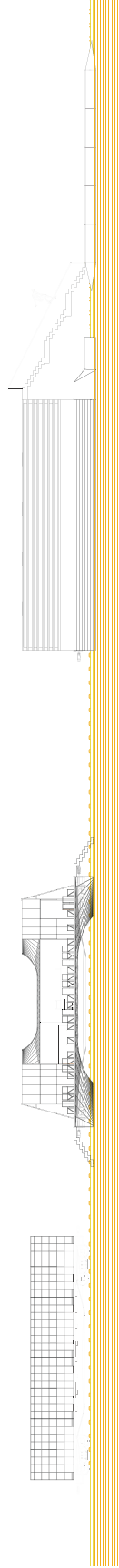
Annual events along the Arbutus Corridor. They include existing civic events and four new seasonal events.



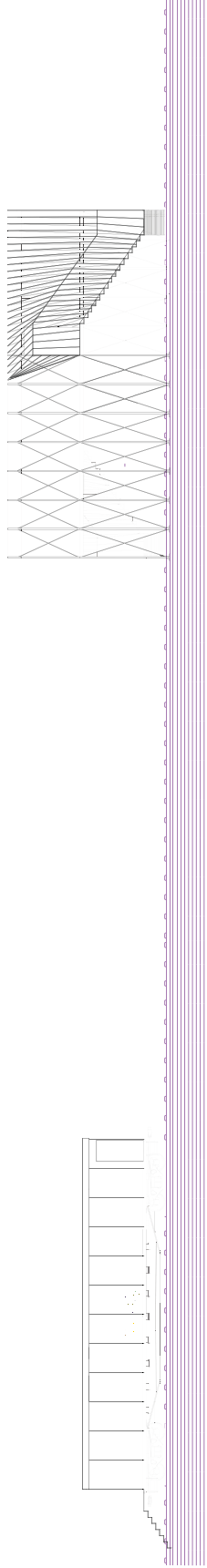
Elevations of the different combinations of cars. The ground plane color corresponds to the colored circles on the annual time-space movement graph, representing when cars come together.



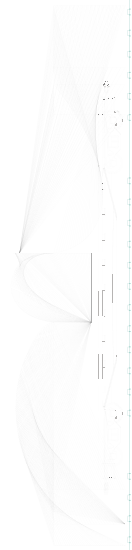
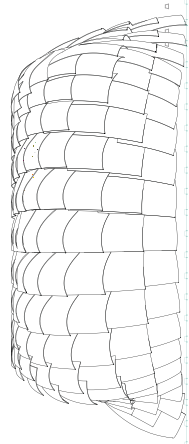
The natural history museum car moves four times a year. Its customizable form at each site is unique. The image shows the museum at one event on the calendar.



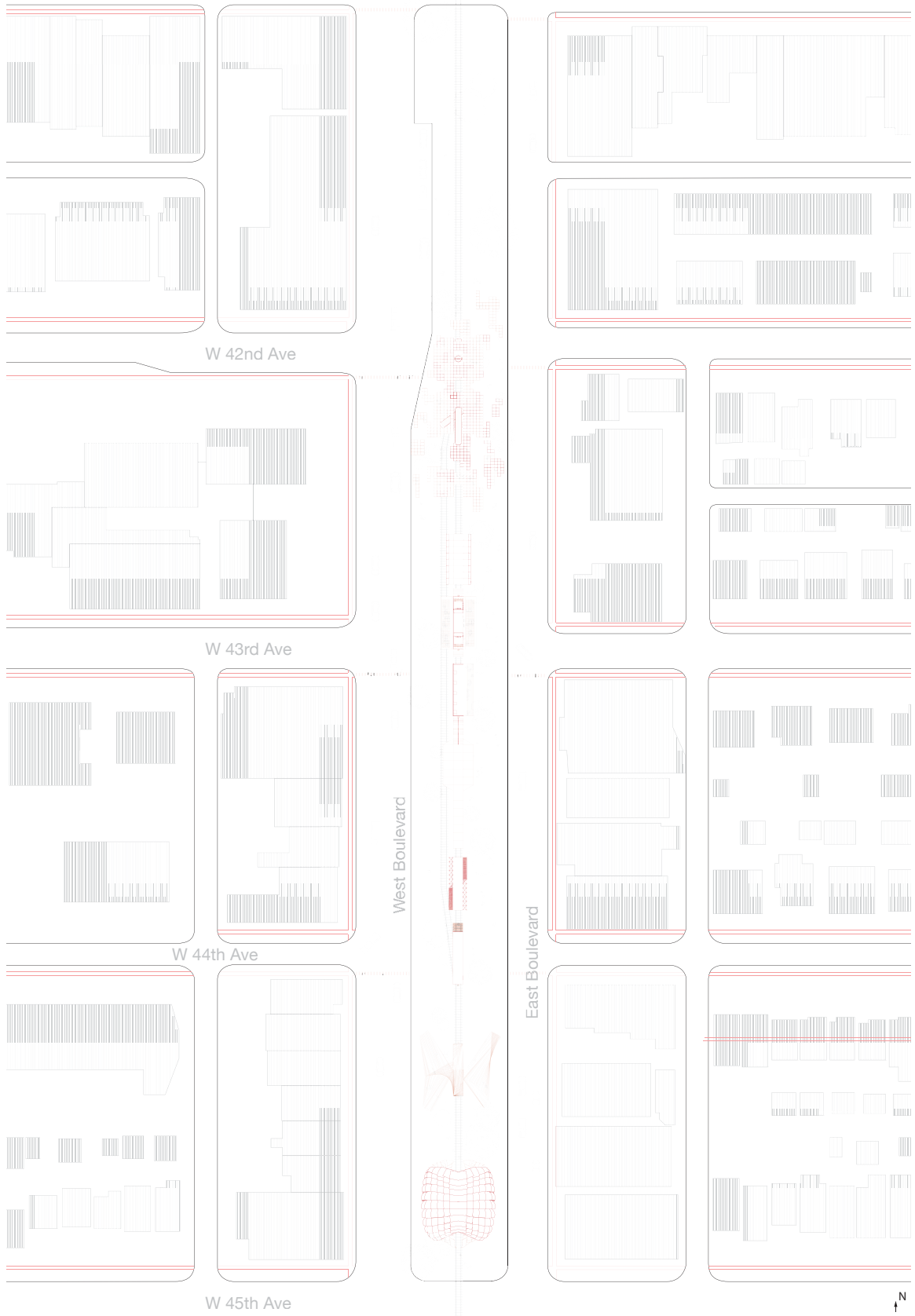
The summer camp gives parents access to supervised summer activities for their children. This image shows the summer camp at an event on the calendar.



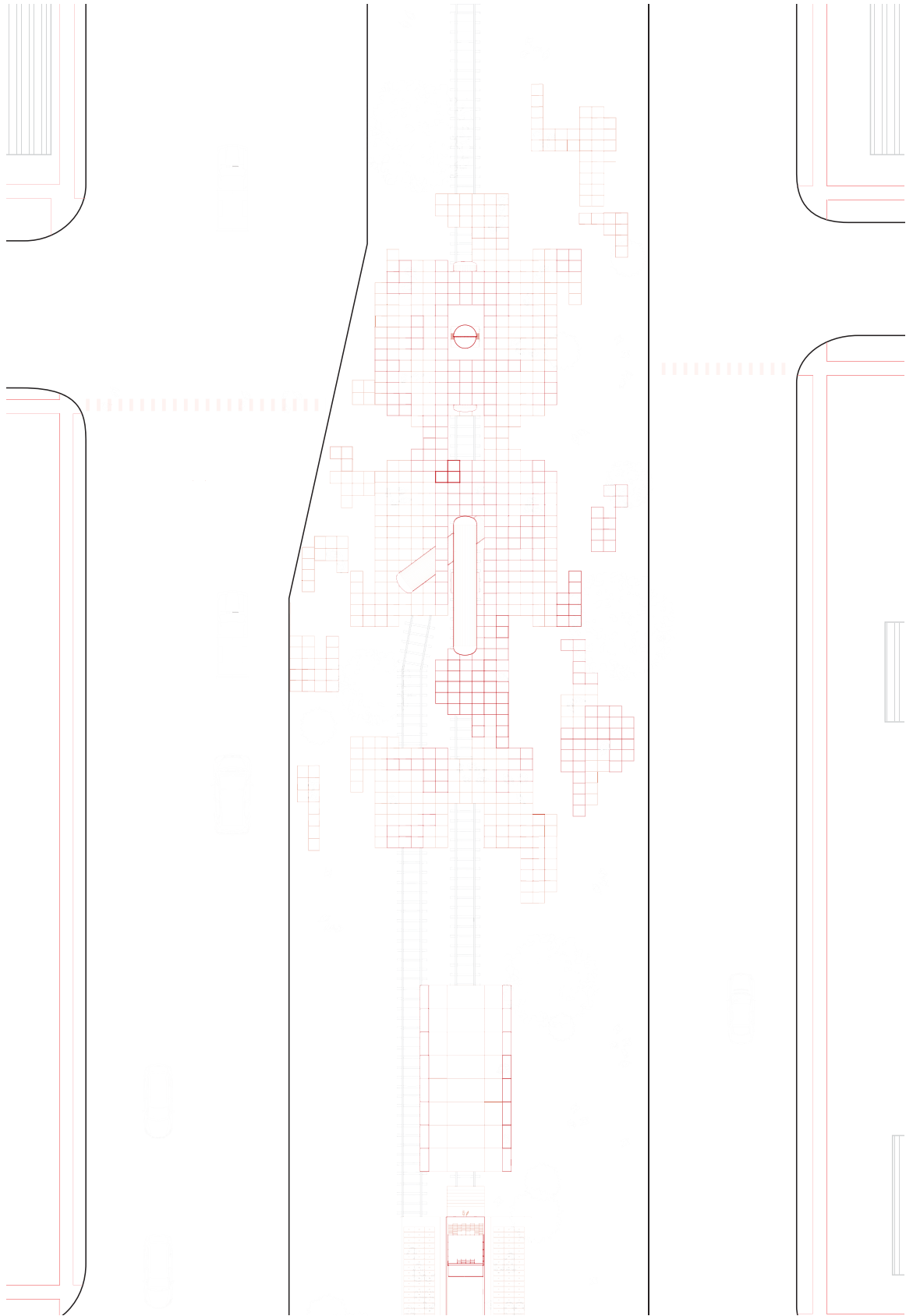
The energy car promotes contact between neighbours. The car is moved between neighbourhoods through residents' use of the apparatus in the energy car. This image shows the energy car separated at an event on the calendar.



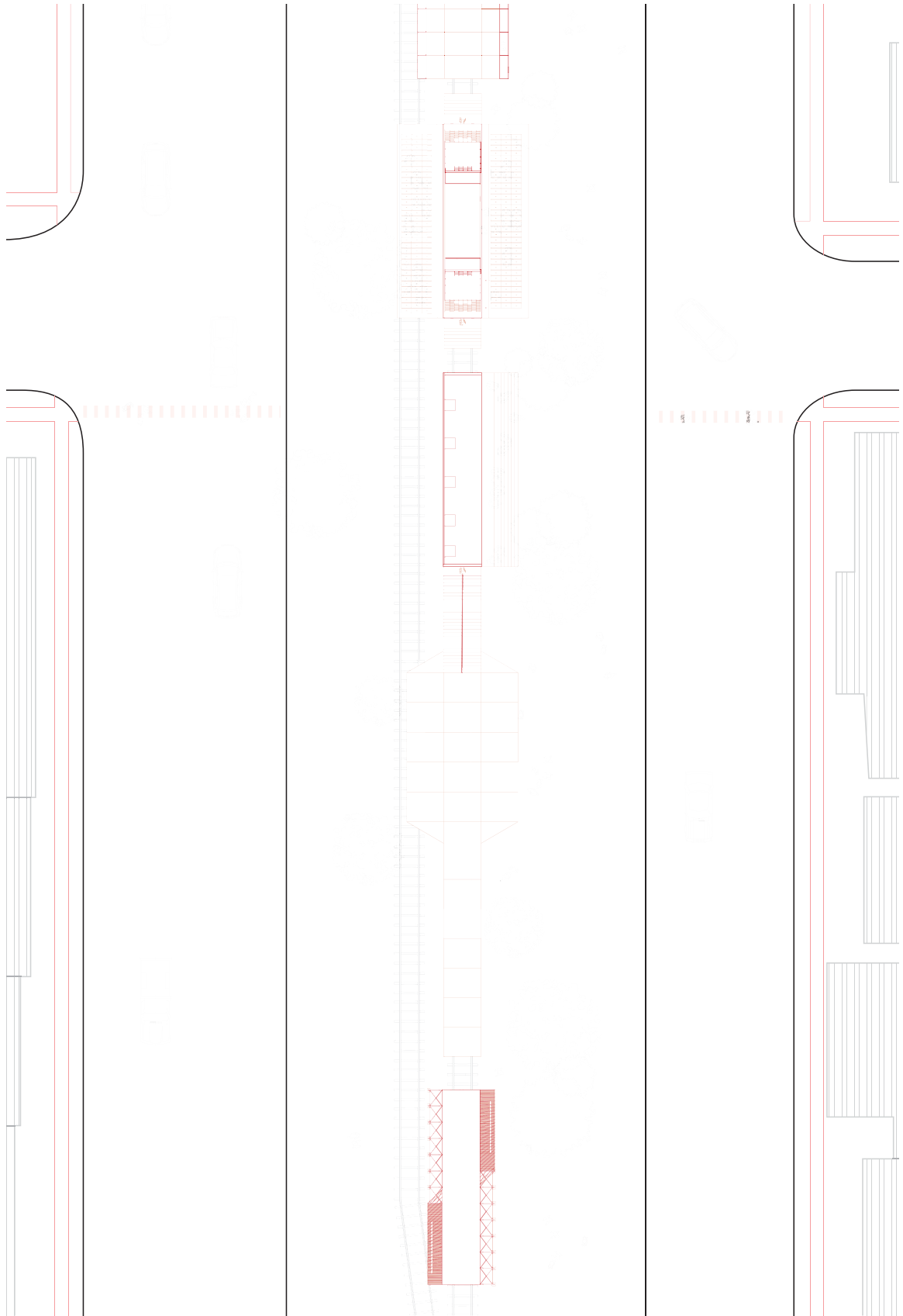
This image shows the market car and the event car at an event.



Winter festival at 44th and West Boulevard. This plan is enlarged on the next four pages.

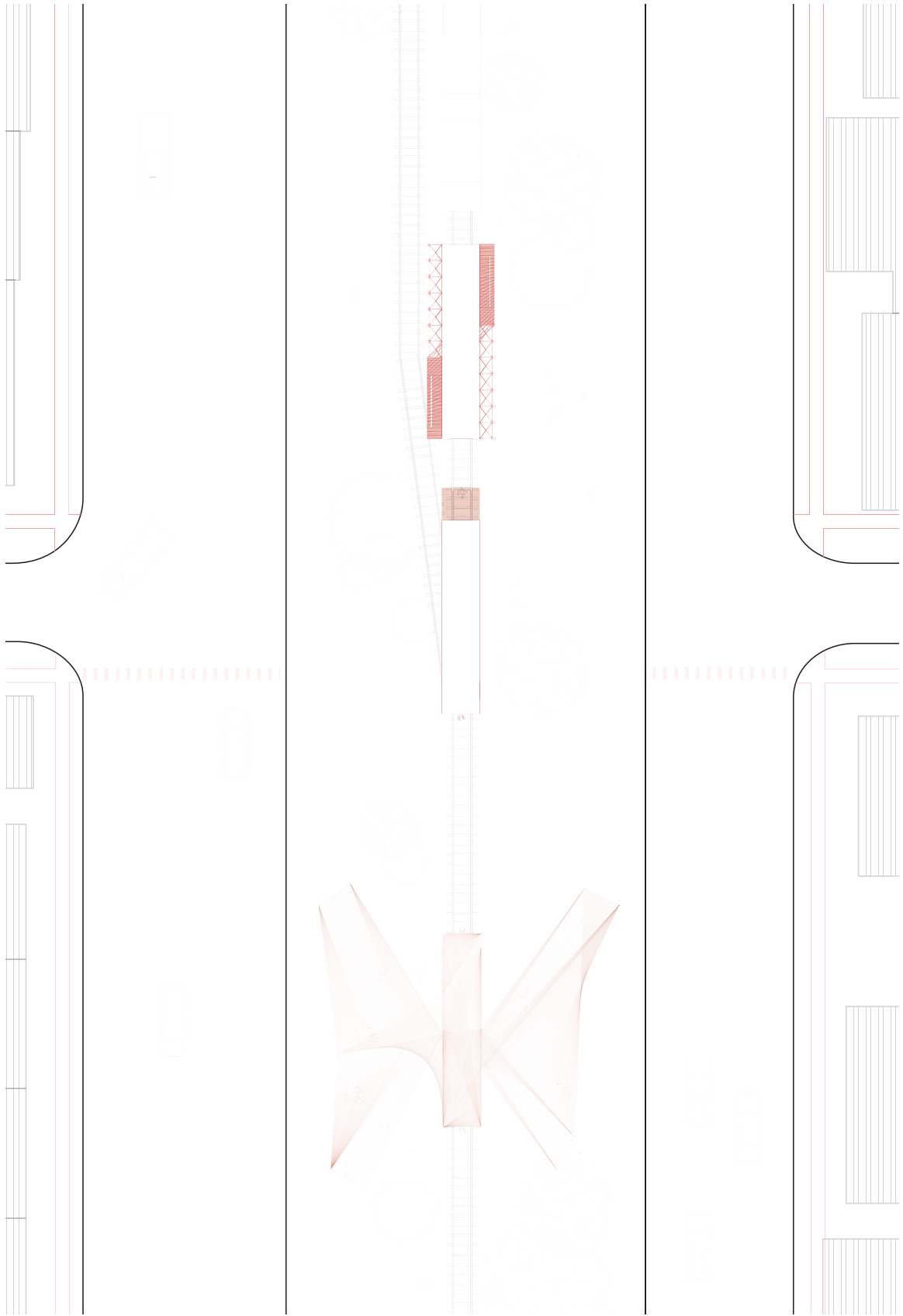


Winter festival at 44th and West Boulevard, part 1



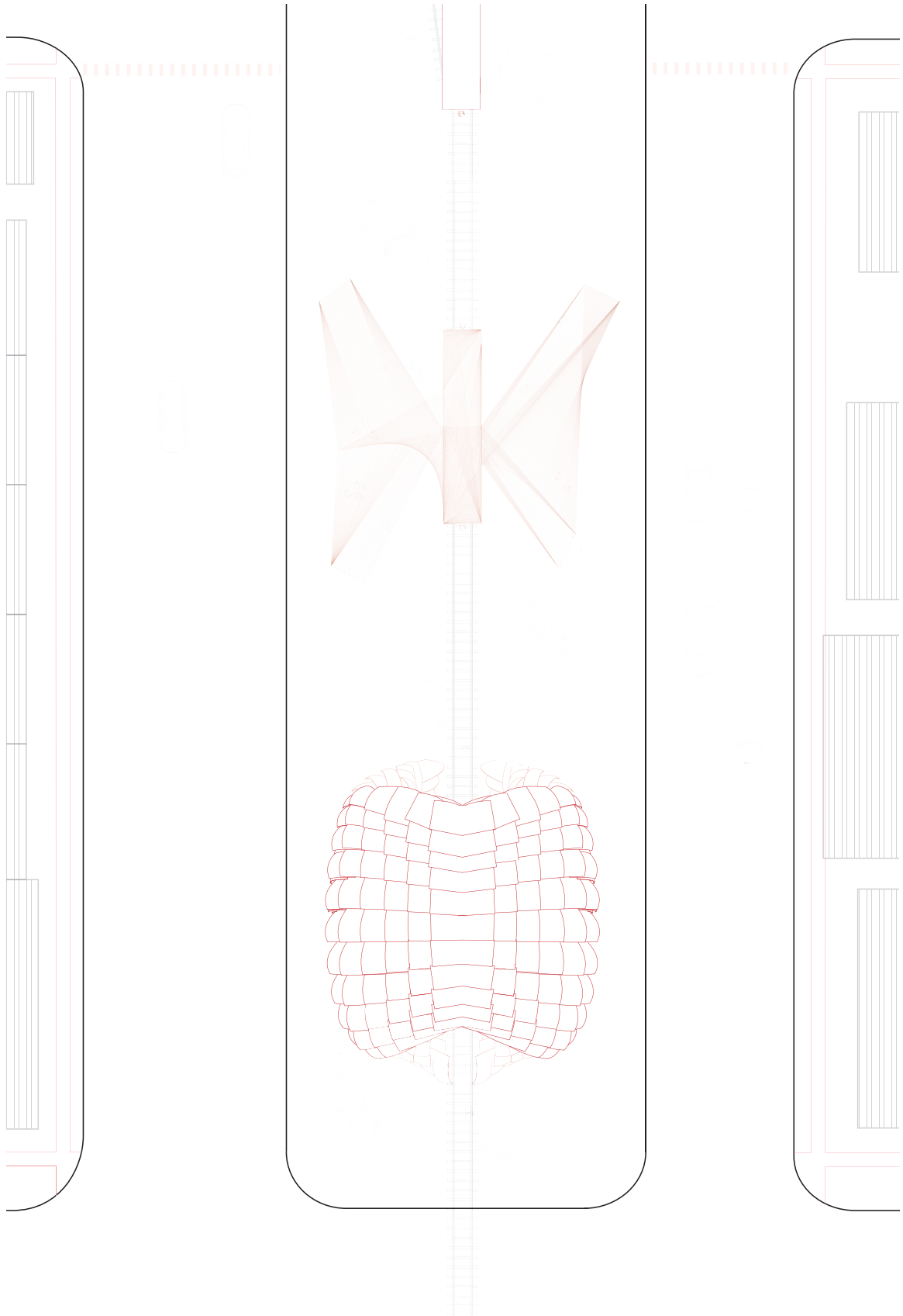
Winter festival at 44th and West Boulevard, part 2





Winter festival at 44th and West Boulevard, part 3





Winter festival at 44th and West Boulevard, part 4



CHAPTER 3: CONCLUSION

Reorganization: Additive Understanding

Reorganization of how we understand the railway begins to unveil new possibilities; the railway can be more than transport, it can also be a destination. Considering transport and destination together is a significant portion of this architecture. The system maintains its original mechanisms and its intended use, in addition to discovering new uses and value.

Program Selection

Motivations for what is placed on the track can be economic, political, cultural, social, recreational or exploratory. The architectural responses will be temporary, in their claiming of space. As the motivations change for what will be placed on the rail, the architecture too will change. Its adaptable, resilient system can develop along with the people it serves.

Human and Machine

Regular systems (e.g., the railway) do not need to be limited to their usual drab connotations. They can become exciting and attractive.

The proposed mobile system would be in constant flux, adapting to different inputs and outputs, as well as different frequencies. Mixing an industrial system with a community could create a more vibrant neighbourhood.¹⁰ This exploratory work suggests that humans and mechanics,

10. Peter Cook, *Archigram* (New York: Princeton Architectural Press, 1999), 36-43.

architecture and urban systems, when mixed together, can promote architectural expression and experiential qualities. Such initiatives can result in a more dynamic community environment.

Community Value

The Arbutus Corridor is valuable. Value varies between people; how can a single place be of unique value to many people? A place that changes, can be shared by many groups of people, satisfying multiple needs or desires. The value of that place, if measured by the number of people it satisfies, is great. A mobile architecture would enable the Arbutus Corridor to address many different needs of its constituents.

Densifying the west portion of Vancouver is a topic amongst local residents. This proposal allows a residential area to enjoy the perils of density ephemerally. The architecture on the corridor can attract people, but if removed, the magnetic pull of the corridor would also be removed. In this manner the local neighbourhoods can turn on and off the excitement that comes with density.

Vancouver's Greenest City initiative aims to have the city lead the world in green building design and construction. Using better products more efficiently helps to do this; however, building smaller can produce even better results. The track's dimensions and its load-bearing capacity limits the size of the built intervention. Small mobile structures consume significantly less resources, use less material, shorten construction times, and require less maintenance than permanent buildings.

The activated corridor can be the platform for healthcare services, community improvement through gathering, seasonal youth programs, a place for new and existing local businesses, and a vessel for exhibitions. In activating the railway, new jobs would be created; the rail will require management. The activated corridor would be valuable to Vancouver in providing a place for new ideas to improve the quality of life in the city.

Value: With vs. Without the Railway

The Arbutus Corridor is more valuable with the railway than without. Without the railway to move objects, the land can be used for static buildings, which by definition limits the use of the land. Reusing the railway allows the entire corridor to be used for multiple events at a time. Value is added by multiplying the potential of each site.

Video Representation

In addition to the images of the project, an external video highlights moments in the proposed architecture for the Arbutus Corridor. It also shows how the corridor may look while driving by in an automobile. The video can be found at the following link: <https://vimeo.com/123567031>.



The Arbutus Corridor has potential to enrich Vancouverite lives.

APPENDIX: EXISTING RAIL CARS



CN 668203 89' Flatcar. Photograph by David Graham, 2008, from Canadian Freight Railcar Gallery.



CNA 753039 Bunk Car. Photograph by Dan Dell'Unto, 2007, from Canadian Freight Railcar Gallery.



CNA 753221 89' Automotive Frame Flatcar. Photograph by Chris vanderHeide, 2011, from Canadian Freight Railcar Gallery.



CN 601843 66' Centre-Post Bulkhead Flatcar. Photograph by David Graham, 2004, from Canadian Freight Railcar Gallery.



CN RY22 Steel Caboose. Photograph by Paul O'Shell, 2003, from Canadian Freight Railcar Gallery.



CNSU 300521 40' Wheel Container. Photograph by Dan Dell'Unto, 2008, from Canadian Freight Railcar Gallery.



CN 622662 66' Bulkhead Flatcar. Photograph by Chris vanderHeide, 2013, from Canadian Freight Railcar Gallery.



CN 639958 89' Flatcar. Photograph by William Henderson, 2014, from Canadian Freight Railcar Gallery.



CN 76641 Transfer Caboose. Photograph by Jim Parker, 1979, from Canadian Freight Railcar Gallery.



CN 78921 Wood Caboose. Photograph by Jim Parker, 1979, from Canadian Freight Railcar Gallery.



CNEU 840147 20' Container. Photograph by Rob Iwacha, 2010, from Canadian Freight Railcar Gallery.



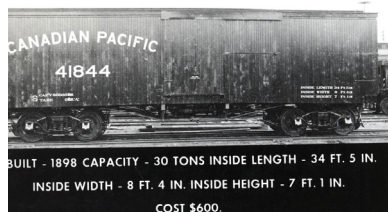
CN 135027 52' Gondola. Photograph by Pierre Lacombe, 2010, from Canadian Freight Railcar Gallery.



CP 21785 40' Boxcar. Photograph by Chris VanderHeide, 2012, from Canadian Freight Railcar Gallery.



CP 31466 40' Woodchip Boxcar. Photograph by Eric Gagnon, 1981, from Canadian Freight Railcar Gallery.



CP 41844 34' Wood Boxcar. Photograph by Jim Parker Collection, 1898, from Canadian Freight Railcar Gallery.



CN 815072 40' Stock Car. Photograph by Andy J. Broscoe, 1981, from Canadian Freight Railcar Gallery.



CN 815074 40' Stock Car. Photograph by Earl Minnis, 1971, from Canadian Freight Railcar Gallery.



CN 603985 52' Bulkhead Flatcar. Photograph by Marc-A. Hudon, 2004, from Canadian Freight Railcar Gallery.



CN 618150 Flatcar. Photograph by Pierre Lacombe, 2010, from Canadian Freight Railcar Gallery.



CN 291646 40' Insulated Boxcar. Photograph by Andy J. Broscoe, 1977, from Canadian Freight Railcar Gallery.



CN 283032 50' Insulated Boxcar. Photograph by Andy J. Broscoe, 1971, from Canadian Freight Railcar Gallery.



CN 210431 Ice Refrigerator. Photograph by Jim Parker Collection, 1961, from Canadian Freight Railcar Gallery.



CN 610515 56' Wire Flatcar. Photograph by Chris VanderHeide, 2007, from Canadian Freight Railcar Gallery.



CN 675001 Depressed Centre Flatcar. Photograph by Brian Switzer, 2000, from Canadian Freight Railcar Gallery.



CN 5482 Coach. Photograph by Jim Parker, 1976, from Canadian Freight Railcar Gallery.



CN 873632 59' Woodchip Gondola . Photograph by Mark Boesche, 2004, from Canadian Freight Railcar Gallery.



CN 34201 Coil Steel Car. Photograph by Chris vanderHeide, 2014, from Canadian Freight Railcar Gallery.



CNIS 623163 Centrebeam Flatcar. Photograph by Bernie Goodman, 2014, from Canadian Freight Railcar Gallery.



BCNE 900363 Coal Gondola. Photograph by William Henderson, 2014, from Canadian Freight Railcar Gallery.



CN 104095 Side Dump Gondola. Photograph by Jeremy MacPherson, 2010, from Canadian Freight Railcar Gallery.



CN 155034 65' Gondola. Photograph by Bernie Goodman, 2004, from Canadian Freight Railcar Gallery.



CN 602266 51' Centre-Post Bulkhead Flatcar. Photograph by David Graham, 2004, from Canadian Freight Railcar Gallery.



CN 604480 51' Centre-Post Bulkhead Flatcar. Photograph by David Graham, 2004, from Canadian Freight Railcar Gallery.



CN 197627 Coal Gondola. Photograph by William Henderson, 2014, from Canadian Freight Railcar Gallery.



CN 625533 73' Centre-beam Bulkhead Flatcar. Photograph by Pierre Lacombe, 2013, from Canadian Freight Railcar Gallery.



CN 873097 52' Woodchip Gondola. Photograph by William Henderson, 1977, from Canadian Freight Railcar Gallery.



CNA 192022 Rotary Dump Coal Gondola. Photograph by William Henderson, 2013, from Canadian Freight Railcar Gallery.



CN 188410 52' Covered Gondola. Photograph by Chris vanderHeide, 2012, from Canadian Freight Railcar Gallery.



CN 667354 62' Coil Steel Flatcar. Photograph by Chris vanderHeide, 2008, from Canadian Freight Railcar Gallery.



CN 328004 Triple Hopper. Photograph by David Graham, 2003, from Canadian Freight Railcar Gallery.



CN 135228 Slab-Side Covered Hopper. Photograph by Jim Parker, 1965, from Canadian Freight Railcar Gallery.



CN 9504 Double Deck Automobile Transporter. Photograph by Alex Simins, 1991, from Canadian Freight Railcar Gallery.



CN 300374 Offset-Side Longitudinal Hopper. Photograph by Chris vanderHeide, 2004, from Canadian Freight Railcar Gallery.



CN 109541 Cylindrical Covered Hopper. Photograph by Chris vanderHeide, 2009, from Canadian Freight Railcar Gallery.



CN 399000 Articulated Covered Hopper. Photograph by Dan Dell'Unto, 2008, from Canadian Freight Railcar Gallery.



CN 346558 Barrel Ore Hopper. Photograph by Earl Minnis, 1975, from Canadian Freight Railcar Gallery.



CN 347000 Hopper. Photograph by Brendan Frisina, 2008, from Canadian Freight Railcar Gallery.



CN 374271 Pressure Unloading Covered Hopper. Photograph by Marc-A. Hudon, 2004, from Canadian Freight Railcar Gallery.



CN 53761 52' Gondola. Photograph by Chris vanderHeide, 2007, from Canadian Freight Railcar Gallery.



CN 53395 "Slab Side" Sand Hopper. Photograph by David Graham, 2003, from Canadian Freight Railcar Gallery.



CN 90194 Ballast Hopper. Photograph by Pierre Lacombe, 2003, from Canadian Freight Railcar Gallery.



CN 51070 Spreader. Photograph by Paul O'Shell, 2003, from Canadian Freight Railcar Gallery.



CN 73130 Fuel Car. Photograph by Marc-A. Hudon, 2009, from Canadian Freight Railcar Gallery.



CN 59544 Module Car. Photograph by Paul Lantz, 2013, from Canadian Freight Railcar Gallery.



CN 56120 Side-Dump Ballast Gondola. Photograph by Ed Cooke, 2010, from Canadian Freight Railcar Gallery.



CN 50483 Crane. Photograph by Paul O'Shell, 1986, from Canadian Freight Railcar Gallery.



CN 58258 Boom Car. Photograph by Marc-A. Hudon, 2010, from Canadian Freight Railcar Gallery.



CN 54989 Turnout Panel Flatcar. Photograph by David Graham, 2010, from Canadian Freight Railcar Gallery.



CN 56215 Flanger. Photograph by Pierre Lacombe, 2003, from Canadian Freight Railcar Gallery.



CN 710657 Open Bilevel Autorack. Photograph by Bernie Goodman, 1998, from Canadian Freight Railcar Gallery.



CN 49258 Wheel Car. Photograph by Pierre Lacombe, 2012, from Canadian Freight Railcar Gallery.



CN 44296 Welded Rail Unloading Car. Photograph by Colin Restorick, 2009, from Canadian Freight Railcar Gallery.



CN 42906 Bunk Car. Photograph by David Graham, 2006, from Canadian Freight Railcar Gallery.



CN 44960 Rail Flatcar. Photograph by Chris vanderHeide, 2007, from Canadian Freight Railcar Gallery.



CN 704518 Enclosed Trilevel Autorack. Photograph by Pierre Lacombe, 2013, from Canadian Freight Railcar Gallery.



CN 44206 Buffer Car. Photograph by Marc-A. Hudon, 2004, from Canadian Freight Railcar Gallery.



CN 46504 Welded Rail Flatcar. Photograph by David Graham, 2008, from Canadian Freight Railcar Gallery.



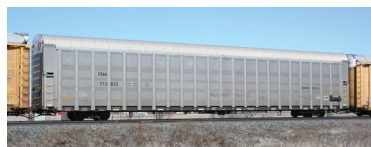
CN 43691 Generator Car. Photograph by David Graham, 2006, from Canadian Freight Railcar Gallery.



CN 41589 2-Man Bunk/Kitchen/Diner Car. Photograph by Paul O'Shell, 1975, from Canadian Freight Railcar Gallery.



CN 720063 56' Double Deck Auto Boxcar. Photograph by William Crago, 1978, from Canadian Freight Railcar Gallery.



CNA 712832 Enclosed Autorack. Photograph by Chris vanderHeide, 2013, from Canadian Freight Railcar Gallery.



CN 639458 89' Container Flatcar. Photograph by David Graham, 2004, from Canadian Freight Railcar Gallery.



CN 670101 Well-hole Flatcar. Photograph by Bob Boudreau, 2003, from Canadian Freight Railcar Gallery.
 CN 40330 Track Panel Flat Car. Photograph by Chris vanderHeide, 2010, from Canadian Freight Railcar Gallery.
 CN 15008 TEST Track Geometry Car. Photograph by Bernie Goodman, 2014, from Canadian Freight Railcar Gallery.



CN 15204 Distributed Braking Car. Photograph by David Graham, 2007, from Canadian Freight Railcar Gallery.
 CN 682780 2-unit TOFC Flatcar. Photograph by Chris vanderHeide, 2009, from Canadian Freight Railcar Gallery.
 CN 911 Tank Car Safety Training Car. Photograph by Chris vanderHeide, 2011, from Canadian Freight Railcar Gallery.



CN 40286 89' Track Equipment Flat Car. Photograph by Chris vanderHeide, 2009, from Canadian Freight Railcar Gallery.
 CN 683656 40' Double Stack Container Car (5 unit) - Unit A. Photograph by Marc-A. Hudon, 1998, from Canadian Freight Railcar Gallery.
 CN 15007 TEST Ballasted Boxcar. Photograph by Bernie Goodman, 2014, from Canadian Freight Railcar Gallery.



CN 730057 74' Double Deck Auto Boxcar. Photograph by Jim Parker, 1973, from Canadian Freight Railcar Gallery.
 CNA 712628 Enclosed Bi-level Autorack. Photograph by Chris vanderHeide, 2012, from Canadian Freight Railcar Gallery.
 CN 874285 51' Woodchip Gondola. Photograph by Bernie Goodman, 1999, from Canadian Freight Railcar Gallery.

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