

Urban Regeneration: Enabled by Mobility Centric Architecture

By
Wayne Charles Higgins

Submitted to the Department of Architecture in partial
fulfillment of the requirements for the degree of

Master of Architecture
at the
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February 2010

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Signature of Author

Department of Architecture
Jan. 15th, 2010

Certified by

William J. Mitchell, MS
Professor of Architecture and Media Arts and Sciences
Thesis Supervisor

Accepted by

Julian Beinart, BArch, MCP, MArch
Professor of Architecture
Chair, Department Committee on Graduate Students

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Abstract

The primary goal of this thesis is to develop a new urban architectural prototype to reinvigorate the British New Town. New models of adaptable, sustainable, architecture and urban design are explored with the ultimate goal of enhancing livability through mobility within these established towns.

Modernized mobility and information technology networks enmeshed into the current system of over-congested roads and under-utilized yet ubiquitous cycle pathway's, will engage and connect communities that are currently dissociated because of the expired components of original New Town design. The architectural focus will be on creating a networked system of enhanced mobility hubs at strategic locations within a town with the goal of shifting transportation behavior to revive/re-create community centers. The research and scope of this thesis will thus be on revitalizing the British New Town with a novel, sustainable and adaptable model of urban mobility.

Thesis Advisor: William J. Mitchell

Title: Professor of Architecture and Media Arts and Sciences

Thesis Committee:

William J. Mitchell

Professor of Architecture and Media Arts and Sciences
Thesis Supervisor

Andrew Scott

Associate Professor of Architecture
Reader

Julian Beinart

Professor of Architecture
Reader

Biographical Note

Wayne Higgins is an accomplished design professional with 15 years of work and educational experience in consumer product, medical device, automotive and architectural design with a recent focus on urban scale mobility interfaces. He is an aesthetic thinker with a passion for the intersection between technology and human centric design.

Acknowledgements

Christiana DelloRusso, my wife, confidante, inspiration, beacon. Without your focus, support and dedication I would have failed on this journey. This degree is ours as a family and I'm proud to share it with you. We tested the limits and succeeded. I look forward to our next adventure.

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Acknowledgements, Continued:

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Marissa Cheng, the brains of my MIT Family. Thank you for bailing me out, for filling me up and for accepting the limitations of an “old man.”

M.I.T., three and a half years of the most intense butt kicking possible... Thank you MIT

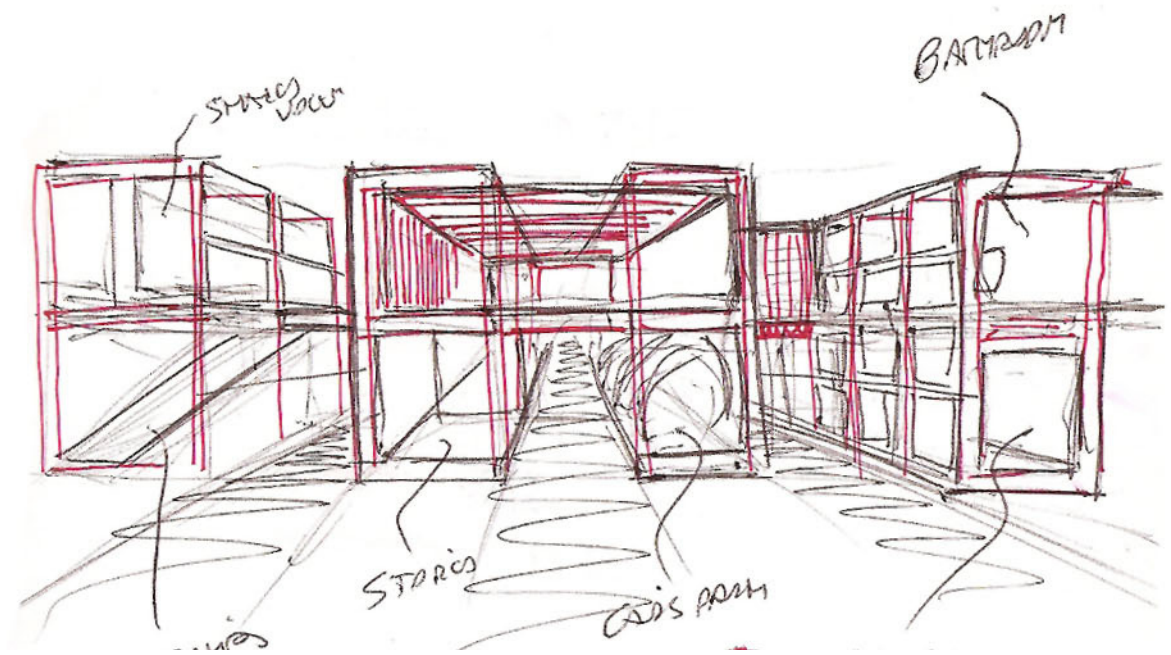
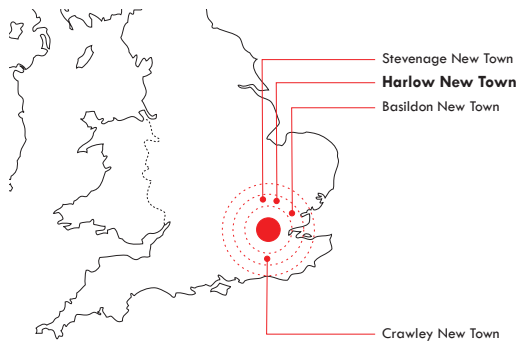


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Site: Harlow New Town, U.K.



British New Towns: Urban Context

The modern architectural movement, along with its utopian ideas, was the ideal fit for reconstruction efforts in post-war Britain. For the first time in modern history, architects and planners were handed an almost blank canvas on which to reconstruct parts of the country. Much of London had been destroyed during the blitz, leaving thousands of people homeless. The new technologies, materials and utopian message that modern architectural principles suggested helped modernism to finally break through into Britain at a time when the country and the public were begging for a future to be excited about and a past to forget. Architectural debate centered on the goal of “building a better tomorrow.”

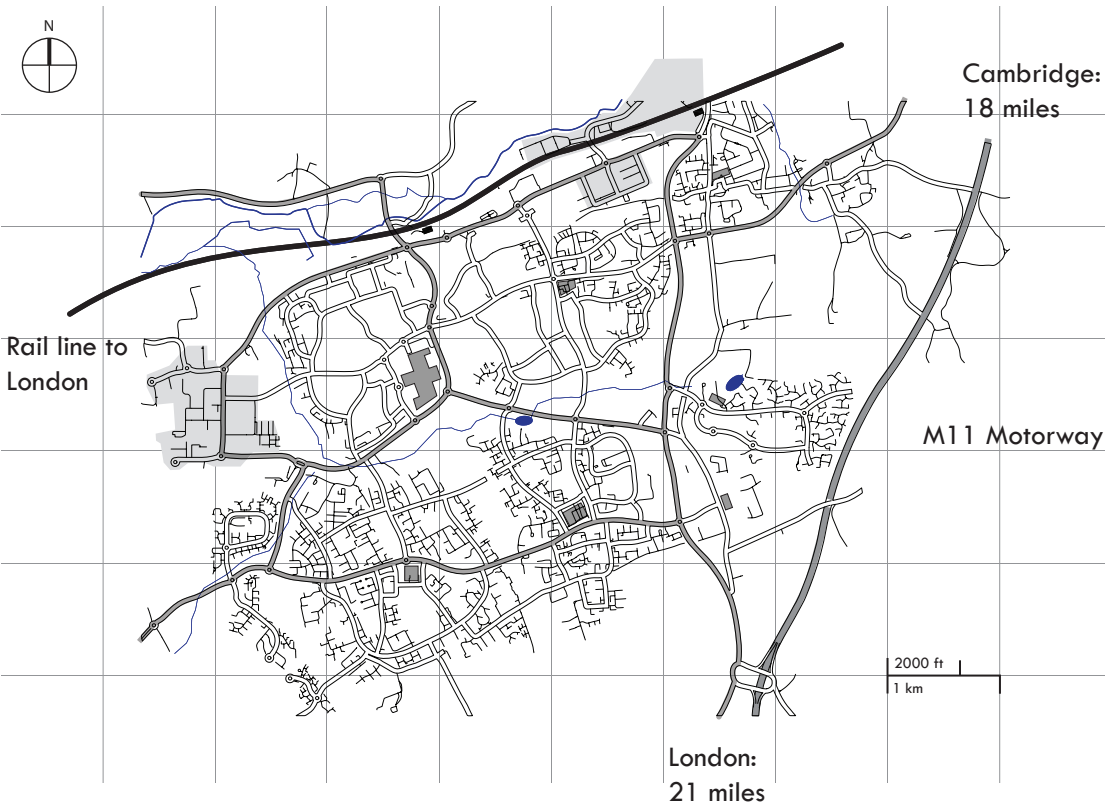
Before the Second World War was even over, government officials began addressing the problem of future housing. The homes that had been destroyed would need to be replaced. Possible solutions to the housing shortage were explored in an attempt to stem a future crisis. Six “New Towns,” each bordering London, were proposed. The primary function of these towns was to catch urban overflow from London. The towns would be built outside the green belt that surrounded London and planned so as to prevent urban sprawl. Harlow, Essex was one of the first New Towns completed, and remained a model for new urban development worldwide.

The New Town movement attempted to establish a new utopian vision by creating dense urban centers of social interaction supported by surrounding residential landscaped neighborhoods. A network of industrial work zones and retail community centers connected by both main roads and a pedestrian/bike path network aimed to link retail cores with surrounding neighborhoods. The placing of individual estates around center cores of retail and civic activity encouraged residents to use these community facilities before all others.



British New Towns: Urban Context, continued

Sir Francis Gibberd, Harlow's planner, unfortunately could not have predicted the advent of the big box store. Mega supermarkets and discount department stores positioned themselves at strategic locations on the outskirts, effectively changing the identity of towns. The larger stores removed the need to travel into the central hub of Harlow, and as a result, the neighborhood hubs of social and cultural mixing that Gibberd intended to nurture have become a faint shadow of the past. Most stores sit empty while others are a mixture of restaurants, dollar stores and take-out windows. Areas of the existing infrastructure are currently under utilized, and an innovative urban architectural intervention is necessary for these New Towns to remain valid in a future that is evermore technologically unpredictable.





Disabling congestion

Inaccessible - underfunded - unsecured - vulnerable family community centers



Ubiquitous parking garages - no longer viable due to their size and location next to wooded areas



Empty retail space is common throughout the town

Expired Utopia





Number of cars
per household



1 car - 1330 households = 1330
In Sector 002

Lawns being replaced with black top
and paving

Vehicular Infrastructure and Neighborhood Condition

New Towns in England are struggling to remain relevant in the 21st century. The infrastructure that was designed and built is no longer sustainable for the density of residents. The existing road infrastructure cannot deal with the density of traffic in most New Towns in Britain. Roads were built too narrow and are now impossible to widen. Neighborhood parking quotients could not predict the occupant density levels most New Towns experience today. More people with more cars trying to move around a town designed and built with little flexibility has created poor livability conditions.

The following graphics illustrate neighborhood parking scenarios with respect to the number of vehicles per household, and the effect this has had on home owners and the pedestrian experience.

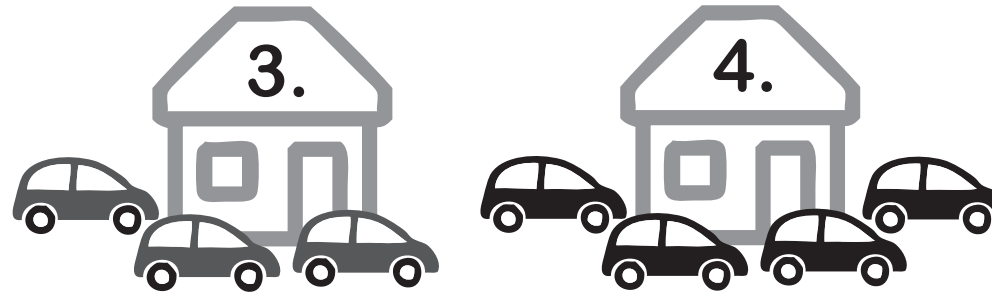
The numbers listed indicate car ownership in sector 002 (described on page 30) based on the following totals:

Households in sector 002	= 1,996
Cars total in sector 002	= 2,805



Number of cars
per household





Number of cars per household

Pedestrian pathways are commonly blocked causing pedestrian to walk on roads

Curb parking and congestion. Parking is common on both sides of residential streets



3 car - 95 households = 285 cars
 4 or more - 24 households = 96 cars
 In Sector 002

Car movement through neighborhood restricted

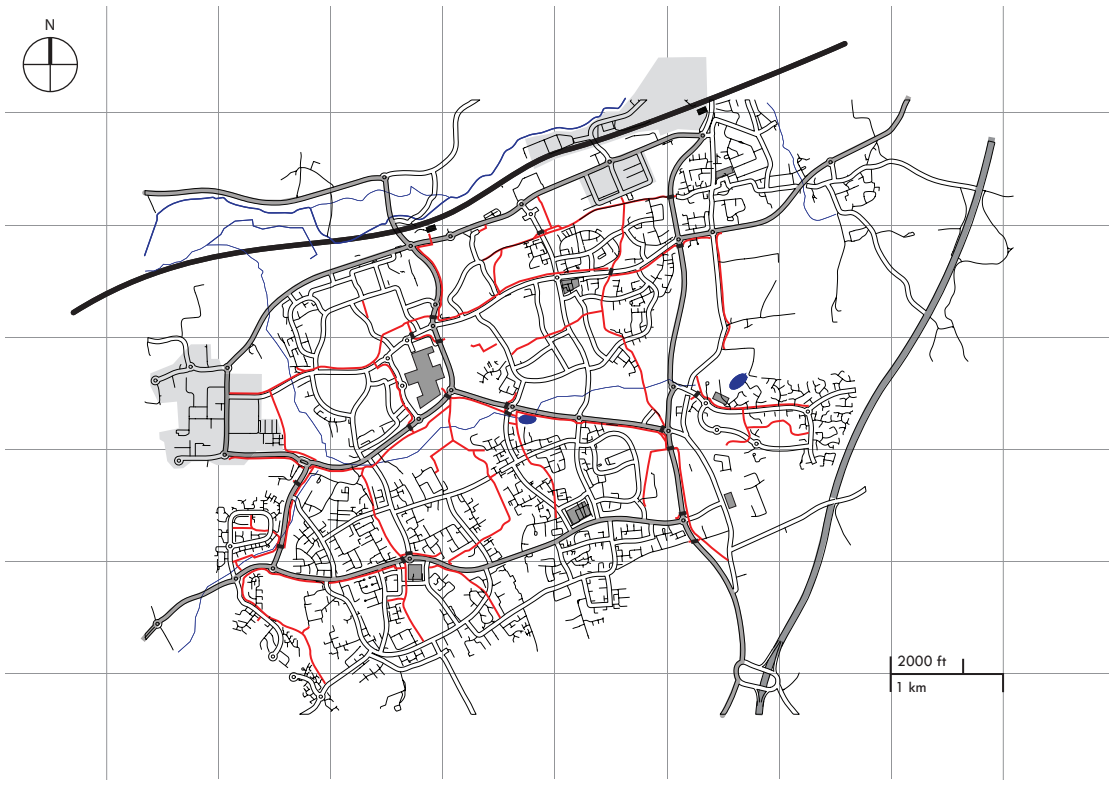
Lawns being replaced with black top and paving

Site: Infrastructural Crossover



Pedestrian/Bike Path Network

The cycle routes in Harlow were designed to run the shortest possible distance between the various town centres, and for that reason travel through the residential areas rather than around their perimeter, as is the case with main town roads. The tracks are limited to a few main routes about the town as a safe alternative to the main town roads. Where the bike path crosses a main road, an overpass is provided.



36.5 Kilometers of cycle path in red

Pedestrian/Bike Path Network, continued

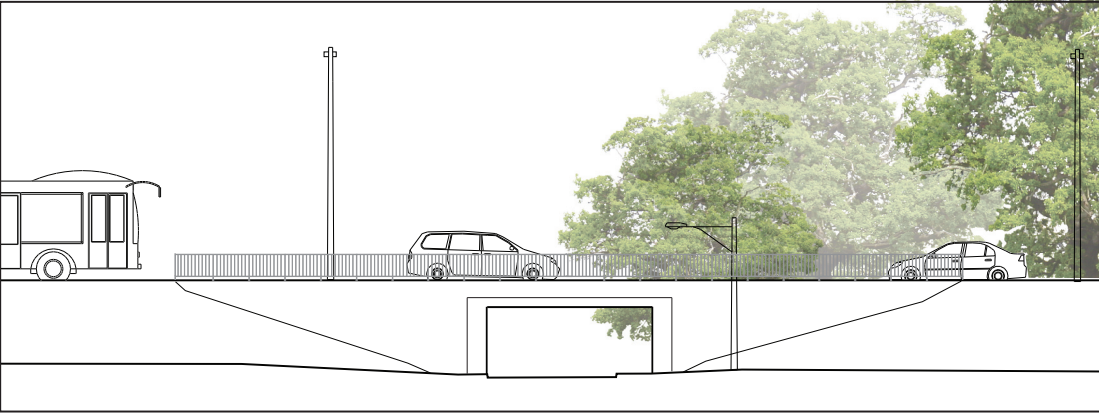
These bike paths crisscross the town, connecting neighborhoods together and connecting the neighborhoods to the main town center. The bike paths are built atop what were existing village roads. These roads once connected the original villages from around the Harlow area before the building of Harlow New Town engulfed them. These bike paths snake between neighborhoods and act as the single most direct route to anywhere within the town.

Unfortunately, social concerns have rendered these bike paths obsolete. Originally, the paths were “nestled” between neighborhoods allowing residents to “experience nature”. These nestled spaces now attract less desirable people and activities and people tend to stay far away from them unless within a group.

The intersection of the road and bike path, the overpasses, are the most undesirable areas along the bike path. These overpasses are often perceived as unsafe, undesirable and as such are more often fractious than cohesive components of the town.

U n s a f e
U n u s e d
I n e f f i c i e n t
U n d e s i r a b l e
F r a c t i o u s
D i s t r i b u t e d

Road and bike path overpass



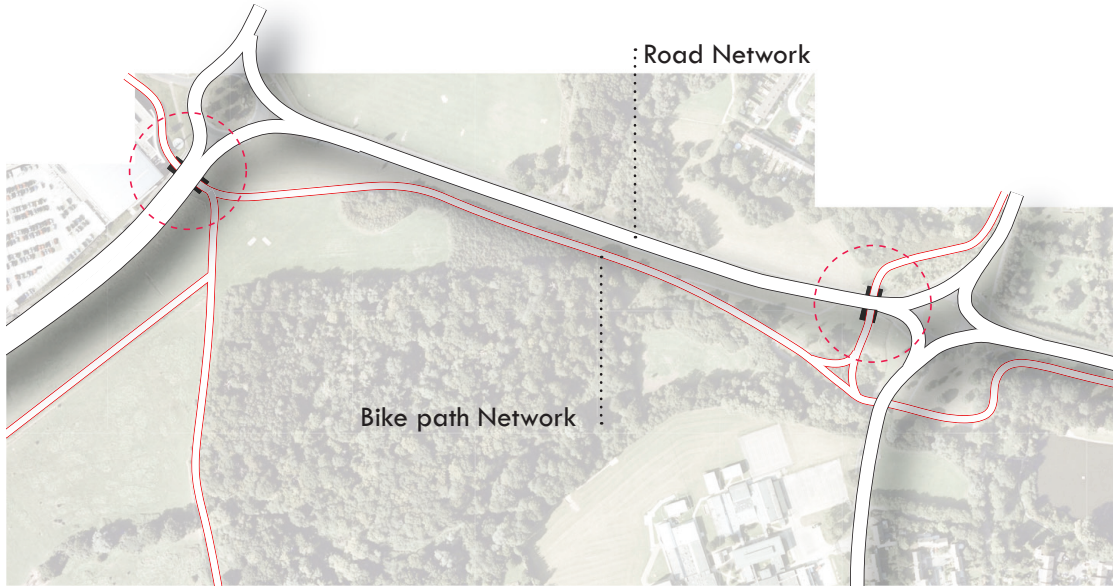


Road and Bike Path Overpass, Continued

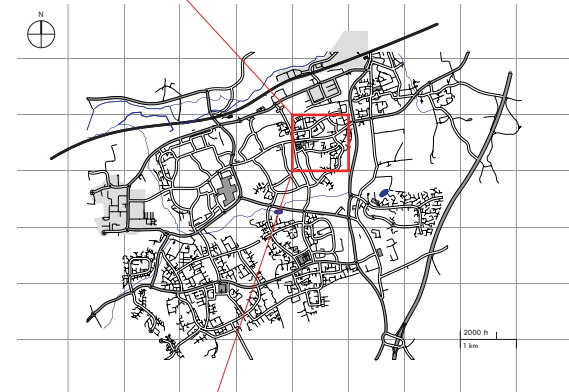
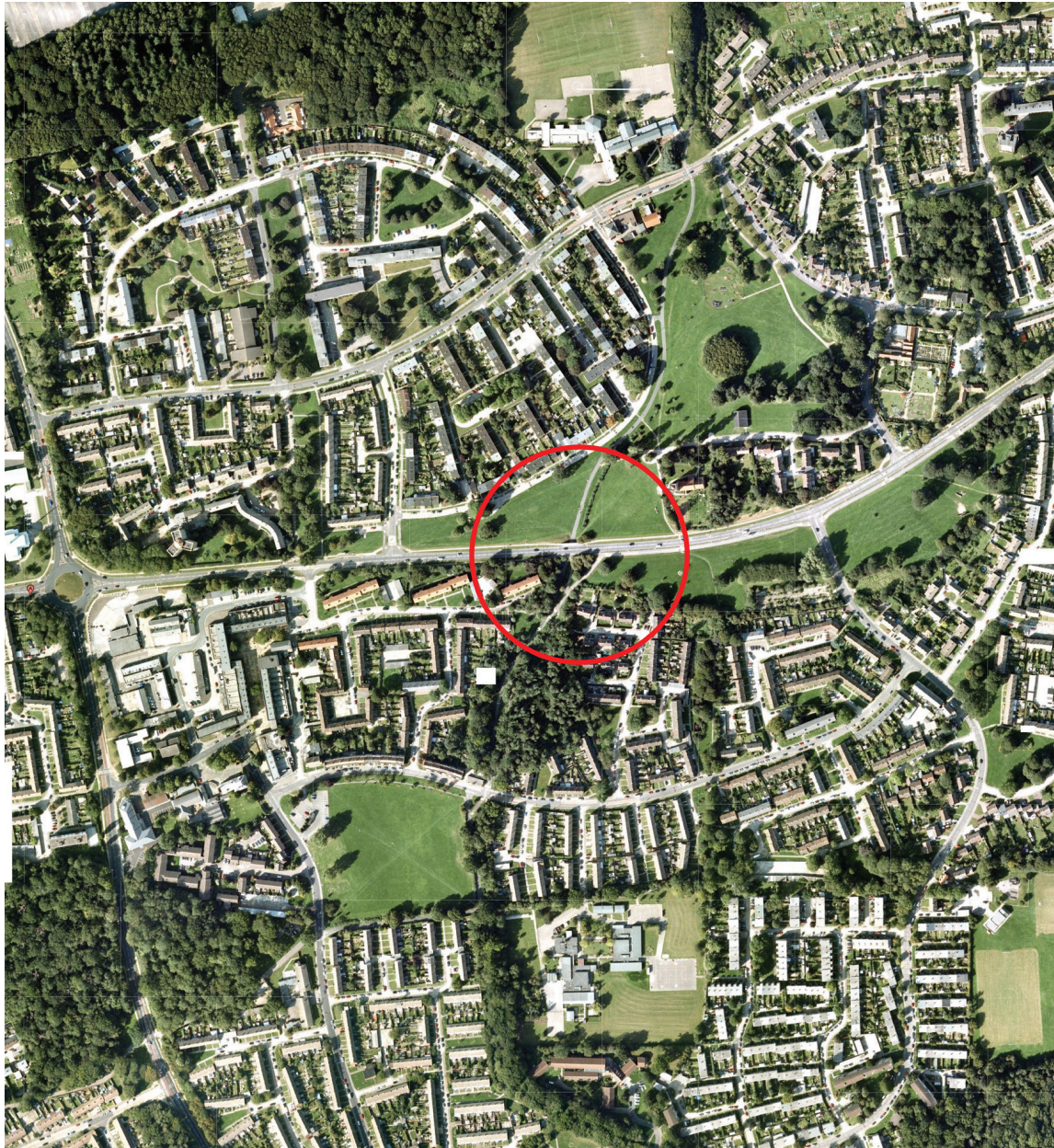
These overpasses are located in the center of all major neighborhoods within the town. There are 21 such sites around the town and each one of them have their own unique character.



Infrastructural crossover, Road/Bike path



Aerial photograph of site and surrounding neighborhoods



The area in Harlow defined as Sector 002 is known as Mark Hall North, and is boxed above in red.

This thesis is focused on the infrastructural crossover within Sector 002, which is circled in red at left.

Site Photos



Facing South



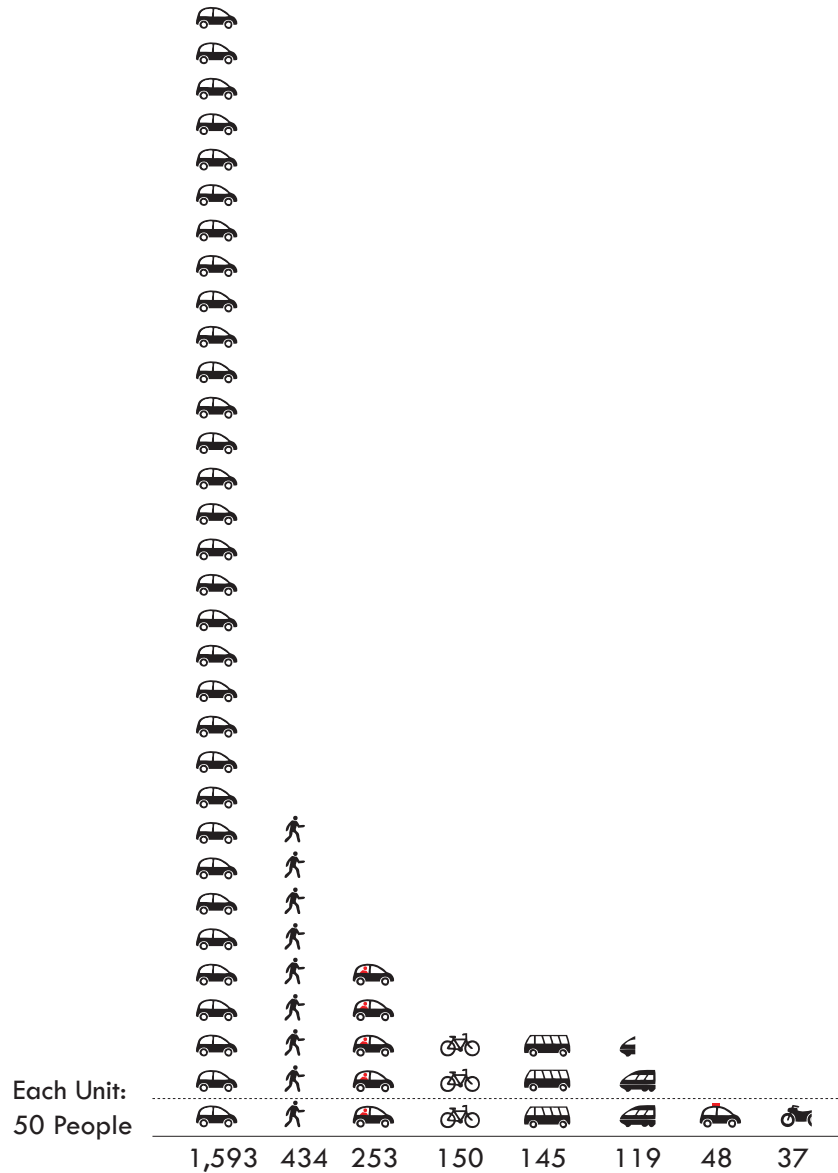
Facing North



Facing East

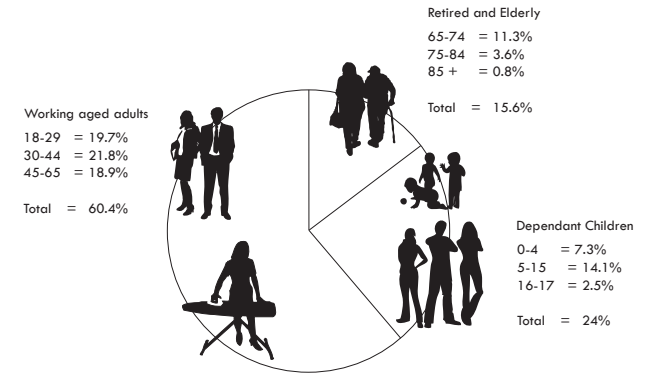
Panoramic Facing North





How people travel to work:
Sector 002

Demographic breakdown



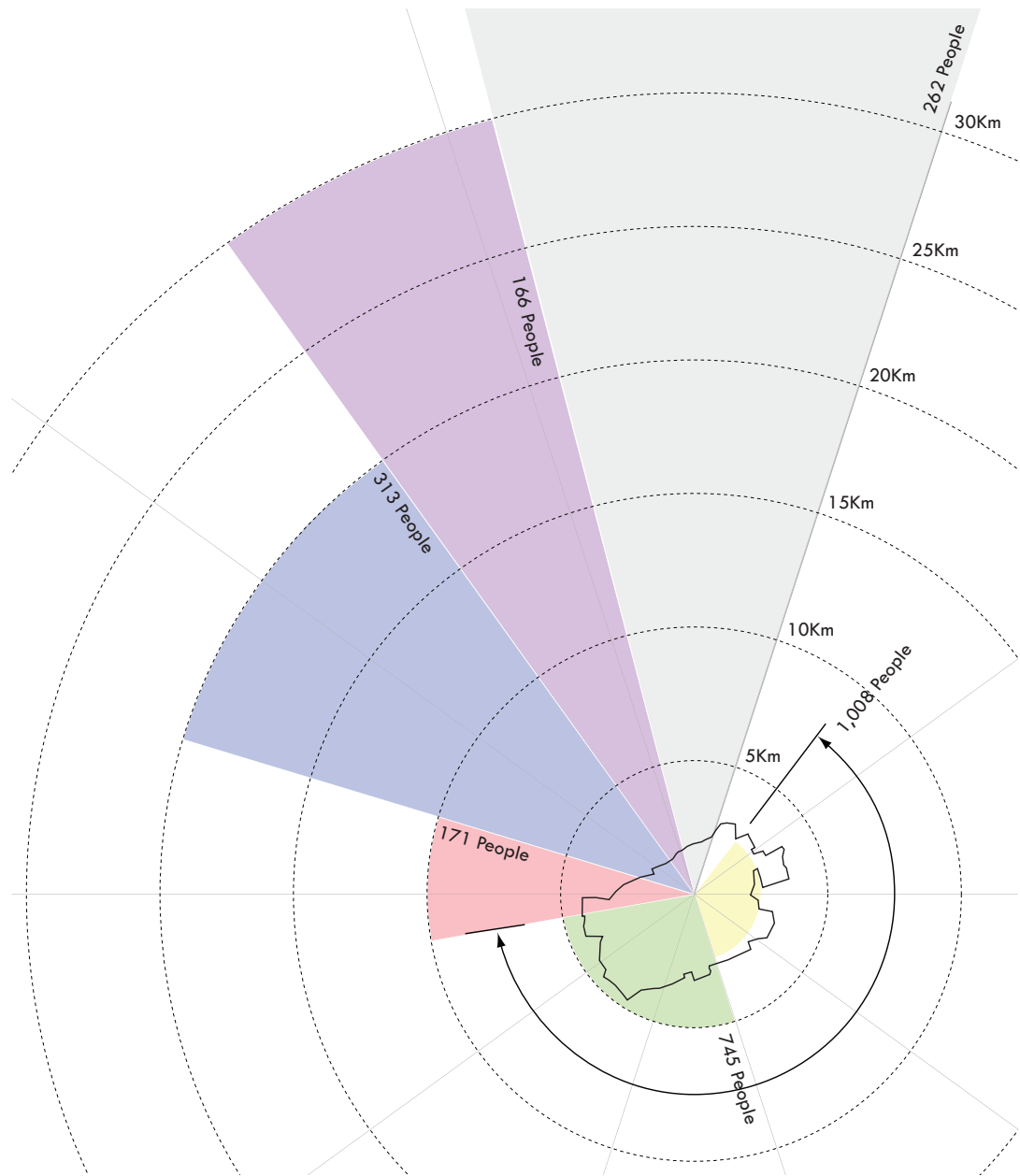
Mode of travel to work

The above graphic shows the demographic breakdown of Harlow sector 002.

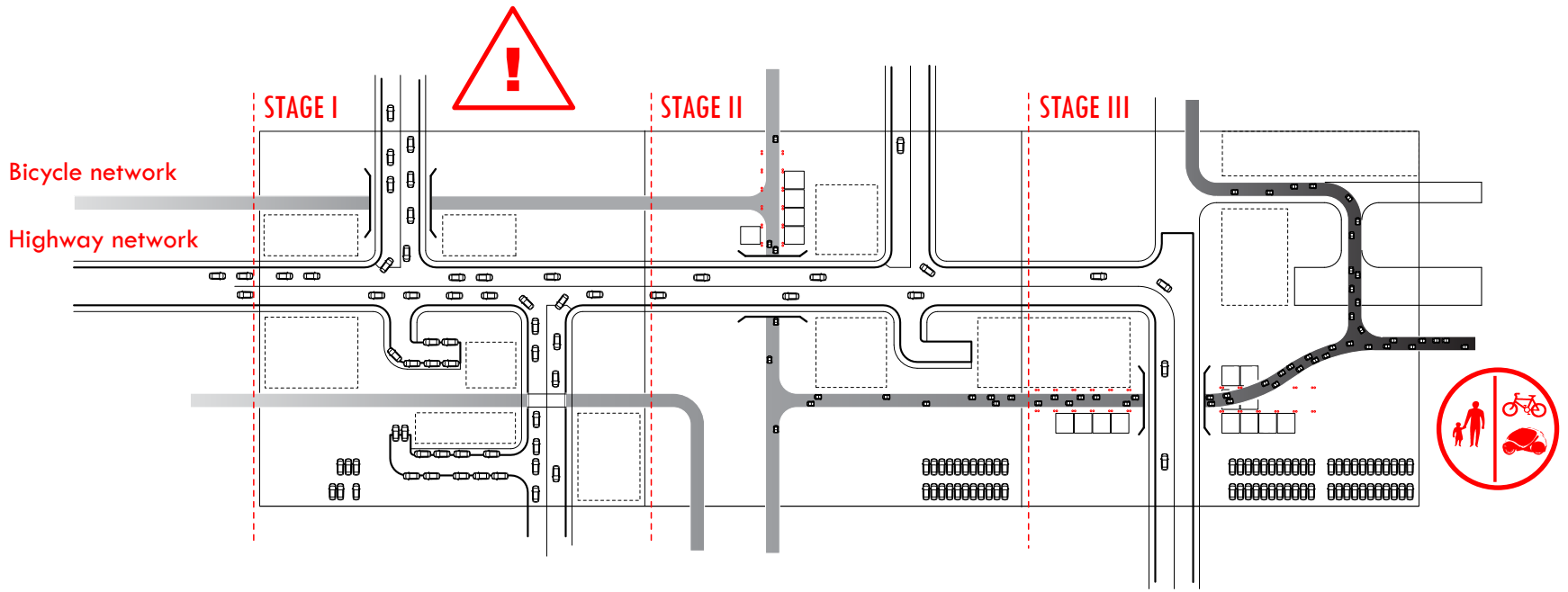
The graphic on the left illustrates the modes of transportation used by Harlow sector 002 residents. The most common mode of transportation is via single occupancy vehicle, followed by walking, shared vehicle, bicycle, bus, train, taxi, and motorcycle.

Distance travelled to work

Over 60% of Harlow sector 002 residents travel 5K or less to work each day. Most of this commuting is done in a single occupancy car.



Thesis Narrative



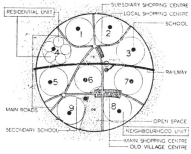
Thesis Narrative

The ultimate goal of this thesis is to enhance livability through mobility within an established New Town. The architectural focus is on creating a networked system of enhanced mobility hubs at strategic locations utilizing existing infrastructure. The modern mobility system that will be employed is the CityCar, developed by the Smart Cities group within the Media Lab at MIT. Modernized mobility networks enmeshed into the current system of over-congested roads and under-utilized yet ubiquitous bike paths will engage and connect communities that are currently dissociated because of the expired components of original New Town design. The diagram at left illustrates the three stages of regenerative transition that will be enabled by this networked architecture and the CityCar.

Stage I shows the current condition of congested roads, underutilized bike paths, divisive overpasses and gridlocked neighborhoods. In this stage, the bike paths are a wasted resource, and the overpasses limit neighborhood passage and cohesion.

Stage II represents the embedding of the proposed architectural prototype and CityCars on the bike paths. The initial mobility hub will transition vehicle volume from the congested roads onto CityCar use on the bike paths, reducing vehicular dependency on main roads. Programmatic expansion of the building will be enabled by neighborhood context and increased CityCar use.

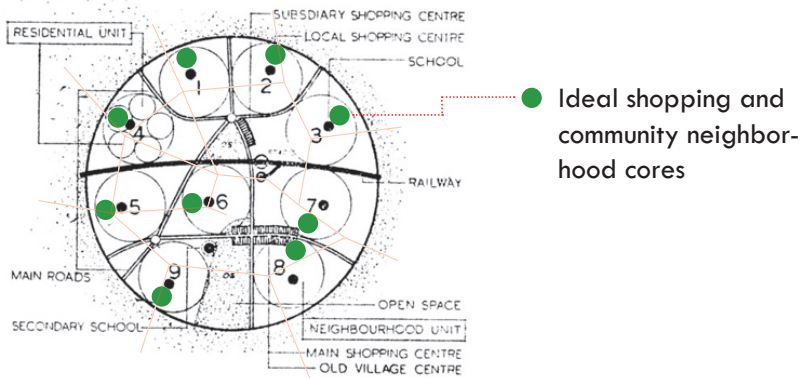
Stage III shows that over time, the architecture and mobility system work together as a catalyst for social cohesion and programmatic homeostasis. In addition, space around homes that prior was used for parking is being returned to the neighborhood, improving community livability. Finally, vehicular traffic on main roads becomes less dense.



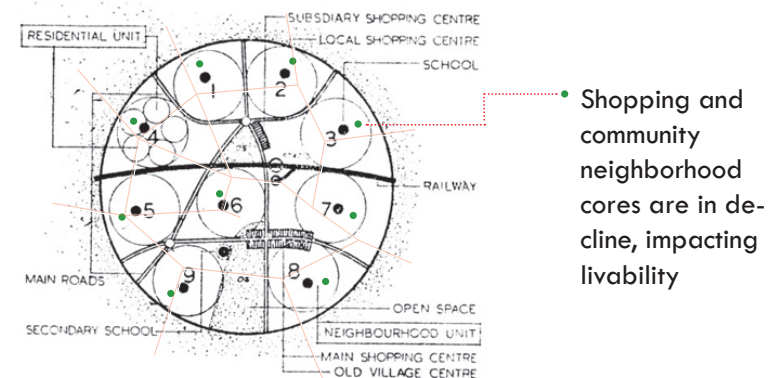
The New Town "Diagram":

This image is typical of the diagrammatic representation of the original British New Town ideal: a large community urban core surrounded by smaller subsidiary neighborhood cores. Vehicular and pedestrian connectivity along with green access were fundamental goals at the core of the New Town movement

New Towns Utopian Goal



Stage I: An Expired Dream



Original/existing goals:

The master plan of the British New Town attempted to create a series of self-sufficient neighborhoods, each with shopping and community facilities within walking distance. The neighborhoods were separated by green wedges, which intended to bring the countryside within easy access of every resident.

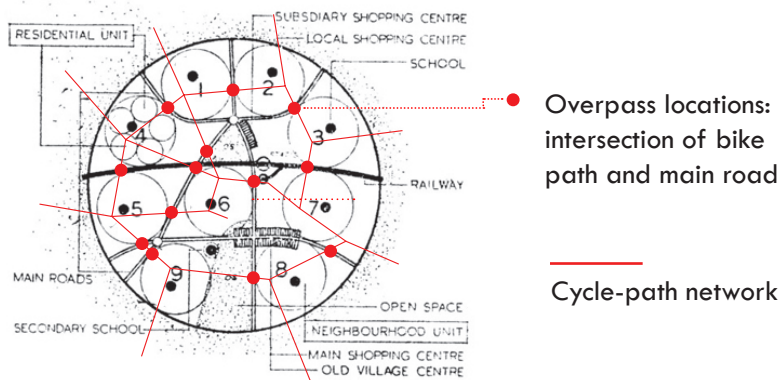
Careful planning ensured that the town sustained a balance between the needs of business and the environment. The town maintained a rural atmosphere with over one third of land use devoted to parks, woodlands, ponds and open spaces.

Current condition:

Main roads are plagued with congestion due to unsustainable automotive and housing occupancy densities. Original infrastructural usage patterns are impractical and failing. Cycle paths are a wasted resource. Big box store phenomenon is destroying neighborhood centers. Community is heavily affected. A disenfranchised youth is leading to a culture of fear and violence.

Thesis Narrative, Continued

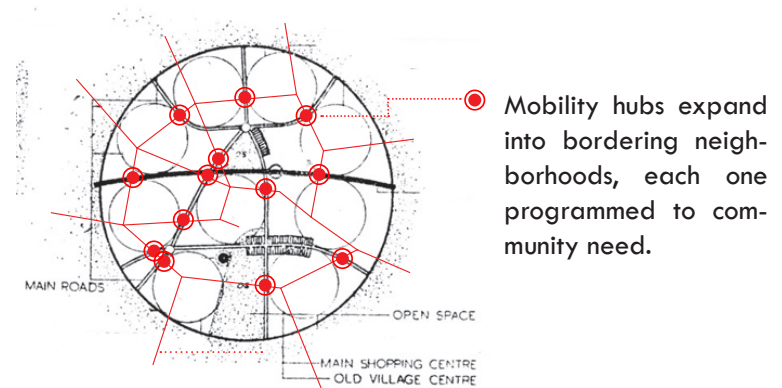
Stage II: New Networked Centers



Mobility hubs:

To revitalize the British New Town, decentralized urban mobility hubs will be created at the intersections of existing infrastructure: the road network and bike path network. Thus, the under-utilized cycle-path network is reprogrammed to act as an alternative mobility infrastructure for electric cars and bicycle. This new network will complement the existing vehicular infrastructure and engage with it at specific overpass locations around the town.

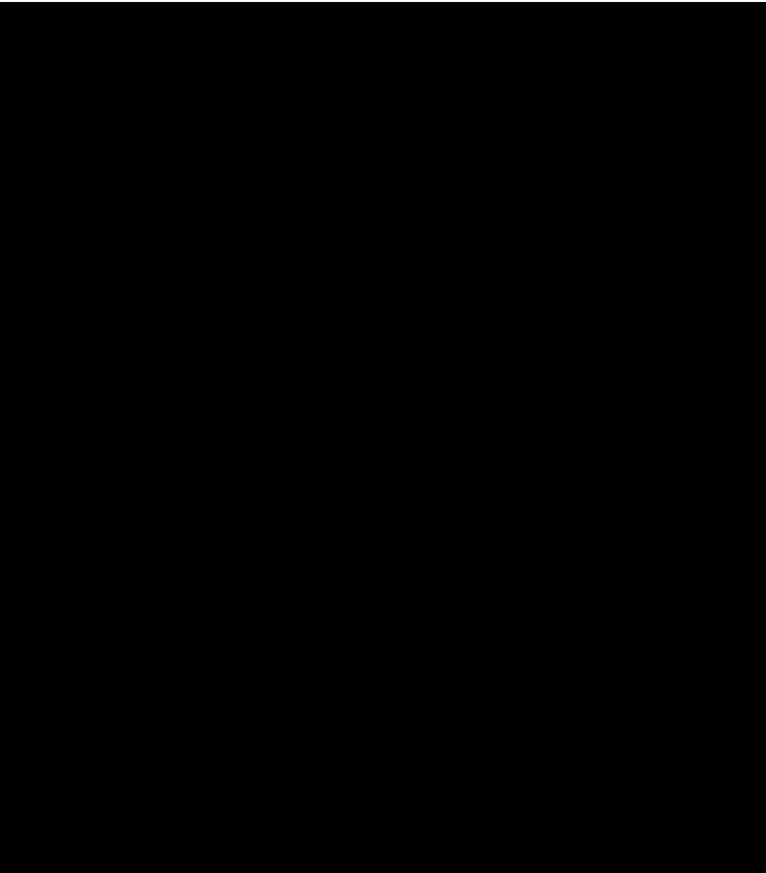
Stage III: Catalyst for Growth



Catalyst:

These mobility hubs will be decentralized and compatible to the neighborhood context in which they are located. Their programming will be flexible and as such seem incomplete. The potential for growth will encourage their use. These hubs will enable everyone within easy walking distance the opportunity of engaging with their local or larger community quickly, cheaply and easily. Programmatic redundancy is not an option. If a hub is failing, the failure is due to a lack of connectivity to the context: the local neighborhood.

The hubs will increase the permeability of these deserted zones within the town. Safety concerns will be ameliorated and so encourage the flow of people through neighborhoods



Technologies: CityCar and Mobility-on-Demand



Image by
Will Lark: Smart Cities Group, MIT Media Lab

Mobility-on-Demand

The system of future mobility proposed in this thesis is the CityCar, developed by the Smart Cities group within the Media Lab at MIT. CityCar, along with the Mobility-on-Demand System it runs on, is a state of the art mobility solution developed to address the myriad of problems driven by increased population density and vehicular congestion.

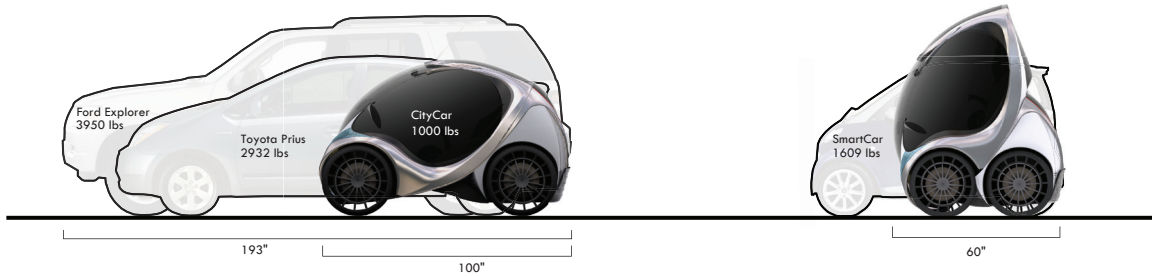
The Mobility-on-Demand System was developed by the Smart Cities group in the MIT Media Lab in the late 1990s. Mobility-on-Demand is a large-scale fleet management system. Essentially, a networked vehicle sharing system allows users to obtain mobility efficiently, affordably, and conveniently. The system does not replace traditional personal automobile ownership- it instead is a supplement.

The use of a Mobility-on-Demand System will dramatically reduce the growing problem of congestion around many of these New Towns. The original New Town infrastructure that was designed for a lower population density and smaller cars has proven insufficient. New technology allows for a fresh look at the original goals of the New Town protagonists, and demands an evaluation of these ideal goals through a new lens; a networked mobility lens.

THE EMERGENCE OF VEHICLE SHARING SERVICES

An emerging mobility sharing culture is becoming commonplace and our comfort with using such systems is growing. Bicycle sharing is exploding: By 2008, more than 80 cities around the world will offer a service. In Paris, 200,000 Bicycles are rented daily. Car sharing systems like Zipcar are rapidly expanding. Mobility-on-demand is a shared use vehicle system utilizing modern, compact, electric cars. In addition, the CityCar can be folded when not in use, reducing it's urban footprint and need for space significantly. These vehicles look and operate very differently to their internal combustion engine predecessors.



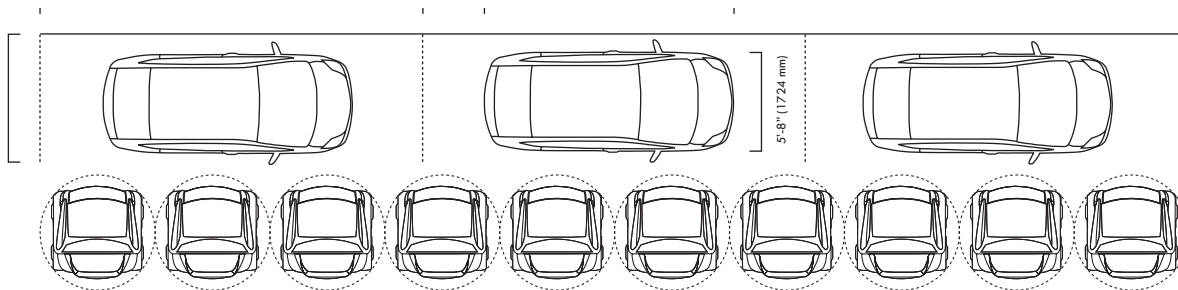


City Car vehicle comparison

Image by
Will Lark: Smart Cities Group, MIT Media Lab

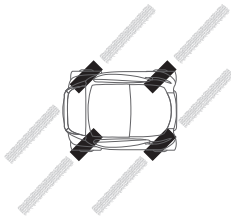
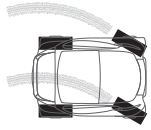


City Car folding sequence



Folded City Car vs Conventional 4 Door Sedan
Parking Ratio = 3.3 : 1

Image by
Ryan Chin: Smart Cities Group, MIT Media Lab



Mobility-on-Demand: CityCar

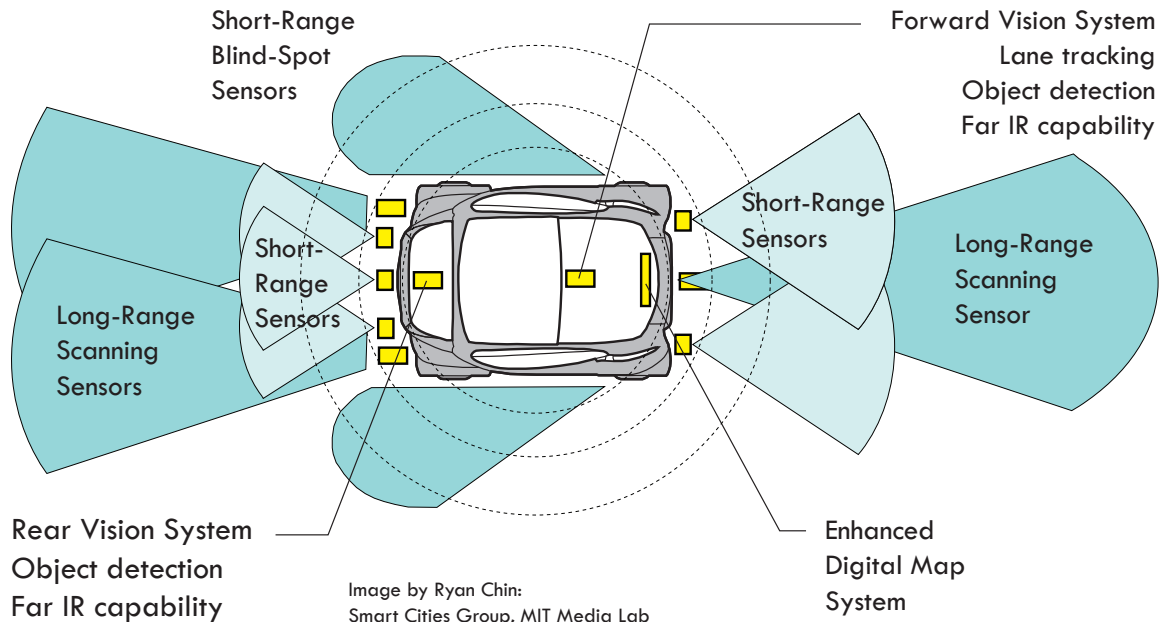
“The CityCar is not simply an exercise on styling or a simple reconfiguration of the automobile. CityCar’s are more than just a car. CityCar’s are designed to function as a system, presenting a new method in the transportation network of urban cores.

They aim for a spot somewhere between mass transit systems and private automobiles, offering public transport in combination with personal mobility. They are meant for a specific use only, that is short trips within urban areas. They would not replace the entire automotive fleet of a city, but they could potentially offer an advantageous alternative to a large number of privately-owned automobiles that are currently fulfilling the need for personal mobility.

A new approach to urban mobility could have huge consequences on the shape of our cities and in the way we live in them. The staggering savings in land space have the potential to reshape entire cities, especially those with high automobile-dependency and huge areas destined to parking lots, by bringing massive portions of real estate in prime locations back to towns and cities and the people who live there. But this is also crucial for cities in formation and cities in China, India, Latin America and other developing countries, that have not yet adopted the private automobile in the same proportion, and still have time to create more sustainable environments for future generations.”

-Statement from Franco Viera’s PhD Thesis describing the fundamental essence of City-Car and Mobility-on-Demand

CityCar: Urban Awareness/Self Awareness

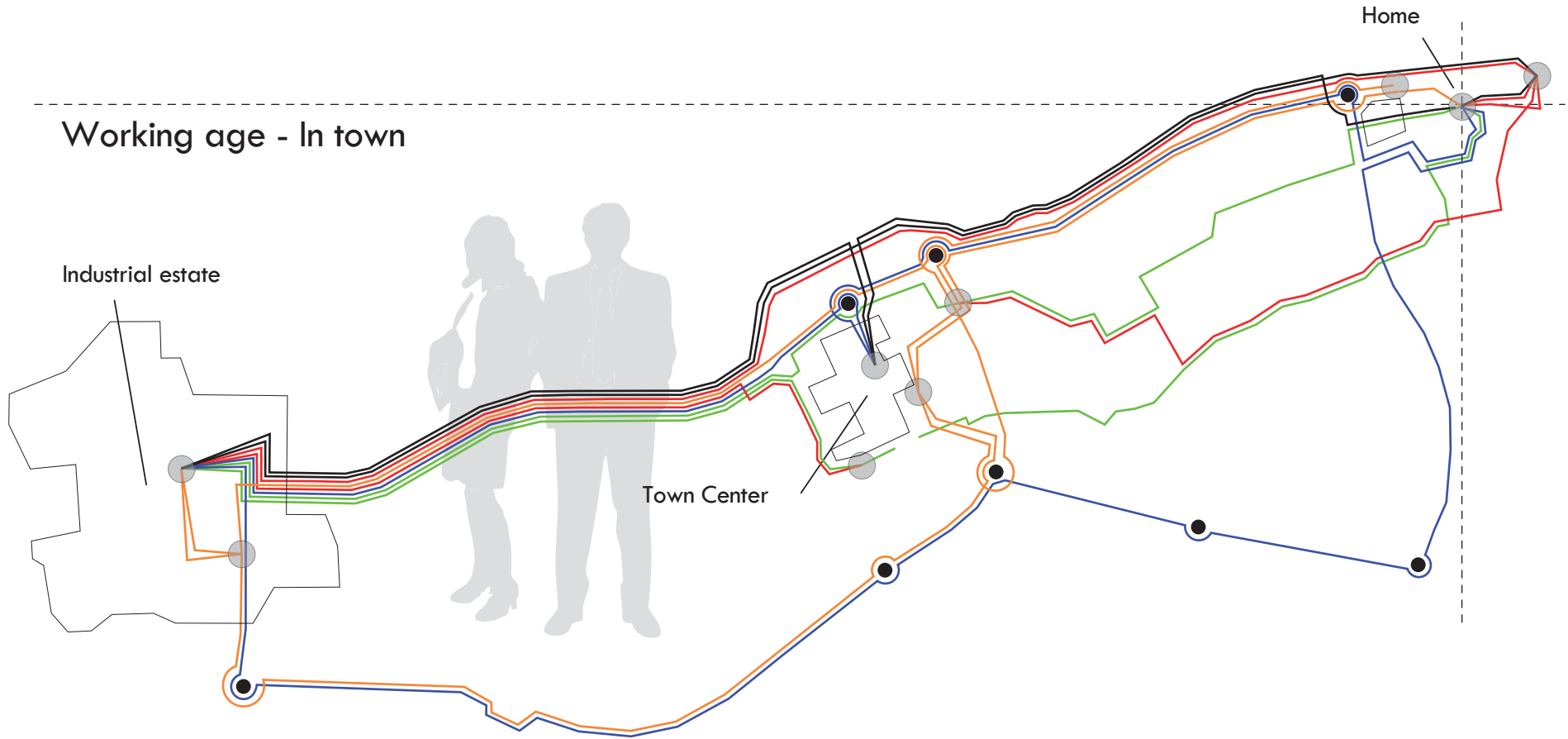


Mobility-on-Demand: Environmental Benefit

“In the 21st century about 90% of population growth will be in urban areas; these will account for 60% of the population and 80% of the wealth. Hence, the patterns of future energy demand will increasingly be determined by urban networks. Transportation and building operations typically account for at least 60% of urban energy use. In congested urban areas, about 40% of total gasoline use is in cars looking for parking.”

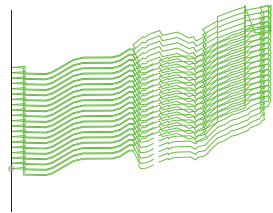
-Imperial College Urban Energy Systems Project

Working age - In town

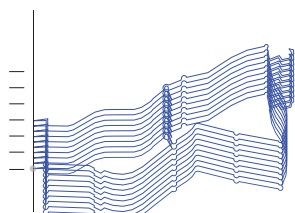


Mins

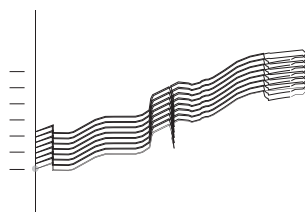
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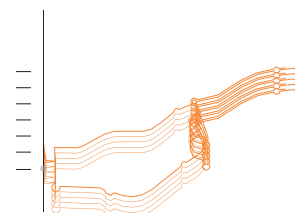
8.3 Km | 100:00 Minutes



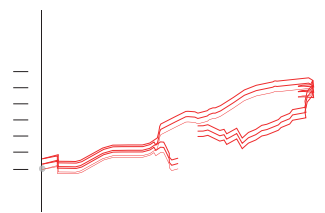
10.7 Km | 49:00 Minutes



8.7 Km | 40:00 Minutes



9.6 Km | 23:00 Minutes



8.3 Km | 13:00 Minutes

Average Speeds



Walking

Commuting	5 kp/h
Normal	5 kp/h



Driving/Car

Commuting	13 kp/h
Normal	48 kp/h



Riding/Bike

Commuting	13 kp/h
Normal	16 kp/h



Riding/Bus

Commuting	32 kp/h
Normal	40 kp/h



Driving/CityCar

Commuting	40 kp/h
Normal	48 kp/h

Demographic Narrative Matrix

These diagrams analyze different demographic usage patterns within the town. By studying different groups and their movement around the town it is clear how beneficial a Mobility-on-Demand system could be. This study justifies the benefits of such a system in the urban context of Harlow by directly comparing different transportation modes.

Working age, in town

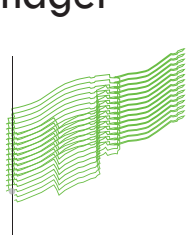
Worker lives within sector 002 and works within the Pinnacles industrial estate on the west side of town. Worker begins his shift at 9am and likes to be out of his house by 8am every morning. His route to and from work takes him past the town center (Shopping district). He likes to stop by the town center after work to do a little shopping and pick up a cup of coffee. He is generally home by 6.30pm and in bed by 11pm.

The diagram shows average distances and travel times for the full distance travelled for one day. The advantage of using CityCar and the bike path network is evident in distance travelled and the time it takes to travel that distance.

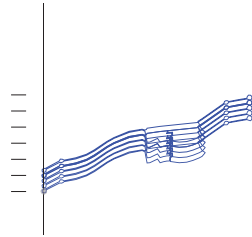
Teenager

Mins

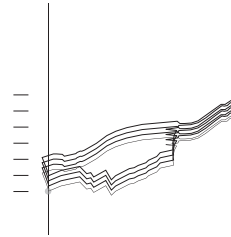
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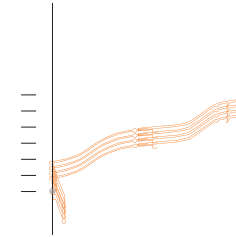
5.8 Km | 70:00 Minutes



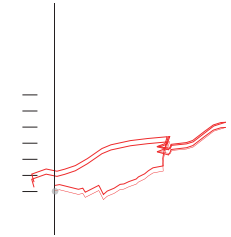
7.0 Km | 32:00 Minutes



6.4 Km | 29:00 Minutes



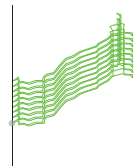
7.5 Km | 19:00 Minutes
+ stops



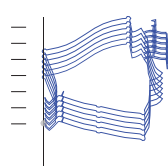
5.6 Km | 9:00 Minutes

Working age - stay home

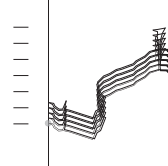
90:00 —
60:00 —
30:00 —
00:00 —



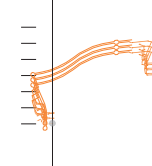
4.1 Km | 50:00 Minutes



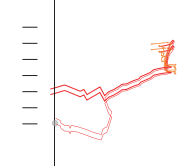
6.6 Km | 30:00 Minutes



5.6 Km | 26:00 Minutes



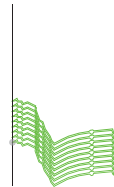
4.3 Km | 13:00 Minutes
+ stops



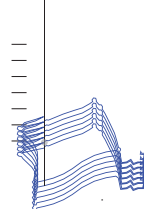
4.9 Km | 8:00 Minutes

Working age - London

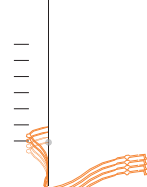
90:00 —
60:00 —
30:00 —
00:00 —



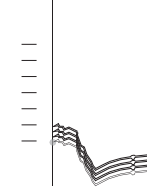
3.6 Km | 43:00 Minutes



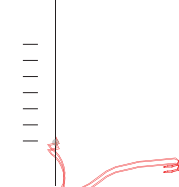
6.0 Km | 28:00 Minutes



8.0 Km | 20:00 Minutes
+ Stops



3.6 Km | 17:00 Minutes



5.2 Km | 8:00 Minutes

Average Speeds



Walking
Commuting 5 kp/h
Normal 5 kp/h



Driving/Car
Commuting 13 kp/h
Normal 48 kp/h



Riding/Bike
Commuting 13 kp/h
Normal 16 kp/h



Riding/Bus
Commuting 32 kp/h
Normal 40 kp/h



Driving/CityCar
Commuting 40 kp/h
Normal 48 kp/h

Demographic Narrative matrix, Continued

Teenage demographic - Typical movement

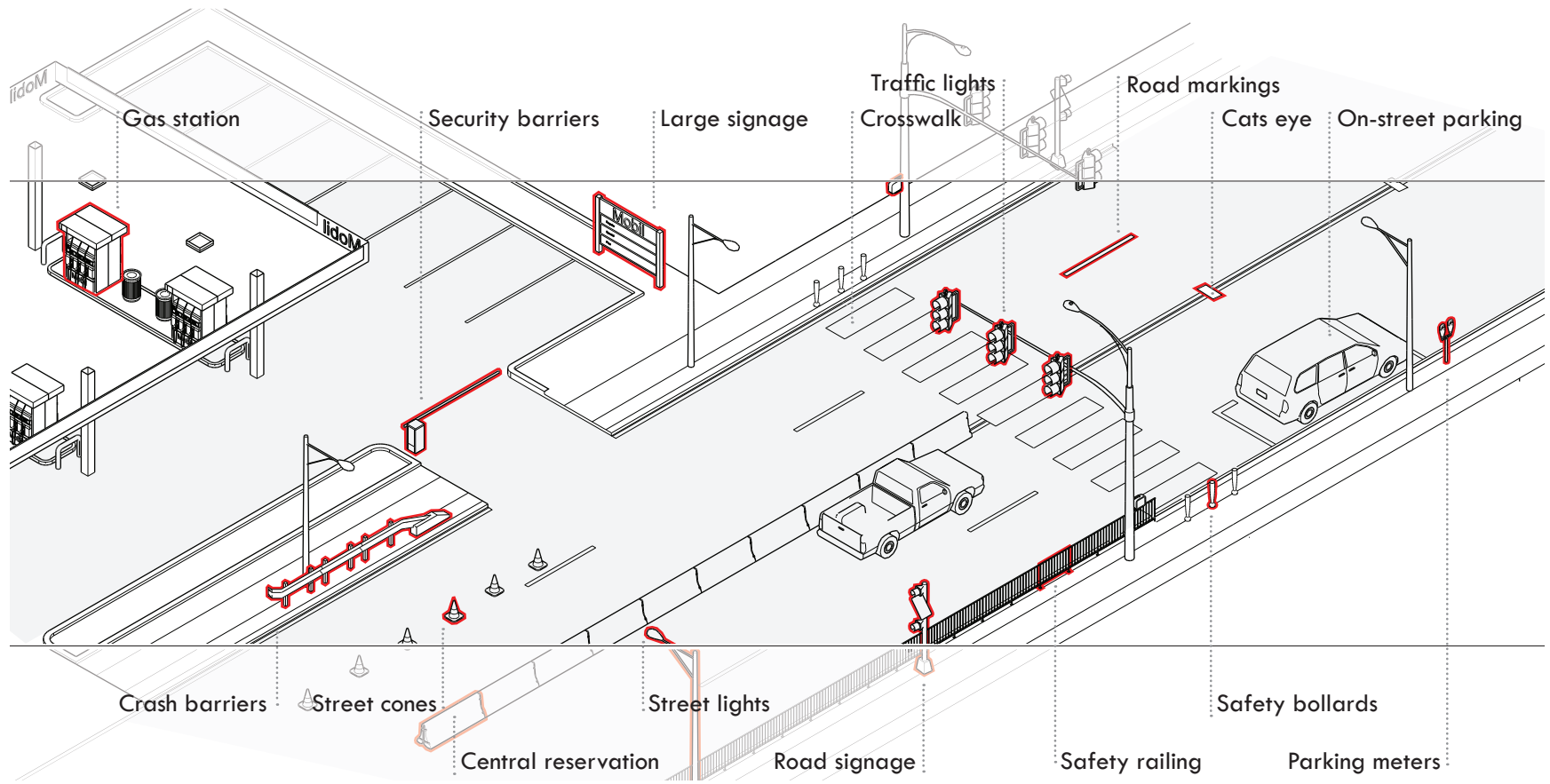
Teenager lives within sector 002 and goes to highschool at Mark Hall Comprehensive school located less than a mile away to the east. Teenage begins classes at 8.30 and normally leaves home at 8.00am. There are very few services for teenagers within the town so many travel to the town center after school to hang-out and chill. They'll either buy dinner while out and about in the town center or come home. Generally they're in bed by 11.00pm

The diagram shows average distances and travel times for the full distance travelled for one day. The advantage of using CityCar and the bike path network is evident in distance travelled and the time it takes to travel that distance. Other hidden advantages of using CityCar include less dependence on parents and a more productive space for the teenagers to hang out in.

Working age, Stay-at-home mom/dad

Stay at home mom/dad lives within sector 002 and represents the demographic most likely to use CityCar and MOD during the off peak hours of the day. Stay at home mom/dad is up early often helping his/her spouse out the house and tending to children too small to care for themselves or teenagers getting to school. They will often take their children to school/day-care and spend the rest of the day tending to the home, doing necessary shopping, or exercising.

Design Drivers



The Urban Legacy of the Automobile

Our urban infrastructural experience is driven by the limitations of 100 years of automobiles. Cars pollute and are big, noisy and dangerous. These characteristics have shaped the conceptualization, design and infrastructure of cities and towns mostly innocuously, but profoundly.

What if all of the limitations of cars were suddenly removed? For example, parking lots, structures and spaces- as well as streets, intersections, and highways- must accommodate the current size of vehicles. CityCar negates the need for expansive space for cars and intricate safety devices and systems. Electric vehicles make little noise and have no emissions, which makes it possible to re-envision how traditional architectural space will engage with such a system. Cities and towns can be re-imagined without the reliance on design that must focus on traditional traffic flow.

New mobility systems and behaviors are nurturing a 21st century industrial revolution. Much like what steel did for architecture back in the 19th century. New mobility and its embedded networking capacity will spawn a new type of architectural/urban space.

This thesis explores the urban and architectural potential of these emerging trends and proposes what this space could be- a “Mobility Centric Architecture.”

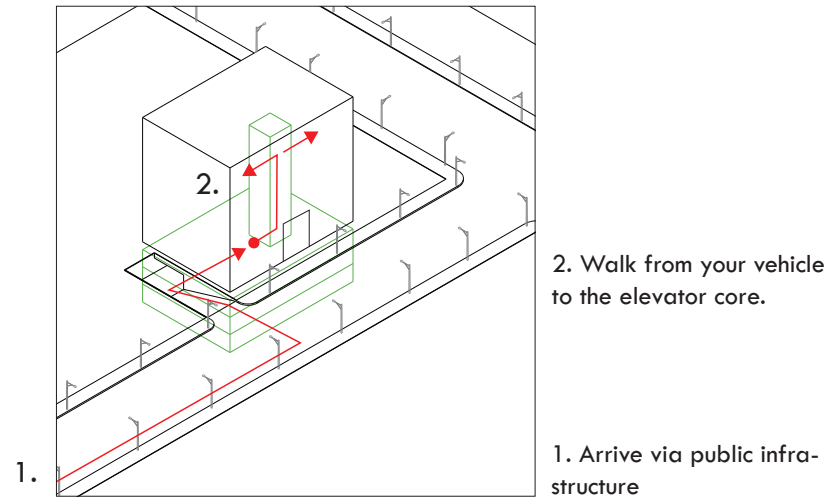
The Architectural Legacy of the Automobile

Automobiles have traditionally been banished to the edge of buildings- shunned because of their noise, size and emissions. The following illustrations explore the relationships between current modes of transportation, pedestrians, and architecture.

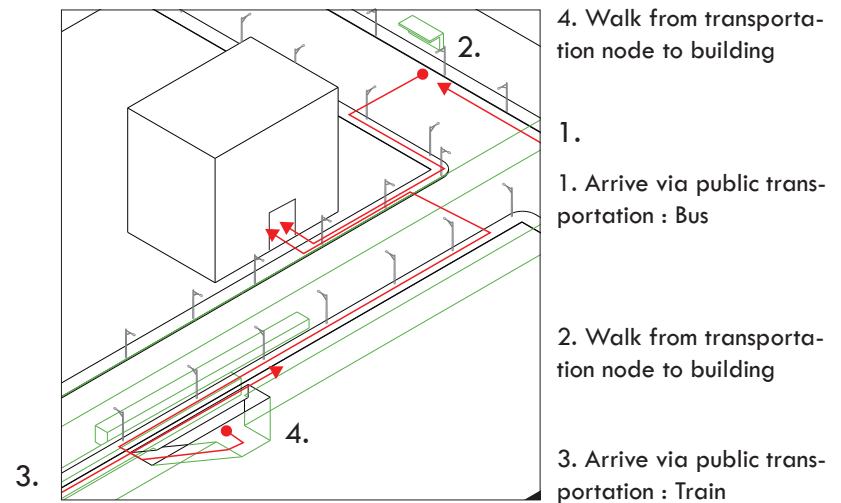
In each model, there is defined disconnect between the user-transport relationship and the user-building relationship. At some point in every transport experience, the automobile, train, bus, or bicycle is abandoned on the periphery of the building. Thus the relationship between the user and the transport mode ends, and a relationship between the transport mode and the building is non-existent.

The final image (F) illustrates the direction in which modern transport systems and technology have been heading. Current GPS systems embedded within cars require the user to disconnect almost entirely with physical space and engage only with a virtual representation of their surroundings.

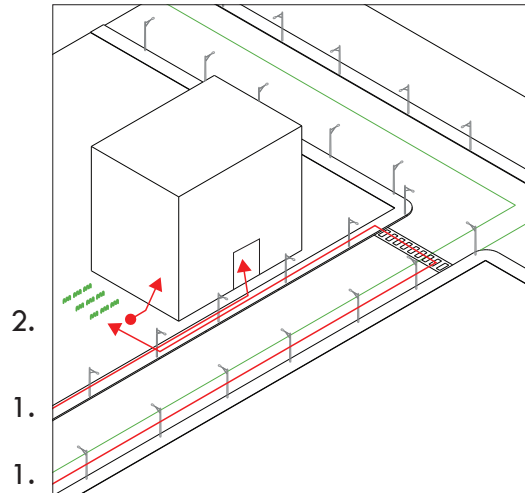
A Personal cars: Private and public underground parking structures



D Public transportation: Train and Bus

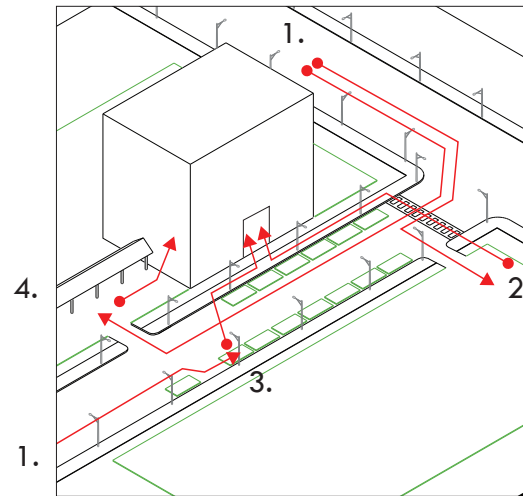


B Pedestrian mobility:
Walking and cycling



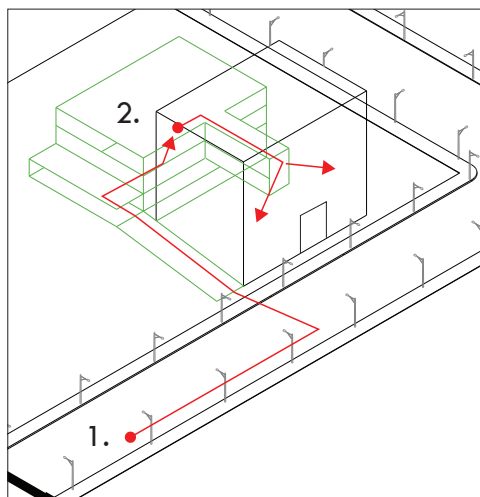
- 2. Walk from bike park to building
- 1. Arrive via footpath
- 1. Arrive via bike using the bike path

C Personal cars:
Private and public surface parking



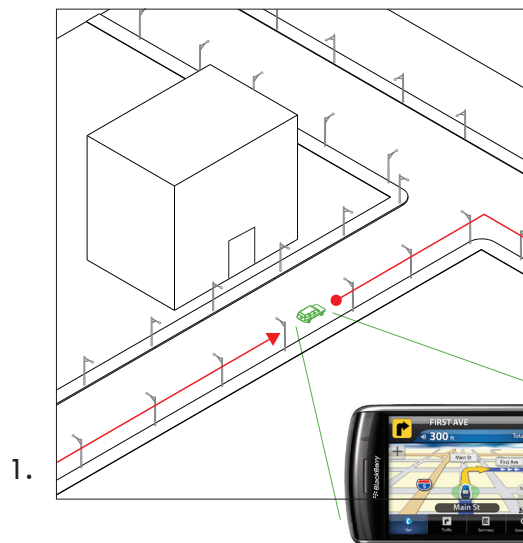
- 1. Arrive via public infrastructure
- 2. Walk from your off-street paid parking lot to the building.
- 3. Walk from your onstreet paid parking space to the building.
- 4. Walk from your off-street private parking space to the building.

E Personal cars:
Private and public Multi-storey car parks

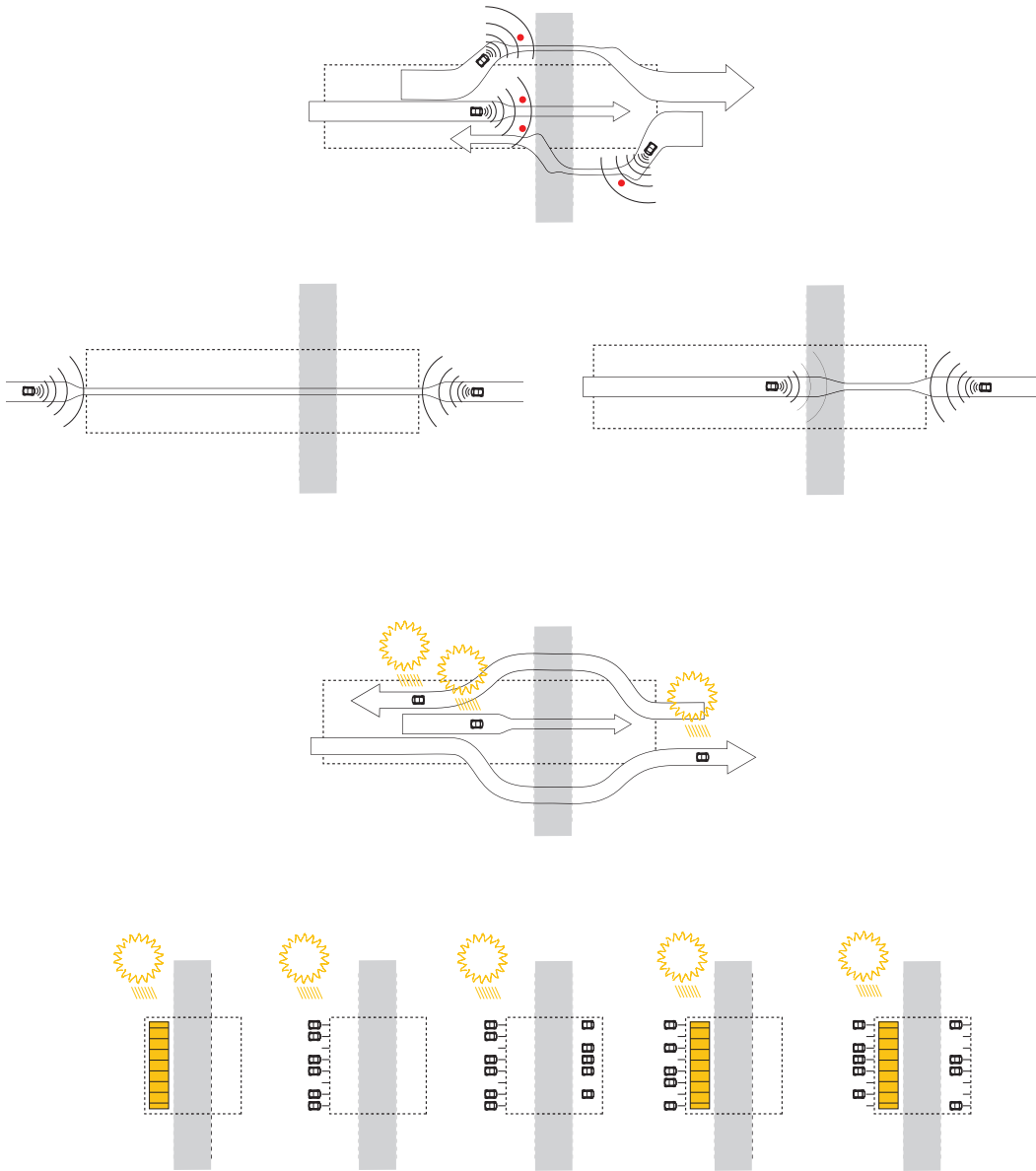


- 2. Walk from your vehicle to the elevator core.
- 1. Arrive via public infrastructure

F Personal cars:
GPS Technology and urban wayfinding



- 1. Physical - virtual Disconnect to architecture



Safety Opportunities

State-of-the-art crash avoidance technology allows mixing of people, architecture and mobility at closer proximity.

Social Opportunities

Plug personal handheld devices into the dashboard- play music, enable email and social networking, hear your schedule, find out where your friends are, personalize the color of your CityCar. Technology increases opportunistic social opportunities.

Environmental Opportunities

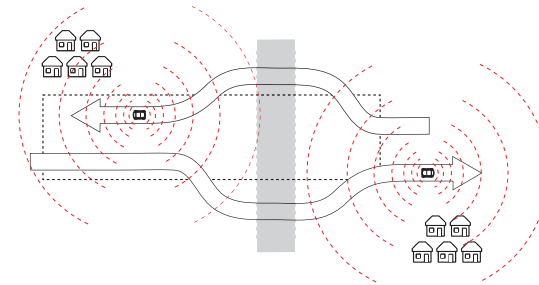
Increased inventory efficiency and optimization- with PV cells embedded in the roof, CityCars act as roving power generators. CityCars generate energy through PV cells while plugged in and waiting at the hub. CityCars also act as an energy storage supplement to the regional grid.

Design Drivers

CityCar and its embedded technology allows a re-thinking of the role of the vehicle in architectural design. These diagrams illustrate the multitude of opportunities available using CityCars in the context of a new architecture model (box in dashed lines) situated at a bike path/overpass crossover. The arrows indicate flow of CityCar mobility along the bike path, and the gray vertical line shows the main road overpass. Novel physical and virtual juxtapositions such as those shown here were used to drive the final design.

Technological Opportunities

CityCars are to become roving Wifi antennae. Free and faster online access is enabled to residents in the vicinity of the vehicle.

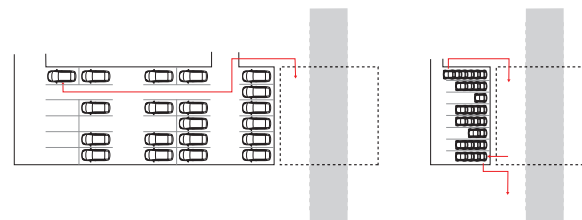


Architectural Opportunities

CityCar provides an opportunity to communicate programmatic status, i.e. Store is closed, cafe at capacity, there is a soccer game in progress - driver may want to avoid the hub.

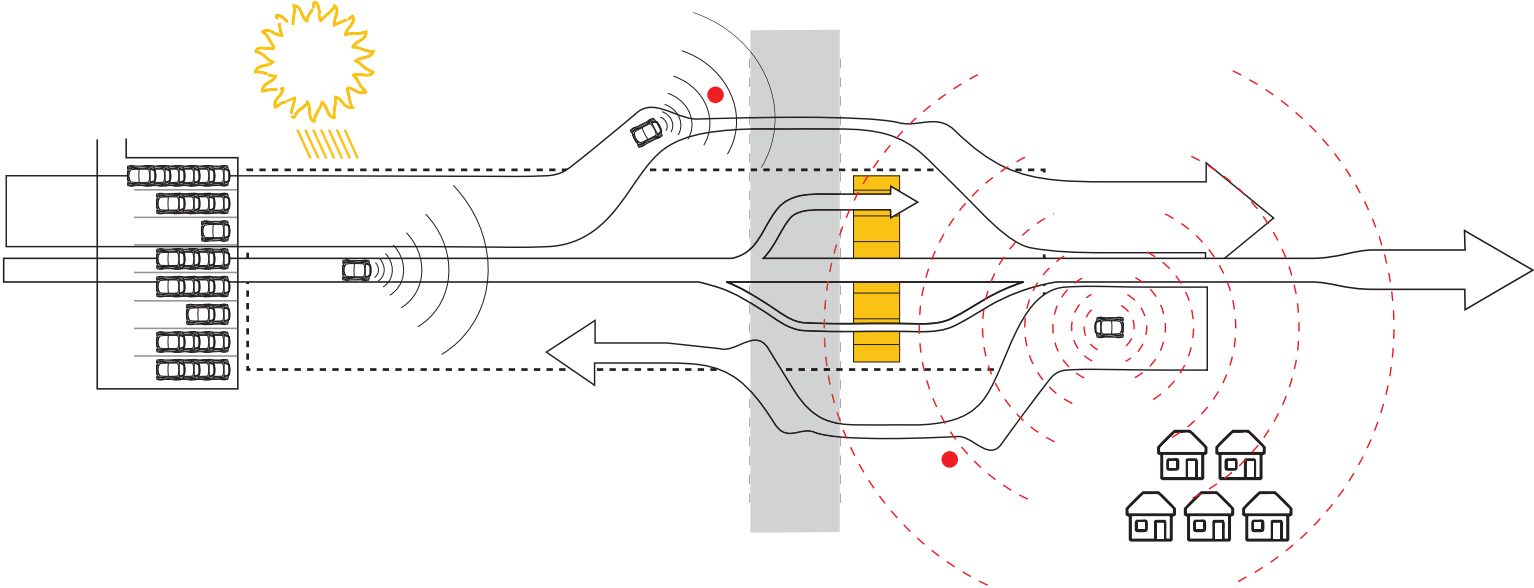
Parking relationship to building and program: vehicles are shared, parking, and charging stations are ubiquitous.

Embedded “terminal” capacity of CityCar creates a novel satellite office concept.

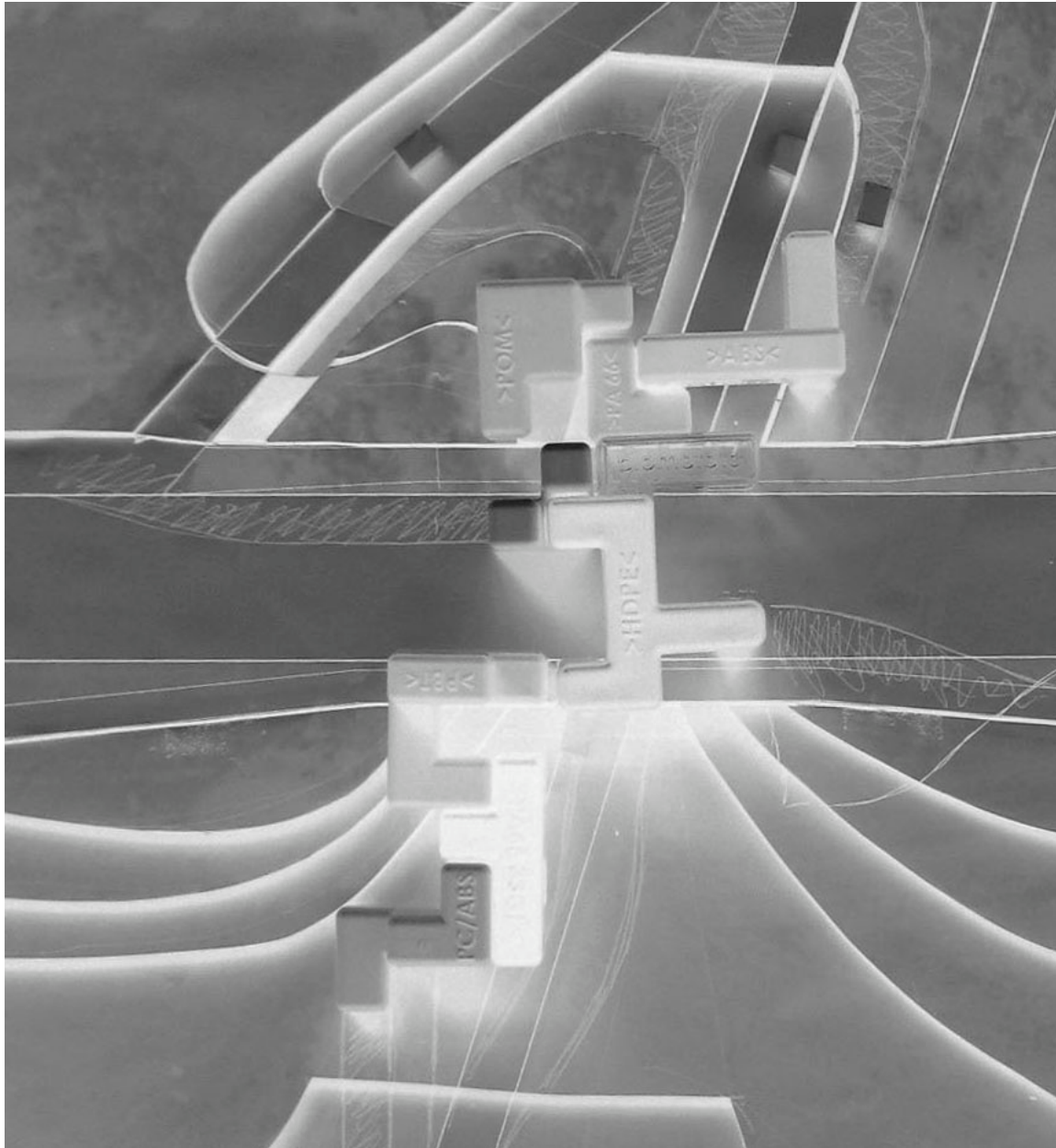


Aggregation of Design Drivers

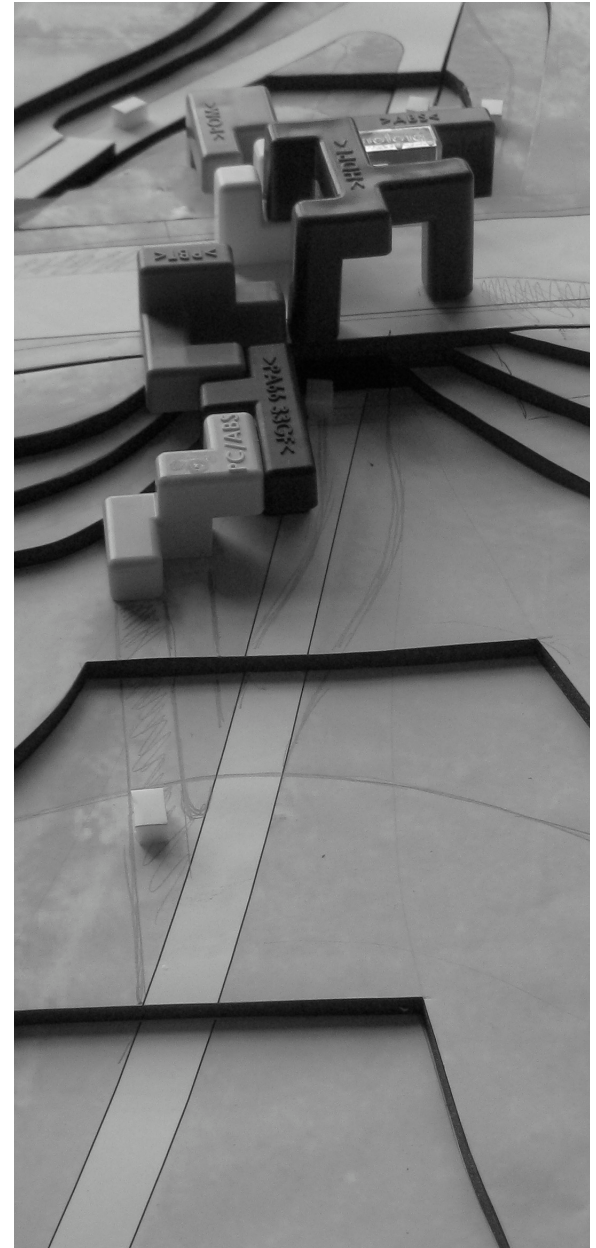
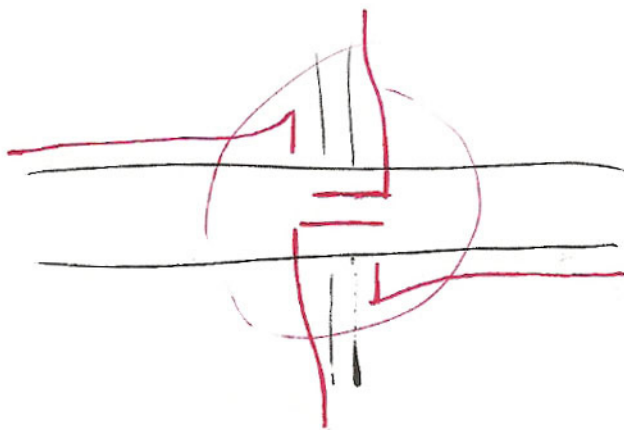
A networked space with mobility as its focus that exploits the safety, social, environmental, technological, and architectural opportunities that CityCar affords.

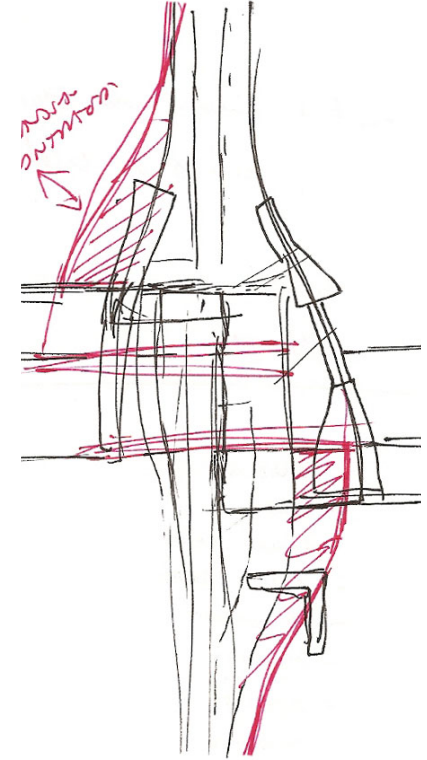
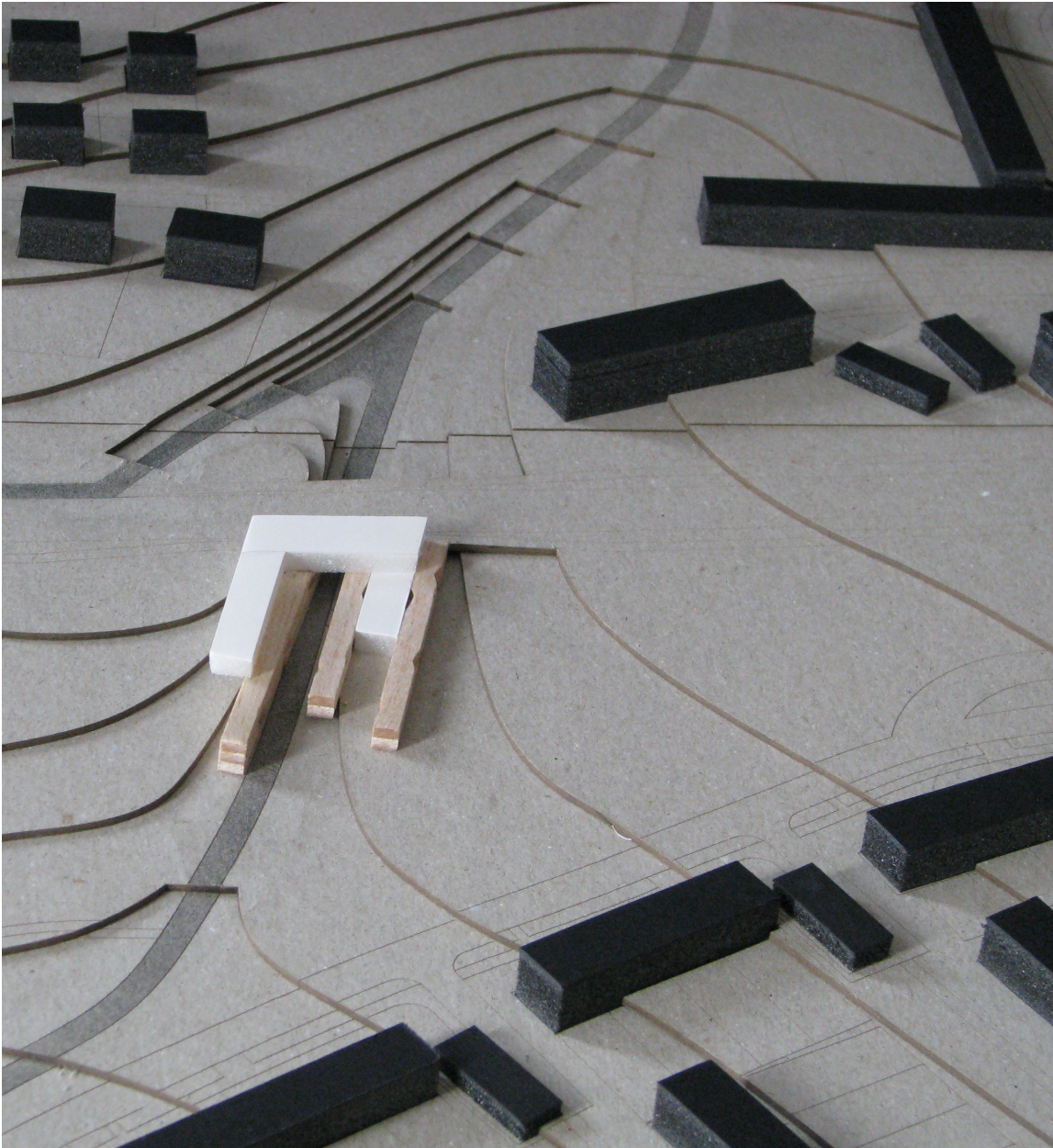


Design Evolution

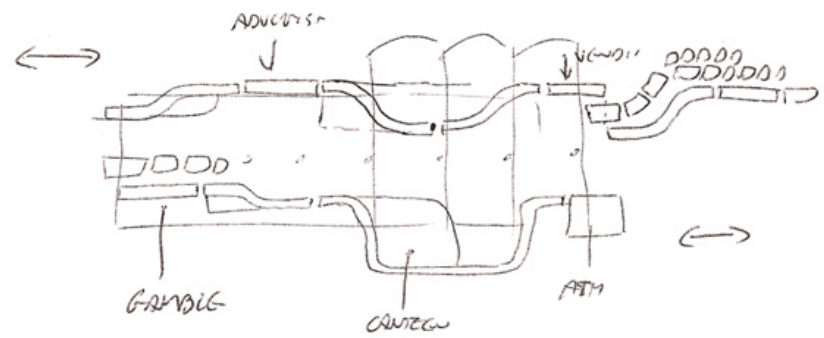


Phase I

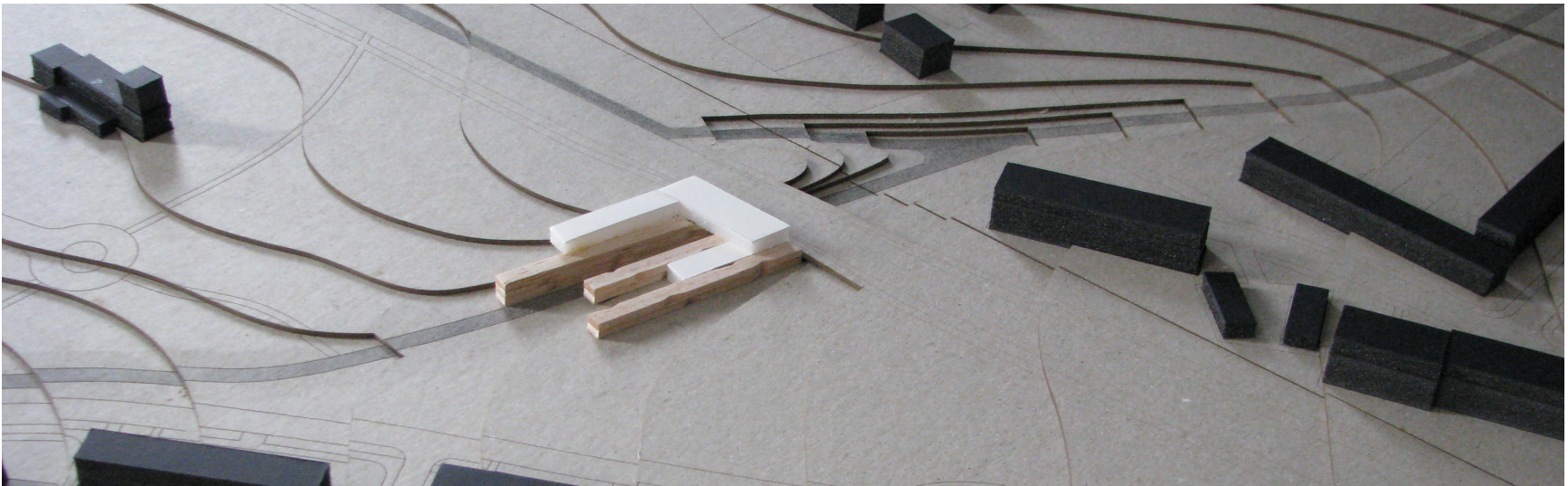




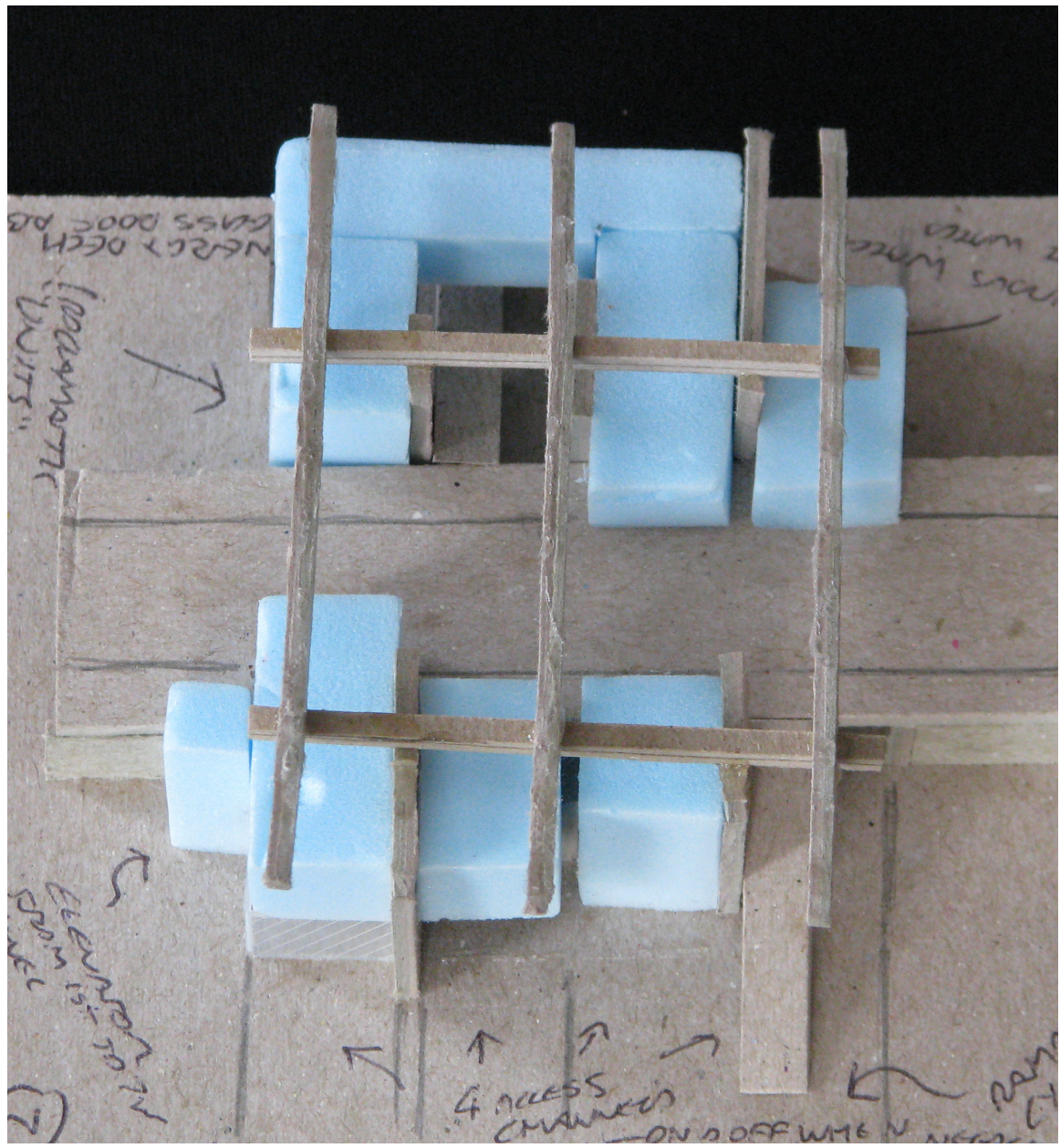
Phase II

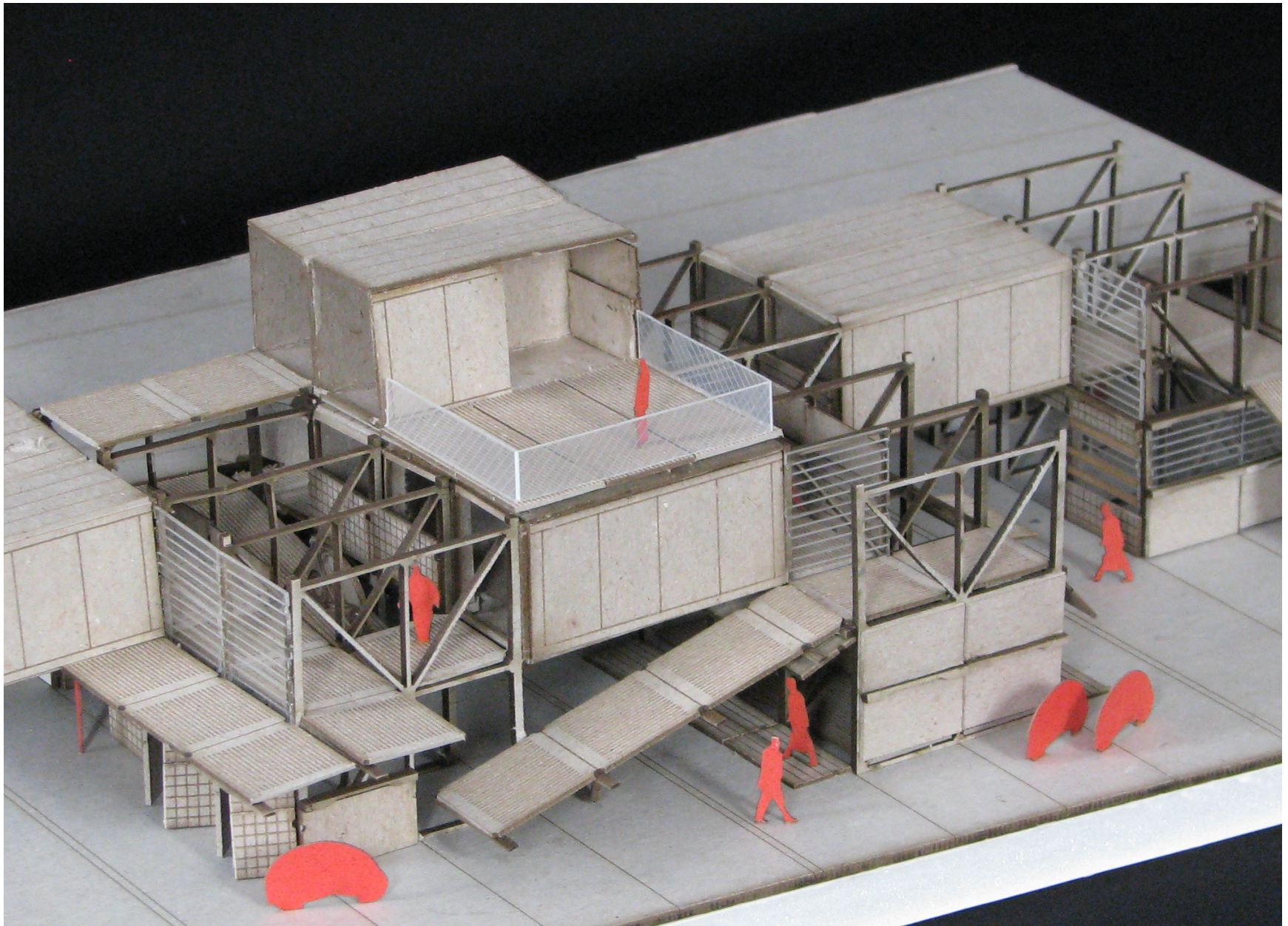


MOVIES CREATE PHONE STREETS

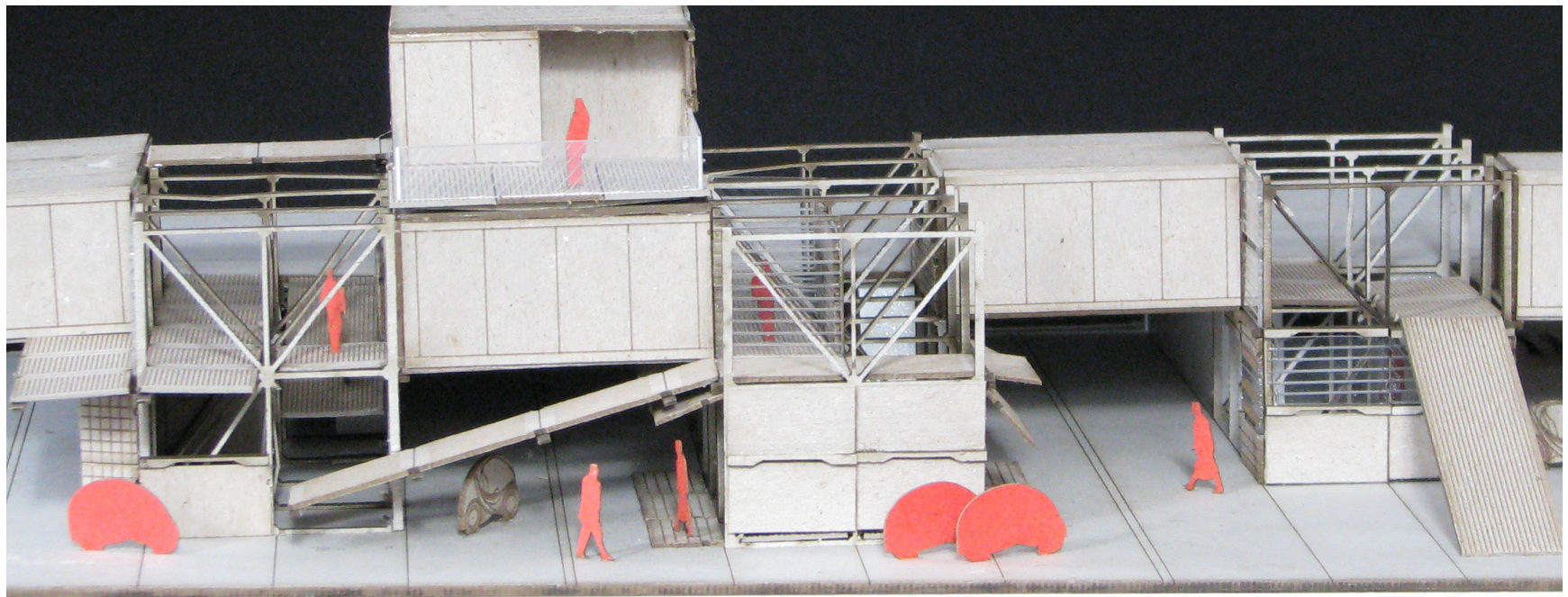
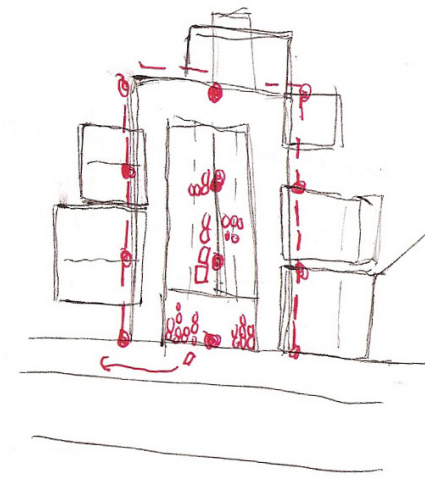


Phase III



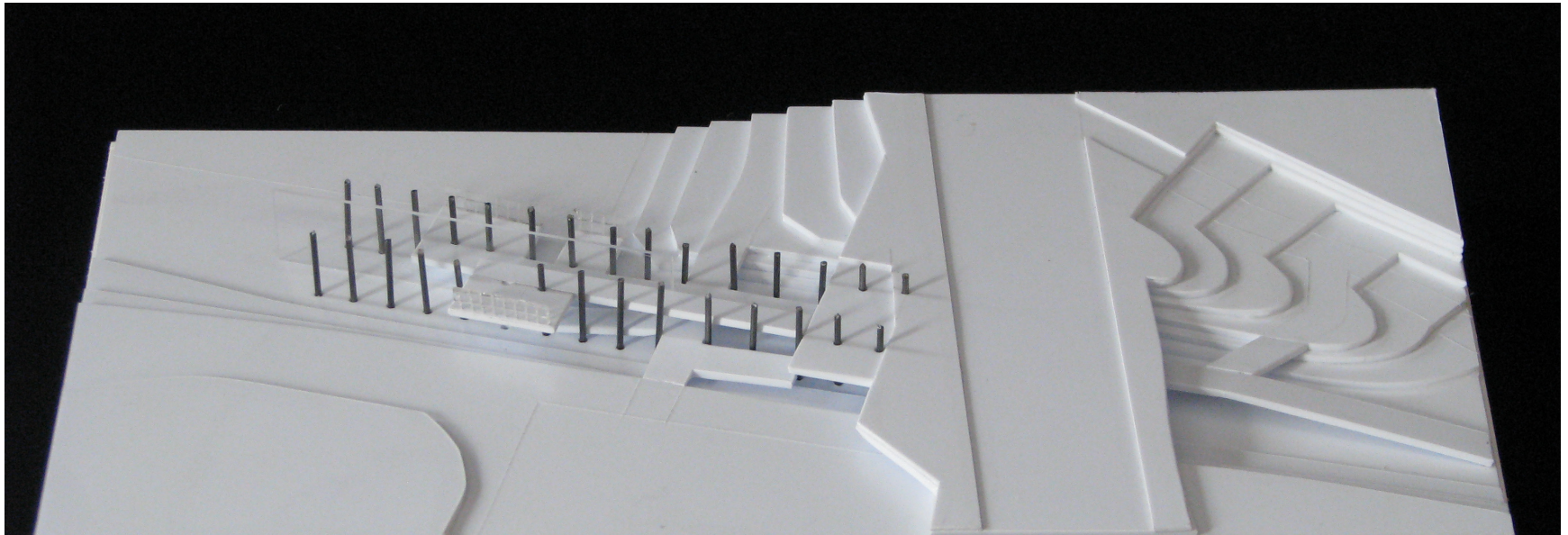
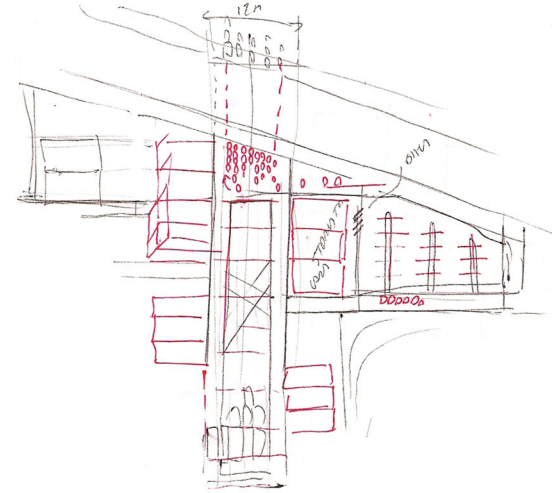


Phase IV

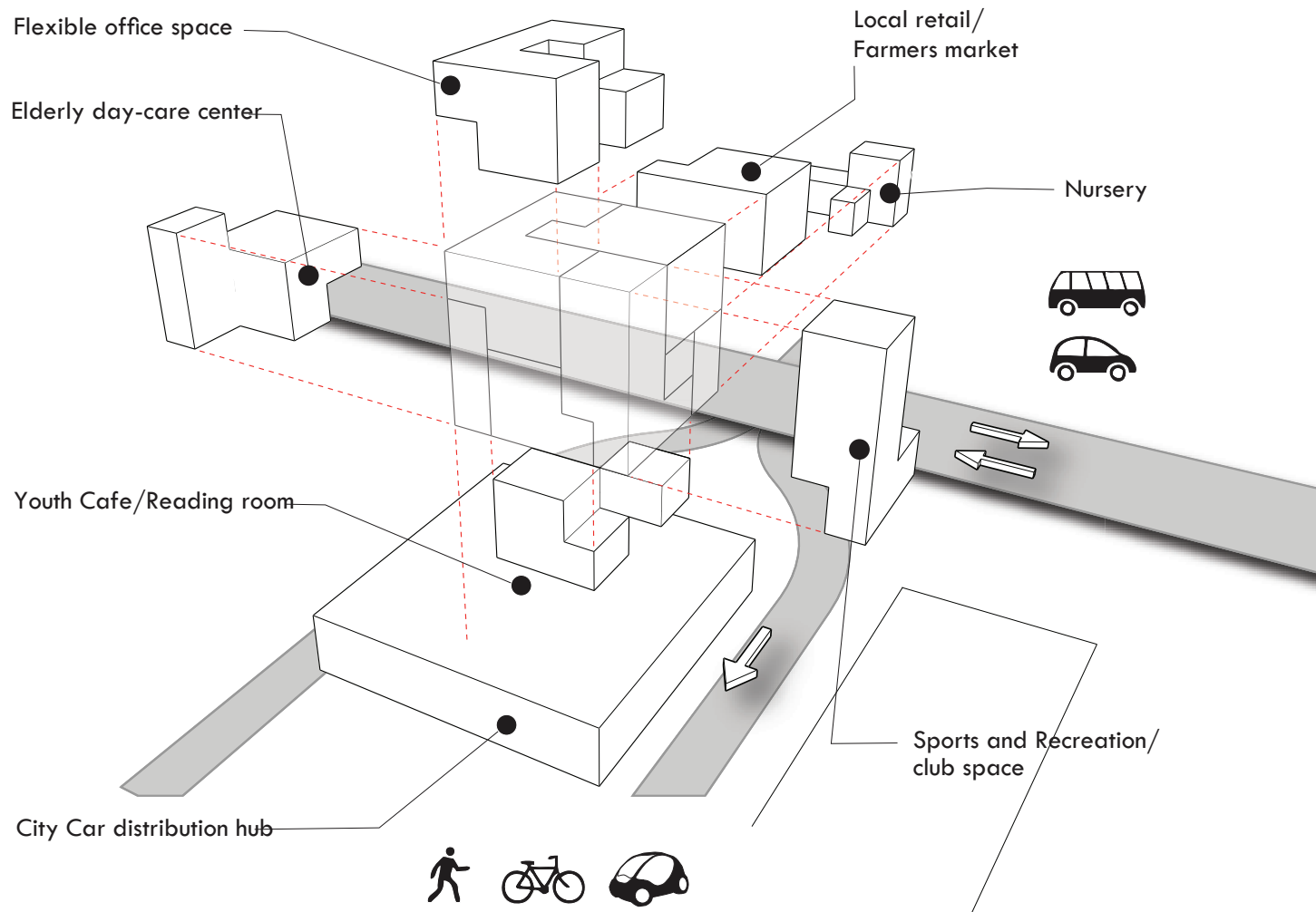




Phase V



Thesis Program



Program Diagram

This thesis is being imagined as a complete/incomplete town-scale networked architecture with mobility as the common binding thread. A networked, more distributed architectural space and program is more efficient, is accessible to more people and makes more economic and social sense to British New Towns in the future.

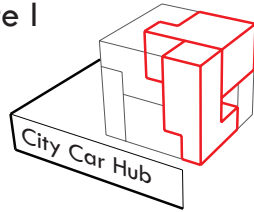
Primarily this project is a Mobility-on-Demand storage and distribution hub. Residents will walk - ride - run - roll to the hub to pick up a mobility vehicle in order to travel further around the town. This mobility mode may be in the form of a CityCar, it may be a Green Wheel, or a Roboscooter- additional vehicles in the Mobility-on-Demand program. The mobility capability will act as catalyst for further programming. The further programming will be pro-actively defined by the community that the hub is sited within. This second level programmatic flexibility will create a space exciting and contemporary to the people using it.

Building Use Diagram

This chart illustrates the need for flexibility of the architecture due to varying time and space requirements of the mixed demographic programs.

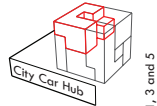


Site I



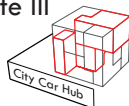
- 1. City-Car storage/distribution hub
- 2. Sports facility
- 4. Retail/Local
- 5. Youth Cafe
- 6. Child care facility
- 7. Elderly care space

Site II



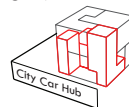
1, 3 and 5

Site III

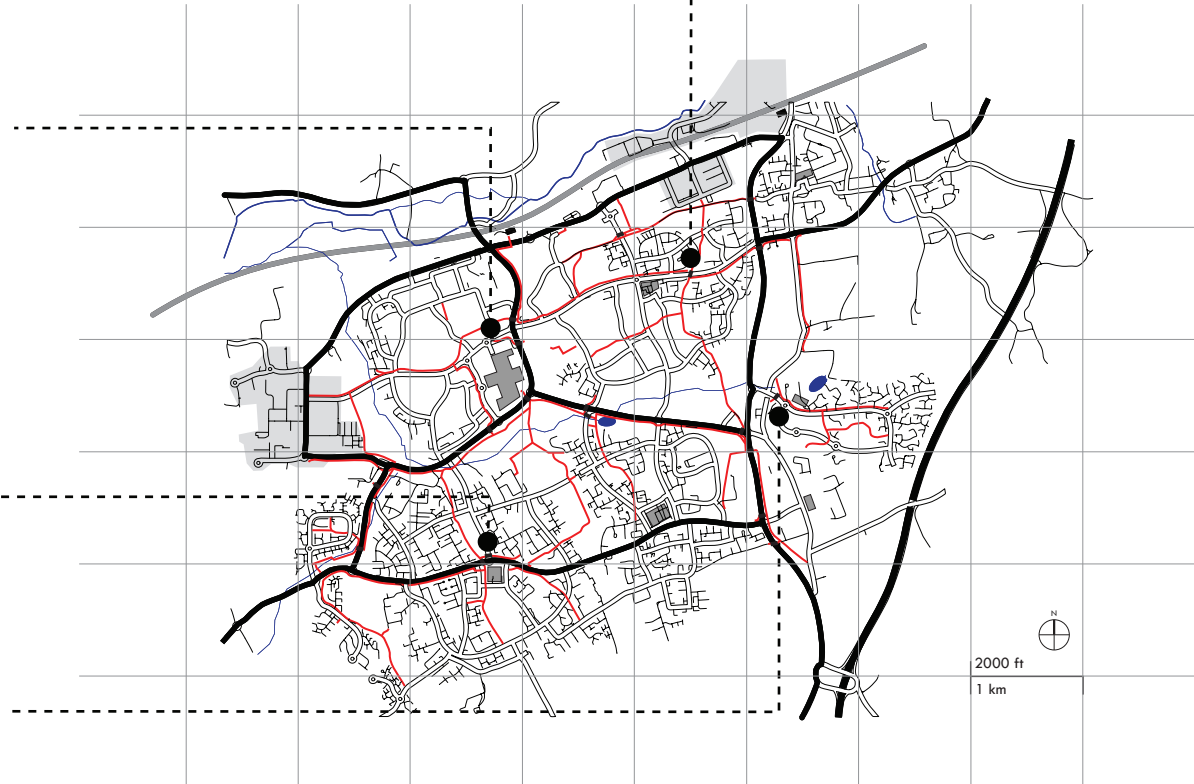


1, 10, 2 and 6

Site IV



1, 10, 2 and 9



Urban Programmatic Variance

The architecture is programmed to neighborhood context as the building functions as a node within a larger array of nodes around the town. Each neighborhood has diverse needs and the buildings would be programmed as such. For example, the neighborhood this thesis is located within has high rates of antisocial behavior of youths. The elderly population has limited social resources and childcare facilities are sparse. Therefore, the node in sector 002 would be programmed as a civic node to fulfill the needs of youth, the elderly, and working parents.

The Mobility-on-Demand model is based on an accepted understanding of a future highly optimized by information technology and the networking capabilities it enables. If the Mobility-on-Demand vehicle sharing system is networked and flexible, why shouldn't the architecture that stores/supplies/maintains it also be flexible? Mobility-on-Demand vehicles are connected to each other, connected to the city and connected to a virtual control system that continuously optimizes programming.

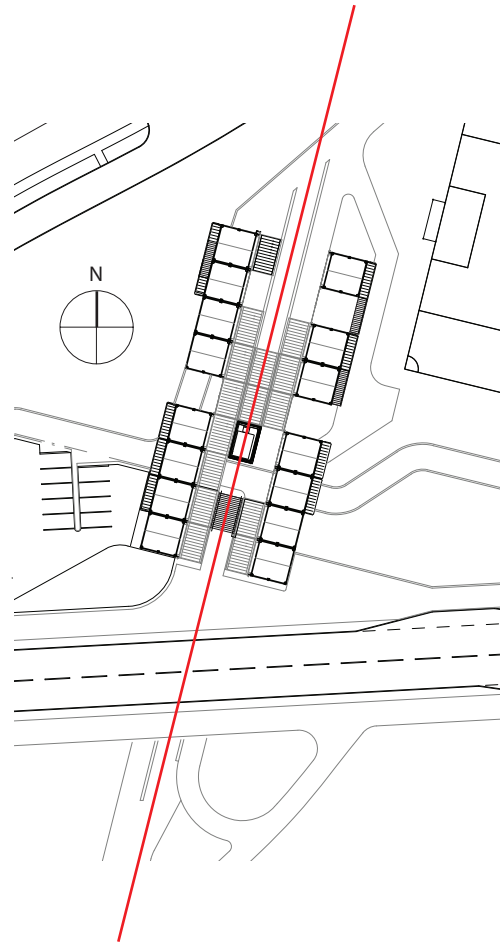
Final Design

Neighborhood Mobility Catalyst

A processional experience. An architecture of dynamic and static spaces which merge seamlessly and safely. An architecture of programmatic juxtaposes and surprises. An adaptable architecture which communicates its contemporary yearnings and expansive potential without seeming temporal. A faster more efficient experience but with selectively ephemeral moments to dwell.



Site Plan
Scale 1:2000

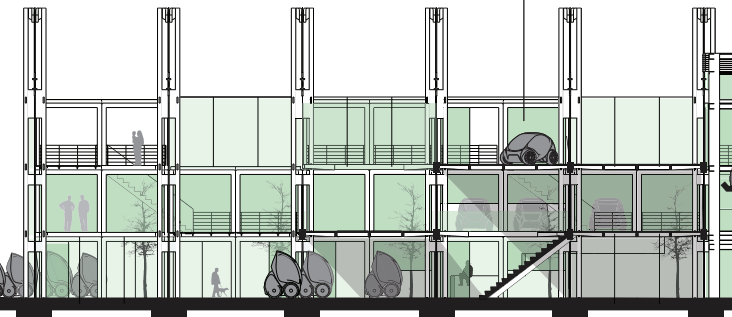


North

Embedded into the neighborhood

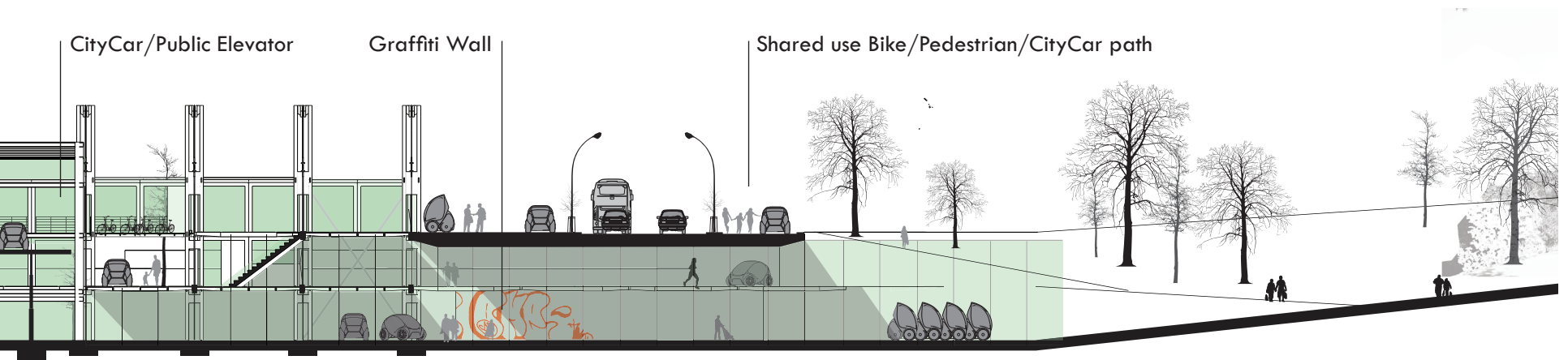


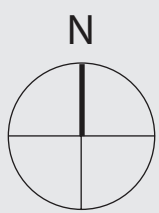
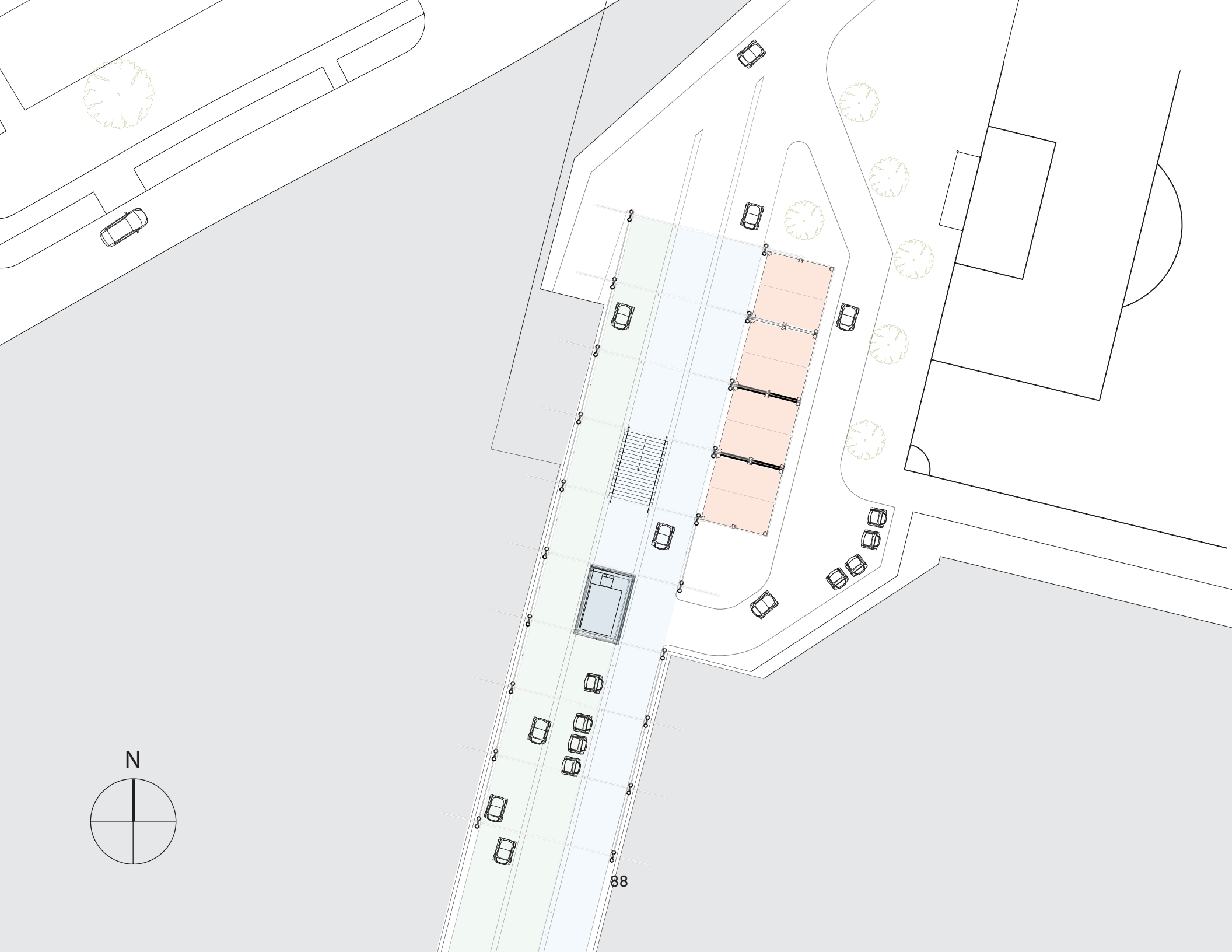
Flexible, mobile offices



Section
Scale 1:400

South





88

Plan: Level 1
Scale 1:400

Program

2,000 Sq. ft.  Recreation cluster



Plan: Level 2
Scale 1:400

Program

2,000 Sq. ft.  Recreation cluster

2,000 Sq. ft.  Nursery cluster

1,550 Sq. ft.  Office cluster

2,000 Sq. ft.  Retail clusters








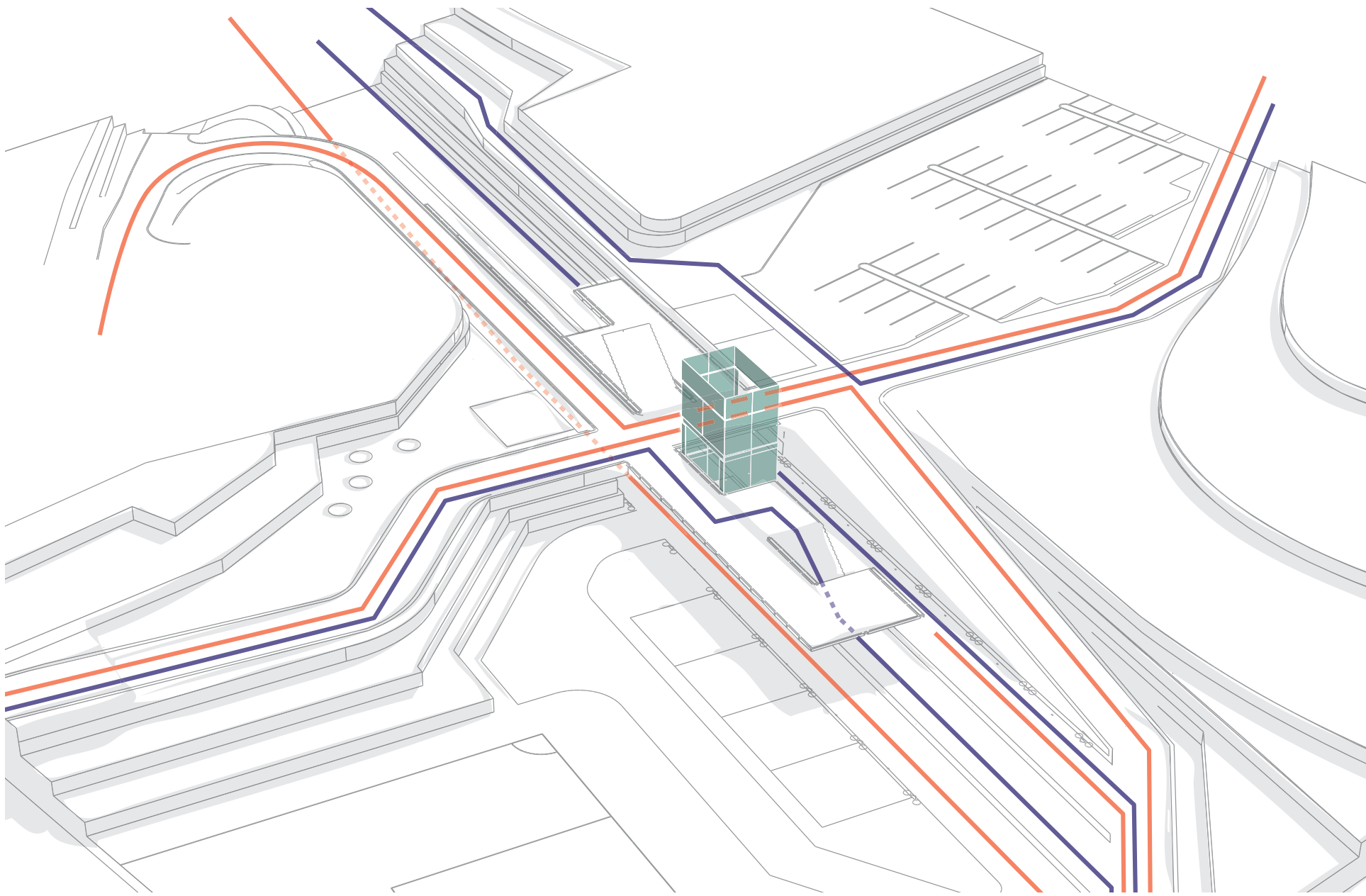
N

Plan: Level 3

Scale 1:400

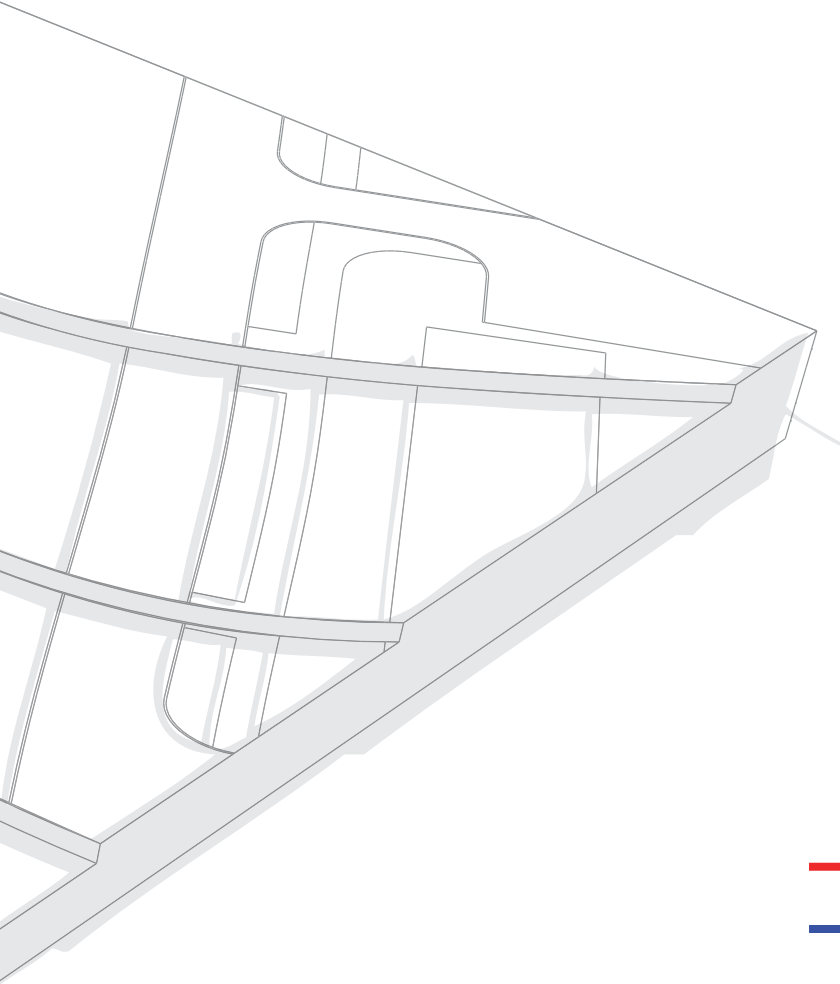
Program




- 2,000 Sq. ft.  Recreation cluster
- 1,550 Sq. ft.  Elderly cluster
- 1,550 Sq. ft.  Teenage cluster
- 2,000 Sq. ft.  Nursery cluster
- 1,550 Sq. ft.  Office cluster

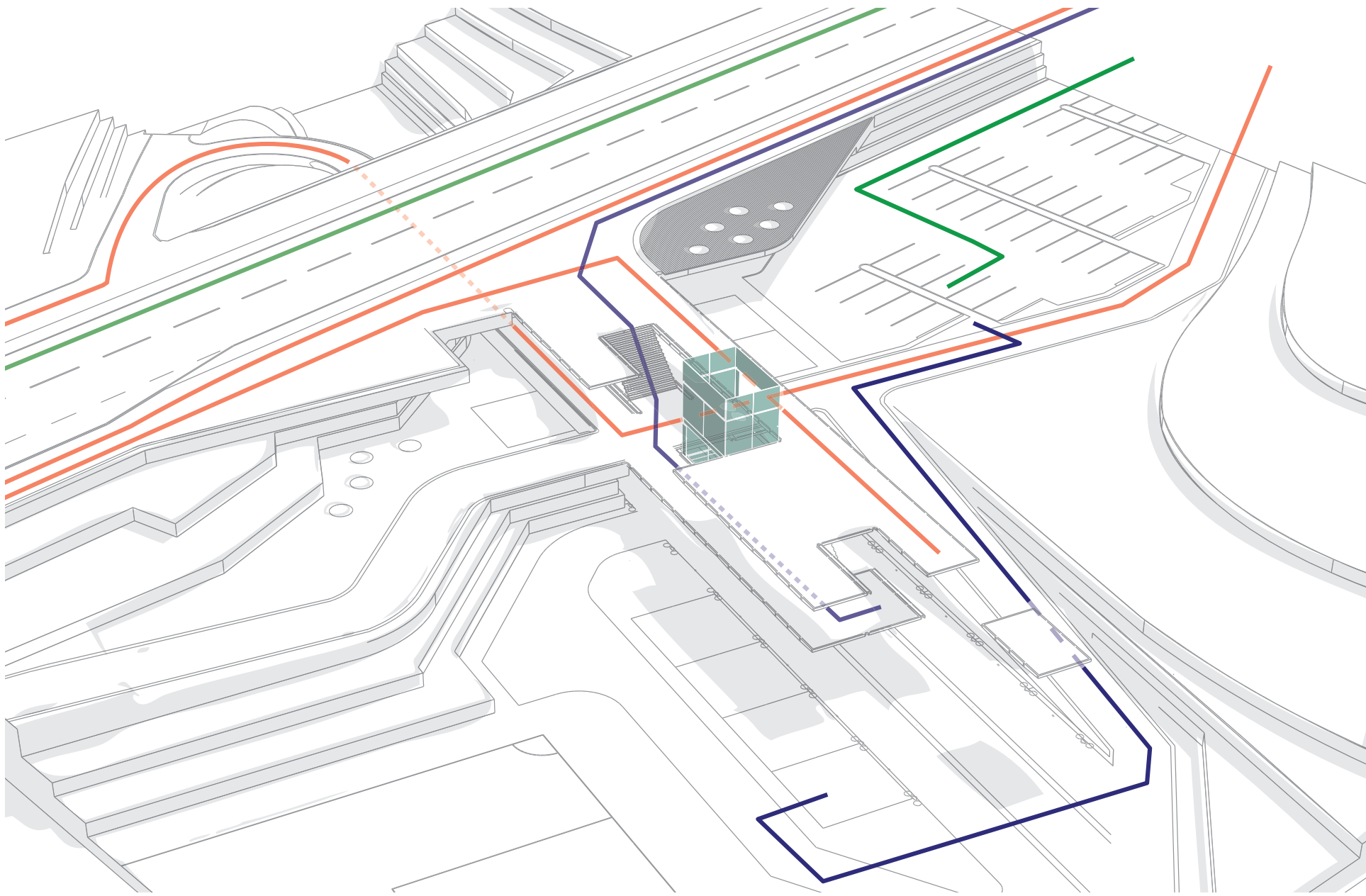


Site/Building Circulation

Level one and two

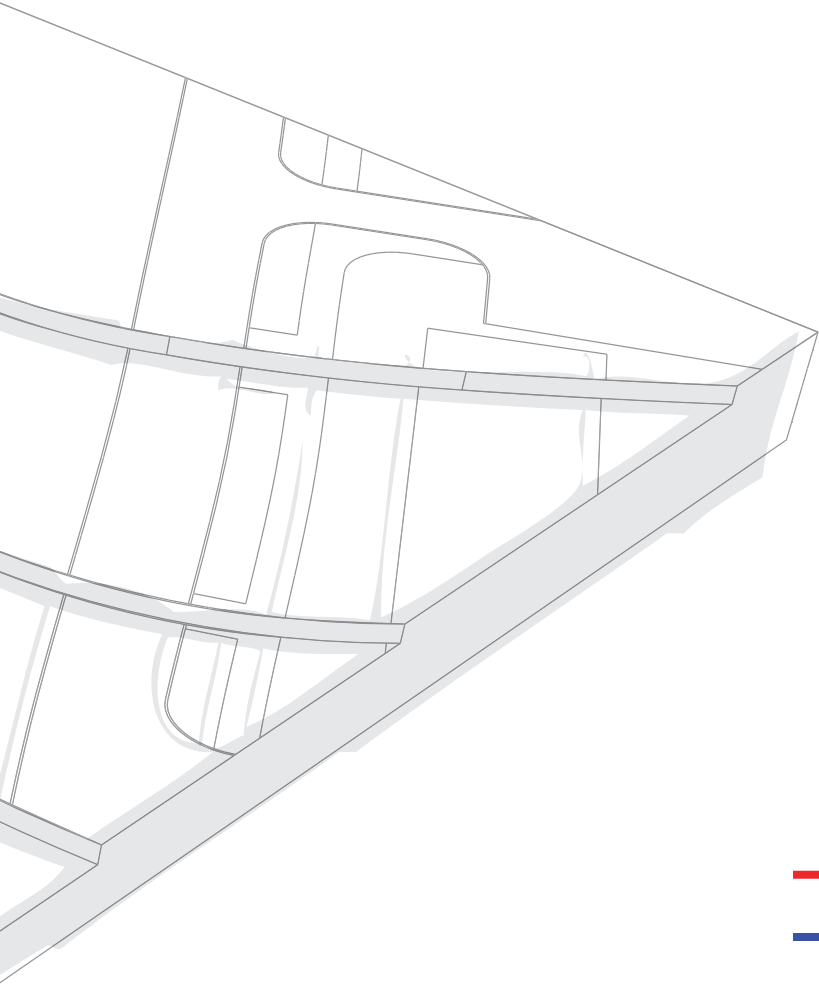





-  City Car, Cycle, Pedestrian flow
-  Pedestrian flow
-  Automobile and public transport flow

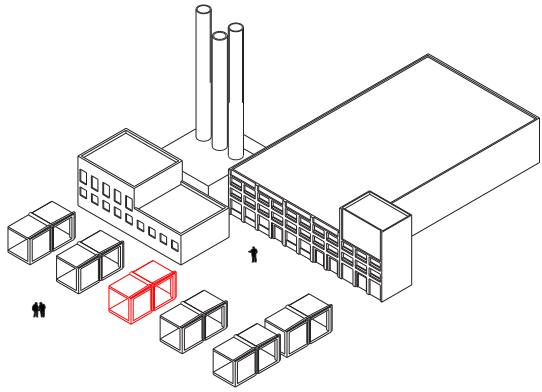


Site/Building Circulation

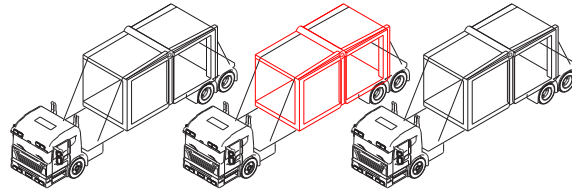
Level one, two and three



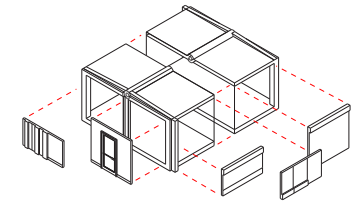
-  City Car, Cycle, Pedestrian flow
-  Pedestrian flow
-  Automobile and public transport flow



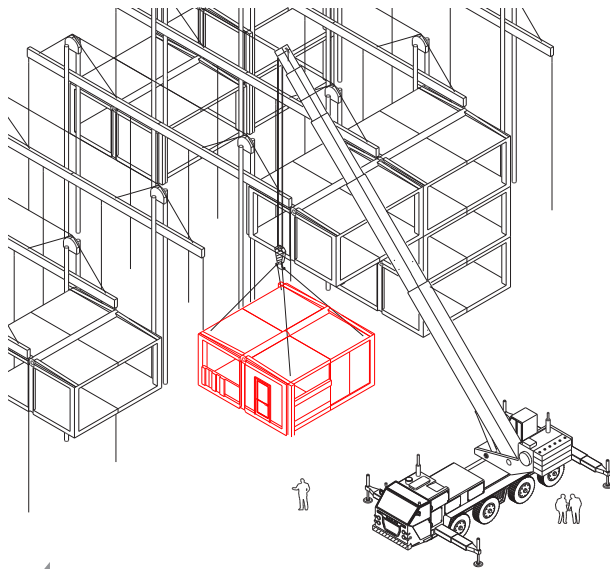
1. Prefabricated modules, made to order off site



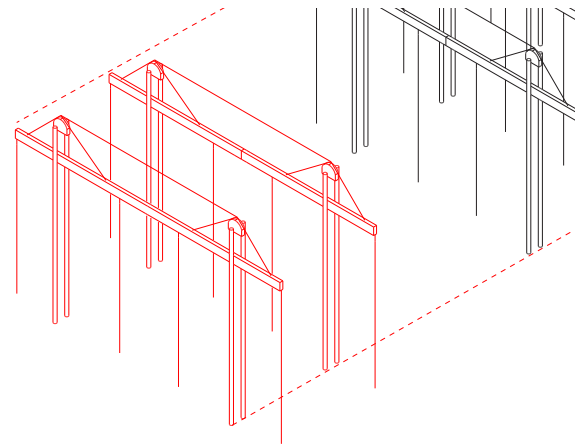
2. Units shipped to site



3. Final assembly of units on site



4. Assembled units hoisted onto super structure



5. Future structural addition

Construction/Fabrication/Structure

The cable stayed masts give the building a recognizable identity that describe how the building works. The syntax is one of efficiency and dynamic architecture. A new industrialism striving to embrace the efficiencies and flexibility of new mobility modes and technological horizons.

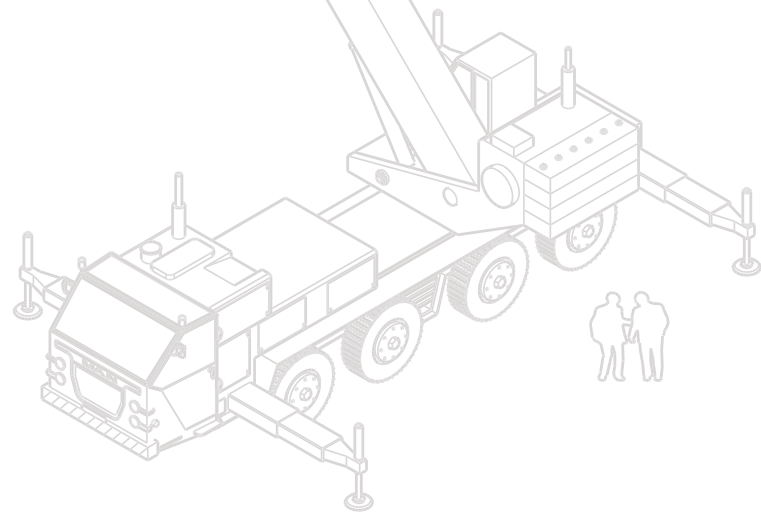
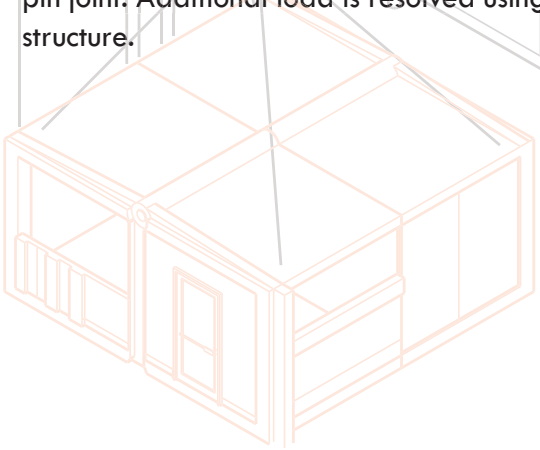
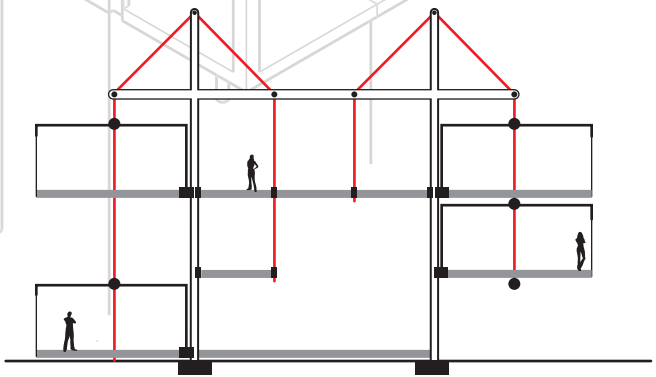
Structural redundancy and programmatic potential are embedded in the design. This is to allow for as yet unknown static and dynamic offset loading caused by fluctuating programmatic needs.

CABLE STAYED STRUCTURE

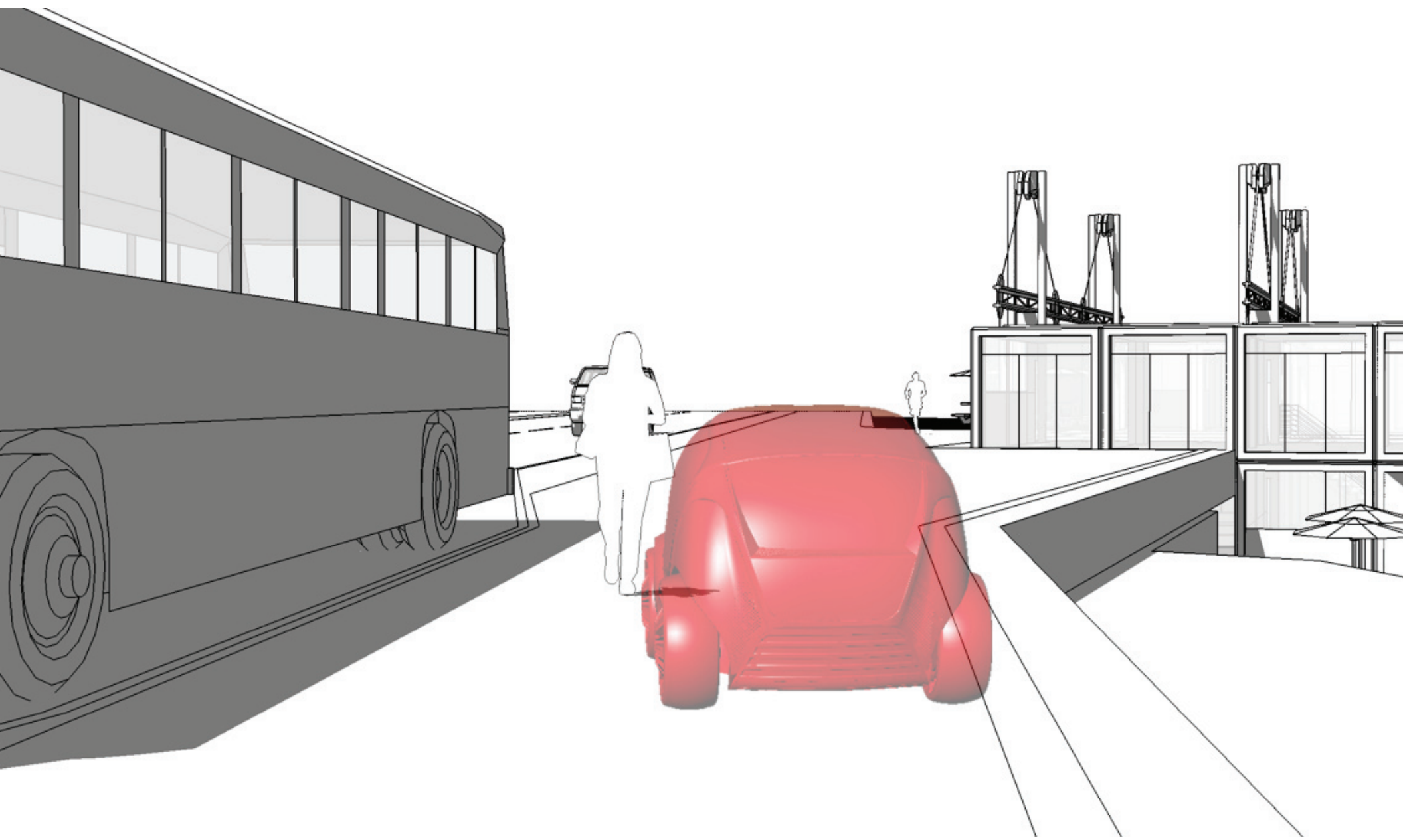
Cable-stay, cantilevered masted beam structure. Vertical masts from which cables extend to support horizontally spanning members arranged in a parallel repeated pattern to produce aggregations of cells along the buildings length. Characterized by tall masts which provide the high level anchorages for systems of tension cables or rods. These masts in turn support the roof construction.

MODULAR UNITS

Lateral stability of the modular units is achieved using a steel frame with rigid joints. The unit assembly is fixed to the main structural armature using a hooking system and pin joint. Additional load is resolved using hung tension rods hanging from the top of the structure.

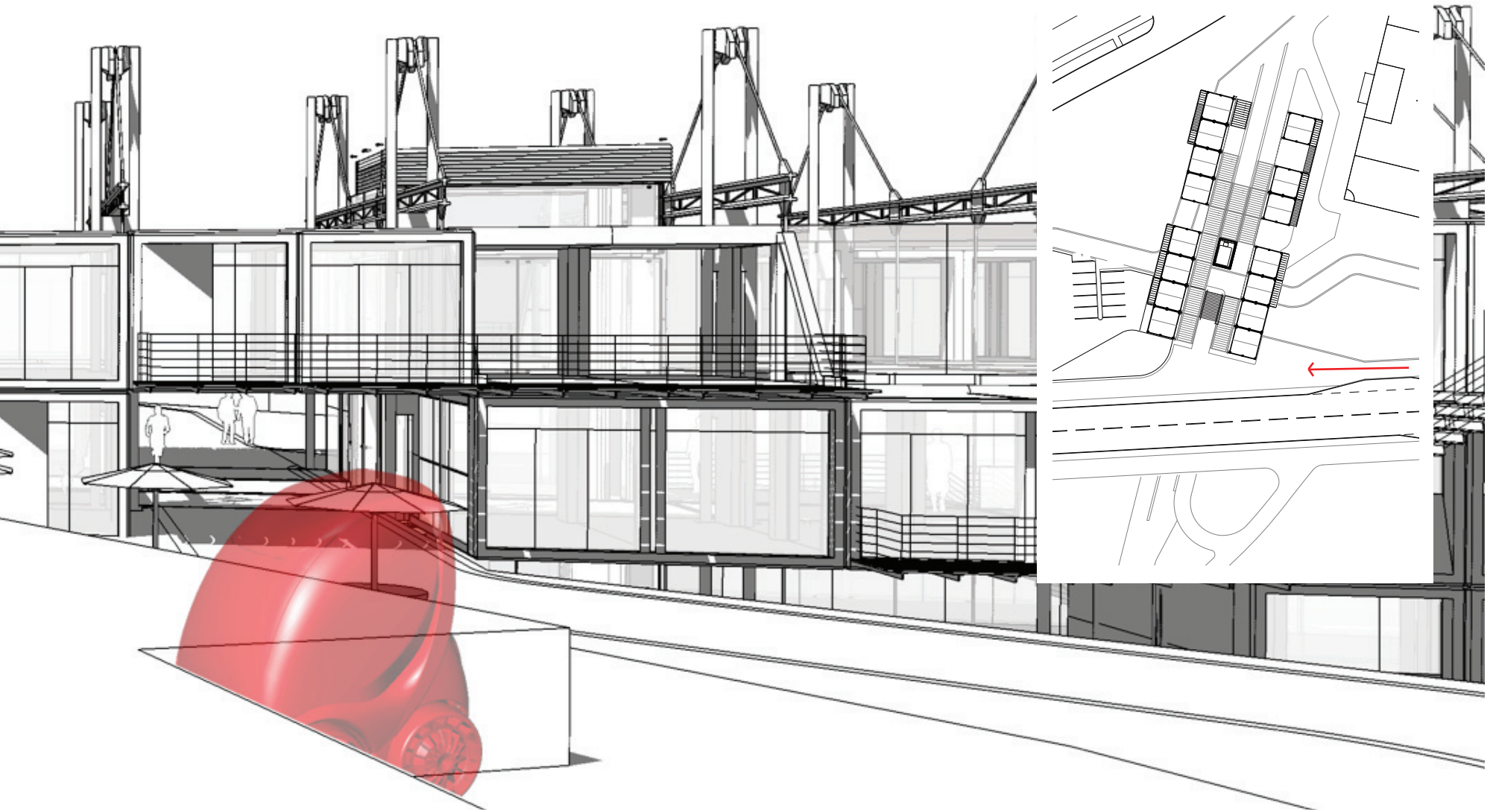


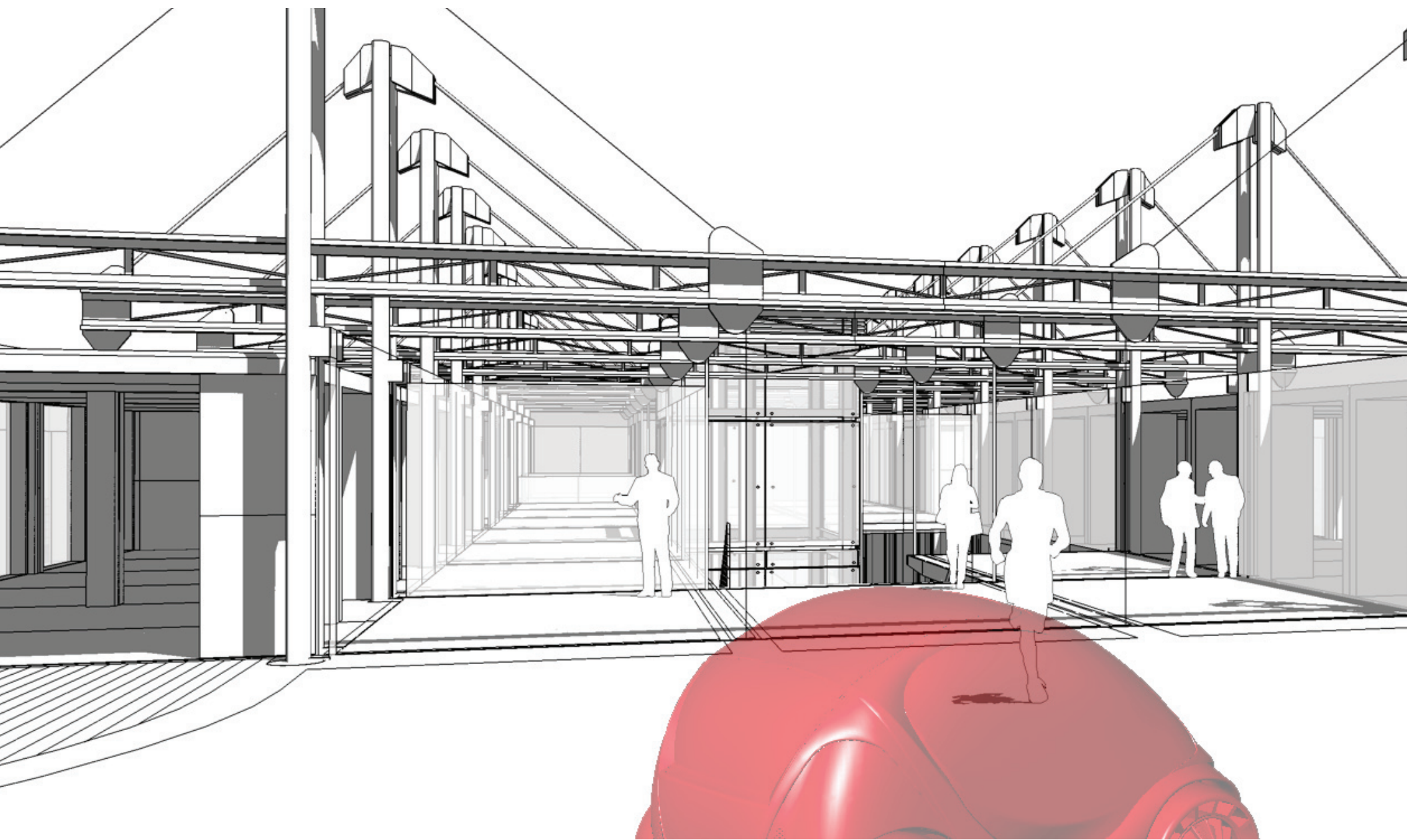
Rendered Narrative: Elderly

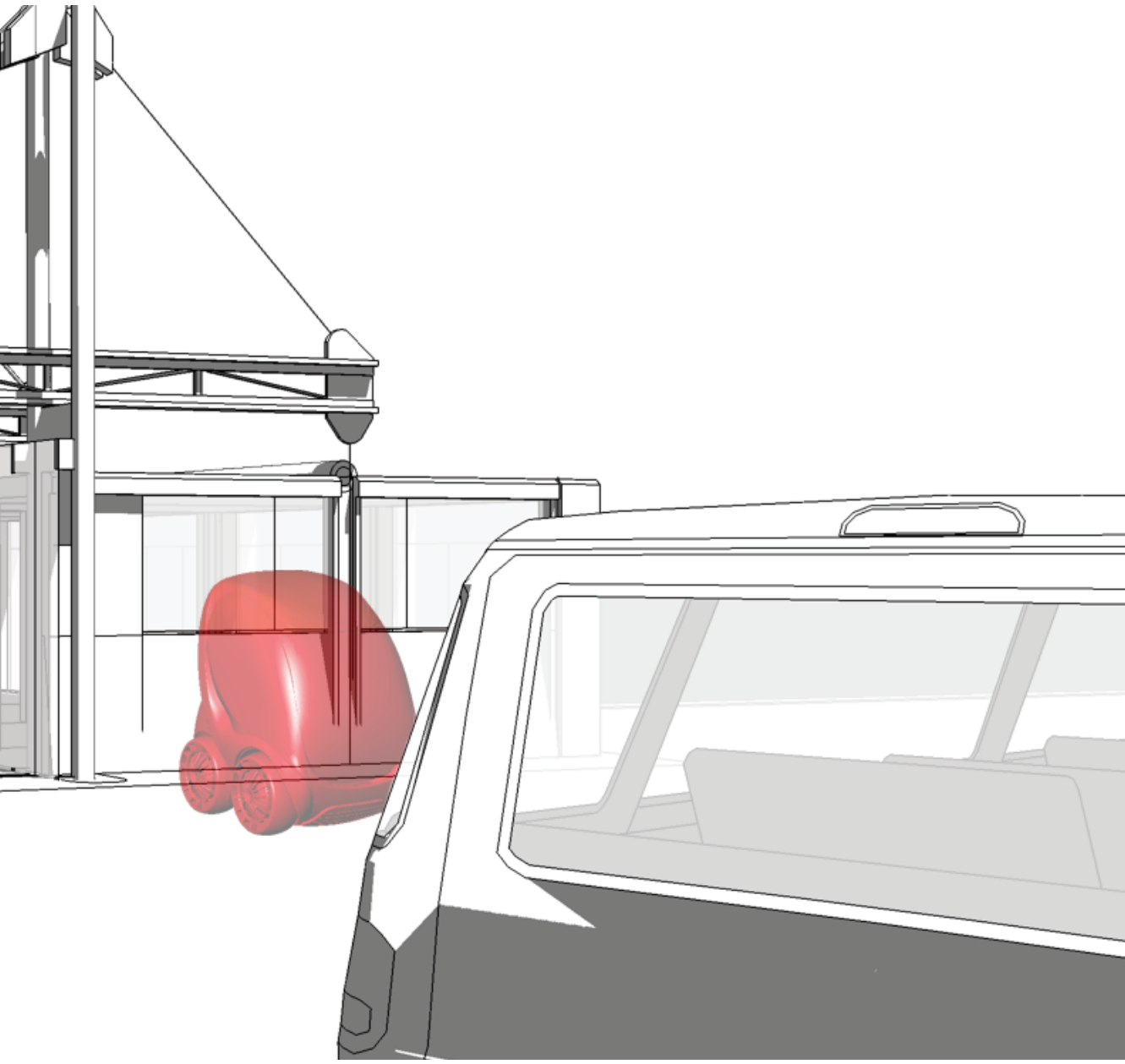


Elderly Interaction

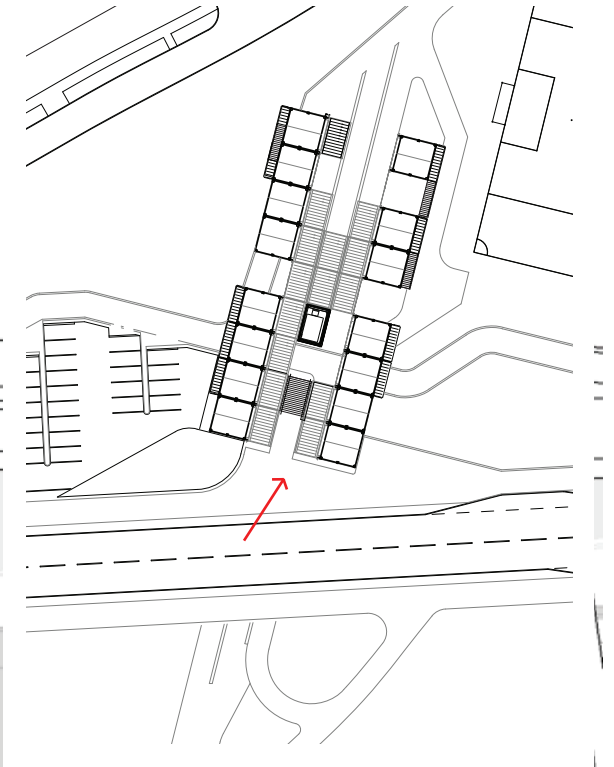
Traveling from another neighborhood the elderly resident departs a public bus and heads toward the building.

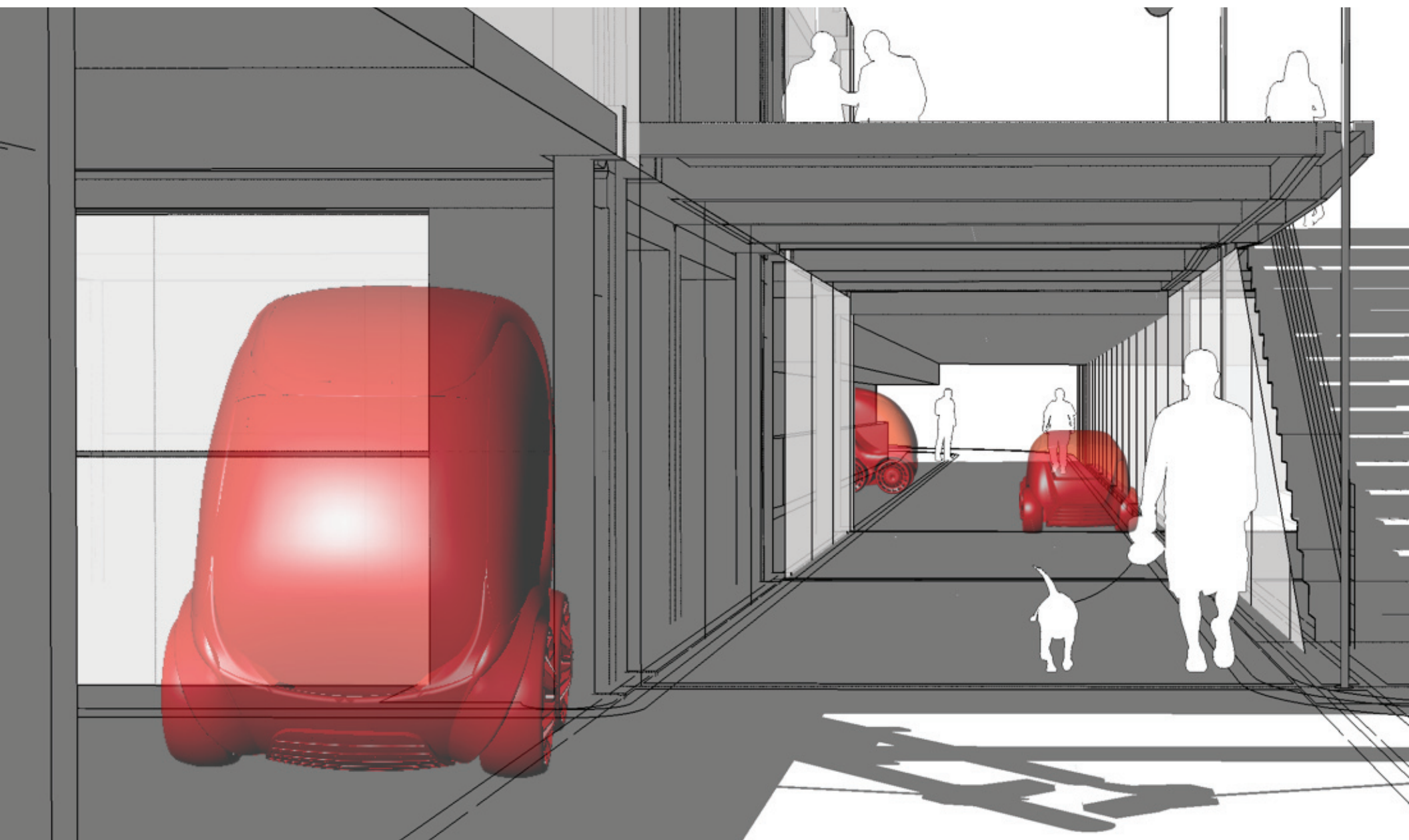


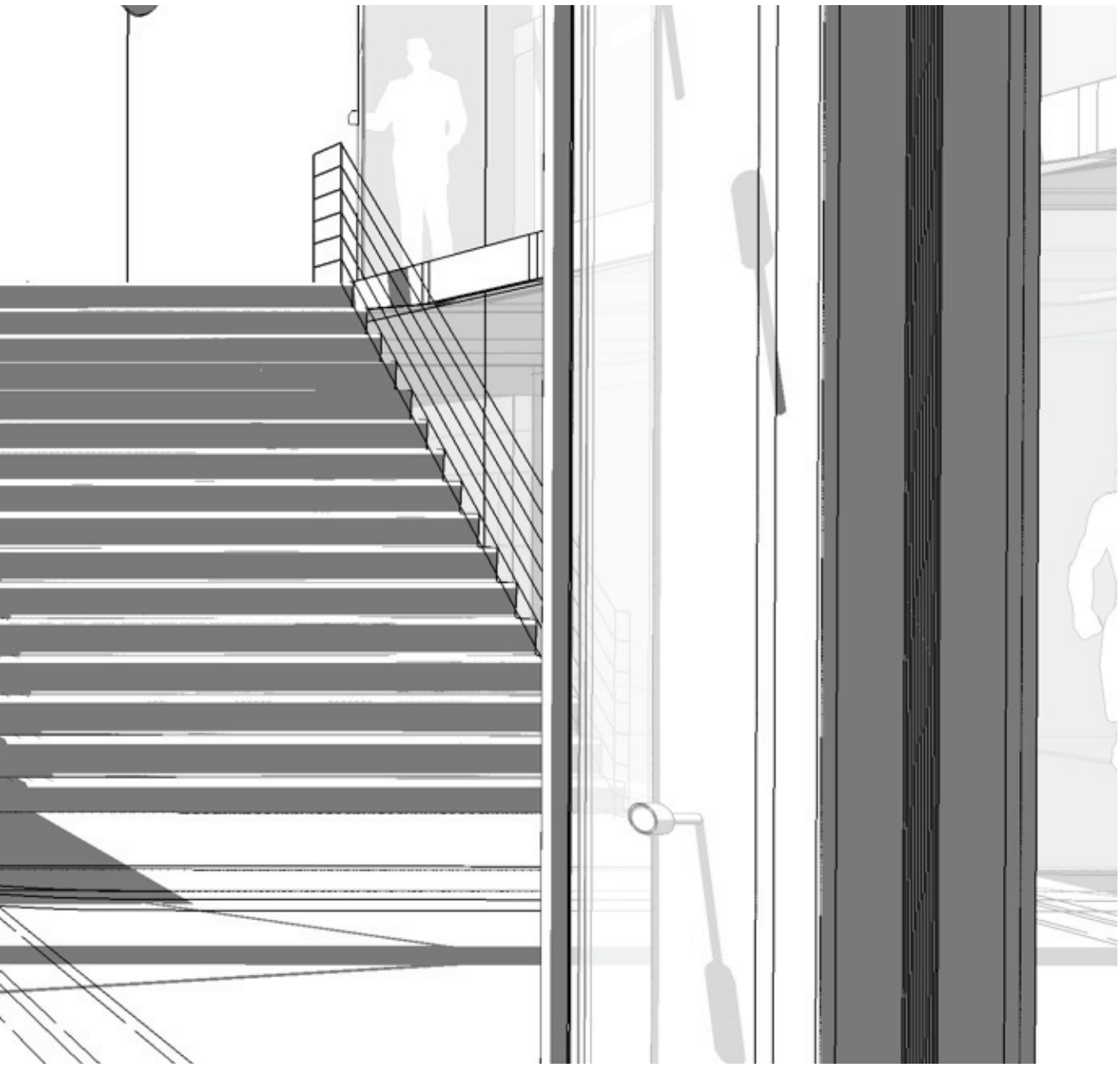




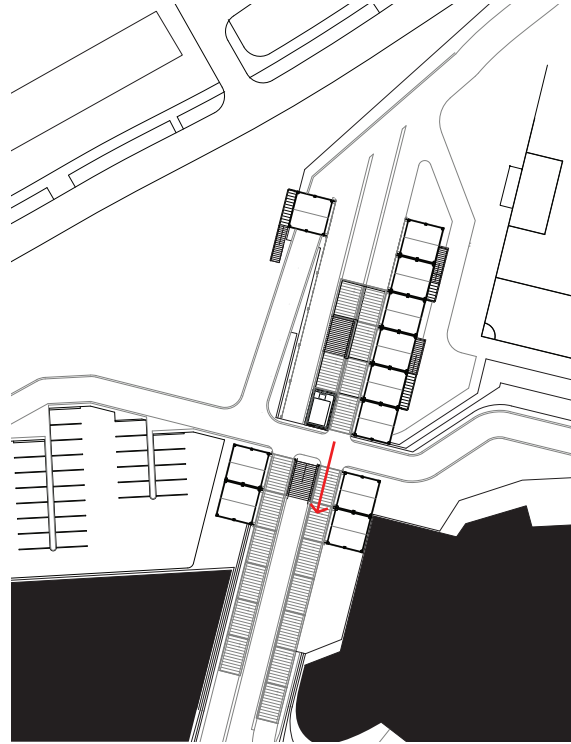
The elderly resident enters the elderly cluster located on level 3 of the building. The elderly cluster faces the teenage cluster encouraging cross generational interaction.





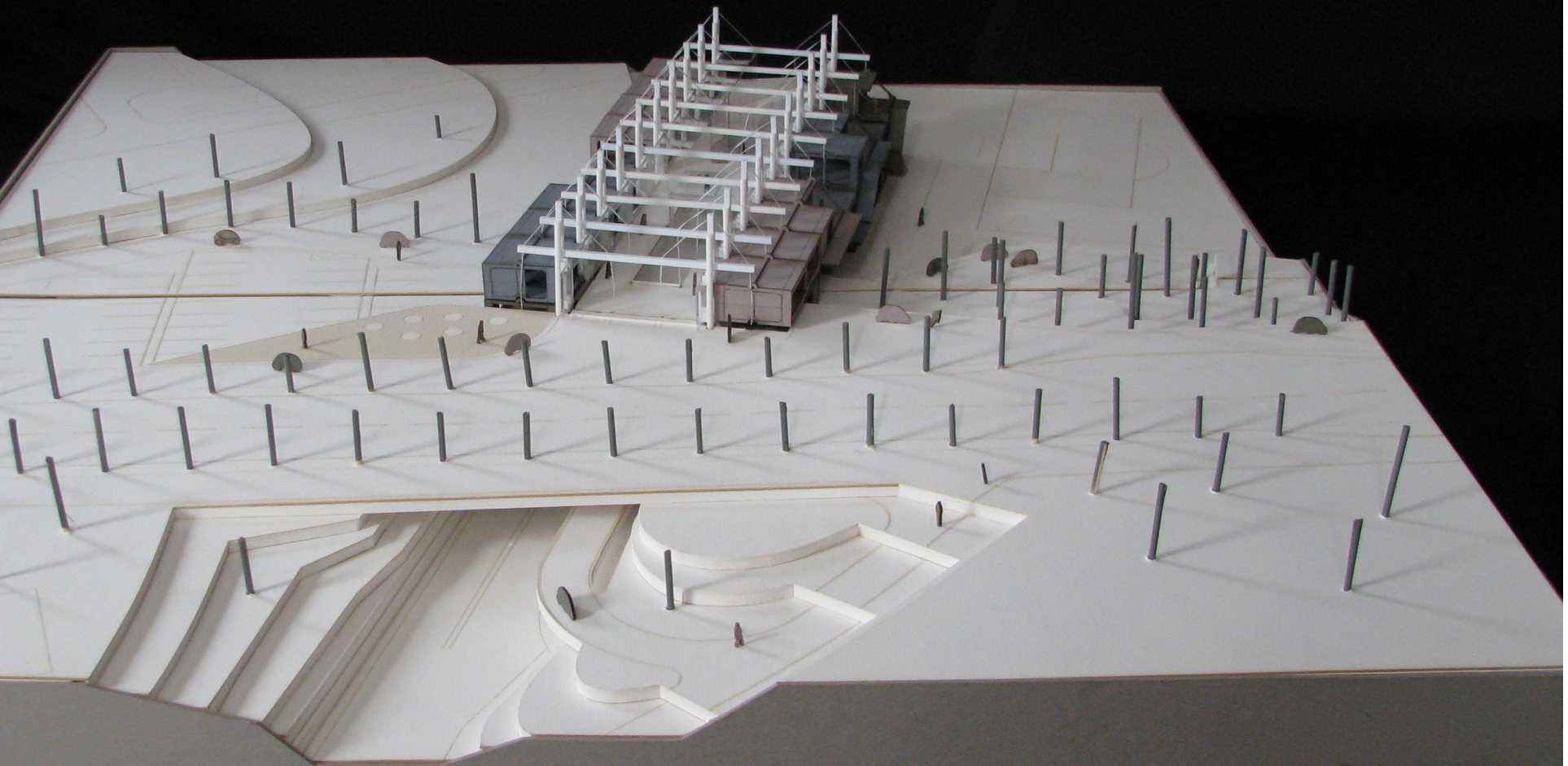


After a few hours the elderly resident leaves to go visit a friend living 2 Km to the south. They leave the elderly cluster and move down one level to level 2. There is an elevator but they choose to take the stairs. They pick up a CityCar from a stack stored under the overpass and head south.

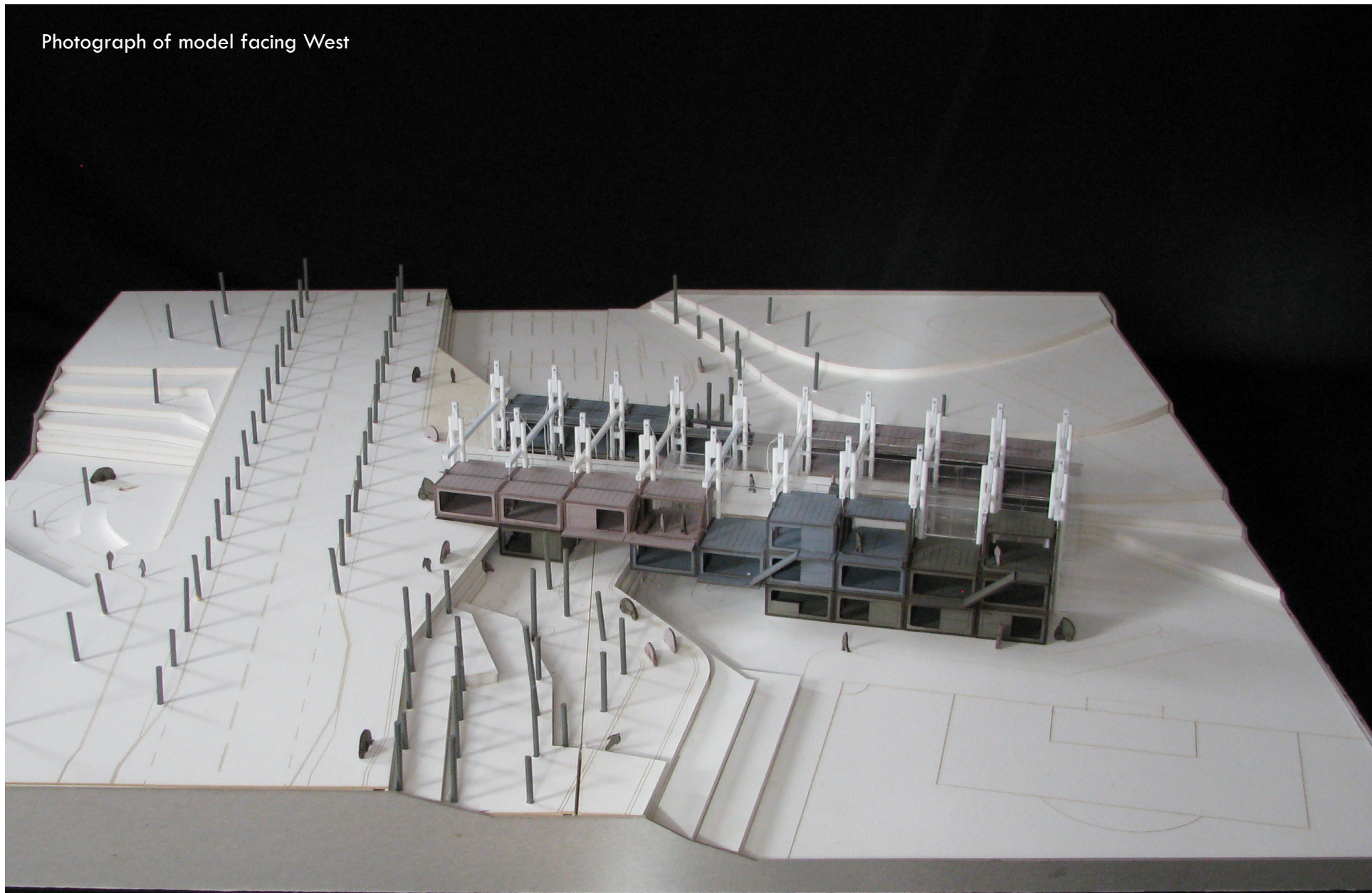


Final Model Photographs

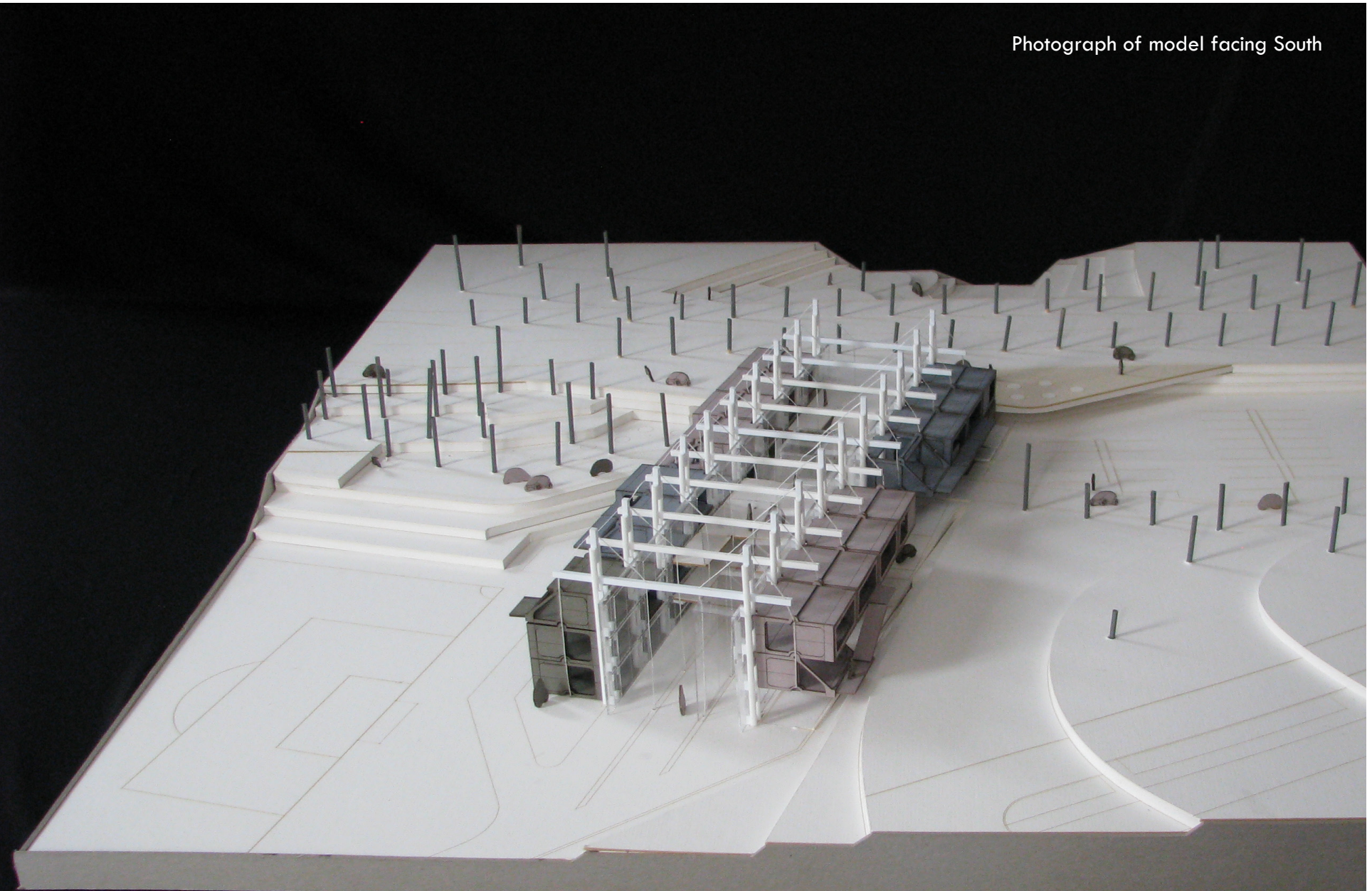
Photograph of model facing North



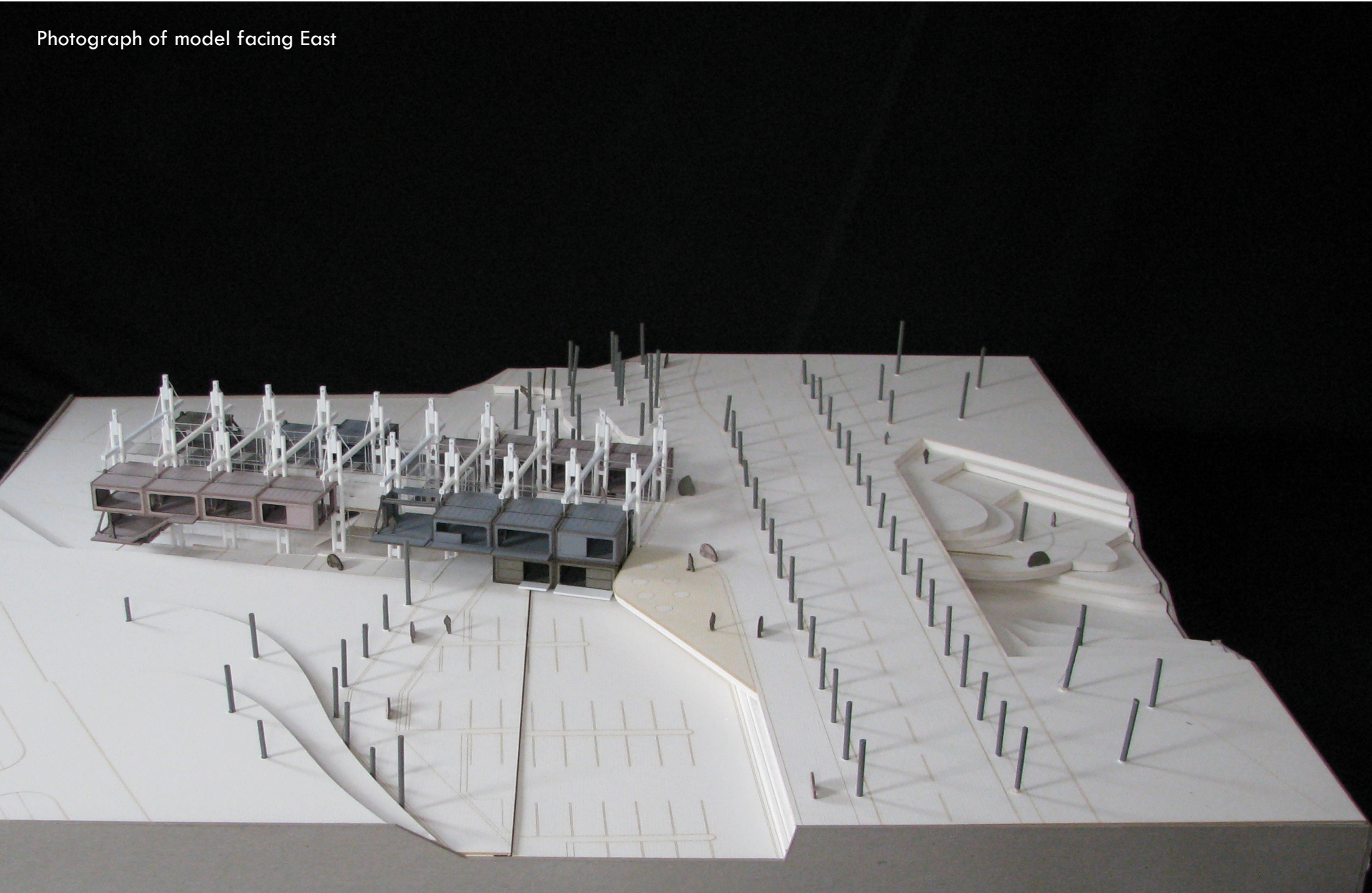
Photograph of model facing West

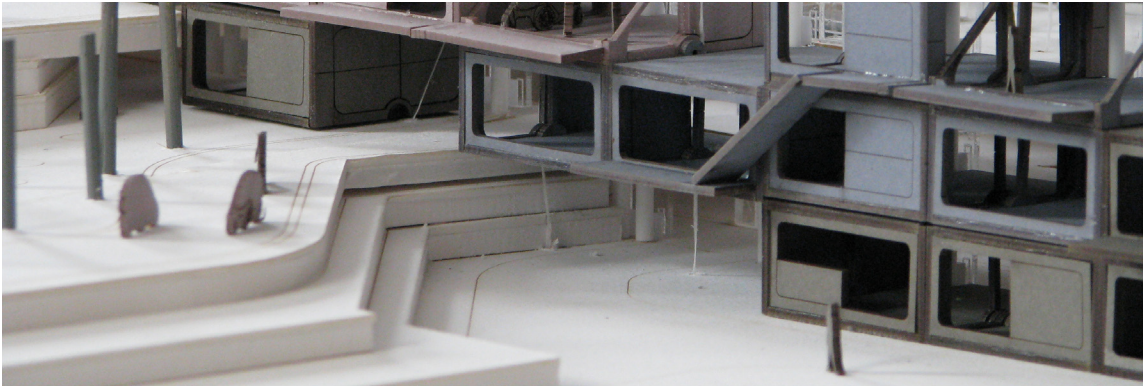


Photograph of model facing South

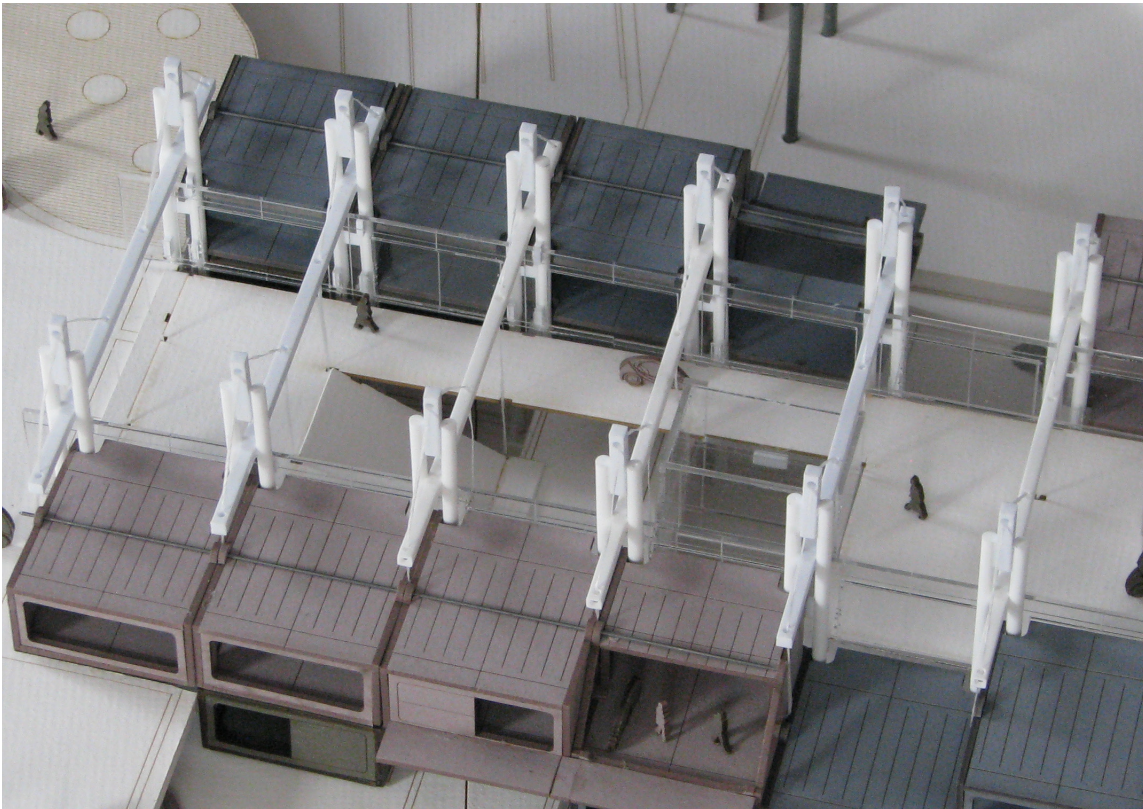


Photograph of model facing East



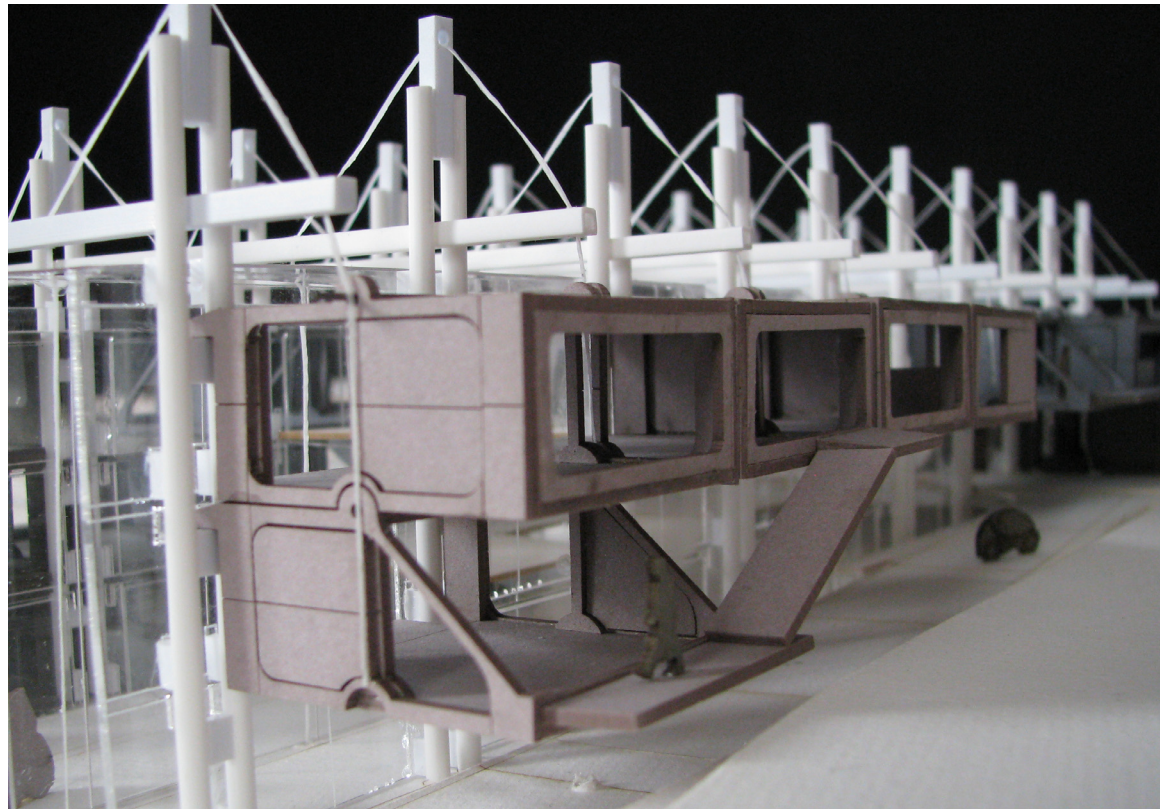


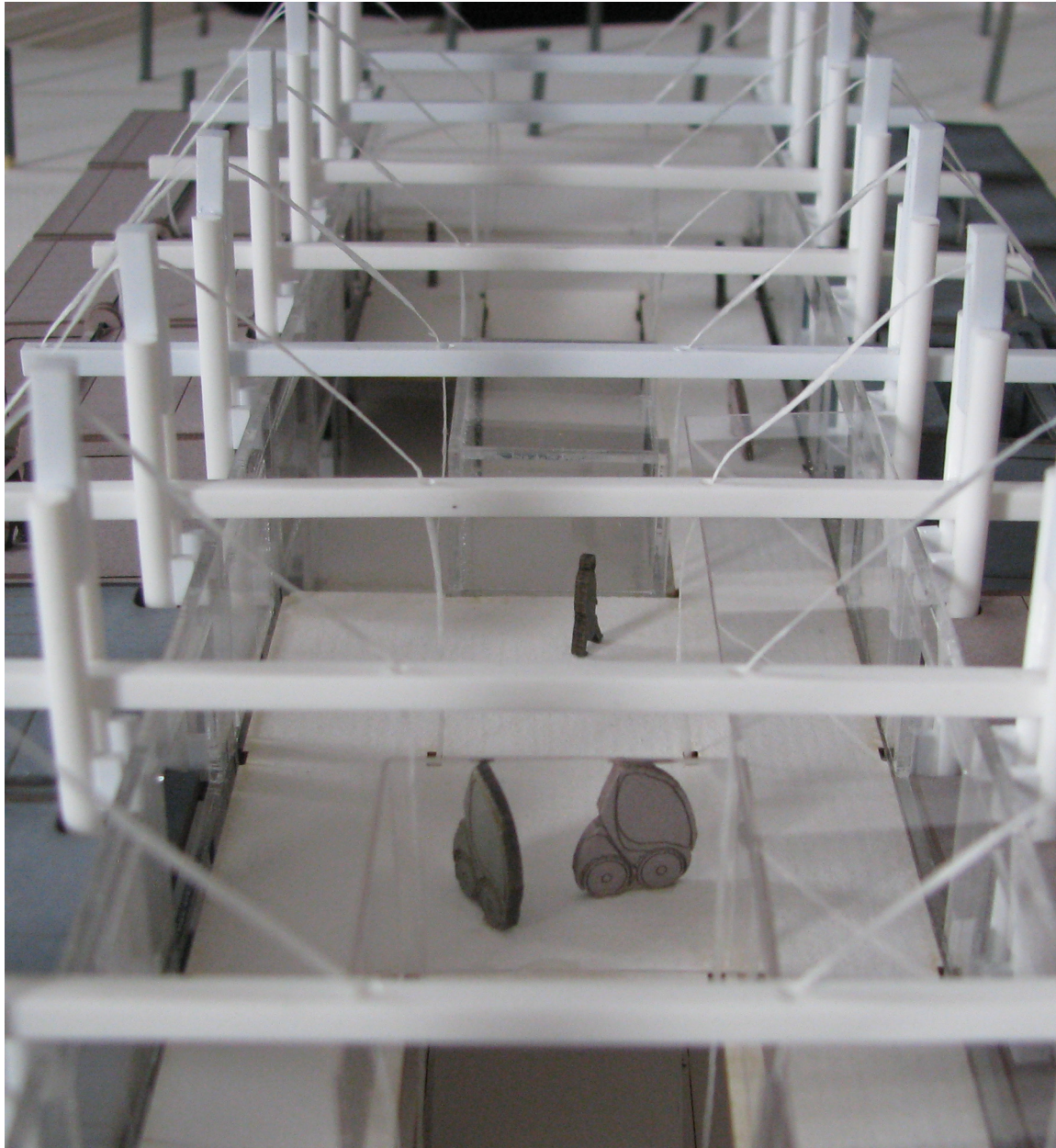
Unit colors are indicative of their programming.

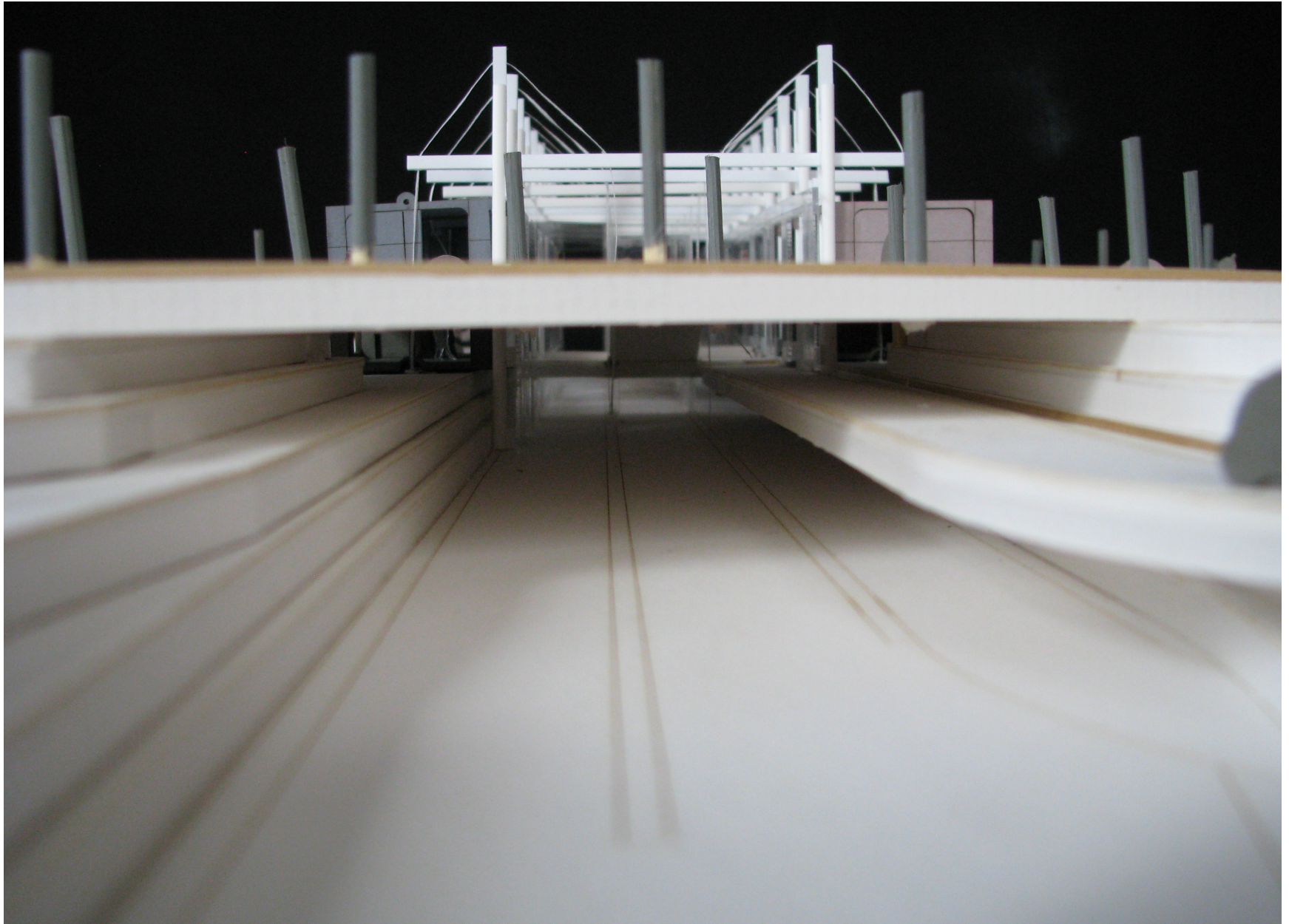


Interior/exterior building corridors supporting fluid movement of pedestrian and CityCar circulation

Cable stayed masts supporting hung programmatic units







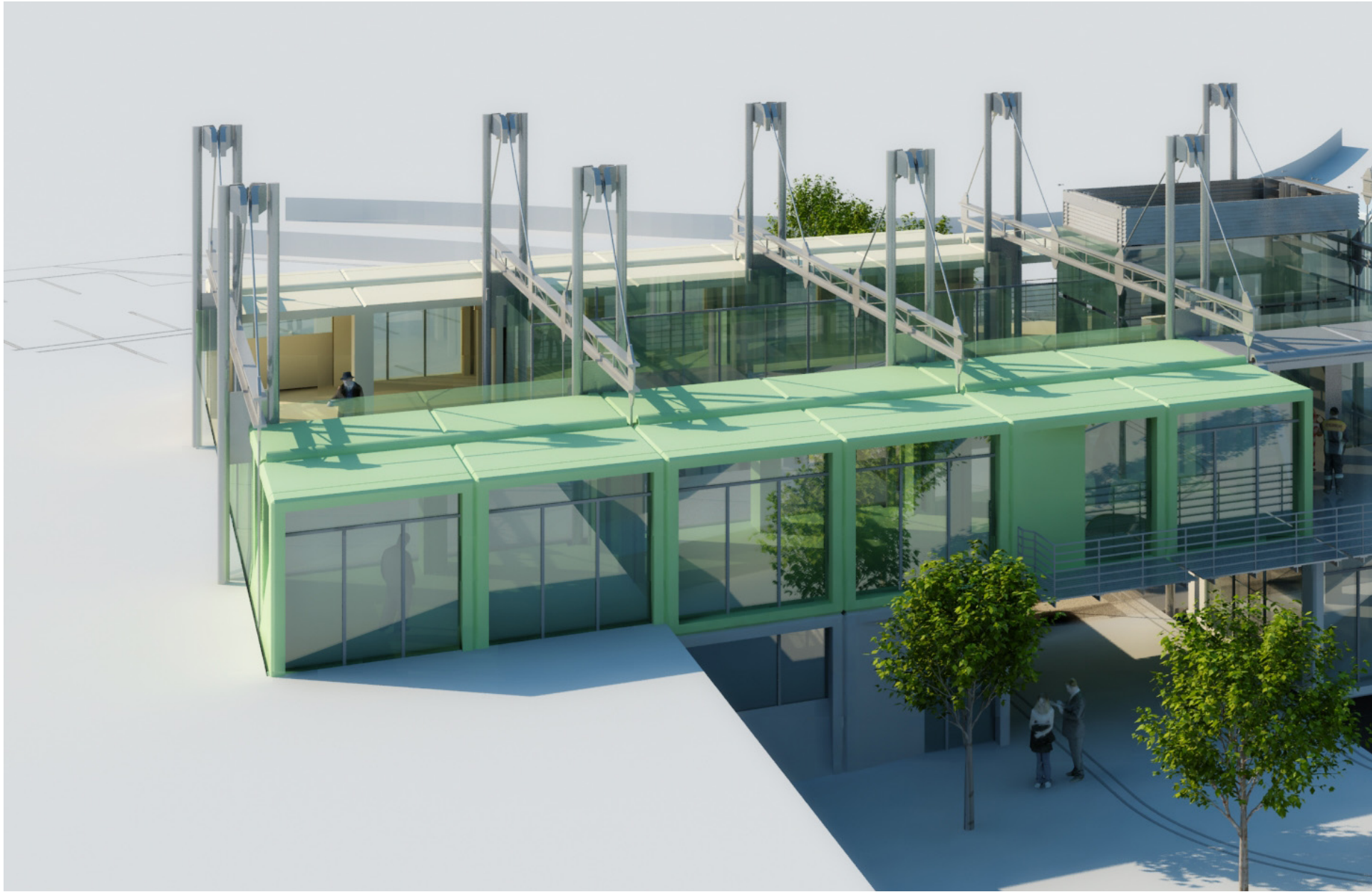
Final Renderings













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