American University of Beirut

The Hyperloop: Hypertext as a tool for navigation

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THE HYPERLOOP: HYPERTEXT AS A TOOL FOR NAVIGATION

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I also want to thank my collegues and companions throughout this semester, who, through their presence and constant support, have lifted me upmore times than I could count.

Finally, I want to thank my advisor Karim Najjar, who always pushed me to explore more, experiment more, do more. He believed in me and my project and gave me enough motivation to keep working until I was done.

ABSTRACT

Architectural navigation often oscillates between linear, orthogonal and freeform, either guiding the visitors down a specific path or offering clear paths for them to go from point A to point B, or offering an open space for them to appropriate. With the rise of the effectiveness of navigation and favoring destination over the journey, architecture has strayed away from adventure-like wandering that would make the explorer discover the project as they walk through it. If this architecture had a story, it would be predictable at best: a navigational cliché, clear from start to finish, focusing on getting the reader to the desired ending.

Hypertext, on the other hand, escapes this cliché by completely breaking the sequence. Hypertext fiction gives the reader seemingly disconnected parts and paragraphs and lets them sew their own story: click after click, like needle and thread sewing a quilt, the reader chooses their own path and navigates the story on the edge of their seat, not knowing what the next part holds.

This exploration aims to break architecture's linearity by creating a non-linear, multi-narrative navigational system using hypertext as a design tool.

In the first part, the thorough exploration of hypertext in all its definitions leads to a better understanding of what makes its identity, which would be the main elements that transfer onto architecture. Through that, I was able to identify how the network was formed, but also how the readers are never confused while reading the path of seemingly randomly selected paragraphs that they chose. This introduces Navigation by Association as a guiding system, where the visitors, following their fascinations, sew together their own space from independent areas.

As for hypertext being a self-contained network, the architectural product would be a self-contained story within itself made from three important elements: independent parts forming one whole, strategic porosity of the structure, and greenery blurring the line between inside and outside. The story is never to be seen as a whole, but rather experienced in parts; moments strung together by the choice of the visitor.

The second part builds on these conclusions and starts by experimenting with space, exploring aspects of hypertext: from spatial qualities to program and site. Sewing all the parts together, the final product is a hyperconnected network following the story of the design process: a triple helix interconnecting Design, Production, and Exploration while still giving each their individuality. There, the explorer, producer, and designer learn from each other and create collaboration by the simple act of walking through the hyper-space.

This book only contains the second part. For it to make sense, the reader is advised to go through part 1 first.

TABLE OF CONTENTS

Introduction

Discourse

Aim and Significance

Spatial exploration - From hypertext to hyperspace

Deconstructing Orthogonality

Case studies and notions

Program as Hypertext

Exploration: Redefinition and Models

Design process - Network, Transplant, and Reassembly

Program as internal network

Charles Helou as external network

Understanding the Site: The plot, surroundings, and Charles Helou as a connective artistic hub

Mercedes Benz as a base to be reassembled

Exhibition systems

The Hyperloop - The Hyperconnected Hub

A tale of three paths

A transplant of movement

A multiplicity of starting points

An entanglement of moments

A breathing lung of experiences

The Hyperloop

Hypertext as multi-narrative navigation

How does Hypertext's spatiality overcome the strict physicality of multi-storey public spaces?

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Tala Farraj

American University of Beirut

The Hyperloop

Hypertext as a tool for multi-narrative navigation

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Table of Contexts

Introduction
- *Discourse*
- *Aim and Significance*

Spatial exploration - From hypertext to hyperspace
- *Deconstructing Orthogonality*
- *Case studies and notions*
- *Program as Hypertext*
- *Exploration: Redefinition and Models*

Design process - Network, Transplant, and Reassembly
- *Program as internal network*
- *Charles Helou as external network*
- *Understanding the Site: The plot, surroundings, and Charles Helou as a connective artistic hub*
- *Mercedes Benz as a base to be reassembled*
- *Exhibition systems*

The Hyperloop - The Hyperconnected Hub
- *A tale of three paths*
- *A transplant of movement*
- *A multiplicity of starting points*
- *An entanglement of moments*
- *A breathing lung of experiences*

Introduction

Discourse, Aim and Significance

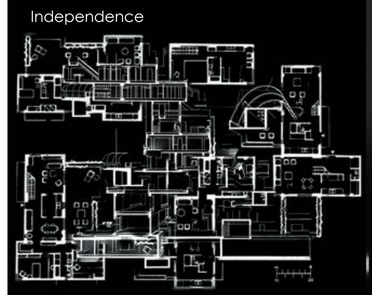
Thesis 1 conclusions

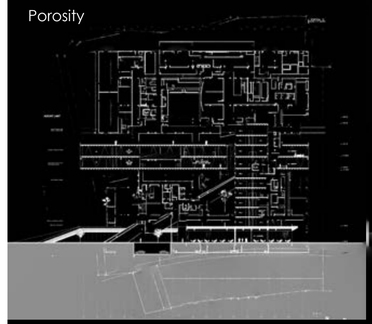
Hypertext, and more specifically hypertext fiction, is a storytelling method where, instead of flipping through the pages of a book, the story is divided into a multitude of independent paragraphs connected through links. In each paragraph, some words are highlighted and clicking through them leads to a different paragraph, allowing the reader to actively sew together his own story. They can therefore never see the whole, only the parts that they have clicked through. Entering a hypertext is mysterious, as nothing from the outside shows what the storyline holds; one click and the reader finds himself in a whole new self-contained world filled with suspense and adventure.

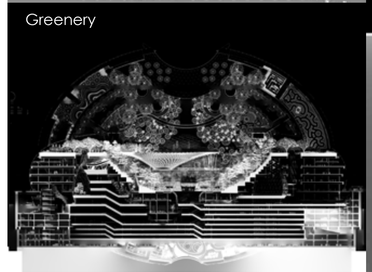
Thesis 1 was an exploration of that notion and specifically what its presence in architecture would mean. The conclusion defined hyper-space as an interconnected network of independent areas linked together through hyperlinks, or shortcuts, while confusing the visitor's sense of orientation just enough to make him lose sense of the outside world and focus on the adventure at hand.

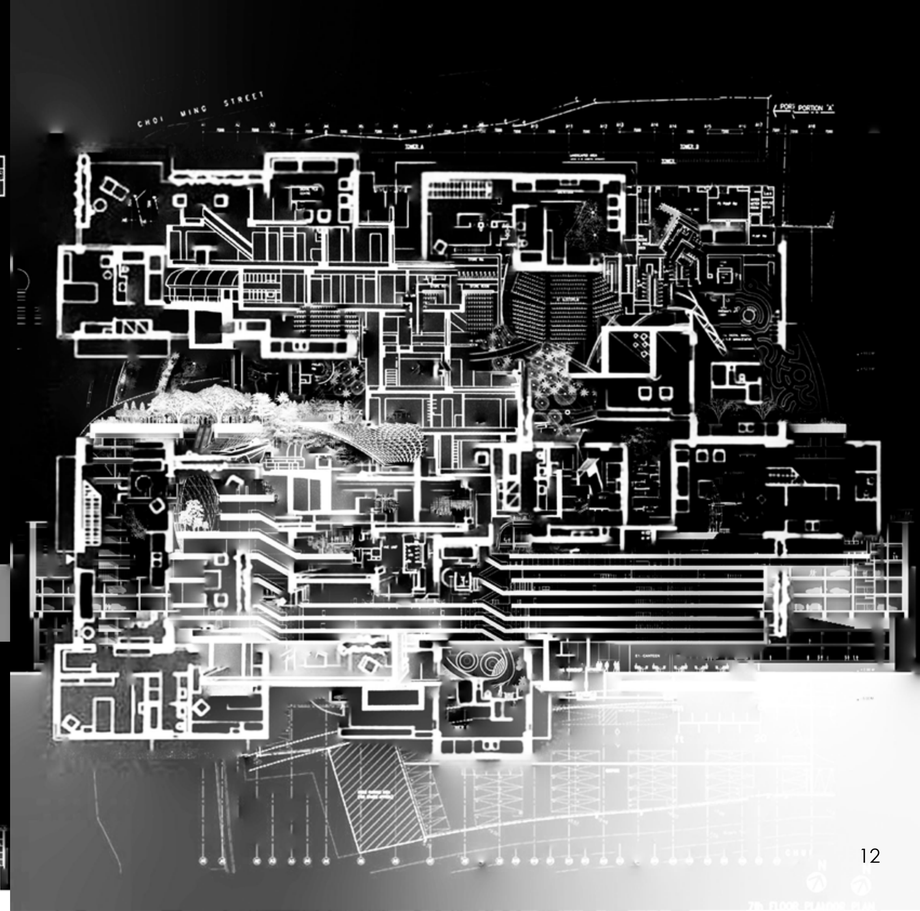
To create a self-contained story or building, three main parameters have to be met: independence of the parts, porosity of spaces and structures, and greenery.

This book is a continuation of that exploration, fully bridgingthe gap between hypertext and architectural space and ending with a spatial design as a conclusion and application on site.









Hypertext in architecture
Breaking the orthogonality or linearity of architectural navigation to create spaces of connectivity

The experience of walking through multi-storey public spaces is often dull, monotonous and uninspiring. They could be compared to a shelf where programs are stacked neatly and conveniently in an orthogonal system that people use to get to their destination. But in doing so, like that shelf, architecture is only holding these programs and not adding anything to the experience.

The lack of free secular spaces that are not overcome with capitalism and the insignificance of parks in our social culture lead us to investigate alternatives. Though this thesis, I will be exploring hypertext as a tool for architectural navigation, and its ability to turn public spaces into a personalized adventure.

A creative hub that thrives on collaborations between Designers, Producers, and Explorers, acting as an incubator for talent, relationships and growth.

The project will offer free secular spaces for the people as well as adequate studio spaces for the creative part.

The arts involved comprise of a mix of traditional and high tech, meant to complete each other and aim for more interesting collaborations: both keeping traditions alive and propelling them into the future.

The *project*'s main aim is to revive an area with relationships, connections and collaborations between creatives in order to create a better environment for growth.

Spatial exploration

From Hypertext to Hyperspace

Deconstructing Orthogonality

Dissecting the problem

First and foremost, it is essential to redefine what space as a hypertext would be, physically; as the first book concluded with a verbal definition, the focus from this point onwards is the physicality of this space and what the new definition entails in terms of physical manifestations in projects.

The first step toward this redefinition actually starts from the issue at hand, which is the orthogonal navigation in buildings. While it is an effective way of moving from point to point, it does not inspire suspense and adventure, unexpected twists and encounters that inspire character growth.

Starting from that rigid point, navigation is deconstructed and reconstructed to fit the hyper-space definition from thesis 1: a hyper-linked circulation made from independent parts.

Base of operation and tools

This exploration is framed by three main notions through various case studies:

The Mercedes Benz museum shows an important notion of hypertext which is the presence of clear paths that peoplecan cross between. However, as it only presents 2 paths or loops, which only presents one type of connection, I decided to add a third loop to add variety and complexity to the journey.

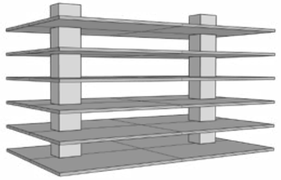
The two other notions shape the experience:

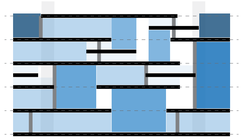
- An understanding of museum and exhibition design reveals how to guide people through the space by their fascinations in a storyline that makes sense;

- To make people feel like they've entered a different dimension and make them loose their sense of orientation, bubble geometry is necessary: this means having similarly sized spaces being the same distance apart, making spaces feel like a click away.

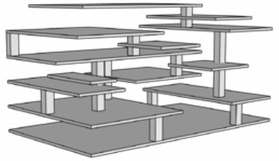
Spatial Application

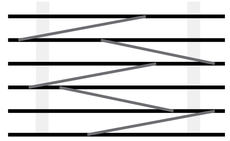
Orthogonal



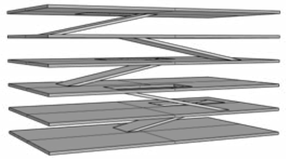


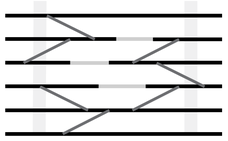
fragmented
horizontal and vertical



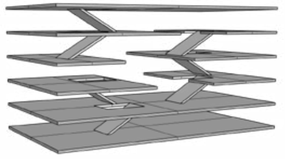


split - diagonals 1
verticals





split - diagonals 2
horizontals and verticals

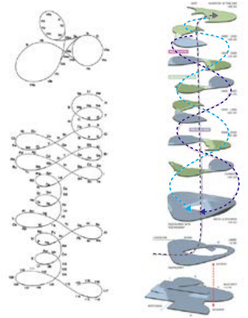


Notions and Case Studies

Geometry and patterns

Case study: Mercedes Benz Museum, UNStudio
2 narratives twisting around each other and crossing at specific intersections, allowing the visitors to switch narratives

Contrary to the Gugenheim museum, this circulation presents a choice through the option of changing paths, however, both still operate with a certain vertical directionality



- split-levels (fragmentation)

- looping in similar pattern

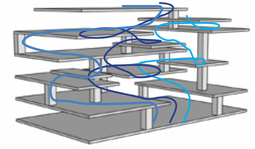
- moving the pattern laterally destroys the linearity of the "stem"

- Application: from double to triple helix for more connections

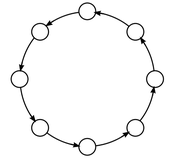
Double Helix: intersections are always of the two narratives

Triple Helix: more opportunities for diverse crossing narratives

- Application in 3D

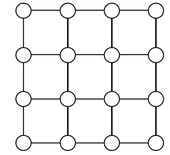


Study: Museum Theory and degrees of Narrativity
The issue of multiple narratives in museums and the best way to follow them. Measuring Integration and Connectivity.
A few configurations:



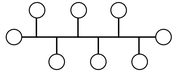
"Beads on a String"

- Low integration
- Moderate connectivity
- No shortcuts



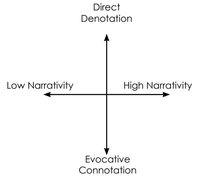
"Grid System"

- Maximum choice but overwhelming
- Confuses visitors; path must be guided



"Classic"

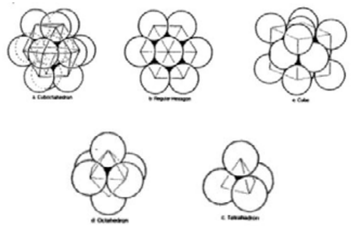
- Clear and easy circulation
- Allows for path to be guided by fascination
- Possibility of skipping
- Doesn't follow complex narratives



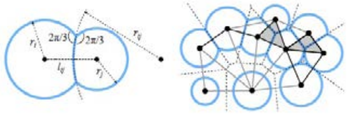
"Scales of Narrativity"

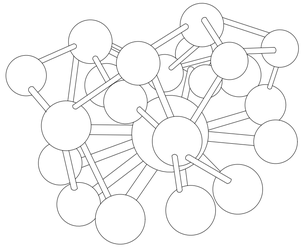
- Narrativity = ability to tell stories
- Denotation vs Connotation = Direct Text vs Feeling of space
- Intuitive = Connotative high narrativity

Application: Bubble theory, triangulations and patterns
Hypertext is conected through a network of hyperlinks, all accessible though a simple click. All clicks are the same length, all transitions feel the same, which helps in disorienting the reader. This can be acheived with patterns and Bubble Theory:



This allows for an equal connection of many differently sized spaces, adding to the richness and variety of the project

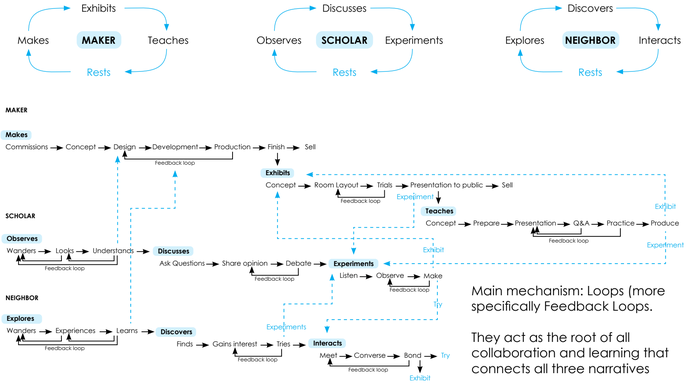




Program division: Narratives

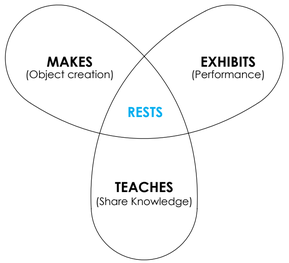
Armed with these notions and the initial deconstruction, it is time to give some direction to the exploration.
The project first sprouted as a hypertext, a diagram of connections and interconnections shaping the multiple paths of the adventure.

As the hypertext shifted and evolved toward functionality, one thing remained consistent: 'Rest' as the core of the project. Resting areas present the most connected and collaborative spaces in the project, as all three loops are connected to it and convene in it.



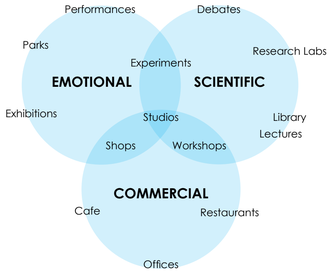
Main mechanism: Loops (more specifically Feedback Loops.

They act as the root of all collaboration and learning that connects all three narratives



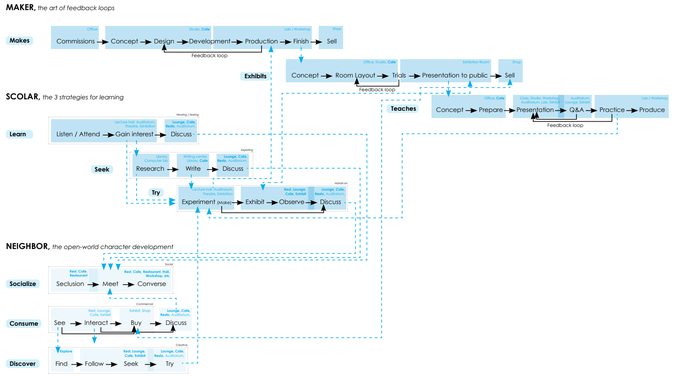
Narratives canbe summarized in this way:

- "Rest" is an overlapping aspect between all three, it is the areas where all three narratives converge.
- The whole project can be understood as one continuous loop instead of 3 separate ones



The Narratives also fall in some different categories; a different reading of the same story

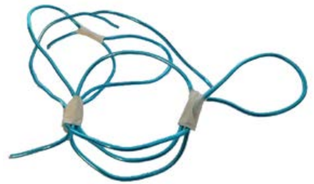
Exploration: Redefinition and Models



The hypertext shifts and twists as the loops' definitions change; the 2D structure slowly morphs to form stronger bonds between its parts, some of them starting to lock in place.

As the hypertext nears an initial functional form, it reaches its transformation point: words and dotted lines detach from the 2D plane and rise in a three dimensional path of entangled wires.

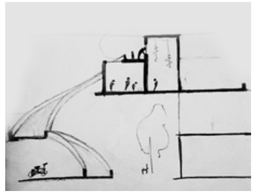
First seperate, they merge to become one continuous loop of movement, with multiple beginnings and no real ends; only a wide variety of connections.



Model of second level of fractal narrative: 3 major meeting points (tape)

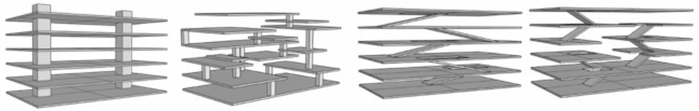
Models of third level of fractal narratives SEPERATELY with the links connecting them. The "exhibition" is at the center of the project

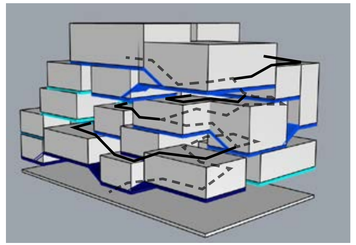
Models of third level of fractal narratives combined. 3 zones, one for each narrative, and the zone in the middle (exhibitions and workshops) are the heart of the project

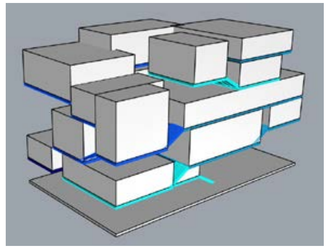


Attempt at a section of what i see in the previous model. This is less than a quarter of the project. I tried this because i felt stuck with the models but it didn't help much.

Massing Evolution

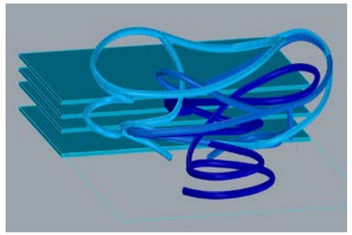




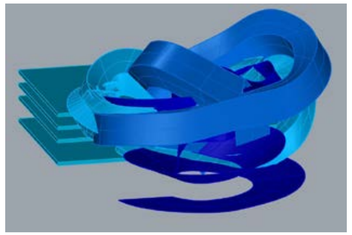


Circulation : Alternation Inside-outside using roofs of volumes as well as ramps (But from within, using inner courtyards)

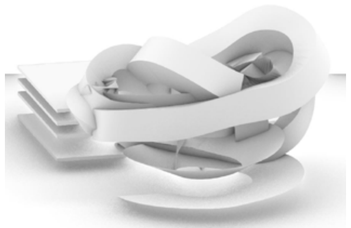
While the deconstruction of orthogonality led to a surface-level understanding of hypertext as a deconstructing tool, the programmatic hypertext added a layer of understanding and specificity in terms of the links themselves: the former resulted in a variety of identically connected boxes while the latter introduced curves that makes the journey smoother and a variety of hyperlinks where the experience changes with size and steepness.



Reproducing the model in 3D



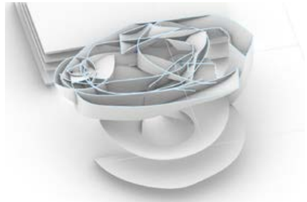
Trial: from wires to spaces
solid for Maker and Scholar narratives
swirling ramp for Neighbor narrative

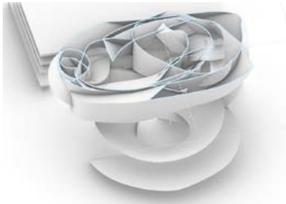


Rendered view to visualize spaces without the distinction of narratives

Exploring the model

Plans at multiple levels of model
Starts with mostly Neighbor oriented spaces with open areas, and enclosed spaces (exhibition and performance) next to Charles Helou Station





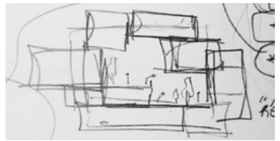
Spaces of different sizes intersecting to create other spaces. Lounge, Auditorium, classes, workshops, etc...

Some spaces are open, creating inner courtyards while others are closed.
Circulation alternates between being next to the spaces or crossing through them

New qualities of spaces also start to appear, like an external ramped area used as outdoors and internal courtyards or larger areas at the heart of the model serving as a “Rest” space;

The space feels hyperconnected, but the reason remains uncertain; a careful study -a dissection- is in order.

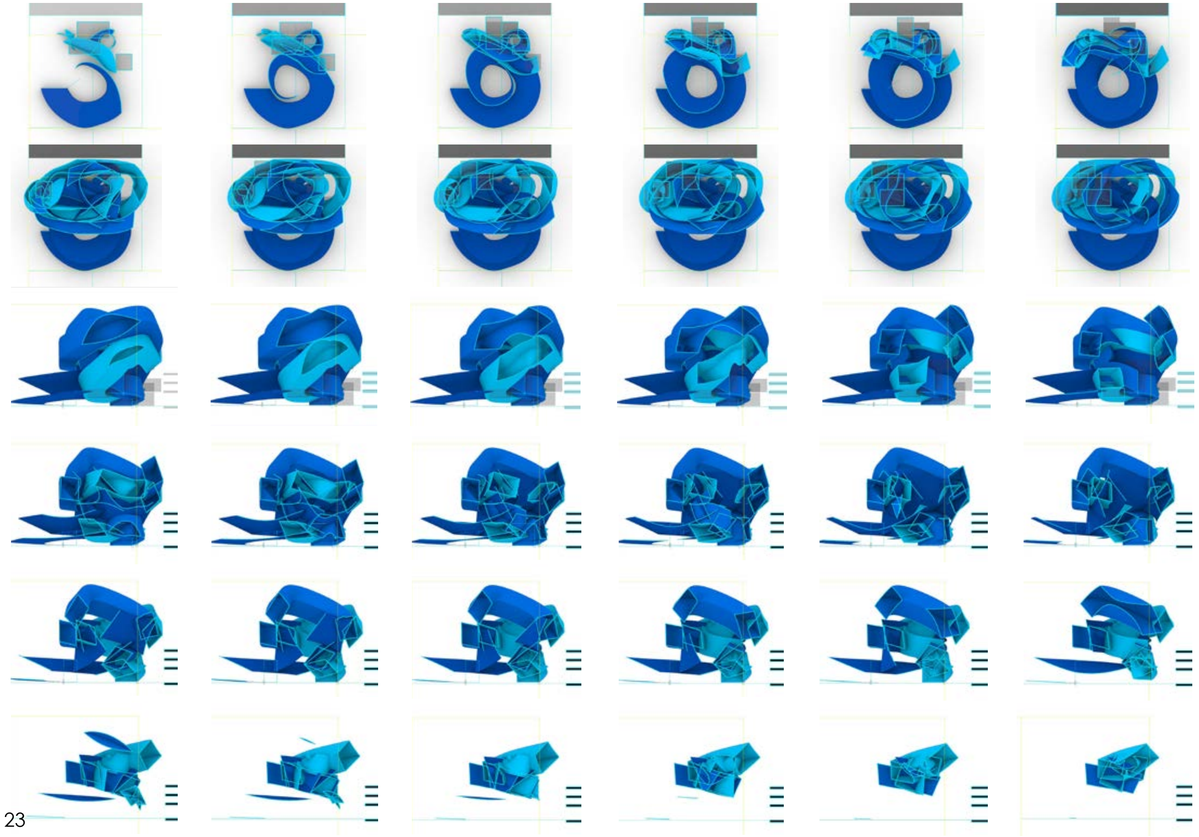
Open courtyards

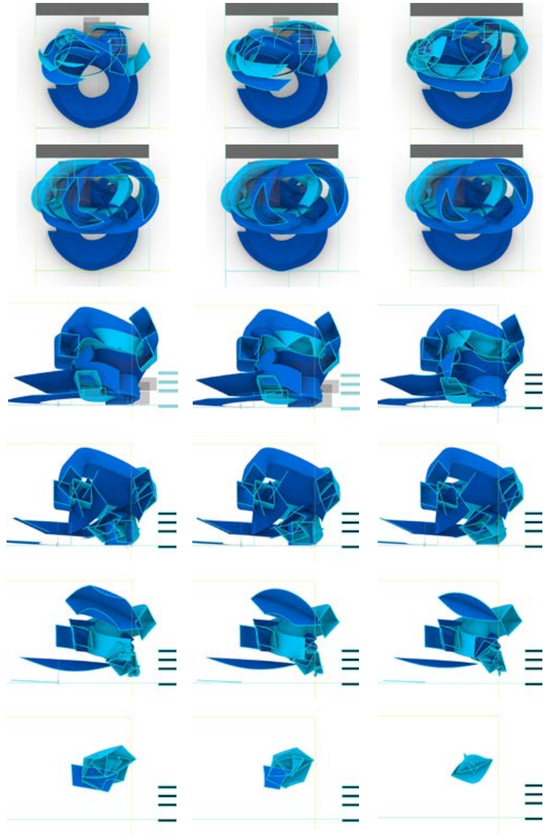


Closed ‘courtyards’

Concept sections

3D Model section interpretation
Too tilted and curved, I need to go back to the first evolutionary diagrams





Understanding the 3D: Dissection *in color*

Cut every 2M

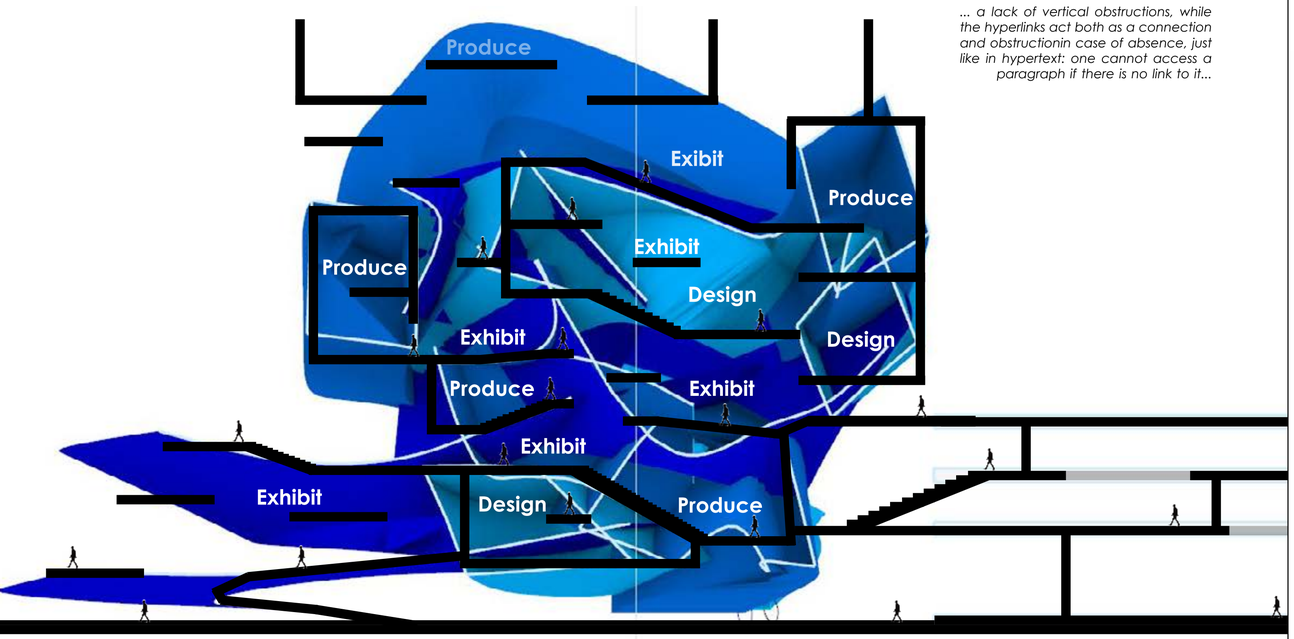
A throrough dissection of the navigational hypertext gives new insights on what exactly makes a space feel hypertextual. It introduces quite a few parameters that, if designed correctly, make the space feel like a constant discovery.

From the proportional scales of spaces to their overlap, the height of ceilings, large open spaces on the inside as well as a buffer on the outside; the spaces themselves change when met with hypertext.

As for the hyperlinks, we notice a wider variety of steepness and connectivity, some cut through spaces thus creating more than one type of connection and flow smoothly through the whole model.

All in all, we notice a lack of vertical obstructions, while the hyperlinks act both as a connection and obstructionin case of absence, just like in hypertext: one cannot access a paragraph if there is no link to it.

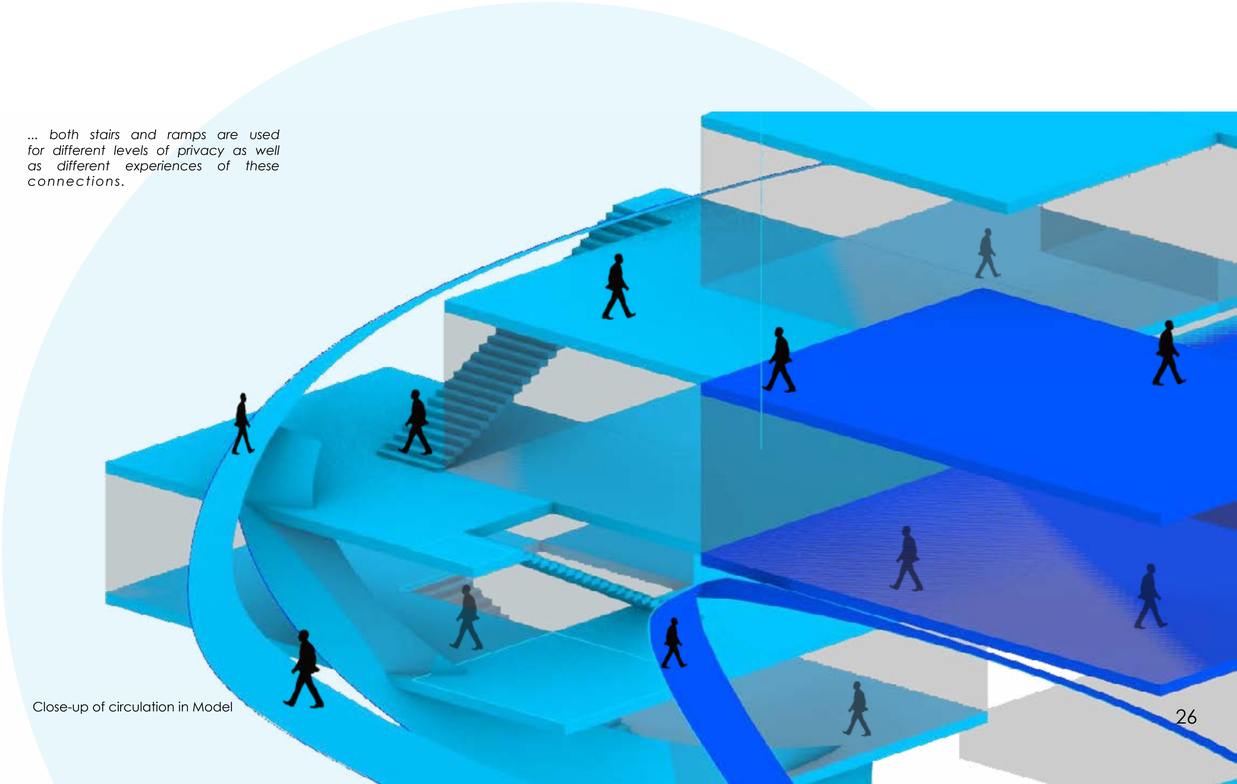
The variety of steepnesses and lengths translates to a variety of link types, using both stairs and ramps for different levels of privacy as well as different experiences of these connections.



... a lack of vertical obstructions, while the hyperlinks act both as a connection and obstructionin case of absence, just like in hypertext: one cannot access a paragraph if there is no link to it...

Sectional interpretation of wire 3D model

... both stairs and ramps are used for different levels of privacy as well as different experiences of these connections.



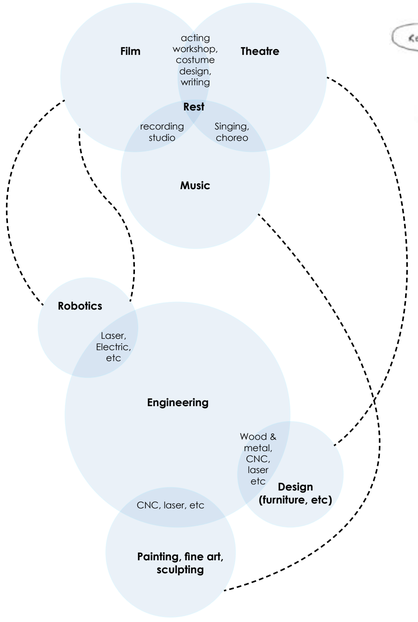
Close-up of circulation in Model

Design Process

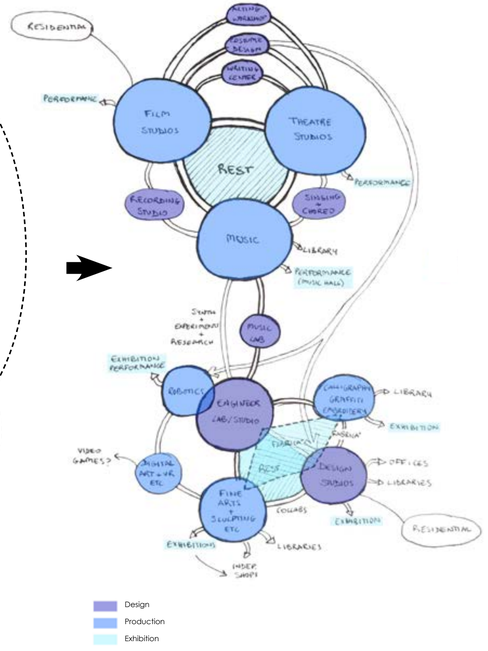
Network, Transplant & reassembly

The program as internal network

General program diagram
3 main hyperlooped spines



Association as a Guide for Navigation
Detailed diagram showing connections and sub-connections



From hypertext as a deconstructing tool, to hypertext as a navigation tool, the next step is using hypertext as a base for design.

The programmatic hypertext evolves into a hyperlinked bubble diagram which starts to explain how the final, functional journey is connected: two connected 'rest' cores with two main interconnected clusters of arts.

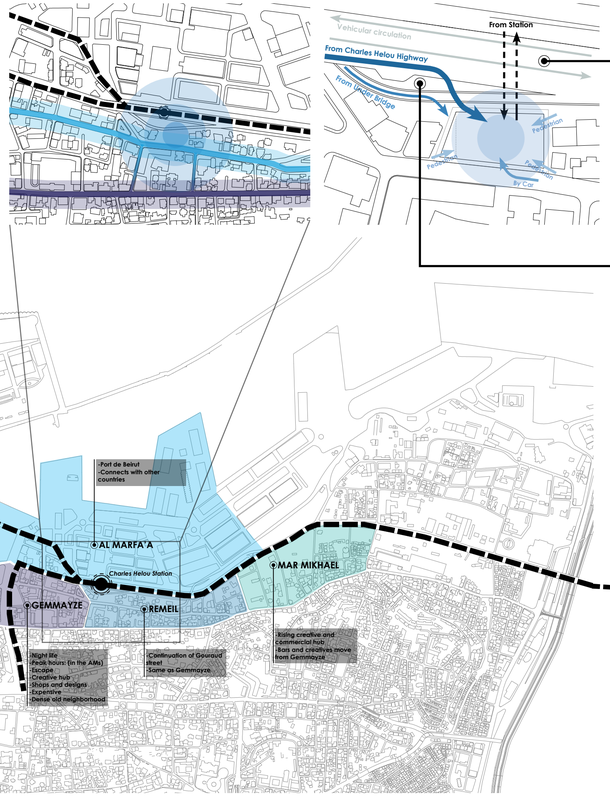
The 'rest' areas are essential for maximum collaborations between arts, and the way the journey is sewn together creates an environment of learning from each other while meandering through the space. Explorers -as well as designers and producers- move through the space through the process of association, connecting programs and creating their own paths and stories by following their fascinations.

The internal network is now ready to take a physical form.

Charles Helou as external network

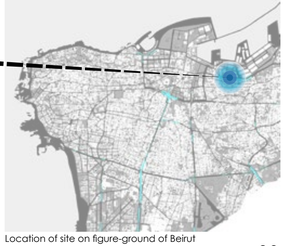
As for the site, it presents itself as a hub for transportation and connections. Right behind the Charles Helou highway and bus station, the site is at a strategic point of movement, connecting the station to the road network but also connecting the lower production-oriented neighborhood to the East with the popular commercial and art hub to the south on Gouraud and Pasteur street. From the art hub on Gouraud to the educational hub on Pasteur and the traditional community near the highway, the site's surrounding communities feed the project.

The station itself is only half of what it used to be: while the ground floor is still used as a bus station and houses the driver's community, the two upper floors are now abandonned.

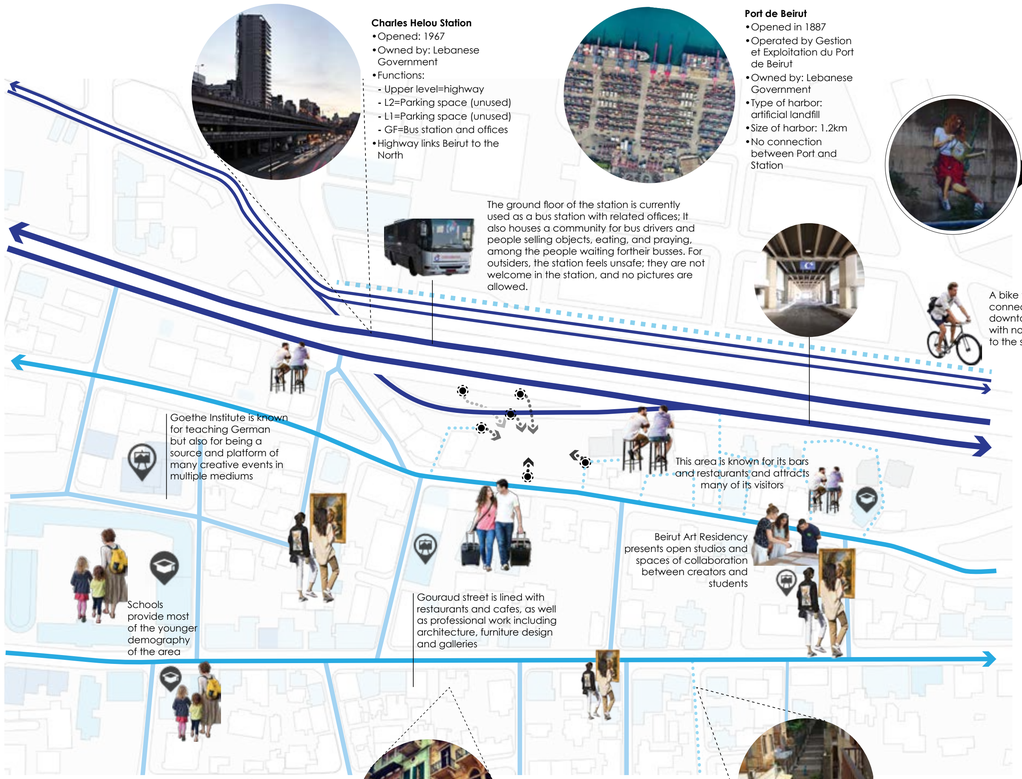


Charles Helou Station

Under the bridge, between site and station



Location of site on figure-ground of Beirut



Understanding the Site: The plot, surroundings, and Charles Helou as a connective artistic hub

Movement / flows as a design element; to transplant the network and connect it to the site's main arteries

The Site as a working, receiving Network

Around the site we find quite a handful of creative or art-related functions, from art galleries to museums to to architecture offices / design studios, which range from residences to places of creation to places of learning.

Most of the educational functions are concentrated between rue Gouraud and Rue Pasteur; and while rue Gouraud is mainly populated with businesses (mostly restaurants and cafes, among some art related stores), rue Pasteur is mostly surrounded by residential buildings (along with a hospital, and a pharmacy).

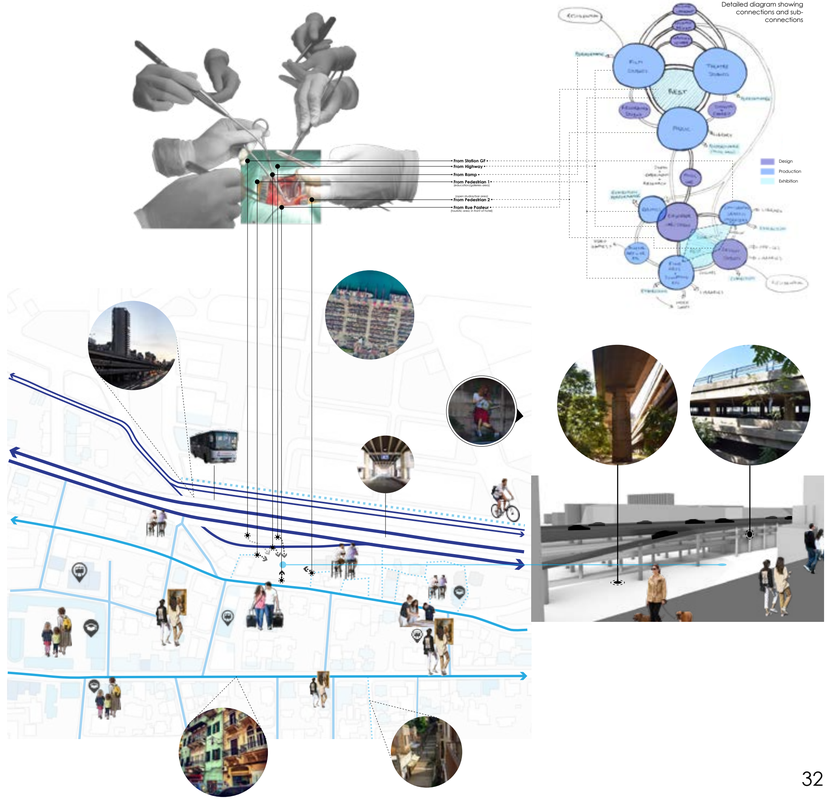
The main population of the area is relatively young (partying, also schools), and include professional creators (design offices, art galleries,etc)

Hypertext as the Heart

Hypertext is mostly aimed inward: it is an interconnected network of semi-independent parts. However, the hypertext is often part of a much larger, already functioning network. It is inserted almost surgically, akin to an organ transplant, feeding off of working arteries while keeping the flow going at the very least, and significantly improving it at its best.

The site's network and flows appear then as an important design element revealing openings and loose ends as possible entry points for the project, each connecting differently to a specific part of the community surrounding it.

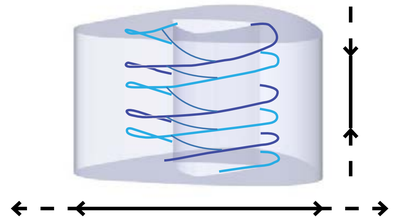
The Hyperloop is to be a new heart for this network, constantly pumping movement, creativity, and dynamism into its veins.



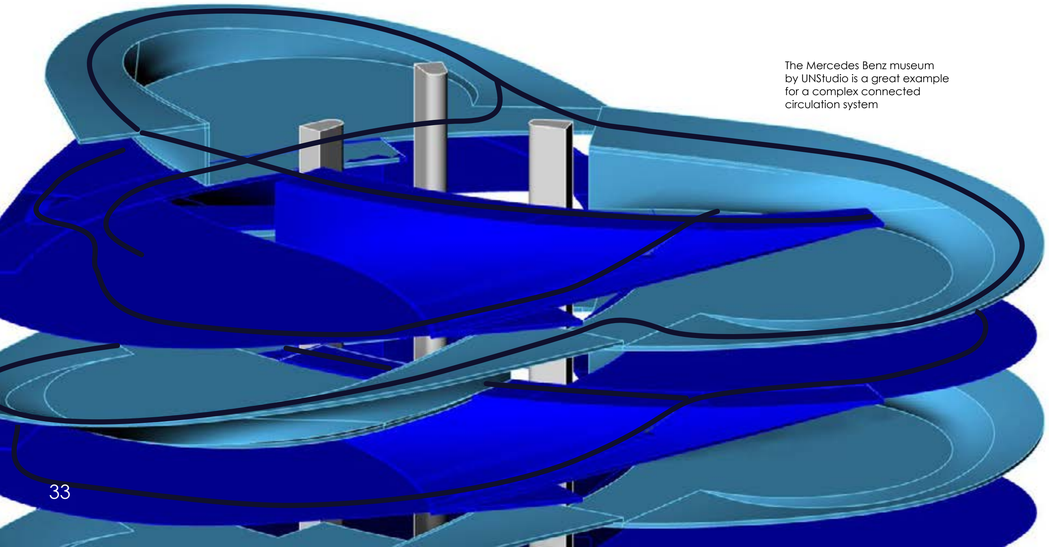
Mercedes Benz Museum as a base to be reassembled

While the Mercedes Benz museum by UNStudio is a great example if a complex connected system that breaks new grounds in terms of narrative-oriented exhibition, this circulation system is lacking when it is observed knowing the complexity that hypertext requires. However, it does present a few notions seen during the spatial exploration: smoothe flowing and continuous space, similarly dimensioned platforms located the same distance apart, and a variety of links used, as both stairs and ramps are used throughout the project.

Most of all, this museum offers a very particular quality: it is made from two clear parallel and looping paths that can be crossed between at specific points along the project.



Vertical compression and horizontal expansion for more free-flowing and ease of access



The Mercedes Benz museum by UNStudio is a great example for a complex connected circulation system

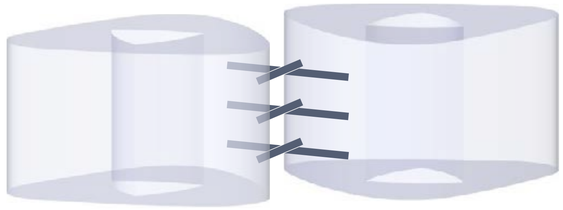
However, its centrality around the single atrium, and the limited variety in the connections keep it from reaching its hypertextual potential; and its general directionality makes it hard to access, which justifies the need for an elevator. To remedy this, vertical compression and horizontal expansion is needed.

To get that vertical compression and horizontal expansion in terms of proportions, the helix is doubled and flipped, then sewn together once more. The two loops interlock at the core with a multitude of mobius strips adding variety to the hyperlinks while enhancing the experience. The project's heart is therefore made of unique mobius links made specifically to house the most connected and collaborative areas of the program: this is the main "Rest" area.

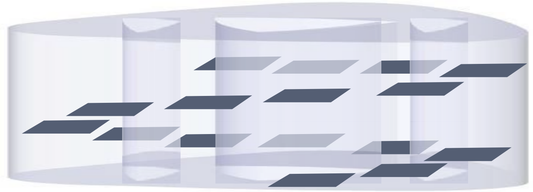
Through this, the atrium is doubled and the centrality therefore shattered. The massing has now three main axes: the collaborative heart at its core, and two atriums on either side, acting as the lungs.

The doubling not only breaks the strict centrality but also negates the directionality, as the additional loop offers the possibility of contradicting the first one. It also doubles the amount of linking possibility with the amount of platforms present: the visitor could either follow the path around either atriums, or the larger loop made by the combination of both helixes at their periphery, or a combination of both; or -ideally- a new personalized path catering to their fascinations.

The first loop is closed by the second, creating a path with multiple entries and no real end.



2 loops connected through direct links or mobius strips, creating common courtyard space



Shift platforms to create flattened closed loop instead of vertical open loop

Doubling the Helix: new patterns

At the heart of the project, a new pattern of platforms creates unique units which house different experiences. The pattern repeats throughout the core, alternating between all three units and giving variety to the journey.

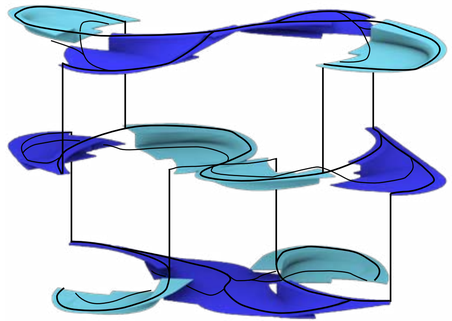
The units generated by the new configuration welcome explorers, designers, and producers alike into three types of spaces:

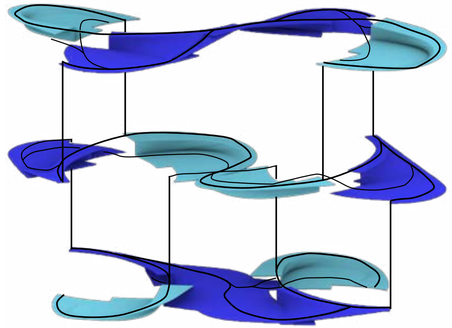
First, the bridge: a long slim corridor lined with exhibited pieces, connecting the two most extreme sides of the project. Passing through it feels similar to passing through a portal which teleports the visitor, seemingly in record time; as he is distracted by the exhibitions and cannot tell where the bridge leads, the visitor emmerges on the other side completely disoriented as if emerging from a cave into a new world.

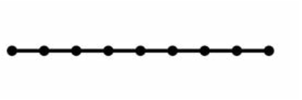
Second, the large common ground connected through a small corridor: the two ramps on either side create a narrow opening just wide enough to let a few people pass. While the ground is singular and continuous, the starts of the ramps disrupt the planar platform and delineate a narrow path inbetween the two halves. This create a sense of suspense while passing from one part to the other and a sense of relief as one emerges on the other side.

Finally, the large, uninterrupted experimental area: made from two uninterrupted units, it is a platform the size of two combined, offering the perfect area for exchange of ideas, appropriation of space, experimentation with machines, shows, exhibitions, and experiments with large audiences. This is a space of extreme collaboration, where the boundaries between designer, producer and explorer are blurred and creativity blossoms.

The three new units, along with the two initial loop and a third one to be added, constitute the main parts of the final creature. In order to sew them together into a journey of creative discoveries, we must devise an exhibitional strategy.

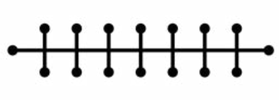






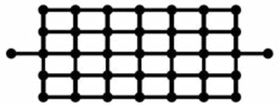
Hallway

succession of rooms/platforms



Inter-mezzo

common hallway connecting units of content



Enfilade

All units are connected for a free-flowing meandering through the structure

Existing exhibition systems can be divided into three main categories:

• *The Hallway system*, where the journey consists of a succession of rooms or platforms with one specific direction to follow.

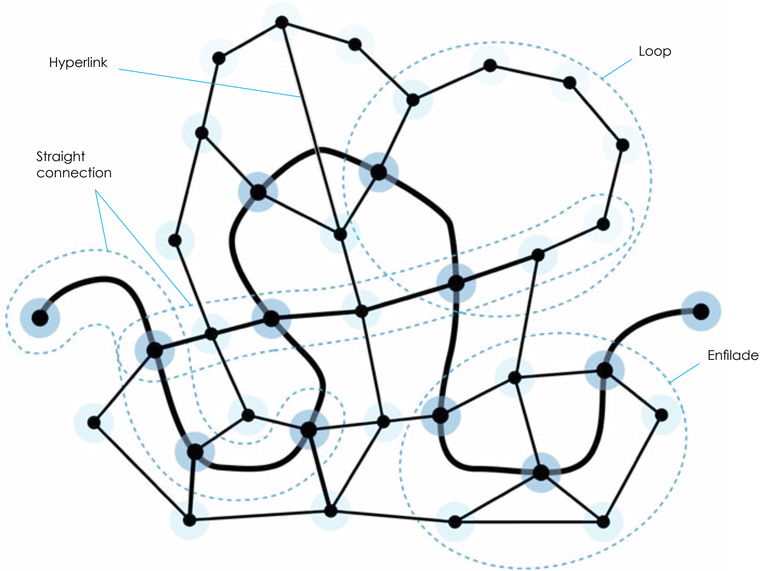
• *The Inter-mezzo system*, where the journey is similar to the hallway system except that the exhibited items are stored in rooms distributed alont the hallway, and the rooms are meant to be entered.

The Mercedes Benz museum's loops fall somewhere inbetween the Hallway and Inter-mezzo; it is made from two continuous hallways that cross at specific points.

• *The Enfilade system*, where each room is connected to the ones directly adjacent to it. To get from one point to the other, the path leads you through a multitude of rooms. Whereas the first two systems are considered too directional, the enfilade system could be considered too freeflowing, as nothing guides the visitor through the structure, which confuses him as to where to go next, resulting in stagnation.

All three systems lack the main element that will make them cross from a linear space to a hypertextual space: that element is the hyperlink, the shortcut which makes the paths more personal and give more freedom to the visitor without giving them too any choices to the point of stagnation. Every hyperlink has a purpose.

The best way to create an engaging hypertext is through a combination of differently functioning hyperlinks, which lead to a wide variety of paths and experiences. Similarly, as we work on hyperspace, the key is in the variety of hyperlinks/shortcuts and the types of exhibition systems used.

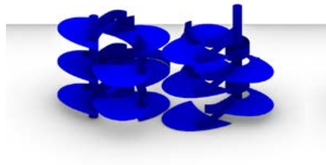


The Hyperloop

A Hyperconnected Hub

THE HYPERLOOP
Highway perspective

The Hyperloop: A tale of three paths

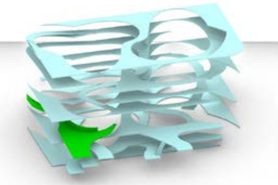


The Designer Loop

This loop houses designers and creative thinkers working on individual stations, from paper to laptops to individual craft-making

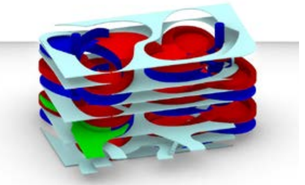
The Producer Loop

Very closely connected to the Designer loop, this loop offers a space for them to experiment with machines, as well as a production space for customized items



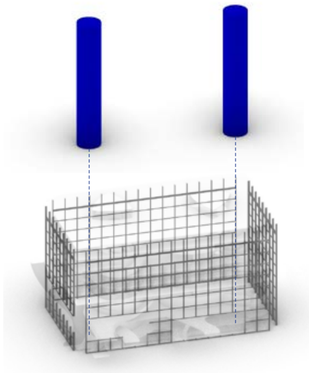
The Explorer Loop

Less straightforward than the others, this loop connects to most levels and platforms in a way that allows explorers to observe all areas during their journey

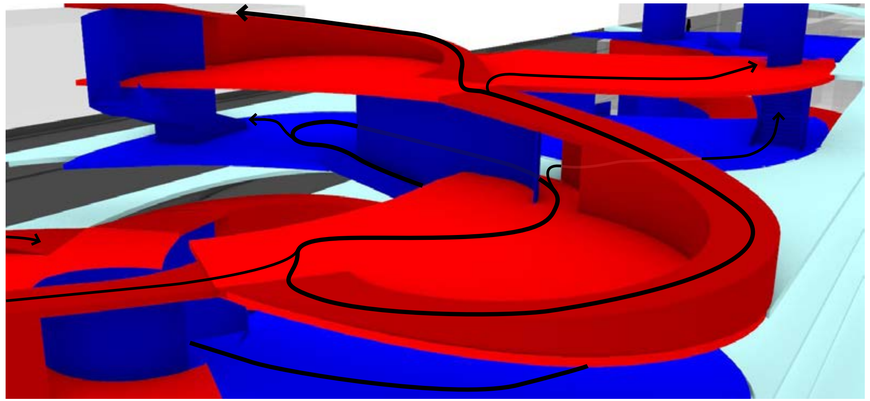


All loops combined: the Hyperloop

The three loops form a closely-knitted triple helix of open and constantly flowing movement. collaborations arise from their connections.



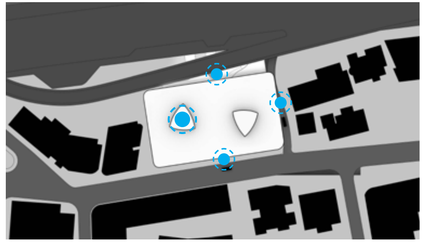
Structural elements



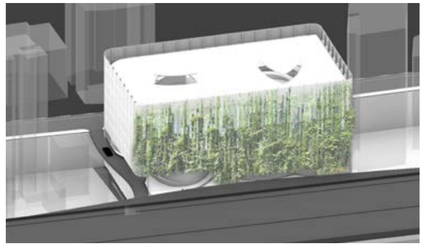
Circulation within the loops

The Hyperloop: A transplant of movement

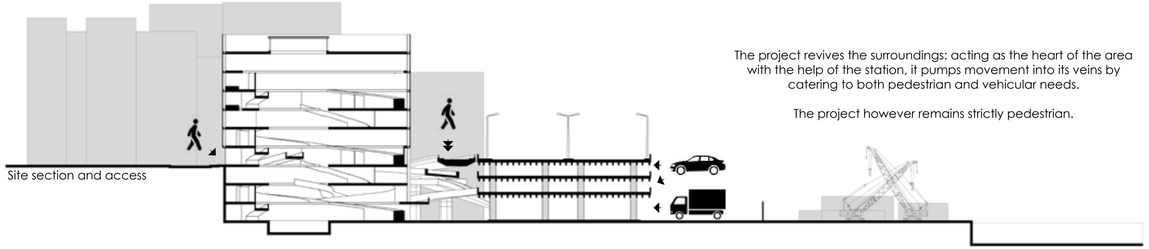
Figure ground showing location on site



Four different types of entry points



Perspective showing the Hyperloop on site - Highway side, North

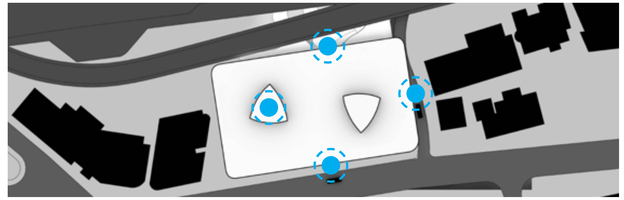


Site section and access

The project revives the surroundings: acting as the heart of the area with the help of the station, it pumps movement into its veins by catering to both pedestrian and vehicular needs.

The project however remains strictly pedestrian.

The Hyperloop: A multiplicity of starting points



Buffer between Charles Helou Station and the Hyperloop - Green outdoor connections

Drop-off from bridge connecting Rue Pasteur to Charles Helou Station

Garden at Ground Floor level

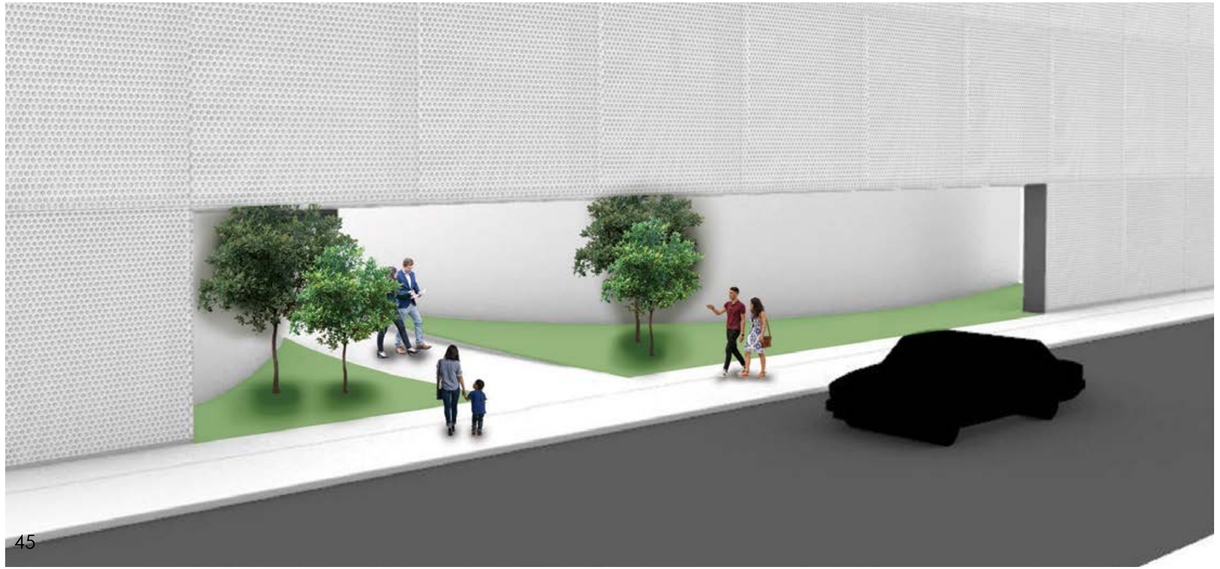
Entry point from Rue Pasteur

The Hyperloop: A multiplicity of starting points

Entry point from Rue Pasteur

The entry point on Rue Pasteur welcomes visitors with greenery while keeping the project hidden behind a mysterious, semi-opaque blank facade. The horizontal slit at street level keeps the inner dimensions vague and only give a glimpse of the interior to any outside viewer. The main targeted users are:

- Students from nearby schools and workshops
- People coming from the nearby art galleries and art studios
- People coming from the residential fabric
- Tourists visiting the upper gouraud street

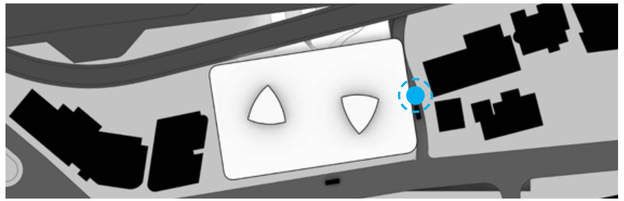


The Hyperloop: A multiplicity of starting points

Drop-off from bridge connecting Rue Pasteur to Charles Helou Station

The dropoff slices part of the project and turns it into an outdoor waiting area for newcomers and a place to convene before getting lost within the structure. The green edge could also double as a sitting area, and curves to seemlessly merge with both the outdoor and indoor resting areas on the north side. The main targeted users are:

- People being dropped off
- People walking toward their cars parked in the station
- People walking along the buffer zone

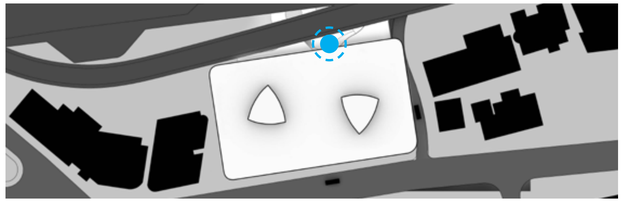


The Hyperloop: A multiplicity of starting points

Buffer between Charles Helou Station and the Hyperloop - Green outdoor connections

The buffer zone between Charles Helou Station and the Hyperloop appears as an entaglement of overlapping bridges and ramps connecting multiple levels of one side to multiple of the other. Adding to that the green facade, as well as the garden underneath makes this the perfect outdoor area to convene in, meet new people, and share ideas regardless of the area you're in. Users incluse:

- Explorers parking who just parked their cars / are walking toward them
- People coming from the inside and wanting to enjoy the greenery and outdoors
- Creators wanting to take a break from their work

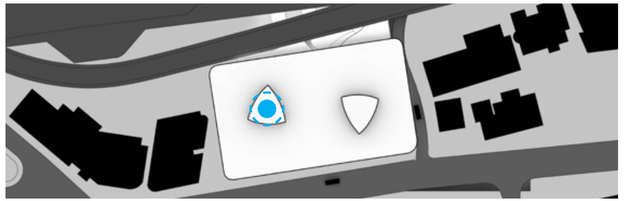


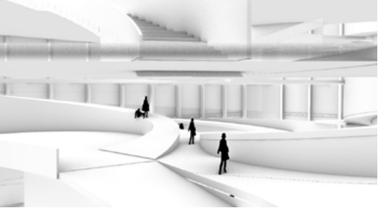
The Hyperloop: A multiplicity of starting points

Garden at Ground Floor level

The Garden at the ground floor starts as soon as the Station ends, and extends into the building reaching the central atrium. The garden offers an enjoyable space for anyone to use, regardless of whether they come for the art or not, while leading them toward the heart of the project, pushing them to explore more. The main targeted users are:

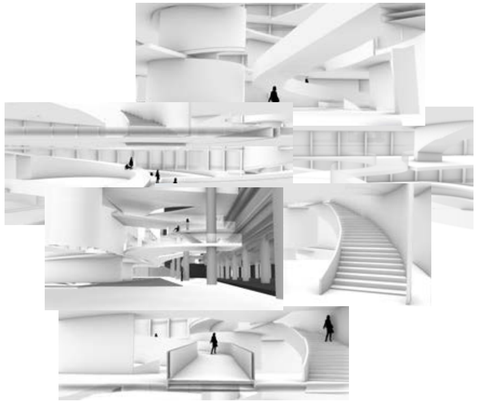
- The bus driver community from the Station
- People exploring or working in the nearby platforms of the project
- Film and photography enthusiasts

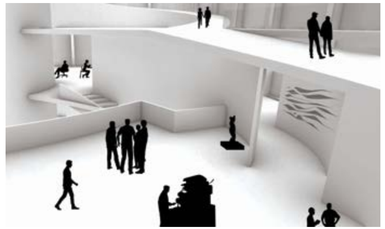


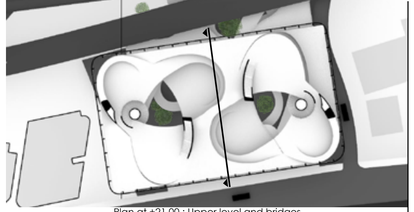


The Hyperloop: An extanglement of moments

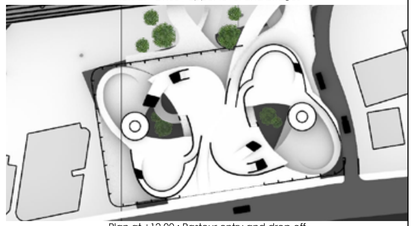
The Hyperloop is experienced in a succession of flowing moments. In true hypertext fashion, the project can never be seen as a whole but is rather experienced in parts following a less obvious path. Movement and spaces are shapes through the various links connecting them: Ramps offer a more “public” space perfect for meandering and exploring, while stairs and smaller corridors between design area and production area allow for privacy while keeping the movement flowing.



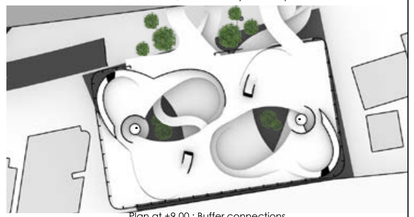




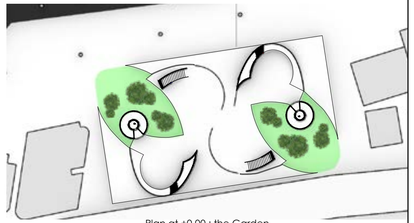
Plan at +21.00 ; Upper level and bridges



Plan at +12.00 ; Pasteur entry and drop off



Plan at +9.00 ; Buffer connections

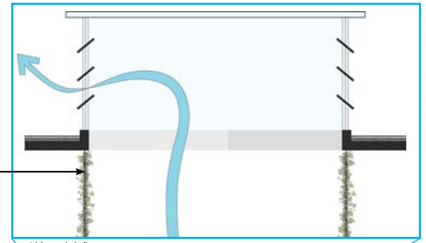


Plan at +0.00 ; the Garden

The Hyperloop: A breathing lung of experiences

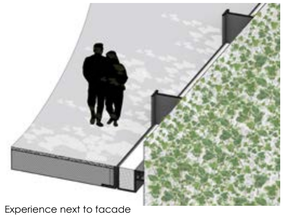
Vines on the inside of the atrium not only enhance the experience but also provide protection from the sun

Lebanese Vines on rods



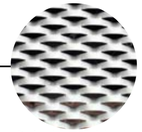
Atrium detail

The glass atrium also serves as a solar chimney and moves the air coming in through the perforated facade back outside. That way, the air is always renewed naturally by the structure; the Hyperloop is a breathing lung.



Experience next to facade

Walking through the facade is an experience akin to a fairytale: the sun shyly peeks through the perforated facade and the vine leaves and lightly floats on the ground; the static ground moves gently with the north wind.

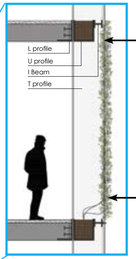


Perforated metal sheets

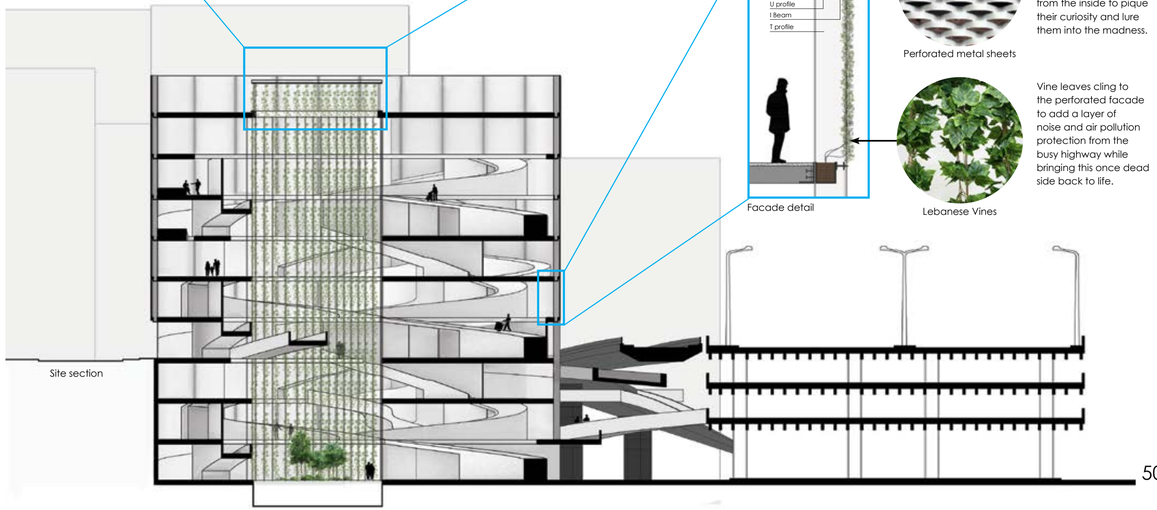
Perforates sheets create a semi-transparent facade, allowing the outside viewer to discern just enough from the inside to piaue their curiosity and lure them into the madness.

Lebanese Vines

Vine leaves cling to the perforated facade to add a layer of noise and air pollution protection from the busy highway while bringing this once dead side back to life.



Facade detail



Site section