

SUSTAINABLE FASHION

URBAN FACTORY

Urban and architectural
redevelopment of an industrial site



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Abstract

We are currently facing consequences due to massive production which impacts the environment. In 2015, in the Paris Agreement, the United Nations developed 17 Sustainable Development Goals to be reached in 2030. Urban redevelopment, urban growth, fashion production, and Industry 4.0 contribute to this achievement. The present thesis discusses these current areas by combining them in a final architectural and urban project proposal.

The work is divided into two main sections. The first one, characterized by the theoretical part, is subdivided into three parts. Firstly, the research emphasized the changes of the fashion industry production due to sustainable issues. Secondly, the work underlines the modifications of French strategies towards sustainable fashion production and industry 4.0. Finally, on the last subdivision, the author reports the impact of urban factories, industrial districts and sustainability, by providing a panoramic view of the current and future situation of industrial sites.

In the second section, the study focuses on the vacant Gressillon industrial site in Gennevilliers, Ile de France. The city is characterized by industrial port and a major quantity of industrial sites. On the periphery of Paris, the Gennevilliers is the reflection of urban growth. The urban and architectural project is an opportunity to apply principles of urban factory and the integration of cities to factories. The proposal aims to reflect one of the possibilities to combine industry 4.0, fashion, factories and cities.

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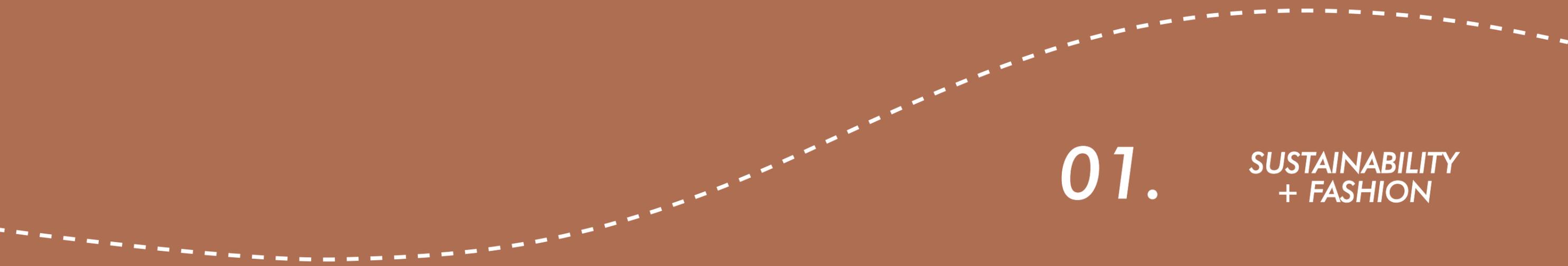
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01.

SUSTAINABILITY
+ FASHION

1.1 SUSTAINABILITY+ FASHION



Textile consumption and production have achieved global levels. Millions of producers and companies are willing for higher and faster production due to consumers' needs.

Clients worldwide are voracious for the new items, innovation, new technologies and the constant need for a higher diversity of clothes, accessories, and shoes, in a short period. The idea of fast fashion has come to reality rapidly and has badly influenced the environment at the same velocity.

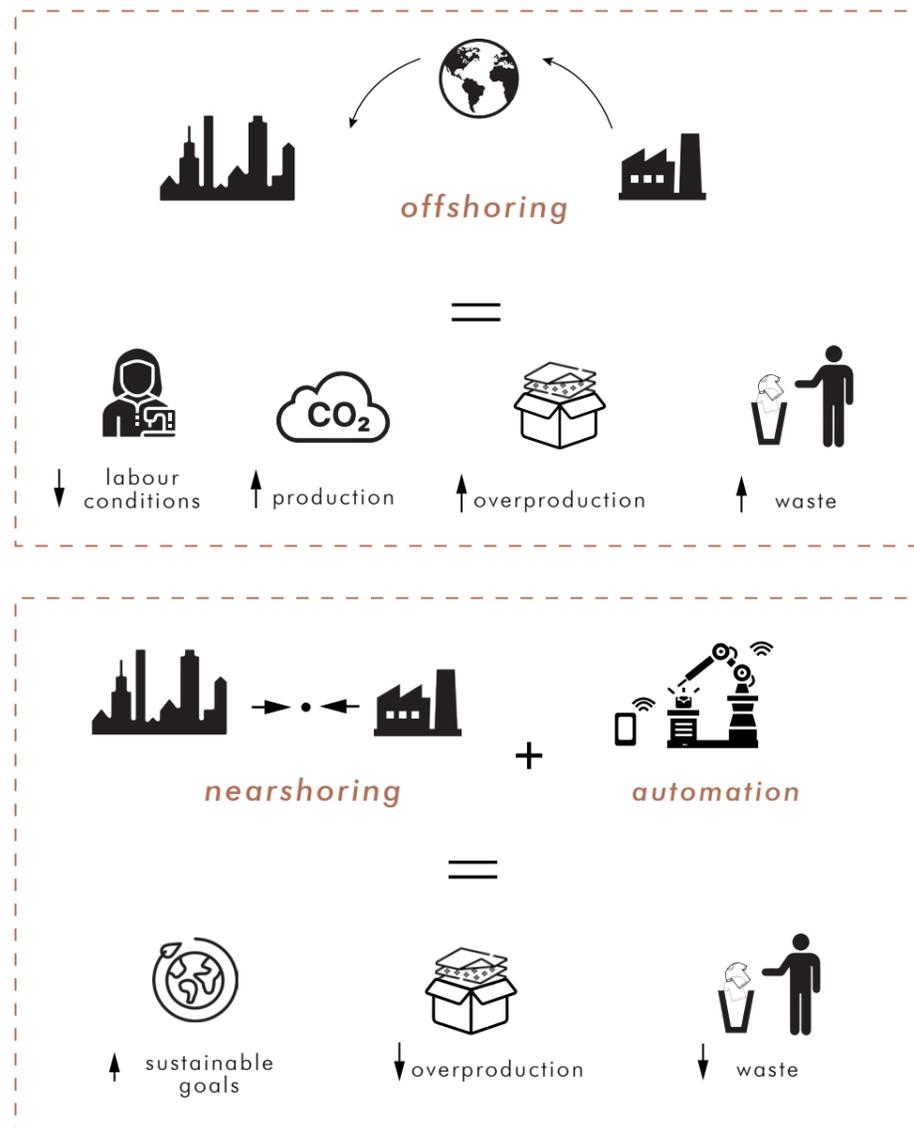
Responsible for 8 to 10 per cent of global carbon emissions and the second-biggest consumer of water, the fashion industry is the second most destructive industry in the world after oil, according to the United Nations (UN).

Textile manufacturing causes environmental problems due to the noxious and toxic chemicals that are used and wasted inappropriately. In consequence, it provokes a harmful environment for workers and communities. Therefore, fashion has been forced to change its mindset due to sustainability and consequently, its pre and postproduction.

Fashion put sustainability on the map in 2009 with the Copenhagen Fashion Summit. In 2018, the United Nations Framework Convention on Climate Change (UNFCCC) and UN agencies created the Fashion Industry Charter for Climate Action. Its mission is to drive the fashion industry to achieve net-zero emissions by 2050, with the will to keep global warming below 1.5 degrees. Moreover, one of the Charter's goals is to target the reduction of 30% of GHG emissions reductions by 2020 and set the decarbonisation path for the fashion industry, drawing on the Science-Based Targets Initiative methodologies. This clarifies the urgency of the fashion commitment towards climate action. (Unfccc.int. 2020)

Furthermore, in 2019, United Nations agencies united with affiliated organisations and initiatives to contribute to the Sustainable Development Goals in the fashion sector, the United Nations Alliance for Sustainable Fashion. The Alliance aims to supervise the whole fashion production process from raw materials production until the disposal.

It is essential to ratify that 17 Sustainable Development Goals, implemented by the United Nations at Paris Agreement in 2015, will probably be achieved by the fashion industry. From the 1st until the 17th SDG, the fashion industry can help end poverty and protect the planet by 2030. Additionally, the UN has made partnerships with other companies to achieve the Paris Agreement goals more rapidly. The partnership SDGs for Better Fashion, with Re/Generate, is an example. (UN Alliance for Sustainable Fashion | UNDP Climate Change Adaptation, 2020)



Offshoring x Nearshoring

According to McKinsey State of Fashion of 2019, nearshoring is characterised as a practice to transfer a business operation to a nearby country, especially in preference to a more distant one. The term nearshoring is the opposite of offshoring, which means that the company can outsource the production to a far place due to its lower costs.

The world has seen the enhance of offshoring during time, however, due to production of manufacture increasing, and the effect on the environment and its production costs, nearshoring has been seen by rich countries as a strategy to stimulate the own production and minimise costs.

1.2 CIRCULAR ECONOMY

A circular economy is a regenerative approach. Aims to provide **cyclical strategies** to minimise resources input (waste, emission, water, and energy leakage). In the garment's "situation", the life cycle in miniature.

A circular economy approach can extend the life cycle of garments, being capable of recycling several rounds into closed loops. Minimising the waste of 80% of all productions after at six months it was bought. (Baker-Brown, 2017, 11)

The main principle refers to a designated product to have various life cycles or can be biodegradable. After the end of the cycle, the product can begin a new technical or biological path.

In the garment, for example, circular economy has the intention to **extend the lifetime of the clothes,** to while separating fibres in blended materials, biological composting can help, for example, to destroy bio-based materials from blends, and in this way, polyester can be separated and used again in the recycling process "(Yao 22.3.2018).

The change of the mentality from linear production (design-manufacturing-sale-dispose), started with Walter Stahel's report "The potential for substituting manpower for energy" from 1976. Later, the idea was developed by McDonough and Braungart with the concept 'Cradle to Cradle' and then Circular Economy.

According to PANDIT (2020), the stages of the textiles manufacturing life cycle and that

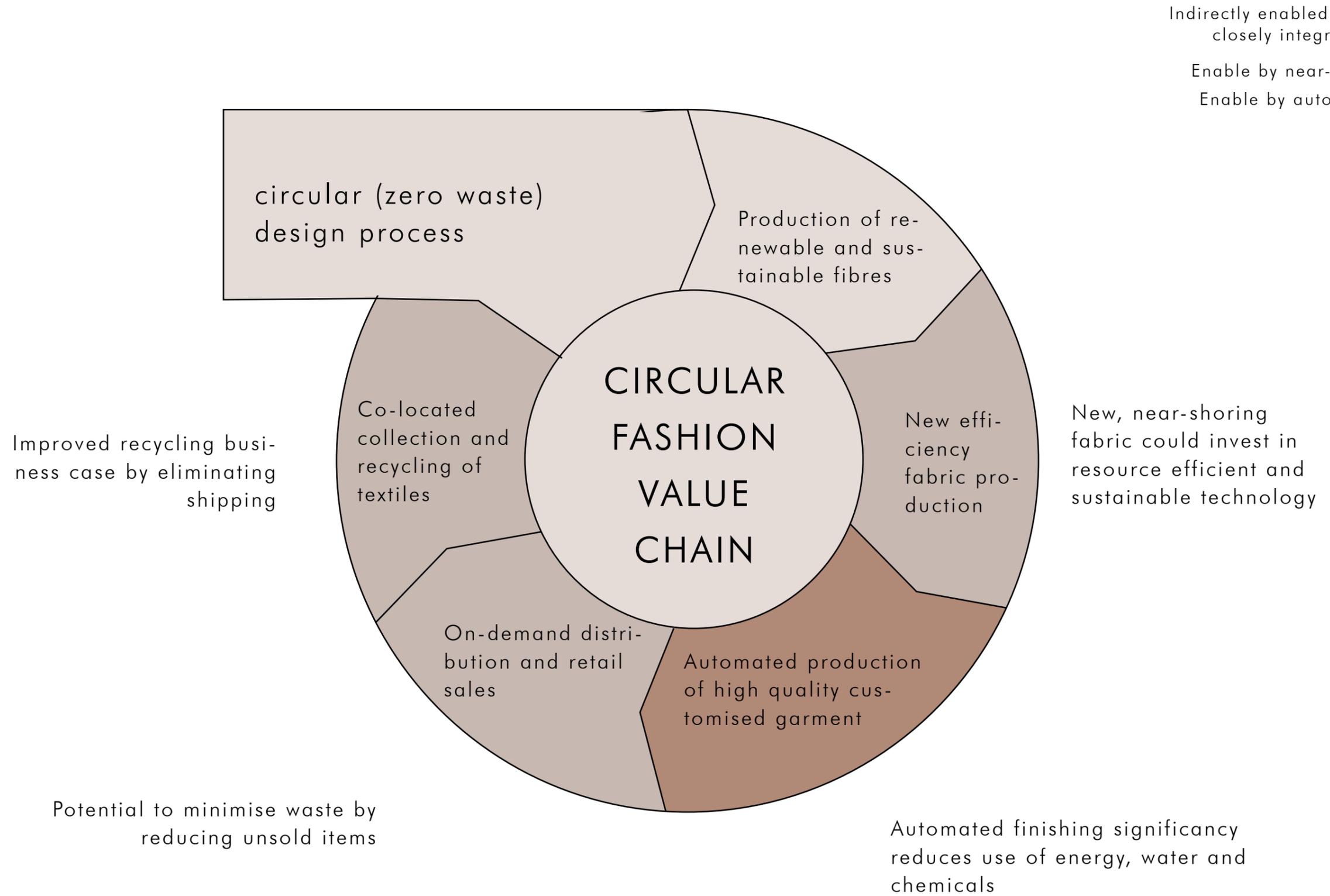
have a direct relation to the environmental impact are:

- Selection of raw materials (fibres and chemicals)
- Production and finishing processes (eco-friendly, bio-based)
- Final packing, transportation, and dissemination of the end products
- Use, care procedures—use of household detergents, dry-cleaning, finishes, vacuum cleaning of furnishing materials
- End of life management (end of first use), reverse logistics, and disposal of the waste textiles.

Upcycling

Upcycling has a direct relation to a circular economy. The term refers to producing **new or equal products** with high performance, based on waste materials.

It generates sustainability by re-using resources that would be discarded as raw materials for new products, extending their lifespan and decreasing the need for natural resources. In fashion, upcycling has a direct impact on critical resources and activities as access to suitable materials for upcycling can be a source of advantage (B.V. Todeschini et al.2017, 762)



1.3 BIOTEXTILES

As referenced in the Circular Economy concept, waste can be biodegradable or remanufactured. Due to that, new production capacity based on new resources such as materials, design practice, and services can also be increased.

The possibility of producing sustainable clothes is enhancing the textile industry due to innovation, sustainable raw materials, and textile effluent treatment. The development of sustainable textile models with a cradle-to-cradle concept and circular economy is being discussed frequently.

In the fashion industry, sustainable raw materials such as hemp, recycled fibres, bamboo, and lyocell are inert for environmental fabric production. The recycling of these raw materials, need to be tracked from the production process until the end of life and finally, waste. Besides, a renewable product's quality needs to guarantee longevity, fabric serviceability, and textile recycling. These raw materials will improve the use of recycled textile and enable the reprocessing of used textile to move the production to be sustainable and achieve a zero disposal of clothing waste to the landfill site.

However, the textile factory's effluent treatment system shows the complexity of textile waste and effluent change of nature. The use of toxic chemicals, biological make-up and harmful substances of the products, directly influences human and environmental health.

The alternative of design textile model is the synthetic cells to create a closed-loop product



Mylo Unleather by Biothreads. Source: <https://www.mylo-unleather.com/>

and minimise the energy, water, chemicals of the products. Biotextiles is a reflection of this alternative.

Biothreads, Ecovative, Modern Synthesis are companies specialised in bio-textile production through diverse raw materials. Biothreads focusses on mushrooms (mycelium cells) to create leather, which they call Mylo Unleather. Ecovative also creates the Mushroom Leather using their MycoFlex™ Platform and a traditional, non-toxic tanning process. Finally, Modern Synthesis utilise a microbial weaving process based

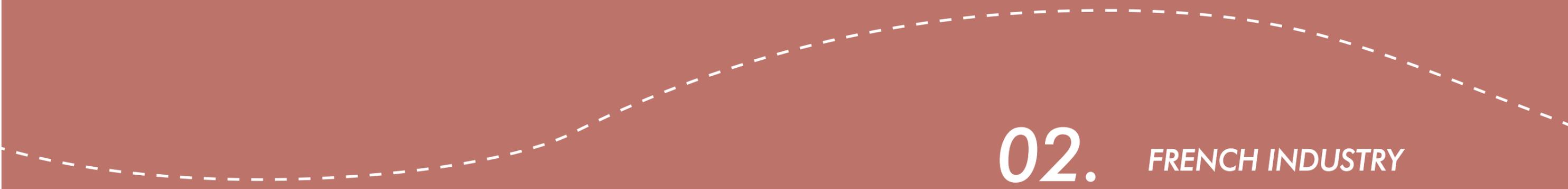
on bacteria that weave to customise bio-textiles.

However, according to PANDIT(2020), two barriers reflect the enhance of new sustainable fashion products and consume. "The first barrier is the limited knowledge of the consumer about sustainable fashion. It was found that, in general, consumers have little information about environmental hazards related to apparel products. Because of this, consumers are unable to differentiate between eco-friendly and



Modern Synthesis Prototype. Source: <https://modern-synthesis.com/>

non-eco-friendly apparel. The development of multifaceted education/training programs for consumers can improve their knowledge about sustainability. The second barrier is the supply sources for sustainable fashion. There is an inadequate supply of sustainable products in the retail market even though there is consumer demand for sustainable products. The solution to this barrier is an improvement in marketing policies such as designing new marketing messages which highlight the environmental advantages of sustainable fashion."



02. FRENCH INDUSTRY

2.1 Fashion in France

The fashion industry has realized the need to reduce its impacts on the environment and on working conditions. As said before in this thesis, the United Nations SDG's is a reference to reorientate the fashion textile towards innovation and sustainability.

Fashion in France is responsible for 2,7% of French GDP. It is renowned internationally for its success due to the higher number of jobs (1,000,000), 80% of French exportation and fashion shows, as a tourism and economic attraction. (gouvernement.fr/).

The leading French fashion companies began to address the new global trend due to sustainability. The change of mentality of costs, production, global warming and the need for eco-responsible solutions, are targets that huge companies, SMEs and artisans, are facing daily.

Therefore, digital revolution emphasizes this dynamic change. E-commerce, online platforms, social media, pure players are constantly increasing their use as well as consumer needs. Especially, due to COVID-19, the need to innovate customer experience will interfere on the retail. According to the Director of IS&T Retail and Digital Americas of Louis Vuitton, Mirko Dawy Marcovaldi, digital retail, integration capability and pop-ups stores, are keys to attract the clients in the recent future.

Nevertheless, digital revolution impacts not only the consumer needs, but also, the production of fabric and clothes. French fashion tech, is a terminology that means the digital development in or for fashion in France. This fashion movement aggregates the innovative technologies which impact all stages of supply chain. Which reflect in the academia, designer, entrepreneurs and consumers.

Industry textile and clothes federations, associations, analysts and decision makers are taking actions towards technology and sustainability. As well as Retailers for example, Lafayette Go for Good and H&M Conscious. The first retail example refers to clothing certified in organic cotton or Oeko-Tex, collections made in France, vegetable leather or natural cosmetics.

In addition, France has a national production of linen and hemp. Young brands are seeking to develop the use of hemp lead by innovation and technology through its process. (GRAS.A, 2019). Furthermore, sustainable fashion brands seek to inspire and attract consumer. Due to that, transparency of its production through social media, DIY programmes, are educating consumers to the real value of sustainable fashion.

#PROUDOFFRANCE



French Companies are frequently thinking about innovation and sustainability in the long term. Incubators, labs and accelerators are boosting sustainable fashion research towards technologies. The achievement of environmental goals influences French tech innovation.

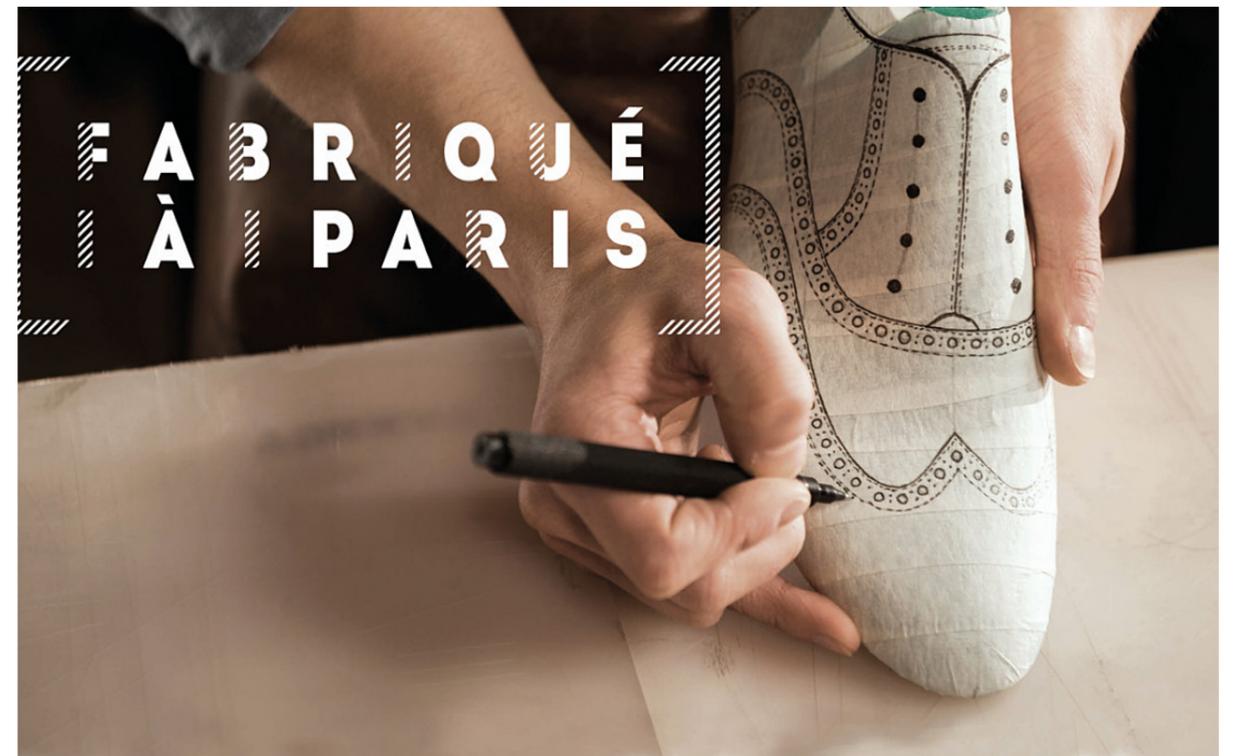
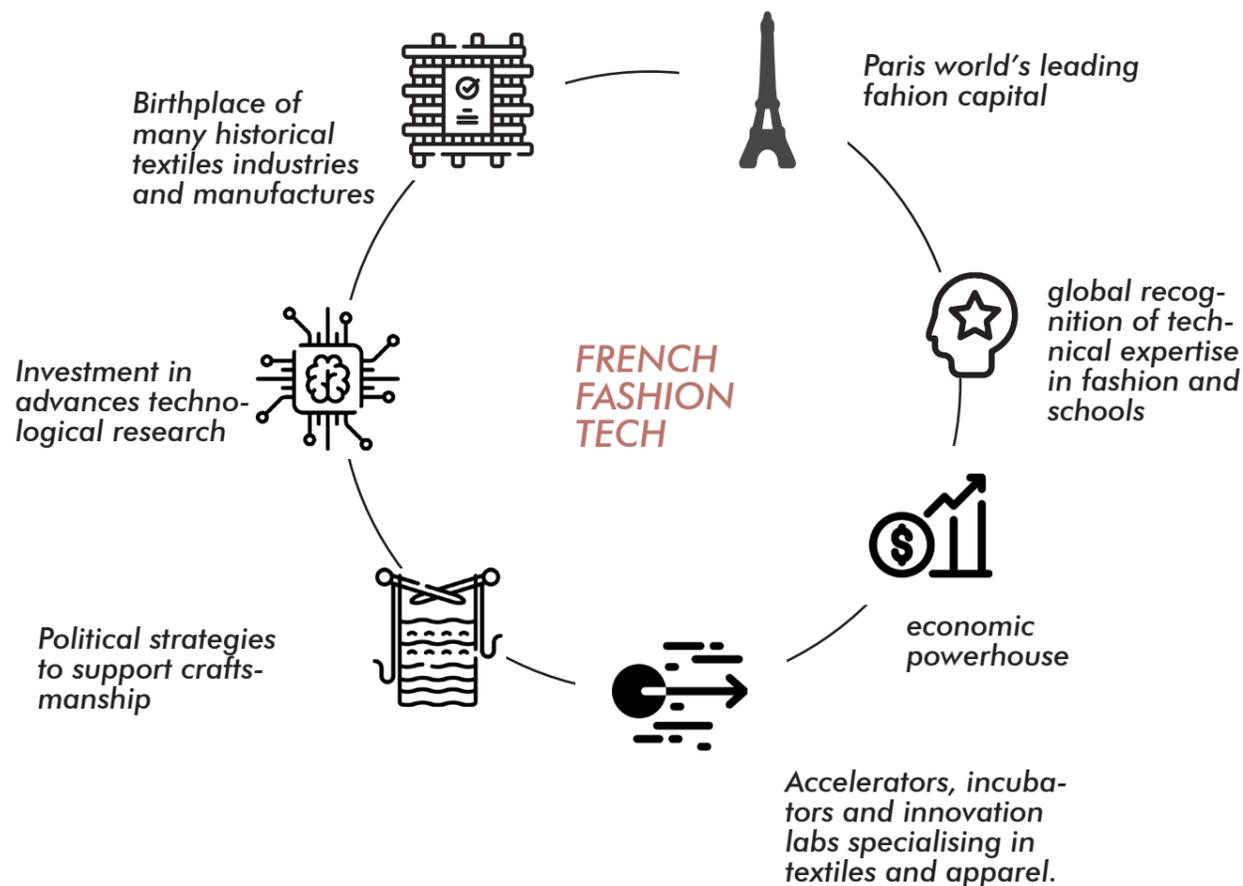
According to the "Innovation and sustainability in French Fashion Tech outlook and opportunities" study, France claims to be a role model in the fashion tech landscape according to the following scheme. (GRAS.A and ELIOT.C (2019).

It is crucial to notice that the trend of technology and innovation towards clothing is new.

Beyond that, France is constantly with the will to promote technology and innovation in its industries. In 2014, the French government announced a vast industrial innovation plan and in 2018, it was launched an industrial plan to support SMEs from all sectors towards their digital transition.

According to the previously cited study, there are some strategies to impulse innovative technologies on the major fashion and luxury brands:

- Minority capital investment
- Partnerships with technology companies



Fabroqué à Paris slogan. <https://www.paris.fr/pages/label-fabrique-a-paris-les-laureats-2019-sont-connus-7345>

- Accelerators and awards - LVMH's Maison have startups at Station F (biggest accelerator in Paris).

- Labs and foundations: Gucci Art Lab has promoted, since 2018, craftsmanship and R&D in design and leather goods.

Patent acquisition: Modern-synthesis is an example. As well as LVMH biopolymer oyster shell 3D printing filament

- High-tech accessories
- Recruiting "tech" profiles: Louis Vuitton and Hermès hired innovation and research staff

Furthermore, French is characterised by public organisations that stimulate the production in France of textile and fashion

items. Ateliers de Paris is an example. It is a startup incubator that supports the business project for a determined period, offering the possibility of housing, advice and guidance. They work with a gallery for artisans and designer in Paris. (paris.fr/)

Paris encourages artists, designers, artisans to fabricate and produce items in Paris. The will to enhance the production in the city and the country, promoting the decreasing of importation.

FRENCH QUOTE:

to promote national industrial excellence abroad.

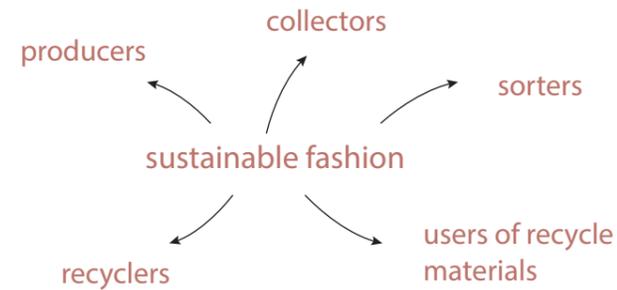
2.2 France x Luxury x Waste

In 2019, the French Government established the Contrat stratégique de filière Mode et luxe 2019-2022 (Fashion and luxury sector strategic contract 2019-2022), which characterize the current situation of Fashion and Luxury industry towards their challenges.

In Paris, the goal to invite international development and attract market is constant. The State and development economic committees funded the promotion of exportation by medium high SMEs/VSEs, which are responsible for a significant part of exports.

According to the Contract, consumption is declining, however, the export system continues to increase, which is fundamental for the fashion and luxury sector. In France, the annual expenditure generates over 155 million euro. In a global perspective, companies of this sector generate 10.6 billion euros in exportation. This situation has increased by 40% in the past 5 years. (CONTRACT STRATEGIC, 2019)

However, as said before, this sector faces major challenges to expand sustainability in various fields. French manufacturing SMEs and VSEs are facing difficulty towards the efficiency, rewards to be sustainable. Furthermore, there is a failure critical size or internal



resources that structured sustainable policies.

Beyond that, there is a need to emphasize the stakeholders involved on the process of sustainable fashion. Those are described in the scheme above

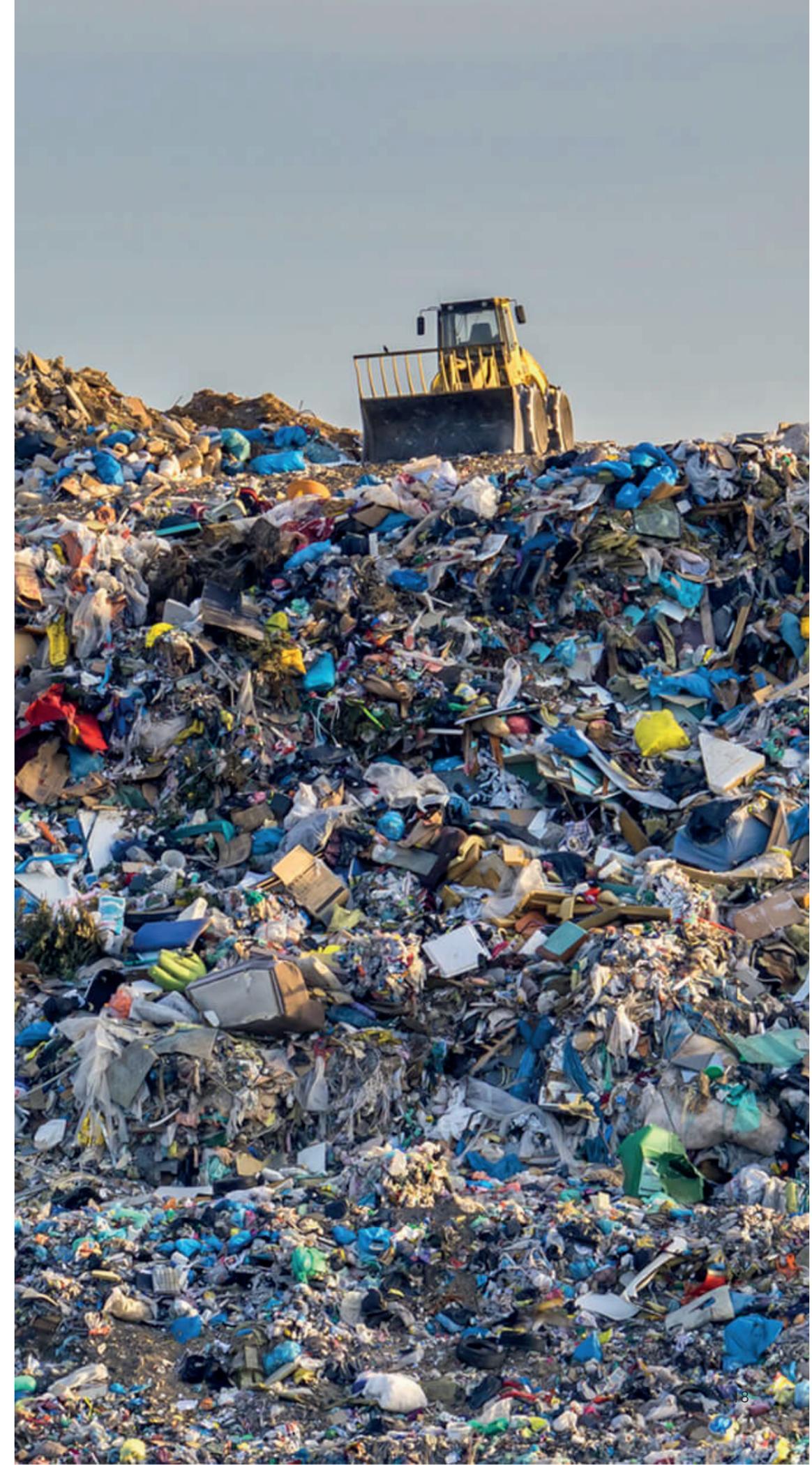
To develop a close loop guided by circular economy, the chain of stakeholders needs to be strict. The use of technological solutions can provide the transformation of textile waste in insulation to construction, plastics, and cement, for example. Some companies have already initiated this path to provide new uses to wasted materials. Nike and Stella McCartney are examples.

Law on the fight against waste and the circular economy - Law No. 2020-105

Loi relative à la lutte contre le Gaspillage et à l'économie circulaire

Law No. 2020-105 mark the TLC sector (Clothing textile, Household linen & Shoes) towards the path to achieve sustainable development. The companies need to promote market, reuse, extend lifespan product, better collect, no waste and marketing to consumers the right consumption by attributing to them the proper knowledge of sustainable fashion.

Furthermore, the Law ratify the prohibition of Prohibit the destruction of unsold items. Currently, companies are destroying the environment five times more than providing benefits. The law emphasizes the need to recycle or reuse unsold products and infer the payment of charges if companies avoid the elimination of these products. The goal is to fight against overproduction and develop product donation of first necessity with authorized associations. In addition, the (Law No. 2020-105)



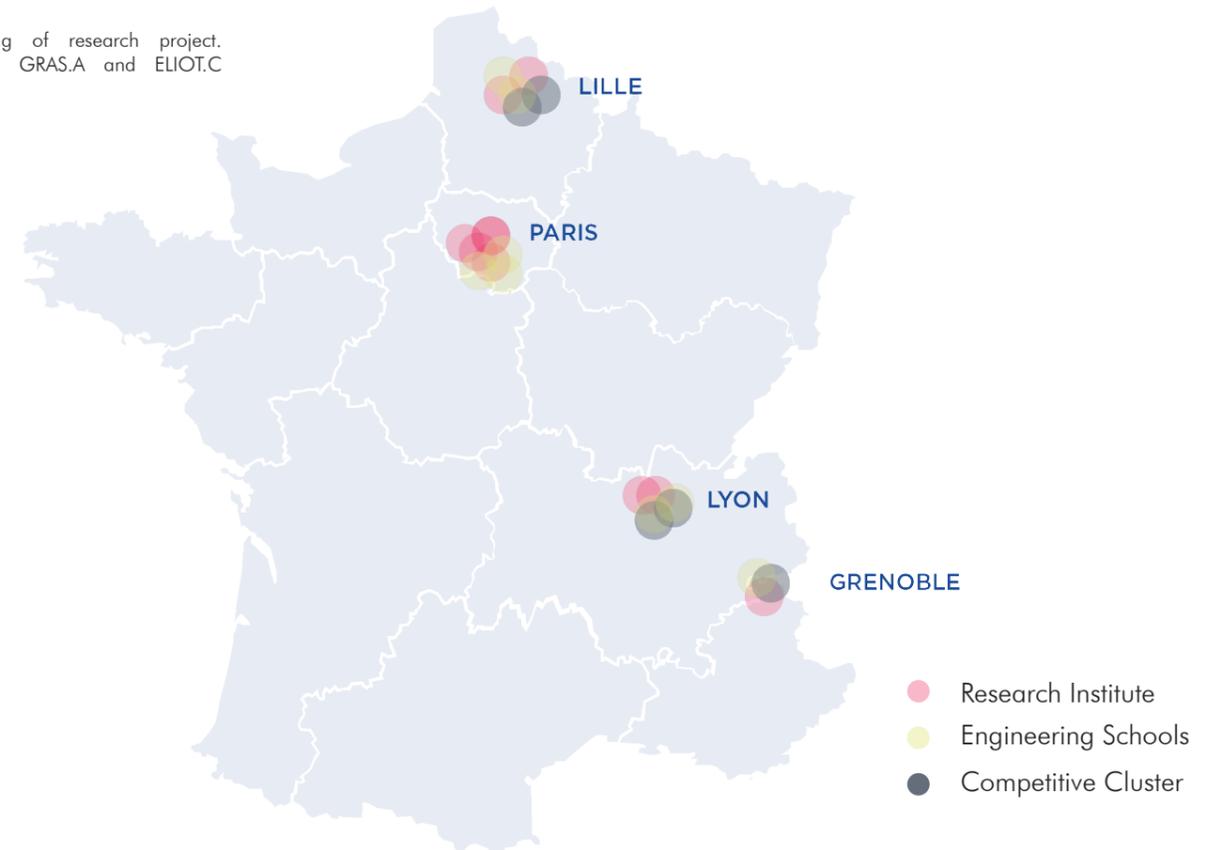
2.3 Textile in France

The present study fosters the textile industry in Gennevilliers, Paris periphery. The map emphasizes the main regions that outstand the textile industry in France.

NORTH (Lille, Marcq en Barouel, Roubaix, Tourcoing)	LYON Region focused on specializing center and research programmes
Represent a strong textile heritage.	
PARIS (Paris and its peripheries)	GRENOBLE Important player in nanotechnologies
Historical legacy; Trend fashion consultancies; Stimulating environment for possible fusion of fashion and science	

Based on the research of french key players, it is important to highlight ECO TLC and UIT, in the region of Paris and Euramaterials and CETI, which are localized in the North of the France.

Mapping of research project.
Source: GRAS.A and ELIOT.C
(2019)



CETI - European Center for Innovation Textile

NORTH

Encourage companies to accelerate innovation. It is a place to design, experiment, prototype and industrialise new products, materials and processes adapted to the global industry's needs.

Collaborate with producers, major brands and distributors of fashion, sport, luxury goods and technical textiles. It is in the top 5 of world technical centres.

Goals: Minimise your environmental footprint/ Make smart technologies accessible./ Integrate digital transformation into business lines./ Develop value ecosystems. Deploy new business models (functional economy, circular economy). (ceti.com)

EURAMATERIALS

NORTH

It is the 2nd European producer of textiles for technical uses behind Germany. The textile industry dominates an important place in France and Hauts-de-France (NORTH). The association focus on the materials process in the industries. The network is supported by specific issues:

- the material (biobased origin or not ...)
- their transformations (formatting processes, new properties and functionalities, etc.)
- their uses (e.g.: materials for mechanical use, biocompatible materials, etc.)
- their impact on the environment (product life cycle, recyclability, circular economy, re-use, recovery, etc)

UIT - Union des Industries Textiles

Union of Textile Industries

PARIS

UIT aids with its members, redraw strategies of the profession: society challenges, technological revolution, environmental responsibility and international competition. It is an essential player in the textile industry in France.

Contribute to the attractiveness of the textile industry. The innovation and traditional know-how paths drive the encourage new partner, markets and young talents.

Ensures a dynamic network through collaborative work with textile institutions and federations from all sectors. It regularly mobilises and renews its support and partnerships to adapt the actions to be carried out to the socio-economic context. (textile.fr)

REFASHION/ ECO TLC

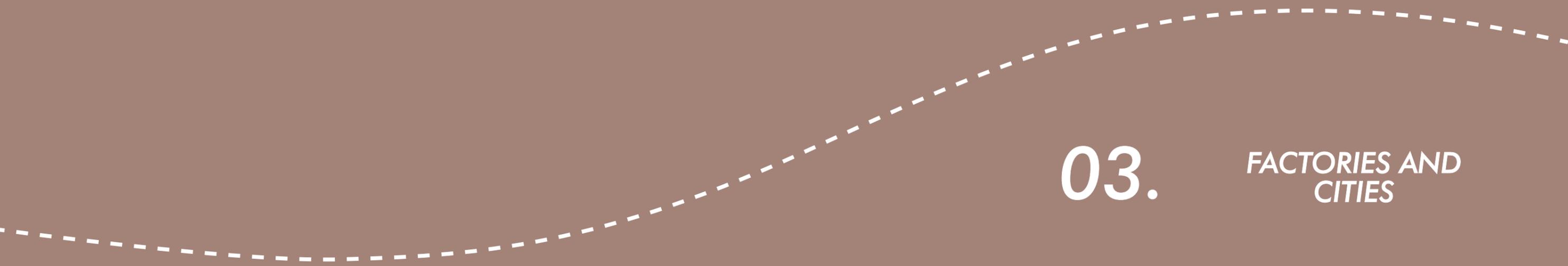
PARIS

Re fashion / Eco TLC is the eco-organisation of the Clothing Textile, Household Linen and Footwear Sector. Stimulates the prevention and management of the end of life of the products of the listed sector, by placing them on the public market. Supports more than 5,000 companies.

Refashion offers tools, services, and information to facilitate and accelerate the transformation and help finance the circular economy's transition. (refashion.fr)

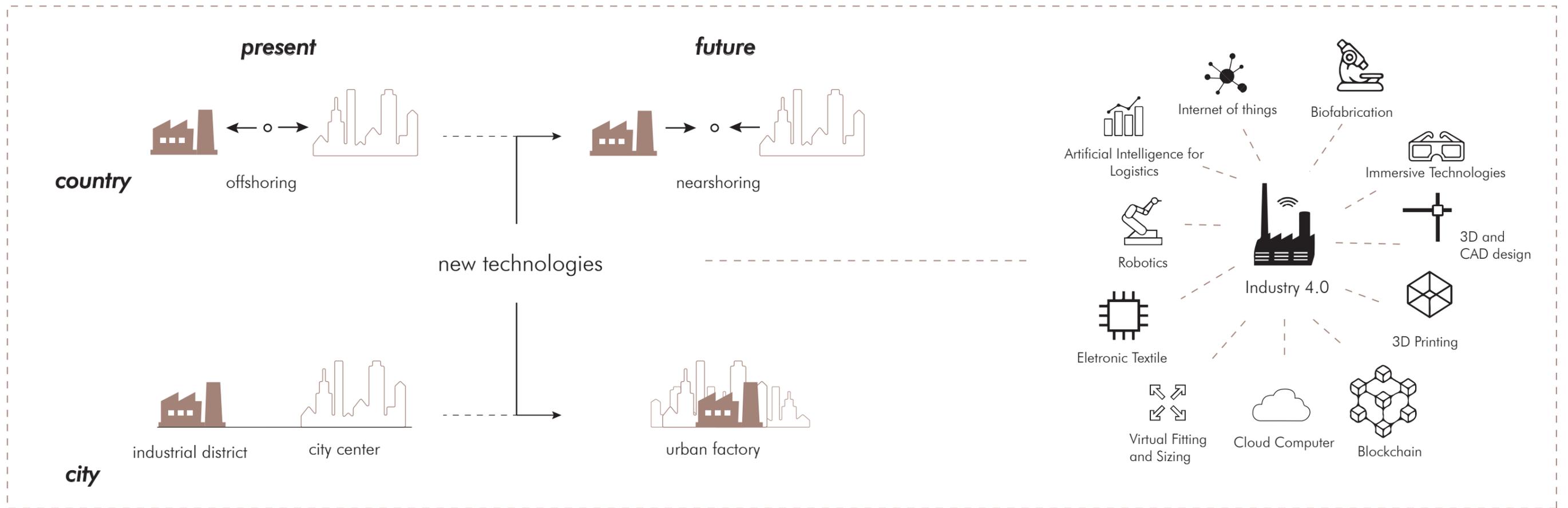
#jesoutiensletextilefrançais

#isupportfrenchtextile



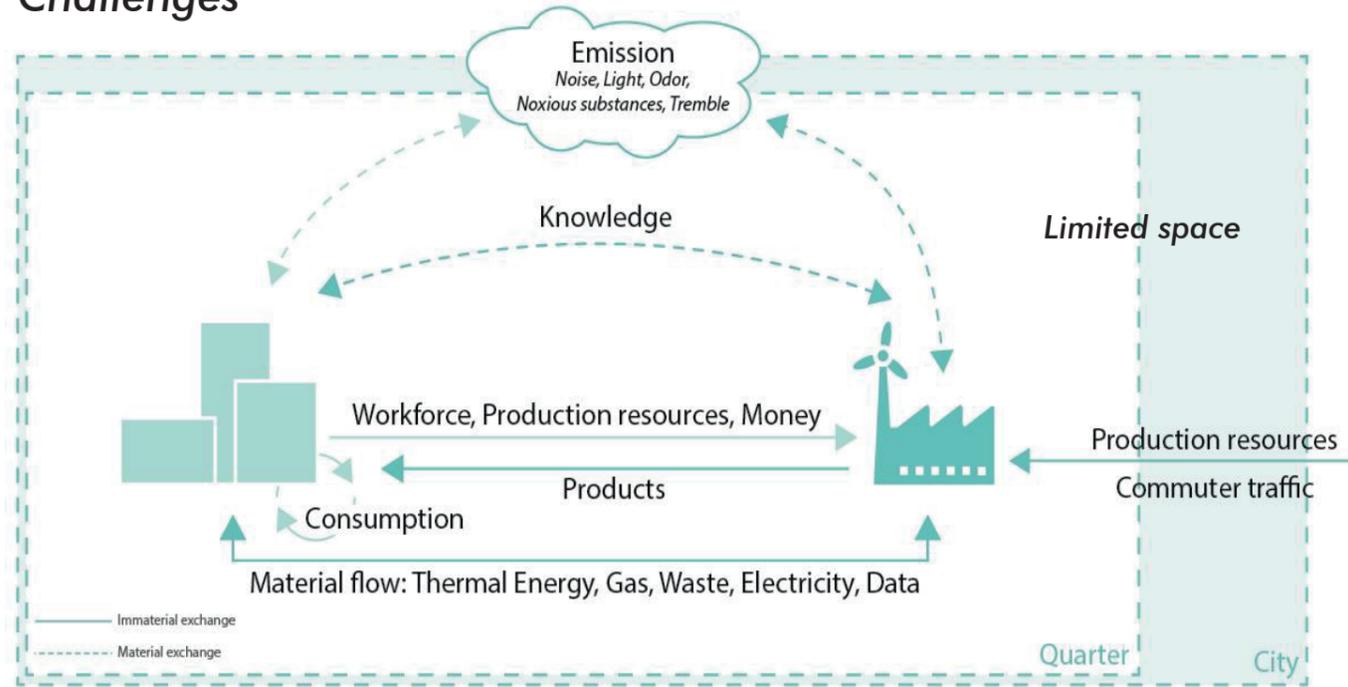
03.

FACTORIES AND
CITIES



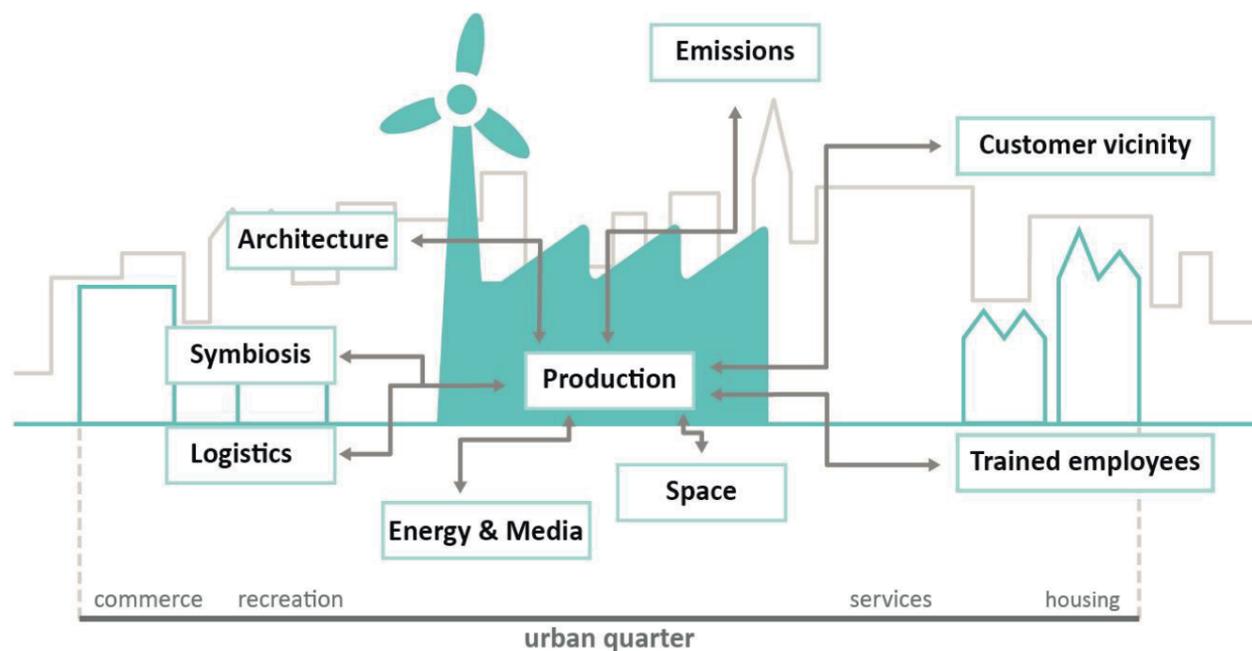
3.1 CONTEXT

Challenges

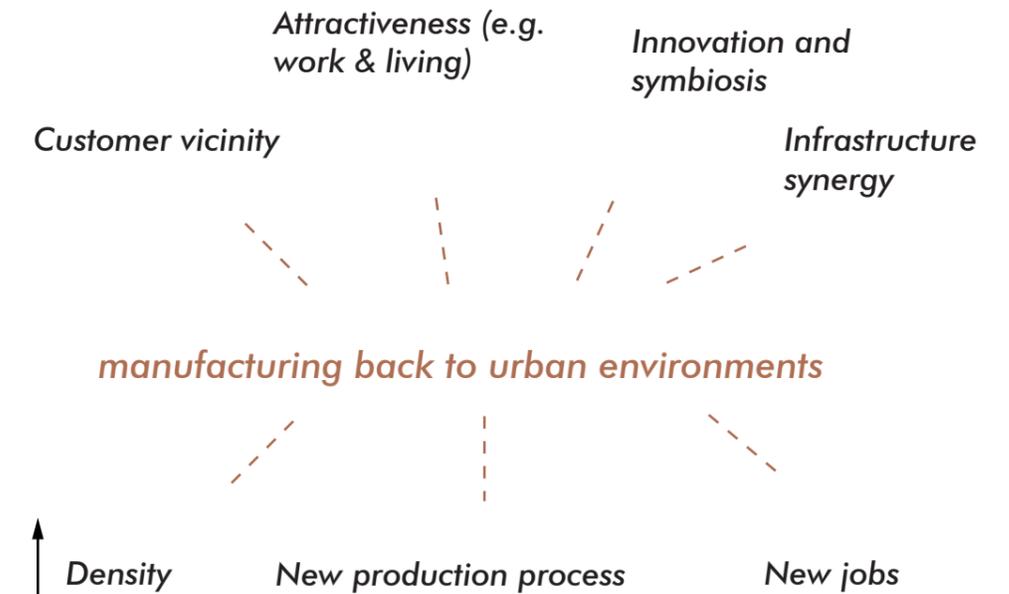


JURASCHEK, 2016

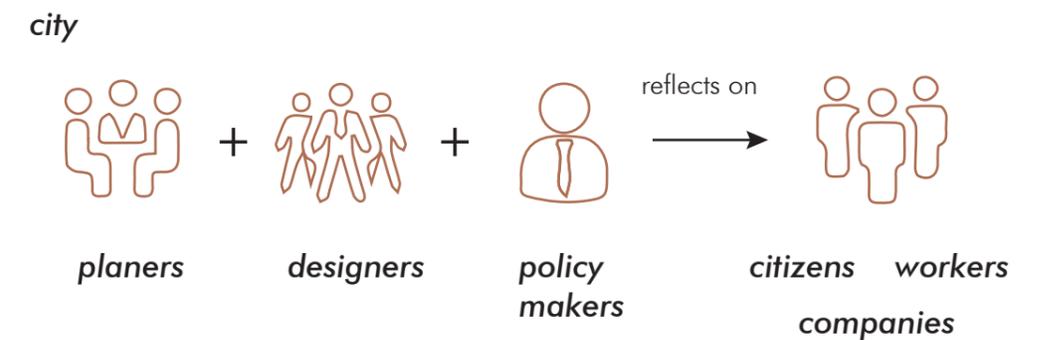
Outcome



JURASCHEK, 2016



How?



“For manufacturing to thrive, planners, designer and, policy makers need to work collaboratively to create places for production that are healthy and economically, environmentally, and socially sustainable” Robert Lane and Nina Rappaport

3.2 INDUSTRIAL DISTRICTS

The link between cities, urbanism and production, is becoming more visible every day. By evaluating cities' changes through history, the connection between industrial productions, zoning, citizens behaviours, and laws are noticed.

Industrial Revolutions caused a change of mindset through years by technologies updates and consumer needs, reflecting in industrial zones. However, these districts have been isolated due to urban plans and seen by citizens as a marginal place.

Nevertheless, industrial lands can be an essential role in urban value creation. (Juraschek, 2018). Throughout history, production and living were attached in populated areas. Since the first industrial revolution, massive production needed larger areas to fabricate new items. Due to that, factories were allocated outlying from the urban core, ratifying a social and physical separation.

Industrial lands and buildings can be allocated in fixed zones, characterised by stringent urban plans and patterns. Nonetheless, unplanned and unselfconscious industry sites can operate in the city, which was previously planned outside. The main reason is the "unexpected" urban growth.

According to Jane Jacobs (1973), the growth of the cities represents the generation of goods. She states the need for diversity and complex multiple public utilities into urban plans. Those have to bring vitality by understanding the city's needs, providing multiple functions and not isolating zone

with diverse activities.

"The term urban factory describes a factory situated in an urban environment, with a factory being a place of value creation. For the urban factory, the input and output flow of energy, material, and people impact the urban surrounding and are influenced by it." (Juraschek, 2018)

Urban factories are characterised by windowless, acoustic pollution due to the high quantities of trucks. Broken sidewalks due to trucks weight and disconnection to the city centre and neighbourhoods in a physical and social fabric are some main characteristics of Industrial districts.

According to Rappaport (2020), "Industrial districts are thought of as the disconnected, leftover spaces of the city fouled with noise, dirt, and truck traffic, better suited to movies about the shadowy underside of Gotham than to the parks, street trees, and other amenities often deployed by the urban designer.". Industrial districts bring insecurity and uncertainty to the citizens, expelling the possibility of interaction between people.

Based on the United Nations report in 2016, the Earth population will increase by two thirds by 2050. The constant urbanisation, rapid urban growth and continuous technological updates do not match with urban plans. Due to that, it generates uncertainties for local authorities and planners. (Rappaport, 2020). Those modifications are directly connected with sustainability.

What is happening with the factories nowadays?

Industrial land and building far away from urban core



=
vacant terrain
=
insecurity
=
not included communities



↓ urban manufacturing jobs =



↓ elimination of living-wage jobs =
↑ income polarization



Production, food service, transportation → automation + Industry 4.0

3.3 SUSTAINABILITY

Urban factories can enhance a sustainable city, in diverse dimensions: economic (value creation), social (job and social security) and ecological (emissions). By reutilising sites and giving different needs to buildings and sites, rather than to expand the urban footprint to new places, urban factories save materials and infrastructure. Also, by minimising the distance between work, home and final delivery, the amount of fossil fuel consumed is reduced. (Rappaport, 2020).

In this context, in 2015, the United Nations determined the Paris Agreement to achieve 17 Sustainable Development Goals (SDG) by 2030. The need for sustainable cities and communities is urgent, and factories have a significant role in maximising this situation.

Juraschek et Al. (2018) were able to describe how urban factories would enhance the quality of sustainable communities and cities according to the UN. Evaluating the Sustainable Developments Goals to 2030, urban factories represent the increase of sustainable strategies in the five SDGs: 8,9,12 represent the high potential to be achieved, and 7,11 represent medium contribution.

“The factory has as essential place in the city and has the potential to return manufacturing to urban environments with increased density and in a forma that supports the new production processes”

Robert Lane and Nina Rappaport

Promote sustainability by creation of resilient infrastructure and fostering innovation

Potential to make human settlements inclusive, safe, resilient and sustainable



Contribute by supply extra energy if use their own energy source.

Employment and GDP raise + infrastructure and services to urban surroundings+ energy efficiency

Circular economy Urban factories can close the material loop by the collection and treatment of waste generated by the city and provide new products. The circulation between factories and urban can promise the concept of urban industrial symbiosis

3.4 DENSITY X DIVERSITY

Industrial zones do not enable the dynamic and flexibility for current necessities to become mixed-use spaces. Nevertheless, analysing these zones from a panoramic perspective, city governments and planners have to promote industrial zones' transformation to mixed-use spaces by adapting to future needs. However, the change of mentality to join factory and urban core is a current hamper.

Currently, factories are changing technologies and constantly updating to be more efficient and faster production. Due to Industry 4.0, automation has increased production capacity, consequently making modifications to the type of labours. Robots, machines, Artificial intelligence, machine learning and other strategies will step ahead jobs and optimise production.

A factory is organised based on an operational flow. Factory of nowadays represents well designed, flexible and sustainable.

Mixed-use districts are characterised as a

high-value human interaction and variety of uses and users. In addition, it inspires cultural/educational events that foster creativity and innovation.

According to Lane and Rappaport (2020), density and diversity are key points for urban manufacturing from a design perspective:

Diversity is characterised by the extensive small and medium manufacturing companies that can array production by space flexibility.

Density reflects directly on proximity. According to studies, for example, the Garment District in New York enhances workers' productivity through the proximity of all principals' garment production steps. It has proven the increase of urban economy. However, it intensifies the isolation of groups minimising networks.

SHARED KNOWLEDGE + CROSS-FERTILIZATION

+ CIRCULAR ECONOMY

=

REINVENTION OF MANUFACTURING DISTRICTS

=

URBAN CREATIVE DISTRICT



3.5 URBAN MOBILITY STRATEGIES

“to understand cities, we have to deal outright with combinations or mixture of uses, not separate uses, as the essential phenomena”

Jane Jacobs

Urban transportation systems and the increase of density in cities reflects directly on the support of Urban Manufacturing. The constant changing of these factors influence the complexity of good movements in cities directly. Due to that, city logistics characterised by transport activities' logistics have a linear relationship with private companies and local policy initiatives. To optimise it, those stakeholders must consider the traffic environment, congestion and energy consumption with the market economy structure (Rappaport, 2020, 79).

The increase in passengers movements is the consequence of public transportation and non-motorised modes. Lanes, roadway geometries are changing based on the citizens and local policies needs. With the increase of mixed-use, lanes, road geometries need to be adaptable. Spaces for loading/unloading, bicycle lanes have to think as co-spaces. Trucks lengths determined a higher radius and distance that are unmatched with pedestrian-friendly streets.

With the increase of density in residential and commercial activities, the “logistics sprawl” is the spread of warehouse to peripheries areas due to economic reasons, it is more affordable. For urban manufactures, the concern is a land price, which is higher in the urban core.

Large freight vehicles produce pollutants that are the cause of short or longterm health problems. The constant movement of trucks

and loading and unloading provokes acoustic pollution, disturbing residents nearby in the night hours.

Due to the negative impacts of urban transportation with a mix of industrial and residential spaces, some strategies can be inferred to minimise those impacts. Electric trucks and vans can be more expansive, however, minimise the noise and the pollutions. Non-highway modes, which can be described as delivery barge through the Seine, for example in Paris, or gas-powered vans and electric cargo cycles make. Based on a New York City study, off-hour deliveries showed that it minimises costs by reducing fuel consumption, delays from congestions, and peak-hours. However, it inferred that the need for off-hours staff and noise impacts on local residents is negative. (Rappaport, 2020, 84)

The public sector influence directly on-road transportation. With the will to minimise possible constraints between non-motorised modes and heavy vehicles, Paris implemented some strategies: bike lanes which prevented trucks from unloading and loading in the curbside; “urban logistic spaces” (ULS), spaces dedicated to loading and unloading in a central business district with small rent.



Truck x Bike line. Source: <https://www.amny.com/transit/bike-lanes-nyc-1-33086701/>

Possible solutions:

green vehicles

off-hour delivery strategies

engage manufacturers in planning

new shared-economy goods delivery alternatives

land use regulations

implement street designs

evaluate public policy

3.6 FACTORIES

Factories are characterised by building or set of buildings with facilities for manufactured goods.

Since medieval cottage industries, factories have been following architecture and engineering designs according to the decade/architecture trends. They reflected the reality of citizens, cities and the environment.

Robert Venturi, in *Learning from Las Vegas*, makes the analogy of a “Decorated Shed”. It represented an ornament and an independent system of space and structure in the inter part. In comparison, the terminology “Duck” appears to the buildings that were completely transformed into their symbology. The symbolic form overall the architectural system with function based on the shape and the construction.

These same analogies are represented in the factories. Buildings that possess steel tanks which are meant to be seen can be classified as “Duck”. However, “Decorated Shed” can be seen through the function. However, both intend to optimise and make the factory more efficient.

Technology has interfered in production through the years, and consequently on the factory flow chart and especially on its design. At the beginning of the 20th-century factories were characterised, by concrete reinforced structure, rational construction systems, which generates efficiency and cost reduction. An example is the Fiat Lingotto factory in Turin.

Nevertheless, the need for efficiency was beyond the engineering and architectoni-

cal design. Workers need to be efficient and specialised in a specific task. The main intention was the human production line.

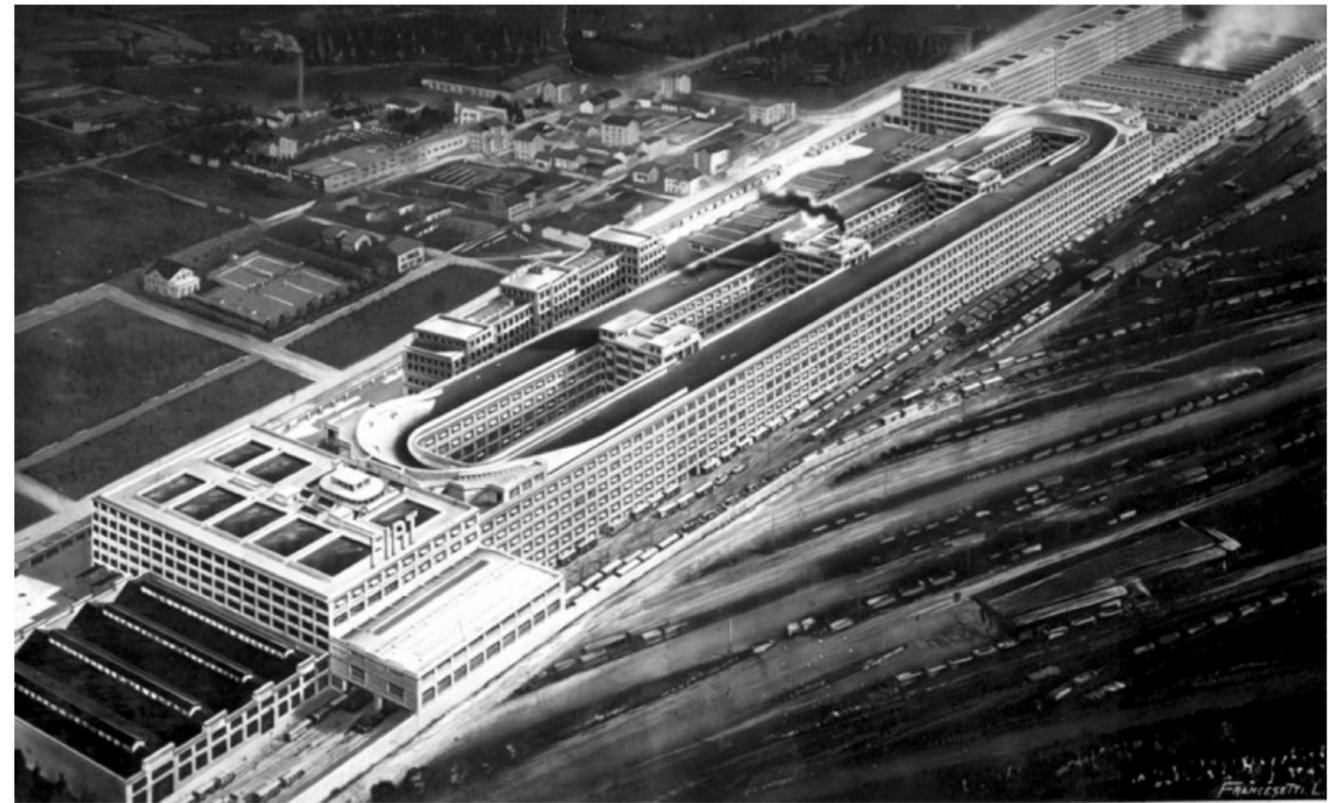
The factory has a unique program in the 1900s, architects of the modernism movement were enchanted by the freedom to explore and organise the space in the best way. The characteristics of this movement within factories were: major occupancy in city blocks, the formation of the courtyard, waterfront access for transportation logistics.

However, architects were encouraged to design windowless and big concrete mass due to World War II. Being an attack point, the need to minimise windows and be separate from the city centres, influenced the cities design and eradicate the distance between blue-collar. As a consequence as well, this dispersant measure reflected in environmental issues. (Rappaport, 2020, 111)

In addition, in the Postwar, architects find the new solution to design factories, by applying: innovative cladding and structural systems, articulated roofscapes, skylights, material experimentation. Modular metal prefabricated panel system was seen in 1962, by Angelo Mangiarrotti for SIAG in Marcianese.

The “high-tech” begun to translate factory aesthetic to diverse architectural typologies. Example: Centre Pompidou - Renzo Piano and Richard Rogers.

Factories continued to change in the further year, with innovation and sustainable and adaptable strategies. Those will be seen in the continuation of this thesis.



Fiat Lingotto Factory in Turin Source: <https://www.laboiteverte.fr/le-circuit-sur-le-toit-de-lusine-fiat-lingotto-turin/>



Fagus Factory - Walter Gropius Source: <https://twitter.com/bauhausmovement/status/1141296466503315456?lang=fr>

3.7 VERTICAL URBAN FACTORY

Vertical urban factory it is cost-saving, due to the valorisation of the urban land. Increase the number of factories, and multiple floors system production need in condensed urban sites. Thus, the land cost is constantly increasing, and vertical factories are a solution to maintain and capitalise in urban areas.

The production organisation flow was from the upper floors to the lowers. An example of a modernist vertical factory is Van Nelle Factory which contain on the scope warehouses, workers facilities and offices.

In this thesis, the necessity to combine these factors is current; however, it will only be emphasised in the next years.

It is important to emphasise that the return of manufacturing to urban environments. The factory has an essential place in the city and has the potential to return manufacturing to urban environments with increased density and in a form that supports the latest production processes.

Divided by Nina Rappoport (2020) in four categories, vertical urban factories bring strategies that fit with the current time dynamic.

Vertical Urban Factory is...

multistoried factories can house a mix of SMEs

smaller, cleaner, lighter manufacturing

worker amenities (library, cafeteria)

high-end design *cost-saving*

increase technology

spectacle

The factory considered a spectacle to reflect the recognition of the consumption society. It can express a specific company, utilising the building as a marketing tool.

Furniture, fashion and automotive sectors are some examples of the customised factories.

Another marketing design strategy is utilising the companies elements in the factories, as a façade, instead of on the intern layouts.

Glass façade is another design approach that influence as a marketing tool physically or socially. These façade allows the public to see and experience the working process. Also, it has the potential to increase public knowledge about factory labours.

neo-cottage and flexible

Flexible and smaller industries which occupies neo-cottage spaces rather than entire buildings. It is characterised by shared space called "Industrial Commons", where companies share facilities and expertise to reduce cost. The shared spaces include fab labs, co-working spaces, collaborative workshops. Business focus on sharing computer, high-tech machinery, 3D printer and CAD/CAM machines.

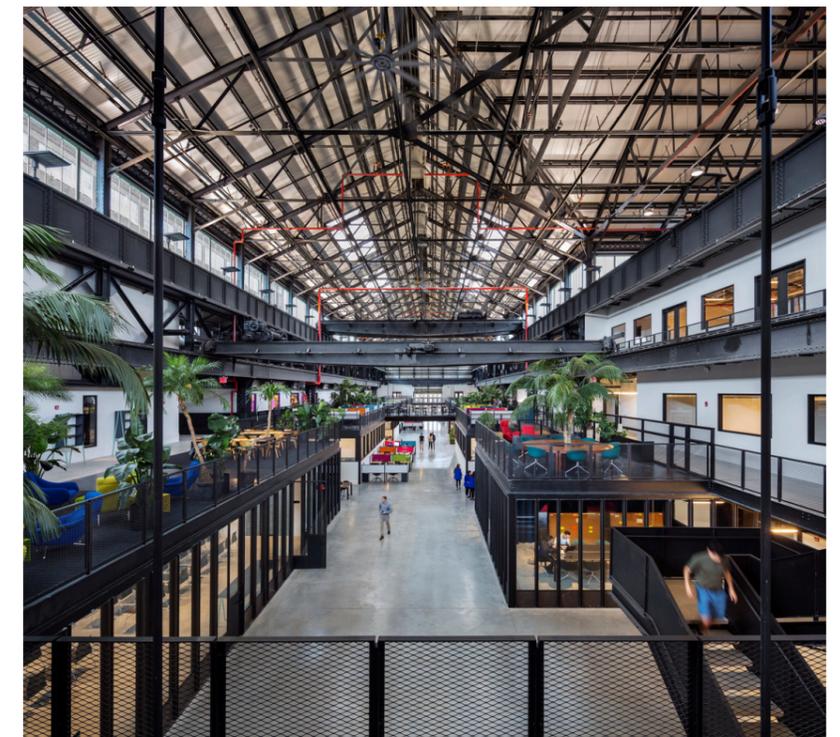
- smaller and flexible
- dispersed and local network
- industry 4.0
- industrial commons = shared fabrication spaces = co-working industrial spaces

"bring the workers to the view"

Jane Jacobs

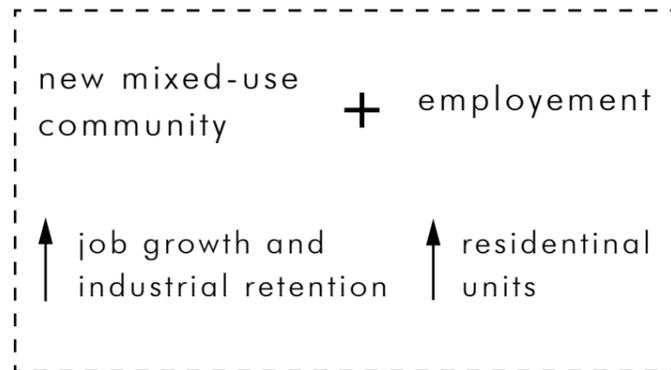


Volkswagen Sachsen GmbH - The Transparent Factory Dresden
Source: <https://www.volkswagen-newsroom.com/>



New Lab - Marvel Architects.
Source: <https://www.archdaily.com/922614/new-lab-marvel-architects>

Hybrid



Its is a multistoried project, in Vancouver, which is a role model to mixed-use typology. It was developed by Wall Financial Corp and combined residential and light-industrial spaces. The site is composed of traditional manufactures, innovative industries like breweries, wine distributors, artisanal workshop.

To make the project feasible, the developer realised that lower land costs could make a mixed-use project feasible. The market-rate and lower-cost housing can cross-subsidise the manufacturing portion of the building.

70 units of non-market housing, 280 units of market housing and 6.000m² of light industrial and commercial retail space.

Location: Vancouver BC

Client: Wall Financial

Type mixed use: market residential, non-market residential, office industrial

Size: 27870 m²

Sustainability: Leed Gold

Status: Completed

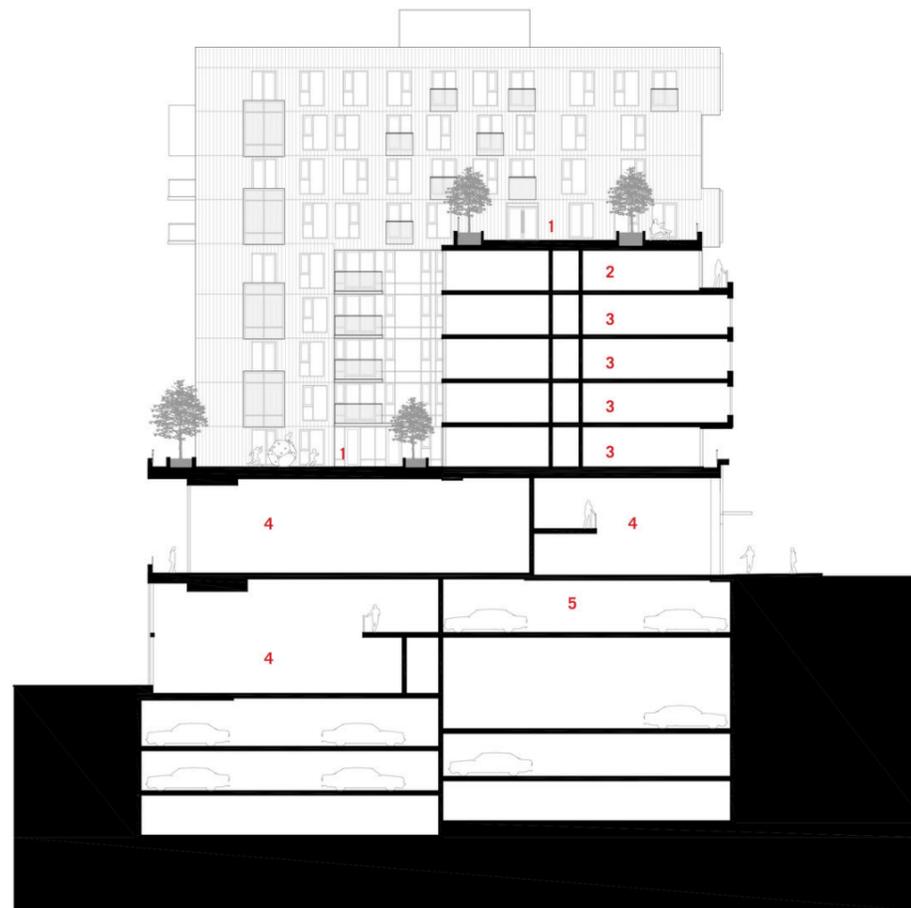


The building is zoned as market residential, non-market residential, office industrial. Vancouver's Municipality determined industrial spaces of 465m² maximum, with the will to maintain factories small and clean. GBL architects chose as the heart of the project the vertical loading, differentiating the circulation according to the building's use. In addition, to be compatible with the residential uses, the industrial spaces are separated by these loading docks and elevators, is composed of soundproofing and provide corridors of 1.8m to firefighting access, which is more significant than residential sections. "This new hybrid, both with its transparency and resolved building technology solutions for industry and residential use, contributes a significant architectural presence in the community as well as being a financially viable model in that mix." (Rappaport, Nina, 2020, 123)

Furthermore, the building achieved the Leed Gold and the NAIOP Commercial Real Estate award 2020. The project was considered the top mixed-use project. The award was based on the quality, functionality, leasing, sustainability and financial performance of the project, and Innovation and scale. (CREA,2020)

"Working closely and collaboratively with the design team and City staff ... we were able to successfully create a building program that incorporates the needs of the industrial users while ensuring a comfortable living environment for the residents."

Bruno Wall, President of Wall Financial Corporation (WFC)



CROSS SECTION

- 1 COMMON ROOF PATIO
- 2 MARKET RESIDENTIAL
- 3 NON-MARKET RESIDENTIAL
- 4 PRODUCTION, DISTRIBUTION, REPAIR (PDR)
- 5 UNDERGROUND PARKING

Strathcona Village. Source: <https://archello.com/project/strathcona-village>

sustainable

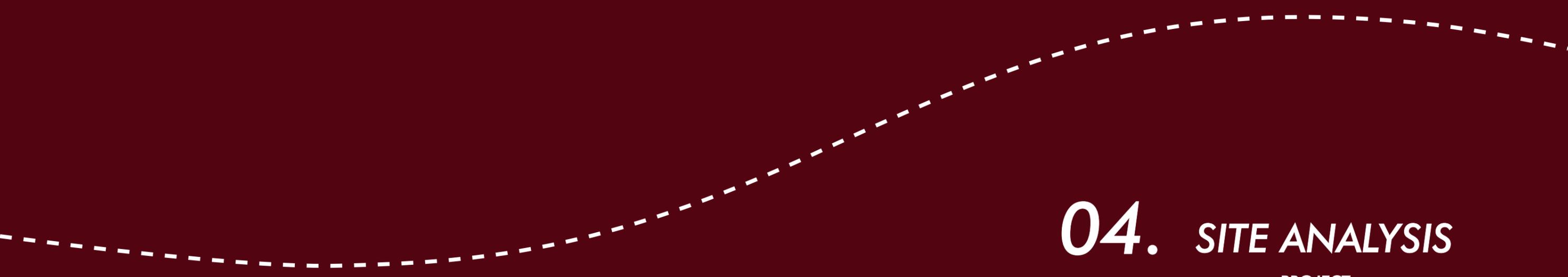
Sustainable manufacturing element is to minimize supply chains and reduce a company carbon footprint, since shipping and delivery to worker commutes.

- greenhoused on factory roof for energy reduction, water reuse and activating community
- full material circularity, including material passports for building components, disassembly and material reuse
- cities and regions with closed-loop energy, water, and material system = waste elimination
- transform waste into new products, operating using renewable energy, becoming vital centers for jobs, community building and capital.

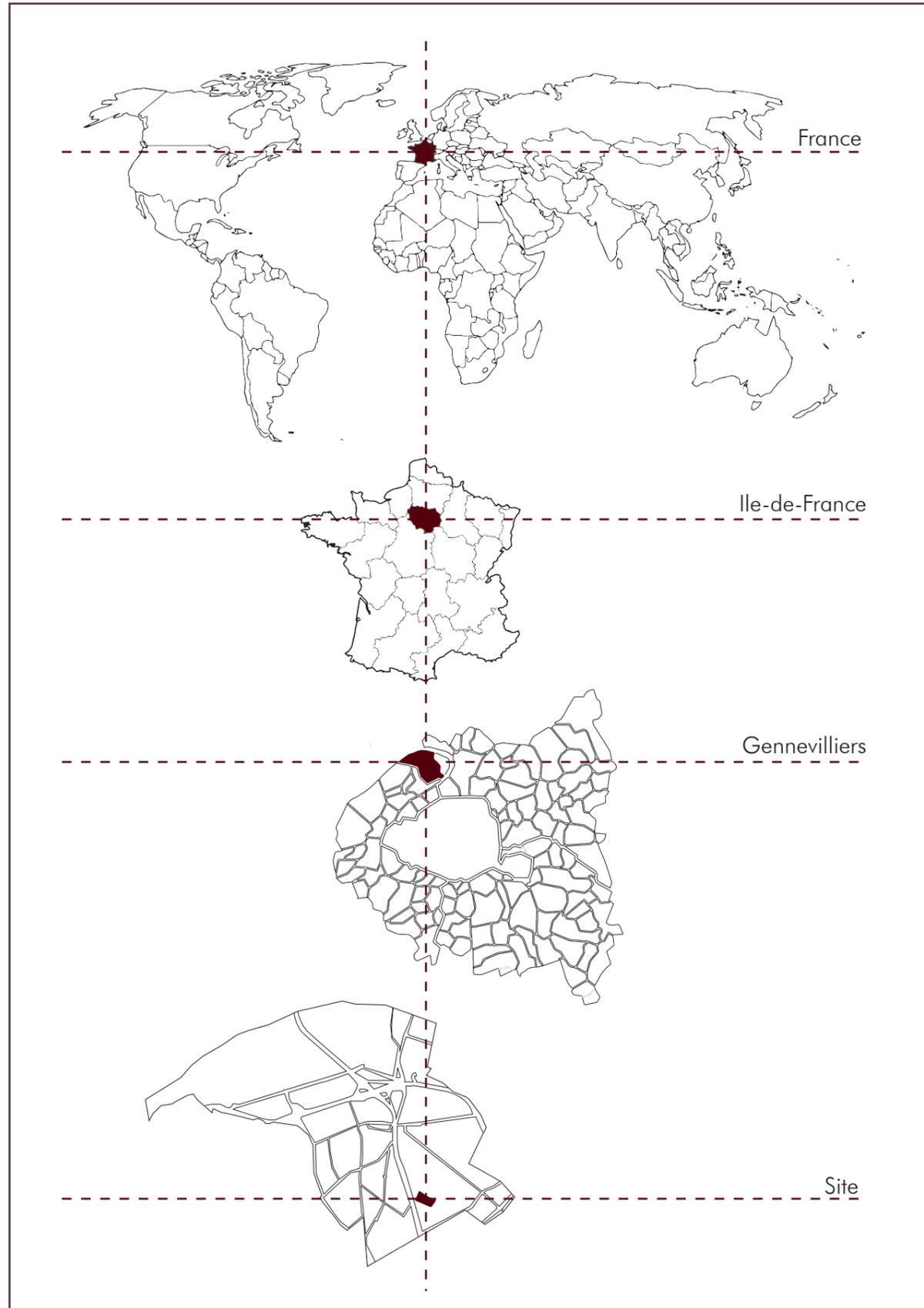
(Rappaport, 2020, 148)



BIG Architects' Amagerforbraeding power plant (2019)
Source: <https://www.archpaper.com/2020/11/copenhagen-bigs-skia-ble-waste-to-energy-power-plant-gets-sweeping-new-photos-from-hufton-crow/>



04. **SITE ANALYSIS**
PROJECT



4.1 GENNEVILLIERS

In this section will report the continuous fact of the changes of the city and specially on the chosen site. It is important to rati that the sources utilized for this section were taken directly on the Municipality of Gennevilliers website. In addition, to have current information of the study site, the author got in touch with the Director of Project Operations of Gennevilliers, to understand better the issues and will of the stakeholders. It w a privilage to received this information.

The city of Gennevillier is located near Paris and on the Boarc of Asniers-su-Seine. The city is connected a few minutes from the Paris ring road and La Défense, Gennevilliers is at the confluence of major road infrastructures (A15, A86) and near Charles De Gaulle airport. Its river and seaport, one of the fir in Europe, contributes to the region's wide influence.

It is situated on the isolated marshy plain on one of the mean ders of the Seine nicknamed "the bond of Gennevilliers". It known by the profound industrial transformation and industri zation.

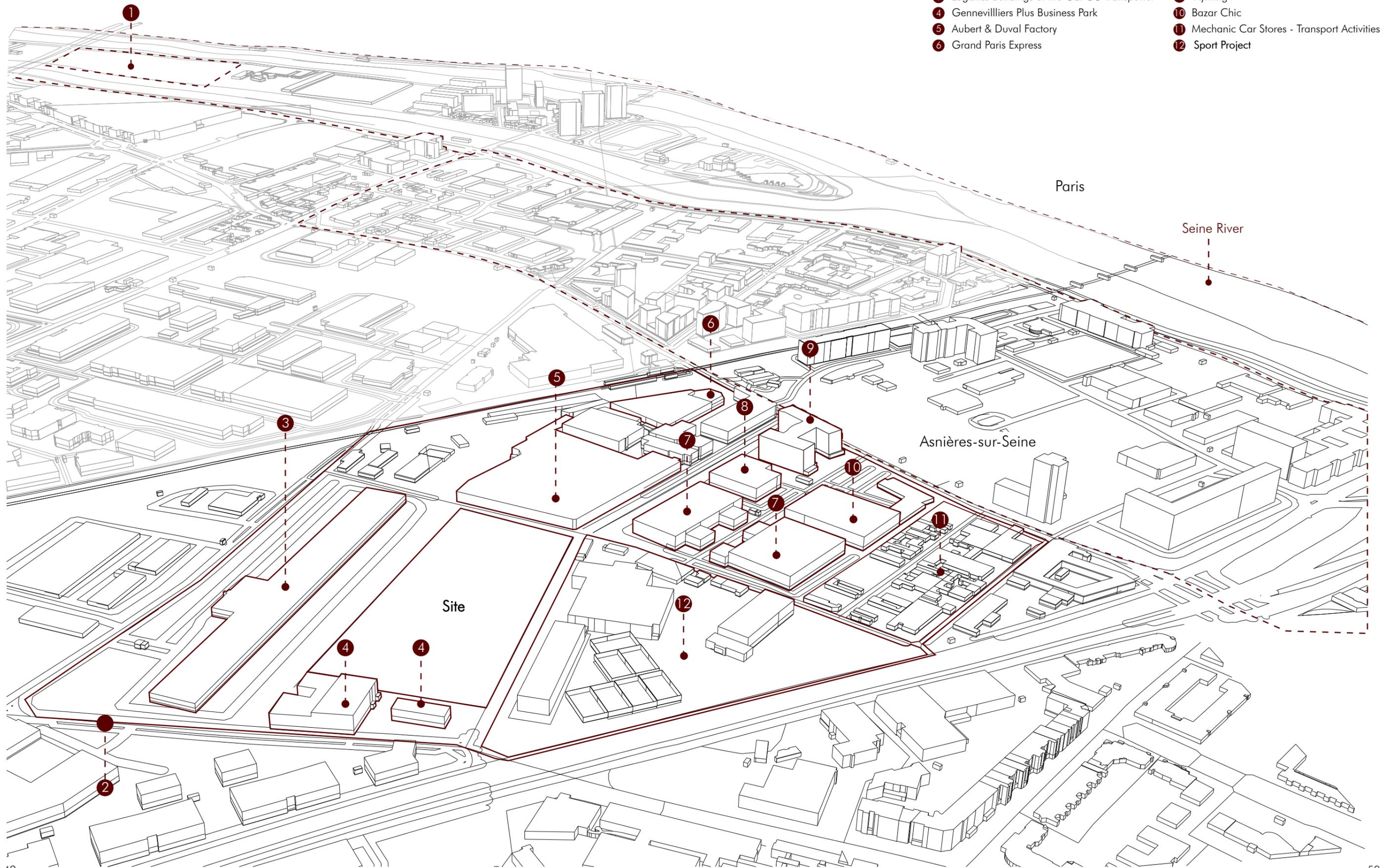
Followed by the construction projects for the extension of the tramway line from Paris to Gennevilliers in 1877; the Paris Gare du Nord - Ermont railway line in 1909, dedicated primarily to freight transport and the construction of the Port, begun in 1925 and completed in 1950. (Municipality of Gen nevilliers)

Furthermore, the timeline will guide the path of the city of Ger nevilliers and the study site.



Figure : https://survoldefrance.fr/affichage2.php?f=&img=56612&prev_suiv_link=0

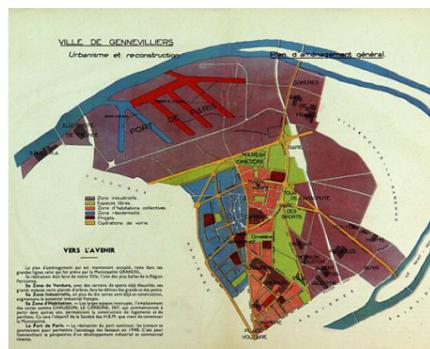
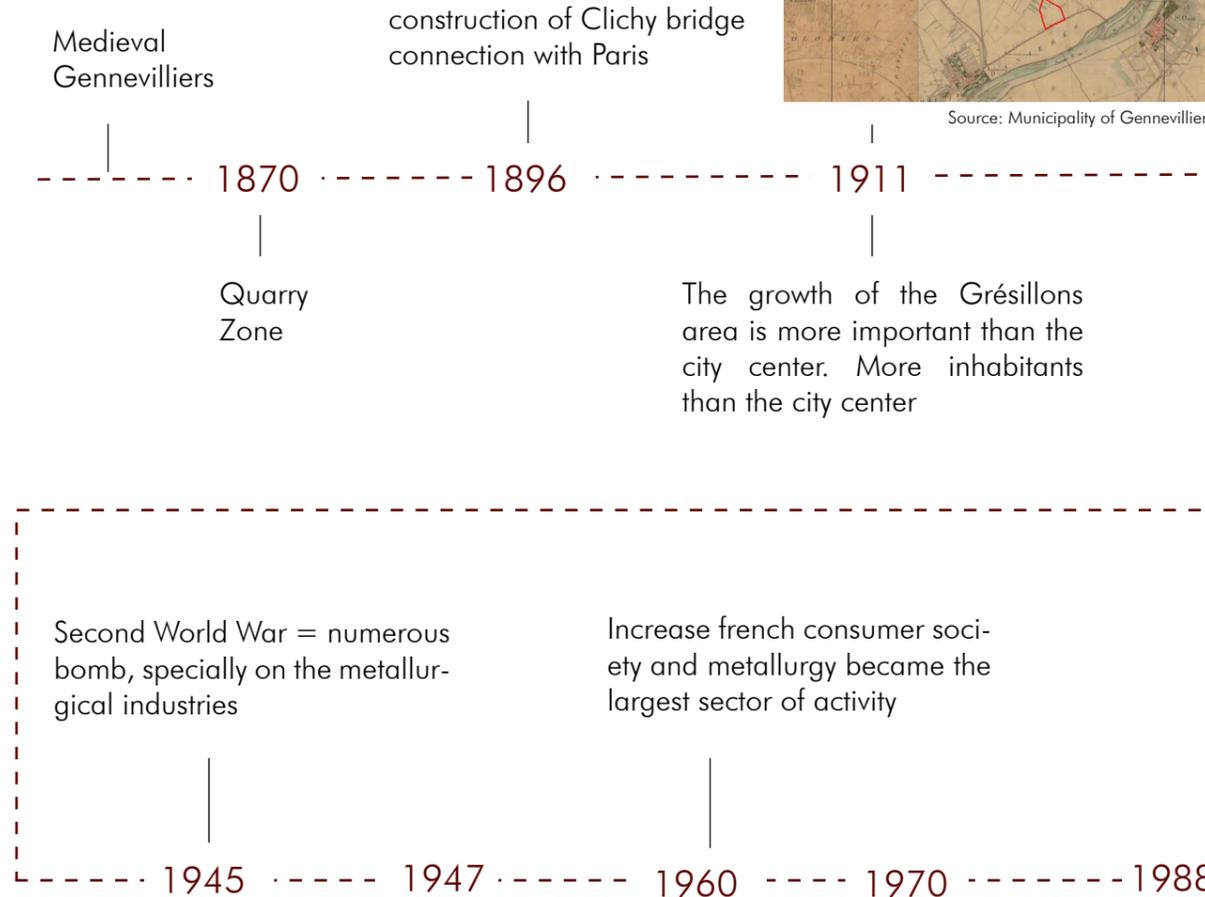
- 1 Olympic Ville 2024
- 2 ZAC Gare des Gresillons
- 3 Logistics buildings of the GEFCO transporter
- 4 Gennevilliers Plus Business Park
- 5 Aubert & Duval Factory
- 6 Grand Paris Express
- 7 ActivitiesParc : GVIOr
- 8 LEGOUX SAS + Autotrans
- 9 Ayming
- 10 Bazar Chic
- 11 Mechanic Car Stores - Transport Activities
- 12 Sport Project



4.2 TIMELINE/URBAN PLANS



Source: Municipality of Gennevilliers

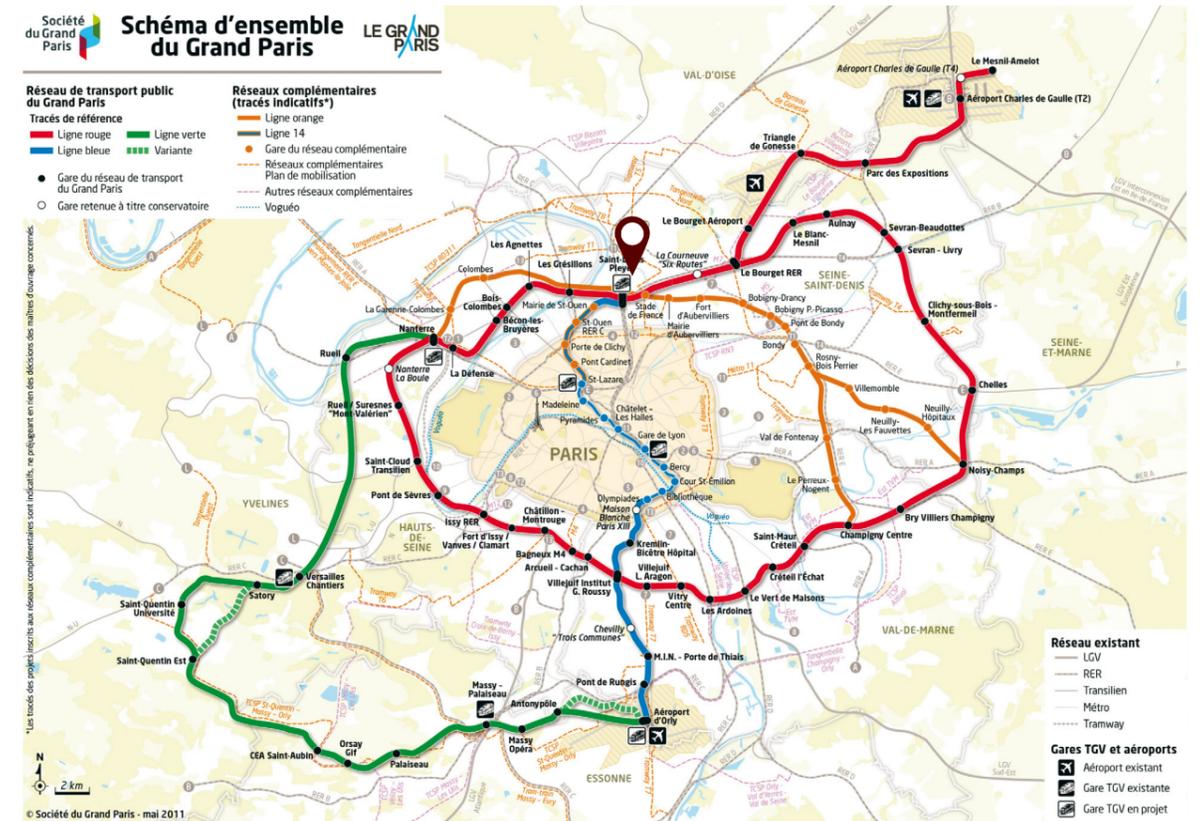


Source: Municipality of Gennevilliers

General development plan. 1st in reconstruction period

2011 Gran Paris Express

The Grand Paris Express is a public transport network project consisting of four automatic metro lines around Paris and two existing lines. The construction of these metro lines will be done from 2020 until 2030. In the site region, the Les Gresillions station will be available for the Grand Paris Express circulation in 2027.



2012 ZAD Zone to Defend

The term ZAD (Zone à Défendre) which means Zone to Defend, tends to block a development project. In this case, in 2012, the Municipality for six years. Urban project understudy to develop this industrial area into a mixed quarter, in connection with the creation of a Grande Paris Express station, interconnected with the RER C (metro suburban line) (horizon 2027)

domain: mixed housing / activities/ developer: commune/ deferred development zone

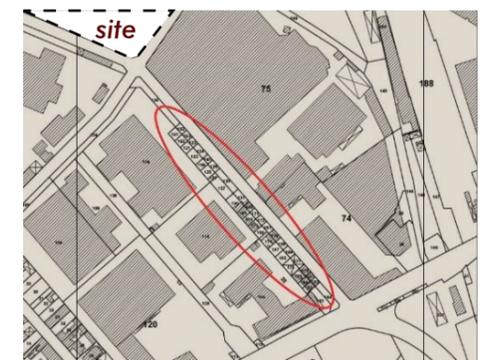
2013

Aubert & Duval

Aubert & Duval is a methalurgic company which its production were made on the site study. In 1919, the Aubert and Duval company bought land from the old quarries. The price of the land was cheaper due the fact that it was over-used. Located on rue Henri-Vuillemin, it starts manufacturing high-tech steels and alloys, thus becoming an essential player in the high-tech industry. Near the factories, across the street, the workers used to live nearby. In addition the characteristics of the factories were windowless and made by brick.



Figure: Aubert & Duval factory, which is in front of the site. Image provided by the Municipality of Gennevilliers



- Demolishment of Aubert & Duval worker`s house, built in 1930

- Demolition of workshop, industrial buildings then depolulation of sites as for part of the site of the Aubert-Duval company



2012



2021

2016

ZAC Gare des Gresillons

In France, a Concerted Development Zone (ZAC - Zone d'aménagement Concerté), or more commonly known as a construction zone, is a public urban planning operation under the urban planning code.

february 2016

ZAC Gare des Gresillons is located on the border of Asnières-sur-Seine and in the industrial area of Gennevilliers.

Master plan

"The main goal of ZAC Gare des Gresillons is to assess from the land, economic capacities and economic development of the sector as a "showcase for collaborative innovation". Due to that the development of the guidelines resulted in maintaining the economic vocation of this sector with the objective of economic programming focused on collaborative innovation, which enhances the value of existing businesses and new ones. (Gennevilliers website)

december 2016

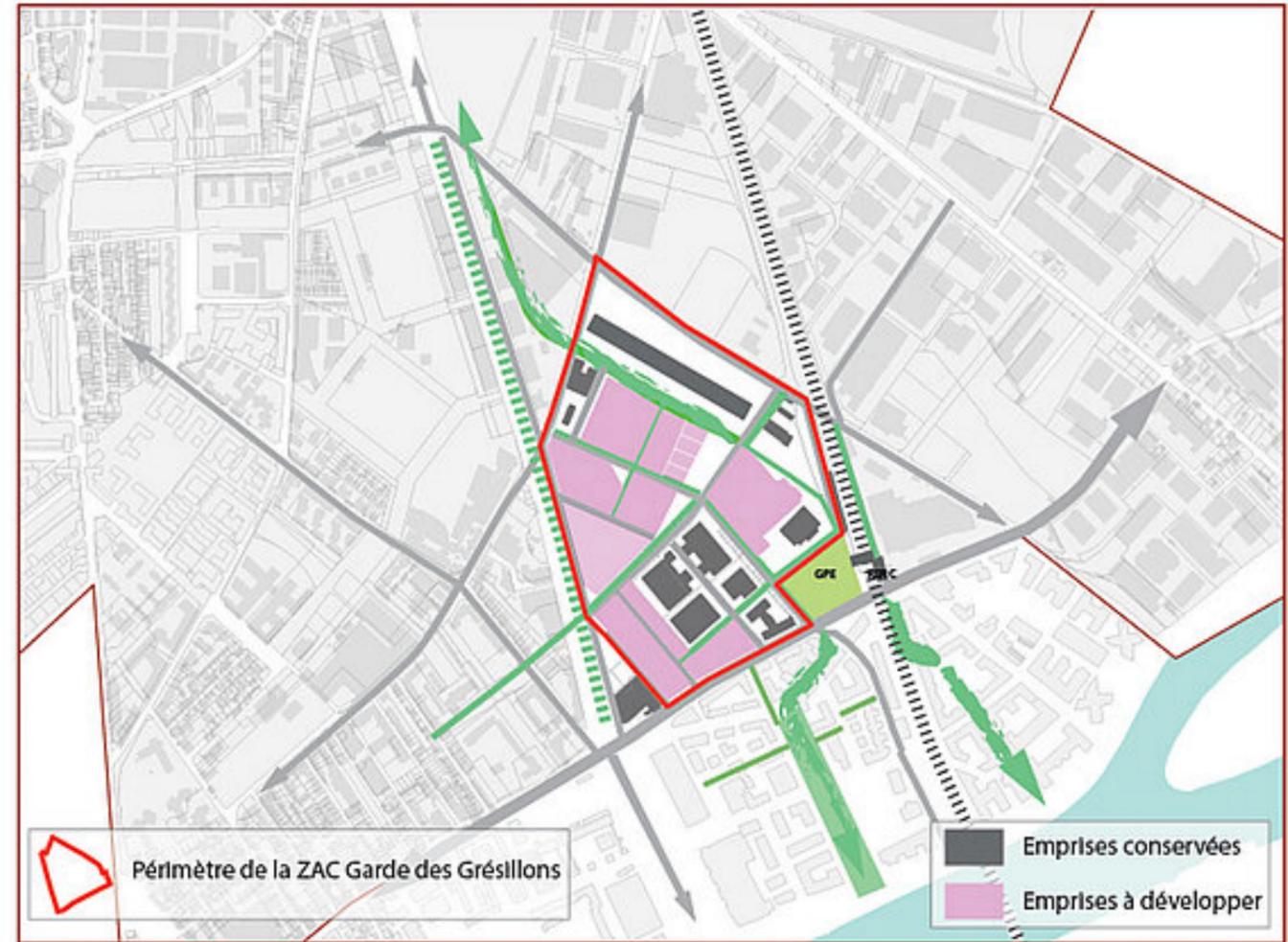
According to the Municipality the intention to develop this area is to create a collaborative innovation campus, with: "innovative, creative and digital companies" area; a recycling plant; a digital sound and image center; business premises (very small businesses, third places, etc.). Beyond that this facilities need to be followed by:

The reorganization of the fabric of public spaces and the road network

A qualification of the green and landscape fabric

Territorialized programming, distributing densities / functions over mutable or non-mutable sectors

As this site is currently occupied mainly by former industrial activities and surrounded by major transportation infrastructure, the ZAC project impact study analyzes the main environmental and health issues: soil and surface - ground and groundwater pollution, significant noise pollution, pronounced urban heat island phenomenon,



ZAC Gare des Gresillons Plan. Source: Municipality of Gennevilliers

ZAC main program:

Offices: 8,000 m²
 Industry: 49,400 m²
 Shops and services: 2,000 m²

Equipment of collective interest: 15,300 m²
 Hotel accommodation: 5,600 m²
 Housing: 2,250m²

"How can a city now accept and be design including working areas, with new factory, new way of working, new office buildings?"

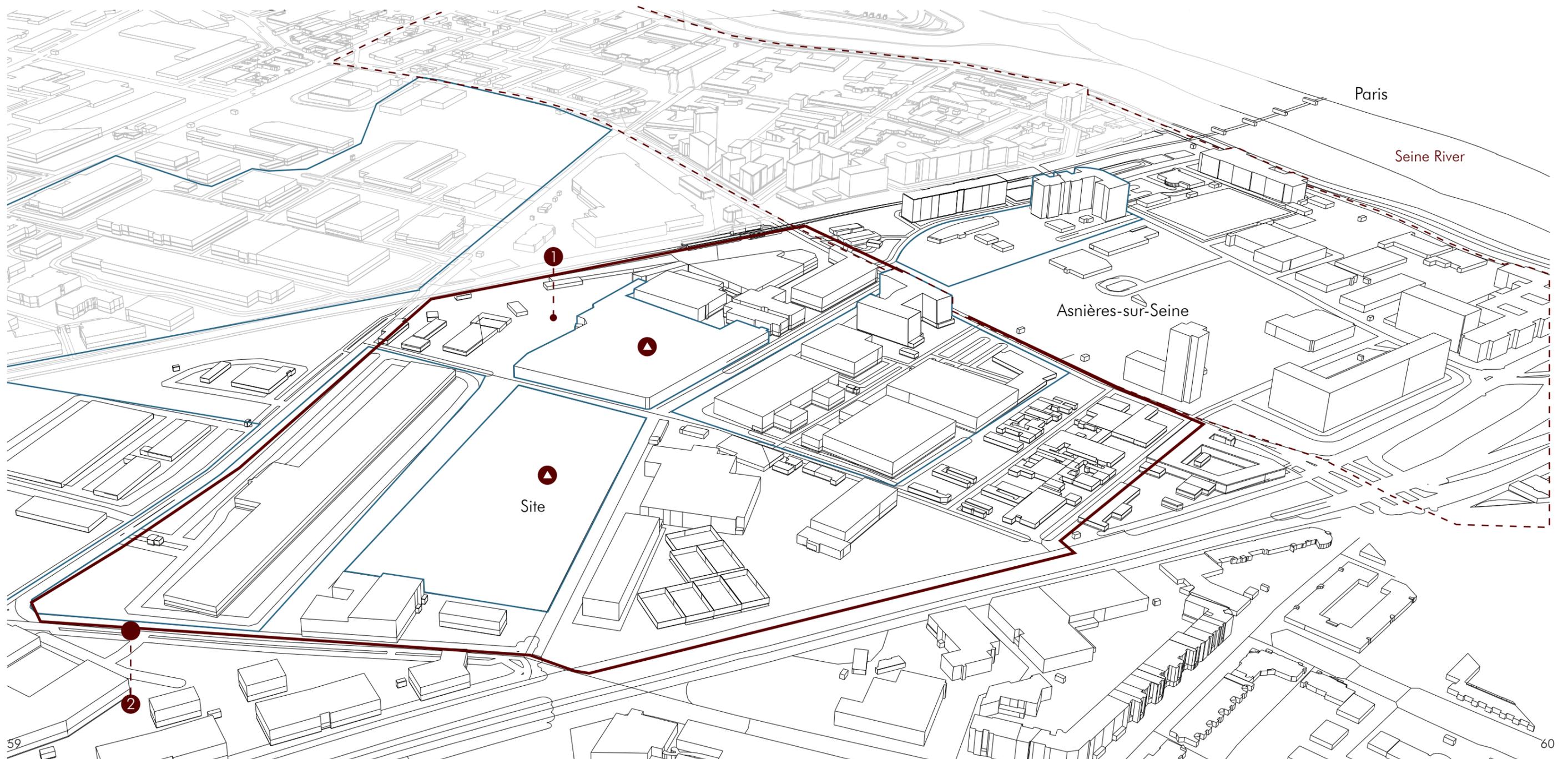
What is it going to like working into the city tomorrow? today the big factories have to leave the centers of the city. We have to think about on this part."

Gérald Cadinot
 Ville de Gennevilliers, Direction des Projets Opérationnels, Directeur

2017 Stop ZAC Gare des Gresillions

Based on the information of French Government in 2017. Polluted sites in the Industrial Zones are highlighted in Blue. The sites operated by Aubert and Duval presents soil and groundwater polluted with hydrocarbons, chlorinated solvents and metals. There were difficulties to move the industrial ovens of these areas. Beyond that, it is confirmed inundation, technological and ground risks. After the knowledge of these problems, the ZAC development was stopped.

- ▲ Aubert and Duval Properties
- Polluted Site
- ① Previously Polluted Site. Currently, Unpolluted Site
- ② ZAC Gare des Gresillions



2019

PLU- Gennevilliers Local Urban Plan

The PLU (Plan Local d'Urbanisme de Gennevilliers), the Gennevilliers Local Urban Plan, was modified in 2019.

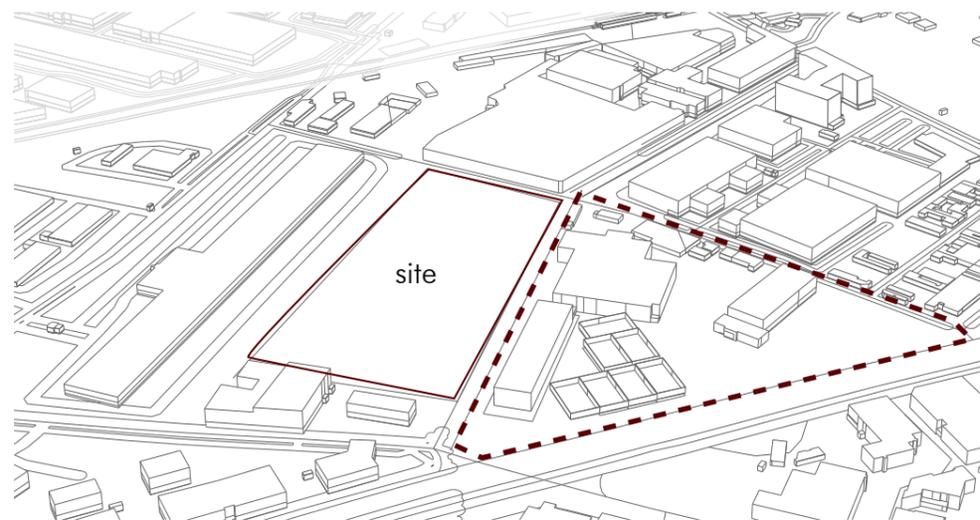
The study site is located on the zone UEe (Zone Urbaines - Urban Zone) which emphasizes the framework of mixed economic vocations, as well as tertiary activities and services which are more incentivized than other.

The plan ratifies the industrial zone and provokes the mixed use vocations. In terms of the restrictions due to the site, the plan emphasizes that the buildings must be erected with a minimum setback of 5 meters from the alignment. No further modifications are being determined by the plan in this area. Façades and materials were explained as a suggestion.

2019

Feasible Study

After the stop of the ZAC , the Municipality wanted to continue the advance on the agreement. Due to that in 2019, the Municipality of Gennevilliers started to develop a feasible study, since it has less difficulties and risks, to be implemented sooner. It initiated the development of a proposal, which focused on urban sports, which maintains the previous function of the place, which is a sport center.



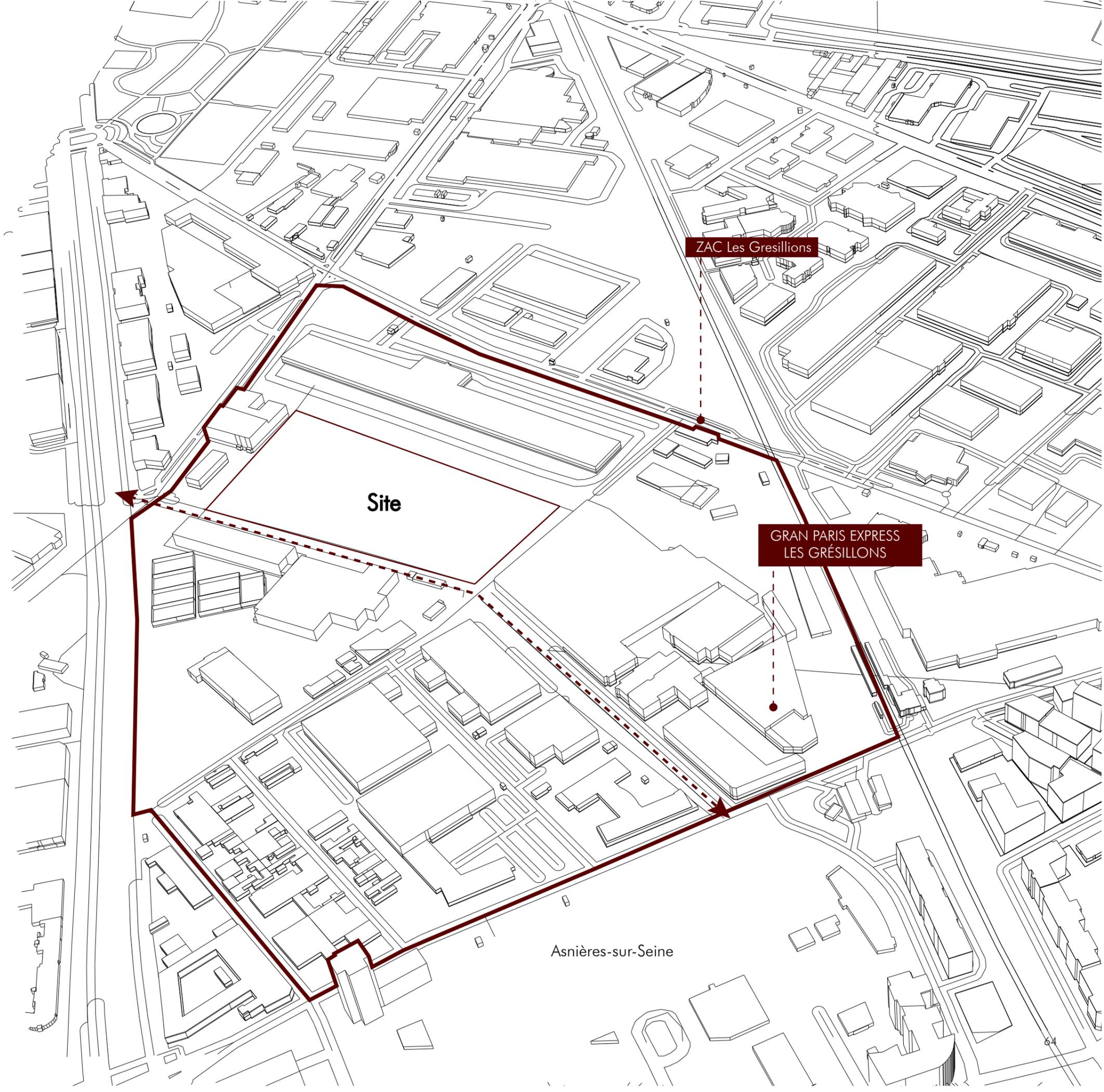
--- feaseble study



2027

Gran Paris Express

Inauguration



Inauguration of Gran Paris Express in Les Gresillons. The project contributes to the circulation on the area, specially on the Rue Henri Vuillemin (highlighted in the image)

2027

Project Inauguration

"I remember...

that in my building, there were ten occupants. We weren't always with each other, but if someone needed anything, they could count on the solidarity of others.

Even today, the Grésillons district is more than a district, it is a village and solidarity is daily there."

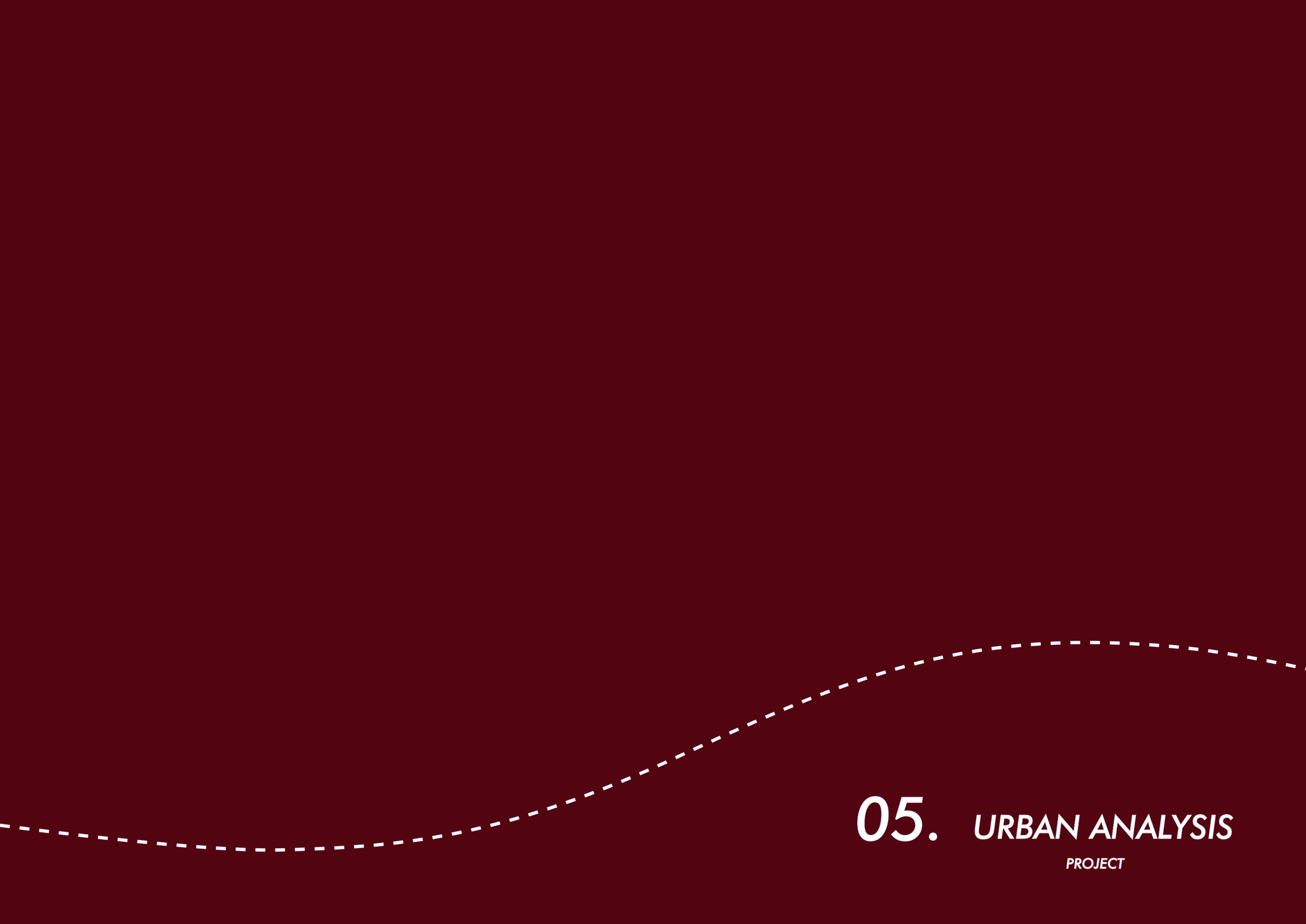
Gennevilliers Citizen

"I remember... of these companies that disappeared in Les Grésillons. Others have moved in or will move in tomorrow.

We must keep the memory of this industrial past, of workers' memory and of union struggles. If all this were to disappear without leaving a trace, how will our children know that we have to fight to get something?

The Grésillons district is more than a district, it is a village and solidarity is daily there. "

Gennevilliers Citizen



05. **URBAN ANALYSIS**
PROJECT

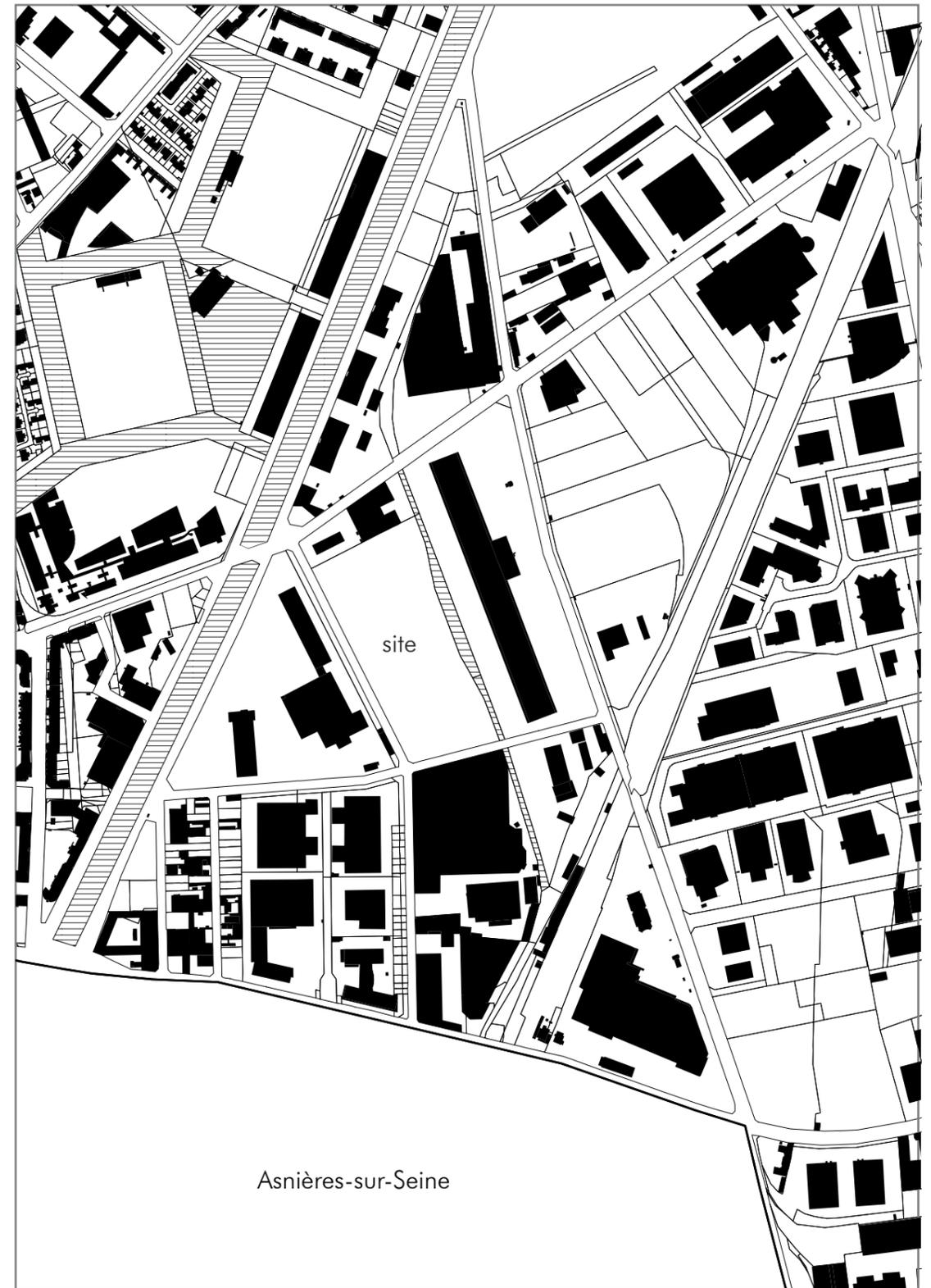
5.1 LAND USE



Industrial
 Commercial
 Residential
 Vacant



5.2 NOLLY PLAN



Buildings
 Green Spaces



5.3 STREET AND BLOCKS NETWORK



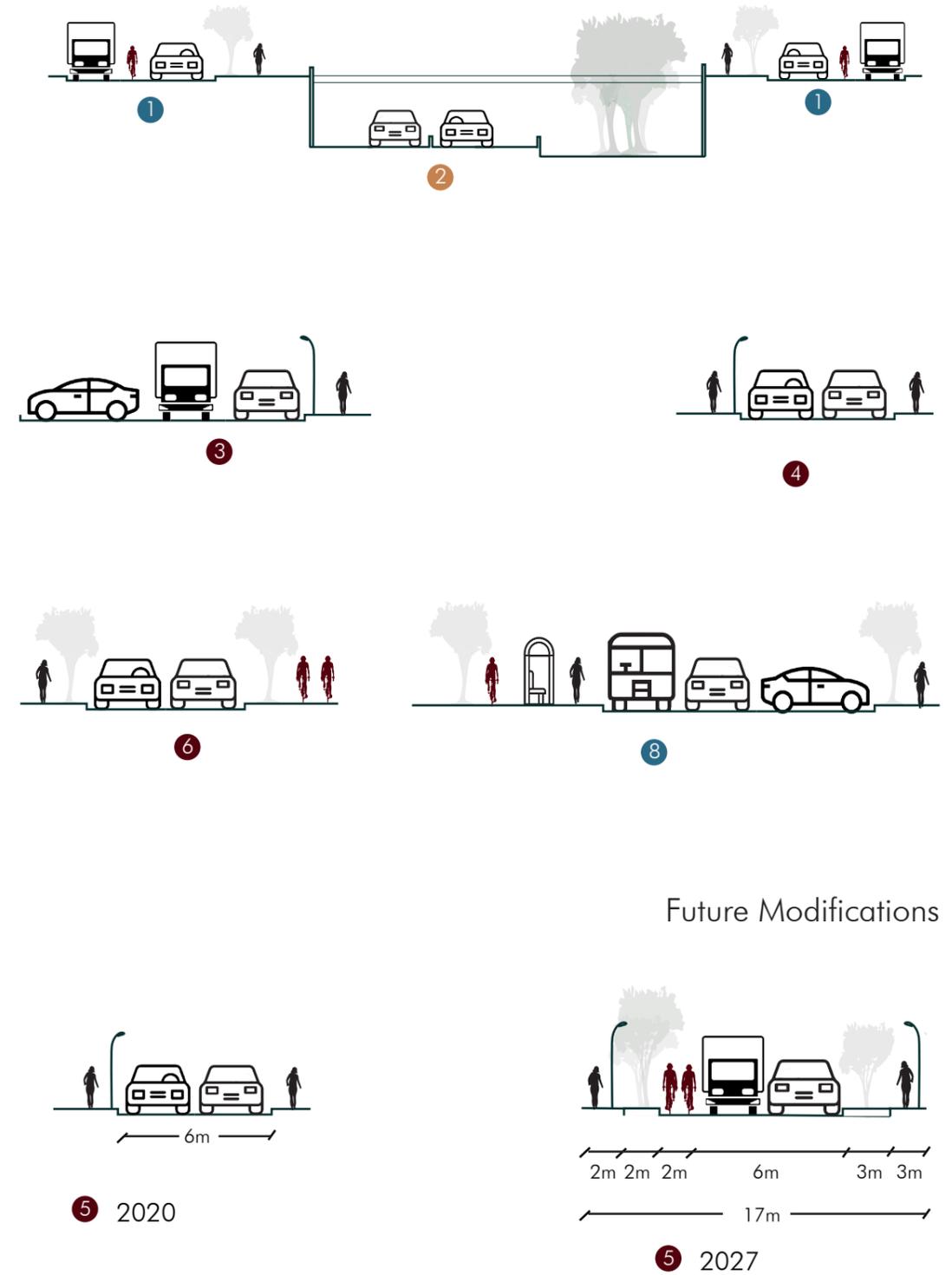
5.4 BUILT PATTERN





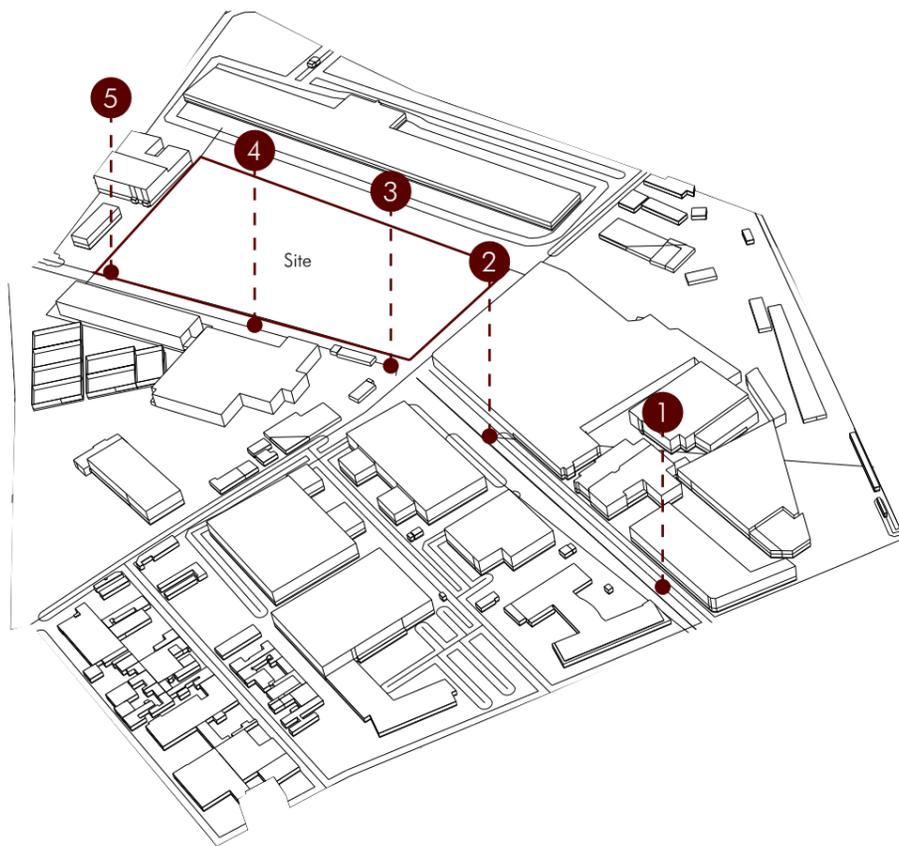
- 1 D17
- 2 N315
- 3 Rue du Fossé Blanc
- 4 Rue Transversale
- 5 Rue Henri Vuillemin
- 6 Rue des Caboeufs
- 7 RER C
- 8 Av. Gresillons

5.5 ROAD SYSTEM



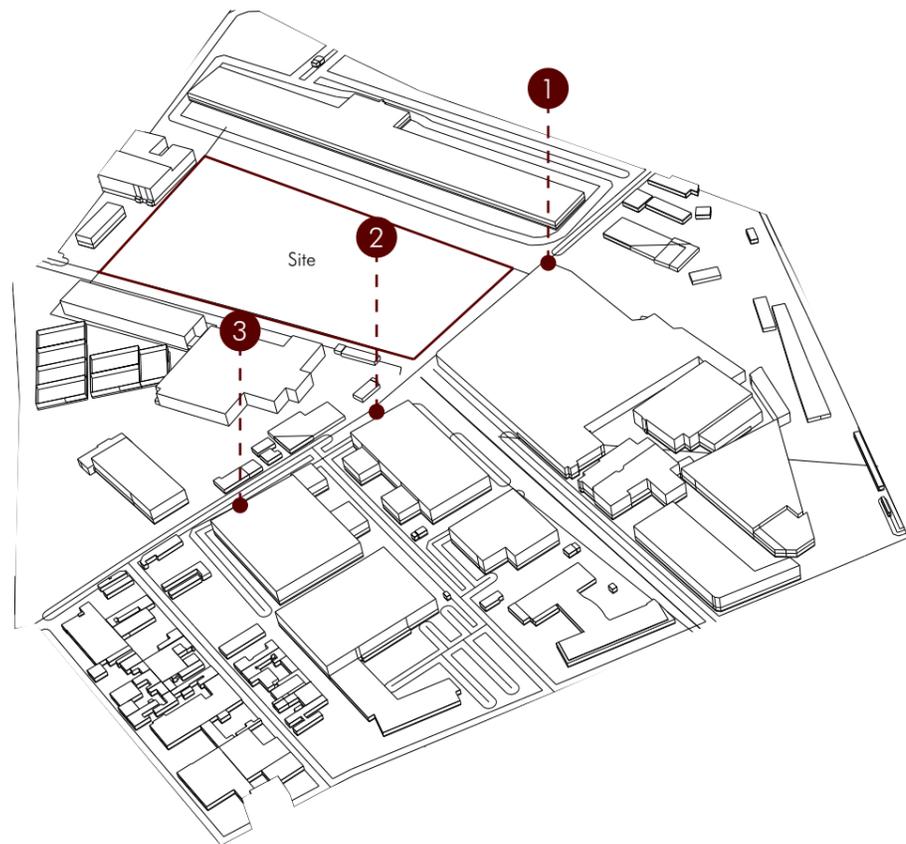
Rue Henri Vuillemin

Rue Henri Vuillemin is characterized by 10m of distance. Has a strong acoustic pollution due to trucks and cars. These vehicles usually park on the sidewalk which is unsustainable and dangerous. The lack of unloading and loadings spots, reflects on constant traffic. In addition, the street obtain huge quantities of trash. As a woman, this street provided the feeling of insecurity and danger. Due to the retrofit of the Les Gresillions station, the length of the Rue is going to be enlarged to 16m. The quantities of users will increase and the need to a mobility refurbishment is necessary.

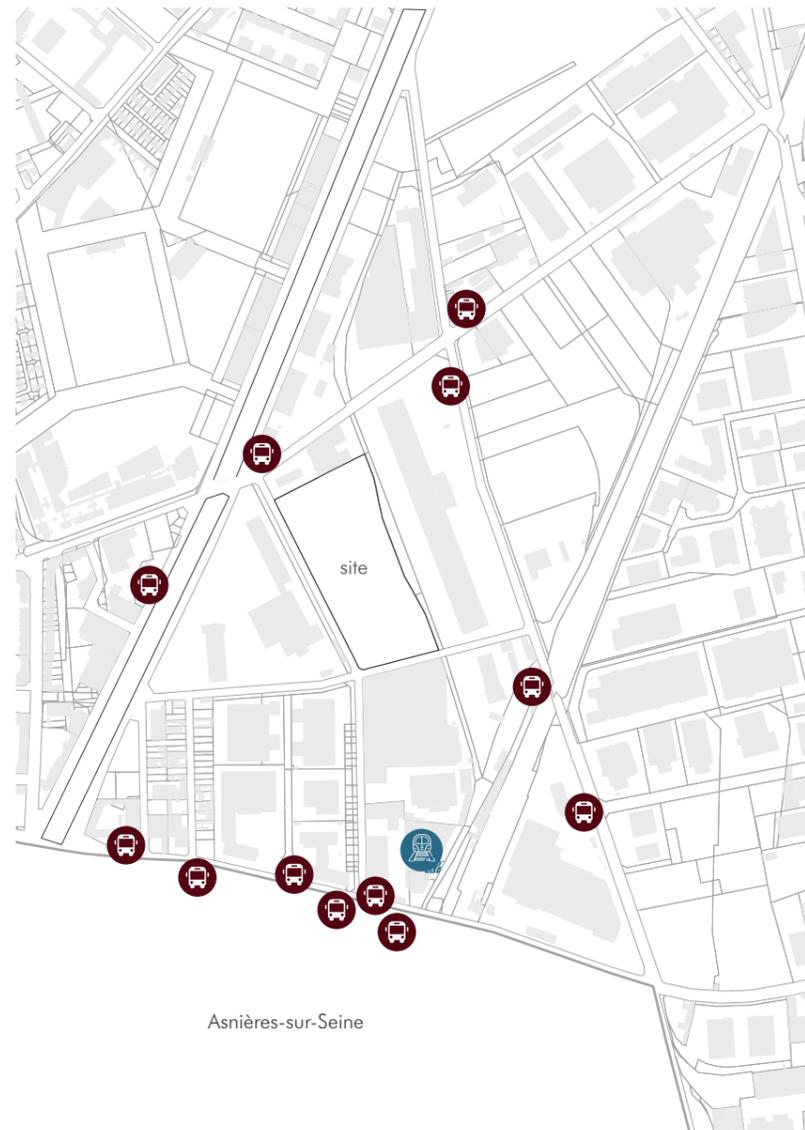


Rue Transversale

Rue Transversale is characterized by acoustic pollution, constant dirty, traffic congestion, lack of curblines. Negative aspects emphasized the need of a local transformation, it is not on the plan of the Grand Paris Express. In addition, on the day that the author visited the place, people were living in the area in tents, which emphasized the lack of public circulation.



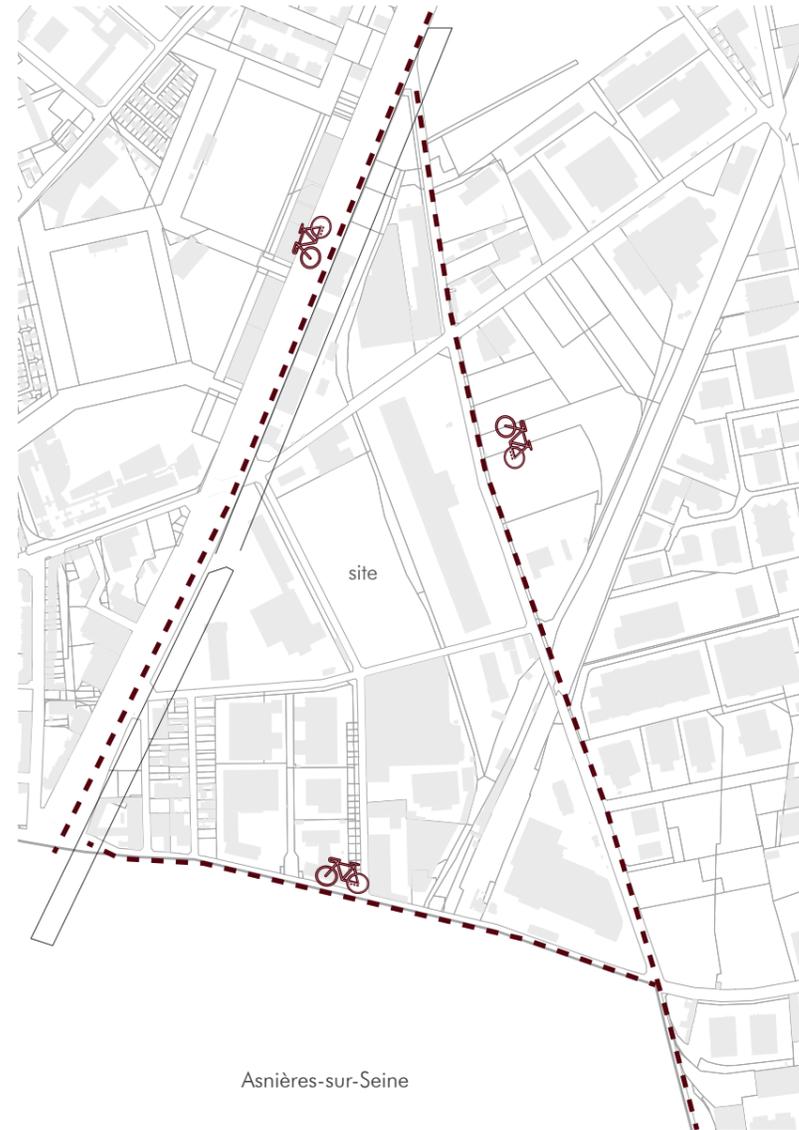
5.6 TRANSPORT AND ACOUSTIC ANALYSIS



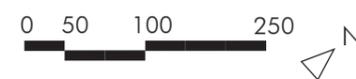
- Gare Les Gresillions
- Bus Stop



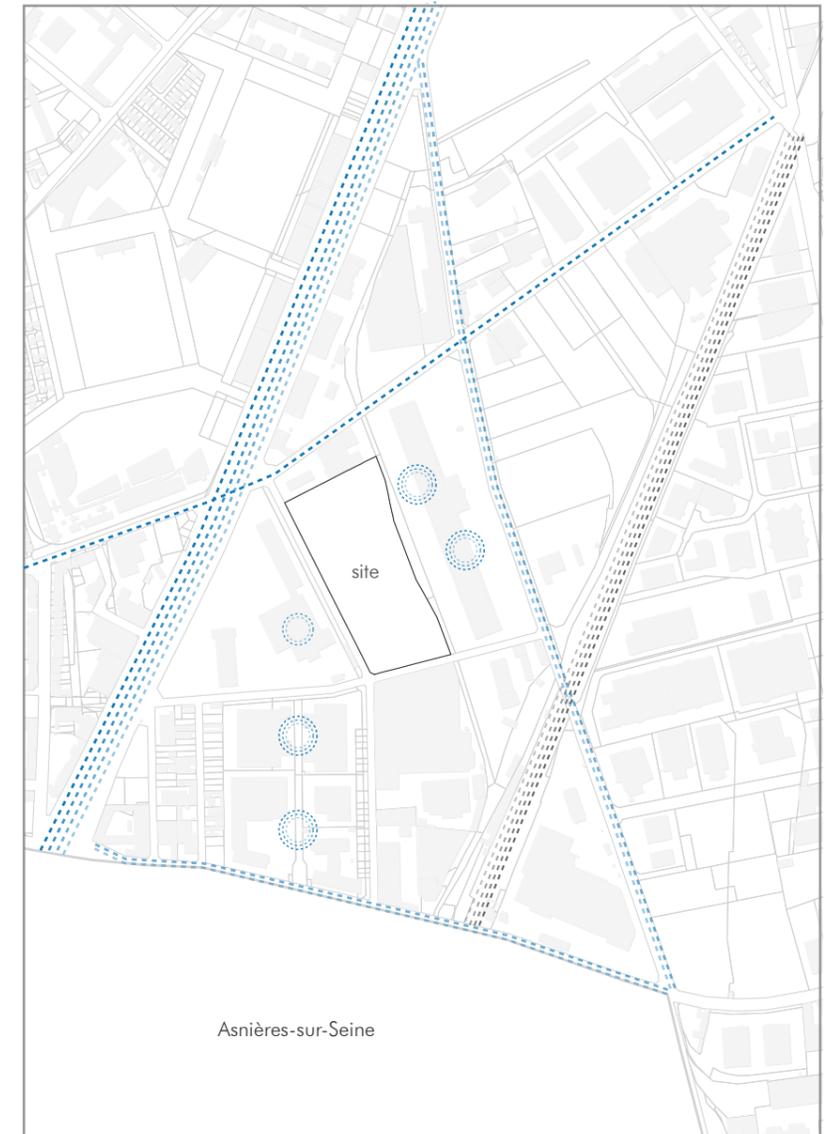
Transport Stop



- Bike Lanes



Bike Line



- Acoustic Intensity
- Train Acoustic Intensity



Acoustic Map

5.7 CLIMATE ANALYSIS

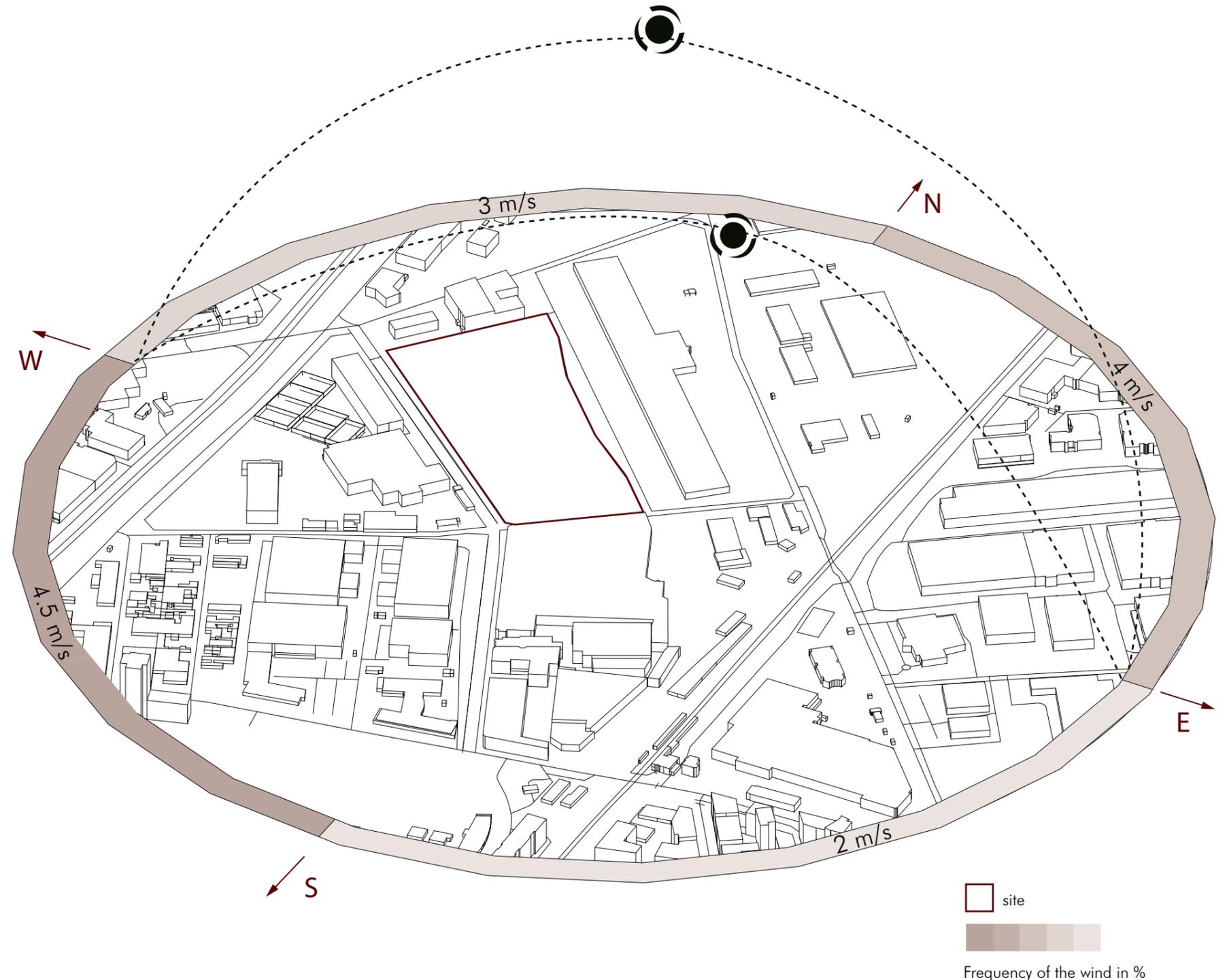
The climate of Gennevilliers is characterized by mild temperatures and a reduced gap between summer and winter, regular but low rainfall and a prevailing wind from the southwest and north-east. Climate change modeled according to different scenarios suggests an increase in temperatures and drought phenomena on the Ile de France scale in particular.

By its proximity to Paris, the town is strongly concerned by the phenomenon of urban heat island. The ZAC project area of the Gare des Grésillons is particularly exposed to this phenomenon, due to the high density of artificial surfaces and the absence of a well of freshness on the site or in the immediate vicinity. The site contains very little relief.

URBAN HEAT ISLAND

Some causes: Added to this is also anthropogenic heat, especially in winter: heating, air conditioning, industries, car traffic, lighting, etc.
= Architecture solutions to minimise those problems.
ZAC did an analysis about CO2 measures

Clear/ reflected materials
Wider streets
Water



5.8 SWOT ANALYSIS



STRENGTHS

- Accessibility to the site by various destinations.
- Area directly connected to the main road, N315
- Central railway station next to Les Gresillons.
- Improve urban quality
- Enhances urban and neighborhood permeability.
- Close to other residential areas
- Regulations according to the project guidelines



WEAKNESSES

- Polluted site
- Probably more than 10 years to be built
- Not approval of the current Mayor to develop a hybrid project.
- Unsafe site at night
- Windowless one-story factories
- Unwanted smell and noise for residents
- Lack of bicycle lane on the main roads of the project : Rue Henri du Vuillemen and Rue Transversale.



OPPORTUNITIES

- Vague terrain with the possibility to develop projective interventions
- Increase the number of jobs, residential units and density in the area
- Promote innovation network, sustainability and circular economy in Fashion
- Implementation of needed facilities (youth, extracurricular equipment, cultural and leisure facilities).



THREATS

- Possibility of not having the authorization to realize the project
- Difficulty to design a project for residents and workers.

5.9 SOCIOECONOMIC ANALYSIS

Families

Number of people per family in 2015: 2,5

Since 2007, there is an increase on the percentage of the number of inhabitants.

87,9%

renter households

8,7%

individual accommodation

Industry

- o Most significant industrial area.
- o Has more jobs than the Port.
- o Most of the areas in the ZAC were methorlugic indusrtuy

8,1%

employees works at the Industry.

76,5%

of the industry represent by Manufacture Industry

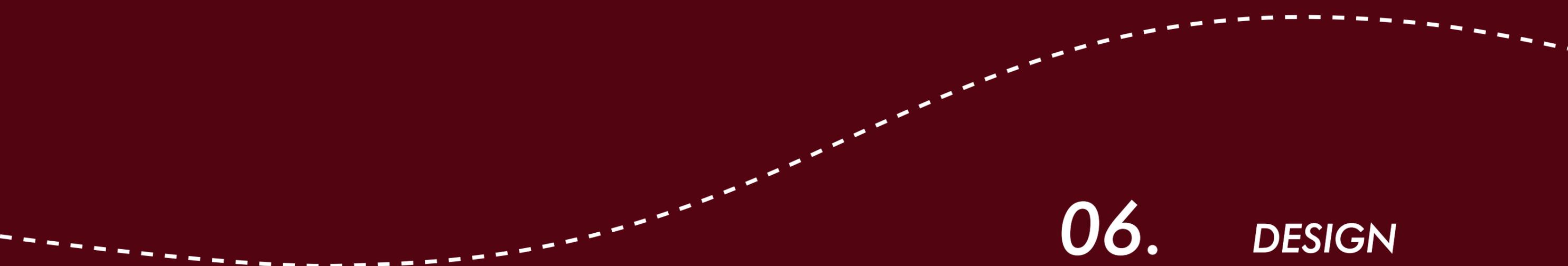
Jobs

ZAC's perimeter welcomed 70 companies and 1,700 jobs.

Essentially SMEs

Facilities

- × Extracurricular equipment
- × Youth facilities
- × Cultural and Leisure facilities
- × Sports equipment
- ✓ Health and social facilities
- ✓ Childcare facilities



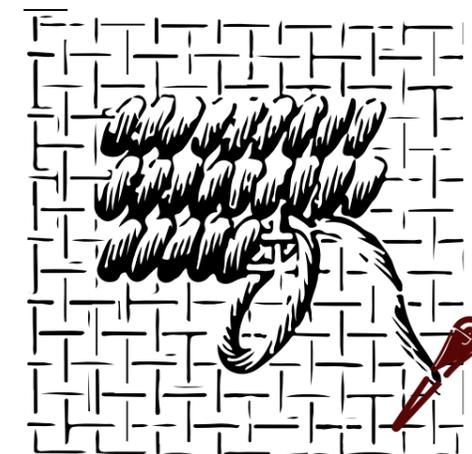
06.

DESIGN
PROJECT



6.1 CONCEPT MASTERPLAN

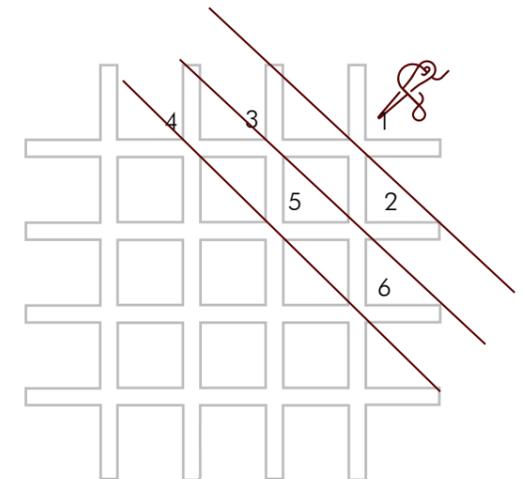
POINT GOBELIN OBLIQUES



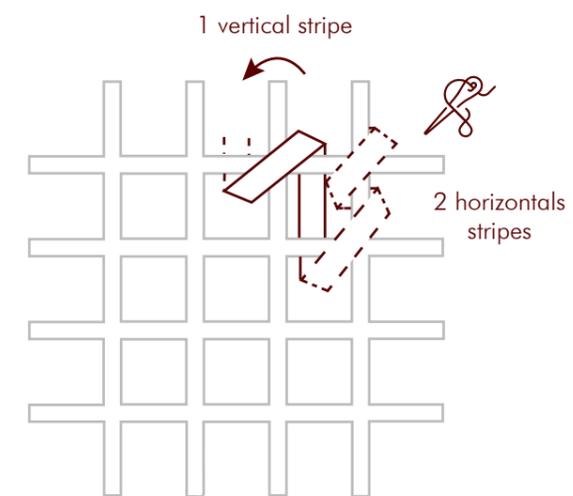
Same Gobelin points used on the 17th century in Paris. Gobelin is a manufactory of tapestry created at the instigation of Henri IV

DECONSTRUCTION OF POINT GOBELIN

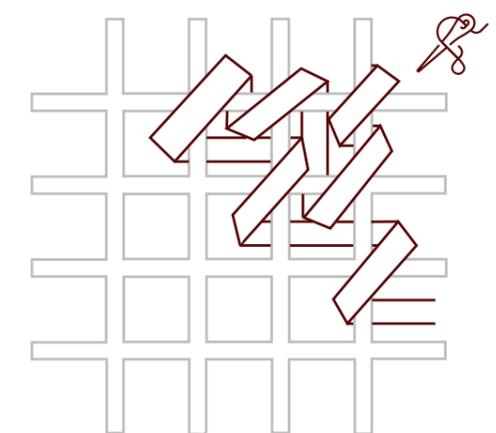
DEVELOPED WITH PAPER



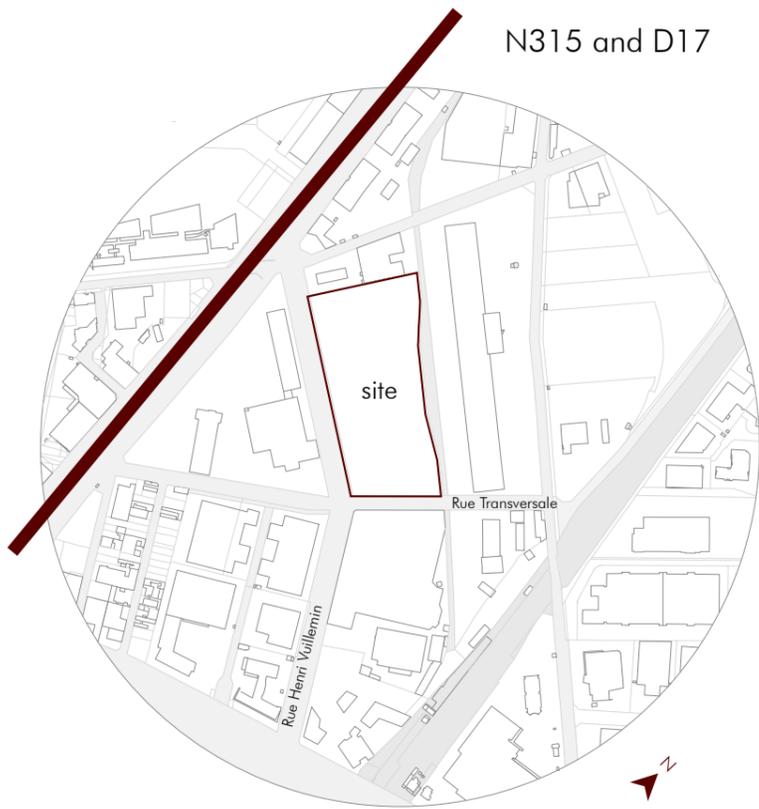
ordem to do the
tecelary and each node



repeat this step til the end



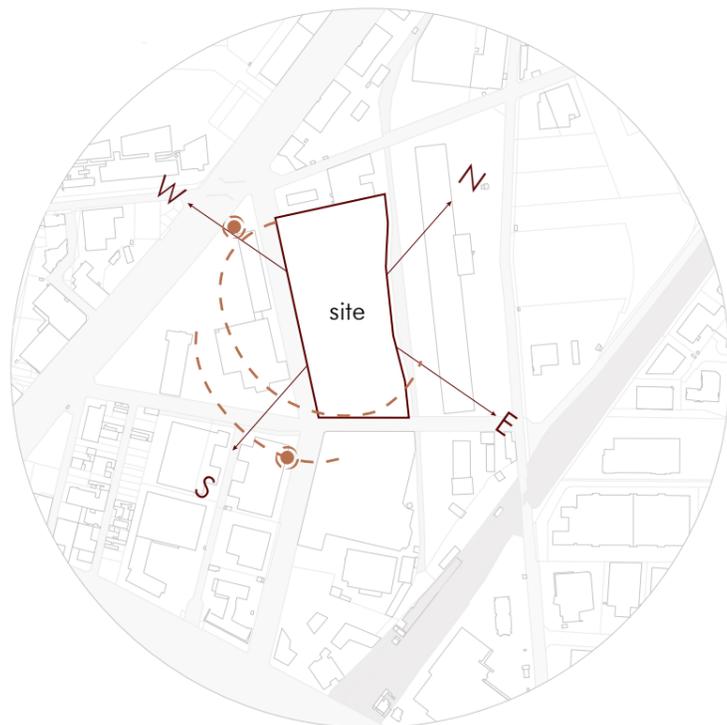
final result



Urban fabric - N315 has a strong connection with the other highway, representing a powerful guide line of the project



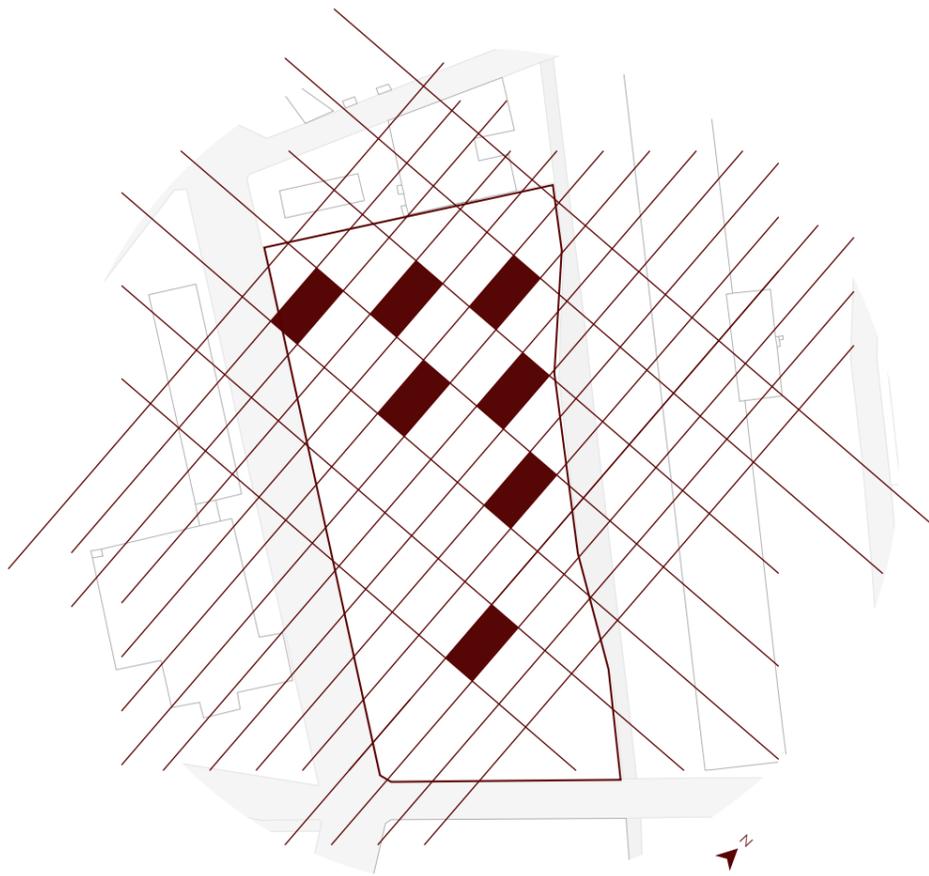
Project GRID
30m x 15m



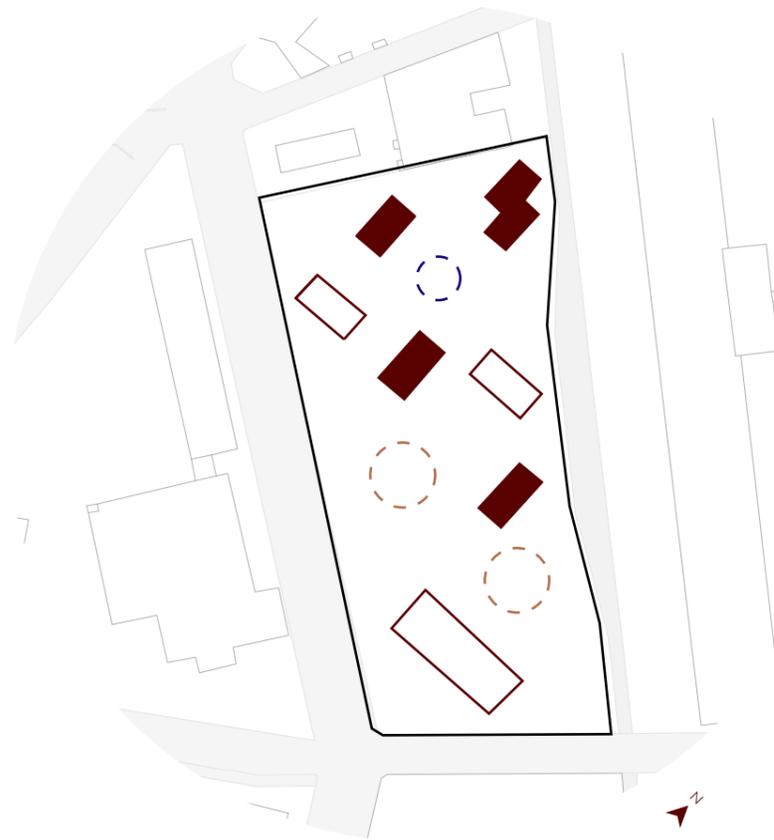
Site's latitude 48.929N. North direction as a reference guide line to the project.



- ▲ Bike/patinet access
- ▲ Car access
- ▲ Truck access
- Attraction Points

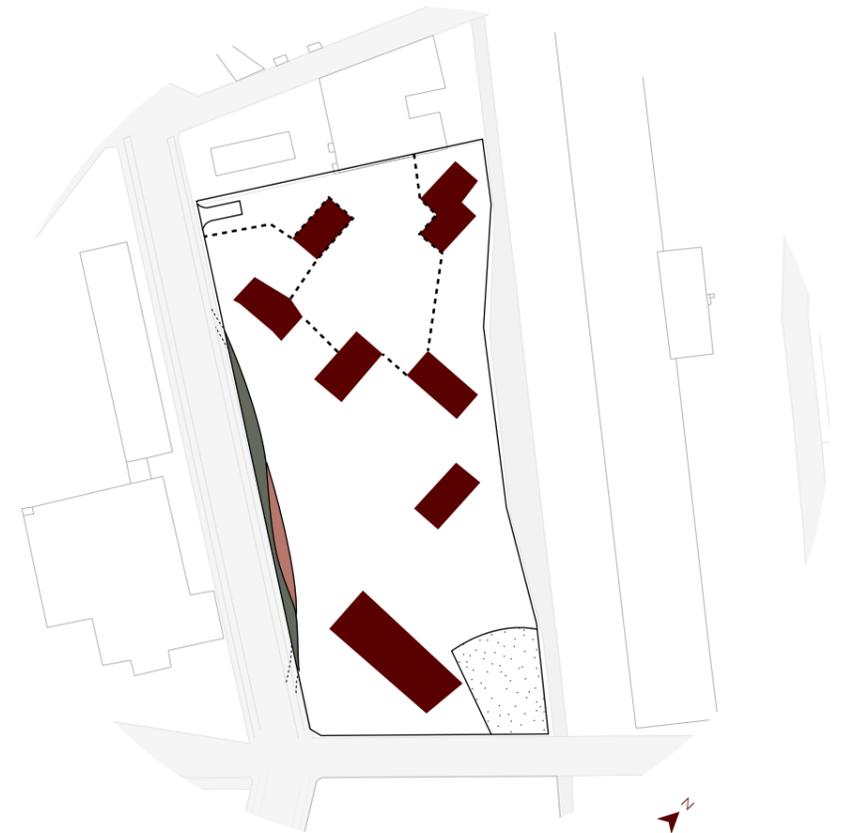


Position of buildings according to Gobelins Points Project GRID 30m x 15m



Rotation of 90 degrees of selected, providing common spaces

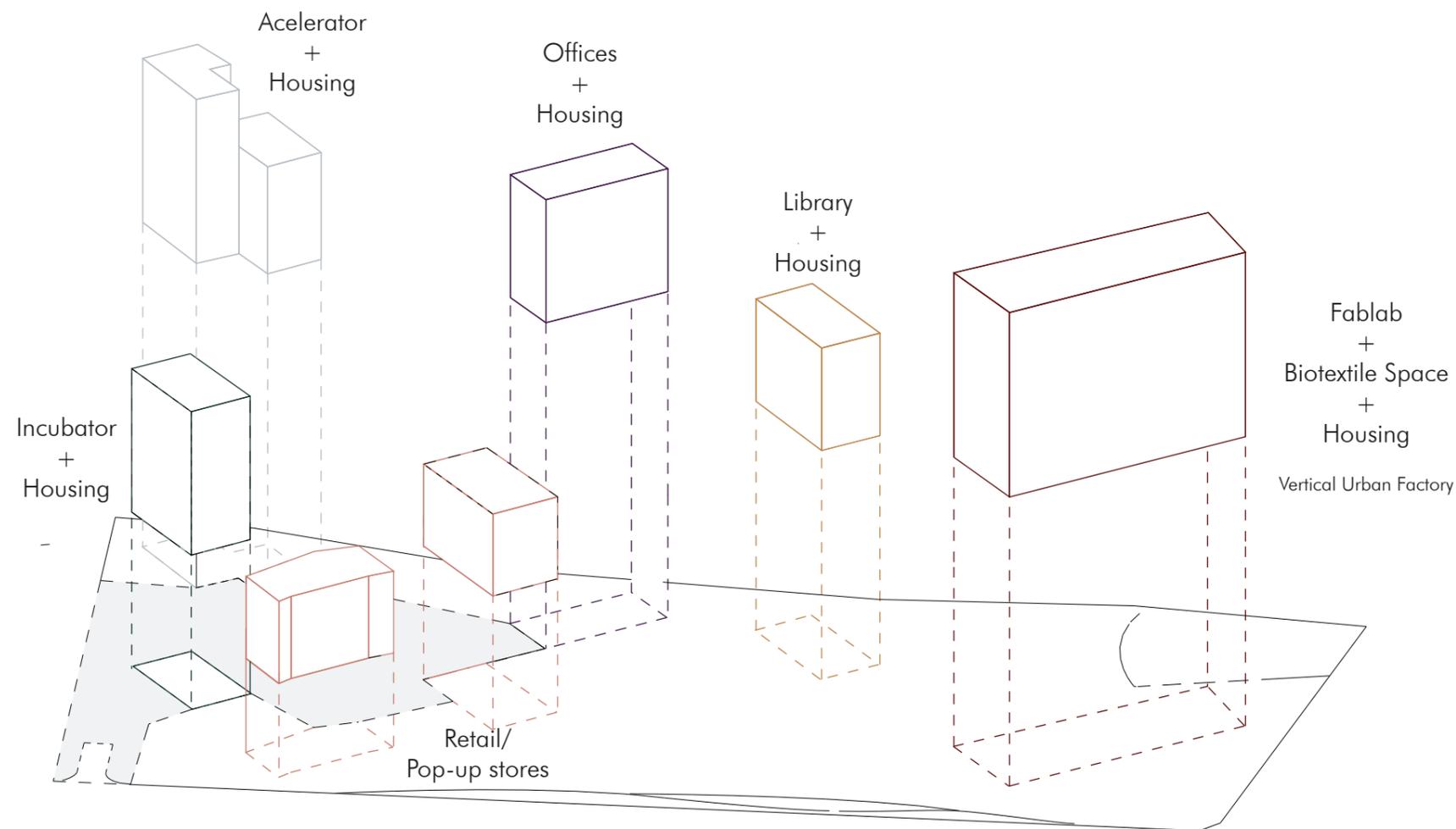
-  elevated piazza
-  common spaces



In the level 0, access to cover parking lot for cars, bicycle lane with parking and trucks loading and unloading area.

-  - - cover parking lot on level 0 and plaza on level 1
-  parking and rent of new transportation/bikes/patinete
-  bike lane
-  trucks loading and unloading

6.2 BUILDINGS USES



Due to COVID-19, the layout of these associations/companies is changing. The necessity of isolate certain activities is urgent, specially due healthy issues. According to Modern Synthesis and Fabricademy & FabTextiles, the modifications are still being done. The research of these changes will be deepened in future studies.

● Incubators ● Accelerators

"New businesses, which are no longer focused on the whole production process and its substantial logistics, materials, and cheaper labor needs, are proliferating in urban areas in proximity to creative industries. As a result, emerging incubators and accelerators accommodate a mix of "production" businesses." (Rappaport, Nina. 2020, 172)

An incubator helps entrepreneurs achieve business ideas while accelerators accelerate the growth of established companies with a minimum viable product (MVP).

Incubators operate on a flexible time period (can last a year) which ends when a company has an idea or product to present to investors or customers. The incubator may provide living space during the process of developing the idea. In comparison, the accelerator timeline is a few months, during which the entrepreneur receives mentoring, funding, and networking help.

Accelerators usually start with a rigorous application process. The goal of the accelerator is primarily networking, mentoring, and resource allocation to increase the success of proven business ideas. A business's time in an accelerator usually ends with a presentation sharing the growth and development they have achieved during their weeks or months in the program.

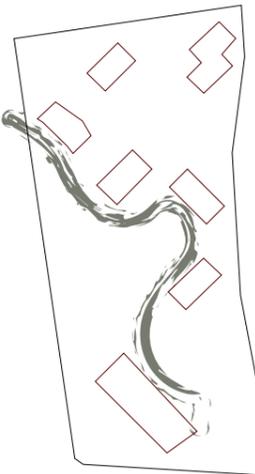
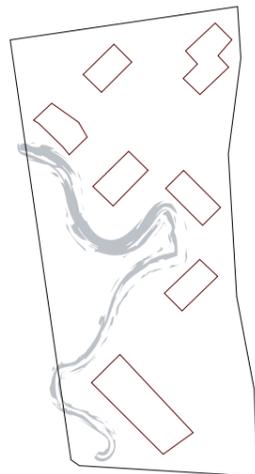
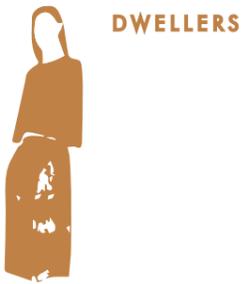
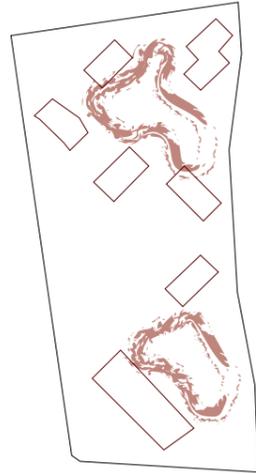
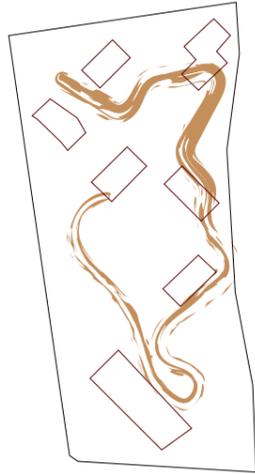
● Fablab

A fab lab is generally staffed with a set of flexible computer-controlled tools that cover different size scales and different materials, with the goal of making all possible technological and innovation solutions. Based on the DIY and opensource hardware, the technological products demystifies the limited only for mass production.

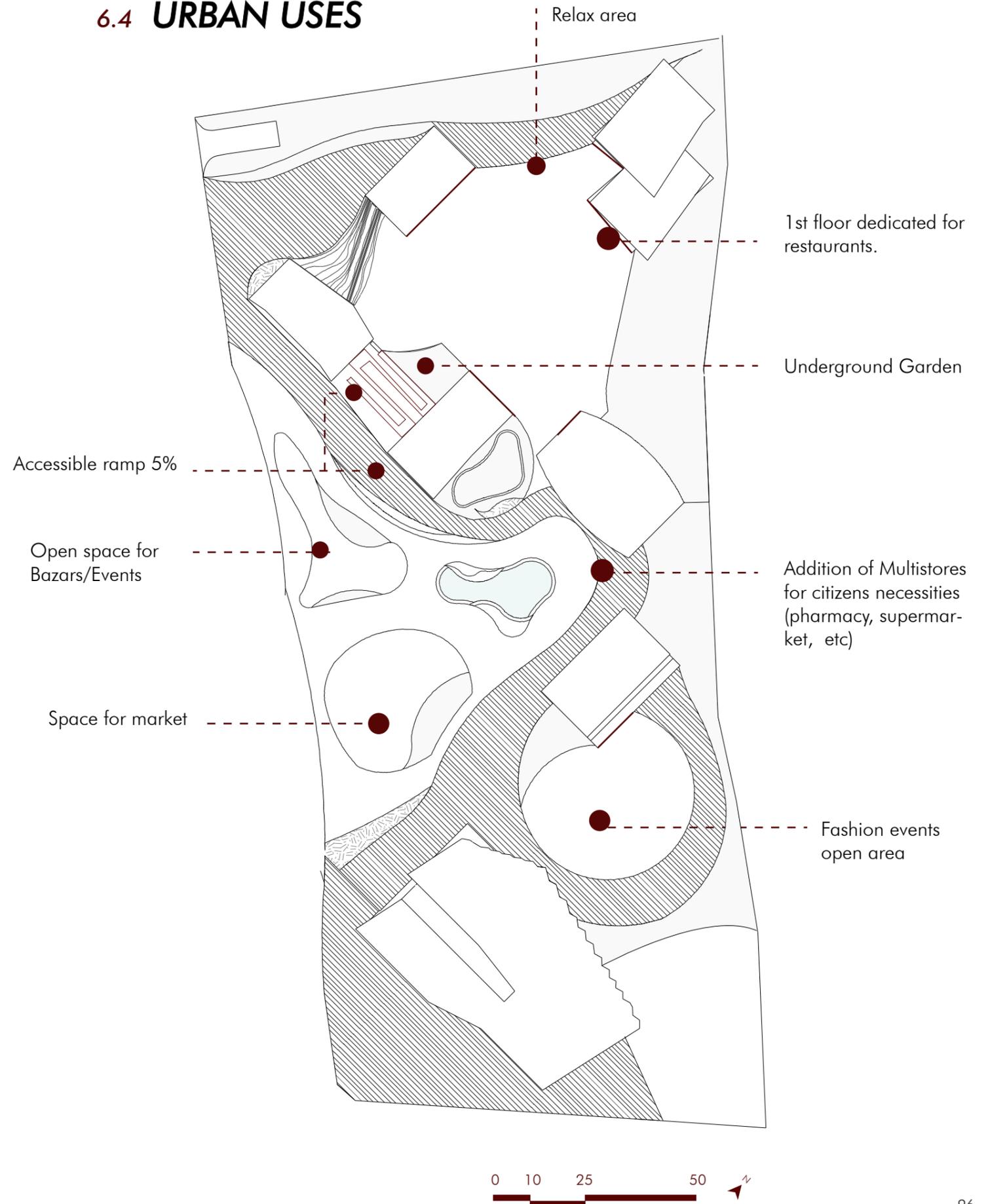
● Biotextile

As described in the first section of this thesis, the Biotextile labs, spaces, will increase their quantities to achieve a wider sustainable fabric production in the future.

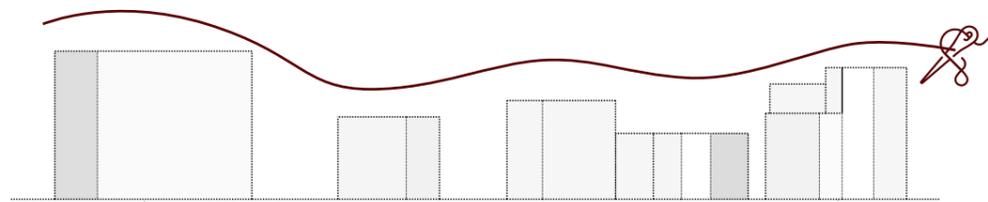
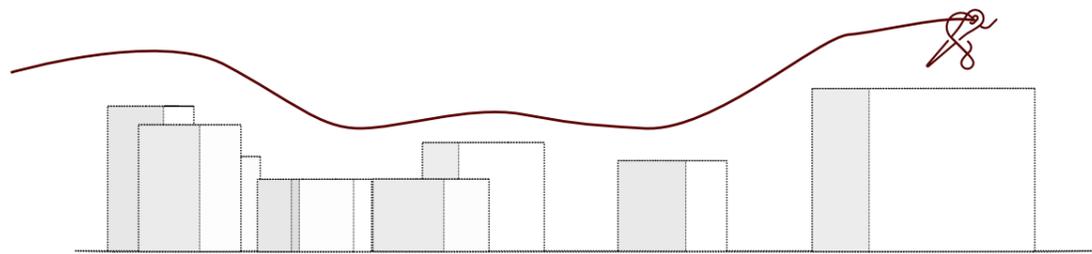
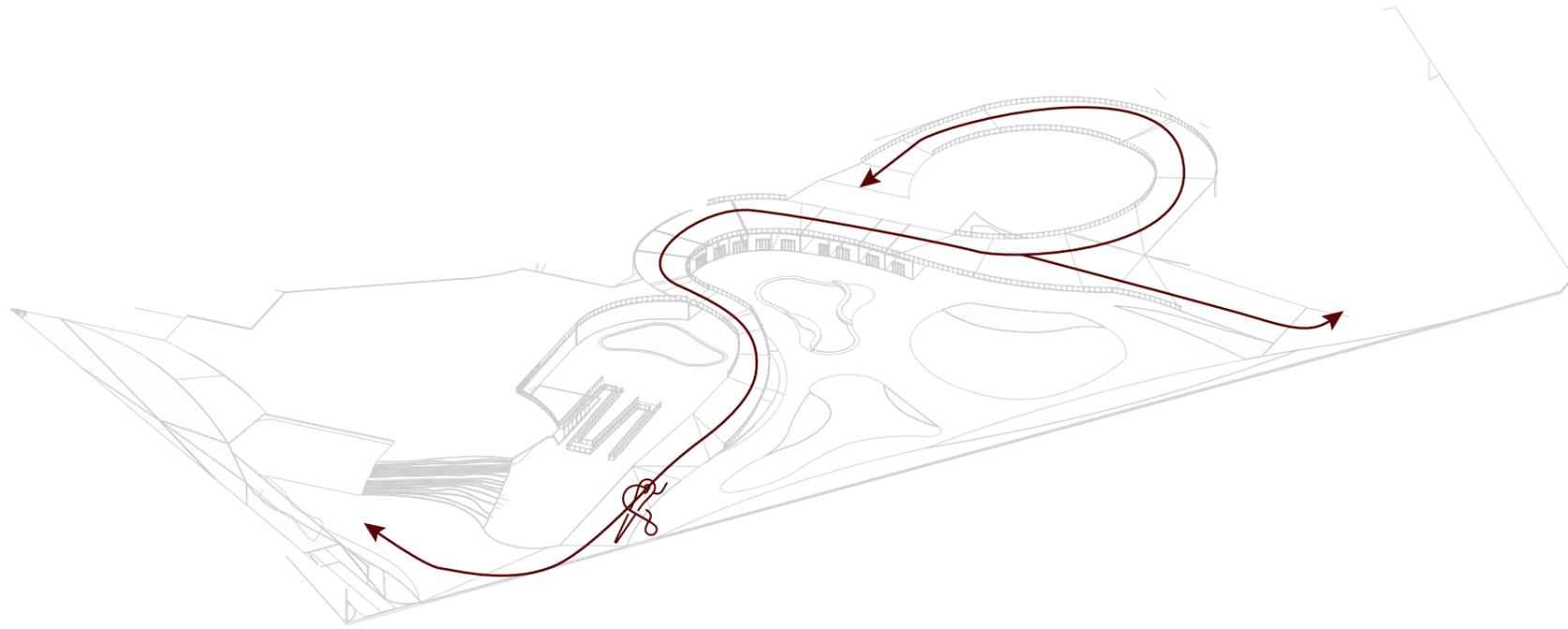
6.3 USERS PATHS



6.4 URBAN USES



6.5 SEWING MOVEMENT

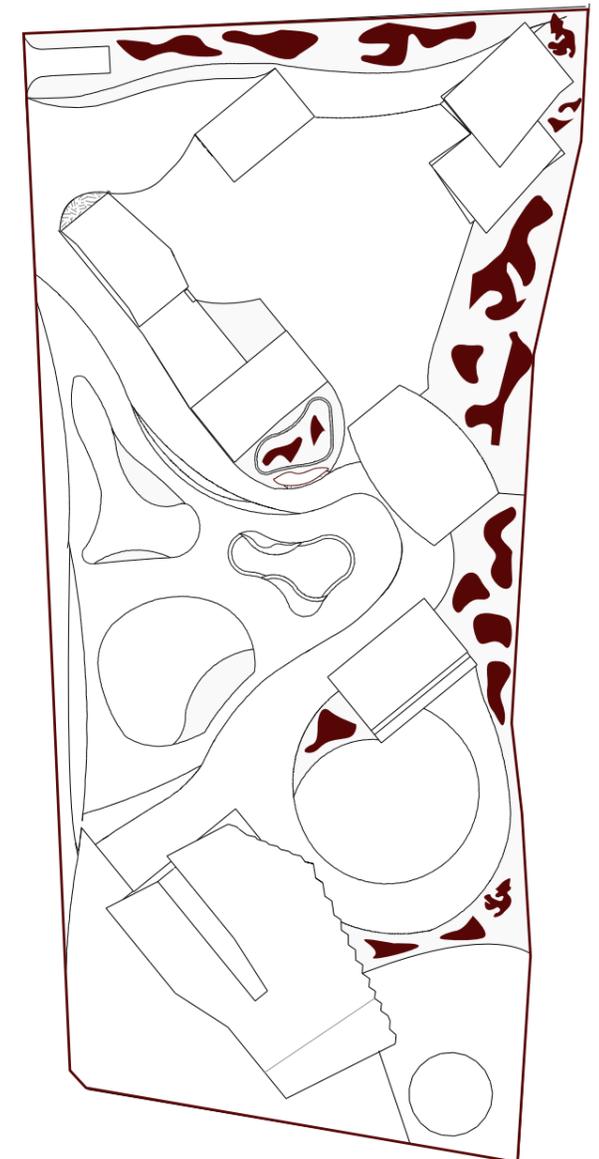


6.6

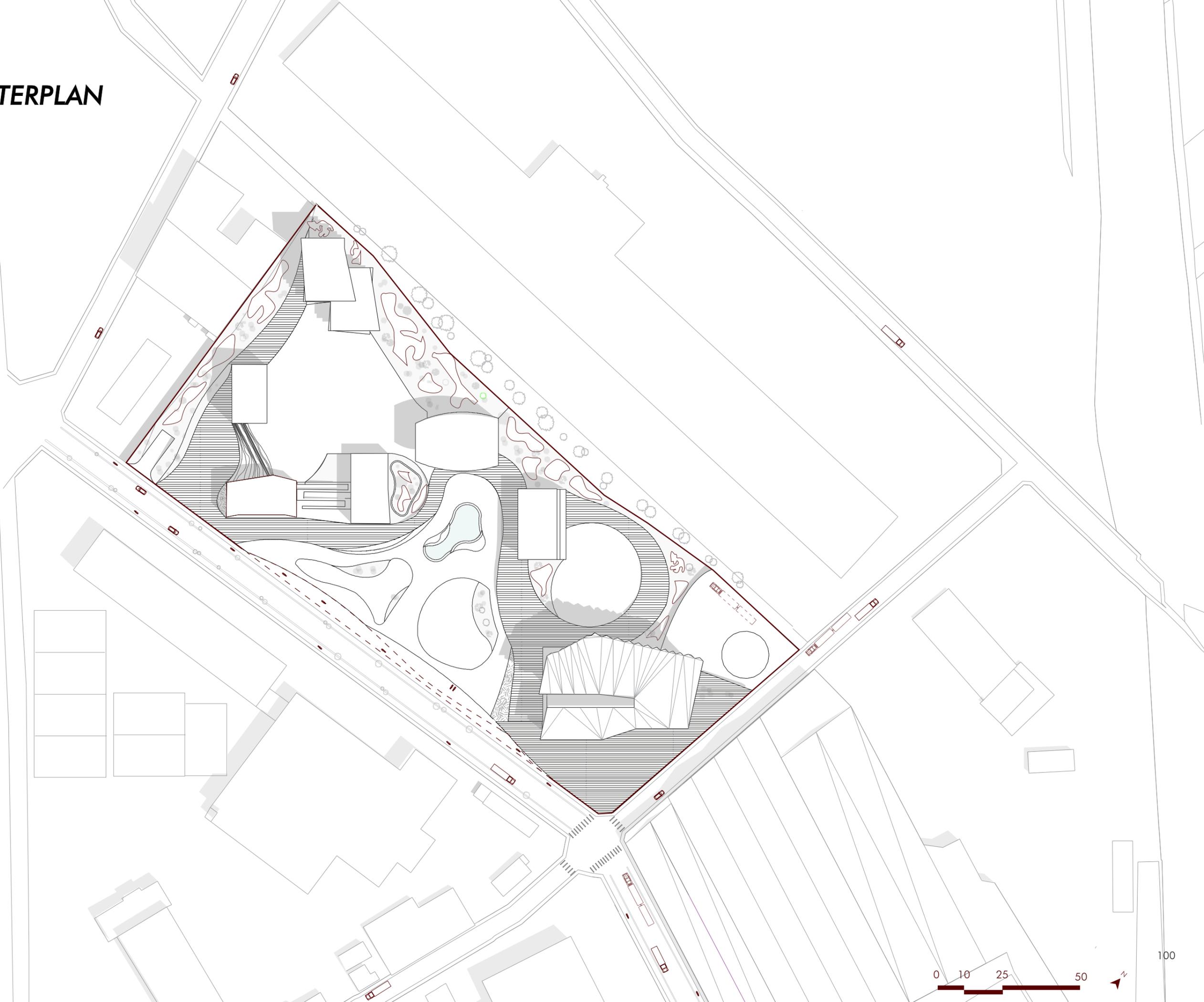
LANDSCAPE



Based on the influential Brazilian Modernist landscape architect, plant explorer, conservationist, and artist Roberto Burle Marx. Design made by sewing movement through the site.

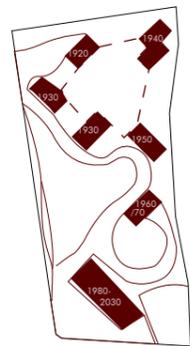


6.7 MASTERPLAN



6.8 BUILDINGS AND FASHION

It states their roles, fights, victories. Based on the 20th century fashion history until the current days, the concept of the seven buildings guides the years of fashion through the terrain. Specific elements were chosen as a symbology of the concept. The study of each building will not be the focus of the thesis, except the last one.



1920 Façade based on the details forms

Main details of the dress



Chanel Ford dress

1940



draped skirt shape



New Look - Dior

draped building form

1950



dress shape



Dress Sack Givenchy

building form based on dress shape

1960/70

dress stripes

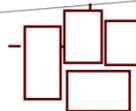
building form based on diagonal stripes



Mini skirts and colorful stripes marked 1960 - 70

1930

frames on reflected on the buildings façades



Photos frames

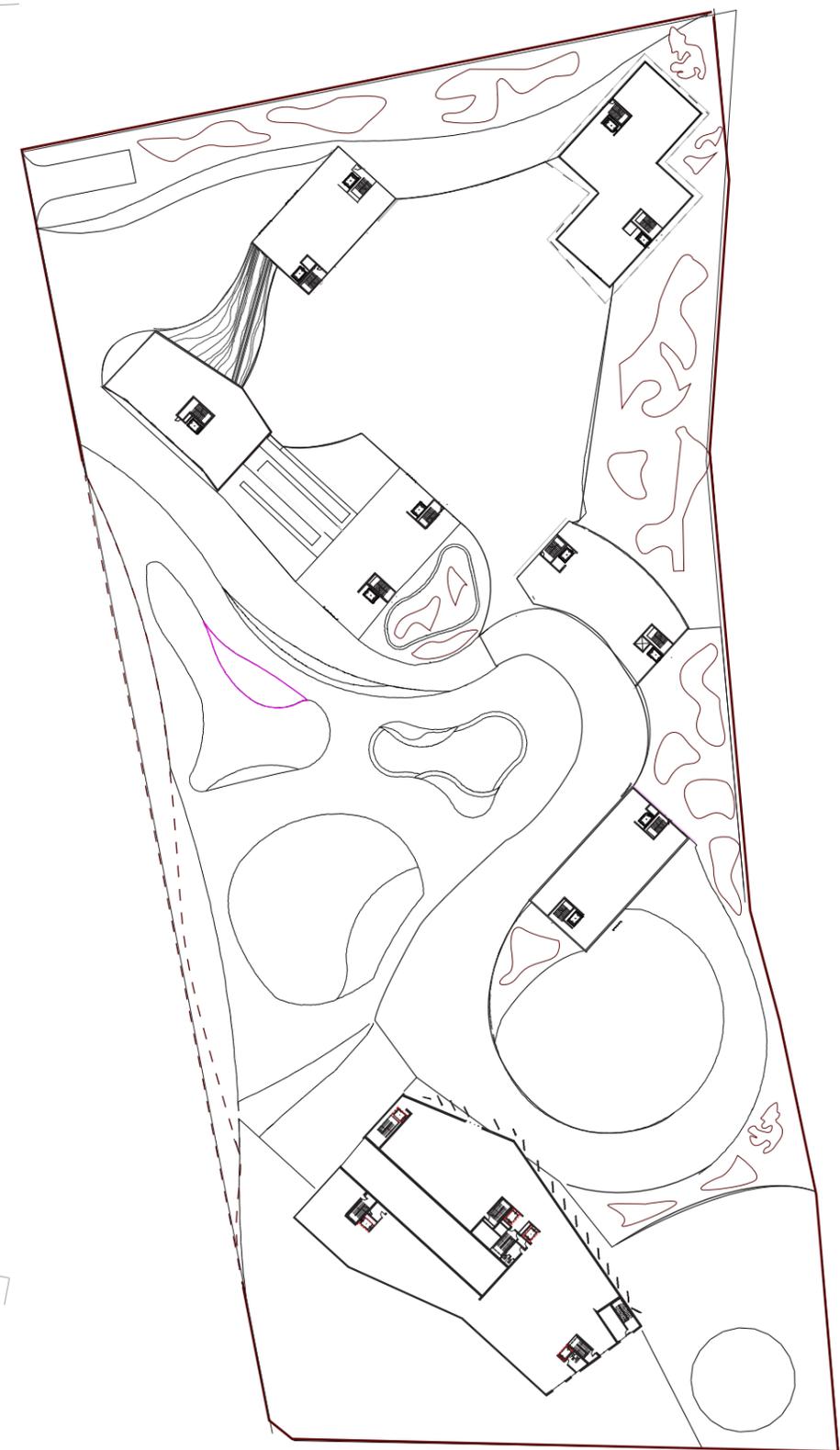


Fashion Photography was born

6.9 PLANS



GROUND FLOOR

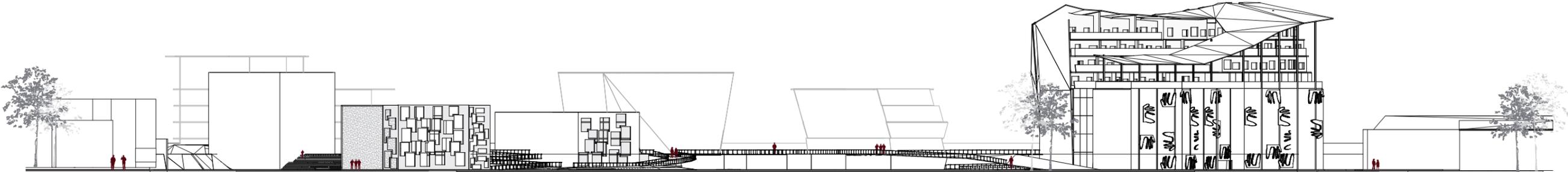


FIRST FLOOR

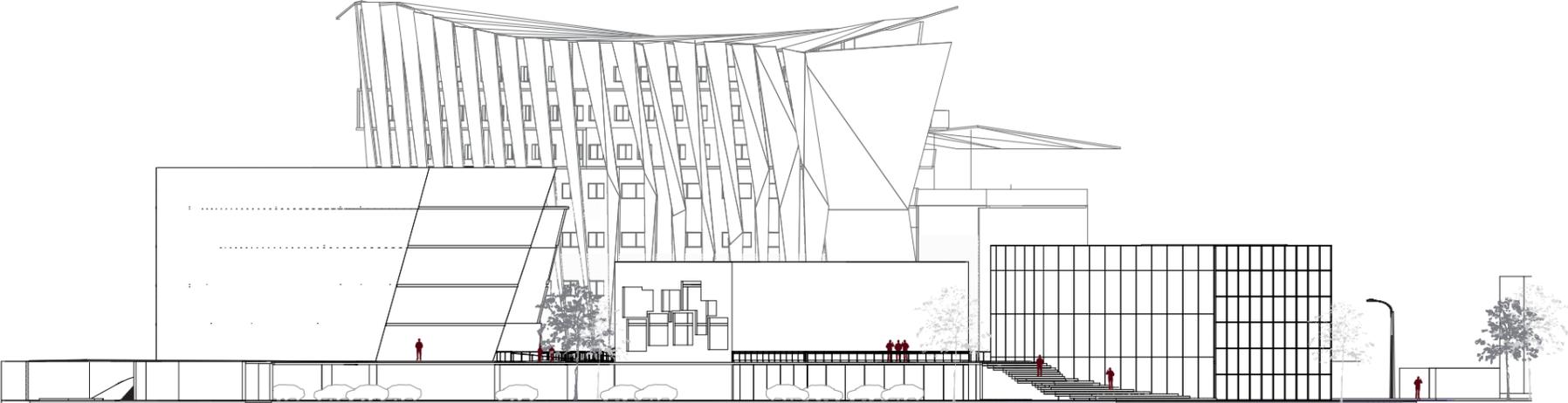


SECTIONS

Urban section AA

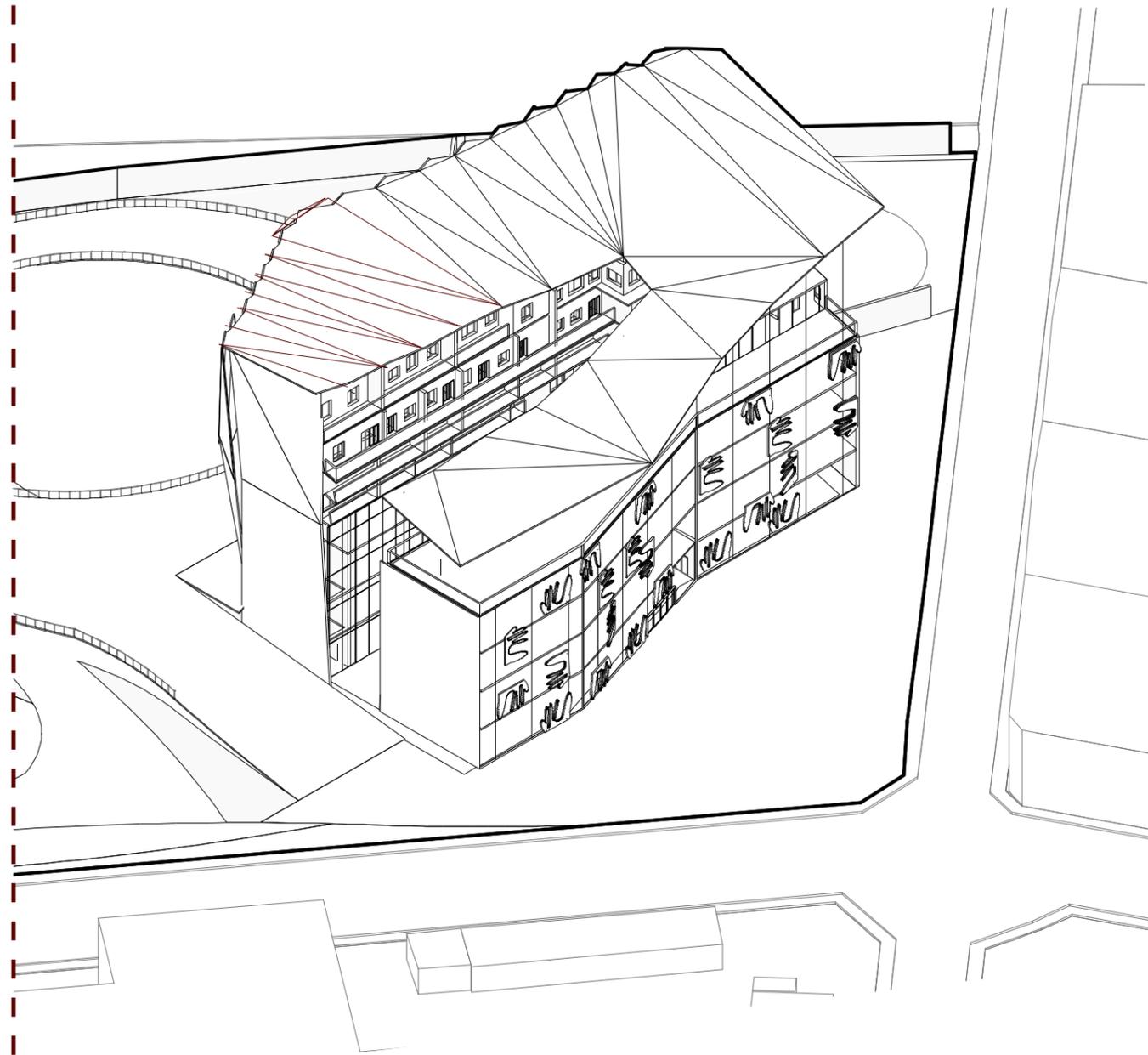


Section BB



6.11 VERTICAL URBAN FACTORY

1980-2030



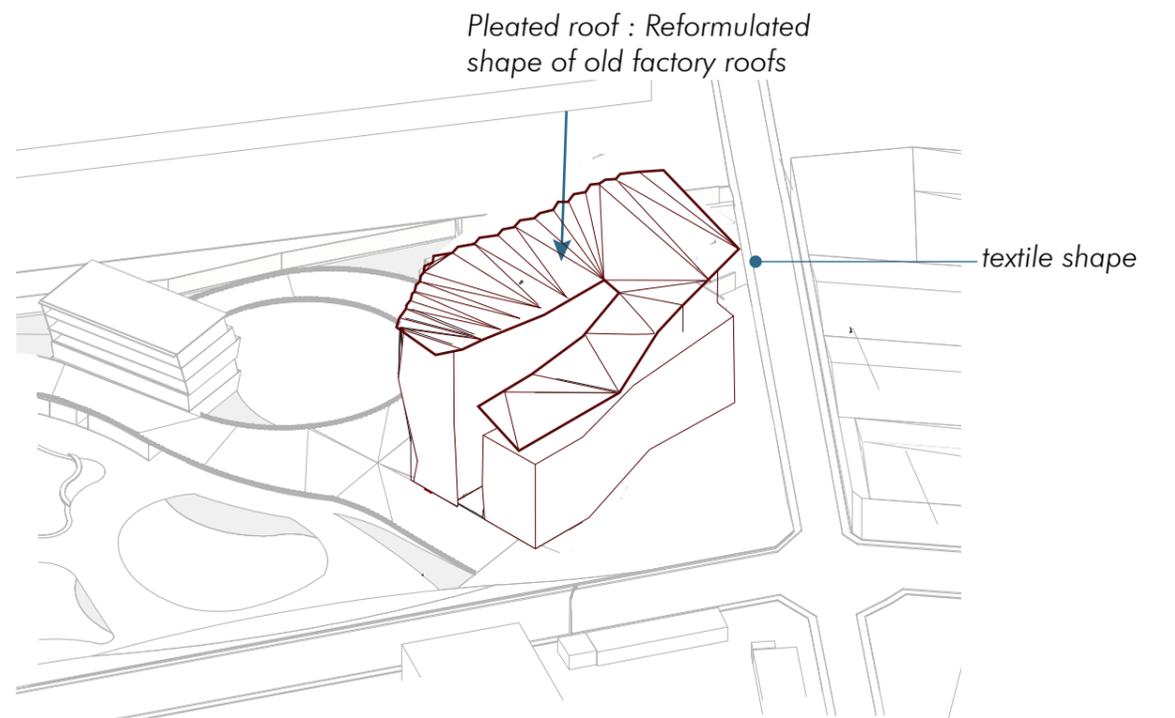
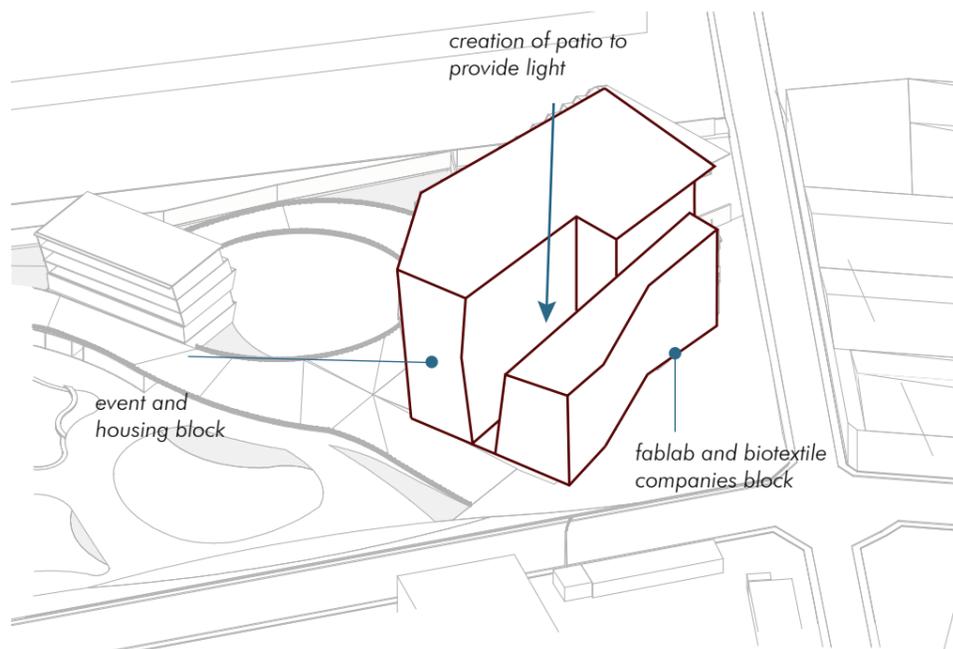
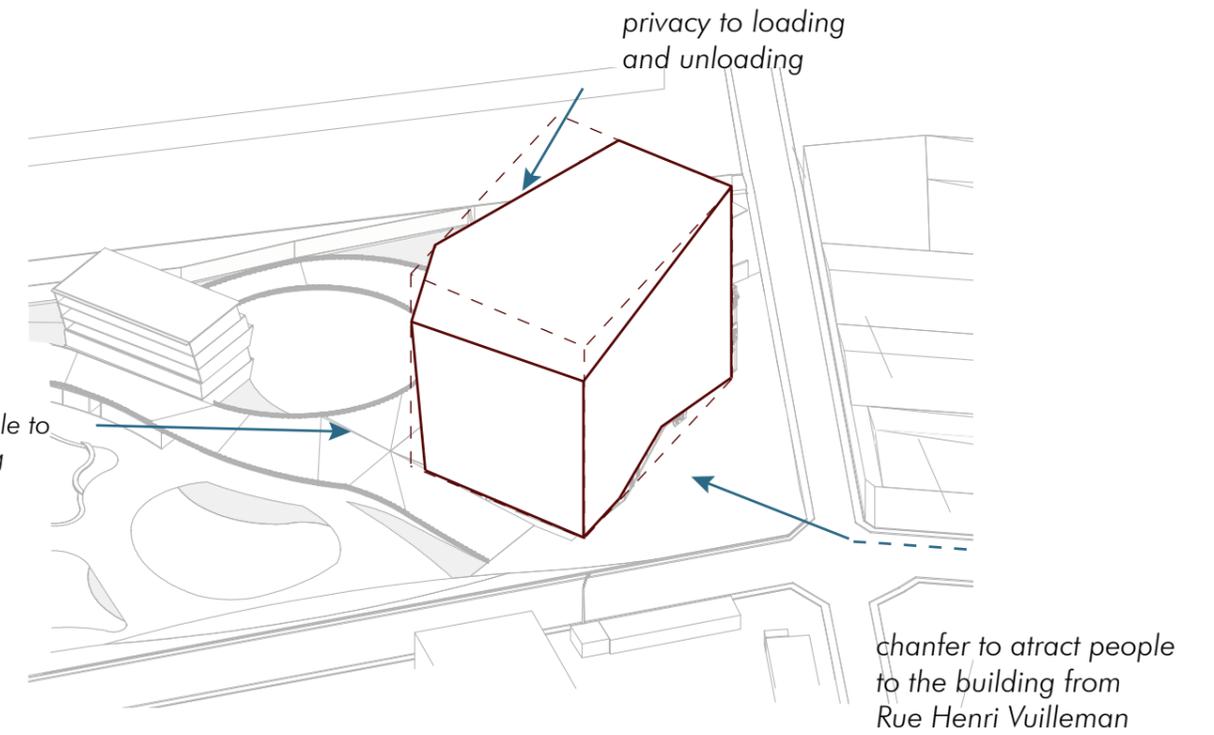
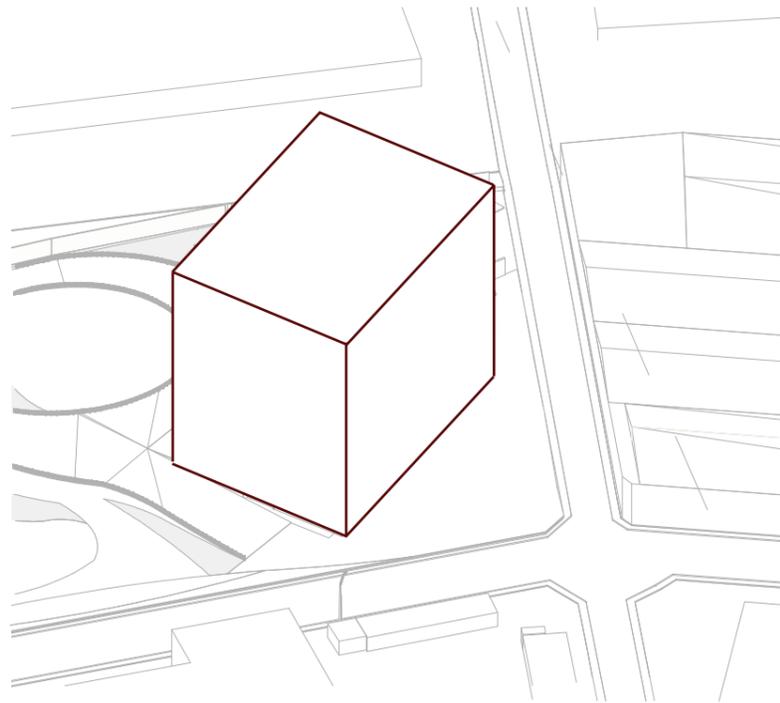
Pleated

“A pleat (older plait) is a type of fold formed by doubling fabric back upon itself and securing it in place. It is commonly used in clothing and upholstery to gather a wide piece of fabric to a narrower circumference”

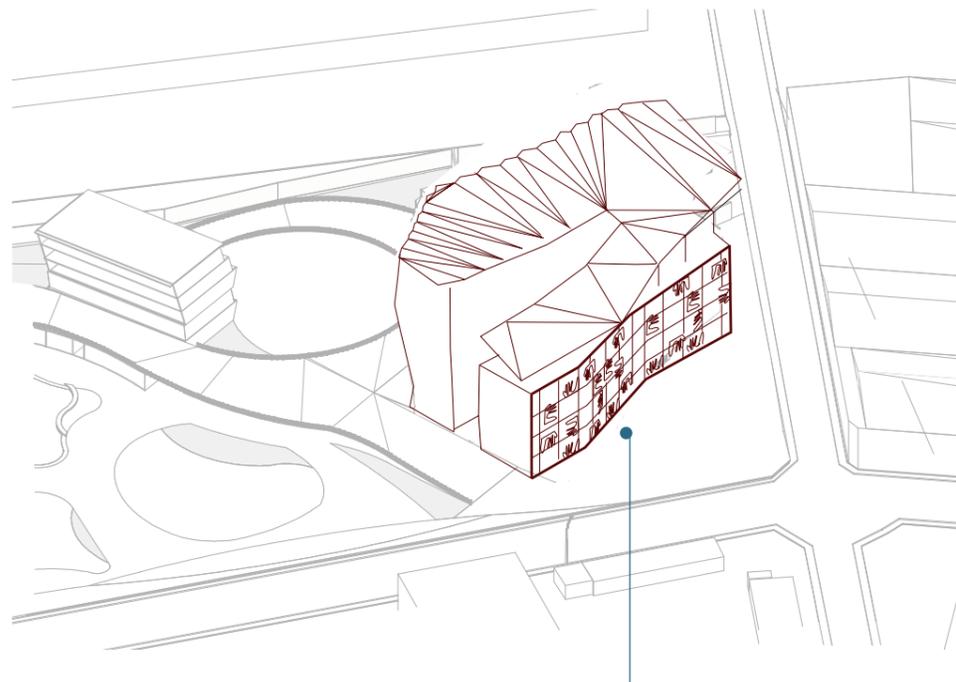
Torsion

Twisting or wrenching of a body by the exertion of forces tending to turn one end or part about a longitudinal axis while the other is held fast or turned in the opposite direction also : the state of being twisted.

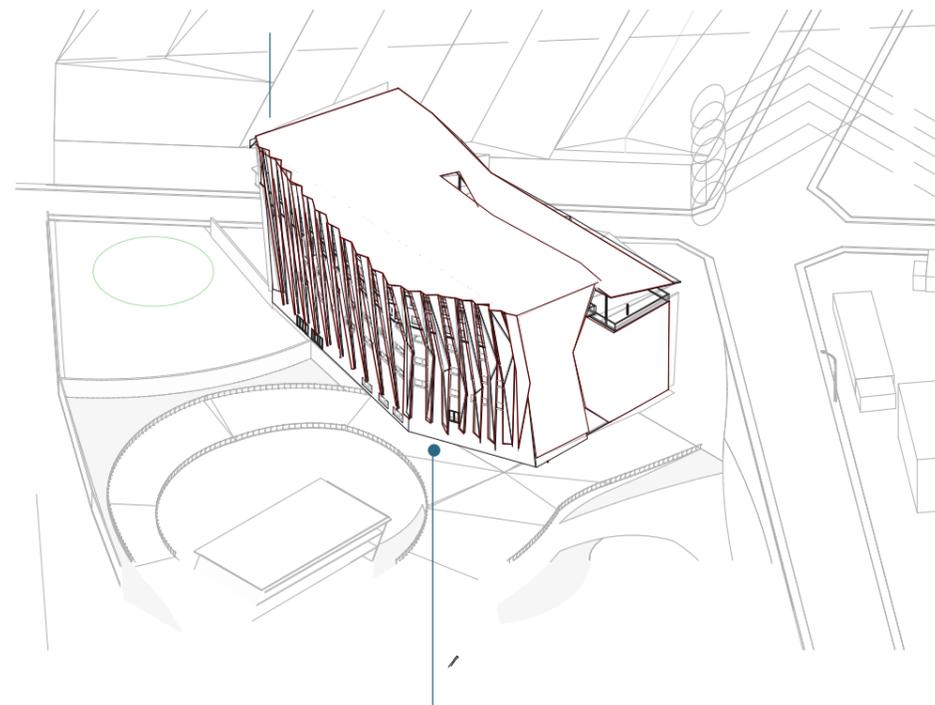
CONCEPT



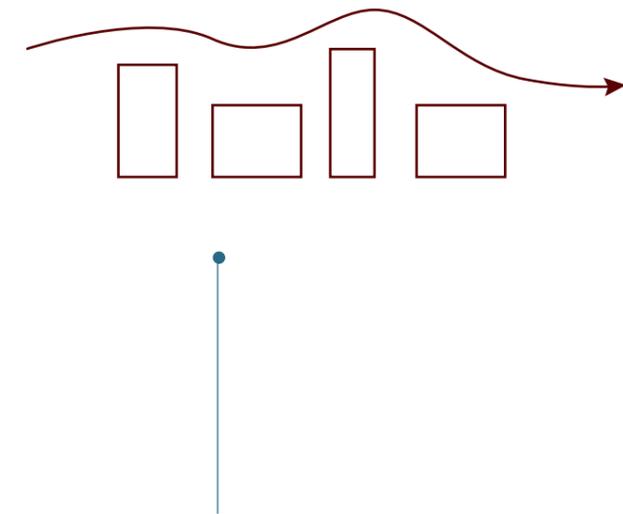
6.13 FAÇADES



Port of Gennevilliers shape



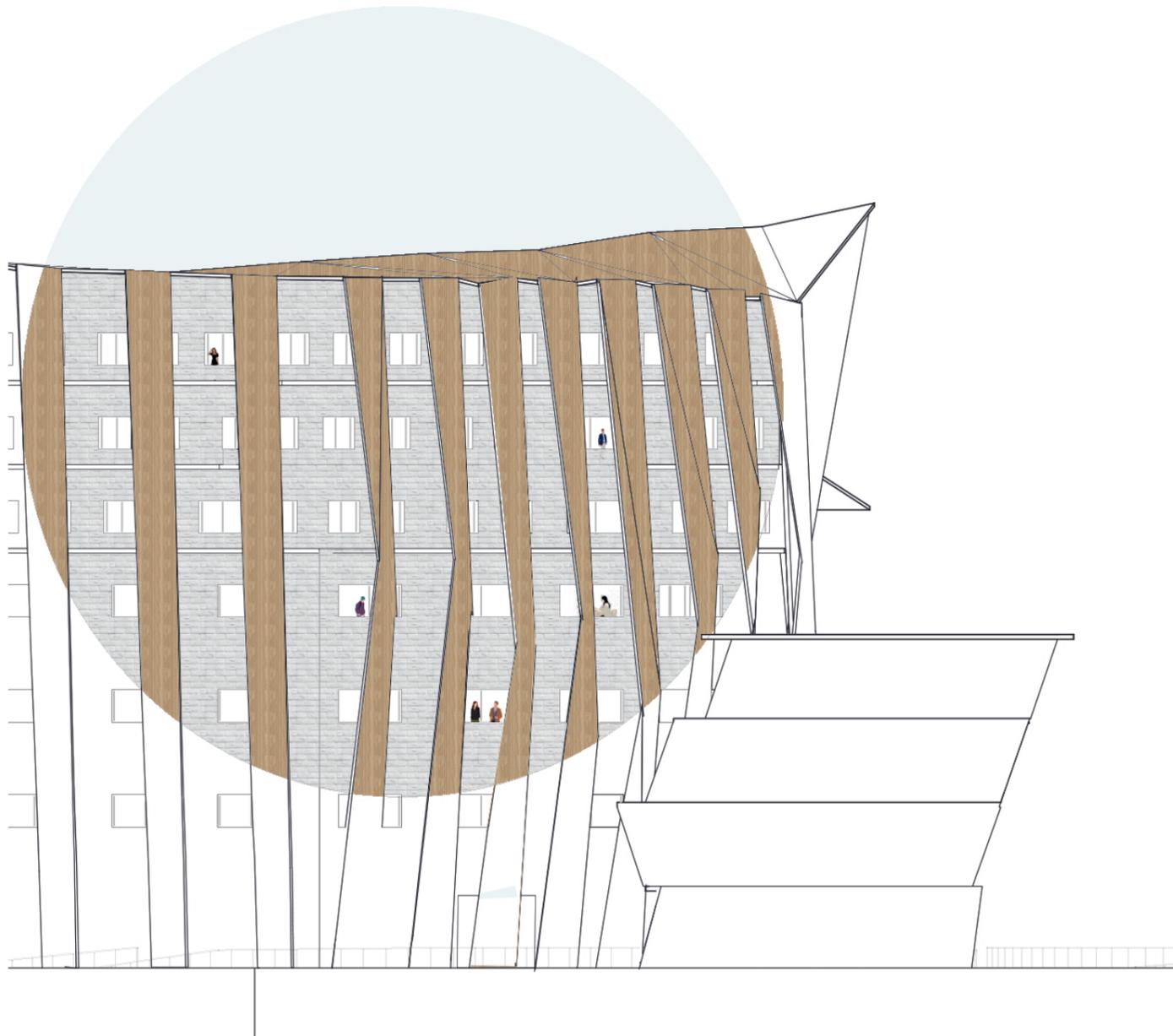
Brise Soleil as pleated shape. Wood material, shape block acoustic issues



Housing and Social Housing Façade - textile movement - dynamic on the façade

Main materials: Wood and Paris Bricks

North Façade



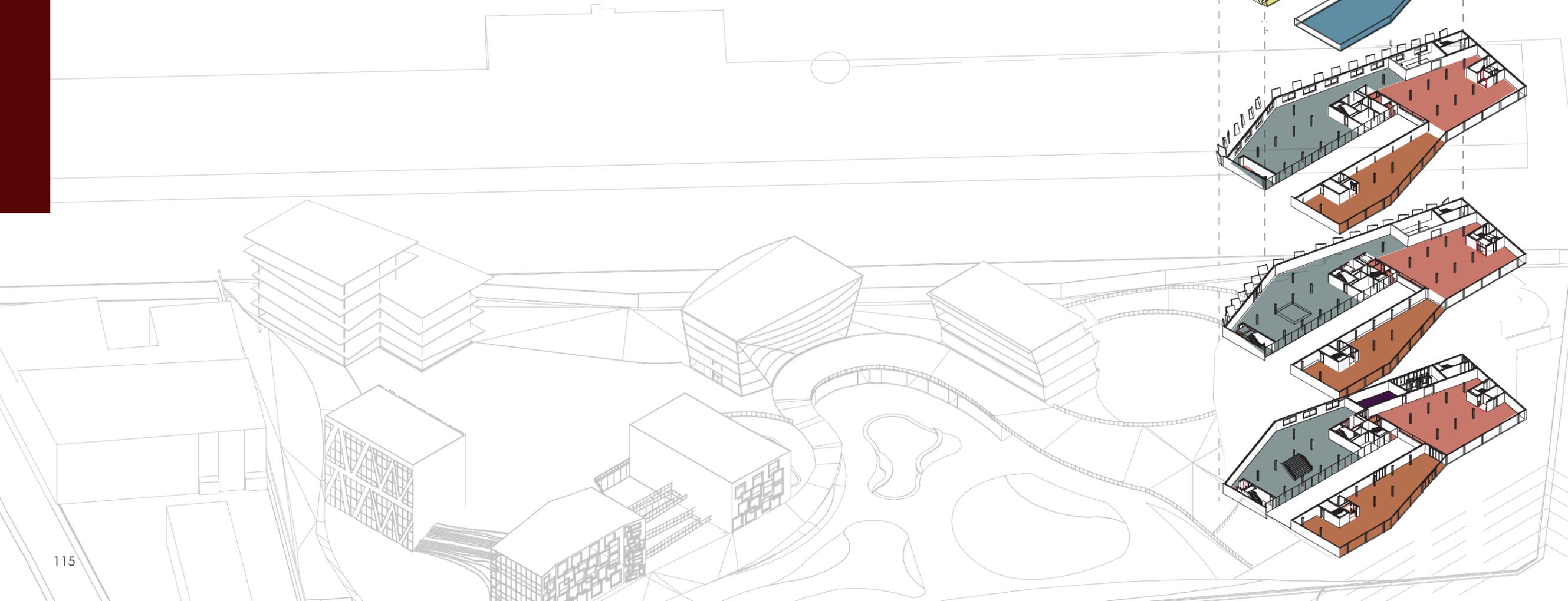
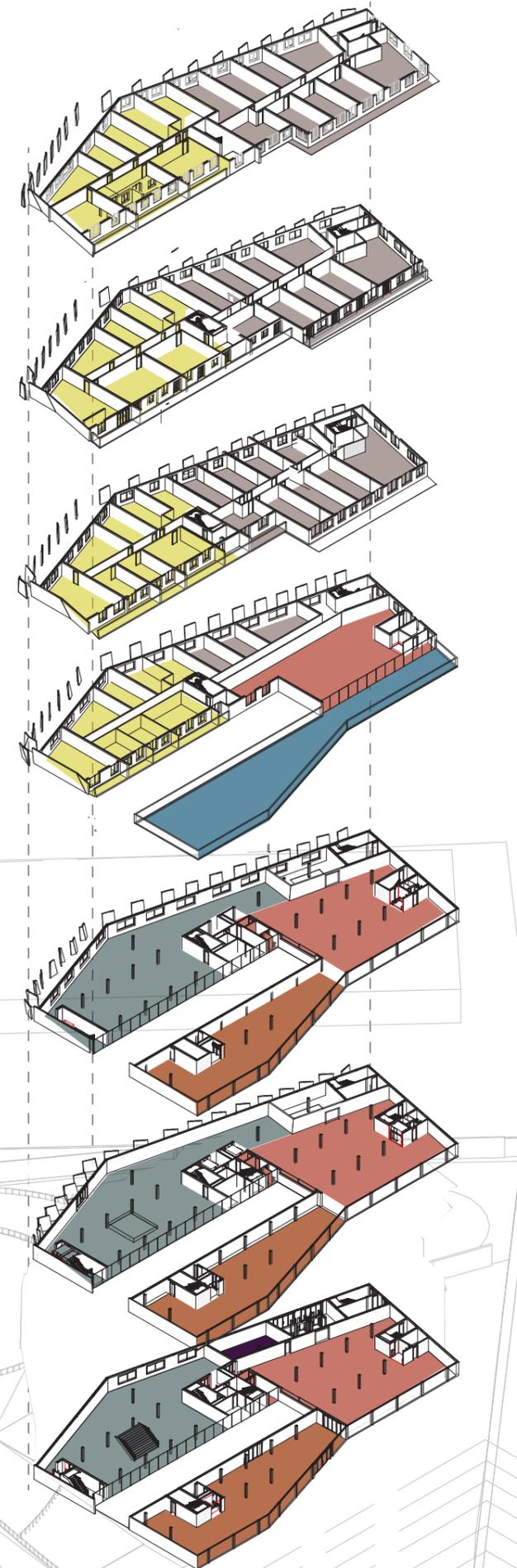
South Façade



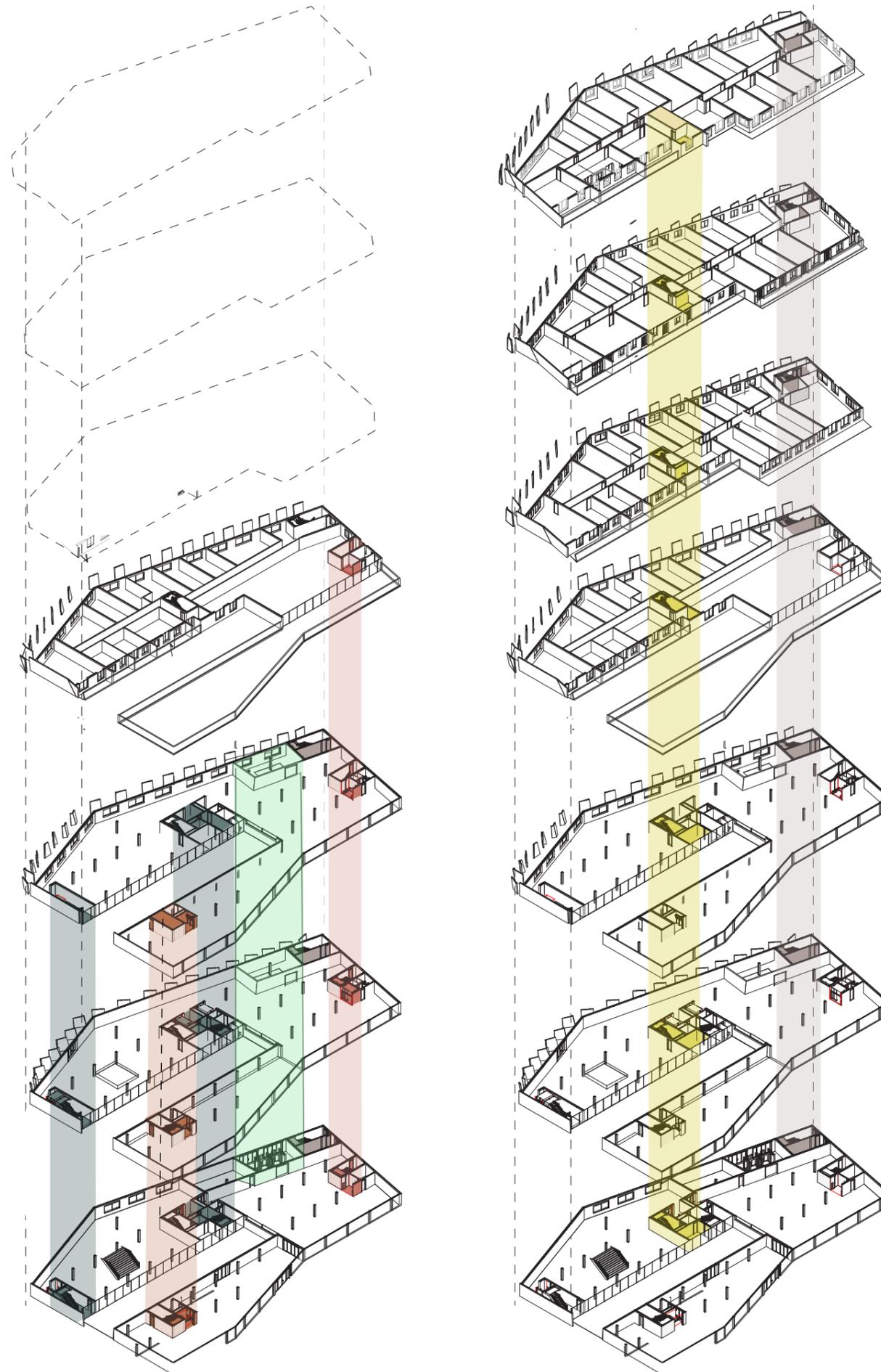
6.13

USES

-  housing
-  social housing
-  garden
-  events
-  fablab
-  biotextiles
-  technical area

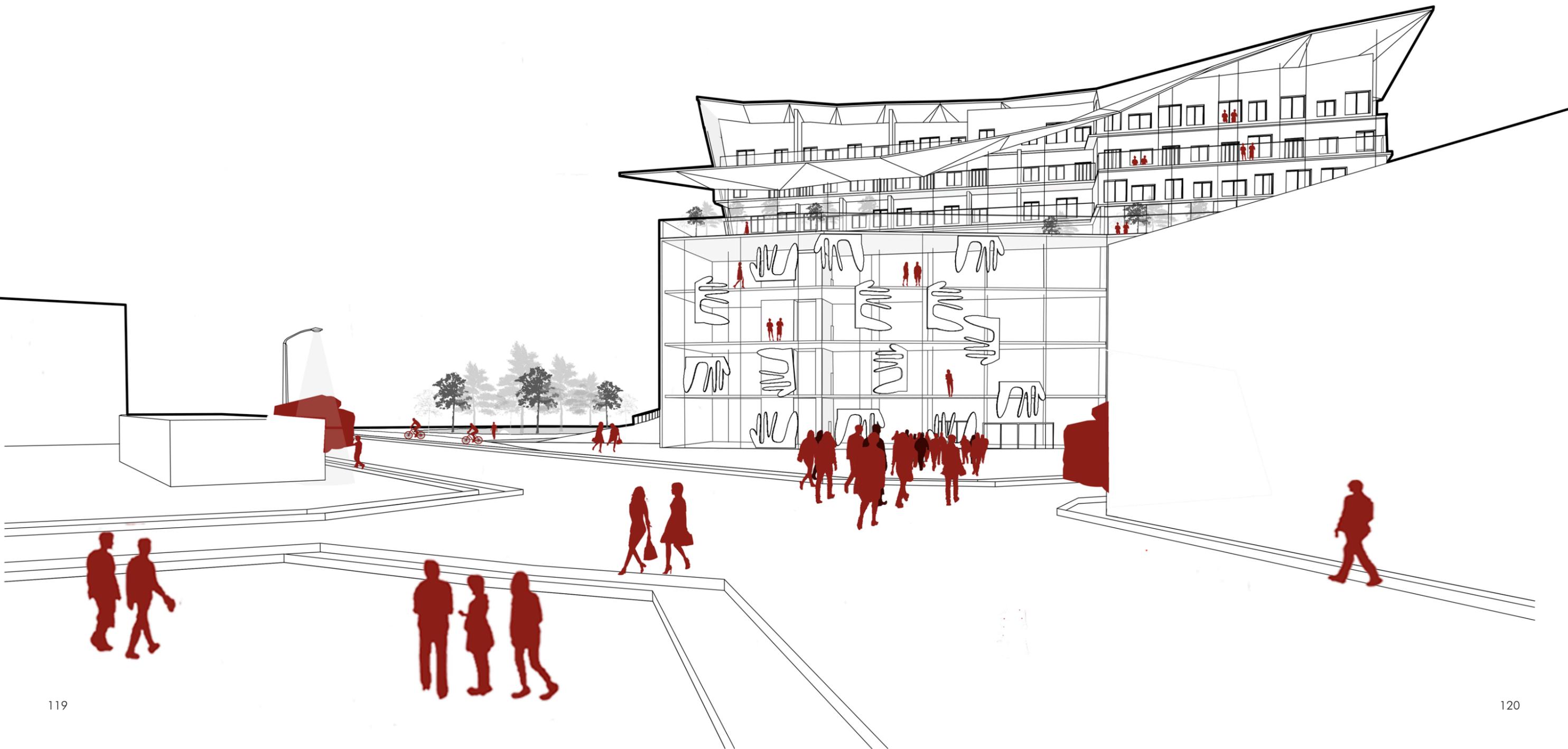


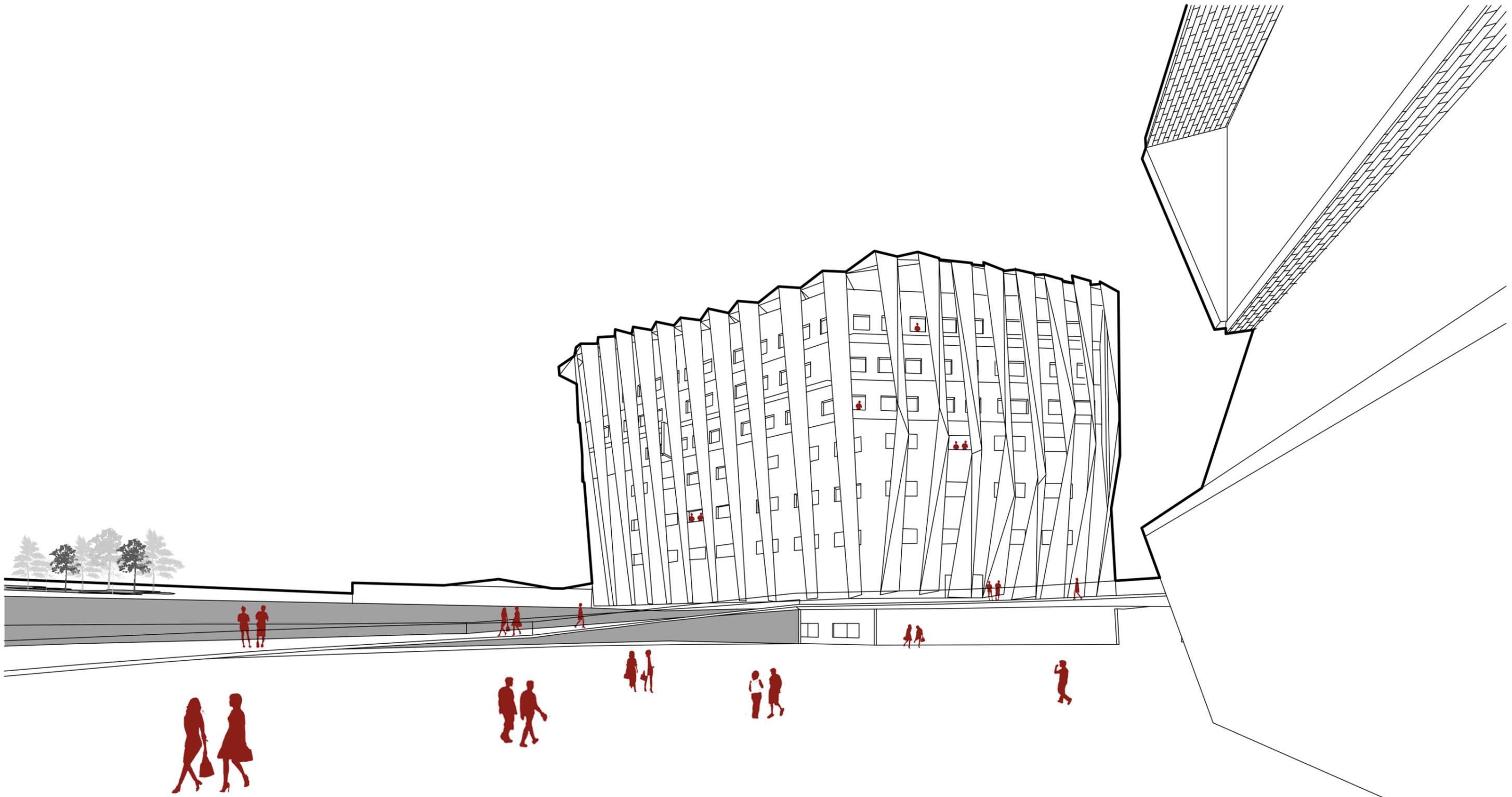
6.14 CIRCULATION

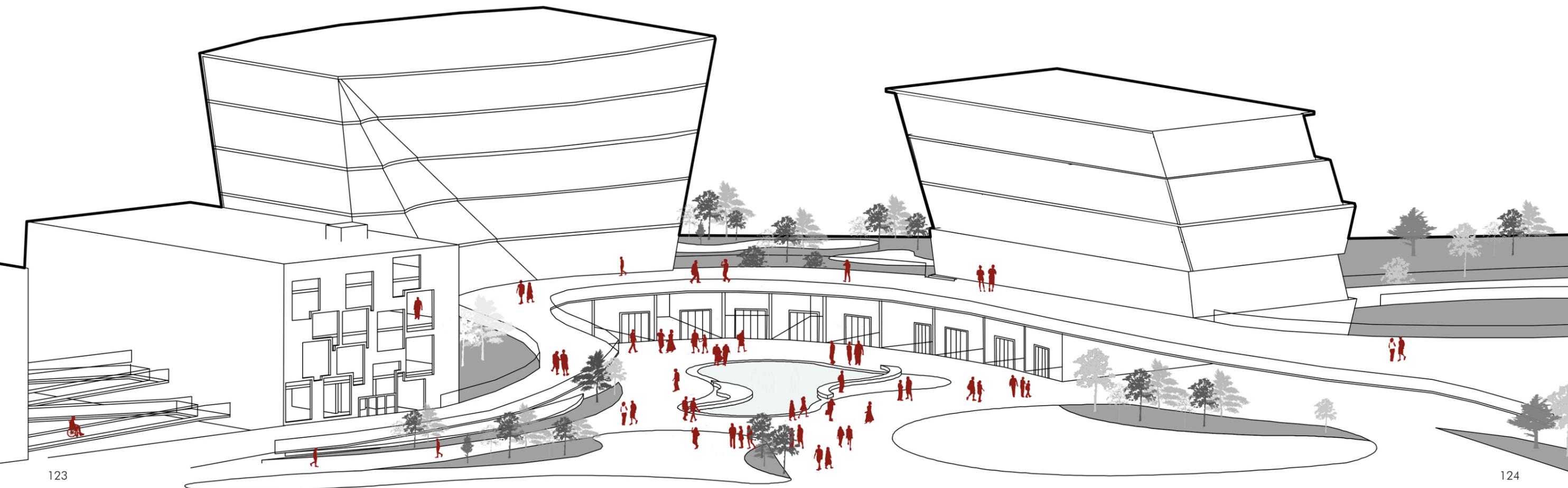
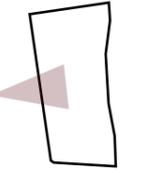


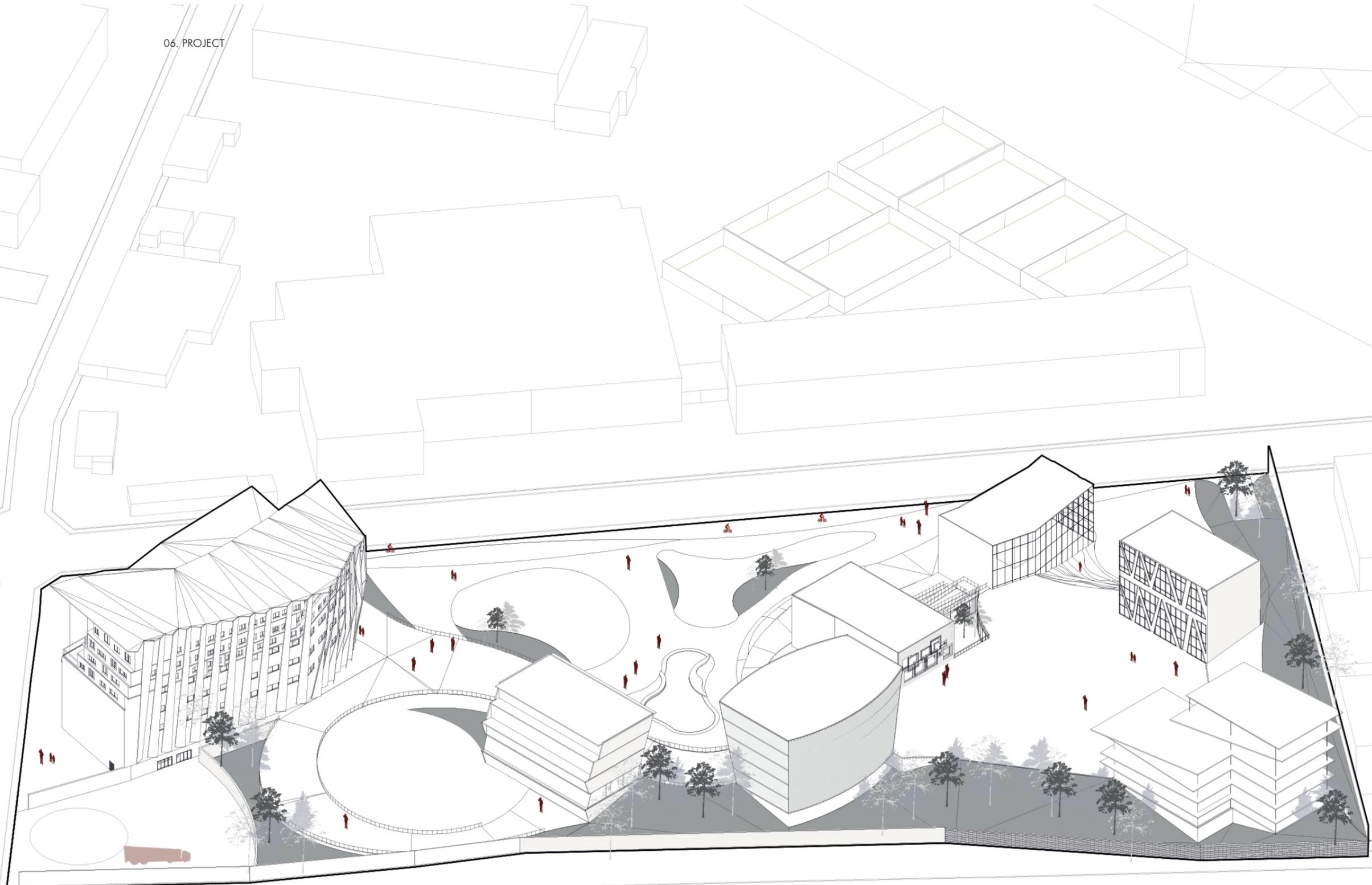
- housing**
- social housing**
- events**
- fablab**
- biotextiles**
- freight area**

6.15 VIEWS









CONCLUSION

In 2015, in the Paris Agreement, the United Nations developed 17 Sustainable Development Goals to be reached in 2030. Urban redevelopment, urban growth, fashion production, and Industry 4.0 contribute for this achievement. The present thesis discusses these current areas by combining them in a final architectonic and urban project proposal.

We are currently facing consequences due to massive production which impacts the environment. Fashion production is responsible for a significant amount of pollutants. Relevant changes of the fashion industry production are occurring due to sustainable issues.

The United Nations and other international institutions are working on strategies to reduce pollution in the fashion industry, including the use of the concepts of circular economy and technology, both topics discussed in this thesis.

Simultaneously with the issue of sustainable development, the economic and organizational phenomenon of nearshoring is discussed, which tends to geographically bring together the parties involved in production.

The industry 4.0 has stimulated new types of factories and made it possible to bring industrial areas closer to urban centers, as was said by Nina Rappaport and Max Juraschek.

These authors, taken as a theoretical basis for this thesis, point out challenges and advantages for this approach. Challenges in relation to noise pollution, traffic, CO2 emissions. Advantages, such as increased population density, fostering innovation and encouraging job creation, and different population groups living at the same area. Population growth, the dynamics of urbanizations, technological innovations foster a movement in which factories will be closer to urban centers.

As a result, governments and companies must be aware of this economic, urban and social trend and prepare themselves to monitor and plan their actions.

It is necessary to identify and bring together the stakeholders involved in this process, in order to enhance and enable the control and optimization of the phenomenon in progress. The need for action by planners and policymakers was perceived in this Project.

In the chosen industrial zone (LES Gresillions Gennevilliers) we can see the situations that Nina Rappaport described in her book

Design of Urban Manufacturing about industrial zones: windowless, one storey, unsafe, heavy truck traffic and noise.

The director of urban planning of the city of Gennevilliers reported that when technological risks arose, ZAC planning was interrupted. But, according to him, these technological risks will cease to exist because the renovation of the Grand Paris Express metro station will take place, and the entire region will be valued. Some projects are already underway, but in the area chosen for this thesis nothing has yet been developed.

The director agrees with the idea of using the bases of the circular economy and bringing industrial areas and urban centers closer together, a professional assessment that corroborates the thesis developed here.

Nina Rappaport developed the concept of “vertical urban factory”, the hybrid use, in the same building, of factory and housing. The main focus of the project applies this concept in the Gennevilliers industrial zone, developed around fashion industry production.

The project, based on the gobelin points (tapestry), follows the main guidelines and guidelines of the city. It develops around a grid, which causes continuous movement, up and down, between buildings and between the entire project.

The project applies fashion to architecture. The urban fabric and the clothing fabric are compatible and the project is a reflection of that, seeking to revitalize the site.

The entire masterplan and the concepts of seven buildings were developed, with the main focus on the factory, which is the combination of two types of “vertical urban factory”, described by Nina Rappaport: hybrid, neo-cottage.

The main reference project was the Strathcona Village, in Vancouver. The project was successful and shows the feasibility of the concept of joining “factories and cities”, with new uses, such as housing and factory. The success was only possible due to the interest shown by the City of Vancouver and other stakeholders.

My thesis is the intervention proposal of an urban factory in Gennevilliers. The choice of the project is the relationship between the urban fabric and the clothing fabric. Therefore, the developed design is a suggestion of the constructions that can be developed on the site. In this way, the architectural choices are one of the various possibilities of intervention in the area.

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