

THE IMPORTANCE OF URBAN INDUSTRY IN ASPIRING COMPACT CITIES

Consolidating
Dublin's Compact
Future

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Fig. 1- Beantown original sketch [generated by author]

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1.0 THESIS INTRODUCTION

In light of the global rise in population and the subsequent need for housing, cities have begun to employ growth containment strategies to create more efficient and sustainable urban forms. The compact city model is the most popular urban planning theory and has a number of benefits, it is, however, not without its flaws. Due to a scarcity of space for new urban housing, planners have begun to target low intensity land uses for redevelopment with large areas of industrial land set to be displaced. These industrial lands are deemed to be “redundant” with little attention being paid to the potential consequences.

This thesis aims to understand these consequences and determine the best course of action. This thesis encourages the use of the compact city model to be re-thought based on research that has shown urban industry to be a vital tool in the pursuit of sustainability.

On the 15th of November 2022, the global population reached 8 billion people, and although the rate of growth has begun to slow, it is predicted that by 2080 it will reach its peak of 10.4 billion (United Nations, 2022). With this growth in mind, cities all over the world, including Dublin have begun to employ strategies to ensure their future sustainability. These strategies follow the compact city model (United Nations, 2022) which encourages cities to stop growing outward, densify their population and maximize their sustainability (Lehmann, 2015). The compact city model has many advantages making cities more economically, environmentally, and socially sustainable, but may require the relocation of less intensive activities (Leigh and Hoelzel, 2012), often encouraging directly encouraging industrial sprawl (Dublin City Council, 2022). Industrial lands are deemed to be less intensive than other developments and, as such, have been targeted for residential and commercial redevelopment. The lack of consideration for industrial activity in aspiring compact cities is the driver behind this paper.

As such, this paper explores the blindside of compact cities with specific reference to the Draft Dublin City Development Plan 2022- 2028. It explores the potential for urban industry to be used as a means to help create more sustainable compact cities. This paper is based on a literature review of relevant material and the author’s own personal findings. It recognizes the challenges of integrating urban industries into aspiring compact cities and presents examples of how this can be achieved.

2.0 THE COMPACT CITY

- A sustainable urban model?

2.1 Compact Growth's Blindside

A compact city is an urban planning model that promotes dense urban growth, with consequent overlapping of uses, better pedestrian connections and more efficient public infrastructure. The compact city is aligned with sustainability¹ and improves the vitality of cities while preventing urban sprawl² (Ghisleni, 2022). Cities such as Amsterdam [fig. 1] and Copenhagen [fig. 2] have become exemplary models of compact cities. Burton describes five scenarios for accommodating compact growth in existing cities: urban infill, urban extensions, key villages, multiple village extensions, and new settlements (Burton et al, 2003). The advantages of compact cities are widespread with numerous economic, social, and environmental benefits that help cities achieve sustainability (Burton et al., 2003).

While compact cities are considered essential for sustainable growth, experts have argued that such an approach may encourage industrial sprawl,³ as through the processes of urban infill and intensification many low density industrial areas are displaced (Leigh and Hoelzel, 2012). Leigh and Hoelzel note the lack of consideration paid to industrial sprawl in the 2002 "Growing Smart Legislative Handbook". The 1400-page document describes the best practices of smart growth in 47 different neighborhood studies, but fails to describe any policies about how to reduce industrial sprawl (Leigh and Hoelzel, 2012). This is supported by Park and Kim, "Despite an enormous amount of research over several decades on the urban sprawl of residential and commercial land uses, little attention has been paid to the sprawl of industrial land development" (Park and Kim, 2022). Industrial sprawl can contribute to decentralization, a weakened urban-economic base, reduced accessibility to employment, increased poverty in lower class suburbs, and

climate change (Leigh and Hoelzel, 2012). Despite the negative impacts of industrial sprawl, policymakers rarely see industrial activity as a means to achieve the goals of smart and compact growth, but it has been argued by many, that urban industry is more efficient, productive, and sustainable than suburban and rural industry. Industrial sprawl should be of major concern to aspiring compact cities but it is often overshadowed by other needs, mainly housing and service based employment. This lack of consideration is referred to as smart growth's blindside.



Fig. 2 - Amsterdam, Netherlands- Compact City



Fig. 3 - Copenhagen, Denmark- Compact City

1. In 1987, the United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." (United Nations, 2022).

2. In 2019 the Encyclopaedia Britannica defined urban sprawl as "the rapid expansion of the geographic extent of cities and towns, often characterized by low-density residential housing, single-use zoning, and increased reliance on the private automobile for transportation." (Rafferty, 2019)

3. In 2022, Park and Kim defined industrial sprawl as the movement of major industries and employers from city centers to the outskirts during the processes of economic recovery and urban regeneration (Park and Kim, 2022)

2.0 THE COMPACT CITY

- A sustainable urban model?

2.2 Compact Growth's Blindside - Dublin City Development Plan 2022 - 2028

The lack of consideration for industrial sprawl in the aspiring compact city of Dublin is evident in the Draft Dublin City Development Plan 2022-2028. The document has 17 chapters in which it describes plans to develop Dublin into a vibrant and sustainable compact city but has not recognized industrial sprawl or the impact it will have on Dublin and its strategic long-term goals. It mentions in several sections [1, 2, 4, 5, 6] that it will require the "progressive relocation" of less intensive activities outside of the existing built-up area of Dublin. It will use this land to build 40,000 homes within the next six years. The plan has a chapter dedicated to its housing strategy [chapter 5], detailing plans for underutilized industrial lands, but has not developed or mentioned a strategy for retaining the displaced industries within the local economy. It simply states they will be relocated outside the built-up area of the city (Dublin City Council, 2022).

Evidence of its lack of consideration for industrial sprawl lies in a series of statements [fig. 3] made throughout the plan as shown in red. Additionally, the form and location of these industrial areas have not featured in any of its 37 maps of Dublin.

Dublin has large amounts of industrial activity, of which most are located in suburban areas [fig. 4]. Those located in urban areas have been marked for redevelopment (excluding the remainder of the Dublin Docklands). This process of urban regeneration involving the conversion of relatively inexpensive industrial zoned land to land zoned for mixed-use commercial /residential developments will cause the relocation of industry to outside of the city, thereby, contributing to industrial sprawl. Despite this, the Draft Dublin City

Development Plan has not provided a strategy to keep these industries in their existing locations, demonstrating the blindside of Dublin, an aspiring compact city.

"Compact growth is the first NSO and it has particular significance for the spatial planning policy, requiring at least half of all future employment growth in Dublin to be located within and close to the existing "built-up" area of the city - specifically within the canals and the M50 ring which will require the progressive relocation of less-intensive land uses outside of this built-up area." (Chapter 1, p 39)

"A number of large scale, industrially zoned lands were identified as having significant potential for regeneration as new mixed-use communities." (Chapter 2, p 69-70)

"Previous low intensity industrial land has in many cases been redeveloped for high quality office use and other more intensive land uses. This has been particularly evident in the Dublin Docklands. The economic strategy seeks to build on these trends and to continue to support the shift from low intensity, more land-extensive employment uses towards more intensive office, service, retail, tourism, and culture related employment activity." (Chapter 2, p 71)

"The city has also been assisted by a strategic review of all low intensity industrial areas which was undertaken during the last planning period. This review culminated in the rezoning of a number of sites for more intensive development." (Chapter 4, p 130)

"The Metropolitan Area Spatial Plan (MASP)... calls for increased employment densities within Dublin City and the suburbs and at other sustainable locations near high quality public transport nodes, near third level institutes and employment hubs, and for the relocation of less intensive employment uses outside the M50 ring and existing built-up areas" (Chapter 6, p 209)

Fig. 3- Dublin City Council proposing the relocation of industrial activity, Draft Dublin City Development Plan 2022- 2028 [generated by author]

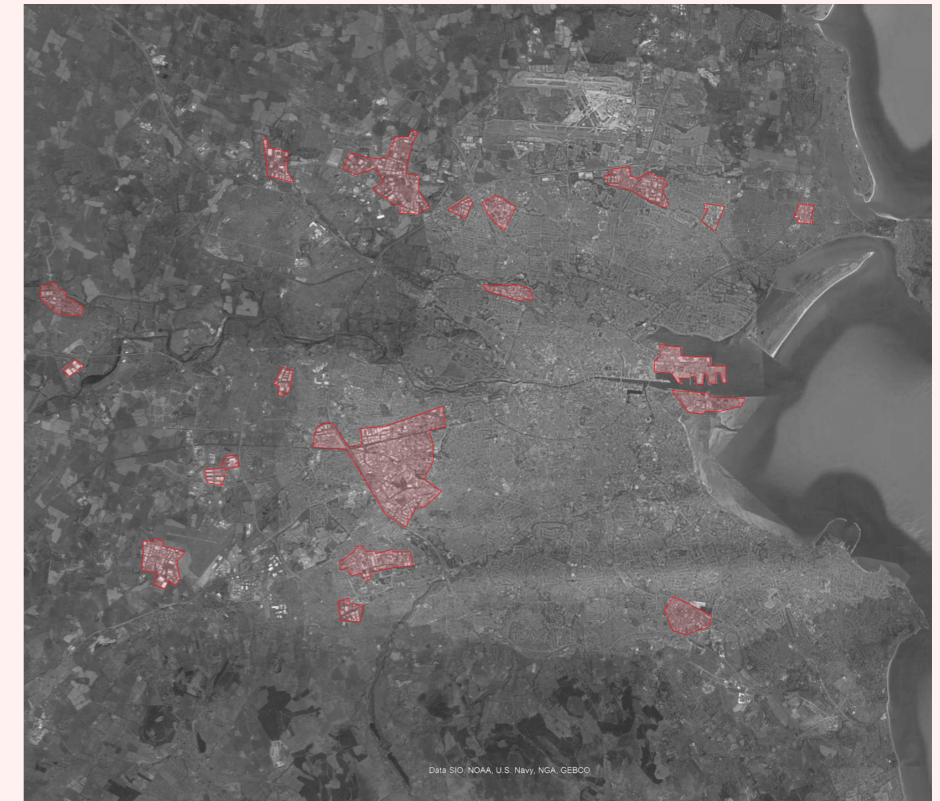


Fig. 4- Industrial estates in Dublin City [generated by author]



Fig. 5 - The Dublin Industrial Estate, looking south east

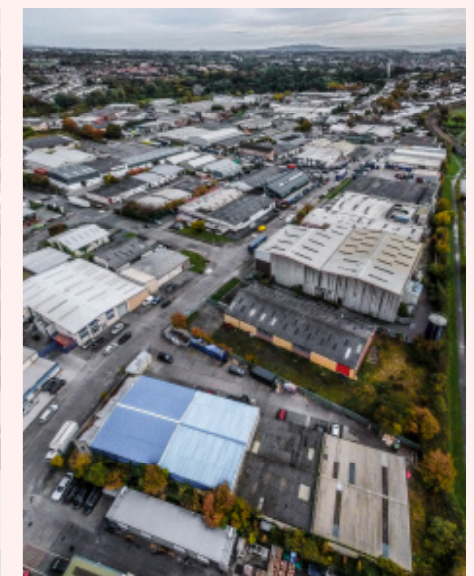


Fig. 6 - The Dublin Industrial Estate, looking east

3.0 URBAN INDUSTRIES IN COMPACT CITIES

3.1 Industry As a Means to Achieve Sustainability

Industrial areas used to occupy large portions of cities but through the processes of industrial sprawl these areas have been reduced in scale, rezoned, and converted into activities that reflect new values for urban areas. The consequences of this are not always favorable as by relocating manufacturing processes from city centers to rural locations, compact cities are contributing to industrial sprawl while simultaneously increasing emissions associated with transportation (CoM, 2022). Not only can industrial sprawl create environmentally unsustainable manufacturing processes, it can also have serious social and economic implications for the city, as previously described in section 1.1 (Leigh and Hoelzel, 2012). To mitigate these issues many have pointed to creating mixed-use industrial areas citing numerous benefits that would aid compact cities in their pursuit of sustainability. As cited by many experts, preserving, and enhancing urban industrial areas can help cities achieve sustainability by creating a circular economy, maintaining a strong economic base, reducing industrial sprawl, generating diversity, and allowing for more efficient use of infrastructure (Leigh, 2012., Leigh and Hoelzel, 2012., Park and Kim, 2022., Jacobs, 1961).



Fig. 7 - Truly compact city sketch [generated by author]

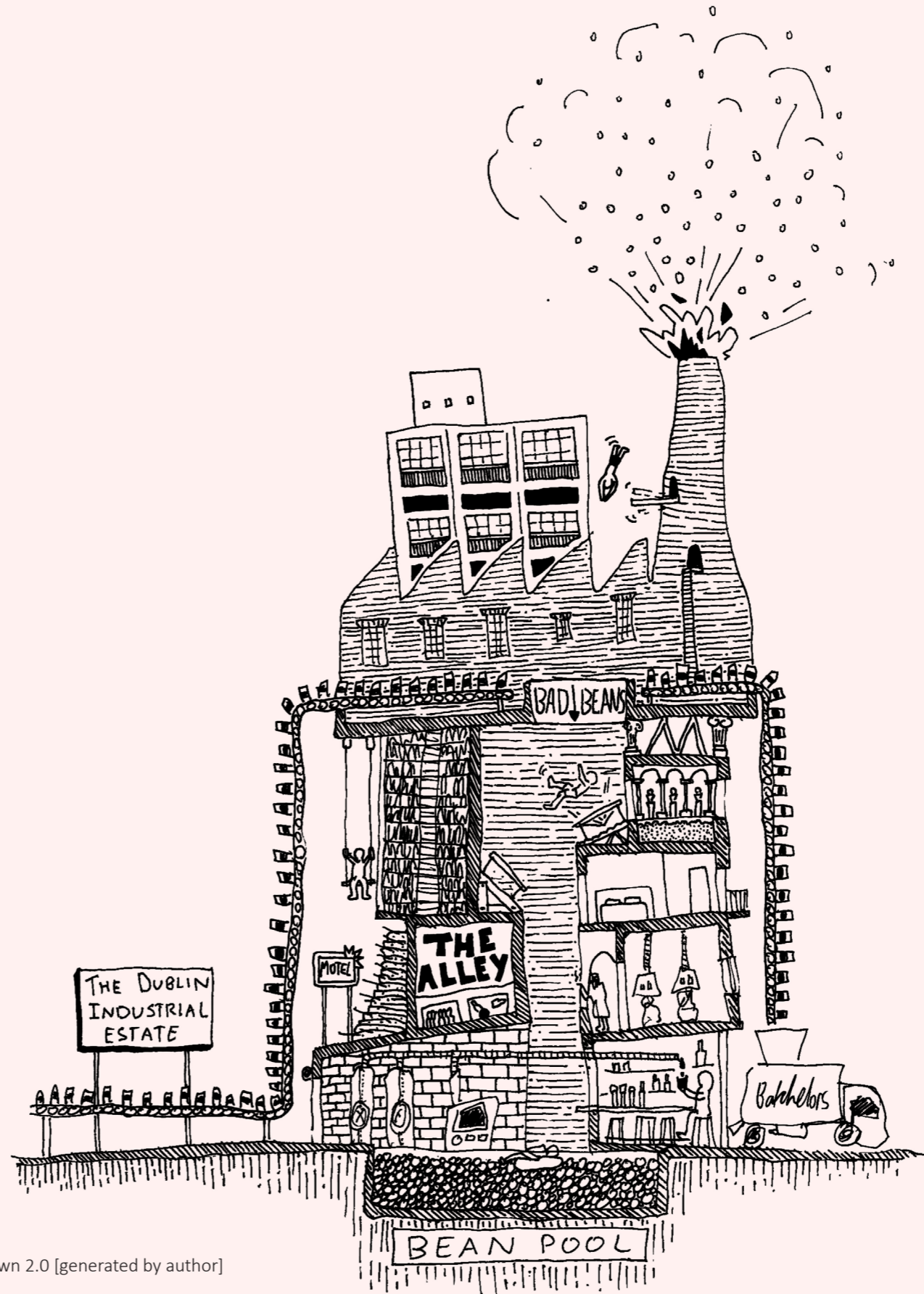


Fig. 8- Beantown 2.0 [generated by author]

3.0 URBAN INDUSTRIES IN COMPACT CITIES

3.2 CIRCULAR ECONOMY

The circular economy has been defined “as a regenerative system in which resource input and waste, emissions, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, manufacturing, refurbishing, and recycling.” (Geissdoerfer et al., 2017). The circular economy is considered the most sustainable and low-carbon economic model (Carchman, 2019). A study of seven European nations found that by facilitating a circular economy they could reduce their greenhouse-gas emissions by 70% and grow the economy by 4% (Stahel, 2019). Dublin City Council have recognized these benefits and have stated in their economy and enterprise strategy that they wish to support Dublin’s “transition to a low-carbon, green, circular economy”. Despite this, the Dublin City Development Plan has identified a number of large scale industrially zoned lands for regeneration as a new mixed-use communities. This has resulted in urban manufacturers, such as Colorman, selling their land to make way for these developments (Deegan, 2022). The Dublin City Development plan has not put forward a strategy to consolidate these existing manufacturers. This will lead to the loss of urban manufacturers in Dublin and contribute to industrial sprawl. The sprawl of these industries could prevent Dublin from developing a circular economy as urban manufacturers have been reported to be better able to participate in circular economies than suburban and rural manufacturers (Tsui et al., 2020). It is believed that greater proximity to other manufacturers reduces transport emissions and allows for the utilization of local waste flows as a resource (Tsui et al., 2017). A 2017 study found that by utilizing waste products, manufacturers were able to reduce their emissions by up to

8% (Tsui et al, 2020). These findings support urban manufacturing as a key aspect of developing effective circular economies. Their urban location allow them to make savings on transport emissions and develop more efficient waste management flows (Tsui et al., 2020). The Porterhouse Brewery in The Dublin Industrial Estate is an example of a manufacturer using its urban location to form symbiotic relationships with other industries. Its spent grain is used as animal feed for cattle in South Dublin and its spent hops are collected by Mulch [a green compost manufacturer in Dublin] and used for compost (Porterhouse Brewing Company, n.d.). Mutually beneficial interactions like this that occur when people are in close proximity, create the complex social networks that give a city life and character. The diagram below explains how close proximity of industries and people allows for increased circularity.

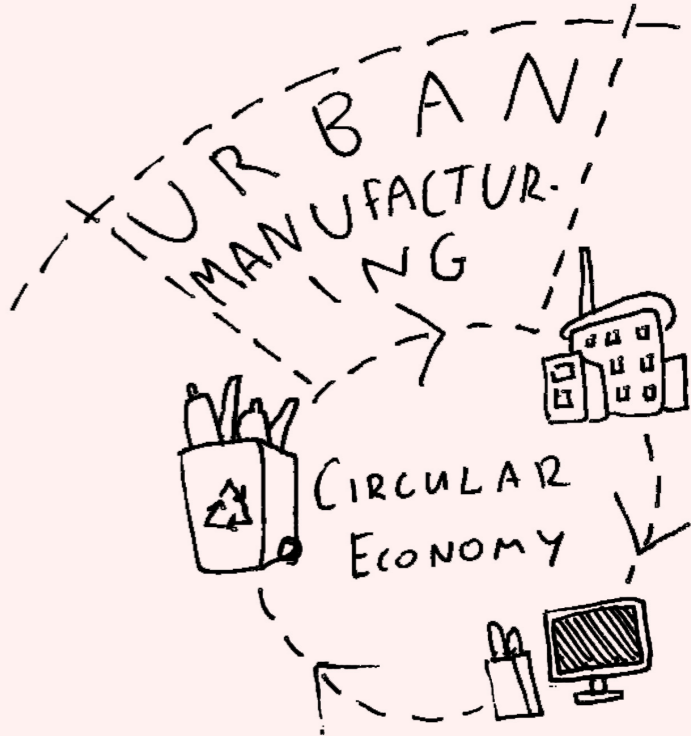


Fig. 9 - Circular economy diagram [generated by author]

It is with this in mind that we question the lack of consideration aspiring compact cities have given to the consolidation of their urban manufacturers.

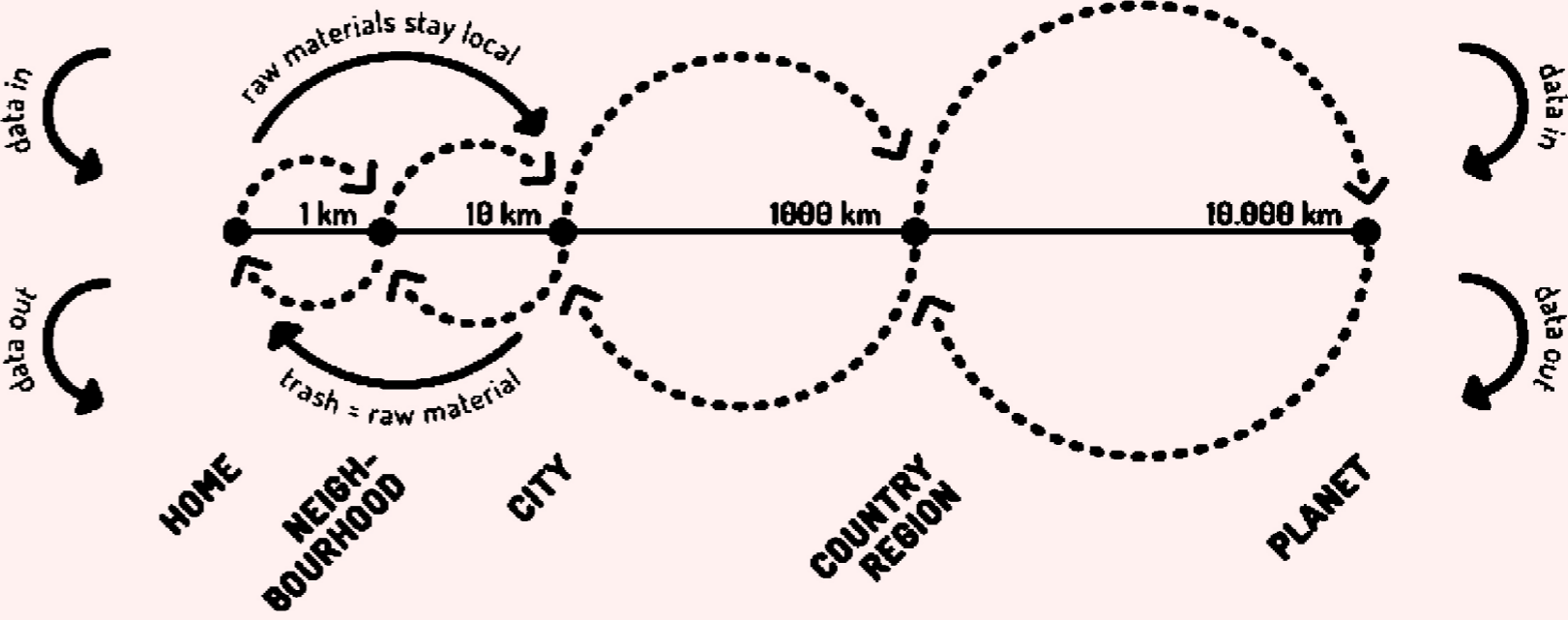


Fig. 10 - Circular economy diagram

3.0 URBAN INDUSTRIES IN COMPACT CITIES

3.3 MAINTAINING A STRONG ECONOMIC BASE

In the absence of a strategy to consolidate industrial activity in Dublin City, there is a risk of losing industrial activity which could result in de-stabilizing the local economy.

Manufacturing is the backbone of any industrialized nation and even though most developed countries have become more dependent on service-based activities, industrial activity still makes up a huge proportion of the world's gross domestic product (Haraguchi, 2016). For example, Ireland's GDP has, since 2015, been made up of 35% industrial activities, the largest of any sector [fig. 6] (CSO, 2022). According to a 2014 study, manufacturing has the strongest multiplier effect of any sector. This study found that every dollar in the final sale of a manufactured product supports \$1.33 in output from other sectors (Poischbeg, 2014). Research has shown that manufacturing is most profitable in urban areas as companies form indispensable links and become a strong part of the city economy, generating multiplier effects across regions (Byron and Mistry, 2011). For example, small urban manufacturers in Los Angeles and New York are critical to the internationally recognized entertainment and fashion industries and provide higher median wages than other industries (Byron and Mistry, 2011).

Manufacturers need urban locations for access to customers, suppliers, and labour markets and remain relevant in developed urban areas because their products serve aspects of urbanization (Curran, 2007). Close proximity to labour markets allows manufacturers to attract specialized workers which enables them to adopt environmentally sustainable production processes that are predicted to play a huge role in future economies due to ongoing climate issues (Rosen and Kishawy, 2012).

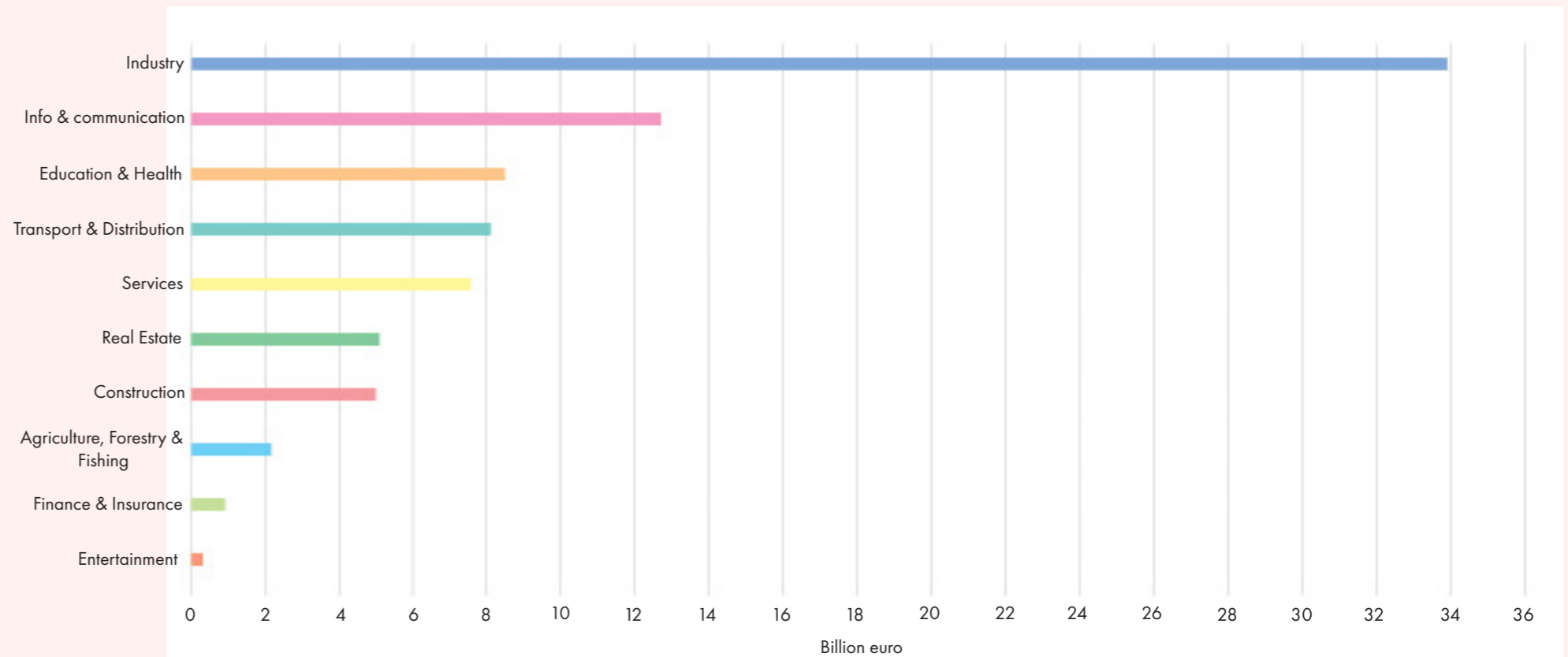


Fig. 11- The economic importance of Industry, Irelands GDP by sector, 2020

3.0 URBAN INDUSTRIES IN COMPACT CITIES

3.4 REDUCING URBAN SPRAWL

As previously discussed, displacing industries from Dublin city will have the effect of further deindustrializing the local economy. This will also have the effect of decentralizing the labour force. A 2010 study found that the quality of a place did not have a major impact on the retention of graduating students when compared to employment opportunities (Darchen and Tremblay, 2010). As such, displacing industries from Dublin city will result in urban sprawl as people will relocate in search of employment. This is supported by Southall who states that in attempts to achieve balanced urban growth in America during the 1980's, industrial estates and administration offices were removed from primate cities and relocated to smaller ones to spur growth (Southall, 1982). Relocating industrial areas could also create and worsen social division as manufacturing industries often provide employment to a less educated and largely lower-class workforce (Curran, 2007). A 2012 study found that between 2002 and 2012 the number of jobs within typical commuting distance in major metro areas across the United States fell by 7% but affected poor neighborhoods the most seeing unemployment rises of up to 17% (Kurtzleben, 2015).

Urban sprawl is characterised by loss of biodiversity, low density, increased transport emissions, car dependency, vacant buildings, lack of amenities, and a poor sense of place (Leigh and Hoelzel, 2012, Krier and Porphyrios, 1984, Jacobs, 1961, Johnson, 2001). Johnson discusses this topic extensively in his review “environmental impacts of urban sprawl” (Johnson, 2001). Dublin is already suffering from urban sprawl with large suburban areas such as Tallaght [fig. 7] on its peripheries. Tallaght is reported to have 110 vacant properties, the most in Dublin (O’flaherty, 2022), and is regarded as one of the cities most dangerous places (Loughlin, 2022).

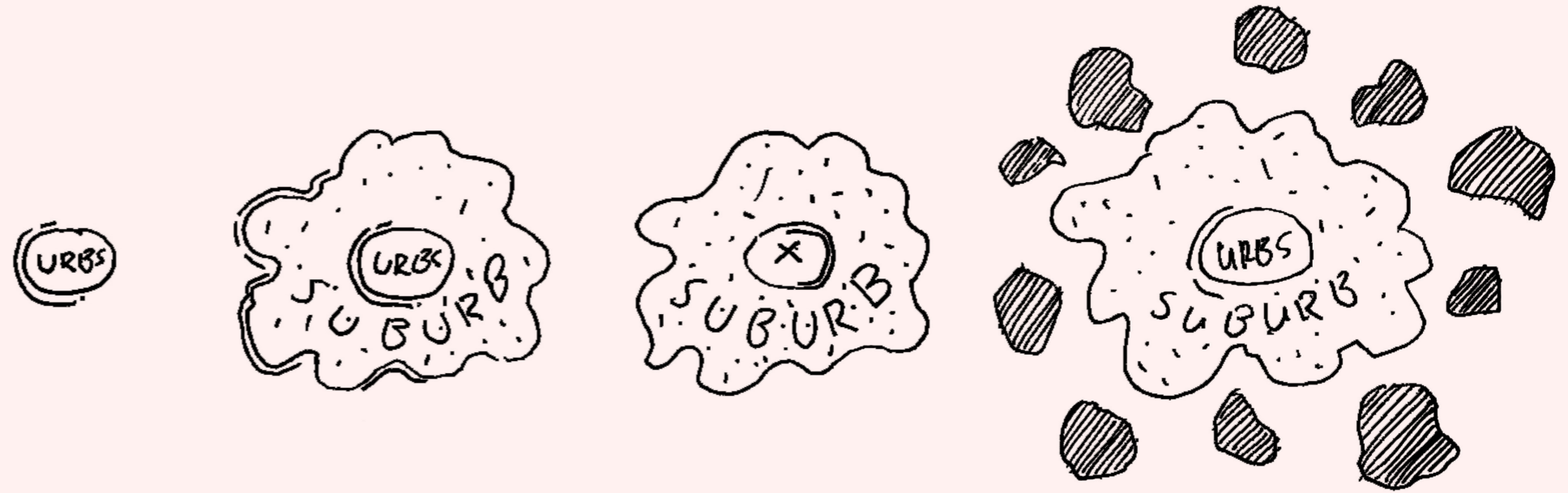


Fig. 12- Growth of suburbs and exurbs [generated by author]



Fig. 13- Tallaght, one of Dublin's most dangerous places

3.0 URBAN INDUSTRIES IN COMPACT CITIES

3.5 DIVERSITY & SHARED INFRASTRUCTURE

Urban diversity is defined as land that has a combination of different uses and activities that enable a social and economically vibrant environment (Jacobs, 1961). Diversity of uses is, according to Jacobs, essential to ensure city sustainability, and creates vibrant and connected cities.

Primary uses are, as Jacobs defined, anchors of everyday life, they draw people to them regardless of where they are. She states that districts must serve at least two primary uses ensuring the presence of people at differing times, explaining that good primary diversity encourages secondary diversity. She describes secondary diversity as enterprises that form in response to the presence of people drawn to primary uses and includes businesses such as restaurants and cafes.

In addition to diversity, the increased overlapping of uses resulting from integrated industry allows for a better use of infrastructure. Industrial activities require lots of infrastructure and displacing them will lead to the extension of grey infrastructure further into the suburbs and beyond (Leigh, 2012). It has been argued that the inclusion of industrial activities in compact cities could allow for greater cross-use of infrastructure (Morris et al, 2018). When compact cities displace their activities they reduce the efficiency of their infrastructure, incurring additional economic and environmental costs. Morris et al highlight a potential situation where urban industry can benefit a city in terms of water supply. Industrial buildings use city water supplies but are adept at rainwater harvesting. Morris argues that by integrating these private supplies of water into a shared system we would create a more resilient water supply for both the city and its industries. Similarly, if industrial activities leave cities, this

infrastructural synergy would be lost. This is demonstrated by the diagrams below [fig. 8]. “Two independent” sources of water represents a situation where industry and cities have been segregated and have no cross use of infrastructure while “Two shared” sources represents a situation where industry has been integrated into the city, allowing for cross use of infrastructure. This mutually beneficial relationship is just one example of how urban industry can benefit a city both economically and socially.

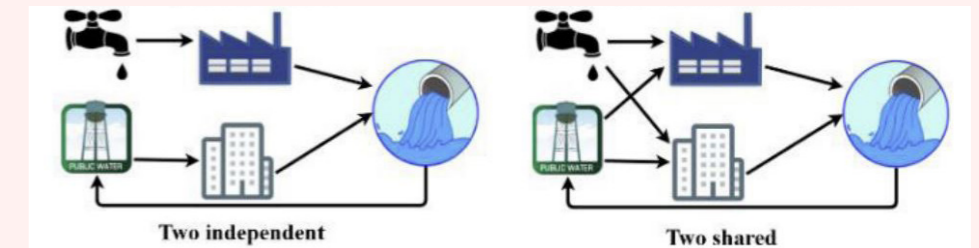


Fig. 14- Independent and shared water supplies

The absence of a strategy to maintain urban industries in the Dublin City Development Plan could unintentionally result in the inefficient use of its land through the loss of a primary use and reduced cross use of infrastructure.

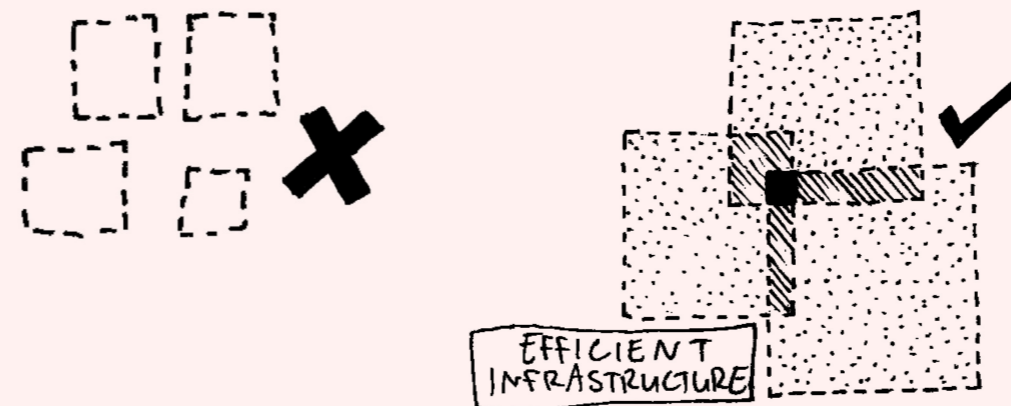
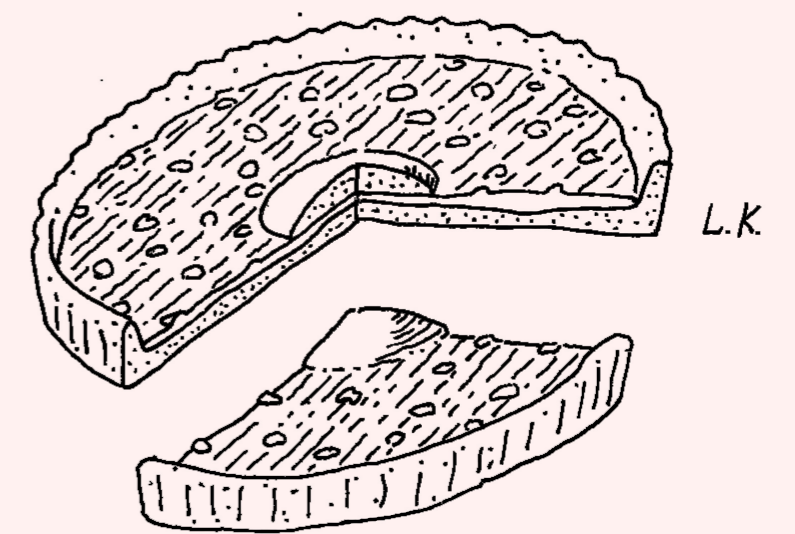


Fig. 15- Inefficient vs efficient infrastructure diagram [generated by author]



DIVERSE URBAN QUARTERS

Fig. 16- Leon Krier's pie redrawn by author

“This ubiquitous principle is the need of cities for a most intricate and close-grained diversity of uses that give each other constant mutual support, both economically and socially. The components of this diversity can differ enormously, but they must supplement each other in certain concrete ways” (Jacobs, 1961).

4.0 ACCOMODATING URBAN INDUSTRIES IN ASPIRING COMPACT CITIES

4.1 CHALLENGES

Mixed use industrial areas have been employed in many different cities all over the world, however, these are not without their challenges. For example, cities such as London and Manchester [fig. 12] mitigated the dangers of living near industrial areas by relocating industries as far north or east of cities as possible, reducing the impact of noise and air pollution (Adam et al, 2004). Industry has however, become much cleaner in recent years with new technologies and less toxic production processes (Russo, 2003). They are now more capable of co-location and have a lot of potential to help create more sustainable cities. They do however add more complexity to mixed-use developments, which are deemed to be more difficult and expensive than single use development (Rowley, 1996). As stated by Rowley, residences are very sensitive to noise and can sterilize industrial areas and as such urban industries need to create strategies to deal with noise pollution. Air pollution and waste are also significant factors to consider, raising issues around the compatibility of industry with residential and commercial developments (Adam et al., 2004).

The low land intensity of industrial areas is another challenge which needs to be addressed. These industries tend to be horizontal in nature, generally taking up lots of space (Sachse, 2018).

Despite these challenges, in order to achieve a diverse compact city with a circular economy and strong economic base that facilitates shared infrastructure and minimizes urban sprawl, solutions need to be found to retain these urban industries. The following case studies highlight projects that have demonstrated successful strategies for accommodating industries in cities. These strategies could be applied to

places like the Dublin to allow industry to be more closely integrated with the city, thereby facilitating a truly compact city.

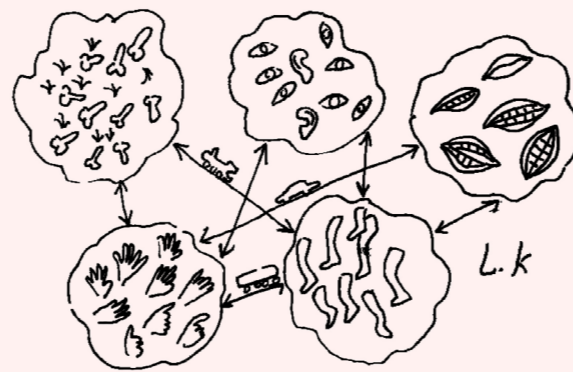


Fig. 17- Zoning of the body, Leon Krier



Fig. 18- City of communities [generated by author]

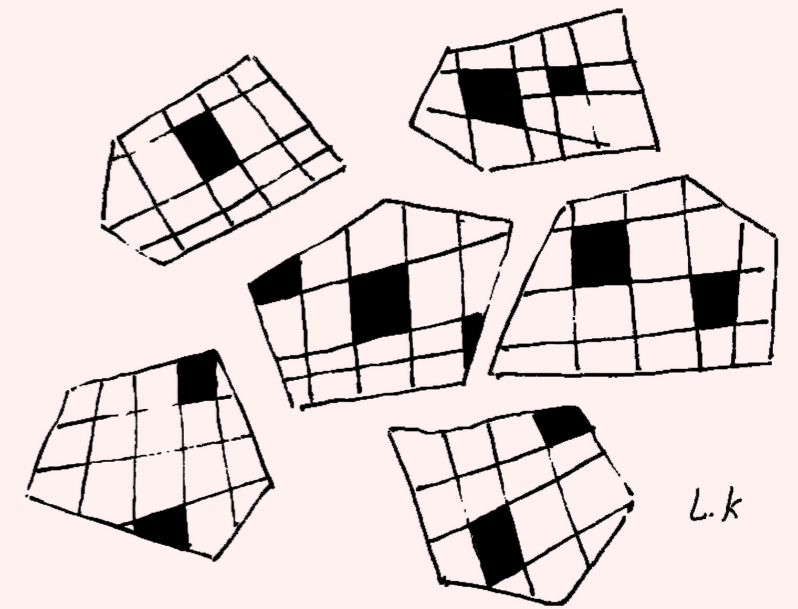


Fig. 19- Polycentric city, Leon Krier redrawn by author

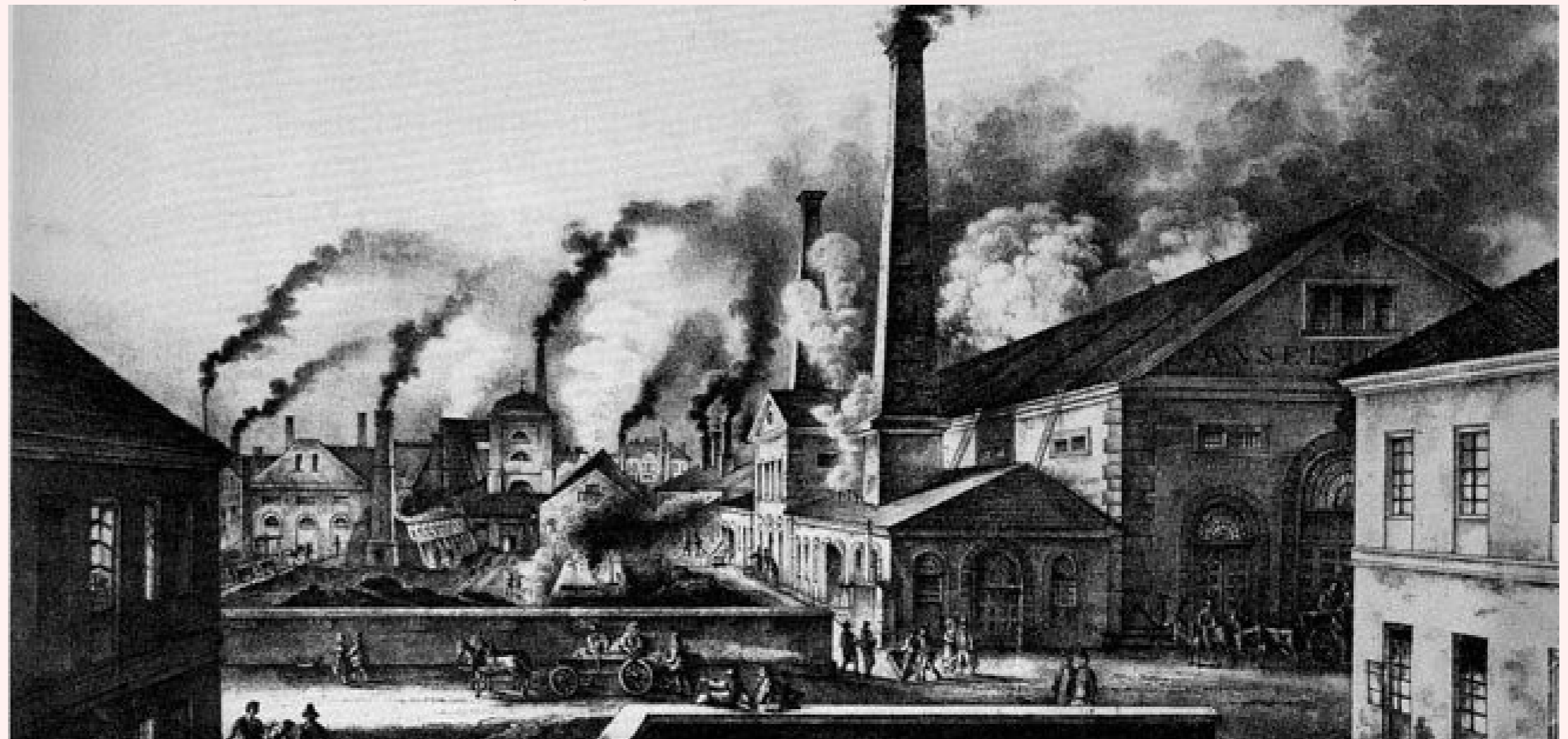


Fig. 20-19th century Manchester's "satanic mills"

4.0 ACCOMODATING URBAN INDUSTRIES IN ASPIRING COMPACT CITIES

4.2 CASE STUDY - WICK LANE - NOISE CONTROL

Wick Lane is a mixed-use project located in Hackney Wick, London. It co-locates light industrial units, retail, workspaces and 175 homes within a pedestrian-friendly landscape of yards and lanes. It is a collection of six buildings that together form a new community (Hole, 2016). The site is located between the Fish Island Conservation area to the North and Strategic Industrial Lands [SIL] to the South [fig.13]. Since the decline in industry, the Fish Island Conservation Area has slowly been inhabited by creative communities who have given it a strong identity. The design attempts to connect the Fish Island Conservation Area, the SIL and the greenway, while facilitating the future growth and adaptation of the SIL. Maintaining the historic and industrial character of the area was a key concept in the project. The main challenge of developing residencies so close to the SIL was the potential noise pollution.

This project is of interest to this paper due to its use of an architectural buffer zone between the residential aspect of its development, and the industrial area which is located to its south [fig. 14]. It also acts as a transition space and does not cut the industrial area off from its surroundings, but rather through a series of permeations connects it to them [fig. 15], creating a flowing series of distinct urban areas. These design decisions have not only allowed for new quality housing in an industrial area, but they have also consolidated the SIL as part of Hackney Wick's urban fabric. A considered layout and plan of different building uses like this allows for denser development around industrial areas while protecting the mixed-use residential/commercial development from potential noise pollution. If the design failed to allow the residential and industrial areas to co-exist in a

harmonious way, the dwellings would sterilize the industrial area, eventually leading to its relocation. To achieve this, the design incorporates a series of fronts onto the Old Ford Road which house several light industrial units. These units are based around the art studios of Gavin Turk and don't produce much noise. The residential components are set back into the site, using the light industrial units as a noise buffer [fig. 14]. This means that the residents will be less affected by the noise associated with the Old Ford Road and the SIL.

This method was used to facilitate denser growth in and around the SIL, while retaining their industrial activity.



Fig. 21- Wick Lane site plan



Fig. 22 - Wick Lane, concept sketch of the architectural noise buffer and set back residencies

4.0 ACCOMODATING URBAN INDUSTRIES IN ASPIRING COMPACT CITIES

4.3 CASE STUDY - LAFAYETTE 148 - INTENSIVE LAND USE

“Factories are truly radical structures, purely pragmatic boxes, spaces for machines [and people] that execute clearly defined production processes. When functionality means everything- and budget is limited – architecture finds itself taking on a fascinating role.” (Chris Van Uffelen, 2009)

Factories are usually one or two stories and require large amounts of land to complete efficient production processes. By stacking production processes in a vertical building, large amounts of space can be freed up allowing for a range of other activities to occur. Multi-story factories can facilitate densification but require a considered logistical approach, as their vertical nature can create inefficient production processes. The problems associated with multi-story factories can include transportation of parts and materials, future expansion, evacuation during emergency, and hazardous waste removal.

The Lafayette Factory in Shantou, Guangdong Province, China [fig. 16] is of interest to this paper because it houses all the functions of the Lafayette 148 clothing brand in one vertical building, achieving an intensive use of land. It demonstrates how architecture can develop effective vertical production processes (Hadhigi, 2020).

The factory is 11 stories with a basement level carpark. The double height ground floor acts as a showroom and runway for events, also housing the shipping and packaging facilities, which are located in the buildings east side. The first floor houses a cafeteria with floors three to nine housing all the manufacturing spaces. The top two floors contain offices, design studios, an apartment, and a gym. The factory

implements a top-down strategy to achieve an efficient vertical production process. The production flow begins at the top with design and administration in the studios and offices and proceeds downwards with cutting, sewing, and all other manufacturing processes taking place in the lower levels, until the final product arrives on the ground floor at the shipping and packaging area.



Fig. 23-Lafayette 148 exterior close up



Fig. 24 -Lafayette 148 exterior in context

4.0 ACCOMODATING URBAN INDUSTRIES IN ASPIRING COMPACT CITIES

Potential for future adaptation was considered during the design of this factory. If the building could not facilitate adaptation, it runs the risk of being demolished prematurely. To achieve this the Lafayette factory is constructed using a post-tensioned concrete frame system, allowing for a free plan with no internal columns [fig 17]. The building is 26-by-87 meters with the services located in a 9-meter-wide bar running the full length of the north façade, keeping the factory floors free of obstructions. The uninterrupted space allows for a series of parallel worktables and sewing machines [fig. 18] with carts that drop fabrics at designated places and pick up finished goods to be brought to the packaging section. Due to the open plan, these spaces can be adapted to change in line with the most efficient production processes. The open plan also means the factory could be more easily repurposed than a cellular building.

Evacuation is an issue in a multi-story factory. As such, the factory includes three lifts and three stairs which are distributed along three cores in the buildings northern face [fig. 17].

The building employs clever shading and ventilation strategies to make energy savings. It is clad in a brie-soleil made of twisted concrete fins [fig. 19]. The fins conceal outdoor areas that have been “carved” into the manufacturing block allowing for deep penetration of natural light [fig. 20]. A chimney is used to allow hot air to rise on a north-south axis which provides cross ventilation reducing the temperature and humidity of the manufacturing spaces [fig. 21]. These design decisions allow the building to achieve a 40% reduction in energy costs associated with cooling, thus reducing the noise and air pollutants associated with using air conditioners.

Hazardous waste is not a typical by-product of this factory and as such is not of concern.

The design of this building shows how architecture can facilitate the densification of industries, allowing compact cities to accommodate industrial and manufacturing processes, while maximizing land use.

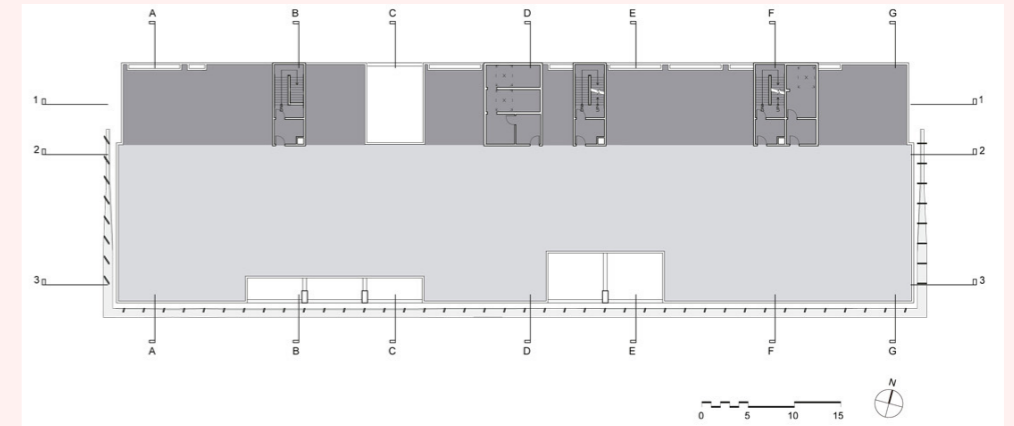


Fig. 25- Lafayette 148 typical plan



Fig. 26 -Lafayette 148 factory space

5.0 THESIS CONCLUSION

This paper shows that aspiring compact cities do not recognize the benefits of retaining urban industries and therefore cannot achieve maximum sustainability. This is particularly evident in the Dublin City Draft Development Plan 2022 - 2028. The lack of consideration for the benefits of urban industry in aspiring compact cities reduces their ability to develop circular economies, create a strong economic base, reduce urban sprawl, generate urban diversity, or facilitate shared infrastructure.

In the author's opinion this is a major flaw in the planning process of developing compact cities as the opportunity of achieving a high level of sustainability is missed. Whilst the difficulties of retaining urban industries in aspiring compact cities are recognized, this paper highlights examples of how considered architectural design can successfully co-locate industrial and residential activities as well as intensifying the use of industrial land. The retention of urban industries in compact cities allows them to consolidate their urban form without contributing to industrial sprawl.

In the author's opinion, if Dublin City Council is to achieve maximum sustainability through the compact city model, it must modify its plan to include a strategy for the active preservation of its urban industrial sites.

6.0 PRELIMINARY THESIS PROJECTS

6.1 DUBLIN INDUSTRIAL ESTATE ACTIVITY MAPS

As part of the first project this year, we were each assigned a group containing both architecture and architectural technology students and were asked to gather and analyze relevant information on the Tolka Valley. I was assigned to group two under the title "Local and Global Economy". My interest in the vitality of cities drew me to analyze the activity of the area over the period of a week. The opening times of the industrial estate's businesses were recorded and mapped as well as the activity of the surrounding residential areas of Cabra and Finglas (the activity of these areas was estimated using employment and population statistics from the CSO).

The results show that the industrial estate and residential areas are out of sync with each coming to life as the other goes to sleep. Essentially this study is a critique on functional zoning, a planning theory that took over the majority of the western world's cities throughout the 20th century. This planning theory segregates a city based on its functions and has been criticized for creating car dependent cities with very high carbon emissions. The study demonstrates the inefficient use of land by functionally zoned cities.

This is just a sample; the full version is available via the QR code on the contents page. (Spam the right arrow and watch the maps come to life!)

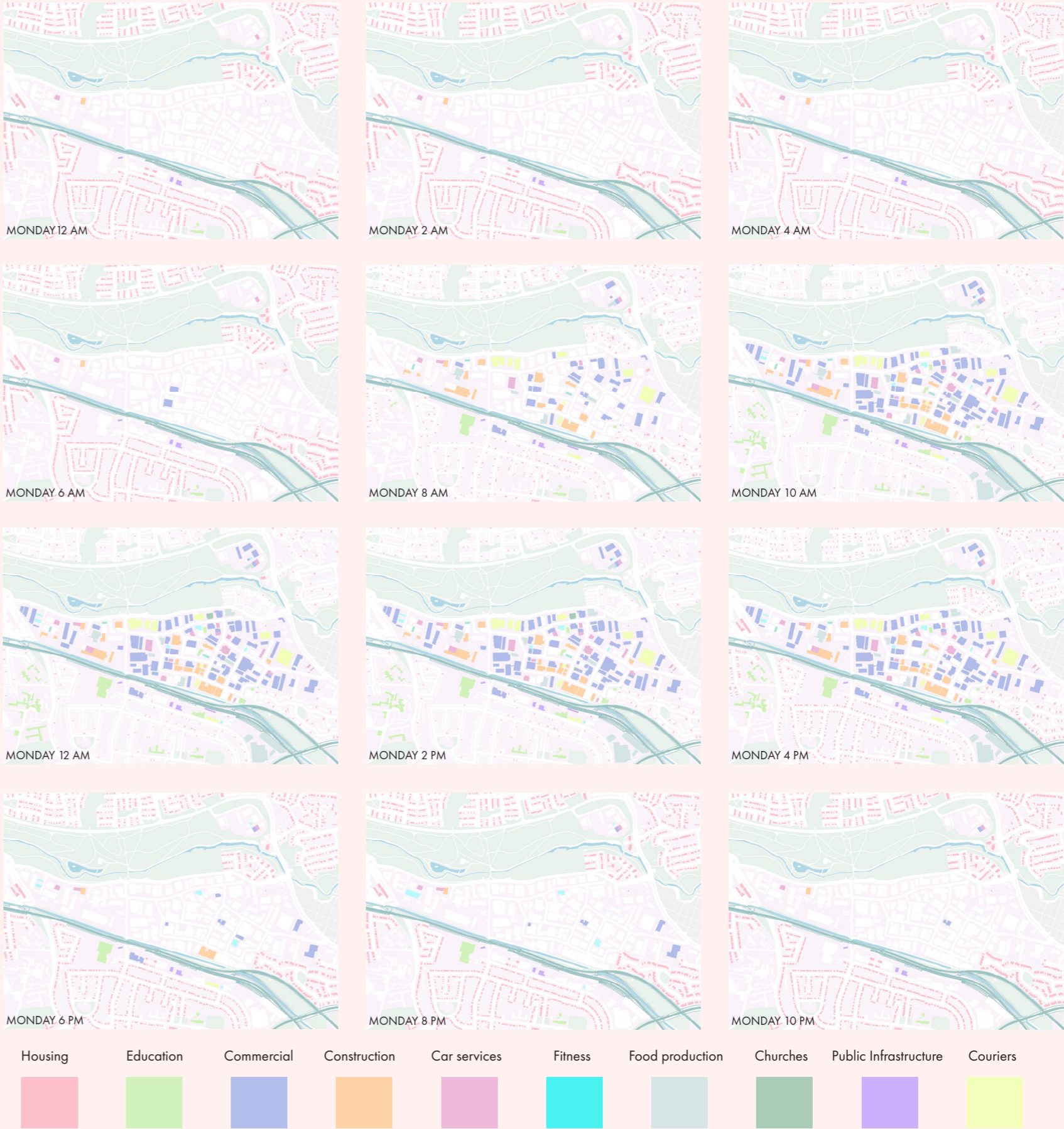


Fig. 27 -Tolka Valley Heat Maps [generated by author]

6.0 PRELIMINARY THESIS PROJECTS

6.2 BEANTOWN

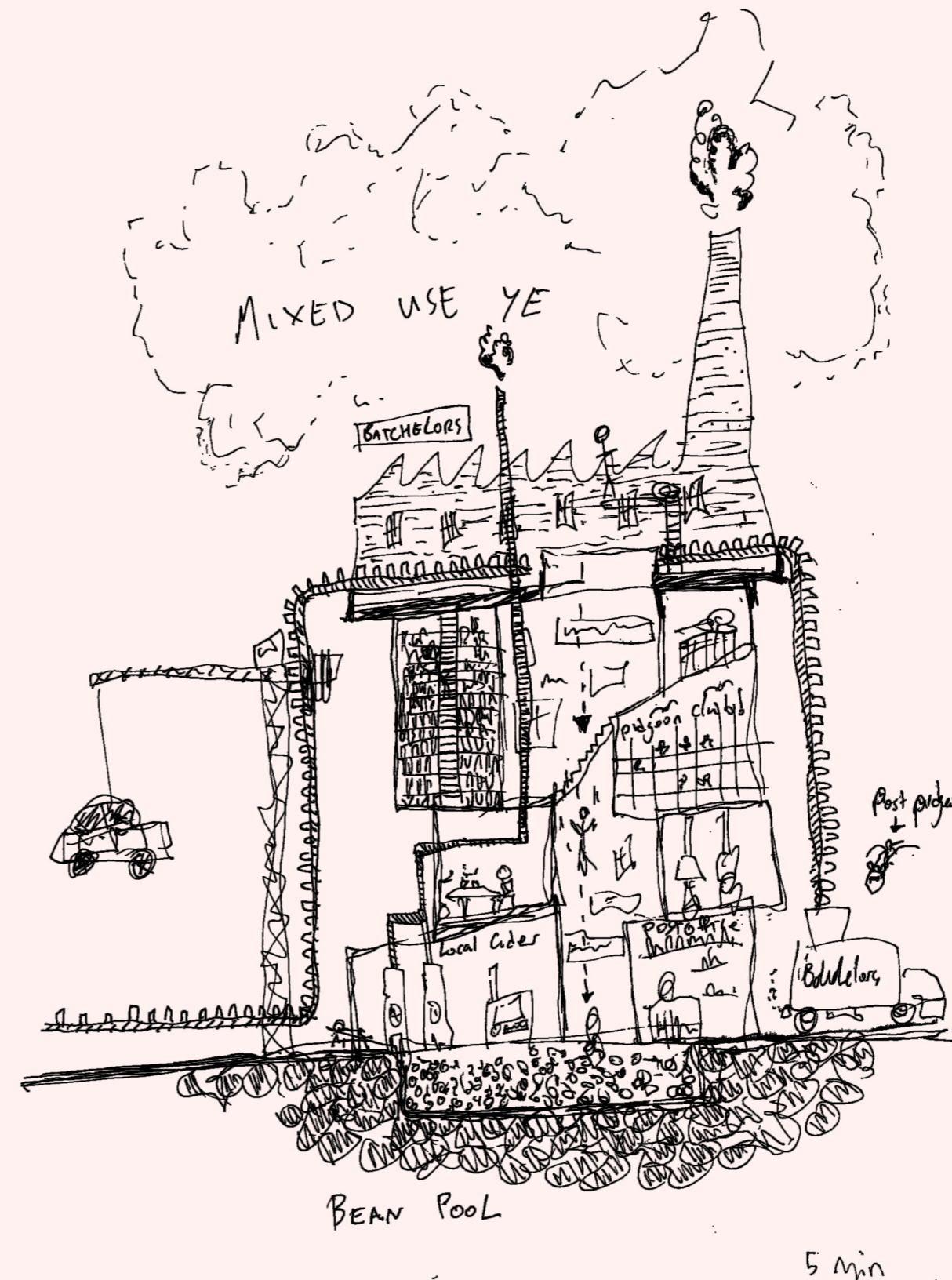
Following on from our research project, we (group 2) were asked to make a speculative proposal inspired by the information previously gathered. Still amazed by the amount of activity hiding behind the warehouse doors of the industrial estate, we decided that we would highlight this in a semi abstract section drawing. Influenced by the current trend of displacing low intensity uses to allow for more intense development we decided to stack the various businesses on top of each other to create a vertical version of the currently horizontal industrial estate. In doing so the rest of the land could be developed as the Dublin City Council desires, but without displacing its existing industry and facilitating industrial sprawl.

Upon agreement of the plan to create this section drawing we decided to each spend five to ten minutes creating an initial sketch of what we each had in our heads. When we were all finished, we discussed each other's work and picked out parts we liked from each, before setting out a larger scale collage version. After this we produced the final Beantown drawing.

When producing this sketch, I wanted to create something fun and loose but at the same time this was a serious proposal that hinted at something bigger.

This was in my opinion successfully carried into the final drawing and contained many of the businesses in the industrial estate while also including additional uses such as housing and other recreational activities not currently found in The Dublin Industrial Estate. The full drawing on the next page can be viewed digitally at the QR code on the contents page.

Dublin, a city in Crisis



GROUP 2

Donal Brophy
Conor Byrne
Samuel Donovan
Kate Hunter Hanley
Paul Kennedy
Shona Quigley
Luke Sheridan
Jessica Whelan

Fig. 28 - Beantown original 5 minute sketch [generated by author]

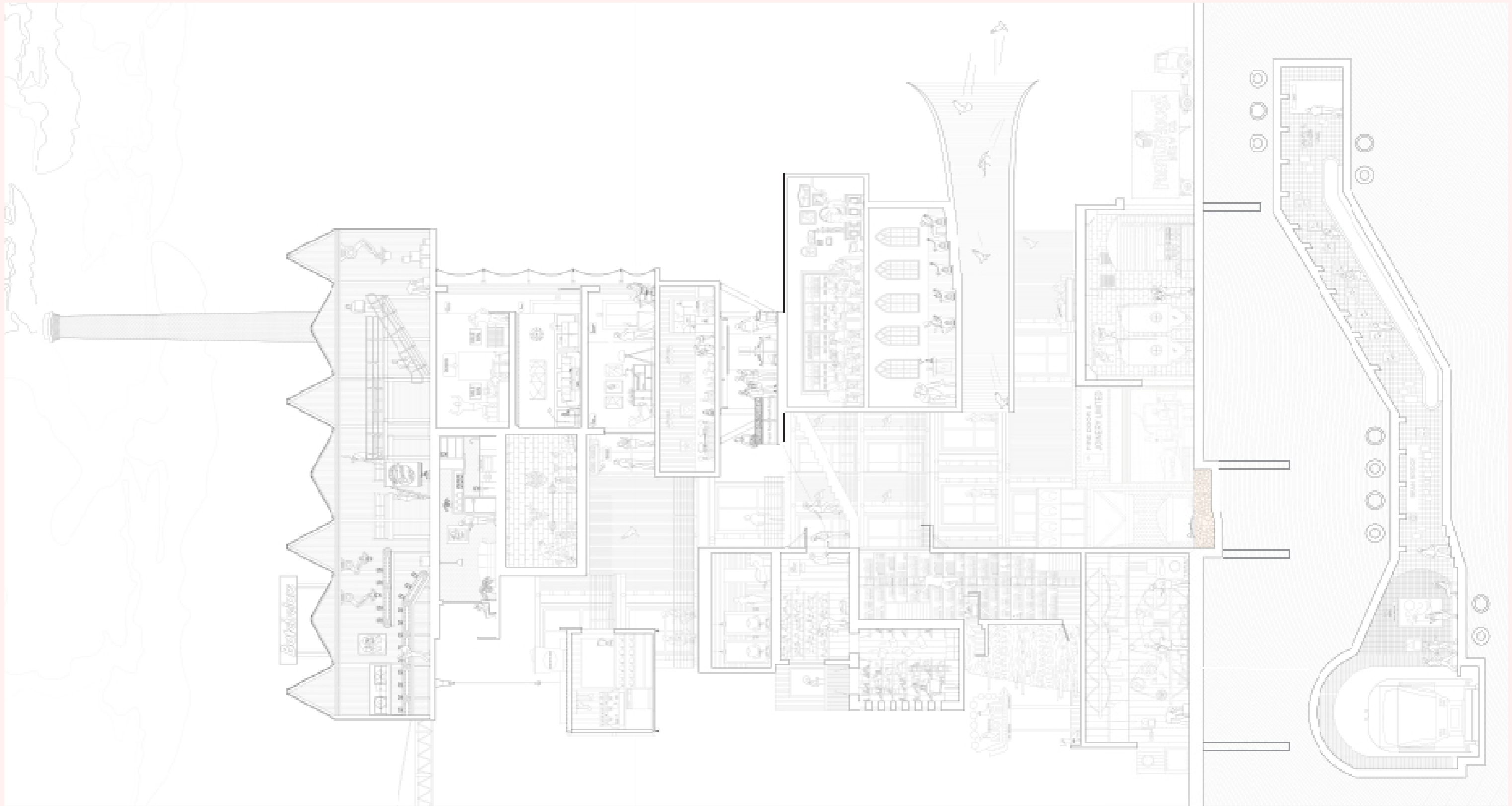


Fig. 29- Beantown full drawing as completed by group 2

6.0 PRELIMINARY THESIS PROJECTS

6.3 TOLKA VALLEY HIGH STREET

After Beantown we were assigned new groups. Eager to further the ideas that Beantown embodied, specifically densifying the industrial estate, we proposed Tolka Valley High Street. We took a large three bay portal frame shed that contained several independent industries and redeveloped it into a mixed-use industrial/commercial/residential street made up of two long buildings running parallel to each other. The southern building contained commercial and community spaces on the lower levels with housing above. The northern building contained industrial spaces with additional community spaces and housing above. The street between was to become a commercial route through the industrial estate connecting it to the Luas stop, Tolka Park, and TU Broombridge. The building was designed with mostly new materials but the existing frames and corrugated panels were repurposed throughout the project. The large section drawing can be viewed digitally via the QR code on the contents page.

GROUP 3
Conor Byrne
Vince De Jesus
Alia Mc Gurrin
Tadgh O'Rourke
Renaldas Skripta

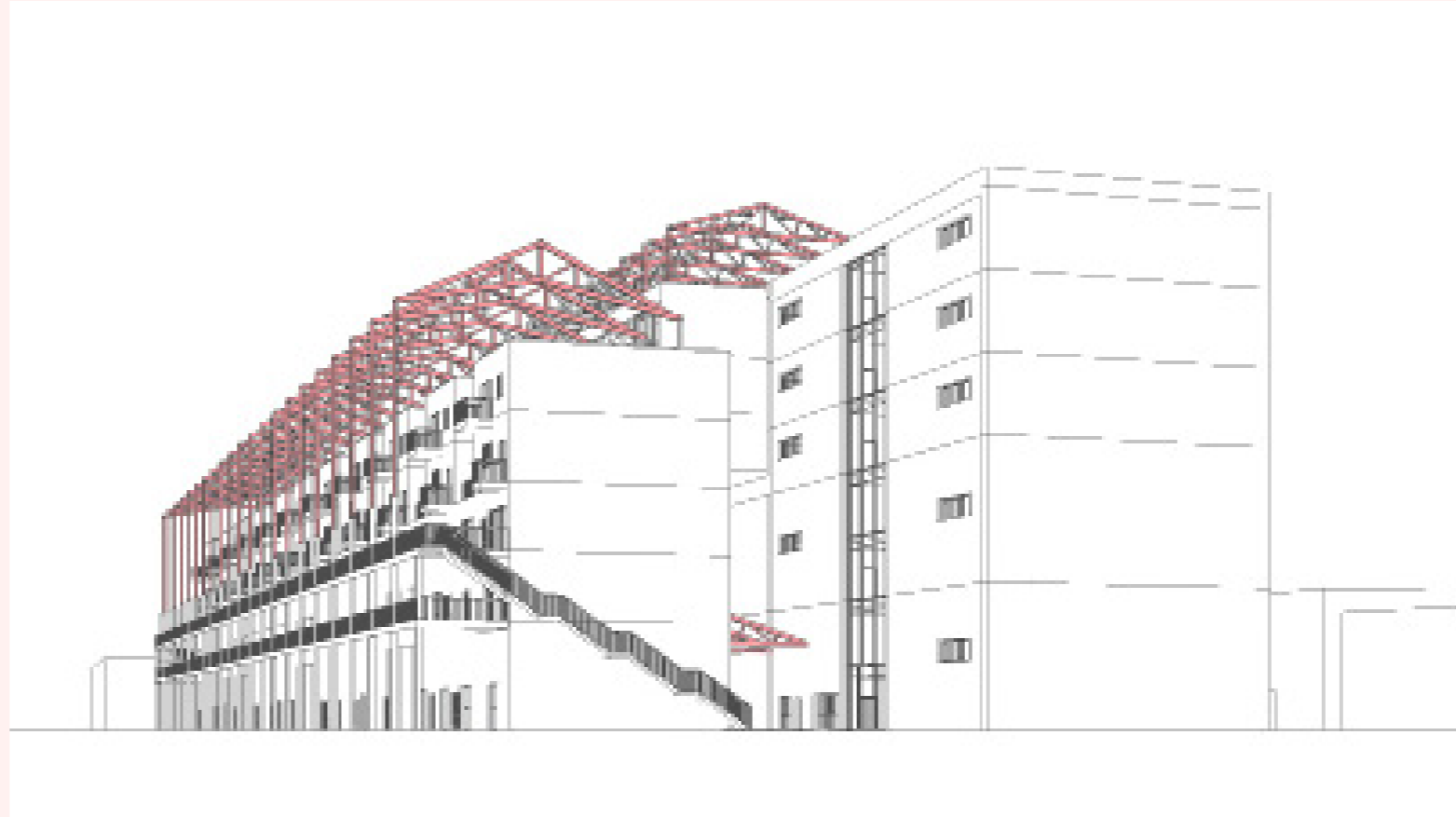


Fig. 30- Tolka Valley High Street exterior perspective



Fig. 31- Tolka Valley High Street Southern Elevation [generated by author]



Fig. 32- Tolka Valley High Street Section [generated by author]

7.0 THESIS PROJECT

7.1 PICKING A SITE

When tasked with picking a site for my thesis project I decided to pick a single-story row of existing shops at the Phibsboro Shopping Centre just beside Dalymount Stadium. I chose this site because I was interested in testing an idea I had about the future of urban industries. I imagined a perfect world where Dublin had become a truly compact city, with no suburbs and an intricate mix of building typologies evenly spread throughout the city. How would industrial buildings sit within this new urban world? That is the question I sought to answer. As such the Phibsboro site was chosen because it offered the most urban setting in the Tolka Valley. This was not a simple decision with several other sites being considered prior.

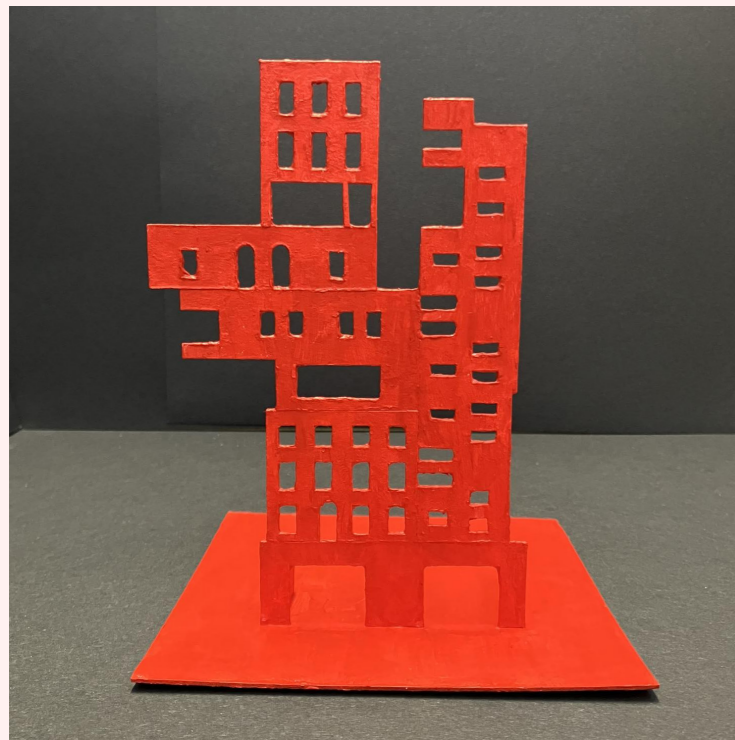


Fig. 33- Conceptual model from site analysis of Stoneybatter

The site is set in the heart of Phibsboro and is surrounded by a variety of building uses such as housing, office space, restaurants, pubs, and shops. It was important to choose such a busy site to fully test the thesis idea of integrating industry into a city's urban fabric. I decided (for several economic, environmental, and social reasons) that I would conserve as much of the existing site as possible. If industry is to be successfully integrated into the urban fabric, it must not negatively affect the other building uses. I decided to build above the single-story shops, in a bid to complete the street front and provide a new commercial civic space that would create an access point to Dalymount Stadium. The cross use of this space would further boost the urban diversity of Phibsboro.



Fig. 34- Existing Site Plan [generated by author]

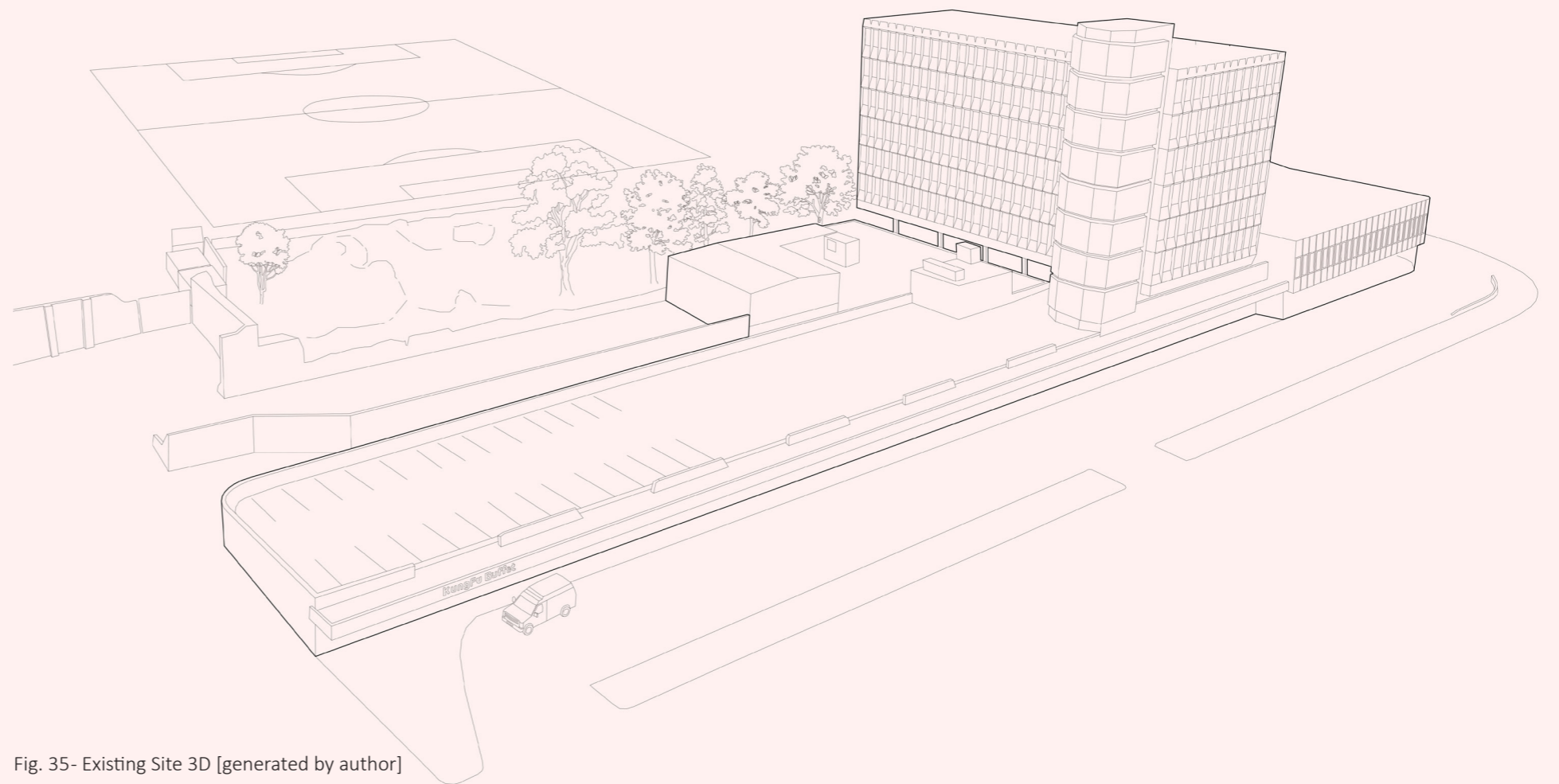


Fig. 35- Existing Site 3D [generated by author]

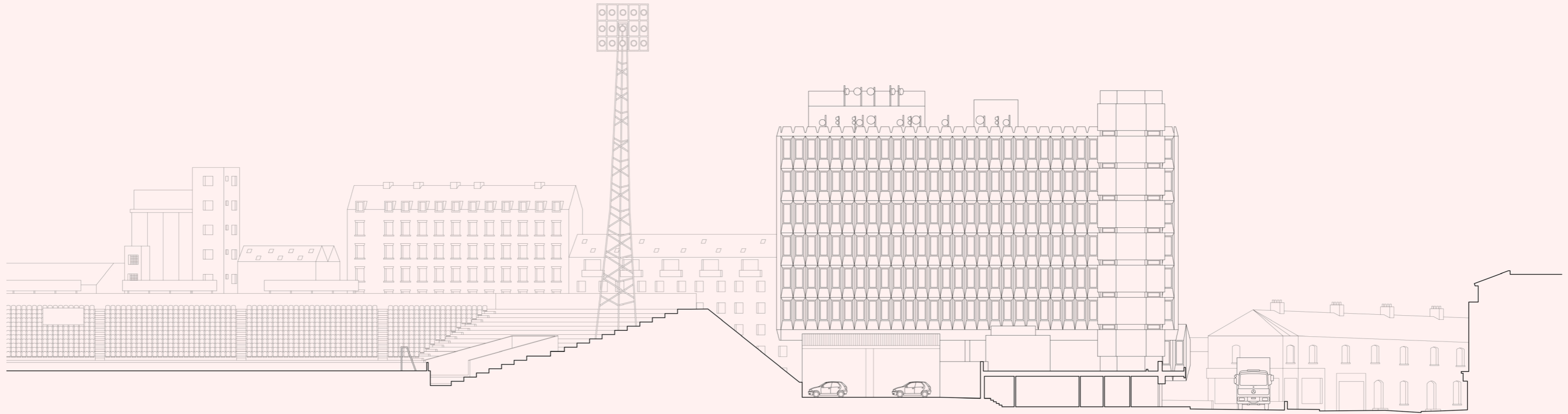


Fig. 36- Existing Site Section [generated by author]

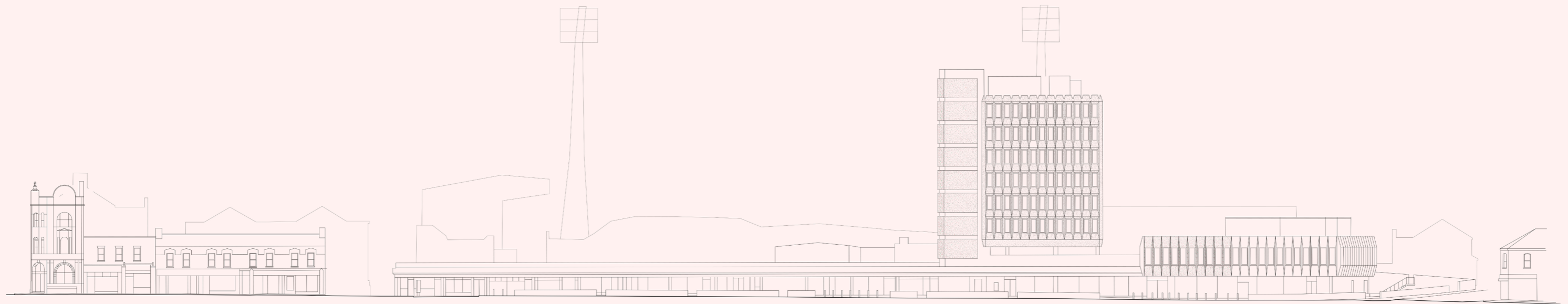


Fig. 37- Existing Site Elevation [generated by author]

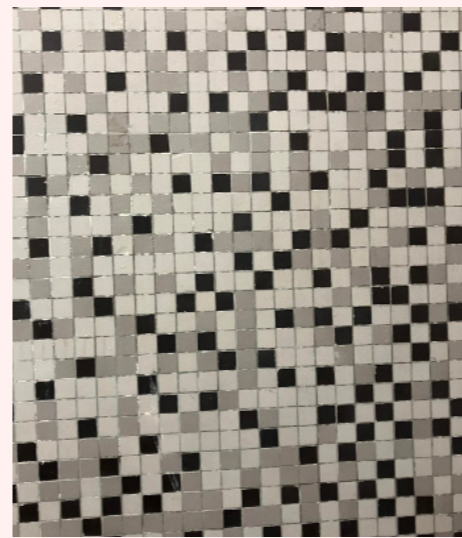
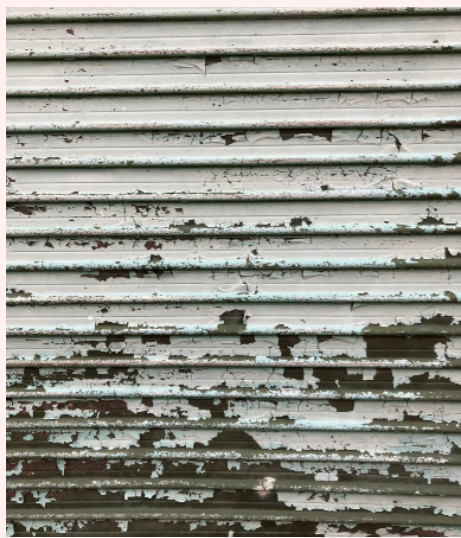


Fig. 38- Existing Site Photographs [generated by author]

7.0 THESIS PROJECT

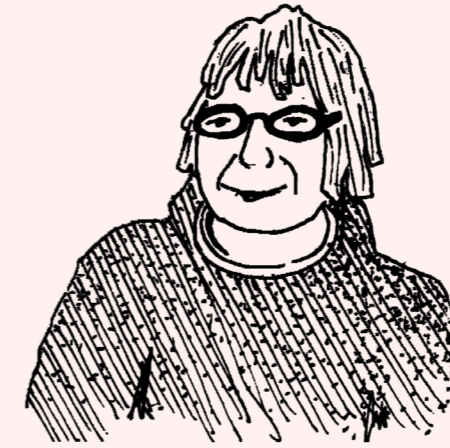
7.2 FORMING A PROPOSAL

It was always important for me to not only integrate industry into the site but to do so in a way that benefitted the area's social vitality. The scheme takes inspiration from several academics, most notably Jane Jacobs, Leon Krier and Le Corbusier. Prior to designing my thesis project, I decided to investigate a series of precedents. This helped me to develop a brief and allowed me to think about a potential program and form for the project.

This sketch by Leon Krier accompanied by Aldo van Eyck's description of a city illustrates the complexity of a true city. Celebrating industry in our cities amidst our pursuit of compactness will add to this complexity, making cities even more vibrant.



KRIER



JACOBS



LE CORBUSIER

L.k *** This indicates a Leon Krier sketch that has been redrawn by the author***

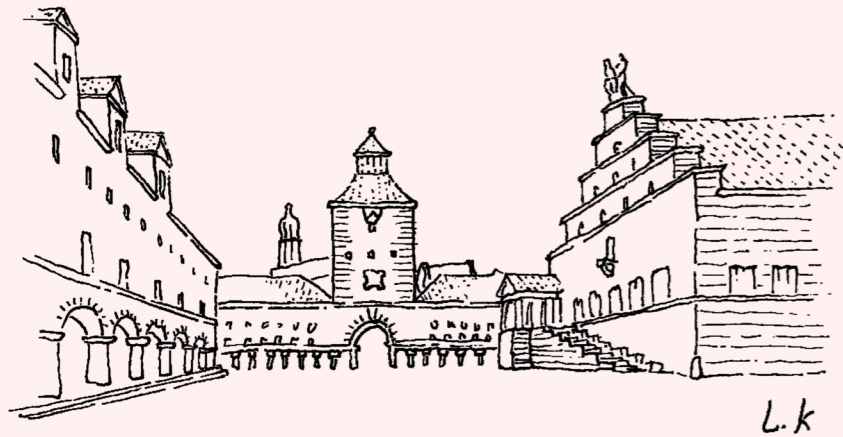


TREE IS LEAF AND LEAF IS TREE - HOUSE IS CITY AND CITY IS HOUSE - A TREE IS A TREE BUT IT IS ALSO A HUGE LEAF - A LEAF IS A LEAF BUT IT IS ALSO A TINY CITY. A CITY IS NOT A CITY UNLESS IT IS ALSO A HUGE HOUSE - A HOUSE IS A HOUSE ONLY IF IT IS ALSO A TINY CITY. ALDO VAN EYCK.

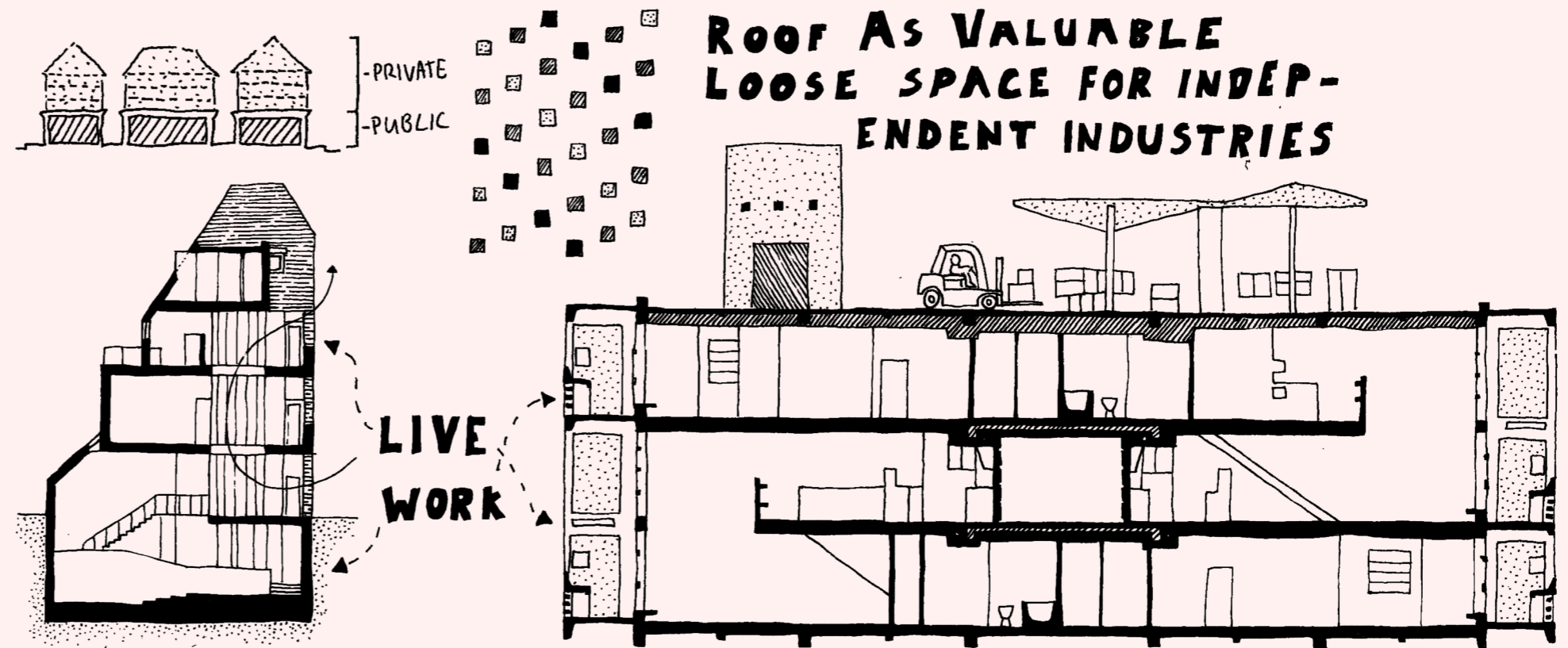
Fig. 39- Leon Krier sketch redrawn by author [generated by author]

7.0 THESIS PROJECT

7.2 FORMING A PROPOSAL



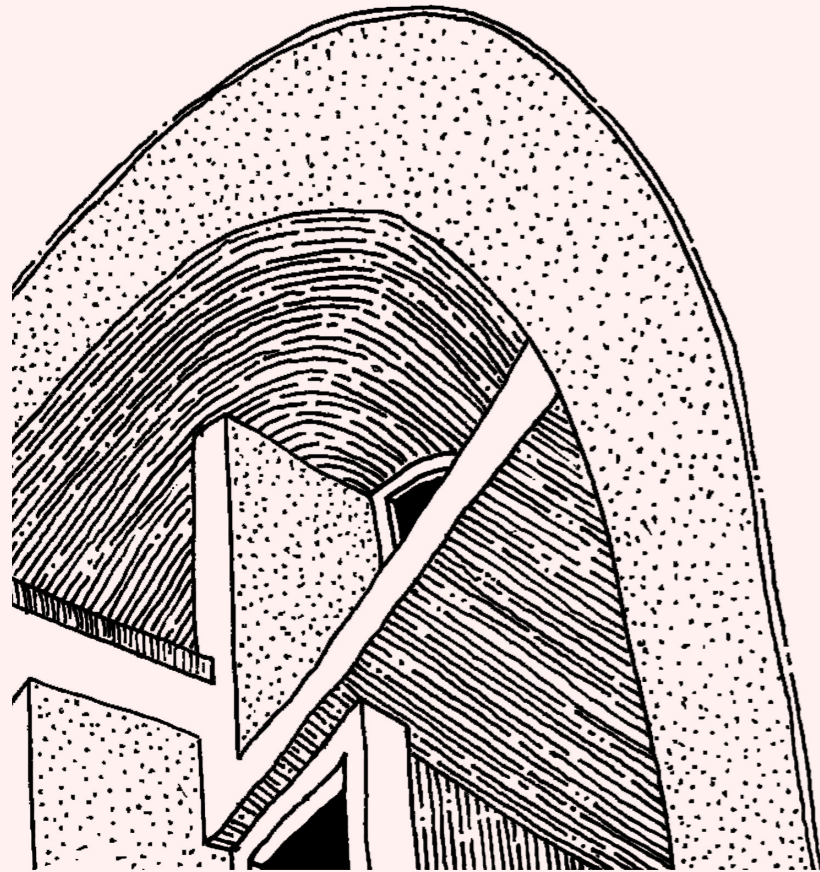
1. When creating a public space, it is essential that it forms a collective point of accessibility to the city. Do not turn your back to public space.



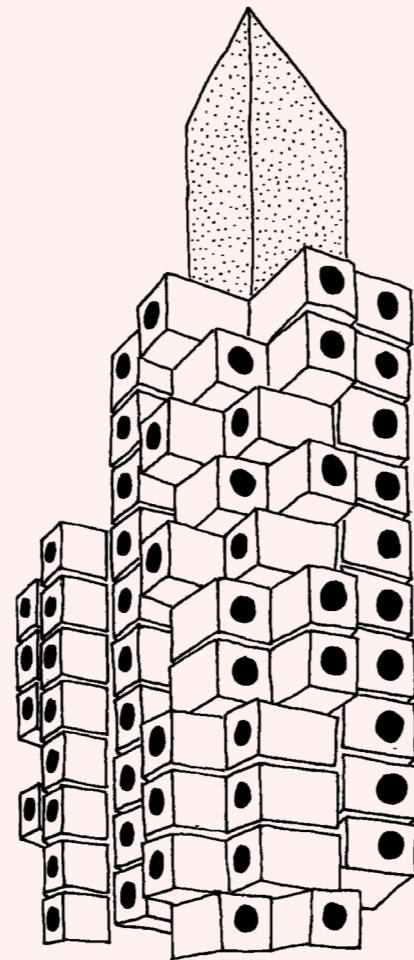
2. The compatibility of each building's use with the city should be considered. Does it need to interact with the public or does it prefer to be isolated?

7.0 THESIS PROJECT

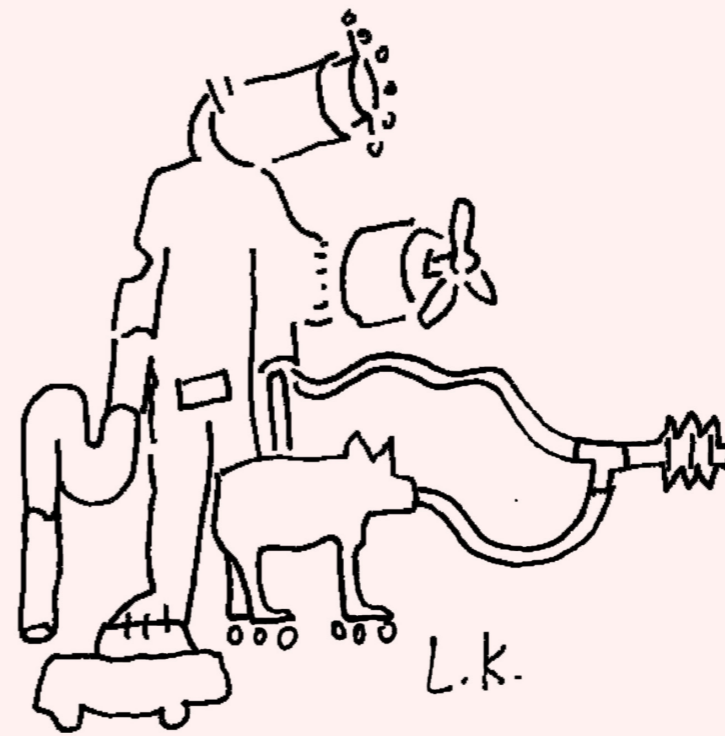
7.2 FORMING A PROPOSAL



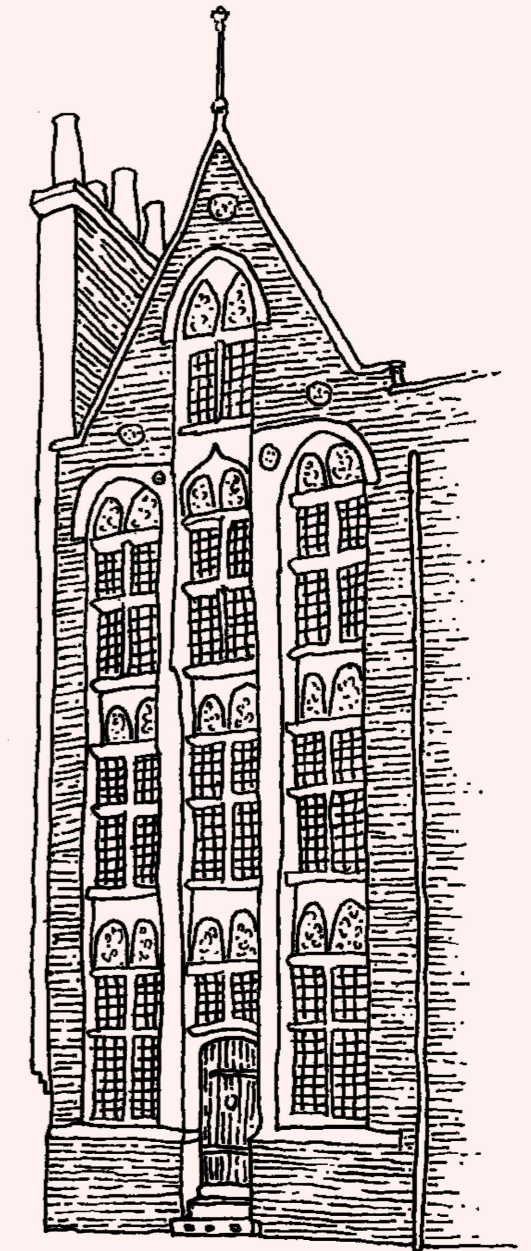
3. The built object is just as important as the thinking behind it. There is always room for beauty.



4. It is important to consider the nature of the scheme. Is it one large unit or a series of smaller ones? How does this affect the built object?



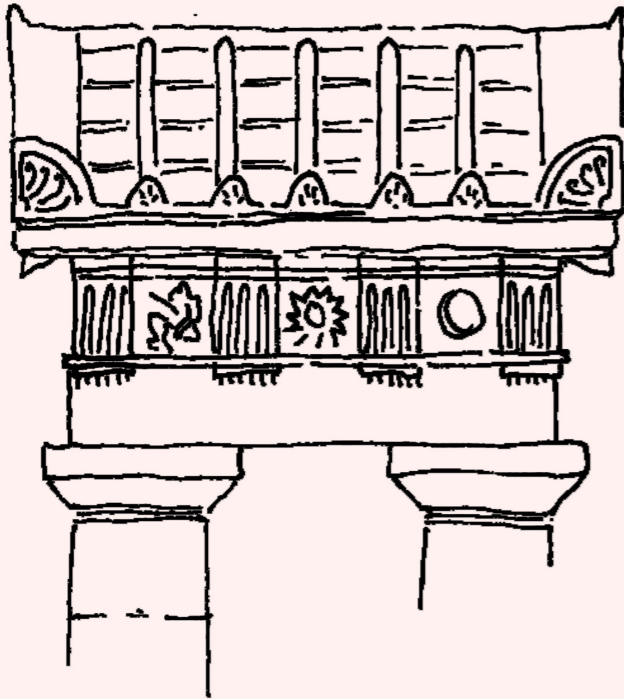
5. This sketch represents the industrial city. What once was a complete city, is now an industrial abstraction. To avoid the creation of industrial “limbs” in our cities we must ensure that industry is intricately mixed in all parts of the city.



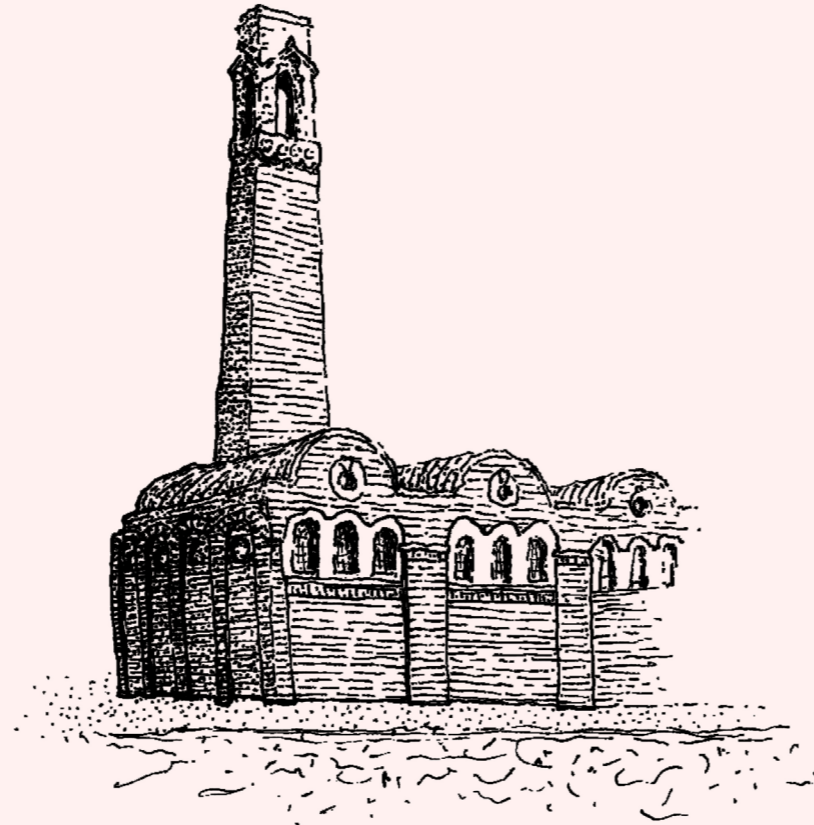
6. A Victorian warehouse. Note the incredible brickwork and details in comparison to a warehouse of today. Perhaps if warehouses were part of the city’s urban realm, they would consider more deeply how they look to the public.

7.0 THESIS PROJECT

7.2 FORMING A PROPOSAL



7. Structure can be heroic without being arrogant. There is beauty in strength.



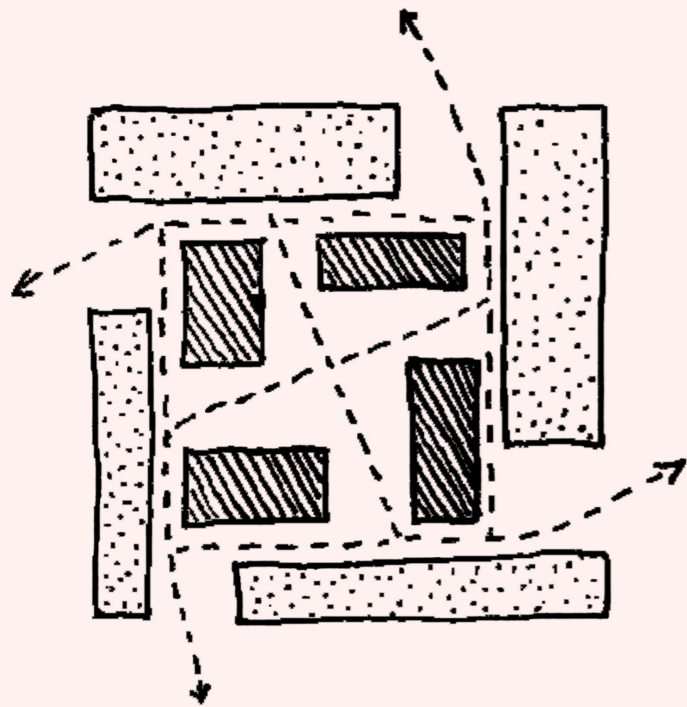
8. A building should look like what it is. An industrial building should read as such.



9. It is important to remember the origins of the city. Each city was conceived by man for man, the introduction of the automobile and the subsequent expansion of modern cities is a new phenomenon that has destroyed the character of many cities worldwide.

7.0 THESIS PROJECT

7.2 FORMING A PROPOSAL

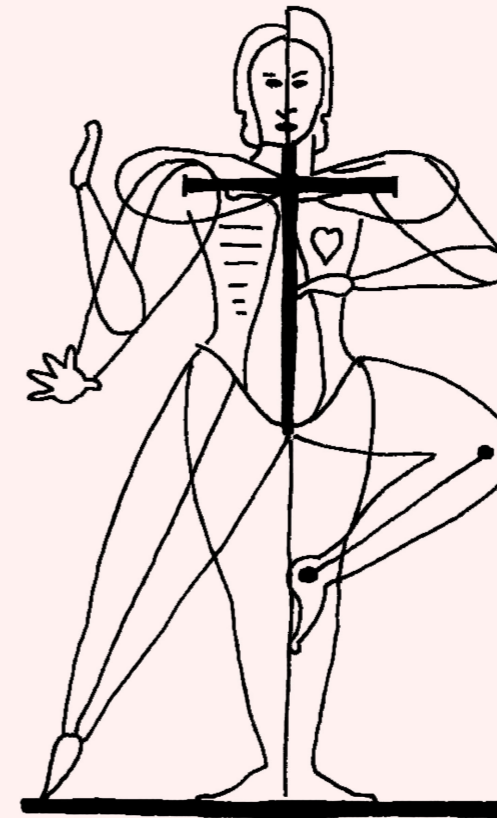


10. Public space needs to be accessible in multiple directions. A good public space can influence the area surrounding it by making it more people and pedestrian friendly.



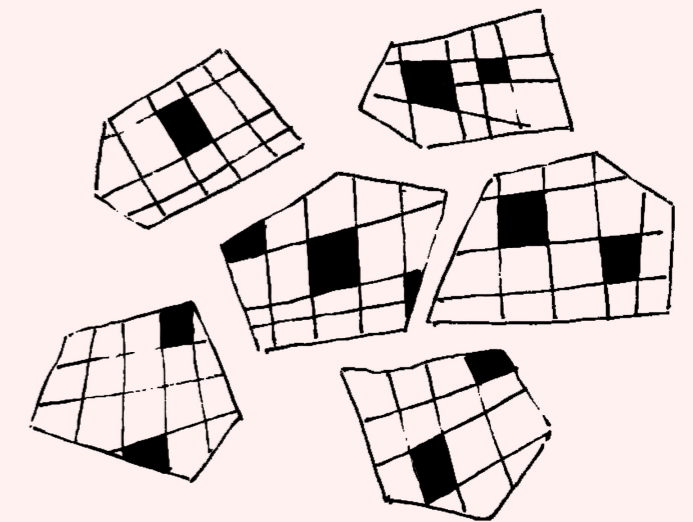
THE HILL HOUSE

11. Each building is unique and should be treated as such. There is no set way of doing things in architecture. Every experiment is successful even if the outcome is not as desired.



Bauhaus

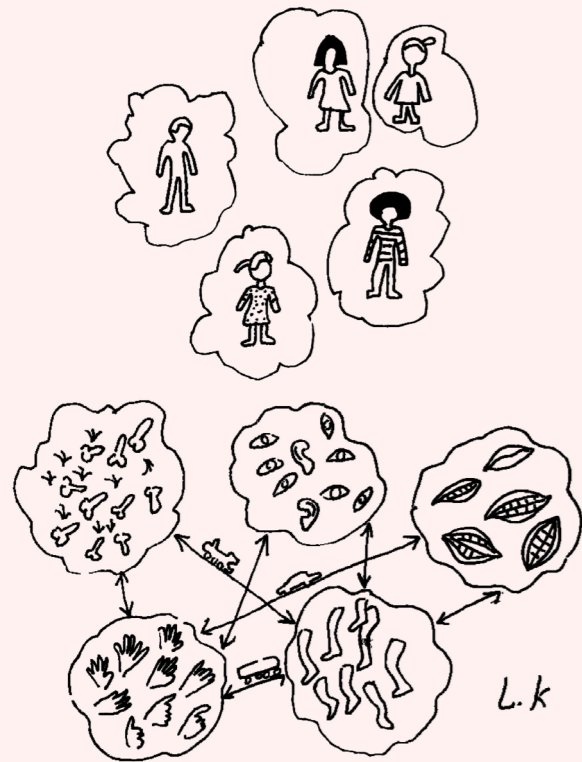
12. Aesthetic is important and should reflect the values of the scheme. As an industrial building, a no-nonsense functional approach makes the most sense.



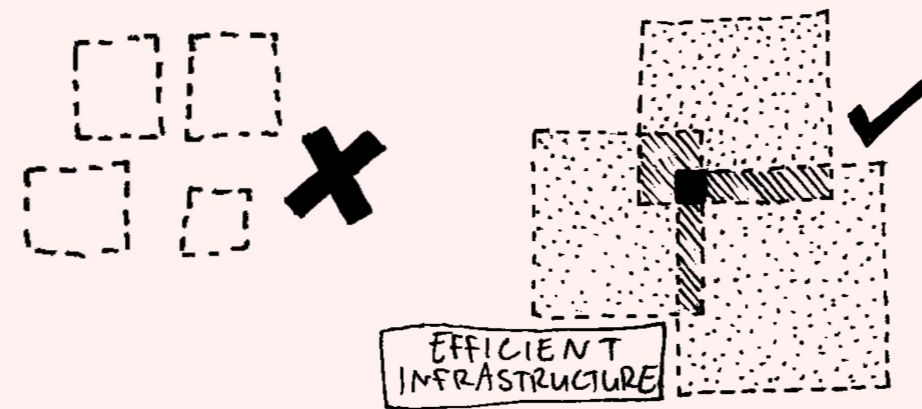
13. Each community in a city should be treated as a city within a city. In doing so distinct areas can be created, facilitating the creation of a polycentric city. This would help relieve the issues (congestion, housing shortages, dereliction etc) associated with monocentricity that currently plague Dublin.

7.0 THESIS PROJECT

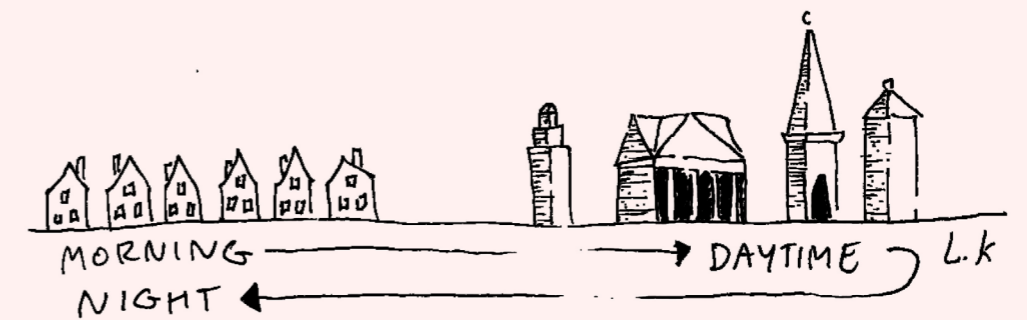
7.2 FORMING A PROPOSAL



14. Each community should be a mini city. It should contain everything needed to live an urban life. The rationale behind functional zoning is as ridiculous as segregating a human body based on the function of each body part.



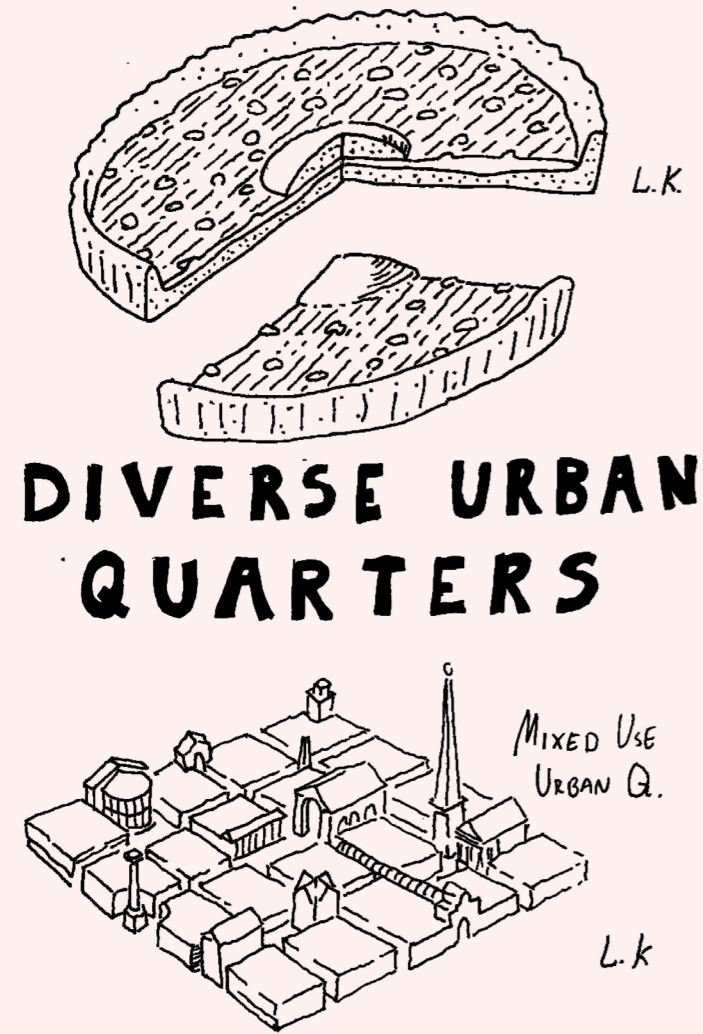
15. The city needs to take advantage of its density by creating efficient infrastructure that can be used at different times, by different people who are in the same place for different reasons (Jacobs, 1961)



16. The city's current form of a dense center surrounded by a blanket of low-density suburbs is not just environmentally and economically unsustainable, it also destroys the social vitality of a city by removing its most valuable commodity, people.

7.0 THESIS PROJECT

7.2 FORMING A PROPOSAL



17. Each city should be made up of diverse mixed-use urban quarters that allow for every aspect of urban life. They should all be connected by an efficient network of public transport.



18. Urban industries can help cities to develop more economically, socially, and environmentally sustainable cities.



19. Suburbs are a form of urban cancer. They inundate the center, surrounding it like a python and squeezing it to death. The most beautiful cities are the ones with the smallest suburbs.

7.0 THESIS PROJECT

7.3 PROPOSAL

The building floats over the existing shops, creating a sheltered civic space underneath. This civic space will be the focal point of Phibsboro, offering the public a chance to stop and enjoy the city. It will house public activities such as markets and events while becoming the main access point to Dalymount Stadium. The building becomes not only a place for industry but also a piece of public infrastructure, nurturing urban industries while making Phibsboro a more enjoyable space. A service area is created under the civic space to the rear of the site and is sandwiched between the shops and stadium. This service yard will take deliveries, reducing noise levels associated with trucks and creating a more pleasurable street front.

It uses a pair of large girders on each level to create a free plan that can change over time. This was a very important design decision with relevance to the thesis idea. This is a building for a truly compact city, a city that houses all its functions in its urban realm, of which industry is included. The building uses its versatility as a defence mechanism. It utilizes three 24m x 48m structural platforms with a floor to ceiling height of 10m to make it capable of housing any of the compact city's functions. It is not a perfect building by any means. The deep floor plates created some serious issues with the housing due to concerns surrounding lighting and ventilation. Perhaps the floor plates could be narrower depending on the use at each level, however this would undermine the buildings versatility and reduce its ability to house any of a truly compact cities uses.

The project can be viewed digitally via the QR code on the contents page.

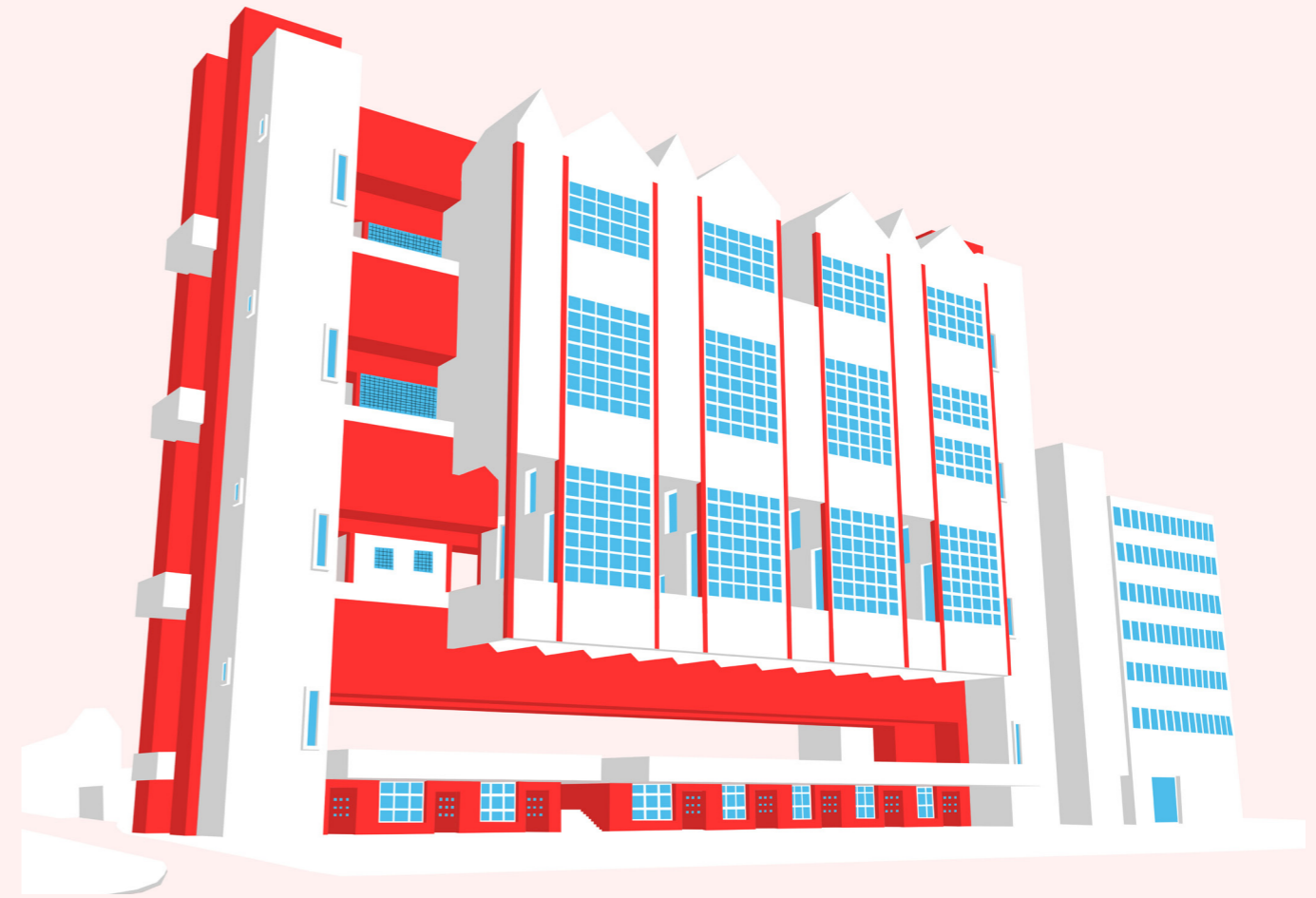


Fig. 40- Proposed street perspective [generated by author]

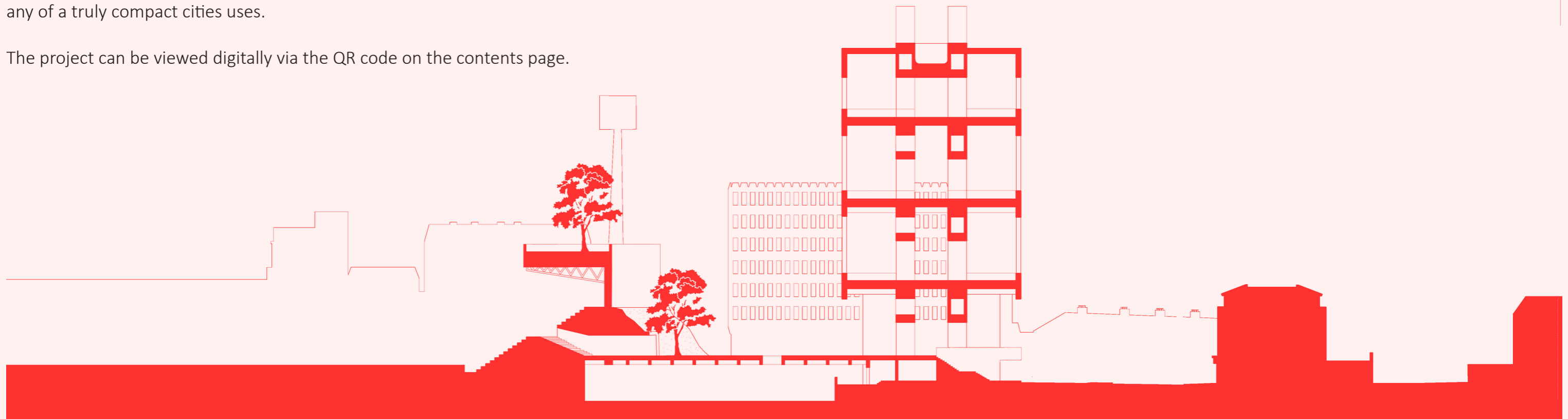


Fig. 41- Proposed site section [generated by author]

7.0 THESIS PROJECT

7.3 PROPOSAL

To the right, diagrammatic plans of an industrial house illustrate the ventilation strategy. By keeping the central corridor external, wind is naturally channeled through the building. This allows the houses to be ventilated on all sides.

The main girders support a series of cantilevered beams that prop up the floors. These beams are cast into the girders and are connected to their counterparts in the central corridor to increase the building's rigidity.

These secondary beams are then encased in an acoustic material and insulated. This creates a pleasing triangular rhythm while also decreasing the transfer of noise from one floor to the next. This can be seen in the section below and the larger sections.

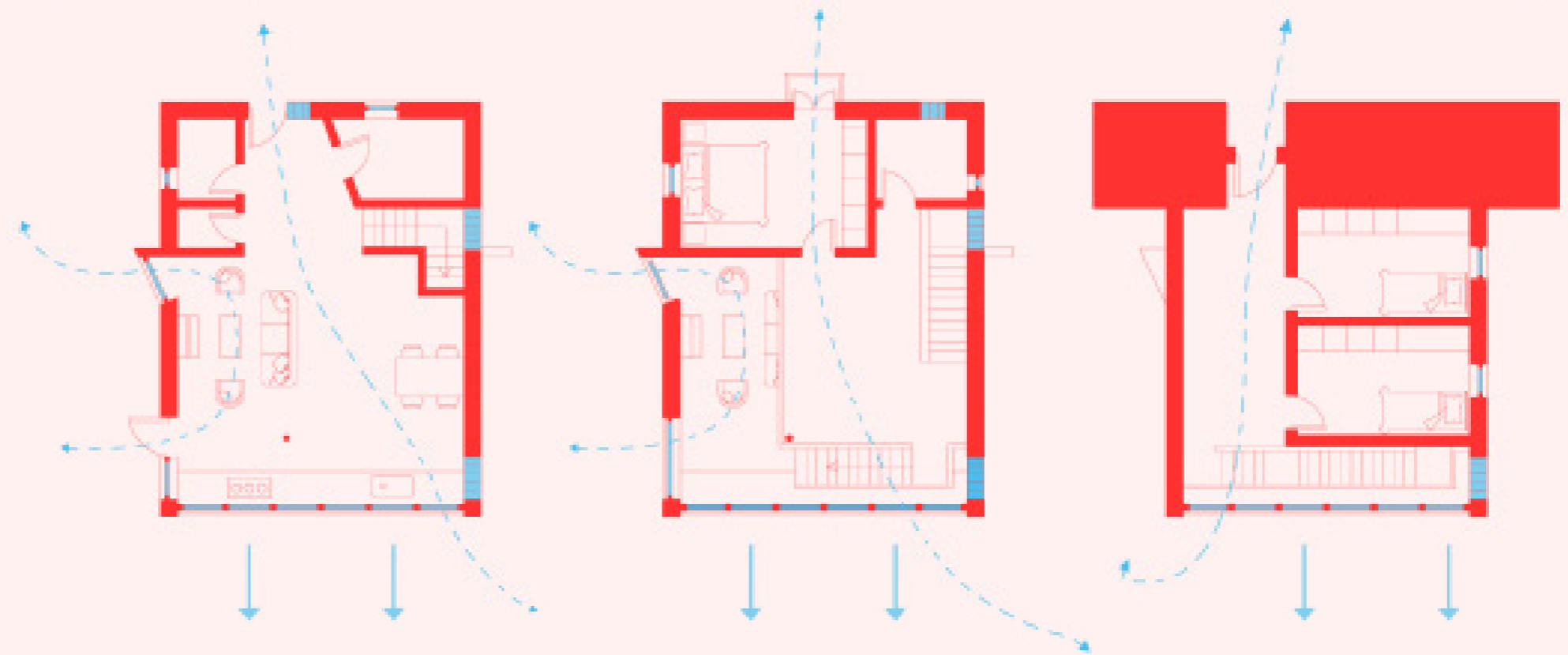


Fig. 42- Industrial House Plans [generated by author]

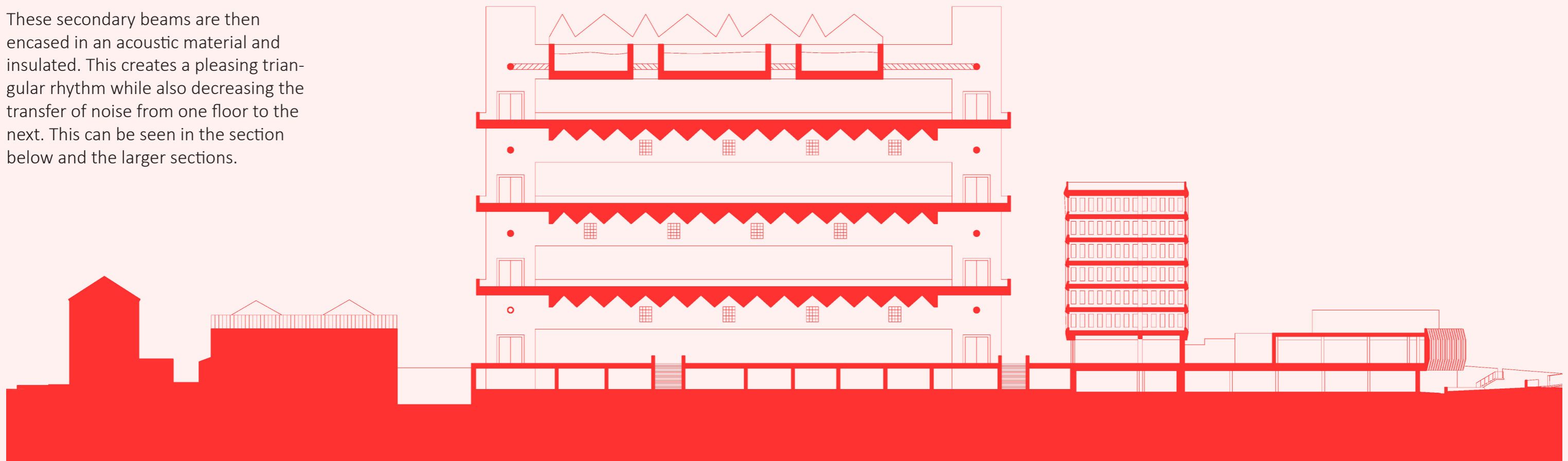


Fig. 43- Proposed Site Section [generated by author]

7.0 THESIS PROJECT

7.3 PROPOSAL

Each floor in the building has the same skeleton but is occupied in a different way. The arrangement of space can change but the building appears similarly from the exterior.

The housing units, for example, have the same large windows as the factories but have exterior spaces carved out between them to increase ventilation and natural light.

Industrial uses occupy larger spaces and utilize the same ventilation strategy as the housing albeit in a less intense manner. The wide floor plates create a situation where production processes can be altered to allow for increased efficiency.

In each case, the structural girders dominate the space, displaying strength and power through their size and dramatic colour. These girders create secondary spaces that can be used as access corridors or for housing services.

The girders are 55m x 4m x 2.5m and utilize a series of post tensioned cables to combat the tensile stresses created on their underside. This allows them to span the floors without intermediate supports.

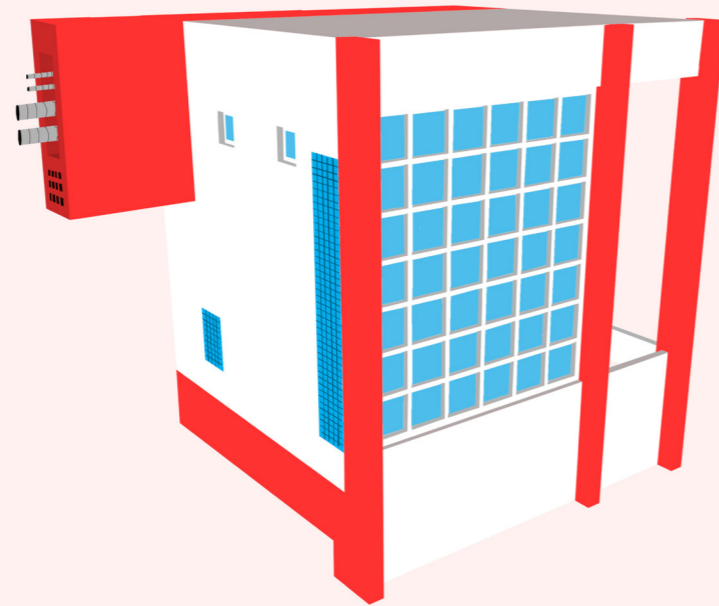


Fig. 44 - Industrial House [generated by author]



Fig. 45- Industrial Space [generated by author]

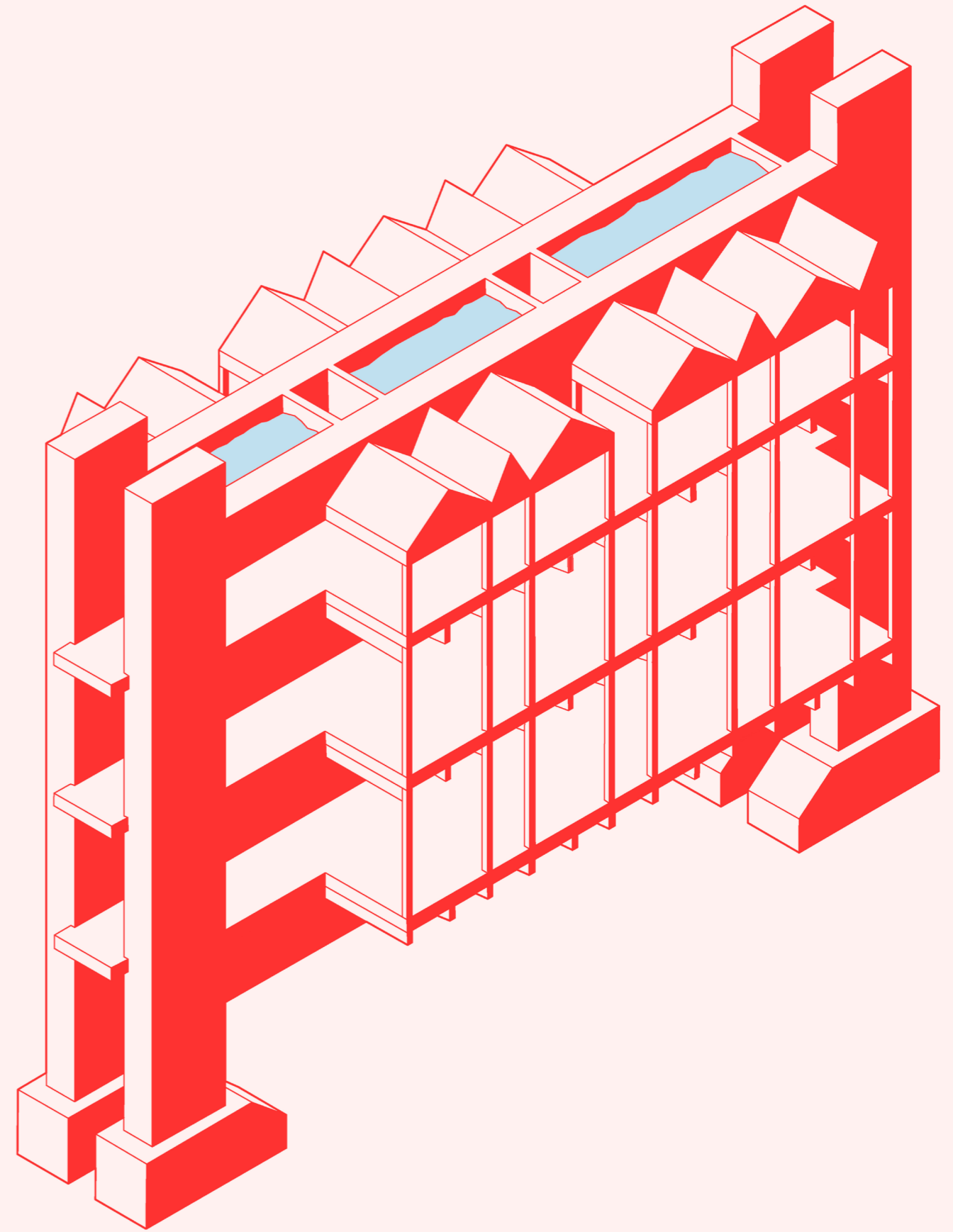


Fig. 46- Structural Axonometric [generated by author]

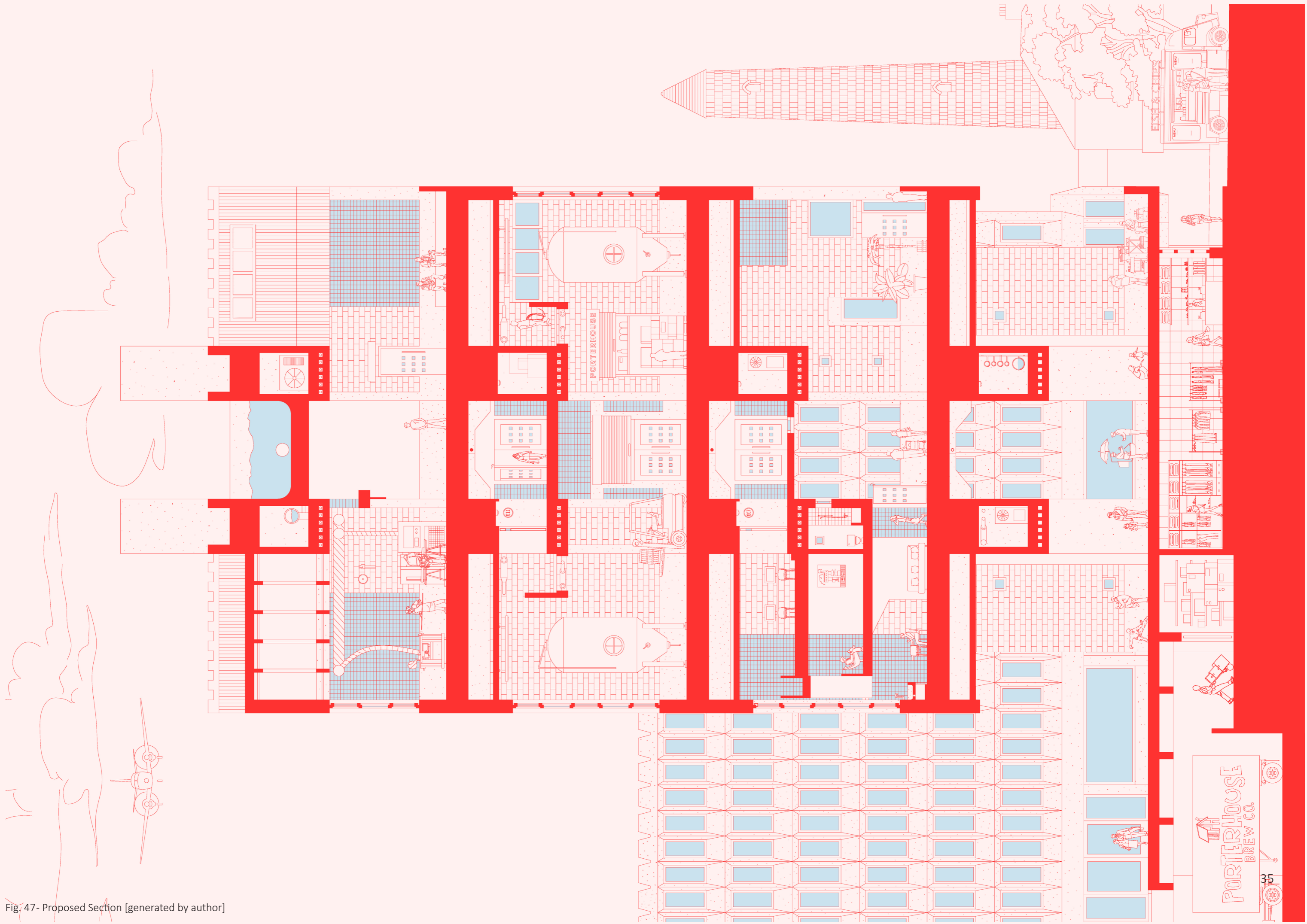


Fig. 47- Proposed Section [generated by author]

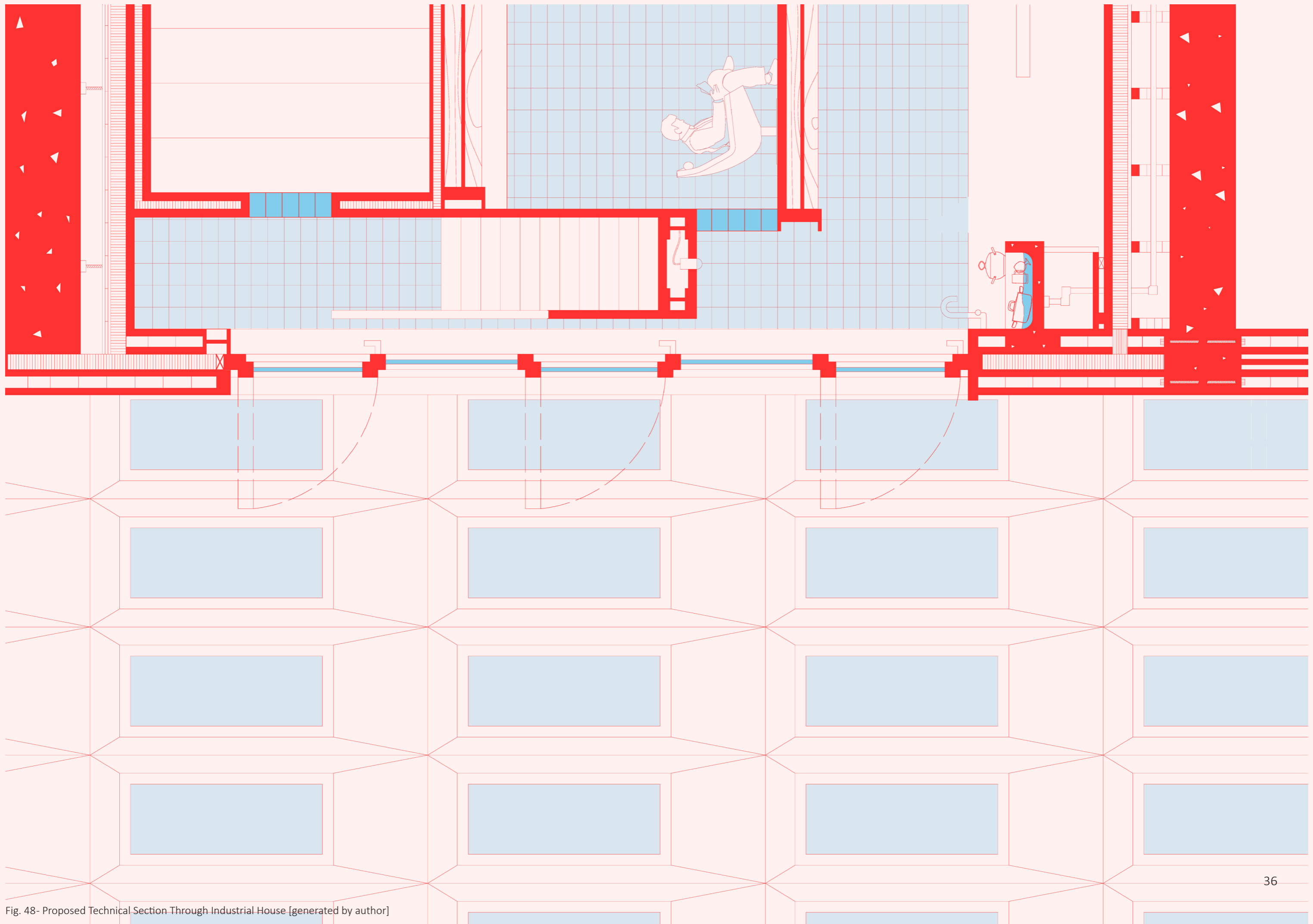
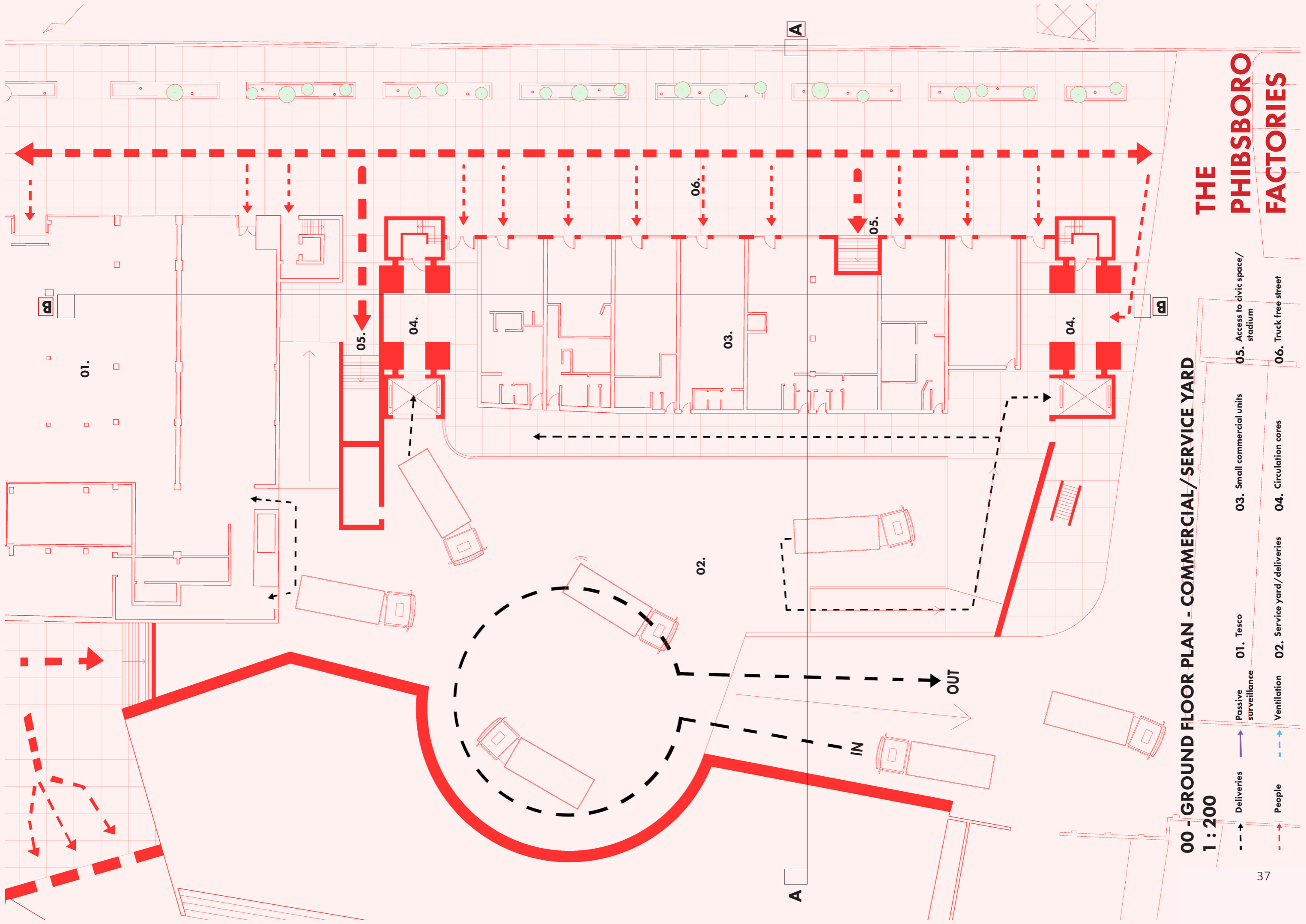


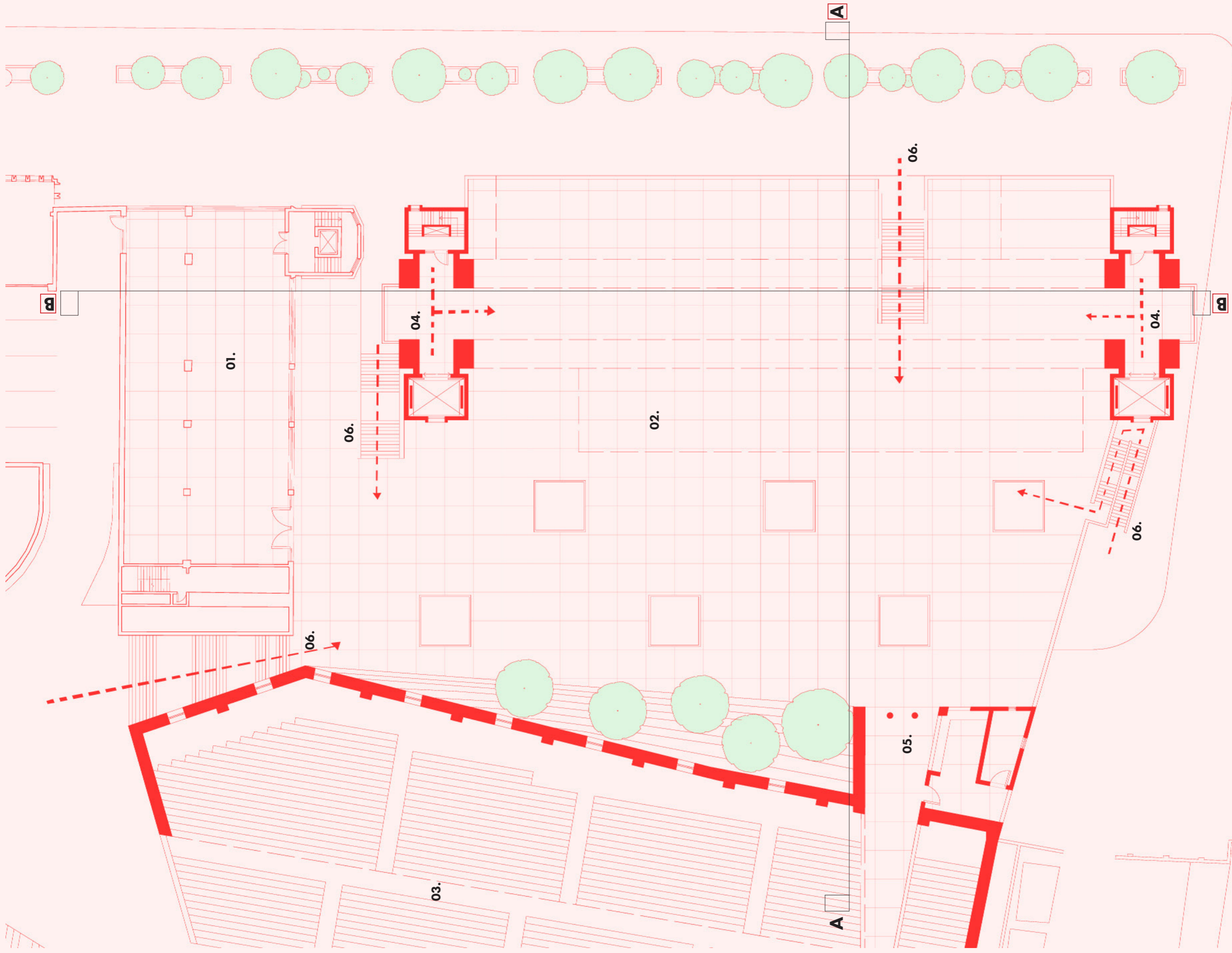
Fig. 48- Proposed Technical Section Through Industrial House [generated by author]



00 - GROUND FLOOR PLAN - COMMERCIAL/SERVICE YARD
1 : 200

THE PHIBSBORO FACTORIES

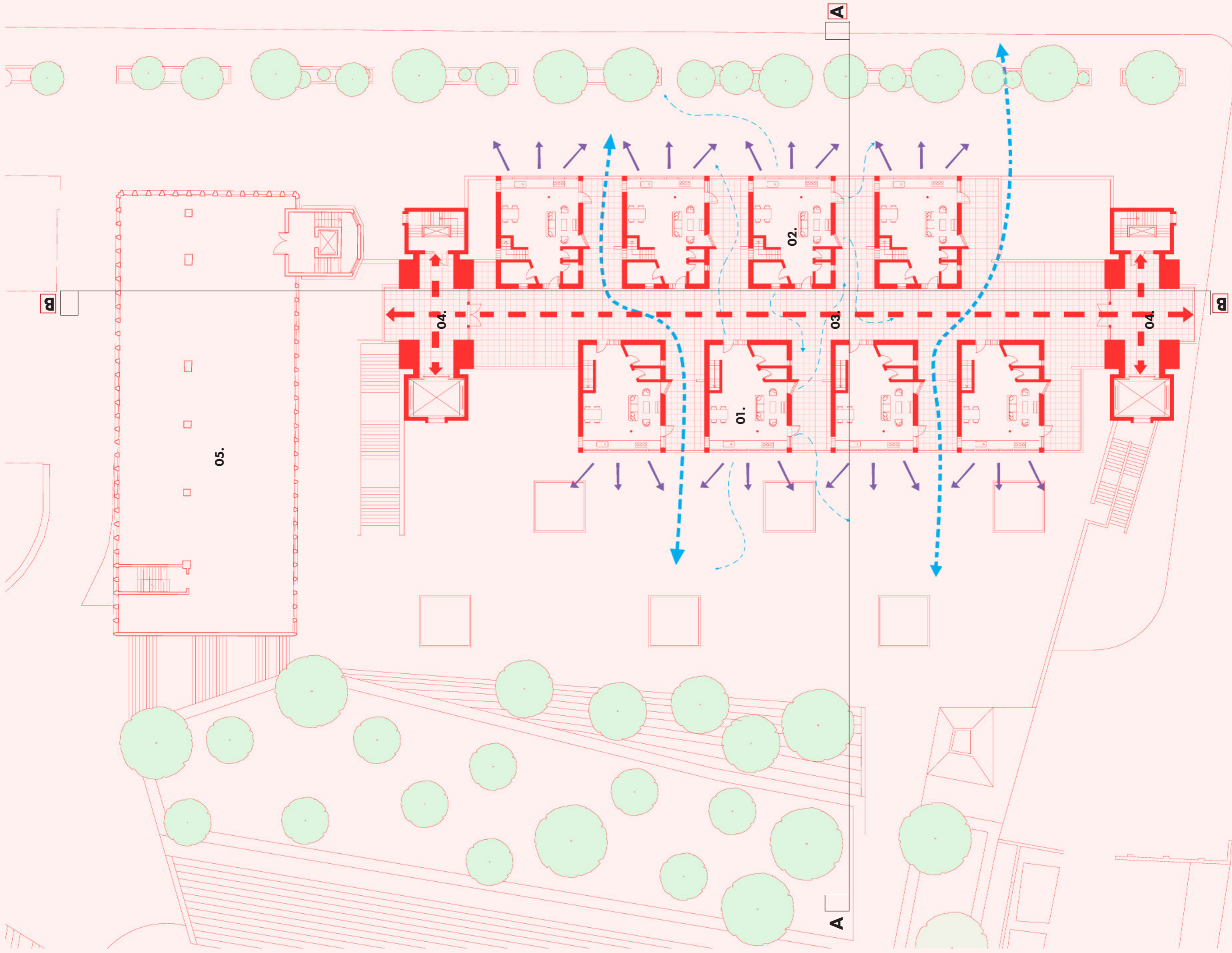
- Passive surveillance
- Deliveries
- 01. Tesco
- 03. Small commercial units
- 05. Access to civic space/stadium
- Ventilation
- 02. Service yard/deliveries
- 04. Circulation cores
- 06. Truck free street
- People



01 - FIRST FLOOR PLAN - CIVIC SPACE / STADIUM ENTRANCE
1 : 200

- - -> Deliveries
- - -> People
- Passive surveillance
- Ventilation
- 01. Bohemians FC visitor center
- 02. Civic space
- 03. Repaired stadium
- 04. Circulation cores
- 05. Stadium entrance
- 06. Public stairs

**THE
 PHIBSBORO
 FACTORIES**

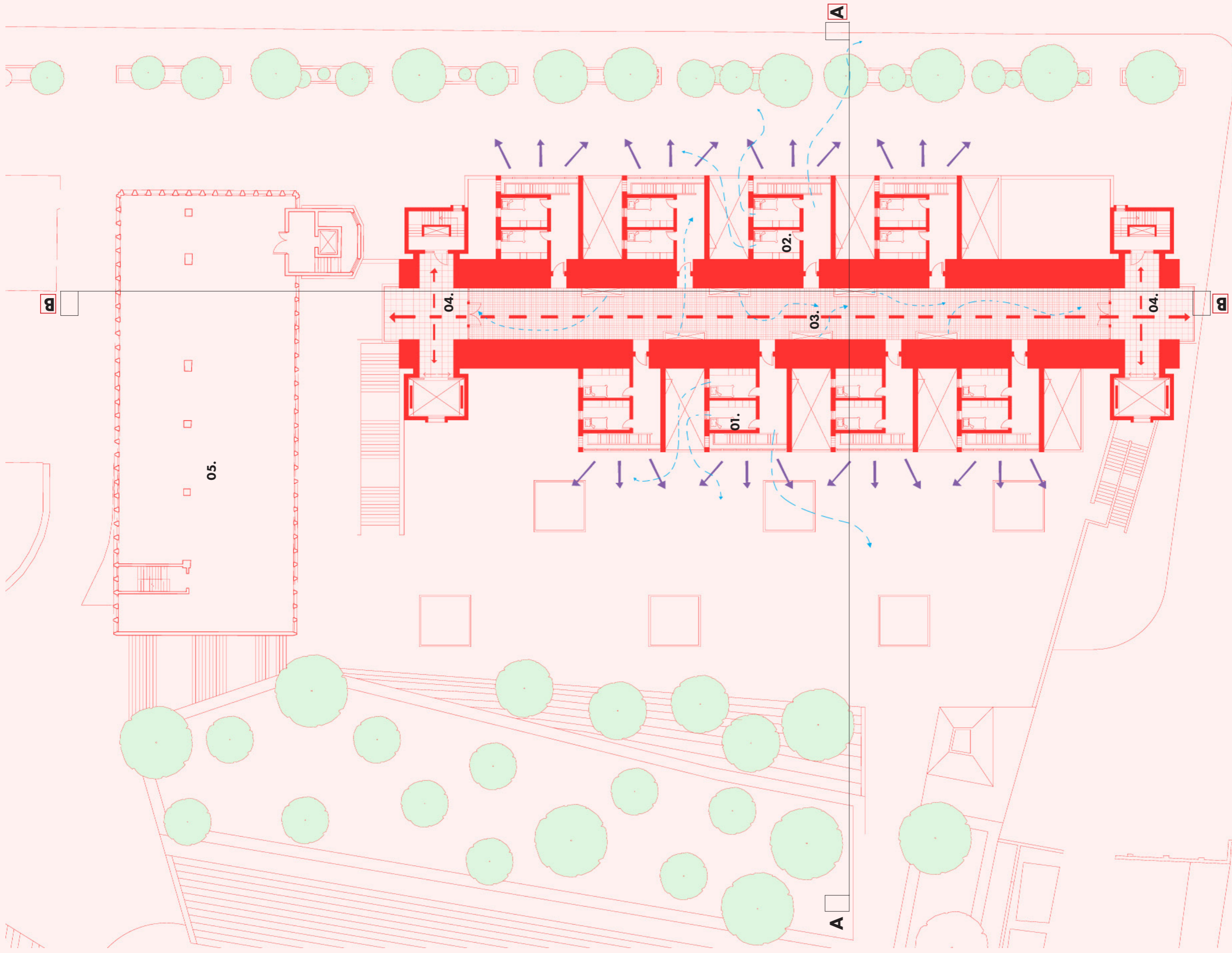


02 (A) - SECOND FLOOR PLAN - HOUSING
1 : 200

- Deliveries
- Passive surveillance
- Ventilation
- People
- 01.** West facing dwelling
- 02.** East facing dwelling
- 03.** Shared corridor
- 04.** Circulation cores
- 05.** Existing offices

**THE
 PHIBSBORO
 FACTORIES**

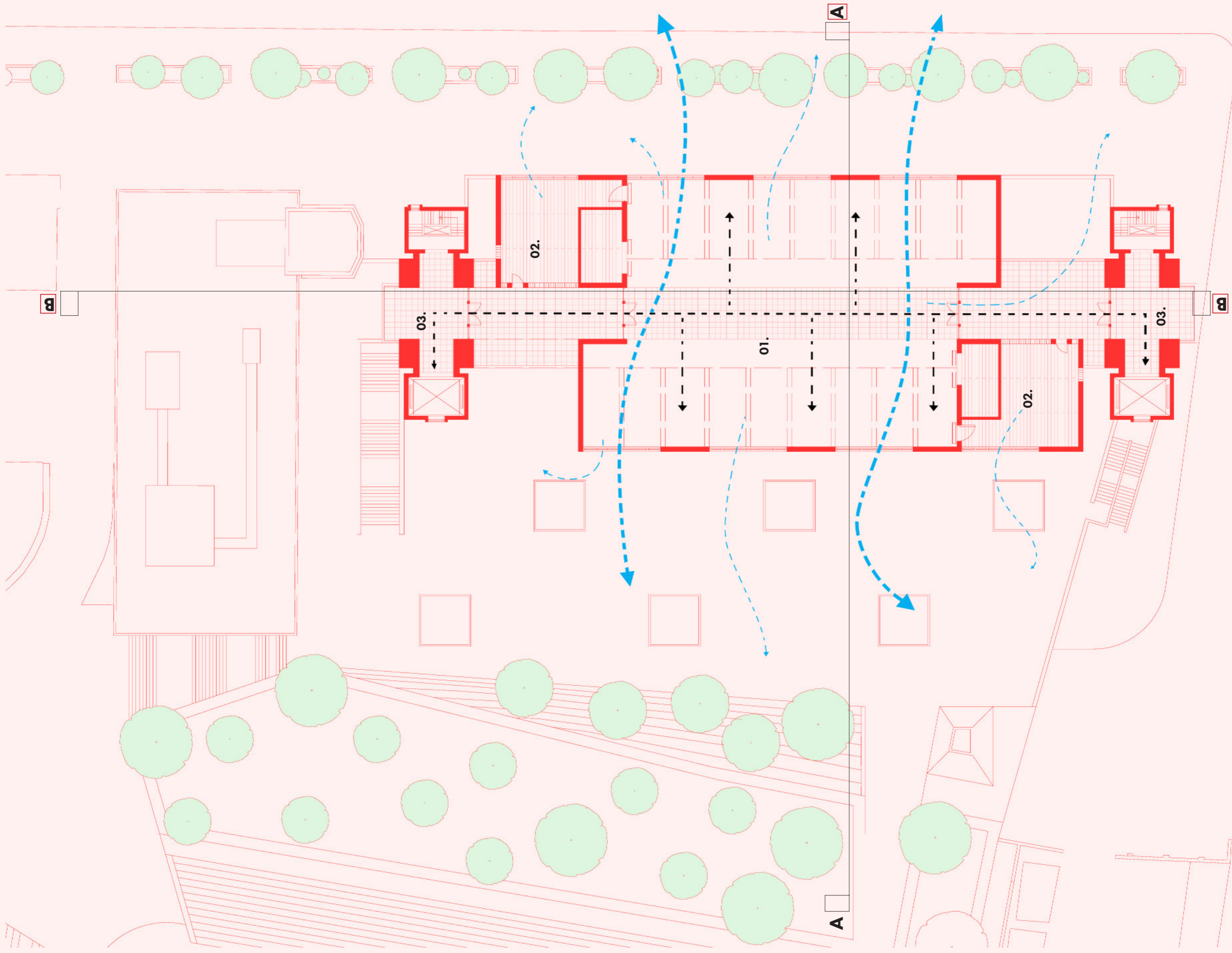
THE PHIBSBORO FACTORIES



02 (C) - FOURTH FLOOR PLAN - HOUSING
1 : 200

- Deliveries
- People
- Passive surveillance
- Ventilation
- 01. West facing dwelling
- 02. East facing dwelling
- 03. Shared corridor
- 04. Circulation cores
- 05. Existing offices

THE PHIBSBORO FACTORIES

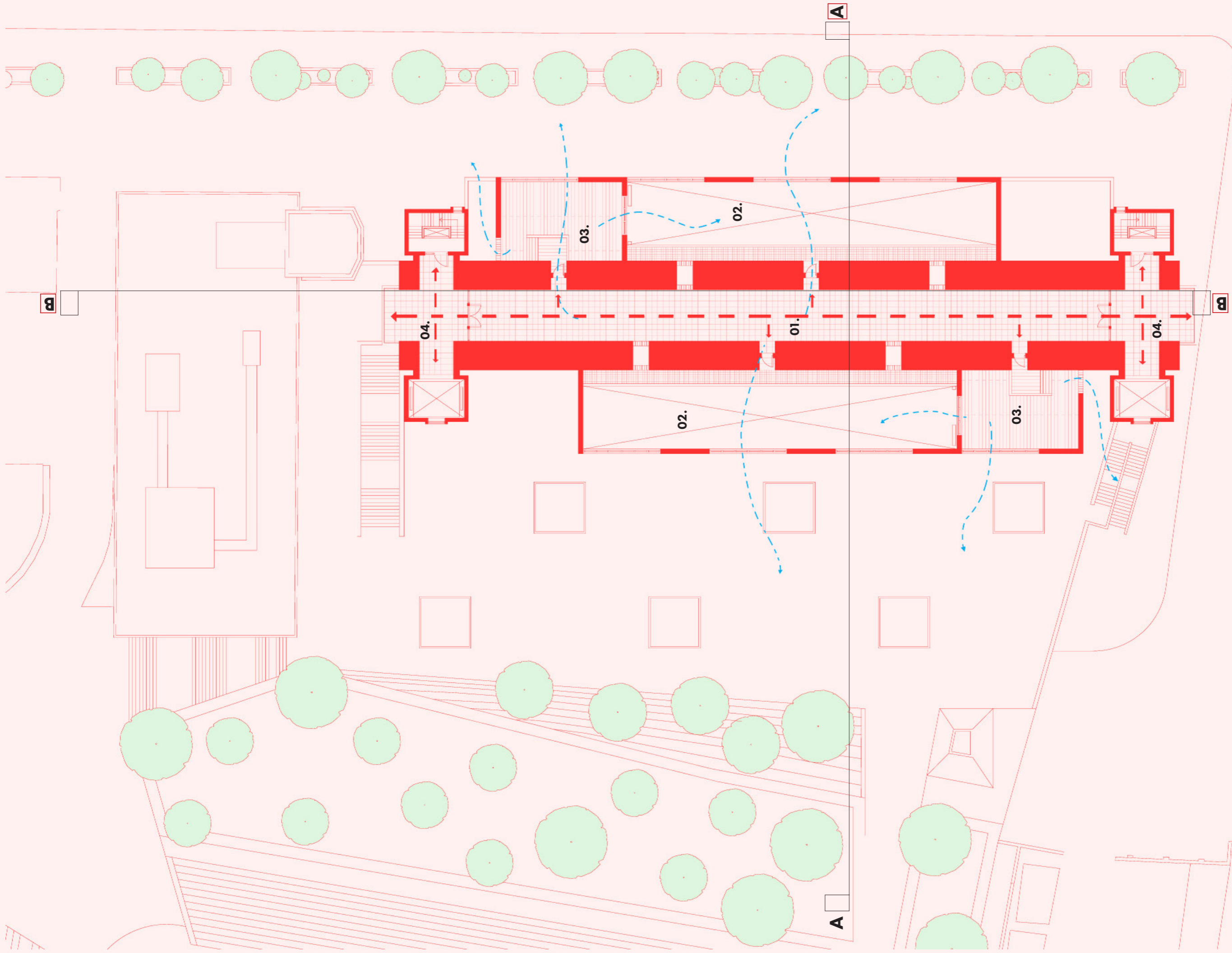


03 (A) - FIFTH FLOOR PLAN - PORTERHOUSE BREW CO.

1 : 200

- - -> Deliveries
- - -> People
- ↑ Passive surveillance
- ↑ Ventilation
- 01. Porterhouse factory floor
- 02. Porterhouse office space
- 03. Circulation cores

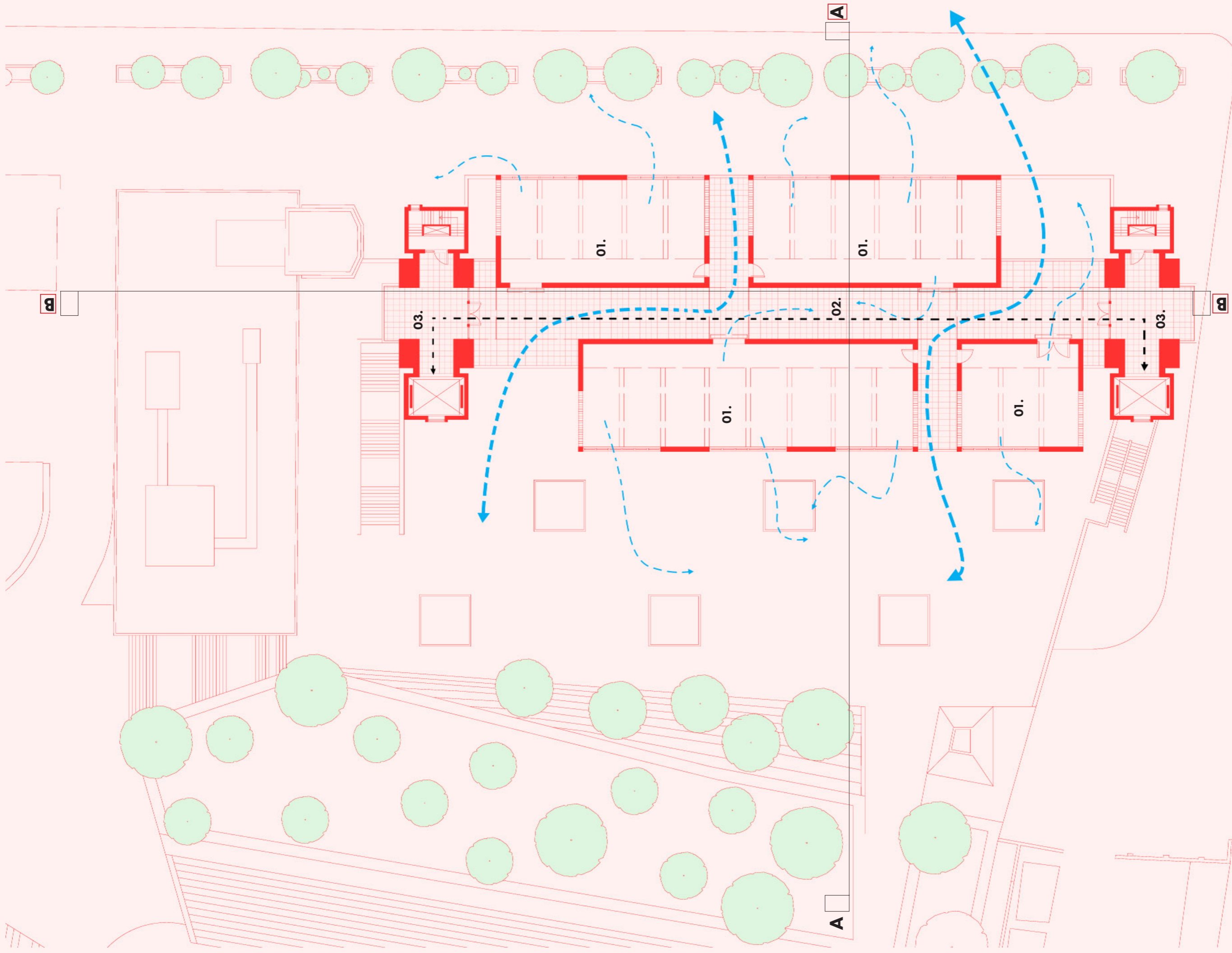
THE PHIBSBORO FACTORIES



03 (B) - SIXTH FLOOR PLAN - PORTERHOUSE BREW CO.

1 : 200

- Deliveries
- Passive surveillance
- People
- Ventilation
- 01.** Service corridor
- 02.** Mezzanine overlooking factory
- 03.** Porterhouse office space
- 04.** Circulation cores



04 (A) - SEVENTH FLOOR PLAN - SMALL INDUSTRIES
1 : 200

- - -> Deliveries
- - -> Passive surveillance
- - -> Ventilation
- - -> People
- 01. Small scale industries
- 02. Shared corridor
- 03. Circulation cores

**THE
 PHIBSBORO
 FACTORIES**

THE PHIBSBORO FACTORIES



04 (B) - ROOF PLAN - RAINWATER HARVESTING

1 : 200

- - -> Deliveries
- ↑ Passive surveillance
- - -> People
- ↑ Ventilation
- 01. Solar panels
- 02. Drain
- 03. Rainwater harvesting

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