



ELEVATED LONDON

**Investigation of the horizontal and vertical
infrastructure groundscapes**

Research Paper - AR3A010 - MSc3 Architecture Design Crossover - Fall 2022- Joan Hu

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INTRODUCTION & PROBLEM STATEMENT

Nowadays with the continuous development of the metropolitan cities, the city is getting more and more packed. The land of cities like London is very precious, land is scarce, every inch counts. Therefore, the decision of what to do with space is crucial, the highest bidder often gets the land. However, how to deal with space that is wasted, like residual space and disused spaces? The research started with this fascination of residual spaces and the lack of space in London. In the search for lost spaces in London, it is discovered that there is plenty of disused infrastructure. From these structures new groundscapes were born; on the ground, above, under and the in-between. These spaces are rarely translated into productive and meaningful spaces, even in the context of London where every square metre counts. The result of new groundspaces created by layering infrastructure would be the main topic of my research, because of the potentials it contains to revive space in London.

As the city gets more and more crowded, other alternatives have been implemented to create 'ground', this is often done by layering and levelling of spaces. Especially when it comes to movement and efficiency of infrastructures. These are often layered over each other to create good connections throughout the city. These groundscapes are to be explored to find new common grounds, as well as, perspectives on these spaces. The addition of the elevated grounds also generate opportunities to explore new grounds; the in-between vertical and horizontal grounds of these

systems. However, transforming the grounds is challenging. The City of London has planned an intricate and ambitious plan to implement the pedway system in the existing urban fabric. However, this did not work out due to various factors like lack of policy, land ownership, financial reasons, difficult to implement, etc. However, there were a few of these multi-layered systems that were realised and exist until today. Nevertheless, they are not used as they were planned, and are a lost space in the city. Through investigating what the potentials are and how to generate new meaning within these groundscapes, the hope is to reclaim and revive and redevelop these residual spaces for the public.

One could argue that the topic is already explored in the context of other metropolitan cities like Hong Kong, Montreal underground shopping malls, Toronto and Nogoya, Seoul, etc. which have created systems and networks that are based on layering. These cities are designed to live in buildings and the vertical world by connection, and create public spaces on the layers. Similar spaces could be found everywhere in London but different. In the context of London, the layers are often not designed for public use. Infrastructure is difficult to revive due to the nature of it. The intervention should become a new typology. Therefore, the layering of grounds should be an experimental playground where the purpose is to create a suggestion on how to use these new groundscapes, and what opportunities and potentials they can create for transforming metropolitan cities like London in the future. Moreover, the meaning of reviving and transforming these spaces should also be experimental. The research aims to find possible ways to make architectural interventions on new groundscapes which could potentially benefit the city as a whole.

This research would be done through a thematic research, design research, argumentation and conclusion. In thematic research the possibilities of how to

deal with multi-layered levels is investigated through the concept of groundscapes. From that a study is done about Hong Kong and the success of their systems. This is followed by an investigation into new potential ways to deal with Vertical Urbanism. The research is continued by the possible applications in architecture, infrastructure and open public spaces and how they are interconnected as one entire superorganism. In the design research, the focus is on the existing pedways systems. The research investigates the history, why it failed, what can be learned from it, existing pedways, the architectural and social features of the pedways. These findings should be taken further in the design and define the design criteria. An argumentation would be followed, the argumentation would be mainly a discussion thematic formulation, elaboration and argumentation; cases, counter arguments and challenges. conclusive reflection with emphasis on the insights for the design agenda.

The research would be led by the main question:

How to implement an architectural interventions on new groundscapes which could potentially benefit the future of The City of London and London as a whole?

The thematic sub-questions below are to help to guide through the theoretic research, design research and argumentation. They are divided into three smaller topics; tackling the ground conditions, potential adaptations, and the social-spatial relationships and tensions.

What is the groundscape? What are the effects of reviving residual ground spaces created by layered infrastructure on the continuity of the horizontal and vertical space? What is the meaning of the material and intangible qualities of the groundscape (transition zone)?

What alternative spaces are the pedways capable of adapting into? What are the effects of the readaptation in the context of the city, ecology and environment? What are the consequences of reviving the groundscapes?

How do the new ground spaces created by the socio-spatial relationship? How is the relationship between the social and spatial impacted by the transformation of the pedways?

THEORETIC RESEARCH

Introduction

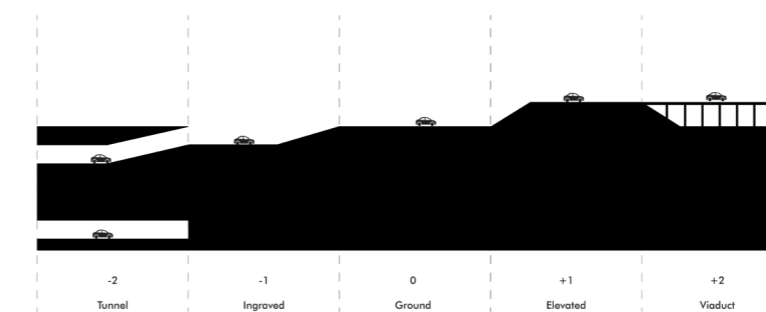
London is significantly expanding, densifying and intensifying over the years. In this chapter, the goal is to discover various concepts that are useful to develop The City of London in a more integrated way and experiment with the notion of elevated groundscapes in architecture, infrastructure and public space. The chapter will begin with the definition of the ground, followed by a case study of Hong Kong, from which a distinction would be made between Vertical City and Vertical Urbanism. Further discussion on how to apply these concepts in the context of architecture, infrastructure and public space, finalised by a discussion and conclusion. The thought by investigating this concept is to understand and find application new opportunities to develop and densify London in the future. The discussion of thesis topics should formulate a deeper understanding on the topic and help answer the research question.

Groundscape

In order to understand vertical urbanism the ground level has to be determined. The ground is defined as a continuous plane and stable reference points.¹ In the context of the metropolitan city of London, the 'ground' is often a result of layered grounds and infrastructure. This can be seen on many degrees such as; railways, motorways, cycle lanes, buildings, pedestrians, etc. The intense layering of various infrastructures systems creates different in-between 'grounds' also

¹ Frampton, Adam, Clara Wong, and Jonathan D. Solomon. 2012. *Cities Without Ground: A Hong Kong Guidebook*. N.p.: Oro editions.

known as groundscapes. The in-between grounds are found both on the vertical and horizontal axis of the city. The true ground becomes a point of reference to the level the person or object is on. In some way, it can be said that the ground does not exist anymore, the ground becomes an abstract concept. The ground can be defined as a physical position in space but at the same time it is a mental anchor. The definition of the ground changes for every individual person due to the difference of interpretation, memories and experiences. The individual can be tricked to experience a layered space as ground through the tectonics, materiality, ornamentation, organisation, programs, etc. that are related to a traditional ground floor level characteristics. Through looking at these conditions, multileveled spaces could become more successful, as the ground floor is associated to be one of the most successful ways to create urban life. Moreover, the traditional ground is not necessary anymore.



Hong Kong

After understanding the ground, the next step is to understand how to apply this knowledge in a successful manner. The city of Hong Kong is an extremely established example. The erection of the vertical urbanism due to scarce developable land, high land prices, and increase in population.² Intensifying existing land and densification throughout multiplying horizontal and vertical layers of the city was the solution. The book "The making of Hong Kong", is mainly discussing the redefining ground, movement between new grounds

² Shelton, Barrie, Justyna Karakiewicz, and Thomas Kvan. *The making of Hong Kong: from vertical to volumetric*. Routledge, 2013.

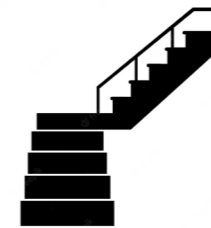
and stacking of functions.

The redefinition of ground is listed in four categories. The duplicated ground is where the ground is, as the name explains duplicated; the horizontal motion of this kind of floor is more dominant. In split ground, there is separation made vertically, several levels are climbed by elevator or stairs; the vertical axis of motion is dominant. The concept of multiple grounds is where both vertical and horizontal features are submissive. The ground floor is engaged in multiple levels with continuous movement throughout. Borrowed grounds is the concept where other opportunities are explored by reclaiming new land.³ In the context of this project, all these concepts would be explored in the design research, especially the notion of multiple grounds. However, the determination of the method used is dependent on the situation of the site. For it to be perceived as a continuous movement, it is important to understand the various topics of movement in space.

The subcategories of circulation of space is divided into the following, interlocked Ladders, mechanical ladders, elevated pedways, elevated roadways. What is interesting about this area is that the staircase and escalator do have their own subcategory and while lifts and ramps are not mentioned at all. In my opinion they are an essential part to make the motion throughout smooth and continuous as well, and create inclusivity for people with a limitation in movement. The staircase case is one of the elements disturbing the continuous movement on these platforms, while ramps, escalators, and lifts make people forget the ground. The elevated pedway reduces the distribution of movement in a horizontal manner; they provide a degree of freedom from the infrastructure on the street. They are the mediator between urban isolated islands, they are used to connect the solitary areas. This freedom can only be sustained with sufficient programs and layered functions.

³ Bh Shelton, Barrie, Justyna Karakiewicz, and Thomas Kvan. *The making of Hong Kong: from vertical to volumetric*. Routledge, 2013.

The elevated grounds create functions that are suitable for their typology, and abandoned ones that do not work, it evolves. Similar to functions placed underground, they can be ones that are difficult to locate because of unwelcoming functions or shortage of land.⁴ The function is often a mixture of several sectors, involving both private and public parties. The book gave a few examples, however, I believe that the function should be derived from the context and situation of the developing area. Nevertheless, it provided interesting insights. The functions can be unconventional, they should not be limited to the obvious, they ought to instead be a reflection of the needs of the neighbourhood.



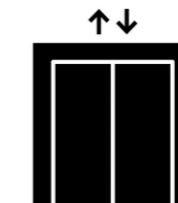
Stair



Escalator



Ramp



Lift

Nevertheless, when there is too much layering and levelling it becomes a 'city without ground' this concept comes from the book "Cities without ground: a Hong Kong Guidebook". No ground means no figure. The matters of axis, edge, centre and even fabric which shape the urban space, are missing. The city can not be understood anymore from a traditional urban form, it should be understood from a three-dimensional way.

⁴ Endicott, J., P. Johnston, and N. F. Lin. "Underground cities: new frontiers in urban living." (2020).

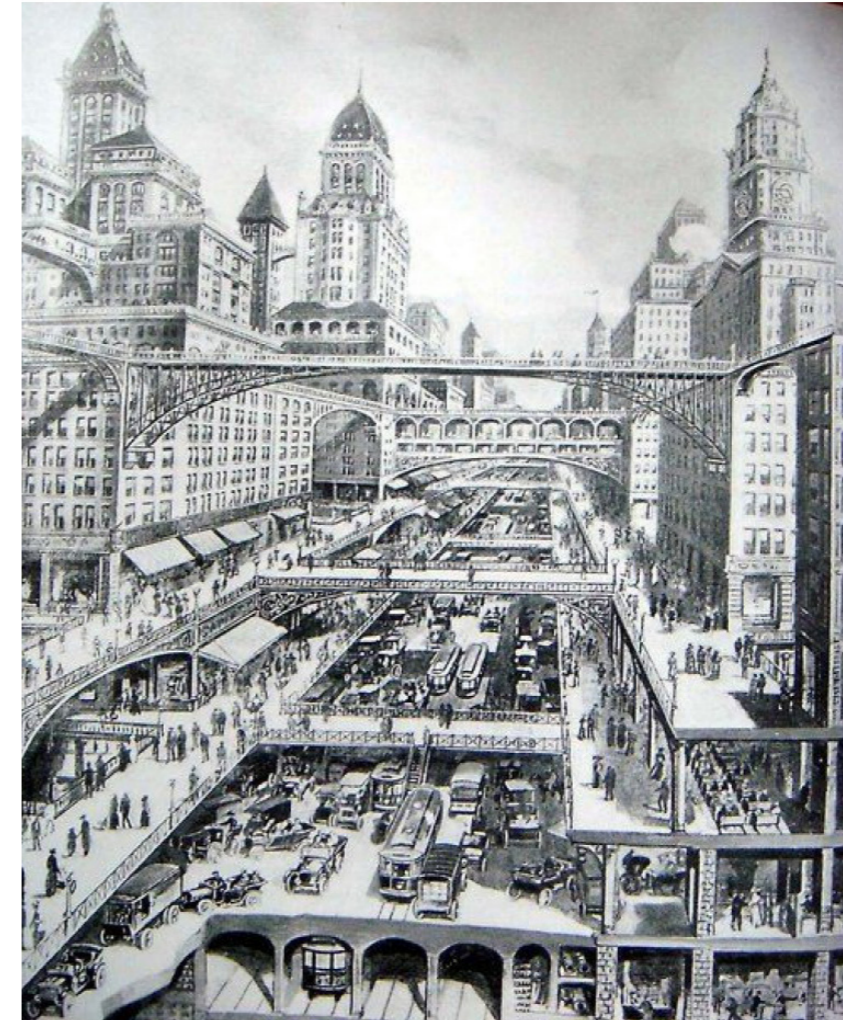
⁵ Gausa, Manuel, and Young Joon Kim. 2020. *Superground / Underground*. New York: Seoul Metropolitan Government.

Vertical City vs Vertical Urbanism

Hong Kong is already a successful example, however, the way of planning is outdated. Gausa and Kim mentioned in their book *Superground/Underground* the need for a new model beside Revisionistic, Structuralistic and Objectualistic/Mercantilistic which were used mainly between the 1970 and 2000.⁵ They are not uptodate, and do not reflect the complex dynamic systems of future networks and cities. Therefore, it is important to distinguish the differences between the concepts of Vertical City and Vertical Urbanism. The two are very different, the vertical city is largely influenced by Le Corbusier's theory of urban planning. This way of planning often results in buildings segregated and disconnected from the urban fabric; the superblock was the main vocal point of the project, as known many of these blocks did not work out overtime. The concept Vertical Urbanism distances itself from the Modernist concept. "It represents a dynamic and adaptable strategy of urban design and development". Density, Complexity and Verticality are the key components of Vertical Urbanism. According to Lin, vertical urbanism is an interactive layer of a three-dimensional framework of infrastructure, space and ecology that results in an integrative design strategy.⁵ This concept is meant to adapt to the geological and cultural context, it should intensify the identity of place, and maintain this balanced development throughout the whole process. This form of planning is no more one fits all, but a case based sustainable heterogeneous way of expansion of the existing urban fabric.

In the case of the elevated pedways, they are an essential component of the new model. Not only are they the glue that connects various islands but they become something more than infrastructure, they become part of the architecture, landscape and open public space.

⁵ Lin, Zhongjie, and José LS Gámez, *Vertical Urbanism: Re-conceptualizing the Compact City*. eds. Vertical urbanism: designing compact cities in China. Routledge, 2018.



[IMAGE] A 1913 idea for a future city by Harvey Wiley Corbett. It includes a multi-layered city with myriad uses packed into a single street section. <https://www.onverticality.com/blog/past-cities-of-the-future>.

Infrastructure

Allen suggests that they can be identified as the movement of the site of these intertwined infrastructures should be seen as a continuous matrix. This matrix consists of the horizontal axis (infrastructure and landscape) and vertical axis (building). The two axes are woven together and both could be understood as architectural material. The spaces could be identified as movement, building, infrastructure and open space.⁷ However, this is somewhat outdated. Infrastructure itself should be part of the system. However, how should this be tackled?

Transportation infrastructures are mainly made to create the purpose to commute, and thus the mission to revive them becomes sometimes very challenging. This is because infrastructure is static itself but serves the function of movement.⁸ The view on infrastructure should be changed, it should be dynamic. The purpose of infrastructure can be more than just commuting. The book *Supergrounds/Undergrounds* identifies ways to intensify infrastructures in four potential site categories that are capable of being synthesised:

**Mix-multilayer connectors of roads, railways and underground areas*

**Program reactivation and revitalisation of old elevated and lower-level structure*

**Water, Mix-use of reservoir sites*

**Recovery of urban island-sectors and crossing points*

*"The concept of multi-ground responds to thesis criteria: it does not intend to "continue" or "recreate" the traditional city. Nor impose or positionate, transform it, build machines or objects but superimpose a new dense floor that becomes a new topo on, inside, in, where and through which to develop new/old programs, uses and activities of life and relationship."*⁹

⁷ Allen, Stan, "Landscape Infrastructure", *Infrastructure as Architecture: Designing Composite Networks*. N.p.: Jovis. ed. Stoll, Katrina, and Scott Lloyd, eds. 2010, p. 36-45.

⁸ Ibid.

⁹ Gausa, Manuel, and Young Joon Kim. 2020. *Superground / Underground*. New York: Seoul Metropolitan Government.

Infrastructure becomes an extension of architecture and vice versa. By introducing this concept, the ground is relieved. The ability of architecture to transform within the realm of infrastructure becomes an opportunity to rethink the invisible.¹⁰ Reclaimed infrastructure has to prioritise integrating new programs and interconnecting systems.¹¹ The new program and systems create a new superorganism and ecosystem. The transition ought not to be static in any means, but dynamic. They should interact with one another and adapt themselves in the complex environment and over time.¹²

Public space

There is a tendency for these leftover spaces created by the overlaying infrastructures to attract informal activities like, drinking, skating, street art, camping, homelessness, etc. Wall continues to talk about the tension between the informal and formal, public and private, city and infrastructure, the planned and not planned. He suggests that the socio-spatial relationships of these informal activities reveals a new typology of urban space.¹³ Acconic explains this as being a negotiation of public space in a private time. Public space does only work when there is a public gathering. Private and not intended public space can be made gathering points by force.¹⁴ Therefore, how to create effective public space should be taken into account when integrated with infrastructure. Cuff talks about those failed public systems and how to give back to the public. It is suggested that the next centre generation of public sphere is infrastructure, they were designed for the public, and thus should give back to the neighbourhood. She continues to talk about the WPA 2.0 competition, five lessons can be drawn from it; infrastructure must give back to the communities it serves, infrastructure should be made visible, infrastructure should be productive and be service-orientated, public works should be the end result

¹⁰ K. Stoll, S. Lloyd, "performance as form", *Infrastructure as Architecture: Designing Composite Networks*. N.p.: Jovis. ed. Stoll, Katrina, and Scott Lloyd, eds. 2010, p.4-7.

¹¹ Angelil M_Klingmann A. (1999) *Hybrid Morphologies- Infrastructure, Architecture, Landscape*.

¹² Bhatia, Neeraj, Maya Przybylski, Lola Shepard, and Mason White. *Pamphlet Architecture 30: Coupling: Strategies for Infrastructural Opportunism*. New York: Princeton Architectural Press, 2011.

¹³ Wall, Ed. "Infrastructural Form, Interstitial Spaces and Informal Acts," In *Infrastructural Urbanism-Addressing the in-Between*, edited by Thomas Hauck, Regine Keller, and Kleinekort, Volker, 145–58. Berlin: DOM Publishers, 2011.

¹⁴ Acconci, Vito. "Public space in a private time." *Critical Inquiry* 16, no. 4 (1990): 900-918.

of recycled, reclaimed and revitalised infrastructure, and the process of transformation ought to be completed in phases.¹⁵ The new dimension of public space is challenging, it is an experimental investigation.

Architecture

Architecture

The idea of creating multiple layered grounds in architecture are simply creating more elevations with staircases to increase the use of the plot. However, with the influence of the concept 'five points of architecture' created by Le Corbusier, detaching the architecture from the ground and thus creating 'new groundscapes'. The ground is no longer physical ground but could be lifted off the ground, embedded in the ground, raised ground, stacked ground, inflated ground, vectorial ground, carved ground, exposed ground, and inscribed ground. The void between building and ground condensed to become real space that redefines that relation between architecture and territory.⁶ The layers are merged into each other. This creates an opportunity to look at the roof as more than just the roof but as the ground. This is a toolbox for reference and conceptual knowledge about different situations of architecture and their relation to ground-scape. This would further explode during the design phase and the situation of architecture.

¹⁵ Cuff, Dana, "Architecture As Public Works", *Infrastructure as Architecture: Designing Composite Networks*. N.p.: Jovis. ed. Stoll, Katrina, and Scott Lloyd, eds. 2010, p.18-25.

⁶ Ilka, Ruby. "Andreas, Groundscapes. The Rediscovery of the Ground in Contemporary Architecture." (2005).

DESIGN RESEARCH

Introduction

In the design research, the focus is on the existing pedways systems. The research investigates the history, why it failed, what can be learned from it, existing pedways, the architectural and social features of the pedways. These findings should be taken further in the design and define the design criteria. This chapter is lead by the question **What are the potentials of reviving and reclaiming and extending existing underused infrastructure space like pedways produced through layered grounds?**

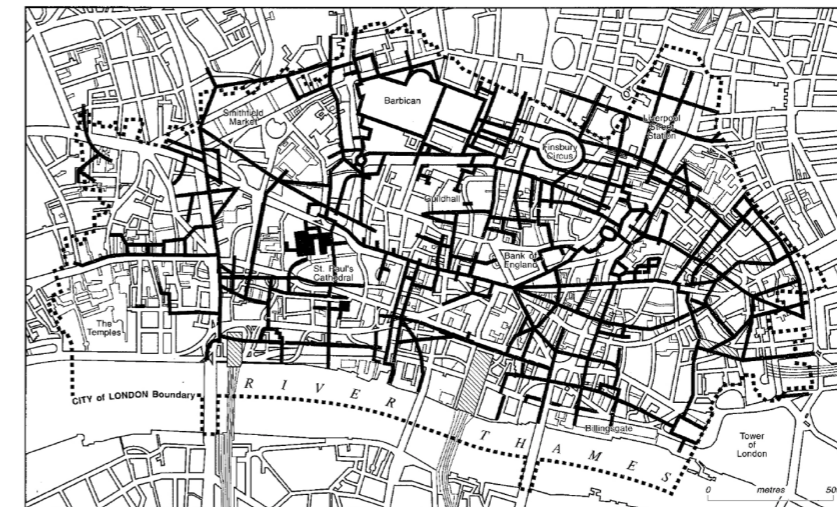
History

With the fascination towards the invention of the motor vehicles and the influence of modernist school, urban planning at that time was more in favour of pedways to divide the pedestrian from the automotive.¹⁶

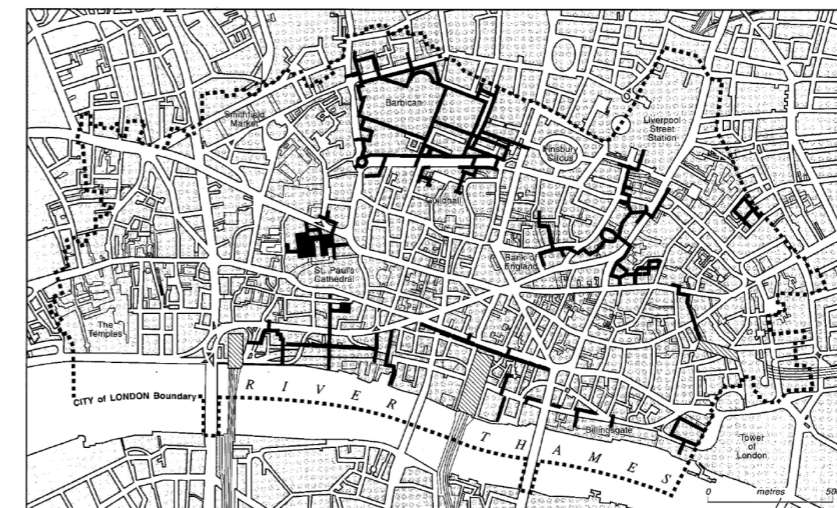
In London, plans were made to create an intricate raised pedestrian network in the City of London. Similar to the underground tube system created in the 19th century, the elevated pedways are a way to relieve the packed ground and could complement the underground walkway system. The motivation of the city of london was clear, pedways would have provided environmental, time, and horizontal and vertical segregation and freedom to the pedestrians.¹⁷ Authorities of the City of London, agreed that this was a right location area to implement the pedways. This judgement was based on four critical points; business activities

¹⁶. Hebbert, Michael. "The City of London walkway experiment." *Journal of the American Planning Association* 59, no. 4 (1993): 433-450.

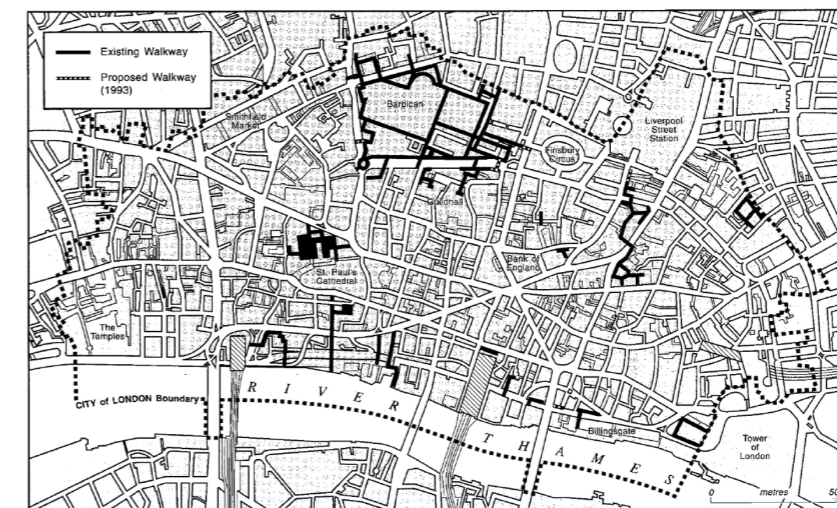
¹⁷. "Pedestrians in the City." *Official Architecture and Planning* 31, no. 8 (1968): 1035-40. <http://www.jstor.org/stable/43957707>.



1963 Drawing 3400B



1976 Minimum network policy



1992 Network, as built

[IMAGE] Hebbert, Michael. "The City of London walkway experiment." *Journal of the American Planning Association* 59, no. 4 (1993): 433-450.

relating to pedestrian movement, area of redevelopment due to damage from the war, the development of Barbican and the London Wall offered opportunities to experiment, and, at the time a special Act made it feasible for the corporation to implement proposals for a City walkway network.¹⁸

Large studies were made about the patterns of pedestrian, peak hours and business, in order to derive the location, direction and activity of and on the elevated walkways.¹⁹ Despite the intricate planning and extensive studies, most of the planned elevated pedways were never realised. The ones that are finalised are concentrated in the south area of the City of London and in Barbican estate. Moreover, the ones that are realised, are mostly unused lost spaces nowadays.



What went wrong & how to tackle it?

According to "The City of London walkway experiment", in order for the pedways to function, the advantages of having a multi-layer pedestrian system should exceed that of a singular layer, in this case it did not and therefore failed. Despite the failure of the pedways in the City of London, the question is how to revive and reclaim the residual walkways, bridges, decks, and passages for future use in this dense and

crowded area of London.

To do this, firstly an understanding should be made on why the pedways failed in general. After this knowledge is gained ways on how to revive, reclaim, suggestions and stuff to avoid ought to be derived. The Barbican is a relatively successful example in the area, therefore, the focus would be on the other pedways. One of the reasons is the pedways were extremely difficult to implement in the existing urban fabric. Negotiation had to be done between the various private landowners. Even when it was successful to build the pedways they were expensive. There was a confusion whether the new territories were public or private space, confusing security, pedestrians, public authorities, etc. whether they could excess the area. Secondly, there was a lack of design regulation. The elevated walkways were unattractive due to the variety in style, finish and size. People were discouraged to use them as they were dark and unpleasant. Services and programs supposed to be implemented also were set on halt for the same reasons, giving pedestrians even less reasons to use the pedways. Thirdly, the pedways are short and not connected among each other and to attractive services. The pedways are only bridging over a busy road and because of the nature of the pedway itself, one has to go up through stairs, without a purpose or destination pedestrians choose to stay on the ground. The pedways failed to fulfil their purpose to relieve the traffic and create an interactive pedestrian network.²⁰

The remaining elements are disused, the way to approach them is to reuse and reclaim them in a consistent matter of size, style and finish.

Notwithstanding, the built pedways are existing scars of the London walkway experiment. The pedways should be given meaning and purpose again. They should be reclaimed, extended, and given new programs. However, not in the traditional way. They should not be static, but dynamic.

¹⁸. "Pedestrians in the City." *Official Architecture and Planning* 31, no. 8 (1968): 1035-40. <http://www.jstor.org/stable/43957707>.

¹⁹. *Ibid.*

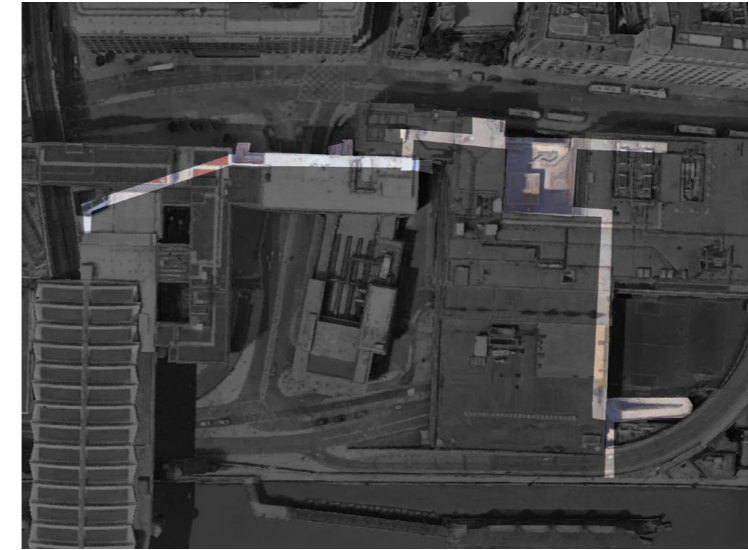
²⁰. Hebbert, Michael. "The City of London walkway experiment." *Journal of the American Planning Association* 59, no. 4 (1993): 433-450.

Existing pedways

The few remaining pedways in London are: The Barbican Highwalks (including the new London Wall walkways), Blackfriars / Baynard House pedway, Peter's Hill pedway (all at ground level), Fyfefoot Lane pedway, Suffolk Lane pedway, Swan Lane pedway (all that remains of this pedway is a staircase to a landing which are not accessible and under demolition), Pudding Lane pedway, Bishopsgate pedways and Middlesex Street Estate (currently no access to public). Most of the accessible and unused ones are located next to the riverfront of the Thames. These are the ones the study would be focussing on.

The experiences perceived on the walkways are fragmented. The walkways are merged with the surrounding buildings. The difference of stakeholders resulted in the fragmentation of space and architectural expressions of the pedways. The walkways create a pathway without a beginning and ending. They are unfinished and non continues with no distinct destination. Whereas the pedway system in Hong Kong seems to be an elaborated infrastructural system on its own. This fragmentation of the space and urban fabric, discontinuation, and no destination resulted in the abandoned lost space.

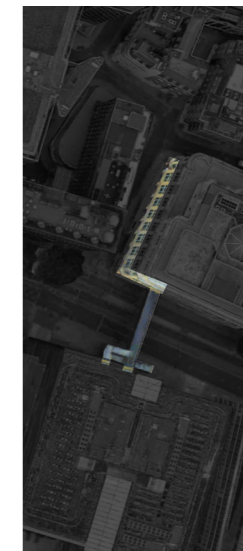
For the existing pedways to thrive again, more has to be understood about the materialisation, experience of space and the current activities that could be found on them. The following chapter would be hoping to unravel these features through analysis.



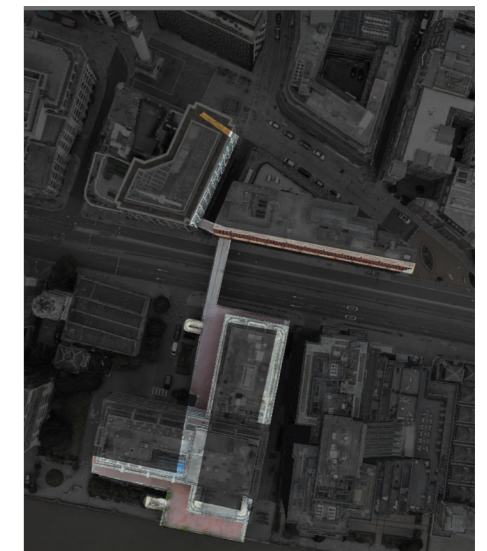
Baynard House



Fyfefoot Lane



Suffolk Lane



Pudding Lane Pedway

Running



Play & Leisure



Exploring



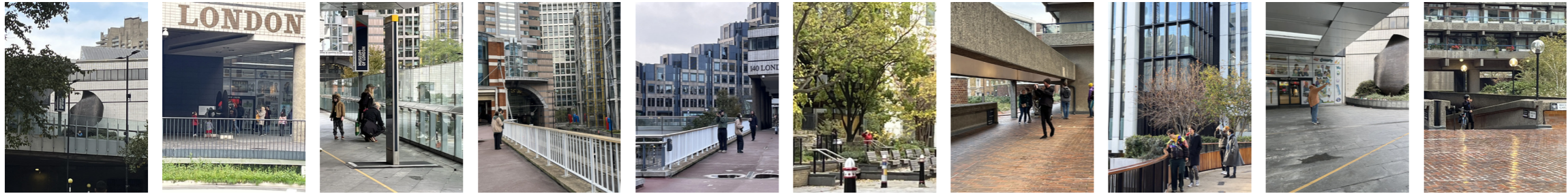
Lost/Finding way



Sitting, Drinking, eating



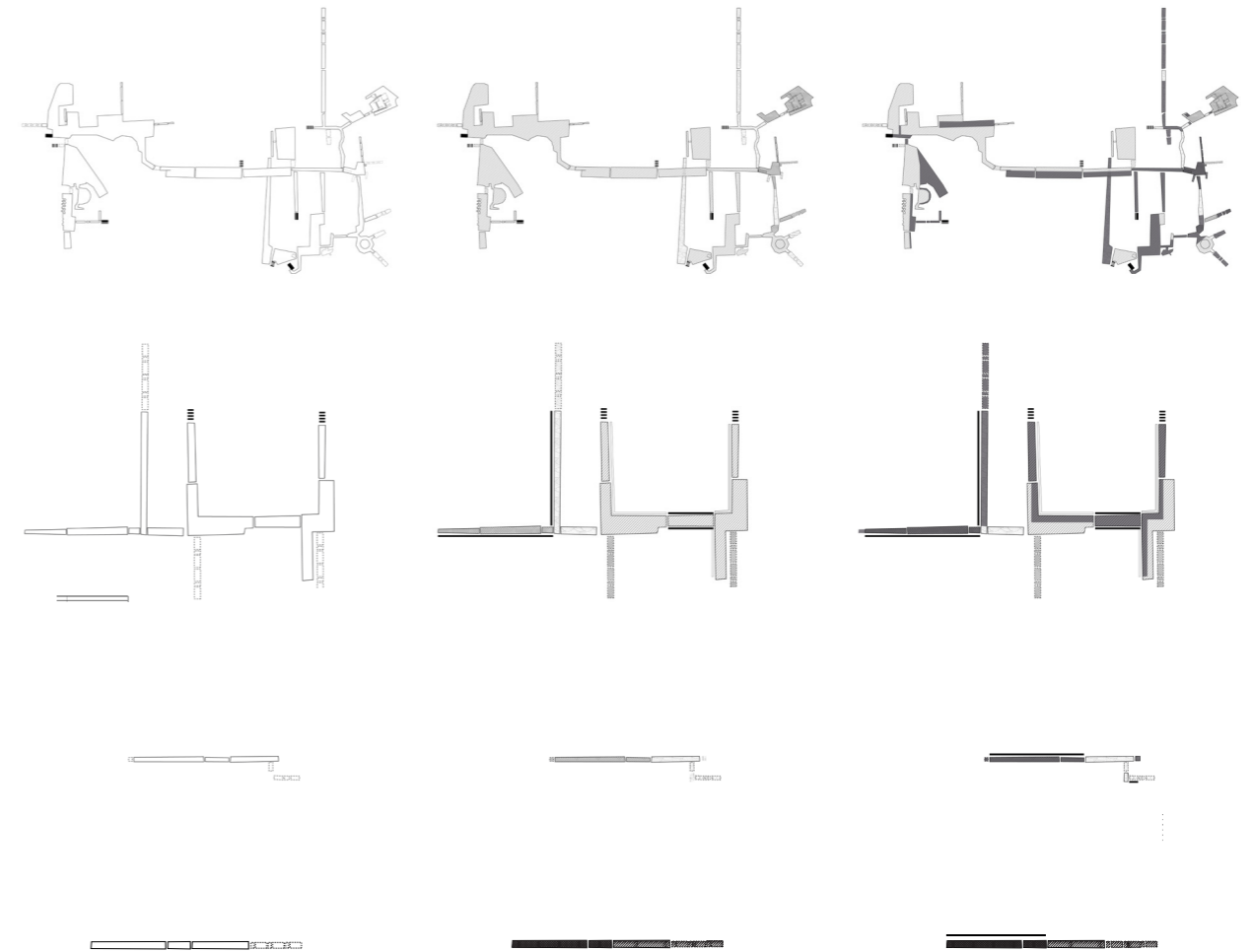
Taking Pictures



Tour

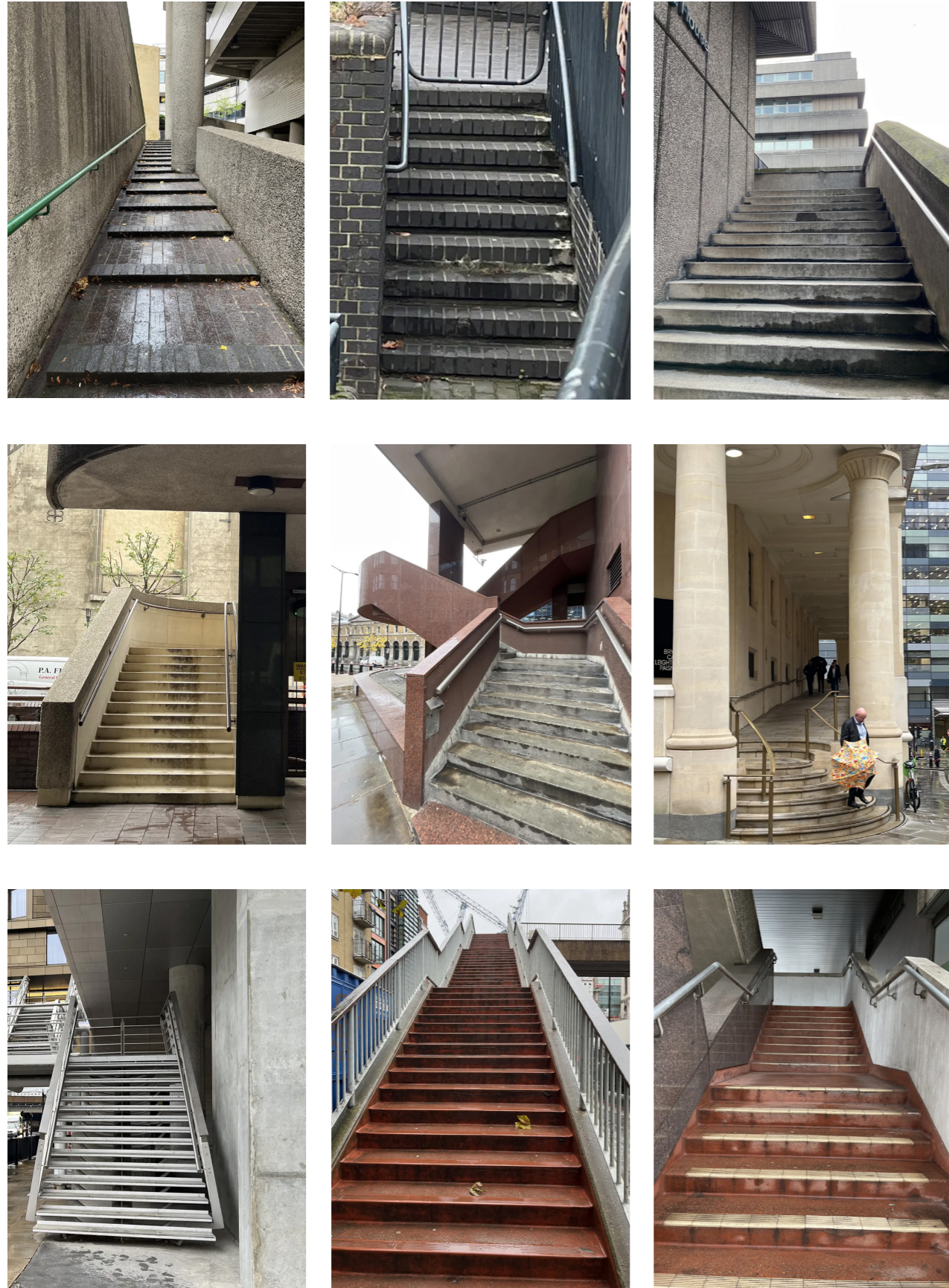


The qualities of the elevated padways and human interaction with them are very interesting and essential to consider. The elevated pedways are an extension of the ground and therefore the ones that are creating lively environments do mimic street life. This is done by creating similar finishes and activities and conditions throughout. When looking at the activities that take place on the elevated pathways. The most prominent are running, exercising, sightseeing, exploring, sitting, enjoying the view and being lost. From this the assumptions of the program can be made to relate to these topics in a way. The pedways can be places for playgrounds, walking, running, biking, exercising, new ways to view the city, etc.

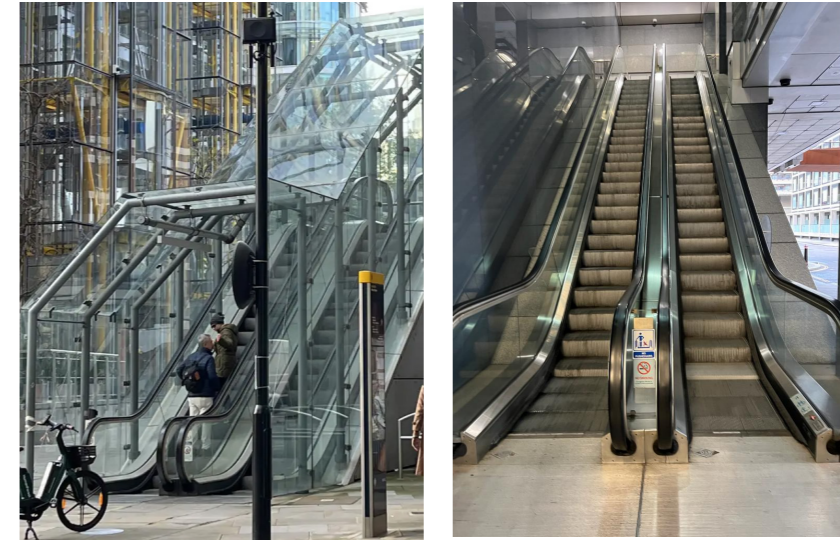


PEDWAY STRATEGY 2.0

Staircase



Escalator



Ramp

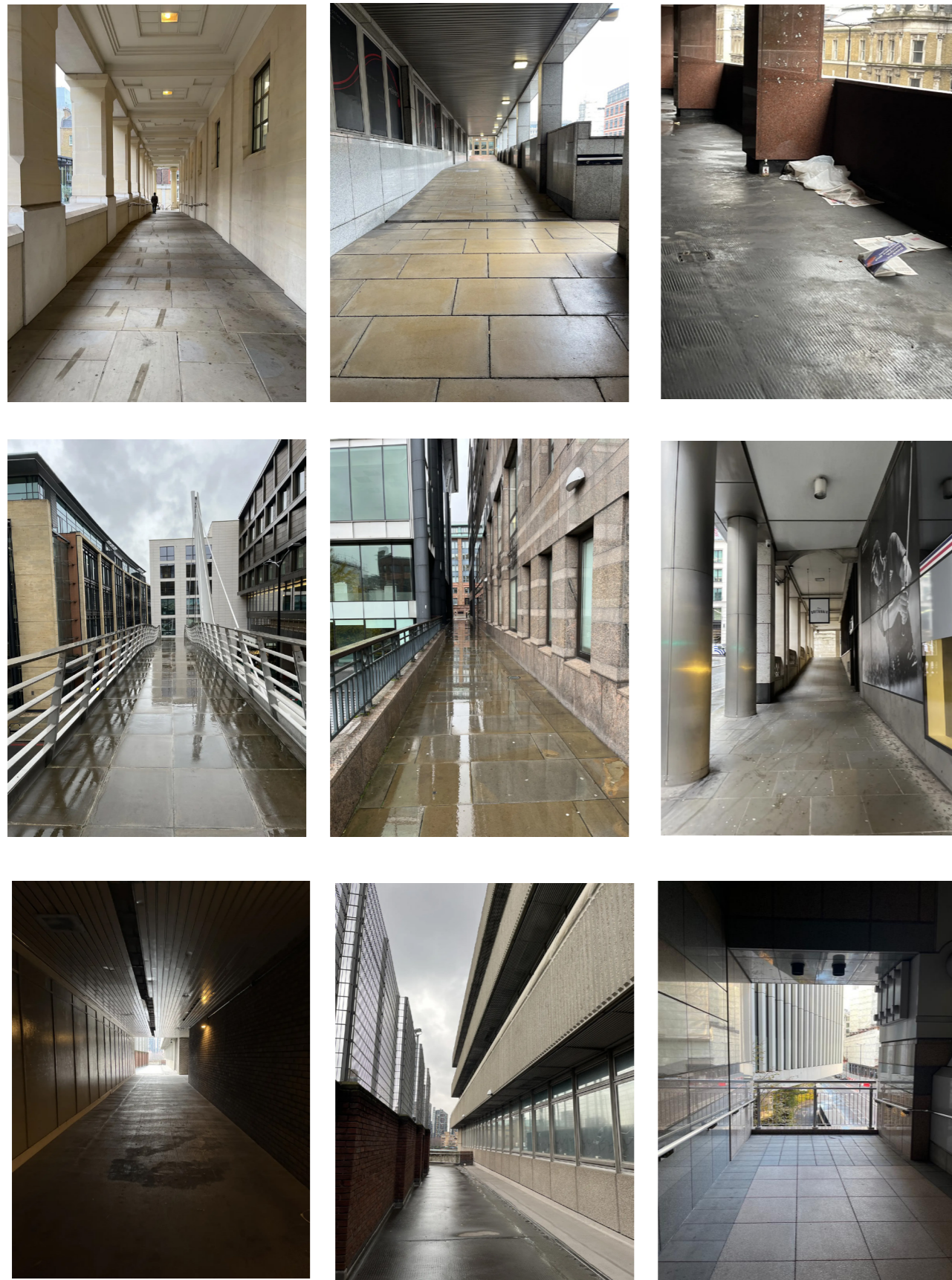


Mixed



Vertical experience

In the context of the elevated ground the mediums to reach the elevated decks area are an essential medium. They provide the first and final impression of the system to the users. They ought to be first to attract people to the place. As can be seen from the existing pedways they the materiality and experience is quite varied throughout. Most of them give a weathered and unwelcoming feeling. These entrances are unclear in the informational communication of where they are heading towards and create confusion as well as uncertainty of usage. From this the conclusion is made that for the pedway successful the vertical mediums have to be clear and consistent.



Horizontal experience

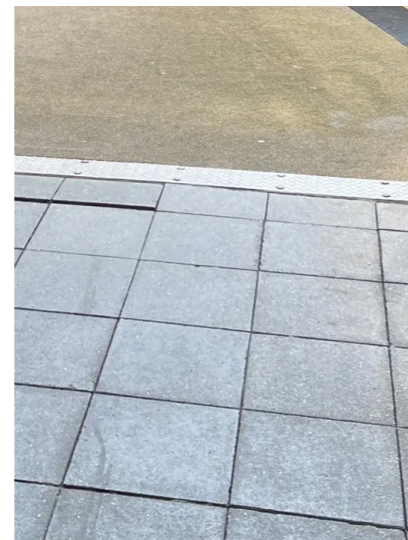
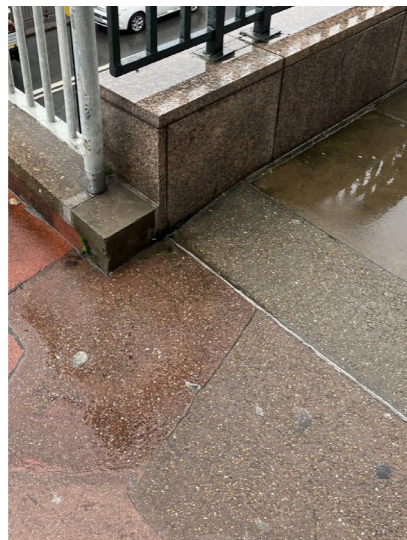
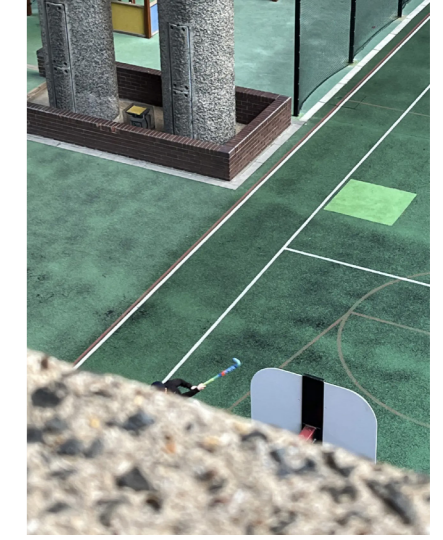
The experience for the additional horizontal ground changes throughout. The spaces are more experienced as corridors. The indication of pleasantness in the areas are mostly determined by the finish, light, openness and cover of the pedway. These factors are the one of the main reasons why some are still in use to some degree and the ones that are not in use anymore.

Urban furniture is an effective way to make people stay at a place for gathering or enjoy the public space, it transforms the space and encourages more interactive interaction with the space.

Urban Furniture



Materialisation



PEDWAY STRAGEY 2.0

ARGUMENTATION

At the moment metropolitan cities are packed with stuff. The land of cities like London is very precious, land is scarce, every inch counts. Therefore, the decision of what to do with space is crucial, the highest bidder often gets the land. However, how to deal with space that is wasted, like residual space as a result of layered infrastructure?

As the city gets more and more crowded, other alternatives have been implemented to create 'ground', this is often done by layering and levelling of spaces. Especially when it comes to movement and efficiency of infrastructures. These are often layered over each other to create good connections throughout the city. These landscapes are to be explored to find new common grounds, as well as, perspectives on these spaces. The addition of the elevated grounds also generate opportunities to explore new grounds; the in-between vertical and horizontal grounds of these systems. However, transforming the grounds is challenging. How could these grounds be given meaning in these harsh conditions?

One could argue that the topic is already explored in the context of other metropolitan cities like Shanghai, HongKong, Tokyo, Seoul, etc. which have created systems and networks that are based on layering. These cities are designed to live in buildings and the vertical world by connection, and create public spaces on the layers. Similar spaces could be found everywhere in London but different. In the context of London, the lay-

ers are often not designed for public use. Infrastructure is difficult to revive due to the nature of it. The intervention should become a new typology. Therefore, the layering of grounds should be an experimental playground where the purpose is to create a suggestion on how to use these new landscapes, and what opportunities and potentials they can create for transforming metropolitan cities like London in the future. Moreover, the meaning of reviving and transforming these spaces should also be experimental. The research aims to find possible ways to make architectural interventions on new landscapes which could potentially benefit the city as a whole.

There has to be an increase in the number of residents in order to create functions for the public realm in the city of London. When it comes to policy making and the people in power of the local government of the city of London. The amount of votes are distributed over the residence and the businesses. Per every 5 people working in the business there is one voting right. The residence has one each. However, in 2011, there was a huge imbalance between the two, there were 7400 residents and 450,000 city workers.²¹ It can be said that the parliament and policies would be in favour of the working class. Therefore, to reduce the size of this gap, one of the proposals is to create more residential housing in the City of London.

The city should be created to share common interest and values between collectives, it should be a collective oeuvre.²² But due to the imbalance of the voting population, there is a lack of public space, as public space and facilities are most of the time not profitable in any way. From 2011 to 2021, there has already been an increasing trend of 16.6% population growth in the neighbourhood.²³ As the city is getting more and more crowded there is less and less space remaining on the ground level for the people. The tall buildings, busy motorways, and packed streets are taking away space reserved for public space. With the increasing

²¹. James, Aiden. 2017. "The place where businesses and their office workers vote." BBC. <https://www.bbc.com/news/uk-politics-39283177>.

²¹. Lefebvre, Henri. "The production of space (1991)." In *The people, place, and space reader*, pp. 323-327. Routledge, 2014.

²². "Population and household estimates, England and Wales: Census 2021." 2022. Office for National Statistics. <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/populationandhouseholdestimatesenglandandwales/census2021>. 2014.

trend of inhabitants in the area there will be more need for public spaces. The project should not only serve the residence but also the working class after a long day of work by creating public leisure spaces and walkways.

The City of London is an area in the centre of the city, The area is quite known for its ruling position in the financial service sectors, historical heritage from mediaeval times, and as a tourist site visiting location. However, most of the activities exist in clusters and there is little overlapping. Spatial segregation is what is created. In the business area the streets are mainly occupied mostly by commuting staff from the station to work, road workers and cars. The fast phase of the environment affects people to be fast and efficient, and sometimes stresses them. The equilibrium between the infrastructure for people and businesses is off. The area is made efficient to work, but not to function as a human being. Resulting in a homogeneous City of London.²³

*'Here it's like you're on holiday. People walk slowly, they're not bankers—they're normal people. If you're surrounded by people who walk fast, you walk faster and this makes you stressed out ... it's not healthy running around like an idiot.'*²⁴

The life of the bankers is boring and repetitive. With the introduction of a mixed group of people, interesting walk paths that stimulate exercise, mental well being, and other routing opportunities from the tube station to the company, lunch areas to get fresh air, and meeting points along the way. However, there is little space to operate around on the ground level. As a result the proposal would be a combination of elevated grounds to intensify the land use - new grounds have to be created which involve the existing pedway systems, and potential new elevated walk routes, which would provide relief from the ground and introduce a new typology to the city. For this to happen the

pedways itself have to be understood first.

Over the years, urban planners have been obsessed with the idea to create horizontal and vertical segregation between various infrastructures. In the past, the segregation of the walkways was to create the ambition for cars to flow freely on the ground level.

As London continues to densify, the city is running out of space. It is unbelievable that there is still space that is unused. The pedways do have great potential to be revived into something extraordinary. We should be thinking of how to revive, extend and intensify the pedways and the city.

Nevertheless, the reasons for the failure should also be kept in mind and learned from. At the same time, because they failed to serve the people once they should not be overlooked. They contain the memory of past planning ambitions. The intention of the past, however, was more to separate the pedestrian and the automotive to create freedom of space for the vehicle. The vehicle was the centre of the plan, the human instead not so much. It was discarded due to the unpleasant, unwelcoming, lack of activities, and discontinuation of the pedways. From these failed examples can be learned, and improved for future purposes.

In the context of today, this is not feasible. The city is thinking of ways to keep people moving and reduce pollution. The implementation of the pedways in a contemporary way where the people could move freely with purpose would be ideal. In my opinion, for this to happen there should be a few steps taken.

²³. Trangoš, Guy, Ilana Adleson, Nicolas Palominos, Adriana Valdez Young, and Sharifa Alshalfan. "Reordered publics: Re-imagining the City of London." *City 18*, no. 2 (2014): 191-213.

²¹. Ibid.

CONCLUSION

From the research the potential design agenda can be derived. The City of London is running out of space. With the large amount of businesses, the residence voices are drowned. Moreover, public space is most of the time not of interest to businesses as it is not profitable. The goal of the intervention is to create residential area public space, increase walkability, and introduce new programs and functions for both the residents and workers.

However, with the limited space, where should this intervention take place? The intention is to design a vertical system that is not dependent on the ground. It can be said that the project is freed from the limitation of the ground floor. This degree of freedom can even be extended to create new grounds to a further extent, where the new grounds are not sensitive to the problem of ownership of land. The intervention should consist of an architectural intervention which would likely be of public use, infrastructure that encourages movement and is integrated in the architecture and open public space which is also merged in the other two elements. First, is to revive the existing structures. Then, the existing structures should be connected to a larger network system. Thirdly, the network has to have new attractive functions.

The design should revive and reuse the existing pedway system, to revive them the experience on the pedways should have an resemblance of being on the ground floor. They should preferably be in a sim-

ilar style and be welcoming to the visitors. It should be made clear to the visitors that the area is a public space. Then the possibilities should be investigated on how to expand the pedway system, to overcome the reason it failed due to being too short. The pedways should be given some kind of meaning. The pedway should be connected to stations. One is to redirect the flow of people. Secondly, it already is a likely area where people have to accommodate the change of elevation. The next step is to create meaning to the site. For people to use the area, from the research it is known the importance of functions. The existing network is close to the riverside of the Thames. The intervention consists of public space that is located on or nearby the pedway that is in change. The function should be of public interest and related to leisure and health.

The intervention should serve domestic and foreign tourists, residents, and the working class. The intervention is to create leisure activities for people in different situations.

ANNOTATED BIBLIOGRAPHY

Allen, Stan, "Landscape Infrastructure", *Infrastructure as Architecture: Designing Composite Networks*. N.p.: Jovis. ed. Stoll, Katrina, and Scott Lloyd, eds. 2010, p. 36-45.

Allen suggests that the site of these intertwined infrastructures should be seen as a continuous matrix. This matrix consists of the horizontal axis (infrastructure and landscape) and vertical axis (building). The two axes are woven together and both could be understood as architectural material. The spaces could be identified as movement, building, infrastructure and open space.

Angelil M_Klingmann A. *Hybrid Morphologies-Infrastructure, Architecture, Landscape, 1999*.

"A wasted territory within the city is reclaimed through the introduction of new programs and through the interconnection of systems, commonly kept apart, such as those for infrastructure, architecture, and landscape. The project avoids any type of compositional order which might prioritise architecture; it instead alludes to potential strategies promoting a hybridization of components within a space of topological extension."

Bhatia, Neeraj, Maya Przybylski, Lola Sheppard, and Mason White. *Pamphlet Architecture 30: Coupling: Strategies for Infrastructural Opportunism*. New York: Princeton Architectural Press, 2011.

The essence of the reading is to create opportunities for infrastructures to reintegrate with architecture so that it creates a system based organisation- a superorganism. By reintroducing architecture as a superorganism, it has the ability to be dynamic rather than static. The system becomes an open system that adapts and interacts with its environment.

Cuff, Dana, "Architecture As Public Works", *Infrastructure as Architecture: Designing Composite Networks*. N.p.: Jovis. ed. Stoll, Katrina, and Scott Lloyd, eds. 2010, p.18-25.

Cuff talks about those failed public systems and how to give back to the public. It is suggested that the next generation of public sphere is infrastructure, they were designed for the public, and thus should give back to the neighbourhood. She continues to talk about the WPA 2.0 competition, five lessons can be drawn from it; infrastructure must give back to the communities it serves, infrastructure should be made visible, infrastructure should be productive and be service-orientated, public works should be the end result of recycled, reclaimed and revitalised infrastructure, and the process of transformation ought to be completed in phases.

Frampton, Adam, Clara Wong, and Jonathan D. Solomon. 2012. *Cities Without Ground: A Hong Kong Guidebook*. N.p.: Oro editions.

In the book *Cities Without Ground: A Hong Kong Guidebook*, the ground is defined as a continuous plane and stable reference points. However, playing intensively with levelling and layering can create a condition of 'city without ground'. No ground means no figure.

Gausa, Manuel, and Young Joon Kim. 2020. *Superground / Underground*. New York: Seoul Metropolitan Government.

The book talks about the potentials of urban infrastructure how it can be transformed and the challenges. The focus is on the new groundscapes, what they mean to the metropolitan city of Seoul.

Ireson, Ally, and Nick Barley, eds. 2000. *City Levels*. N.p.: Princeton Architectural Press.

The book focuses on the different levels of the city: The highest point, Elevated territories, the street and the beneath ground, reading the book the hope is to clarify the definitions of the different levels. And how they are blurred and essential to the metropolitan city of London.

Shelton Barrie, Karakiewicz Justyna and Kvan Thomas, *The making of Hong Kong*, In McGrath, Brian, ed. *Urban Design Ecologies: AD Reader*, West Sussex: Jon Wiley & Sons, 2013

In "The making of Hong Kong", is mainly discussing the matter of movement throughout multiple horizontal and vertical layers of the city. The book redefines the ground, the movement on and between the ground and layering of functions on the ground. The definition of multiple ground would be suitable, where the users can traverse as if they are on the ground plane.

K. Stoll, S. Lloyd, "performance as form", *Infrastructure as Architecture: Designing Composite Networks*. N.p.: Jovis. ed. Stoll, Katrina, and Scott Lloyd, eds. 2010, p.4-7.

This book is a selection of chapters, the main essence of the book is to identify infrastructure systems and the invisible. It looks at infrastructure in the forms of Infrastructure Economy, Infrastructure Ecology, Infrastructure Culture, Infrastructure Politics, and Infrastructure Space and Networks. Recycling, reclaiming and revitalising could be ways to rethink infrastructure. The ability of architecture to transform within the realm of infrastructure becomes an opportunity to rethink the invisible.

Wall, Ed. "Infrastructural Form, Interstitial Spaces and Informal Acts," In *Infrastructural Urbanism-Addressing the in-Between*, edited by Thomas Hauck, Regine Keller, and Kleinekort, Volker, 145-58. Berlin: DOM Publishers, 2011.

This article gives insight to the informal and formal uses of residual spaces created by infrastructure. There is a tendency for these leftover spaces created by the overlaying infrastructures to attract informal activities like, drinking, skating, street art, camping, homelessness, etc. Wall continues to talk about the tension between the informal and formal, public and private, city and infrastructure, the planned and not planned. He suggests that the socio-spatial relationships of these informal activities reveals a new typology of urban space.

Anuar, M. I. N. M., and Raziah Ahmad. "Elevated highways and its lost spaces: A review of Kuala Lumpur? s seldom seen." *Environment-Behaviour Proceedings Journal* 2, no. 6, 2017, p. 279-291.

Bette, Urs. *Architecture in Dialogue with an Activated Ground: Unreasonable Creatures*. UCL Press, 2020. <http://www.jstor.org/stable/j.ctv13xpsm8>.

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Lak, Azadeh, Mina Ramezani, and Reihaneh Aghamolaei. "Reviving the lost spaces under urban highways and bridges: an empirical study." *Journal of Place Management and Development* 2019.

Khaleghi, Marjan, and Jahanshah Pakzad. "Elevated highways in residential layouts: The imposed negative impacts (case study: Sadr Elevated Highway)." *International Journal of Architecture and Urban Development* 7, no. 2, 2017, p. 5-18.

REFLECTION

Aspect 1

the relationship between research and design.

The research about the pedway systems tries to unlock opportunities for transformation of the existing underused spaces and its relation to architecture. The pedway systems are most of the time known to segregate pedestrians from the ground. However, with the further research about the topic, ways are found to give the pedway a new notion. A way to revive, reconnect and reimplement them again in the urban fabric. This time not only as infrastructure but as a part of architecture, infrastructure and public space. The pedway should not be only to commute but a public space with meaning.

Aspect 2

the relationship between your graduation topic, the studio topic, your master track, and your master programme.

The graduation studio recognizes the omnipresence of heterogeneity as an inherent characteristic of the modern urban environment. This complex state defies conventional disciplinary boundaries, necessitating a fresh approach to address its challenges. Consequently, within the studio, we perceive the architectural project as a harmonious amalgamation of both tangible and intangible elements, within an interdisciplinary framework. This approach calls for a multi-modal design research, engaging various modes of exploration and

inquiry. This resonates with the topic of the elevated walkways. The complex layering of groundscapes is seen back in the pedways system located in central London, where the goal was to relief the ground as a result of lack of space. The research about the pedways and their ability merge in the urban fabric, architecture, public space and infrastructure leads to program and design decisions.

Aspect 3

Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.

The methods and approach used were mainly theoretical research, photographic essay, walkscapes, drawing, mapping, and archival research. The relevance of the work is to understand the reasons why the pedways system failed as a whole. The importance of this is to recognise the pitfalls and to avoid and improve on in the future. Although the pedway system is recognised to be a failed experiment, the interest is also to look at the successful parts and what is happening to them at current times. Moreover, the pedways are a hidden pearl due to its location in the City of London. There is potential to transform these lost places. Therefore, opportunities should be found to transform these spaces and explore new ways to interpret the pedway.

Aspect 4

Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.

The project results in an intervention in front of the Baynard House which is next to the Blackfriars pedway. The intervention is an extension of both the pedways system and the Baynard House. The design is based on several assumptions. However, with the argumentation of the place being a top location in London with

an amazing view, and considering the current conditions, it would be feasible and realisable to create the intervention as an improvement of the current conditions the site is facing. The benefits are larger in this case. In relation to the professional framework, the project aims to explore the possibilities of the pedways in the architecture and the urban fabric. The experimentation leads to the opportunity to explore the rooftop as public space. As a result, multiple solutions are implemented to end up with a functional aesthetic extension of the deprived areas next to the Thames river.

Aspect 5

Discuss the ethical issues and dilemmas you may have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.

The ethical issues and dilemmas should be discussed. In the research itself is done by me as an individual, the research is very much influenced by my decision making and opinion. The data, results and interpretation of them are based on my personal interest, opinion and beliefs that have to be acknowledged. As part of the research photos were taken of individuals in public space as part of the research of behaviour.

Dilemmas in the design are mostly sustainable and environmental impact related. Should design decisions prioritise sustainable practices, minimising environmental impact and promoting responsible use of resources at all times? Is it still feasible at this moment of time to make decisions based on aesthetics?

In regards to the potential applications of the result in practice, the intervention is based on educated assumptions. The concern is also at the reality of how the space would be used. Would the improvement of the space really result in more visitors in the new intervention and the existing pedways, would it stimulate the public life in the area? These questions can only be

answered when the project would be realised.

Overall, addressing ethical issues and dilemmas throughout the research, design, and practical application stages is crucial for fostering responsible and sustainable architecture, promoting social well-being, and ensuring the equitable and respectful treatment of all stakeholders involved. The project is an experimental way to explore possibilities and new insights regarding the existing pedway system and how to tackle it.

