Seamless Integration of Skateboarding in Public Space

- A Design Proposal for an Urban Extension of Jubileumsparken.

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Preface

We started this process with the ambition of making a design proposal as our final project and master thesis. The proposition for this design project was to see if we could possibly combine our life-long interest in skateboarding with our curiosity for stormwater management in a design that could address a third interest of ours: public space. We approached the landscape architecture office Mareld Landskapsarkitekter with the knowledge of their design background in all of the above-mentioned topics, wondering if they could provide us with an actual project site that would suit our topics, and where we could test our ideas. Among a couple of suggestions, the prospect of working with a site on Frihamnen, Gothenburg was presented, and it seemed the best fit for what we wanted to do. The site is positioned adjacent to Mareld's just completed Jubilee Park and is planned to be developed sometime in the future. With the park freshly constructed, Mareld has been able to provide us with ample amounts of material related to the site, their technical expertise, and design input, which has been invaluable throughout the process. On top of this, we have been able to sit and work on our thesis in their office in Malmö. Our hope is that the appreciation of our collaboration has been reciprocal, and that this thesis will be of value for them as well. Special thanks go out to David Gough and Fabian Narin at Mareld Landskapsarkitekter.

Acknowledgements

We would firstly like to thank our supervisor Jitka Svensson for believing in us and guiding us through this process and project from start to finish.

We would also like to again thank Fabian Narin and David Gough at Mareld Landskapsarkitekter for their input and resources during the time of writing this thesis.

This thesis would not have been the same without the help of our talented friends providing us with photos at request. Thank you Markus 'Makke' Bengtsson, Fredrik Angner, Sean Christiansen, Tom Botwid, Eddie, John Dahlqvist, Emmilou Holmgren, and Olof Heinö.

Additionally, we would like to thank Jemima Hoffman for her valuable feedback on our thoughts and writing.

Lastly we would like to thank all the skaters that have crossed our paths over the years, continuously inspiring us to keep going and helping us remember why we do this.

Abstract

This thesis explores how designing for a primary function of stormwater management can create opportunities for a more authentic skateboarding experience. The project consists of a design proposal for a public square on a site in Frihamnen, Gothenburg. The proposal combines stormwater management design with integrated skateable elements to demonstrate their potential to contribute to a functional and vibrant urban space while also addressing climate change related challenges.

Climate change is contributing to sea level rise worldwide, and will bring larger and heavier rain events with the risk of flooding, which places greater demands on cities to be able to deal with large amounts of water in a sustainable way. At the same time, there is an increased need to include and integrate more users and functions in public space due to continuous densification and urbanisation. Aligned with these ideas of a multifaceted public space, skateboarding is nowadays used as a tool in urban planning in many cities to activate urban space and generate added value. To many skateboarders, the feeling of an authentic urban space is important for the skateboarding experience. Authenticity in skateboarding, in turn, depends on a variety of factors, much of which is related to the built environment.

The proposal is supported by literature and site studies that provide increased knowledge of the topics covered and a deeper understanding of design decisions related to the design proposal. It also presents guidelines and suggestions on how stormwater and skateboarding can be combined in design in similar contexts. Finally, a general conclusion of the project is that there is potential for planners and landscape architects to apply similar approaches to achieve engaging multifunctional spaces. However, this requires that the design takes site-specific conditions and needs into account as they ultimately dictate which tools and strategies are appropriate to apply.

Keywords: skateboarding, stormwater design, climate adaptation, multifunctionality, sustainable urban space, urban development

Sammanfattning

Detta exjobb undersöker hur man genom att gestalta för en primär funktion av dagvattenhantering kan skapa möjligheter för en mer autentisk skateboardupplevelse. Projektet består av ett designförslag för ett torg på en offentlig plats i Frihamnen, Göteborg. Förslaget kombinerar dagvattenhantering med integrerade skatebara element för att visa deras potential att bidra till ett funktionellt och levande stadsrum, samtidigt som man tar hänsyn till utmaningar relaterade till klimatförändringar.

Klimatförändringar påverkar havsnivåer världen över och kommer att medföra större och kraftigare regn med risk för översvämningar, vilket ställer högre krav på städerna att kunna hantera stora mängder vatten på ett hållbart sätt. Samtidigt finns det ett ökat behov av att inkludera och integrera fler användare och funktioner i det offentliga rummet på grund av kontinuerlig förtätning och urbanisering. I linje med dessa idéer om ett mångfacetterat offentligt rum används skateboardåkning numera som ett verktyg i stadsplaneringen i många städer för att aktivera stadsrummet och skapa mervärde. För många skateboardåkare är känslan av ett autentiskt eller genuint stadsrum viktig för skateboardupplevelsen. Autenticitet i skateboardåkning beror i sin tur på en mängd olika faktorer, varav många är relaterade till den byggda miljön.

Förslaget stöds av litteratur- och fallstudier som ger ökad kunskap om de ämnen som behandlas och en djupare förståelse för designbeslut relaterade till gestaltningsförslaget. Det ger också riktlinjer och förslag på hur dagvatten och skateboardåkning kan kombineras i design i liknande sammanhang. En generell slutsats från projektet är att det finns potential för planerare och landskapsarkitekter att tillämpa liknande tillvägagångssätt för att skapa inspirerande multifunktionella ytor. Detta kräver dock att designen tar hänsyn till platsspecifika förhållanden och behov eftersom de i slutändan avgör vilka verktyg och strategier som är lämpligast att använda.

Nyckelord: Skateboard, dagvattenhantering, klimatanpassning, multifunktionalitet, hållbart urbant stadsrum, urban stadsutveckling

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Background

Climate change together with a more sustainable approach to our environment requires that public space be provided with solutions to tackle these challenges. Floods are becoming more common due to extreme weather phenomena such as heavy rainfalls and sea level rise, and knowledge about pollution has led to the realisation that even smaller amounts of runoff need to be taken care of and cleaned. This results in higher expectations on the built environment and surroundings to be able to handle large amounts of water in a short time. As a result, major investments are currently being made in modern stormwater solutions that should not only dispose of the water but also make use of it to generate added value.

Since we often talk about immense amounts of water that must be taken care of, this often results in large facilities that take up a lot of room in public space. At the same time, there is a great need for social meeting places that ensure a good quality of life as our cities become denser. Places that both activate people and work for inclusion are important. It is therefore imperative to be able to combine functional solutions to climate challenges with the creation of good living environments for inhabitants of our cities.

A tool to promote social interactions and activate places can be skateboarding. Skateboarding is an urban activity that brings different types of people together to use public space in a playful and spontaneous way. It has been acknowledged in urban planning for some time and has been implemented in many cases to activate places, with more or less success depending on the situation. The non-conformist heritage and the creative nature of skateboarding makes this more challenging than it may seem: A drive to be noncompliant, paired with a desire to explore and discover the urban landscape renders design perceived authentic by skaters a complex task.

Stormwater management practices and skateboarding have previously been combined to meet functional and social requirements through design. Though, these facilities have mostly been large, located far the city centre, and designed as conventional skateparks. As an effort to contribute to the creation of more sustainable cities, both environmentally and socially, this thesis has another outset:

Through a joint understanding of sustainable stormwater practices and skateboarding as a social and cultural phenomenon, we will try and combine these in a more seamless way in an urban context, thus contributing to the multifunctionality discourse.

Aims & Purpose

The aim of the project is to come up with a design proposal for a site at Frihamnen, Gothenburg, addressing issues of stormwater management for future urban development, rising and fluctuating sea levels of the adjacent river Göta Älv while also contributing to the design of sustainable public space.

By integrating elements of playfulness and reinterpretation into functional structures, the design is intended to be of multifunctional character. In this thesis, playfulness and reinterpretation addresses the use of a site from a skateboarding perspective by creating ‘skate opportunities’, and functional structures are exemplified here as stormwater management design.

Purpose
This project seeks to contribute to the body of work on multifunctionality in relation to urban stormwater management and skateboarding by providing design solutions for an actual site. Thus giving an idea of how we can design for the ‘spontaneous’ whilst respecting the needs and demands of a specific site. Furthermore, by focusing on the dissonance between skateboarders’ inherent need for unpredictability and spontaneity and the often overly programmed spaces developed for skateboarding in modern city planning, the thesis offers alternatives and inspiration on how to design for ‘the spontaenous'.

Project Questions

A set of investigative questions were formulated at the start of the project to guide the process forward.

Main question:

- *How can we design for stormwater management while simultaneously creating possibilities for recreation in the form of skateboarding?*

Supporting sub questions:

- *How can we design to create skateable spaces without them feeling overly programmed?*
- *How can we combine design principles for stormwater management with design considerations for skateboarding?*
- *How can we implement these design principles in a design proposal for the site at Frihamnen?*

Limitiations & Constraints

This project is thematically limited to two topics: stormwater management and skateboarding. The theoretical depth in which the two topics have been studied is limited due to the focus on design in the project. This basically means that the topics have been studied to gain a general understanding for how they work and are designed, with the purpose of being able to reproduce, or reimagine them, in a site-specific design situation. It is worth noting that our pre-existing knowledge of skateboarding has fed into our understanding and implementation of the concept.

In turn, the two topics have been limited to their respective role in the specific urban context in which our project is located; For stormwater management, this means that the physical solutions we have looked closer at consist of those used in cities rather than, for example, large constructed wetlands.

For skateboarding, this means focusing on the genre of street skateboarding, practised in the built environment and seen as part of the urban fabric, rather than skateparks constructed for the sole purpose of skateboarding.

As for case studies of precedent projects, we limited ourselves to projects that we could visit and study in real life. We looked at other designs and projects for inspiration to design, but the way in which we found inspiration will not be discussed in this thesis.

Lastly, the fact that this thesis was written by us, two white CIS men interested in skateboarding and landscape architecture, undoubtedly shape our understanding of the world. With this said, we have tried our best to see beyond ourselves in working with this project.

Methodology

Process

This design project and process was not approached with any definite method or step-by-step formula, but rather with an awareness of the iterative and non-linear nature of the design process. Although complex and situational, Lawson makes an effort to distinguish the general components of a design process, splitting it into three 'modes': Analysis, Synthesis, and Evaluation.[1] He stresses the fact that these parts are interdependent, far from linear, and can even be hard to distinguish from each other.

Additionally, Weedon explains Dorst's conclusions on problems in design; The core of design problems, or any problems for the matter, are impossible to define before being interacted with.[2] One cannot see the whole scope of a problem at the start of a project. He argues that this is because the problem is related to its solution, and the two are changing simultaneously as the problem and its solution evolves[3] (see fig. 1.). This further debunks the idea of a pre-decided and linear trajectory of the process while also justifying the decision to make a design proposal. In line with these theories, we have tried to avoid locking into a formula for reaching our goals, but instead implemented a perspective of 'investigate by trying'. This means that by consciously alternating between 'modes' paired with having an iterative approach as new knowledge is produced, we have used design to work our way forward throughout this process.

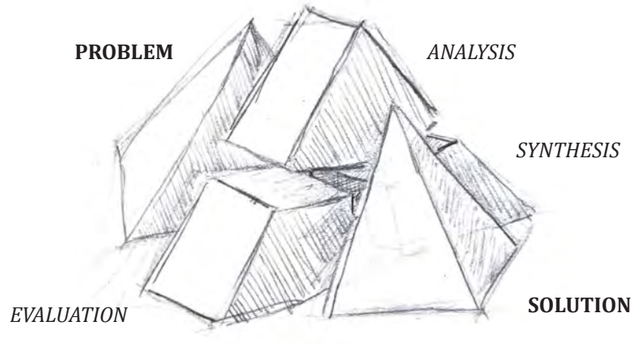


Fig. 1. Sketch of Lawson's map of the design process. It got no apparent start, finish or direction. It also shows how the problem and solution is intertwined with the modes of a design process, *Lawson sketch*, Flemming Pedersen, 2023.

1 Bryan Lawson, *How Designers Think: The Design Process Demystified*, Reprint (Amsterdam Heidelberg: Elsevier Architectural Press, 2010), 37, 38.
2 Scott Weedon, "The Core of Kees Dorst's Design Thinking: A Literature Review," *Journal of Business and Technical Communication* 33, no. 4 (October 2019): 426, https://doi.org/10.1177/1050651919854077.
3 Weedon, "The Core of Kees Dorst's Design Thinking," 426.

Implementation
This iterative process does of course consist of concrete actions and activities. Following is a description of its different components:

- Our two main subjects were studied in a literature study where we read books, articles, journals and other publications on the topics. As the sketching and designing progressed and got more distilled, we had to revisit literature, and add readings to our study.

- The goal of the design project was to find out if it is possible to design for stormwater management while creating opportunities for 'spontaneous' recreation (and in particular skateboarding). Therefore, we felt it necessary to visit and study sites that seek to address these issues. The sites chosen for this thesis are a selection out of several site-visits in Sweden and Denmark.

- As for the designing, to make the most out of being two, we used a couple of strategies. The overall approach consisted of gathering information or producing sketches individually or together that we then discussed and came to 'conclusions' about. This was the strategy for finding and digesting readings, 'mood boarding' for inspiration in design and graphic expression, and sketching.

- In addition to sketching individually we also sat together and drew and conducted 'semi-structured' sketching sessions. In these we sketched individually for a set period of time to then discuss our findings and ideas and continue to draw together, or do another round of sketching.

- Throughout the design process we used 3D-modelling parallel to sketching with pen and paper. As an alternative sketching approach, we also built physical models of different scales and in various materials. The purpose of these models were investigative, as opposed to models made for the purpose of displaying designs.

- On a few occasions during the process, we also presented our work to our contacts at Mareld.

Fig. 2. Design meeting with David and Fabian in Mareld Landskapsarkitekter's office in Gothenburg, *Design meeting Gothenburg,* Flemming Pedersen, 2023.

Design Context

This first part of the thesis will address the thought process behind the choice of site for implementing our design ideas. It will also discuss the context of our project: Frihamnen, Gothenburg, and consider its historical, cultural, and geological status and how this affected and informed the project.

Gothenburg
When choosing what site to work with we naturally tried to find a place where the two topics of interest would be of relevance. This contradicts real life design situations, conventionally initiated with a brief given to the designer by a client.[1] In conventional design procedures 'topics' rather present themselves through the problems and aims manifested in the brief. On the other hand, Lawson also states that the brief cannot comprise all the problems of a design project anyway, in a way legitimising our unconventional method of finding a site for our project.[2] With that said, one such favourable location was presented to us in Gothenburg, Sweden.

fig. 3. *Frihamnen's position in Gothenburg in the outlet of the Göta River*, Flemming Pedersen, 2024.

Gothenburg & Stormwater
Gothenburg is the second biggest city in Sweden, located on the country's west coast. The city is situated on the outlet of the Göta River, where it meets the sea of Kattegatt. Gothenburg brands itself as a rainy city, with the goal of being the "world's best city when it rains."[3] What this 'tongue in cheek' objective really means is that the city is striving to become an example worldwide in resilience against climate change related to water issues.[4] To make this a reality, Gothenburg's vision is to turn the city into a "knowledge city" celebrating innovative and appreciated solutions, embracing rain, and facing a future of imminent climate change focused on shifting the perspective on water as a multi-facetted resource for the city.[5]

These ideas are not pulled out of thin air; on average rain falls every third day in the city, and Gothenburg is of course not exempted from the effects of climate change. Threats such as sea level rise, intense cloudbursts, temporary high sea-levels, and flooding during storm events, paired with increased annual rainfall put pressure on the city's built environment.[6] Major parts of what is today known as Gothenburg is in fact constructed land in the outlet of The Göta river. Much of these constructed areas are low-lying and consist of landfill and locally occurring loam. One could say that Gothenburg finds itself in a tricky situation, positioned amidst outlets for several major waterways at one end, and with the sea at the other. Add the city's geological build-up and that many developed areas sit in flat valley bands, and we are looking at a complex stormwater situation with a challenging outlook for the future.[7]

Gothenburg & Skateboarding
The city has not always offered an equally warm embrace for the idea of skateboarding being part of the Gothenburg image. A good example is the long-lasting dispute around Esperantoplatsen, a square that was part of a project with the objective to redevelop the Rosenlund area of the inner-city, finished in 2008.[8] The square was 'accidentally' very suitable for skateboarding and was almost instantly inhabited by skaters. However, this group was not the intended users by the city, and when residents adjacent to the square complained, the city resorted to defensive architecture. Many years of attempts of mediation and compromise followed, where skateboarders felt pushed to the side and ignored.[9] However, times have changed, and today Esperantoplatsen is skateable again thanks to local efforts and an agreement with the city (see fig. 4). In the spirit of cities like Malmö and Bordeaux, a handful of other efforts to include skateboarding in the urban context has been made as well, such as Stenpiren, Slottskogsvallen, and Serneke Arena in Kviberg.

In conclusion, the imminent adaptations needed in the wake of climate change, the positive attitudes held by decision-makers relating to this topic, along with the changing attitudes towards skateboarding as an element of the city's identity made Gothenburg an interesting location for our project.

fig. 4. *Local skaters repairing Esperantoplatsen, Gothenburg after reaching an agreement with the city,* Olof Heinö, 2023.

1, 2 Lawson, *How Designers Think*, 182.
3 Göteborgs Stad and Rambøll, *Göteborg när det regnar: En exempel- och inspirationsbok för god dagvattenhantering*, (Göteborg: Göteborgs Stad Grafiska gruppen, April 2018), 5, http://tinyurl.com/yx5uyfar
4, 5 Göteborgs Stad and Rambøll, *Göteborg när det regnar*, 5.
6 Stadsbyggnadskontoret Göteborgs Stad, *Översiktsplan För Göteborg: Tematiskt Tillägg För Översvämningsrisker, Bilaga Översiktsplan*, (Göteborg: Stadsbyggnadskontoret, April 25, 2019), 4, http://tinyurl.com/ukfe4z3v.
7 Stadsbyggnadskontoret Göteborgs Stad, *Tematiskt Tillägg För Översvämningsrisker*, 5; Lasse Johansson, Extremvattenstånd i Göteborg (Karlstad: MSB, SMHI, June 24, 2020), 5, http://tinyurl.com/4v9dxmnx
8 Olof Antonsson, "Krönika: Esperantoplatsen revisited," Yimby Göteborg, published April 24, 2010, https://gbg.yimby.se/2010/04/kronika-esperantoplatsen_2848.html.
9 Olof Antonsson "Krönika: Konsten att suga livskraften ur ett stadsrum," Yimby Göteborg, published September 23, 2011, https://gbg.yimby.se/2011/09/kronika-konsten-att-suga_3051.html.

Frihamnen, Gothenburg
Frihamnen is part of the old port of Gothenburg's grounds on the island of Hisingen on the other side of the Göta River from the city centre. Today, the land is mainly owned by Älvstranden AB and the City of Gothenburg.[10]

At present, Frihamnen hosts the newly inaugurated Jubilee Park, warehouses, offices, temporary housing, a new church, and event spaces, among other things. This might seem like a lot, but with the scale of post-industrial port sites, the vast majority of Frihamnen is still empty asphalt plains. The city's vision is to turn Frihamnen into a bustling city district connected to the city centre, and in May 2021 the new lower and more accessible bridge from the mainland was finished.[11] Additionally, as of fall 2023, the construction of a new tram line going through the area has started.[12]

The Jubilee Park, designed by Mareld Landskapsarkitekter, is among the only finished parts of Gothenburg's plans on developing Frihamnen into a new city district. The reason for this 'reversed' development (traditionally, housing development comes first), is due to unforeseen economic issues that lead to further investigations of feasibility and ultimately a halt in planning of the future neighbourhood.[13] Despite the pause in conventionally developing the site, an exception was made for the park, which was launched in 2014 and set out to be finished in time for Gothenburg's 400th anniversary 2021.[14] The park is also the final, yet evolving, product of a long experimental

Fig. 5. *Frihamnen and project location in its Gothenburg context,* Flemming Pedersen, 2023.

10 "Frihamnen - Program för Frihamnen och del av Ringön," Göteborgs Stad, accessed December 19, 2023, https://goteborg.se/wps/portal?uri=gbglnk%3agbg.page.bb7386fd-1152-47cb-9da4-d06bd7780a77&projektid=BN0652/12.
11 "Hisingsbron, Göteborg," skanska.se, accessed January 4, 2024, https://www.skanska.se/vart-erbjudande/vara-projekt/215856/Hisingsbron%2c-Goteborg.
12 "Frihamnen – Lindholmen," Göteborgs Stad, accessed December 22, 2023, https://goteborg.se/wps/portal?uri=gbglnk%3a2023914111026267.
13 "Frihamnen," Göteborgs Stad, accessed January 3, 2024, https://goteborg.se/wps/portal?uri=gbglnk%3a20221014143142781.
14 Martin Allik, *Process Prototype Park - Design of Jubileumsparken, Gothenburg*, ed. David Gough et al. (Gothenburg, Sweden: Mareld Landskapsarkitekter & atelier le balto, 2021), 3.

*Knowledge transferring: Different ways of conveying knowledge about concepts, for example history or function, in this case through design.

planning process at Frihamnen carried out by the City of Gothenburg, Prototypa Göteborg, and Älvstranden AB called 'prototyping'. Here, the act of prototyping can be explained as a planning tool focused on co-creating and testing ideas for future permanent implementation in a 1:1 scale.[15] Frihamnen has been the main stage for these processes with many years of various projects, such as mussel farming, a roller derby course (also used for skateboarding), a sauna and a public pool placed in the river, among many others. A possible reason that prototyping has been so widely used and convenient for Frihamnen is that it enabled activating the area while politics and planning were standing still.

Aligned with Gothenburg's vision of a knowledge city, 'knowledge transferring'* is integrated as part of Frihamnen's prototypes spread out over the area. One could presume that a positive outcome of prototyping is that it has engaged citizens and users of Frihamnen in a way that 'prepares' them for new ideas. This can contribute to creating a supportive atmosphere for attempting to design an urban space with an experimental approach such as in this project. Additionally, its future central location (following the planned tramline and development) aligns with the urban nature of skateboarding and the coming need for multifunctional public space.

Further, Frihamnen is historically part of Gothenburg's expansion into the Göta River. This is important in the understanding of the site and the difficulties relating to its redevelopment.

A Harbour History
Historically, Frihamnen plays a part in Gothenburg's long harbour history, dating back to the 1600s and the very beginning of Gothenburg. As trade business improved in parallel with the great emigration to America the port needed to expand, and in the beginning of the 1900s the island of Hisingen on the other side of the river began to be exploited. Ports soon covered this shore as well, and the port of Frihamnen was inaugurated in 1922. As the city grew and as technical advancements in shipping took place, by the beginning of the 21st century the port of Gothenburg had successively fully moved from the city all the way to the river's estuary by the sea.[16] Today only remnants of the inner-city port era stand, such as large cranes, old warehouses, and some boatyards. The port is to this day Scandinavia's biggest and although it has moved, it continues to have a lasting impact on the city's cultural image.

Site Conditions & Geology
During the historical expansion of the port and to accommodate bigger ships entering the river inlet, dredging was needed. The dredging and filling led to the shaping of Gothenburg's shores, including the area of Frihamnen. Pre-development Frihamnen was a reed dominated marshland characteristic of the region.[17] As the years went by the area was completely

14 Allik, *Process Prototype Park - Design of Jubileumsparken*, 3.
15 Cecilia Helsing, "Prototyper i Göteborg", in *Prototypa! – Bygga platser tillsammans*, vol. 194, Stad & Land (SLU Tankesmedjan Movium, 2023), 67–92, https://movium.slu.se/media/vall1gxq/prototypa-ta.pdf
16 Allik, *Process Prototype Park*, 5; "Hamnens Historia", Göteborgs Hamn, accessed September 4, 2023, https://www.goteborgshamn.se/Om-oss/hamnens-historia/.
17 Johan Rosdahl and Thomas Holm, *Översiktlig mijöteknisk markundersökning*, (Gothenburg, Sweden: Sweco Environment AB, June 15 2018), 6-7.

transformed into its current state. (see fig. 9). This leaves Frihamnen with a geological build-up consisting of masses from dredging and other landfill acquired during more than a hundred years of use.[18] Soil surveys conducted on the several layers of landfill and dredge masses (under the all-covering asphalt) have shown that it contains pollutants.[19] Underneath, the naturally deposited loam runs on occasions up to a 100m deep.[20] The stormwater management conditions this entails are of the character described as challenging by the city.[21] Apart from the pollution and inability to infiltrate water to subsoils and groundwater, simulations of high water levels in the year 2100 show a Frihamnen almost entirely below the water surface.[22] This constitutes an interesting and complex situation to work with regarding stormwater and flooding risks.

A Site for The Project

The undeveloped area adjacent to the new park, east of the playground and just north of the short end shoreline part of the Jubilee Park project (see fig. 10), is a possible continuation of public space at Frihamnen. From the beginning of master planning Frihamnen, the park has been viewed as 'a part of the whole', and this new area is intended to become a piece of this greater park system envisioned to run through Frihamnen and beyond.[23] Another vision for the park is its function of tying the city, the emerging neighbourhood, the waterfront, and the existing ruderal grounds together.[24] The project site sits right where all these spaces intersect. When combined with the new tramline planned to run just north of the site and the landing of the new bridge directing people into the area, it can be understood that this site has the potential to become that central point in the new Frihamnen. Lastly, this next step in the development of Frihamnen further facilitates the unique opportunity of public space dictating the future of an area, instead of being constrained by uncompromising building plans. When looking at this design commission and its physical, cultural, and historical context, it seemed like a favourable situation, or 'testing ground', for trying the ideas of our thesis.

Fig. 6-9. *Historical maps of Frihamnen showing the extensive land manipulation on the site over the years. Stadsbyggnadsförvaltningen, Göteborgs Stad & Lantmäteriet,* Accessed January 29, Lantmäteriet & Stadsbyggnadsförvaltningen Göteborg, 2023.

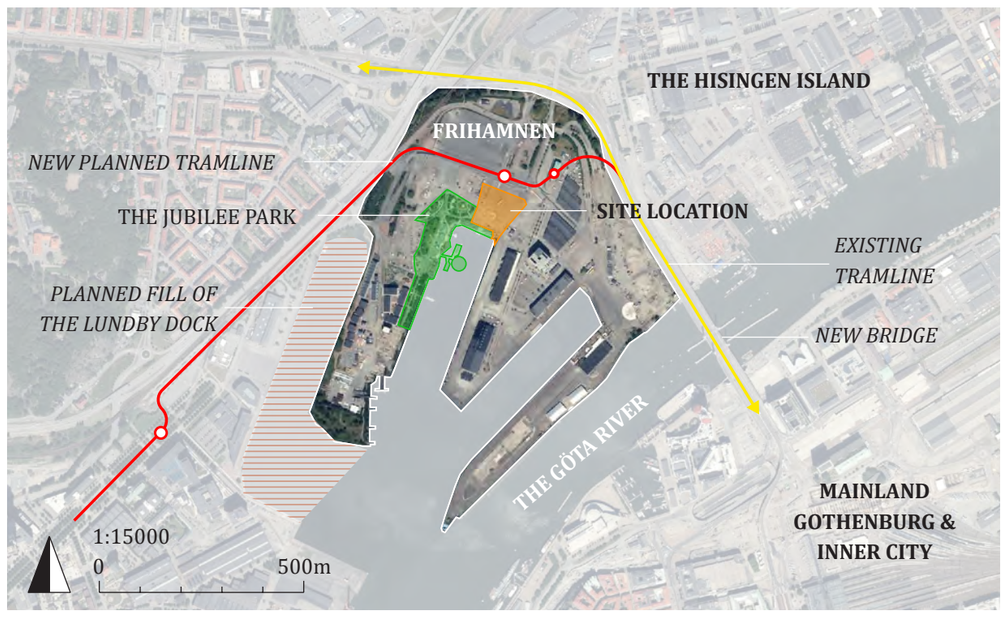


Fig. 10. *Plan showing site location with planned and existing immediate context,* Flemming Pedersen, 2024.

18 Rosdahl and Holm, *Översiktlig mijöteknisk markundersökn*ing.
19 Rosdahl and Holm, *Översiktlig mijöteknisk markundersökning,* 18.
20 Rosdahl and Holm, *Översiktlig mijöteknisk markundersökning*, 5.
21 Stadsbyggnadskontoret, *Tematiskt Tillägg För Översvämningsrisker*.
22 Stadsbyggnadskontoret, Göteborgs Stad, PM – *Översvämningsrisker Frihamnen, Samrådshand-ling Frihamnen DP1* (Göteborg, Sweden, November 11, 2015), 19, https://docplayer.se/106981715-Pm-oversvamningsrisker-frihamnen.html.
23 Allik, *Process Prototype Park*, 18-19.
24 Allik, *Process Prototype Park*, 18.

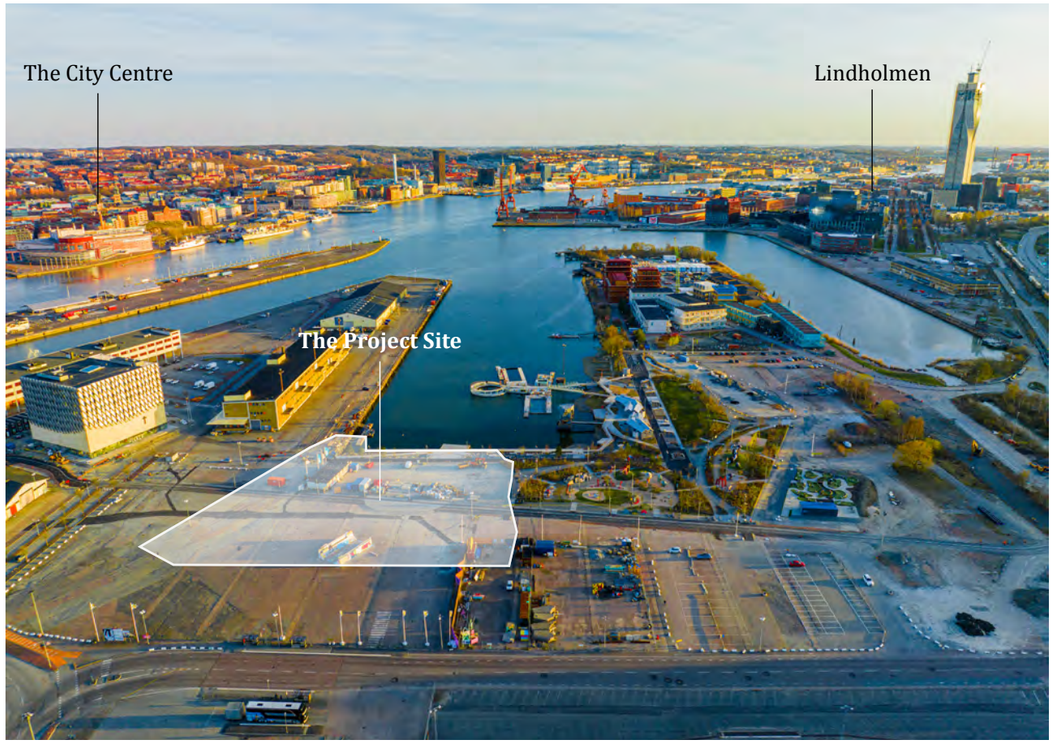


Fig. 11. *Drone image of Frihamnen with the scope of our site marked out,* Mareld Landskapsarkitekter, 2023.

Fig. 12-13. *Entrances into the site. Rennamts of the harbour hinting of an axis from the city (left), and the entrance to the site from the Jubilee Park (right)*, Flemming Pedersen & Johan Bergljung, 2023.

Fig. 14-15. Left: *Part of the custom-designed playground in The Jubilee Park.* Right: *The 'mineral edge' shoreline of The Jubilee Park*, Flemming Pedersen & David Gough, 2023.

Fig. 16. *Wide angle of the site with the new church in the background. Picture taken facing east,* Johan Bergljung, 2023.

Supporting Research

This second part of the thesis will address the two main topics of our project: stormwater management and skateboarding. First, the topics are individually introduced and discussed in connection to how they relate to and can inform the project and its context. The chapter is then concluded in an effort to systematise where and how the identified skateboarding possibilities can be integrated with sustainable stormwater management (SSM).

1. Sustainable Stormwater Management

Sustainable stormwater management (SSM) is today common practice in urban landscape design. This derives from a better understanding of our impact on the environment and the growing need to brace for climate change and the challenges associated with it. The following text on sustainable stormater managment is included to develop a basis for how to combine stormwater and skateboarding in design.

Context & Challenges:
Sustainable stormwater management practices are a necessity in design and planning today due to ongoing changes to our urban environments and the effects of climate change. The inevitable landscape changes following population increase and movement, paired with expansion of urban areas globally, will demand more from sewage and stormwater infrastructure.[1] As cities grow, so does the amount of impervious surfaces, directing more water to stormwater management systems.[2] One way to tackle urban sprawl* is through densification of our cities. The higher pressure on public space as a result of densification increases the demand for sustainable urban space in terms of its flexibility and multifunctionality. More pressure on these infrastructures is also expected due to ongoing global warming and climate change.[3] Climate change can cause compounding changes in precipitation and sea-level rise, causing floods, jeopardising existing built environment in low-lying locations and overwhelming sewage and stormwater systems, causing pollution affecting human and animal life.

Climate simulations for Sweden show predictions of an increase in general precipitation nationwide, and a greater frequency of extreme storm events such as '100-year rains.'[4] Simulations also show that situations of depression or low-pressure weather with long lasting periods of rainfall will also occur more frequently. Alongside continually rising sea levels resulting from global warming,[5] more frequent and intense rainfall and storms have already been recorded, temporarily raising 1.5m above regular sea levels in locations across the country.[6] While cities and urban environments will be affected by these issues, the degree of this impact depends on the location and planning of built environments, and the strategies applied to meet forthcoming conditions.[7] A way to face these challenges - perhaps even convert them into opportunities - could be by reimagining our relationship with water in cities not as a problem but as a resource instead.

Sustainable Stormwater Approaches
The concept of sustainable urban drainage practices can be considered a strategy for adapting cities for the future. Similar and overlapping ideas about accepting and working with water in cities with focus on 'green' solutions have been formulated and put into practice all over the world.
To mention a few; In Australia, Water Sensitive Urban Design (WSUD) uses design and planning to prevent the pollution and disruption of waterways and water bodies by "mimicking the natural water cycle as closely as possible."[8] Ideologically, the WSUD approach means to protect waterways and their ecosystems and create more livable and appreciated places for humans, through green solutions for stormwater.[9]
The Swedish, *Lokalt omhändertagande av dagvatten* (LOD) translating to "local management of stormwater" is an approach that focuses on delaying and minimising the volume of stormwater at a location that enters the grey pipe system or nearby waterways. This approach puts emphasis on what can be done at the source site, such as infiltration of stormwater, but also storage and delaying of water as a part of relieving the traditional grey systems.[10] The LOD perspective sees these solutions as mostly green ones. In addition, Landscape Stormwater Management (LSM) is an approach where the emphasis is put on the idea that urban stormwater management should be dealt with through green solutions inspired by the natural hydrological function in the landscape pre urban development.[11]

As one can see, these examples show that there are several approaches that fall under the term sustainable urban drainage practices. As they address the same type of issues with only minor differences, we have chosen to use the 'umbrella term' sustainable stormwater management (SSM) that is meant to encompass their shared ideology that we employ in our design project. The foundation of this ideology can be categorised into two foundational themes: 1) *Looking at natural water processes for solutions and inspiration and understanding the greater systems at play*, and 2) *Rethinking our relationship with water in urban settings as an asset to society, rather than a problem.*[12]

These themes are reflected in our project in two major ways. Regarding the first theme, we have taken our site's position in the greater system into consideration when deciding what type of solutions to employ: Aligned with Stahre's ideas,[13] our site is located closer to the bottom of the system where infiltration into rain gardens and slow transport in for example swales are recommended. As our project also sits right before a major recipient, downstream control such as wetlands or ponds were deemed unfit. As apparent from the proposal, the choices of stormwater solutions in the project are a direct reflection of this ideology. As for the second theme, this perspective aligns with our aim of contributing to the design of sustainable public space in relation to stormwater management. Throughout the project we have had the outlook that the stormwater challenges our site presents are something that can be turned into advantages. Further explanation of the features of these themes and their connection to our project are developed next.

*Urban Sprawl: When low densification city or urban development claim large expanses of land as they grow.

1 Antje Backhaus, Ole Fryd, and Torben Dam, "Chapter 16: The Urban Water Challenge", in Research in Landscape Architecture: Methods and Methodology (London; New York, NY: Routledge/Taylor & Francis Group, 2017), 285–306; 2 "Översvämning," Klimatanpassning.se, modified October 26, 2023, https://www.klimatanpassning.se/hur-klimatet-forandras/.
3 Hoesung Lee et al., Climate Change 2023: Synthesis Report: Summary for Policymakers: A Report of the Intergovernmental Panel on Climate Change (Geneva: IPCC, 2023). doi: 10.59327/IPCC/AR6-9789291691647.001
4 "Nederbörd," Klimatanpassning.se, modified October 19, 2023, http://tinyurl.com/f78c7j6j
5 Calvin et al., *IPCC, 2023: Synthesis Report.*
6 "Vattenstånd," klimatanpassning.se, modified October 31, 2023, http://tinyurl.com/397kj7wt.
7 "Översvämning," Klimatanpassning.se.
8 Sunshine Coast Council, *Sunshine Coast - Open Space Landscape Infrastructure Manual: Water Sensitive Urban Design (WSUD)*, (Sunshine Coast, Australia: Sunshine Coast Council, April 2023), https://publicdocs.scc.qld.gov.au/hpecmwebdrawer/RecordHtml/21740923.
9 "Water Sensitive Urban Design (WSUD)", Water by Design, published August 19, 2016, https://waterbydesign.com.au/wsud.
10 Pär Persson et al., *PlanPM Dagvatten*, (Skåne County, Sweden: Länsstyrelsen Skåne, February 26, 2009), http://tinyurl.com/wcsx364t
11 Thomas W. Liptan and J. David Santen, *Sustainable Stormwater Management: A Landscape-Driven Approach to Planning and Design*, (Portland, Oregon: Timber Press, 2017), 17, 32.
12 Liptan and Santen, *Sustainable Stormwater Management*, 17; Peter Stahre, *Blue-green fingerprints in the city of Malmö, Sweden*: Malmö's way to a sustainable urban drainage, (Malmö, Sweden: VA SYD, June 20, 2008), https://libris.kb.se/bib/11332263.
13 Stahre, *Blue-green fingerprints*

Looking at natural water processes for solutions & inspiration: The hydrologic cycle and watershed systems

The SSM approach is as stated grounded in natural water processes, and thus it is necessary to look at how these natural systems work. All freshwater travels through the hydrologic cycle and this cycle takes place in what is called watershed systems. Watersheds can be explained as "a land area that channels rainfall and snowmelt to creeks, streams, and rivers, and eventually to outflow points such as reservoirs, bays, and the ocean."[14] Within a watershed water is cleaned, delayed, stored and 'recycled' naturally, in a dynamic but 'balanced' cycle. As urban environments and cities grow more and larger, the balance in the affected watershed gets disrupted.[15] As SSM approaches suggest, we need to look at the workings of watersheds, and the smaller cycles within watersheds such as forests, as role models and as a base for how to design our cities with a sustainable stormwater management lens.[16] The amounts of paved area in our design might seem to contradict these ideas, but the site-specific conditions of polluted and clay rich soils forced us to find other solutions. On the whole, a lot more of the site has been made green than before to delay and clean runoff, despite eventually entering the grey systems. Additionally, this method for designing in 'nature's image' works across scales, and it is fit to use when planning water management at a larger scale, such as city districts.[17] Although seemingly obvious, it is by knowing where in the watershed system a site is located the appropriate SSM measures can be implemented. This was true also for our project, as mentioned positioned at the bottom of the system it is sitting in, determining what SSM strategies would be the most logical to use.

Rethinking water as an asset in urban settings: Multifunctionality

This theme is central to our design project, namely in its connection to possible amenities that follow the SSM approach, which is at its core multifunctional. Apart from mitigating the risk of floods destroying homes and property, combined with reducing the amount of pollutants entering different waterways, Calkins explains that the fact that these designs, as opposed to traditional pipes are above ground and visible, can contribute to "greater user satisfaction and perceived value."[18] This aligns with research on peoples' perceptions of WSUDs in Australia; Green sustainable stormwater solutions are generally appreciated and when the WSUD function is understood it can be connected to a sense of pride in one's neighbourhood.[19]

The list of potential amenities produced stretches beyond this, such as; better access to open space - with benefits for humans and animals alike; enhanced physical and mental health; reduced heat island effect; and greater urban biodiversity.[20] Green spaces in urban environments also have a positive effect on stress levels, and they can facilitate social interaction and create incentives for physical activity.[21] As seen, with the SSM's ideology and subsequent green implementation strategies, several benefits connected to green and blue infrastructure can be achieved.

Conveniently, water enhances these effects even more; its natural flow is associated with movement and play, and will physically manifest as "attractive lanes (or) corridors to cycle, walk, run, (or) skate (through)."[22] Interpreted, this means that the physical form of a moving body of water enhances incentive for physical activity. This is interesting in comparison to 'solely green' infrastructure, which might not convey movement to the same extent and be less effective in their level of multifunctionality. Sustainable stormwater designs also have the ability of revealing ecological function and thus educate the public and create awareness about the ecosystems that cities are still a part of.[23] In that respect, it is important to obtain an understanding of the natural processes informing this ideology and how they function.

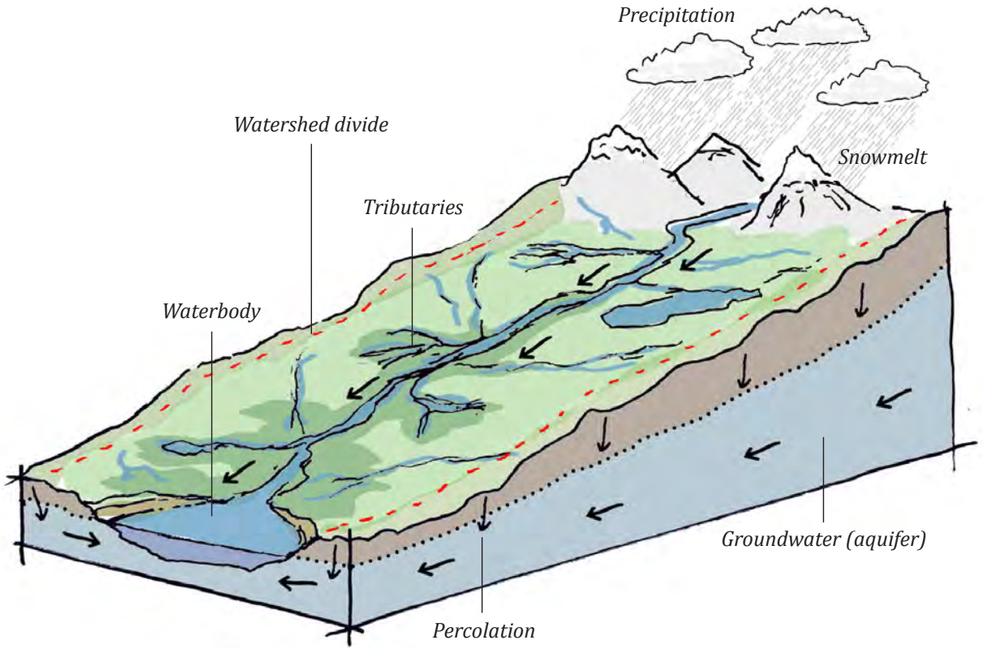


Fig. 17. Cities and other human settlements exist within these watershed systems, *Sketch of a watershed system,* Flemming Pedersen, 2024.

14 National Ocean Service, "What Is a Watershed?," National Oceanic and Atmospheric Administration, published 20 January 2023, https://oceanservice.noaa.gov/facts/watershed.html.
15 Liptan and Santen, *Sustainable Stormwater Management*, 32.
16 Backhaus, Fryd, Torben Dam, "The Urban Water Challenge", 285–306.
17 Antje Backhaus and Ole Fryd, "Analyzing the First Loop Design Process for Large-Scale Sustain-able Urban Drainage System Retrofits in Copenhagen, Denmark," *Environment and Planning B: Planning and Design* 39, no. 5 (2012): 820–37, https://doi.org/10.1068/b37088.
18 Meg Calkins, *The Sustainable Sites Handbook: A Complete Guide to the Principles, Strategies, and Practices for Sustainable Landscapes* (Hoboken, N.J: Wiley, 2012), 97.
19 Rosemary Leonard et al., "Community Perceptions of the Implementation and Adoption of WSUD Approaches for Stormwater Management," in *Approaches to Water Sensitive Urban Design,* eds. Ashok Sharma, Ted Gardner & Don Begbie, (Amsterdam: Elsevier, 2019), 511, https://doi.org/10.1016/B978-0-12-812843-5.00024-1.
20 Leonard et al., Community Perceptions of WSUD, 505; Kelsey Jessup et al., "Planting Stormwater Solutions: A Methodology for Siting Nature-Based Solutions for Pollution Capture, Habitat Enhancement, and Multiple Health Benefits," *Urban Forestry & Urban Greening* 64 (September 2021): 2, https://doi.org/10.1016/j.ufug.2021.127300.
21 Hans Gehrels et al., *Designing Green and Blue Infrastructure to Support Healthy Urban Living* (Wageningen, The Netherlands: TO2 - Maritime Research Institute Netherlands, June 2016), 45, 51, http://tinyurl.com/ymnd6aa8
22 Gehrels et al., *Designing Green and Blue Infrastructure.*
23 Calkins, *The Sustainable Sites Handbook.*

2. Skateboarding

Skateboarding as an Urban Activity
Skateboarding is an urban activity that originates in the city and whose identity is closely linked to the urban environment. Through their practice, skateboarders challenge the conventional use of public space by repurposing urban architecture and giving it a more playful meaning. This idea of spatial reinterpretation of the urban environment is at the heart of skateboarding and in turn underpins the development of the practice and its subcultural identity.[24] Hence, in order to understand the importance of the urban environment for the identity of skateboarding, it can be useful to recall its historical context. The aim is that it will not only provide insight into their strong connection but also help us to understand the skateboarding experience, which can be beneficial for working with skateboarding in urban planning.

History & Identity
Skateboarding was initially developed in California in the 1960s, in response to surfers' boredom when the surf was flat. The hard pavement of the city provided ocean-like forms that surfers used to emulate surfing. By applying the surfing movements to the urban terrain, a whole new activity and way of perceiving the urban landscape was created: the birth of skateboarding. This playful reinterpretation of one's surroundings could be compared to a child's vision of the world as one enormous playground and is central to the skateboard experience. As new terrains were conquered, unique bodily and cultural expressions gradually began to develop. For skaters, urban structures such as large drainage ditches, pipes, school playgrounds and backyard pools presented opportunities for exploring their physical boundaries and experiencing new sensations. At the same time, in their urban exploration in the search for new skateable terrain, tensions began to develop with 'organised' society, seeing as their activity often conflicted with the conventional use of public space. In response, skaters developed strategies to avoid confrontation. A good example of this is the appropriation of drained backyard pools by skateboarders in the 1970s. Where skaters would often organise themselves to find properties whose owners were absent and sneak in to skate the pool until they were chased off by the owners or the police. Here, the danger of being caught became part of the attraction, heightening the sense of discovery of this otherwise unknown terrain and strengthening a sense of common identity.[25]

The misappropriation of urban space, accompanied by a displayed rebellious attitude, propagated by the skateboard media of the time, fed the rebellious image and the strong non-conformist identity which still is very much present in skateboarding today.[26] The second half of the 70s saw the first wave of skate parks in urban areas, providing the skaters with dedicated spaces. This period marked a shift from the streets to purpose-built facilities. However, it soon became apparent that the construction caused a reduction in the diversity of skateable terrain, which is thought to be one of the reasons for skateboardings decline in popularity in the late 1970s.[27] With the closure of a great number of skateparks by the start of the 1980s skateboard took on a more underground character.[28] Skaters were now forced to systematically explore the urban area to find skateable terrain. During this time skateboarding forged bonds with other rebellious subcultural movements like punk and hip-hop and came to distinguish itself completely from surfing.[29] In addition, Alan Gelfland's invention of the ollie several years earlier, a technique that allows you to jump with the skateboard glued to your feet without grabbing it with your hands, revolutionised skateboarders' relationship with the city and opened the door to endless variations of how to interact with it.[30] The practice, which had previously often been located on the outskirts of the city and in the suburbs, now moved into the city centre, thus consolidating its urban identity. The rich architectural and social fabric of the city offered skateboarders a plethora of buildings, social relationships and places to explore,[31] which in return enriched and diversified the skateboard experience. Street skating subsequently emerged as the predominant style of skateboarding, characterised by the use of everyday urban architecture, such as benches, handrails and stairs to perform tricks.

With the democratisation of the video camera, skateboarders began to document their activities and share them with the skateboarding community. As a result, street skating spread throughout the world, largely due to its accessibility, requiring nothing more than a skateboard and a hard surface. Since the mid-90s up until today, street skating remains the most popular style of skateboarding, largely because it is so closely linked to the historical development of skateboarding, which is characterised by a non-conformist and creative identity.[32]

The Habitus of Skateboarding
To explain the importance of the skateboardings identity regarding the design of skateable spaces, skateboarding can be viewed as a self-sustaining structure that is being heavily influenced by its history and subcultural heritage. The nature of "identity" intersects with the design of skateable spaces. In order to explain this phenomenon, skatepark designer and former professional skateboarder Veil Kilberth,[33] develops the concept of "The habitus of skateboarding". The term habitus originates from sociology, where habitus is everything that makes up a person. Habitus thus consists of a person's experiences and history which in turn structures the person's actions by allowing and preventing different types of behaviour. A person's habitus can be modified over the course of life, with childhood being particularly formative. By applying this concept to skateboarding Kilberth argues that the practice is constantly in a dynamic process of change, always evolving but

24 Iain Borden, *Skateboarding, Space and the City: Architecture and the Body* (Oxford [England]; New York: Berg, 2001), 29.
25 Borden, *Skateboarding, Space and the City*, 29-55.
26 Veith Kilberth, *Skateparks: Räume Für Skateboarding Zwischen Subkultur Und Versportlichung*, (Bielefeld, Germany: Transcript, 2021), 116.
27, 28 Borden, *Skateboarding, Space and the City.*
29 Julien Glauser, *Tokyo-skate: les paysages urbains du skateboard* (Gollion, Switzerland; [Paris]: Infolio, 2016), 33; Jürgen Schwier and Veith Kilberth, eds., *Skateboarding Zwischen Subkultur Und Olympia: Eine Jugendliche Bewegungskultur Im Spannungsfeld von Kommerzialisierung Und Versportlichung,* (Bielefeld, Germany: Transcript, 2018), 55.
30 Glauser, *Tokyo-skate: les paysages urbains du skateboard*, 31.
31 Borden, *Skateboarding, Space and the City,* 186.
32 Glauser, *Tokyo-skate: les paysages urbains du skateboard*, 55.
33 Kilberth, *Skateparks: Räume Für Skateboarding.*

at the same time trying to preserve its own subcultural, non-conformist identity. Consequently, in a design context, it can be valuable to be aware of the influence of this non-conformist heritage, as actions that restrict or limit the sense of freedom among skaters may be less well received. As an example, skaters will generally react less enthusiastically to environments whose design appears programmed and predictable. Examples of this are discussed further on.

Found vs. Constructed Space

When examining the relationship between skateboarding and the built environment, it can also be interesting to distinguish between found and constructed space. On the one hand, found and constructed space refer to different environments that the skater engages with. On the other hand, they also suggest different experiences and approaches to skating.

Constructed space within skateboarding is often synonymous with skateparks or skate facilities. It can be defined as an artificially created functional space that is optimised for primary use with skateboards and related movement practices, and regroups one or several obstacles, reflecting architectural elements found in the city. Constructed spaces are mainly optimised for practising tricks for the purpose of progression and higher expectations are therefore placed on the quality of their design and construction.[34] The fact that these environments are purposely constructed for skateboarding often makes them more predictable and less diverse.[35] That said, efforts are being made in city planning today to integrate skateboarding in a more subtle way into the urban fabric which will be discussed later on.

As opposed to constructed space, found space refers to places that are not explicitly designed for skateboarding. Found spaces are rather the result of the creative misappropriation or repurposing of the urban environment through skating.[36] This practice implies a playful approach to the city where only the mind of the practitioner sets the limits to the extents of skateable space.[37] Examples of found places are common public spaces such as streets, sidewalks, plazas, parking lots, public parks, but also peri-urban spaces like industrial wastelands, empty drainage ditches and trainyards.[38] In addition, it may be worth specifying that found spaces seem to have a higher utility value in the skateboard community compared to constructed spaces. It is consistent with the fact that in the context of subcultural identity, found spaces meet a greater number of the identity-defining characteristics considered valuable by skateboarders such as spontaneity, urbanity, non-conformism and diversity.[39]

34 Kilberth, *Skateparks: Räume Für Skateboarding*, 130.
35 Kilberth, *Skateparks: Räume Für Skateboarding*, 112.
36 Borden, *Skateboarding, Space and the City*.
37 Christian Peters, Thomas Alkemeyer, and Eckard Balz, *Skateboarding: Ethnographie einer urbanen Praxis* (Münster New York: Waxmann, 2016)
38 Kilberth, *Skateparks: Räume Für Skateboarding*, 131.
39 Kilberth, *Skateparks: Räume Für Skateboarding*, 124.

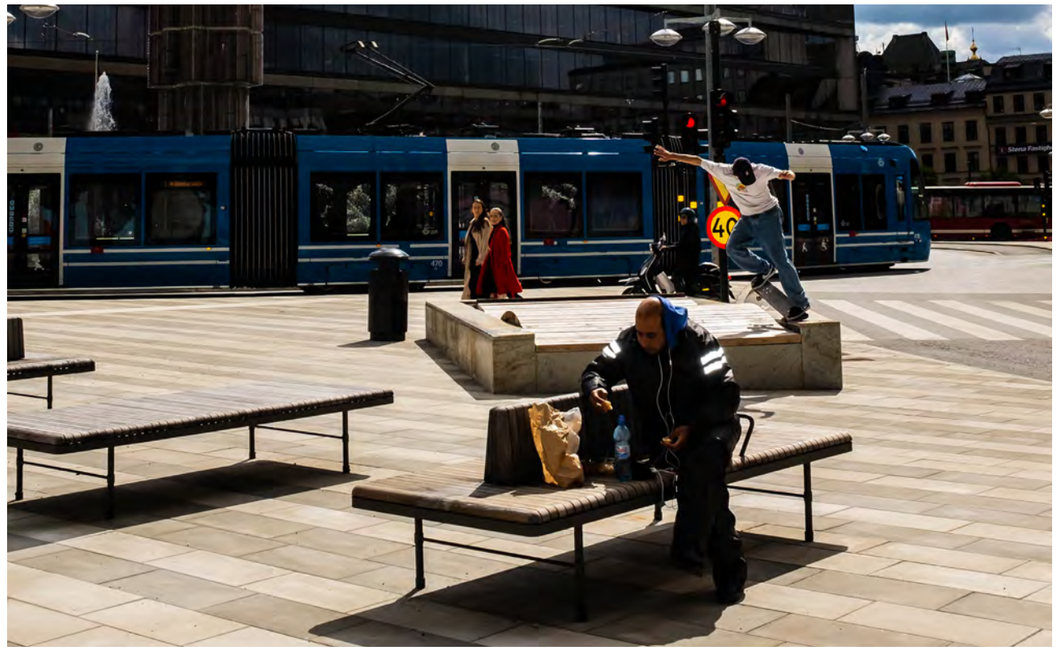


Fig. 18. Found spaces are the result of repurposing the urban environment through skateboarding. It is the basis of street skateboarding, where the city is transformed into one big playground, *Olle BS nosegrind,* Markus Bengtsson, 2020.

Fig. 19-20. Found space (L) is not planned for skateboarding and thus inspire a more creative approach. *Elliot blunt*, In comparison, constructed space (R) is optimised for practice and progression, *Elliot FS air,* Markus Bengtsson, 2021.

Skate Urbanism & the Creative City
Skateboarding has long been represented as an antagonistic force against strict urban planning and societal norms. Historically, the practice has been marginalised and in many cases criminalised, which has contributed to skateboarding's non-conformist identity and reputation, which still characterises the practice today.[40] Although skateboarding can still be a source of conflict in public space in many places, there seems to be a shift in how skateboarding is viewed and treated in relation to the city. In the last decade, cities such as Copenhagen, Bordeaux, Melbourne and Malmö have begun to label themselves as skate-friendly cities, working actively to make skateboarding an integrated part of the urban fabric.[41] In 2021, skateboarding was part of the Olympics for the first time with millions of spectators worldwide, and for the 2024 Olympics in Paris, the city plans to construct a skate park along the iconic river La Seine.[42] Consequently, skateboarding can no longer be considered as a purely subcultural activity but as an integrated part of mainstream culture.

To explain this sudden interest in skateboarding in relation to the city, it may be interesting to consider two distinct phenomena that have developed independently but are now converging:

Firstly, the development of the "creative city" model, which strives to promote creativity in order to create a more vibrant and competitive city.[43] Today, cities rely on creative and cultural capital, notably reflected in urban space, to distinguish themselves from the competition.[44] To achieve this goal, cities are increasingly relying on smaller community groups and non-profit organisations to come up with ideas on how to shape urban space, referred to as "urban gouvernance"[45].

Secondly, due to its creative and experimental nature, skateboarding falls within the scope of what is deemed attractive to the creative city. In addition, the skateboard scene tends to be more open to collaborating with politicians and to participate in urban planning processes than before.[46] As a result, skateable spaces are becoming an increasingly common feature of the urban landscape, which has led to an increase in the number of practitioners and the normalisation of the activity.

Skate Urbanism
In view of the above mentioned trends and in contrast to the traditional construction of spatially and functionally separated skateparks, the term skate urbanism is used to describe the idea of seeing skate as an integral part of urban space and experimenting with solutions to integrate its use in public space.[47] It corresponds to a holistic approach to urban development that recognizes the value of different recreational activities in shaping vibrant and engaging urban spaces.[48]

40 Borden, *Skateboarding, Space and the City*; Vivoni Gallart and Francisco S, "Contesting Public Space Skateboarding, Urban Development, and the Politics of Play" (Master's thesis, University of Illinois at Urbana-Champaign, 2010), https://hdl.handle.net/2142/16735.
41 Marko Lampinen, "Skeittiseminaari -Gustav Svanborg Eden," December 15, 2016, 43:46, https://www.youtube.com/watch?v=GyBYK_flMf4; Fredrik Angner, "Skateboard urbanism: An exploration of skateboarding as an integrated part of public space" (Master's Thesis, Ulltuna, Uppsala, Swedish University of Agricultural Sciences, 2017), http://urn.kb.se/resolve?urn=urn:nbn:se:slu:epsilon-s-6461.
42 "La Concorde," Paris 2024, accessed December 15,2024, https://www.paris2024.org/en/venue/concorde/.
43 Kilberth, *Skateparks: Räume Für Skateboarding*, 254.
44 Martina Löw, *Soziologie der Städte, Suhrkamp-Taschenbuch Wissenschaft 1976*, 3rd ed., (Frankfurt am Main: Suhrkamp, 2018), 65.
45, Kilberth, *Skateparks: Räume Für Skateboarding*, 255.
46 Kilberth, *Skateparks: Räume Für Skateboarding*, 256.

Added Value
The benefits of integrating skateboarding into urban space are often brought up in the context of skate urbanism. According to Angner,[49] skateboarding promotes social sustainability and inclusion by creating a platform for social exchange and meetings between people from different genders, races, ages and social background. Skateboarding also contributes to public health through physical activity while creating a sense of security by activating public space. In addition, skateboarding has a strong identity-building capacity that not only affects its users but also the places they occupy, giving them added meaning. Other positive aspects are easy accessibility, economic in terms of tourism as well as encouraging other urban activities to use public space.[50]

Fig. 21. The mirror pond in Observatorielunden, Stockholm is an example where skateboarding has been subtly integrated. Here, the old concrete edge has been replaced by granite, which slides better. At the same time joints have been preserved to create challenge and an authentic feel, *Heitor FS tail,* Sean Christiansen, 2020.

47 Owens, C, ""Skateboard Urbanism" Could Change Park Planning" Next City, October 10 2014, http://tinyurl.com/55mvtr8k
48 Angner, "Skateboard urbanism."
49 Angner, "Skateboard urbanism," 72.
50 Angner, "Skateboard urbanism," 72-73.

The Way Forward

In order to maximise the positive effects of urban skateboard design and create appreciated places, different tools and techniques are at designers' disposal. The concept of 'shared spot' refers to public space, which is designed for shared use but also for skateboarding.[51] Here, the word spot is a word used by skaters to designate a place suitable for skateboarding. Shared spot is the idea of creating places for shared use between non-motorized users such as pedestrians and cyclists, and movement activities such as skateboarding and similar activities. This type of space differs from conventional public space in that it grants skaters an underlying right to the space. This means that the site lends itself well to skating without it being the sole use of the site, as it also possesses other user values. An example would be a skateable granite block that also becomes a seating area or gym equipment.[52] The advantage of this type of design is that it creates a more dynamic and more urban skating experience compared to dedicated spaces such as skate parks (see fig. 23). However, the site risks feeling programmed and thus appears less authentic to skaters. The degree to which the site is perceived as authentic can also be affected by the way the site has been worked on. By applying only small modifications to an existing site, subtly adding skateable elements or using site-specific materials in a new construction, a certain authenticity can be achieved.[53]

Challenges

Despite an increased knowledge of what we should take into account in the design of skateable spaces, today even the most well-intentioned and informed projects often fail to convey an authentic skating experience. Assuming one of the fundamental aspects of skateboarding consists of the repurposing of everyday architecture into skateable terrain, then designing for skateboarding becomes seemingly contradictory. This idea can be further substantiated by looking at how we are affected by the symbolism and built-in logic of the urban environment.

When the design is consistent with and supports the activity of a certain group, it creates a sense of ownership that is further reinforced and sustained by the activity itself.[54] This means that, as skateboarding becomes more normalised and accepted in the city, it risks restricting the right of other groups to public space. This leads to tension between different user groups in their need to assert their legitimacy to be on the site, as Danish architect and skateboarder Soren Enovoldsen explains in an interview:

...for example, the Red Plaza, it is like this trash-training facility with our own homemade obstacles and some people get annoyed when they have to cross the plaza, while the skaters are like, "You are in my space!" Sometimes I tell the skaters, "You should be happy that you are here with other people,"...[55]

Other problems often have to do with the inability of the design to reproduce the creative sense of discovery and exploration that skaters look for. Due to standardised choice of material, form and dimension the design seems out of place and predictable. Skateboarding is a sensory experience that engages all the senses. For example, small changes in materials, level differences, slope, weather conditions, soundscapes can have a big impact on the experience and possibility of skating.[56] This attention to detail makes skaters very adept at discerning when something is artificial and programmed for skateboarding.

Confinement of skateboarding to designated and regulated spaces presents a challenge. Historically, and still today, skateboarding spaces tend to be located outside of urban centres and popular locations on the outskirts and migrate to less vibrant areas in the form of skate parks.[57] Moreover, it is not uncommon to see similar tendencies in today's more progressive initiatives to integrate skateboarding into urban space, where skaters are allocated to spatially segregated rooms in public squares. These phenomena can be viewed as a cause of concern as the increased confinement and segregation of skateboarding into functional spaces goes hand in hand with the criminalisation of skateboarding in informal

Fig. 22. Nobeltorget, Malmö was recently rebuilt to attract skateboarders. However, overly explicit design and poor execution have resulted in it being unpopular among skaters, *Nobeltorget Malmö,* Flemming Pedersen, 2024.

51 Kilberth, *Skateparks: Räume Für Skateboarding*, 132.
52 Kilberth, *Skateparks: Räume Für Skateboarding*, 132.
53 Kilberth, *Skateparks: Räume Für Skateboarding*, 132.
54 Michel de Certeau, *The Practice of Everyday Life,* 3rd ed. (Berkeley, Calif.: Univ. of California Press, 2013); Lina Olsson, *Den självorganiserade staden: appropriation av offentliga rum i Rinkeby* (Lund: Inst. för Arkitektur och Byggd Miljö, LTH, Lunds univ, 2008).
55 Stefan Schwinghammer, "Søren Nordal Enevoldsen Interview," *Solo Skate Mag*, January 24, 2020, https://soloskatemag.com/soren-nordal-enevoldsen-interview.
56 Borden, *Skateboarding, Space and the City*.
57 Kilberth, *Skateparks: Räume Für Skateboarding*, 135.
58 Chihsin Chiu, "Contestation and Conformity: Street and Park Skateboarding in New York City Public Space," *Space and Culture* 12, no. 1 (February 1, 2009): 25–42, https://doi.org/10.1177/1206331208325598; Gallart and Francisco, Contesting Public Space Skateboarding.

– and more authentic – locations.[58] On the basis that designed spaces compromise both the authenticity of skateboarding, or reduce it to either a highly regulated or otherwise criminalised activity, we might arrive at the conclusion that it is better to simply stop designing for skateboarding altogether. However, a more promising alternative exists, wherein a greater diversity in type of skateable spaces is sought. The question then becomes: how can we create opportunities to skateboard, without designing for skateboarding per se?

Skate Opportunities

When it comes to municipal sports development planning, the whole city can be interpreted as one big sports arena.[59] In this context, in addition to traditional sports and recreational facilities, the term 'sport opportunities"' is increasingly used to refer to public spaces that should be activated for sporting use through informal sporting activities. Sports opportunities are hence defined as spaces and places whose primary use (e.g. streetscapes) allows a secondary use for informal sports practice.[60] With regard to the previously discussed spatial definitions of skateable spaces, found space but also the concept of shared spot can be considered to fit the description of sport opportunities. A further delineation can be made within the framework of planning and design of skateable spaces; here we introduce the term "skate opportunities" to refer to the physically skateable elements that result from the design of places with various purposes, where skateboarding is a secondary function. Moreover, with the aim of contributing to the knowledge and tools for urban skateboard design, we further propose that the idea of skate opportunities is translated into a design concept. In short, we seek to create physical opportunities for the practice of skateboarding (skate opportunities) by designing for another function. The aim is to address the previously discussed challenges of urban skate design and thereby improve the possibility of a more seamless and harmonious integration of skateboarding into urban space, which in turn corresponds to the overall ambition to create a more vibrant and sustainable public space. Ideally, the design process involves the participation of the local skate scene as they can be considered to have expertise in terms of the preferences and needs of local skaters.[61] Lastly, despite the limited influence of skateboarding on the overall design, this type of approach is to be attributed to the category of shared spots, since the practice is still taken into account in the final design.

Considerations

In reality, as already discussed, designing for purposes other than skateboarding can be sufficient in creating satisfactory skate opportunities in their most authentic form, as found space. However, this evidently becomes a game of lottery since skateability is not guaranteed. As an alternative we see potential in creating the illusion of found space through small modifications of functional elements in the overall design. In itself this is not a new idea, as alluded to earlier when discussing shared spots, there already exists a practice of modifying parts of public space to make it skateable. The difference here is that we propose this practice to be integrated in the context of "designing from scratch". To exemplify the potential efficiency of this type of approach, a recurring theme of discussion in skate circles is often the missed opportunity for skateability due to a seemingly insignificant obstacle in the design. It could be a joint, a poorly placed pole or the orientation of a piece of urban furniture that renders an otherwise perfectly good spot non-skateable. The following considerations are thus meant to guide designers on how to prevent these types of problems, by making small interventions in the original design and thereby creating an enhanced skating experience. It should also be specified that these guidelines have a primarily material focused approach given the aim of this work. Guidelines dealing with social perspectives have been explored in other academia on the subject and can be seen as complementary to the guidelines developed here.

Fig. 23. Cleverly designed urban furniture can provide for multiple uses due to skateable materials and reinterpretable forms, *Place de la République,* Fredrik Angner, 2016.

59 Kilberth, *Skateparks: Räume Für Skateboarding.*
60 Kilberth, *Skateparks: Räume Für Skateboarding*, 127.
61 Angner, "*Skateboard urbanism.*"

Three Pillars of Design in Relation to Skate Opportunities

The proposed approach can be summarised in three main pillars of design: (a) *Sustainable public space*: the proposal should be based on the general objective of creating a vibrant and sustainable urban space. This is currently the basis for all urban planning and involves a holistic approach that takes into account different users, local conditions and building regulations. In terms of skateboarding, it ensures, among other things, skateboarding's inherent need for urbanity by providing an authentic urban context; (b) *Practical function:* designing for another primary function such as stormwater management or other urban activity supports, among other things, the creative and experimental aspects of skateboarding and creates conditions for exchange between different user groups. In addition, the combination of utility function and ability to address social issues can give skateboarding access to a larger range of public funds;[62] and (c) *Consideration for skateboarding:* consists of adjusting proposed design to facilitate skateboarding. This can include adjusting angles, heights, distances and materials to be accessible for skateboarding.

Spatial disposition & Flow

To begin with, the practice of skateboarding requires a flat, smooth surface. The size of the surface has an impact on the variety of skateable elements that the surface can provide. A small area with lots of different skatable objects squeezed together quickly feels unnatural and is inconsistent with an authentic urban space. Angner suggests staying within the limits of the best found spots.[63] He emphasises that most popular skate spots are relatively simple in design, which often contributes to their authenticity. Hence, when considering what part of the design to enhance for skateboarding, look at popular urban skateable spaces for inspiration. A skateable part can often be utilised in many different ways by skaters, so it may be worthwhile to focus on the skateability of a specific object or type of object instead of several different ones. It again depends on the scale and the specific conditions of the site and a larger site has the potential to offer a number of different skateable terrains, which can be beneficial if done properly.[64]

When working with several skateable terrains it can be helpful to view them as part of a sequenced journey. Much of the urban skating experience can be described as a journey. An urban exploration which is guided by the fragmentation of skateable objects in an homogenous context.[65] The scale of the journey can vary from being seen as the journey between different skate spots in a neighbourhood or a city, or it can be the journey between different skateable elements on a single terrain. The journey is in turn characterised by a flow dictated by the physical terrain in relation to the skater's movements. Flow is thus a bodily state that can be described as the freedom of movement resulting from the physical composition of the terrain and the technical skills of the practitioner to navigate it. In terms of terrain construction, this means that the possibility of flow is influenced by the spatial arrangement of skateable elements. Simplified, this means that the arrangement of multiple or the properties of individual elements define the number of routes/sequences a skater can take. A spatial arrangement that provides a variety of different routes for a skater thereby increases the possibility of flow as it allows for a greater freedom of movement.[66] Therefore, when looking to create skate opportunities for a site, consider the interaction between different elements of the design and their ability to promote different journeys through the site.

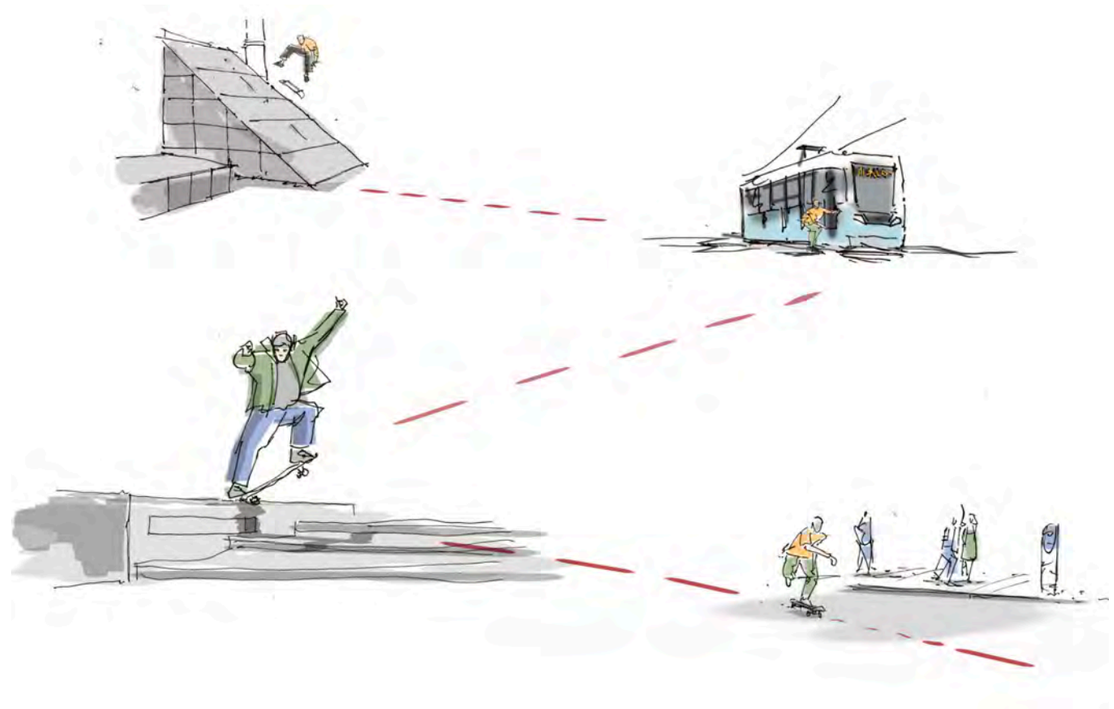


Fig. 24. Illustration of 'the journey'. Spatial disposition works on mutliple levels: both in the composition of elements in a site, and as the journey between different sites in a city, '*The Journey,*' Johan Bergljung, 2024.

62 Kilberth, *Skateparks: Räume Für Skateboarding*, 154.
63 Angner, "Skateboard urbanism," 45.
64 Kilberth, *Skateparks: Räume Für Skateboarding*.
65 Borden, *Skateboarding, Space and the City*, 195
66 Kilberth, *Skateparks: Räume Für Skateboarding*, 122-124.

Typologies
A useful way to determine which parts of a site or design that create favourable conditions for skateboarding is to adopt "skater vision". By examining the shape of the design and comparing it to common urban typologies of interest to skateboarders, you can get a better sense of how to integrate skateboarding in the design. Below is a selection of forms that skaters find interesting in an urban context. It is worth specifying that there are no absolute rules in this regard.

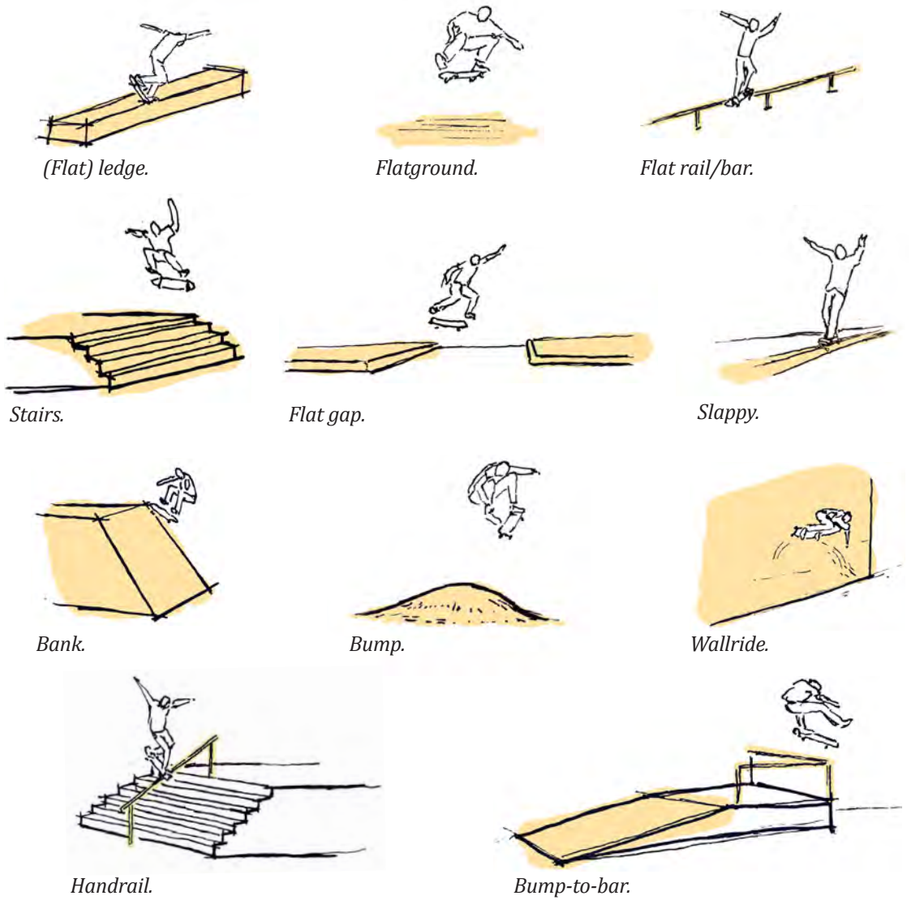


Fig. 24. *Typologies*, Flemming Pedersen, 2024.

Materials
The choice of material in skateboarding is crucial to the rideability and the overall experience of a site. While skateboarders are not afraid to push the boundaries of what can be considered a skateable surface, a really good surface can be enough to make an excellent skate spot. The choice of materials should therefore be carefully considered in the design of an urban skate site. Angner lists a number of things to consider when choosing materials for urban skate design.[67] Firstly, the key to achieving a sense of authenticity is that the material is consistent with the aesthetics of its surroundings. For example, avoid using in-situ concrete solutions as it usually conflicts with regular street paving and evokes the image of a skatepark. Instead, favour materials such as granite slabs, brick or tiles depending on the context and the shape of the design. A particular texture, colour or joint on a surface can give a characteristic feel to a place. However, be careful that the surfaces are not too uneven or irregular as this can easily make a place unskateable. Furthermore, consider using robust materials for urban furniture and other elements in the design to give them a longer lifespan.[68] Avoid using metal edge guards or other physical cues that would suggest a specific purpose element, such as in a skate park.[69] Lastly, depending on the aesthetics of the design, consider using darker coloured materials as they better conceal the wear and tear of skating.

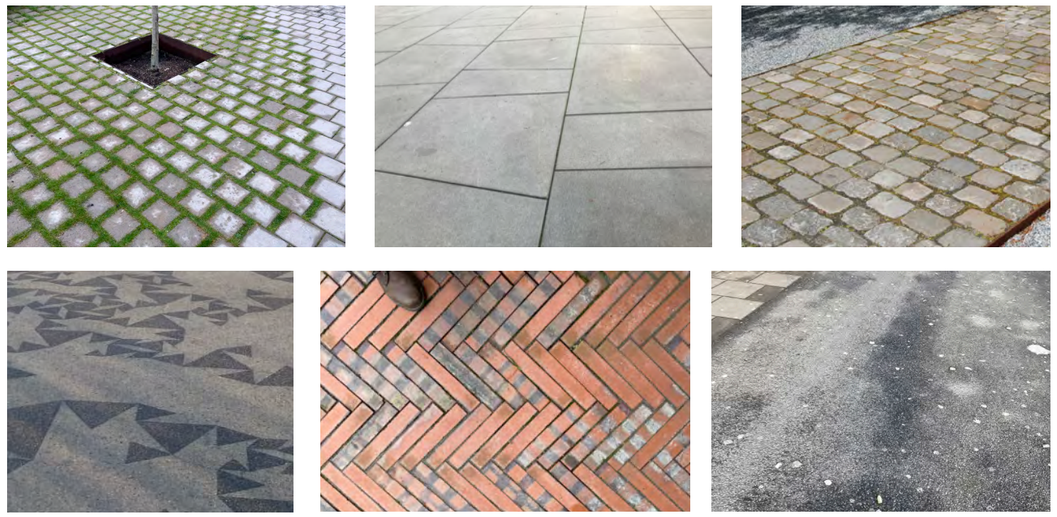


Fig 26-31. Many materials works for skateboarding. It is important that the material corresponds with overall aesthetics to convey authenticity. Dare to also incorporate unskateable materials like cobblestone to zone designs or create 'gaps', *[multiple titles]*, Mareld Landskapsarkitekter & Flemming Pedersen, 2024.

67 Angner, "Skateboard urbanism," 101.
68 Angner, "Skateboard urbanism," 105.
69 Kilberth, *Skateparks: Räume Für Skateboarding*, PAGE.

3. Skateboarding & Stormwater Management

The historical link between skateboarding and stormwater management can be traced back to the occupation of drainage ditches and pipes by skaters in the1960s.[70] A practice that today has translated into purposely built mixed-use facilities that can be seen in pioneering projects such as Rabalderparken in Roskilde, Denmark and the Stormwater Square Benteheim in Rotterdam. These types of projects have shown that it is possible to transform large-scale, imposing infrastructure projects into vibrant and engaging places for people. (Wired article).[71] It also suggests a potential for cities to work with and promote design solutions that, in addition to their functional utility, also recognise the social and cultural values that reflect a 'modern lifestyle'. This not only increases people's appreciation of their surroundings, but also of the technology that supports it, making people more aware of its vital contribution to a functioning and prosperous city. (Slaney, 2016).[72] We therefore believe that there is a great interest in further developing innovative ways to combine stormwater management and recreational solutions in the city. The solutions do not always have to result in large-scale installations, but can also consist of smaller interventions on seemingly ordinary elements of public space.

This section is intended to show how different stormwater measures and strategies can be translated into skateboarding opportunities. As mentioned, the focus of design should be on meeting the stormwater needs of the specific site. The selection of stormwater measure, location and design will therefore be primarily based on factors that determine its ability to address the required stormwater treatment objectives and performance goals of each individual project.[73] This ensures the optimal functioning of the site, which in and of itself is crucial for its usability and perceived authenticity in terms of skateboarding. Finally, it is of course important that the design satisfies other user values and basic needs of a well-functioning public space.[74]

The physical design solutions connected to the SSM approach are plenty, and in this section a few of them will be categorised and discussed alongside skateboarding. As mentioned, the SSM ideology advocates planning stormwater management at a larger scale, however, these greater systems are built of smaller components, that will always be site-specific and the design of these are what we will focus on in this segment.[75]

The different design solutions can be broadly categorised into three general strategies: Infiltration, conveyance and surface storage. These strategies are incorporated into design through different tactics, a series of design solutions connected to each strategy.

To begin with, we can roughly review these different stormwater strategies and solutions to assess how their function could be translated into skateable terrain. Along with each individual strategy, possible overall concepts for implementing skateboarding in the design are discussed followed by examples of concrete design solutions. The conclusions are based on literature studies in the respective subjects, as well as personal knowledge from being experienced skateboarders, further supported by site studies and design experiments.

Since the focus here is on the combination of the topics, more thorough information on the SSM solutions can be found in appendix 2. "Project Relevant Stormwater Strategies."

Figure 32. In Rabalderparken, Denmark, recreational values have been integrated into a large-scale stormwater facility, *Rabalderparken*, Emmilou Holmgren, 2023.

70 Borden, *Skateboarding, Space and the City.*
71 Liz Stinson, "Ingenious Architecture: A Skatepark That Prevents Flooding", *Wired*, June 25, 2013, https://www.wired.com/2013/06/innovative-infrastructure-a-skate-park-that-prevents-flooding/.
72 Scott Slaney, ed., *Stormwater Management for Sustainable Urban Environments* (Mulgrave, Victoria: The Images Publishing Group Pty Ltd, 2016).
73 Slaney, *Stormwater Management for Sustainable Urban Environments*, 18.
74 Slaney, *Stormwater Management for Sustainable Urban Environments*, 18.
75 National Association of City Transportation Officials, ed., *Urban Street Stormwater Guide* (Washington, DC: Island Press, 2017), 3.

Infiltration
Stormwater infiltration is the strategy of directing stormwater to spaces that allows the water to slowly percolate into the ground or soil.[76] The purpose of the various solutions of this category is to slow down water's movement across a site, prolong the time before the stormwater enters the traditional grey systems, while also cleaning the stormwater as it filters through layers of mineral and organic matter.[77] Infiltration solutions also hold an important role during storm events, as they receive the first flush of stormwater, containing the highest concentration of pollutants.[78] Our design proposal in Frihamnen includes components of:

Biofilters: an infiltration solutions that refer to various planted solutions that handle stormwater, such as rain gardens and planters

Porous surfaces: a set of solutions such as porous pavement or lawns, meaning surfaces that are accessible but still infiltrates stormwater.

Integration of Skateboarding Opportunities
Regarding skateboarding, infiltration practices become interesting as both stand-alone skateable objects but also as segments in a larger spatial context. Various constellations of planters and rainbeds are commonly used for skateboarding, with e.g. edges, tree grates, curbs and gaps creating a wide variety of skating opportunities. Interesting results can be achieved, for example, by tilting edges, using robust and smooth materials and curving angles. Furthermore, to avoid wear and tear that negatively affects the infiltration capacity of the site, consider using hardy vegetation and compaction-resistant substrate. Pervious paving is usually less compatible with skateboarding since its generally wider infiltration joints limit skateability. That said, permeable paving can be used advantageously, for example, to delineate a flow of movement through a site or to create interesting barriers/borders at times.

Fig. 33. Tree grates are commonly transformed into bumps by skaters. Additionally adjacent plant beds can be used as gaps. *Grate bump-to-bar,* Johan Bergljung, 2024.

Fig. 34. Raingardens and planters provide good skating opportunities. Associated seating, edge supports and gaps can be easily adapted for skateboarding, *Rain garden ledge,* Johan Bergljung, 2024.

76 National SUDS working group, *Interim Code of Practice for Sustainable Drainage Systems*, (London: CIRIA, July 2004), 8, https://www.susdrain.org/files/resources/other-guidance/nswg_icop_for_suds_0704.pdf.
77 National Association of City Transportation Officials, *Urban Street Stormwater Guide*, 16; Göteborgs Stad and Rambøll, Göteborg när det regnar, 24.
78 Liptan and Santen, *Sustainable Stormwater Management*, 69; Calkins, The Sustainable Sites Handbook, 71-76.

Conveyance
Surface conveyance refers to the strategy of leading water by letting it move across the landscape as opposed to pipes underground.[79] The strategy is inspired by water's journey through natural landscapes, and how water flows across, around, or through permeable areas.[80] Technically, surface conveyance strategies can handle larger volumes of stormwater than conventional systems while also mitigating the destructive and erosive powers of stormwater.[81] Amenities connected to this category are increased biodiversity, recreation in form of play and exercise, and opportunities for education. The different solutions connected to this strategy are both of green and paved character. Our design proposal includes components of:

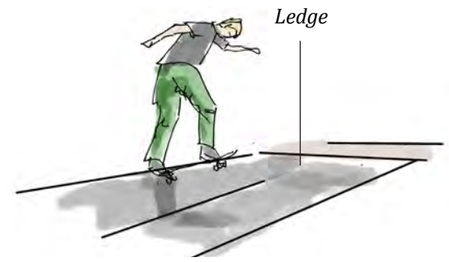
Bioswales: a solution of often larger vegetated open channels for surface conveyance.

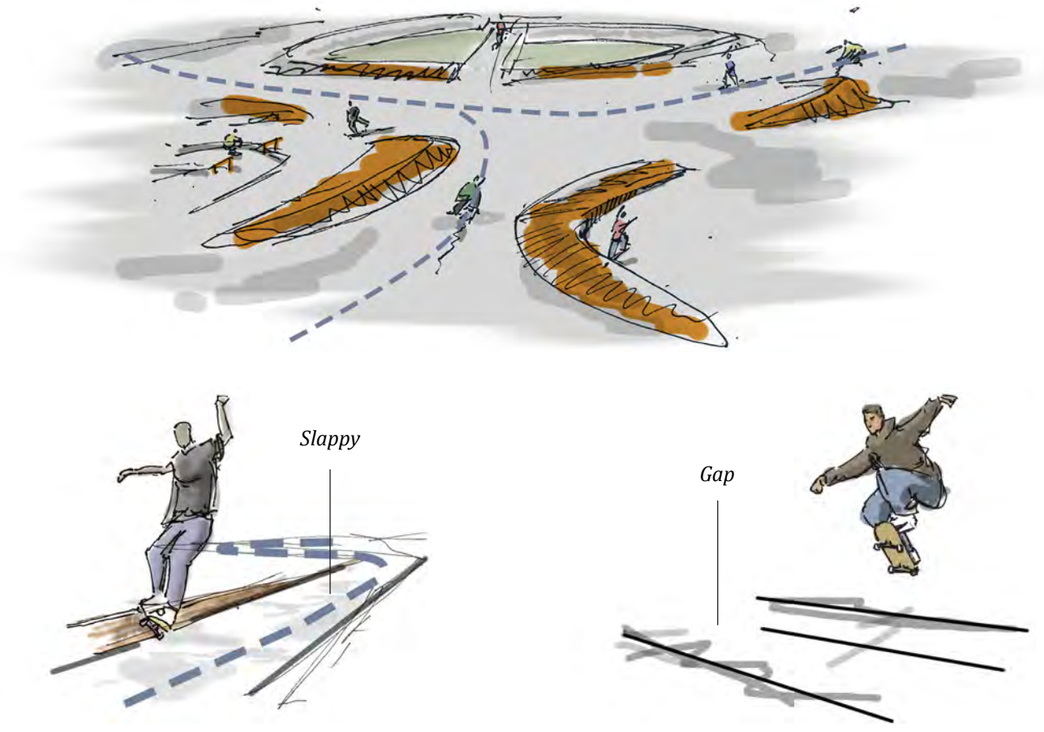
Surface drains: are shallow, open or partly covered, paved stormwater conveyance channels.[82]

Integration of Skateboarding Opportunities
At most sites, designers may need to employ several strategies in a "roof to stream" sequence in order to meet stormwater management requirements.[83] This means that water travels across the site between different structures sequentially reducing runoff. The idea of a sequenced journey through space can be further linked to the concept of spatial disposition in skateboarding, where the distribution of skateable elements in a design in relation to the skaters movement creates a "journey". From a design perspective, the inherent flow attached to the strategy of conveyance could be used to influence the spatial arrangement of skateable elements in a design, or vice versa. In terms of tools, grading can, depending on the slope, give direction to a site and thereby influence the flow of skateboarding across it. Furthermore, changes in inclination can create interesting spatial conditions for skateboarding such as banks and kickers. Flow berms designed to stop the flow of the surface gradient and lead the water into the stormwater landscape can take the shape of bumps or ledges. Runnels and paved channels used to guide water across urban surfaces can, depending on dimensions, create various skate opportunities such as kickers, ledges, slappys and gaps. Here, there is a potential to play with contrasting materials to emphasise the stormwater function while achieving an aesthetic effect. Check dams in bioswales and similar structures could also be retrofitted to be skated across.

79 Liptan and Santen, *Sustainable Stormwater Management*, 26.
80 Liptan and Santen, *Sustainable Stormwater Management*, 141.
81 Liptan and Santen, *Sustainable Stormwater Management*, 37.
82 Göteborgs Stad and Rambøll, *Göteborg när det regnar*, 38.
83 Slaney, *Stormwater Management for Sustainable Urban Environments*, 24.

Fig. 35. Skateable elements can be arranged across a site to create a sequenced journey. The concept of flow is used to link the movement of water and skateboarding in our proposal. Runnels, depending on construction can offer different skate opportunities, *'Conveyance,'* Johan Bergljung, 2024.





Storage

Storage
Volume storage systems intercept, divert, store and release rainfall for future use. They can be, for example, vegetative solutions that allow infiltration and purification with slow infiltration to subsoils or conventional systems. There are also hard surfaced alternatives that address flood risk and act as a safety buffer during heavy rainfall.[84] Solutions in this category are connected to amenities such as increased biodiversity, aesthetic value and physical activity. Our design proposal includes a variant of:

Multifunctional retention storage: refers to solutions of temporary stormwater storage that doubles as places for urban recreation, such as outdoor sport facilities, playgrounds, or squares.[85]

Integration of Skateboarding Opportunities
In an urban setting, where vegetative solutions may be limited, hard surface designs can be effective as they may offer other user values in addition to their flooding function.[86] The aforementioned Rabalderparken and the Water Square Benteheim in Rotterdam can be attributed to this category of storage systems that support skateboarding. Their capacity to intercept large volumes of water in a short period of time means that their spatial footprint is relatively large. As a result, they have the capacity to accommodate entire sports facilities such as skate parks with the associated risk of spatially separating the activity from its surroundings. Special consideration should therefore be given to the mixed function of this type of solution in order to promote an authentic urban environment favoured by skateboarders. The advantage of surface storage systems is their dynamic character. They create changeable places that allow for different uses and diversity in the cityscape, further catering to the urban identity of skateboarding. Architecturally, they are often characterised by differences in height paired with varying shape depending on location. This creates endless possibilities for skateability, with stairs, bleachers and transitions being some of the structures that can support skateboarding.

Summary of Supporting Research
This chapter can be seen as a summary of our conclusions from the design process and as a complement to the design proposal. Firstly, it gives a general idea of how landscape architects and planners can work to create a multidimensional place with favourable conditions for skateboarding. Secondly, it also provides a deeper understanding regarding different design decisions and solutions found in the proposal for Frihamnen.

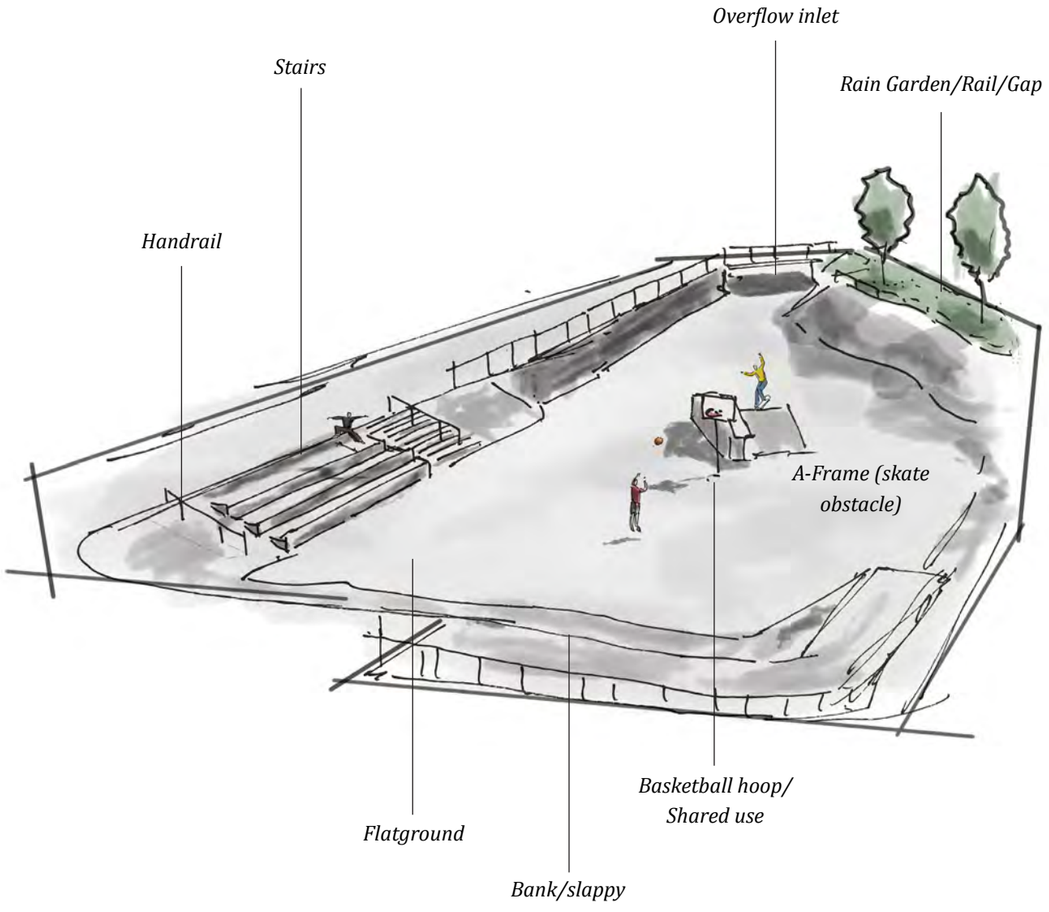


Fig. 36. Illustration of stormwater basin in Elsa Echelsson's Park that brings together several skate typologies. Note that this design has a clear skateboarding function and qualifies as a skate park, *Skate/storage example,* Johan Bergljung, 2024.

84 Calkins, *The Sustainable Sites Handbook*, 75; Slaney, *Stormwater Management for Sustainable Urban Environments.*
85 Borislava Blagojević, Magdalena Vasilevska, and Ljiljana Vasilevska, "Outdoor Sports and Recreational Facilities as Elements in Urban Stormwater Runoff Management Systems," in *International Monograph Sports Facilities – Modernization and Construction* (Belgrade, Serbia: University of Belgrade, Faculty of Sport and Physical Education, 2016), 295–309, https://www.researchgate.net/publication/304541323_Outdoor_sports_and_recreational_facilities_as_elements_in_urban_stormwater_runoff_management_systems.
86 Slaney, *Stormwater Management for Sustainable Urban Environments.*

Case-Studies

We concluded that conducting case-studies looking at the integration of stormwater and skateboarding in different contexts, and evaluating these in relation to our studies and project could be pedagogical for both us and the readers of this thesis. The projects have been evaluated in relation to the three design pillars, i.e. their ability to contribute to a vibrant and sustainable urban space, to manage stormwater and to create opportunities for skateboarding. We deliberately chose to present sites that differ slightly in their stormwater management strategies, which results in a broader knowledge base. The idea is that the site studies, in addition to being a basis for decision-making in our project, will also contribute to an increased understanding of what authenticity means in relation to the skateboarding experience.

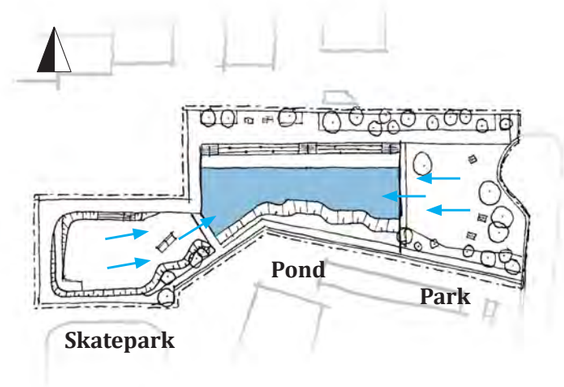
4. Elsa Echelsson's Park

Elsa Eschelsson's Park is a new multifunctional facility with stormwater focus designed by the office Karavan Landskapsarkitekter. The park is located in Rosendal which is a new development project in the outskirts of Uppsala. The project is one of the earlier finished parts of the new development and buildings are currently being constructed around it.[1] The concept of the park is visibly stormwater, where it is designed into a three part sequence able to handle large amounts of runoff and rain in a storm event (see fig. 38).

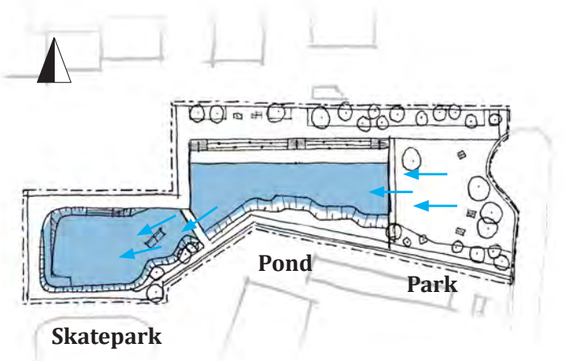
The park's function as a stormwater facility is apparent with water and its connections made focal points in the design. Additionally, the skatepark has "Rain Park" written on it in large letters and is provided with marks for stormwater amounts in relation to sea level in the basin.

As for skateboarding, a rather conventional skatepark has been built. The level to which it works with the stormwater function of the design is high, and its ditch-like design is a nod to the historical skating of drainage ditches and similar facilities. However, the skatepark is not integrated with the rest of the design due to a clear delineation in function that is reinforced by visual cues such as material contrast and overly explicit design. Regardless of whether done intentionally or not, from the point of view of seamlessly integrating skateboarding into

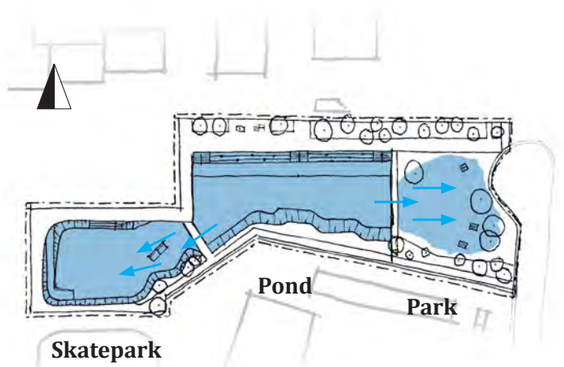
Fig. 37. The multifunctional retention storage and its overflow connection to the pond. On the wall are markings for different storm event water levels, *Basin*, Flemming Pedersen, 2023.



The place consists of a sunken concrete skatepark, a detention pond, and a lawned park. During everyday rainfall, the runoff from both the skatepark and the park goes into the pond.



If the stormwater levels exceed a certain point, the skatepark can temporarily act as a retention storage facility.



During an extreme storm event, the park area can also be flooded and the runoff can then partly infiltrate into the soil.

Fig. 38. *Plan diagrams Elsa Echelsson's,* (not to scale), Flemming Pedersen, 2024.

1 "Elsa Eschelsson's Park by Karavan Landskapsarkitekter", Landezine, published March 8, 2023, https://landezine.com/elsa-eschelssons-park-by-karavan-landskapsarkitekter/.

public space, this design does not tick the boxes, so to speak. Due to its materiality it is instantly read as a place designated for skating. It can also be argued that its depth cut it off from the rest of the design.

The site can further be used to clearly demonstrate the difference in the response to a programmed site compared to a found one. Since the site is intended for skateboarding, it immediately lacks the creative discovery effect of a found site. As we have seen earlier, requirements are therefore immediately placed on the constructed terrain to be well adapted for skateboarding. However, the design often fails to provide the adequate spacing and dimensions required by the different skateable parts of the site. For example, the bank leading up to the rain bed equipped with skateable rails is disproportionately large in relation to the opportunities for speed that are offered. In addition, unnecessary obstacles such as the placement of the A-frame* and poorly placed street lights further complicate the skateability of the bank. This can be seen as a recurring problem in the park as many elements intended for skateboarding paradoxically block and prevent skateboarding opportunities (e.g. rail blocking bank curb). Again, the dimensions and finish with angle iron on the different parts reveal a clear skate function but are unfortunately poorly executed. Finally, the site points to a lack of knowledge of skateboarding regarding both design and execution that could have been remedied in some way if the site was not explicitly intended for skateboarding. Skatepark design requires an understanding of skateboarding that is difficult to achieve without being a practitioner yourself. By avoiding a clear skateboard function, the previously mentioned problems could instead be perceived as challenges and add authentic value to the spot through an increased degree of difficulty

A realisation from this site visit is that this could be a design solution for a project with a similar brief as ours, but not an identical one. Firstly, the stormwater program in Elsa Eschelsson Park is focused on flood mitigation, while the need for daily stormwater management/cleaning and adaptation to sea level rise is more central in Frihamnen. In addition, the site is more park-like in character, in relation to our ambition of creating a public square. Hence, in the even more urban context and vision for our site, a more 'open' and functionally overlapping design may be preferable. At the same time, it must be emphasised that we look at this design from the perspective of our project and goals, where we try to achieve both a multifunctionality in terms of skateboarding and stormwater management, but also a situation where skateboarding is integrated in a more seamless way. That being said, Elsa Echelsson's park succeeds in highlighting its stormwater function, reusing stormwater reservoirs for skateboarding and creating a place for Rosendal residents to dwell.

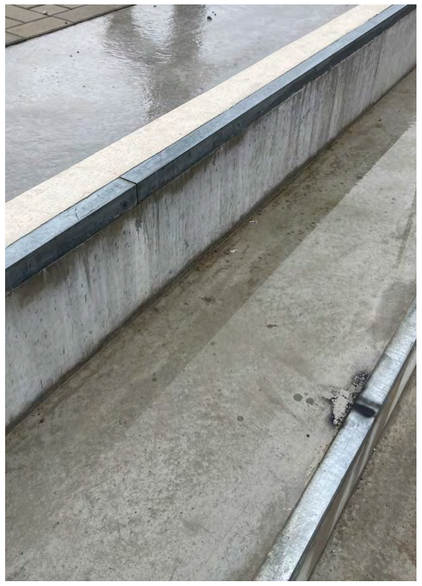


Fig. 39-40. Conventional materials and obstacles inform this as a skatepark. Questionable spatial composition and poor construction increase risk of dissapointment as expectations rise. *Skatepark - Skatepark 2*, Flemming Pedersen, 2023.

Fig. 41. The visual connection and the accessibility between the project's different parts seems to have suffered as a consequence of its stormwater concept, *Elsa Echelsson's Park, pond,* Flemming Pedersen, 2023.

* An A-frame is a skateboarding obstacle made up of two kickers facing each other without any gap in between them. Often paired with a rail or ledge following the incline of the slope. An A-frame is pictured on page 52.

5. Karens Minde Aksen

Karens Minde Aksen in the Sydhavn area of Copenhagen is a redesign and climate adaptation project designed by Schönherr Landscape architects, inaugurated this year (2023). The elongated design runs between existing buildings, forming a linear park through the neighbourhood. The place is designed as a sequence tied together by an eye-catching flooring; a slim bright beige brick that runs throughout the project.

As for practical function, the site manages stormwater from roofs of adjacent buildings and other surfaces that are led into the system, and during storm events the facilities are dimensioned to handle 15000m^3 water, according to flooding relief requirements for the neighbourhood (Schønherr website).[2]

Experientially, the design succeeds in conveying a sense of flow and an analogy of water through the meandering wave-like structure even when there is no rain or water to be seen. Regardless if you make the connection to water or not the smooth brick banks are still enhancing the flow in terms of movement along the site, while also feeling 'special' or site-specific. This convincing concept and its translation into an easily accessible and striking design, combined with the saved full-grown trees

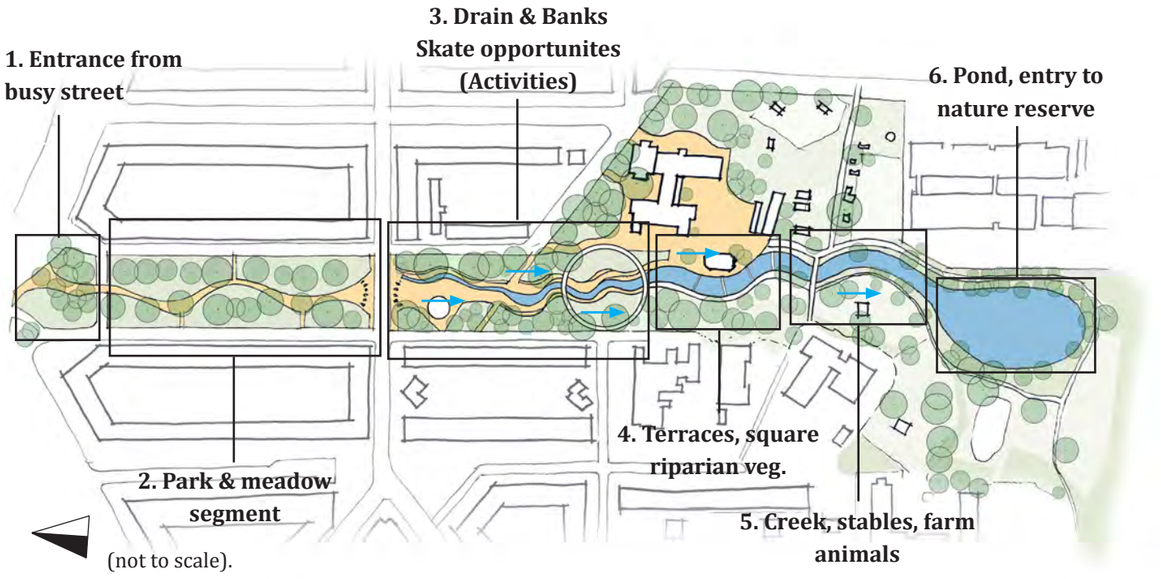


Fig. 42. Coming from the city, one can follow water's way as the landscape atmosphere simultaenously changes. Only the two final segments of the sequence are always filled with water, *Site plan sketch,* Flemming Pedersen, 2024.

2 "Karens Minde Aksen - klimatilpasning af Københavns Sydhavn", Landskabsarkitekt - Schønherr, published June 7, 2023, https://schonherr.dk/projekter/karens-minde-aksen/.

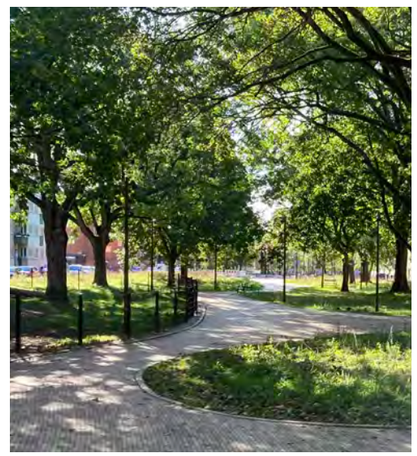


Fig 43. (Top) The skateable brick 'riverbed' with its shallow drain. (Bottom left) The meandering vegetated terraces with span crossings. (Bottom right) The initial park segment of the design with full grown trees. *Photos Karens Minde Aksen,* Flemming Pedersen, 2023.

constitutes what we perceived as a ‘vibrant and sustainable urban place’. One can assume that it accomplishes this partly thanks to the exclusive material used and how well it is executed construction-wise.

On the subject of materials, the choice of brick aligns with the criteria for materials related to design considerations for skateboarding (see p. 36). But from what we can tell, the end goal of this design is not skateboarding. This conclusion is drawn based on a couple of features; The type of brick that make up the surface is not commonly used in conventional construction of spaces designated for skateboarding; The dimensions of the banks are functioning for skateboarding, but not optimal; And the drain’s edge is actually hindering skateboarding to an extent and would have been omitted in a design made for skateboarding. These features signal this as a ‘shared spot’, and the custom-designed forms along with the unconventional material make up a unique place for skateboarding, facilitating authenticity. When the design has been interpreted as a non-skating design, the oddities and ‘flaws’ that would have been frowned upon in a skatepark (see previous case-study on Elsa Echelsson’s Park) are instead accepted, and ironically attributed to the uniqueness of the place.

Conclusions from this site-visit are several, both in terms of integration of skateboarding and sustainable stormwater management. Aesthetic form seems to have been prioritised over trying to educate users of its practical function through design. One can argue that this potentially leads to a more resilient (read sustainable) urban space considering the much more common state of the design being dry compared to it being filled with stormwater. This way the experiential appreciation is ‘ensured’ instead of being reliant on intellectual appreciation. With intellectual appreciation, we mean the understanding and appreciation of a site’s practical function (here stormwater). Undoubtedly, this function can still be perceived and add to the positive feelings towards a site.

In this project, the skateboarding opportunities we observed were perceived as *authentic, discovered* and *repurposed* by us. This seamless integration of skateboarding was made possible mainly because of the material chosen. Interestingly, the notion of a place being authentic gives more leeway in how skateable it is, and the ‘faults’ in the design from a skateboarding perspective can be overlooked or even appreciated as a unique challenge of this spot. In comparison to Elsa Echelsson’s Park, one can identify a clear advantage regarding critique from the skateboarding community if the ‘illusion of found space’ is successfully established.

Fig. 44-45. (left) A challenge rather than a nusiance, *The shallow drain, 2023.* (right) A creek follows the terraces, the whole sequence ends in a pond, *The Creek,* Johan Bergljung & Flemming Pedersen, 2023.

Fig. 46. Some of the more apparent skateable elements in the brick ‘riverbed’ apart from its sloped sides. Of course, your imagination is the limit. *Skateable obstacles,* Flemming Pedersen, 2023.

Takeaways from Case Studies
The insights gathered from these two case studies inspired us and is reflected in our design proposal. The context of a design determines both what kind of stormwater management solutions can and should be applied, which in turn naturally affect what kind of skateboarding opportunities that can be integrated. Karens Minde Aksen has a similar context to our project: although not a waterfront one, it is a city one like ours, and the use of ground materials and 'low' elements to avoid creating physical and mental borders is relevant to the urban situation we were trying to create. Both projects studied deal with the same topics, yet how function, form, and the visibility (read knowledge transferring) of stormwater is approached differ greatly. Karens Minde Aksen presents an educational and functional approach that aligns with our objectives more than the ones in Elsa Echelsson's Park. With this said, it is worth noting that this does not make the approach of the latter bad. Karens Minde Aksen also offered ideas into how to possibly integrate skateboarding as opportunities opposed to programmed obstacles. Although it possibly happened unintentionally in this case, by identifying reasons for its success it can hopefully be reproduced more intentionally.

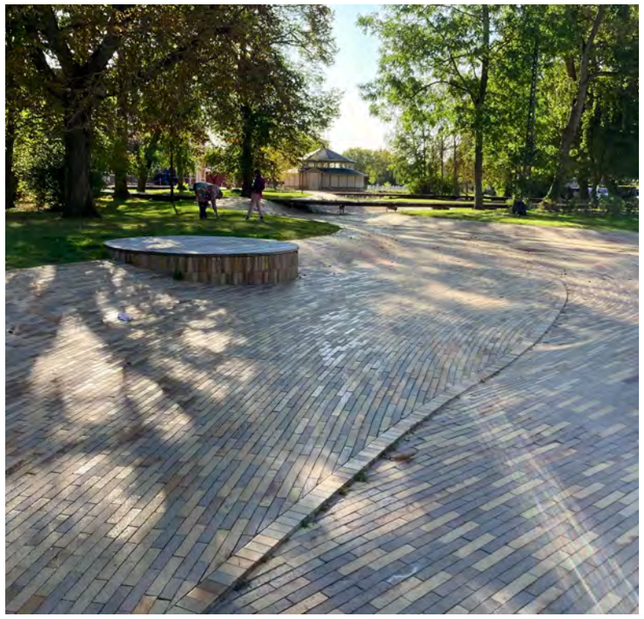


Fig. 47-48. (left) 'Rain Park' *A-frame,* & (right) *Karens Minde,* Johan Bergljung & Flemming Pedersen. 2023.

6. Conclusion of the Project

To gain an understanding of how skateboarding and stormwater management can be combined to achieve a richer and more sustainable urban space, our design proposal for Frihamnen can be seen as a synthesis of the previously suggested design considerations. The proposal exemplifies different design solutions in relation to a specific site whose conditions have determined the different stormwater strategies applied as well as the final overall design. The three design pillars: 'Sustainable Public space', 'Practical function', and 'skateboarding considerations' can thus be seen as guidelines in the selection of stormwater strategies, where the ability of the strategy to contribute to the quality of urban space, to fulfil stormwater needs and to provide skateboarding opportunities should be examined in relation to the site. In designing for the unique social and practical needs of the site, we can ensure a certain urban authenticity that is sought by many skaters. The suggested design considerations can then provide ideas on how skateboarding can be integrated into the design, but are ultimately limited, as it is the unique design of the site combined with the creativity of the skateboarders that determines how the site is used.

Discussion

This discussion will address the results of our project and our studies and how it could contribute to the profession. It will handle our methodology and process, and finally how our work potentially could be used or developed for further research and in other projects.

Discussion of results

We consider it important to clarify that our main objective in this work has been to develop a design proposal that addresses stormwater management and skateboarding. Knowing this, the proposal should be considered as the most elaborate part where our ideas and lessons on the subjects are crystallised in the form of concrete design solutions. The proposal presents, albeit limited to a specific site, opportunities to integrate skateboarding with stormwater solutions in a more 'subtle' way and hopefully also shows how these can be successfully combined to become part of a pleasant urban space. Our belief is that the proposal can serve as an inspiration for the design of other facilities and that it will facilitate the understanding of the guidelines and considerations that we propose in writing.

As for the design pillars, they were formulated with the aim of achieving an authentic skate environment. However, they can also be associated with a general design approach by landscape architects and urban planners where the main goal is usually to achieve a pleasant and functional urban space. In this way, the pillars may be perceived as somewhat vague, but we believe that in the context of this work, which focuses on the impact of the physical environment on skateboarding, they are sufficient. The pillars are further legitimised by the fact that they have guided the decisions linked to our design proposal, which corresponds to a typical design proposal in a planning context.

It is mainly the third pillar that deals with the development of skate opportunities as a secondary function in relation to the practical function of stormwater management that is developed in more depth in our work. This pillar concerns the forming or defining of typologies, considerations regarding materials, suggestions on spatial composition, and examples on the integration of skateboarding opportunities in stormwater management design. These should ultimately also be regarded just as examples, considerations and suggestions. They can be used as a set of guidelines at best because ultimately the specific brief and context of a project determines the appropriate approach and integration of skateboarding.

An associated discussion is how this type of design method is applied in practice, seeing as the presence of skateboarding is limited to a later stage in the design process. Consulting the proposed design considerations for skateboarding and integrating them into a proposal is one way to approach this. However, we argue that the most reliable way would likely be to collaborate with (local) skateboarders, as they can provide invaluable expertise of local needs and wishes. For example, a proposal could be discussed in terms of the skateability and how parts could be retrofitted to promote it. In this stage, it may also be beneficial to involve other user groups to further nuance the design and increase understanding for different uses. Thus, this type of approach could be interesting e.g. in the context of citizen participation and dialogue.

Multifunctionality

Regarding multifunctionality, we have approached the issue from the perspective of the two main topics of skateboarding and stormwater management. The aim was to reflect a real-life context where technical solutions to address common urban challenges such as heavy rainfall are combined with activities that promote a socially sustainable urban space, in this case skateboarding. It may seem limiting to address the topic of multifunctionality only from the perspective of two functions. However, we would argue that this kind of delineation rather aided in explaining complex mechanisms and concepts related to multifunctionality, as it allowed us to exemplify them. In addition, our concept of multifunctionality is based on the spontaneous overlap of different functions where we enable one activity by designing for another. A wall can probably work just as well as a climbing route or graffiti canvas as a skateboarding surface. This means that we did not exclude other uses just because they are not discussed in depth in this work. On the contrary, as we have tried to argue, we believe that by taking several user groups into account when designing the city, we can create a more diverse and interesting urban space, not least from a skateboarding perspective. In a wider context, we also hope that our work can provide further insight into how we can work to create better multifunctional urban spaces.

Skateboarding & Authenticity

This work emphasises authenticity linked to skateboarding as a hopefully interesting addition to the skateboard urbanism discourse but also to urban planning in general. Once again the notion of authenticity in skateboarding related to urban space seems to be dependent on several different factors, such as the historical value of the site, overall design, material choice, social conditions, location etc. In our work, however, we have primarily investigated the impact of the physical environment on the skateboarding experience with the aim of deepening the knowledge of their relationship. The understanding that skateboarding is largely based on the individual's ability to creatively reinterpret their surroundings emphasises the importance of creating unique urban spaces that encourage this type of creative expression. Ultimately, however, we want to highlight that the city does not consist solely of the physical environment, but arises from human interaction with it. It is in this interaction that skateboarding takes place, in coexistence with other activities, which we believe ultimately can be seen as the basis for authenticity, perhaps even outside of skateboarding.

It should also be added that although we believe that it is important to be aware of the authenticity aspect in urban skate design, it can sometimes be considered

less significant depending on the context. Different practitioners have different needs and backgrounds, for example there are many who don't care if the place feels authentic or lacks this kind of notion altogether. As we have seen, authenticity in skateboarding is strongly linked to its historical roots, which is maintained by practitioners in the shape of norms of what constitutes cultural value, where the built environment plays an important role. On the other hand, not all skateboarders support this idea and as skateboarding grows in number of practitioners, so does the diversity of expression and meaning. That said, with cities increasingly striving to create a more diverse and dynamic public space, we believe that a diversity of different spatial expressions is essential. In that sense, we consider innovative ways of designing for spontaneous activities in the city to be positive, and at least with regard to skateboarding, authenticity is of great importance.

Designing for Authenticity

Although it is difficult to determine yet how effective our method is in achieving the experience of an authentic skate spot, it can be argued that there are other advantages to this kind of approach. For instance, as skateboarding is not the primary purpose of the site, the site does not risk being left unused in the absence of skateboarding value/skateability. Furthermore, as this approach does not involve any major changes to the core design, the additional costs of skate adaptation can be seen as negligible. A further advantage of avoiding clear signals of skateability is that it can potentially counteract functional segregation in urban space and the spatial conflicts that can arise when one type of use is legitimised over another. This is something we advocate as a general lesson to consider regardless of the purpose of the design. An assumption related to multifunctionality in the broader sense, is that the encouragement of an activity like skateboarding that hasn't been officially acknowledged, can also inspire or 'open the door' for other (more or less) organised groups to also appropriate the space. In the long run, creating opportunities for one function could hopefully make ripples in the water, enhancing multifunctionality as a whole at a site. Lastly, it is not uncommon for existing sites that are used and appreciated by skaters to be upgraded with additions that maintain or improve skateability. There are many successful examples, such as Observatorielunden in Stockholm and Hôtel-de-Ville in Lyon, where the authenticity of the sites has been minimally affected despite design interventions. In these cases, the historical value of the sites for skateboarding cannot be overlooked, but we would again argue that this illustrates the potential of working in a similar way for new projects.

Methodology & Process

Although the set of project questions that have guided us through this project implies that we would use the design principles and considerations described in this thesis in our designing, that is not how we ended up working. We did start this project with the notion that the design process is not linear, but at the outset we still had the idea that as we went on and gathered more knowledge, we could formulate and then also use strategies, typologies, and principles in the design of our site. This proved not to be the case, as we rather used our prior knowledge from many years of skateboarding to integrate skateboarding as the design task developed. Formulating these surely aided our understanding of what is important for creating skate opportunities and how to possibly integrate these with stormwater solutions, but when it comes to designing, the site-specific conditions and other constraints make the concept of strategies and typologies less transferable.

The Process

As for methodology, we did not follow a set method, but were rather inspired by the idea that the design process is virtually impossible to map out, due to its iterative nature and the inherent (site-)specificity of design projects. This basically means that it does not matter where you start in your design, what is important is that you start engaging with the project, and what you need to find out or work with will reveal itself as questions arise in this engagement.

Out of old habits we still started with burying ourselves in readings, and without much progress we found ourselves having to change strategy and immerse in the idea of 'investigate by trying' instead. Although still not an easy task, engaging in the site and starting designing right away rather than doing analysis proved to work: Trying ideas made us realise what answers we were missing to take the next step in the design. An apparent advantage of this approach is that you get the actual sketching going, getting closer to the finished product and dodging the pitfalls of trying to read or 'see' what works or not, which just gets you *that* far. A disadvantage is probably that one could miss the iterative aspect of the approach and lock into a problem or solution formulation far too early and overlook a 'better' alternative solution for the design task at hand.

Another aspect of this investigative approach was to alternate between different modes of sketching. The shifting of techniques proved helpful, and one example during our process was the introduction of sketch modelling with delta sand. This helped us resolve a tricky design decision we had been stuck on for quite some time. Although specific to every project (and every landscape architect!), a takeaway from this is to learn to see the signs for when you or your colleagues get stuck simply because you need to change the perspective.

Continuing with our process, it is also worth mentioning our collaboration with Mareld, which partly consisted of presenting our 'work so far' at a couple of occasions. These presentations or meetings 'forced' us to synthesise our work and helped us evaluate our current position in the design.

It also made sure that we (as in Johan and Flemming) were on the same page. Interestingly, in contrary to the fluidness of the other aspects of our method, adding more fixed stops for evaluation and synthesis proved to be helpful for the development of a project.

Skateboarding Bias

As mentioned in the start of this segment, we cannot talk about the process of this project without discussing our own position as skateboarders. With both of us having around 20+ years of experience in skateboarding, we arguably possess deep knowledge about the practice of it and culture around it. This obviously had an impact on the design process, where decisions, considerations and conclusions could be made with a confidence and certainty that somebody new to the topic of skateboarding would not be able to obtain. This 'special competence' (although not in any way final) has mostly been to our gain in designing and in writing in general, but it also come with some possible downsides.

This knowledge and the lens in which a skateboarder sees the world through (as discussed in this thesis) undoubtedly comes with a bias. It may spill over in more or less subconsciously making design decisions favouring skateboarders as they are our 'people'. To further complicate things, this bias also extends into the skateboarding discourse. As our major interest is street skateboarding, our personal experiences of belonging to this subgroup will colour our understanding and beliefs about skateboarding. Hence, we do not account for all the other genres of skateboarding and their experiences in this thesis, whose ideas about skateboarding can vary greatly from ours.

On the other hand, the opposite can be said for stormwater management, where our knowledge barely stretches beyond the start of our studies as landscape architects. A deeper understanding of this phenomenon and its application could have made the presence of the topic greater in the thesis and elevated its complexity, something we hoped for at the start of this project.

Future Research

Although it feels like we have been working on this project for quite some time now, in the context of research it could be considered merely a start. Within this project, there are of course multiple paths we did not walk, and areas that we did not explore as deeply as we had wished. The reason for this is partly the limited timeframe in which we worked, but also our limitations in still being students of landscape architecture. One could also argue that there are limitations that come with the profession of landscape architecture, and that it is in itself insufficient in conducting a 'complete design' as the reality of a design project is a multifaceted undertaking. With this said, the following paragraphs will discuss some potential ways of taking our work one step further.

As a start, it could be interesting to look at other constellations of functions than stormwater management and skateboarding and try and apply our suggested approach of designing in another context. As for practical function, the range of different site-specific constraints, opportunities, or desires from a client can vary greatly. For example, the brief of a design task could be to preserve and create as many opportunities for biodiversity as possible. This example situation may then need to cater for a secondary function or group of users like city ornithologists, mountain bikers, or even residents wanting to picnic in the proximity of their home. Regardless of the authenticity and seamlessness required for this secondary function, it would still be exciting to see how this approach could be used. The combinations are of course immeasurable.

Additionally, it may also be of extra value to further develop the aspect of seamlessness this approach advocates for in integrating other functions. Say a designs required to support multiple functions, to then investigate whether the approach can be applied to 'mask' functions and overprogramming that would hinder democratising or multifunctionality of a site could be a way to take our work to the another level.

Regarding the limitation of mutlidisciplinary knowledge in relation to our project, the topic of stormwater management, and water in general could be investigated further. As multifunctional designs entail sites that have a built in dynamism to be really successful, water can possibly play an even more important role than it did in our project. The temporal dynamic aspect of a site can both be enhanced or steered by water. In our project we tried integrating the fluctuation of sea levels to create a variable design.

This temporality is not locked to a flooding situation, but could consist of daily variations in tide, seasonal change like frozen water bodies, or longer periods of drought or wet seasons. As one can see, the opportunities connected to this idea are site-specific, but here we see a great potential in exploring mutlifunctionality further.

Again considering our project, technical expertise that we lacked could possibly have got the dynamic complexity of stormwater management even deeper and 'better'. This idea of integrating the dynamic water features in design is of course not original, but is it potentially a way of further developing our approach in design.

FInal words

We hope that this work will prove to be useful for future research and design related to multifunctionality. We also hope that it contributes with an additional perspective on the function and integration of skateboarding in urban space and thus the variety of its expressions. Lastly, we believe in a city in movement, where spontaneous activities play a mayor role in shaping the urban environment, a city for the poeple.

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Figure 43. Pedersen, Flemming. *Photos Karens Minde Aksen.* 2023. Photograph. Personal collection. Copenhagen.

Figure 44. Bergljung, Johan. The shallow *drain*. 2023. Photograph. Personal collection. Copenhagen.

Figure 45. Pedersen, Flemming. *The Creek.* 2023. Photograph. Personal collection. Copenhagen.

Figure 46. Pedersen, Flemming. *Skateable obstacles*. 2023. Edited photograph. Copenhagen [malmö].

Figure 47. Bergljung, Johan. *'Rain Park' A-frame.* 2023, Photograph. Personal collection. Uppsala.

Figure 48. Pedersen, Flemming. *Karens Minde*. 2023, Photograph. Personal collection. Copenhagen.

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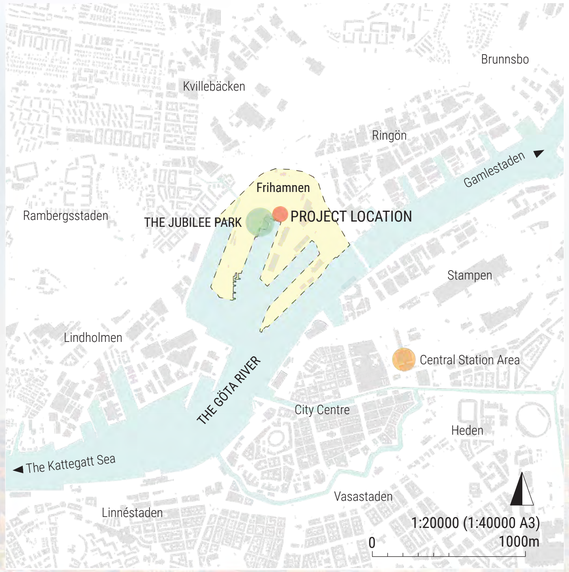
SLU

SCIENCE AND EDUCATION **FOR SUSTAINABLE LIFE**

FRIHAMNEN DOCK SIDE SQUARE

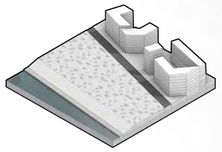
The Dock Side Square is a proposal for a new vibrant urban square in Frihamnen, Gothenburg. The proposal will be a central part of the new urban development project in Frihamnen and offers a multifunctional urban space that tackles climate challenges such as increased flood risk while simultaneously providing good recreational opportunities for an active urban lifestyle. The proposal is based on the idea that by designing for functionality, also create conditions for a less programmed, more dynamic and inclusive urban space. This is exemplified in the proposal by giving applied stormwater strategies an extended purpose as skateable terrain.

THE PROJECT IN ITS CONTEXT



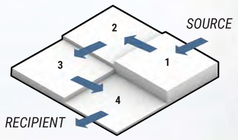
Positioned on the island of Hisingen, Frihamnen sits right by the Göta River looking out over the city on the mainland. It is closely connected to the city centre by the new bridge that crosses the river. Frihamnen is a post-industrial harbour site characterised by the big scale of industrial infrastructure.

DESIGN PRINCIPLES



SUSTAINABLE URBAN SPACE

The main objective of the project is to create a vibrant and sustainable urban space that promotes encounters between the city's inhabitants and encourages a multitude of activities. This also requires that the site meets the needs of the city in terms of mobility, cultural amenities and biodiversity. We believe this is fundamental to the success of modern urban design.



PRACTICAL FUNCTION

The city's demand for hard surfaces for accessibility, combined with increased climate challenges in the form of more frequent rainfall, places greater demands on the ability of the urban environment to handle large amounts of water in a sustainable way. The project aims to emphasise the potential and value of water for an enhanced urban experience by making its movement and management visible through design.

SKATEBOARDING CONSIDERATIONS

By designing for a primary stormwater function, the project aims to create opportunities for other uses through playful design. The goal is that this will lead to less programmed urban spaces that instead encourage more spontaneous activities and a more inclusive urban space. The idea is exemplified through the practice of skateboarding

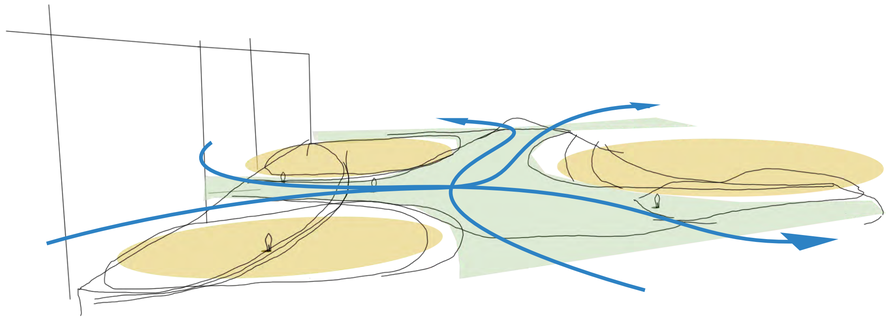
FLOW - A CONCEPT

Flow is the place where stormwater management and skateboarding intersect: The inherent flow of water and the flow fundamental to the act of skateboarding correlate figuratively. Flow is the main aesthetical concept of this proposal.

The concept of flow is considered and reinterpreted in several ways. It is a way of highlighting the stormwater functions in the proposal and make them an aesthetically pleasing addition to the whole design.

Simultaneously, the concept is used to integrate skateboarding seamlessly and congruently with practical stormwater solutions and other functions throughout the design. Flow is also an approach on how to design for movement visually and spatially in and across the site.

These different levels of flow are referred to as multidimensional flow, multidirectional flow, and visible flow of water.



This conceptual sketch shows how flow is faciliated at a structural level. The channels created between the softly sculpted mounds delineate the different 'places within' the greater design. The soft forms of the mounds rising out of the ground encourage skateboarding and allows for unrestrained movement over the site, while also evoking thoughts of waves in water.

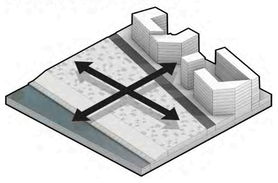
The strategically placed mounds along with shifts in the paving create a flowing landscape that directs the movement across the site. The soft mounds steer the flow while allowing a smooth visual and physical transition between the different parts of the site.

Visible stormwater features emphasise the site's functionality while creating different amenities, not least in the form of skateboarding opportunities.

Meandering passages span across the green-blue spine, linking the site with its surroundings. The green-blue spine in turn facilitates the movement of different species in relation to Göta älv.

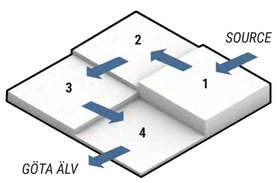
MULTIDIMENSIONAL FLOW

The design allows for and encourages flow of different kinds simlutaneously. (Pedestrians, cyclists, skateboarders, residents, visitors, dwellers, and passersby).



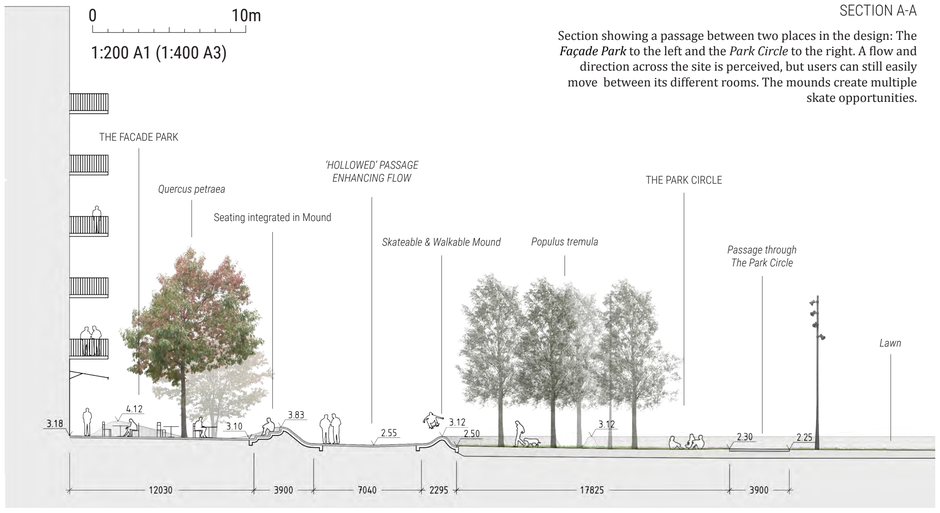
MULTIDIRECTIONAL FLOW

The mutlidirectional flow slows down the pace and helps facilitate the feelings of the place being an urban site and a node in the neighbourhood.



VISIBLE FLOW OF WATER

The flow of water is made visible in different ways across the design. The site's position in the 'top-to-bottom' flow of the natural water cycle and is also picked up by the concept and informs design decisions.



SECTION A-A

Section showing a passage between two places in the design: The *Façade Park* to the left and the *Park Circle* to the right. A flow and direction across the site is perceived, but users can still easily move between its different rooms. The mounds create multiple skate opportunities.

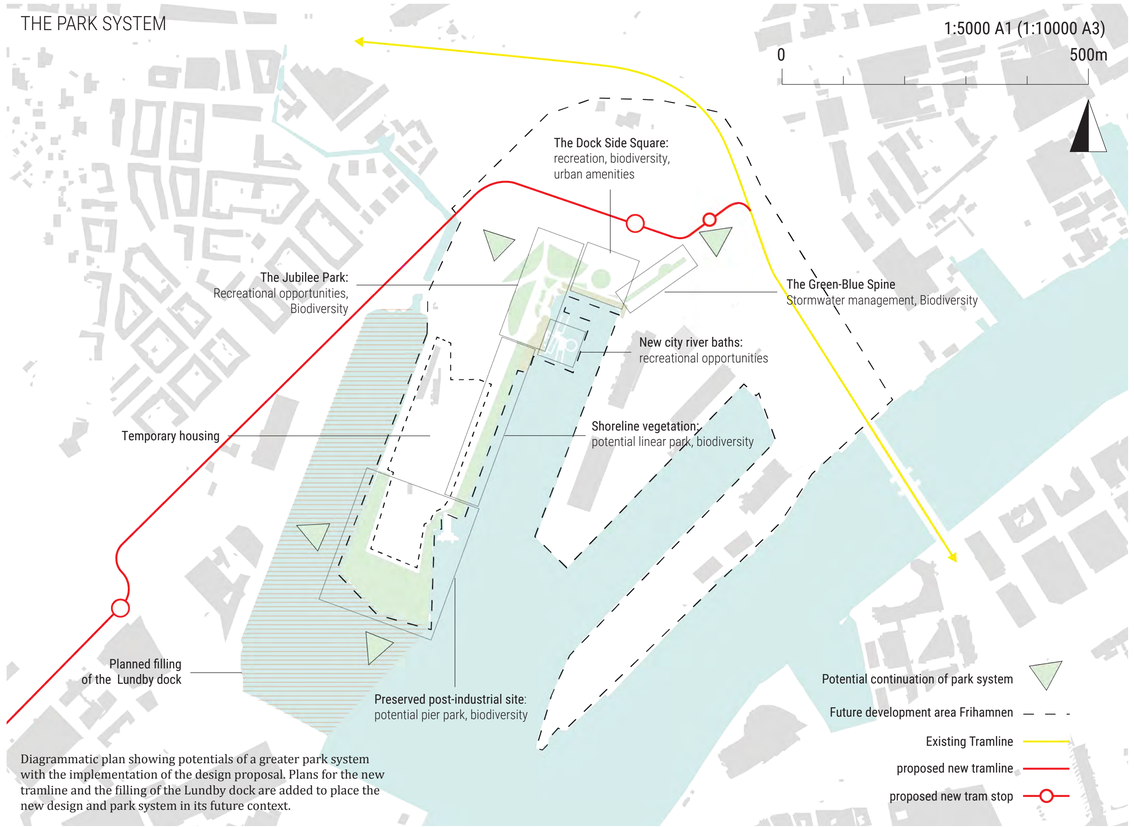
SECTION B-B

Section showing the whole design from building to waterfront. The slight slope enhances direction and flow, both for human users and water's movement across the site.

A PARK SYSTEM PHILOSOPHY

One of the foundational ideas for The Jubilee Park was that it would be part of a greater park system stretching across and beyond the new Frihamnen neighbourhood into the different adjacent districts on the Hisingen Island. This design proposal picks up on this idea and adds a piece to the puzzle.

Apart from added plantings and trees in the design, the evolving green corridor receives a 'green-blue' addition in *The Green-Blue Spine*. Through this 'philosophy' biodiversity is benefitted, and the liveability of the future neighbourhood is ensured.



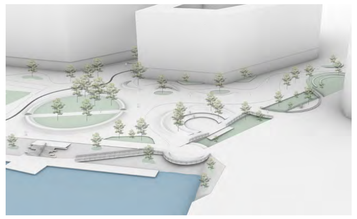
Diagrammatic plan showing potentials of a greater park system with the implementation of the design proposal. Plans for the new tramline and the filling of the Lundby dock are added to place the new design and park system in its future context.

The blue-green spine flows into Göta älv and is topped by a circular lookout. Thanks to a uniform plant selection, overlapping design (with the existing mineral edge) and connection to existing pathways, the site becomes an extension of the park system.

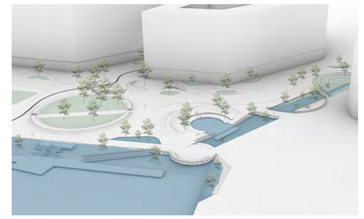
A DYNAMIC DESIGN - EMBRACING SEA LEVEL RISE

When examining simulations of future scenarios for sea levels, it shows that storm events with a 50 and 100-year recurrence already in 2070 will flood the site as it is graded today. In the future, even more extreme events are to be expected. The proposal takes this into account, and employs a strategy that could be called 'embrace'. In this project, water expected to enter the site is 'embraced' and seen as an advantage that can be part of the design, instead of a problem that needs to be kept away.

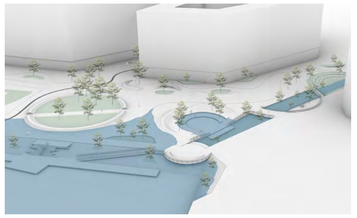
This is exemplified in The Green-Blue Spine, expected to backfill during events of high sea levels. Although mostly dry, The Flood Circle is connected to the Spine, and different sea levels can temporarily flood its levels, adding a dynamic and exciting layer to the place.



Mean sea level in the year 2070: +0.45
The mean sealevel is expected to rise significantly from today, but this won't noticeably affect the site.

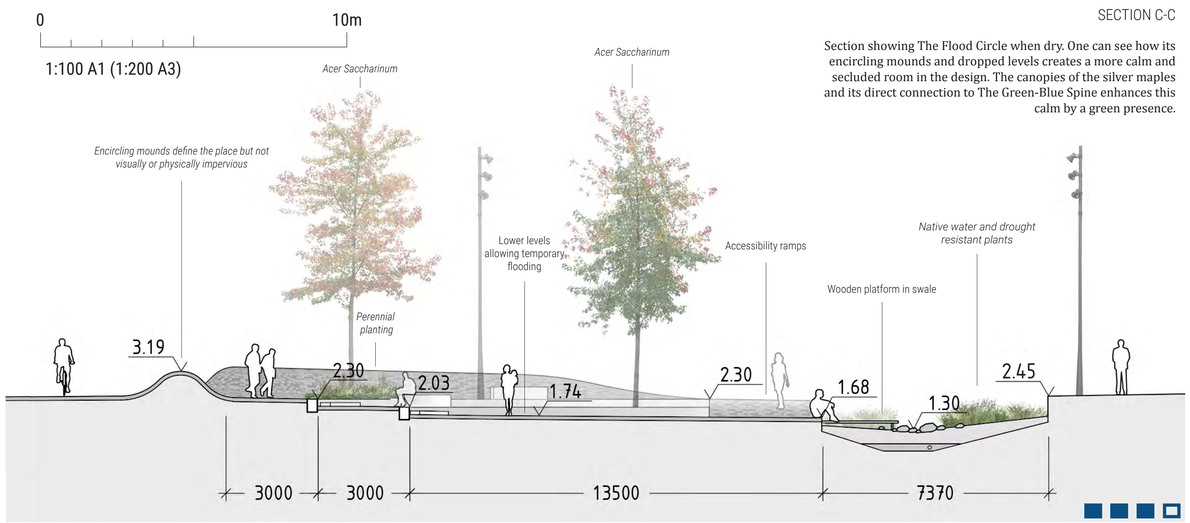


Sea level rise of a 50-year storm event in 2070: +2.00
At a storm event of this level, sea levels will rise and fill the Green-Blue Spine and the first level of The Flood Circle temporarily. The lowest lying blast rock planting will also get filled by its overflow connection to the mineral edge.



Sea level rise of a 100 year storm events in 2070: +2.20
A storm event of this magnitude will be dealt with similarly, but more of the site will be temporarily filled. The next level of The Flood Circle is flooded as well in a scenario like this.

During major storm events, the flood circle becomes an exciting feature as it fills with water. This contributes to the dynamic character of the site, which embraces natural processes.

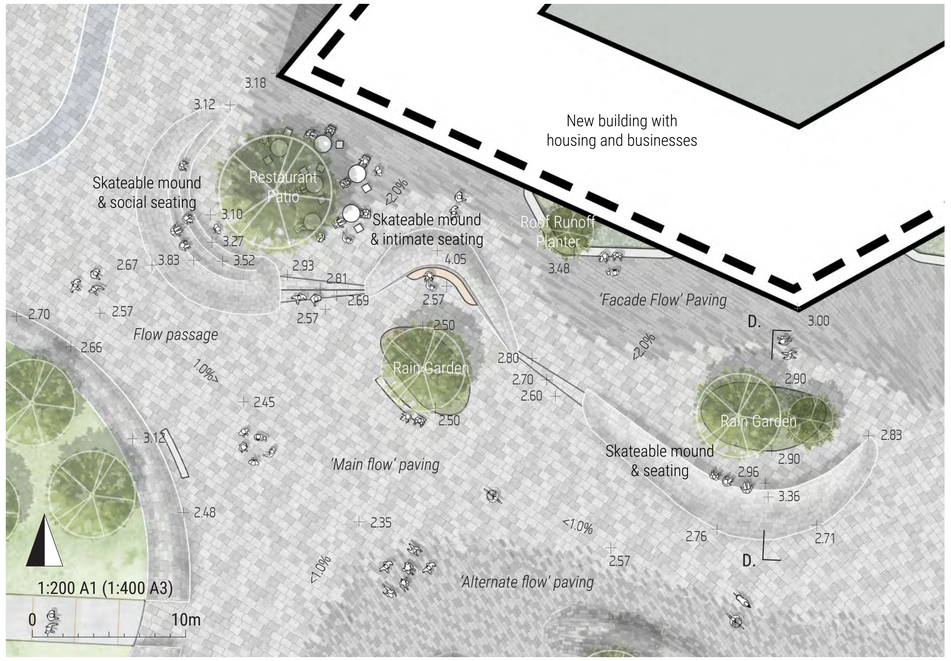


SECTION C-C

Section showing The Flood Circle when dry. One can see how its encircling mounds and dropped levels creates a more calm and secluded room in the design. The canopies of the silver maples and its direct connection to The Green-Blue Spine enhances this calm by a green presence.

THE FAÇADE PARK

The façade park is adjacent to the front of the future urban development and creates a transition between the public square and a slightly more private setting. In the Façade Park, there is room for leisure in the form of various spaces framed by mounds in different shapes, a slightly elevated plane and a special paving pattern. Together, these create a dynamic urban park space to move through surrounded by lush vegetation. The various planting areas exemplify how everyday stormwater runoff can be taken care of primarily through various infiltration beds. The superficial system from the roof to the catchment areas becomes an educational element that emphasises the importance and benefits of stormwater management in the city.



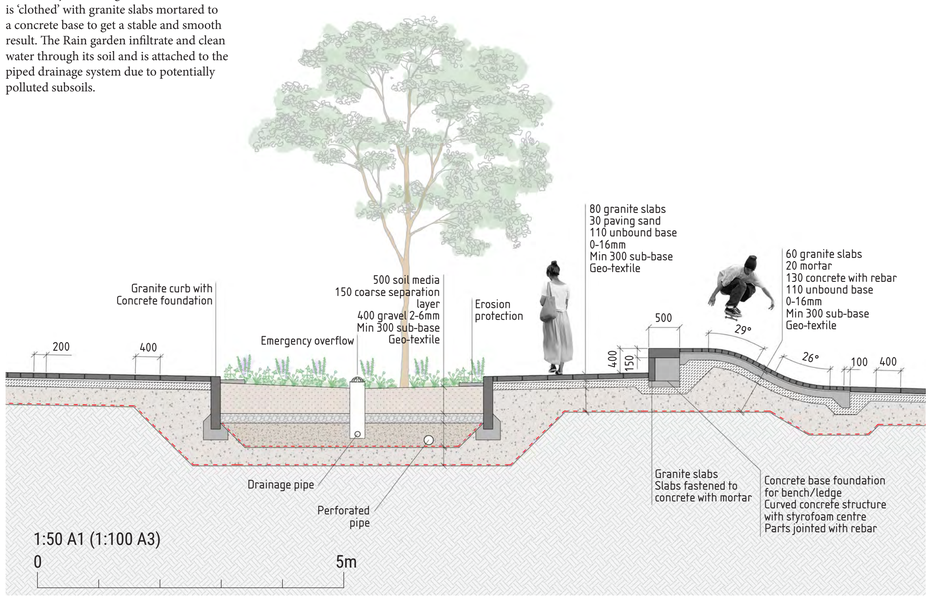
The Façade park is defined by its small elevation in comparison to its surroundings and three mounds that embraces and defines the space. The three mounds all have a unique design that can be used for leisure but also reinterpreted for skateboarding. The distinctive meandering paving gives the park its own lateral flow along the façade.

The façade park offers spaces for contemplation and leisure for residents and visitors alike. The slightly elevated surface looks out over the site and provides space for local businesses and terraces.

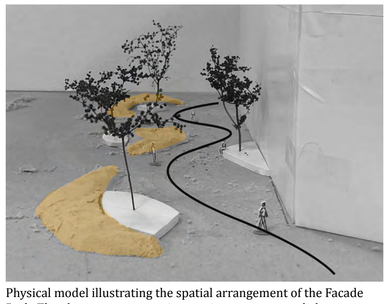
SCHEMATIC CONSTRUCTION DRAWING

Schematic construction drawing of the mound-ledge hybrid of the Façade Park and the adjacent raingarden. The mound is 'clothed' with granite slabs mortared to a concrete base to get a stable and smooth result. The Rain garden infiltrate and clean water through its soil and is attached to the piped drainage system due to potentially polluted subsoils.

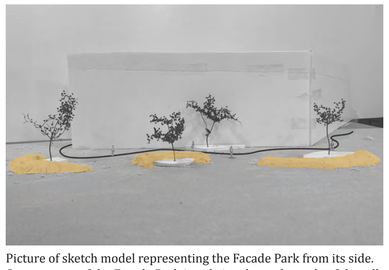
SECTION D-D



INVESTIGATIVE SKETCH MODELS



Physical model illustrating the spatial arrangement of the Facade Park. The elements create an interesting sequence and also a sense of 'flow' in the design laterally.



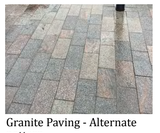
Picture of sketch model representing the Facade Park from its side. One purpose of the Facade Park is to bring down the scale of the tall building to a more human one.

MATERIAL PALETTE AND INVENTORY

The number of different materials used for paving and for inventory have been limited in order to achieve coherence. Except for the added granite slabs, the Accoya wood and Corten steel have been 'borrowed' from The Jubilee Park and the surrounding post-industrial landscape. Steel beams found on the site are reused and transformed into skateable benches. The blasted stone used in the mineral edge is also reoccurring in the project.

Granite Paving - Façade Pattern

Granite Paving - Main Pattern



Granite Paving - Alternate pattern

Accoya Wood Decking

Corten Steel Railing

Corten Steel Benches

Accoya/steel benches

Blast Rock

PLANT SELECTION

The south-facing Gothenburg waterfront location makes for a tough habitat. Plants here naturally need to withstand lots of wind and sun. Due to the nature of this project, some plants also must temporarily manage standing in wet conditions. On these grounds, the plants are primarily native species adapted to tolerate these challenging conditions. Though, some species are of foreign origin to give the design a more urban and exclusive feel.

Quercus Petraea

Populus tremula

Pinus nigra

Salix caprea

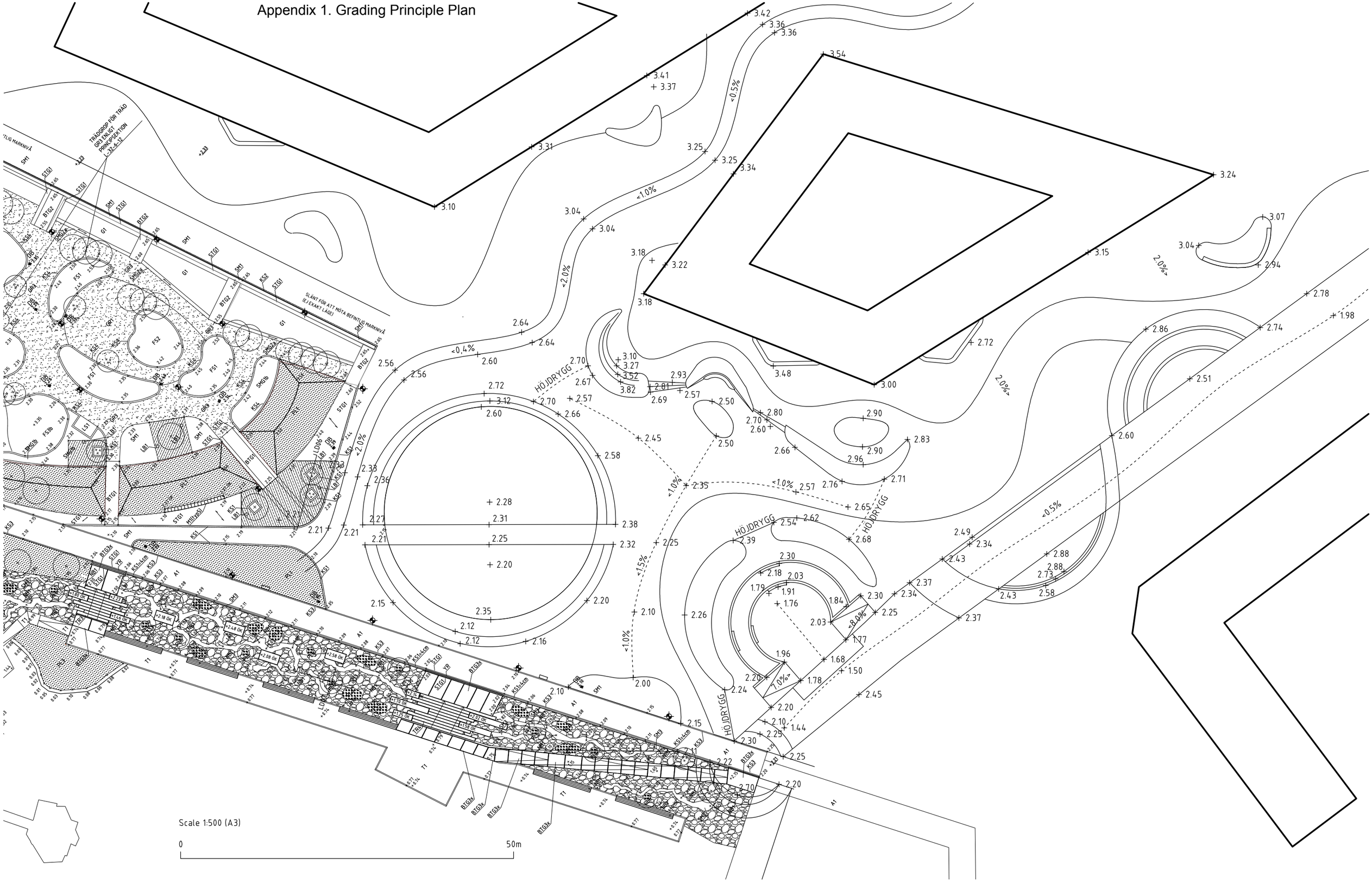
Betula pendula

Acer rubrum

Alnus glutinosa

Acer saccharinum
'Laciniatum Wieri'

Appendix 1. Grading Principle Plan



Appendix 2. Project Relevant Stormwater Strategies.

Infiltration

Stormwater infiltration is the strategy of directing stormwater to spaces that allows the water to slowly percolate into the ground or soil.[1] The purpose of the various solutions of this strategy is to slow down water's movement across a site, prolong the time before the stormwater enters the traditional grey systems, while also cleaning the stormwater as it filters through layers of mineral and organic matter.[2] Infiltration solutions also hold an important role during storm events, as they receive the first flush of stormwater, containing the highest concentration of pollutants.[3] This project includes components of biofilters, porous surfaces, expanded upon next:

Biofilters refer to various planted solutions that handle stormwater, such as rain gardens and planters. These are constructed to allow for stormwater to enter, and then filter through various layers of soils that remove pollutants or sediment. Biofilter design can be of various sizes and depths, and doesn't necessarily have to be sunken, although this affects its ability to temporarily store water.[4] Infiltration rates and even possibilities of infiltration in general are dependent on the site-specific conditions, rendering the composition of biofilters varied from design to design.[5] Full infiltration into subsoils is of course preferred, but in sites with low to no infiltration, infiltration to a perforated drain, or a flow through planter might suffice.[6] The level or possibility of infiltration is dependent on several factors, one of such is soil permeability. Soil permeability is impacted by soil composition, simplified, permeability increases with the size of particles of the soil.[7] Another factor is existing pollutants capped at the site; infiltration may not be preferred as it might help release these into groundwater or adjacent waterways. Cleaning of stormwater can be split into removal of sediment and removal of pollutants. These processes will not be dealt with in the scope of this thesis.

Porous surfaces involve solutions such as porous pavement or lawns: surfaces that are accessible but still infiltrates stormwater. One type is porous pavement, it come in many shapes and forms but can be defined as "a load-bearing surface with sufficient porosity or permeability to allow rainfall to pass through to the pavement base course."[8] This is a useful tactic for integrating stormwater management in places where accessibility requirements prevent a fully green solution. Porous pavement can be made of all kinds of paving, where the open joints can be filled with coarse gravel, soil, or grass.[9] Though, this kind of solution is not fit for cleaning of stormwater, as clogging is likely to occur.[10] Water can also be directed to lawns for infiltration just as any other 'green' surface in the landscape. Lawns can be made more efficient for infiltration by, for example, increasing the percentage of sand in the soil mix. Lastly, a lawn designated to receive large volumes of stormwater can be made bowl-shaped to store water temporarily.[11]

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1 National SUDS working group, *Interim Code of Practice for Sustainable Drainage Systems*, (London: CIRIA, July 2004), 8, https://www.susdrain.org/files/resources/other-guidance/nswg_icop_for_suds_0704.pdf.

2 Göteborgs Stad and Rambøll, *Göteborg när det regnar: En exempel- och inspirationsbok för god dagvattenhantering*, (Göteborg: Göteborgs Stad Grafiska gruppen, April 2018), 24, http://tinyurl.com/yx5uyfar; National Association of City Transportation Officials, ed., *Urban Street Stormwater Guide* (Washington, DC: Island Press, 2017), 16.

3 Thomas W. Liptan and J. David Santen, *Sustainable Stormwater Management: A Landscape-Driven Approach to Planning and Design*, (Portland, Oregon: Timber Press, 2017), 69; Meg Calkins, *The Sustainable Sites Handbook: A Complete Guide to the Principles, Strategies, and Practices for Sustainable Landscapes* (Hoboken, N.J: Wiley, 2012). 71-76.

4 Göteborgs Stad and Rambøll, *Göteborg när det regnar, 25.*

5 Liptan and Santen, *Sustainable Stormwater Management, 76.*

6 Liptan and Santen, *Sustainable Stormwater Management, 76.*

7 Bo Huang et al., "Experimental Study on the Permeability Characteristic of Fused Quartz Sand and Mixed Oil as a Transparent Soil," *Water* 11, no. 12 (2019): 1, https://doi.org/10.3390/w11122514.

8 Calkins, *The Sustainable Sites Handbook, 117.*

9 Göteborgs Stad and Rambøll, *Göteborg när det regnar, 52.*

10 Calkins, *The Sustainable Sites Handbook, 117-118.*

11 "Infiltration i Grönyta," Stockholm Vatten och Avfall, Published March 28, 2023. https://www.stockholmvattenochavfall.se/dagvatten/tekniska-losningar/anlaggningar-for-kvartersmark/i-mark/infi_gron/.

Conveyance

Surface conveyance refers to the strategy of leading water, by letting it move across the landscape opposed to pipes underground.[12] The strategy is inspired by water's journey through natural landscapes, and how water flows across, around, or through permeable areas.[13] This sequence between infiltrable or storing structures can be mimicked in landscape design and elaborated on in connection to the idea of flow and movement in design. Technically, surface conveyance strategies can handle larger volumes of stormwater than conventional systems while also mitigating the destructive and erosive powers of stormwater.[14] Amenities connected to this category are increased biodiversity, recreation in form of play and exercise, and opportunities for education. The different tactics connected with this strategy are both of green and paved character. This project includes components of bioswales, and surface drains:

(Bio)swales are vegetated open channels for surface conveyance. Bioswales have many benefits; they are cheaper than their grey counterparts, they can act as green corridors enhancing biodiversity, they clean stormwater from pollutants and help discharge sediment, and they are also an efficient way of turning stormwater conveyance into a green appreciated addition in the city.[15] There are different variations of bioswales, such as the stepped pool bioswale effective on steeply sloped sites, or the "turf-reinforced matted swale"[16] where plants and soil are held by matting if velocities get to high. Regardless of variant, native dense planting material is always preferred.[17]

Surface drains are shallow, open or partly covered, paved stormwater conveyance channels.[18] This tactic doesn't necessarily clean water but can aid in directing water to stormwater infiltration or storage locations. Surface drains can instead act as visible pedagogic and playful elements to a site design, vividly showing how water moves across a design and in turn how it moves across the landscape.

Storage

Volume storage systems intercept, divert, store and release rainfall for future use. They can be, for example, vegetative solutions that allow infiltration and purification with slow infiltration to subsoils or conventional systems. There are also hard surfaced alternatives that address flood risk and act as a safety buffer during heavy rainfall.[19] Solutions in this category are connected to amenities such as increased biodiversity, aesthetic value and physical activity. This project includes a variant of multifunctional retention storage.

Multifunctional retention storage is an interesting category of stormwater management in relation to skateboarding. Multifunctional is here defined as places designed for urban recreation, such as outdoor sport facilities, playgrounds, or squares.[20] Retention refers to their capability of being filled with water temporarily during storm events. Other examples of surface storage are retention and detention ponds, green roofs, and constructed wetlands.

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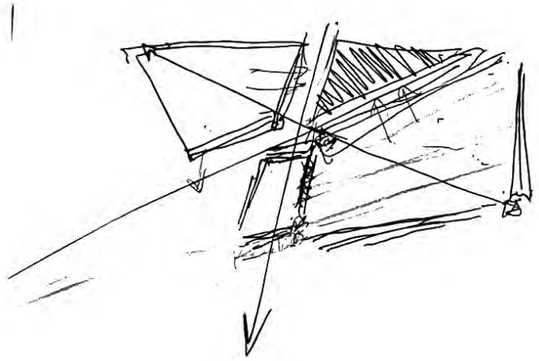
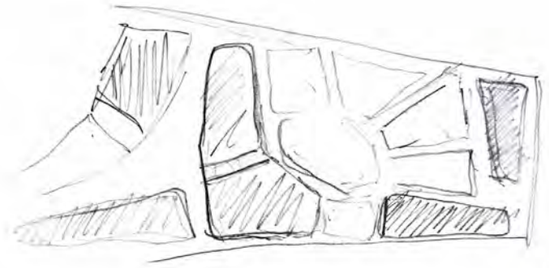
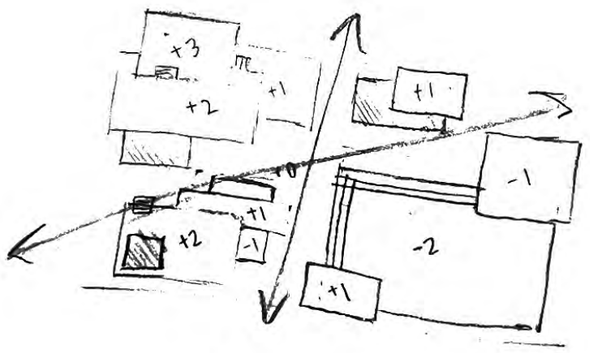
12 Liptan and Santen, *Sustainable Stormwater Management, 26.*
13 Liptan and Santen, *Sustainable Stormwater Management, 141.*
14 Liptan and Santen, *Sustainable Stormwater Management, 37.*
15 Calkins, *The Sustainable Sites Handbook, 129-130, 132.*
16 Calkins, *The Sustainable Sites Handbook, 130.*
17 Calkins, *The Sustainable Sites Handbook, 130.*
18 Göteborgs Stad and Rambøll, *Göteborg när det regnar, 38.*
19 Scott Slaney, ed., *Stormwater Management for Sustainable Urban Environments* (Mulgrave, Victoria: The Images Publishing Group Pty Ltd, 2016); Calkins, *The Sustainable Sites Handbook, 75.*
20 Borislava Blagojević, Magdalena Vasilevska, and Ljiljana Vasilevska, "Outdoor Sports and Recreational Facilities as Elements in Urban Stormwater Runoff
Management Systems," in International Monograph Sports Facilities – Modernization and Construction (Belgrade, Serbia: University of Belgrade, Faculty of Sport
and Physical Education, 2016), 295–309, http://tinyurl.com/3p4vpp8s.

Appendix 3.
The Process Seen through Sketches



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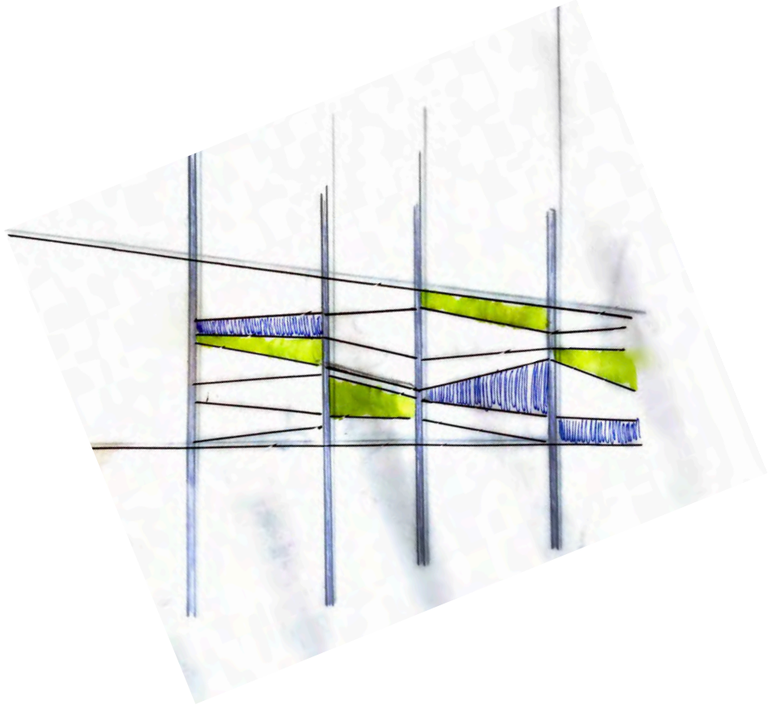

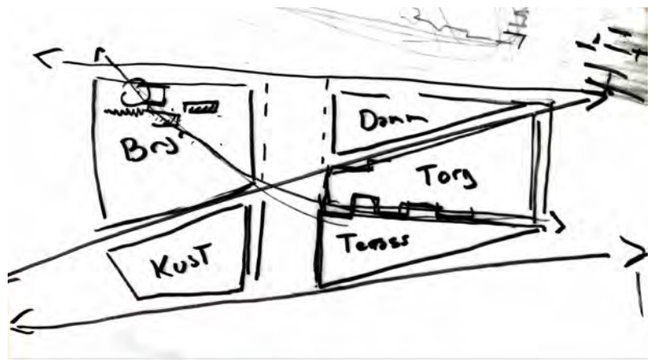
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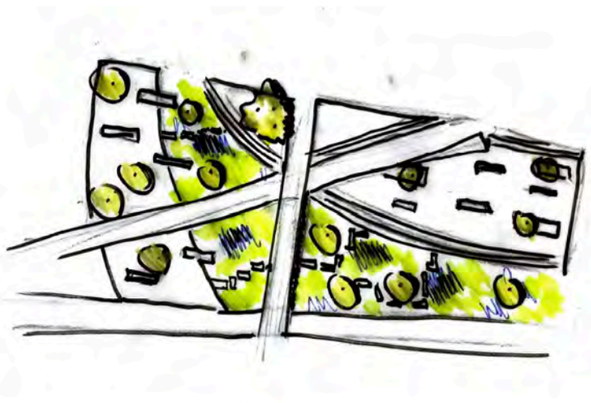

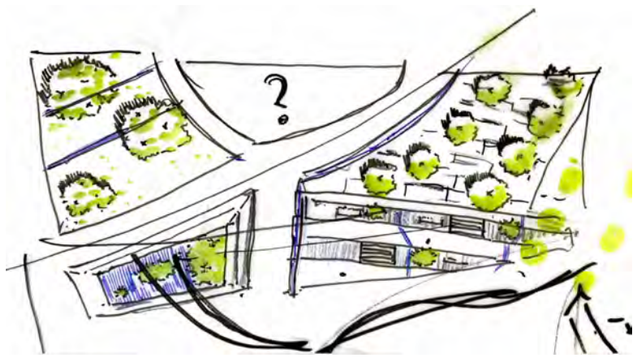
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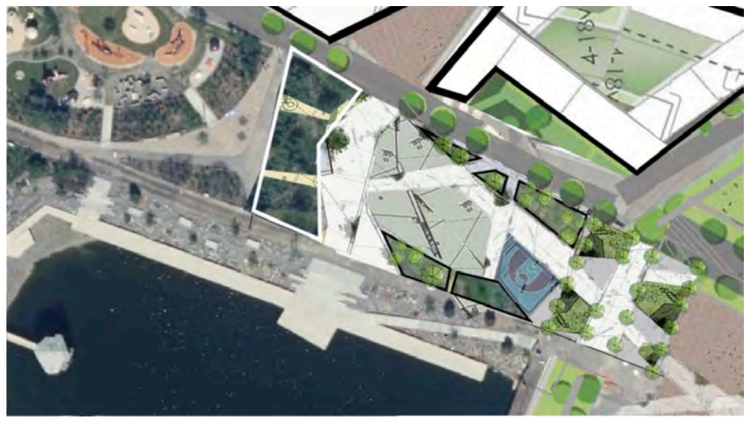

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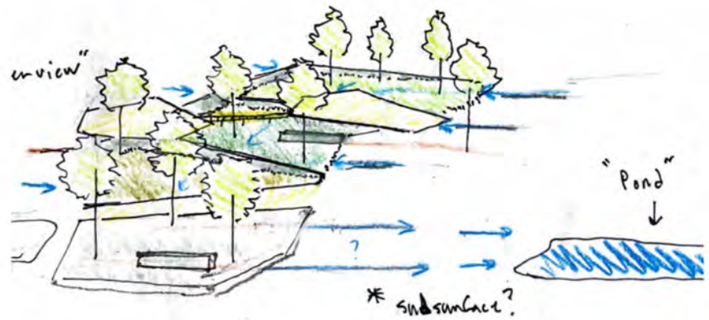

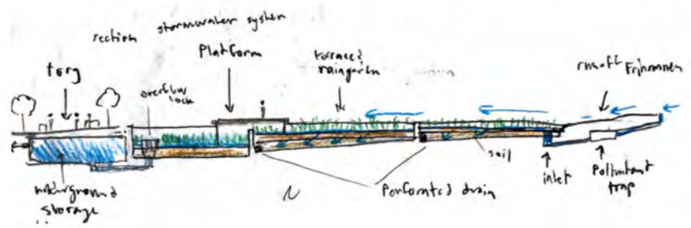

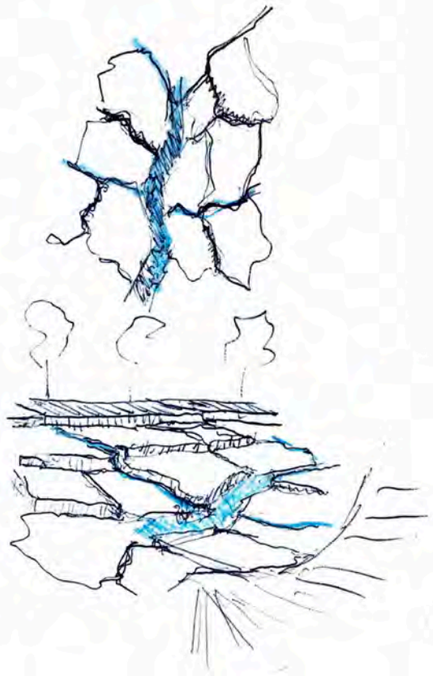

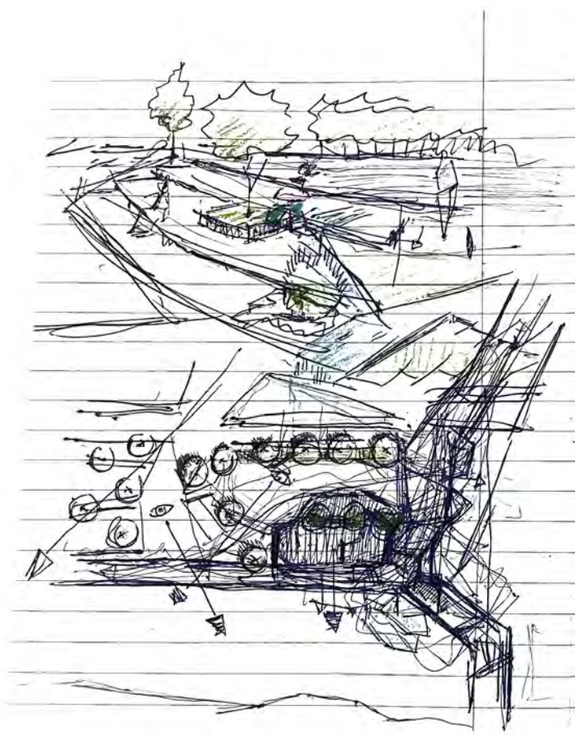

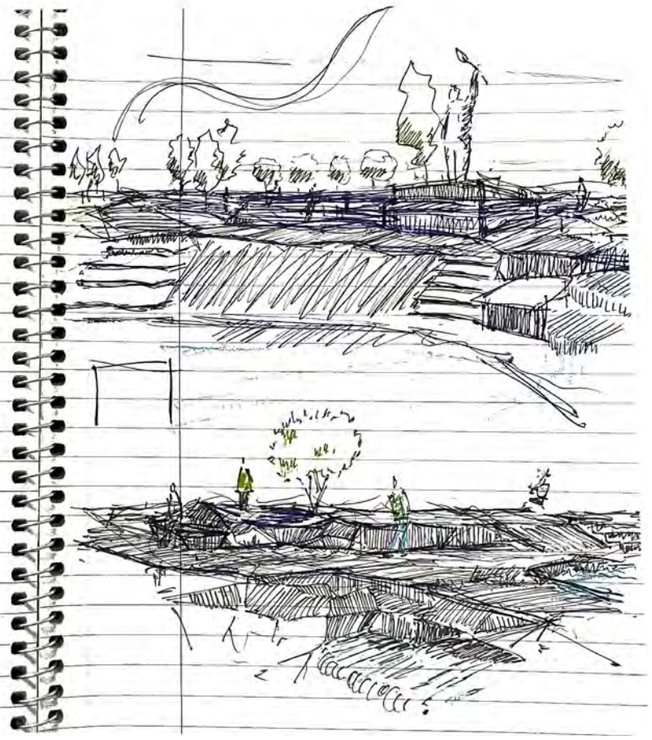

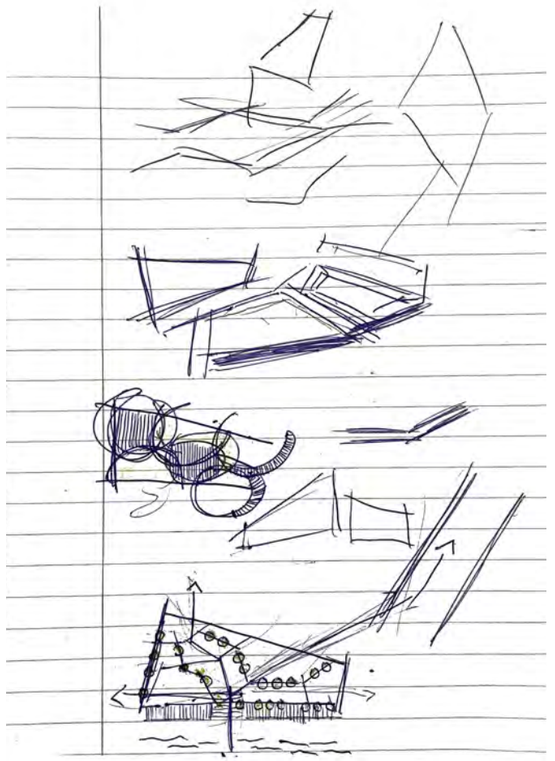

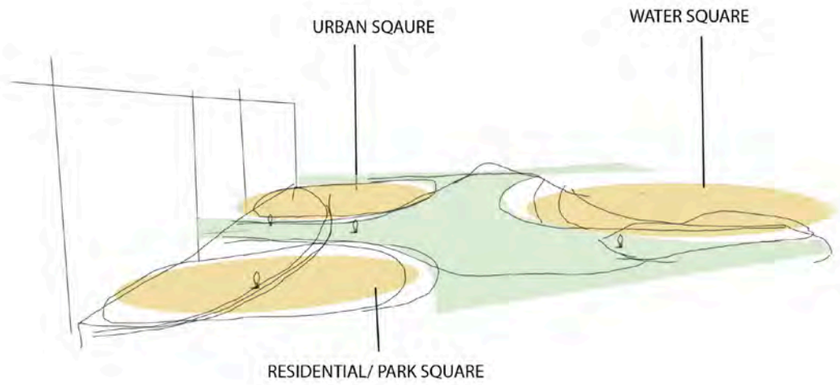
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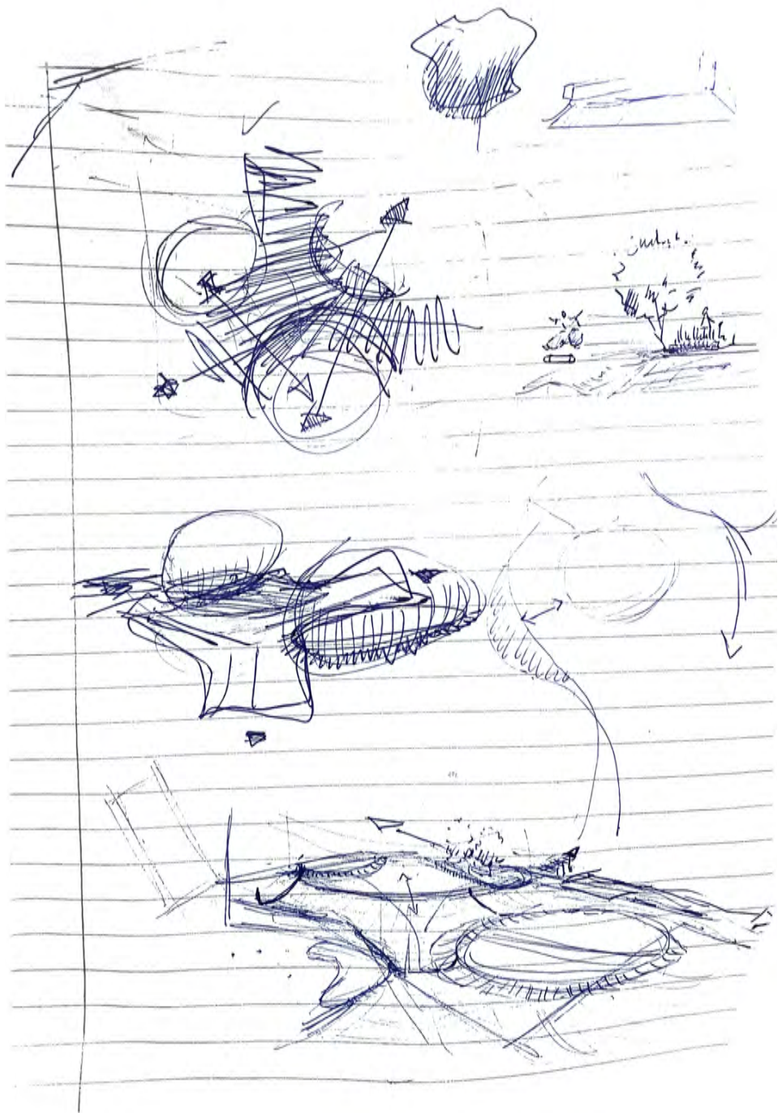

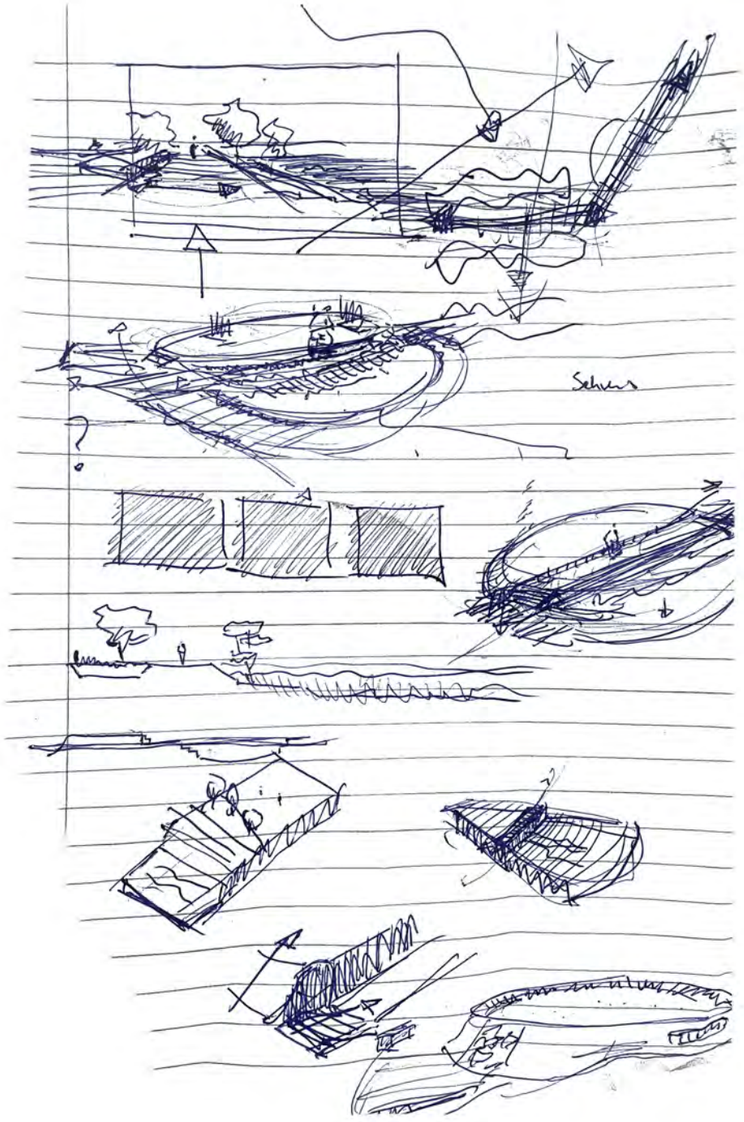

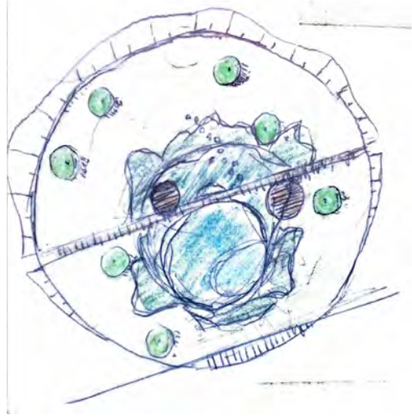

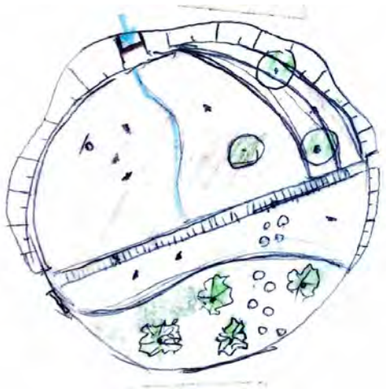

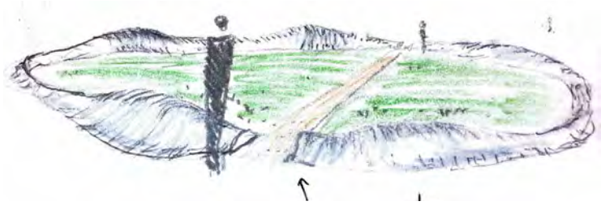

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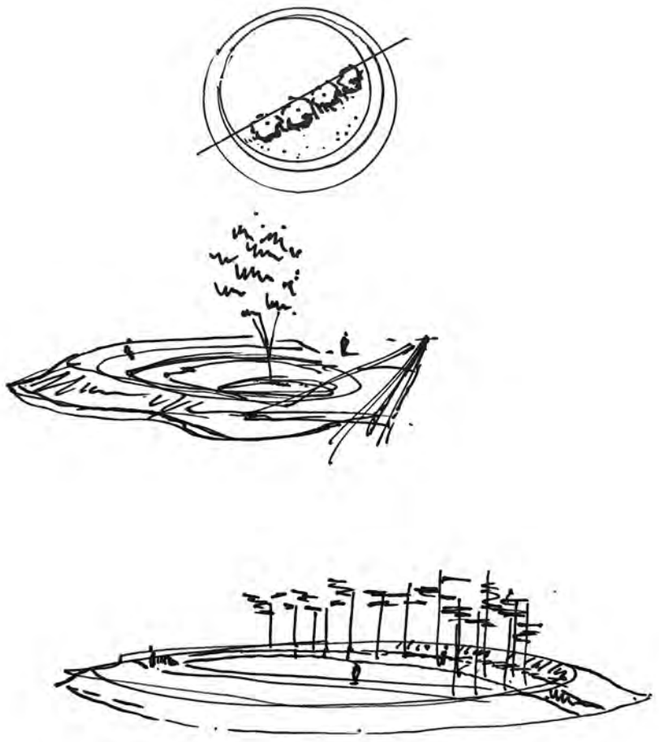

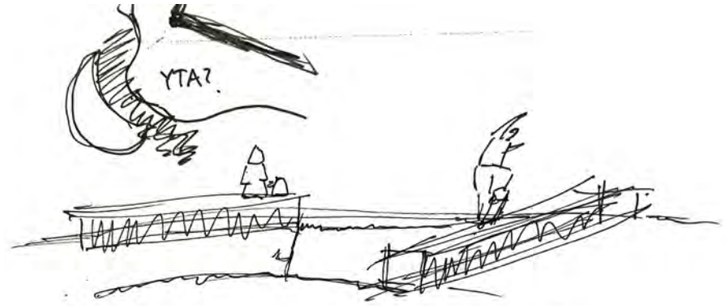
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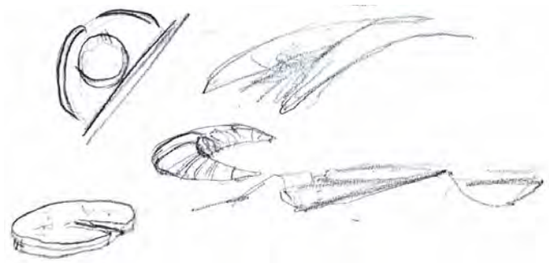

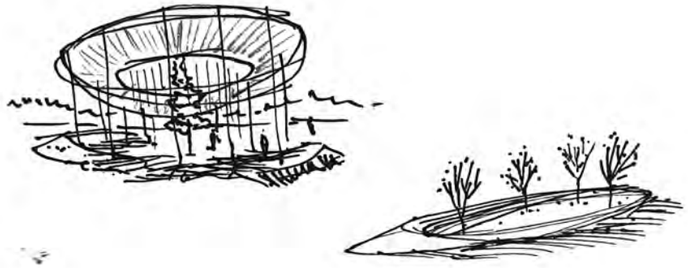

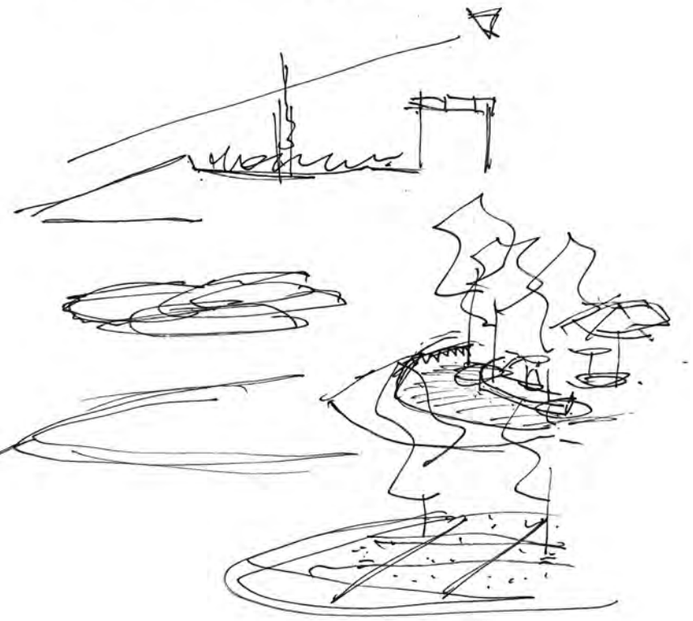

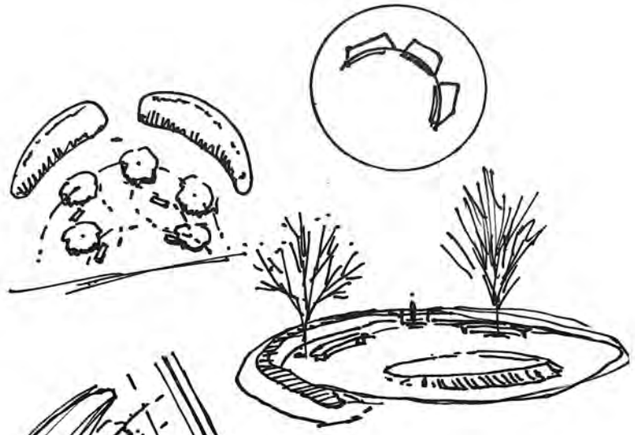

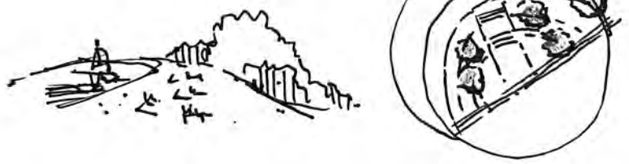

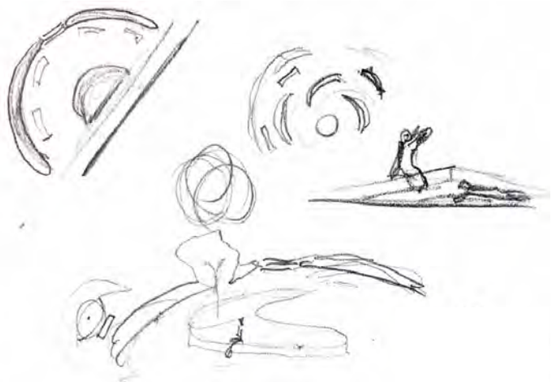

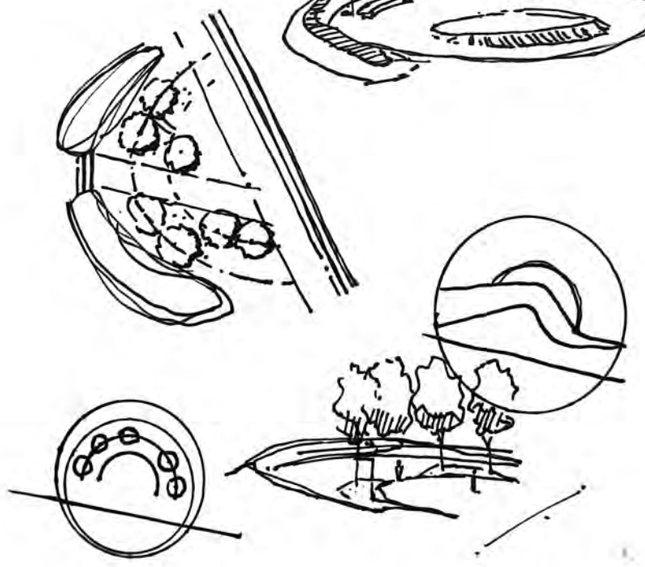

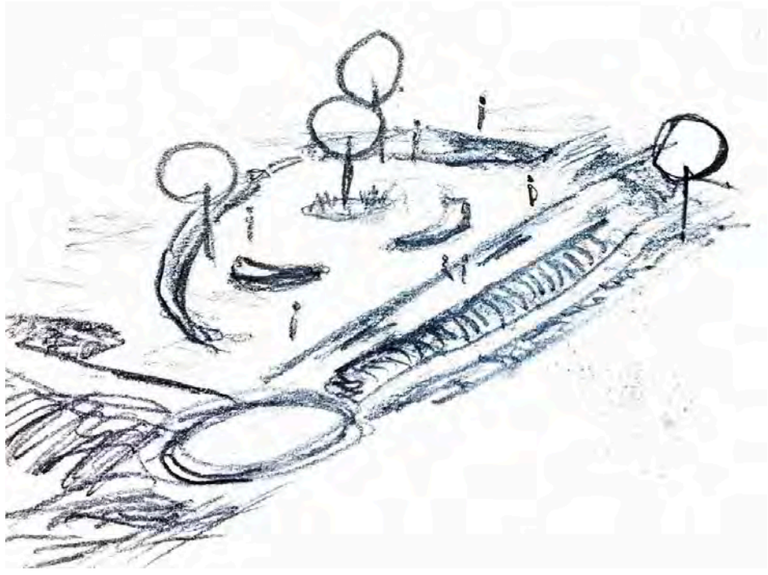

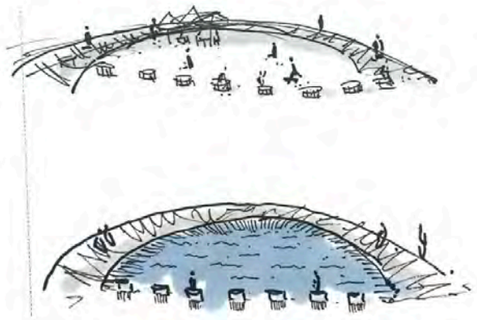

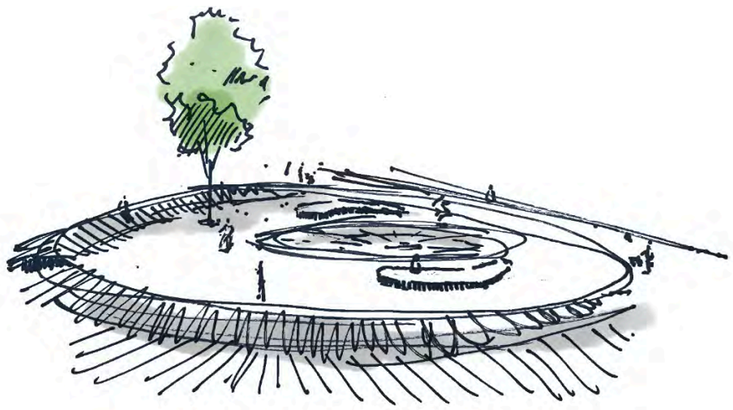

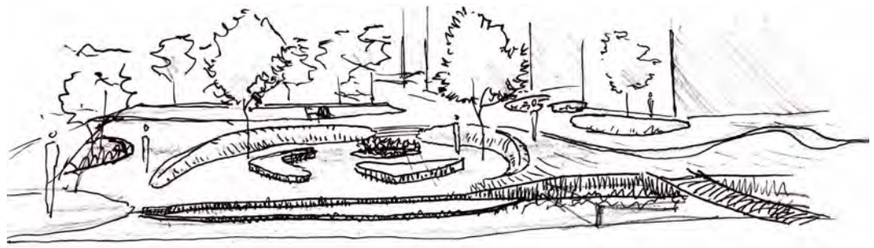

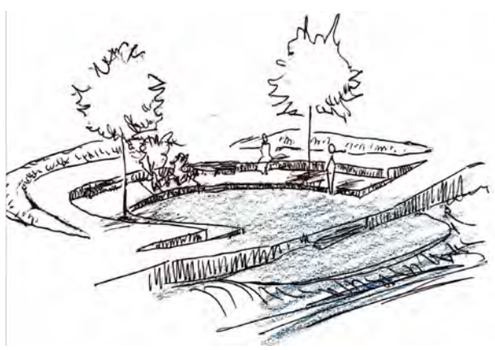

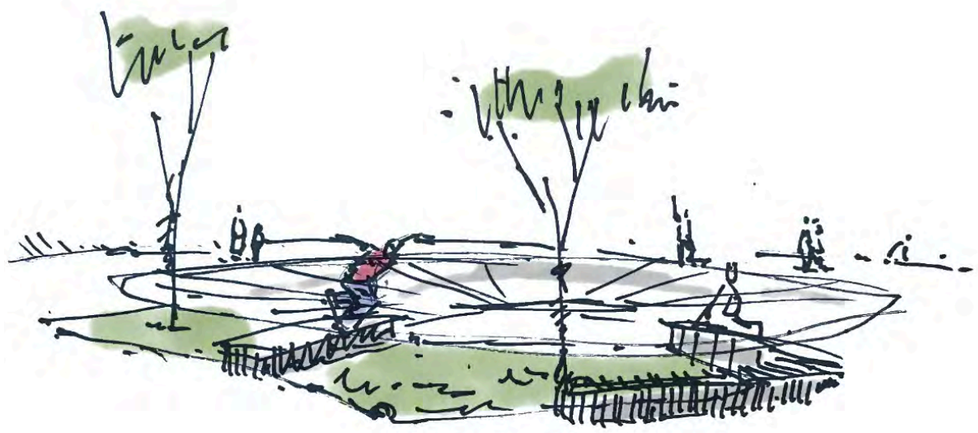


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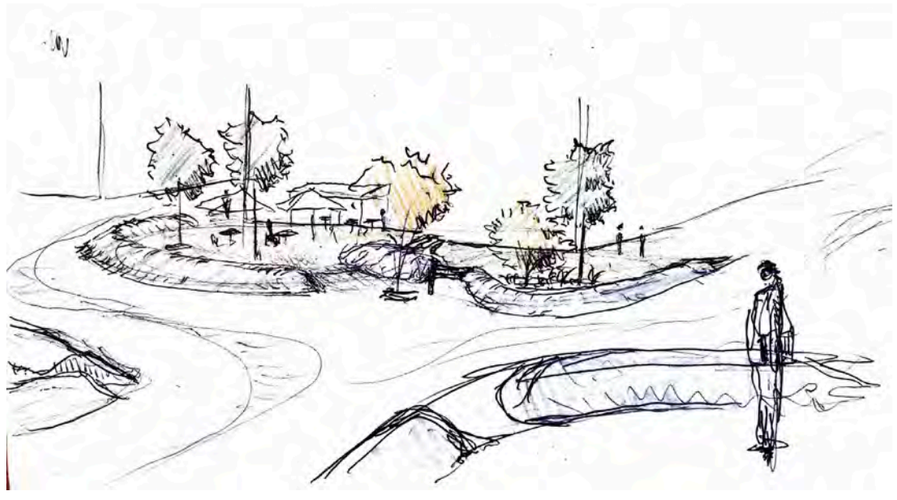

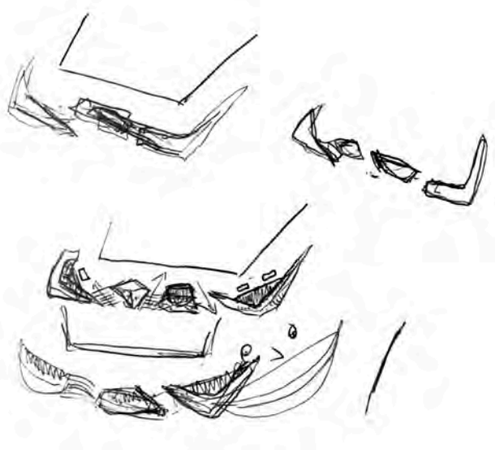

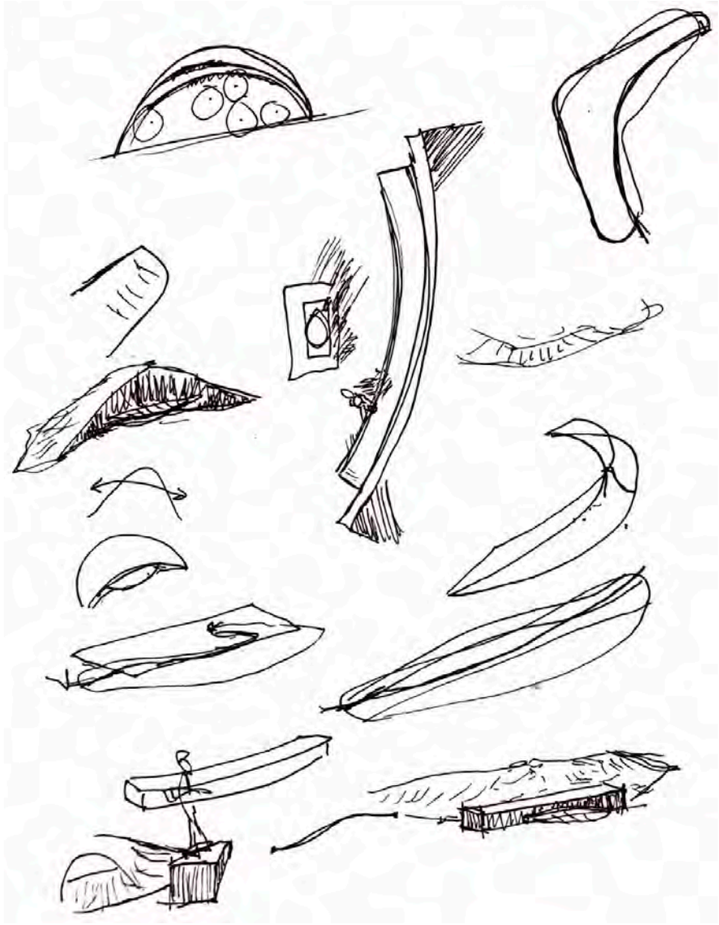

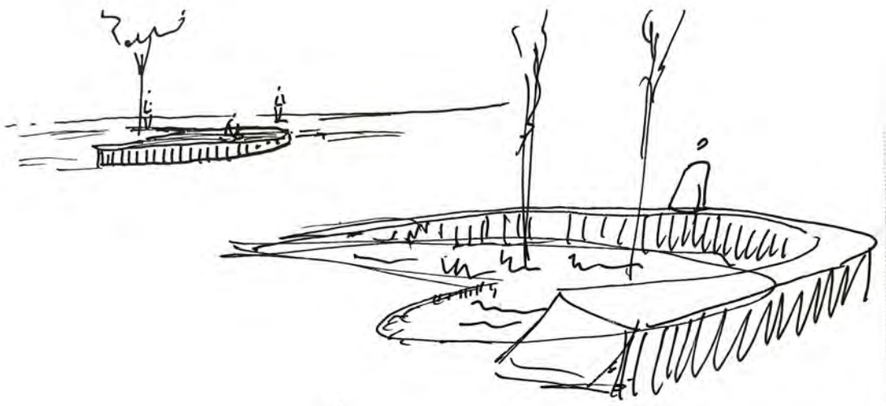

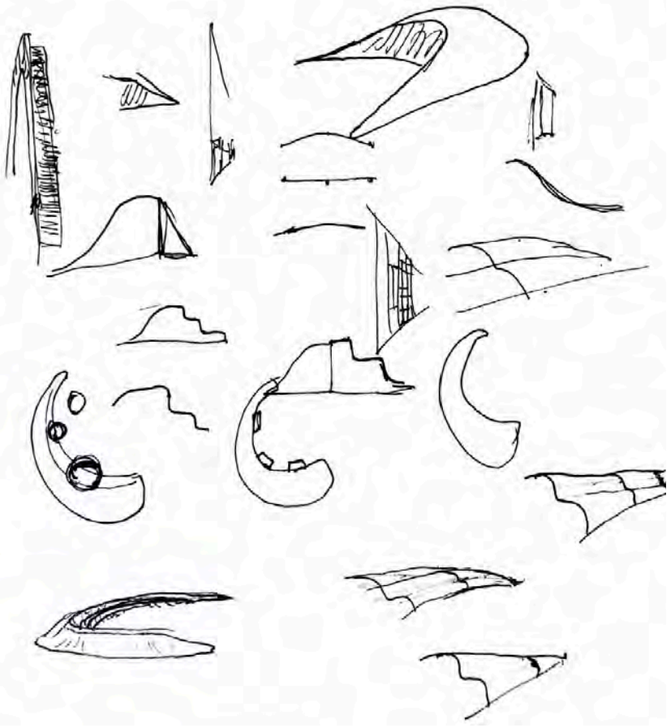

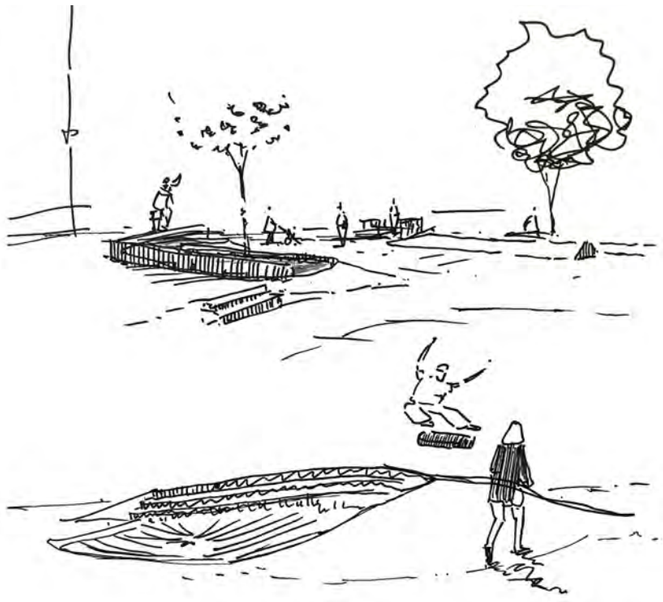

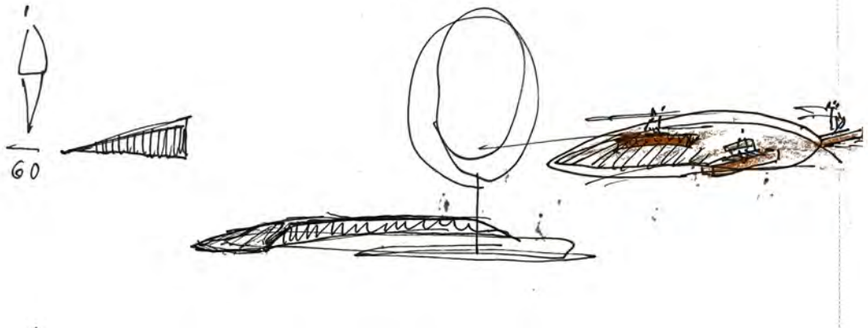

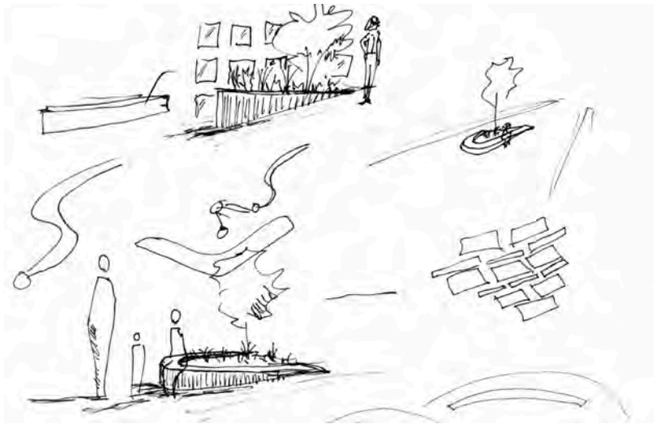

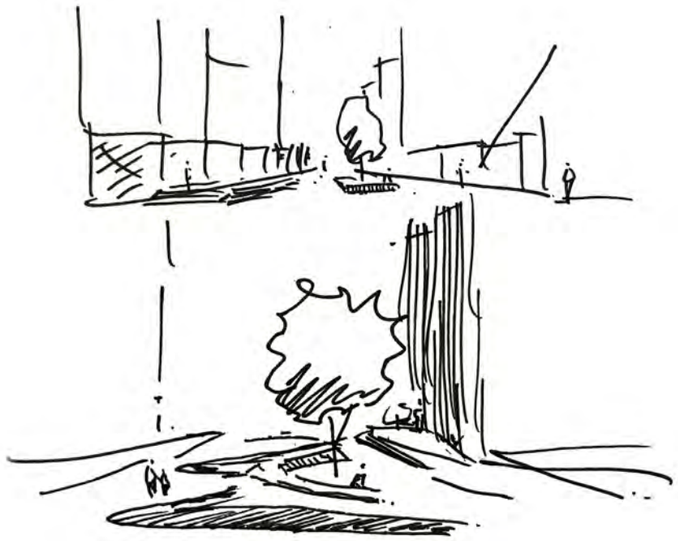

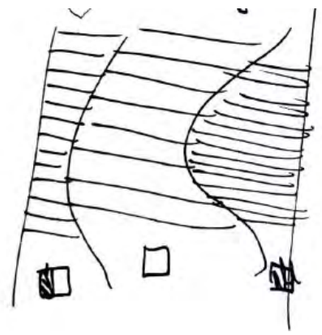

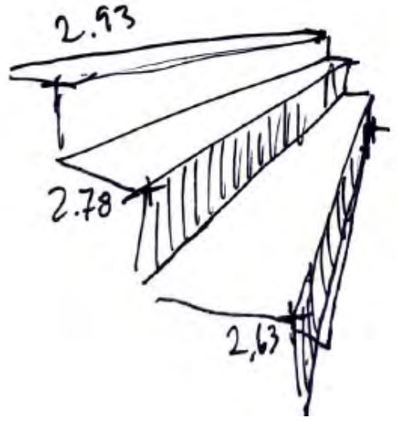
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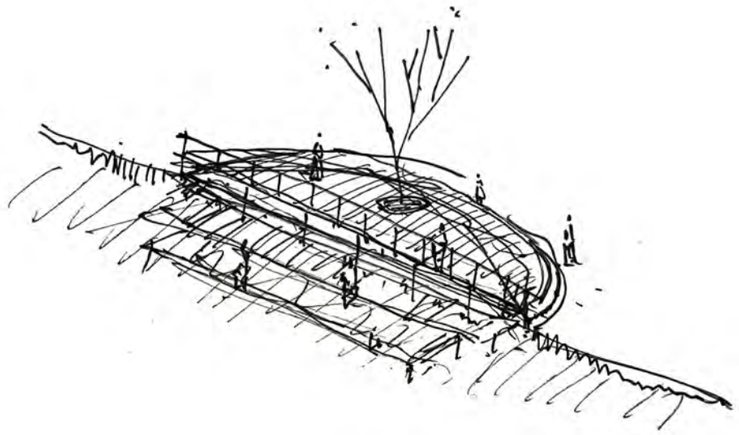

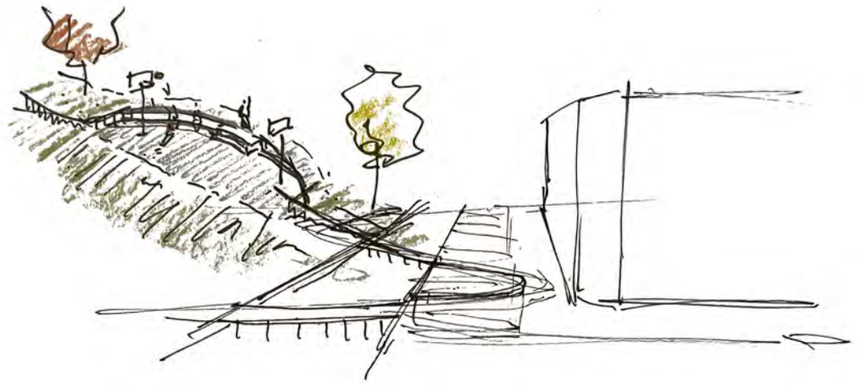

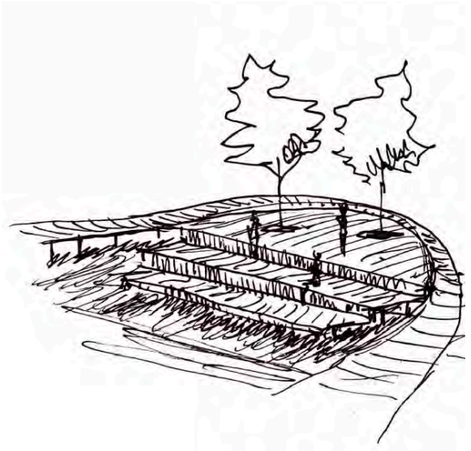

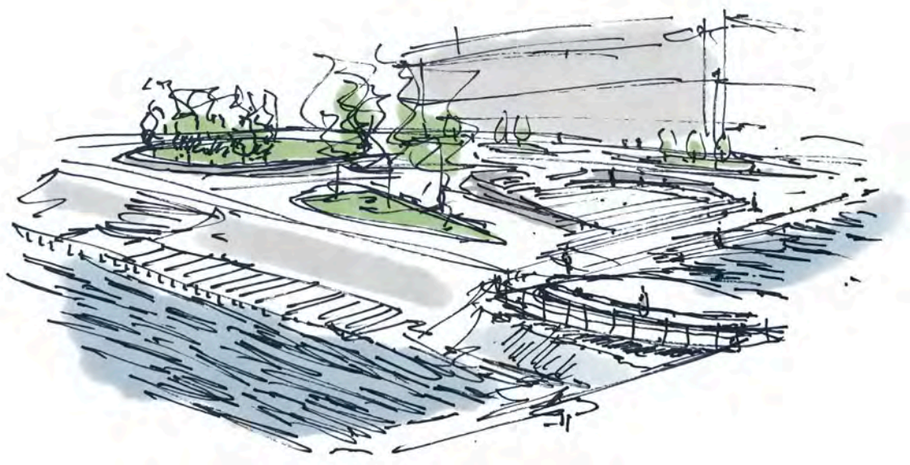

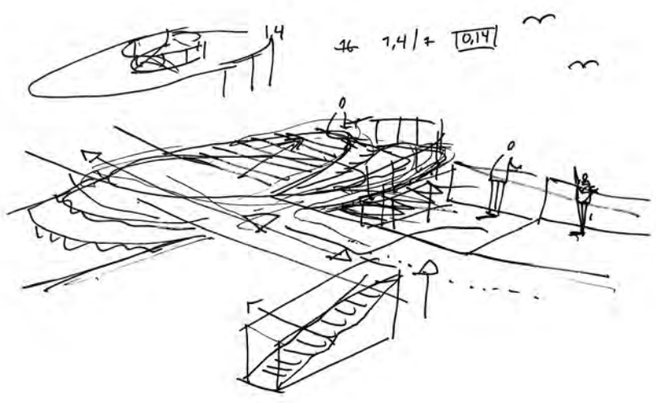
14
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