READING GUIDE

HOW TO UNDERSTAND THE REPORT

This master thesis was originally intended to be printed as three separate booklets: *Part one - The knowledge compilation, Part two - The design guide* and *Part three - The applied design*. The reason for this division lays in the content of each part. Together the three booklets represents the full master thesis, while separated they each serve their own purpose:

Part one - The knowledge compilation consists of a literature review of contemporary literature regarding playful learning and co-creation. It further includes the methodology, collected fieldwork and the following analysis hereof as well as the conclusion and reflection of the complete thesis.

Part two - The design guide is a collection of recommended initiatives to consider and decide on during a schoolyard design, and is compiled from the contemporary literature and conducted analysis from the knowledge compilation. The design guide is made for schools, communes, developers etc. for them to implement playful learning in the built environment.

Part three - The applied design is a representation of how the design guide can be used when redesigning or renovating a schoolyard, with Kærbyskolen as the case. It seeks to demonstrate how theory can be applied in practise and further serves as the design proposal that will be given to Kærbyskolen upon this thesis completion.

As listed above, each part serves a separate purpose and can be read both as stand-alone booklets or as a full thesis. With part one as the theoretical foundation, part two is a tangible overview of these findings and part three demonstrating how part two can be applied. This division also serves as the argument for why the design of Kærbyskolen is only mentioned in part three, as this part will function as a separate booklet, with the design proposal intended for Kærbyskolens design team.

It should be noted that the thesis conclusion and reflection, presented lastly in part one, includes findings derived from part two and three. Each part answers to each of the three research questions that will be presented and therefore aids in answering the overall thesis aim.

As this thesis concerns adults involving children in physical designs, a two pointed glossary about the relevant themes is attached on the following pages. The glossary describes our definition of the thesis thematics in an adult perspective. Children helped include a child's view to emphasize the need for adults to understand children's knowledge and mindset when including them in the design process. The glossary can be used as a reference while reading the thesis and has also been used during the communication with children of Kærbyskolen for a better understanding of their knowledge. Lastly, it should be noted that when referring to children in this thesis, it concerns the danish elementary school age group ranging from 6-16 years old in part one and two, and 6-12 years old in part three as this is specific for the case school.

~~Glossary~~ DICTIONARY FOR KIDS AND ADULTS

This glossary describes the definitions of the thesis thematics, but as the project concerns children's involvement in physical designs, the glossary are two pointed; both explaining the adult and child's perspective. Thus emphasizing the need for adults to understand children's knowledge and mindset when including them in the design process. In this project this glossary is used as a background to understand children better before involving them further in the process.

Play [plā]

Play represents a broad variation of human experiences and it can be anything you can imagine. It can be defined as something that is performed for the player's sake and it is typically the process of playing that is important compared to the result of it. Play includes '*flexibility*' to change and adapt along the way and '*positive affect*' as play is voluntary and enjoyable. (Zosh et al., 2018)

"PLAY IS SOMETHING YOU GET TOGETHER TO DO LIKE IN A GAME OF TAG. IT IS COMMUNAL DECISIONS ON WHAT TO DO, WHERE AGREEMENTS HAS TO BE MADE. BUT SOMETIMES YOU CAN PLAY ALONE AS WHEN JUMPING ON A TRAMPOLINE."

Learning [lərniNG]

Learning is a broad term that covers basic life skills ranging from walking and talking to calculating math equations in school and learning how to socialize with other people. Learning is about developing a skill and then building on top of that skill to further improve it. (Zosh et al., 2017)

"YOU CAN LEARN SOMETHING THAT YOU DO NOT ALREADY KNOW. FOR EXAMPLE YOU LEARN HOW TO READ, MULTIPLY AND DIVIDE. YOU CAN LEARN AT HOME, DOING YOUR HOMEWORK."

Playful learning [plāfəl ˈlərniNG]

A holistic approach to the term '*learning*', where focus is on *emotional, creative, cognitive, social* and *physical* skills. It is about learning-to-learn skills acquired through '*free play*', '*adult guided play*' or '*games*' with rules set by adults. (Zosh et al., 2017)

I DON'T KNOW EXACTLY WHAT THAT MEANS

"HMM...
YOU LEARN WHILE YOU ARE MORE MOTIVATED? MAYBE YOU PLAY AND THEN WORK AND THEN PLAY AGAIN."

Playground [plā˛ground]

Playgrounds can appear with varying content, but their purpose is to be specific areas where children can come to play. It is meant to be a safe place away from busy streets and bad influences and serves the purpose of aiding children's development and recreational time. (Jansson, 2010)

"A PLAYGROUND IS A PLACE WITH MANY THINGS TO PLAY WITH. IT COULD BE A PLAYHOUSE, A TRAMPOLINE, SOCCER GOALS AND SOMETHING TO CLIMB ON. A SOCCER GOAL BY ITSELF ISN'T ENOUGH TO BE A PLAYGROUND."

Recess [rē˛ses]

A certain amount of time every day where children get a break from the educational lessons, this usually consists of 5-35 minutes at a time. This time will typically be spent on lunch, physical activity and outdoor play. (Skole og Forældre, 2020)

"THAT IS THE TIME WHERE YOU HAVE TO GO OUTSIDE. YOU GO OUT TO PLAY AND GET SOME FRESH AIR INTO THE BRAIN. YOU CAN BE BY YOURSELF OR WITH YOUR FRIENDS."

Schoolyard [skoo̅l˛yärd]

Schoolyards act as free spaces during breaks in contrast to the teacher-controlled classes. Their purpose is to give children an outdoor space where they can play and relax, and they have often been defined as a flat space with asphalt or grass surfaces and various play elements predefining the areas. (Andersen, 2008b)

"A SCHOOLYARD IS NOT COMPLETELY THE SAME AS A PLAYGROUND. THERE IS NOT ENOUGH TO DO AND PLAY WITH IN SCHOOLYARDS."

School [skoo̅l]

A school is a space where children can learn various subjects and skills. Its primary purpose is to prepare children for future education and prime them to be independent and confident in their abilities, while developing social abilities and a sense of humanity. (Børne- og Undervisningsministeriet, 2020)

"SCHOOL IS A PLACE WHERE YOU LEARN STUFF! YOU CAN ALSO MAKE NEW FRIENDS. IT IS IMPORTANT TO HAVE NICE FRIENDS SO YOU LIKE TO GO TO SCHOOL."

Co-creation [kō'-krē'āSHən]

An unambiguous notion for a method and practice that in this case is defined by multiple stakeholders with a common interest joining together, not necessarily on equal terms, in the process and design to solve and create a common solution. Co-creation with children is emphasized as a creative, playful learning process. (Dilling & Tanggaard, 2019 cited in Jelić et al., 2020, p.24)

"I HAVE NOT HEARD ABOUT THAT BEFORE BUT I KNOW WHAT COLLABORATION IS. THAT IS WHERE YOU WORK TOGETHER IN A TEAM."

LEARNING LANDSCAPE

Integrating playful learning environments in schoolyard designs

1

Part one

The knowledge compilation

LEARNING LANDSCAPE

Integrating playful learning environments in schoolyard designs

Learning landscape:
Integrating playful learning environments in schoolyard designs

Urban Design, Aalborg University
MSc04

Project period
February 1st - May 20th 2020

Total pages 197
Pages 49 - Part one: The knowledge compilation
Pages 41- Part two: The design guide
Pages 107 - Part three: The applied design

Pages 53 - Appendix

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Special thanks to
Marie Astrup OP & NED, Peter Randorff Larsen
LEGO House & Julie Skovgaard Klok Utzon Center
Kærbyskolen: Jørn Skovmand Larsen, the designteam, teachers and students

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Julie Kikkenborg Viig, Simon Winther Jensen and Sofie Rejkjær Bülow

PREFACE

PROJECT CONDITIONS

This master thesis project in urban design, concerns playful learning in the urban context of danish schoolyards. It was initially inspired by a petition from Kærbyskolen inquiring about a redevelopment of their schoolyard, after being granted 0,5 million dkk from Aalborg Municipality (Skoleudvalget, 2020). Two groups of master thesis students got involved; us as Urban Designers focusing on the thematics of play in a masterplan and a group of Industrial Designers creating a specific playground element.

Schoolyards in Aalborg Municipality are currently given more importance, because of an evaluation from 2018 stating the need to invest 80 million dkk to make greater improvements in 27 of the municipalities 53 schoolyards (Aalborg kommune, n.d.a). For the period of 2020-2023 Aalborg Municipality and AaK Bygninger have allocated funds of 5,6 million dkk to improve both accessibility and playgrounds in the seven schools with the highest need which includes Kærbyskolen. (Skoleudvalget, 2020)

From the beginning, the goal was to design a schoolyard for Kærbyskolen, but the course of the project and its theme was only decided after further research on the topic of schoolyard designs. The school system differs nationally, therefore this thesis concerns the elementary school of the danish education system named '*folkeskolen*'. The structure of this system is 10 grades from 0th to 9th where children attend the year they turn 6 (Retsinformation.dk, n.d.). In the case of Kærbyskolen there is only 0th to 6th grade, afterwards the children attend the last years of elementary school somewhere else.

As this thesis centers around playful learning it was initially supposed to include co-creation with the students of Kærbyskolen, as the students wanted to get involved with the redesign of their schoolyard, with workshops in week 12 and 13. Due to the corona pandemic and lockdown of Denmark on the 11th of march in week 11, all workshops were cancelled indefinitely. Given the amount of produced and prepared material, it was decided to continue the thesis with focus on playful learning and co-creation processes, though co-creation became secondary due to the conditions. The thesis further included interdisciplinary work between Urban design and Industrial design students with information sharing, common meetings at Kærbyskolen and the initial 'on site' workshops being planned together.

As a result of the lockdown the planned workshop changed into a minor digital design task for the students to be entertained and gain new knowledge at home, resulting in a minor involvement than planned. Their workshop outcome has been included in the design process of Kærbyskolens schoolyard. In the reflection, thoughts of how this possibly could have affected the design is discussed. A further effect of the lockdown was the inability to have physical encounters in our group, resulting in all communication being conducted digitally.

ABSTRACT

RESUME

Going to school is about more than just learning scholarly subjects. It is also about developing personal competencies. Considering Danish schoolyard renovations during the past decade, it is evident that an emphasis has been put on movement and physical activity, arguing that it enhances children's well-being and ability to learn, though *'physical'* is only one competency that is developed during childhood. Aiming at including the development of more competencies through schoolyard renovations, this thesis seeks to investigate how '*playful learning*' can support children's learning and how it can aid co-creating with them, when designing their schoolyard. Building on existing theories of playful learning and co-creation, it is asked as to what the benefits are, how academic and practical knowledge can aid the inclusion of it when designing, and how it can be integrated in a physical design while encouraging co-creation with children. In this context, playful learning is therefore defined as a way for children to learn unknowingly through play, thereby developing the five competencies; *emotional, creative, cognitive, social* and *physical*. Co-creation is further defined as a way of designing *with* children instead of *for* children, utilizing playful learning when doing it.

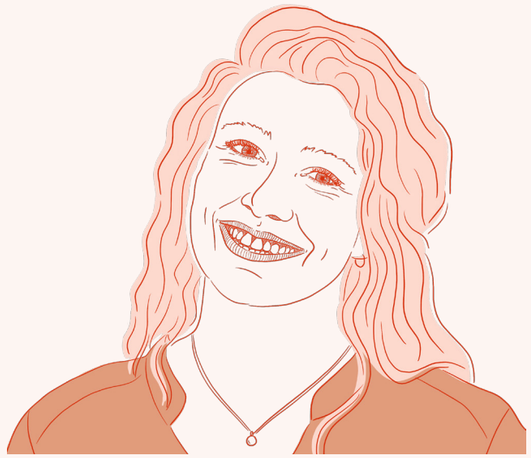
Rooted in a review of literature on playful learning and co-creation, experts were interviewed, reference studies of renovated schoolyards were conducted, a co-creational workshop was held, and analysis of the case schoolyard was performed. These initiatives resulted in a design guide, based on academic and practical knowledge, which was then applied to the case schoolyard; Kærbyskolen in Aalborg, Denmark, where a design was developed. In conclusion, it was discovered that playful learning can afford the five competencies when integrated in a schoolyard and that it can be integrated in a physical design by focusing on what you wish to gain from it, which includes the five competencies. It can further be concluded that playful learning through co-creation is not about the physical design but instead about the children being and feeling heard, while developing a preceding relationship to their new schoolyard.

BEHIND THE AUTHORS

ABOUT US

As urban designers, we are driven to shape the world we live in for the better, but we are not alone in shaping the future. We aim at listening and involving the users of the urban spaces, admitting that we as designers do not have all the answers without integrating the end users in the process. With a playful mind we aim at emphasizing the importance of designing spaces not only for children, but with children. Through playful learning we stress the importance of play in children's upbringing and how playful designs can help a community.

***III. 1** Authors illustrations*



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2019 Internship at Randers Arkitekten, Randers

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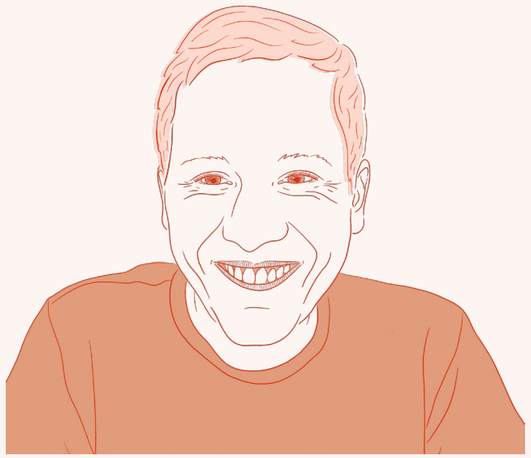
My passion lies within the analytical field of urban design – How we move through the city, what affects us and why. I believe in a strong theoretical foundation when designing, while still seeking to explore and ask questions, aiming at contributing to the continuous discussion of what a good urban space is and how we can achieve it. With a background in architecture and a master's degree in urban design, I further believe that the awareness of the interplay between buildings and urban spaces can enhance the development of a holistic city together with the inclusion and reintroduction of nature.



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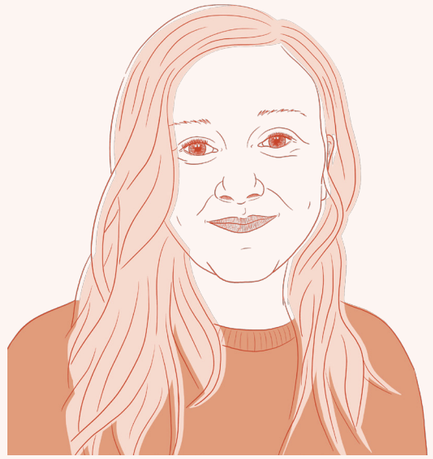
An urban designer should involve end users in the process - we are not experts in any field, we are generalists who find the solution together. As an interdisciplinary student with a bachelor in urban planning and a master in urban design, I find a holistic approach fascinating when developing cities. How do we design for everybody in a city? Ideas can be born from a creative designer who interacts with locals or a planner with a philosophic mind. When collaborating across professions, with the addition of locals, we can create the closest possible outcome to a perfect design. We should include each other, not exclude.



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As an Urban Designer I feel a responsibility when designing for people. I believe that involving and integrating local users in a collaborative process not only affects the final design but also makes the process more dynamic, inventive and instructive. Thus emphasizing a knowledge sharing society and resulting in physical design that respects and enhance the local values as no place is identical. As an urban designer I have the possibility to affect the way we handle the present global problematics, seeing these as potentials for positive change instead of obstacles creating more social and harmonious places to live.

LIST OF CONTENT

OVERVIEW

INTRODUCTION
THE BEGINNING

Context of the study

Children today must consider and have an opinion about problems that were not relevant 20 years ago. From today's online bullying, loneliness and eco-anxiety to older and more commonly known problems such as obesity and school bullying (Pawlowski et al., 2019; Andersen, 2008b). At the same time children's voices are getting louder and more influential, like Greta Thunberg at the UN Climate Conference in 2019 (Nissen and Vestergaard, 2019). Even the danish prime minister, Mette Frederiksen, made a special press conference for children during the corona lockdown (Scheel, 2020).

Children are not only growing up faster by being connected to the internet, expectations to their performance in school are being increased as well. In 2014 the Danish school reform was implemented by several of the political parties with the purpose of enhancing children's performances on national tests and increasing their well-being, resulting in prolonged schooldays and more targeted learning (Bjerril, 2018). However, school is not just about national tests and good grades. According to the shared governmental legal information, going to school is also about learning basic life skills and shaping children's future from an early age, about learning how to solve problems, socialize and behave (Retsinformation.dk, n.d.). These skills can be developed in schoolyards, with no formal learning objectives, where children have the opportunity to play and develop in an informal space, and where play can act as a gateway for learning unknowingly.

Schoolyards often manifest as flat grey surfaces, which does not inspire movement or physical activity (van Dijk-Wesselius et al., 2018; Realdania, Lokale og Anlægsfonden and Kræften Bekæmpelse, 2017). Though, in recent years a wave of schoolyard renovations have begun, focusing on physical activity and movement as a result of studies stating that enhanced physical activity improves children's well-being and ability to learn (Realdania, Lokale og Anlægsfonden and Kræften Bekæmpelse, 2017). In general there has been a larger focus on physical activity with various initiatives such as "*Speed up the schoolyard*", "*All children rides bicycles*", "*Get recess started*" and becoming DGI certified (Own translations. Realdania, n.d.; Cyklistforbundet, n.d.; Dansk skoleidræt, n.d.; DGI, n.d.), furthermore, Aalborg Municipality, Denmark, has also deemed 2020 as the year of physical activity (Aalborg kommune, 2020), encouraging children to move and become more active.

Focus and relevance

The aspect of children learning unknowingly have been praised in academic writings, with *'learning through play'* as the state-of-the-art method (Zosh et al., 2017; International School of Billund, 2019; Jelic et al., 2020). While *'learning through play'* and schoolyard renovations have been studied and explored separately, limited studies have directly tackled the concept of *'learning through play'* in schoolyards.

An initiative from 2010 called *'Speed up the schoolyard'* discovered a general need for an update of the Danish schoolyards to help increase physical activity and play on school grounds, with results from 2017 proving the benefits of innovative and creative schoolyard designs. (Realdania, Lokale og Anlægsfonden and Kræften Bekæmpelse, 2017)

The importance of schoolyard renovation can further be implied by the UN DESA (2018) stating that it is assumed that 2/3 of all people will live in urban areas by 2050, which causes Jelic et al. (2020, p.42) to derive that: "*most of the world's children and young people will grow up in urban contexts from this time forward. In other words, the childhoods of the future will be largely urban childhoods*". With this number of children possibly growing up in urban areas, it is therefore important to enhance and use the open public spaces that will be available to children wisely.

When looking into schoolyard renovations and the need herof, it is evident that recent renovations have been focusing on enhancing physical activity, safety and spaces designed for outdoor teaching (Realdania, Lokale og Anlægsfonden and Kræftens Bekæmpelse, 2017b; Conference for playground-makers, 2020; UNIQA, n.d.a; Astrup, 2020). In addition to these initiatives and their ability to enhance activity levels and academic skills, the need for a more holistic approach to learning embracing the option to include life-skills, is called upon.

The concept of *'playful learning'* introduces children to the experience of learning through play unknowingly, making it a fun and engaging way to acquire knowledge that will be easier to remember afterwards (UNIQA, n.d.a; UNIQA, n.d.b). Playful learning also makes it possible for children to either play alone, in groups or while being guided by an adult, and can provide an output that can be explained as a learning-to-learn skill, which will aid children in the development of future skills. These skills are also important when tackling the problems that children face today, including the earlier mentioned bullying, loneliness, eco-anxiety and obesity, as playful learning can have a positive effect on physical activity, social interactions and emotional well-being. (Zosh et al., 2017; Jelic et al., 2020)

In relation to schoolyard renovations, playful learning is also a relevant topic when looking at co-creation with children, as younger children's voices are limited (Spyrou, 2011) hereby making it difficult for them to formulate or express their specific wishes for a new play area. Here playful learning can aid the process when including young children in the conceptual phase of a design, while adolescents might be better at communicating what they want in a schoolyard.

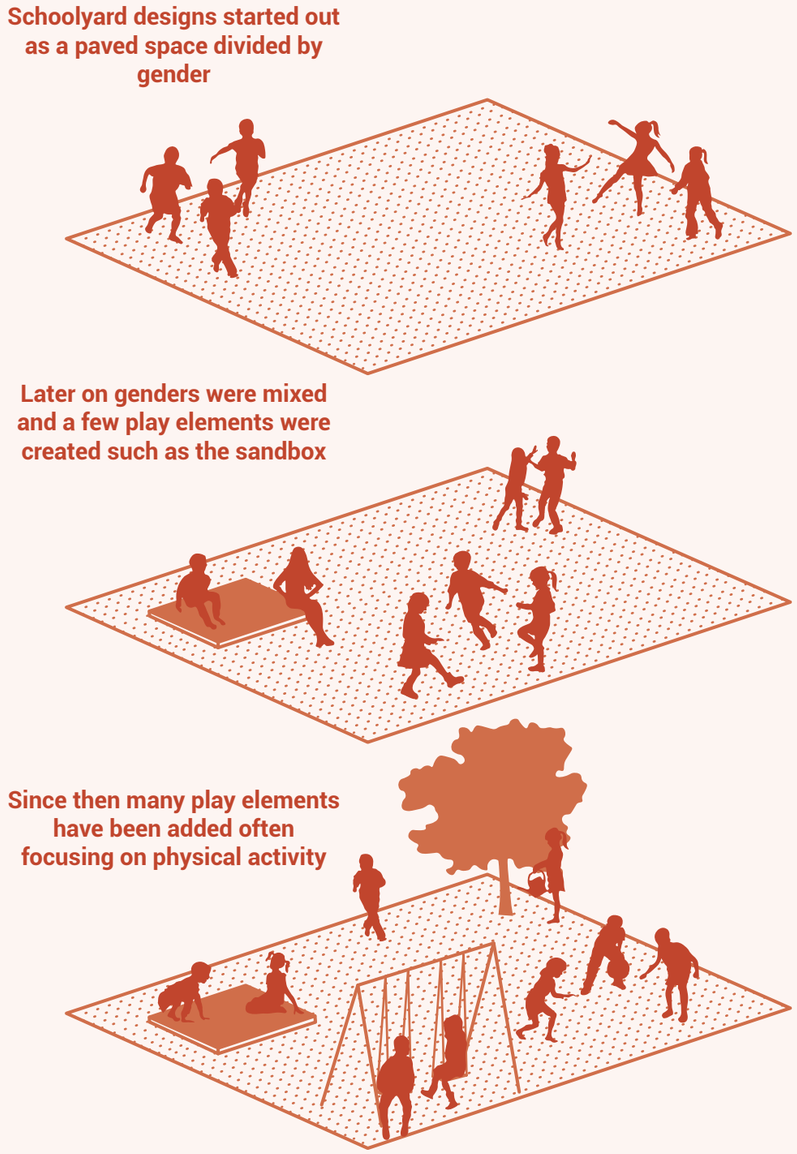
An issue when co-creating with children has proven to be the amount of resources and time it needs as it is something that is still fairly new in the urban design field (Jelic et al., 2020). With Realdania, CoC Playful Minds, LEGO and OP & NED as representatives of the inclusion of children in the design process (Realdania, Lokale og Anlægsfonden and Kræften Bekæmpelse, 2017b; OP & NED, n.d.; Larsen, 2020; CoC Playful Minds, n.d.), it is relevant to investigate how schools, municipalities and clients can become more keen on including children in the design processes in general, making this the norm instead of the exception. It is further argued that if you design for children you design for everybody (Astrup, 2020; Mintzer, 2020), meaning that showing consideration to children's needs will include elders, handicapped and other restricted population groups. Schoolyards are ideal places to start as these are spaces made specifically for children. It can be argued that if it is not possible to co-create with children here, how should it be possible to include them in the future, when designing new urban spaces in the city?

In general there seems to be a need for adults to level with children and learn how to understand their unique ways of seeing the world, which is a great skill to acquire in times like these where children's voices are given more importance.

Danish schoolyards

When questioning the need for schoolyard renovations, no specific data on the amount, size or age of danish schoolyards were found, though building data have been available to some extent. In Denmark there are presently 1640 elementary schools counting both private and public institutions (Børne- og Undervisningsministeriet, 2020d). Therefore, it is derived that an equal amount of schoolyards are adjoined. Danish schools were generally built during the late 19h century and early 20th century (Attwell, et al., 2004) thus adapted to a different school system than seen today, with many schools having undergone multiple renovations and extensions.

Since year 1524 breaks during school days have been registered, because of children's need to move. It was not until the 1850s where the traditional schoolyard was created, an asphalted area separated by gender (Københavns Lærerforening, 2018). In the 20th century change happened in the educational style, focusing more on creativity, prompting the introduction of sandboxes in the schoolyards, to emphasize children's motor skills and play (Københavns Lærerforening, 2018). In modern times children's well-being is emphasized and schoolyard renovation is often focusing on movement and physical activity responding to the increasing obesity and sedentary lifestyles. In 2013, 106 danish schools applied for funding through Realdanias campaign "*Speed up the schoolyard*" (Own translation), where seven schools were granted money and afterwards renovated (Realdania, n.d.). Thus emphasizing the need to update danish schoolyards to match the modern education system and respond to the present culture.



III. 2 *Danish schoolyard development through time*

AIM & OBJECTIVES

This thesis aims at investigating how playful learning can support children's learning when integrated in a danish schoolyard. It further seeks to communicate an opinion on how schoolyard designs should be executed in the future and why a playful learning approach is important when including children in the design process.

This aim is inspired by the pressure that is put on children today, through national goals of enhancing academic performances, at the expense of children's free play and space to grow at their own pace. It will further be supported by a literature review of contemporary research, grey literature and academic papers, and will be aided by the following research questions:

THEORY

What are the benefits of playful learning and how is it visible in modern schoolyards?

DESIGN GUIDE

How can academic and practical knowledge aid the inclusion of playful learning when building or renovating schoolyards?

DESIGN

How can playful learning be integrated in a physical design and encourage a co-creational approach with children?

METHODOLOGY
APPROACH

Chapter introduction

This chapter describes the methodological approach and selected methods applied in the project, what they contributed with and why they were important to include, when seeking to answer the previously presented research aim.

This thesis has been divided into three research phases as shown in ill. 3. These phases link to each objective and present the applied methods for each phase.

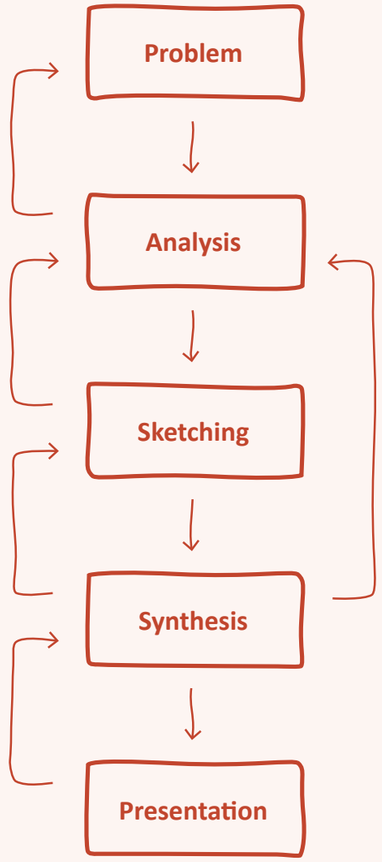
Research phase	Objective	Method
Phase 1: Collecting information	**Links to objective 1:** *What are the benefits of playful learning and how is it visible in modern schoolyards?*	Literature review Fieldwork - Semistructured interviews - Online lecture - Conference - Reference studies
Phase 2: Developing a tool	**Links to objective 2:** *How can academic and practical knowledge aid the inclusion of playful learning when building or renovating schoolyards?*	Assemblance of academic theory and practical knowledge
Phase 3: Designing a schoolyard	**Links to objective 3:** *How can playful learning be integrated in a physical design and encourage a co-creational approach with children?*	User involvement - Digital workshop Mappings Atmosphere

III. 3 *Research phases*

Project approach

The frame of the project is based on *Problem Based Learning (PBL)*, thus finding a problem in society and formulating a statement to serve as a starting point. Through research and investigation of the problem, a solution or strategy to comprehend the problem is proposed based on theoretical framework and empirical knowledge. The empirical and theoretical knowledge forms a common discussion to propose the best solution. (Askehave et al., 2015)

The Integrated Design Process (IDP) by Knudstrup et al. (2005) has further been used during the development of the thesis, as information has been collected, investigated and discussed, leading to new questions and information that redefines or affects earlier phases, hereby creating an iterative process.

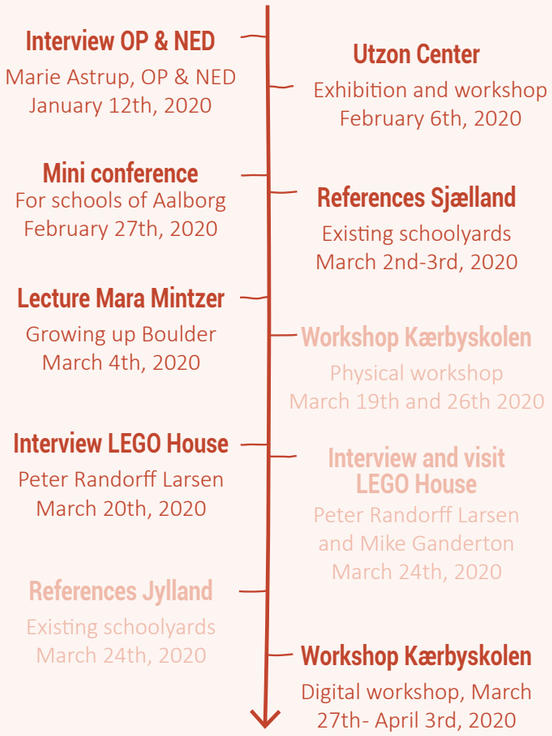


III. 4 *The Integrated Design Process*

PHASE 1

Collecting information

Based on the initial thesis proposal, the first phase focused on collecting information, changing and rewriting the theme and identifying key authors on the topics of playful learning and co-creation through a literature review. It further sought to include knowledge from experts on the field and reference studies of newly built or renovated schoolyards to gain a stronger foundation of knowledge. It was during this phase that the thesis theme *'playful learning'* and the knowledge gap between playful learning and how it can be implemented when renovating or building a schoolyard, was identified.



III. 5 *Timeline for research - Light red is cancelled plans*

Literature review

The literature review outlined a theoretical discussion based on multiple peer-reviewed journals and grey literature of topics related to children and play in various situations. Search keywords included: *Children, Play, Learning, Schoolyard, Playful Learning, Green schoolyards* and *Physical activity*. A mixture of different literature sources, both academic and non-academic was sought to develop a general knowledge within the field. Furthermore, reviews were read from a critical viewpoint as the information in these was investigated based on the authors agenda. Therefore, relevant referenced sources were further examined to validate the extracted information and ensure that no important findings, relevant to this thesis, were omitted.

Two reviews by Jelic et al. (2020) and Dilling & Tanggaard (2019), were selected and examined based on their thematics being similar to this thesis topics; *'playful learning'* and *'co-creation'*, with co-creation as the secondary topic made possible through playful learning. Thus, this thesis literature review is not case or site specific, but a wider understanding of the topics, with these having formerly been researched as isolated themes.

Practitioners and reference studies

To collect practical knowledge about *'learning in schoolyards'* and *'co-creation'* today, a number of initiatives were employed. The executed fieldwork can be divided into five parts; the Utzon workshop, the Utzon exhibition, expert interviews, a playground conference and reference studies. These five represent first-hand data and serve the purpose of providing a wider perspective than what was gained from academic knowledge.

The architectural exhibition *'Space Crazy'* and an additional workshop was observed at Utzon Center, the nordic center for architecture. The purpose of observing *'Space Crazy'*, was to discover how children interact and play with the exhibition, which acted as many innovative playscapes to explore. The additional workshop was observed to acquire knowledge on how it was executed in relation to getting children to create and be creative within a fixed frame.

A playground conference, with manufacturers showcasing products and design methods, was attended together with Kærbyskolen with the purpose of investigating how schoolyard designs are executed today. Further investigation on today's schoolyard designs were conducted through reference studies of schoolyards renovated or built within the last decade. This was accomplished through a field trip, where observations and information was collected, with the purpose of obtaining knowledge about current trends and designs. The field trip initially included schools across Denmark, but was cut short due to the lockdown, resulting in the inclusion of schools on Sjælland only. The schools were selected based on internet searches, participation in the project "*Speed up the schoolyard*" (Own translation, Realdania, n.d.) and recommendations from the playground conference.

Two semi-structured interviews, based on the approach of Andersen (2008a), were conducted respectively with Marie Astrup (2020) from OP & NED, a firm designing innovative urban spaces for children, and Peter Randorff Larsen (2020) from LEGO House, the world's largest playhouse for children, focusing on learning through play. The semi-structured interviews were based on previously acquired academic information on the topics of playful learning and co-creation. Therefore, an 'interview guide' with notes and questions had been produced, while still being open to new information and discussions, allowing the possibility of elaborating on certain topics and initiating a free-flowing conversation. This approach served the purpose of acquiring knowledge about how the experts work with playful learning and co-creation, hereby providing in-depth information from practitioners.

Furthermore a digital lecture with Mara Mintzer (2020) from Growing Up Boulder was attended with the purpose of acquiring additional knowledge about co-creation and how she works with children.

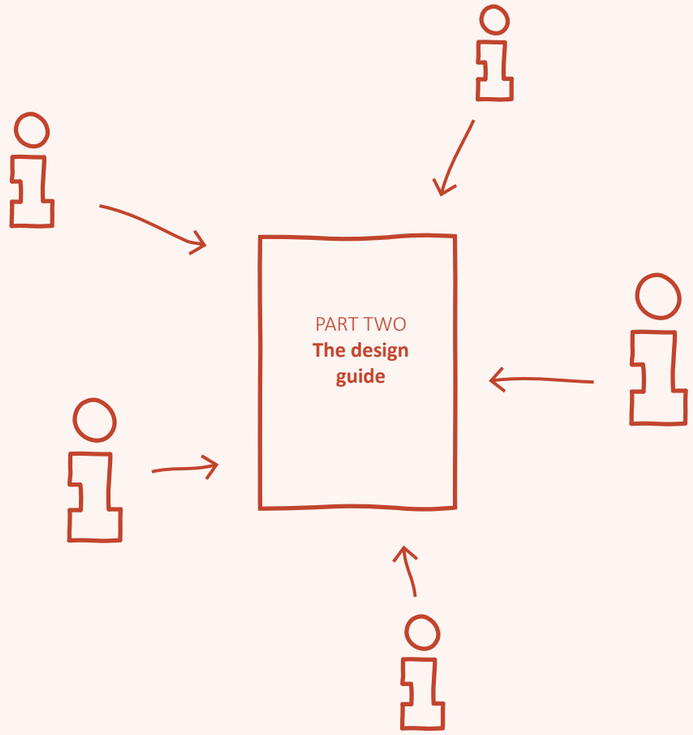
III. 6 *The five parts of practical fieldwork*

PHASE 2

Developing a tool

Through the literature review and the practical knowledge collected, the purpose of the second phase was to develop a tool providing a tangible overview of recommendations for designing a schoolyard where playful learning would be included. These recommendations were developed through the assemblance of academic and practical knowledge, hereby cross referencing the information to reveal inconsistencies and compare arguments.

III. 7 *The design guide communicating information from The knowledge compilation*



Methodology - *Approach*

PHASE 3

Designing a schoolyard

Based on the developed tool, the third phase seeks to implement playful learning in the design of a new schoolyard. This phase further included user involvement, mappings and sketching, as these methods provided insightful information when designing. Lastly, visualisations and a final masterplan was produced to show how playful learning was incorporated into the design.

Co-creation

As an evaluation of the schoolyard and its condition had previously been conducted (Rossel+Arkplan, 2018), it was the intention to carry out a different type of design process where user involvement focused on co-creating with children through playful learning. Initially, a brainstorm installation and focus group workshop had been planned with the school. The brainstorm installation was intended for 0th to 2nd grade and would have been executed through creative drawings and words on each student's individual speech bubble. Furthermore, the 0th to 2nd grade students would have been given a colored sticker and asked to place it on their favorite spot in the schoolyard, to provide quantitative information regarding favored play elements and spaces in the yard. These two types of user involvement would then have been the foundation of the focus group workshop, where student body representatives from 3rd to 6st grade would have experienced a day as 'mini-designers'. They would have been subjected to trying a mini design workshop, going from obtaining knowledge about schoolyards in general, to being context specific at Kærbyskolen and lastly come up with their own creative ideas for a new schoolyard element through the work with physical models.

Instead of conducting workshops at the school, user involvement became possible through digital communication to the students through the school. An instructional video and additional documents with the students assignments were sent out as a voluntary assignment to all students at the school. In total 24 answers were received. This method of user involvement focused on co-creation through playful learning and served the purpose of gaining creative inputs from children representing all age groups attending the school.

Mappings

To obtain knowledge about the site, mappings of Kærbyskolen were produced with the intention of gaining an overview of the school's context and current conditions. These mappings contain observations of site functions, movements, surfaces and site boundaries and represent relevant information aiding the identification of the sites opportunities and limitations, which was useful to the design process.

Atmosphere

Inspired by the writings of Norberg-Schulz (1979) regarding a site's spirit, atmospheric illustrations were made to encompass and showcase elements that would provide a sense of place. The illustrations were therefore made to communicate how the atmosphere felt when moving through the site.

LITERATURE REVIEW
THE ACADEMIC RESEARCH

Chapter introduction

The aim of this chapter is to provide an understanding of the focal point in the thesis. A thorough elaboration on theory is divided in three themes; *The danish school system, Playful learning* and *Co-creation of children's playscapes*. The chapter explores how school systems are established, how playful learning can be integrated in an existing outdoor institutional area and how it can support children's development. Furthermore, it is relevant to define what playful learning is and why it is important to implement. Finally, co-creation is defined, as the approach originated in the concept of playful learning when performed together with children.

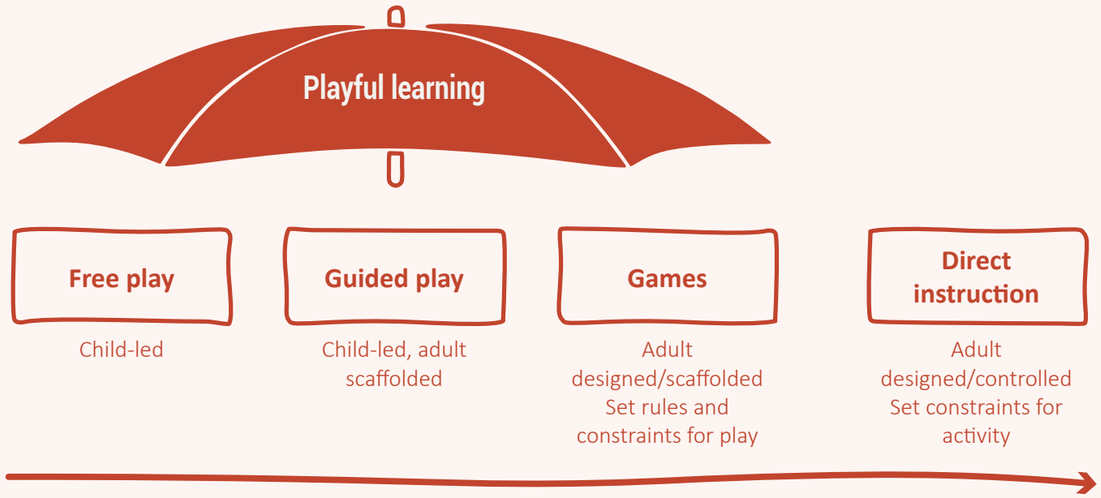
The danish school system

Danish children today spend a minimum of 10 years in the educational system, starting when they turn 6 years old, due to the compulsory education in Denmark (Børne- og Undervisningsministeriet, 2020a). Based on a school year containing 200 schooldays (Aalborg Kommune, n.d.b), children today will spend an average of 6,3 hours in school everyday including an average of 1,33 hours set aside for breaks and assisted teaching (Børne- og Undervisningsministeriet, 2020b), where assisted teaching consists of exercises or activities supporting children's academic skills or personal development (Børne- og Undervisningsministeriet, 2020c). With the amount of time spent in school, during the ages between 6-16 years old, it enhances the importance of why this space should be an advocate for playful learning and children's self-development.

By providing a free educational system, Denmark also meets the requirements of the UN Convention on the Rights of the Child, where 54 articles pose as rules and guidelines for children's rights in their countries (Red Barnet, n.d.). With children's well-being in mind the convention tries to ensure that children have access to basic necessities for survival, but also opportunities for self-development, which includes: "*access to education, leisure time, play and information*" (Own translation. Børnerådet, n.d.). By danish law elementary schools are also required to aid childrens' understanding of the interplay between humans and nature, teach them about joint responsibility and societal responsibilities, educate the younger children through games and stimulating activities, and organize class hours to include physical activity and movement every day (Retsinformation.dk, n.d.). Therefore, going to school is more than learning what is in the books, it is about learning to be a decent human and acquiring everyday life-skills. It is also about growing up in a healthy and social environment where good habits are implemented and encouraged through positive and engaging experiences, which is the exact purpose of playful learning.

Playful learning

Playful learning is an umbrella term covering different types of play (see ill. 8). As explained by Zosh et al. (2017) *'Free play'* allows children to explore and play without major constraint, *'Guided play'* is a structured version with minor adult intervention and *'Games'* are adult designed play with specific rules for participating. They all cover different types of play, but the point is that: "*learning through play can happen through free play and when adults or aspects of the environment structure the play situation towards a particular learning goal.*" (Zosh et al., 2017, p.13)



Ill. 8 *Playful learning (Zosh et al., 2017, p.13)*

The important aspect of playful learning is its holistic approach to the term *'learning'*, since it does not only concern learning a certain topic. As Zosh et al. (2017) states, research reveals that the development of a skill in one area can influence the following development of a skill in another area, including physical, social, emotional, cognitive and creative skills being viewed as interconnected pieces. This can further connect to the possibility of enhancing classroom learning through playful skill development during breaks and playtime. Zosh et al. (2017) continues by pointing out that playful learning is about learning-to-learn skills, which are skills that allows children to obtain a deeper understanding of what they have learned and hereby transform and connect conceptual principles to real-life situations and experiences.

This deeper understanding and the following optimal learning are explained as something that occurs when an activity:

"(1) is experienced as *joyful*, (2) helps children find *meaning* in what they are doing or learning, (3) involves active, engaged, *minds-on* thinking (4) involves *iterative* thinking (e.g., experimentation, hypothesis testing), and (5) involves *social* interaction (the most powerful resource available to humans - other people)."

(Zosh et al., 2017, p.16)

It should be noted that all five aspects are not required at all times but should be experienced at some point to create a positive learning experience. Furthermore, children should experience a sense of agency and it is suggested that joy, meaningfulness and active engagement, are the key factors when learning, while iterations and social interactions are viewed as supporting characteristics enhancing deeper learning. (Zosh et al., 2017)

Parker and Thomsen (2019) further develops on these five aspects by mapping integrated pedagogies onto them with the purpose of applying them to a primary school learning context. Detailed descriptions of each extended aspect can be found in Parker and Thomsen (2019, p.9). As shown here, playful learning has been researched in relation to schools before but with a pedagogical purpose and academically oriented outcome, therefore it is still lacking information on playful learning in relation to the outdoor build environment of schoolyards and their role as informal learning spaces.

In a literature review by Jelic et al. (2020) it is investigated why play and playful learning matters in children's lives and why their agency then matters in the build spaces. It is argued that play during early childhood contributes to brain development and consequently the development of the previously mentioned five aspects, furthermore, it is suggested that play positively affects children's ability to make decisions, control their temper and interact with others (Jelic et al., 2020). With the rising number of positive effects from play, it has been highlighted as a right and not a luxury, hereby making it a matter of public health and therefore necessary to keep in mind when considering where and how children play (Jelic et al., 2020). In relation to the amount of time children spend in school and the fact that there is a focus on their personal development during childhood, playful learning has the potential of becoming a useful tool to implement in the outdoor institutional spaces.

When looking at children as agents in the built environment, Jelic et al. (2020) states that they are both affected by and affecting their environment and that: "*the way children interact with the built environment is always relational and depends on children's skillful bodily and cognitive abilities.*" (Jelic et al., 2020, p.47). It is further stated that cities today are designed with adults in mind, leaving designated areas for children to play. When children then play in an adult area, they will adapt and use the space in a different way than originally intended, leading to adults deeming it as inappropriate, trivial or dangerous behavior. Instead of seeing this behavior as a problem, it is suggested that: "*By being and playing in places children learn how to participate in collective social practices as well as to develop their own identities*" (Jelic et al., 2020, p.59) and that there is a need for open and non-standardized spaces for children of all ages and abilities, where they can grow, challenge themselves and explore their creativity. (Jelic et al., 2020)

Co-creation of children's playscapes

User based design is highly used in the field of architecture and urban design, but when the user is a child there seems to be problems involving them in the process and design, often because of the different mindsets of adults and children (Bo and Gehl, 2003). Many co-creation studies with elder students regarding school curriculum has been performed, but there is a lack of studies implementing younger children in the co-creation of built playscapes resulting in physical designs and not only tokenistic use of children (Cook-Sather et al., 2014; Healey, Flint & Harrington, 2014 in Bovill, Könings, and Woolner, 2017; Jelić et al., 2020).

Reviewing the UN Conventions Rights of the Child, article 12 emphasizes the importance of the child's opinions: "*Every child has the right to express their views, feelings and wishes in all matters affecting them, and to have their views considered and taken seriously. This right applies at all times, for example during immigration proceedings, housing decisions or the child's day-to-day home life*" (Unicef.org.uk, n.d.). Hence there is a need to involve children in the process of designing their own playscapes. Rasmussen (2004) emphasizes that adult designed *'places for children'* not necessarily becomes *'children's places'*, stressing that children need to engage physically and emotionally to a place for it to become a value in the child's life. Thus highlighting that adults should not design playgrounds *for* children, but *with* children and giving the possibility for children to engage earlier with the playground through a co-creational process.

Co-creation is an ambiguous term related to both a process, a practice and a method. Many different models have been created to better communicate the interchangeably meaning of co-creation (Dilling and Tanggaard, 2019; Bovill, Könings, and Woolner, 2017) though often lacking the flexibility and fantasy that occurs when co-creating with children (Dilling and Tanggaard, 2019). To define co-creation Dilling and Tanggaard (2019) review of multiple articles on co-creation in relation to children, has been the base for a common definition for this project. Co-creation is about more than a normal user involvement and demands a greater wish for everyone involved to not only understand the different needs but to learn and engage with the involved to achieve a common goal.

Involving children in a co-creational process can be a goal in itself because of the learning process. Co-creation is proven to have many different benefits, it is meaningful for children to be heard and involved in a democratic process hereby understanding how it is to be a part of a community and it improves their curiosity and their creativity while encouraging critical thinking. In a co-creational mindset, the process is often chaotic, intransparent and playful which gives children an advantage and invites adults into the childish mindset to better understand the needs of a child. (Dilling and Tanggaard, 2019)

Co-creation is demanding a lot of the involved stakeholders, especially adults. Power is to be given to children, the process is longer and more complicated, demanding more time and resources and evaluations throughout the process is needed regularly, hence why many people do not understand the need to involve children in the process. (Dilling and Tanggaard, 2019; Jelić et al., 2020)

Summation of playful learning in the built environment

Children aged 6-16 years old spend a majority of their time in school while growing up, deeming this an important space for self-development and growing. School is about learning certain subjects but also about learning how to be a decent human and obtaining skills regarding characteristics such as the physical, social, emotional, cognitive and creative ones. These skills can be developed through playful learning, a holistic approach to learning that concerns both academic and human skills, hereby interlacing these and stating that the development of one skill can positively affect the development of another.

The aim of incorporating playful learning is to further help children's development, and implement good habits through positive and engaging experiences, which can happen through a controlled situation defined by an adult or in free playing controlled by the child. With playful learning having formerly been researched with a pedagogical purpose in relations to schools, a gap has been identified regarding playful learning in relation to the build environment of schoolyards. Co-creation and playful learning is closely related by being playful, self-developing and an insightful method to involve children. Even though co-creation has been a term in many years by different names, it is neglected in many processes due to the time consuming task and resources it takes to involve children on a deeper level and the complexity of integrating their creative input into a physical design. It can be derived that adults should design *with* children and not merely *for* children, as they are the primary end user of the schoolyard. They have knowledge, intel and ideas which adults would not think of and they are active participants in society.

PRACTICAL KNOWLEDGE

THE PRACTICAL RESEARCH

Chapter introduction

Taking a step back from the academic field and looking at society today, the involvement of children do happen on occasion. As new schoolyard renovations are being initiated, it is relevant to investigate how schoolyards have been built and renovated during the last decade and how practitioners design with and for children today.

This chapter presents a collection of knowledge from the practicing field, which include observations at Utzon Center, reference studies of newly built or renovated schoolyards, interviews and a digital lecture with practitioners and through participation in a playground conference. The collected knowledge has been divided into three categories, with the experts providing a variety of information as seen in table 8.

	Utzon workshop	Utzon exhibition	Marie Astrup	Peter Larsen	Mara Mintzer	Mini conference
Playful learning	X	X		X		
Co-creation	X		X	X	X	
Info/ recommendations	X	X	X	X	X	X

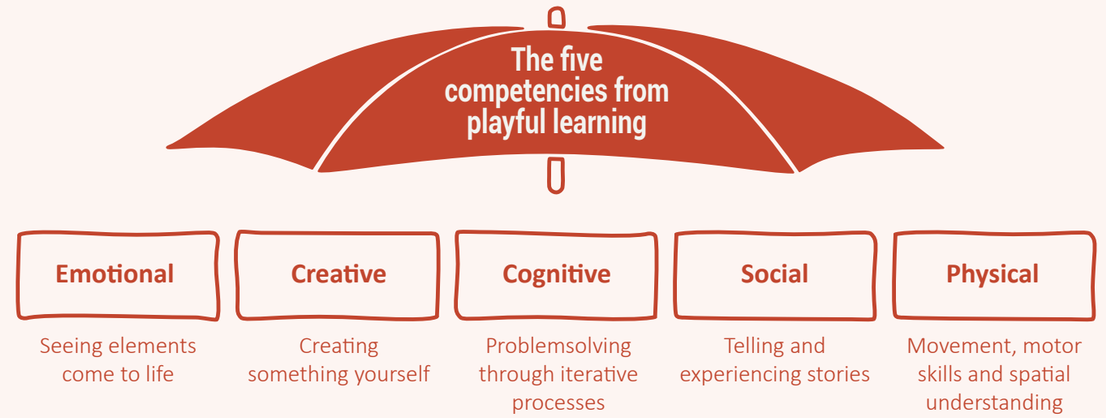
III. 9 *Overview of expert knowledge divided in themes*

PRACTITIONERS

Playful learning in practice

With the purpose of LEGO House being to represent *'learning through play'* and with the opinion that *'Play matters'* and should be taken seriously, a recommendation from Play Specialist, Peter Larsen (2020), when designing for playful learning in practice, is to design for competencies instead of themes. When designing for competencies a larger awareness of what children can learn is created, where themes such as '*pirates*' do not reflect the same awareness (Larsen, 2020). LEGO House is based on the five competencies; *emotional, creative, cognitive, social* and *physical*, and all activities are related to either one of them, thereby not excluding others, but simply focusing on one when being developed (Larsen, 2020). This results in a play area where children through play, can acquire certain competencies that might affect the development of others. The Utzon exhibition (Klok, 2020) further highlights children's free play and creativity, as the children modified the use of sack cushions from objects for seating to objects for sliding. This behavior was observed on multiple occasions, proving how children are innovative and creative while playing, stating that it is fun because it is different (Klok, 2020).

When investigating how playful learning was expressed during guided play both Larsen (2020) and the Utzon workshop (Klok, 2020) provided insights. At the Utzon workshop (Klok, 2020), students from 8th grade were assigned the task of designing their own houses in small groups. This task was guided by a teacher and it was observed that they learned to cooperate, used their bodies to understand heights and got to work with their senses. At LEGO House Larsen (2020) describes how *'guided play'* is still play and that adults can have relevance in a play context. While free play with Lego can be fun and educational, the experience of assembling a car or a plane with guidance from an adult can also be viewed as fun and educational (Larsen, 2020). Both types of play can therefore support the development of skills, with free play supporting creative thinking, while the assemblance of a car can support cognitive skills. Larsen (2020) further explains LEGO Houses *'learning through play'* perspective as being balanced between chaos and order, with children needing to understand the chaos and creative ideas, but still be able to understand the structures they live within.



III. 10 *The five competencies from playful learning according to LEGO (inspiration from ill. 7 by Zosh et al., 2017, p.13)*

Co-creation in practice

When designing with children it is evident that they are not educated designers, as they lack an understanding of scale, distances, people's movements and 2D plan drawings (Klok, 2020; Astrup, 2020). Instead children have important creative inputs and should be seen as equals to a reasonable extent, while using designers who are able to relate to children's mindsets and hereby extract and interpret their ideas (Astrup, 2020; Larsen, 2020). It is further noted by Astrup (2020) that:

"Most people experience children's ideas as inferior and ugly. That crooked and crazy, as children most often deliberately are drawing and creating, are sweet on paper but in the urban space we have a tendency to choose the streamlined and only choose the crooked one if there is a recognized artist behind."

(Astrup, 2020, Own translation)

Supporting the statement of children and young people being more creative and flexible than adults are Mara Mintzer (2020), who further explains that the inclusion of children and young people, can have an effect on vandalism and violence, as a result of a community designing together.

Specifying on how to design with children, it is evident that things should be explained multiple times and in various ways to ensure that everybody understands (Klok, 2020; Astrup, 2020). Astrup (2020) elaborates that artefacts and conversations about feelings or needs can be used instead of talks about actual play elements. From the Utzon workshop (Klok, 2020) it is further observed that assignments should be specific, children work at different speeds and that the level of concentration declines after lunch. Continuing the topic of children's creativity with Mintzer (2020), the question of children being stuck in what they know was asked. Mintzer (2020) suggested that designers should start with children's uninfluenced ideas and then afterwards stretch their knowledge through references, making them point out which ones they like. In this way, children's creativity can move from chaotic and free flowing, to tangible and structured. Lastly, Mintzer (2020) further notes that it is important to show children that their work is integrated when designing with them, to show that they are being heard.

Other relevant information and observations

Apart from information about the thesis themes; *playful learning* and *co-creation*, other important inputs from the practitioners have been highlighted. When looking at play, Larsen (2020) states that play is serious because you learn through it. He further explains that:

"There is a political challenge in parents thinking it is important to learn, while it is not the same if you ask if it is important for your child to play. It is easier to communicate *'play'* when you connect it with *'learning'*."

(Larsen, 2020, Own translation)

This statement of viewing play as something serious, relates to the Utzon workshop (Klok, 2020) through the observations that children continued to measure and work during their break because it was fun. They tried methods, which architects and designers use in practice, hereby proving that what they learned while playing and attending the workshop, can be transferred to a live scenario. Apart from the workshop, it was observed that the Utzon exhibition (Klok, 2020) was used by all children, including older students who would normally watch youtube during their break. The Utzon exhibition (Klok, 2020) further proved, through its giant houses, how technology can be incorporated in a positive and playful way, by taking pictures while interacting with the exhibition.

The topic of designing for children, let it be noted that this differs from designing with children, was also mentioned by two practitioners. Here Astrup (2020) and Mintzer (2020) both argue that when you design for children, you design for everybody and that children are the best indicator for a sustainable city. Astrup (2020) further mentions that designers should investigate what children need and already have, implement elements that can move and change and also create something that is right on the edge of the safety standards, as it is okay for children to get hurt sometimes.

Regarding the clients and companies building for children today, Astrup (2020) notes that clients often want a product before conducting research. She further explained that many practitioners are unhappy about the standardisation of play, believing it to originate from anxiety (Astrup, 2020). By attending the playground conference with Kærbyskolen, it was possible to converse with and see the different companies' suggestions to new playgrounds at the schools. Here the standardisation mentioned by Astrup (2020) was evident, as many companies had the same elements, but differed in company identity and their flexibility to adapt a specific design to each school. Their approaches also differed, as some companies focused on money while others focused on products, with this observation it should be noted that the event in general was sales oriented and arranged by the municipality's building administration.

REFERENCE STUDIES

Contemporary schoolyards

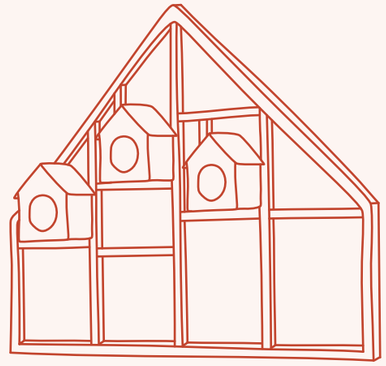
With the purpose of obtaining information about newly built or renovated schoolyards, reference studies have been conducted at eight schools; Guldberg Skole, Brønshøj Skole, Ørestad Skole, Halsnæs Lilleskole, Vanløse skole, Amager Fælled Skole, Kalvebod Fælled Skole and Skolen på Strandboulevarden. The schoolyards were observed and later five themes occured revealing both differences and similarities. The themes were *flow, identity, dynamics, social interactions* and *local community* as seen on ill. 11. The full observations can be found in appendix 5, with this chapter presenting the highlights of these.

With multiple schoolyards displaying similar initiatives, it can be derived that the schoolyard's flows were often defined by humps, suspended connections or intertwining paths, thereby connecting the area in multiple ways, affording movement and play at high speed. It was further observed that the schoolyards had their own identity, as they contained uniquely designed elements and recurring themes. When looking into the schoolyard dynamic it was evident that most places had static elements with the students acting as the dynamic element. It is speculated that this is an effect of the schools placements in urban contexts, with the risk of theft being a factor. At one school, Halsnæs Lilleskole, moveable elements were available in the shape of wood logs and milk crates, with independent thinking and creative free play being the focus. It was further observed at some schools that markings were made on the asphalt surfaces with school subject-related content. Observations on social interactions reveal that upscaled elements such as a large slide at Guldbergskolen and a rotating platform at Ørestad Skole, brought the children together. These large elements afforded several children to happily play together, with no conflict observed. Apart from the children's internal community, it was also evident that most schools had torn down walls and gates, creating transparency and thereby opening the schoolyard up to the local community, with signs inviting people in after school hours.

These observations mark the importance of diverse play opportunities, but also highlights the focus that has been placed on physical activity and movement when designing. Subject-related content was seen as implemented through markings on the asphalt, but no thoughts towards the inclusion of playful learning were evident. It can then be argued that through the implementation of playful learning, and when remembering that it is a learning environment being designed, it will be possible to incorporate both physical activity and learning, instead of only focusing on the implementation of physical activity.

Flow

Hilly flow at Skolen
på Strandboulevarden



Identity

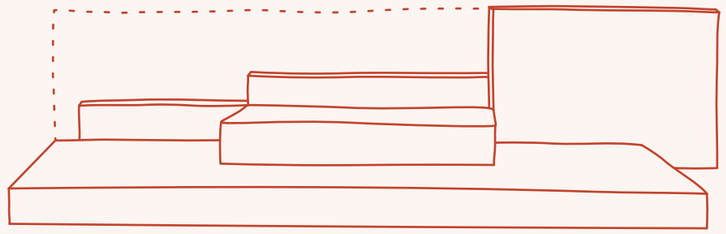
A wooden pitched roof structure
at Halsnæs Lilleskole

Social interactions

A wide slide with a climbing hill
at Guldberg Skolen

Dynamic

Static balance beam at
Vanløse Skole



Local community

Innovative wall structure
with seating areas at Amager
Fælled Skole

Ill. 11 *Reference study observations*

ACADEMIC VS PRACTICAL EXPERTISE
COLLATION

Chapter introduction

This chapter concludes the past two chapters with an assemblance of the theoretical and practical knowledge, which is compiled with the purpose of revealing similarities and inconsistencies between the two parts.

Collation

Between theory and practice *'playful learning'* is described as a way for children to learn while playing. Both practices agree that *'free play'*, *'guided play'* and *'games'* comprise playful learning and that it is about learning-to-learn skills. As observed at the Utzon workshop (2020) guided play was fun and educational, with children using their creative, cognitive and social skills, hereby supporting the theoretical statement made by Zosh et al. (2017).

It is further noted that The LEGO Foundation (n.d.) has funded multiple writings and research about playful learning and its benefits, simuntationally developing a full knowledge base. The writings of Zosh et al. (2017) belong to this knowledge base, therefore resulting in similarities to the statements of the play specialist Peter Larsen (2020), who represents LEGO House, a play-house also funded by The LEGO Foundation. Therefore similarities such as the five competencies can be found, as their incorporation into LEGO House was based on prior conducted research underlining their importance when designing for playful learning. The importance of play is emphasized in theory, explaining how skills developed during childhood affects future interactions, behavior and decisions (Zosh et al., 2017; Jelic et al., 2020). Even when based on theory and research, Larsen (2020) explained that LEGO House experiences how difficult it is to communicate the importance of play. Parents acknowledge the importance of learning, but not playing, making it evident that it can be hard to grasp the importance of play as a tool for learning (Larsen, 2020).

When comparing co-creation in theory and practice similarities are evident. Theory states that co-creation is important to children, as early engagement with a place that is being designed will enhance its value to the child (Rasmussen, 2004). This theory is supported by Mintzer (2020) who believes that it is important to include children's work as proof of them also being listened to. In practice it is noticed that co-creation with children is about using their strengths such as their creativity, as they are not educated designers (Astrup, 2020). Though in theory co-creation is more about learning through the process of designing, thereby improving their creativity and critical thinking (Dilling and Tanggaard, 2019). Co-creation is also about giving children the advantage, hereby inviting adults to play and be creative from a child's perspective, with the purpose of understanding the child's needs (Dilling and Tanggaard, 2019). This theoretical notion is supported by Astrup (2020) who argues that designers working with children need a childish mindset themselves to understand their ideas.

As co-creation is demanding, complicated and time-consuming for the involved stakeholders, theory states that many people do not understand why it is important (Dilling and Tanggaard, 2019; Jelić et al., 2020). This statement is supported by Astrup (2020) expressing sadness about the fact that clients often want a product before conducting research. Even though co-creation with children can be difficult, it is important to integrate given its positive effects. Children are the future adults and what they learn while playing and growing up will impact them throughout their lives.

DESIGNING SCHOOLYARDS

PART TWO AND THREE

From this knowledge compilation theories from playful learning and schoolyard designs have been investigated. It is time to look into the two additional reports as described below. After reading these, return to this document for the conclusion and reflection of the whole project.

Part two - The design guide

This booklet represents a collection of information derived from the academic and practicing fields. It was produced as the result of discovering a need for a tangible overview, while researching topics relevant for school renovations.

Its purpose is to act as an inspirational guide when designing or renovating schoolyards and serves as tangible recommendations for school staff, municipalities, designers, interested parents and children. The recommendations are presented as separate design parameters on each spread and provides the opportunity for schools and other stakeholders to make an informed choice when selecting elements to use in a new schoolyard design.

Part three - The applied design

This booklet presents the case specific design of Kærbyskolens schoolyard based on the previously produced material in *The knowledge compilation* and *The design guide*. Apart from being an example of how the topics from *The design guide* can be used in practice, it further includes case specific analysis and mappings, together with a digital student workshop, aiding the design process.

Its purpose is to provide a new masterplan for Kærbyskolens schoolyard with a design that focuses on playful learning and co-creation, rooted in the findings of *The knowledge compilation*. This booklet further seeks to represent how The design guide can aid the understanding of what to implement in a schoolyard, without providing a detailed step-by-step formula. It also affords the opportunity to reflect upon how *The design guide* was implemented and examine if the guide works in practice and not just in theory.

CONCLUSION

THE END

This thesis aimed at investigating how playful learning can support children's learning when integrated in a Danish schoolyard and further sought to communicate an opinion on how schoolyard designs should be executed in the future and why a playful learning approach was important when including children in the design process. To support this aim, three research questions were established, with the following text seeking to answer these and thereby the overall aim.

When investigating playful learning and its benefits, it was evident that the development of the five competencies was an important part. With the purpose being to learn unknowingly and while performing an activity the children deems fun, learning through play enables the development of skills that affects other skills and subject relevant knowledge. While this happens in a playful atmosphere, it is theorized that the obtained knowledge will be remembered better given that the information is learned through an experience that the child can later relate to. Looking at modern schoolyards during the conducted reference studies, the five competencies are not clearly present. Instead LEGO House, which was also built on the principles of the five competencies, provided an opportunity to understand how a competence-inspired design could be executed. As for the modern schoolyards, it can be concluded that focus has been on the measurable changes in physical activity and health during the past decade, while still integrating playful learning to a minor extent, without making it a focal point.

Seeking to include playful learning in the design, information was gathered from the academic and practicing fields, revealing an extensive amount of knowledge. With the aim of structuring this knowledge and thereby making it tangible for the common person, *the design guide* highlighting the important findings were developed. It can be concluded that the design guide aided the structuring and understanding of the collected information, but regarding its ability to aid the inclusion of the knowledge while designing, it still appeared too complex and in need of further development. Thoughts on this result will be made in the following reflection.

With playful learning being an abstract term, focus was on the inclusion of the five competencies and the 14 guidelines while designing. It can be concluded that when trying to implement playful learning in a physical design, considerations as to what you wish to gain from playful learning should be made. In regards to co-creation, playful learning is about learning from the experience of participating in it. Playful learning through co-creation is not about the physical design but instead about the children being and feeling heard, while developing a preceding relationship to their new schoolyard. In this way co-creation through playful learning appears as the means becoming the end goal.

When considering the relevance of this thesis theme, it is both rooted in the predicted future of further urbanization and a need for better utilized outdoor spaces, but also in the need for better outdoor learning facilities, assuming the way people will associate themselves with each other might change given the occurrence of another pandemic. The relevance of playful learning lays in the current trend of focusing on physical activity while renovating or designing schoolyards, where this thesis argues that by focusing on playful learning instead, physical activity will still be included but so will many other positive effects.

REFLECTION
FURTHER THOUGHTS

With the sudden lockdown as a result of the corona pandemic, parts of the thesis and planned studies had to be altered. Affected parts include the observations of recess periods, the planned workshops and the design process. Regarding the observation of recess, only one period was observed before the lockdown, resulting in limited information being gathered. The parts including the interdisciplinary workshop that was to be held in collaboration with industrial designers, school staff and students was also affected. Time was spend rearranging the workshop to fit digital criteria, resulting in this time being prioritized at the expense of the time that would have been used to include the teachers. Reflecting upon this decision, it might have been favorable to gain inputs from the teachers and those on playground duty as well, since they could have expanded on and clarified the previous observation made during recess. Thought, in retrospect the decision to focus on the children provided important inputs and further allowed for the co-creational aspect to still be implemented. At the same time, and as reflected on in *Part three – The applied design*, theory states that co-creation should be a learning process for the students, but as the workshop became digital, it was not possible to determine what or if they learned from the experience. Another affected part was the sketching during the design process. Where thoughts would normally flow freely in a shared creative space, they now had to be structured and systematically presented digitally, resulting in a different process than usually. It can be reflected upon whether this has affected the final design and to what degree.

The initial idea behind the structure of this thesis was to gain knowledge on the topic of playful learning, create a strategy for implementing it in a design and lastly, use it in a design to prove that it could work. During the first stage of collecting information, it became evident that there was a need for a tangible overview, as the amount of both academic and practical recommendations was extensive. This need resulted in *Part two - The design guide*, which became an overview of things to consider and decide on when developing a schoolyard. During the following step of implementing the guide, it was discovered that the recommendations were still too vague, providing several issues while designing. These issues revealed the need for a tool that would dictate *how* to implement the recommendations instead of stating *what* to implement. Reflecting on this realization, the flaw of the design guide was only discovered due to the guide being used, proving that while it seemed tangible in theory, further work is needed before the tool can be fully utilized.

While proving difficult to use in the design process, the design guide was instead used as part of the analysis of the schoolyard. Taking a step back, the design guide provided useful insights when considering the layout of the schoolyard and when determining what functioned and what would have to be replaced. It further served as a checklist while developing the design, being a useful tool for evaluating design proposals as compared to its initial purpose of recommending what to include. Reflecting on why it functions better as a tool for evaluation, brings the thoughts back to the facts that all schoolyards are different. The need for certain elements might vary, as will the way these can be introduced, making it more difficult to determine one correct way of implementing playful learning and instead easier to determine afterwards whether one's proposal has incorporated it or not.

When reflecting on the design guide being used as a checklist, thoughts on the difference between renovations and new projects occur. As a renovation project can be analyzed and evaluated beforehand, a newly developed schoolyard will only be able to use the tool as a checklist while designing and not have prior need for it regarding existing conditions. The level of renovation can also be reflected upon, as budgets might constrict some schools, making it possible to only renovate a smaller part. In this case *The design guide* can aid designers when determining what is missing in the schoolyard, while during a full-scale renovation the guide can be used to ensure all recommendations have been considered and decided on.

Reflecting upon the theme of '*playful learning*' in the built environment it is evident that Kærbyskolens '*aesthetic learning processes*' correlates with the thesis' theme. However, playful learning can be integrated in any schoolyard regardless of their profile. It supports the fundamental idea of learning unknowingly, and it is not required, as a school, to have focus on the same aesthetic learning processes as the case of Kærbyskolen, to implement playful learning in the schoolyard. Lastly, this thesis is a message when designing or renovating future schoolyards to include playful learning in both the process and physical design - stressing the importance of play in children's upbringing.

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ILLUSTRATION LIST

All illustrations and pictures are made or taken by us.

LEARNING LANDSCAPE

Integrating playful learning environments in schoolyard designs

2

Part two

The design guide

Learning landscape:
Integrating playful learning environments in schoolyard designs

Urban Design, Aalborg University
MSc04

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Intro

Recess is explained to be a break from learning. It is a time to blow off steam, thus former schoolyard renovations have often focused on creating possibilities for increasing movement (Københavns Lærerforening, 2018). Though, there is more to a recess than physical activity. Recess is not a break from learning it is a time for play, learning basic skills and personal development. A place to grow up and evolve.

Through *playful learning*, a holistic approach to the learning-to-learn skills, children gain competencies in not only physical movement, but also in *emotional, creative, cognitive* and *social* skills. The concept of playful learning introduces children to learn through play unknowingly, thus making it fun and a different way to acquire knowledge. This way of learning is easier to remember than regular learned knowledge because it was learnt through an embodied experience. Playful learning affords children to either play alone, in groups or guided by an adult. The outcome will be a learning-to-learn skill which then aids the children in developing the aforementioned competencies. (Larsen, 2020; Zosh et al., 2017)

Designing a new schoolyard or renovating existing environments is complex. This booklet is part of a master thesis called "*Learning Landscape: Integrating playful learning environments in schoolyard designs*" developed by urban design students at Aalborg University, as a tool to promote playful learning in schoolyards for developers, schools, design teams and municipalities to use. The design topics are based on research in both the academic and practiced field. Every school is different and therefore this guideline does not show specific solutions but emphasizes a mindset of playful design with 14 different topics to integrate based on the concept of playful learning.

Good luck designing your new schoolyard!

The design topics

01 **Work together with children**

02 **Allow getting hurt**

03 **Build high**

04 **Create subdivided spaces**

05 **Integrate play in nature**

06 **Aid local climate challenges**

07 **Encourage physical activity**

08 **Invite in the local community**

09 **Activate the edges**

10 **Make room for diverse play**

11 **Create opportunities for evolving play**

12 **Remember the importance of placement**

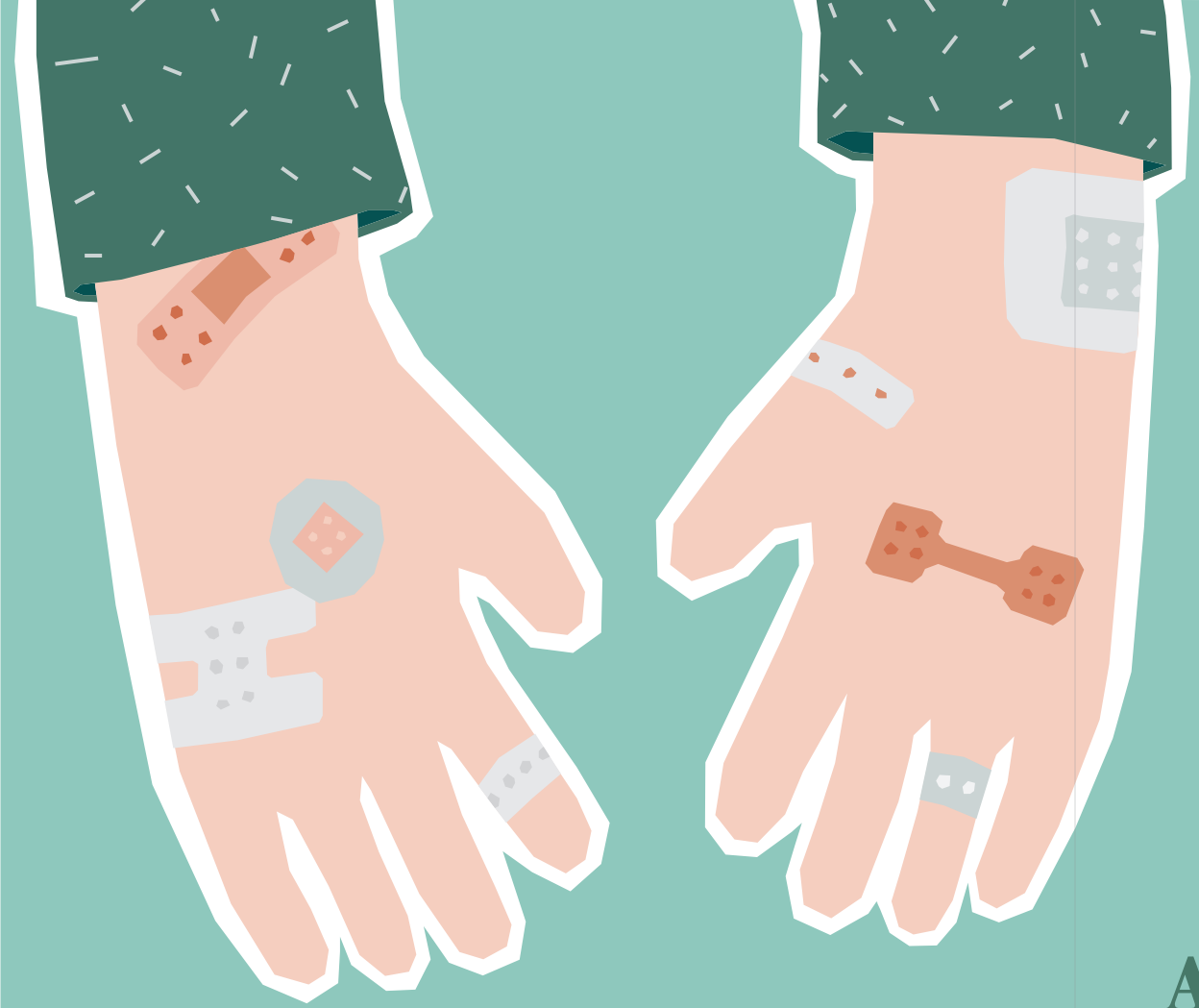
13 **Design for social differences**

14 **Think about technologies**

Work together with children

Create a sense of ownership by including children in the development or redesign of spaces to enhance their affiliation, hereby also expressing that their voices matter. Children should be included in a creative, fun and educational manner supporting the aspect of learning while playing and creating.

(Astrup, 2020; Dilling and Tanggaard, 2019; Rasmussen, 2004)



Allow getting hurt

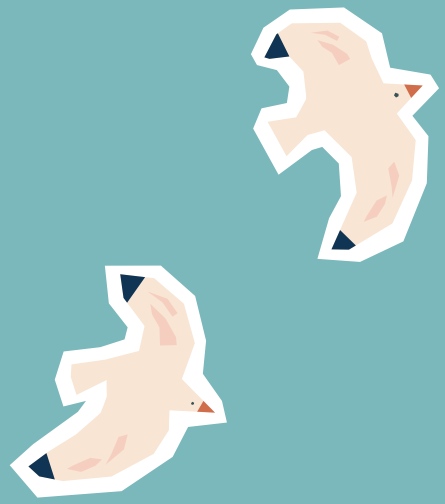
Safety is important, but proven benefits from *'risky play'* such as learning why we get injured and how we can avoid it in the future are essential. Build to challenge children's movement and comfort zone. They find it thrilling and exciting to explore, which is why climbing trees or jumping from a high place to another is a popular thing among them.

(Astrup, 2020; Jelic et al., 2020; Sundhedsstyrelsen, 2019; Jansson, 2015)

Build high

Build high to challenge children and increase available space. Conflicts can arise when there is a lack of space and physical activity can be limited. Children value places that are '*up*' such as when climbing trees and using climbing frames. Together with the additional space it allows, it further provides opportunities for risky play and physical activity when moving up and a different view of the schoolyard.

(Sundhedsstyrelsen 2019; Realdania, Lokale og Anlægsfonden and Kræftens Bekæmpelse, 2017a; Rasmussen 2004)



Create subdivided spaces

Apart from building high, schoolyards should be subdivided to provide space for different types of activities and children's differences. This can include spaces for different levels of activity, age groups or genders, hereby avoiding too many conflicts while creating a schoolyard where children can be outside together.

(Aminpour, Bishop and Corkery, 2020; Pawlowski et al., 2019)

Integrate play in nature

Play in green surroundings enhances physical activity and children's well-being. Green elements have a positive impact on children's ability to pay attention and it increases their appreciation of the yard, social support and creative play. It further promotes different levels of physical activity, positively affecting a wider variety of students, while it also affords play with a greater variety of loose objects that affords free imaginative play and hereby includes children in the development of their own playspace.

(Chawla et al., 2014; Chawla, 2015; van Dijk-Wesselius et al., 2018; Raney, Hendry and Yee, 2018; Puhakka et al., 2019)

Aid local climate challenges

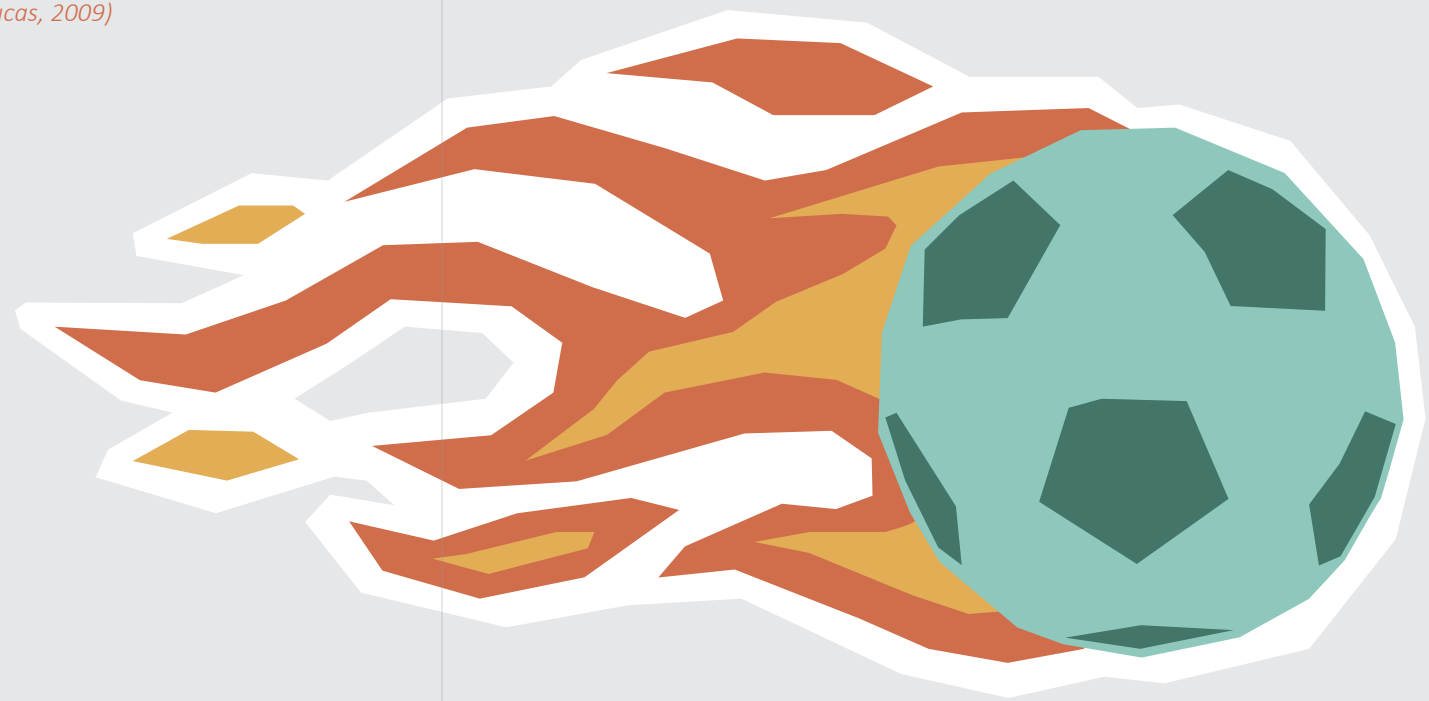
Apart from playing in nature, schoolyards can be used to tackle local climate challenges. As an example, these can include rainwater management, air purification, high temperatures or wind. The way these challenges are addressed in the build space can aid the communication of climate changes and inform children about what can be done to relieve them and can be an entertaining teaching element rather than a problem.

(Plan09, 2008)

Encourage physical activity

Recess can provide up to 40% of children's daily recommended physical activity, which in Denmark is recommended as 60 min by the National Board of Health. The inclusion of game equipment, markings on the ground, supervised physical play or facilities such as trampolines, obstacles courses, speakers for dancing and gymnastics have proven to increase activity.

(Pawlowski et al., 2019; Sundhedsstyrelsen 2019; Realdania, Lokale og Anlægsfonden and Kræftens Bekæmpelse, 2017a; Dyment, Bell and Lucas, 2009)



Invite in the local community

Make the schoolyard available to the surrounding communities and create a culture around using it after school hours. This can aid children's activity levels and provide them with more play opportunities. At the same time it provides adolescents and adults with a place to meet and can act as a space for leisure activities.

(Realdania, Lokale og Anlægsfonden and Kræftens Bekæmpelse, 2017b; Sundheds-styrelsen, 2019)

Activate the edges

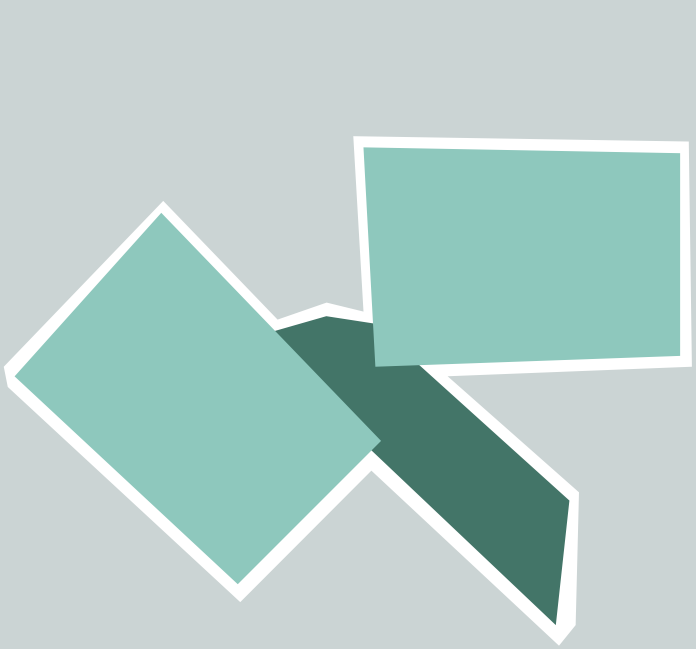
A schoolyard consists of different elements, but an important feature is the playful gap between these formal play areas. By activating the edge zones, which are not designed with a specific purpose, it brings life and new opportunities surrounding the stationary play. An example can be a plinth not only being the boundary for a field, but also a bench for observing children.

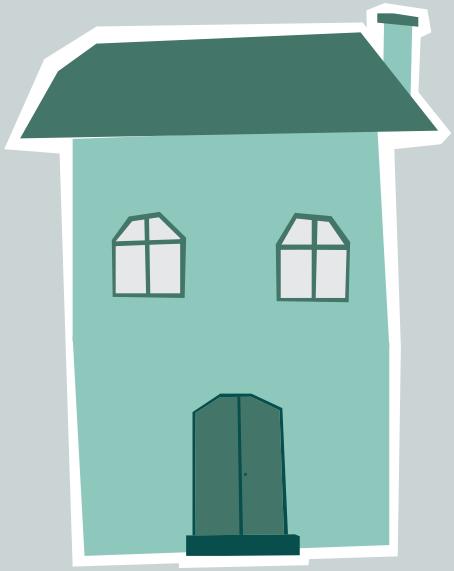
(Sundhedsstyrelsen, 2019; Aminpour, Bishop and Corkery, 2020)

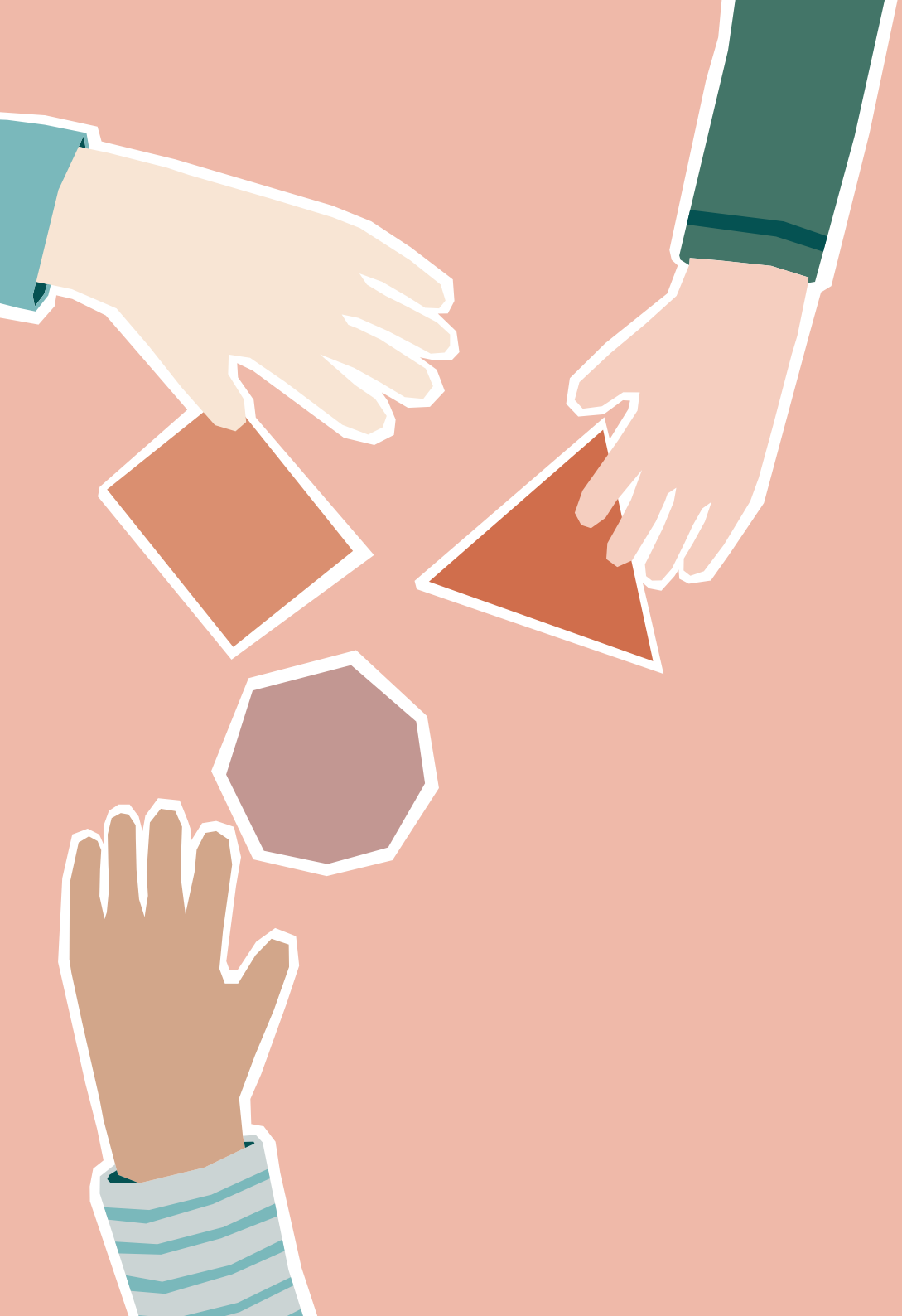
Create opportunities for evolving play

Children spend a large amount of time in schoolyards playing with the same elements repeatedly. There should be room for the play to evolve and change over time. Make sure the play can evolve with the children's imagination and age thus facilitating multiple plays with the same toolsets or element.

(Astrup, 2020; Jansson, 2015; Holman, 2015)



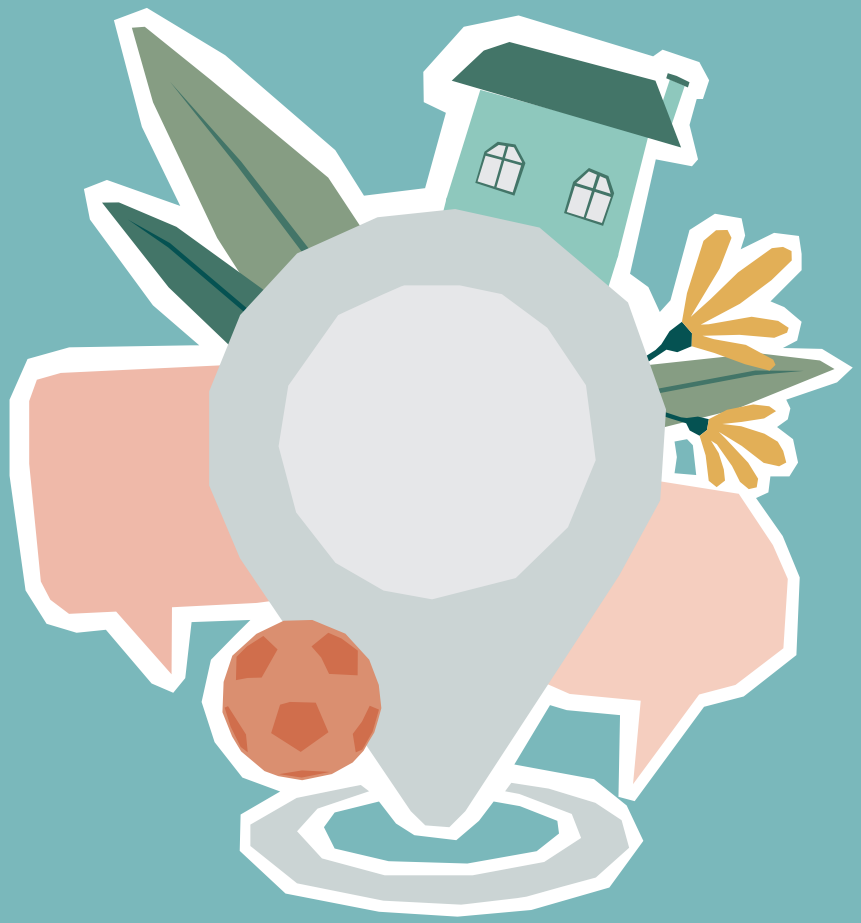




Make room for diverse play

All children are different, just as play is. A schoolyard should afford opportunities and variability in children's play spaces, allowing the children to select between multiple plays everyday and thereby granting them the opportunity to affect their own play and interests.

(Jelic et al., 2020; Jansson, 2015; Holman, 2015)



Remember the importance of placement

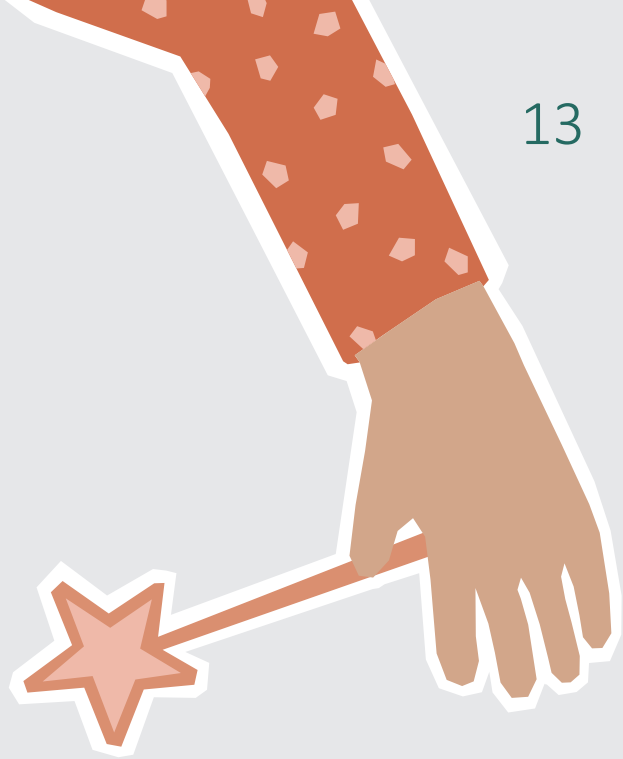
A schoolyard does not function well, just because it has modern play elements. The placement of these is important as the surroundings also affect them and the intended play. Place a facility for younger children, so they almost fall over it when they leave their classroom and think about the older students who mostly want to socialize and observe the schoolyard rather than play. Through placement awareness different areas in the schoolyard can be subdivided to prevent disturbances affecting both other students in the yard or students attending a class next to it.

(Realdania, Lokale og Anlægsfonden and Kræftens Bekæmpelse, 2017b)

Design for social differences

Social differences in a schoolyard are evident. It can express itself through gender-specific play or age-relevant activities, with boys dominating ball courts, girls participating in varying types of play and movement, younger students being more physically active and older students preferring sedentary activities. Common for all are the social aspect and while it appears differently it is still present for both genders and all ages.

(Pawlowski et al., 2019; Realdania, Lokale og Anlægsfonden and Kræftens Bekæmpelse, 2017b; Dyment, Bell and Lucas, 2009)



Think about technologies

Living in a technological age, children are attracted by it. Phones are popular during breaks and their involvement in students recess should be considered and decided on. The union of play and technology can afford new ways of learning and playing, with phones affording innovative and inspiring new play activities.

(Realdania, Lokale og Anlægsfonden and Kræftens Bekæmpelse, 2017b; Pawlowski et al., 2019; Larsen, 2020)

End note

It is difficult to decide what to implement in a schoolyard, when it is time for an upgrade. The 14 guidelines with the theme *'playful learning'* provides an overview of considerations to do when designing or renovating a schoolyard. Therefore, no specific design parameters are presented as each schoolyard is different and requires a contextual approach. Instead, recommendations such as building high, subdividing spaces, affording risky play and including the children in the design are presented with the intention of reinventing the play. Recess is a time for learning through play instead of a book.

This guide compiles theoretical and practical knowledge rooted in a playful learning approach. While the practical knowledge provides first hand information from existing renovations and designs, the theoretical knowledge consists of recommendations often based on observations and reflections rooted in former research and experiments conducted during renovations.

We hope this booklet and its recommendations have inspired you on your journey towards designing a new schoolyard.

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All illustrations are made by us.

LEARNING LANDSCAPE

Integrating playful learning environments in schoolyard designs

3

Part three

The applied design

LEARNING LANDSCAPE

Integrating playful learning environments in schoolyard designs

Learning landscape:
Integrating playful learning environments in schoolyard designs

Urban Design, Aalborg University
MSc04

Project period
February 1st- May 20th 2020

Total pages 197
Pages 49 - Part one: The knowledge compilation
Pages 41- Part two: The design guide
Pages 107 - Part three: The applied design

Pages 53 - Appendix

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List of content

Ill. 1 Case location

Introduction

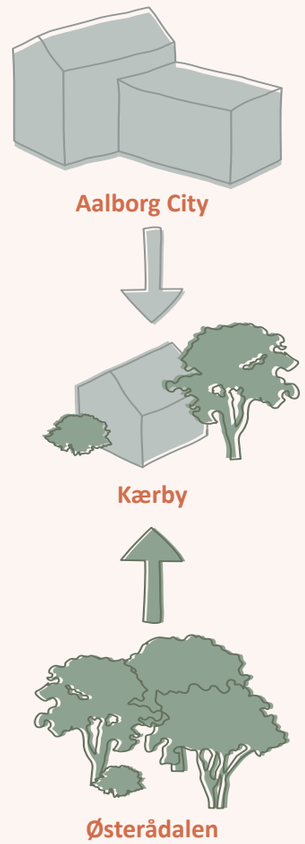
This booklet is part of a master thesis called "*Learning Landscape: Integrating playful learning environments in schoolyard designs*" developed by urban design students at Aalborg University. It builds on the two previous parts; '*The knowledge compilation*' and '*The design guide*'. The two parts are the foundation on which the design is based. The knowledge compilation consists of information regarding playful learning and co-creation, collected from both the academic and practicing field. *The design guide* is a collection of guidelines and recommendations on how to implement playful learning during schoolyard designs, rooted in the information provided by *The knowledge compilation*.

These two parts stand as predecessors to this third booklet, which then will present a new design for Kærbyskolens schoolyard as a case on how to implement playful learning, showing how *The design guide* in addition to the usual design approach, can aid the development of a new schoolyard design.

The schoolyard of Kærbyskolen is old and worn down and experiences problems with noise levels, lack of space and youths leaving trash. A design team created by the school has reached out to Aalborg University asking for students to help develop a future plan for the schoolyard. Two groups of master thesis students got involved; us as Urban Designers focusing on the thematics of playful learning integrated in a masterplan and a group of Industrial Designers focusing on developing a specific playground element. The interdisciplinary collaboration was regarding the planned physical workshops and meetings with the school and not the specific design solutions. This report contains analysis of the existing schoolyard and the schools needs, the design process and a presentation of the new schoolyard design.

Aalborg

Kærby is situated in Aalborg Municipality right outside the city center. Aalborg is Denmark's fourth biggest city with approximately 220.000 inhabitants (Aalborg kommune, 2019). The city is situated in the north of Jutland close to the fjord. The city used to be an industrial mekka, but has since become a knowledge capital (Visitnordjylland, n.d.; Aalborg kommune, 2019). The suburb of Kærby is located south of Aalborg city center and north of the nature area Østerådalen, placing it as a link between the urban city and green landscape.



Ill. 2 Ortophoto Aalborg 1:25.000
Ill. 3 North to south conceptual section

- Kærby
- Green areas
- Land
- Dense city
- Water
- Conceptual topography
- Main road
- Secondary road
- Railroad

Ill. 4 West to east conceptual section

The story of Kærby

Kærby is situated in a valley going from Østerådalen down to the water of Limfjorden. This landscape is dated back to the Stone Age where the area of Kærby was covered by the Litorina Sea. When the country elevated and Aalborg, many millennials later arose, the city was only a small town with creatures within. Kærby was known as Padeengene, a flat meadow landscape where animals grazed and frequent floods occured because of the nearby stream, Øster Å. About a hundred years ago, Kærby as we know it today started being built forming the residential area of Kærby. (Kærby Grundejerforening, 2005)

Ill. 5 Context 1:25.000

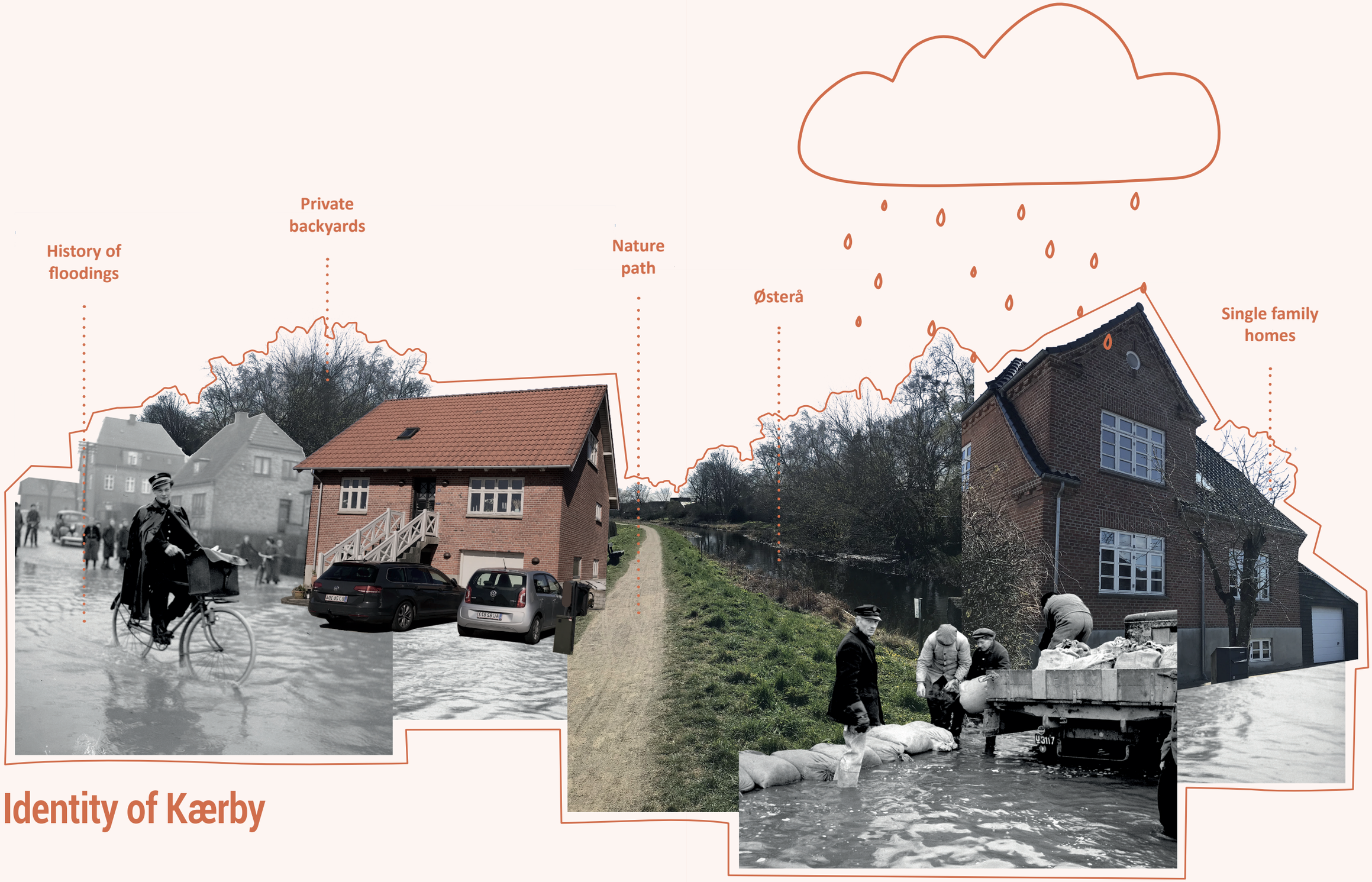
Ill. 6 Historical flooding in Kærby 1939 and 1941 (credit Aalborg Stadsarkiv, photographer H. Dalby)

A main part of the history of Kærby is the hydrological conditions that are reflected in its history as an ocean. The areas issue with water and floodings can be traced back several decades (Kærby Grundejerforening, 2005). Primary soil types consist of dirt, sand and clay (Geus, n.d.), with groundwater levels reaching up to 200mm from the surface (DinGeo Boliga, n.d.), thereby making Kærby a wet area with poor infiltration options close to its groundwater table. Supporting the statement of Kærby being a wet area, is the information acquired on rainwater (Styrelsen for Dataforsyning og Effektivisering, n.d.), showing how 15mm of rain clearly affects Kærby, while the surrounding higher east and west areas are less affected as seen on ill. 7.

Ill. 7 Kærby rainwater conditions 1:25.000

The division of the industrial area and housing area is made by the stream Østerå, effectively separating the area of Kærby in two parts to the east and west. The majority of residents in Kærby are families with children, many living in single family housing fulfilling the suburban dream. ¼ of all the residents are children aged 0-17 (Aalborg Kommune, 2019; Kærby Grundejerforening, 2005). Within this area Kærbyskolen is situated in the southern part surrounded by single family houses.

Ill. 8 Kærby 1:7.500



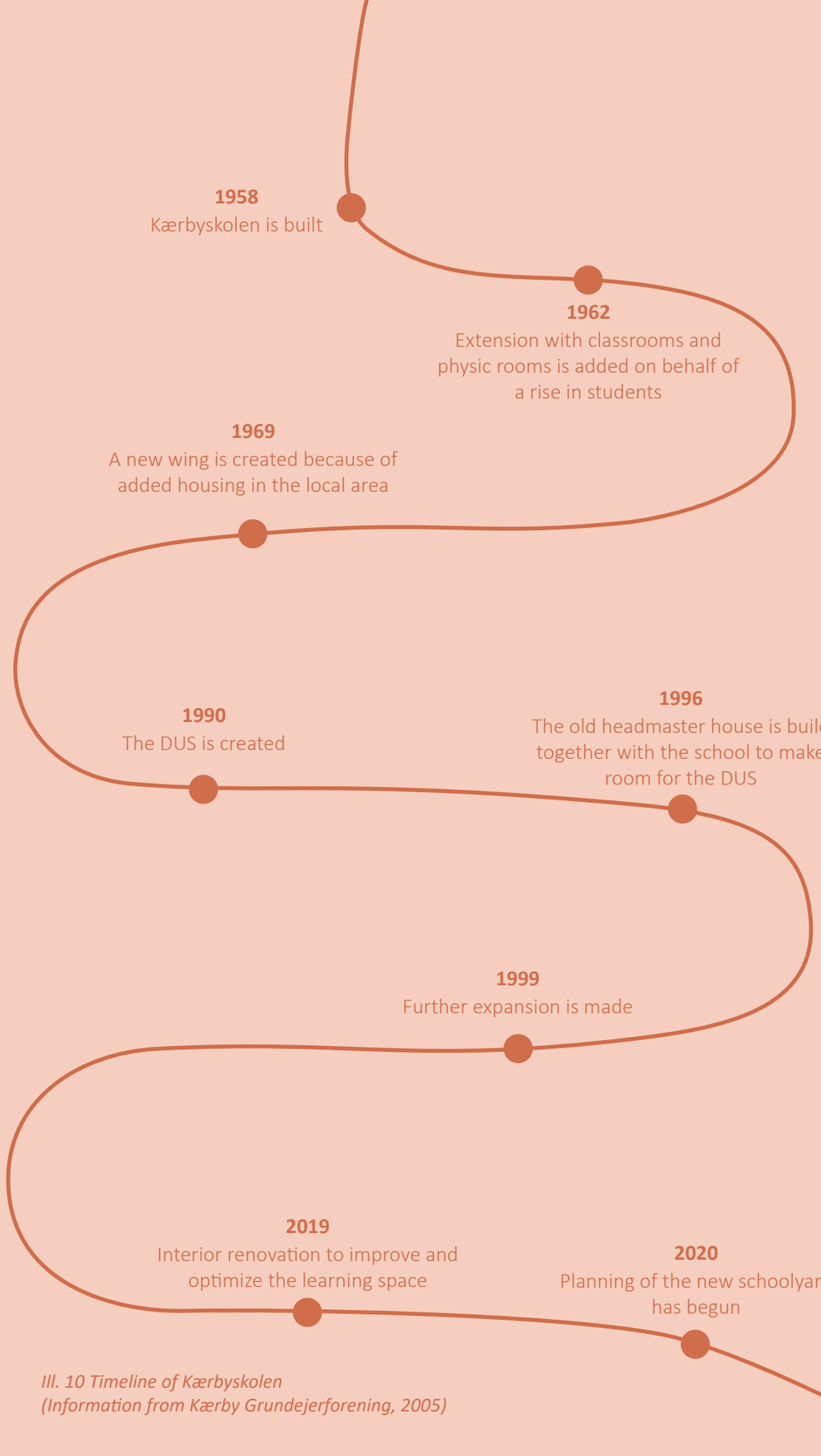
Identity of Kærby

Ill. 9 Kærby atmosphere (historical photos credit Aalborg Stadsarkiv, photographer H. Dalby)

Analysis

In this chapter, analysis of the existing environment and future needs are presented to provide a stronger foundation for the design. Kærbyskolen was built in 1958, by the demand of a local school with safe infrastructure for children. Since then the school has grown with multiple expansions responding to the growth in the area as seen on ill. 10. (Kærby Grundejerforening, 2005)

In 2019 the interior of the school was renovated for 8,5 million dkk to optimize space and improve the functionality of the school. The renovation created a link between the historical building with the yellow bricks and a soft modern style with the simple use of colors and wooden elements, allowing the students colorful creations to stand out. With a bigger interior renovation, emphasis is now on the worn down exterior.



Ill. 10 Timeline of Kærbyskolen
(Information from Kærby Grundejerforening, 2005)

Identity of Kærbyskolen

At Kærbyskolen teaching and learning are executed differently given the schools status as a profile school with focus on *'aesthetic learning processes'*. Problem based learning and experimentation are emphasized at Kærbyskolen through aesthetic creative methods. Students thereby improve their own motivation and find it enjoyable and interesting to learn. It is important that the students themselves are involved in the creative process, where there is focus on play and creations. Morning assembly with all the students and partnerships with Kunsten Museum of Modern Art and Aalborg Kulturskole are all part of integrating the aesthetic learning processes into the school. (Kærbyskolen, n.d.)

"We wish that our students learning increases through creative, experimental and problem solving processes - and that the communal feeling strengthen through increased involvement and understanding for each other. Our students need to have courage and knowledge of themself, each other and the world."

(Own translation, Kærbyskolen, n.d.)

Ill. 11 Kærbyskolen in numbers

Stakeholders

During the renovation of a schoolyard stakeholders have different ideas and expectations to the outcome. The following diagram illustrates the relevant stakeholders at Kærbyskolen and presents an overview of their primary individual expectations.

Us as urban designers
Enhance playful learning

Aalborg Municipality and Aak Byg
Optimization and economy

Staff and design team at Kærbyskolen
A greener and more open masterplan

Ill. 12 Stakeholders

Students
Social play and challenging play

Teachers
Outdoor learning spaces

Parents
Well-being of their children

Community
New meeting space

Daily use

Today there are four main uses of the schoolyard. On ill. 13 a principal timeline is illustrated, representing the use during a day. Students use the yard during school and DUS hours, while the yard gradually opens up to the public as school functions closes down.

Recess - A place to play

Recess represents a temporary increase in the schoolyards activity coinciding with the students breaks between classes. It occurs twice a day and the amount of children in the schoolyard is approximately 240 as the special needs class have separate recess periods. Furthermore some students are indoors as they need a calmer environment, while others participate in a buddy-system playing in the indoor gym hall. Given the schoolyards limited space, recess are currently structured in a manner that separates the students. Elements such as soccer courts are scheduled so each grade has a specific time and day. Apart from the two major recess periods, students are allowed smaller breaks during the day to clear their minds and get some fresh air resulting in a to some extent continued use of the yard across the day.

Education - An outdoor learning environment

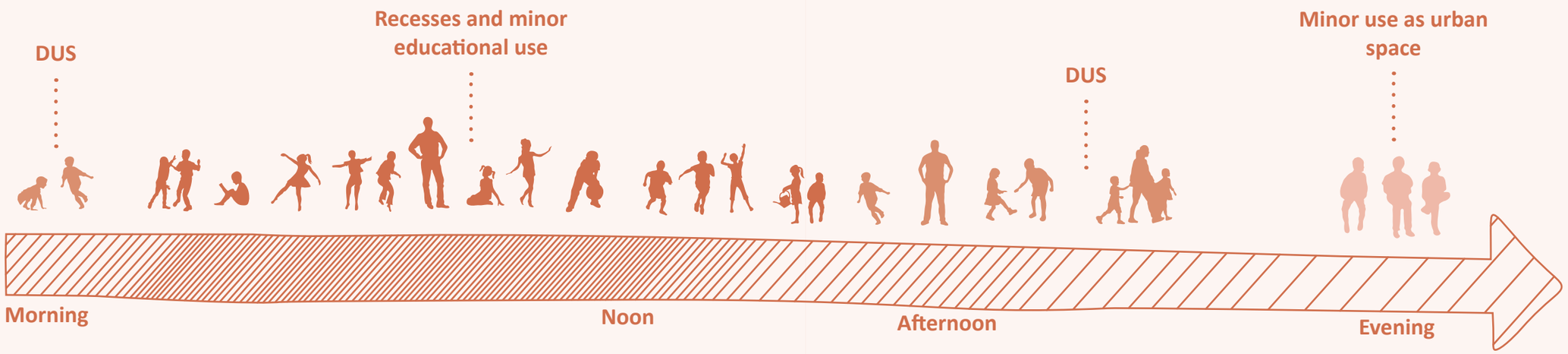
The schoolyard is currently used for outdoor education in a minor degree, with a workshop shed used during some creative classes. The yard is further used during sports and nature classes, with self made kitchen gardens aiding the last mentioned. In light of the recent corona pandemic and the new ways of associating ourselves with each other, a greater need for outdoor educational spaces has appeared possibly affecting the future demands.

DUS - An after school institution

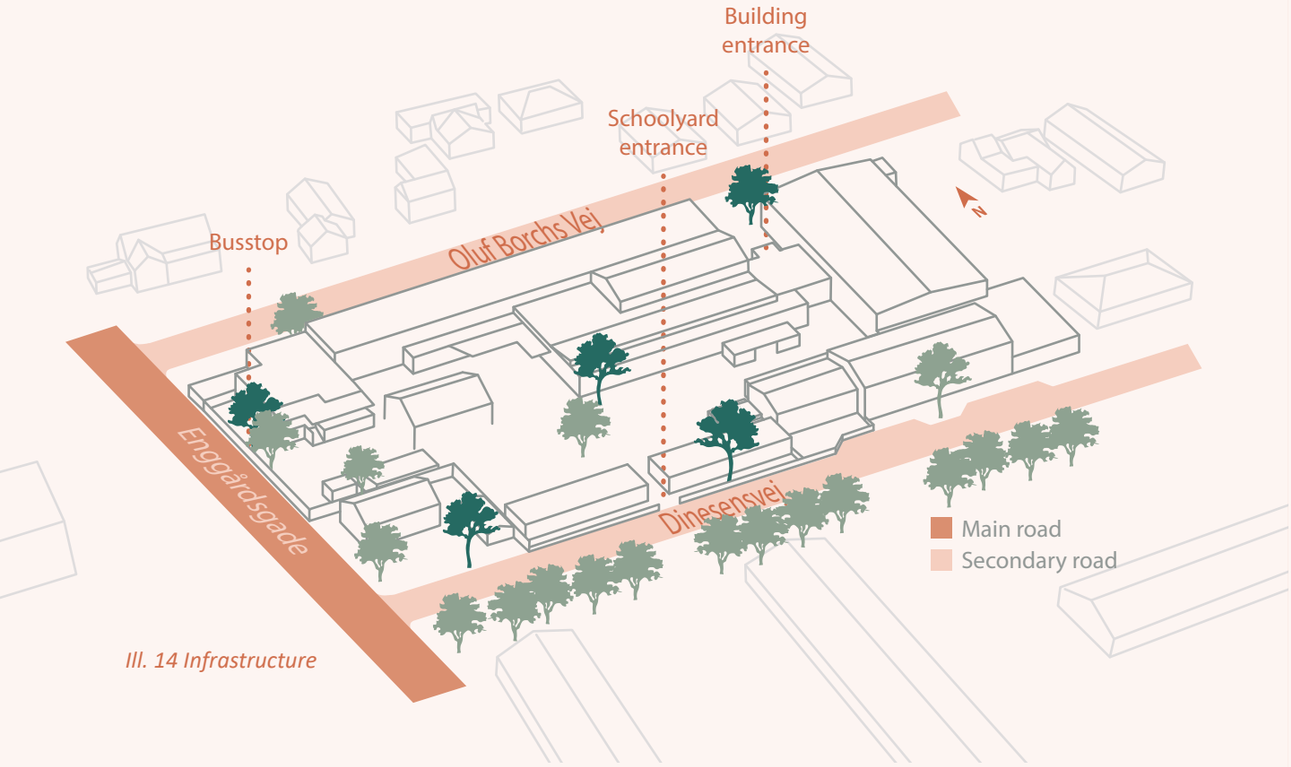
The after school offer DUS is a place where children can be during their leisure time. It is primarily open in the mornings and afternoons. In the afternoon children are required to play in the schoolyard at the beginning of the DUS time. Play differs from school hours because of the smaller number of children, resulting in moon cars and roleplay swords being introduced into the schoolyard at this time.

Urban space - A place for the community

The schoolyard is mostly empty after DUS has closed. Not many people from the community come to play or meet up. Kærbyskolen experiences problems with youth hanging out in the evening drinking and smoking, leaving trash and glass shards.



Ill. 13 A day in the schoolyard - Intensity and users



Ill. 14 Infrastructure

Infrastructure

The school is surrounded by three roads; *Enggårdsgade, Oluf Borchs Vej* and *Dinesensvej*. Enggårdsgade serves as the major road with a throughgoing connection and bus stop, while Oluf Borchs Vej and Dinesensvej serves as minor roads and dead end streets. The schoolyard is accessed from Dinesensvej while the school buildings main entrance is located at Oluf Borchs Vej. Dinesensvej further appears greener given the amount of trees and planting along the road.

OLUF BORCHS VEJ

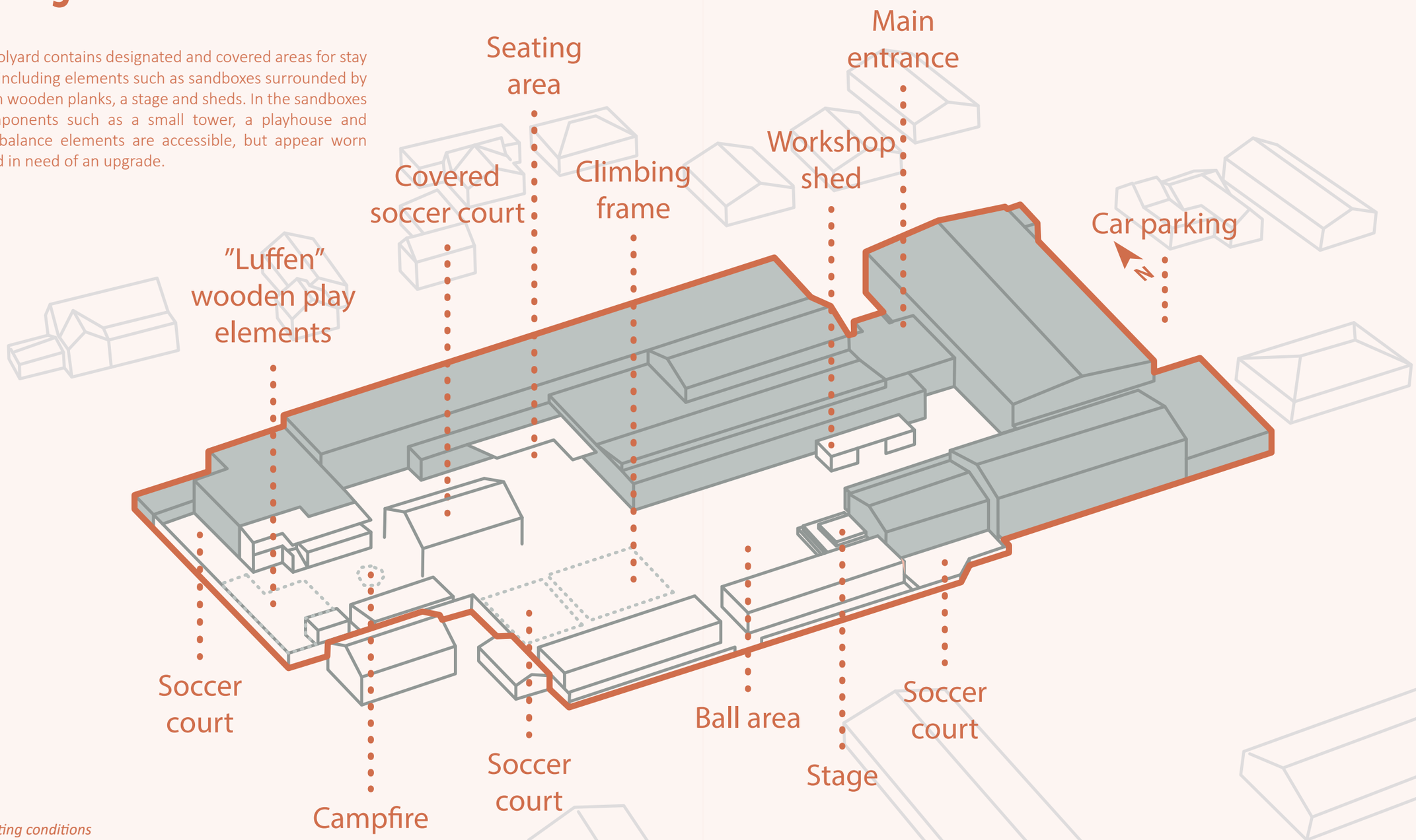
ENGGÅRDSGADE

DINESENSVEJ

Ill. 15 Adjacent roads

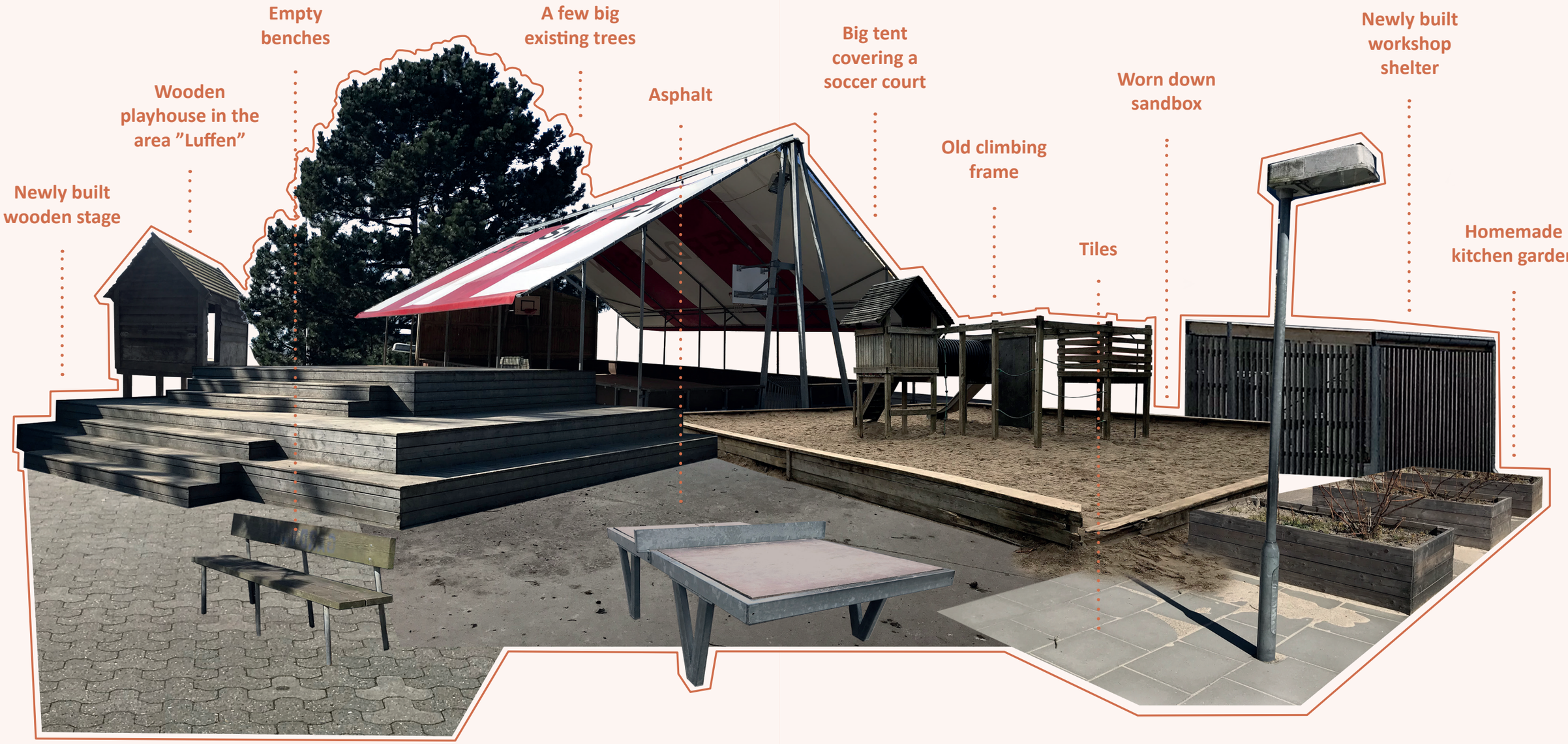
Existing conditions

The schoolyard contains designated and covered areas for stay and play including elements such as sandboxes surrounded by run-down wooden planks, a stage and sheds. In the sandboxes play components such as a small tower, a playhouse and wooden balance elements are accessible, but appear worn down and in need of an upgrade.



Ill. 16 Existing conditions

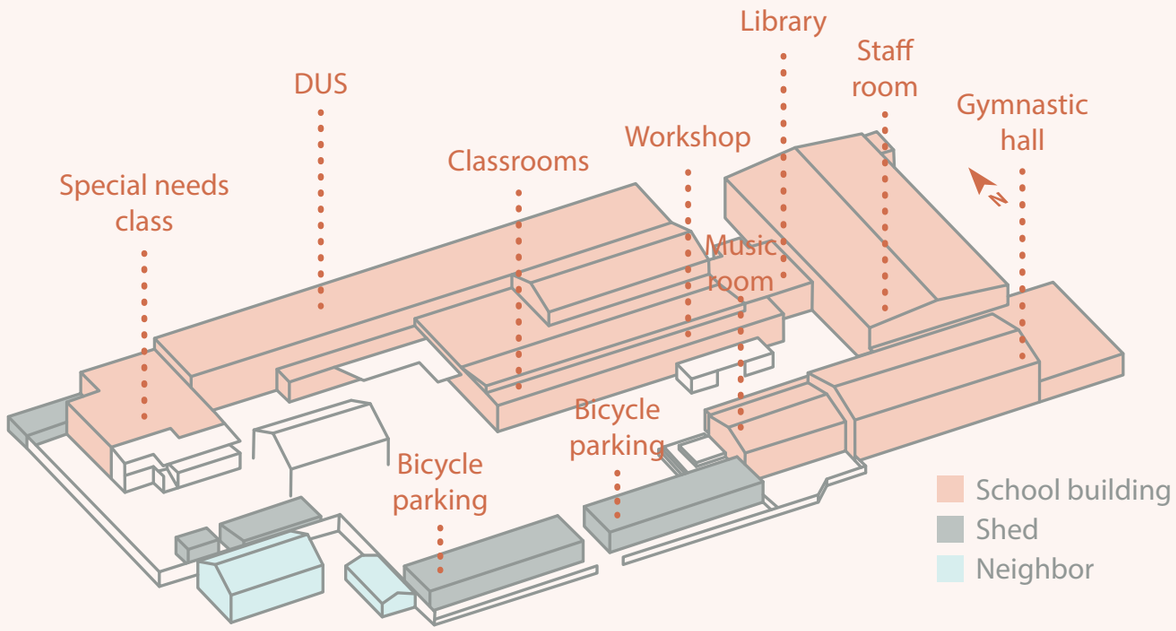
Atmosphere of the schoolyard



Ill. 17 Atmosphere of the schoolyard of Kærbyskolen

Indoor environment

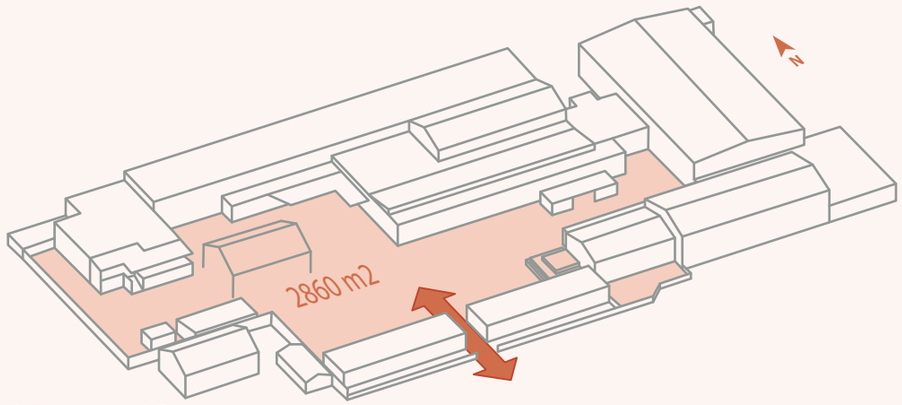
With the 2019 renovation of the interior space workshop rooms were created, the gym hall was renovated and a new pavilion for outdoor teaching were built. Furthermore, the limited space was optimized by creating study areas in the wide hallways and giving a stronger identity to the school with statement staircases in the common room with seating arrangements integrated both on and under the stairs.



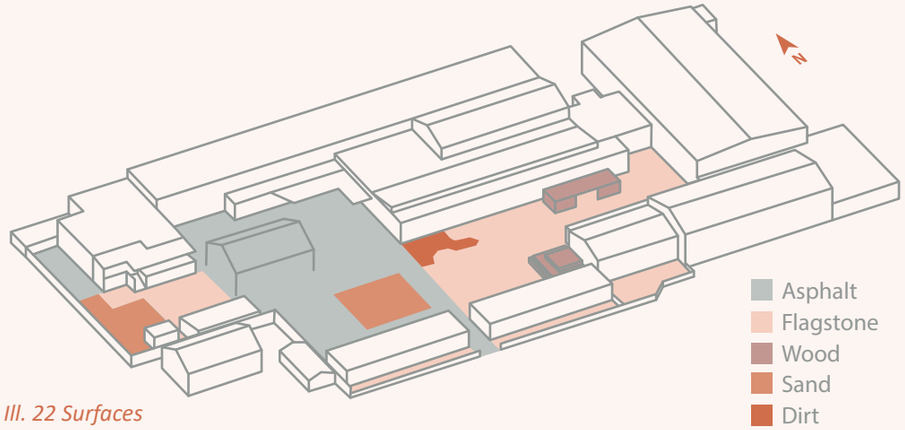
Ill. 18 Indoor placements

Ill. 19 Indoor atmosphere

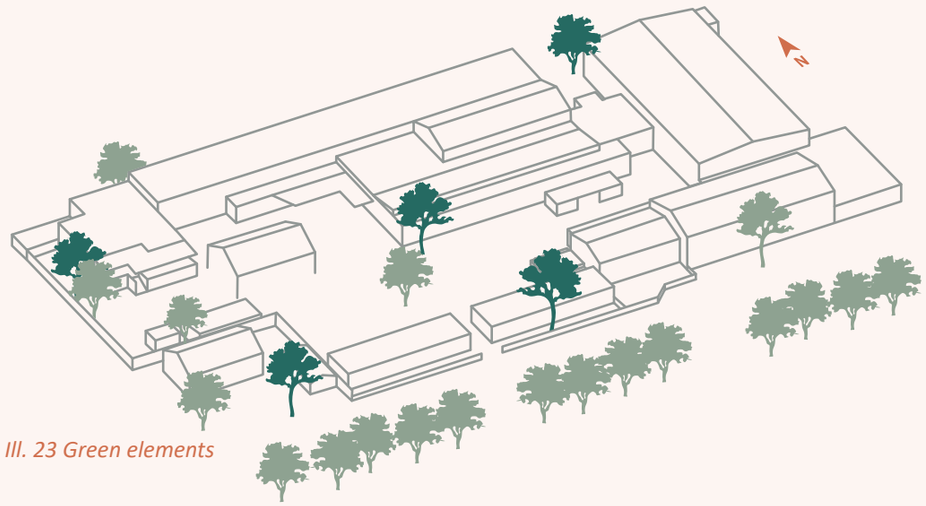
Ill. 20 Indoor materials and colors



Ill. 21 Area and flow



Ill. 22 Surfaces



Ill. 23 Green elements

Area and flow

The schoolyard covers a surface of 2860 m^2. This area is enclosed by brick walls and fences allowing only one opening, which entails a closed flow in the schoolyard for visitors. It is further noticed that the total area of 2860 m^2 provides each of the 310 students with an average of 9,2 m^2 of space in the yard, if everyone used it at the same time. It is assumed by the school that 240 students use the schoolyard during recess, hereby providing an average of 13,3 m^2 for each student.

Surfaces

The surface shows signs of incoherent renovations and additions as the hard grey plane is characterized by multiple variations in the pavement. It is further noticed that the sand has spread across the yard in an uncontrolled manner. Alternative surfaces include the wooden workshop shelter and stage in addition to the bare brick walls, which provides an opportunity to use during ball games or decorate with art.

Ill. 24 Outdoor materials and colors

Green elements

The schoolyard contains few trees and no major green areas. In contrast green areas and planting have been observed surrounding the school, with Dinesensvej to the south as the major green area. Though there is a lack of trees in the schoolyard the existing once are valuable due to their size and age.

Topography and rainwater

The topography reveals a flat surface situated at the height of three meters with few points reaching 3,5m. Compared with an overview of rainwater, starting at 15mm of rain in the darkest zones and rising to 105mm of rain in the lightest zone, it is evident that the schoolyard itself is not majorly affected. Instead the surrounding streets and south-west area collects a larger amount of water. (Styrelsen for Dataforsyning og Effektivisering, n.d)

Affected at 105mm rain

Affected at 15mm rain

Topography lines

Wind

According to the Danish Meteorological Institute (1999, p.23), the yearly average wind is strongest and most frequent from the southwest, with the direct west as the secondary direction as seen on ill. 26. Given the placement of a neighbouring home, the schoolyard is already shielded towards the southwest direction, leaving the west direction to be shielded by a wooden fence. Notable is the fact that the west direction is stronger and more frequent from may to september, making this the primary direction during summer, see appendix 6 for monthly variations.

Percent:
> 11 m/s
5-11 m/s
0,2-5 m/s

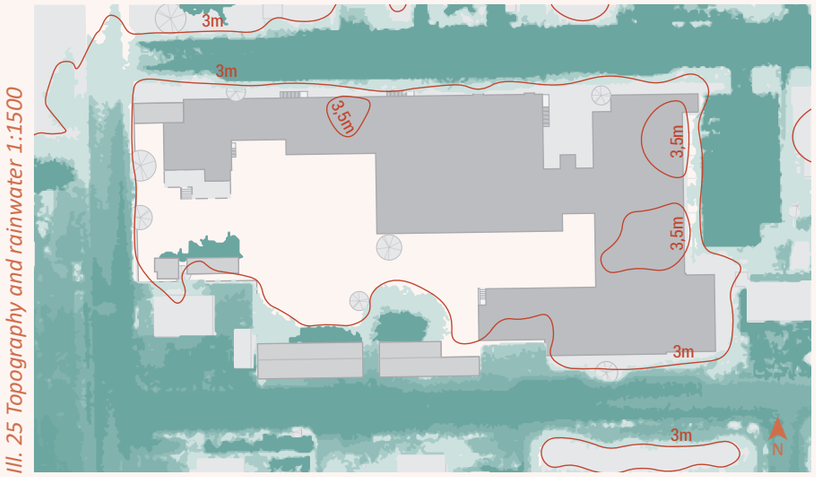
Shadows

Based on an analysis of the summer, winter and equinox sun, the map provides an overview of the average shadows cast by the buildings and fences divided between the three periods, see appendix 6 for differentiated mappings. It is evident that shadows provide little to no impact during summer and equinox, while the winter period covers more of the schoolground. It is notable that the eastern and northern part of the schoolyard are the most affected areas during winter.

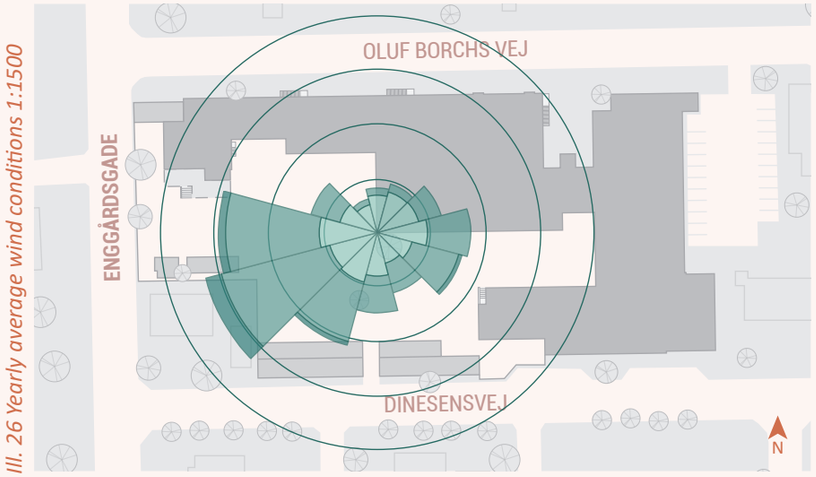
Average winter shadow

Average equinox shadow

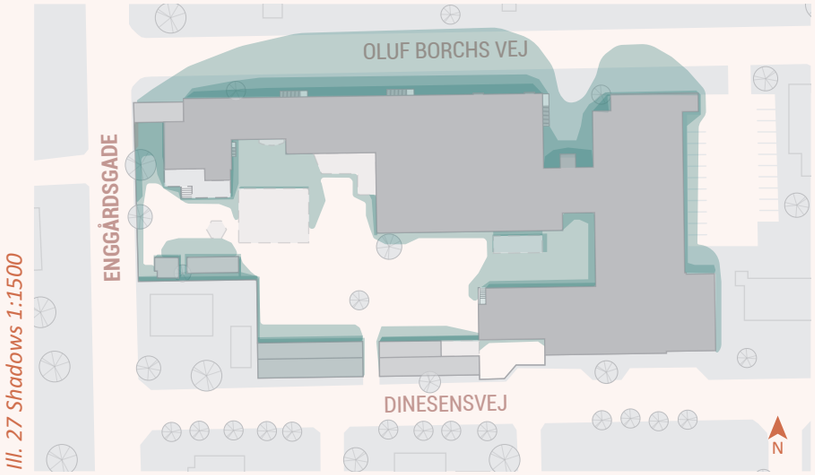
Average summer shadow



Ill. 25 Topography and rainwater 1:1500



Ill. 26 Yearly average wind conditions 1:1500



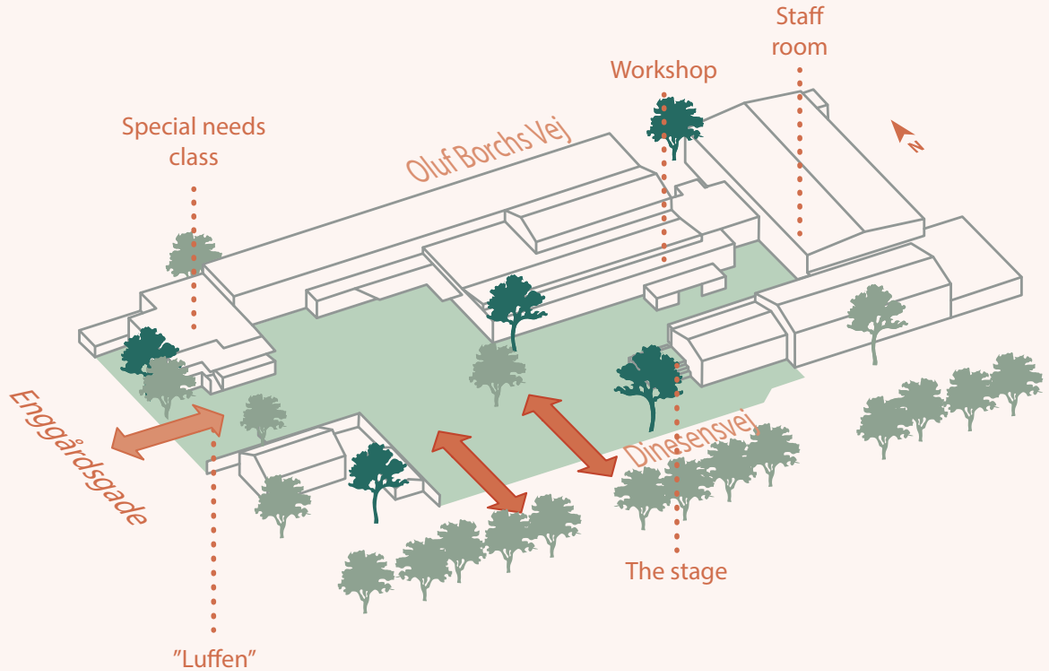
Ill. 27 Shadows 1:1500

Important findings

From the mapped observations presented on the previous pages, important findings have been collected with the intention of aiding the coming designproces. With Enggårdsgade as a trafficked road, a visual connection to the schoolyard will be favored as opposed to a full opening. Instead, a full opening of the schoolyard can be obtained towards Dinesensvej by removing the sheds and connecting to the green areas along the road. With the opening towards Dinesensvej, a new central space can be developed around the stage, aiming at inviting people into the schoolyard, by placing it near the road. It is further intended to remove the worn down sandboxes and the excess sand covering the schoolyard, while keeping the barrier towards the neighbouring home at the southwest corner for privacy and protection from the wind.

Looking at the eastern part of the schoolyard and the unused space, it is intended to activate this area better in the future design. Considerations regarding this include the amount of shadows covering the area and the fact that the staff room has windows placed towards this area. Another problem area is the covered terrace outside the special needs class. Here the intention is to divert the students attention towards another area that can fulfill the same needs as this one, meaning a covered area heightened from the ground level which will be considered in the design.

Based on the findings of Kærbys rainwater mapping in ill. 7 and the site's rainwater mapping in ill. 25, rainwater considerations for the schoolyard include the management of only the site's water, as a larger strategic rainwater management plan for the Kærby area is beyond the scope of this thesis.



Ill. 28 Important findings

Playful learning competencies

Learning to learn, as Zosh et al. (2017) states, is an important aspect of *playful learning*. Learning and developing skill sets is done throughout life and can have influence in other areas such as the five competencies; *emotional, creative, cognitive, social* and *physical* as these are viewed as interconnected skills (Larsen, 2020). The following shows how the competencies could be understood in a schoolyard context:

- **Emotional competencies** could be about self-creations, creating an identity in areas of the schoolyard, watching life evolve through animals, insects and nature. Also the many different emotional feelings could be emphasized.

- **Creative competencies** could also include self-creating, but emphasizing changeable and twisted ideas to make room for children using their imagination.

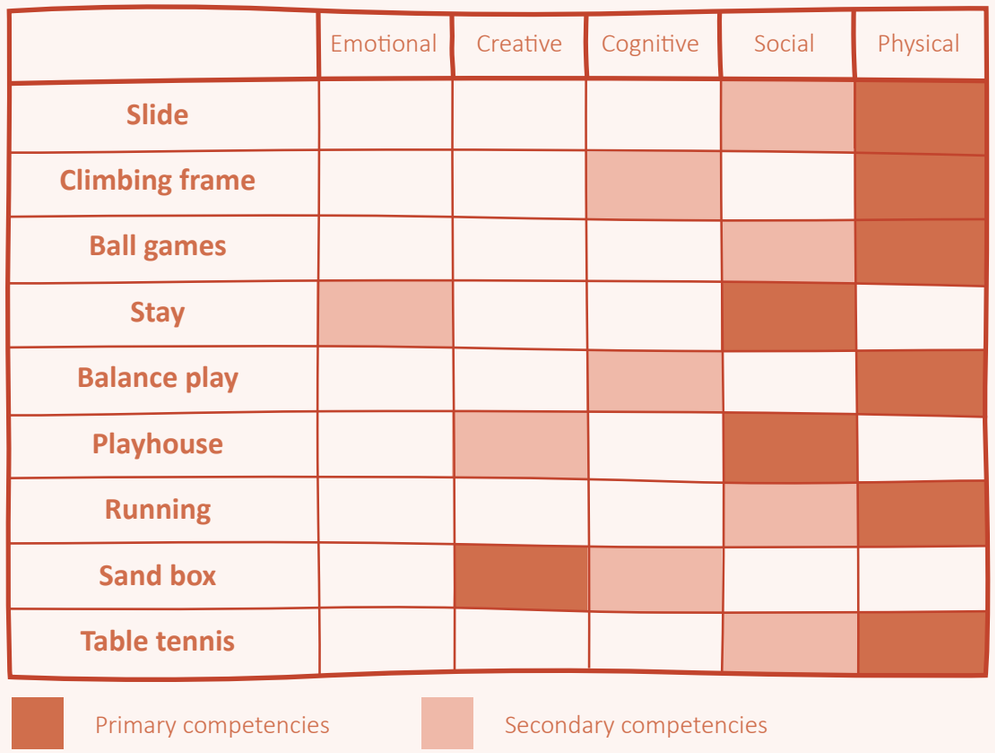
- **Cognitive competencies** could involve outdoor teaching areas, risky play where the children learn from their experiences and undergo iterative learning.

- **Social competencies** could be emphasized through stories, rethinking play elements to be more social as something that does not work until several children are involved.

- **Physical competencies** are often understood as something that challenges the body either in speed, movement or balance. Furthermore, it is also about a spatial and tactual understanding of the physical space.

The mentioned competencies can be developed in schoolyards in varying degrees depending on the specific school. In theory, every skill is equally important, but in practice many schools tend to afford the physical competency rather than the others, thus making them secondary skills within the schoolyards functions.

When using the five competencies as a tool to analyse the schoolyard at Kærby-skolen, it is evident that all five are present. It should be noted that the general tendency to focus on physical activity in danish schoolyards, mentioned in *The knowledge compilation*, is also valid in this case. Digging deeper into the schoolyard and the functions it affords, it is standard traditional play elements that conquers the schoolyard. It is observed that two thirds of them are having the physical skill as their primary competency, while the other skills are secondary. The table in ill. 29 demonstrates how the social and creative competencies are the only other skills that are primary, while the emotional and cognitive only appear as secondary in the schoolyard.



Ill. 29 Playful learning competencies at the schoolyard of Kærbyskolen

Design guide analysis

With the primary purpose of *The design guide* being its ability to aid concerned parties during the design of a new schoolyard, it is interesting to consider its ability to aid the evaluation of a schoolyard as well. It includes 14 recommended focal points that should be considered and decided on when designing and in this case be used to evaluate the existing space.

For the case of Kærbyskolen, the evaluation has been divided into three categories of inclusion, ranging from a high level to not existing. The current setting provides four highly included and four minor included points as shown in ill. 30.

Starting from the highly included points it is evident that Kærbyskolens schoolyard consists of subdivided spaces that to some extent allows diverse play and different levels of physical activity. It is further noticed that different levels of physical activity are divided between types of play including ball games with high activity, free play with both high and medium activity and lastly sedentary activities such as card games with low activity levels. When looking at placement it is evident that activities for the youngest children have been situated at Luffen, away from the older children, while activities such as ball games have been enclosed by fences. It is further noticed that the stage has been placed in relation to the music room while the workshop shed has been placed in relation to the indoor workshop rooms. Lastly, the design for social differences appears through its considerations to gender play and age relevant activities, with boys playing soccer, both genders participating in free play, girls sitting and talking, older students observing others activities and younger students playing at the playtower and at Luffen.

Continuing with the minor included points, it is observed that the schoolyard has play areas that have been built high, activates the edges, allows for diverse play and provides a small chance of getting hurt. The central playtower provides the opportunity to climb higher while also providing a chance for risky play, as children can ‘fall’ down onto the sand. It is further possible to move up higher at the terrace in front of the special needs class and when climbing the stage. Play diversity is observed in the different activities children can engage in, but it is noticed that there is a great emphasis on ball games. Lastly, activated edges are observed around the open space in front of the stage, as the surrounding elements can be used as alternative seating areas. Detected problems include play and socializing in front of the special needs class during their lectures and children trying to access the roof through alternatively stacked benches.

	Not existing	Low	High
Co-creation with children	■		
Risky play		■	
High spaces		■	
Subdivided spaces			■
Play in nature	■		
Aid local climate challenges	■		
Physical activity			■
Local community	■		
Active edges		■	
Diverse play		■	
Evolving play	■		
Placement			■
Social difference play			■
Technologies	■		

Ill. 30 Design guide analysis at the schoolyard of Kærbyskolen

Design approach

Vision

The vision is to implement a new agenda in schoolyard designs where playful learning is integrated in the outdoor built environment to support children's growth and learning. Thus broadening the agenda of schoolyard design from a mere movement and educational focus to embracing children's need for play and the benefits hereof.

Given the present world situation regarding the current pandemic, a sudden demand in optimizing institutional spaces has occurred, causing changes to many outdoor spaces that may affect the future use of schoolyards. With the renovation of Kærbyskolen, the vision for this case is to adapt the schoolyard to a future with more outdoor learning opportunities, while still being a case of integrating the playful learning agenda.

Problem statement

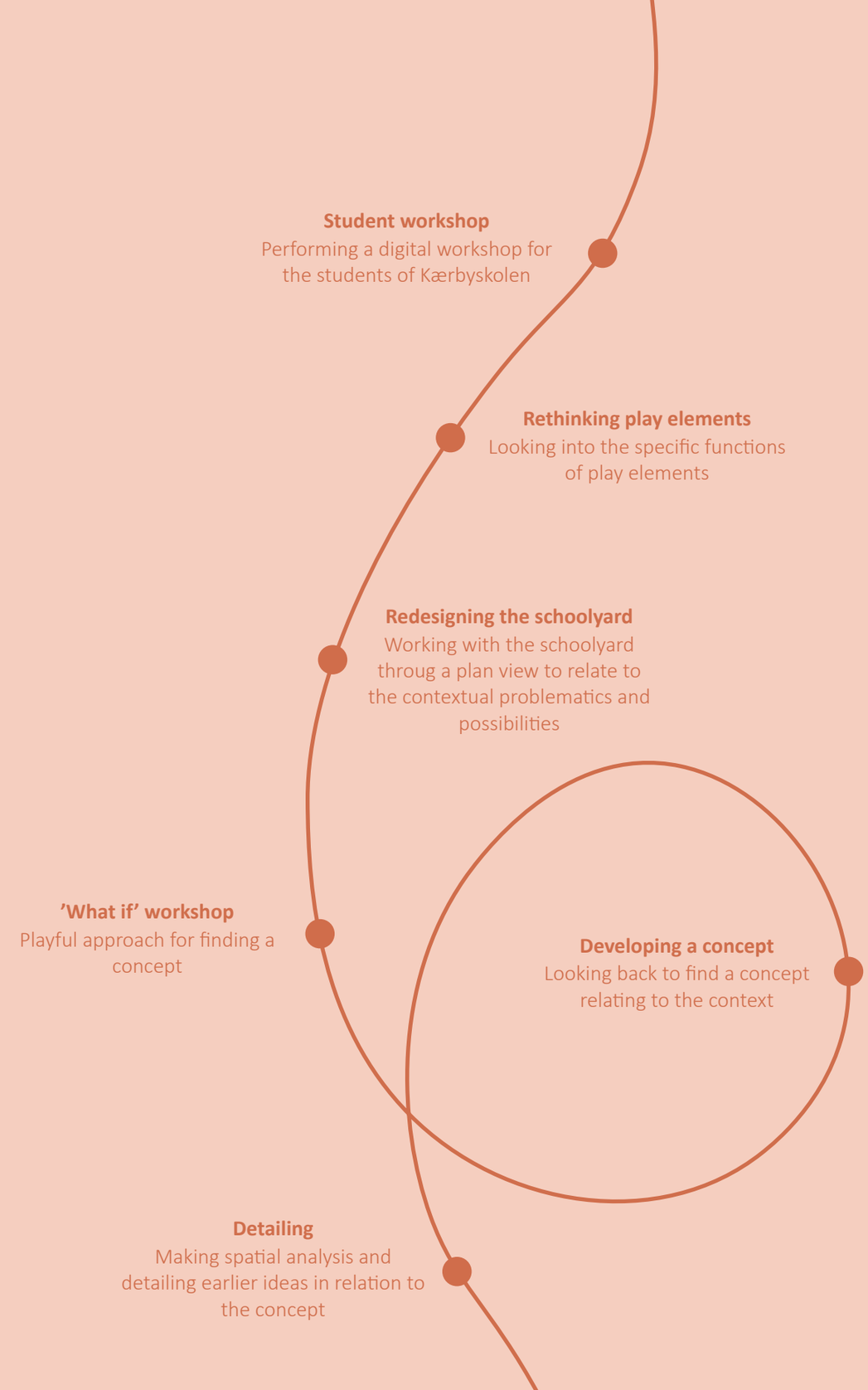
How can the small and crowded schoolyard of Kærbyskolen adapt to its local circumstances and be transformed from a grey urban space to an engaging learning environment while enhancing the schools profile of aesthetic learning processes?

Ill. 31 Conceptual visualization of the vison for the schoolyard of Kærbyskolen

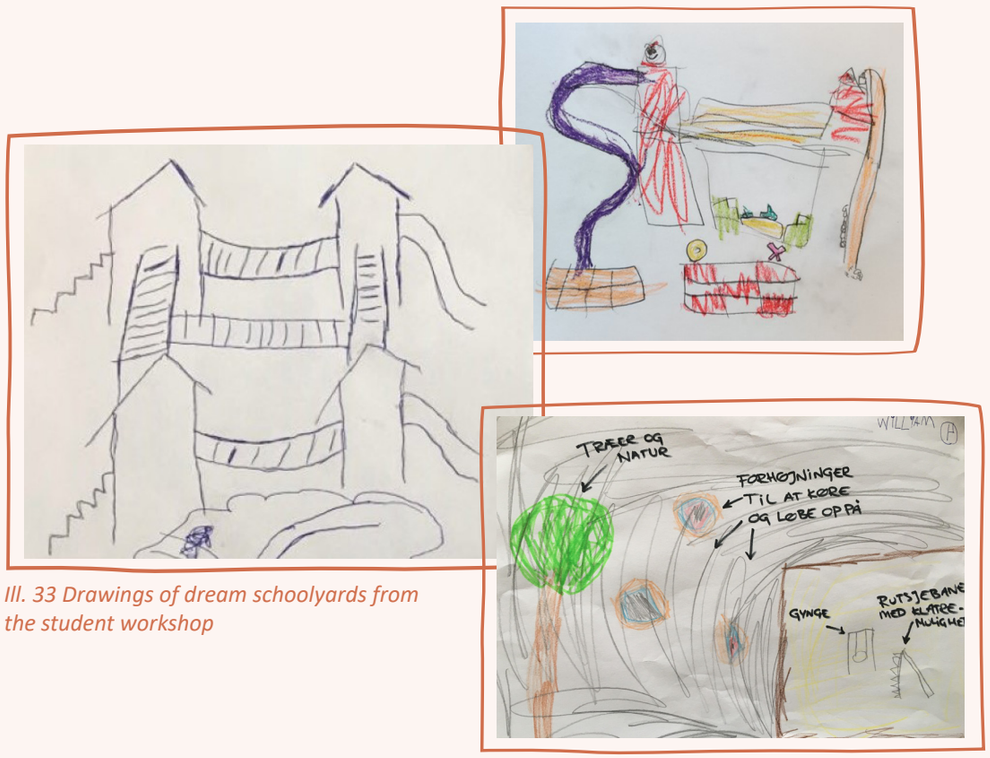
Design process

The following chapter explains the simplified process of designing the new schoolyard of Kærbyskolen. On ill. 32 a simple overview of the process is shown thus the process is iterative creating loops along the way.

During the sketching and development of the design, the lockdown period was in action. This meant that discussing and sketching was conducted differently, while rough quick model testing was not possible.



Ill. 32 Simplified process timeline



Ill. 33 Drawings of dream schoolyards from the student workshop

Student workshop

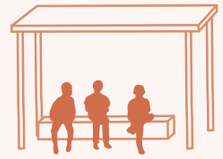
Children at Kærbyskolen have been involved as mini designers in the process of developing a design for the future schoolyard. Because of the lock down the students were involved digitally instead of the planned physical workshop. The task was created with the help of the teacher Trine Sørensen who is in charge of the youngest students at Kærbyskolen. Her responsibility was to make sure that the task would be fitted to the knowledge and understanding of even the youngest students for example recommending making a video for the younger students who cannot read yet.

The task focused on involving the children in the process of designing a schoolyard and concerned four steps: *brainstorm, references, context* and *design*. A document and a video was shared with all of the students at Kærbyskolen. See appendix 7 and 8 for the full task and results from the digital workshop. Ill. 34 shows the overall needs and ideas from the children themselves. These were used as parameters in the design process but with reservation to the possibility of questioning these and developing something unexpected for the students.

Likes in the existing schoolyard

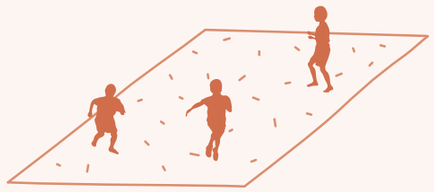
Luffen

The stage



Pokemon game area

Dislikes in the existing schoolyard

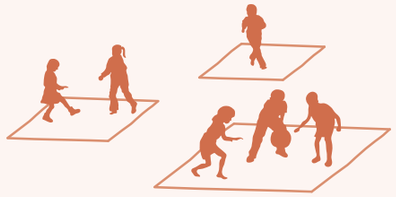


To much asphalt

The ruined sandbox and climbing frame

Wants in a future schoolyard

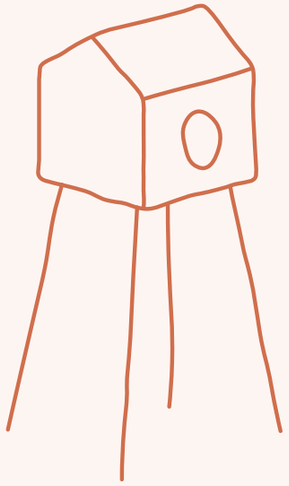
A slide



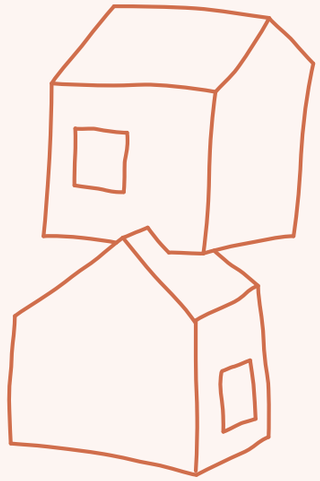
Many seperated spaces

Spaces to go up high and climb

Ill. 34 Design parameters from the student participation

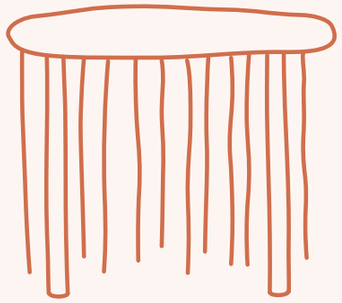


The possibility to experience different perspectives and views, that also challenge your emotions through risky play



Play elements that looks goofy and give different spatial impressions and also could be used as small group rooms during educational classes

Allowing more creative play when boundaries are limited as this swing that can move in all directions



Ropes where children can connect them differently depending on the play experience allowing for more creative play

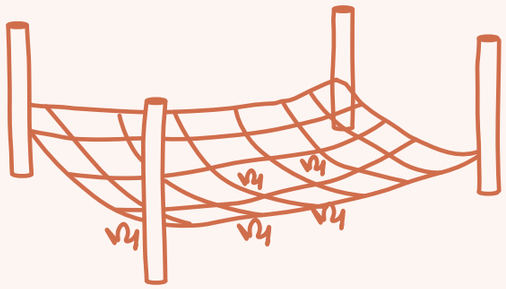
Ill. 35 Retinking design elements

Rethinking play elements

A schoolyard's layout is different depending on the context, but the formal elements such as swings, slides etc. are repeating themselves in most of them. This design process was kickstarted by rethinking play, thereby not being limited by the boundary of Kærbyskolens schoolyard. Therefore standardised play elements were rethought through the knowledge of the five competencies gained by play; *emotional, creative, cognitive, social* and *physical*. Ill. 35 shows a section of the rethought play elements.

The process resulted in a changed and creative mindset that continued throughout the design process and specific elements that were later integrated in the final masterplan.

Social and cognitive developing seesaw which only works when more people join the play

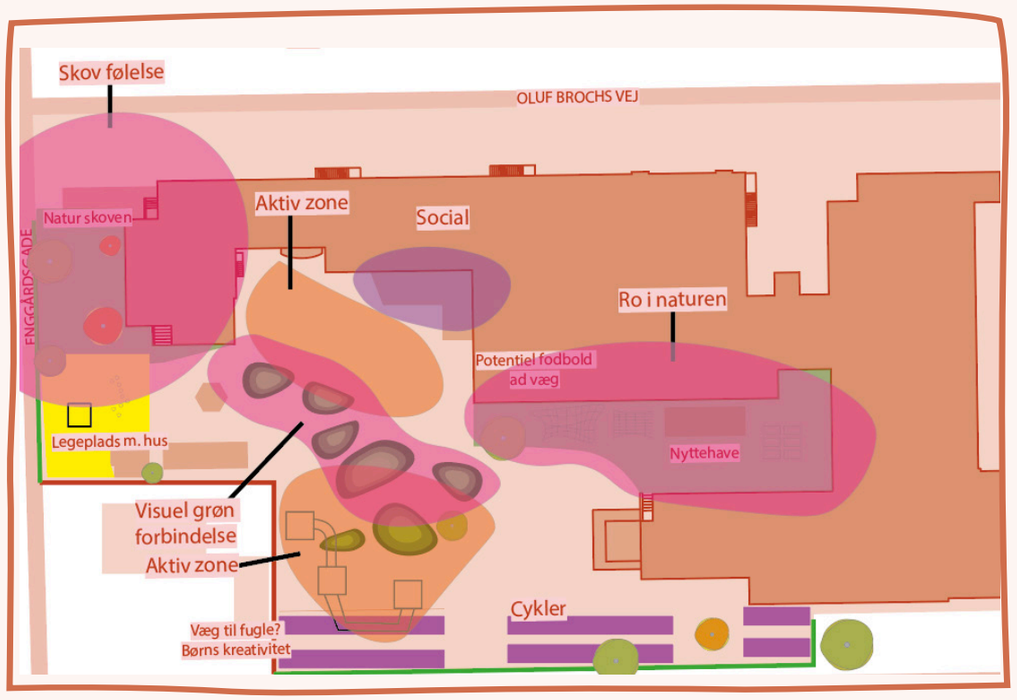


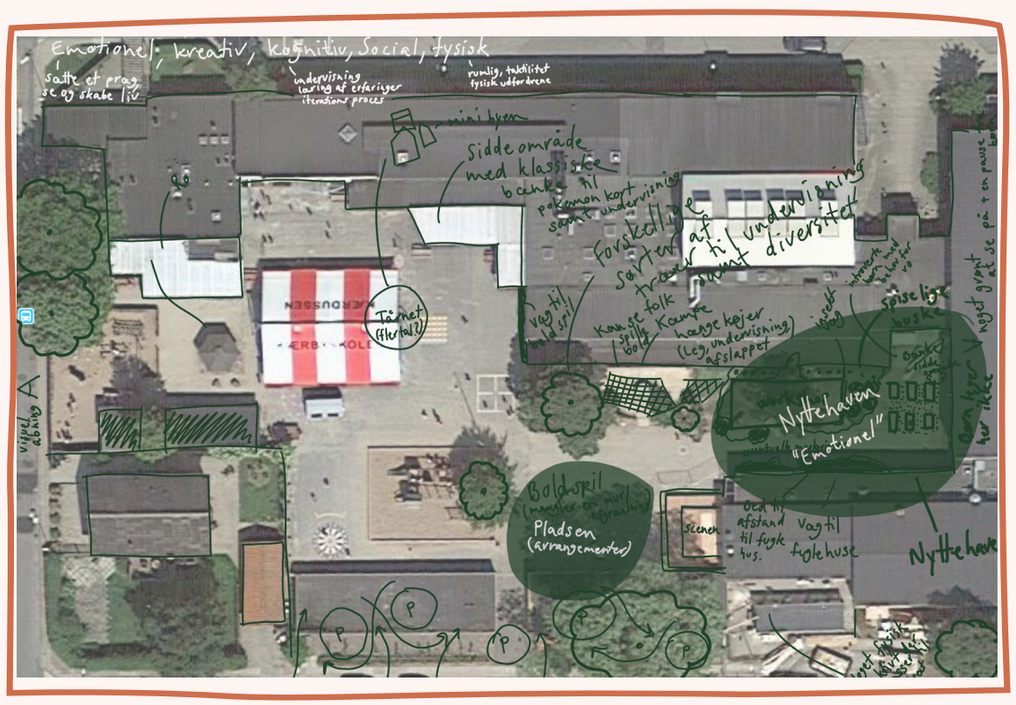
Elements that can be used in cognitive study situations, relaxing and playing

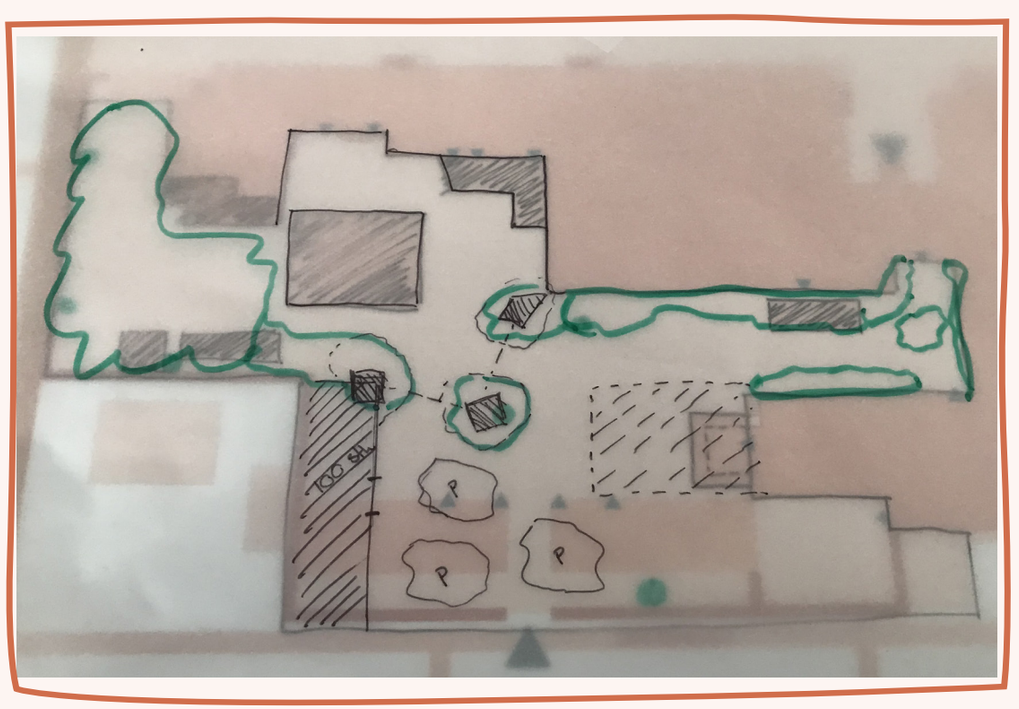
Redesigning the schoolyard

After looking into the specific play element, there was a need to contextualize the design within the boundary of Kærbyskolens schoolyard. Thereby the further work in designing the schoolyard was done in 2D through masterplan developments.

This resulted in the evolution of the existing urban garden at west and a new area for main events in front of the newly built stage. Though ideas were developed, there was a need to find a strong identity and design concept related to the schoolyard. The first thought of a "*Mini city*" for children to grow and evolve was mentioned.

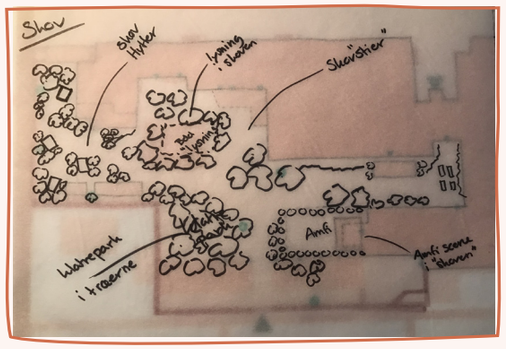






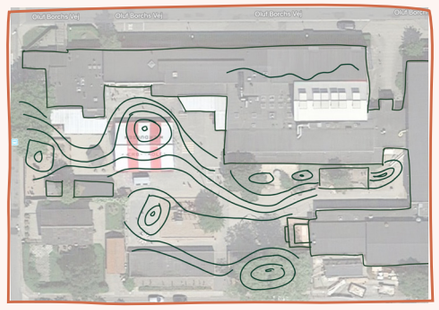
Ill. 36 Different drawings for the redesign

... the schoolyard was a forrest?

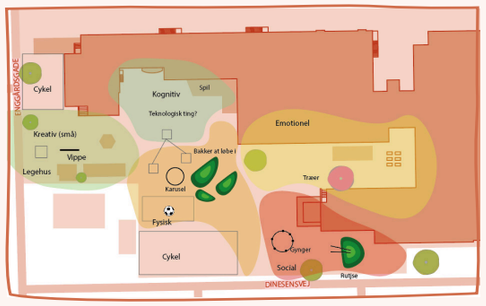


... the schoolyard was a mini city?

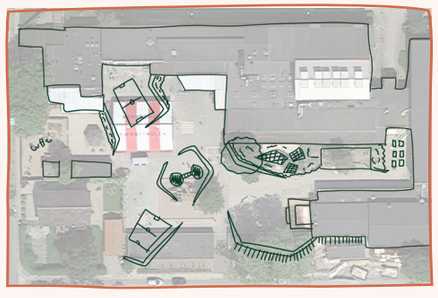
... the schoolyard was a landscape?



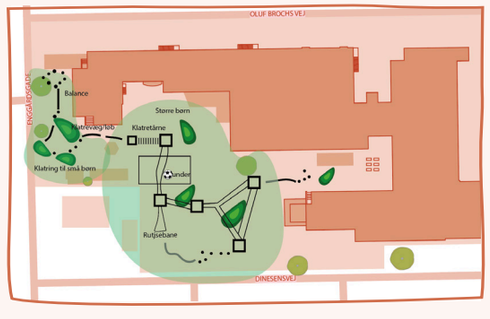
... the schoolyard was divided by the five competencies?



... the schoolyard was many small spaces?



... the schoolyard was a climbing park?



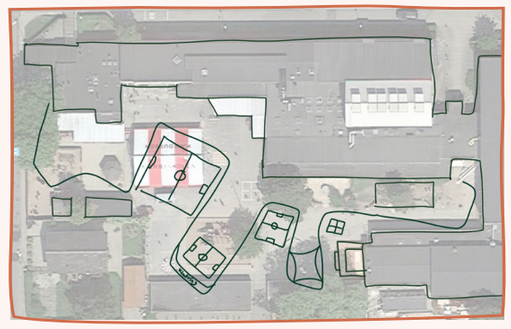
Ill. 37 Illustrations from the 'what if...?' workshop

'What if...?'

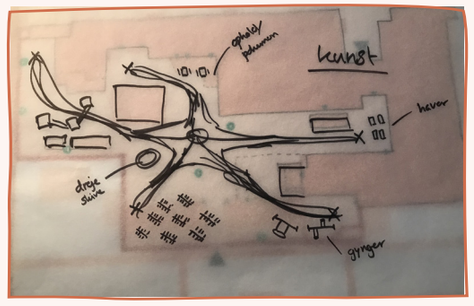
During the development of a concept for Kærbyskolen, a digital workshop of '*what if?*' was established based on a childish mindset of overdoing: "*What if the schoolyard was a jungle? What if the schoolyard was full of hills or a piece of art?*". Different themes of what the schoolyard could become was chosen and many concepts were tested within a short period of time, see examples at ill. 37.

Though this process provided varying options, there was a lack of a strong contextualized concept. A concept that would be based on the identity of Kærby and the school representing the community rather than only relating to schoolyard designs.

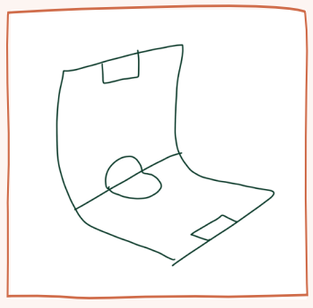
... the schoolyard was one big space?



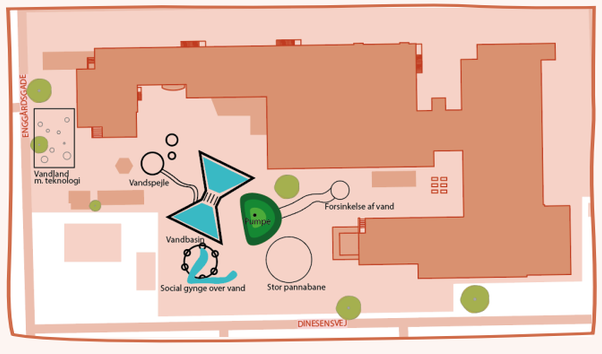
... the schoolyard was a piece of art?



... the schoolyard was a soccer field?

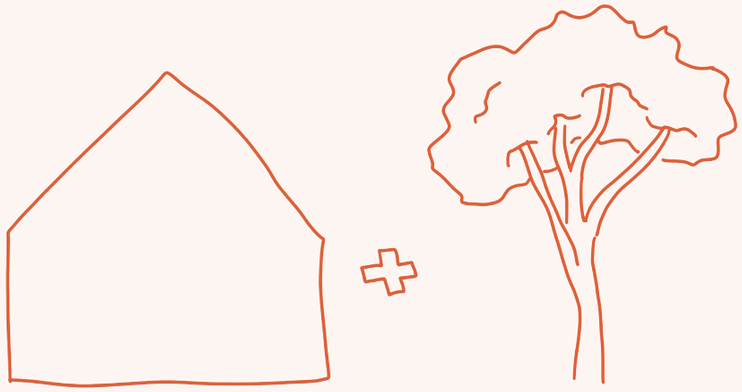


... the schoolyard was a water park?



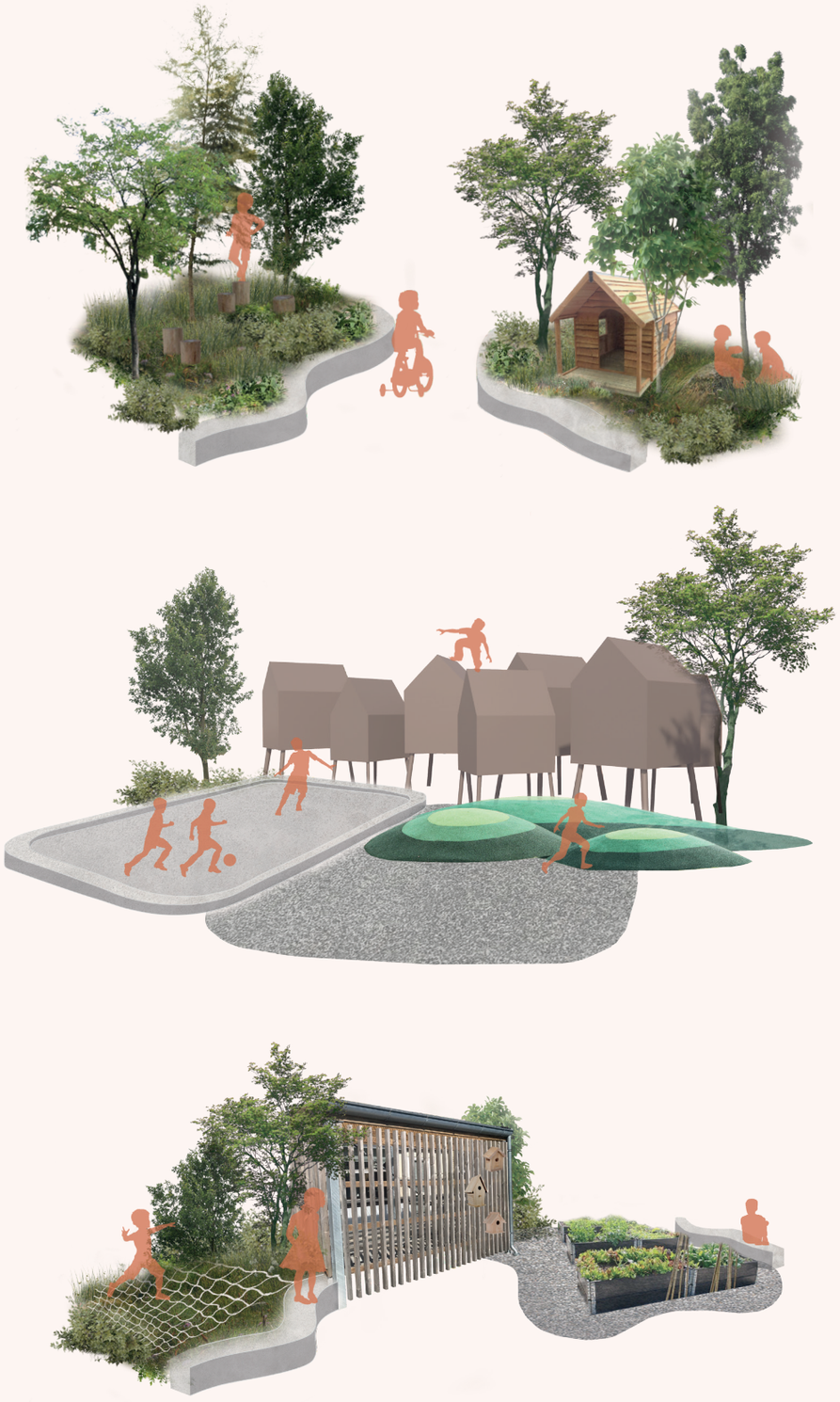
Developing a concept

Through the iterative process the identity of Kærby was revisited to create a stronger concept. The "*Mini city*" concept that was shortly mentioned earlier in relation to a schoolyard being a place for children to grow and evolve reappeared, this time in relation to Kærby and how it relates to its nearby surroundings; *Aalborg City* and *Østerådalen*. The concept of working with the identity of both smaller individual pitched roof buildings and integrating nature evolved and an idiom was found in the history of Østerå that has been a part of shaping Kærby. Thus relating to the contemporary discussions about urbanisation and climate changes, allowing nature and urbanism to be coexisting.



Ill. 38 The concept evolving the idea of coexistense of urban spaces and nature

From the existing process this concept evolved and created three different spaces in the schoolyard allowing different activities and atmospheres in relation to the context. On ill. 39 collages of the spaces atmospheres can be seen, utilized during group work to help communication.



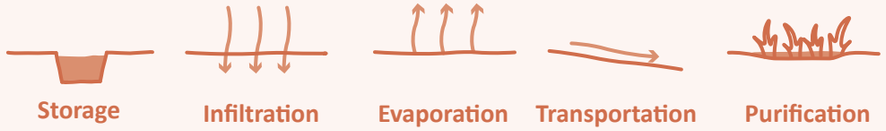
Ill. 39 Spatial collage of the three main spaces of the new schoolyard design

Detailing

Concurrent with the development of the design, detailing of selected elements were performed. Detailing was conducted in regards to the concept, 2D plan drawings and spatial 3D studies, aiming at providing a solid foundation for the decisions to be based on.

Rainwater management

Given Kærbys placement and its issues with rainwater and flooding, Sustainable Urban Drainage Systems has been integrated during the design process. Concurrent with the design development the five SUDS-solutions were being considered and incorporated, which included ideas on infiltration, storage, evaporation, transportation and purification.



Ill. 40 The five principles of Sustainable Urban Drainage Systems

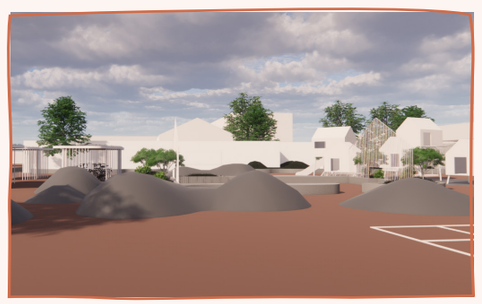
Regarding the ideas on infiltration, soil conditions and groundwater levels were relevant to investigate further. Detailed calculations and procedure can be found in appendix 10. Based on the calculations it was established that a green surface area of 307 m^2 was needed to infiltrate the amount of water that would fall within a two-year return period.

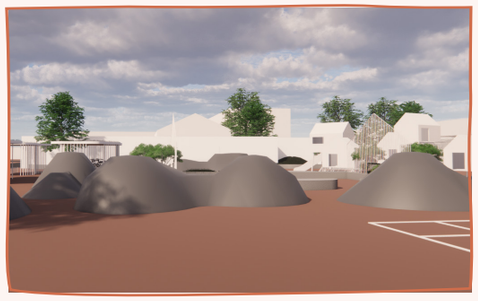
With infiltration as the major SUDS-solution, the other four solutions were thought integrated at a smaller scale with focus on the learning aspect of incorporating these. The idea was that students would be able to see how water can be collected and later used to water plants or how it accumulates in designated playful puddles to slowly evaporates.

Topography

Creating a more diverse topography required spatial awareness and multiple iterations on the layout. The design had to work both in the masterplan, in connection to the other elements in the yard, but also when seen from a person's perspective with considerations to visual connections. Thinking about the functions of the topography further produced principal sketches of how it could be used in different scenarios, as seen on ill. 41.

Ill. 41 Principles of the hills

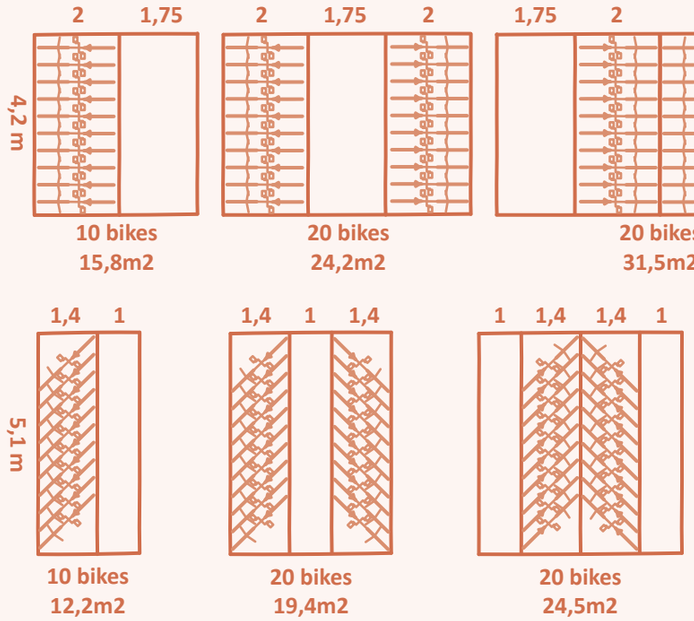




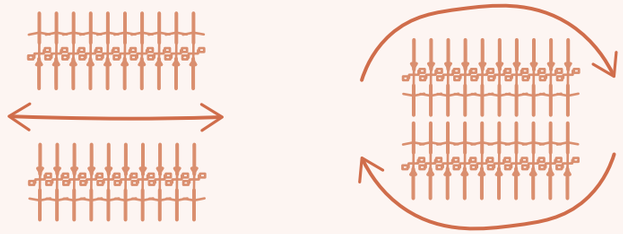
Ill. 42 Spatial analysis of the hills

Bicycle parking

When tearing down the existing bicycle parking with the purpose of opening up the schoolyard, it was important to develop a new parking area that would be transparent and open though have the possibility to contain 155 bicycles (Aalborg Kommuneplan, n.d.). It should still be easily accessible from the road, thoug avoid forming a barrier. From the idiom that was being developed shaping the cover, spatial studies on the supporting structure was conducted. Thoughts on how the parking should function in relation to a playspace was further included when determining whether the parking should be accumulated in clusters or spread out in longer rows.



Ill. 43 Process illustration of bicycle parking (Vejregler, 2018)



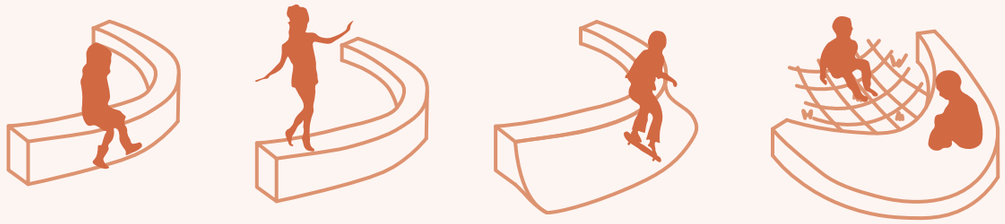
Different ways of integrating playful flow in bycycle parking areas

Ill. 44 Bicycle parking flow principles

Ill. 45 Spatial analysis of the construction for the covered bike parking

Edges

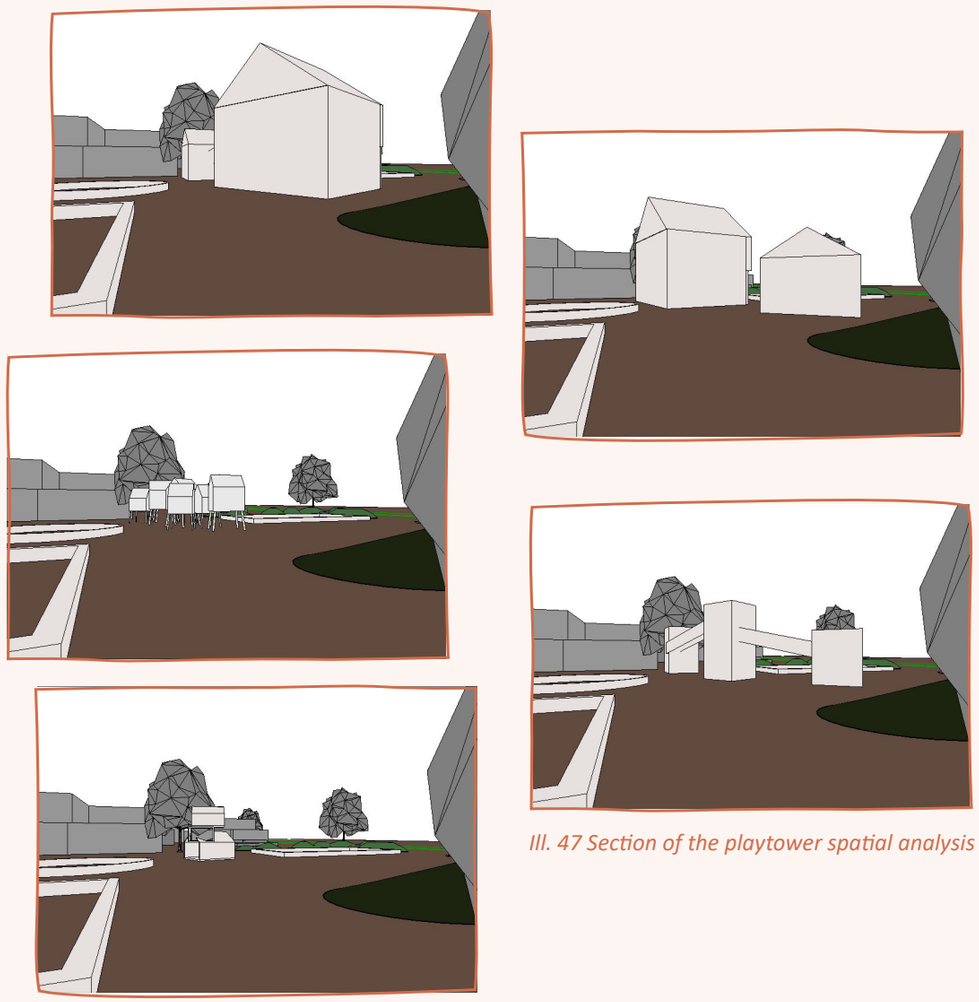
Working with activating the edge was important in relation to the schoolyard of Kærbyskolen due to the lack of space. The edge can become both a part of the identity and functional with variations increasing the value of a playful gap. Thus, not only serving as a boundary but as a function with multiple user scenarios as seen in ill. 46.



Ill. 46 Active edges principles

Playtower

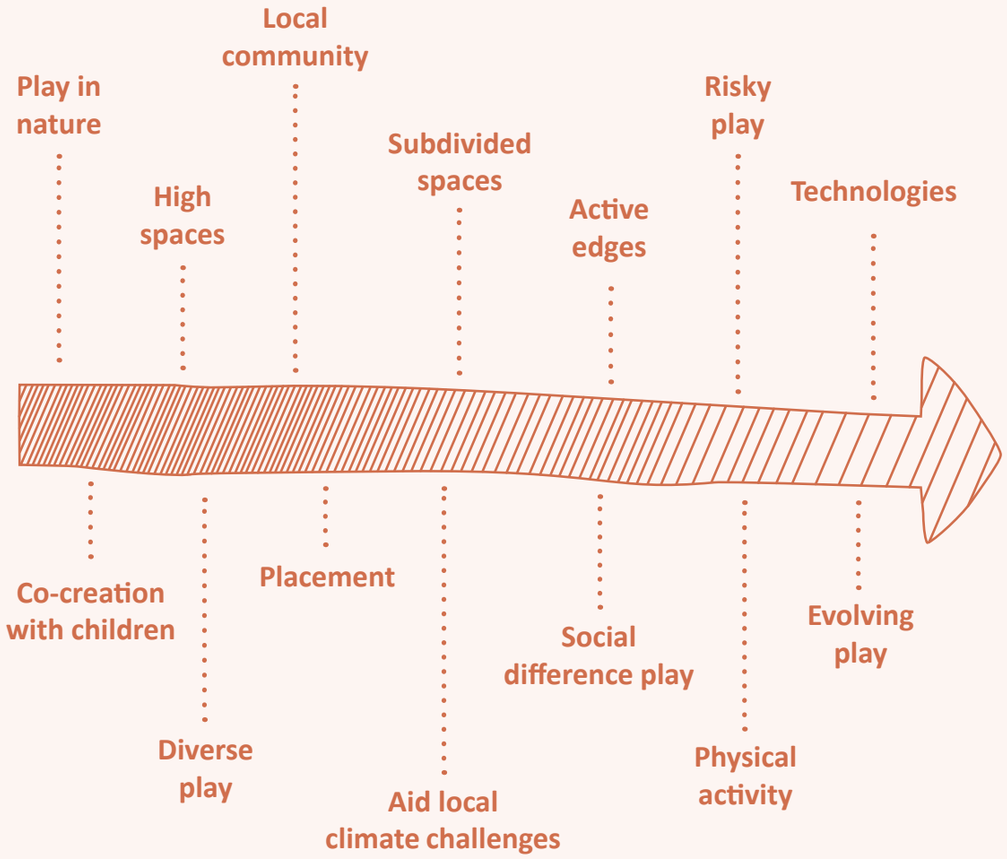
The development of the playtower was rooted in the concept of creating a '*mini city*' and further supported the establishment of a strong identity for the schoolyard. The process of designing the playtower included iterations on size, heights, materials and functions, with an emphasis on creating a central element with visual connections throughout the schoolyard. Safety considerations were based on the Danish Standards Association (2017) requirements. See more pictures from the spatial analysis in appendix 9.



Ill. 47 Section of the playtower spatial analysis

Integrating the guidelines

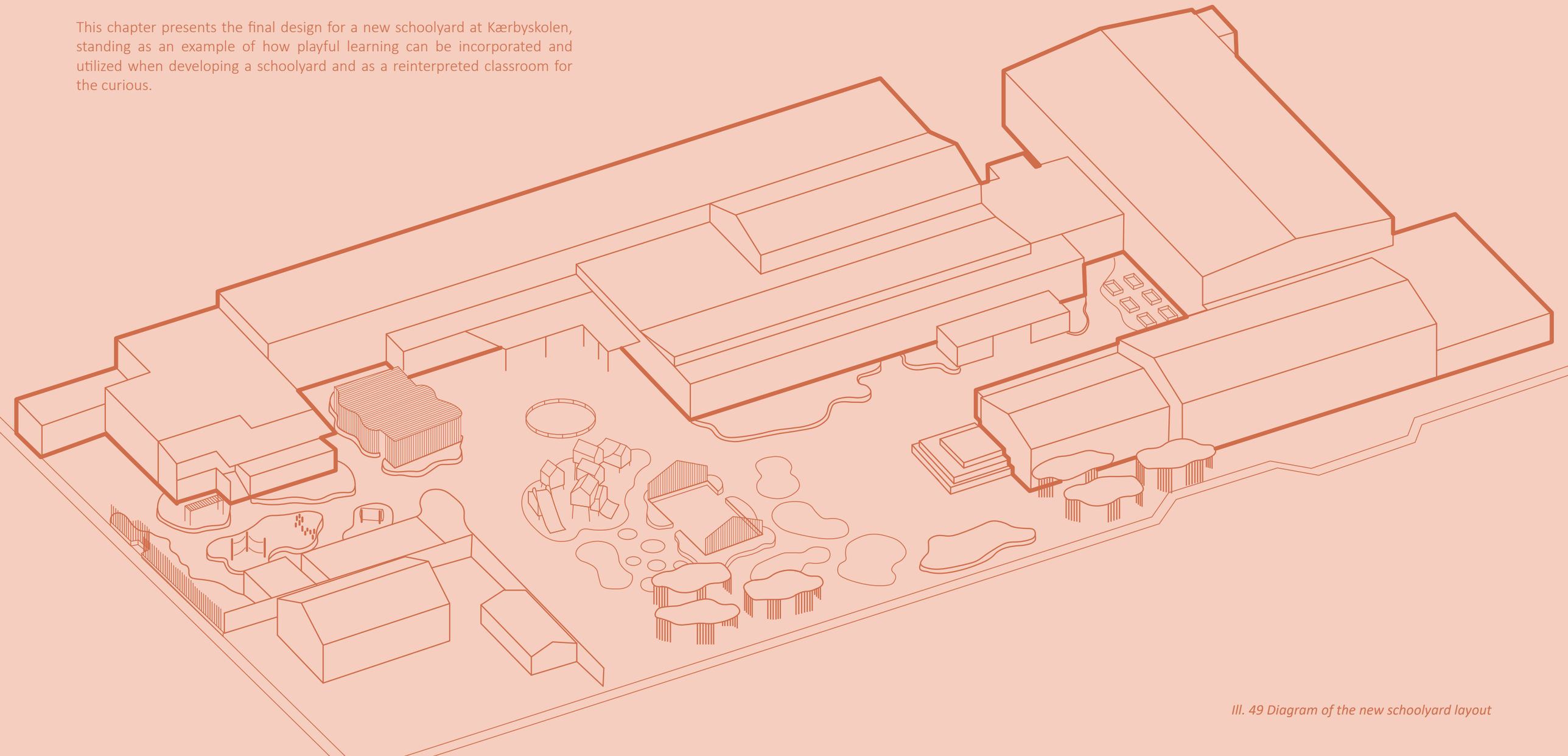
When detailing the schoolyard, the 14 guidelines from *The design guide* were integrated in parallel with the development of the design. As it was not possible to integrate all at the same time, it was prioritized which ones held the most importance to Kærbyskolen. Based on the wishes of the school's own design team and the workshop with the children, the prioritized order is presented in ill. 48. As all 14 guidelines are deemed important, there is no correct order of implementation, meaning it is a case of evaluating the individual school and their needs as performed here.



Ill. 48 Importance of the 14 design topics in relation to the design process

Presentation

This chapter presents the final design for a new schoolyard at Kærbyskolen, standing as an example of how playful learning can be incorporated and utilized when developing a schoolyard and as a reinterpreted classroom for the curious.

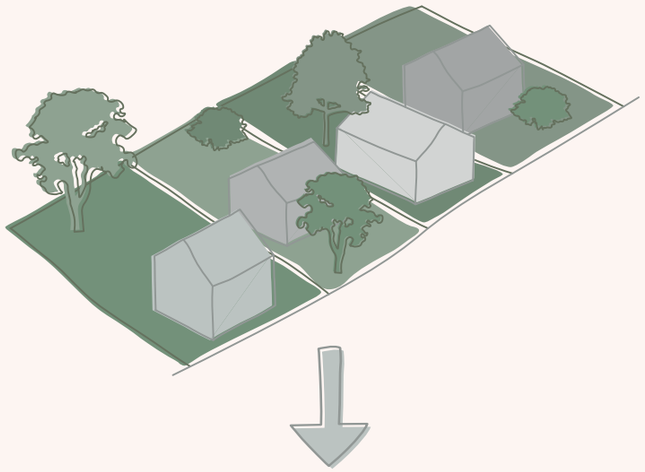


Ill. 49 Diagram of the new schoolyard layout

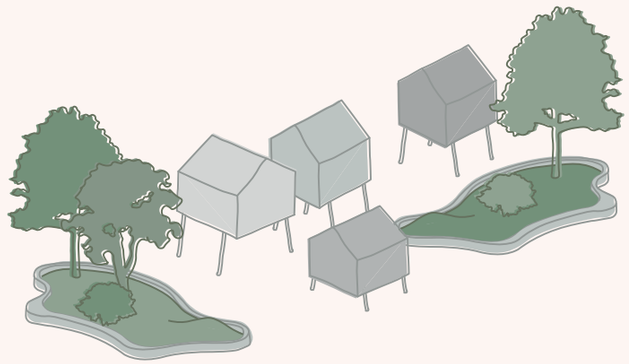
A schoolyard with a local identity

The new identity for the schoolyard of Kærbyskolen are rooted in the identity of the neighborhood, Kærby. The local identity is shaped by both nature and urbanism with its location between the urban city of Aalborg and natural area of Østerådalen. This identity has been reinterpreted to compliment a schoolyard setting, creating space for play and learning. The identity of pitched roof houses and green gardens inspired a '*mini city*' concept, emphasizing the story of a schoolyard being a place where children grow up, while making room for the subtle diversity.

Identity of Kærby



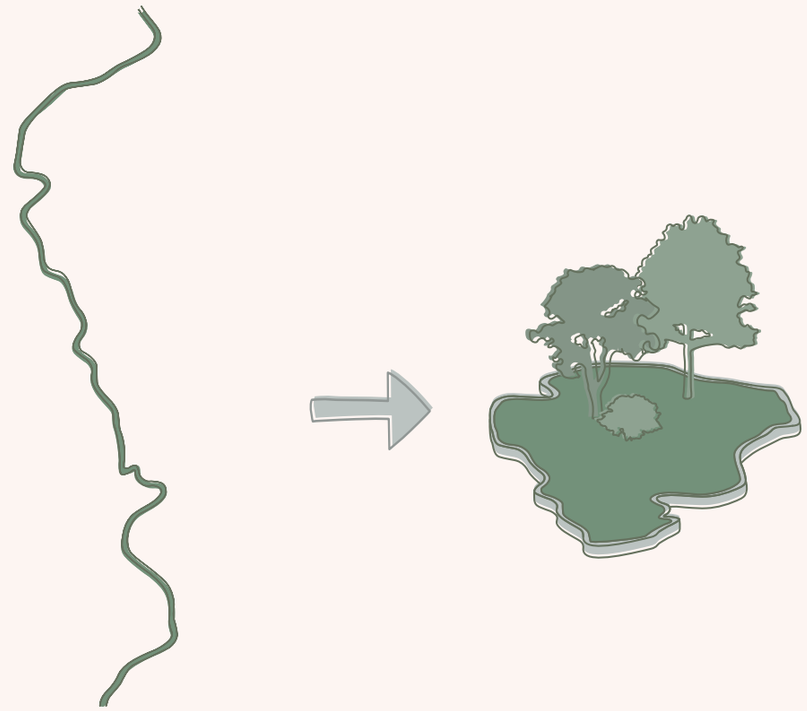
Identity of Kærby translated to the new schoolyard concept



Ill. 50 Local identity becomes the schoolyard identity

The past shape of Østerå

The shape of the new garden beds



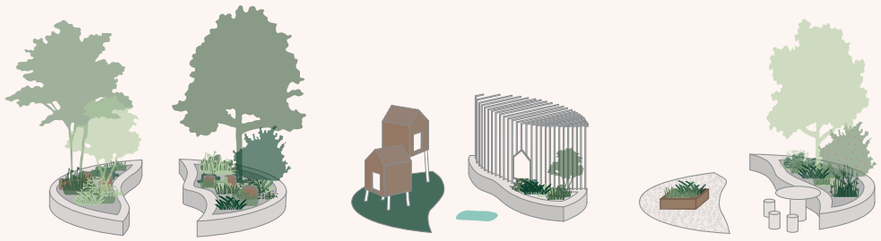
Ill. 51 The past shape of Østerå becomes the shape of the new garden beds

Shaped by the past

From the concept of emphasizing the local identity, the history of Østerå and how it has shaped the city of Kærby has inspired the forms in the schoolyard. The form of the green garden beds is rooted in the pasts wavy shape of Østerå, before buildings inflicted the layout of the natural landscape, creating a subtle link to the local history by reflecting the past in the present. With the wavy natural shapes, a great diversity in the spatial experience is created in between the green areas in the new schoolyard.

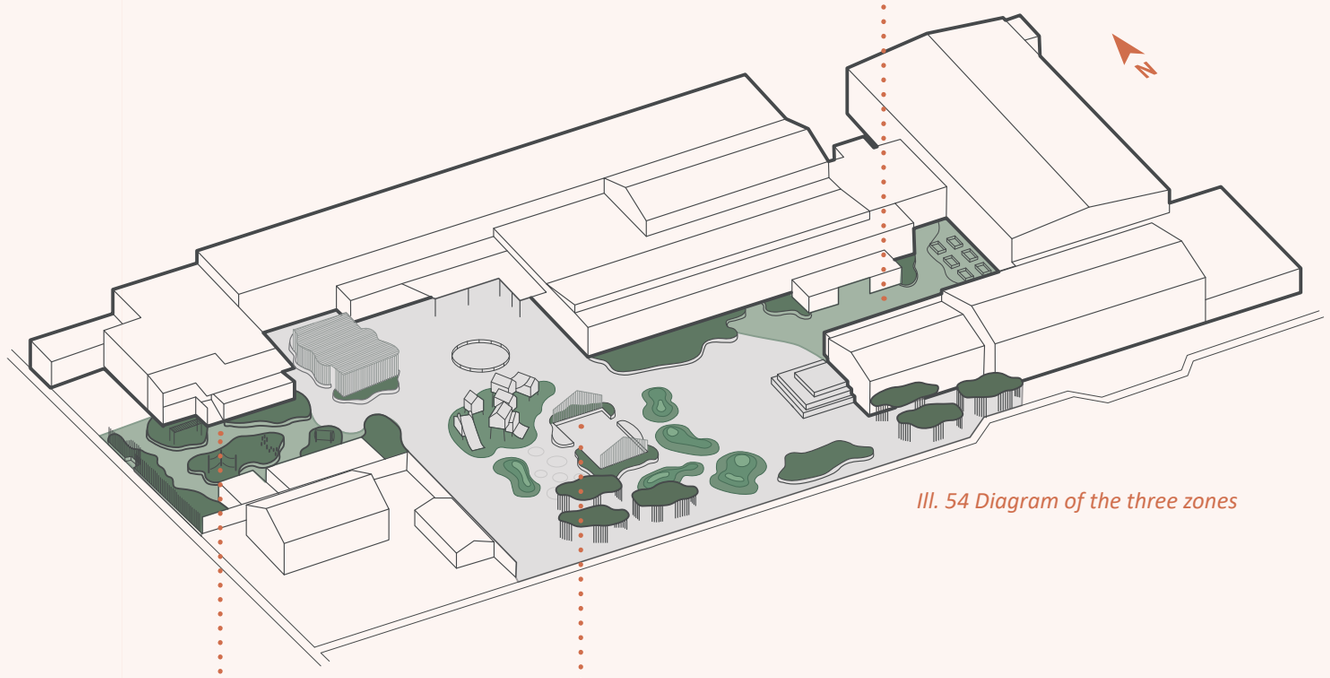
Three main spaces

The new schoolyard design of Kærby is separated into three main spaces to make room for different individuals and needs. The areas are; *Luffen, The Urban Space* and *The Garden* area as seen on the illustrations. All of the areas contain existing qualities as well as new elements. The areas to the east and west enhances an existing green quality while the middle area represent an urban open space as seen on ill. 54.

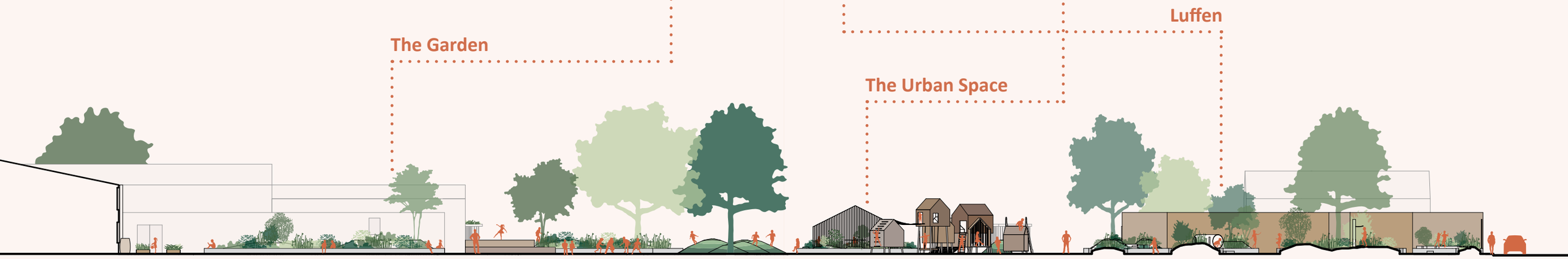


Luffen **The Urban Space** **The Garden**

Ill. 52 Atmosphere icons of the three main spaces



Ill. 54 Diagram of the three zones



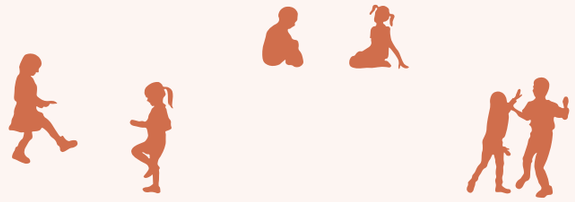
Ill. 53 Cross-section AA - The schoolyard 1:300

Luffen

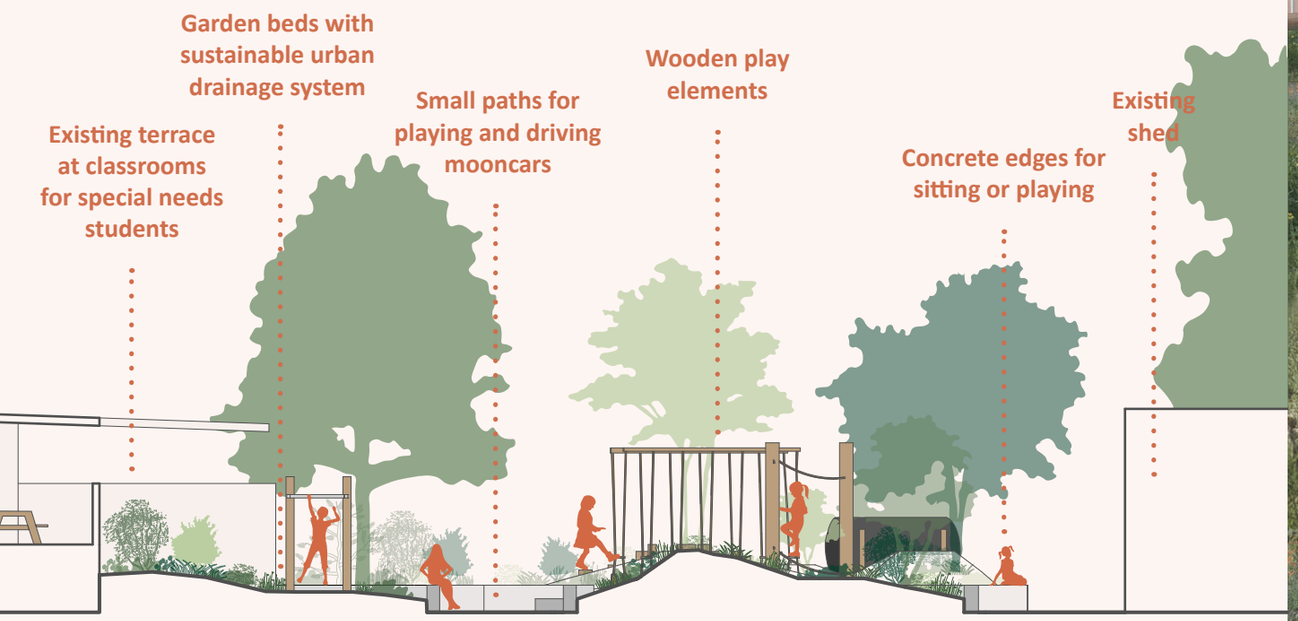
The existing area of Luffen is presently an enclosed soccer field and an area with soil and wooden play elements. The name '*Luffen*' and its play elements are already appreciated mainly by the younger students. Thus enhancing the existing identity through a greener landscape that also creates a calming environment for the special needs classes allowing them to remove the window blinds and look at the treetops. With new high areas in the schoolyard the terrace is expected to be less attractive for the other students, making the space primarily for the special needs classes.

Target audience

Younger students playing on separate play elements in smaller groups



Ill. 56 Target audience Luffen



Ill. 55 Section BB - Luffen 1:100

Ill. 57 Luffen visualization

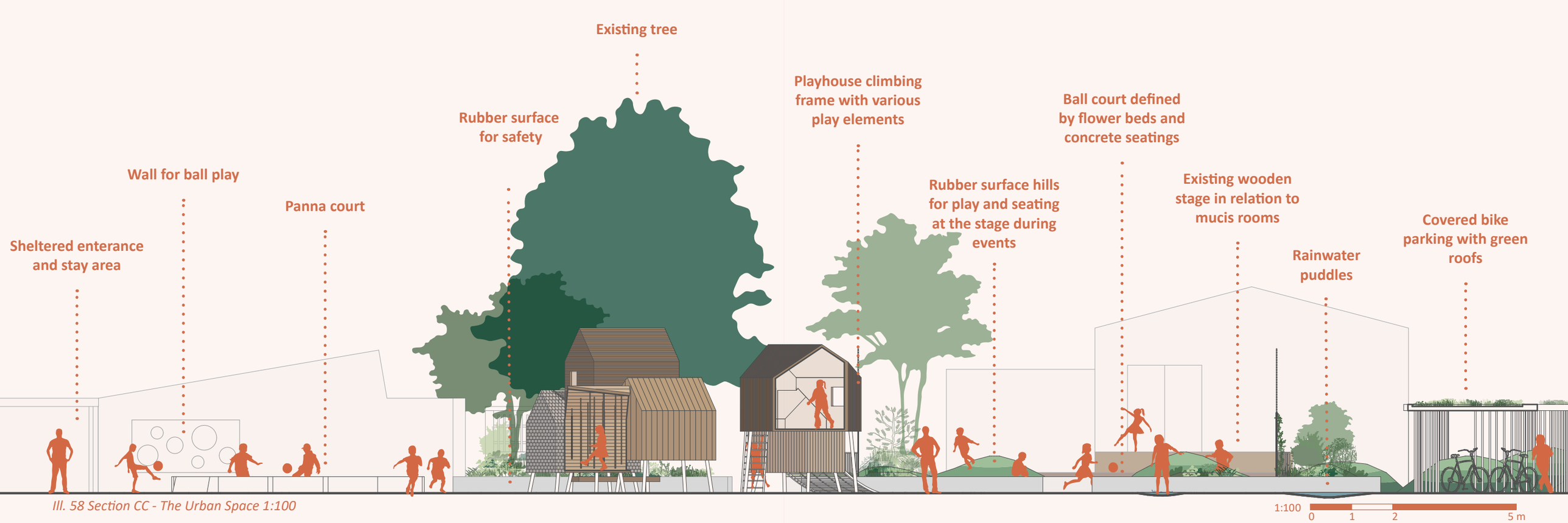
The Urban Space

Multiple soccer courts and a worn-down climbing frame with a ruined sandbox is the primary identity of The Urban Space today and sheltered bicycle parking encloses the area from the public. The new design opens to the public by dividing the bicycle parking into smaller shelters, while integrating them in the schoolyard instead of acting like a barrier. Iconic diverse play elements are implemented through a play tower of mini houses, fences around the soccer courts and hills adding topography into the otherwise flat schoolyard thus creating divisions of the urban area. The space in front of the stage is left open for free play and running while also creating opportunities for bigger gatherings and events.

Target audience

Students of all ages playing in groups, pairs or alone on bigger shared play elements and space inbetween

Ill. 59 Target audience The Urban Space



Ill. 58 Section CC - The Urban Space 1:100

Ill. 60 The Urban Space visualization

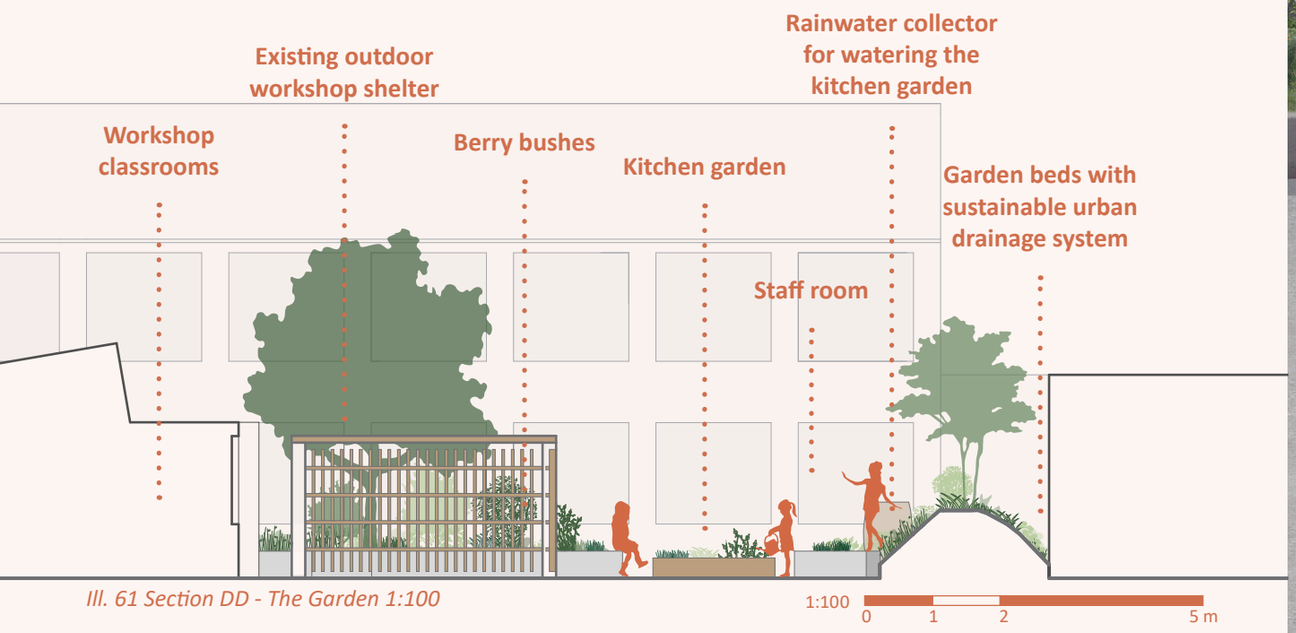
The Garden

Presently The Garden area is an unutilized space where the newly built workshop shelter and six kitchen garden beds are the only functions. Renovations of the schoolyard enhances the identity by adding green elements such as berry bushes and creating space to hang students' creations such as insect hotels and birdhouses. Not adding further playful elements creates a calm environment for children that otherwise stays indoor during recess. Thereby creating a safe space for sensitive students where the staff room is nearby. Seating and tables along the edge of the garden beds allow outdoor eating, chatting and groupwork.

Target audience

A calmer area for stationary chatting groups and more introvert students

Ill. 62 Target audience The Garden



Ill. 61 Section DD - The Garden 1:100

Ill. 63 The Garden visualization

Oluf Borchs Vej

Bicycle parking

B

Special needs class terrace

Covered soccer/ basket court

C

Covered entrance and stay area

Wall for ball play

Panna court

D

Path for mooncars

Rescue vehicle access

Wooden play elements

A

Campfire

Shed

Play towers

Net

Workshop shelter

Kitchen garden

Markings on ground for play

Soccer court

Black-board

Rainwater puddles

Stage

Open square for bigger events

Covered bicycle parking

Covered bicycle parking

Enggårdsgade

Dinesensvej

N

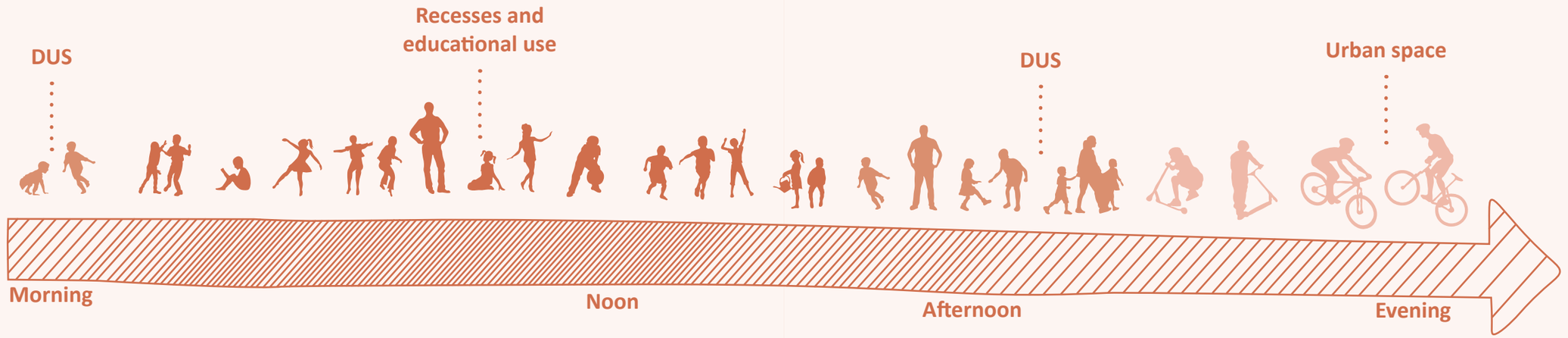
1:400

0 4 8 20 m

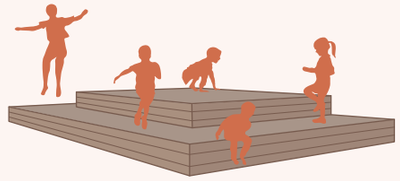
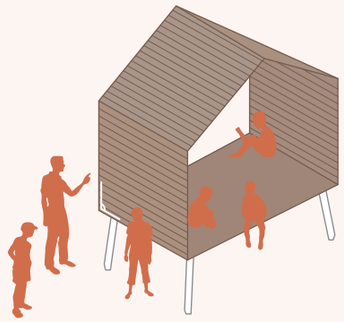
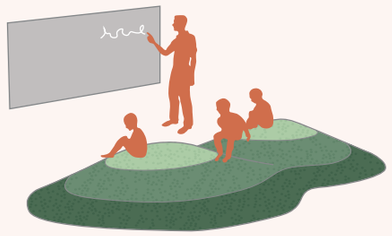
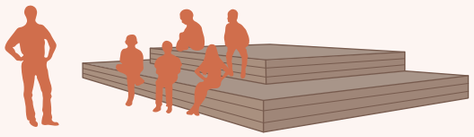
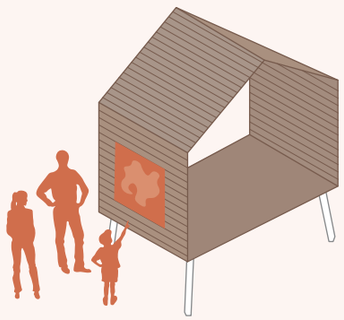
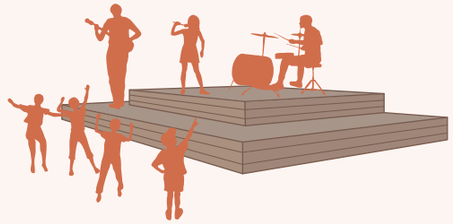
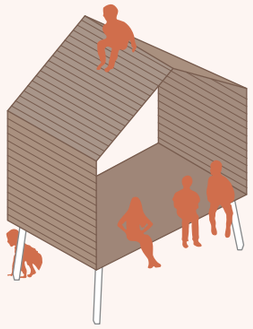
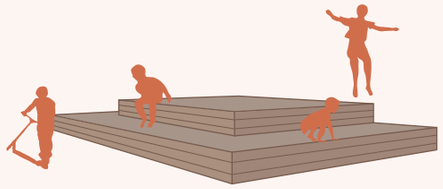
Ill. 64 Masterplan 1:400

A new daily use

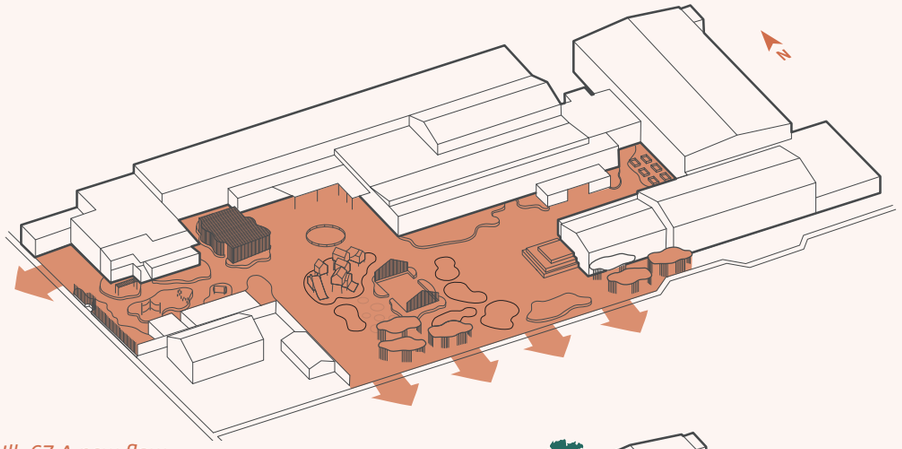
The new schoolyard design has created the possibility for a greater use during the whole day. In school hours the integration of educational use makes sure learning not only happens inside and makes it more possible to improve embodied learning experiences. With the new design it is expected that the DUS will use outdoor areas even more since the quality of the space is improved. During DUS hours playing with elements such as riding moon cars in between the landscape in Luffen and roleplay fights with swords are possible. When the DUS closes for the day the community are invited into the schoolyard. Creating two openings to the schoolyard makes it possible to take a shortcut and interact with each other and the play elements. The integration of play elements that is not seen at home such as the hills and playtower creates an attractive urban space for gathering and play. The new design is shaped by the needs of the different stakeholders resulting in a schoolyard for the whole neighborhood focusing on a playful way of learning. On the following page ill. 66 shows different scenarios and their uses.



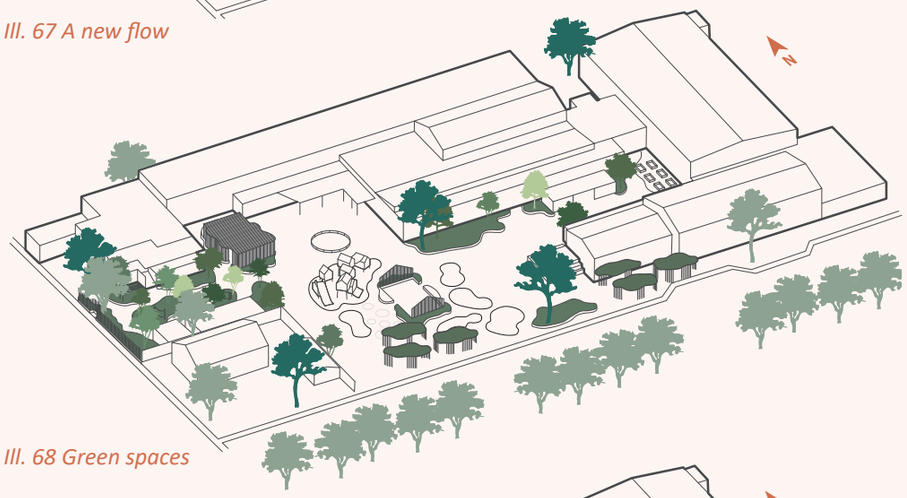
Ill. 65 A day in the new schoolyard - Intensity and users

	Playtower	Hills	Stage	Edge and garden beds
Recess				
Education				
Events				
Urban space				

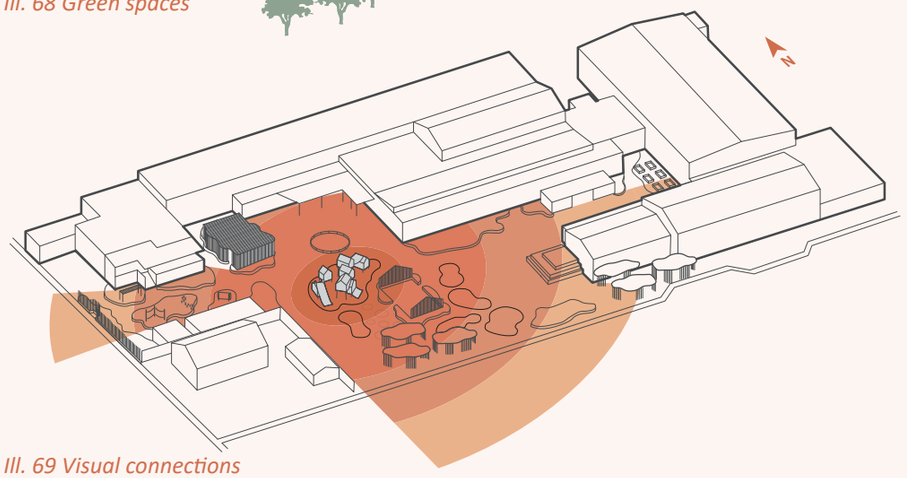
Ill. 66 User scenarios for different schoolyard elements



Ill. 67 A new flow



Ill. 68 Green spaces



Ill. 69 Visual connections

A new flow

An new flow through the schoolyard is created with the opening of the schoolyard towards the west and the removal of the enclosing bicycle sheds, thus freeing 263 m^2 to integrated into the schoolyard. With the major access point from the south, the schoolyard now appears open and welcoming, while it affords leisurely passage across.

Green spaces

While preserving most of the existing trees, new ones have been added. These vary in species and sizes to enhance a biodiverse environment in the schoolyard. Trees have primarily been situated at the green areas; Luffen and The Garden area.

Visual connections

Where visual connections were formerly lacking, the new open schoolyard enhances these. From the central playtower, visual connections are now possible across the whole yard, while the view from one end of the yard to the other, will only be partly obstructed by minor elements and trees. Considerations to neighbors privacy have been taken in regards to heights and placement of the visual connections.

Main entrance

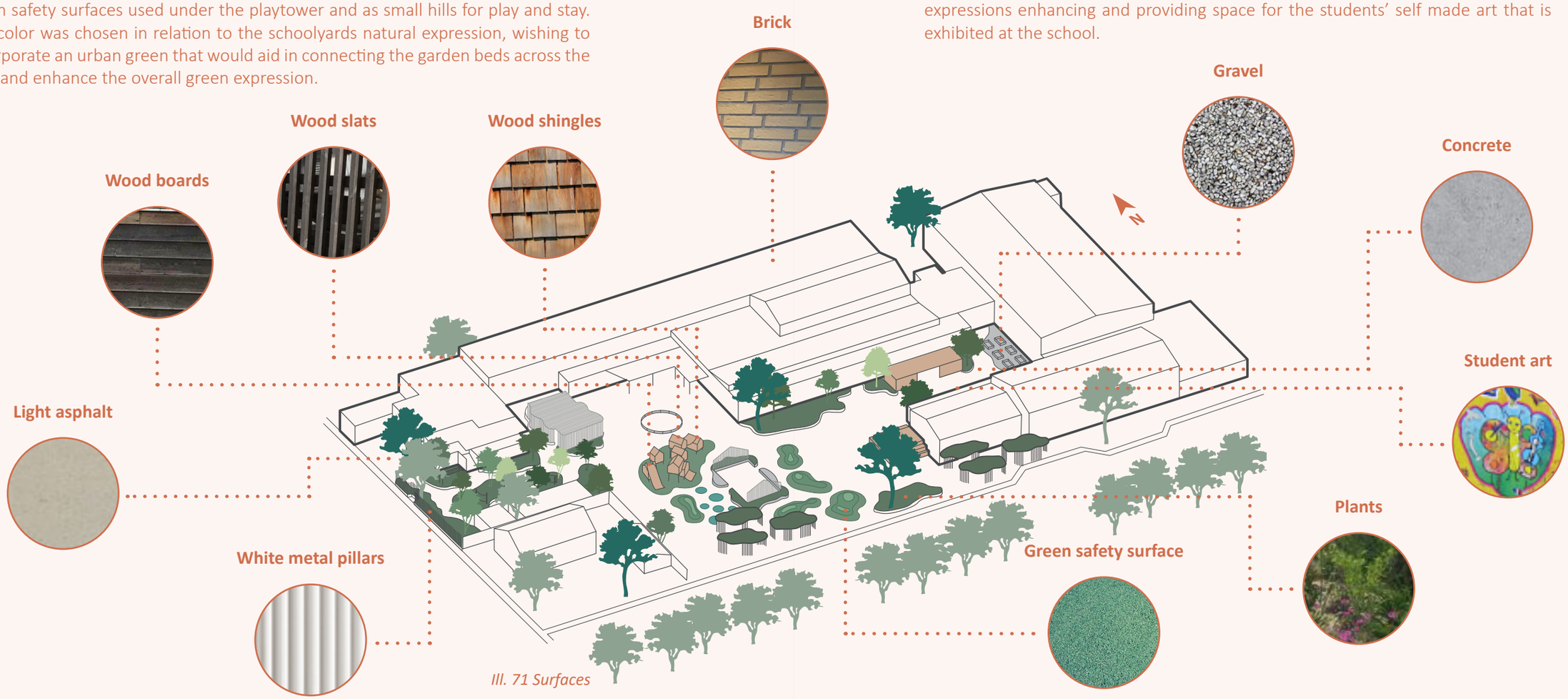
Redesigning the bicycle parking creates an inviting schoolyard exploiting the full potential of the schoolyard for the local community. New play elements such as safety surface hills and the play tower affords playful use for different ages.

Ill. 70 Visualization main entrance

Surfaces

When selecting the material for the schoolyard considerations were given to the overall relation between them. The schoolyard will be cladded with a light grey asphalt, providing a lighter and coherent expression across the yard. Grey concrete surrounds the garden beds as it contrasts the green natural content and was chosen due to its robust qualities allowing for multiple uses for play and stay. As for the garden beds, various green plants occupy the space and appear as part of the schoolyards outward expression. Surrounding the kitchen garden is a gravelled area with a different identity, implemented to emphasize a change in pace through the sound and feeling when moving across. Another ground level surface includes the green safety surfaces used under the playtower and as small hills for play and stay. The color was chosen in relation to the schoolyards natural expression, wishing to incorporate an urban green that would aid in connecting the garden beds across the yard and enhance the overall green expression.

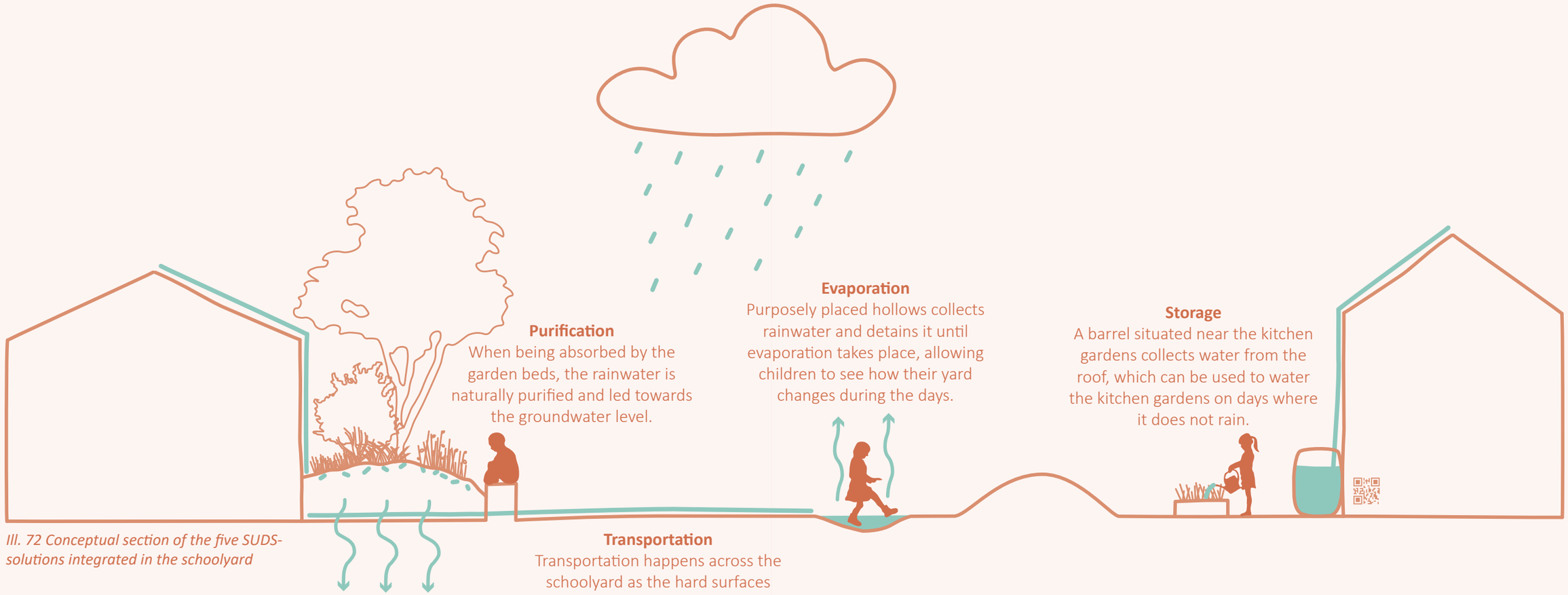
Wooden elements have been incorporated in various ways. This material was chosen based on the existing inclusion at the stage, workshop shelter and sheds, and also in relation to the previous indoor renovation, aiming at including some of the indoor identity in an adapted manner. Various types and sizes of wooden materials were used for the playtower to enhance the '*mini city*' concept, providing each house with a different expression as it would appear in a real city. Surrounding the soccer courts are white metal pillars chosen with the purpose of keeping a neutral expression colorwise, while still providing a contrast to the other green, grey and wooden covered surfaces. Overall the materials have been selected due to their simplistic expressions enhancing and providing space for the students' self made art that is exhibited at the school.



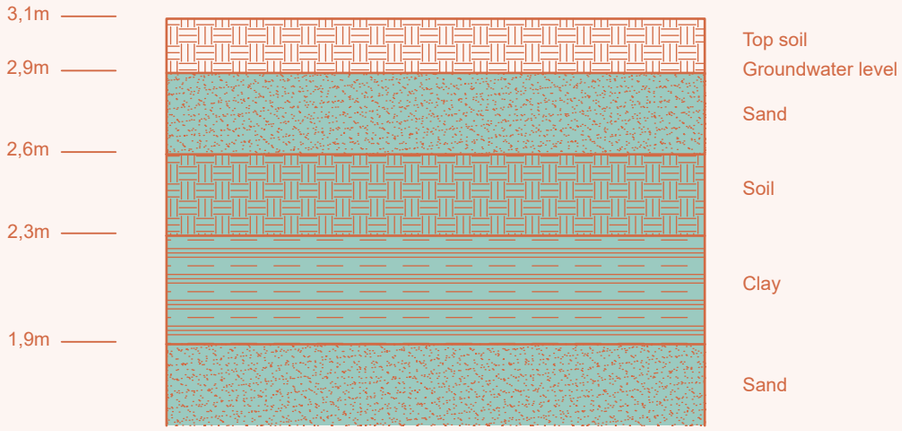
Ill. 71 Surfaces

Learning about water

With the goal of implementing a natural flow of water management and thereby removing the schoolyard from the hydrological balance, the five SUDS-solutions have been implemented in the design. The reason for using all solutions to a larger and lesser extent are founded in the wish to create awareness about the different possibilities and spark children's curiosity, inspiring them to bring this knowledge home. As the schoolyard is a space for learning, the different solutions can aid children's knowledge about SUDS-solutions while they play, jumping in the puddles that will evaporate, watering their kitchen gardens with detained water or watching the water flow towards the garden beds and disappear. At the same time teachers can educate the children about how the earth absorbs and cleans the water before it again continues as part of the natural cycle. After school hours information about water management and biodiversity can be communicated through digital QR-codes for everyone to gain more knowledge.

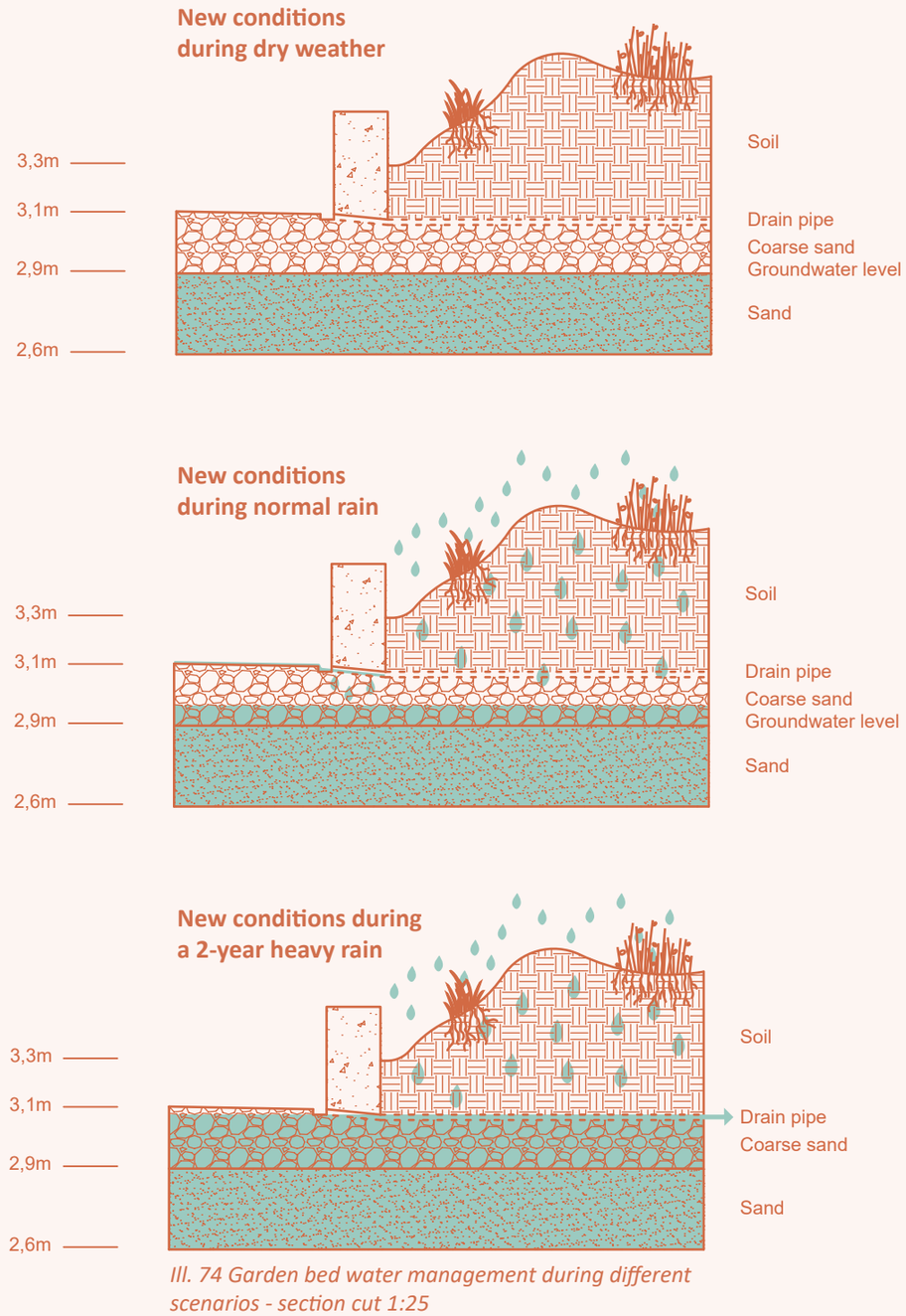


Ill. 72 Conceptual section of the five SUDS-solutions integrated in the schoolyard



Ill. 73 Current soil conditions - section cut 1:25

The primary water management solution in the schoolyard is infiltration, resulting in the garden beds absorbing and purifying rainwater, thereby infiltrating it down to the groundwater level. Ill. 73 provides a detailed overview of the current conditions, while ill. 74 represents the new design and how it functions during rainfalls. First an image of the conditions during dry weather is shown followed by a representation of the conditions during a normal rainfall. As illustrated, water will infiltrate through the soil and coarse sand while moving towards the groundwater level. Lastly, a representation of a heavy rain event where the garden beds will not be able to infiltrate the necessary amount of water. To remedy this occurrence a drainpipe has been placed just below the surface, which will redirect the excess water to the sewage system. See appendix 10 for the calculations, which the garden bed design has been based on.



Ill. 74 Garden bed water management during different scenarios - section cut 1:25

Playful learning competencies in the schoolyard

The design encapsulates the aspects of playful learning by incorporating the five competencies gained by this approach. The following describes the integrations of the competencies in the new schoolyard design.

Emotionel

Green elements that grow, evolve and need to be taken care of emphasises the emotional connection to the schoolyard, especially in the kitchen garden where children can both see and taste the plants. There is also room for self creation in the workshop shelter where insect hotels and birdhouses can be made and hung up in conjunction with the schools aesthetic learning processes. Emotional connections are preserved by keeping and emphasising important existing features such as Luffen, the stage and the kitchen garden. Furthermore the identity of Kærby is translated into the concept of the schoolyard telling a story about co-existence of nature and the build environment.

Ill. 75 Emotional competencies

Creative

Allowing children to create elements as mentioned above improve their emotional as well as creative competencies. Adding creativity in play is achieved by avoiding play elements with predefined usage to allow for a more creative free play and imagination. By implementing special contextual designed elements as the playtower the play differs from the common surrounding playscapes as for example elements seen in their home gardens.

Ill. 76 Creative competencies

Cognitive

By implementing new learning environments in the schoolyard such as SUDS and biodiversity the schoolyard has become a classroom for the curious where students can go discover. The playtower has different sizes of pitched roof buildings that could be integrated in math class for volume calculations and in other classes they can act like smaller group rooms. For outdoor classroom teaching the hills act as elevated seatings and a blackboard is added, thereby offering many diverse learning possibilities in the schoolyard focusing on the schools identity of aesthetic learning processes.

Ill. 77 Cognitive competencies

Social

The social competencies are emphasized through diversity creating multiple areas with different identities and usage, play elements for different age groups and activity levels. Walls have been removed to invite the community in thus changing the flow and creating a shortcut through the schoolyard. Luffen and The Garden have remained the same identity as before, though enhanced, thereby reinforcing the existing relationship while creating different levels of calmer areas.

Ill. 78 Social competencies

Physical

Hills creates a changed topography that encourage speed through running, biking and the use of scooters resulting in a variation of movement. The playtower affords possibilities to go up or down and elements in Luffen challenges the balance. The design thereby includes different zones which challenges the body in speed, movement and balance. Also introducing green elements has earlier proven to be beneficial for children's activity levels (van Dijk-Wesselius et al., 2018). The spatial understanding has also been important to implement, thereby creating both open and enclosed spaces and for example implementing variations in the sizes of the houses in the playtower.

Ill. 79 Physical competencies

Integrated design guide topics in the schoolyard

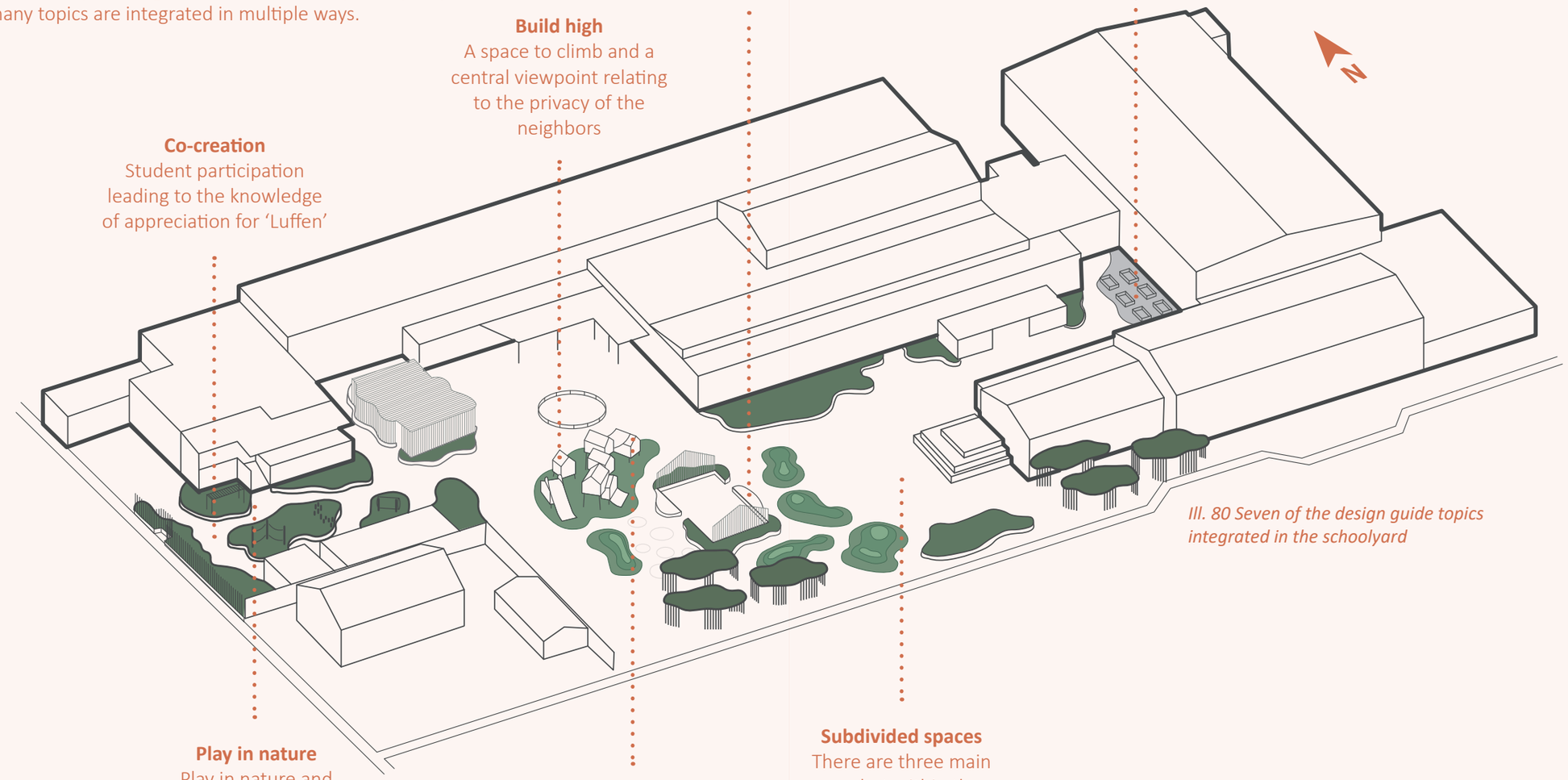
On this and the following page the 14 design guide topics are described and shown on the schoolyard diagram. These are the primary implementations but many topics are integrated in multiple ways.

Co-creation
Student participation leading to the knowledge of appreciation for 'Luffen'

Social difference play
Activating edges allow girls and viewers to observe and feel involved in the play

Build high
A space to climb and a central viewpoint relating to the privacy of the neighbors

Technologies
Integrating QR codes with knowledge on biodiversity and SUDS in the schoolyard for children and the community to learn by



Ill. 80 Seven of the design guide topics integrated in the schoolyard

Play in nature
Play in nature and biodiversity is emphasised for educational and climate purpose

Risky play
It is allowed to sit on the roof, giving a feeling of challenging safety

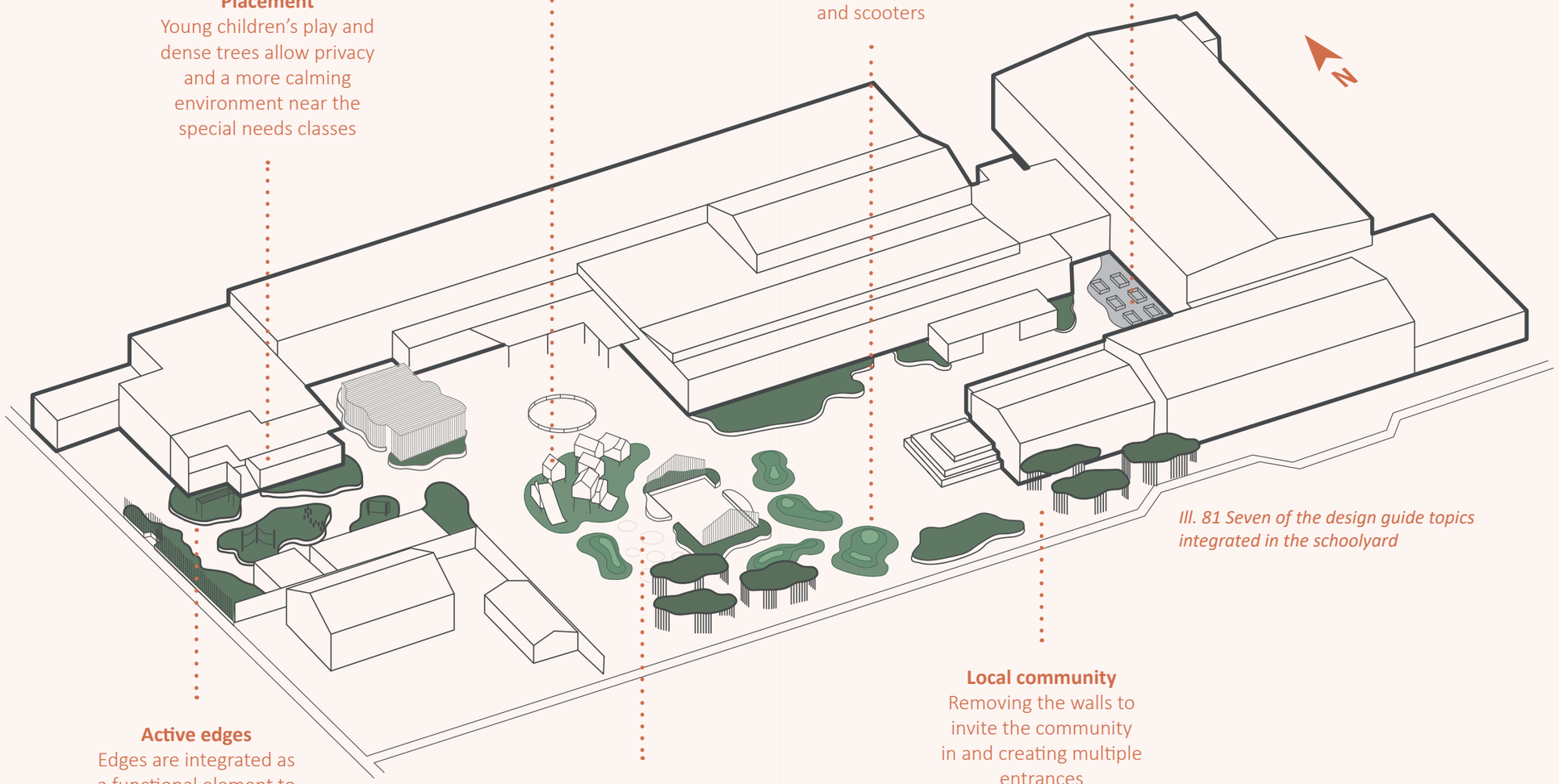
Subdivided spaces
There are three main areas, but within these primary divisions smaller spaces is created such as the square

Placement
Young children's play and dense trees allow privacy and a more calming environment near the special needs classes

Diverse play
Diversity by creating different zones and avoiding elements with clear defined usage

Physical activity
The terrain affords physical activities both by running, mooncars, bikes and scooters

Evolving play
Educating through the schoolyard environment new usage can occur with new knowledge



Ill. 81 Seven of the design guide topics integrated in the schoolyard

Active edges
Edges are integrated as a functional element to walk, jump, sit or play on thus exploiting the limited space

Aid local climate changes
SUDS is implemented to prevent flooding and communicate different solutions

Local community
Removing the walls to invite the community in and creating multiple entrances

Epilogue

Design conclusion

Regarding the adaptation to the schoolyards local circumstances, it can be concluded that it has been mostly removed from the water balance, with the note that heavy rain with a 2-year return period will flood the infiltration capacity and be led to the sewer system for treatment. The former problem regarding the schoolyard being small and crowded have been managed through activation of the edges and building high, thereby providing more space for informal play and stay. The edges have further aided the division of the schoolyard, separating the children between different play options depending on their inclination, proving how a dense grey schoolyard can be transformed to an open green space. An example can be seen in the layers that have been implemented, allowing for stay on top of the garden beds because of a web or through the green roofs on the bicycle sheds. In response to the issues regarding noise around the special needs class and other sensitive children, the design aims at providing more attractive spaces for louder play, while the terrace and area around the kitchen gardens will be reserved for more quiet activities.

The design further aims at providing the area's families and children with a new meeting space, while enhancing the schools profile on playful learning, which compliments their existing profile of aesthetic learning processes. Inspired by Kærbys identity as a cross between city and nature, the developed concept for the schoolyard was built on this notion, creating a space for growing up and learning about life, unknowingly guiding children towards a sustainable mindset and future.

Design reflection

Working with water management in Kærby proved difficult as the area has high groundwater levels and bad soil conditions. It was possible to develop a solution that in theory should be able to handle a 2-year rain event, but with the groundwater only 0,2m from the surface water management through infiltration would not be the optimal solution. In reflection a better solution would have been transportation and detention options, aiming at slowly releasing the detained water into the ground over a longer period of time. Though this solution could be implemented through the use of the ball courts.

Further reflections regard the digital workshop with the students at Kærbyskolen. In theory co-creation should provide the designers with inputs from the children but at the same time it should be a learning experience for them. As it was not possible to conduct the physical workshop and talk with the children during the process, it is hard to determine whether they learned something while working through the steps of designing their own schoolyard. It should be noted that positive feedback from the school was received on the completion of the workshop and the appertaining inclusion of the children. It can further be reflected upon whether the children could have been included again and presented with an initial design idea. This could have been done with the purpose of gaining feedback from them and observing whether or not they felt listened to.

When reflecting on the design process, it became clear once the sketches moved from 2D plans to 3D illustrations that the spatial understanding of the schoolyard provided much needed inputs while designing. A challenge also appeared in the inability to sit together and sketch, as the creative process often happens as a fluid stream of thoughts affected by the surrounding team members. Instead digital mini workshops were conducted, where everyone uploaded their sketches and discussed them slavishly in a structured and systematic manner. While it was different from what usually occurs, it should be noted that while it made things more difficult it was still possible to develop a satisfying design. Reflecting further upon it, all new approaches appear difficult at first, but with practice and experience this way of working can possibly be utilized better in the future.

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Interview

Larsen, P. R., Learning Through Play Supervisor LEGO House, March 2020

Illustration list

All illustrations and pictures without any source is made and taken by us.