Moments of Awe: Connecting young children to nature on their daily journeys

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Abstract

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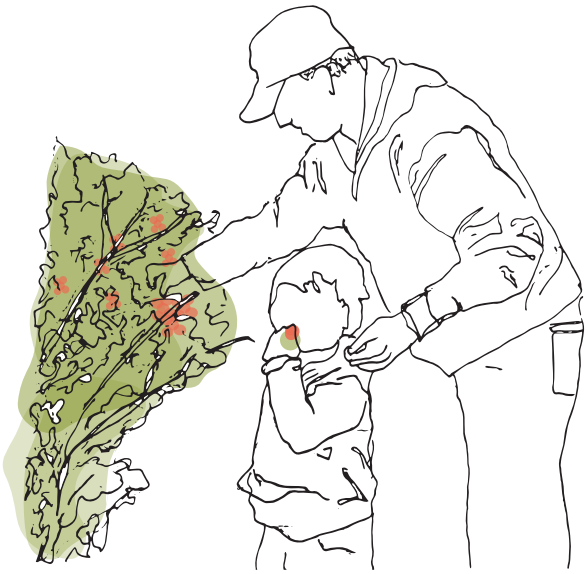
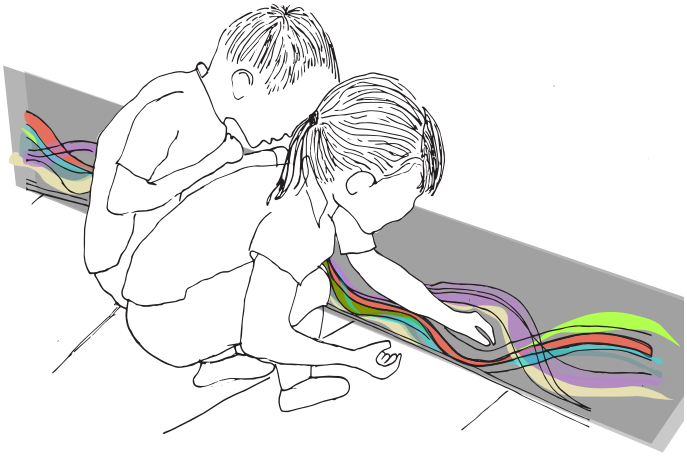
Awe is one of the most special, rare, and powerful emotions that we as humans can experience. It is awe that creates the foundation within us from which we can build empathy and care for environmental stewardship. Urbanization, monotone architectural styles, and an increasing use of technology have reduced our opportunities to feel this emotion. This thesis seeks to explore how we can create opportunities for young children to experience awe and develop emotional connection to nature in the everyday places they experience in their cities.

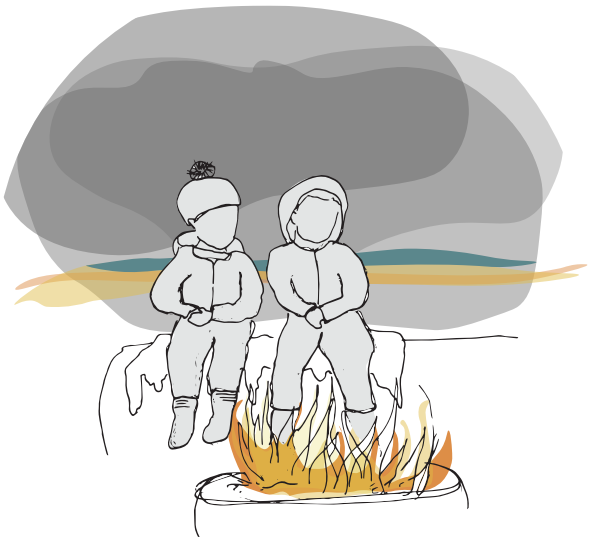
This thesis provides a design framework for urban neighborhoods based on the principles of Marketta Kytta's Bullerby model for child friendliness, with the goal of creating opportunities for children to experience moments of awe and to create emotional connections to nature. This framework emphasizes the of importance the intersection between a child's independent mobility and an increased amount of affordances. This framework is explored through Scandinavian case studies. It is then applied to the Cascade Neighborhood in Seattle to create three design typologies that provide surrounding preschool children opportunities to experience moments of awe.

MOMENTS OF AWE

Connecting young children to nature on their daily journeys







Sarah Bartosh

For my dad, who will forever make me the best version of myself and will never stop guiding me to follow my heart.

For Iain, and the spirit of awe he has brought to the University of Washington for the last 37 years

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Acknowledgements

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I would also like to thank the cohorts of 2019 and 2020 who have been an endless source of encouragement, laughter, and have made me want to push myself to be a more thoughtful and empathetic designer. Thank you to the faculty at Queen Maud University for your expertise: Ellen Beate Hansen Sandseter, Pål Rystad, and Trond Hagen. Thank you to the professionals who lent me their time and wisdom: Craig Skipton, Clayton Beaudoin, and Vinita Sindhu.

Thank you to my mom for always believing in me, empowering me to follow my passions, and teaching me the strength to never quit.

"Slowly, but with no doubt or hesitation whatever, and in something of a solemn expectancy, the two animals passed through the broken, tumultuous water and moored their boat at the flowery margin of the island. In silence they landed, and pushed through the blossom and scented herbage and undergrowth that led up to the level ground, till they stood on a little lawn of a marvellous green, set round with Nature's own orchard-trees—crab-apple, wild cherry, and sloe.

"This is the place of my song-dream, the place the music played to me," whispered the Rat, as if in a trance. "Here, in this holy place, here if anywhere, surely we shall find Him!"

Then suddenly the Mole felt a great Awe fall upon him, an awe that turned his muscles to water, bowed his head, and rooted his feet to the ground. It was no panic terror—indeed he felt wonderfully at peace and happy—but it was an awe that smote and held him and, without seeing, he knew it could only mean that some august Presence was very, very near. With difficulty he turned to look for his friend, and saw him at his side, cowed, stricken, and trembling violently. And still there was utter silence in the populous bird-haunted branches around them; and still the light grew and grew."

- The Wind in the Willows (1908) pg. 93

Kenneth Grahame

1. THE POWER OF AWE

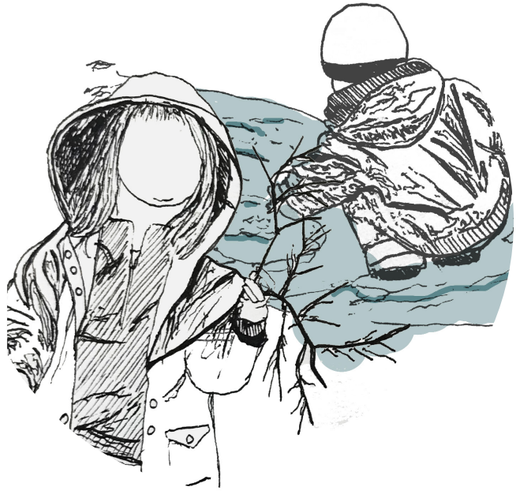
Children experience the world differently than adults. Perhaps it's their naïve spirit or sense of fascination that allows children to clearly see the beauty and complexity of our world. Seemingly mundane elements within our daily environments can spark a child's curiosity. When a child makes a personal discovery, their brain begins to understand the world differently. Soon after a moment of discovery, other unknowns become clear and answers unravel before their eyes. The sense of accomplishment associated with discovery combined with a deeper understanding of the vastness of the universe, is the essence of awe. When we feel awe within nature, we grasp the power of the intricate, ecological systems that weave us together. It is awe that creates the foundation within us from which we can build empathy and care for environmental stewardship.

Children are quickly losing opportunities to have these moments of awe with nature. The results are many, and include urbanization, converging architectural styles, and an increasing use of technology. As landscape architects, we have a responsibility to younger generations to design places that enable moments of awe and support children in becoming engaged environmental stewards. This thesis seeks to explore how we can create opportunities for young children to experience awe and develop emotional connection to nature in the everyday places they experience in their cities.

1.2 The simplicity of childhood

Unlike most other emotions, awe has a relatively small body of research. It is a powerful emotion, but also uniquely complex and difficult to define. In a landmark paper that laid the foundation of the definition for awe, psychologists Dacher Kelner and Jonathan Haidt characterized awe by two phenomena, "perceived vastness" and "need for accommodation." "Perceived vastness" is essentially any stimulus that exceeds a person's normal range of experiences and/or leads people to feel as if they are part of something larger than themselves.[1] The term "accommodation" refers to Jean Piaget's theory of development, in which he defines this as a "process of adjusting mental structures that cannot assimilate a new experience."[2] To Kelner and Haidt, when we truly experience awe, we are experiencing something so new that it forces us to revise our understanding of the world.

Rachel Carson, environmentalist and author of the groundbreaking book *Silent Spring,* speaks to the importance of fostering the emotions of wonder and fascination at a young age in her essay, "Sense of Wonder." In this essay, she recalls memories of experiencing nature together with her two-year-old nephew, Roger. Together they adventure out onto the water's edge at night with only a flashlight in search of ghost crab. Carson admires his trust of the world that allows him to explore without fear. She and Roger share joys of nature that are often hidden from children because they create inconveniences for adults, such as changing muddy clothes and going to bed on time.[3] In this essay, she reflects on how precious these experiences are in a child's life and how small their window is for feeling wonder that will last them a lifetime:



1.3 Wonder of loose parts

"A child's world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that rule instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood. If I had influence with the good fairy who is supposed to preside over the christening of all children I should ask that her gift is to teach children in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchantments of later years, the sterile preoccupation with things that are artificial, the alienation from the sources of our strength.… I sincerely believe that for a child…it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once the emotions have been aroused- a sense of the beautiful, the excitement, of the new and the unknown, a feeling of sympathy, pity, admiration or love – then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning. It is more important to pave the way for a child to want to know than to put him on a diet of facts he is not ready to assimilate."[4]

The work of philosopher Edith Cobb extends my examination of the impact of connecting to the natural world in childhood in her book *The Ecology of the Imagination in Childhood*. Her book is analyzes the memories of creative thinker's own childhoods that they associate with their original source for their desire to create. Her research revealed that these memories often happened between the ages of five and 11. Cobb describes this period of childhood as "the experience of emerging not only into the light of consciousness but into a living sense of a dynamic relationship with the outer world. In these memories, the child appears to experience both a sense of discontinuity, an awareness of his own unique separateness and identity, and also a continuity, a renewal of relationship with nature as process."[5] Through her research, Cobb concludes that during childhood, the natural world "is experienced in some highly evocative way, producing in the child a sense of some profound continuity with natural processes and presenting over evidence of biological basis of intuition." Her work provides another view into the long lasting impacts of feeling a deep connection to nature.[6]

Since Carson and Cobb's writings, the way that children typically experience nature has drastically changed with increasing urbanization. In 2003, Richard Louv's book, *The Last Child in the Woods*, called attention to the effects caused by this shift. He coined the term "Natural Deficit Disorder," to explore the damage that been caused due to this disconnect. This disorder, he explains, takes a toll on our health by having an increased difficulty with attention, an increase in obesity and higher rates of emotional and physical illness. He also suggests that through Nature Deficit Disorder, our senses are diminished, ultimately impacting our ability to be ecologically literate. The less we sense, the less we understand our world, and the less we desire to be stewards for it.

Louv hypothesizes that this disconnect is due to the fact that most children experience nature through technology. While a child's use of technology has allowed them to be more aware of the global threats of the environment, such as endangered species in the Amazon or the causes of wildfires on the other side of the country, it simultaneously desensitizes them. The more screens capture children's attention, the less they feel the need to engage their senses in the nature they experience in their everyday lives. While the awareness that technology affords can be critical, it does not replace the connection to nature built through physical exploration of their own backyards. [7]

There are an increasing number of constraints beyond access to technology that make it difficult for children to develop connection to nature. As humans are continuing to move towards cities, their ability to even access nature is limited due to poor urban planning and a lack of open space. The more that adults are disconnected from nature, the more they fear it and become reluctant to expose their children to it. The constraints of inequitable city planning and parents who are not enabling have led to children more frequently labeling themselves as "more of an indoor kid."

How can we not let these barriers stop us from designing opportunities for children to build an emotional connection to nature? By designing for moments of awe, can we break through the cold and harsh pavements that we have laid over the ecological systems that connect us?

The efforts for creating opportunities to feel awe and connection should not happen only occasionally and only in some places. To build the strongest foundation, opportunities should be integrated as much as possible into the everyday lives of young children. As designers, we need to consider a young child's whole experience of an urban environment. Where do children already spend their time? Where are they already going? How do they get there? How can nature be integrated into every piece of that?

The environment of a child between the ages of three and five, also known as early childhood, can be broken down into three primary parts; home, school, and playground. Already, there is a robust body of literature that addresses how we can design schools and parks to foster this sense of connection to nature. The work of the Child Nature Network[8] and Sharon Dank's movement towards Green Schoolyards[9] have deeply impacted the way that these spaces are designed and planned

But these spaces are not the only important ones in a child's day. What about all the spaces in between, the places of a child's journey between home, the park, and the school? How can the streets of urban neighborhood be places that provide opportunities for children to create an emotional connection to nature?

Director of the Natural Learning Institute at North Carolina State University, Robin Moore's research on early childhood movement patterns tell us that children aged three to five feel the need to wander and dawdle. They want to move through the environment slowly and are frequently engage with what is around them. Wandering allows children to prolong their contact with social and physical phenomena that is around them. Wandering allows their interactions to be more intimate, fluid, and intense. [10] How can the infrastructure of our streets not only be spaces where children can find opportunities to have access to nature, but also be spaces where they have the agency to wander and dawdle at their own pace and not have to keep up with adults that are in a hurry to get from point A to point B? By supporting movement patterns of wandering on urban streets that are rich with nature, we create opportunities for children to have more moments of awe.

Although there are precedents of preschools in urban environments that sufficiently expose children to nature-filled environments, that is not the case for most schools. This reinforces the need to develop the streets, specifically around schools, to be places that teachers can use daily as opportunities to expand their classrooms and increase access to the outdoors. Specifically, this thesis is focused on how our city streets can provide nature-filled journeys for children to take with their teachers.

Structure of Thesis

This thesis provides a design framework for urban neighborhoods based on the principles of Marketta Kytta's Bullerby model for child friendliness, with the goal of creating opportunities for children to experience moments of awe and to create emotional connections to nature. This framework emphasizes the importance the intersection between a child's independent mobility and an increased amount of affordances. From there, I examine Norway's Kindergarten Framework, which outlines how agency, sustainability, and community should be integrated into the everyday pedagogy of a child's experience at school. Each of these goals have the capacity to develop a child's relationship with nature. Using two schools as case studies, I look at how the outdoor spaces at these schools support the integration of these pedagogical goals into childrens' daily experience. My research reveals how, by combining pedagogical goals and supportive environments, we can create more opportunities for moments of awe within nature in a young child's life. From there, I explore Copenhagen's Urban Nature and Climate Adaptation Framework. I investigate how the implementation of this framework through the revisioning of the Osterbro district and redesigned Sankt Kjeld's Plads created the ideal streetscape to support a young child's urban journey in nature. Finally, I apply my framework and lessons learned through both Scandinavian case studies to a reimagination of the Cascade Neighborhood in Seattle, Washington. As one of the most rapidly changing and dense urban neighborhoods in Seattle, it is home to two preschools that need more spaces that allow children to explore, wander, and have moments of awe.

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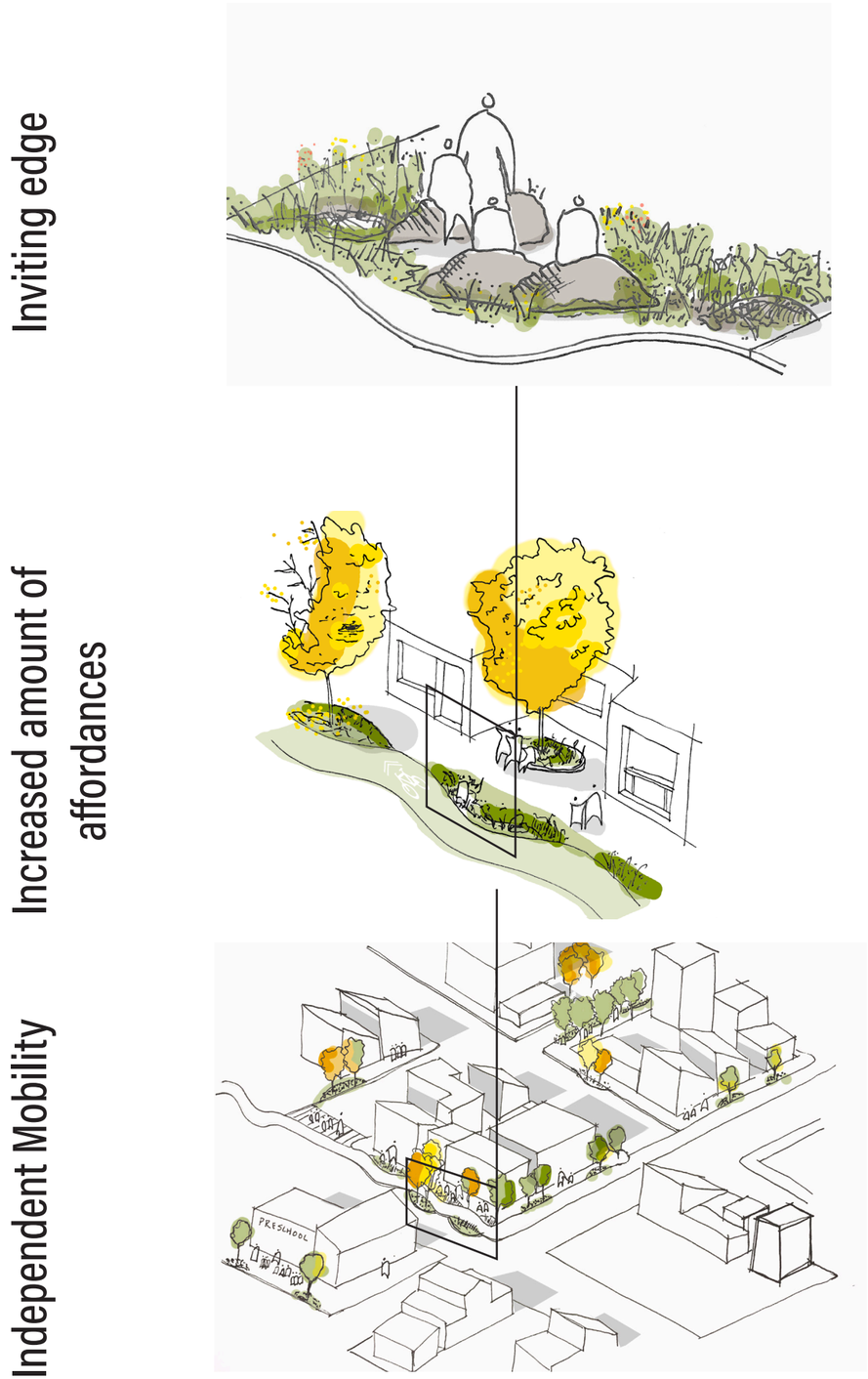
2. A CHILD FRIENDLY URBAN NATURE FRAMEWORK

Research in the literature by Robin Moore demonstrates that designing for childrens environments is critical for their development. Through their work, we can understand that urban environments that allow children to create emotional connections to nature allow for independent mobility, have an increased amount of affordances, and support their movement patterns. Considering the future development of children in cities, this framework will support the research in design methodology to engage in relevant design interventions.



2.1 Child Friendly Urban Nature Diagram

The Foundation For Child Friendliness

Robin Moore's research on the *Childhood's Domain* defines a child friendly environment as one that has a diversity of environmental resources and access to play and exploration.[1] A robust body of literature has been developed around these guiding principles as the foundation for research and design. One method for developing child friendly environments is through Marketta Kytta's Bullerby matrix for child friendliness.[2] Through her model, Kytta modifies Moore's criteria and emphasizes that ideal child friendly environments are ones that have a strong intersection between independent mobility (access to play and exploration) and amount of affordances that the environment offers (diversity of environmental resources). Marketta Kytta's model has been referenced in literature that considers how we can design a wide variety of environments that allow children to build a relationship to a place. Specifically, environmental psychologist Louise Chawla[3] applies this model to explain the types of environments that allow children to build an emotional connection to nature. ARUP[4], an international design and research firm, also utilizes this model to explore the components of a child friendly city.

Based off Kytta's intersection of mobility and affordances, my framework provides three design principles for creating urban neighborhoods that increase opportunity for children to develop a connection with nature. This framework centers on increasing a young child's independent mobility, increase the amount of affordances found within the neighborhood, and support a young child's movement patterns for engagement.

Environmental Preference and Affordances

We can understand why independent mobility and an increased amount of affordances are the primary criteria for an ideal child friendly environment by unpacking the relationship between Kaplan, Kaplan, and Rachel's[5] theory of environmental preference and James Gibson's theory of affordances[6].

Kaplan et. al suggests that people prefer and are attracted to environments that offer a variety of possibilities for action. The amount of possibilities for action is also referred to an environment's "affordances".

This idea of an environment's affordances comes from psychologist James Gibson. His theory suggests that the way we perceive the environment inevitably leads to some course of action. Gibson states:

"The perceiving of an affordance is not a process of perceiving a value-free physical object to which meaning is somehow added in a way that no one has been able to agree upon; it is a process of perceiving a value-rich ecological object. Any substance, any surface, any layout has some affordance for benefit or injury to someone"[7]

In the built environment there are two types of affordances, physical and emotional affordances.

Physical affordances are a critical component of design and can be applied in a variety of different ways. If an object is designed well, its physical affordances should be obvious. For example, a chair's affordance is that it allows you to sit in it. This chair should allow immediate possibility for action and know that it is an object that you can sit in.

When designing environments that people, especially children, prefer, we want the physical affordances of that environment to be the opposite of the chair. In the context of children's environments, the chair does not afford for imagination or curiosity. This is a primary reason for the criticism behind typical plastic play structures.[8] Plastic play structure's affordances are immediate yet one dimensional, which is problematic for child development. Nature allows for more imagination, challenge, risk and adventure to be part of a child's play. From an affordance's standpoint, nature has a wealth of physical affordances. To a child, a stick can be a horse, a wand, or anything in between.

Kaplan et al go on to suggest that people are motivated to stay in a place when there is a sense of complexity and mysteriousness to it and have a desire to understand those complexities through order and legibility. So, by design, nature provides a wealth of possibilities for action, and therefore affords the creative attractiveness of a space that children want to go to.

Nature encourages children to stay. Nature provides the right conditions that hold their attention because they can see immediate effects of their actions that allows them to give order to their environment. For example, wet sand will keep a shape that is pressed into it, unless they add too much water, and it becomes too muddy. Nature either rewards you, and allows you to continue to build onto that or highlights a problem that you can try to solve "next time".[9] The more that a child can explore and engage with their environment, the more they want to be there, which feeds into a positive cycle of being able to develop a relationship with their environment.

Based off the relationship between these two theories, we can understand than when there is an abundance of affordances for children to engage with, children are more likely to be attracted to a place. When the possibility of independent mobility is embedded within that environment, children have the agency to explore the elements that they want to engage with. Supporting both actions serve as the foundation for creating opportunities for children to build an emotional connection to nature.

Child Friendly Urban Nature Framework

The process of designing for a child to have independent mobility and an increased amount of affordances will look drastically different in an urban environment compared to school or park environment. Schools and parks are more contained and controlled, meaning that there are significantly less unknown environmental constraints that designers have to consider. Urban streets are much more complex.

Independent Mobility

In order to understand how we can design for independent mobility within an urban environment, we must understand and consider how children primarily move through and mentally process the experience of a space. Based on the work of urban research group, Urban 95, Figure 2.2 explains how a child's movement through their environment evolves as they get older[10]. The center of this diagram shows that an infant's environment is primarily contained within their home, and that their mobility is based on where they can crawl. Up to age two, they are still primarily reliant on their caregivers and caregivers often put them in strollers when they leave their home. What makes their experience different than an infant, is that their brains are developed enough to begin to mentally process the world.

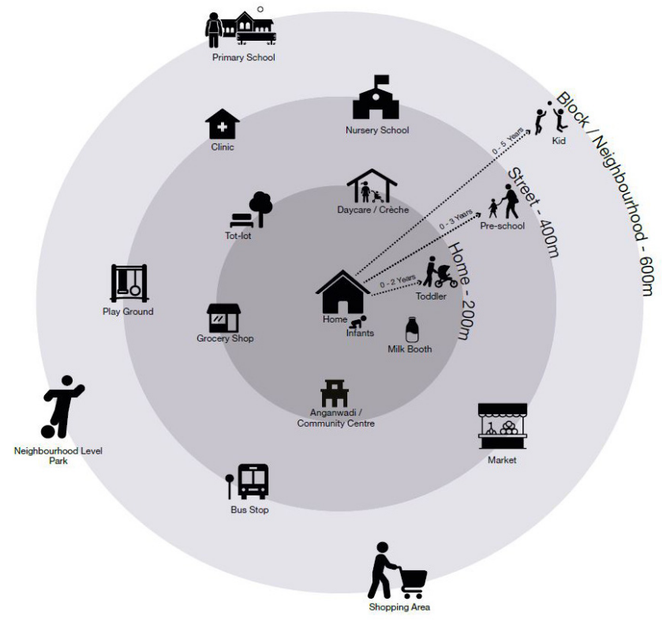
Once they age into preschool years, their ability to walk longer distances is significantly increased. At this age, children can walk approximately a quarter mile without the need of a stroller. From a developmental standpoint, children have begun to develop independent preference and can make decisions. Therefore, this is the first time in a child's life where they have physical capacity to potentially access places and the mental capacity to have the agency to decide where they want to go. But at this age, they are mobile but have constant caregiver oversight.

Since preschoolers are typically accompanied by a caregiver, the way that the caregiver views the environment plays a critical role in how much independent mobility a child can have within the places that they experience. When thinking about the street, a child's independent mobility might look like being able to explore an adjacent planting strip or crossing the street on their own to engage with a puddle that catches their eye. It means that the caregiver is not hovering over each child to make sure that they are being carefully watched, and instead sitting on a nearby bench that provides them with a good perspective of the street. If the caregiver trusts that children will be safe in their environments, their ability for these actions to happen will increase. Therefore, the ability for children to engage in independent mobility is directly correlated to the level of trust that their caregiver has with that environment.

If caregivers trust of an environment is critical to this need for children's development, it offers the question of how can we create an environment that supports caregivers bringing children into the city?

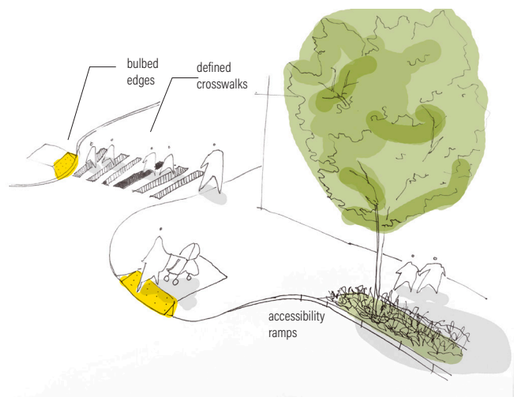
Urban95 collaborated with the Gehl Institute to build a toolkit that allows design researchers to assess the quality of urban environments for young children and their caregivers. [11] We can use the criteria that they base their evaluation to understand how designers can better support the independent mobility of both of these user groups. Two of the criteria they use to evaluate these environments that would support independent mobility are how well a place protects children and how a place can fill a child and their caregivers basic needs.

Through this evaluation criteria, we can understand that if the main design infrastructure protects against traffic and unpleasant sensory experiences, it will increase the ability for independent mobility. Independent mobility will also be increased if the environment addresses their basic needs by increasing comfort and providing opportunities for good hygiene and health. Examples of infrastructure for independent mobility can be seen in figures 2.3 and 2.4.



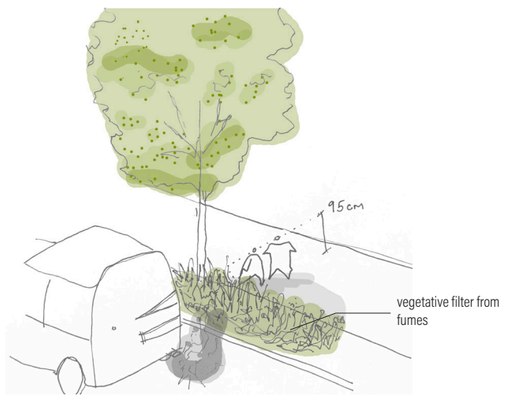
2.2- Location of amenities linked to child's physical development
Image Source: Urban95

Protection



2.3- Protection for Independent Mobility

Basic Needs



2.4 - Basic Needs for Independent Mobility

Increased Affordances through Green Infrastructure

Designers can increase the amount of affordances that the urban environment offers by looking at how we integrate nature into our cities at two different scales; a city wide connected network of green infrastructure and a site specific design with an increased amount of biodiversity.

Green infrastructure is defined as "an interconnected network of green spaces that conserves natural ecosystem values and functions and provides associated benefits to human populations"[12]. Green infrastructure includes a wide variety of spaces within the built environment including places such as private gardens, urban farms, community gardens, regional and local parks, informal green space, grasslands, and wetlands. Additionally, green infrastructure includes the links between them such as green streets and street trees, pedestrian paths, greenways and corridor right-of-way.

Green infrastructure also improves the infrastructure that supports independent mobility by increasing protection and supporting basic needs, as discussed in the previous section.

While green infrastructure cannot eliminate the fear of traffic, adding green infrastructure on our streets can slow down moving traffic, as they increase the visibility of the street edge. Studies have shown that streets with features such as trees and concrete planters along the roadside have resulted in statistically significant reductions in the number of mid-block crashes[13].

Green infrastructure also has the ability to make a significant impact protecting against unpleasant sensory experience the microclimates in our urban environments that can make our experiences uncomfortable. The addition of street trees can significantly reduce the impacts of wind and draft that may be caused by the placement of buildings. Trees protect us during rain events, and provide shelter on hot days.

Green infrastructure on the street helps increase basic needs of children and their caregivers. While fences and physical barriers can be helpful with reducing noise levels, so do street trees and other vegetation, as trees can absorb high frequency noise, making it a more comfortable experience[14]. The addition of green infrastructure also increases the quality of the human scale of our cities.

Looking at the smaller scale design of green infrastructure, we can consider the details that help increase the amount of affordances within that environment by increasing the biodiversity. As simple as this sounds, when there is such a small amount of space to work with, every square foot needs to be considered as an opportunity to bring and support a new form of life to an area. By increasing the biodiversity that can be found within a site, we are supporting the environment to be that much more dynamic. As designers, we can increase biodiversity within green infrastructure by being responsive to and increasing the amount of microclimates that are found within a space, by increasing the amount of different species of plants that are found in this strip and supporting their natural life cycles, and integrating pollinator habitat opportunities.

The stronger and more connected of a green infrastructure network, the dynamic and biodiverse the individual experiences of environment becomes.

2.5 Network of Affordances

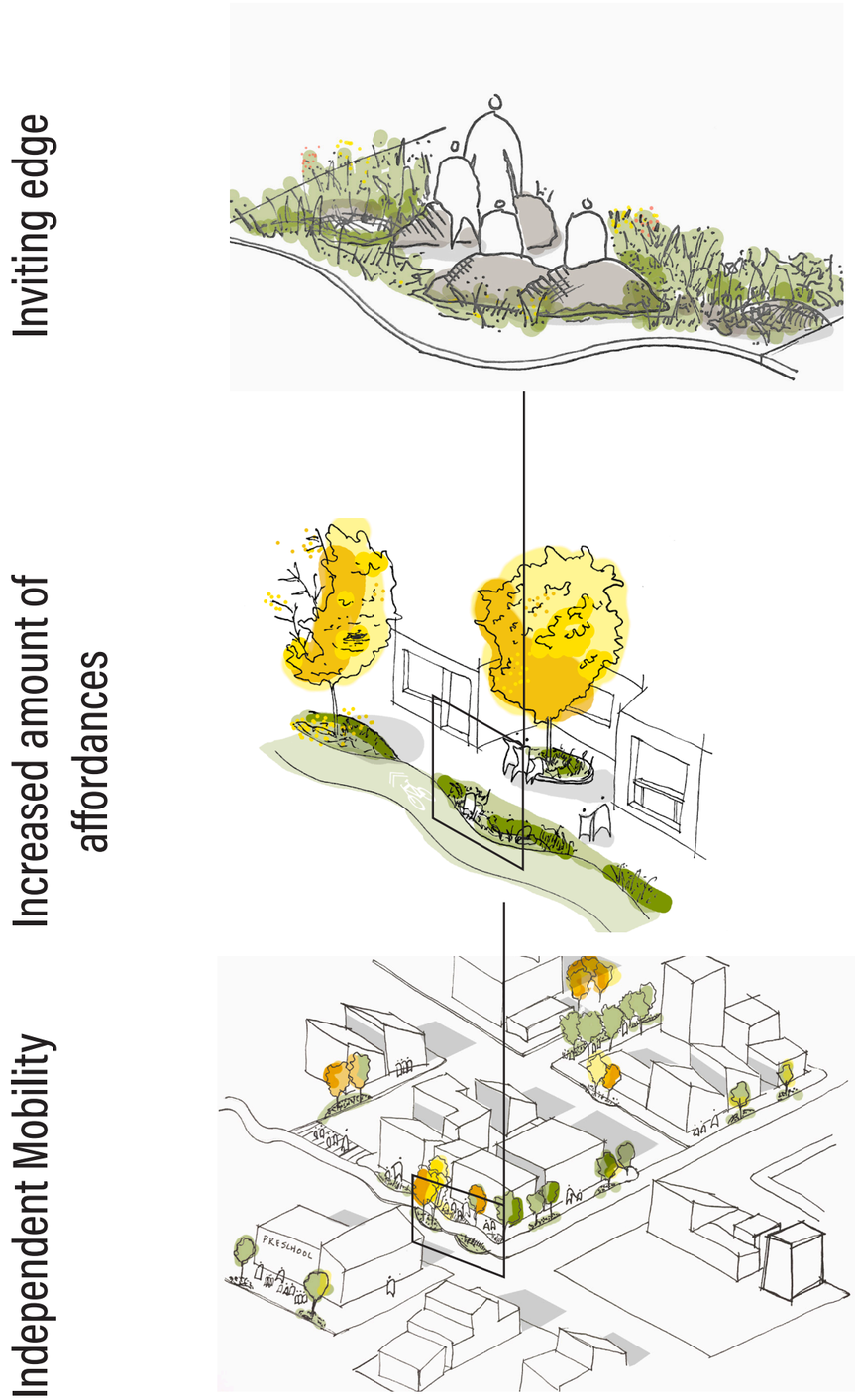
Edges to Support Wandering

The third principle of my framework is implementing design that supports a young child's movement patterns. Moore's research of children's movement patterns shows us that children have a tendency to wander and dawdle through their environment. Wandering allows children to prolong their contact with social and physical phenomena that is around them. Wandering allows their interactions to therefore be more intimate, fluid, and intense. For children living in our cities, their streets need access to nature, but also be places to wander, dawdle, and not worry about adults in a hurry moving from point A to point B. By supporting movement patterns of wandering on streets that are rich with nature, we create opportunities for children to have more moments of awe in today's urban environments. [15]

We can support these movement patterns by designing an edge between the pedestrian infrastructure and the green infrastructure that invites a child to engage with nature. Through the design of these edges, children should be able to understand that they are allowed to be there, they can explore there, and there is a space for them to wander. Supporting these movement patterns also means creating places for children to stop, move with other children, and move with other adults.

An edge that is designed for explorations strengthens the level of trust between caregivers, children, and the environment. When the design invites teachers to bring their children into the city, caregivers trust that the environment is safe space for these actions to happen.

The more opportunities that the environment invites children to experience the dynamic elements of nature, the more opportunities there are foran experience that allows children to reshape their understanding of the world. Making as many opportunities for these complexities to exist and be celebrated, the more opportunities for moments of awe there are. By making it accessible for children to experience these dynamic parts of nature, children will be able to build a relationship with the nature that exists within their cities.



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3. NORWAY'S KINDERGARTEN FRAMEWORK

EXAMINING HOW PEDAGOGICAL PRACTICES CAN BE INTEGRATED INTO THE DESIGN OF OUR ENVIRONMENTS.

The philosophical concept of *friluftsliv* is rooted in Norwegian culture, as a way of expressing the importance of living close to the landscapes that surround them. Norwegians value fostering a deep connection to nature and recognize that building this relationship starts at a young age.[1] Norway's National Kindergarten Framework calls for environments that support children's agency, sustainably, and community integration while embracing opportunities to foster meaningful relationships to nature.

In September of 2018, I had the opportunity to visit Trondheim, Norway, to better understand how nature is integrated into the everyday life of children. While I was there, my research asked the question, how does the design of their outdoor space and surrounding community support a child's relationship with nature and the core values of the Norwegian Kindergarten Framework?

3.1 Bryggene Trondheim

Norway's Kindergartens

My independent research was funded by a grant that was awarded to the University of Washington's Department of Early Childhood Education and Queen Maud University in 2016 from the Norwegian Government. This grant funds an undergraduate, graduate, and PhD exchange program that allows students to pursue an independent exploration of the other country's kindergarten/preschool system. In Norway, what the United States considers to be a preschool is what Norwegians consider a to be a Kindergarten.

Norway is continuously recognized as one of the leading countries in which to raise a child. [2] One of the reasons why they are so successful is because childhood is valued at the level of national policy. Some policies that have contributed to Norway's success are:

- The National Kindergarten Framework that outlines the core values that each kindergarten must incorporate into their pedagogical practices
- Norwegian government spends 150 billion NOK (1.6 billion USD) on schools every year, supporting 9 out of 10 children to attend preschool.
- Keeping a low ration of teachers to children (6:1) and having 39% of staff be qualified teachers[3]

The principles that are outlined in the Norwegian Kindergarten Framework[4] served as a basis for my independent research. Because each kindergarten is required to implement this framework, it serves as a unique foundation to study and compare the design of spaces.

The three themes the Norwegian Kindergarten Framework is based around are agency, sustainability, and community.

Agency - What elements of the surrounding environment allow children to have agency? One of the critical components of everyday life in Norwegian kindergartens is the "excursions", or field trips, that get them out of the classroom. Where they can go and how they get to these destinations outside of the classroom is highly dependent on the how easy their surrounding environment makes it to reach these destinations within their community without a car. The level of accessibility that teachers and children have to destinations correlates to how much agency children can have in making the decisions about the places that they want to visit that support their interests.

Sustainability – How can the surrounding environment allow children to explore the natural world and feel connected to nature? Building a connection to nature is an integral part of the Norwegian kindergarten experience, as it is as an integral part of Norwegian society and pride as a whole. The philosophy of frilutsliv, which roughly means being close and connected to nature, is deeply rooted in Norwegian culture and is an important part of people appreciating their beautiful landscapes. In kindergarten, it is important that teachers begin to lay the foundation for building a child's relationship to the surrounding landscape.

Community – What opportunities do children have to participate in their community and are they prepared to be involved citizens once they move into elementary school? How do they develop an understanding of their society? As a country that acknowledges the UN Conventional Rights of the Child[5], children are thought of as citizens just as much as anyone else. Therefore, the Norwegian Kindergarten Framework emphasizes teaching children the fundamentals of what makes a good and democratic society at a young age.

Although I had not fully developed my thesis design framework at the time I was doing research in Norway, the type of environment that I have proposed could ideally support the three core values of the national framework.

By creating infrastructure that allows for independent mobility, teachers would be able to support children's agency. When the pedagogical approach is one that puts the child's interests first, teachers have the ability to say "yes" to what their class wants to explore that day. Instead of there being a catalogue of only a few places that teachers feel like they have access to, having an environment that supports the needs of both the children and their caregivers opens them up to a much broader world. Children's agency also is supported by landscape design that invites children to interact with the space.

When all three parts of my framework are working together, it creates an environment that allows teachers to easily integrate the goals of sustainability into their pedagogy. Through independent mobility, increased affordances for nature, and an edge that invites exploration, children and teachers can embrace the frilutsliv philosophy.

Lastly, through creating an environment that invites children to engage with their surroundings, they are not only building a relationship to nature, but they are building a relationship to their community. By being able to easily bring children out of the classroom, the door is open to opportunities for learning to become part of society.

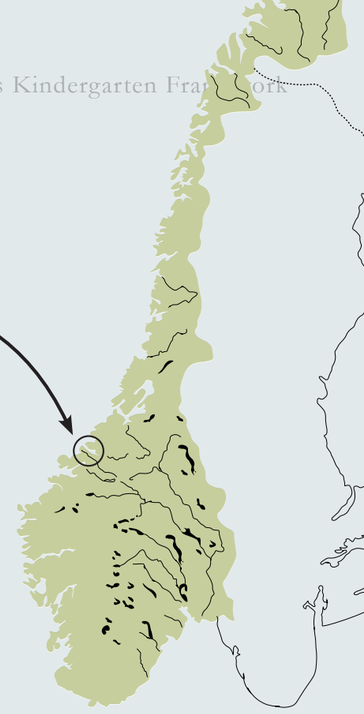
Using a series of observations and interviews, I compared how two schools used the outdoor space on their property and the surrounding city to manifest these values in their everyday lives. One school, Fjaeraskogen, is located approximately 5 km west of the Trondheim city center and is located within a more "typical" nature preschool setting. The other school, Nedre Elvahavn, Barnehage is located within walking distance to Trondheim city center and has a limited outdoor space. It is surrounded by business, shopping, restaurants, pubs, and housing.

I interpreted the information collected through these interviews and observations during my time in Trondheim and analyzed the spaces they use every day to support Norway's pedagogical framework and societal values and how they relate to child-friendly environments literature.

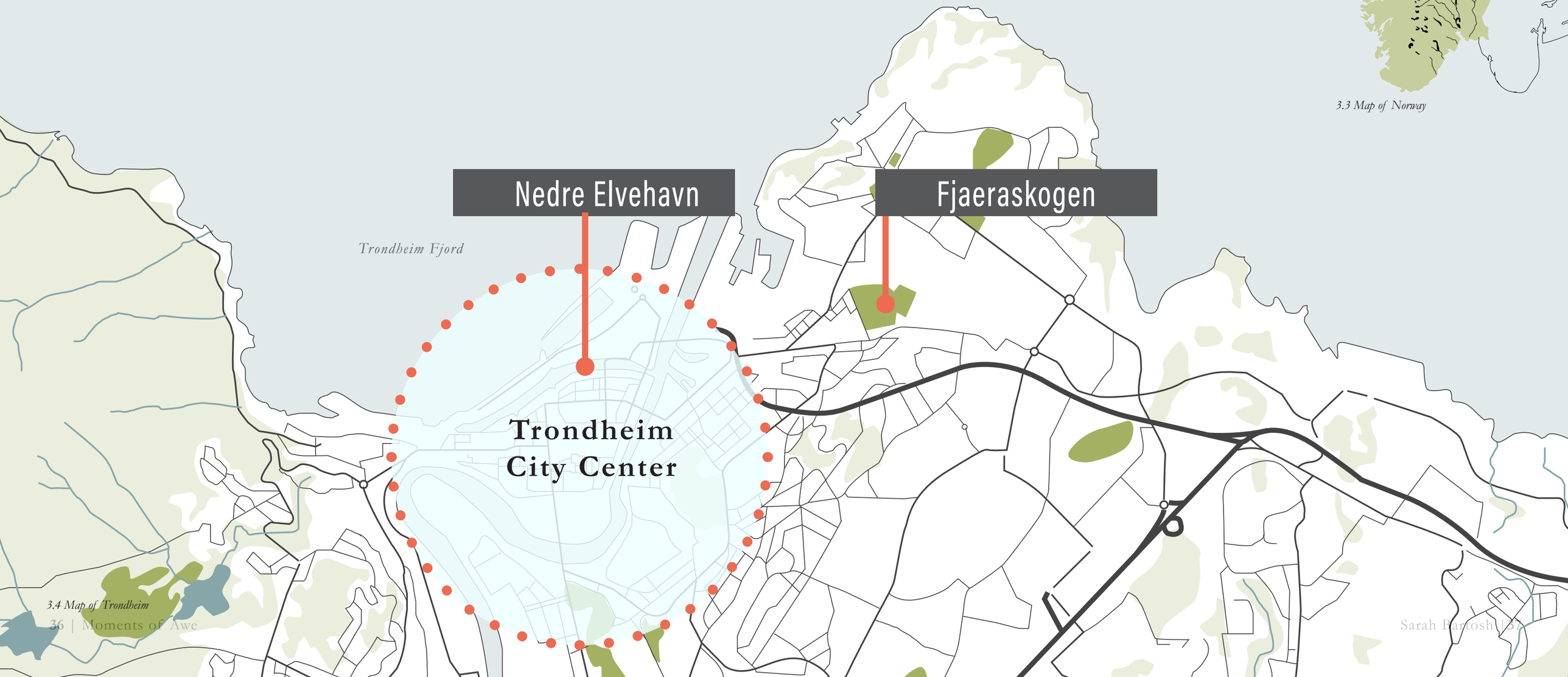
Trondheim, Norway

Trondheim is is a city and municipality in Trondelag county, Norway. With a population of 193,000, it is the third most populous municipality in Norway, and fourth largest urban area. The city is home to various technology-oriented institutions such as Norwegian University for Science and Technology and St. Olvas University Hospital. Trondehim was founded in 997, and served as the capital of Norway during the Viking Age until 1217.

3.2 Aerial View of Trondheim



3.3 Map of Norway



3.4 Map of Trondheim

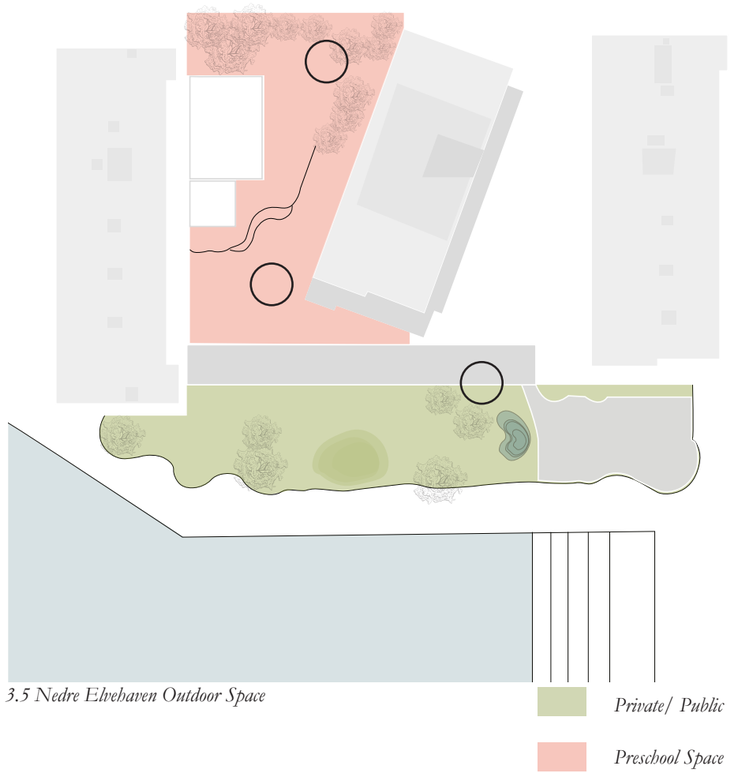
Nedre Elvahaven Barnehagen

Located in the heart of Trondheim, Norway, Nedre Elvehavn Barnehage is Trondehim's most urban preschool. Their outdoor space is contained to a small, two-tiered courtyard located in between the school and a neighboring apartment building. The kindergarten is also situated next to a small public park that they frequently use to expand their opportunities for outdoor play.

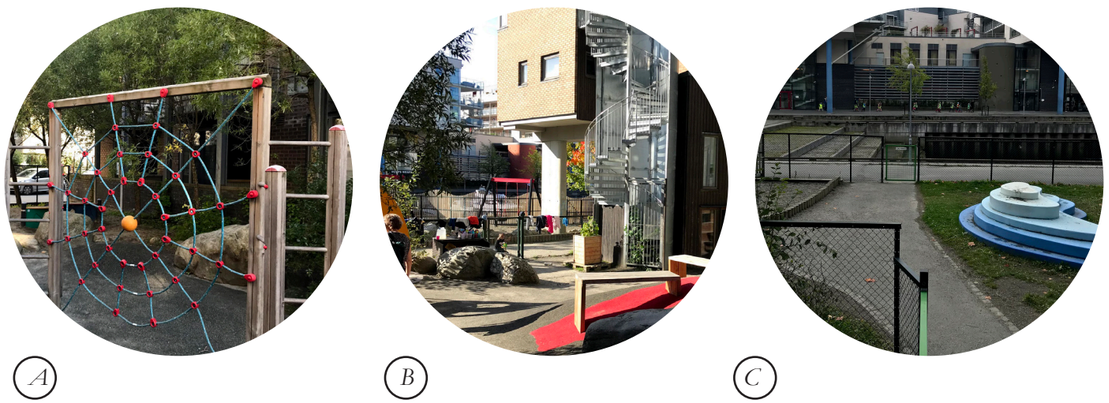
Nedre Elvahaven capitalizes on its central location to explore the rest of their community. Ease of access to buses and a strong network of pedestrian infrastructure allow teachers to comfortably bring their children out of the classroom and into the city. This ease of access is the gateway to allowing children to have agency in what their day to day looks like. If they want to go to the museum, they are able to, if they want to go explore a new park, they have that access.

There are limited natural features encompassed in these two outdoor space. You can find a few scattered trees and a few bushes that line the fence. This means that the nature that children are experiencing in their day-to-day lives looks very different than one might experience at the other nature based preschool. Their daily interactions are with the diversity that can be found in urban settings, squirrels, pigeons, etc. This also means that they rely on excursions to have experiences with bigger nature by bussing to places such as Bymarka, the nature reserve on the west side of the city with over 120 miles of trails.

Since Nedre Elvahaven relies so heavily on their excursions, it is easier for children to understand and feel like they are a part of their community. They are expected to learn early on how to properly cross a street, how to be respectful when riding the bus, and how to settle their own quarrels with each other in public. Teachers celebrate their community by having a wall of photos of the places that they visit throughout the year. Nedre Elvahaven also has a higher rate of immigrant children and the school frequently invites parents to come into the classroom to teach about the diversity of cultures in their community.



3.5 Nedre Elvehaven Outdoor Space

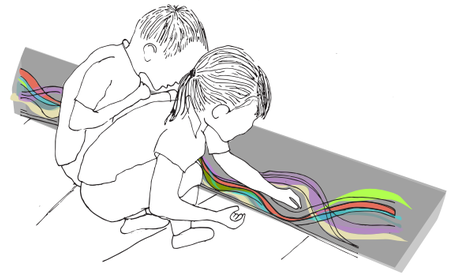


3.5 Play at Nedre Elvahaven

3.6 Moose in the Street

"One of the first excursions that we went on when the year started, we went up to a forest by the university and when we were going by the roads, all of a sudden there is an old lady screaming at us, "Stop, stop, stop!" There Was a moose standing next to the road. He was just standing there eating the flowers, and we just pass them, and I am saying "THIS IS HUGE, WE JUST PASSED A MOOSE!" and [the Norweigan kids] were like, "Yeah whatever." But, later as we were going back, and we see a squirrel in a tree and THAT is what they were talking about for the rest of the day. We had to miss the bus because we were standing there watching a squirrel. And I said to them "Well remember when we saw a moose?" and they were like "Yeah, BUT THE SQUIRREL!" That's when you have to let them decide what is exciting and that is okay." - Nedre Elvahaven Teacher 1

There are two key takeaways from this story when thinking about how a child friendly environment relates to designing for such pedagogy. The first one, is that we cannot control what draws the users of a site's attention, so it is important to **provide them with options,** which supports the need to have an increased amount of affordances. The second lesson is that as landscape architects, we should be open to figuring out ways to **support non-human life** in our city and increase the amount of biodiversity.



3.7 Rainbow Road

"On most of the trips, you experience something or you see something. If you see a police car, that can be a huge thing. Someone fell and hurt themselves, that is a big thing. With the two year olds, especially when they were doing some road work up on the main road, there was an oil spill, and most of the time when we walked that way, there would be a little bit of oil in the water next to where we walk. And that would be so exciting to see the rainbow in the water and see the swirls. In that case, it is okay that we aren't going to get where we are going right away, this is where the children are, and we need to follow that. Small stuff, big stuff." - Nedre Elvahaven Teacher 1

One of the primary takeaways from this story is that children's engagement with the built environment is spontaneous and unpredictable. This also means that the built environment can provide a wealth of affordances that designers may not be aware of or thinking about. Therefore, instead of having environments that can be dangerous for children to explore, an ideal environment will protect all those who walk down the street **at a slow speed**, engaging with unconventional elements. From the story, if the teacher feels comfortable stopping and allowing children to explore the environment in that way, there is clearly a heightened sense of safety.

3.8 Superheros of the City

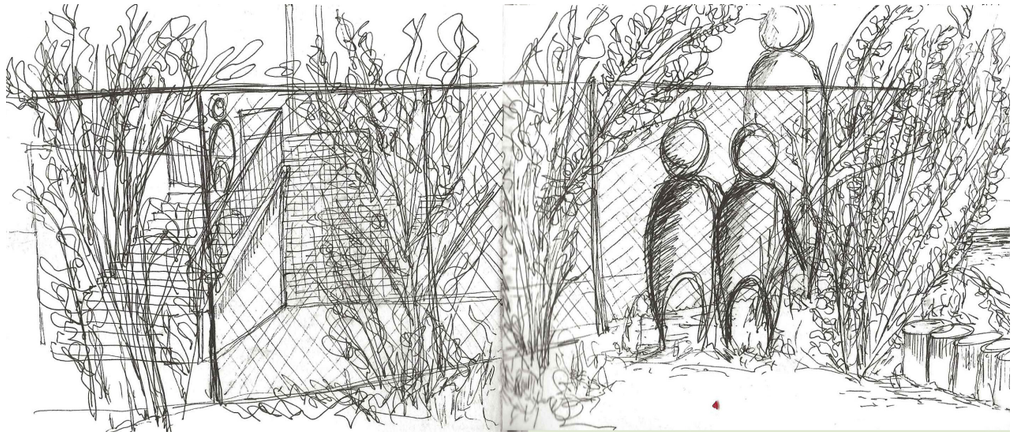
"Whenever I go out with my students, we pick up trash, and I tell them that it is our job to save the world. So, we are in this park one day, and there are a lot of people running around. I don't let them go into the bushes because you can find needs and stuff. So, we are just picking up cigarettes and plastic spoons, small stuff, and then one of them is like "I FOUND A BIG ONE" and so I go over there, and it is a big wine bottle. And she is so happy! She is just standing there and it was so precious and she was so excited. It was the biggest trash of the whole day that we found. And that was what she was talking about for the rest of the day. It's nothing to be excited about, but she was so happy posing for a picture with the wine bottle." - Nedre Elvahaven Teacher 1

Reflecting on this story, designers should be thinking about how we can continue to encourage **stewardship of our cities, even by young children.** Through stewardship, we keep our environments cleaner, which adds to the level of trust that we can feel, allowing children to explore their communities.

Nedre Elvahaven's outdoor space – This space would not be considered an ideal child friendly environment. Within the outdoor space at Nedre Elvahaven, children are generally free to explore wherever they want and teachers trust that their space is safe. However, the amount of affordances that have the ability to be actualized is fairly limited. Most of the play features that can be found are large plastic play equipment. Although this play equipment does not have a defined "theme" that would further narrow the scope of imaginative uses, it still has a limited number of affordances.

From my observations, there are two spaces that do provide unique affordances; the hill in the center of the public park and the row of bushes that line the north end of the park. The hill provided an exciting feature to roll down on a tricycle and where the hill met the fence provided a place of privacy and was a flexible place for teachers to play games with children. The row of bushes on the north side of the park was interpreted as "the forest" by children who attended the school. These bushes were also a place where children could feel a sense of privacy, and the looseness of the nature that surrounded them provided them with inspiration to create an unlimited number of stories through imaginative play. Since the teachers rarely mentioned the space within their school as an example of how they can use the environment to bring their pedagogy to life, it is fair to say that there is significant room for improvement.

The City of Trondheim – Upon reviewing the interviews, I determined that the City of Trondehim has a number of characteristics that support it being a child friendly environment. Teachers feel comfortable not only bringing children out into the city by foot , but they also feel comfortable bringing children in prams (a type of stroller) out into the city. Their ability to bring a pram means that the infrastructure is accessible to those who need wheeled assistance to travel around the city. This continues to unlock the potential for mobility over greater distances because if teachers estimate they won't be back in time for children's naps, the ability to bring the prams along for naps opens up the opportunity to explore more places. There is also a wealth of different activities that can be done on a daily basis. There are museums, chapels, exhibits, parks, etc. that are all within a distance that can be accessed by foot or by bus.



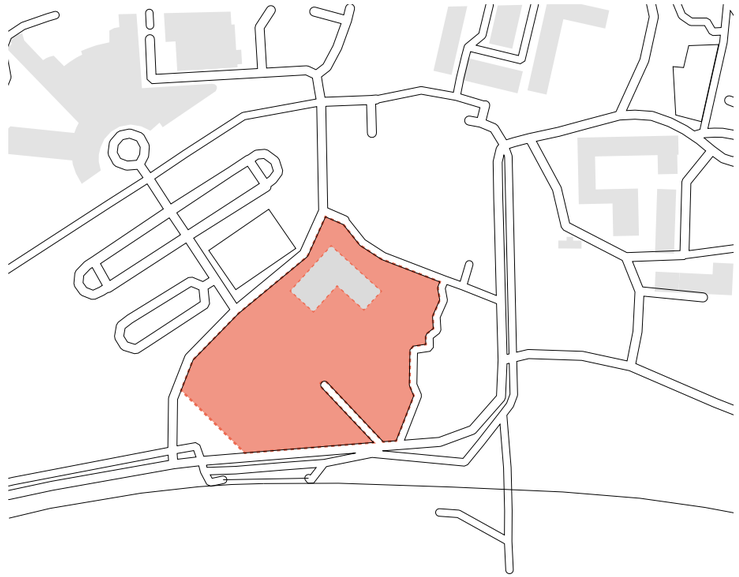
3.9 "The Forest" at Nedre Elvahaven

Fjaeraskogen Barnehagen

Located 10 minutes outside of Trondheim's city center is Fjaeraskogen Barnehagen. Fjaeraskogen's outdoor space is approximately one acre of fenced in forest. Fjaeraskogen's pedagogy emphasizes the importance of the, "good childhood filled with fond memories of freedom and play." They see every minute as an opportunity for learning.

The forest behind their building is large enough that it allows children to feel a sense of freedom and exploration. Due to their frequent use of the forest, children at Fjaeraskgoen build an intimate relationship with nature. A variety of multi purpose structures within the outdoor area allow children to create memories alone, with a small group of friends, or with an entire class. For example, during one of the interviews, a teacher explained to me that one of the small structures acts as a landmark for teachers to gather around, it is short enough for children to climb on the roof and use it as a stage, an animal hyde flap allows children to close the door and feel a sense of privacy. As children progress through the school, they are allowed an increasing amount of freedom within the forest. Teachers also frequently use their outdoor area to have one-on-one moments with children to foster meaningful relationships, which helps the children to feel safe while at school and away from their parents. The relationship that the students have with their outdoor environment allows them to both have agency in what they do and build a connection to nature. The excursions children that attend Fjaeraskogen typically go on revolve around experiencing other types of physical challenges within nature including rock climbing and skiing.

When asked about how their pedagogy prepares kindergarteners to be a part of a community, two major themes were discussed. The first, they focus on making sure that they have fine-tuned basic skills such as tying shoes and putting on a coat. The second theme is that teachers make sure that they have the skills for conflict resolution When children have a disagreement over something, teachers will give children space to settle it themselves.



3.10 Fjaeraskogen Outdoor Space

Preschool Space

A

B

C

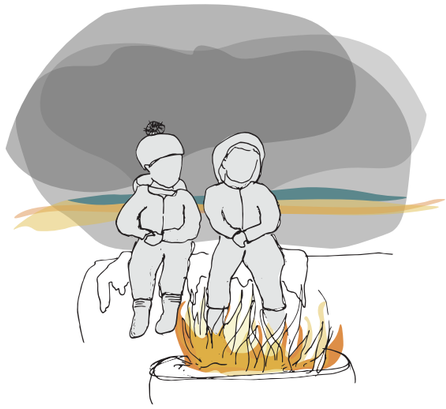
3.11 Nature Play at Fjaeraskogen

3.12 Free Play

"It is all about free play for us. It is the most important way of learning. It is in the free play that children learn almost every part of their mind, body, and motor skills. It triggers all of the points in the children. So that is what it is all about. It is also where we find the magical moments in the free play. And it is about the independence when the children do things of their own free will. When they decide what they do, that is when they do it best. That is when they are most motivated. When they are most motivated, that is when they create the magical moments. It is important to find the areas and time for free play." - Fjaeraskogen Teacher 1

To restate, designing spaces that caregivers can trust is key to a child being able to build a meaningful relationship with their environment. When there is a space that children can explore on their own, they have an abundant amount of self-created "magical moments". Having an environment that supports a **sense of agency** only increases the amount of opportunities to have moments of awe.

Within that environment, it is critical to have opportunities for children to **take risks and challenge themselves.** Risks are what allow children to learn about their bodies and develop fine motor skills. Understanding what is a risk and what is a hazard is a critical difference when thinking about the design of a child's environment.



3.13 Around the Fire

"At the firepit is probably the place where we had some of the most mindful and close moments with the children, where they can watch the fire. You can imagine the mornings when it is very dark in the winter, and the only thing that the children can see is the fire when they walk up, and we sit and discuss things. When we sit around the fire place with the children, that gives us possibilities.The children are calm in the morning when we sit around the fire. For the older kids, it is all about creating those magical moments so that they can feel like the time in kindergarten was important to them. Something that they can remember." - Fjaeraskogen Teacher 1

This story teaches us that when we think about children's design, it is not about active play all of the time. Children need space to **feel close, calm, and collected with themselves and one another.** While we as designers cannot control the "magical moments" that children have at school, we can create an intimate space for teachers to have these moments with their students.

3.14 Berry Bonding

"It is beautiful when the children get back from vacation and we begin to build security and bonding. If you are a teacher, you can take a cup and go pick raspberries with a child. It is like a jungle. When the children come here, if it is their first time in kindergarten, they need to feel secure. Find the adult that comforts them and makes them feel that. Coming and picking raspberries is a good place to find that one-on-one time and get away from the other children." - Fjearaskogen Teacher 4

Spending time in nature is not only a way for children to explore, but also a way to **foster meaningful relationships.** Something as simple as picking berries is a meaningful activity that engages children's senses through smell and taste, while also evoking conversation with a teacher. Therefore, it is important, as designers, that we create opportunities for activities that a child and teacher can do together.

Fjaeraskogen's outdoor space

–Fjaerskogen's outdoor space is an ideal environment for children to build an emotional connection to nature. Children's independent mobility within the space is high, and the abundant amount of nature also provides a wealth of affordances. In addition to the nature, a few undefined flexible structures throughout the space support and enhance the experience for children and invite them to engage with the space in a variety of new ways. A variety of types of trees increases the physical affordances that can be found within the space, and where children can take risks climbing these different trees and develop their fine motor skills.

As children progress through the school, their everyday free play is defined by the amount of freedom they have within their outdoor space. This allows children to build a relationship and understanding of a place gradually and at an appropriate scale for their development. It is important to think about how a child's domain and pedagogy overlap to build trust in the environment.

Conclusions

–Reflecting on both the stories that were told during my interviews and my own observations, there is a lot that can be learned from each of these school environments about designing interactions with nature for children. When looking at the City of Trondheim and the outdoor space at Fjaeraskogen through the eyes of a teacher, we can understand the value of creating environments that support a pedagogy of agency, sustainability, and community.

After returning from Norway, my research revealed two takeaways. The first was understanding the importance and power of providing children with the opportunity to leave their classrooms and uncover the lessons that their surrounding environments can teach. The second takeaway was reflecting on how teachers emphasized creating "magical moments" for their children. These "magical moments" held a lot of power in children's lives, and they were what lasted in their memory as they went on to primary school and beyond. At the root of these moments was creating an intimate setting within nature that was filled with awe, wonder, and creating a sense of community.

Endnotes

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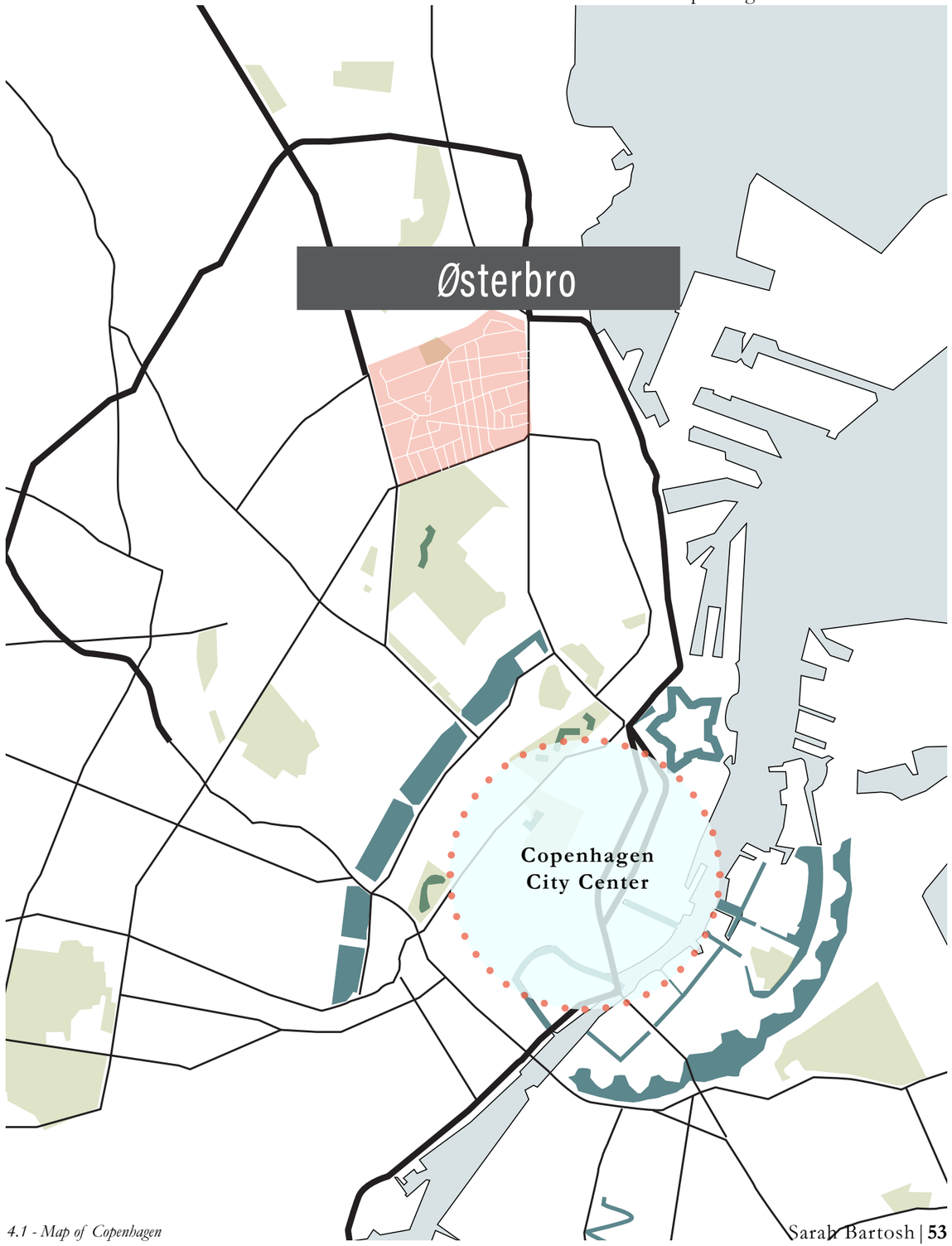
4. COPENHAGEN'S URBAN NATURE

In this chapter, I explore how Copenhagen's Climate Adaptation and Urban Nature plan authored by landscape architecture firm, SLA, is an example of how we can more holistically integrate the ecological benefits of green infrastructure with the human benefits of nature into our public realm. Although not officially adopted by the Municipality of Copenhagen, the design principles serve as a guide for the design of approximately 300 climate adaptation projects that are being implemented throughout the city. I then look at how Copenhagen's first climate adapted neighborhood, Østerbro, embodies these design principles to implement a radical network of urban nature infrastructure into the public realm to create a green neighborhood identity. From there, I zoom into one of the projects in the neighborhood, Skt. Kjelds Plads and highlight how its design provides ideal conditions to create moments of awe.



4.1 - Map of Copenhagen

Climate Adaptation and Urban Nature Plan

SLA's Climate Adaptation and Urban Nature Plan [29] outlines a radical approach to thinking about how we can use the design expression of nature to enhance the value of nature as a public amenity while also using nature as a utility. Urban nature treats the integration of green infractured as more than just nature in urban areas. It is not just "greening" spaces. By designing with SLA's principles of urban nature in mind, designers create an entirely new layer of life to be integrated into the city.

SLA's urban nature approach to design holds nature's value as a functional space for people and ecology equally. They are both equally important to a well-functioning city, and therefore, should hold the same value when designing spaces.

As an amenity, urban nature allows citizens to experience the emotional aspects of nature that humans have been losing contact with as we have moved in towards the city. Through urban nature, a different breath of life comes into the city, a concept that gives life in the city a whole new meaning. Urban nature as an amenity focuses on how nature fundamentally improves our health, happiness, and overall quality of life. It aims to celebrate the sensory experiences of nature and how it enhances creativity, how nature allows us to feel a sense of belonging to places and the city as a whole, and allows us to understand our existence within a greater context.

Through this design framework, urban nature is also recognized for its utility values.As the population in Copenhagen rises and the city continues to density, Copenhageners are increasingly concerned with how pollution will effect life in the city. Because of that, there is a growing need for infrastructure that can self-purify the air, water, and soil, while managing rainwater and regulating temperatures. Urban nature provides the city with the ecosystem services it needs to the problems posed by urbanization and climate change?.

Urban nature as an amenity and a utility are bridged by biodiversity. Viewed through this framework,the value of biodiversity enhances the amenity value by relating to the aesthetics of nature. By increasing biodiversity, spaces designed with urban nature in mind increase the amount of life that a space can hold.Additionally, increased biodiversity expands the ecosystem services provided by urban nature. Biodiversity is strengthened when urban nature projects are designed as a network of spaces rather than projects in isolation.

"This will be a strong signal to send the world – that Copenhagen is able to address both climate change and the biodiversity crisis with the help of urban nature" (pg. 24)

"In 20 years from now, urban nature will be the GREEN in the city that mediates between the built and the grown environment, and thus urban nature will at once become the art of living life, with everything we long for out in nature and everything that gives us an environmentally friendly and climate adapted city. In this way, urban nature is the obvious choice as the next great Copenhagen story" (pg. 20)

4.2 - Urban Nature as an Amenity (SLA)

4.3 Urban Nature as a Utility (SLA)

4.4 Copenhagen Model for Urban Nature and Climate Adaptation (SLA)

Copenhagen's First Climate Resilient Quarter

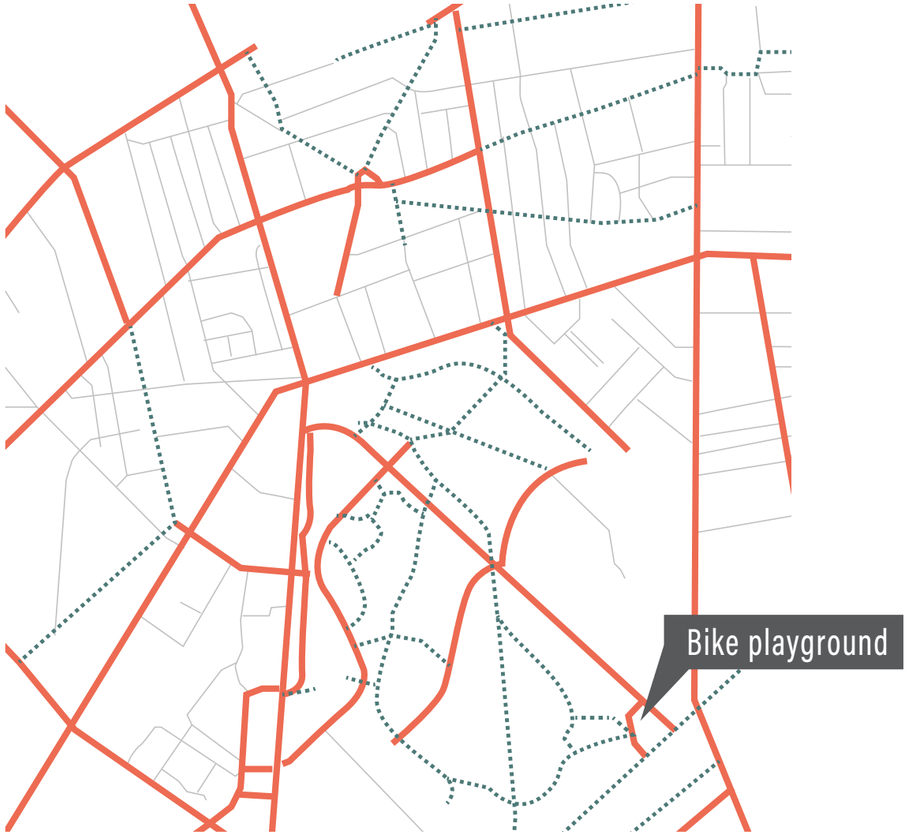
The district of Østerbro has a long-standing history of being an affluent and mostly residential district in Copenhagen. Unlike other districts, Østerbro does not have a strong identity. When selecting a neighborhood to brand as Copenhagen's first climate resilient quarter, Østerbro's lack of identity made it a obvious choice.

Indepedent Mobility

As we look into the district of Østerbro, we can see how the infrastructure for independent mobility already existed and how the neighborhood's public realm then shifted to integrate a connected network of urban nature.

The mobility infrastructure that already exists within Østerbro is very typical of what you would see throughout the rest of Copenhagen. A connected network of raised, wide bike lanes on the main streets bring you into the neighborhood through bike and a wide connected network of pedestrian infrastructure allows you to comfortably walk. Once you enter the neighborhood, you are funneled into narrower streets with significantly slower car traffic, but similar amount of space is allocated for pedestrians and cyclists.

Because so many Copenhageners rely on cycling to get around in their everyday lives, parents are teaching children how to ride a bike as young as possible. Located within the Østerbro neighborhood is the Children's Bicycling Playground. This playground has everything that you would could encounter on a typical street in Copenhagen, but shrunk to the scale of a child. This level of mobility for all ages is ingrained in their culture, and the infrastructure found within the city has the capacity to fill the basic needs and protect all of those who use it.



4.5 Map of Osterbro Street Typologies

Osterbro Street Typologies

4.6- Osterbro Street | Google Earth

4.7- Bike Playground | Copenhagenarchitecture.dk

4.8- "Gas Station" | Nancy Rottle

Østerbro's Urban Nature Plan

In 2012, a new, greener, climate resilient, vision for the Skt. Kjeld's quarter within Østerbro was adapted as part of the 300 climate adaptation projects that are being integrated throughout the city.[30] The projects within this vision are a connected network of urban nature that integrated into streets, public spaces, courtyards, and buildings.

In order to integrate these projects into the public realm, planners and designers took an innovate approach to creating the necessary space. THIRD NATURE, a landscape architecture firm in Denmark, developed a master plan for the quarter that allowed them to reclaim 20% of the street space. Through the use of angled parking, they were able to retain the same amount of spots that existed before. This method narrowed the amount of space allocated for cars, which slows them down and makes for a safer pedestrian experience. Through an analysis of microclimates within the neighborhood, they prioritizied putting the pedestrians in the most pleasant conditions. [31]

4.11- Osterbro Plan | Tredje Natur

A

4.9- Tasing Plads |Tredje Natur

B

4.10- Skt. Kjelds Plads | Tredje

C

Before

4.12- Bryggervangen Before| Tredje Natur

After

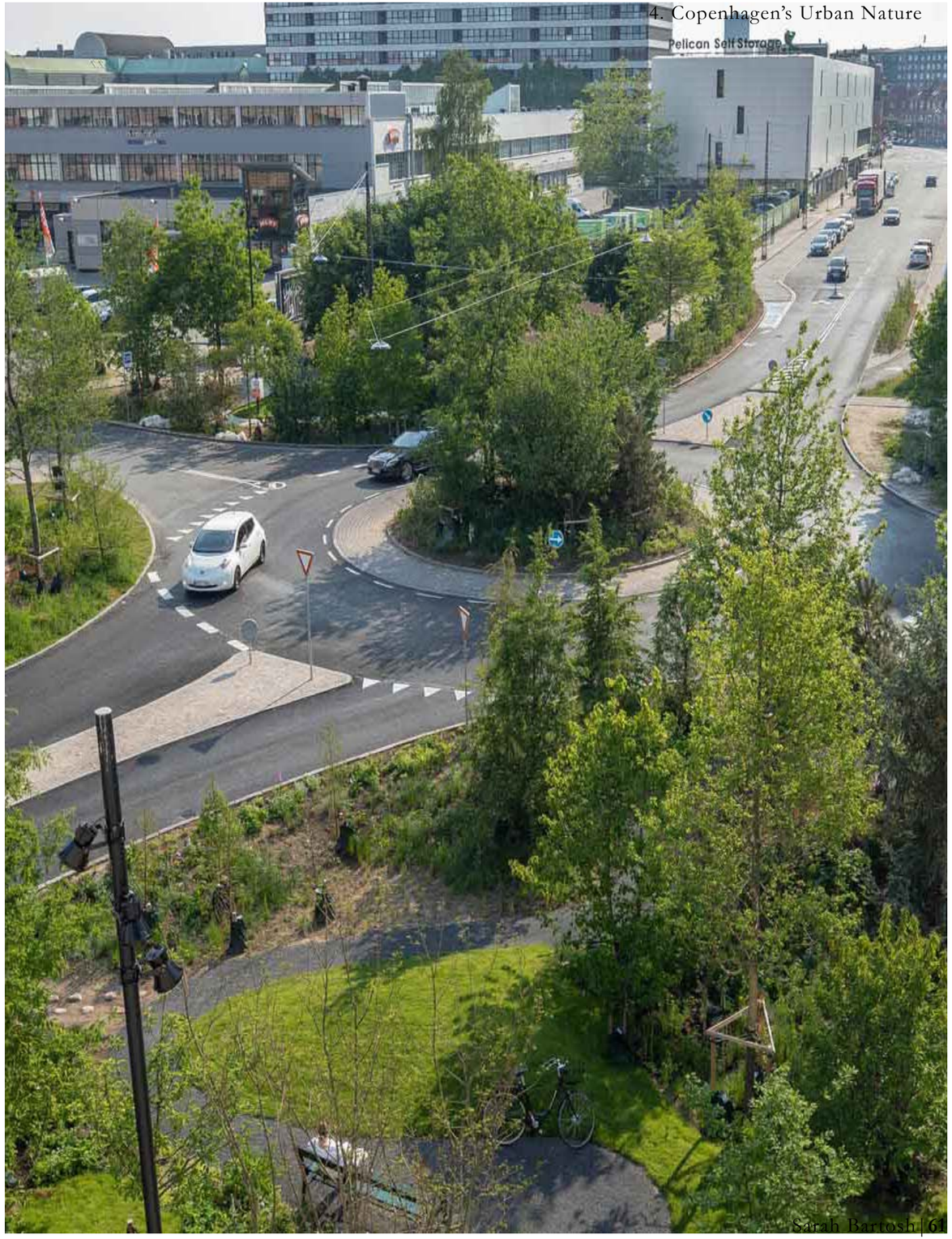
4.13- Bryggervangen After| Tredje Natur

Skt. Kjelds Plads

At the heart of the climate adapted quarter is Skt. Kjelds Plads. Completed in 2019 by SLA[32], this street allows nature to reclaim its space from cars and embraces a radical way of incorporating urban nature into the city and everyday life.

When I visited the site in September 2019, I could feel a sense of immersion with nature that one does not typically experience while walking down a street. The biodiversity was immediately evident which made each space within the site have its own unique character. From street edges lined with wildflowers, to sunken wetland areas, surrounded by ever green trees, there was a powerful aesthetic that would make anyone feel like they were no longer in the center of a city.

As an adult, I felt as though there was a new world to explore with each turn in the path. If I was a preschooler, I could spend hours wandering through this area, wanting to see what adventures each new space held. **Skt Kjelds Plads is filled with opportunities for moments of awe in the heart of an urban neighborhood.**



4.14- Birds Eye View of Skt. Kjelds Plads | SLA

Independent Mobility

Skt. Kjelds Plads supports independent mobility through several design interventions. Figure 4.15 highlights that there is designated infrastructure for both pedestrians and cyclists. While the nature provides both amenity and utility value, it also has safety value by acting as a physical barrier from vehicles. The distinct material for the pedestrian and cycling paths also increases the safety by creating organization and designation for who can travel where. This way, pedestrians can enjoy the experience of wandering and exploring through Skt. Kjelds Plads without having to be interrupted by a cyclists whizzing by. Likewise, cyclists do not have to worry about a pedestrian that are engaged elsewhere blocking their path. As you can see from figure 4.17, the crushed rock that forms the pedestrian path enhances the natural aesthetic of the site, but is still compatible for pedestrians that require mobility assistance or use a stroller.

Pinching in the width of the street before cars enter the round-about and carrying the plantings into each of connecting streets forces the vehicle to slow down before entering. Short crossing and a designated crosswalk between the two areas of the site make traveling between these two sections safer for crossing.

4.15- Plan of Skt. Kjelds Plads | SLA
Edit by author

Cycling Infrastructure

4.16- Cycling at Skt. Kjelds Plads | Zoe Kasperzyk
Edit by author

Pedestrian Infrastructure

4.17- Pedestrian at Skt. Kjelds Plads | Zoe Kasperzyk
Edit by author

Increasing Affordances

4.18- SLA's Wild Nature | Emilio Craddock

There are a robust amount of plant species that can be found within this project. This type of planting is drastically contrasts the monolithic planting that usually can be found within the green infrastructure typically on sidewalks. By increasing the amount of plant species, children have the opportunity to see the diversity of change over time through different plant species. The more diversity of plants also means an increase in the diversity of other non-human life that can be supported, which children are also attracted to.

4.19- Wild Flower | Danielle Dabalow

Integrated throughout the site are features that support the success of these plants. By integrating natural features to support plant life, rather than through specific maintenance, there is a more natural succession of the environment's life cycle. Through this, the nature within this ecosystems is mimicking what would happen in the environments outside of the city. This creates a more authentic representation of the different dynamic elements of nature.

4.20- Rain water | SLA
Edit by author

4.21 - Topography changes

Variation in topography is one of the most successful catalysts for increasing the amount of biodiversity within the project. While there is only approximately a five foot grade change between top and bottom images, microclimates that are created as a result of this differenc. This significantly increases the diversity of life that can be supported. While change in topography is often considered in the planting plans of most landscape architecture projects, deliberately creating more variation in topography at this small of a scale is an underutilized tool.

Supporting Child's Movement Patterns

Unexpected edges turn into paths - The subtle cue of the rocks in a linear and path like formation suggests that a child is invited to wander into this space. The distance between the rocks adds a playful element to the space, by encouraging more active movement of possibly jumping through the space. The mulch underneath the rocks also suggests that children do not have to stay on the rocks, and have the freedom to explore.

4.22- Skt. Kjelds Plats SLA

4.23- Stepping Stone |Danielle Dolbow

Mid block explorations - A small path tyology throughtout the site invites children to step off of the sidewalk and into the planting beds. The size of these stones allows for each children to "have their own" space in the plants that surround them,

Places that invite gathering - Benches next to larger openings provide opportunties for children and teachers to pause and have a mindful moment within the space. This also acts as a gather place for teachers to bring their students to engage with nature as a group.

4.24- Group gathering |Danielle Dolbow

Conclusions – As seen through the design of Skt. Kjelds Plads, SLA's Urban Nature approach to design supports the idea that when designers increase biodiviersty, we significanty increse the amount of affordances within nature that can engage a child. While the circluation design focuses on creating a safe and protected experience for users, the circulation also adds to the immersive experience of the site. Cues within the environment encourage users to wander off the path and explore the various worlds that the diverse plantings create. While we cannot control whether or not a child would feel awe while experiecning the urban nature of the

Endnotes

29 SLA Architects. Climate Adaptation and Urban Nature . Issuu, 2016, Climate Adaptation and Urban Nature , issuu.com/sla_architects/docs/bynatur_booklet_uk_small. Date accessed: Dec, 8, 2019
30https://klimakvarter.dk/en/ Date accessed: Dec, 8, 2019
31https://www.tredjenatur.dk/en/portfolio/the-first-climate-district/ Date accessed: Dec, 8, 2019

5. CELEBRATING THE JOURNEY: A CHILD FRIENDLY CASCADE NEIGHBORHOOD

This design seeks to apply a child friendly urban nature framework to the Cascade Neighborhood in Seattle, Washington. The goal of this design is to create a robust network of spaces throughout the neighborhood that invite teachers and children of nearby preschools to use the city as an extension of their classroom throughout the year. Design interventions are intended to emphasize creating a journey for teachers and their children that invites them to engage with urban nature and seeks to inspire moments of awe while walking down street.

5.1 Jumping Ponds

Design Goals

My design goals are to create a green network of infrastructure throughout the neighborhood that:

- Teachers from nearby preschools feel safe bringing their children to throughout the year and can support their pedagogical goals.

- Provides children with a variety of experiences that they are attracted to and invites them to engage with urban nature.

- Is rich in biodiversity and increases the support of non-human species in urban environments.

Analysis

In order to create a network of green infrastructure that could be frequently experienced and utilized as a tool for teachers throuhgout the year, I identified priority streets based on an analysis of the following criteria:

- Physical locations of preschools
- Pedagogical goals of preschools
- Existing green infrastructure and other opportunities for connection with nature
- Where are the most pleasant climates conditions are
- Streets with a positive Right of Way net - flexible space that can be used to enhance the right of way.

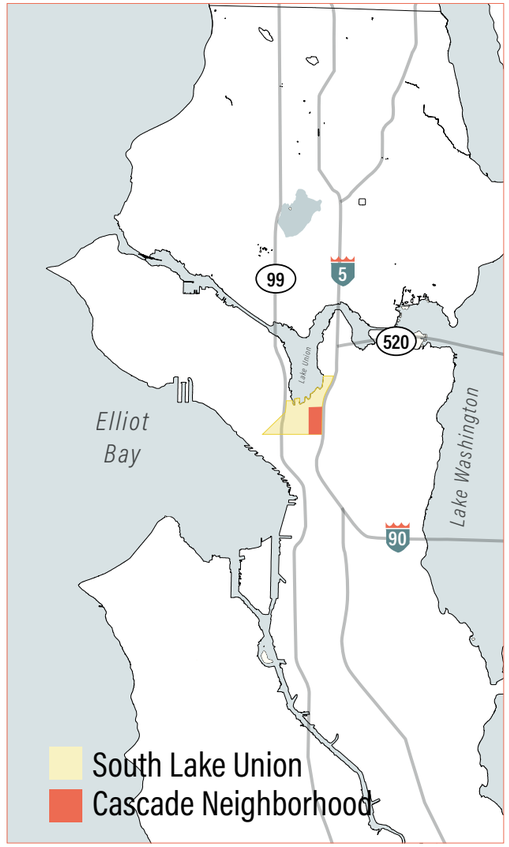
Cascade Neighborhood: The Heart of Seattle

The Cascade Neighborhood is an urban neighborhood north of downtown, and a part of the greater South Lake Union neighborhood. The neighborhood's western boundary is Fairview Avenue North, the i-5 Mercer Street onramp is the Northern boundary, Eastlake Ave to the east, and then Denny Way to the South.

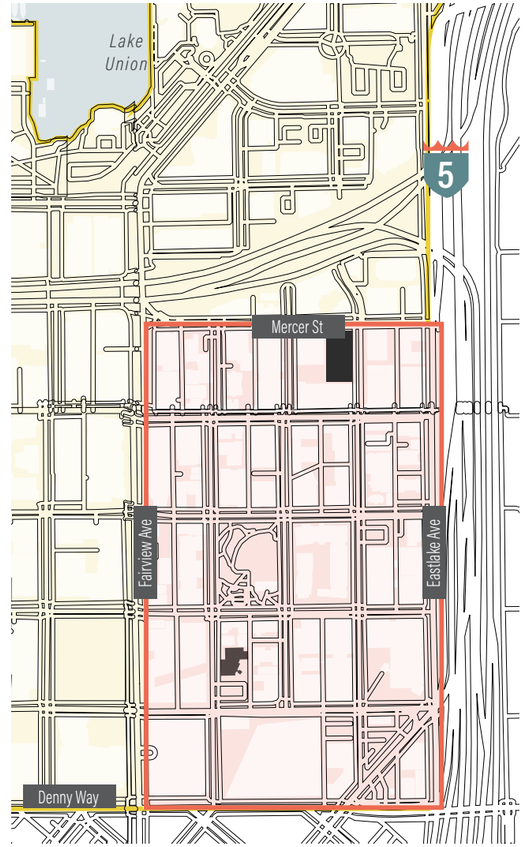
Like most of Seattle, the Cascade Neighborhood was heavily forested when pioneers first came to Seattle in the 1860s. When David Denny established the first sawmill in the South Lake Union area, that area became the water transportation hub of the city. Many more mills were created, and soon the Cascade Neighborhood became one of the first industrial, residential neighborhoods of Seattle. Its location allowed it to be an efficient waterway connecting the resources being extracted north of the city and the Seattle waterfront.

John C. Olmsted analyzed the area while working on the park system for Seattle. He proposed a park on the lake's south shore, but agreed that the best use of the neighborhood was industrial development. This idea was adopted by Virgin G. Bogue, who developed Seattle's first comprehensive plan in 1910 and 1911, and planned the neighborhood as such. [1]

The Cascade Neighborhood continued to write its industrial narrative until about 2012, when it underwent a huge shift in zoning.[2] At this time, it was rezoned to into the mixed use, urban neighborhood that it is today. The Cascade Neighborhood now uses its proximity to the water as a residential economic booster, rather than an industrial economic booster. Around this time, South Lake Union boomed into the tech-hub that it is today, making the Cascade Neighborhood into a desirable neighborhood for young adults. [3]



5.2 Cascade Context in Seattle



5.3 Cascade Map

5.4 Cascade Playground | image source: discoverslu.com

5.5 Cascade Apartment Building | Image source: rent.com

Locating Preschools

The Cascade Neighborhood is home to two preschools, Minor Ave Children's House (MACH) and Bright Horizons South Lake Union (BH SLU). Both of these preschools are private, and part of a larger coalition of preschools that are located throughout Seattle. Minor Ave Children's House is located south of Cascade Park and is located at one of the few half blocks that have yet to be redeveloped. It is also just north of a parking lot that will be redeveloped in the near future. Bright Horizon is in the northern half of the neighborhood and is integrated into one of the recently constructed buildings. Both of these schools have relatively small outdoor spaces with few opportunities to connect with nature. Minor Ave Children's House teachers will bring their children to their p-patch garden plot and to the second, smaller, playground that can found at Cascade Park.

Pedagogical Practices

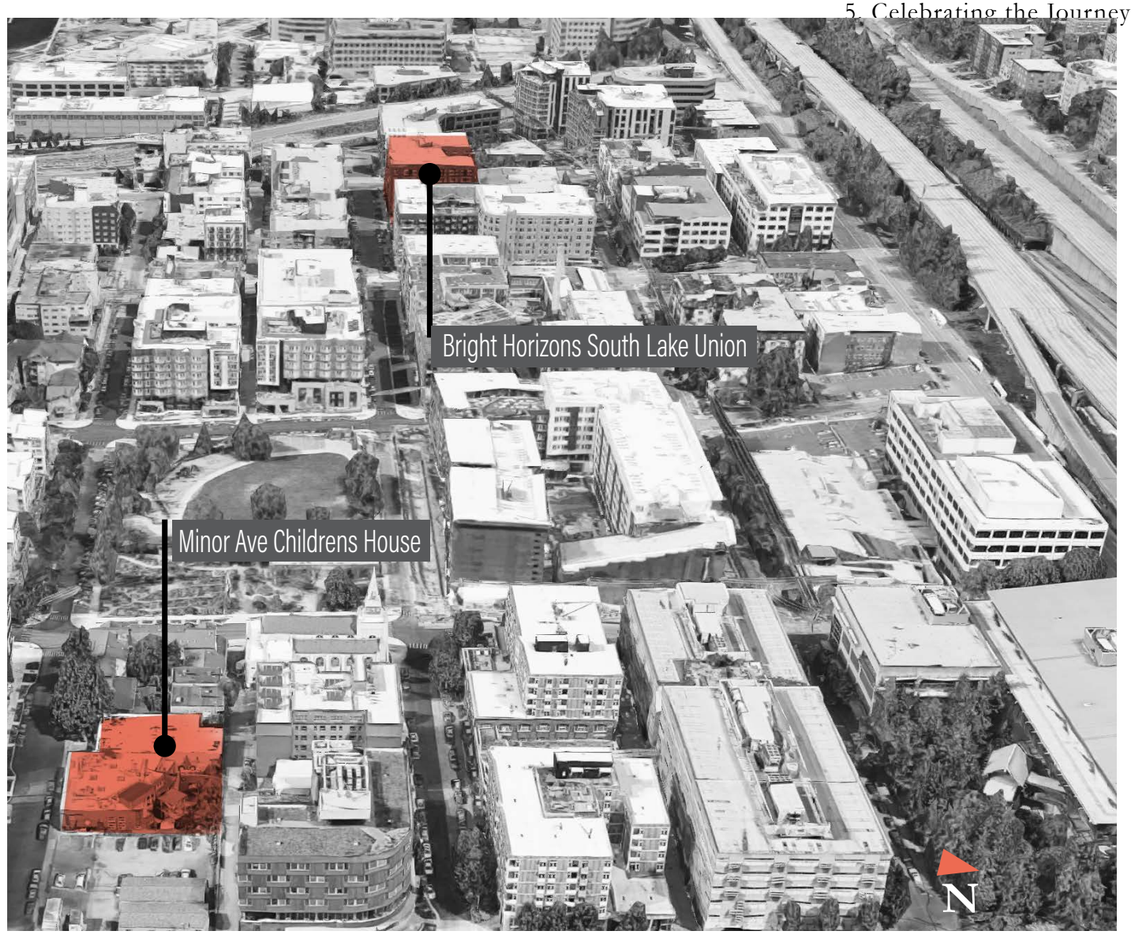
My independent research in Norway allowed me to understand that teachers frequently use the environments available to them to support their pedagogical practices. By understanding the pedagogical values of Minor Avenue Children's House and Bright Horizons South Lake Union, we can create an environment that they can use more frequently.

Minor Avenue Children's House

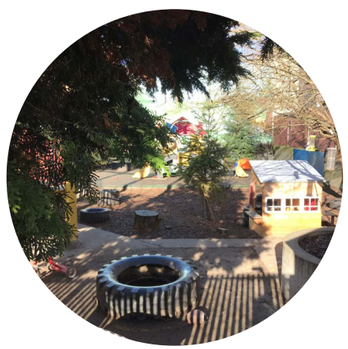
Minor Ave Children's House is a Montessori preschool. Montessori preschools have "an environment in which children have the freedom to choose their work and set their own pace within an engaging, well organized, sequenced curriculum."[4] Materials and activities found within these classrooms are aesthetically pleasing, generally made with natural materials and encourage hands-on exploration. This provides children with the opportunity to learn sensorially and cognitively. Children are encouraged to be independent and self-disciplined and experience the joy of learning and discovery.

Bright Horizons

The pedagogical practices of the preschool classrooms at Bright Horizons Sout Lake Union are based on the World At Their Fingertips curiculum. This is a curriculum model is based on three principles; an emergent curriculum, play and project based activities, and supporting cognitive, social-emotional, and physical development. They reference the Reggio Emilia philosophy that recongizes that the environment in itself is a teacher. Therefore, the design of their classroom spaces offers open-ended experience are intended to engage children and confidently explore.[5]



5.6 Preschool locations in Cascade Neighborhood
Image Source: Google Earth
Edits by author



5.7 Minor Ave Children's House

5.8 Bright Horizons SLU
Image Source: hvengineering.biz

Existing Green Infrastructure

There are four pieces of green infrastrcture that already exist within the Cascade Neighborhood. Understanding their relationship to one another is critical to developing a network.

Cascade Playground is the community hub of the Cascade Neighborhood. Recently undergoing an upgrade in 2005 by Berger Partnership, Cascade Playground is composed of two playgrounds, a wide field, picnic tables, and restrooms. More recently, there has been an increase in events that happen at the park to increase the social vibrancy of the neighborhood.

The Cascade P-Patch is a thriving community garden directly adjacent to the Cascade Playground. This P-patch includes innovative features such as rain collection, children's play features, a giving garden, and a cob bench. Adjacent to the P-Patch is the "the Garden of Happiness" which is a community based project with a native plant focus.

The outdoor space of the REI flagship store is a unique a public/private space that provides users with an immersive natural experience. With towering trees, a cascading waterfall and mountain biking trails, this space creates an atmosphere that allows you to forget that you are within eyesight of of i-5.

The Swale on Yale is a four block long swale project that came out of a collaboration between KPFF, Seattle Public Utilities, and the Seattle Department of Transportation. The unique system was the first of its kind and is intended to treat over 180 million gallons of water annually from Capitol Hill Neighborhood before it enters Lake Union.

5.9 In the trees at Cascade Playground

5.10 Cascade P-Patch Entrance
Image Source: discoverslu.com

5.11 Green Infrastructure in Cascade Neighborhood
Image Source: Google Earth
Edits by author

5.12 REI Flagship Store
Image Source: bergerpartenership.com

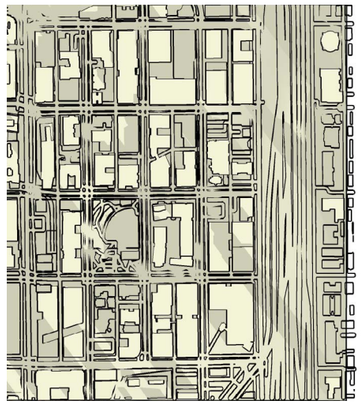
5.13 Swale on Yale

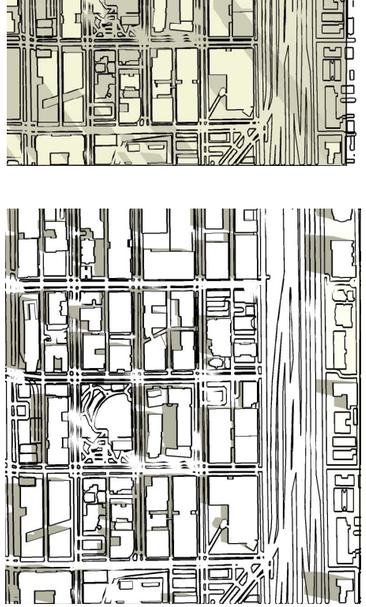
Sun/ Shade Ananlysis

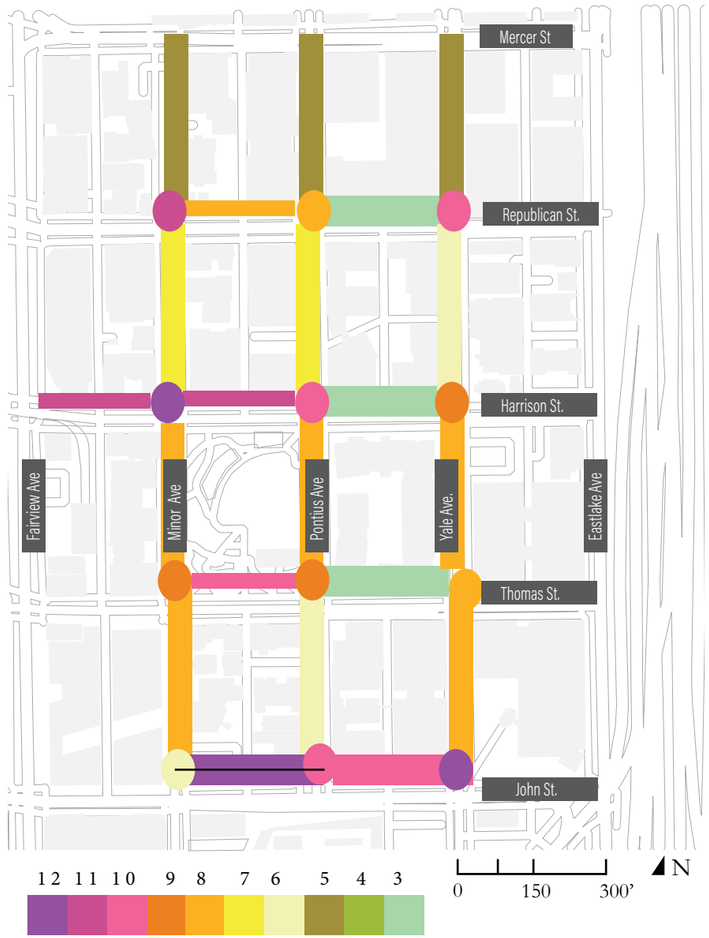
Understanding the climate conditions of the neighborhood is critical to creating a pleasant experience for teachers and children. While walking through this neighborhood, dominating apartment buildings cast shadows on the street, making those areas cold and unpleasant. A sun/ shade analysis for the first day of each season, at three different times of day provided a basis for understanding these conditions. The three times of day fall within the most times of a school day, 8:30 am, noon, and 3:30 pm. Each intersection and street were analyzed and given a score based on how much sun exposure there is to that area. Figure 5.16 shows these results – with 3 being the lowest score, and most consistently shaded area, and 12 being the highest score, and the most consistently sunny area.

Street Type and ROW

The Cascade Neighborhood's industrial past left its marks today in its streetscape. Since it was an industrial neighborhood, the street widths needed to be wide enough to accommodate for the larger forms of transportation traveling in and around the neighborhood. As a result, some of the lane widths that can be found in this neighborhood can be up to 60 ft wide. Since the zoning shift occurred, they have changed street type classification to urban village access. This designation means that on streets such as Harrison St. and Pontius Ave., there is approximately 8 to 14 feet of flexible space that can be used to enhance the right of way.

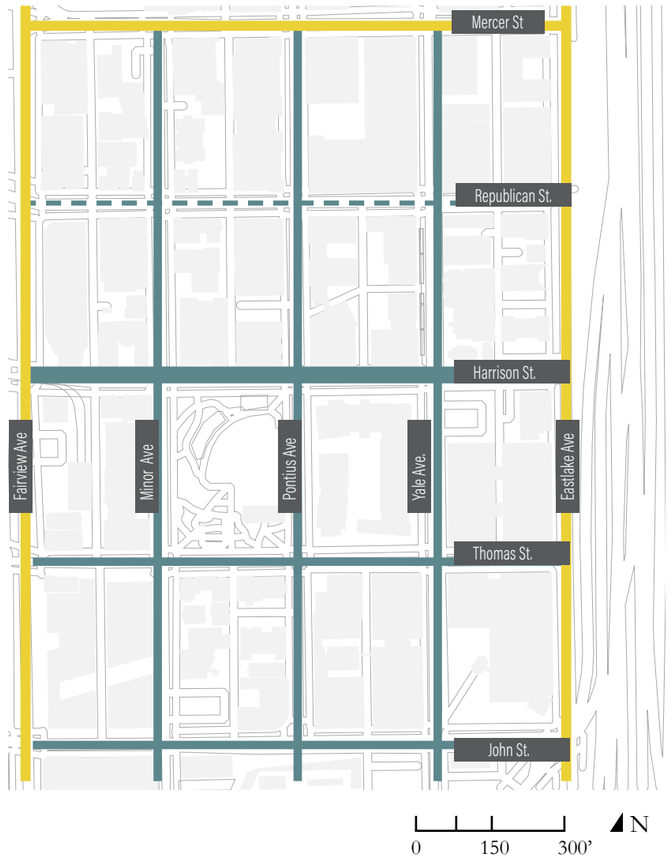






5.14 Top: Dec 21 Morning sun study
5.15 Bottom: June 21 Morning sun study
5.16 Right: Sun Shade Score

5.17 Cascade ROW net map



Priority Route

I determined a priority route for design improvements based on the analysis of the Cascade Neighborhood. Based on these criteria, this route would connect teachers at both schools with the four existing green infrastcture areas within the neighborhood. These streets will all incorporate various methods of infrastructure that is needed to support the needs of teachers and their children to encourage independent mobility. This network of streets favors the streets in the neighborhood that are sunnier and more pleasant to walk. The streets that were selected also have a ROW net of either 8 ft of 14 ft, making it possible to integrate the additional green infrastructure needed to create a network of opportunities for children to have moments of awe. In order to create more space, street parking on some of these priority streets has been relocated to non-priority streets.

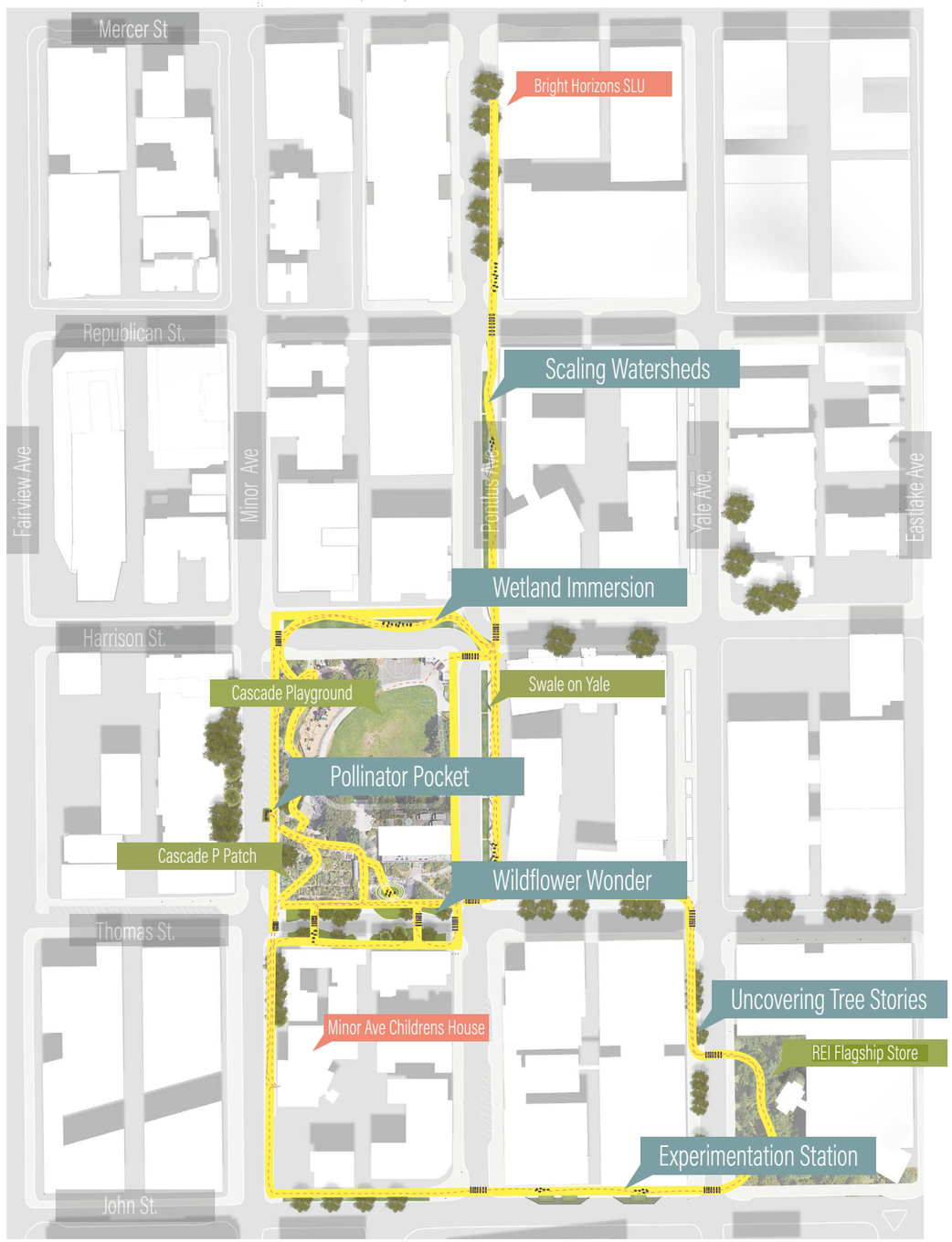
Intervention Typologies

Due to the street conditions that exist within this neighborhood, the scale of these experiences needs to accomodate for these conditions. As a result, there are three distinct typologies of nature experience interventions. At each scale, these typologies are focused on creating an inviting edge for children to interact with nature.

Immersion interventions - Where space allows, infrastructure that immerses the users in nature will be integrated. These are the spaces that invite children to have the opportunity to engage their senses through exploration. These interventions each have their own distinct characteristics and planting palette to increase biodiversity and the affordances that nature provides.

Art interverntions - Where immersion experiences cannot be integrated into the street, nature inspired art pieces link them together. These artful interventions invite conversation and engagement with systems found in nature that typically cannot be seen.

Pocket Classroom interventions - Based on the concept of the "pocket park", these intervention take up spaces to intentionally create opportunties for teachers to gather their students and have places to engage in conversation or activites about the natural environment.

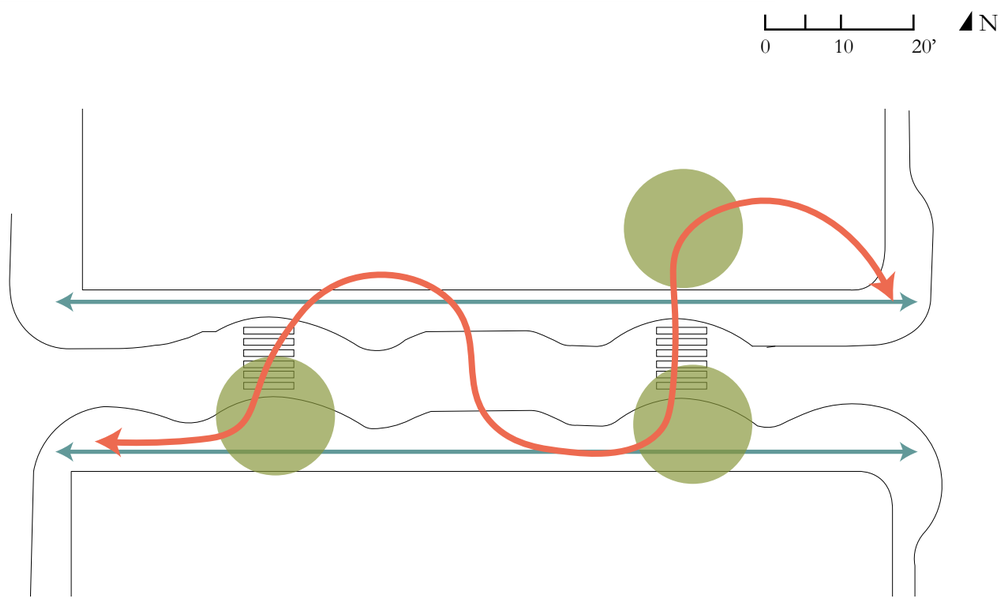


5.18 Priority Network Map

5.19 Thomas St. Plan

WILDFLOWER WONDER / *Immersion intervention*

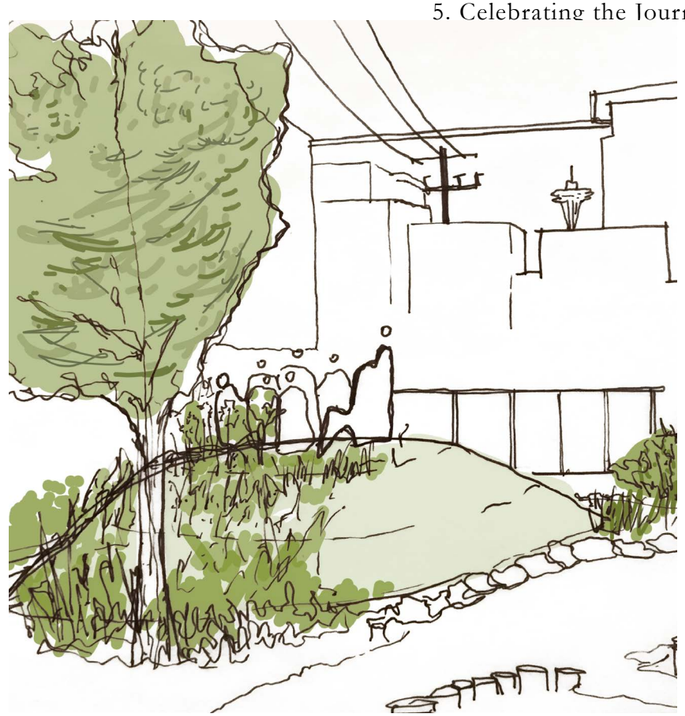
This intervention provides an immersive experience with nature on Thomas St. between Minor Ave and Pontious Ave, with the possibility of extending to Republican. In order to create a protected and safe experience through this site, the street parking has been removed and relocated to the east of Minor Ave, which is not part of the priority network. The planting strips are extended further into the road, and creating curves in the road that act as a method to slow cars down. Figure 5.20 shows the different flows of pedestrians and preschool classes. Paths in the planting strips at the north and south ends of the mid-block crossing encourage a more "wandering" flow, weaving through the street, and discovering each new pocket. Subtle changes in topography increase the feeling of getting lost. A unique plant palette that thrives in a drier conditions was chosen to enhance pollinator habitat, provide a variety of colors, scents, and textures. Contrary to that flow, 10' wide sidewalks on each side of the planting stirp makes for a comfortable and protected pedestrian experience.



5.20 Thomas St. Flow Diagram

5.21 Immersing into Thomas St.

5.22 Chaning colors on Thomas St.



5.23 Emphasizing view of the Space Needle on the gathering hill

Paper Back Maple *Acer Griseum*

Engagement value: Attracts birds, peeled bark provides engaging texture, intersting winged seed pods, color in Fall.

Butterfly Bush *Buddleia Davidii*

Engagement value: Rich nectar for pollinators, honey-like fragrant, lavendar-blue bloom color

Crimson Fountaingrass *Pennisetum Setaceum*

Engagement value: showy flowers, colorful leaves, attracts birds, unique texture, "leaves are majestic in the wind"

Lambs Ear *Stachys Byzantina*

Engagement value: fragrant flowers and leaves, soft texture, attracts butterflies

American Smoketree *Continus Obovatus*

Engagement value: Billowy flowers, provides cover for wildlife, cozy, pink spring color

5. 24 Plant images by PlayCore

5.25 Wetland Immersion Plan

WETLAND IMMERSION / *Immersion intervention*

In Wetland Immersion, water from the Swale on Yale is diverted onto the north side of Harrison St. to create a more lush and immersive experience with water and wetland ecosystems. In order to create a safer experience, Harrison and Pontious have been rerouted into one way streets, and create a completely pedestrian diagonal crossing from the Swale on Yale and into the Wetland Immersion. The street parking on the North side of Harrison has been relocated to the east side of Pontious Ave in order to create a wider area for the intervention. Each bioretention cell has a unique way of interacting with the water that comes through the system. A unique palette that thrives in wet conditions was chosen to enhance biodiversity and have engaging features.

White Sagebrush
Artemisa Ludoviciana

Engagement value: Silver color creates visual interest, interesting texture, fragrant

Kearney Leafy Reedgrass
Calamagrostis Foliosa

Engagement value: whispering sound in the wind

Corckscrew Rush
Juncus Effuses "Spiralis"

Engagement value: Exciting shape and texture

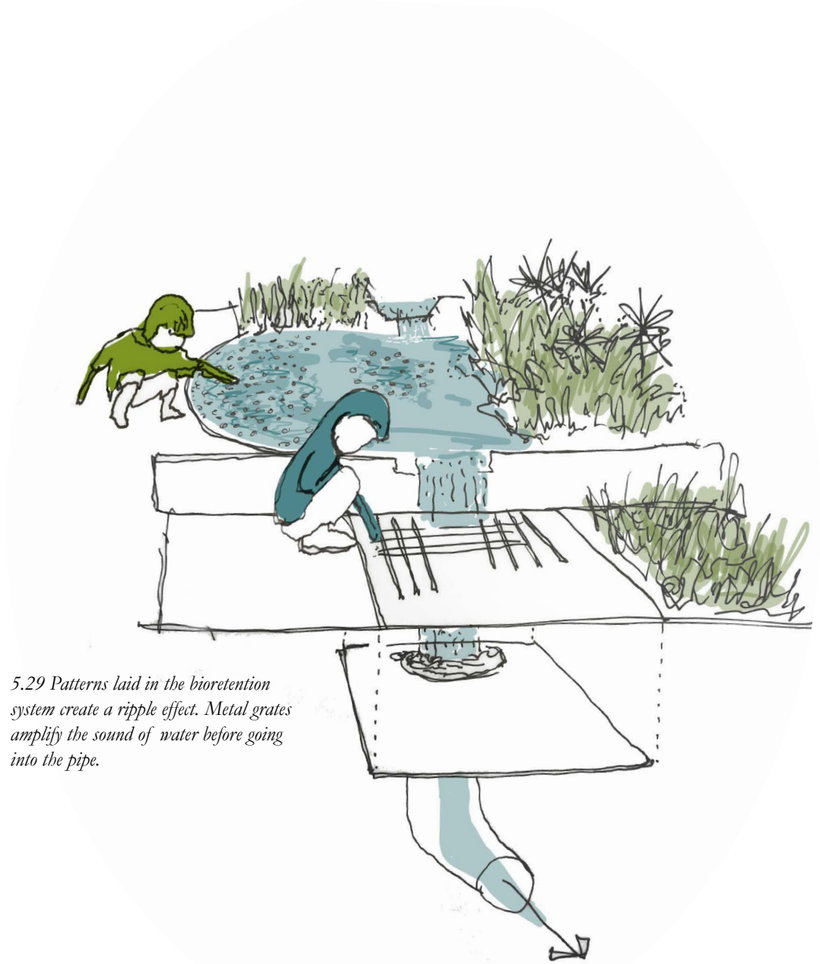
Flame Grass
Miscanthus Sinensis

Engagement value: Showy plumes, attracts birds, bold colors

5.26 Plant images by PlayCore

5.27 Consistant flow of water from Swale on Yale provides puddles for splashing in year round.

5.28 Path through bioretension cell creates elevated experience through water



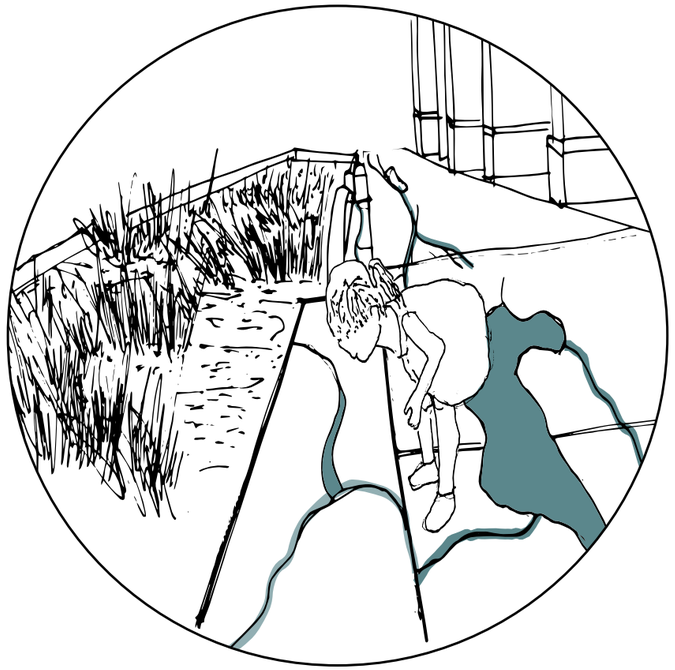
5.29 Patterns laid in the bioretention system create a ripple effect. Metal grates amplify the sound of water before going into the pipe.

Scaling Watersheds / *Artful intervention*

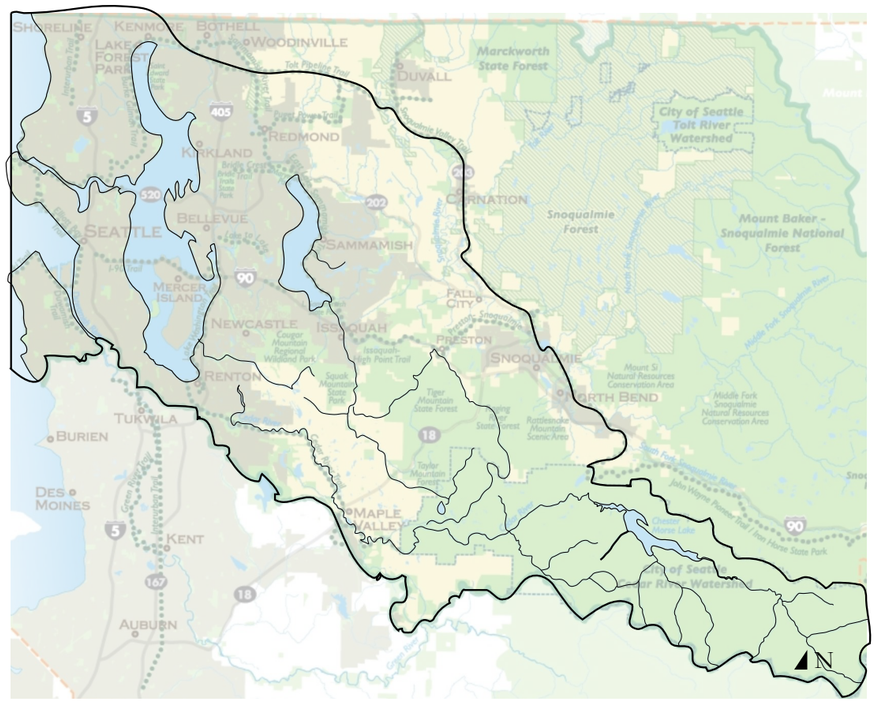
This artful intervention provides an opportunity to create a visual connection to the larger water system that the Swale on Yale is connected to, the Cedar River Watershed. This intervention scales a map of this watershed and ingrains it onto the paraell sidewalk and the biorention infrastructure itself. Weaving the art pice on the swale evokes conversation about how infrastrcture in our cities is connected to a significantly larger network. The shape of the Cedar River and its tributaries create playful lines keep children engaged and supports their wandering moving patterns while walking down Pontiuous Avenue.

Integrating seating into the mid-block crossing that faces the Swale creates spaces for teachers to pause and have their own teaching moments, while allowing children to have a different view over the swale.

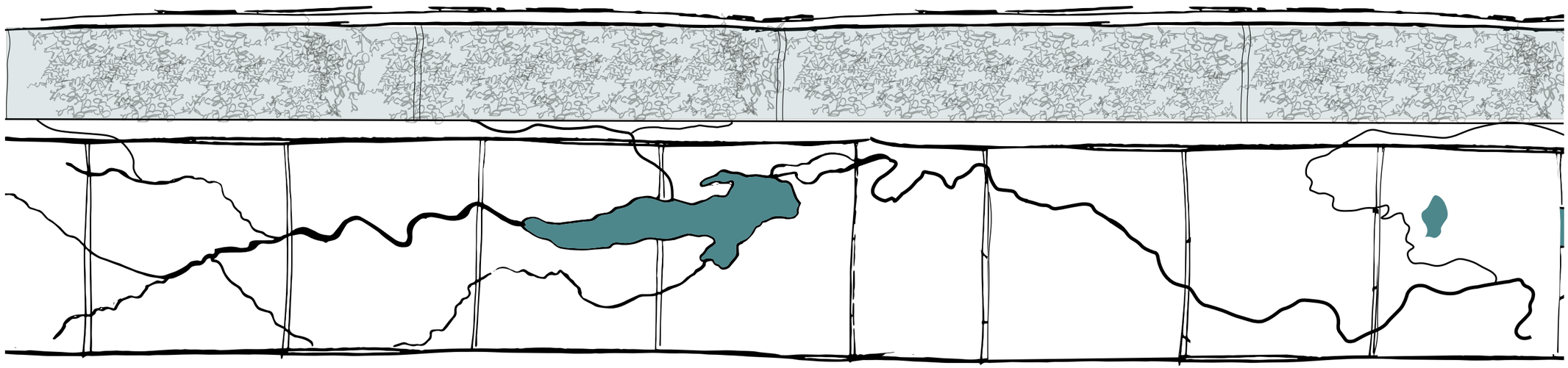
This artful intervention connects Cascade Park to the Wetland Immersion intervention.



5.30 Perspective of Cedar River Watershed pattern installed on sidewalk and Swale on Yale infrastructure



5.31 Cedar River Watershed | Image Source: Google Maps Edits by author



5.32 Cedar River Watershed pattern installed on sidewalk

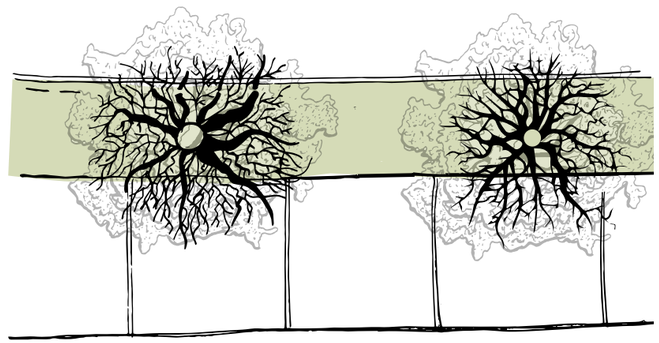
Secret Stories of Trees / *Artful intervention*

Through the design of unique tree grates, this intervention make the invisible parts of a tree visible. Unlike Scaling Watersheds, this intervention is an example of something that can be placed anywhere within the neighborhood to create a continuous path of engagement.

In the top intervention, the tree grates are used as an opportunity to "uncover" the system of tree roots that lie beneath the sidewalk throiugh an artful representaiton of their system. The design exapands beyond just the bottom of the tree and into the sidewalk and street to show the full scale of how their roots would grow. These grates may prompt a child to ask the question, "what are these?" and then lead into a discussion about how trees get their nutrients.

The bottom intervention resembles the rings of a tree, each would be situated under different sized trees, prompting the question, "why are these all different sizes?" Which could lead to a conversation about the age of trees.

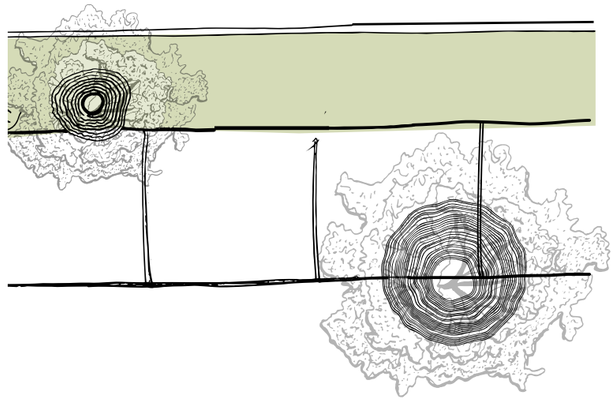
5.33 Root system |Image Source: treecenter.com



5.34 - Root system installation on sidewalk

5.35 Perspective of root system installation on sidewalk

5.36 Tree ring |Image Source: mnn.com

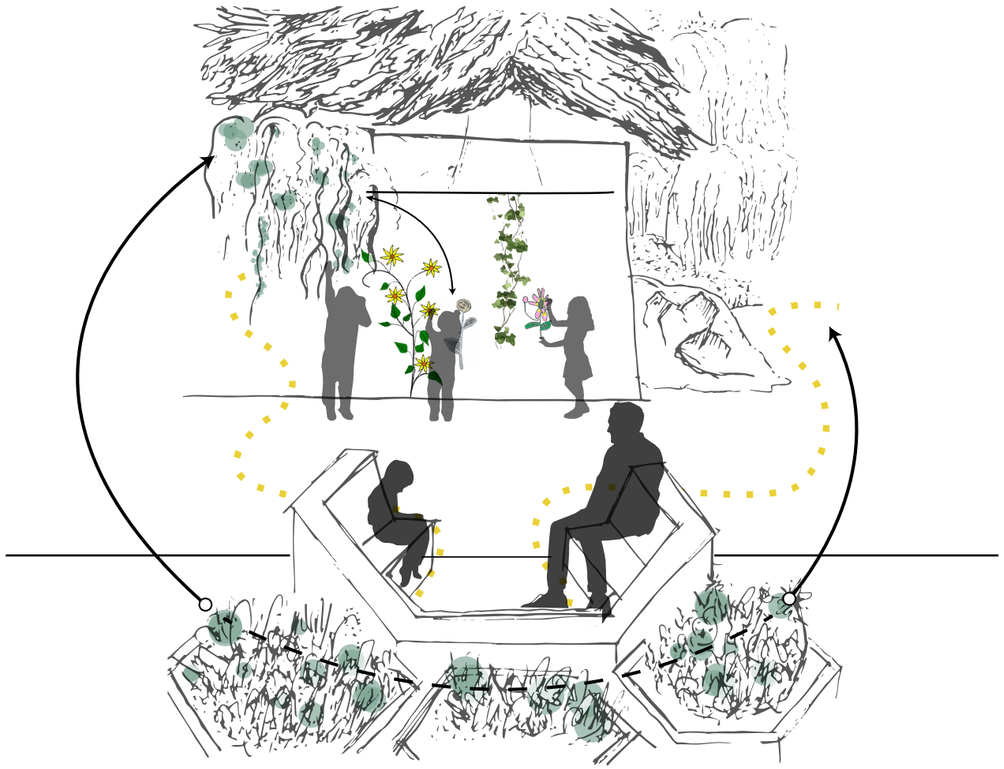


5.37- Tree ring installation on sidewalk

5.38 Perspective of tree ring installation on sidewalk

Pocket Classrooms

Pocket classrooms create opportunities for teachers to have well defined destinations to bring their students. The pocket classroom show in this conceptual drawing is located to the west side of the Cascade Park where a 5' retaining wall exists. Across from the wall, two parking spaces are replaced by a protected seating area for teachers and students, with pollinator plantings surrounding them. Nature based art on the wall invites children to add their own expression, inspired by the nature that surrounds them. This creates an opportunity for children to make their mark on the neighborhood.



5.39 Pocket Classroom concept

Conclusions

Due to the opportunities and constraints of the Cascade Neighborhood, I developed three typologies to create a connected network of green infrastructure. This network is designed to allow teachers from nearby preschools to feel safe bringing their children out all year and supports their pedagogical goals; provides children with a variety of experiences that they are attracted to and invites them to engage with nature; and is rich in biodiversity and increases the support of non-human species in urban environments. By applying my design framework in this way, there are now more opportunities young children to experience awe and develop emotional connection to nature in the everyday places that they experience in this neighborhood.

Endnotes

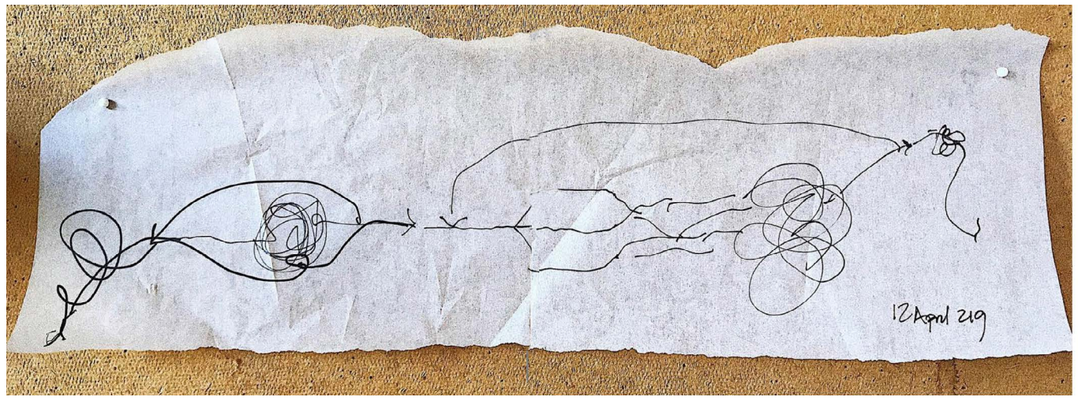
1 "Seattle Neighborhoods: Cascade and South Lake Union -- Thumbnail History." Seattle Neighborhoods: Cascade and South Lake Union -- Thumbnail History, historylink.org/File/3178. Date accessed: Dec. 10, 2019

2 "Zoning Map Books." Zoning Map Books - SDCI, www.seattle.gov/sdci/resources/zoning-map-books. Date accessed: Dec. 10, 2019

3 "Our Approach." Haggard Childcare Resources, www.haggardchildcare.com/partners. Date accessed: Dec. 10, 2019

4 "The World at Their Fingertips." Curriculum: Bright Horizons at South Lake Union, Seattle, WA, child-care-preschool.brighthorizons.com/wa/seattle/slu/curriculum. Date accessed: Dec. 10, 2019

5 "Seattle Neighborhoods: Cascade and South Lake Union -- Thumbnail History." Seattle Neighborhoods: Cascade and South Lake Union -- Thumbnail History, historylink.org/File/3178 Date accessed: Dec. 10, 2019



6.1 The design process | Iain Robertson

6. CONCLUSIONS + REFLECTIONS

The process of this thesis was shaped by the endless dance between my framework develop and the final design of the Cascade Neighborhood. No design process is ever linear, and this thesis was no exception (6.1).

The principles of increased independent mobility and increased amount of affordances did not take many shapes, since they were backed by a robust body of literature. But, the intent of this thesis was not just to make a more child-friendly neighborhood in Seattle. Rather, this thesis explored how landscape architects can create opportunities for young children to experience awe and develop an emotional connection to nature in everyday places that they experience in their cities. The child-friendly environment principles lay the groundwork for this, but they alone do not equate to an environment of awe. Therefore, more specifically, the third principle felt as though it was constantly in flux, as the additional principle could draw on so many different bodies of literature. In one iteration, this third principle focuse on supporting a spectrum of ways of learning. But, when trying to apply that to design, it did not feel focused enough and was too muddy to be a guiding design principle. It also output a series of defined classrooms in the neighborhood, rather than focusing on the journey between the spaces. Other iterations of this third principle felt too focused and didn't allow for enough flexibility in the design to make this framework more universally adaptable. Landing on the principle of supporting a preschooler's movement patterns is backed up by a research that directly connects to how children can be supported to have more meaningful engagement with a place. This principle is also open ended enough that a designer can bring their own interpertation as to how they can support a child's wandering flow.

It would be impossible to evaluate the success of any design based on the amount of "moments of awe" a child has while experiencing a site. There is no prescription for what will or will not make someone feel awe, nor is there a metric for measuring it. Approaching the design of this environment through the lens of awe, provided me with the opportunity to have a unique set of questions for self-critique. With each iteration, I would ask myself, how would this space make me feel? What emotions does this space evoke? Is there the potential to feel connected to the nature if I were a child walking in this space? Regardless of the answer to these questions, I am only one person, and it was impossible to fully take my own personal emotions out of this critique. The emotions that this environment may afford for me, could be drastically different for someone else. But, by iterating the design through this lens, I have learned the value of developing design that is driven by emotions.

The implementation of this framework to the Cascade Neighborhood would not have been as strong without integrating three typologies of interventions: immersive interventions, artful interventions, and pocket classrooms. Being on a track to graduate Fall quarter, opposed to the Spring, provided me with the opportunity to make thoughtful improvements to the final design of the Cascade Neighborhood after my presentation in the spring. In Spring 2019, my design was focused specifically on the incorporation of how artful interventions can act as connectors to engage children on their journeys between school and green destinations. After feedback from professionals and a study tour through Copenhagen and Malmo, I was inspired to push the amount of opportunities for moments of awe throughout the neighborhood, which ultimately made me realize the need to expand the design through immersive experiences.

The design of these additional experiences was an opportunity to draw on the lessons learned from my research in Norway and more explicitly incorporate the pedagogical values of Minor Ave Children's House and Bright Horizon's South Lake Union into the design. Both schools value exploration, hands on learning, and open-ended environments, which can be seen through the more immersive experiences. The stronger connection to pedagogical values allows me to feel more confident about my design's ability to create moments of awe. The more that teachers can find opportunities to take children on journeys into their everyday pedagogy, the more children will engage with the beauty and complexity of nature.

Additionally, by adding the other types of interventions into this design, I have created a continuous network of experiences, rather than just smaller destinations. Seeing a variety of typologies that implement these principles increases the potential for this framework to be implementing into other neighborhoods. If a neighborhood has a surplus of flexible space in the Right of Way, they could implement a whole series of immersive interventions, similarly to that of Skt. Kjelds Plads. Whereas a neighborhood that wants to add something but doesn't have the option to completely reimagine the street could implement artful interventions or pocket classrooms.

In order for this framework to be implemented elsewhere, there needs to be a more defined process of developing a priority network of interventions. Through monthly site visits, I had spent hours walking the neighborhood alone and with others to get a better understanding of the experience of neighborhood. While I was there, I was noting where I felt comfortable and uncomfortable, so I had subconsciously known the streets that made the most sense to implement this network, rather than starting with a more quantitative approach.

Seattle's Crime Prevention Through Environmental Design (CPTED) guidelines would make the implementation of this design significantly more challenging. The selected plants that have more engaging qualities, tend to not follow the stated guidelines. CPTED suggests that uniformly shaped sites are safer than irregularly shaped ones, because there are less hiding places. More specifically, plants should follow the 3-8 rule of thumb, where hedges

6.2 Representation process - Immersive Section

6.3 Representation process - Perspective of Imagination

should not be higher than 3 feet, and tree canopies are no lower than 8 feet. Finding the balance between creating an experience that allows children to feel immersed in nature during the day and a safe streetscape at night is challenging, and would require a deeper look into maintenance and lighting strategies. [1]

When we design for child friendly cities, we are designing for everyone. Looking at the bigger picture of this thesis, when we design for our most vulnerable populations to feel safe, comfortable, and connected to their communities, we make it a little easier for everyone. When we design curb ramps to accommodate for stroller, we are designing for those who are in wheelchairs. When we design sidewalks to accommodate for slower speeds, we make it more comfortable for seniors to walk in their environment.

Next Steps

Integrating an aspect of co-creation into the design process of these journeys is the obvious next step for this project. A stronger dialogue between designers, teachers, and students provides a wealth of benefits. The process of co-creating spaces with preschool aged children fits seamlessly into the Reggio Emilio pedagogical approach, that thinks of the environment as a third teacher. Reggio Emilio classrooms celebrate a making children's interests visible in their everyday environments to empower them to grow into their most authentic selves. With that in mind, I believe that the Pocket Classroom spaces provide an excellent opportunity for schools to bring their children and create a space that reflects the class's identity every year. Teachers also are benefited through the co-creation of space. When designers and teachers are working together, teachers can learn how to more effectively use the spaces that designers are creating, and designers can create spaces that better fill teachers needs.

Exploring the representation of children experience through space has significant potential for growth. My decision to illustrate this thesis allowed me to retain a playful and child like quality while conceptually representing the design. Feedback that I received from my colleagues in Norway suggested that I continue to push the way we represent space from their eye level, opposed to that of an adults. Doing this not only allows designers to see the space differently, but for teachers to understand what a child is experiencing.

Finally, my guiding framework shows a lot of promise for the future of child friendly environments. Chawla and ARUP's application of Marketta Kytta's Bullerby model for child-friendliness shows the potential for applying these principles to an array of environments. If the Bullerby model can serve as the common denominator between the two seemingly unrelated environments of nature play and cities, I hope that this intersection can inspire others to ask; how can the Bullerby model for child friendliness create unique relationships between other types of environments? Through the lens of child friendly environments, can we thread functions of the environment in a more meaningful way?

Endnotes

1 https://www.seattle.gov/police/community-policing/cpted

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