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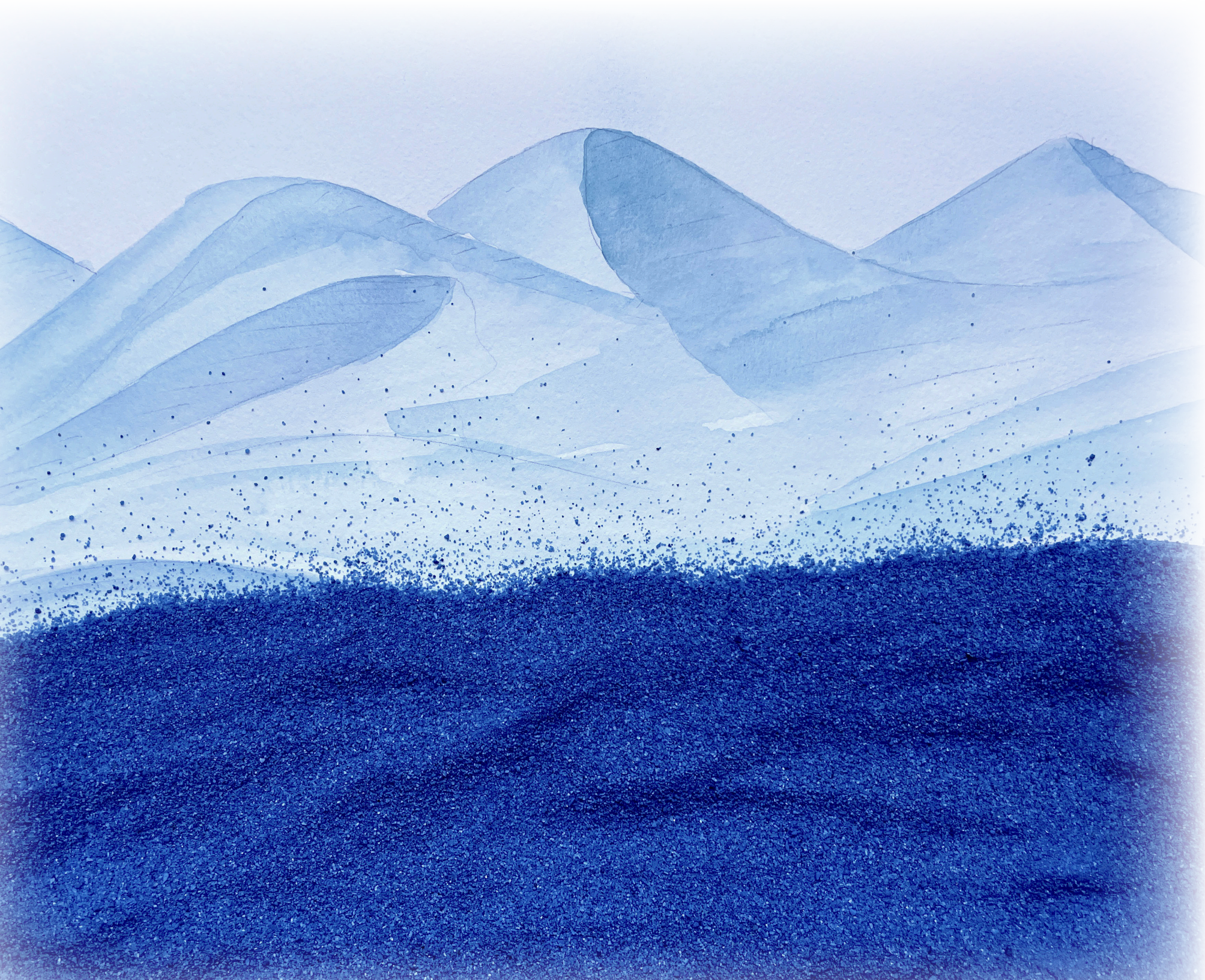


DUNE DYNAMICS | A NATURE-BASED PRESCHOOL

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Spring 2024

TABLE OF CONTENTS

05	ACKNOWLEDGMENT
06	ABSTRACT + RESEARCH
18	PRECEDENT STUDIES
20	PROGRAMMATIC PRECEDENTS
26	SITE CONTEXT
40	CONCEPT
46	SCHEMATIC DESIGN
52	DESIGN SOLUTION
74	FINAL DELIVERABLES
78	DECLARATION
82	FF&E
92	SOURCES



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I would also like to thank all my professors at VCU for their invaluable support and guidance throughout this program. Special thanks to my Thesis advisors, Roberto Ventura, Kristin Carleton, Timothy Hamnett, and Stephanie Lee.

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ABSTRACT + RESEARCH

ABSTRACT

Relevance:

Sustainability is a global issue that requires collaborative efforts. Environmental values and attitudes are shaped in adults by early exposure to nature. During the COVID-19 pandemic, remote learning increased the attention to nature-based learning from families and the press (Prochner, 2021).

Although many early childhood education approaches for the age group of 3-5 years recognize the importance of holistic development and focus on tailoring the learning experience to the developmental stage of young children, few emphasize the importance of integrating nature as one of the learning tools. Nature-deficit disorder in children means that children spend less time outdoors and in nature than in the past,

leading to many behavioral problems (Louv, 2008). Studies have shown the importance of biophilic design on humans, which can be applied to educational centers. The term Biophilic design is inspired by Wilson's "Biophilia Hypothesis," in which he suggests that humans are genetically attracted to nature and need a connection with it in order to survive and enhance their emotional and physical well-being (Ungar, 2005).

Therefore, designing an early childhood education space that emphasizes nature can benefit children and the local community by raising awareness of environmental issues among children, allowing them to interact with nature indoors and outdoors throughout the day, and focusing on enhancing their emotional and physical well-being.

I am an interior designer and a mother of a six-year-old son who loves nature; like many parents, it is necessary for me to find the best education methods

that resonate with our family's values and foster a deep connection with nature. By researching current early childhood education approaches that emphasize connecting children to nature I will explore the impacts of designing a nature-based preschool on children's physical and psychological well-being

Issue/Problem:

This research will address the following question: How can we design a preschool that encourages children to engage deeply with natural environments through year-round outdoor and indoor activities, fostering experiential learning and environmental education?

Context:

Studies have found that children attending preschools which occurs in natural settings are more prepared to learn when they reach formal school age than children from conventional

schools. For example, In Denmark, about 10% of children attend outdoor forest schools where children spend five days a week and 8 hours a day outdoors. When formal school starts at seven, teachers in local public schools found that forest school children are more socially skilled and prepared to learn (Sobel, 2015).

Method of investigation:

A literature review has been conducted to investigate and compare some examples of successful early childhood practices worldwide that incorporate nature in their education philosophy to identify commonalities between the two approaches: the Waldorf education approach and nature-based education. In addition, several precedent studies of schools incorporating biophilic principles will be examined. Moreover, two teachers teaching in a school implementing a developmentally appropriate curriculum for the age group (3-5)

will be interviewed.

Outcomes:

In conclusion, spending time outdoors and in nature in education settings has a range of long-term physical and psychological benefits for children. Furthermore, studies have proven many other benefits of nature elements and designing with nature elements indoors on children's physical and psychological well-being. Research has shown that stress reduction, improved mental health, better cognitive function, and lower obesity rates are a few examples of the benefits. Furthermore, Waldorf's approach and nature-based education in early childhood both emphasize the use of natural environments and outdoor settings as a key aspect of learning and development.

Engagement:

The research will support the exploration of designing a preschool for

the age group of 3-5 years that combines some elements from two nature-focused pedagogies practiced today, the Waldorf approach and the nature-based schools, to create an education environment that emphasizes sustainability.

RESEARCH

Introduction

By tracing a brief history of kindergartens and examining two exemplary kindergarten practices that incorporate nature into their educational philosophies, nature-based education and Waldorf education, this research delves into the concept of nature-centric kindergartens and their profound impact on the well-being of children. It explores the historical context and key elements of the two pedagogical approaches, emphasizing the significance of nature in early childhood learning. First, the research explores nature-based education, rooted in the nature study movement and forest schools, which provide children with a unique educational experience that values the outdoors as an integral part of learning. Next, we explore the Waldorf education model, which embraces a holistic approach to learning, incorporating nature and outdoor experiences into its curriculum.

The research also delves into the concept of biophilic design, guided by the "Biophilia Hypothesis" by Edward O. Wilson, which suggests that humans possess an innate genetic attraction to the natural world. This connection with nature, as Wilson suggests, is integral to our emotional and physical well-being. Furthermore, we explore the six design elements proposed by Kellert: emphasizing the integration of environmental features, natural shapes, patterns, and processes, light and spaces, place-based relationships, and the interconnection between humans and nature. Moreover, the impact of early exposure to nature on children's environmental values and attitudes is covered, highlighting the concern of "nature-deficit disorder" and the emergence of "biophobia" when children are disconnected from nature in their early years. The Research also highlights the formative role of early nature experiences in shaping lifelong environmental values and attitudes. The research further explores the principles that can be used in designing

a nature-centric preschool, both indoors and outdoors. It emphasizes incorporating biophilic elements, supporting children's perspectives, ecological experiences, physical and psychological well-being, and communication among young children. Additionally, to gather insights directly from educators, we include interview responses from teachers with firsthand kindergarten experience. In conclusion, findings from the research emphasize commonalities between Waldorf and Nature-based schools, the physical and psychological benefits of nature on children, the critical components of nature-centric preschool design, and key insights drawn from teacher interviews.

Brief History of Kindergartens

The concept of kindergartens, meaning "children's garden" in German, was introduced by Friedrich Fröebel in the 19th century, emphasizing the importance of independent exploration in nature for young children (Sobel, 2015). According to Koplów (2002), kindergartens

come in two primary models. The first type is a developmentally appropriate kindergarten, where the curriculum is designed to align with the developmental stages of children and helps the children build bridges and slowly cross them at their own pace. This is accomplished by open-ended exploration through dramatic play, playing with blocks, painting, and clay. The second is academically driven kindergartens. According to Koplów (2002), this model challenges children at a young age, forces them to learn in a fast-paced manner that is beyond their ability, and makes them feel out of control. A comparative study of the two practice models on the future skills of kids found that children in the developmentally appropriate kindergartens outperformed the academically driven kindergarten students in reading and math tests and had greater attendance rates (Koplów, 2002).

Examples of Developmentally Appropriate Kindergarten Practices Incorporating Nature in Their

Education Philosophies

Nature-based education is an example of developmentally appropriate kindergartens. Nature-based education, where environments and relationships are two essential elements, has seen a resurgence in the 21st century, but its origins are not new. Two significant historical initiatives led to the creation of nature-based education (Prochner, 2021) The first, the Nature Study Movement, emerged between the 1890s and 1920s. It was a response to mounting concerns about the harmful impact of an increasingly industrialized society on children's development. The movement reintroduced children to the natural world and the fundamental relationships that it nurtures, recognizing the vital role of such experiences in their growth. The second example, forest schools, were established in early 20th-century Germany. These schools were originally designed to expose children recovering from illnesses, particularly tuberculosis, to fresh air and sunshine and gained popularity for their success in fostering a profound connection with nature. The

development of antibiotics caused a decline in their prominence, but forest schools experienced a resurgence in the 1990s, particularly in England and the United States (PROCHNER, 2021). According to the 2022 National Survey on Nature Preschools in the United States, there are 800 nature preschools operating across the United States. Approximately 30% of these nature schools have chosen to operate exclusively outdoors, displaying a strong dedication to exposing kids to the natural world. The importance of establishing a relationship with nature is vital in these preschools. On average, students in full-day programs spend 5 hours a day outside, fostering a deep relationship with the natural world. Even in half-day programs, where time is more limited, children still engage with nature for an average of 3 hours daily. This data highlights how committed these educational

institutions are to giving kids plenty of time outside to explore, study, and play because they understand the enormous advantages of such experiences for their overall development. In Denmark, about 10% of children attend outdoor forest schools. The curriculum in these schools depends on the seasons. Children attend five days a week for 8 hours. In winter, they learn how to keep warm in the snow. In the spring, they learn the names of trees and plants. In summer, they learn about birds and animals. In the fall, they learn about changing foliage and animals' hibernation. When formal school starts at age seven, teachers in local public schools found that forest school children are more socially skilled and prepared to learn than children from conventional schools (Sobel, 2015).

Waldorf education, often referred to as Steiner education,

is a holistic education philosophy that initially started in Germany in 1919. A century after the first establishment of a Waldorf school, it led to the largest independent school movement in the world opening in more than 75 countries (Daskolia & Koukouzeli, 2023). The first Waldorf school in the United States was established in New York City in 1928. Aesthetics hold a special place within Waldorf education. Educators firmly believe that beauty in nature and the classroom environment teaches children respect, gratitude, and harmony, fostering an appreciation for the world around them. Music, storytelling, and dancing are the cornerstone activities in Waldorf education, contributing to a well-rounded and holistic approach to learning that nurtures creativity and a love for the arts (Easton, 1997). In Waldorf education, the pedagogical approach for children from birth to 7 years old emphasizes experiential activities and imaginative play. This includes activities such as free play, drawing, and singing, which are essential to nurturing young minds. One

distinctive aspect of Waldorf teaching is the "block teaching" method, which involves engaging students in a specific topic for an extended period, typically lasting 3 to 6 weeks. Importantly, this approach avoids traditional textbooks; instead, children create their textbooks through different activities, fostering a deeper understanding and connection with the subject matter. Waldorf education uses the power of storytelling as an educational tool, encouraging free thinking and stimulating young imaginations. Stories play an important role in delivering and retaining information, enhancing the learning experience. An outdoor environment is a key aspect of Waldorf's educational philosophy and it is usually intentionally designed to aid students learning. Teachers often describe it as "another type of classroom" or a "learning space" offering children unique opportunities for exploration and discovery. Collaboration and participation are promoted through daily "circle time" sessions. During these gatherings, students can discuss whatever is on their minds, fostering

open communication and a sense of community within the classroom. Furthermore, sustainability is actively embraced in the pedagogy and daily routines of Waldorf schools. Some schools have taken steps to collect rainwater, which helps with more environmentally friendly building operations. Green spaces, including vegetable gardens, are thoughtfully transformed into learning spaces, further emphasizing the importance of sustainability (Daskolia & Koukouzeli, 2023).

Case Study

In a Waldorf school in Charlottesville, Virginia, the educational program and classroom components reflect the core principles of Waldorf education, prioritizing a holistic and nature-centric approach to learning. The classrooms at the school provide a space for creative playtime, where children can use furniture to play, act out stories, or play with puppets. Outdoor experiences are integral to the Waldorf philosophy. Children can spend time outdoors in the playground or the woodlands. These

outdoor activities allow children to connect with nature, develop physical skills, and appreciate the environment. All toys and materials within the classroom are made of natural materials such as silk, cotton, wood, and feathers. Even art supplies are crafted from natural elements, including beeswax crayons and naturally pigmented paints. One of the distinctive features of Waldorf classrooms is their cozy, home-like environment. Classrooms are designed to create a warm and welcoming environment where children feel comfortable and secure. In a Waldorf school, storytelling is essential to the everyday curriculum (Charlottesville Waldorf School, 2023). These elements illustrate the Waldorf educational philosophy, emphasizing the pivotal role of children in their learning process, nurturing a profound bond with the natural world, and recognizing the significance of natural materials and experiences in shaping well-rounded individuals.

Nature-based education during the COVID-19 Pandemic

The COVID-19 pandemic has increased attention to nature-based learning from parents and the press. With remote learning during the pandemic, families began recognizing the importance of outdoor education. Moreover, 80% of nature schools increased the time spent outdoors after the pandemic due to high demand (Prochner, 2021).

Effects of Nature on Children

The impact of nature on children extends to both physical and psychological well-being. Studies in Norway and Sweden found preschool children who played outdoors among nature and uneven grounds, compared to children who played on typical flat playgrounds, have better motor fitness (Louv, 2008). Spending time exercising outdoors increases bone and muscle development and helps combat

obesity. Additionally, being outside regularly can establish neural pathways in children's brain as a response to repetition of the activity. When kids do something repeatedly, like playing outside and staying active, their brains create pathways to make it a normal part of who they are. These pathways get stronger with practice, so the more they play outside, the more they want to keep doing it. It is easier to build these healthy habits when kids are young because their brains are more adaptable. As we age, it is still possible to change habits, but it takes more time and effort. So, it is better to help kids be healthy and active when they are young and create strong habits for life. (Knight, 2016). Unstructured, imaginative, exploratory playtime is crucial for child development, as it allows children to engage freely and creatively. Experiences in nature have been shown to reduce stressors that contribute

to childhood depression and anxiety. Additionally, green spaces provide opportunities for social interaction, offering essential social support for children. Furthermore, Nature has a calming and relaxing effect, enhancing a child's mental well-being. Studies suggest that green spaces can significantly reduce symptoms in children diagnosed with ADHD by improving cognitive abilities and enhancing resilience to stress and depression (Louv, 2008). Besides the benefits on children's physical and emotional development, nature can help them adapt to challenging circumstances. In nature, children often encounter unpredictable change that challenges their sensory system, which teaches them flexibility and problem-solving responses. Children experience pleasure and enthusiasm and sometimes danger and even fear, which makes them adapt more quickly in the future. Moreover, research shows that children can develop a sense of independence, self-esteem, and self-sufficiency, which are important factors in resilience when

exploring nearby natural environments. Exploring nature independently builds a sense of autonomy, contributing to their self-esteem (Ungar, 2005). Experiencing nature with the five senses, including visual, tactile, auditory, and olfactory experiences, is important for child development (Park & Hyo, 2019)

The Impact of Early Exposure to Nature on Environmental Values and Attitudes

Nature-deficit disorder is the idea that children nowadays are spending less time outdoors and in natural settings compared to the past, leading to various behavioral problems (Louv, 2008). The decline in children's connection to nature is attributable to decreased outdoor activities, the increased use of computers and electronic devices indoors, and reliance on cars for school commutes (Park & Hyo, 2019). Failure to offer children the opportunity to connect with nature during their early years may lead to biophobia or a dislike of nature. The term "biophobia" refers to a broad

spectrum of emotions, from discomfort in natural environments to aversion to anything that is not man-made or air-conditioned (Russo & Andreucci, 2023). Furthermore, early exposure to nature greatly influences environmental values and attitudes in adulthood. Early experiences in nature and gardening foster a deeper appreciation of the environment and encourage sustainable practices (Blair, 2009b).

Designing a Nature-Centric Preschool

Indoor:

The "Biophilia Hypothesis" by Edward O. Wilson suggests that humans are genetically attracted to nature. Wilson believes that humans need a connection with nature and other forms of life to survive and enhance emotional and physical well-being (Ungar, 2005). Kellert proposed six design elements of biophilic design, which all combined have 70 attributes. The first element, environmental features, incorporates components like color, water, light, and the presence of animals. The second element is natural shapes

and forms, drawing inspiration from botanical motifs, shells, and spirals. The third element, natural patterns, and processes, focus on sensory variabilities, central focal points, and transitional spaces. Light and space, the fourth element, utilize natural and reflected light. The fifth element, place-based relationships, establishes connections through landscape orientation and incorporating indigenous materials. Finally, the sixth element, human-nature relationships, evokes feelings of security, protection, or exploration and discovery within the designed environment (Heerwagen et al., 2013). These elements and their associated attributes connect the built world with the natural world, fostering a biophilic design that resonates with human nature. Designing a nature-centric preschool environment necessitates careful consideration of several aspects. Indoor spaces should seamlessly integrate biophilic elements. Natural materials, lighting, and greenery enhance learning through hands-on activities, stimulating curiosity and creativity (Van den Bogerd

et al., 2023). Design elements mirroring natural patterns and sensory experiences, such as sand, gravel, water, and green pathways, help children connect with their surroundings. Views of the natural ecosystems from within the classroom are also crucial as they promote concentration and enable children to observe changes in climate and the environment (Park & Hyo, 2019). According to the National Research Council 2007, classroom lighting is a critical factor influencing various aspects of children's educational experiences. Research has shown that classroom lighting can significantly impact students' performance on tests, attendance, and behavior. This influence is attributed to its ability to affect the circadian systems, the internal biological clock rhythms that regulate our daily patterns. Studies indicate that to maintain the

alignment of this internal biological clock rhythm, students must be exposed to short-wavelength light in the morning. Implementing this lighting requirement may involve the installation of features like windows, skylights, or light fixtures designed to mimic the qualities of natural light, creating an environment conducive to better learning, improved attendance, and enhanced behavior among students. Play spaces are equally vital in a nature-centric preschool. Small-scale environments, such as closets, corners, and beneath tables and stairs, are frequently used by children for imaginative play. These small, enclosed spaces offer seclusion, exploration, and imagination, all essential for cognitive development.

Outdoor:

Through small-scale modeling, children could understand the large-scale world, such as how cities are laid out or how water flows down slopes. These small-

scale environments provide a safe base for learning before moving into more complicated social worlds (Chawla, 2015). In addition, outdoor green spaces, including vegetable gardens and green schoolyards, play an instrumental role in fostering physical activity. They also serve as outdoor classrooms for teaching about ecosystems, biodiversity, and conservation, promoting environmental awareness. Gardens, in particular, enhance ecological complexity, supporting experiential learning in science, food, and environmental education (Blair, 2009).

Teachers' interview questions and answers

This research involved the participation of preschool teachers to gather insights into their methodologies and experience concerning nature-centric preschool education. Two teachers contributed valuable responses to ten questions designed to view their professional backgrounds and viewpoints. Both teachers emphasized the importance of unstructured, imaginative, exploratory

play in natural surroundings and its positive influence on child development. For instance, activities such as building forts using natural materials, engaging in unstructured art projects inspired by the outdoors, or simply allowing children to explore and interact freely with the natural environment were cited. The discussion extended to the advantages of physical well-being derived from outdoor engagement and insights into how nature-centric education contributes to psychological well-being, emotional development, and cognitive growth. Additionally, one of the teachers provided specific strategies for integrating elements of nature into the teaching environment, emphasizing the role of exposure to natural light and its potential impacts on students' performance and behavior. Both teachers also showed an appreciation for nature and environmental values by actively pursuing a range of activities and practices. Hands-on activities like planting and maintaining a classroom garden, recycling projects, nature-themed storytelling, and art activities inspired by nature were also

implemented. The interviews concluded with the teachers' perspective on the enduring effects of early exposure to nature during preschool years on children's environmental attitudes and behaviors.

Conclusion:

In conclusion, this research investigated nature-focused kindergartens like Waldorf and nature-based schools and how they affect children. The research explored the history and important parts of these teaching methods, highlighting how nature is crucial for young children's learning. The research also emphasized how being in nature can help children physically and mentally, especially when they have outdoor free, imaginative play. The research also mentioned the important things to consider when creating nature-focused preschools, like using nature-inspired design and making sure there's enough natural light. The findings also examined commonalities between Waldorf and nature-based schools, showing a shared commitment to holistic development

through the integration of nature. Both educational models prioritize experiential learning, creativity, and an appreciation for the natural world. The physical benefits of nature, including improved motor fitness and neural development, were highlighted, along with the psychological advantages, such as stress reduction and enhanced cognitive abilities. As identified in the research, the key elements in nature-centric preschool design encompass biophilic elements, ecological experiences, and consideration for physical and psychological well-being. Insights from teacher interviews provided firsthand experience of the importance of unstructured play, strategies for incorporating nature into the learning environment, and how early exposure to nature can positively impact children's environmental attitudes.

PRECEDENT STUDIES

YueCheng Courtyard Kindergarten
Architects: MAD Architects
Year: 2020
Location: Beijing, China

This kindergarten is built between ancient trees and an old building. The design features a colorful floating roof that protects the existing building and trees. There are three courtyards that embrace the view of nature.

I have chosen to study this project because it incorporates three key components of biophilic design:

- Place-based relationships through landscape orientation and features.
- Human-nature relationships through protecting old trees and promoting children's outdoor play and exploration.
- Natural patterns and processes through transitional spaces.



Cucinella's nursery in Guastalla
Architects: Mario Cucinella Architects
Year: 2015
Location: Guastalla, Italy

This nursery is designed to educate children about play and creativity, the need to respect nature, and the importance of eco-sustainability. Some of key components of the biophilic design that the project includes are:

- Environmental features using natural materials.
- Light and space through natural light
- Natural shapes and forms through curves.



PROGRAMMATIC PRECEDENTS

Project name: Slate School
Design firm: Patriquin Architects
Location: North Haven, USA
Year built: 2018
Square footage: 6,925 sq.ft.

I chose this school primarily because of its nature-based learning environment, where the outdoor space seamlessly extends and enriches the learning experience. In addition, similar to my project, this school has four mixed-age classrooms.

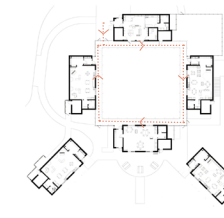
Moreover, the school's design strategies address crucial elements of my project, including solar orientation and the abundant provision of natural daylight. These considerations are important in creating a learning environment that is energy-efficient, sustainable, and beneficial to student well-being.

Furthermore, the commitment to using natural materials that are free from toxins and harmful chemicals aligns with my project. This ensures not only the safety of the students and staff but also aligns with the school's broader ethos of sustainability and environmental responsibility.

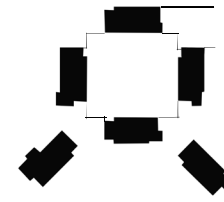
- space/quantity:**
- reception/1
 - library/1
 - office/2
 - vestibule/1
 - courtyard/1
 - playground/1
 - mixed-age classrooms/4
 - multipurpose classroom/1
 - restrooms/6
 - mechanical room/1
 - garden/1



Circulation



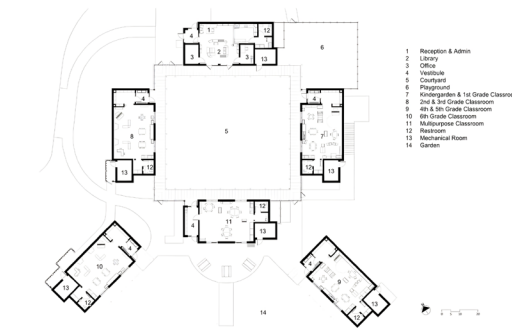
Solid/ void



Students/staff only



Floor plan

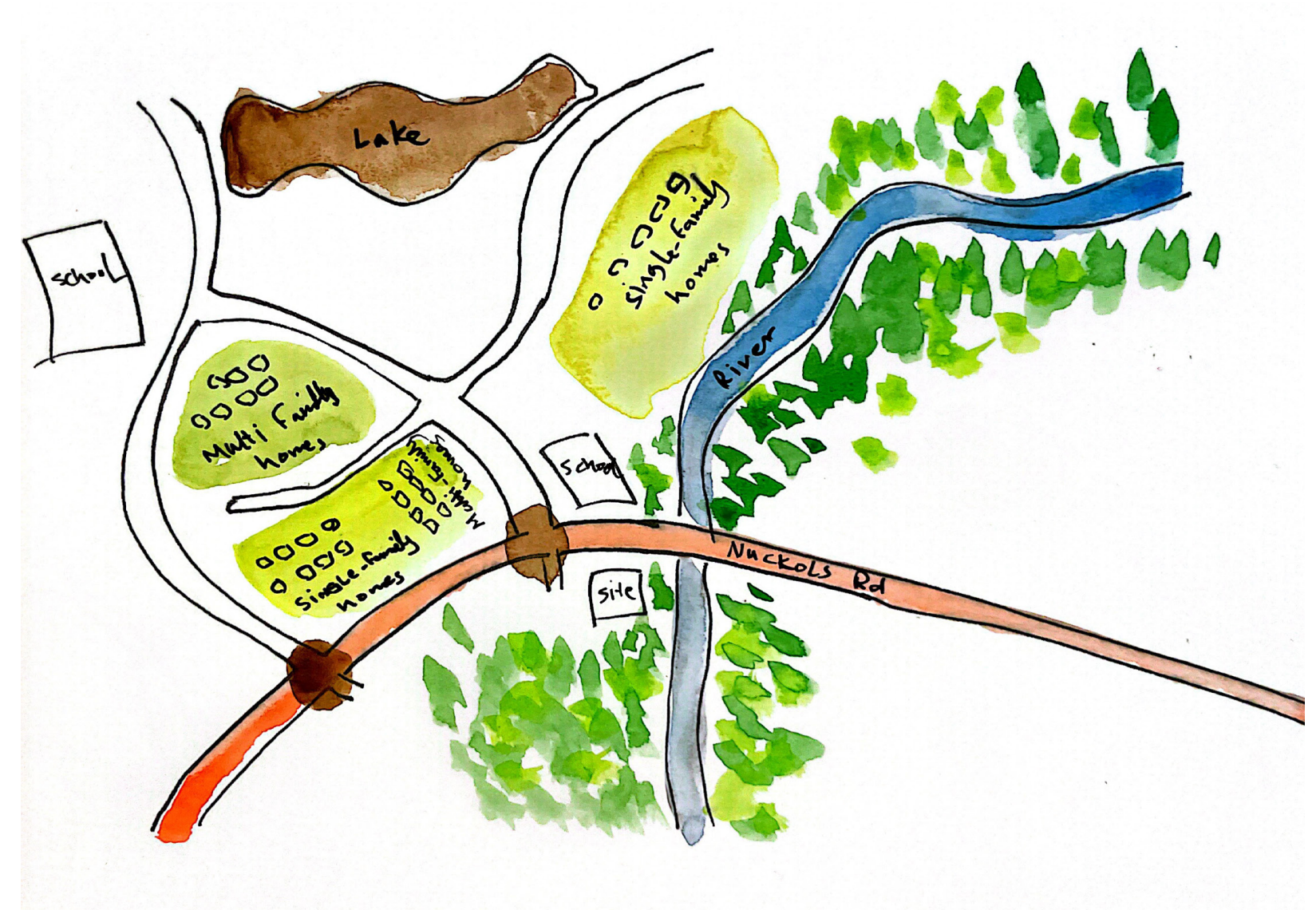


I've been considering incorporating a vestibule into each of my classrooms, similar to what this school has done. This space could serve multiple purposes such as coat hangers, a place for dirty shoes from outdoor activities, and each classroom is also equipped with its own restroom.

SITE CONTEXT

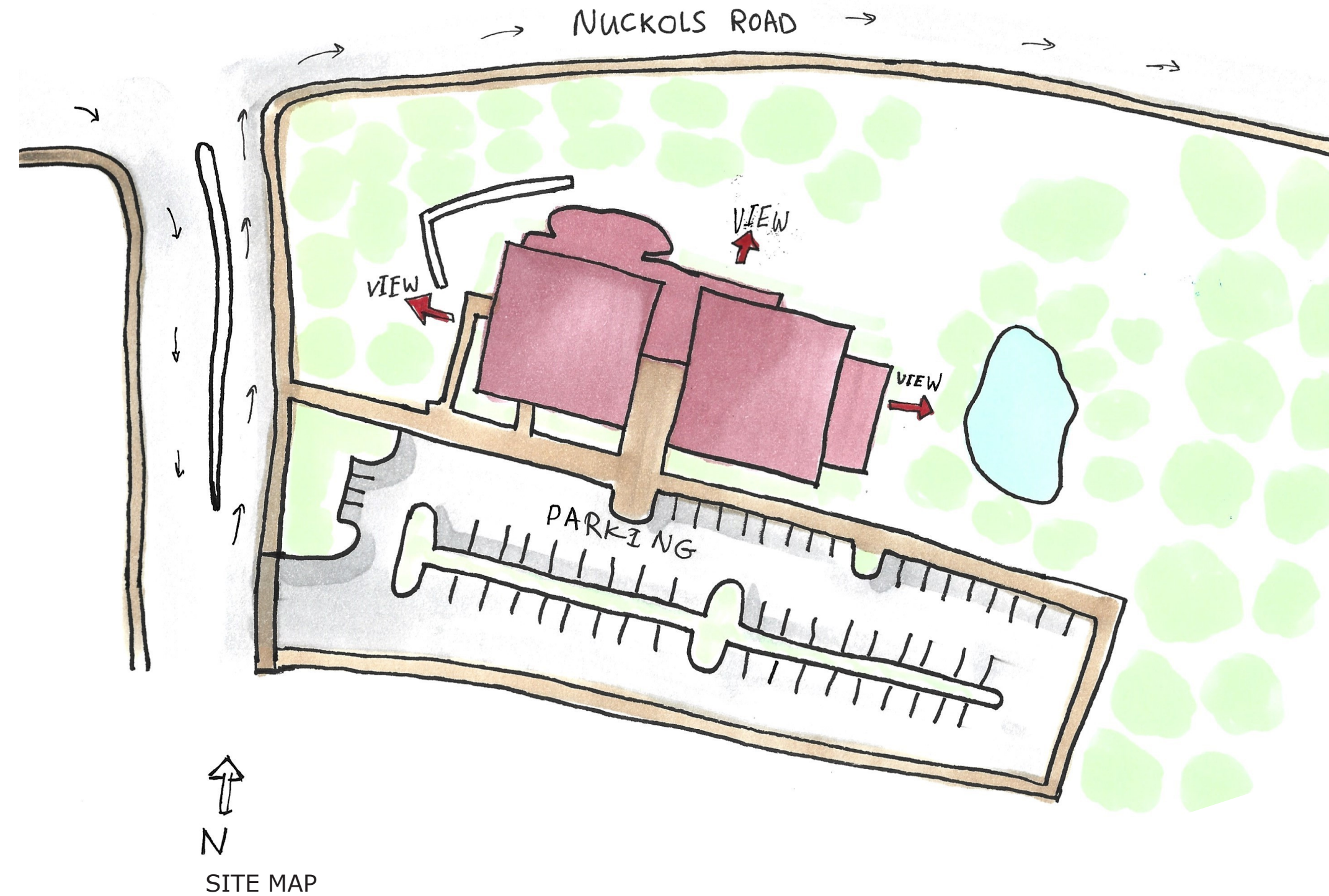
NEIGHBORHOOD HISTORY

The neighborhood has a mixture of single- and multi-family homes built in 2000 or more recently. Chickahominy River runs through the neighborhood, with trees along its banks creating an important ecological asset and a natural habitat. The building is located on the main road, which is Nuckols Road. Nuckols Road is considered the main entry path to the neighborhood, with many commercial establishments built along it, including shops, restaurants, office buildings, and health facilities. The neighborhood also has an elementary school, a middle school, and a preschool.



BUILDING HISTORY

debartoloarchitects firm designed the building, and it was built in 2003 as a community church with a Sunday school. The building has modern architecture features. The building's primary exterior material is brick. Translucent glazing and aluminum storefront glazing are also used. A channel glass wall system uniquely shapes the restrooms in the back of the building.



PHOTOGRAPHIC STUDIES

EXTERIOR PHOTOS



North facade with view to the parking lot



Patio on the east side of the building



South side of the building

INTERIOR PHOTOS



The church auditorium - east side of the building



Natural light coming from the corridor on the south side of the building



View into the restrooms

SUN STUDY AND SITE MAP



- MAIN ROAD
- GREEN SPACE
- WATER
- EDUCATIONAL INSTITUTION
- PEDESTRIAN PATH
- PROJECT SITE

SHADOW STUDY

Summer

8 am



10 am



2 Pm



Winter

8 am



10 am

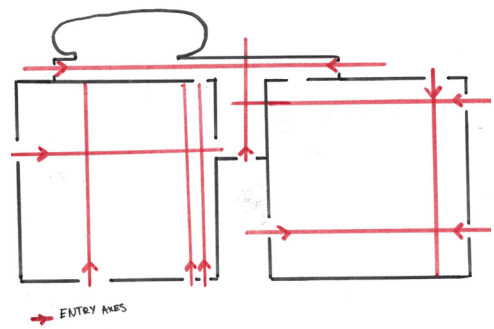


2 Pm

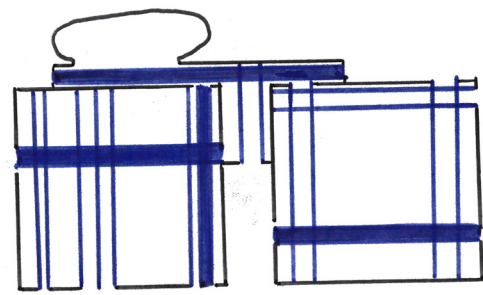


PARTI DIAGRAMS

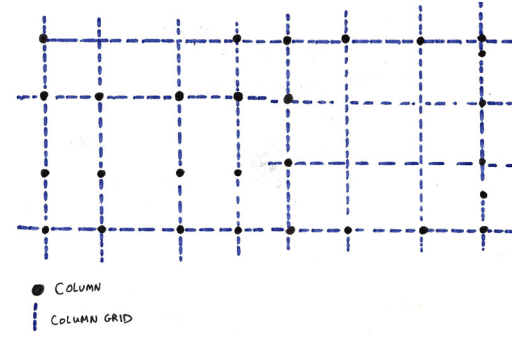
entry axes



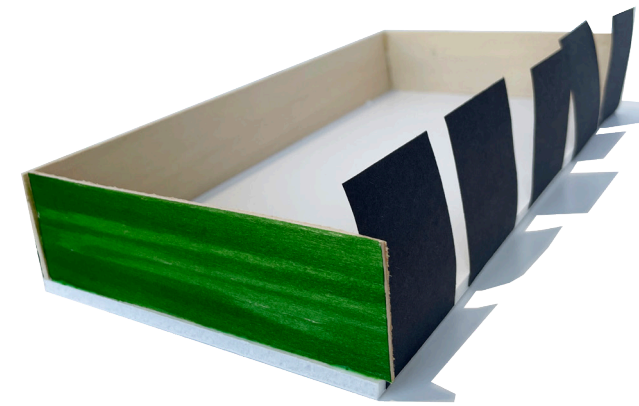
fenestration patterns



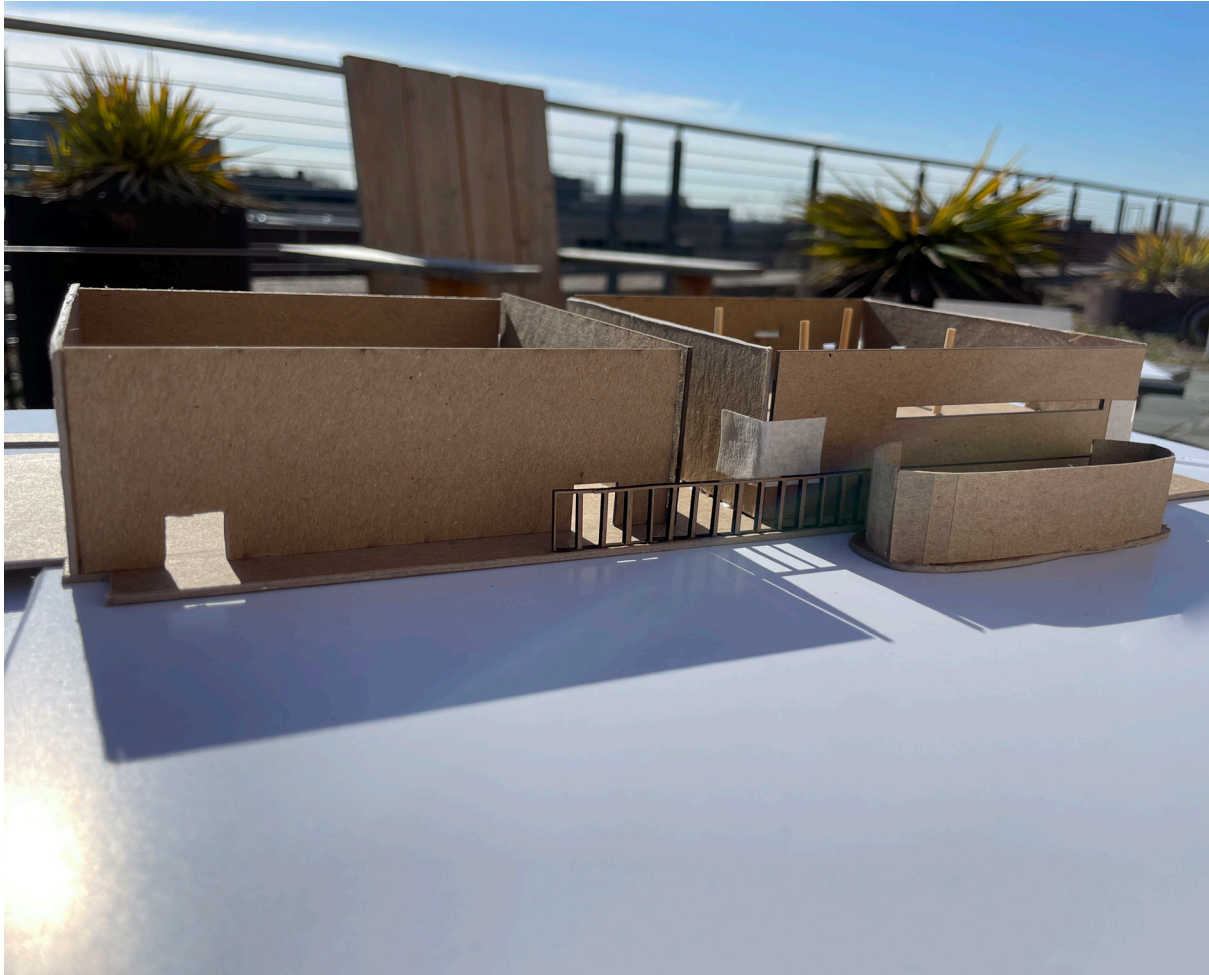
structural grid



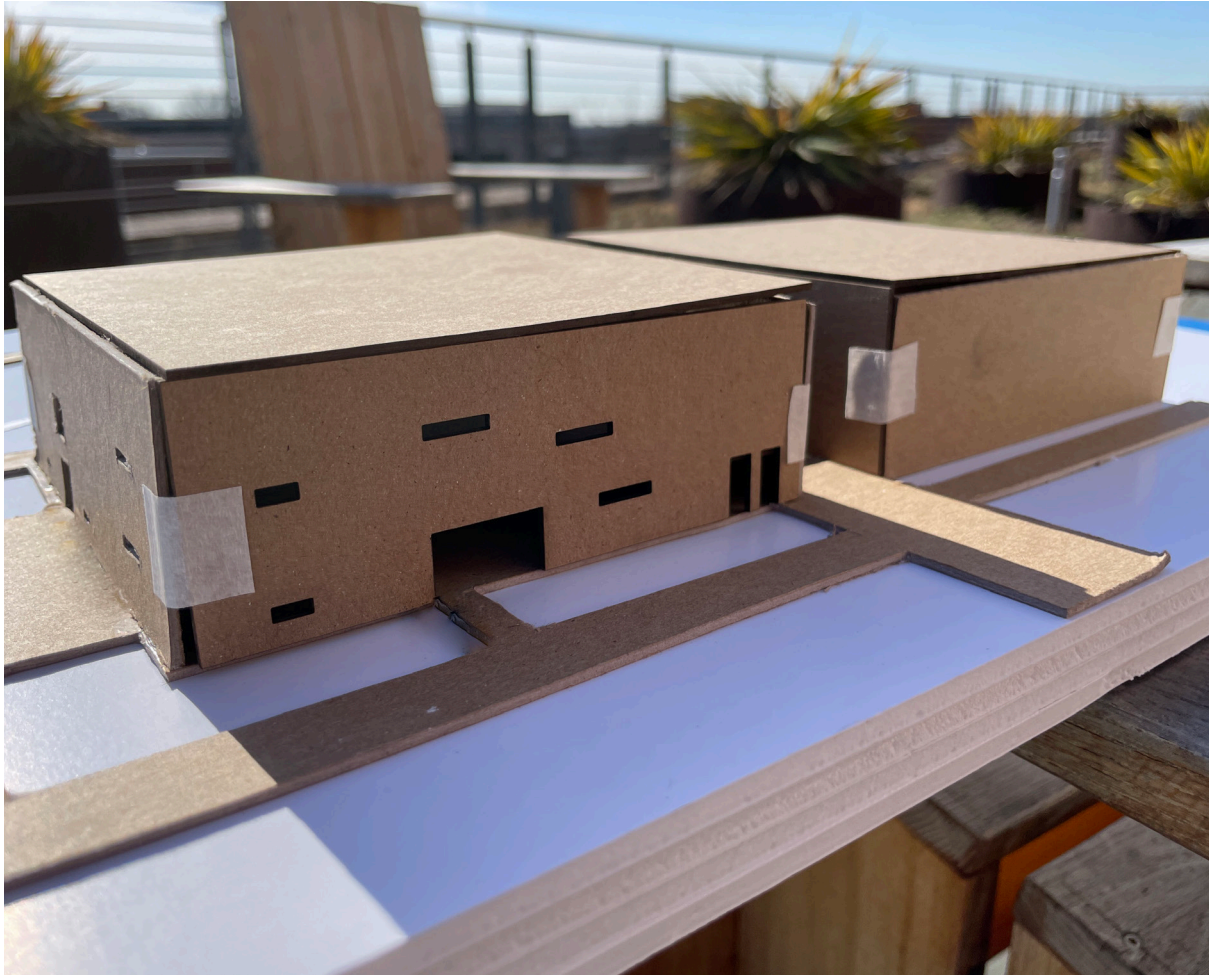
PARTI MODELS



WORKING SITE MODEL



South facade facing Nuckols Rd



North facade of the building facing the parking lot

CONCEPT

CONCEPT STATEMENT

Sand dunes symbolize the dynamic journey of children navigating their early years. Just as sand dunes shift over time, so do the children, forever in a moving state exploring their surroundings. By embracing change and movement, I aspire to infuse our learning environment with the vital traits inherent in nature, nurturing the holistic development of our children.

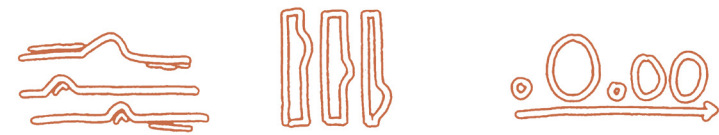
CHAIN / SEQUENCE



REFLECTION



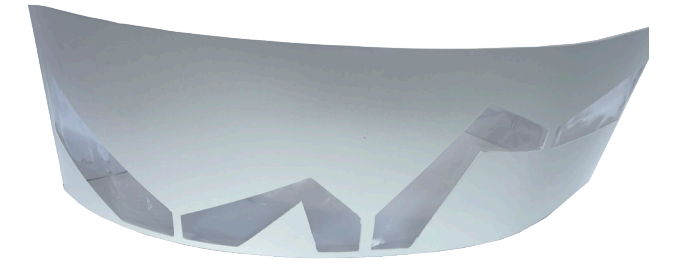
CHANGE



CONCEPT MODELS



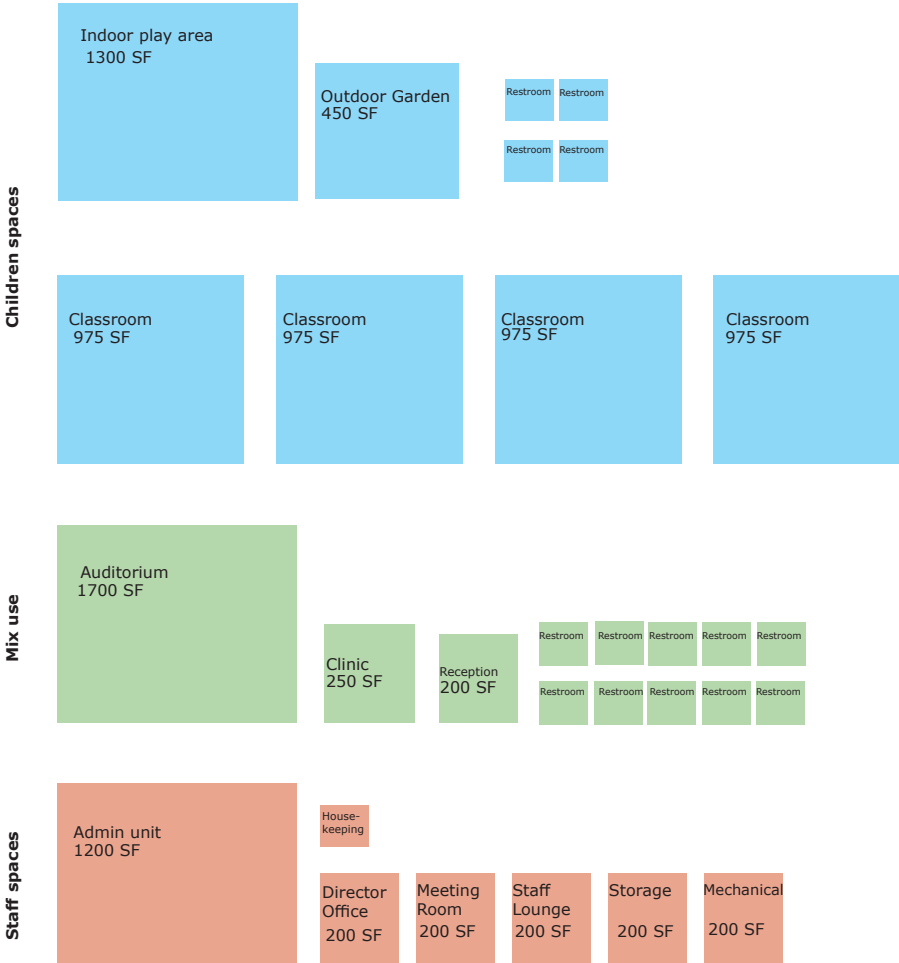
Concept models exploring movement, change, and reflection



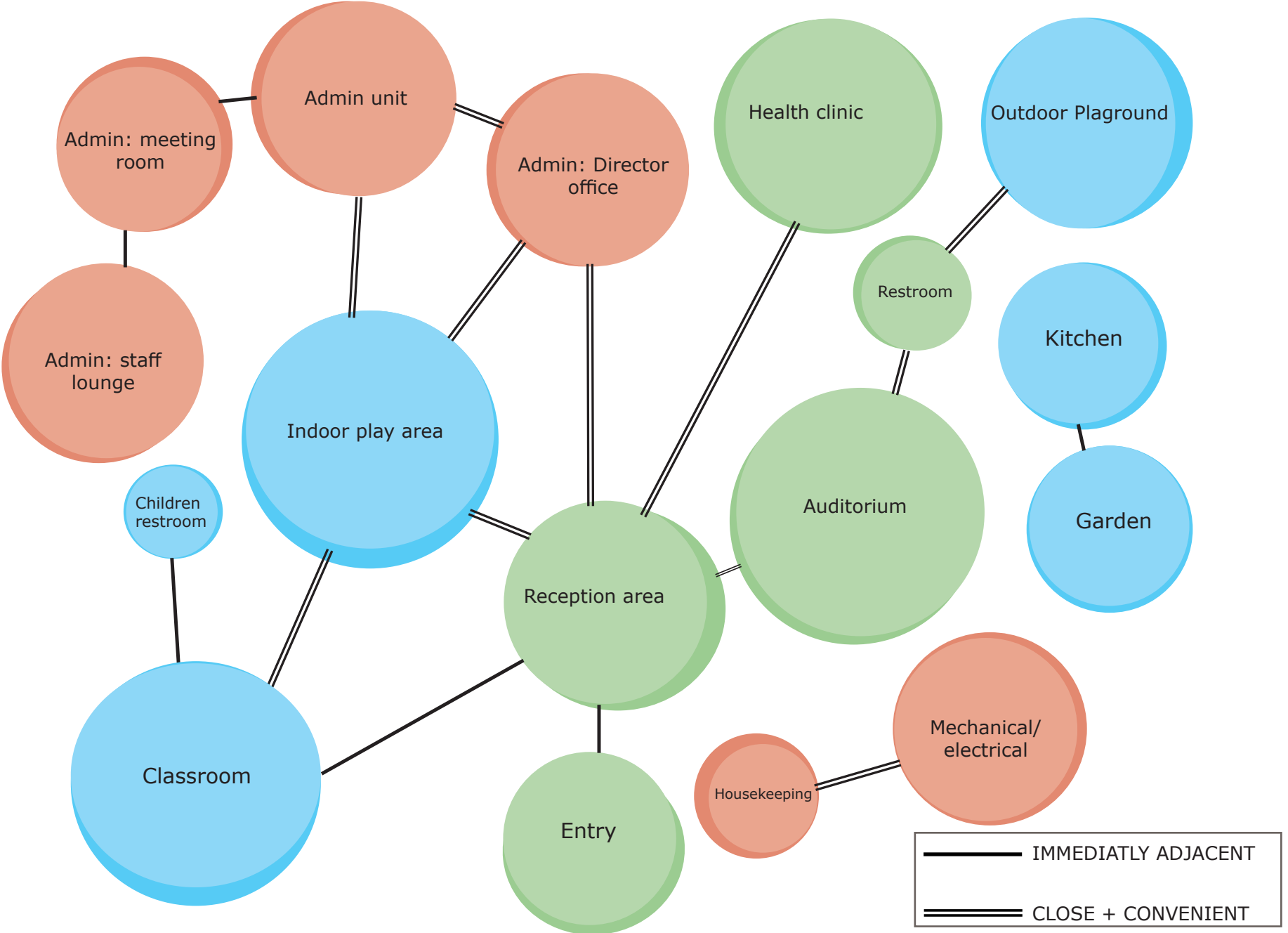
SCHEMATIC DESIGN

PROGRAMMING VISUALIZATION

Building Gross Area 14694 SF
 Total net programmed area 8937 SF



ADJACENCY STUDIES- Bubble Diagram



ADJACENCY MATRIX

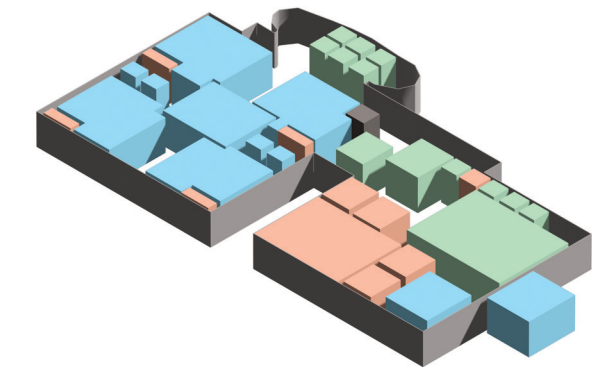
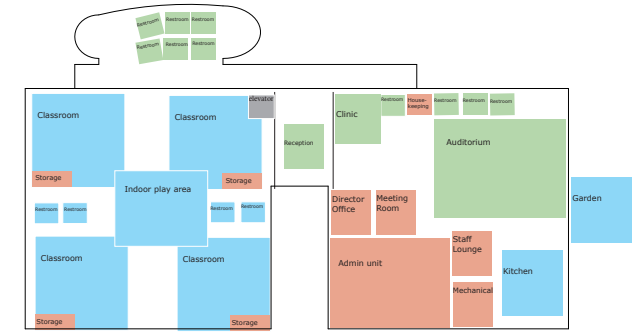
	Area	Quantity	Visual Privacy	Security	Plumbing	Purpose and description
Classroom	975	4	L	L	Y	A mixed-age classrooms that provide an environment that feels like home. The classrooms should have large windows that have nature views.
Reception area	200	1	L	H	N	A designated place to greet each child upon arrival at the school and oversee each child's departure from the school. Also parents, gaurdians or visitors can check-in, ask questions, and recieve information.
outdoor garden	450	1	L	L	Y	An outdoor garden that is connected to each classroom.
Indoor play area	1300	1	L	L	N	A designated space within the school where children can engage in physical play and social interactions.
Health clinic	250	1	H	L	Y	A separate space designated for children who are ill or injured.
Auditorium	1700	1	L	L	N	A dedicated space designed for various events and festival celebrations.
Outdoor playground	1700	1	L	H	Y	A designated space outdoors where children can engage in physical play and social interactions.
Admin: Director office	200	1	H	H	N	An office for administrative tasks, meeting with parents, and communication within the school.
Admin unit	1200	1	M	H	N	In these offices, Assistant Directors handle tasks such as enrollment, student records, attendance, and communication with parents.
Admin: meeting room	200	1	M	L	N	A meeting area where staff can collaborate or discuss tasks.
Admin: staff lounge	200	1	M	L	Y	A space for staff to take breaks or have lunch
Children restroom	56	4	H	L	Y	An enclosed space that have child size toilets and low sinks
Restroom	56	10	H	L	Y	General restrooms
Housekeeping	56	1	L	H	Y	A space that serve as storage areas for cleaning supplies, maintenance tools, and equipment used by the school's staff.
storage	200	1	L	H	N	A dedicated space designed for general storage (school supplies, party cutlery, events decoration,...)
Mechanical/electrical	200	1	L	H	N	A place where the mechanical and electrical systems are placed and managed.

Legend

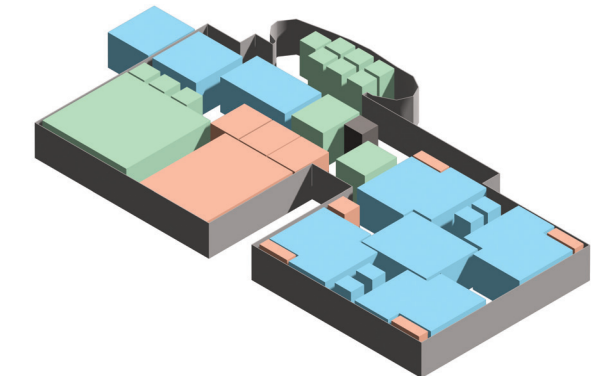
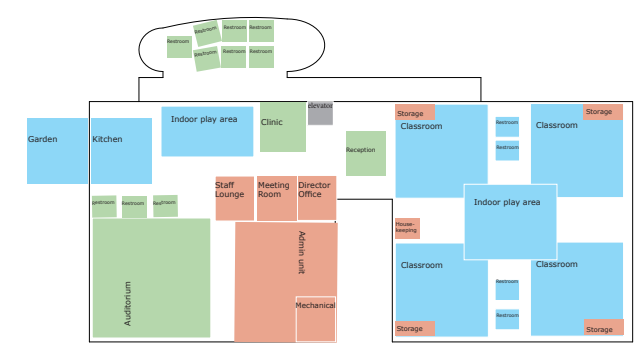
H High ● High ■ Children space
L Low ● Medium ■ Staff space
Y Yes ○ Low ■ Mix use
N NO

SPACE PLANNING

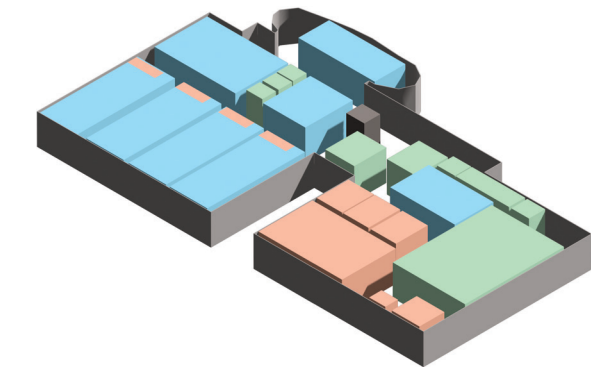
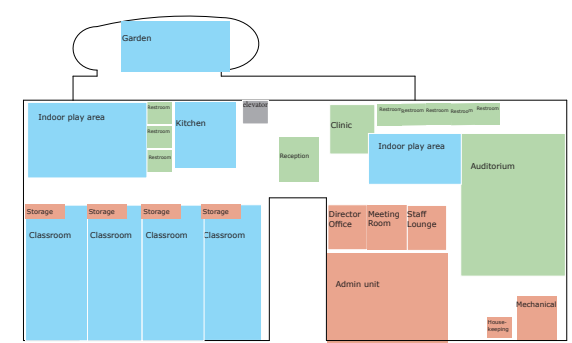
Scheme 1



Scheme 2

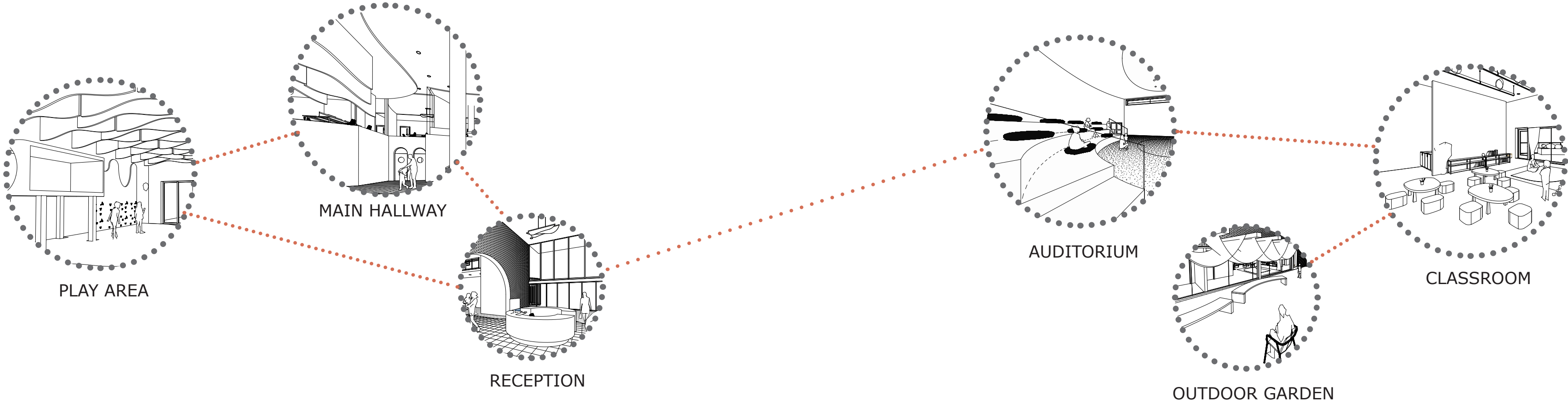


Scheme 3

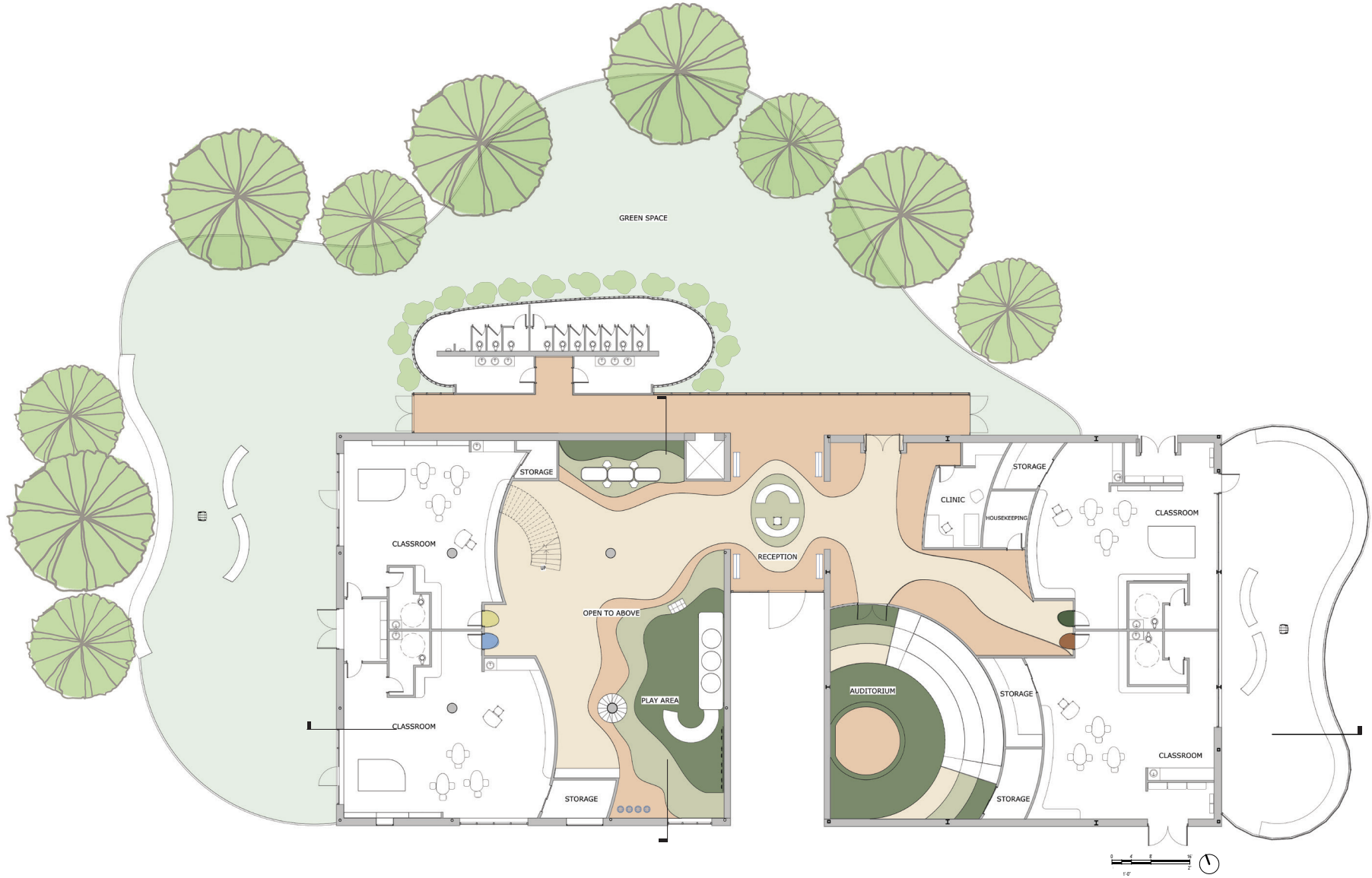


DESIGN SOLUTION

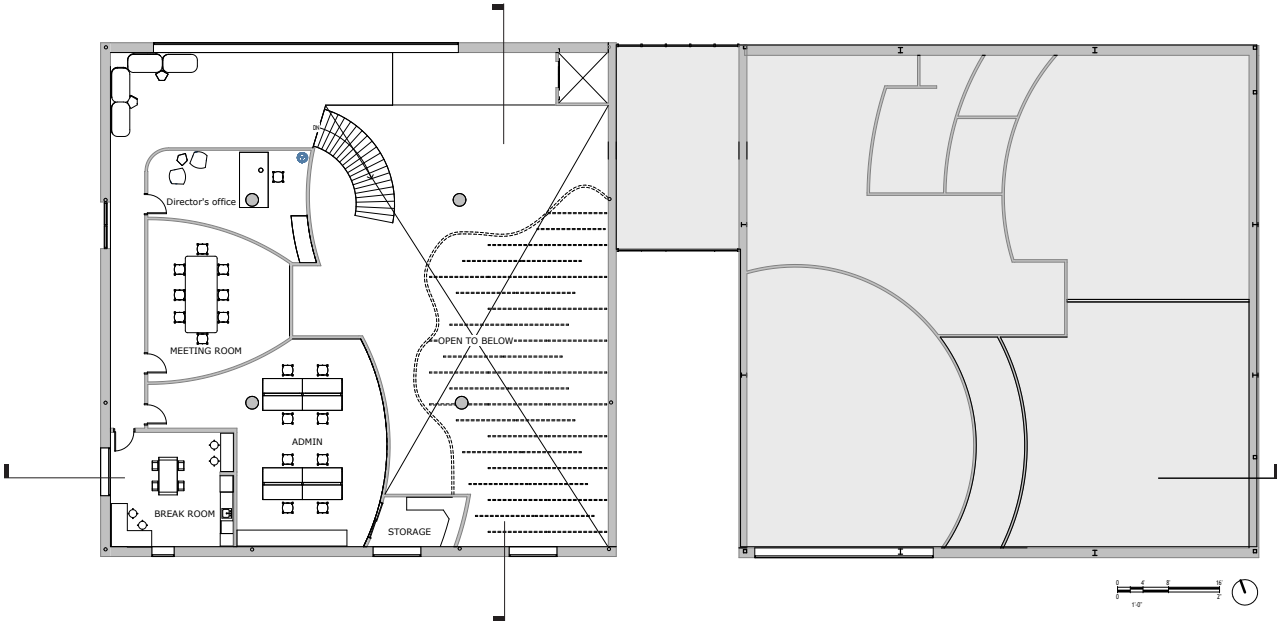
CONCEPTUAL SPACES



FLOOR PLANS

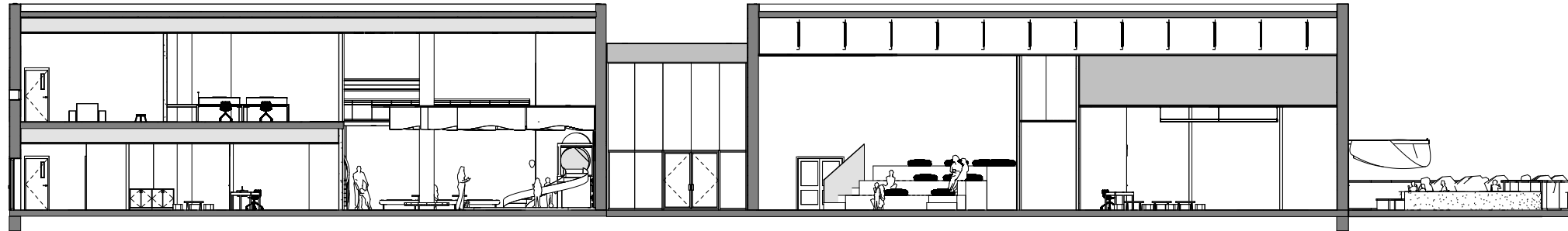


FIRST FLOOR

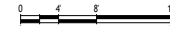


MEZZANINE LEVEL

SECTIONS



LONGITUDINAL SECTION



TRANSVERSE SECTION

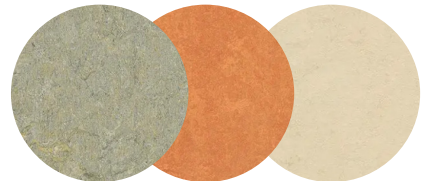




Split Bench by reply furniture



Ribbon wave light by light art



Linoleum flooring

Recycled Plywood
The custom made reception desk is made of recycled plywood which is collected from local cabinet shops. Plywood is a strong, durable material.



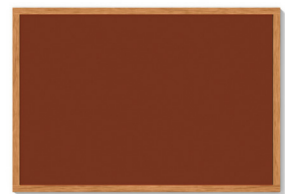
MAIN HALLWAY



The color scheme draws inspiration from a photograph of sand dunes during sunset, reflecting textures and color variations found in sand dunes. Additionally, the green color represents the vegetation complementing the topography of sand dunes and contributing to their formation.



Bayou Ottoman
by zenith



Burlap Bulletin Board
by polyvision



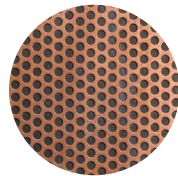
Oak wood-white
Sourced locally from the
RVA urban wood group,
an initiative that helps
use wasted wood.



Turn Stool
by Blutot



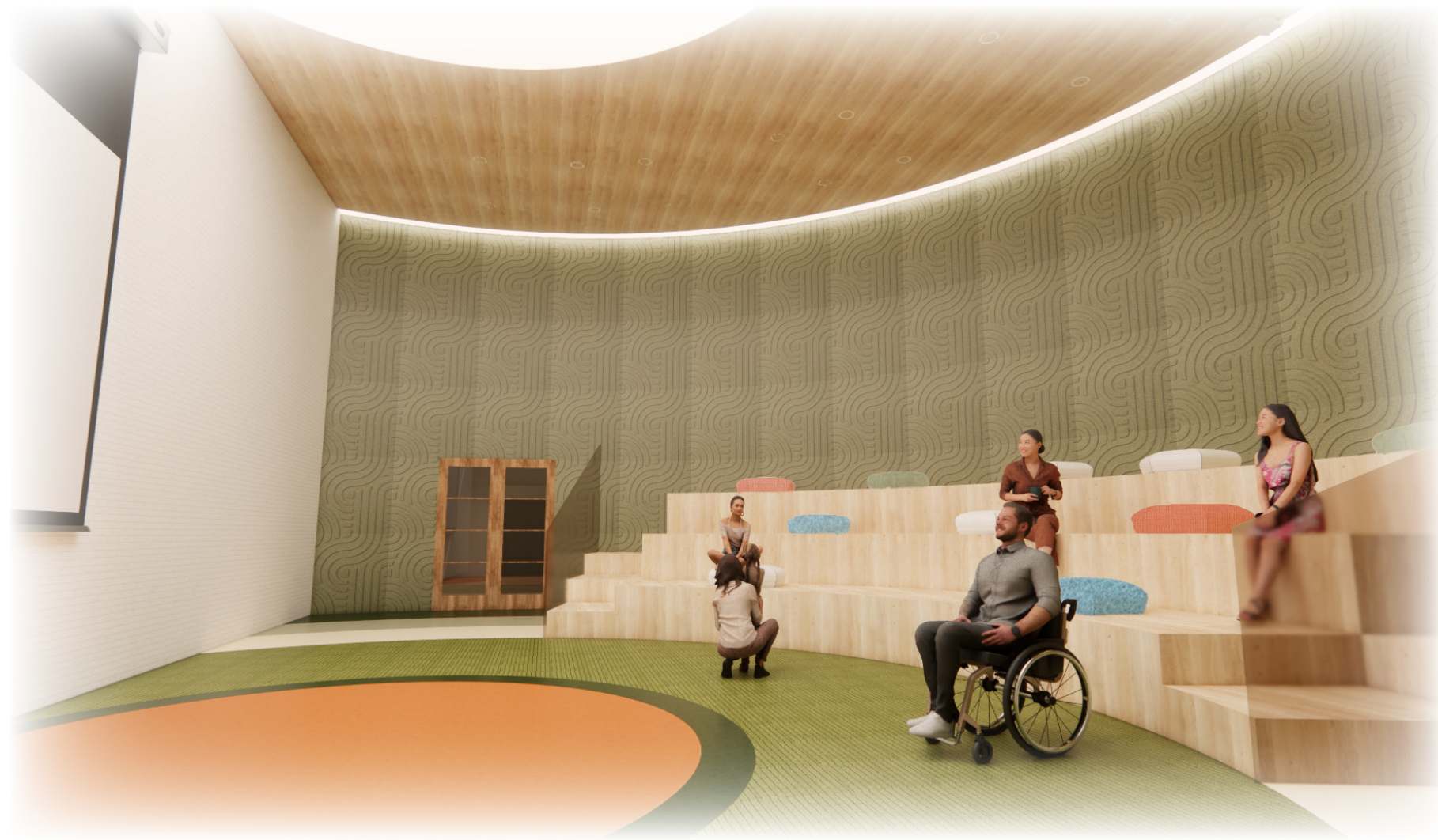
Napa
wallcovering



Perforated
aluminum

The play equipment is designed to mimic natural movements that nature provides us, offering children a range of physical and mental benefits.

AUDITORIUM



Wool Carpet
by J Mish



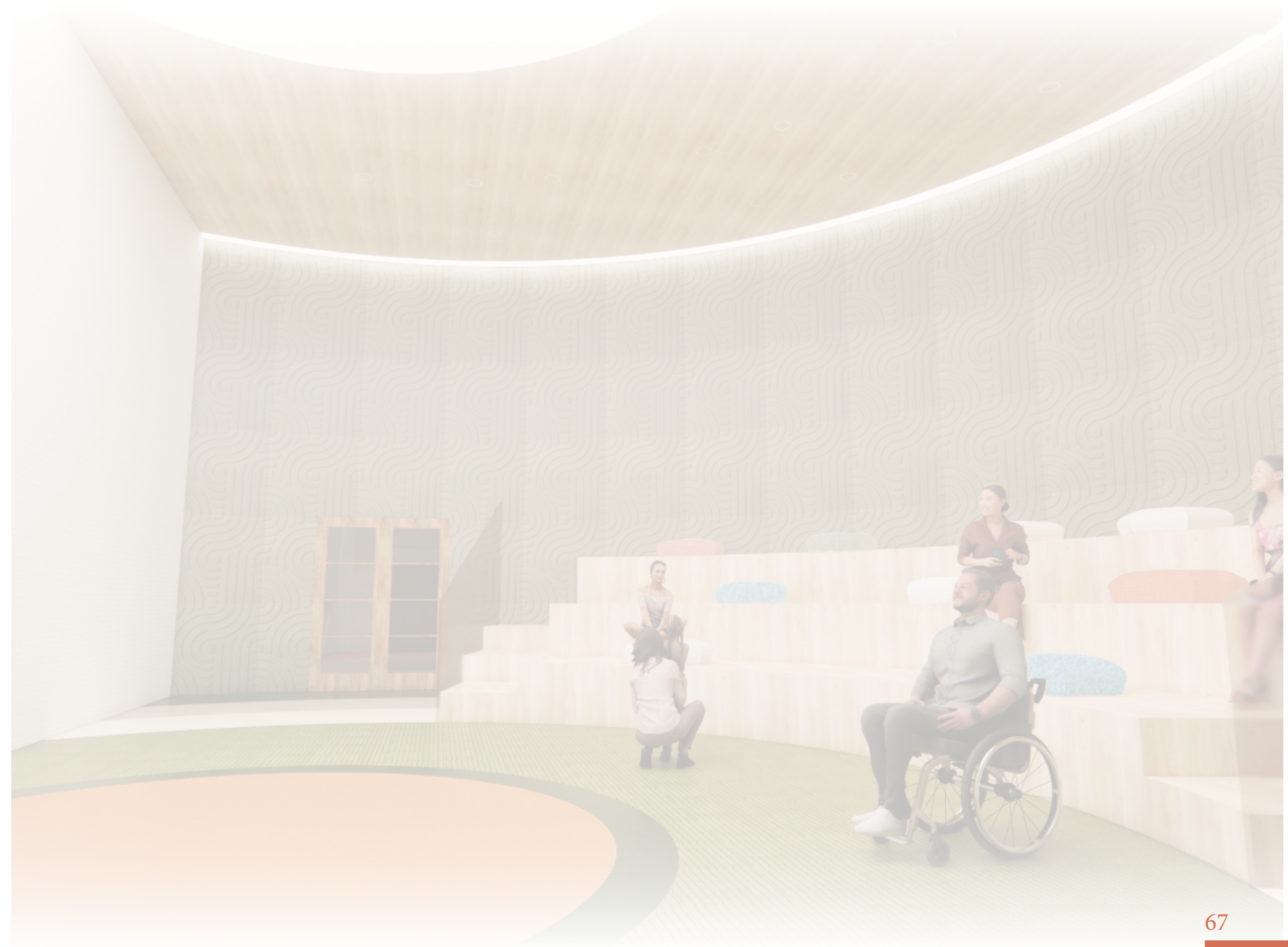
Cork strips
by muratto



Oak wood



Poppy Low Pouf
by fogia



Abundant natural light is important in classrooms. This will reduce the need for artificial lighting during the day. To regulate temperature and further conserve energy, curtains will be installed to control the amount of sunlight entering the classrooms, especially during peak daylight hours.



Relevo Rug by Muuto



Glow direct by lightly



Ouija table
reply furniture



stools are costume
made inspired by Riva
1920 Amedea Stool



Oak wood

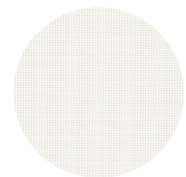


Glass Pebble
Mosaic Tile by
Mineral tiles

OUTDOOR GARDEN



Children here can connect with nature, learn about plant life cycles, and understand where food comes from. This can be done through planting, watering, and harvesting fruits, vegetables, and herbs. Children engaging in gardening tasks in the outdoor garden also promote physical health and a strong connection to nature.



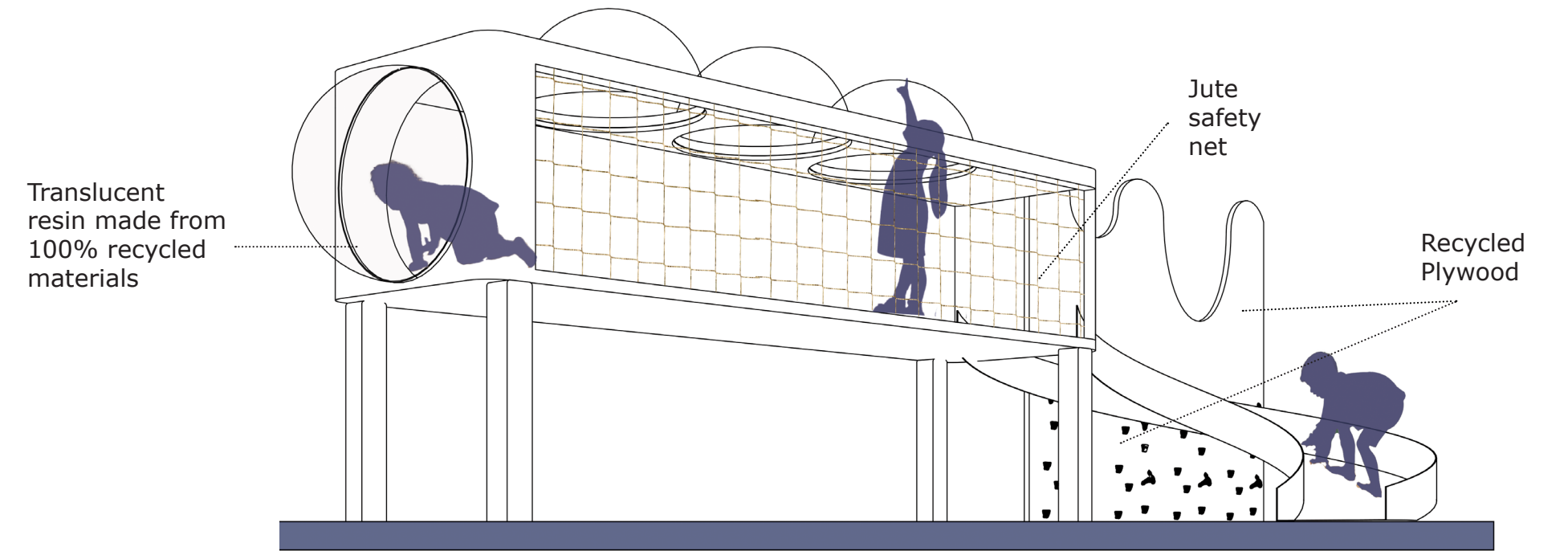
Soltis® Harmony
88 canopy cover



Oak wood

DETAIL DRAWING

Climbing panels offer opportunities that simulate climbing natural elements like trees or rocks, fostering physical strength, balance, and coordination in a fun and engaging way.



FINAL DELIVERABLES

FINAL BOARD

DUNE DYNAMICS A NATURE-BASED PRESCHOOL



REFLECTION

I have just completed a two-year journey of studying for an MFA in interior design, which has been an incredible experience. Today marked the result of my studies as I defended my final thesis, which was the highlight of my academic journey. I stood before my six professors during the defense, I felt grateful for their guidance, support, and expertise throughout my academic journey.

Looking back, I realize how much I have grown. Every challenge and every critique helped me develop the skills required to become the designer I am today. I am proud of the work I have done, and I am excited about the possibilities that lie ahead.

My deep love for nature and interior design is reflected in the effort and dedication I put into this project. During my final presentation, I received feedback on specific areas for further refinement and development. One insightful comment was regarding the potential to extend the small-scale environment idea throughout spaces that children can use for imaginative play. Another significant area of focus was the need for acoustic solutions in the main hallway. This feedback brought attention to the importance of extending some of the wall finishes or elements for further acoustic control.

Receiving positive comments on the sand dunes concept and its successful integration throughout the space was truly uplifting. However, suggestions were made that slight adjustments to the shape of the bulletin boards in the reception area and main hallway could have better aligned with the concept. Overall, I am grateful for the feedback and comments I received, and I look forward to incorporating them into my future work.

DECLARATION

I believe that the best design focuses on serving the practical needs and lifestyles of the users. Understanding the needs and preferences of the users is crucial. Ensuring that essential features are within reach for everyone is always the center of my thinking.

Furthermore, nature's colors and beautiful patterns always inspire my work. Designs that incorporate nature remind me of our connection to Earth and the importance of protecting its beauty and diversity.

In addition, visually pleasing interiors are an essential aspect of my designs. Aesthetic in my interior design is reflected through the material choices, furniture layout, and atmosphere created to achieve a desired look and feel. It is important to balance aesthetics with functionality for harmonious and visually appealing interiors.

Finally, a good design should capture the attention of its viewers. Expressive, unconventional, and new design solutions always attract me. I also believe that creativity and boldness often go hand in hand. Creativity means thinking beyond the traditional norms and exploring unconventional ideas, and boldness is providing the courage to pursue these unconventional ideas.

FF&E

CLASSROOM



Product name: Ouija table
manufacturer: Reply furniture
Link: <https://www.replyfurniture.com/gallery>
material | finish: Salvaged plywood/ multi-color
Sustainable attributes: Plywood is a strong, durable and recyclable material which makes it sustainable.
rationale: The table is made of salvaged plywood, which aligns with the nature-based school's approach to recycled materials.



Product name: Oak wood
manufacturer: RVA Urban Wood Group
Link: <https://www.treesvirginia.org/services/virginia-urban-wood-group>
material | finish: White
sustainable attributes: Oak wood is strong, durable, and naturally water-resistant.
rationale: Oak wood will add warmth to the space. It will be sourced locally from the RVA urban wood group, an initiative that helps use wasted wood.



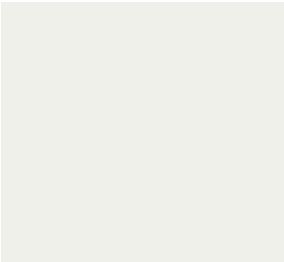
Product name: Glass Pebble Mosaic Tile
manufacturer: Mineral tiles
Link: <https://www.mineraltiles.com/>
material | finish: Emerald
sustainable attributes: Made from 100% recycled glass.
rationale: The pebble shape will bring some of the outdoor elements to the indoors. It is also made of glass that has the same reflective quality of sand.



Product name: Glow direct
manufacturer: Lightly
Link: <https://lightly.com/products/glow-direct/>
material | finish: Natural
sustainable attributes: It is made from 95% biodegradable materials, paint is eco-friendly and they use non-toxic glue.
rationale: Direct light will provide enough task light above classroom tables.



Product name: Relevo Rug
manufacturer: Muuto
Link: <https://www.battenhome.co/products/muuto-relevo-rug?variant=43702777381089>
material | finish: Burnt orange
sustainable attributes: Wool is a natural fiber and is 100% biodegradable.
rationale: Wool rug is durable and tough enough to be used in high traffic areas.



Product name: Ceramic steel wall system
manufacturer: Polyvision
Link: <https://polyvision.com/>
material | finish: White gloss
sustainable attributes: Made from 99% recycled materials
rationale: It is durable and easy to clean

HALLWAY AND PLAY AREA



Product name: Turn Stool

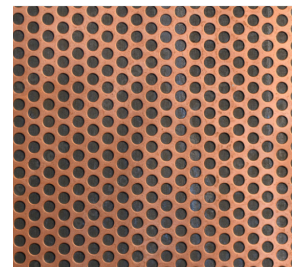
manufacturer: Blutdot

Link: <https://www.bludot.com/>

material | finish: Acacia / Marine Blue

sustainable attributes: Made of solid wood (acacia wood) and 100% felted wool which is durable| 30,000 Double Rubs

rationale: It is made from natural material and can bring some of the outdoor to the indoor.



Product name: Perforated Metal Sheet

manufacturer: Moz Designs

Link: <https://mozdesigns.com/>

material | finish: Copper Metallic- -1/2" Diameter holes

Sustainable attributes:Aluminum is highly durable and 100% recycled at the end of its life.

rationale: The material will be used on the ceiling above the play area. It also can reflect light, add some color, and is lightweight.



Product name: Linoleum Sheet Flooring

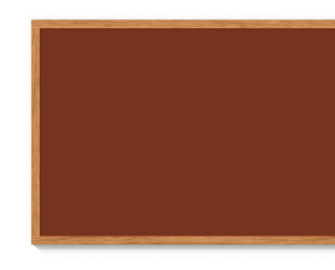
manufacturer: Forbo

Link: <https://www.floorcity.com/>

material | finish: African Desert

sustainable attributes: It is made from natural materials that are biodegradable, compostable and recycable.

rationale: It will be used in high-traffic areas and comes in a variety of colors for wayfinding purposes.



Product name: Burlap Bulletin Board

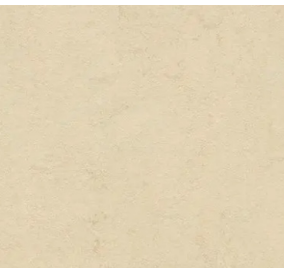
manufacturer: Polyvision

Link: <https://polyvision.com/>

material | finish: Orange| Guilford of Maine

Sustainable attributes: Frame is made of oak wood, and fabric is 100% recycled polyester.

rationale: The board material serves as an acoustic solution and is also an excellent product to showcase children's artwork.



Product name: Linoleum Sheet Flooring

manufacturer: Forbo

Link: <https://www.floorcity.com/>

material | finish: Barbados

Sustainable attributes: It is made from natural materials that are biodegradable, compostable and recycable.

rationale: It will be used in high-traffic areas and comes in a variety of colors for wayfinding purposes.



Product name: Linoleum Sheet Flooring

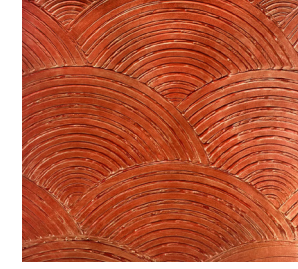
manufacturer: Forbo

Link: <https://www.floorcity.com/>

material | finish: River Bank

sustainable attributes: It is made from natural materials that are biodegradable, compostable and recycable.

rationale: It will be used in high-traffic areas and comes in a variety of colors for wayfinding purposes.



Product name: Napa wallcovering

manufacturer: Craft wallcovering

Link: <https://www.craftwallcovering.com/napa-1>

material | finish: Roji

Sustainable attributes:100% made by hand, no machines or energy exerted.

rationale: The material is eco friendly, and the pattern is inspired by nature elements.



product name: Bayou Ottoman

manufacturer: Zenith

Link: <https://www.zenithinteriors.com/>

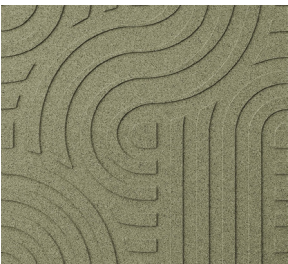
material | finish: Upholstered in Dottie

in Wave by Knoll #K22599.

Sustainable attributes: Fabric is durable and contains recycled content

rationale: Durable and easy to clean.

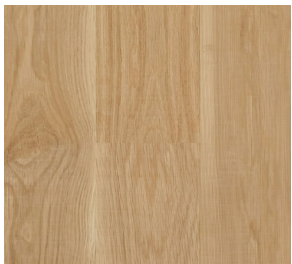
AUDITORIUM



Product name: Cork strips
manufacturer: Muratto
Link: <https://www.muratto.com/en/details/3-cork-bricks/16-3d>
material | finish: Sarge
Sustainable attributes: Natural cork pieces are made from the bark of the cork oak tree. It is biogradable, compostable and recyclable.
rationale: It is made from natural material and can bring some of the outdoor to the indoor, it also have accoustic properties.



product name: Wool Carpet
manufacturer: J Mish
link: <https://www.greenbuildingsupply.com/All-Products/J-Mish-Carpet-Palladian?matrix=95789>
material | finish: Peach Medley
sustainable attributes: Wool is a natural fiber and is 100% biodegradable.
rationale: Wool carpeting is durable and tough enough to be used in high traffic areas.



Product name: Oak wood
manufacturer: RVA Urban Wood Group
Link: <https://www.treesvirginia.org>
material | finish: White
sustainable attributes: Oak wood is strong, durable, and naturally water-resistant.
rationale: Oak wood will add warmth to the space. It will be sourced locally from the RVA urban wood group, an initiative that helps use wasted wood.



Product name: Poppy Low Pouf
manufacturer: Fogia
material | finish: SYNERGY TURQUOISE LDS 58-DIAMOND/UTGÅTT GREIGE 902- JADE/UTGÅTT OCHRE 907
sustainable attributes: Durable with removable covers for a long life.
rationale: The pouf is simple and easy to move, and can be used by both children and adults.



Product name: Flek Chamomile
manufacturer: 3form
Link: <https://3-form.com/>
material | finish: Recycled resin | Sandstone
Sustainable attributes: Made of recycled resin samples.
rationale: The texture resembles the sand particles.

RECEPTION

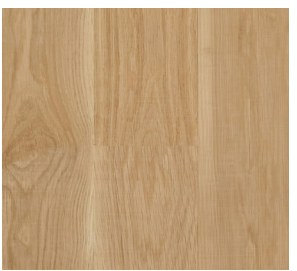


Product name: Split Bench
manufacturer: reply furniture
Link: <https://www.replyfurniture.com/gallery>
material | finish: Dark brown plywood with hardwood edging
sustainable attributes: Plywood is a strong, durable and recyclable material which makes it sustainable.
rationale: The bench is made of salvaged plywood, which aligns with the nature-based school's approach to recycled materials .

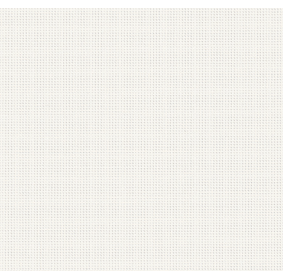


Product name: Ribbon wave light
manufacturer: Lightart
Link: <https://lightart.com>
material | finish: MAI TAI 3Form
rationale: The shape represents movement of sand dunes.

OUTDOOR GARDEN



Product name: Oak wood
manufacturer: RVA Urban Wood Group
Link: <https://www.treesvirginia.org/services/virginia-urban-wood-group>
material | finish: White
Sustainable attributes: Oak wood is strong, durable, and naturally water-resistant.
rationale: oak wood will add warmth to the space. It will be sourced locally from the RVA urban wood group, an initiative that helps use wasted wood.



Product name: Soltis® Harmony 88 canopy cover
manufacturer: roll a shade
Link: <https://www.rollashade.com/>
material | finish: White
sustainable attributes: The material has a long lifespan, which will reduce changing it frequently
rationale: The material's openness factor enables users to enjoy views beyond while being shielded from the sun's rays.

SOURCES

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IMAGE CREDITS

Images 1-3:Architecturalrecord.<https://www.architecturalrecord.com/articles/14445-courtyard-kindergarten-by-mad-architects>

Images 2:Archdaily.<https://www.archdaily.com/951734/yuecheng-courtyard-kindergarten-mad-architects>

Images 4-5:<https://www.abitare.it/en/architecture/sustainable-elements/2015/11/30/cucinellas-nursery-in-guastalla/>

Images:6-7: Archdaily. <https://www.archdaily.com/939487/>

