

## **A SCHOOL AT THE PARK**

OUTDOOR EDUCATION AND TECHNOLOGICAL INNOVATION FOR SCHOOLS

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**“A SCHOOL AT THE PARK”**

NOVARA, ITALY

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“Anything created by human beings is already in the great book of nature.”

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Antoni Gaudi

## Abstract

Outdoor learning, especially in the early years of a child, is recognized to have a positive impact and contribute to the child's well-being as well as emotional and social development. Studies show that outdoor learning can promote positive mental health, reduce stress, anger and violence in children, lower the rates of depression, and also boost confidence and creativity. The past generation of children has benefited from the time spent outdoors, which were then easily accessible and used frequently. However, the current circumstances such as threats to safety of children, increased traffic, pollution and tied-up schedules has eventually led to children spending time indoors with a growing interest in electronic gadgets, therefore adapting a sedentary lifestyle. Moreover, the Covid-19 situation, has led to the closing of schools and to the introduction of online classrooms. As indoor classrooms are not reliable when it comes to ensuring the safety and protection of children from being infected, many schools are unable to reopen. It is required that we alter the current learning mode and utilize outdoor spaces for learning.

Most often schoolyards and local green spaces are underutilized or left vacant. In urban areas where it is difficult to acquire vast open space, the utilization of parks and schoolyards for learning could be considered. The transformation and design of vacant greenyards near schools to serve the purpose of classrooms, all year round despite the weather conditions, could be a potential way out of the situation. Moreover, these local green spaces are easily accessible and ensure safety. With many schools attempting to organize classes outdoors, it is relevant to explore the benefits of outdoor learning and how it could be implemented and attained efficiently in a space as elementary as a park or schoolyard.

This project is an attempt to propose creative solutions to efficiently modify under-utilized local green spaces to outdoor learning spaces, in order to acknowledge and draw the benefits of outdoor learning for children and to encourage the same in the extended future. Moreover, this project is seen as an opportunity to resolve the problems faced by schools due to the Covid-19 pandemic.







## Outdoor Learning

Outdoor learning is a broad term that refers to a variety of curricular educational activities that take place in the natural environment, either on school grounds or in the surrounding community. This includes everything from broad nature-based learning to learning programs customized specifically to the core curriculum, such as Forest Schools, residential vacations, and outdoor adventure. It is an educational strategy that is used to deepen learning, increase school engagement, and promote the health and well-being of students<sup>1</sup>.

<sup>(1)</sup> Marchant, E., Todd, C., Cooksey, R., Dredge, S., Jones, H., et al. (2019) Curriculum-based outdoor learning for children aged 9-11: A qualitative analysis of pupils' and teachers' views. Plos <https://doi.org/10.1371/journal.pone.0212242>

<sup>(2)</sup> Rorandelli, R. (2018) Italian education reform? Just look outside. Politico. [www.politico.eu/interactive/italian-education-reform-just-look-outside/#](http://www.politico.eu/interactive/italian-education-reform-just-look-outside/#)

<sup>(3)</sup> Erasmus Learning Academy (2022) Bologna: Erasmus training courses. [www.erasmustraining-courses.com/outdoor-education.html](http://www.erasmustraining-courses.com/outdoor-education.html)

Children's education in the vast outdoors is not a new concept. In the 1950s, Denmark was the first country to introduce 'forest schools'<sup>2</sup>. Outdoor education is becoming more popular throughout Europe and abroad, with a growing trend of incorporating formal education in outdoor learning activities and taking the indoors outside. Outdoor education not only helps students become more aware of their surroundings and develop an appreciation for the natural world, but it also helps them apply what they learn in the classroom through application and observation, and it contributes significantly to their personal and social development<sup>3</sup>.

The relation between a child's health, happiness, and scholastic success shows that happier and healthier kids do better in school. The possibility to engage children in learning through high-quality teaching experiences is not limited to the classroom. Taking learning outside of the classroom and into nature allows for a more integrated, cross-curricular approach to accomplishing educational goals. Research has shown that being immersed in nature has a positive impact on well-being, creativity, brain function, and mood, underscoring the outdoors' potential for engaging youngsters in learning.

Children's opportunities to interact with nature are dwindling, and they are spending less time outside due to parental concerns about safety, traffic, and crime. Modern environments have seen a decrease in open green spaces, as well as growing reliance on technology and sedentary leisure, all of which compete with children's desire to engage with the outdoors. As a result, through the school grounds and teaching activities, the school setting has possibly the most responsibility and capacity in providing

students with access to natural habitats<sup>1</sup>.

Learning outdoors can provide an educational atmosphere that encourages children and young people to create and experience connections, resulting in a greater understanding of curricular topics and addressing learner needs. Outdoor learning will enrich the curriculum and make learning exciting, engaging, and relevant for children and young people when employed in a variety of ways. Working to restore biodiversity in the school grounds, visiting the surrounding forests, exploring and connecting with the local community, and making a school travel plan are all examples of how outdoor learning may achieve sustainable development education<sup>4</sup>.

### Curriculum-based outdoor learning

Integrating learning with outdoor experiences, whether through play on the grounds or trips further afield, gives the curriculum relevance and depth that is difficult to attain indoors.<sup>4</sup> An interesting curriculum that helps children reach their academic potential has significant consequences for educational outcomes, future employment prospects, and health and well-being during adulthood. However, the methods for fulfilling curricular goals through outdoor learning for children beyond the early years is yet to be recognised and popularised.<sup>1</sup>

Learning in the outdoors could involve literacy, numeracy, and overall health and well-being. In literacy, students can employ a variety of texts, including spoken word, charts, maps, schedules, and directions. Angles can be measured, bearings can be calculated, and journey times can be calculated in numeracy. In the field of health and wellbeing, there are numerous chances to become physically active in new ways while also improving emotional and mental health. As a result, outdoor learning provides numerous possibilities for students to deepen and contextualize their understanding within curriculum areas, as well as to connect learning throughout the curriculum in various contexts and at various levels.<sup>4</sup>

A woodland or forest is not required for curriculum-based outdoor learning. This makes it a simple system to deliver at a school playground, a garden or other local green space. It examines what is being learned at school or at

<sup>(4)</sup> Curriculum for excellence through outdoor learning. Learning and Teaching Scotland (2012) <https://education.gov.scot/Documents/cfe-through-outdoor-learning.pdf> pg.9.

home and uses that as a stimulus. As a result, this method does not necessitate expensive training. The concept is straightforward: not all classrooms have four walls. Only in the last several years has education been restricted to a box. There is a wealth of learning that may be used outside of the classroom to supplement the curriculum. This method does necessitate a different perspective on learning and teaching. This requires the motivation of the staff as well as children.<sup>5</sup> However, the school grounds and local areas are frequently the first choice for students who want to go outside and for teachers who want to go on to new learning environments.

<sup>(5)</sup>What is Curriculum Based Outdoor Learning. (2020) Love Outdoor Learning. <https://loveoutdoor-learning.com/outdoor-learning/what-is-curriculum-based-outdoor-learning/>

The integration of outdoor learning into the curriculum, has its barriers, and a number of impediments prohibit schools from implementing regular outdoor learning in the later primary school age groups. Existing curricular pressure, the heavy demand on teachers' time, teachers' confidence and self-efficacy, safety, cost and availability to resources and training are all common difficulties. Ultimately, despite research emphasizing the benefits and policy acknowledging the value of outdoor learning, widespread adoption of outdoor learning in school practice necessitates teacher training and resources as well as a shift in school culture.<sup>1</sup>

## Benefits of Outdoor Learning

<sup>(6)</sup>(Bjorge et al, 2017; James, J.K. and Williams, T., 2017; Lieberman & Hoody, 1998)

<sup>(7)</sup>Cameron, M., McGue, S., (2019). Behavioral Effects of Outdoor Learning on Primary Students. Sophia, the St. Catherine University repository. <https://sophia.stkate.edu/maed/297>

<sup>(8)</sup>van Dijk-Wesselius, J.E., van den Berg, A.E., Maas, J., and Hovinga, D. (2020) Green Schoolyards as Outdoor Learning Environments: Barriers and Solutions as Experienced by Primary School Teachers. *Front. Psychol.* 10:2919. doi: 10.3389/fpsyg.2019.02919

<sup>(9)</sup>(Bjorge, et. al, 2017)

When outdoor learning is included in the classroom on a regular basis, children are given the opportunity to move and explore on a sensory level, which may increase beneficial learning abilities. Children who do not succeed in an indoor classroom setting may benefit from using the outdoors as a classroom setting. According to existing studies<sup>6</sup>, outdoor learning activities can have a big impact on student motivation and attentiveness, as well as their overall health.<sup>7</sup> Children are encouraged to handle, touch, smell, investigate, and modify elements in nature while playing and learning in a green schoolyard. Child's psychological, intellectual, social, and physical growth can all benefit from these natural, child-initiated, holistic learning experiences.<sup>8</sup>

According to the findings of Youngberg (2015), "Researchers illustrate that contact with nature can help ameliorate many of the psychological issues of at-risk youth from anxiety and depression to the lack of motivation and sensitivity for others and nature". It is found that spending time in nature improves concentration, mental productivity, and emotional state. According to Webb (2010), "the detachment of education from the physical world not only coincided with the dramatic rise in life-threatening obesity but also with a growing body of evidence that links physical exercise and experience in nature to mental acuity and concentration". Incorporating outdoor education into the regular curriculum has numerous advantages.

As per a recent study on the behavioral outcomes of outdoor learning<sup>9</sup>, lack of academic interest, stimuli, and confidence can all trigger behaviors. As a result, their drive to study and stay on target may be affected. Students that fail in the classroom can benefit from using the outdoors for diverse learning experiences. Güdelhöfer (2016) concluded that "Outdoor Education can create strength-based activities and exercises where all children are included and participate on their individual levels". He added that, "Learning outdoors has increased participation and learning motivation for all children in the class. Experiential learning particularly supported the children with special needs in their learning, as they created meanings more easily with practical and sensory experiences. Those concepts of learning to present meaningful potential on how to increase the inclusion of children with special needs".

When children are inspired to learn outdoors, their concentration improves. As a result, teachers are better able to educate students who are more engaged and willing to learn. Furthermore, Güdelhöfer (2016) observed that while children displayed a high level of concentration, they did not take advantage of the freedom they had when outside. According to Güdelhöfer (2016), “hyperactive children for instance are disturbing less outdoors than in a small classroom”.

According to Louv (2009), “Too many school districts have contributed to a growing gap between nature and children. I call this nature-deficit disorder, which is not a medical diagnosis, but a description of the growing gap between human beings and nature, with implications for health and well-being”. Louv continues to argue that re-introducing students to nature in the classroom can improve both their health and their learning. Reduced stress levels, higher mood, greater psychological well-being, and improved focus and concentration are some of the health advantages reported as a result of contact with nature.<sup>7</sup>

Improved academic accomplishment, observational abilities, and reasoning, increased self-esteem, independence, and feelings of responsibility, improved interpersonal skills, cooperation, and social, and multi-disciplinary learning across topics are all other documented benefits of outdoor learning.<sup>8</sup> Despite research demonstrating its capacity to engage all ages and applicability across the entire school, there is a significant drop in outdoor active learning between primary school and secondary school.<sup>10</sup>

## Case Studies

The following part of the chapter are reference projects that relate to the subject of outdoor learning, outdoor classrooms, schoolyards, and integration of nature in learning environments. These projects are used as references to get an idea of how outdoor spaces could be treated as a learning environment for children in different situations. The conversion of schoolyards, outdoor classroom units, the sustainable elements used in projects, the integration of nature in the design are some of the key points in the following projects.

<sup>(10)</sup> Marchant, E., Todd, C., Cooksey, R., Dredge, S., Jones, H., et al. (2019) Curriculum-based outdoor learning for children aged 9-11: A qualitative analysis of pupils' and teachers' views. Plos <https://doi.org/10.1371/journal.pone.0212242>

## Case study 1

Guldberg Schoolyard, Copenhagen  
Nord Architects | 2010 | 10,500 Sqm.

This case study involved the renovation the schoolyard of the Guldberg School, situated in Copenhagen's highly populated Norrebro area. The area has a high density of buildings and a limited amount of public outdoor places.

The main goal of NORD Architects was to build a space that may be used by schools, for recreation, and by the general public. After a long series of workshops with users and local locals, the concept for the outdoor areas was developed.

The square's infrastructure encourages users to walk and relax while also providing security, zoning, and a barrier that is not seen as a hindrance but rather as streetscape elements that can be used for recreation and play.

The outdoor area comprises of a succession of activity zones, based on the premise that children play in sequences. The sequences have multiple loops, allowing for maximum diversity and assisting in the creation of the schoolyard's distinct design. There are numerous options to play and exercise simultaneously.<sup>11</sup>

### Key takeaway

- The project involves a schoolyard that is open to the general public.
- A series of workshops conducted with the users to develop the project.
- Barriers are made in the form of streetscape elements.
- The diversity in activity instead of classification into zones.
- Multipurpose spaces are created with elements that can be used for various activities.

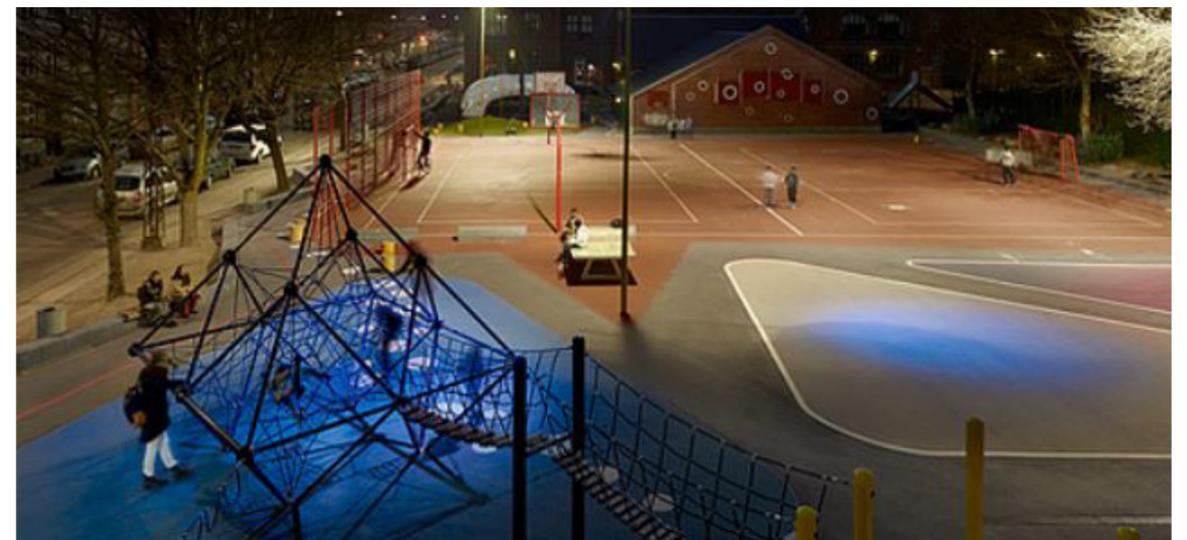
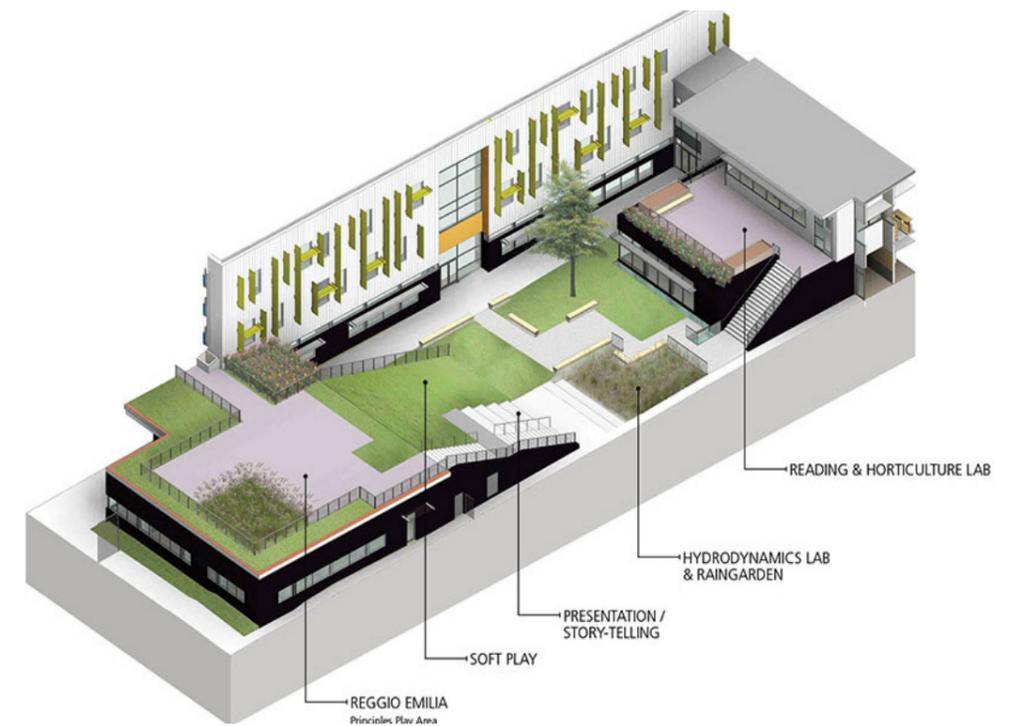


Fig. 1- Fig. 3 - Guldberg Schoolyard, Copenhagen

## Case study 2 Hazel Wolf K-8 E-STEM School, Seattle NAC Architecture | 2016 | 78,000 sqft

The school has an innovative curriculum with an environmental learning program. The school uses the environment to study subjects such as Science, Technology, Engineering, and Mathematics. As a result, combining the site and building design so that the property operates as an indoor/outdoor educational environment was a major factor considered.



(12) NAC Architecture. Hazel Wolf K-8 E-STEM School. [www.nacarchitecture.com](http://www.nacarchitecture.com)

The centrepiece is a vast, covered courtyard, framed by its physical forms, with a 23-foot-wide, one-story-high ramp rising over the administration offices hiding it efficiently.<sup>12</sup>

This “topographic” ground plane falls from completely accessible planted roofs to a densely vegetated rain garden below.<sup>13</sup> Storm water collection and treatment are done in the central courtyard as it flows from the roofs to the water garden. The importance of making the most of available space led to the adoption of green roofs and roof terraces as learning environments on several occasions.<sup>12</sup>

(13) Amelar, S. (January 1, 2018). Hazel Wolf K-8 E-STEM School by NAC Architecture. *Architectural record*. [www.architecturalrecord.com/articles/13168-hazel-wolf-k-8-e-stem-school-by-nac-architecture](http://www.architecturalrecord.com/articles/13168-hazel-wolf-k-8-e-stem-school-by-nac-architecture)

The site’s winding paths pass through botanical and butterfly gardens, as well as relaxing seating areas for observation and drawing. Some of these places are open to neighbours near the periphery, tying school and the neighbourhood together.<sup>13</sup>

### Key takeaway

- The school has an innovative curriculum involving the environment.
- The courtyard consists of sustainable features the students could learn from as well as use as for recreational purposes.
- Interaction between the school and the neighbourhood
- Innovative and interesting outdoor spaces for learning, relaxing and observing



Fig. 4- Fig. 6 - Hazel Wolf school , Seattle

## Case study 3 The Community Classroom, Glasgow Studio O'Donnell Brown | 2020

The Community Classroom in Glasgow, designed by studio O'DonnellBrown, is a demountable and modular timber structure that encourages children and adults to connect with nature.

When it was completed at the end of 2019, before the coronavirus outbreak in Europe, it had already held several community-based events. It will later be installed to promote outdoor learning activities. It is also planned to be used in local schools so that as many youngsters as possible can benefit from the advantages of outdoor learning.

<sup>(14)</sup>Frearson, A. (12 April 2020). O'DonnellBrown promotes outdoor learning with The Community Classroom. Dezeen. [www.dezeen.com/2020/04/12/community-classroom-odonnellbrown-outdoor-learning/](http://www.dezeen.com/2020/04/12/community-classroom-odonnellbrown-outdoor-learning/)

The structure is made up of a few simple elements that are bolted together using conventional wood sections. The wooden roof above is supported by a series of two-column modules.

Seating, workspaces, shelves, and exhibition surfaces are all provided by the plywood modules, which are slotted in and around the structure. Adapting the space to various activities is simple. A lightweight sheet acts as a waterproof covering on the roof and may also be folded down to provide further weather protection around the edge. The translucent nature of this material creates intriguing lighting effects in the early evening.<sup>14</sup>

### Key takeaway

- The classroom promotes reconnection with nature and encourages outdoor learning.
- The structure is demountable and hence can be moved and relocated and reconstructed.
- It blends with nature with the sustainable materials used.
- The structure is flexible and could be used for multiple purposes.
- Weather protection and lighting is taken into consideration.



Fig. 5- Fig. 7 - The community classroom, Glasgow

## Case study 4 Hedge School, Carlow, Ireland AP+E | 2015

The Hedge School is characterized by a ring of plywood columns of varied heights that support a staggered row of wooden planters. The space between the pavilion floor and the planter is covered with a metal mesh for growing vines.

The pavilion's interior contains a gravel floor, plywood platforms that act as steps and benches. The informal space is large enough to hold a class and can be used for a variety of activities such as performances, cooking classes, and play. AP+E also devised a year-round planting scheme to give the Hedge School a dynamic appearance although low-maintenance. The pavilion's raised plant beds allow students to produce their own food and observe the plants grow over the seasons.

It is a place where kids learn about essential life skills including producing food and plants, cooking outside, ecosystems, climate, seasons, and flora and fauna. Natural elements become a significant part of the space, a learning environment where kids can experience rain and wind. <sup>15</sup>

### Key takeaway

- The circular form is uniquely different from the conventional school forms.
- Multipurpose space allowing for play as well as performance and classes
- Use of sustainable materials
- The concept of allowing kids learn from nature through observation



Fig. 8- Fig. 10 - Hedge school. Carlow, Ireland

<sup>(15)</sup> Wang, L. (2015, September 11). Outdoor Living Classroom Constantly Evolves To Bring Children Closer To Nature. Inhabitat. [www.inhabitat.com/outdoor-living-classroom-constantly-evolves-to-bring-children-closer-to-nature/](http://www.inhabitat.com/outdoor-living-classroom-constantly-evolves-to-bring-children-closer-to-nature/).

## Case study 5 Fuji Kindergarten, Tokyo Tezuka Architects | 2007

Fuji Kindergarten is located in Tachikawa, Tokyo. It has 600 children ranging in age from two to six years old. This kindergarten's oval-shaped roof deck allows children to play and run endlessly around it. The Montessori Method, an educational technique in which children are allowed to move around and learn by discovery, is followed here.

Rather than imposing physical limits on the children, Taka-haru Tezuka, a Tokyo-based architect, created the kindergarten as a continuous area where they can learn and play freely. There is no play equipment placed, instead, the architecture serves as a massive playground. Within a safe atmosphere, children are able to move around, fall down, and get wet. The roof area serves as both a playground and a running track. The roof was created around the existing zelkova trees, with netting around the base to make climbing easier.

Sliding doors on the ground level allow the classrooms to be open to the elements during nice weather. Without requiring children to sit quietly and silent for lengthy periods of time, the open plan design encourages independence and collaboration simultaneously.<sup>16</sup>

### Key takeaway

- The oval roof is unique and attracts children to play and run around.
- Children are allowed to learn by discovery
- Multipurpose areas without separations and zoning
- Utilisation of trees around the site as part of the school.
- Creation of a noisy and lively environment, suitable for children of that age.



Fig. 11- Fig. 13 - Fuji Kindergarten, Tokyo



## Introduction to Workshop

The following chapter is regarding two workshop carried out as part of the 'Scarabocchi' Festival held in Novara, between 17th to 19th September 2021. These workshops were organised to discuss with children of age group 7 to 10, and bring out their idea of having lessons and classes in a park instead of a school building. Our role was to identify the right method and execute it so that the result of the workshop is clear and useful for further use, research and development of the project. The workshops were organised in two parts. The first workshop named 'A day of school at the park' took place on the 16th September 2021 in Parco Boroli, Novara. This was followed by the second workshop "A school at the park' which took place in the courtyard of the 'Broletto di Novara' which is a medieval architectural complex where many events were conducted simultaneously as part of the 'Scarabocchi' celebrations in Novara.

### General objective of the workshops

The main objective of the workshops was to allow participation of the users of the project i.e., the children, in the design development stage of the project. The aim was to interact with children and give them activities that would bring out their ideas, opinions, likes, dislikes and preferences about having their school at the park. This was to be done by children through drawing, craft and model making. The focus was to provide them with the right materials and method to bring out the ideas in a clear manner so that it could later be analysed.

In the first workshop 'A day of school at the park' the aim was to provide children with axonometric views of the park so that they could draw and express their needs. The first workshop also required group participation of children to express ideas on how subjects such as Mathematics, Science, English and so on could be organised and conducted in an outdoor space such as a park. This workshop focused on the preferences of children and their imagination of having a day of lessons in the park.

However, the second workshop, 'A school at the park' required the use of a model, which would imitate a game or fun activity, where children would be able to build their school using craft materials and some elements given to them along with the model. The focus was to provide

them with a good model base, where they could build their school, and also provide them the right elements which would give them flexibility to create objects to place on the model. The materials provided and the organisation of the workshops were to give clear results from children that could be analysed and used to develop the project at later stages.

### Organization of the workshops

The first workshop 'A day of school at the park' was organised at Parco Boroli Novara, which itself is the context of the workshop. Children of the third and fifth grade of P.Thouar primary school, the school is located adjacent to the park, were the participants of the workshop along with a few teachers.

The children were given individual sheets to express their drawings, likes and preferences about the park. This was to get a general opinion of the park and their ideas of ideal spaces that should be a part of their school at the park. The second activity on that day was a teamwork where each team focused on their routine in school on a particular weekday. Each group was given specific subjects for that particular day to learn. They showed on sheets through drawings how they would learn that particular subject if it were to be taught in the park.

The second workshop 'A school at the park' was organised in the courtyard of 'Broletto di Novara' along with several other events on the 'Scarabocchi' festival day. A model base was prepared which imitated a park in front of a school. The model making was organised in the laboratory of the 'Faculty of Architecture', Politecnico di Torino. The materials for the making of the model were selected, bought and put together. Along with the model base, predefined elements and craft items were provided to children to build the model of the school at a park. The participants were random children who were present to attend the festival events of 'Scarabocchi'. The age of participating children ranged from 7 to 10.

There were four groups. Each group worked on a model to create a school in the park. Groups were given concepts to focus on such as sports, eating, studying, sleeping and so on. The children would create spaces for each of these

activities in the model. At the end of the workshop, children were asked to explain their ideas seen on the model.

### Architect's role in the workshop and the utilisation of results

As an architect, our prime role in the workshop was to provide the users of the project with the right tools to allow maximum engagement and participation of the users in the workshop through interaction, brainstorming and to allow them to execute and express their ideas clearly through the tools provided to them. At the initial stage of any design project, it is necessary to know the opinion of the users of the project. The preferences of the users are considered throughout the design development stages considering the results of the workshop as the base. The participation of the public in a field which is not well known to them could be a barrier to expressing their needs. In this situation, the workshop is organised in such a way that it is easily understandable and executed to favour the participation of every user.

Architect's main role comes after the execution of the workshop. The results are to be collected and analysed so as to conclude the parts of the workshop that could be taken into the design development of the project. After the first workshop 'A day of school at the park', the drawings were collected and there was a brainstorming session to analyse and conclude on the concepts needed to be used for the second workshop 'A school at the park'. The results of the first workshop gave the routine of children, the functions that are necessary in the project. The second workshop, the results were the design of 'A school at the park' in the form of a model. The components and features that the children created in the model were observed and seen from an architect's point of view. The objective was to see how these features on the model could be brought to reality, in a suitable manner considering all the other aspects of the project. The concepts emerged from the workshop is used as the base for the design development of the project.

## Workshop 1 'A day of school at the park'

The first workshop 'A day of school at the park' took place on September 16, 2021, at Parco Boroli, located adjacent to the Primary School P. Thouar- Sant'Andrea, Novara. It was organised to identify, based on drawings made by children, their idea of an ideal school in the park. The park is currently open to the public. The workshop involved the participation of children of eight to ten years of age. A few teachers from the primary school also took part in the workshop.

### Aim of the workshop

An activity and interaction with children of age 8 to 10 years, to bring out their idea of what an outdoor school i.e. 'A school in the park' would be. The workshop directed children to express their likes, dislikes and preferences, if there were to have their school in the park.

### Participants

6 groups of 5 Children, 2 groups of 5 teacher

### Task 1 ' Individual ideas on having school at the park'

Each child was given a sheet with an axonometric view of their school along with the park. They were asked to draw and colour what kind of activity and spaces they would like to have if they were to have lessons in the park. Their likes, dislikes and preferences were considered and expressed on the sheets.

### Observation

Children were able to draw their first thought when it comes to a school in the park. Most drawings showed activities around trees and spaces to relax and observe in nature. There were suggestions to include a playground, flower garden, space for pets and orchards. Some favourite spots mentioned were the red canopy and the trees.

## Task 2 'Each group of children consider a day of school in the park.'

Each group was given a specific subject in their curriculum such as Science, Art, Geometry, Italian, English and so on. Some graphics were made to illustrate the topics in the subject. Each group was given a sheet with an axonometric view of the school. They were required to illustrate on the sheet how some topics of the subject could be taught outdoors in the park. The children were encouraged to illustrate how their typical day would start, how they would get to school, the objects that they would have in their bags to support their day at school and their routine of the day. There were to draw and demonstrate the activities they would have and the kind of space they would utilize for each activity.

### Observation

Children were able to imagine the routine in the school to be followed outdoors in the park. Their activity throughout a day such as arrival, storage, learning, listening, playing, eating, resting, recreation were considered and given a suitable solution to being carried out outdoors. The need for multi-purpose spaces and boundaries between these activities were expressed in their drawings. The making of tree house, and the consideration of semi-enclosed spaces were a highlight. Natural elements such as water-body, pets, vegetable gardens, orchards were suggested. The type of activities that would take place in a normal day at school and based on that the facilities that would be needed were obtained.



Fig. 1- 'A day of school at the park' Workshop 1



Fig. 2-Group of children showing their idea of a school at the park through drawings



Fig. 3- A child's idea of a school in a park.

## Workshop 2 'A school at the park - Model making'

The second workshop took place in Novara on September 18<sup>th</sup> 2021. It was held as an event at the Scarabocchi festival programme for children. The workshop was a creative activity for children to design a park that could replace a school or classroom. The children would have to represent their ideas on a three - dimensional model, using several materials to craft elements that could be placed on the model. Some predefined elements and forms, such as cubes, sticks and so on were provided to support the making of the model.

### Aim of the workshop

The second workshop was held keeping in mind the themes and results obtained from the first workshop. Children were given a set of themes based on which they could imagine and create elements on the model. Making a three dimensional model would help children think, understand and express their opinions with better clarity. This would help us acquire their interests and preferences in an efficient manner. Moreover, the game- like model would grab attention of children and keep them interested.

### Preparation of the model base

The base of the model was prepared at a scale of 1:50 considering it as a small portion of the park. The base of the model was made with wood. Natural materials were considered for all aspects of the workshop. The model had a base of size 1000mm x 500mm. The base consisted of a space to store the predefined components and a top layer with perforations on which children could place the given elements with ease. Laser cutting was used to make the perforations and predefined elements.

The model was prepared at the architecture model making laboratory of Politecnico di Torino. A total of 4 model bases were made. In order to bring the idea of the school near the park, the profile of some remarkable schools were cut out and placed on the base as reference.



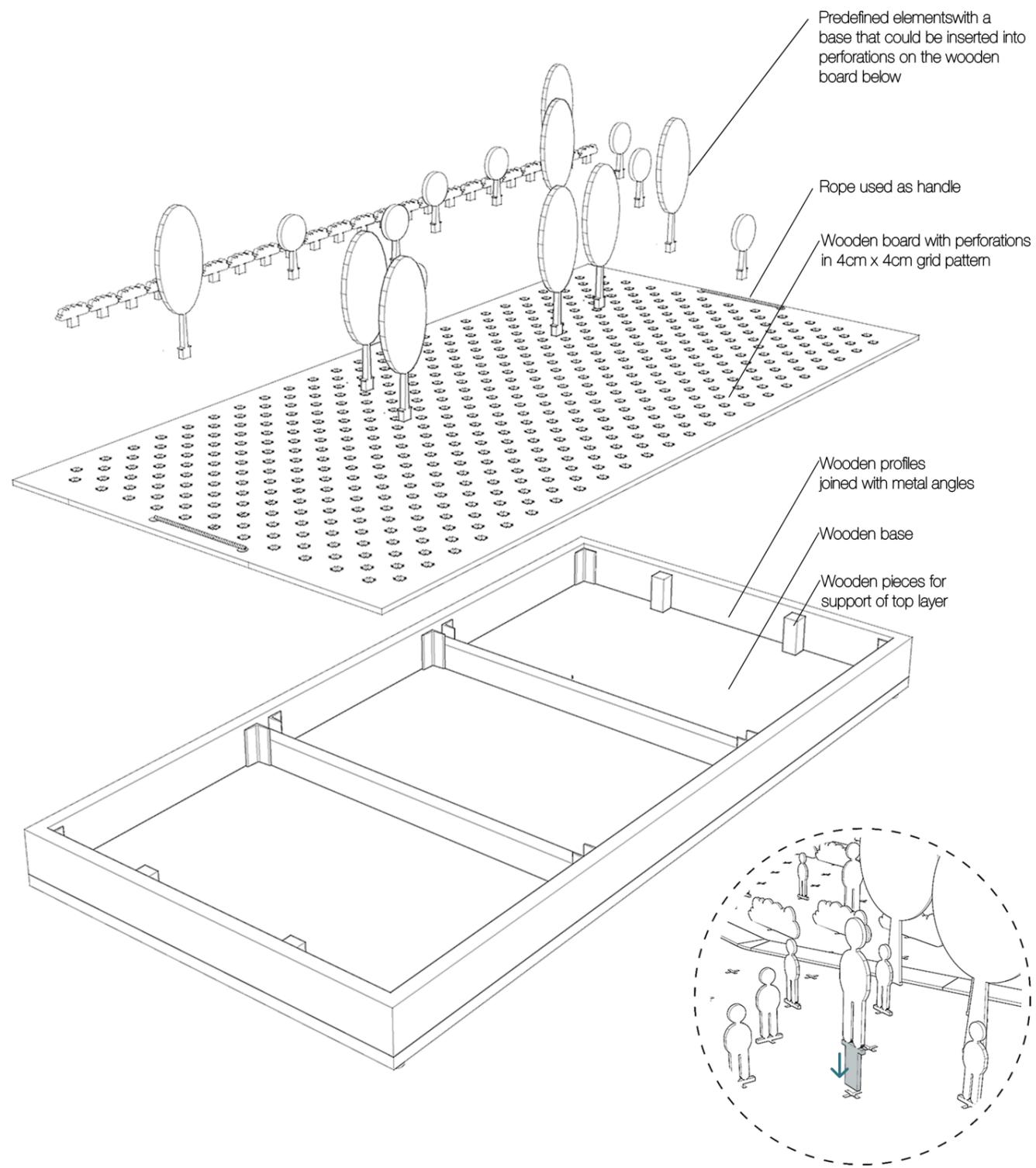
Fig. 4- Drawing by a group of children representing their idea of a school in the park.



Fig. 5-Drawing by group of children representing their idea of a school in the park.



Fig. 6 - Drawing by a group of children representing their idea of a school in the park.



Exploded view of the model

Fig. 7 - Drawing prepared for the making of model base.

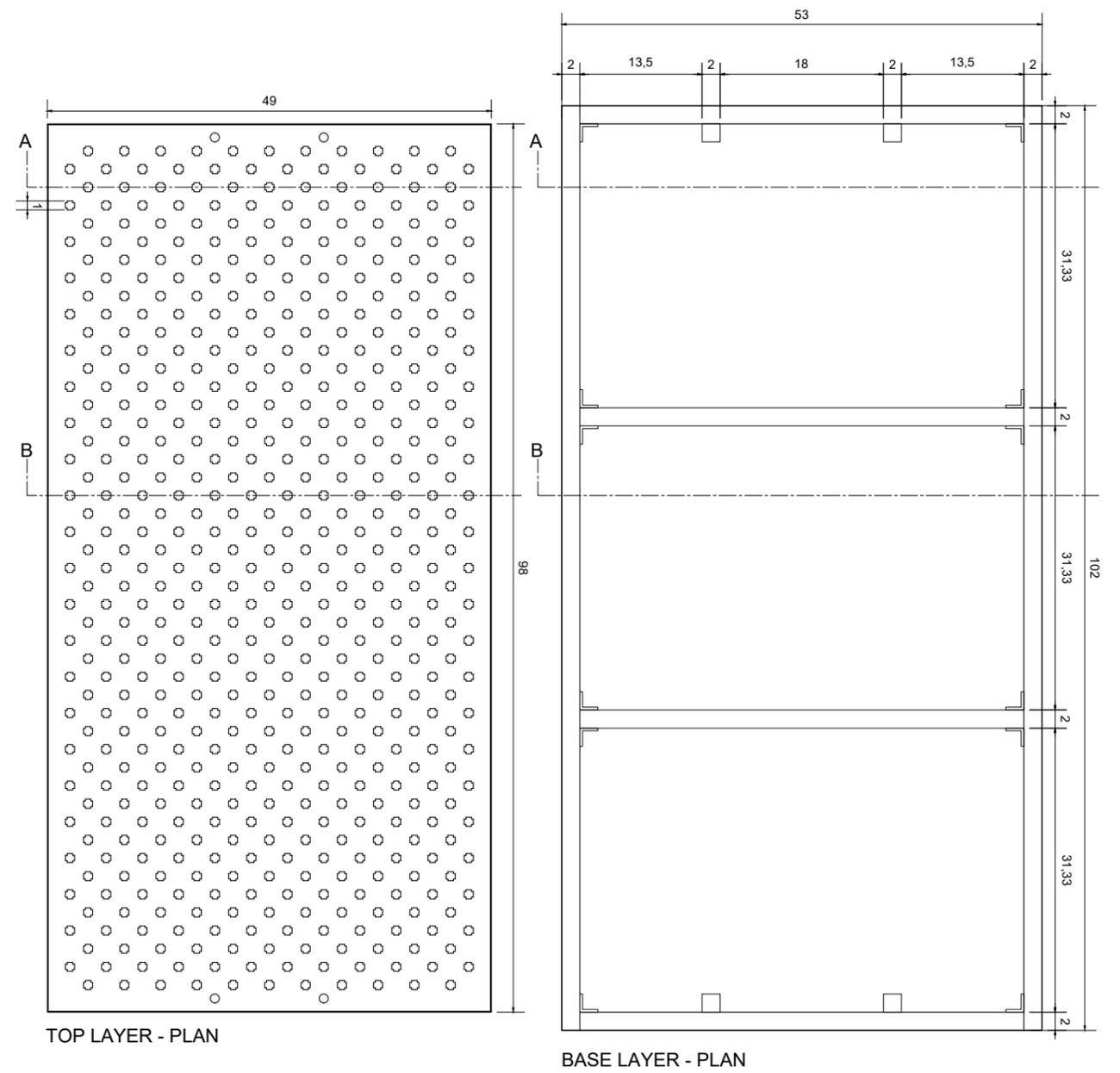


Fig. 8 - Drawing prepared for the making of model base.

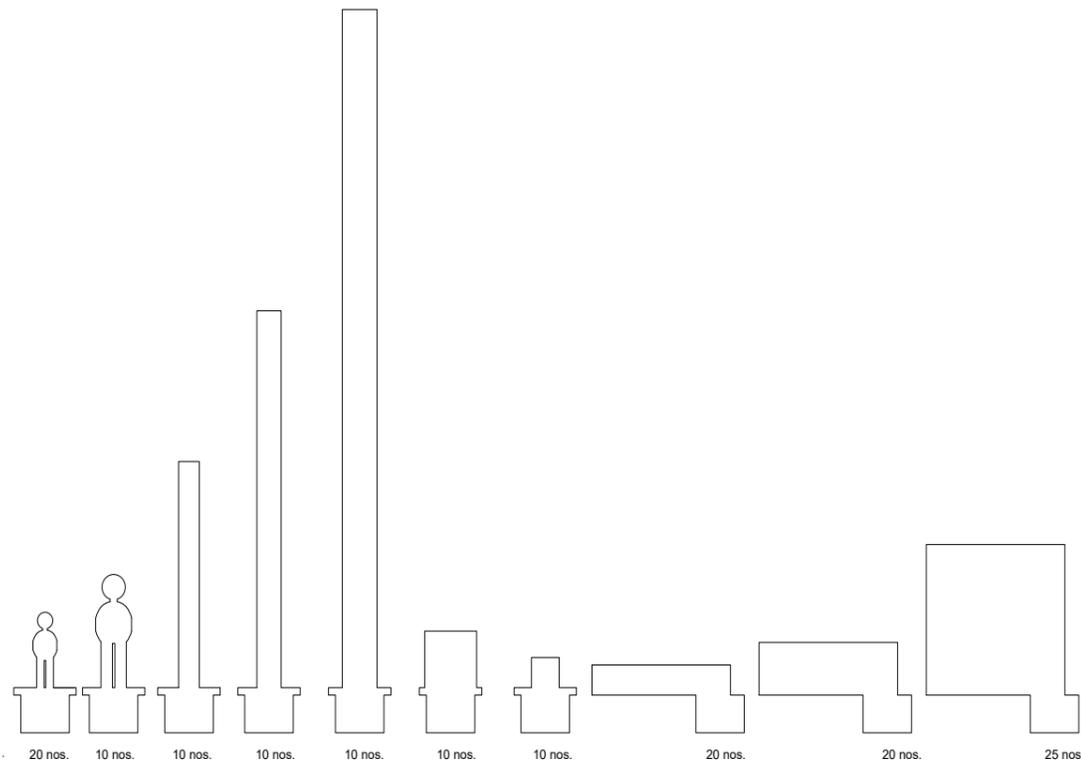


Fig. 9 - Drawing prepared for predefined elements of the model

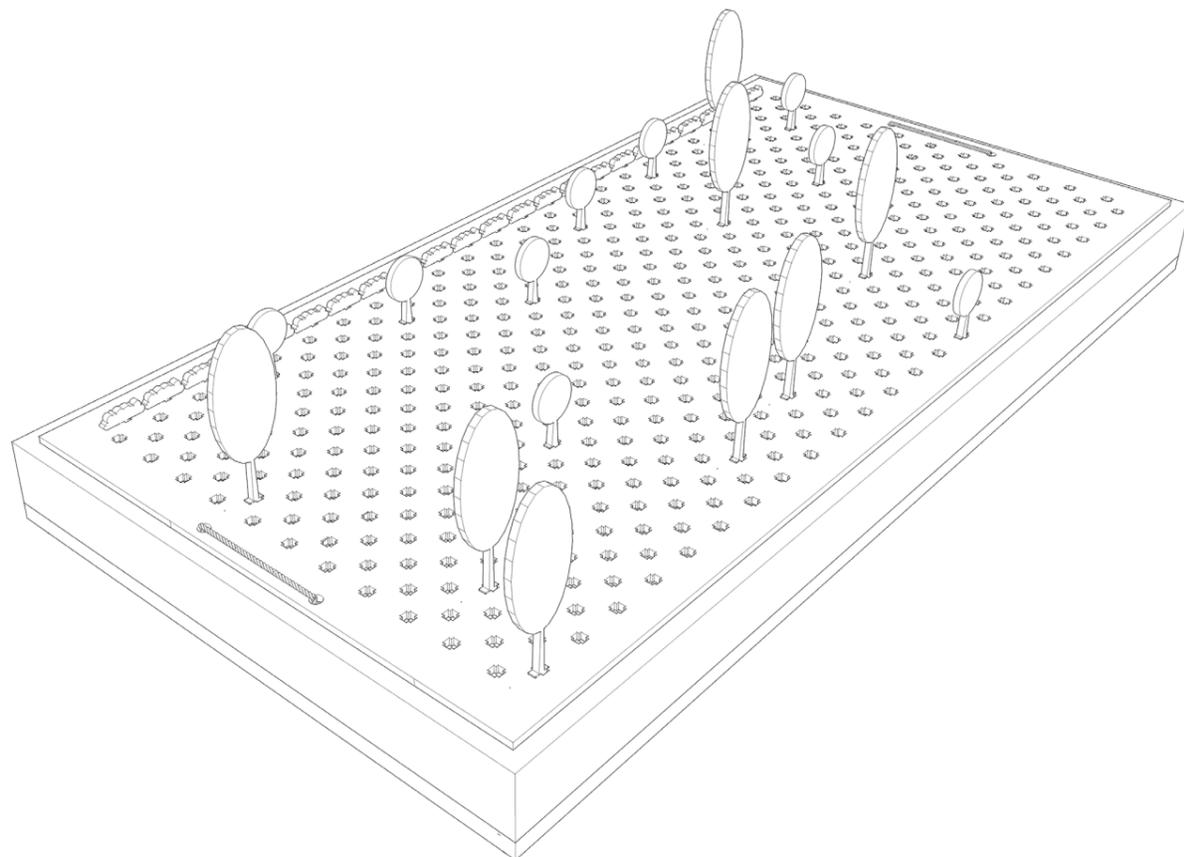


Fig. 10 - Axonometric view of the model

### Experience of preparation of model

The making of the model and predefined elements was an experience of creating a tool to bring out ideas and opinions from non-experts and children. The aim was to create a fun activity, like a game, for children to play and be engaged in. The model acted as a base board just like in games for children such as lego or puzzles, where they use small pieces to put together and build as in their imagination. This idea to provide them with such kind of an activity imitating these games, further developed in a model with perforations on the top layer to allow children to fix object and start building. The predefined elements that were cut out using laser cutting, were provided to them as pieces to help them build what is in their mind. While preparing the shapes of the components, the flexibility to use the components in various ways in the model was taken into consideration. The components consisted of sticks of various sizes, squares of various sizes, round sticks and people. This made sure that there was no limitations and the kids could be as creative as possible with these components.

The drawings were prepared for the model after brainstorming on the concept and dimensions and layout of the model. The shape of the predefined components were identified. The laboratory of the Faculty of Architecture' at Politecnico di Torino was used to make the model. A quotation was prepared for the materials required and the sizes required. It started with the laser cutting of the the perforations for the base board. The shaped and components were laser cut. The model base was constructed using basic tools in the laboratory like screws, hammers, scales, cutting machines, glue and so on. This was a new experience to build the model right from the start. The process of applying changes to the procedure of making the model taking into consideration the convenience and availability of materials was a part of the experience.

This was a project that showcased the development of tools to communicate with children and non-experts to brings out results necessary for the design development in a manner that is enjoyable and engaging to the children. The participation and willingness of children had to be achieved .

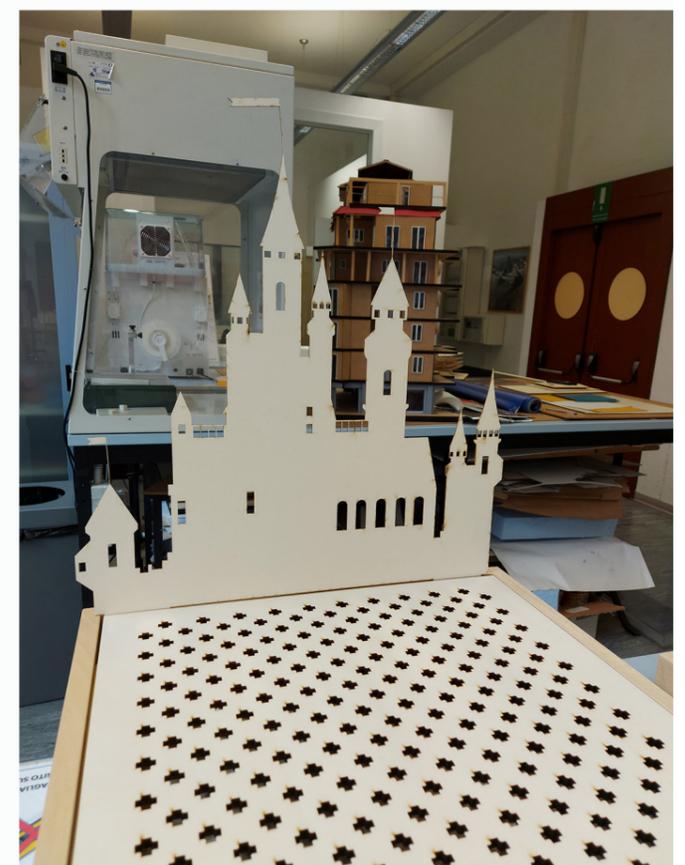
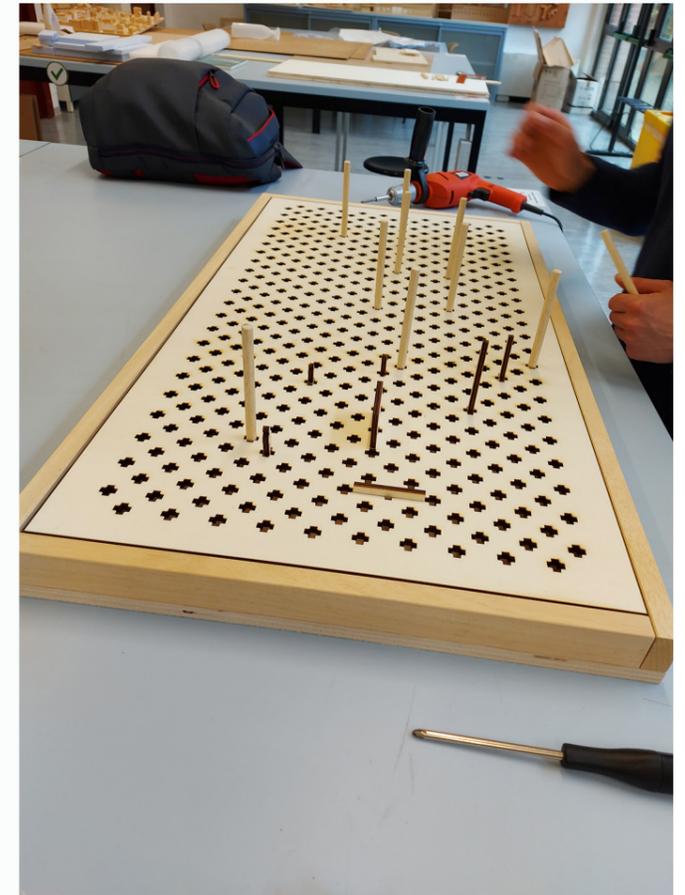
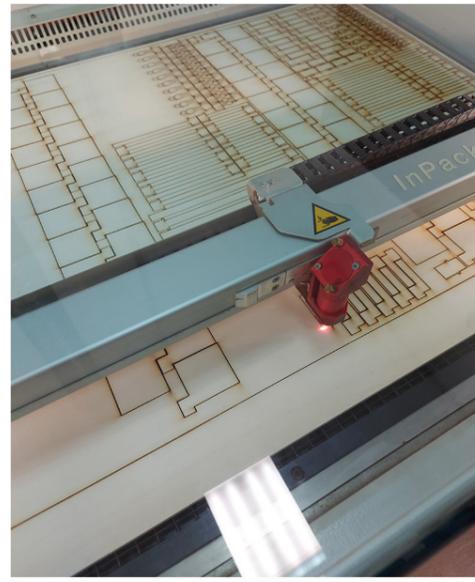
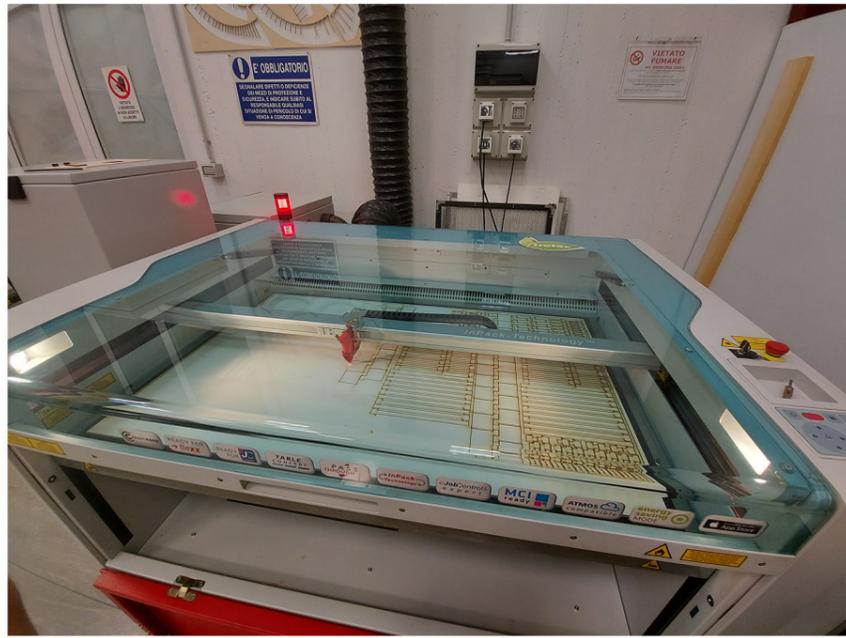


Fig. 11 - Fig. 17- Preparation of the base of model used for workshop 2.

Fig. 18 - Fig. 21- Preparation of the base of model used for workshop 2.

### Task – Making of 3D model showing children's idea of a school in the park.

The first workshop was analysed to get an idea on the themes to be considered for the model making. Since Scarabocchi is a festival focused on trees and the results of the first workshop also demanded the need for trees, the utilisation of trees was the core theme of the activity. The first workshop made clear the activities that happened throughout the day and the spatial requirements. Each group was to provide a space for the given themes and activities such as entrance, storage, studying, eating, relaxing, sports, recreation and services. Children used the predefined elements along with the craft items such as woollen threads, cotton, fabric, colours, coloured papers and so on.

### Observation

The activity brought about a sense of competition and excitement in children. Each child was focused on a particular theme and tried to express their thoughts on the model. The approach to most spaces were through the use of difference in heights and levels. Preference for semi-open spaces was clearly seen. Activities that are physically challenging were suggested. Easy movement and connection between activities were suggested through slides and bridges. The inclusion of waterbodies, pets, vegetable gardens, flowers were seen on the models. Games such as labyrinth and abstract elements that are informative as well were represented. Children preferred elements that could make them learn in an active manner. Some strategies and characteristics of the spaces that could be considered for the design of the park were obtained from this activity. This was an efficient way to bring out the creativity in children and make them express their thoughts, which could be later analysed and developed from an architect's point of view.

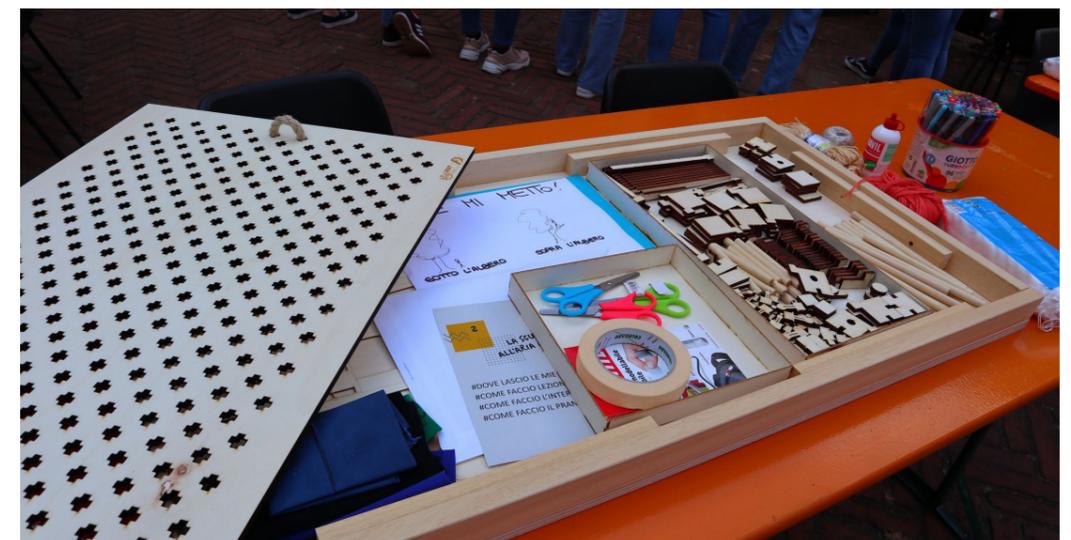


Fig. 22 - Fig. 24- Model making workshop held during Scarabocchi festival, Novara



Fig. 25 - Fig. 27- Children's depiction of their ideal ' School at the park'

Fig. 28 - Fig. 30-Children's depiction of their ideal ' School at the park'

## Concepts emerged from Workshop 1 'A day of school at the park'

As the workshop 'A day of school at the park' clearly showed the routine of children throughout a day and their necessities in a school and during lessons outside, the drawings of children were analysed to form spatial and functional requirements of the project. The following are the concepts emerged from the first workshop.

### To arrive

The entrance of the park is to be welcoming, attractive and friendly with consideration given to the means by which children arrive, whether by walk, cycle or by car. The storage of their belongings, refreshment area and reception are necessary. The entrance could be made interesting with multiple signage boards, boards to welcome children with a message, bicycle stand and also through treatment of the pathway in an attractive manner therefore directing children to their respective activities.

### To store

A safe space for storage is an important part of outdoor activity. The belongings of each child should be easily accessible and in a convenient position yet not intrude into the activities in the park. Storage could be made through use of natural openings, small storehouses, abstract forms or any multipurpose structure or temporary structures that could be moved.

### To listen

When it comes to having lessons outdoors, it is required to have spaces that are excluded from the rest of the activity. Tranquillity is required for convenient listening and interaction between students and the teacher. Unlike the conventional classroom, children are exposed to nature and surroundings which could make it interesting and prevent boredom. These classes could have elements such as seating, boards, tables and barriers that prevent interruption of other activities. It is necessary to look into the year-round weather conditions to utilize the space efficiently.

### To play

Playing is crucial for the social, physical and emotional development of a child. It helps them to interact, think, be impulsive, and get new experiences they could learn from.

### To train

Physical education, recess, sports, play are all a crucial part of a child's daily routine at school. Physical training could be exercising or activities that involve safe risks. This requires multipurpose spaces for flexibility in activities and also structures that support training such as trim trails, wall climbing, rope traversing and so on. It is important to consider that these activities challenge children and bring out their best.

### To eat

Snack breaks or lunch breaks require a space and ambience that promotes interaction, friendship and sharing. Convenience and comfort should be the prime consideration as it could be difficult to achieve for dining in an outdoor area. A good view and closeness to nature could create a good ambience. The possibility of shelter and shade when necessary temporarily should be taken into consideration. The use of trees as shade and benches around trees are typical representations of an outdoor dining that promotes a sense of community.

### To relax

Relaxation and recreation are a part of the interval or in some cases a part of the routine. Children could prefer to have some quiet time to think observe or even to sleep. This makes it necessary to include relaxation spaces. This could be achieved in an outdoor environment through the presence of soft surfaces, bean bags, hammock swings and undulating surfaces. Abstract elements that are informative could be elements that serve both relaxation as well as playing and interacting.

### To gather

A school requires gathering, performing and interaction on a daily basis. Whether it is an assembly, program, celebration or interaction, the gathering space is always the core area of any school. This makes it important for it to be the most attractive and welcoming part of the school. The area could be characterised with elements such as a podium, seating, barriers. Proper visibility and prevention of unwanted sound should be considered.

### To think

Activities that promote creativity and thinking power in children could be in the form of problem-solving games, art, craft and so on. Playing with sand, solving puzzles, painting, games such as solving a maze could challenge children and keep them engaged mentally and physically. This could give a sense of competition and challenge children to think, create, be impulsive and solve-problems.

### To nurture

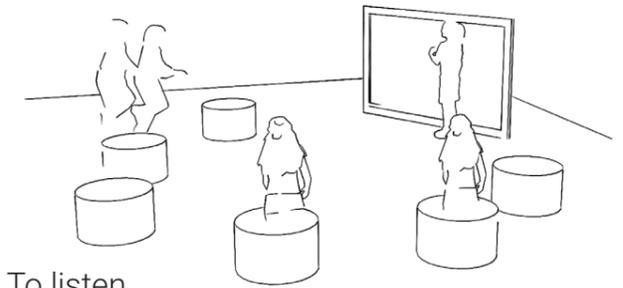
Presence of natural elements such as water body, vegetable garden, pets, flowers and so on give children an opportunity to observe, nurture and learn from experience. The changes that occur in nature, the responsibilities of a child to protect nature, the closeness and interaction with natural elements are some of the best learning methods.

As a result of these concepts emerged, it was possible to guide children during the second workshop, 'A school at the park'. These concepts were given as tasks to them to keep in mind while building the model. They were supposed to achieve these concepts and represent them using their creativity and ideas in a three-dimensional form. In this way, we as architect were able to frame the requirements as well as the strategied that could be used to put while aplying these requirements in the later developments stages.

## Concepts emerged from Workshop 1



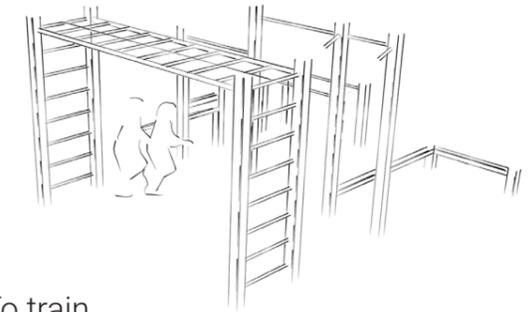
To arrive



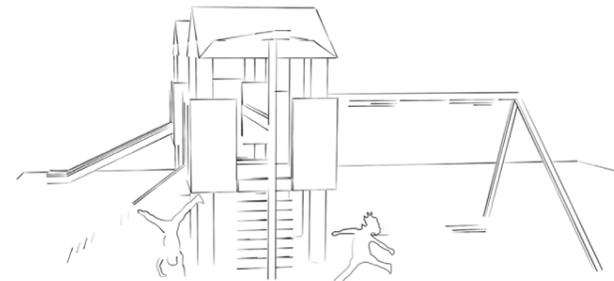
To listen



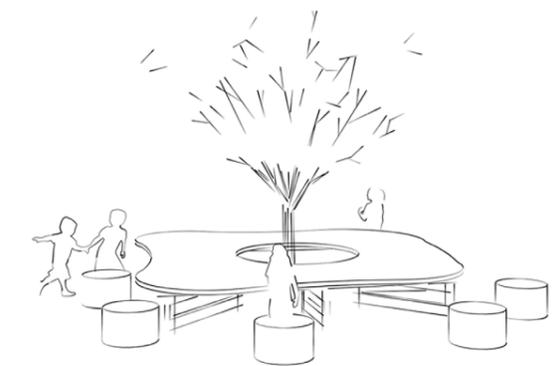
To store



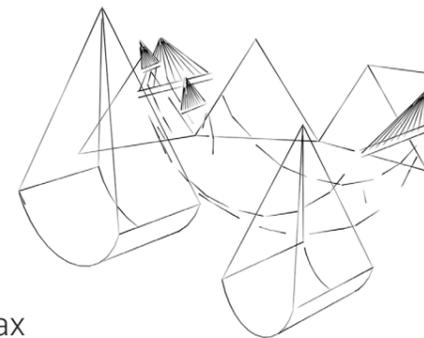
To train



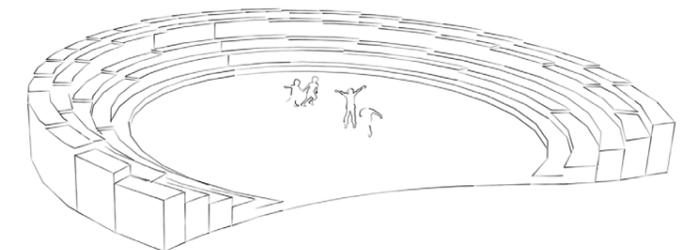
To play



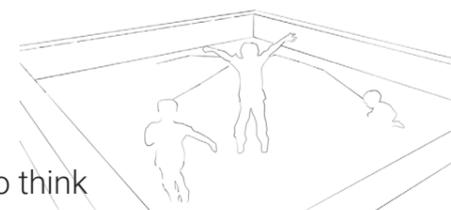
To eat



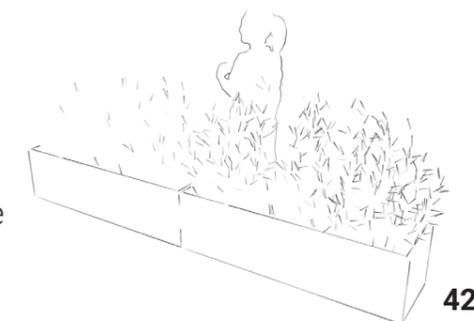
To relax



To gather



To think

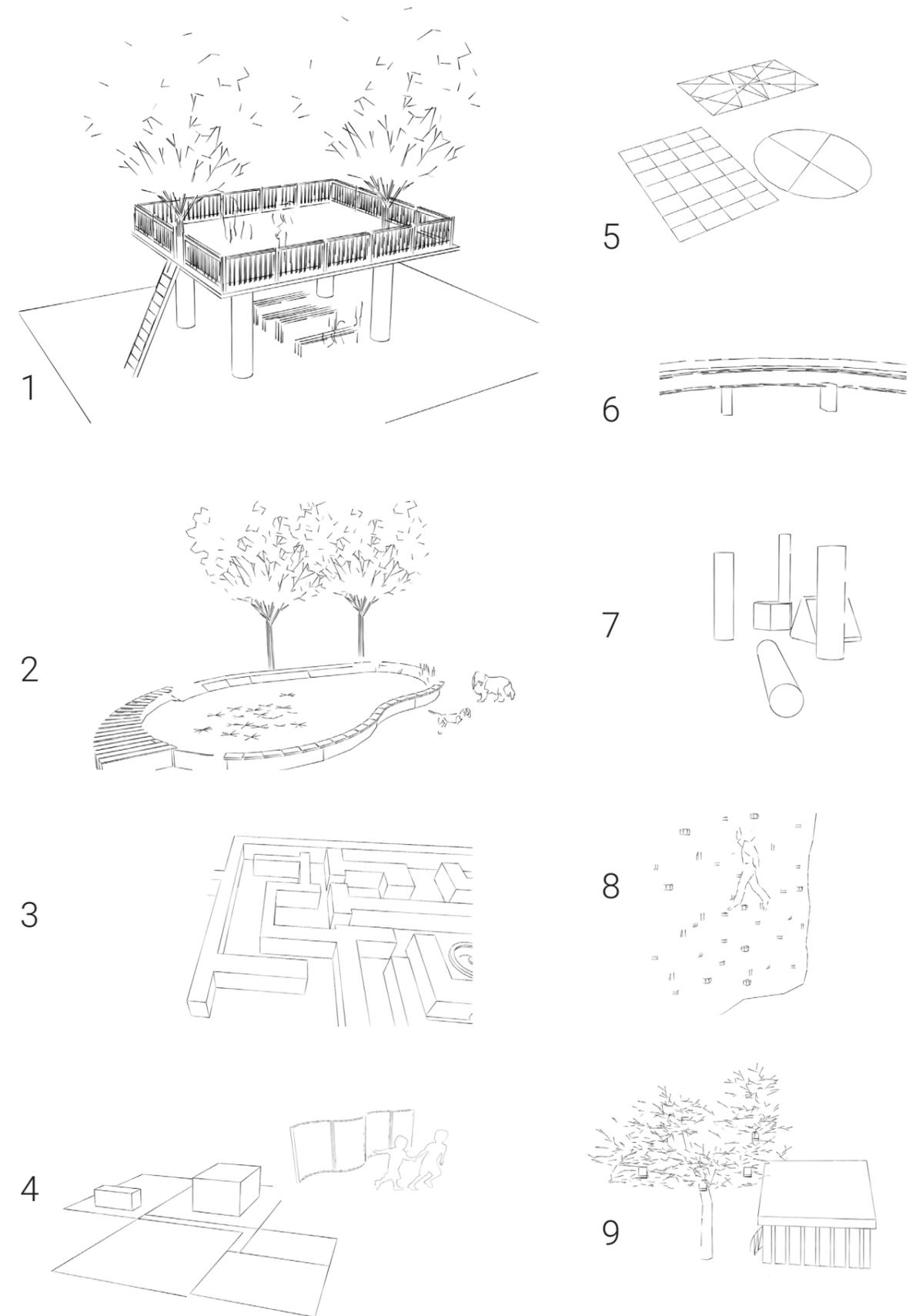


To nurture

## Concepts emerged from Workshop 2

### Concepts emerged from Workshop 2 'A school at the park'

- 1. Spaces for learning at different levels for visual connection and observation and to avoid monotony.** Several elements placed by children on the model showed the playing with levels. This could be incorporated in many ways such as the presence of an amphitheatre, bridges, steps and abstract elements that allow them to observe objects from different angles, to give them interesting visuals, to make the space interesting and to avoid monotony of spaces, and mainly to activate the area and make children play, jump, learn and relax.
- 2. Inclusion of natural elements that enhance the child's relationship with nature.** The model suggested the inclusion of nature in many ways. It could be through the introduction of flower gardens or vegetable garden for organic farming which allow kids to learn about food and observe changes in nature with changing seasons. A pond which could allow the visibility of the aquatic life and aquatic plants could keep them close to nature and feel the connection and bring about a sense of nurturing. Even the presence of pets were suggestions shown in the model that could make their connection stronger.
- 3. Inclusion of games that help improve thinking ability and creativity.** The models showed different type of playing elements. One category was the elements that helped improve their creativity and thinking ability. This could be through the inclusion of mazes, sandpits, drawing of abstract elements on the flooring surfaces that could be used as puzzles to solve and learn at the same time.
- 4. Boundaries and barriers to distinguish functions and avoid interruption.** The models showed the use of partitions to distinguish between functions and also as visually pleasing features. This could be applied in a very subtle manner in the project where necessary. Less visible boundaries such as pathways, the use of colour changes on surfaces, the use of abstract vertical elements, the change in texture of floor are all features that could be incorporated for this reason. The barriers could be incorporated in such a way that the visual connection is not completely blocked so as to ensure safety of children.



5. **Incorporation of various textures and colours on surfaces.** The incorporation of games on flooring and the use of surfaces with different textures such as grass, sand, gravel, pavements, coloured surfaces could all make the space more interesting and help enhance the space visually and functionally although being an outdoor open space. This could grab the attention of children therefore making the space inviting, attractive and active.
6. **Interesting and easy connections and transitions between spaces.** The models showed that children prefer interesting connection throughout the site to be able to easily access each space. This also help keeping them close and connected in the middle of a vast open space. This could be achieved through interesting treatment of pathways and bridges.
7. **Use of abstract and informative elements that help in interaction and learning.** The use of abstract forms such as cubes, prisms, circles and so on could act as mutipurpose features which could be used during intervals, for interaction and also could be informative objects that could give knowledge about geometric forms, shadows and so on.
8. **Elements that encourage physical activity of children that allow them to take risk with safety.** Many adventurous activities engage children and keep their interest. This could be a part of their physical training lessons. The models showed many adventurous activities right from rope traversing to climbing. This could be incorporated in a suitable manner taking into consideration the safety of children and the scale and requirement of the project.
9. **Inclusion of services such as washrooms, lights, and drinking water.** The models showed small tents for the purposes of restrooms, storerooms and so on. These have to be considered as the basic necessities in the project and implemented in a convenient and suitable manner.

## Functional Requirements of the Project

As a result of the two workshops, it was possible to frame the functional requirements of the project and the elements to be incorporated for each functions. The first workshop help intrduce the functions and activity requirements and the second workshop gave results that are the project strategies that could be implemented in the further design stages. The following are the acitivity and spatial requirements framed as a result of the workshops.

### Entry and exit

#### Gathering

Assembly space  
Amphitheatre

### Learning

Outdoor classroom units  
Teachers' room

### Physical Activity

Play structures  
Trim trail

### Interval

Dining  
Snack bar  
Relaxation seating  
Abstract elements

### Creative activity

Art and craft area  
Puzzles/ Labyrinth  
Sand Pit

### Environment

Water body  
Vegetable garden  
Pet zone

### Services

Drinking water  
Rest rooms  
Storage room



## The project

The project site, **Marco Adolfo Boroli Park** is situated in the **Sant'Andrea district, Novara**. This green space was abandoned for many years, although located at a favourable part of the district. In 2017 the De Agostini Foundation, in collaboration with the Municipality of Novara, took up this project of urban redevelopment and social regeneration. By September 2019, Sant'Andrea had a new green park, a space for events, meetings, activities, bringing together, the young, adult and the old, making social relationships stronger. This project was one of the first examples of urban redevelopment in the city.<sup>1</sup>

<sup>(1)</sup> Felisi, A. (2019). Sant'Andrea, In Via Redi the New Park for the Whole District Is Born. NovaraToday. [www.novaratoday.it/attualita/parco-via-redi-inaugurazione.html](http://www.novaratoday.it/attualita/parco-via-redi-inaugurazione.html)

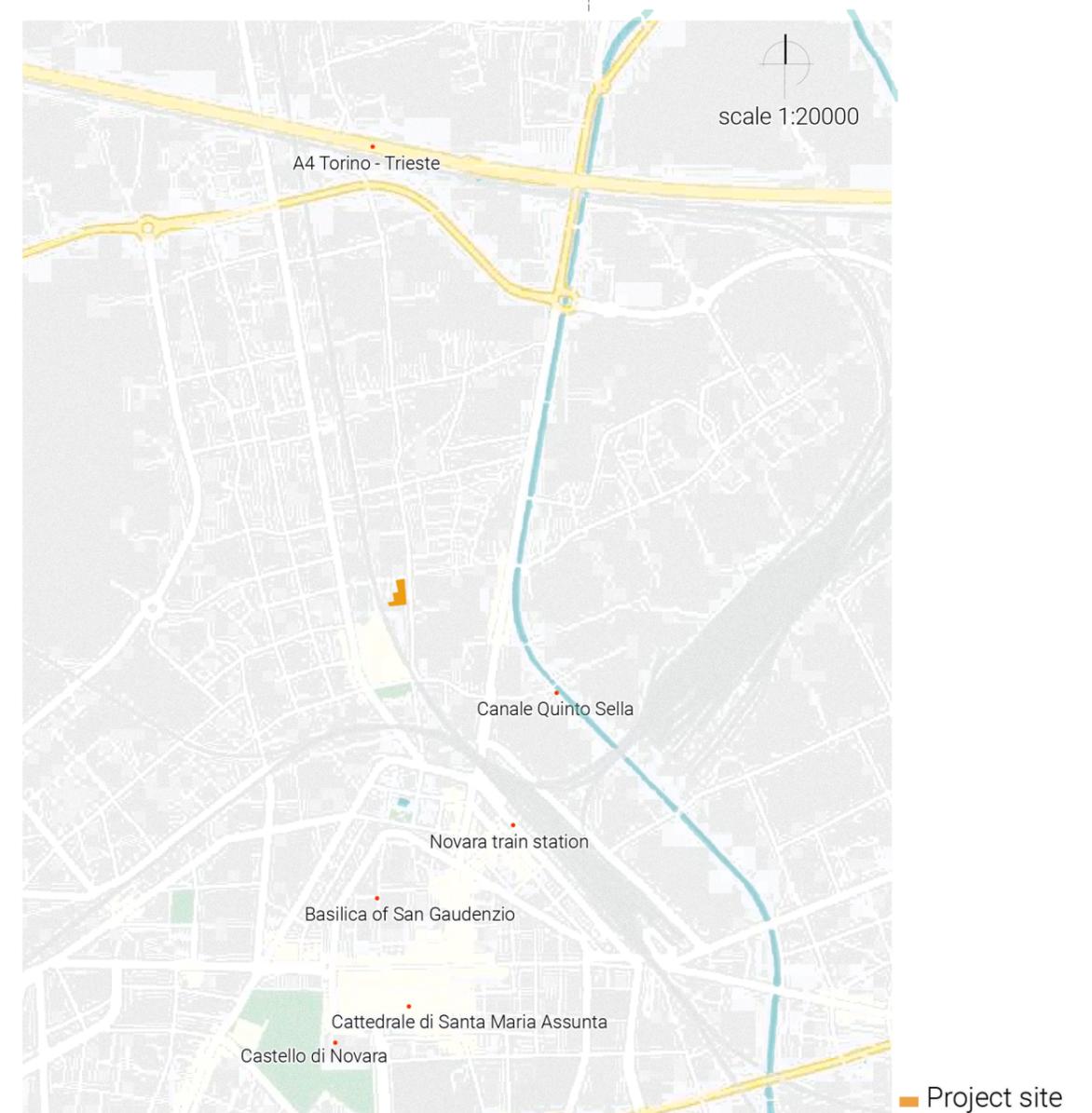
**The primary school P.Thouar**, situated adjacent to the park, is one of the primary users of the park after its regeneration. As an extension to this situation, this project will experiment and demonstrate how the park could be used by the school efficiently, looking at it from the perspective of promoting Outdoor Education. The target is to see how effectively the park could be transformed into an outdoor school i.e. a school without walls.

### Location of the site

The site is located at the periphery of the city of Novara, in the district of Sant'Andrea. The area of the site is predominantly a residential zone. To the south of the site is the city of Novara, to the north is the school of P.Thouar, to the east, separated by the residential zone from the site, is the Canale Quintino Sella. The railway line runs close to the site, along the west side.

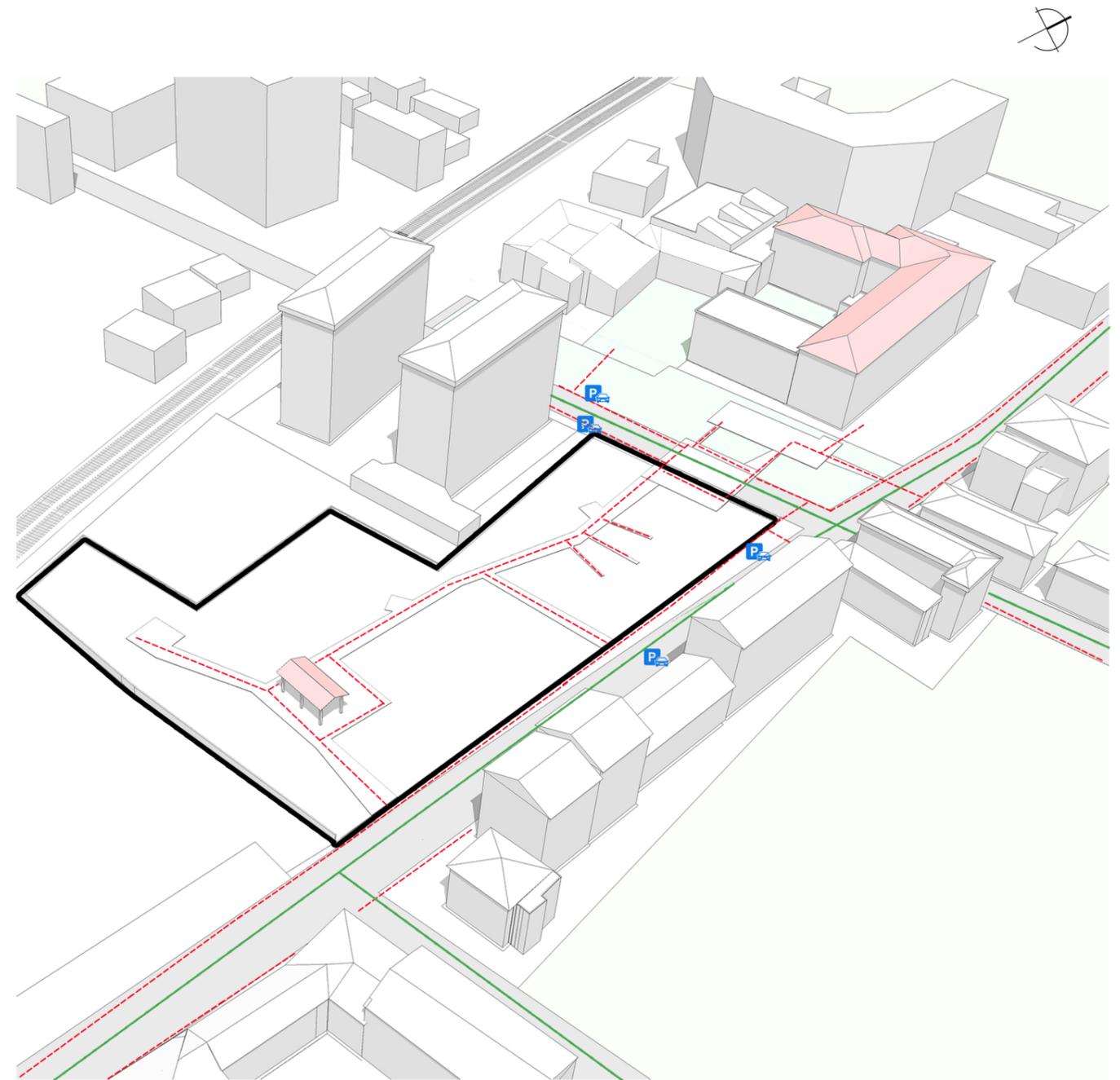
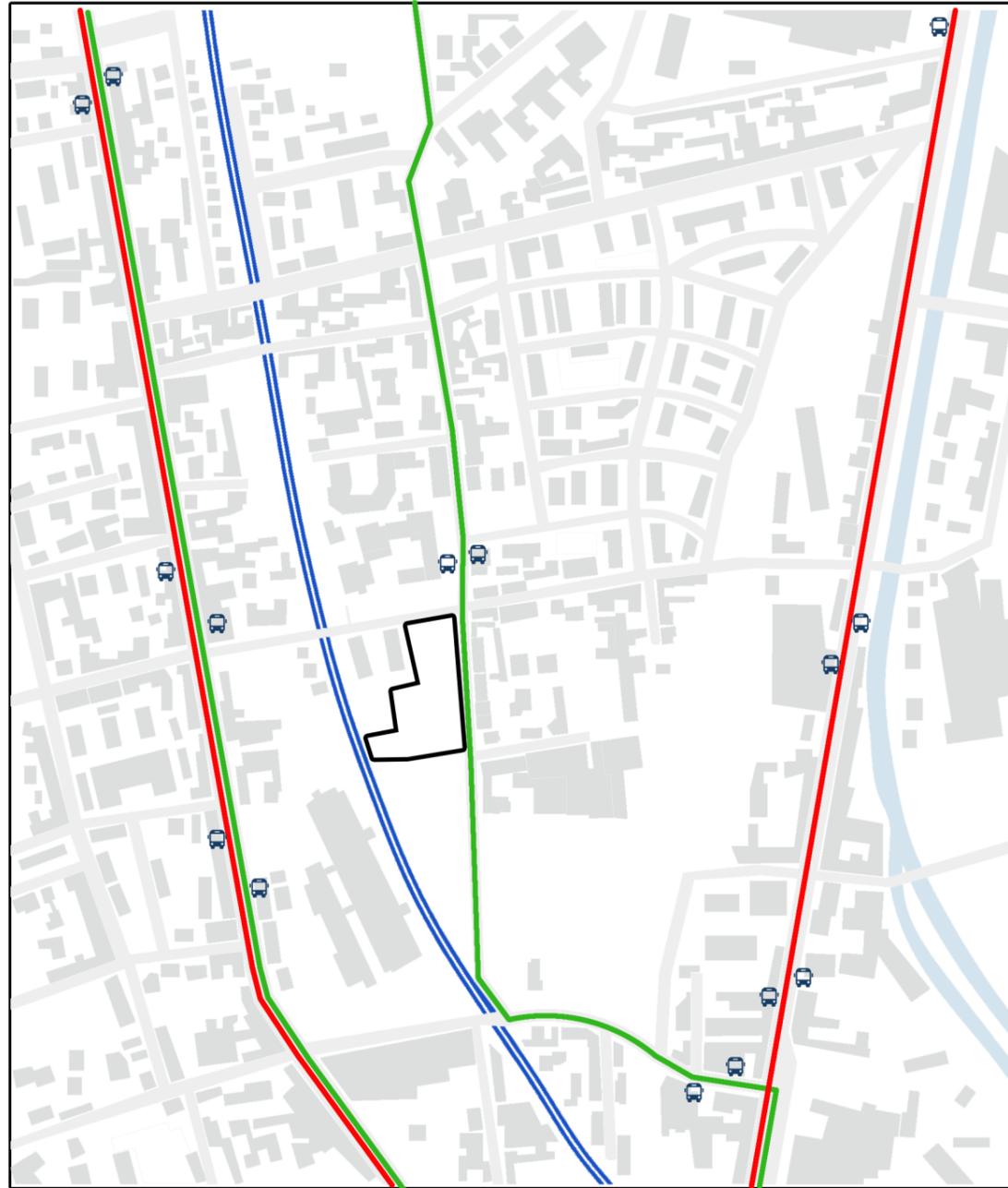
## The Urban Context analysis

The following part of the chapter is an analysis of the neighbourhood of the site, the accessibility, the climatic conditions, the nearby utilities and vegetation around the site. This is done to conclude the strength and weakness of the site, to pay attention to issues such as noise, access, climatic issues and also to see how to include the neighbourhood in the activities of the park.



# Accessibility

Scale 1:1000



### Accessibility

The map covers a radius of approximately 700 metres of the neighbourhood of the site. The most convenient way to access the site is through private transport. There is no public transportation from the city centre to the site. However, the **train station is a 12-minute walk from the site.** The roads through which the site is accessed is **bicycle and pedestrian friendly.** The railway line runs very close to the site on the western part.

A closer look at the site shows **convenient pedestrian access throughout the site and around it.** It is favourable to access the park using bicycle and private vehicles due to the presence of parking space and bicycle paths.

### Inference

- More **space for parking of bicycle** could be considered.
- The **entrances to the park could be maintained** as it is present conveniently throughout the site.
- As the park is devoid of fence along the roads, it is necessary to look into the **safety while placing activities.**
- The railway line at the west could be of disturbance, measures could be taken to **avoid noise.**
- The need for children to **cross the road cutting through the park** could be made minimal through proper placement of activities.
- The **access of the site to the public** has to be considered.

### Surrounding utilities

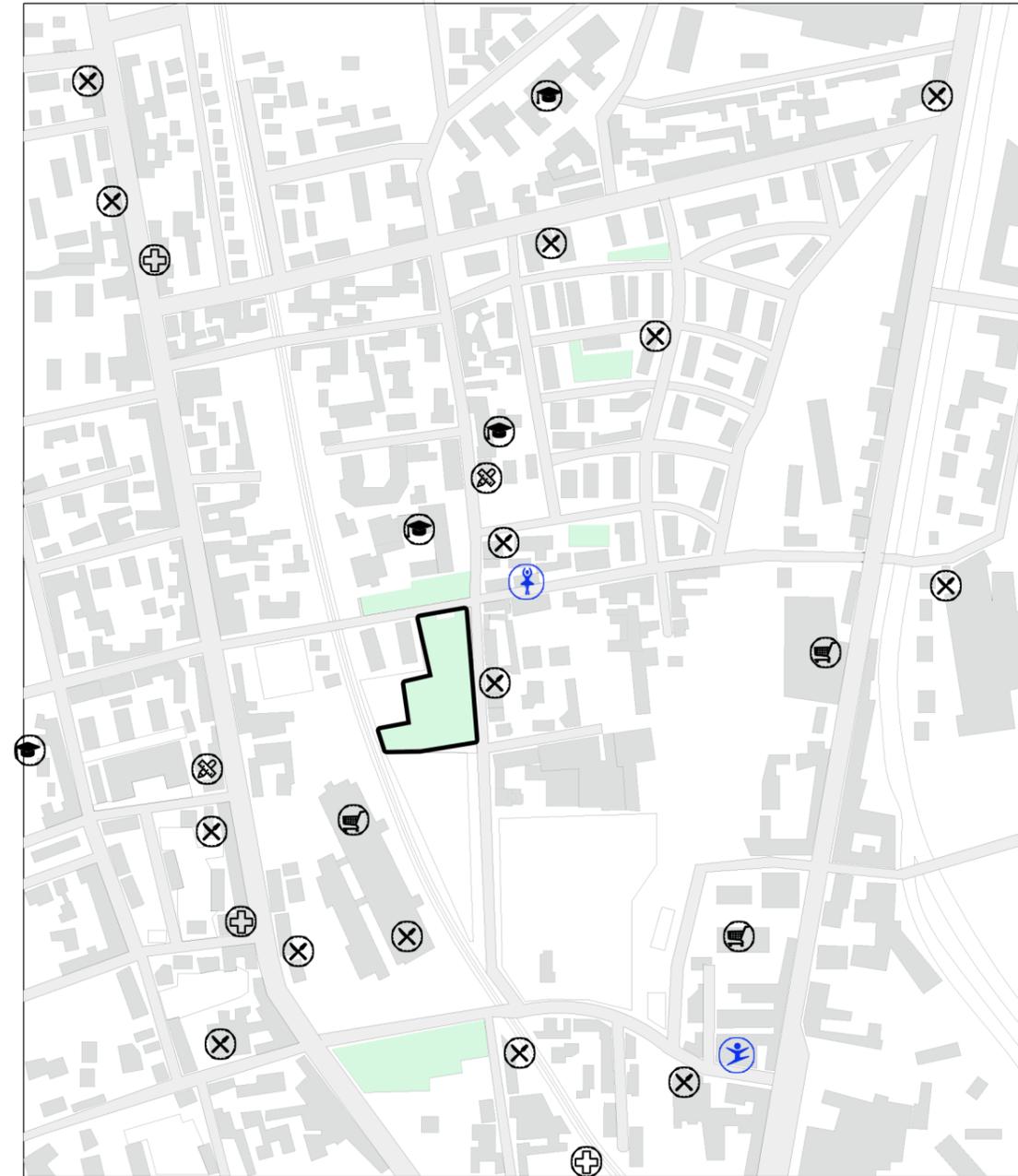
The utilities around the site is analysed to see if **specific activities need to be added or avoided taking into consideration the neighbourhood.**

### Inference

- Currently the site is used occasionally for events and gathering of the local community, some activities identified around the site such as **dance and gymnastics give scope to using the site for the display and conduction of events.**
- There is an **absence of cafes / restaurant close to the site** and hence it could be considered in the project.

### Utilities around the site

scale 1:1000



#### General utilities

- 🎓 Educational institute
- 🛒 Grocery store
- ⊗ Restaurant/ Cafe
- ⊕ Pharmacy
- ⊗ Stationary store

#### Favourable activities for site utilisation

- 🌟 Dance school
- 🌟 Gymnastics academy

### Green and open space

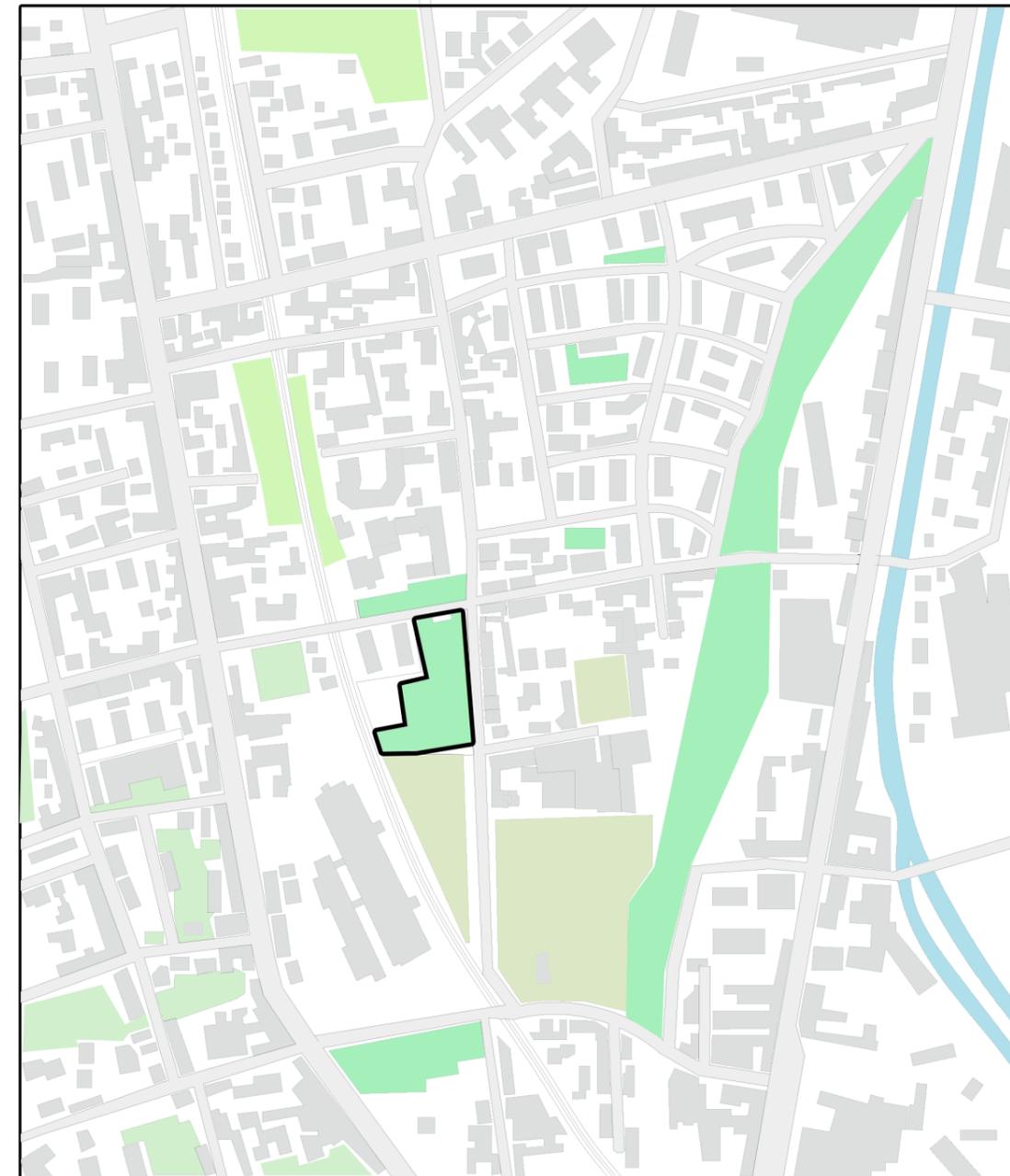
Through the analysis of open and green spaces, it was possible to **identify the activities in other open spaces around the site. The irregular maintenance of other parks does not make them suitable to organise events and have gatherings.** Hence Parco Boroli is found most suitable for the purpose. The presence of the **barren field to the south of the site makes it a possibility to extend the park in the future.** The use of **farming in the vacant spaces near the railway track** affirms a favourable result from the inclusion of farming activities in the site.

### Inference

- Need to use the **park for gatherings and events for the public**
- Inclusion of **farming activities** could be a success.
- Necessary to maintain and focus on the **green environment** of the site.

Green space

Scale 1:1000



Legend: Park (dark green), Garden (light green), Brown field (olive green), Farming (medium green), Canal (blue)

## Climatic Conditions

The climatic data reports of Novara, where the site is located, are collected to see how the weather conditions change through the year in order to come up with an efficient design that could tolerate the conditions and work effectively all-year round. For this purpose, **the average temperate, rainfall, snowfall, sun path, wind direction and speed, daylight and cloud cover are considered.**

<sup>(2)</sup>Climate And Average Weather Year Round In Turin Italy. (2022). Weather Spark. [www.weatherspark.com/y/55583/Average-Weather-in-Turin-Italy-Year-Round](http://www.weatherspark.com/y/55583/Average-Weather-in-Turin-Italy-Year-Round)

### Average monthly high and low temperature

The **warm season last from June to September** with a peak high temperate of 84°F and the **cold last from November to February** going low to a point of 27°F. The **hottest month is July** and the **coolest January**.<sup>2</sup>

### Rainfall and Snowfall

The month with the **most rain in Novara is May**, with an **average rainfall of 93mm**. The month with the least rain in Novara is January, with an average rainfall of 35mm. **The wet days are from the beginning of April to the end of November.**

In Novara, **Snowfall is expected from December to February**. The most snow is seen in January with an average of 48mm. There is no snowfall during the other months.<sup>2</sup>

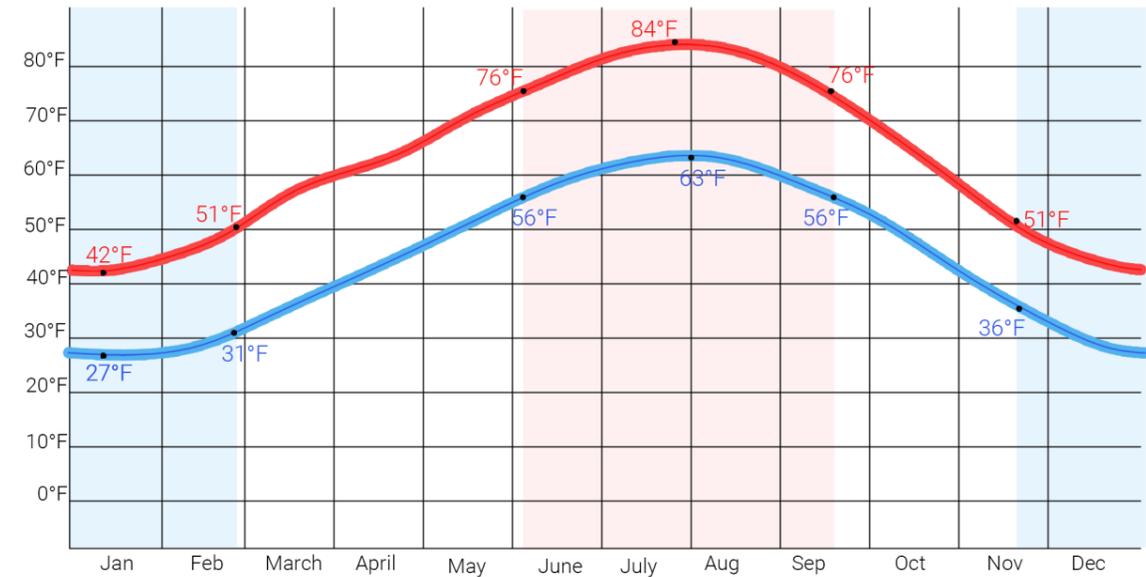


Fig. 1 - Average High and Low Temperature at Novara

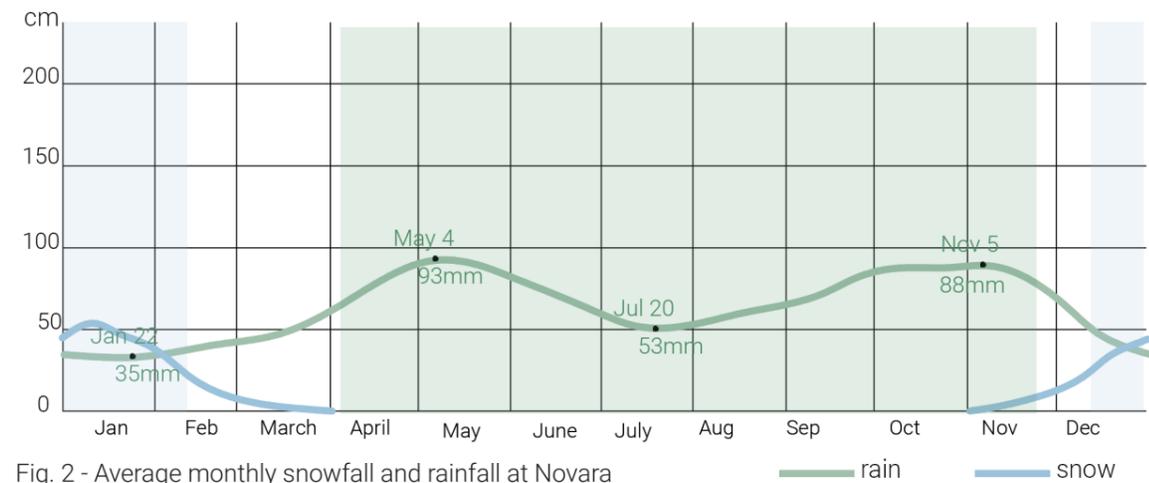


Fig. 2 - Average monthly snowfall and rainfall at Novara

### Wind Speed

The windier part of the year lasts for about four months, from February to June, with average wind speeds of more than 4.5 miles per hour. **The windiest month of the year in Novara is April**, with an average hourly wind speed of **5.2 miles per hour**.

**The calmer time of year lasts for eight months, from June to February.** The calmest month of the year in Novara is December, with an average hourly wind speed of 3.8 miles per hour.<sup>2</sup>

<sup>(2)</sup>Climate And Average Weather Year Round In Turin Italy. (2022). Weather Spark. [www.weatherspark.com/y/55583/Average-Weather-in-Turin-Italy-Year-Round](http://www.weatherspark.com/y/55583/Average-Weather-in-Turin-Italy-Year-Round)

### Wind Direction

**The predominant wind is from the East from February to November**, with a peak percentage of 52% in August. **The predominant wind is from the North, from November to February**, with a peak percentage of 42% in January. The tinted areas in the graph are the percentage of hours spent in the implied intermediate directions (northeast, southeast, southwest, and northwest).<sup>2</sup>



Fig. 3 - Average wind speed at Novara

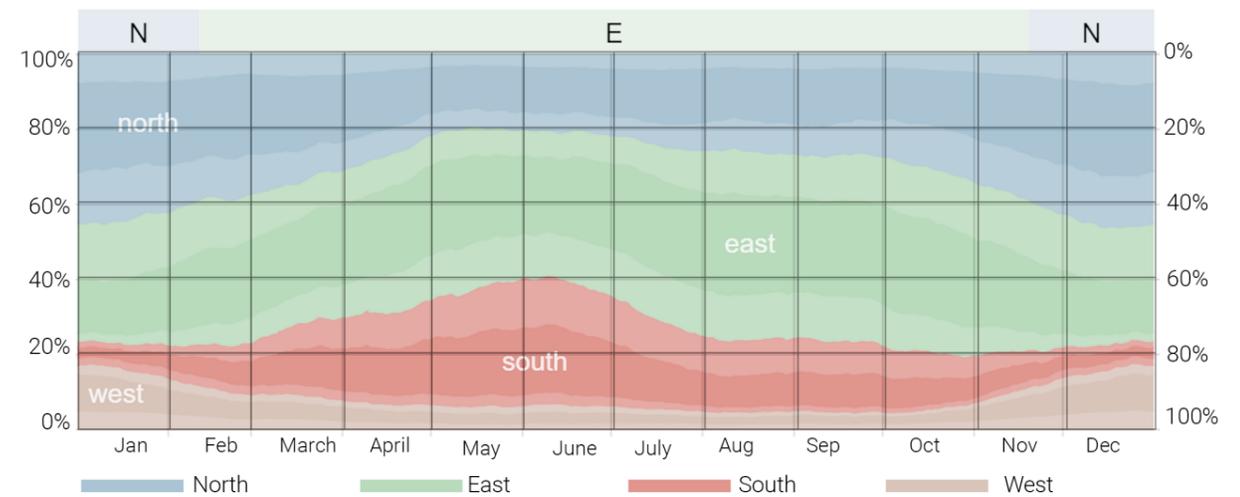


Fig. 4 - Wind Direction at Novara

### Cloud cover

In Novara, the sky is clearest from **mid-June to the end of September**. The cloudier months are **October, November and December**. In November the sky is overcast 50% of the time.<sup>2</sup>

### Daylight

It is seen in the graph that the **hottest day July 25 receives daylight of 15 hours**. The **coolest day January 15 receives daylight for 8 hours**. **12 hours of daylight is received during the spring and fall equinox.**<sup>2</sup>

<sup>(2)</sup>Climate And Average Weather Year Round In Turin Italy. (2022). Weather Spark. www.weatherspark.com/y/55583/Average-Weather-in-Turin-Italy-Year-Round

### Inference from climate conditions analysis:

- As the region has very hot summers and cool winter, it is necessary to examine the microclimate of the site to **distribute activities in a convenient manner and consider thermal comfort of users**.
- The **wind in Novara** is generally calm and hence in **which is favourable situation in winter, but need to be a concern during summer months** and hence it is necessary to rely on shaded areas.
- The **daylight received in winter is only for 8 hours with very cloudy skies** which is an issue to be tackled.

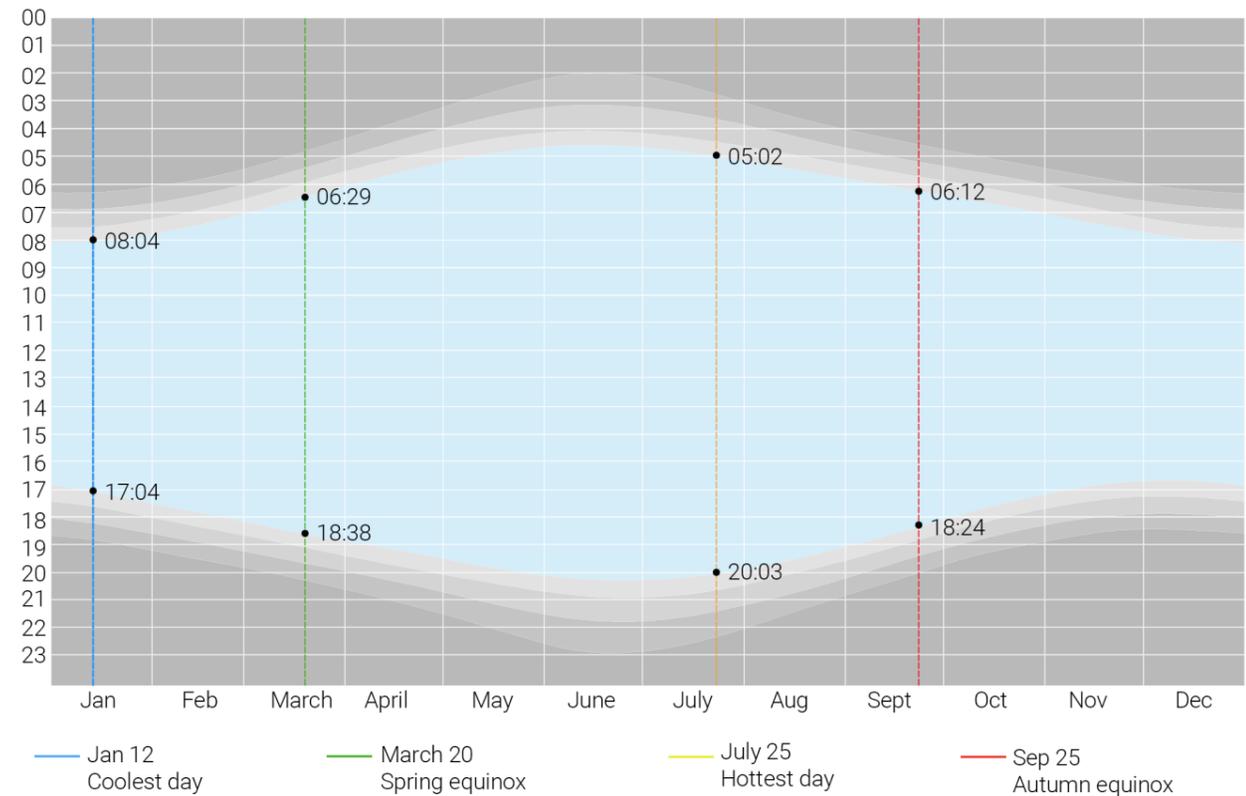


Fig. 5 - Daylight time in Novara

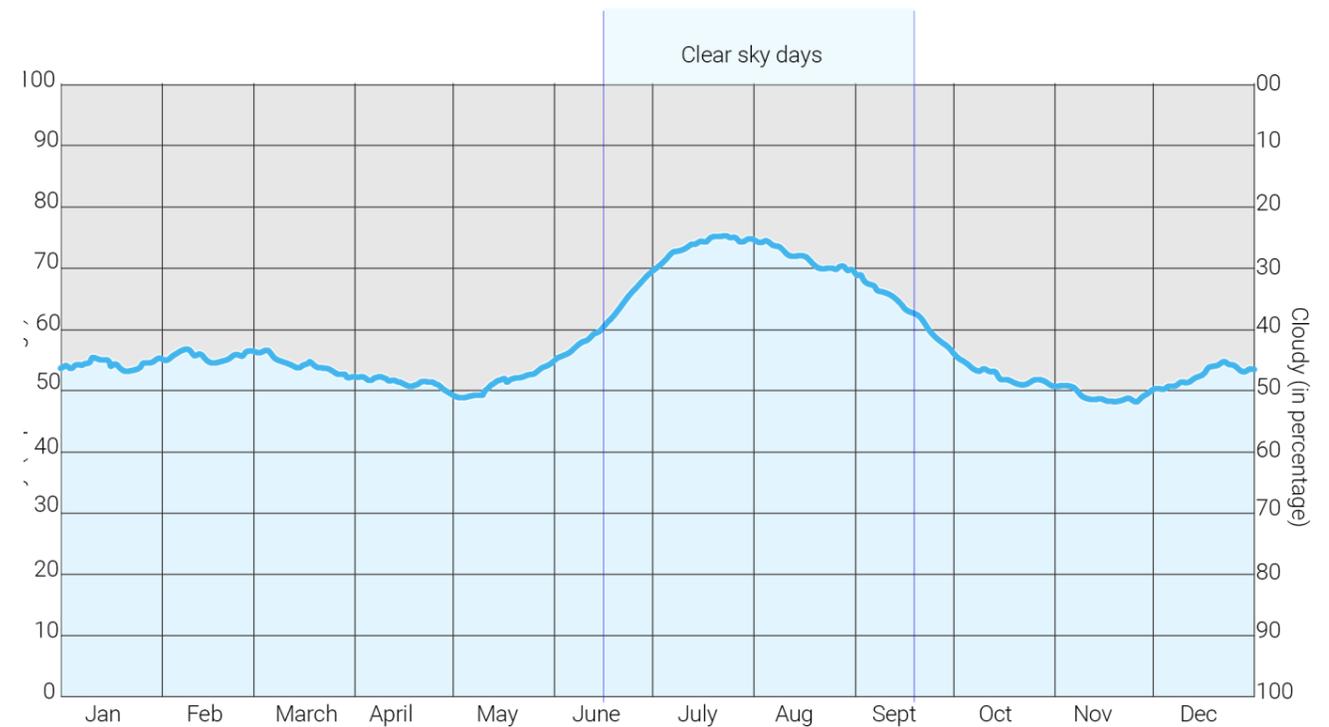


Fig. 6 - Cloud cover in Novara

## The Site and Microclimate analysis

The following part of the chapter shows the details of the project site and also the detailed microclimate analysis. The presence of **vegetation, shadows, winds are considered to detect the best regions of the site and distribute activities around the site efficiently.** The strategies to overcome the weakness of the site could be applied in the proposal.

### About the site

The **entrance to Parco Boroli is from via Delle Rosette on the east side.** It could be **accessed from the north** through the primary school. The park is **divided into two 2 portions by via Redi.** The north portion is a playground with a small piazza adjacent to the primary school. The **lower part is an open green lawn.** The highlight is a **paved pathway that runs through the park.** Along the path there are **several nodes characterised by the presence of urban furniture representing benches, chairs and tables.** Streetlights are present along the pathway. **There is a canopy, a gazebo with a sloped roof and paved flooring, on the southern end of the park.** The southwest corner of the park is a **small fenced area for dogs.** The main attraction of the park is the **designed landscape consisting of a green lawn, the presence of huge trees, shrubs along the fence and young trees planted during the regeneration of the park.** The park is devoid of compound walls on the north and east side.

- LEGEND
- A- Primary School P.Thouar - Sant'Andrea
  - B- Parco Boroli
  - C- Seating
  - D- Canopy
  - E- Playground
  - F- Pet zone
  - ← Access / Entry
  - ← Access from school
  - < Camera viewing point





Fig .7- Parco Adolfo Boroli



Fig. 9-Parco Adolfo Boroli



Fig .8- Parco Adolfo Boroli



Fig. 10 - Parco Adolfo Boroli



Fig. 11 - Parco Adolfo Boroli



Fig. 13 - Parco Adolfo Boroli



Fig. 12 - Parco Adolfo Boroli.



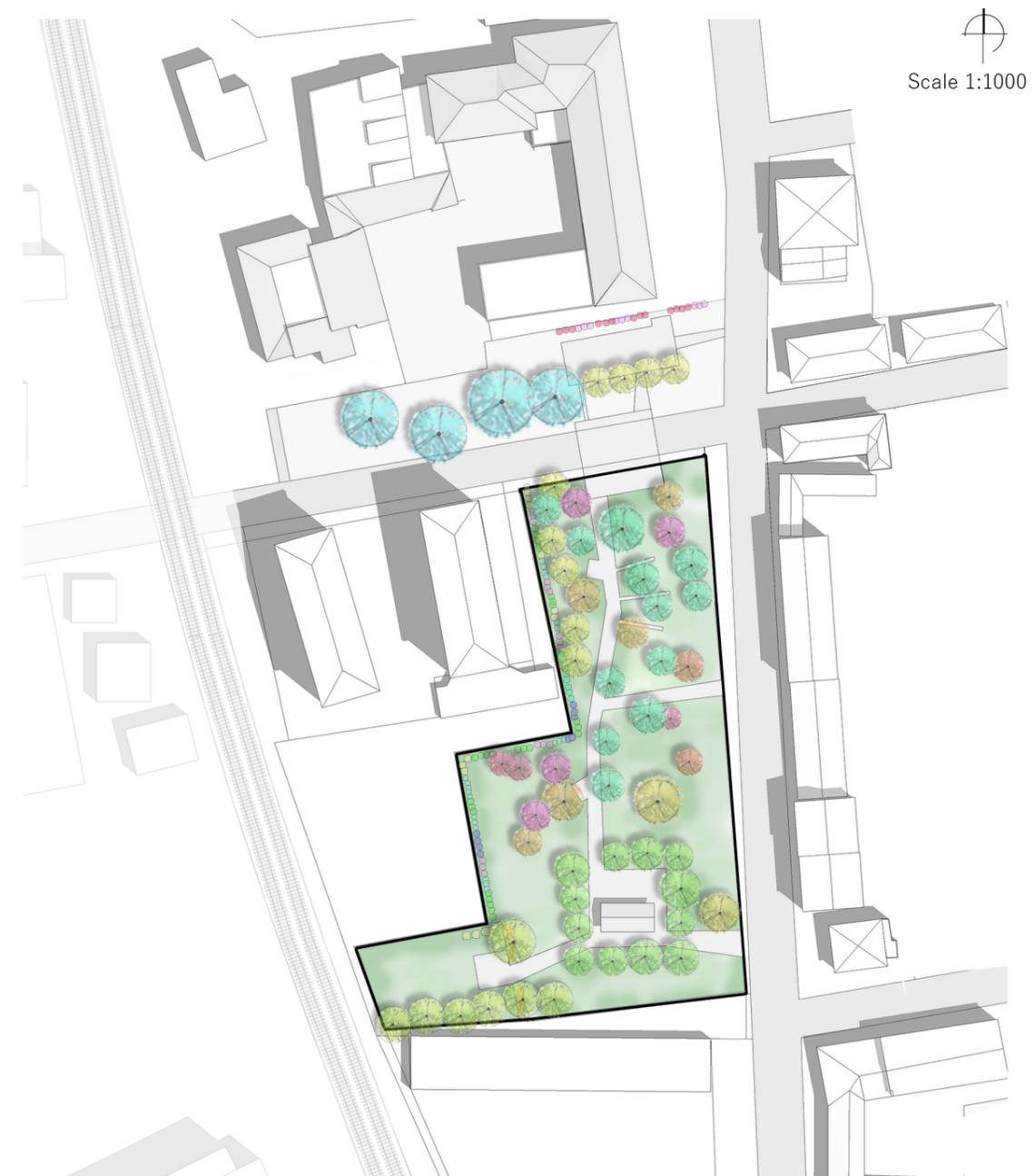
Fig. 14 - Parco Adolfo Boroli

### Vegetation on the site

The vegetation on the site **influences the microclimate mainly through shading and blocking of wind**. Vegetation also act as **buffer for noise and also to block visibility**. Moreover, it plays an important role in making the space lively and aesthetically pleasing. The site has **a few existing trees**. A number of trees and shrubs were **proposed during the redevelopment of the park**. Some trees are deciduous, which **shed leaves during autumn and winter**, which should be considered as it influences the shaded areas in the site. Some functions may be related to the presence of trees or utilise its trunk and branches. **Some characteristics such as its height, trunk size, and foliage** are considered for analysis.

### Inference

- Most trees in the site are of **deciduous nature**. This means that it would have little to no foliage during winter. This is favourable as the shading during winter is reduced and more sunlight is received. **Trees could be taken advantage of to create artificial, temporary canopies when needed.**
- Since the site has plenty of vegetation, **considering trees as a part of each function is necessary. Trees could be the main elements around which the school evolves and functions.**



#### EXISTING TREES

- Cedrus Atlantica Glauca
- Laurus Nobilis
- Prunus - runus domestica
- Ulmis campestris
- Acer ginnala
- Acer rubrum
- Carpinus betulus
- Gleditsia inermis sunburst
- Koeluteria paniculata
- Pterocaria fraxinifolia

#### EXISTING SHRUBS

- Kerria Japonica 'Florepleno'
- Laurus Nobilis
- Mahonia Aquifolium
- Osmanthus fragrans
- Phyladelphus virginalis
- Spiraea bumalda
- Syringa vulgaris
- Spiraea x Vanhouttey

The following is a list of vegetation in the site and its characteristics.

<sup>(3)</sup> *Cedrus Atlantica*. (2021, November 18). Wikipedia. en.wikipedia.org/wiki/Cedrus\_atlantica.

***Cedrus atlantica glauca*** - Fully grown, Atlas cedar is a large **coniferous evergreen tree, 30 to 35 m tall**, with a trunk diameter of 1.5 to 2 m.<sup>3</sup>

<sup>(4)</sup> *Laurus nobilis*. (2022, January 5). Wikipedia. en.wikipedia.org/wiki/Laurus\_nobilis

***Laurus nobilis*** - The laurel is an **evergreen shrub or small tree, variable in size and sometimes reaching 7–18 m tall**.<sup>4</sup>

<sup>(5)</sup> *Prunus Domestica* 'Italian Prune' (Plum 'Italian Prune'). (2019, March 07). Shoot. <http://63.32.165.249/plant/prunus-domestica-italian-prune>.

***Prunus - runus domestica*** - Plum 'Italian Prune' is a **deciduous fruit tree. It will reach a height of 6m** and a spread of 6m after 5-10 years.<sup>5</sup>

<sup>(6)</sup> *Ulmus minor*. Wikipedia. (2022, January 03). Wikipedia. en.wikipedia.org/wiki/Ulmus\_minor.

***Ulmus campestris*** – The **deciduous tree** typically grows to **less than 30 m** tall and bears a rounded crown.<sup>6</sup>

<sup>(7)</sup> *Acer Ginnala*. (2021, November 09). Wikipedia. [www.en.wikipedia.org/wiki/Acer\\_ginnala](http://www.en.wikipedia.org/wiki/Acer_ginnala).

***Acer ginnala*** - *Acer ginnala* is a **deciduous spreading shrub or small tree growing to 3–10 m tall**, with a short trunk up to 20–40 cm diameter and slender branches.<sup>7</sup>

<sup>(8)</sup> *Acer Rubrum* / *Acero Rosso*. Guagno. [www.vivaiguagno.com/en/trees-grow-plants/acer-rubrum/](http://www.vivaiguagno.com/en/trees-grow-plants/acer-rubrum/).

***Acer rubrum*** - It is a large **fast-growing deciduous tree, up to 15-20 m high** if cultivated and with columnar growth habit.<sup>8</sup>

<sup>(9)</sup> *Carpinus Betulus*. (2021, December 22). Wikipedia. en.wikipedia.org/wiki/Carpinus\_betulus.

***Carpinus betulus*** - It is a **deciduous small to medium-size tree reaching heights of 15–25 metres, rarely 30 m** (98 ft), and often has a fluted and crooked trunk.<sup>9</sup>

<sup>(10)</sup> Landscape Plants. (n.d.). OSU Oregon State University. <https://landscapeplants.oregonstate.edu/plants/gleditsia-triacanthos-var-inermis-sunburst>.

***Gleditsia inermis sunburst***- **Deciduous tree, 30-70 ft (9-21 m) tall**, open, spreading crown, distinctive horizontal zigzag branches.<sup>10</sup>

<sup>(11)</sup> *Koelreuteria Paniculata*. (2021, March 22). Wikipedia. en.wikipedia.org/wiki/Koelreuteria\_paniculata.

***Koeluteria paniculata*** - It is a **small to medium-sized deciduous tree growing to 7 m tall**, with a broad, dome-shaped crown.<sup>11</sup>

<sup>(12)</sup> *Pterocarya Fraxinifolia*. (2021, November 16). Wikipedia. en.wikipedia.org/wiki/Pterocarya\_fraxinifolia.

***Pterocaria fraxinifolia*** – It is a **fast-growing medium-sized deciduous tree**. The tree is monoecious and grows to a **height of < 30 m**, the short, thick bole supporting widely spreading branches to form a rounded structure, not unlike the wych elm.<sup>12</sup>

<sup>(13)</sup> *Kerria Japonica* 'Pleniflora'. Missouri Botanical Garden. [www.missouribotanicalgarden.org](http://www.missouribotanicalgarden.org)

***Kerria japonica florepleno*** - The *Kerria japonica* 'Pleniflora' is **kind of shrub**, belongs to the Rosaceae family. The plant has a height between **1.7 and 2.5 meters**, the expansion instead goes from 1.5 to 2.2 meters.<sup>13</sup>

<sup>(14)</sup> *Mahonia Aquifolium*. (2022, January 25). Wikipedia. en.wikipedia.org/wiki/Mahonia\_aquifolium.

***Mahonia aquifolium*** - *Mahonia aquifolium*, Oregon grape or holly-leaved berberry, is a species of **flowering plant** in the family Berberidaceae, native to western North America. It is an **evergreen shrub growing 1 m to 3 m tall** by 1.5 m wide, with pinnate leaves consisting of spiny leaflets, and dense clusters of yellow flowers in early spring, followed by dark bluish-black berries.<sup>14</sup>

<sup>(15)</sup> *Osmanthus Fragrans*. (2021, October 21). Wikipedia. en.wikipedia.org/wiki/Osmanthus\_fragrans.

***Osmanthus fragrans*** - It is an **evergreen shrub or small tree growing to 3–12 m tall**. The leaves are 7–15 cm (2.8–5.9 in) long and 2.6–5 cm (1.0–2.0 in) broad, with an entire or finely toothed margin.<sup>15</sup>

<sup>(16)</sup> *Phyladelphus × virginalis*. Missouri Botanical Garden. [www.missouribotanicalgarden.org](http://www.missouribotanicalgarden.org)

***Phyladelphus virginalis*** - Commonly known as virginal mock-orange, is a **semi-double to double-flowered deciduous hybrid shrub** in the Saxifrage family that typically grows to **1.5m to 3m tall** with an upright arching habit.<sup>16</sup>

<sup>(17)</sup> *Spiraea Japonica*. (2021, March 24). Wikipedia. en.wikipedia.org/w/index.php?title=Spiraea\_japonica&oldid=1013923286

***Spiraea bumalda*** - The shrub reaches **1.2 m to almost 2 m in height and about the same in width**. The **deciduous leaves** are generally an ovate shape about 2.5 cm to 7.5 cm long, have toothed margins, and alternate along the stem.<sup>17</sup>

<sup>(18)</sup> *Syringa Vulgaris*. (2022, January 12). Wikipedia. en.wikipedia.org/wiki/Syringa\_vulgaris.

***Syringa vulgaris*** - *Syringa vulgaris* is a **large deciduous shrub or multistemmed small tree, growing to 6–7 m high**.<sup>18</sup>

<sup>(19)</sup> *Spiraea × Vanhouttei*. Missouri Botanical Garden. [www.missouribotanicalgarden.org](http://www.missouribotanicalgarden.org)

***Spiraea x Vanhouttei*** - called Vanhoutte spirea or bridal-wreath, is a vase-shaped, **deciduous shrub** with branching that arches gracefully toward the ground. It typically **grows 1.5m to 2.4m tall** with a spread to 2.1m to 3m wide.<sup>19</sup>



### Microclimate Matrix

The microclimate matrix is an **early-design method to place buildings and external activities based on bioclimatic conditions**. This method takes into consideration the **position of shadow and absence of wind in portions of site as a result of built structures present in and around the site**. The method has several stages as shown below.

**1. The calculation of shading profile on the plot due presence of building.** The shading profile is considered for the summer solstice and winter solstice. **The shading profiles on 8.00am and 4.00pm is calculated for June 21st and the shading profiles for 10.00am and 2.00pm is calculated for December 21st.** Here, the shading profiles were found using modelling software.

**2. The calculation of the wind calm zones** (the zone where there is absence / calmness of wind due to the presence of obstacles). The wind calm zones **are considered for summer and winter season depending on the prevailing wind direction. This method considers the height, width, length of the building. Using these dimensions, the depth of the wind calm zone is detected.** The profile of the wind calm zone is obtained depending on the direction of the wind, the angle of incidence and the shape of the building. The following tables and graphs were used for the calculation of wind calm zone.

**3. Scoring of each matrix according to the combination of wind and sun.** Four conditions are considered, the areas with **sun and wind, sun and lee, shade and wind, shade and lee**. This is given a score according to the climatic zone. **In our site tropical humid climate type is considered for summer and cold climate type for winter. The scoring is done for the purpose of designing outdoor spaces.** The higher the score, the better the condition. **In summer, it is best to have a combination of wind and shade while at winter it is best to have a condition of lee and sun.** The scoring values determine the favourable areas of the site during summer and winter season.

**4. Seasonal and yearly sum of the score.** The values are obtained for each season and for the entire year. This helps acquire favourable regions of the site for further planning of activities and use of design strategies.

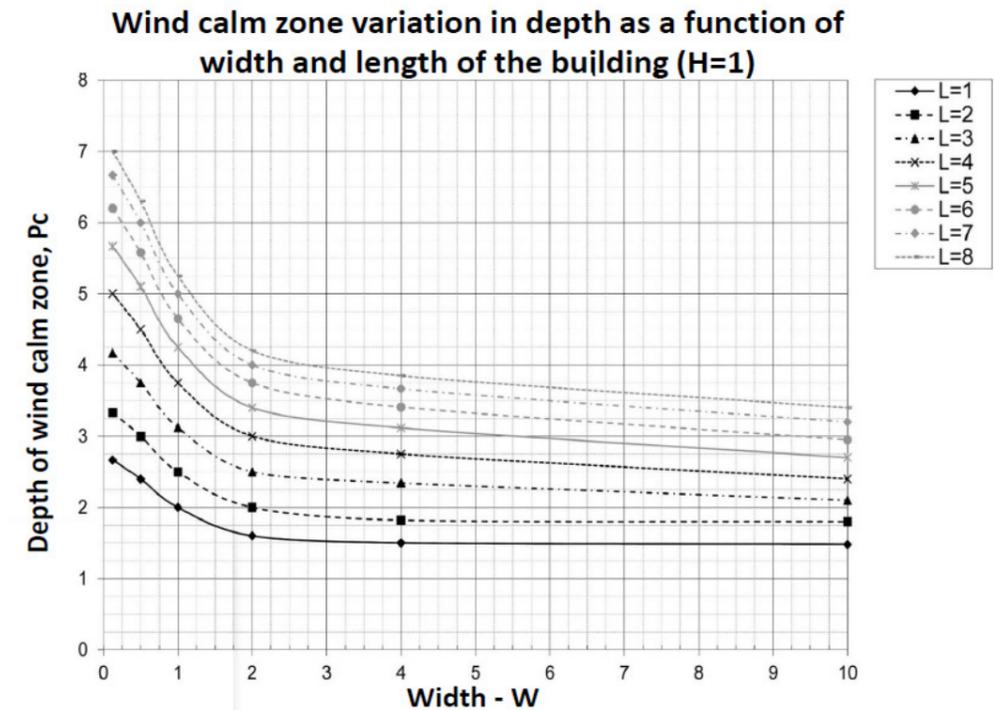


Fig .15 - Wind calm zone variation in depth as a function of width and length of the building when H=1

Coefficients	Wind Incidence angle (°)				
	0	30	45	60	90
n	1	1,07	0,53	0,40	0,40
o	-	1,07	0,87	0,33	-

$$Pc(o) = Pc * o$$

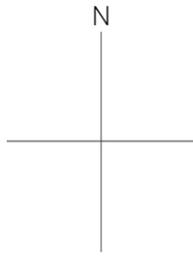
$$Pc(n) = Pc * n$$

Table.1 - Wind incidence angle and Coefficients to calculate depth of wind calm zone for a rectangular building

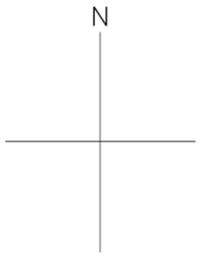
CLIMATE/BUILDING TYPE			SHADE			SUN			LEE			WIND		
Internal Loaded Building	Skin Loaded Building	Outdoor Rooms	W	F/S	Su	W	F/S	Su	W	F/S	Su	W	F/S	Su
		Cold	0	0	0	3	3	3	2	2	2	1	1	1
		Cool	0	0	2	3	3	1	2	2	0	1	1	3
Cold	Cool	Temperate	0	0	2	3	3	1	2	2	0	1	3	3
Cool	Temperate Arid	Hot Arid	0	2	2	3	1	1	2	2	0	1	1	3
Cool	Temperate Humid	Hot Humid	0	2	2	3	1	1	2	0	0	1	3	3
Temperate Arid & Hotter	Hot Arid & Hotter	Tropical Arid	2	2	2	1	1	1	2	2	2	1	1	1
Temperate Humid & Hotter	Hot Humid & Hotter	Tropical Humid	2	2	2	1	1	1	0	0	0	3	3	3

Table. 2 - Scoring of matrix according to the combination of wind and sun

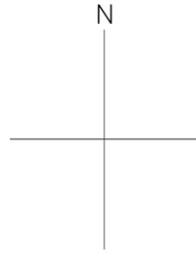
Shading profile  
Summer solstice- June 21 8:00 AM



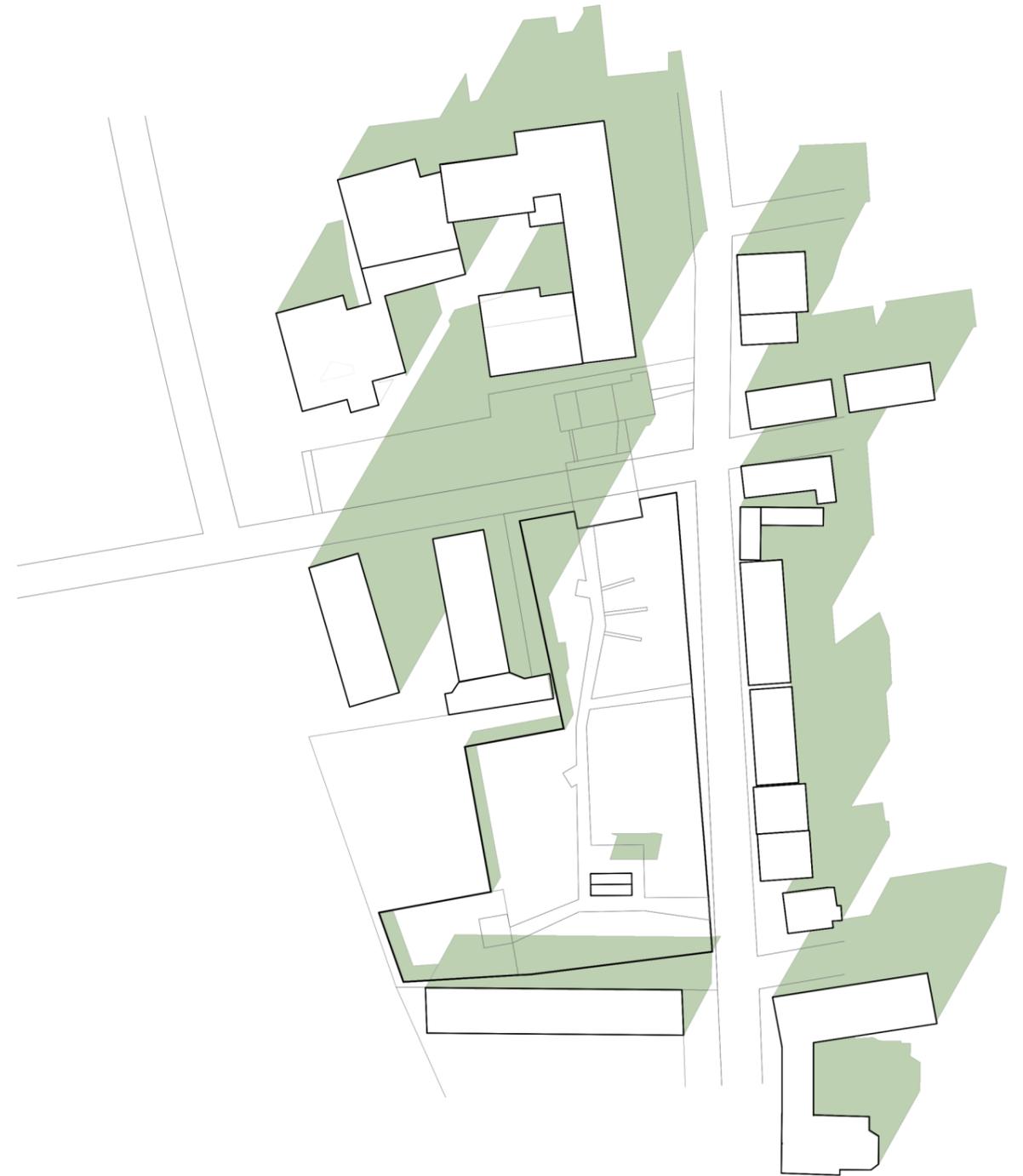
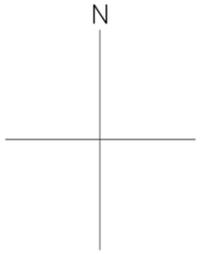
Shading profile  
Summer solstice- June 21 4:00 PM



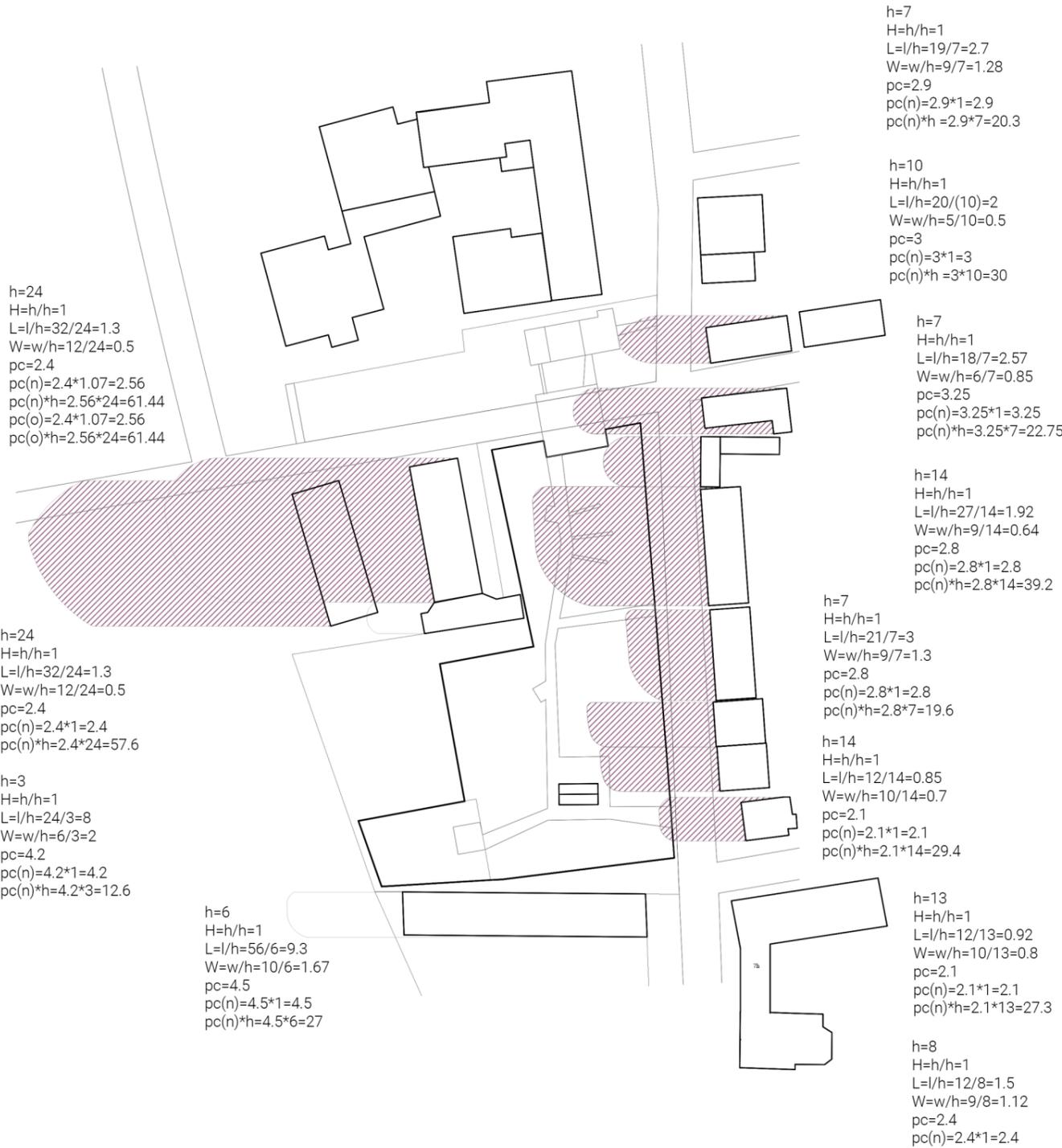
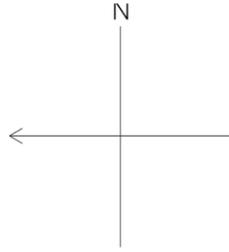
Shading profile  
Winter solstice- December 21 10:00 AM



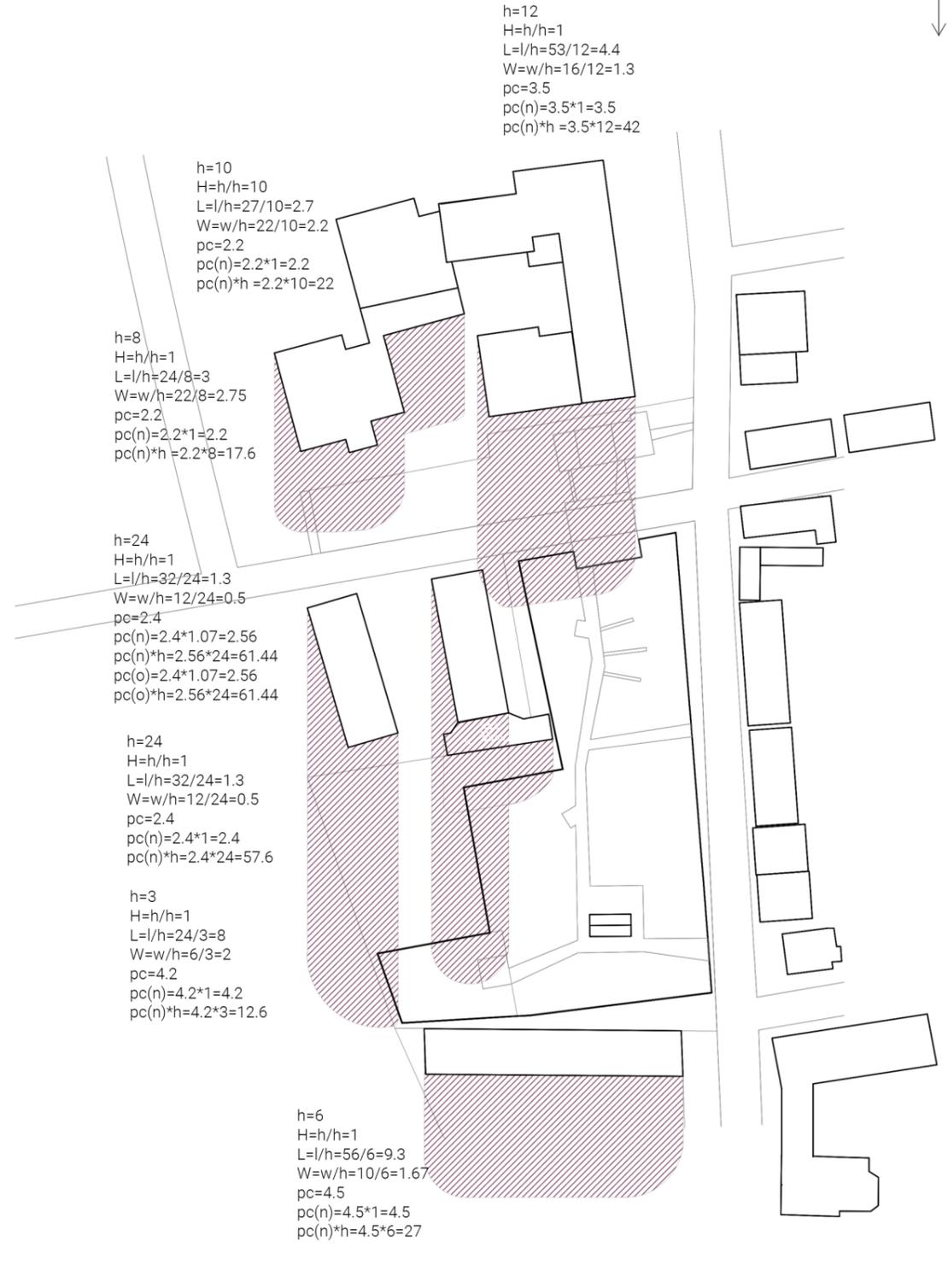
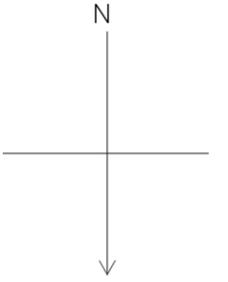
Shading profile  
Winter solstice- December 21 2:00 PM



Summer -Wind wake core  
Prevailing wind direction - from East



Winter -Wind wake core  
Prevailing wind direction - from North

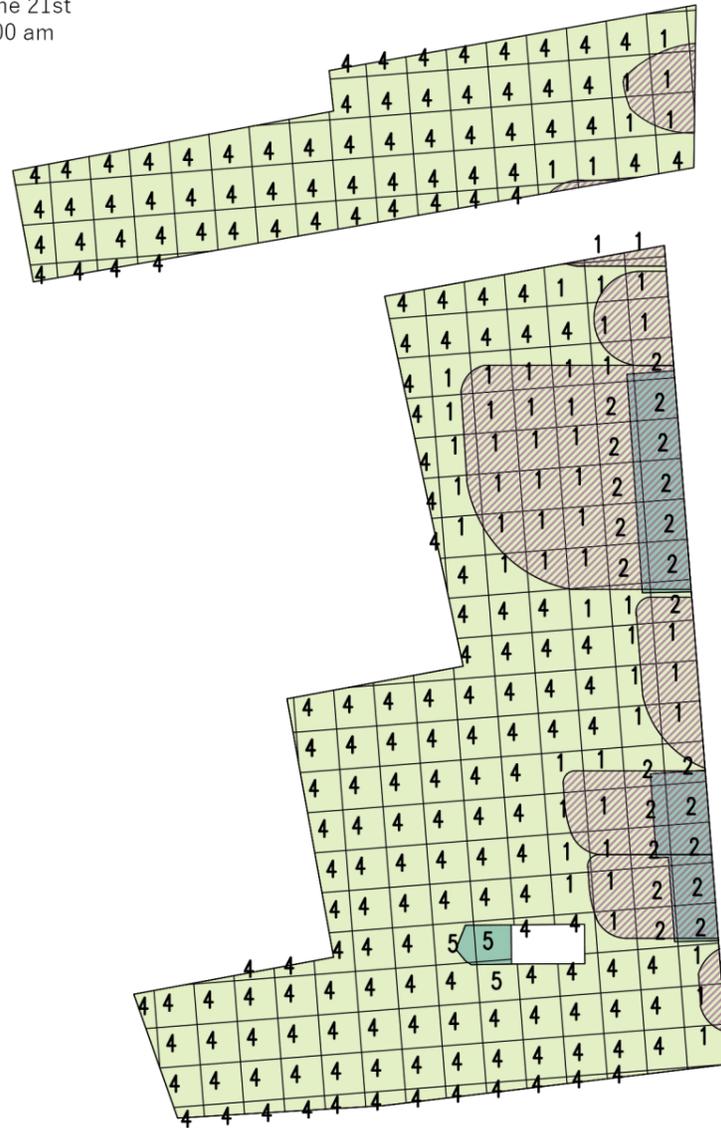


Summer microclimate matrix

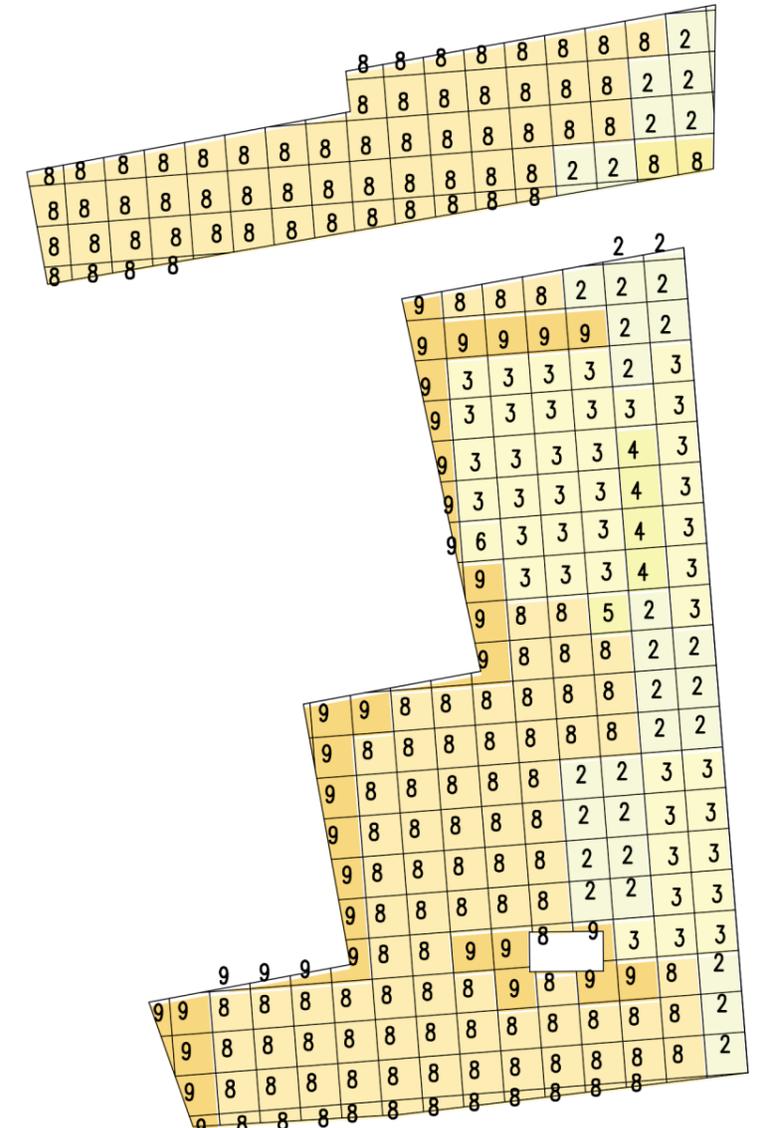
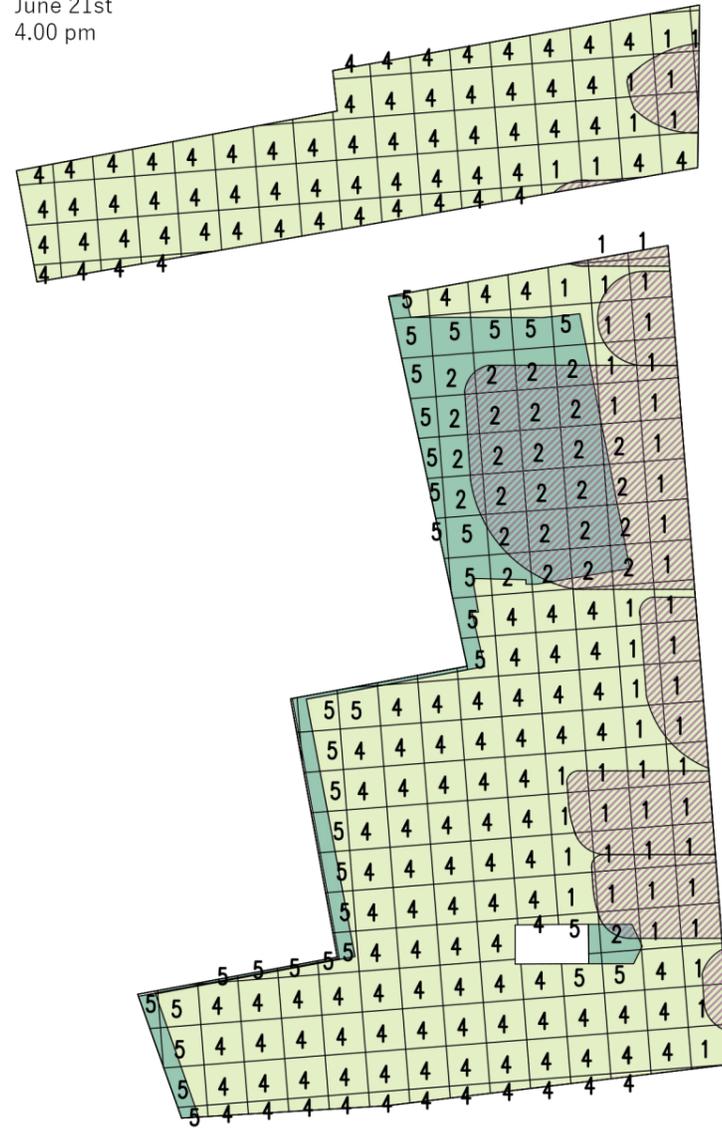


Summer solstice

June 21st  
8.00 am



June 21st  
4.00 pm

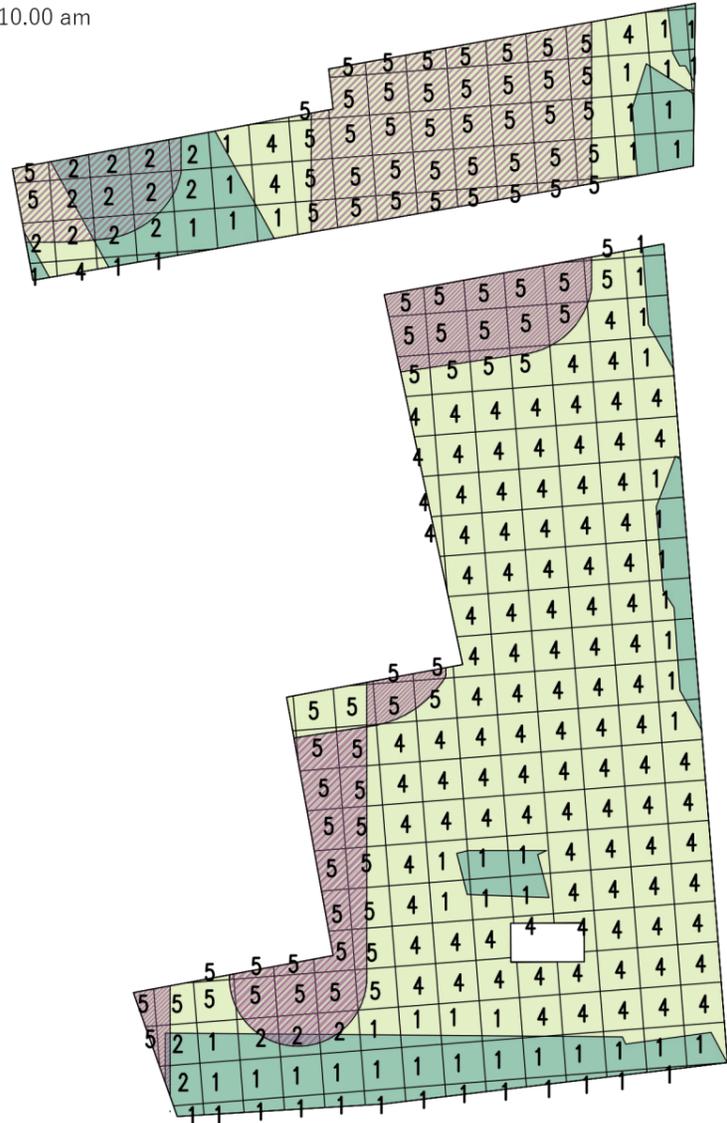


sun +wind
  shade +wind
  sun +lee
  shade +lee

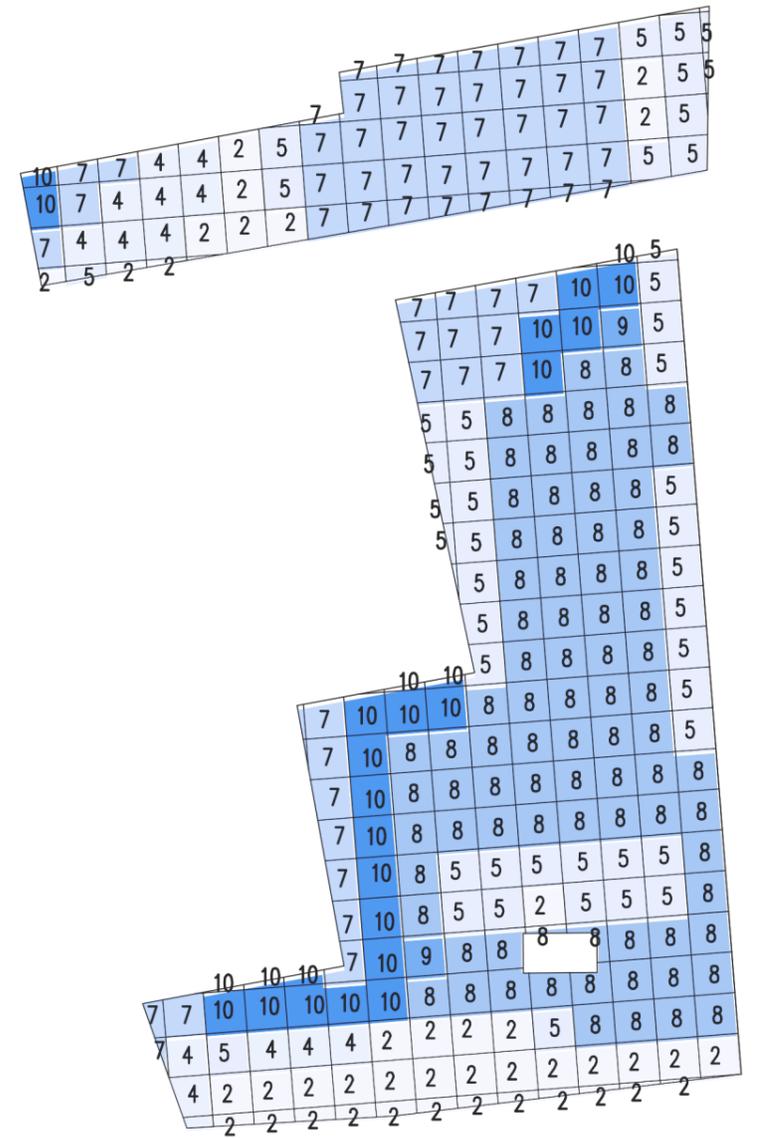
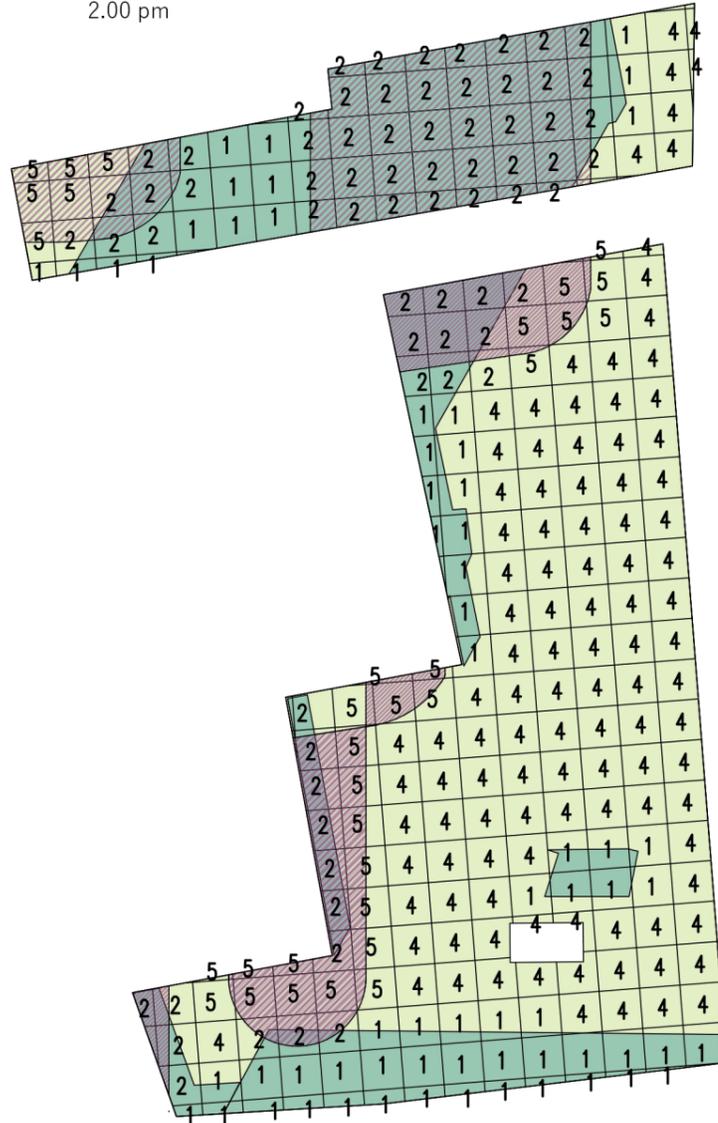
Winter microclimate matrix  
 Better situation →

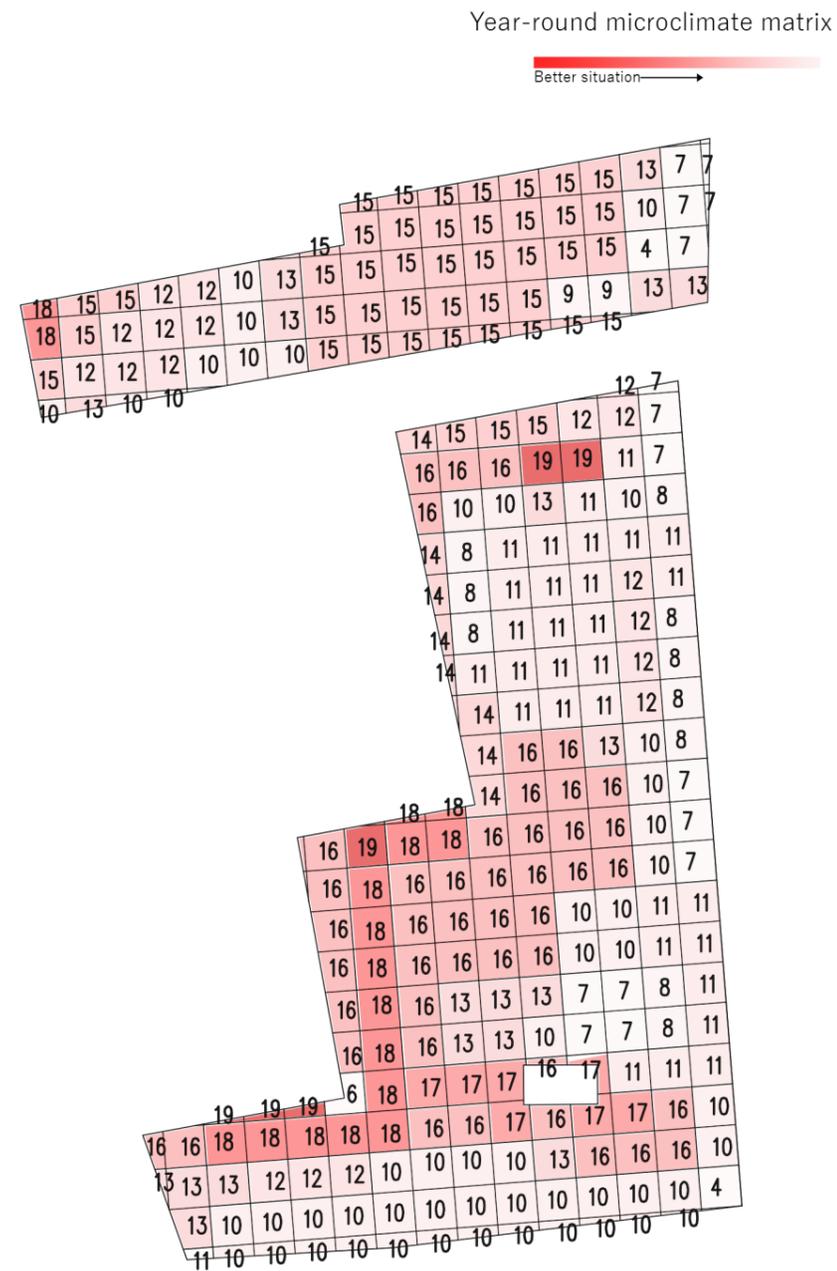
Winter Solstice

December 21st  
10.00 am



December 21st  
2.00 pm





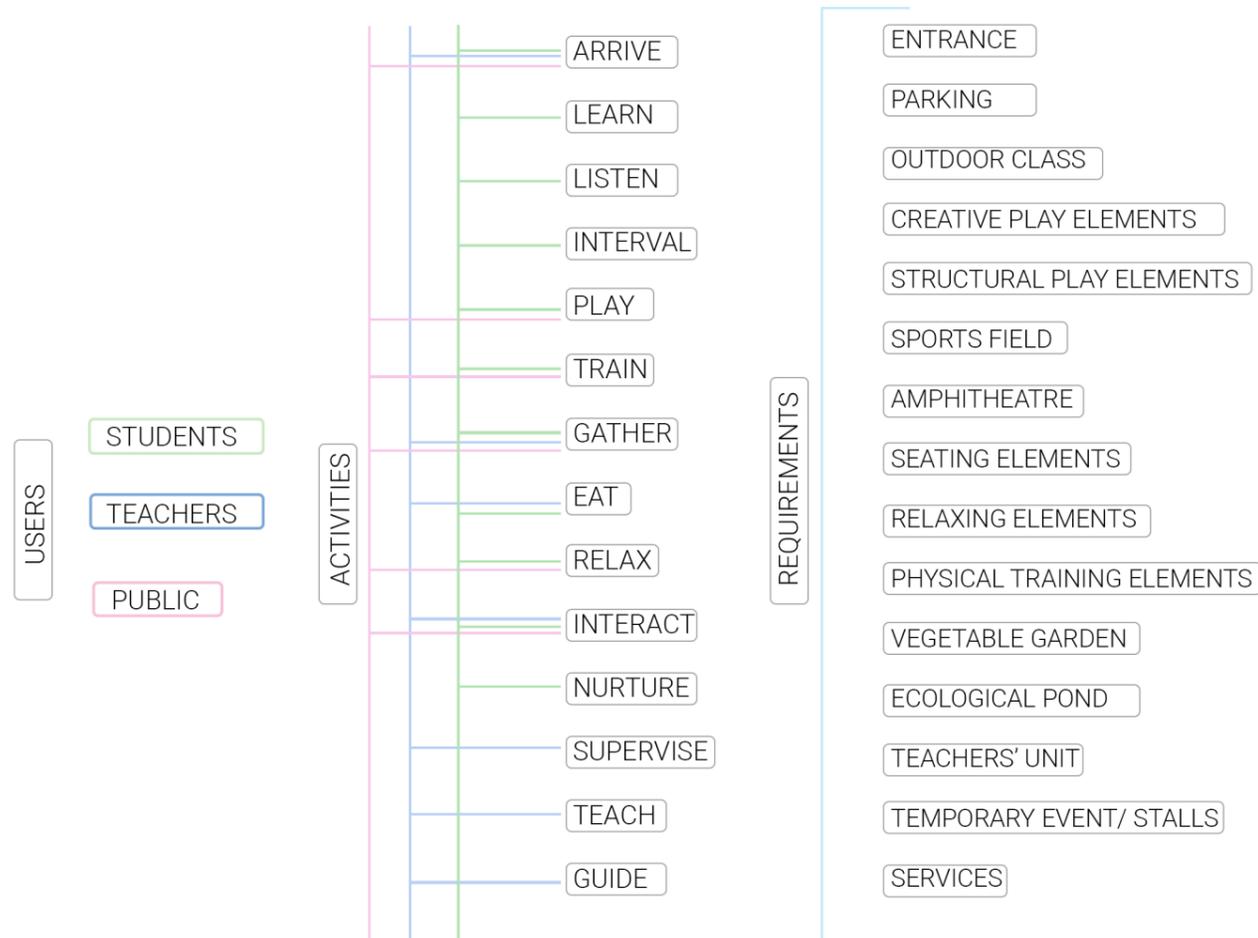
ACTIVITY	PERIOD	INTERRELATION BETWEEN MICROCLIMATE MATRIX AND THERMAL COMFORT			
		BEST	GOOD	BAD	WORST
Low metabolic rate Resting, slow walking	Winter	Sunny-Calm	Sunny-Windy	Shaded-Calm	Shaded-Windy
	Summer	Shaded-Calm	Shaded-Windy	Sunny-Windy	Sunny-Calm
Medium metabolic rate Fast walking, slow running	Winter	Sunny-Calm	Sunny-Windy	Shaded-Calm	Shaded-Windy
	Summer	Shaded-Windy	Shaded-Calm	Sunny-Windy	Sunny-Calm
High metabolic rate Fast running, gymnastics	Winter	Sunny-Windy	Shaded-Windy	Shaded-Calm	Shaded-Windy
	Summer	Shaded-Windy	Sunny-Windy	Shaded-Windy	Shaded-Calm

Table. 3 - Interrelation between Microclimate matrix and Thermal comfort

### Inference

The microclimate matrix shows the regions of the site that are good in terms of thermal comfort taking into consideration the sun and wind throughout the year. This is necessary for the positioning of activities in the site. As seen in Table. 3, there is an interrelation between the microclimate and the activities of the site. If taken into consideration the users would have better comfort conditions. The yearly and seasonal matrix scoring points out parts of site that have better conditions. The higher the score, the better the comfort. The areas that show a low score, could be reviewed in the seasonal matrix to see what situation is not favourable and it could be resolved through sustainable methods such as using canopy where it is too hot, and avoiding shade in cold climate situations. For example, the activities that require high metabolic rate could be placed in windy areas in summer and shaded regions in winter. The microclimate analysis is a key part of the masterplan.

# Functional and area requirements



## Primary School P.Thouar - Sant'Andrea

Type of school - State  
Address - Via Delle Rosette 7/9, 28100 Novara(NO)

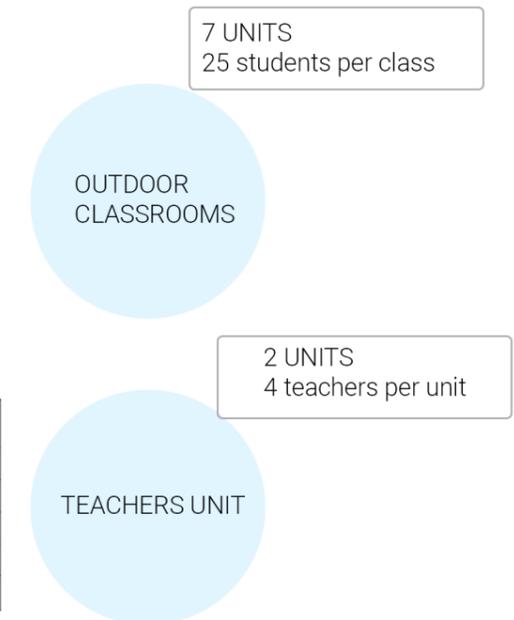
Number of pupils - 129  
Number of classes - 7  
Average pupils / classes - 18

Working time- Full time 40 hours per week

Academic year - 2021-2022

Year of study	No. of students	Class divisions	Students per class
1	22	1	22
2	31	2	16
3	21	1	21
4	24	1	24
5	31	2	16

Table. 4 - No of students and classes in Primary School P.Thouar



	Entrance	Parking	Outdoor class	Creative play	Structural play	Sports	Amphi-theatre	Seating elements	Relaxing elements	Training elements	Vegetable garden	Ecological pond	Temporary event space
Arrive	✓	✓											✓
Learn			✓	✓			✓	✓			✓	✓	
Listen			✓				✓	✓	✓		✓	✓	
Interval				✓	✓	✓	✓	✓	✓	✓	✓	✓	
Play				✓	✓	✓	✓			✓			
Train					✓	✓				✓			
Gather			✓	✓			✓				✓	✓	✓
Eat							✓	✓	✓				
Relax							✓	✓	✓			✓	
Interact			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nurture											✓	✓	
Supervise			✓	✓	✓	✓	✓			✓	✓	✓	✓
Teach			✓			✓	✓	✓		✓	✓	✓	
Guide			✓	✓	✓	✓	✓				✓	✓	✓

Activities Requirements

The users and functions are an extension to the inference occurred from the workshop 'A school at the park'. The users are students, teachers and supporting staff and the public. The user activities are considered to understand the functional requirements of the project. In the table showing the relation between the activities and spaces, it is seen that multiple activities could be carried out in each space. Thus, it is not required to have a functional zoning in this case. The best solution would be to avoid limitation and disperse activities across the site to avoid crowds and to enable the possibility of having time schedule where activities could be carried out without relying on the availability of space.

The data of primary school that would be using the park is considered to conclude the number of classrooms, the number of students using the park, the number of teachers and the number of students per class. The average class size is considered. Since the classrooms are not of the conventional type, the area requirement is not assumed at this stage.

## Concept

As outdoor learning focuses on bringing children close to nature, the theme of the project is based on the curves and free-flowing forms of nature. The existing vegetation on the site is an influence. The forms and structure used in the project are to revolve around the trees, blending in, avoiding distinction. As the free-flowing forms are unlike the conventional school buildings, it could easily invite and draw the attention of children.

### Outdoor Classroom units

The area and form of the outdoor classroom units were first resolved so as to position it in the master according to the microclimate matrix. The curved form is inspired from nature, to bring a sense of freedom, unity, and security. The levels created act as desks and seating. A light canopy is provided without interrupting existing vegetation in the site.

## Masterplan

### Evolution of the Masterplan

The results of the microclimate matrix were considered to find the portion of the site that has better comfort conditions. According to the annual score of microclimate matrix, the portion along the west side of the site was chosen for the school.

The position of outdoor classrooms was given prime importance and hence the best portions were chosen for the placement considering the vegetation and microclimate.

The circulation pathways were formed around and across the outdoor classroom units to make the connection in the site convenient and easily accessible by children. This helped create a boundary between the public park and the school.

The other functions and activities were placed along the circulation pathway taking into consideration the placement of classroom, presence of vegetation and the microclimate analysis.

### FORMATION OF OUTDOOR CLASSROOM

#### FREE-FLOWING FORM AROUND NATURE

+

#### LEVELS

+

#### CANOPY

+

#### UNION WITH NATURE

### STRATEGIES FROM WORKSHOP 'A SCHOOL AT THE PARK'

#### LEVELS

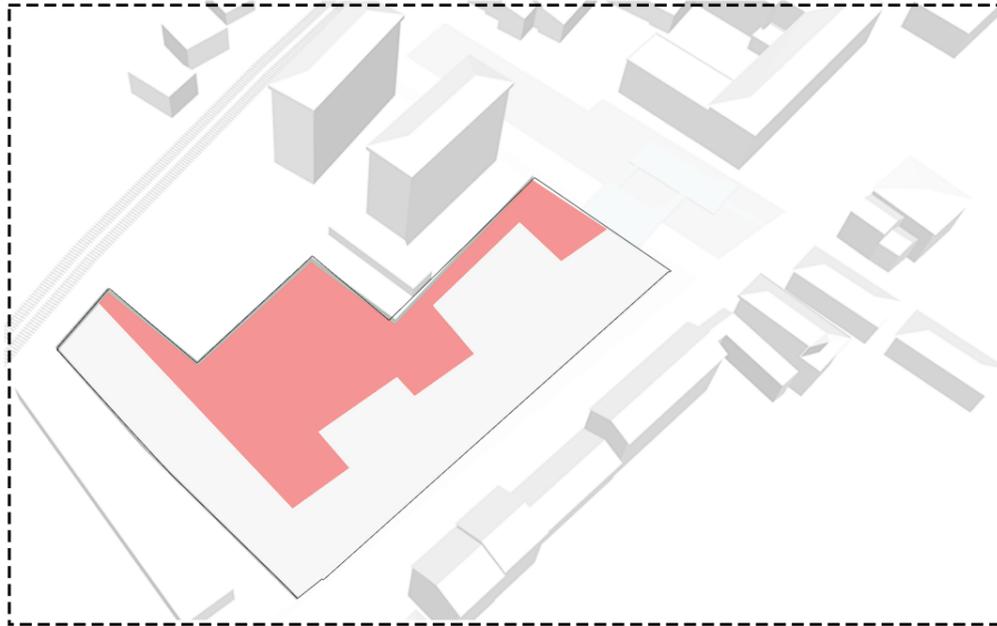
#### NATURE

#### SURFACES

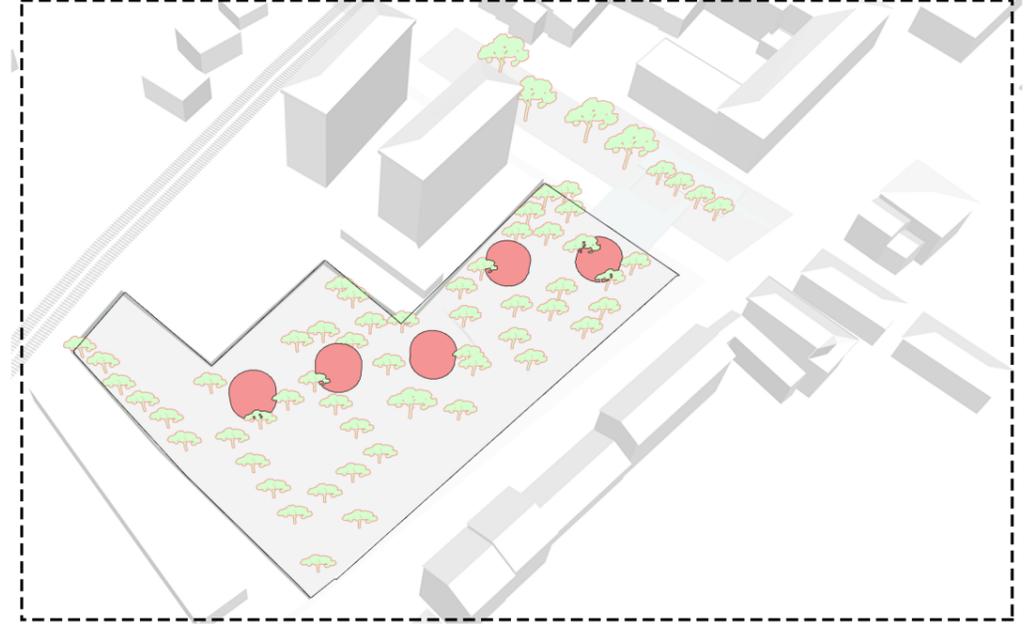
#### CONNECTIONS

#### ABSTRACT ELEMENTS

1 MOST SUITABLE PORTION OF SITE AS RESULT OF MICROCLIMATE ANALYSIS



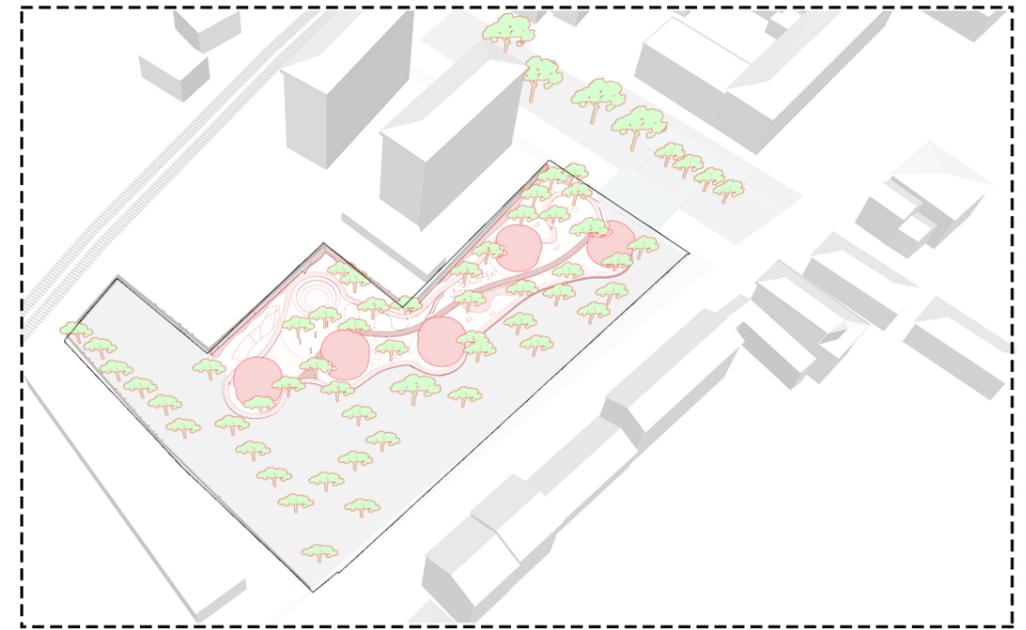
2 PLACEMENT OF OUTDOOR CLASSROOMS WITH RESPECT TO SITE VEGETATION



3 MAKING NEW CONNECTIONS ALONG THE SITE



4 PLACEMENT OF OTHER FUNCTIONAL ACTIVITIES



**SECTION A**  
SCALE 1:400

PARK  
OUTDOOR CLASS  
LAWN  
OUTDOOR CLASS  
PLAZA  
PLAY AREA  
OUTDOOR CLASS  
REALAXATION  
PLAZA  
ECO POND  
OUTDOOR CLASS  
RELAXATION  
VIA REDI  
VIA REDI  
PRIMARY SCHOOL

**ROOF PLAN**



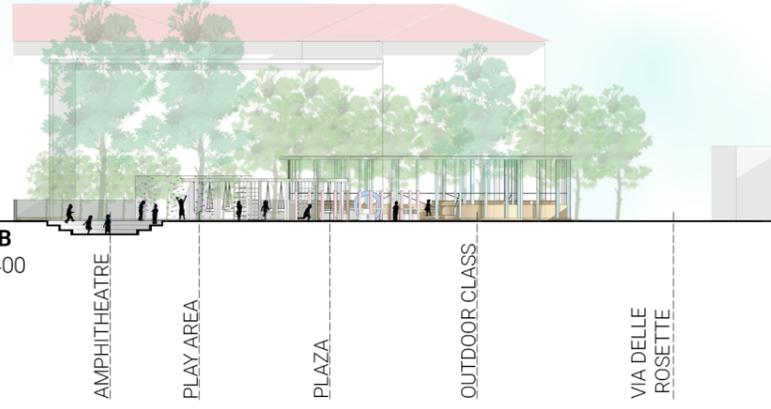
SCALE 1:400

**LEGEND**

- 01 ENTRANCE
- 02 ENTRANCE FROM PARK
- 03 OUTDOOR CLASSROOM
- 04 PLAZA
- 05 AMPHITHEATRE
- 06 PLAY AREA WITH STRUCTURE
- 07 WALL CLIMBING
- 08 SAND PIT
- 09 TEACHERS UNIT
- 10 RELAXATION/ LAWN
- 11 GARDEN
- 12 WATER HARVESTING ECO POND
- 13 RESTROOM & STOREROOM
- 14A 1.5M WIDE PATHWAY
- 14B 1.0M WIDE WOODCHIP PATH
- 15 PROPOSED HEDGES
- 16 EXISTING PLAYGROUND
- 17 PRIMARY SCHOOL P.THOUAR



**SECTION B**  
SCALE 1:400



**SECTION C**  
SCALE 1:400



**SITE PLAN**

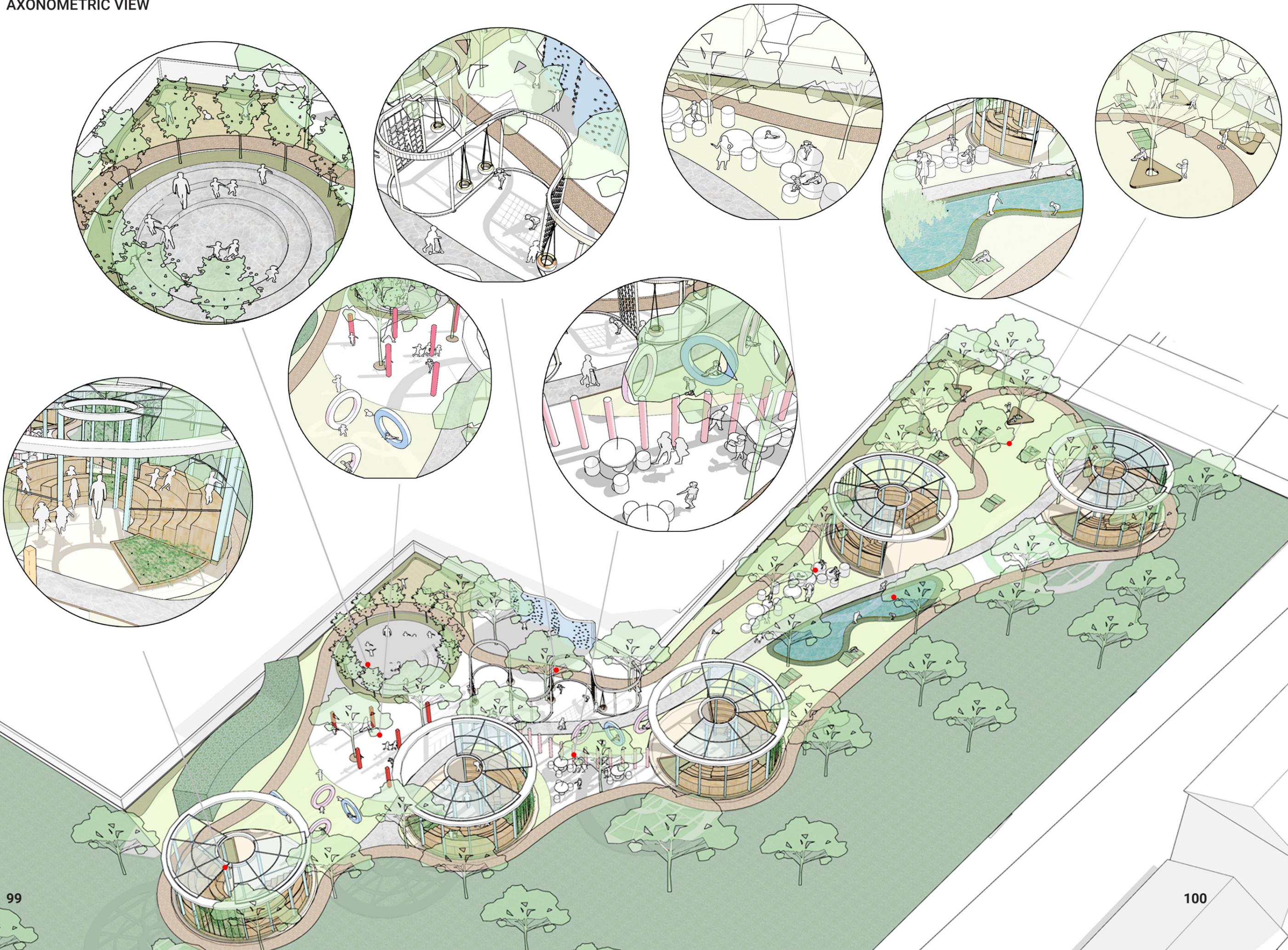


SCALE 1:400

**LEGEND**

- 01 ENTRANCE
- 02 ENTRANCE FROM PARK
- 03 OUTDOOR CLASSROOM
- 03A VEGETABLE PATCH
- 04 PLAZA
- 05 AMPHITHEATRE
- 06 PLAY AREA WITH STRUCTURE
- 07 WALL CLIMBING
- 08 SAND PIT
- 09 TEACHERS UNIT
- 10 RELAXATION/ LAWN
- 11 GARDEN
- 12 WATER HARVESTING ECO POND
- 13 RESTROOM & STOREROOM
- 14A 1.5M WIDE PATHWAY
- 14B 1.0M WIDE WOODCHIP PATH
- 15 PROPOSED HEDGES
- 16 EXISTING PLAYGROUND
- 17 PRIMARY SCHOOL P.THOUAR





## The Masterplan

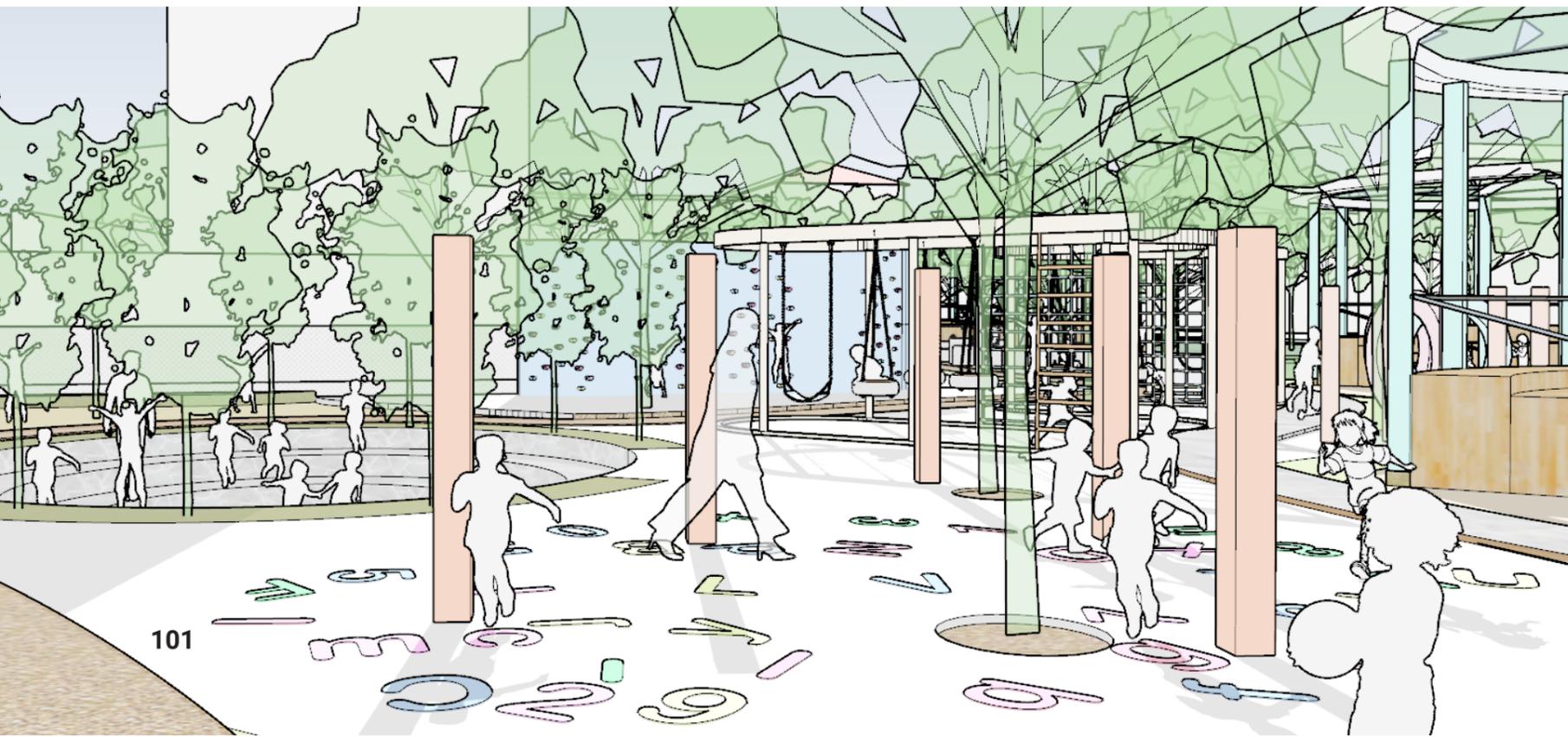
The main entrance into the school at the park is from the primary school. There is access also from the public park. The outdoor classroom units are placed according to the microclimate comfort conditions and the vegetation in the site. Connections are made through one main pathway running across the outdoor school and another woodchip path running around the school also acting as a conspicuous boundary between the public park and the school. The activities are placed taking into consideration the placement of classes and connections.

The entrance from the public park is through the plaza. This space is designed for playing freely. It is characterised by vertical structures placed apart to make the space interesting and to activate the area. The flooring could be used to have painting with information children could learn from through playing such as numbers or alphabets. Along the plaza is a lawn with circular structures that could be used as a multipurpose structure either to play around or to relax or sit. It could also provide shade and could be considered as a study area too placed adjacent to a classroom. The Amphitheatre at the south west corner acts as a performance space as well as outdoor learning space. Trees are proposed around it to provide shade and to create a better learning experience around trees.



The structural play area is given as a continuous structure which consists various activities such as climbers, swings, ladders and so on. Wall climbing and sandpit are given specifically in the masterplan. This is to introduce some adventurous low-risk activities. The sand pit acts as a creative area as well as play area.

In between the classroom is a plaza with tables and seating. This space is for learning and writing. Adjacent to it is a lawn for relaxing or learning. All structures have a multi-purpose and nothing is specific or limited to one activity. Towards the north of the site is a more silent area. The The ecopond is proposed for observation, learning, for aesthetic purpose and also to influence the microclimate at the north part of the site which experience hot summers. Rainwater harvesting is proposed in order to use the purified water in the vegetable patches and garden. Relaxation structures are given around the pond area which promoted observation. Opposite to the pond is another plaza characterised by platforms at varying levels. This space could be considered for outdoor class, for seating, for gathering, playing and so on. The canopy of trees act as natural shading.



Towards the north west part of the site, the presence of trees is abundant. This region is treated as a shaded zone for relaxation. It is characterised by seating around trees and relaxation structures.

The masterplan consists of many multipurpose areas. The connection pathways across and throughout the site makes it convenient to stay together though left free in the open without any barriers between the park and the school. The masterplan was designed considering ideas given by children during the workshop 'A school at the park'.

## Outdoor classrooms

The outdoor class is designed in a circular form. This is inspired from the abundant presence of vegetation in the site. The circle was also used to have a feeling of unity in this vast open space with very less boundaries. Circular forms imitate the curves of nature which is the base of outdoor learning. The classroom is characterised by tables and seating at different levels. This was proposed as a result of the workshop conducted, which showed that children preferred spaces with varying levels.

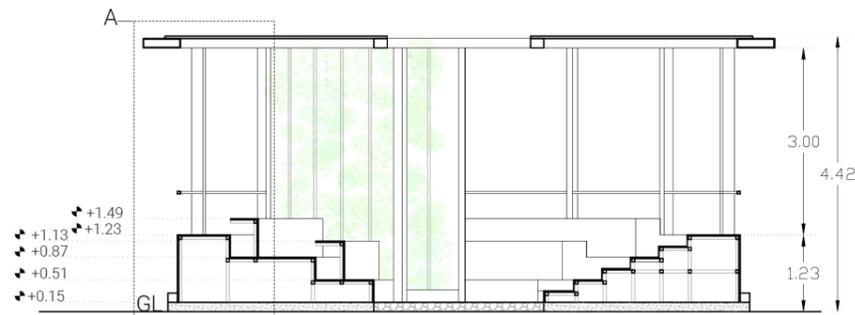
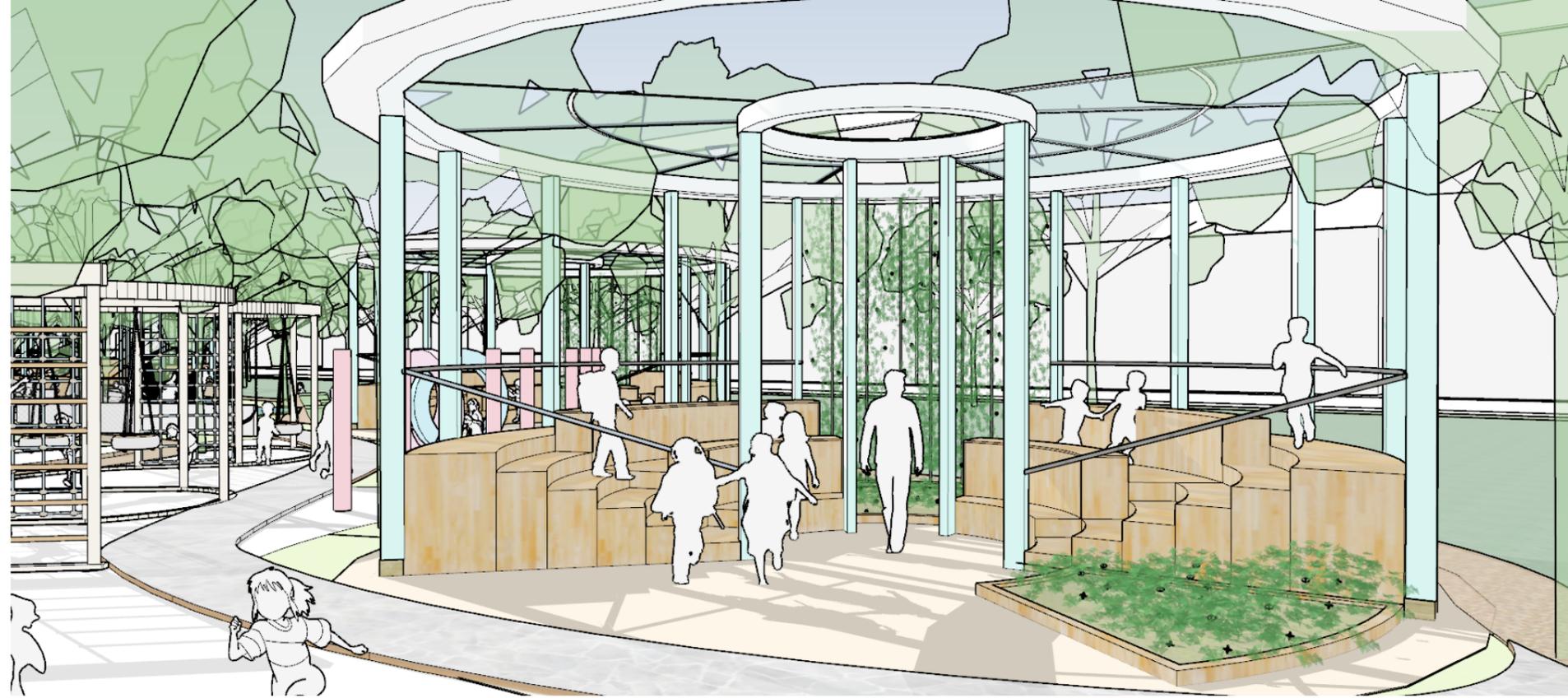
The number of students considered was twenty five students per classroom. Additional space was considered in order to give choice to children whether to use the desks or sit freely on the steps. Additional space was also considered for the purpose of use during change in weather conditions. The borders where rain would enter could be avoided depending on their choice. Between the seating areas is a green space proposed as a vegetable patch. Strings could be connected from top to bottom in the centre portion to allow growth of creepers. The vegetable patch is provided inside the classroom to allow better observation and to give a sense of responsibility and personal care.

The roof is open at the centre and above the green spaces. A glass roof is used above the seating areas. This was proposed to meet weather conditions such as rain, though this does not provide complete protection from rain, the roof was proposed to have the possibility of utilising these classes even during rain yet maintaining the experience of learning outdoors. Glass was preferred also to allow daylight and complete visibility of the sky.

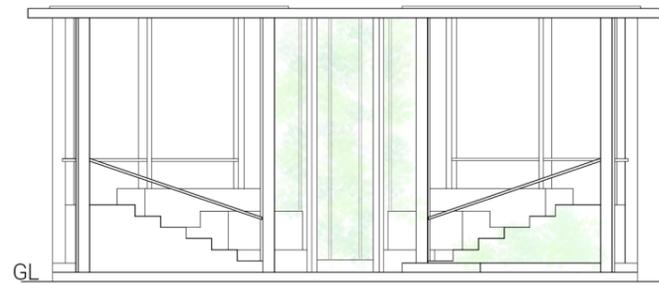
The structure is proposed in such a way that it could be easily installed and removed. The seating and desk is supported on a wooden structure and covered using seasoned wooden planks. Mild steel columns support the structure around the innermost and outermost circle. The structure has a concrete base. The centre portion is filled with gravel. The roof consists of a Mild Steel rolled painted sheet which support the glass roof. Laminated wired glass is used which is placed and sealed above mullion to avoid accumulation of rainwater. Metal railing is given on the borders of seating area for safety of children.



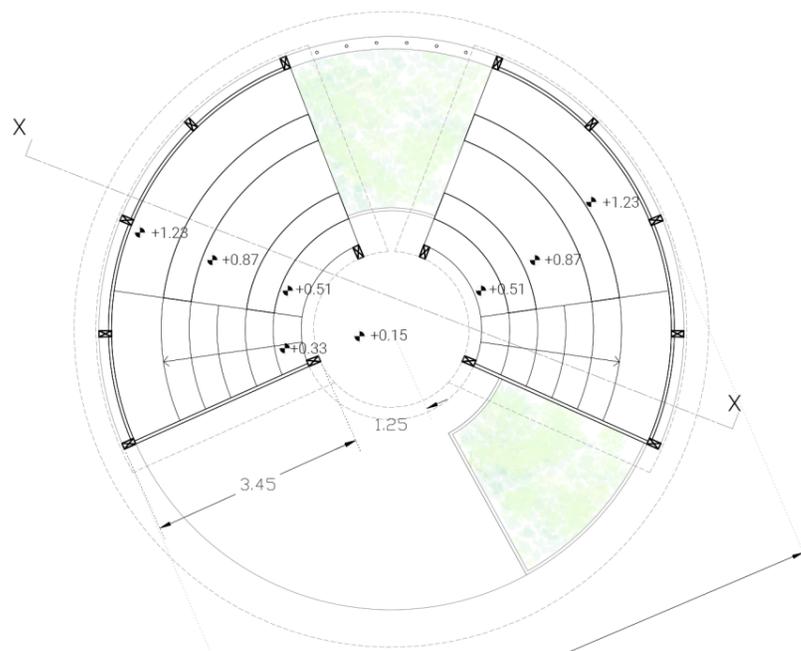
KEY PLAN



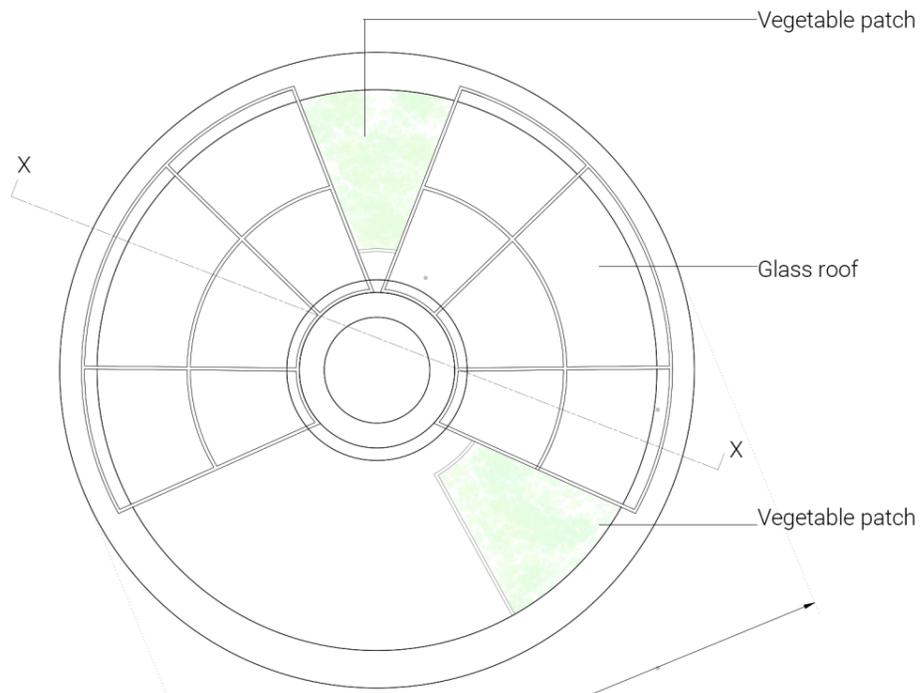
SECTION XX  
SCALE 1:100



FRONT ELEVATION  
SCALE 1:100



FLOOR PLAN  
SCALE 1:100



ROOF PLAN  
SCALE 1:100

- 16mm thick wired laminated glass over mullion
- 1.2mm Mild Steel rolled sheet painted
- 150 x 150 x 6.3mm Mild Steel Square Hollow Section
- 200 x 150 x 5mm Mild Steel Rectangular Hollow Section
- 50mm metal railing
- 20mm thick wooden plank top and sides of seating and table
- Wooden support
- 200 x 200 x 3mm square Mild Steel section curved to radius and painted
- 150mm thick M25 Concrete base

DETAIL A  
SCALE 1:50

## Critical Analysis of Master plan

### Masterplan and Microclimate

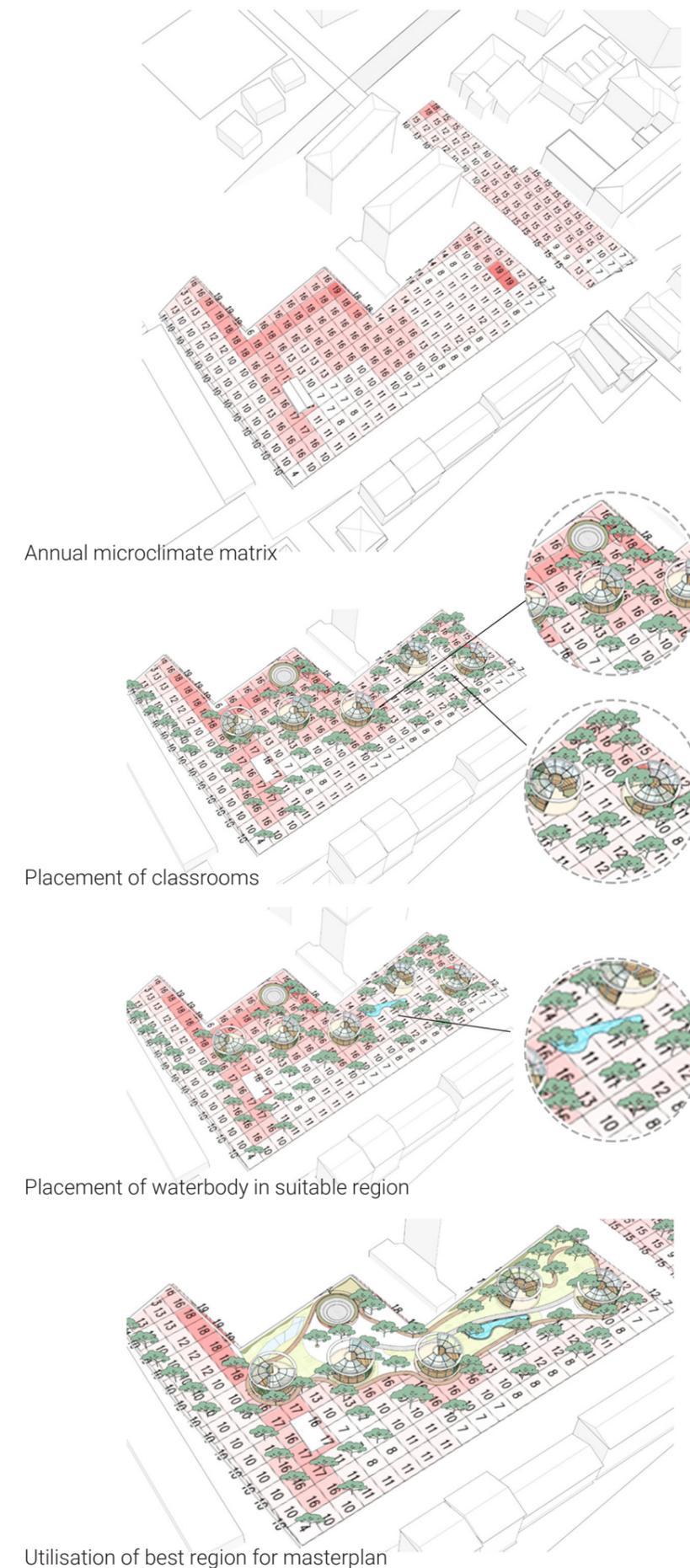
The microclimate analysis has influenced the positioning of functions on the site. According to the microclimate matrix, the regions where the score is highest have better thermal comfort. The best portion of the site according to the annual microclimate matrix is the along the west part of the site. This portion is utilised to place and propose the outdoor school. This ensures thermal comfort conditions for the users without having to use other techniques. The regions that showed discomfort during summer or winter were treated with cooling and heating techniques respectively and also with the careful placement of functions.

The placement of the outdoor classroom units was given prime importance. The outdoor classroom is to be used for long periods and hence chosen the best conditions. The rest of the function and circulation followed the position of the outdoor classrooms.

The northern centre portion of the site is seen to have bad climatic condition during the summer. The water body was placed accordingly to influence the microclimate and give comfort during the summer season. The parts of the site where high or medium metabolic rate activities are suitable are identified. Activities such as wall climbing are placed in the area where the condition is suitable for high metabolic rate activities. The portions where shade is required is treated with canopy or shaded structures. Due to the abundance of trees on the site, this situation is avoided in most cases.

The trees in the site play a major role in thermal comfort of users. The classrooms are curved in form and hence is suitable to have a good fireplace in the winter. As the foliage of trees fall during winter there is better intervention of sunlight into spaces making it warm. The high amount of vegetation on the site act as a barrier for strong winds and noise.

Strategies such as shaded portions, positioning of activities, placement of water body, and so on have been incorporated in the master plan considering the microclimate of the site .



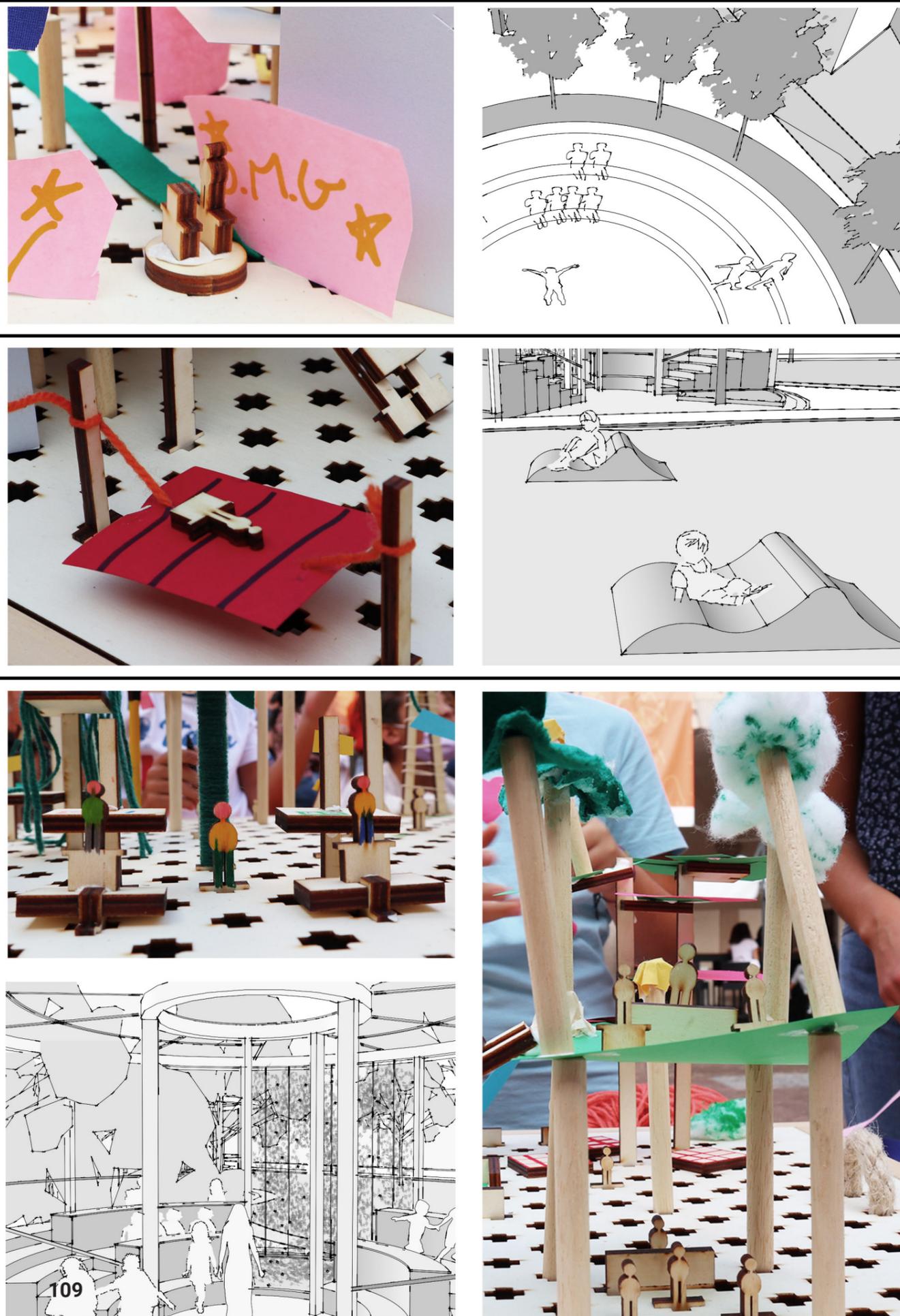


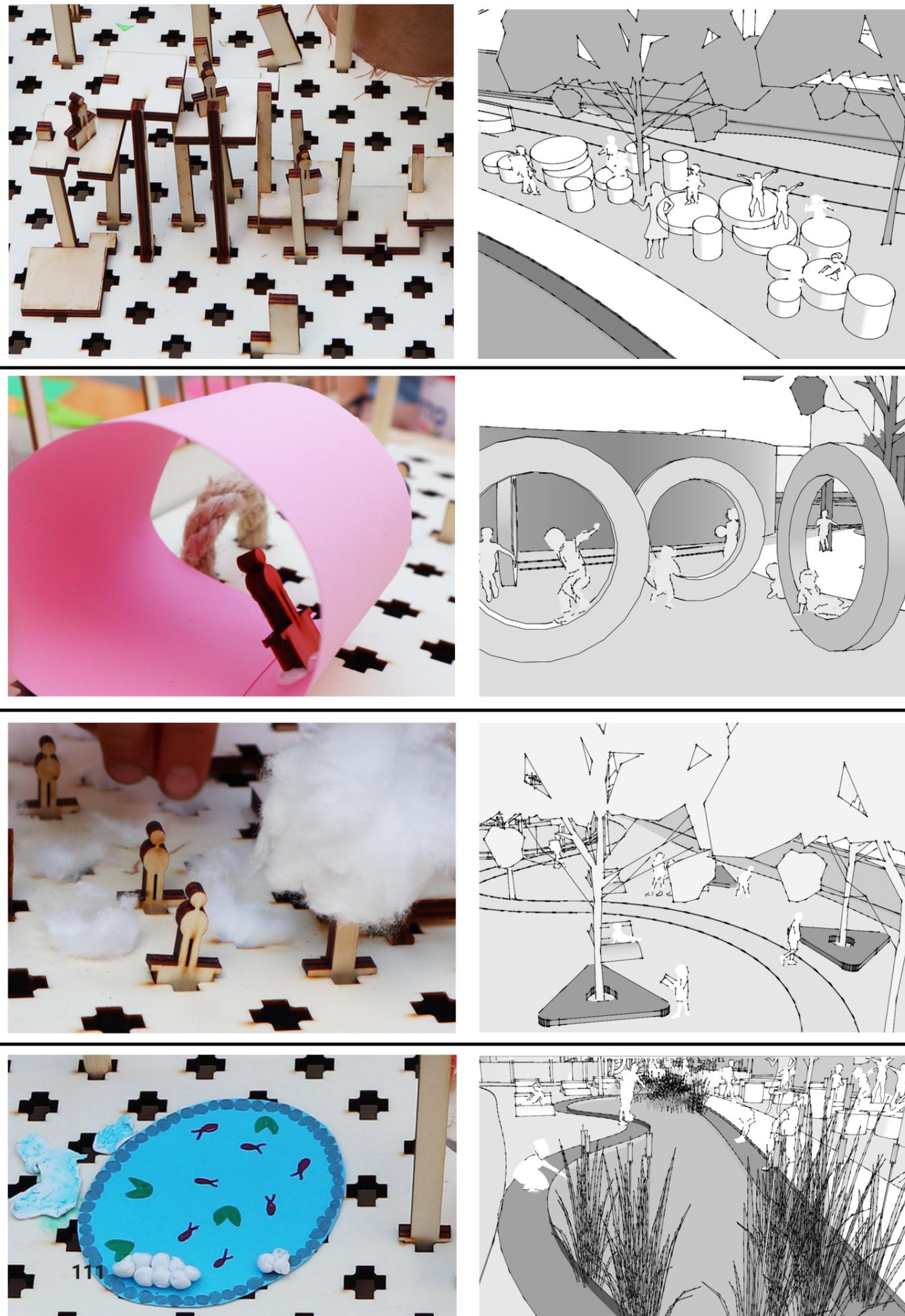
Fig. 16 - Fig. 19 - Elements made on the model during workshop 2

Master plan and functions emerged from workshop 1

The results of the workshop 1 'A day of school at the park' was the beginning of the framing of functional requirements for the project. The routine of students were identified. The daily activities right from their arrival at school to the exit was considered. The functional requirements were first classified into zones such as creativity zone, playing zone, arrival, eating and so on. On the later stage when the project developed and the functions were compared with the space requirements, it was concluded that the zoning of the site according to the functions was not feasible in this project.

The space and elements required for various functions were of multipurpose use. Moreover, the functions are distributed throughout the site to avoid limitations to one zone and to make the environment lively and active at all times during the day. The functions in the master plan are distributed in such a way that children can relax, play, exercise at the same time. Crowding of children at certain parts of the site for long periods is avoided. Also the distribution of functions allows for preparation of better time schedule for children to access activities. The requirements that were framed are included in the masterplan as multipurpose spaces where children could use the same elements and spaces for relaxation, playing, learning, observing and interacting.

The park is accessible to the general public for playing, recreation, training and relaxation. There is no visible barrier between the public and the school except a pathway running along the boundary of the proposed school, showing distinction between the park and the school. The plaza of the school acts as a space for interaction, relaxing and playing. Certain features have been provided to make the space lively. The amphitheatre could be used for learning and performing. Structural playing areas have been provided. As the park itself and the plaza is a free play area, focus is given on the proposal of play areas with structures. Some activities such as dining has not been given a certain spot, children are free to move around the site and choose their convenient spot. The main objective was to allow children to learn, play, observe and relax throughout the site without any restrictions as in the conventional school system.



Masterplan and strategies emerged from Workshop  
'A school at the park'

The project strategies were identified from the workshop 2 'A school at the park'. The strategies are ideas depicted by children of their ideal school at the park. Some of the concepts that were repeated and used by them were considered along with the analysis of the original situation.

Creation of different levels for observation and learning as well as to make the space interesting to children was incorporated in the design in various forms. The different levels in the classrooms and in abstract objects allow different viewing angles for observation. The amphitheatre, the outdoor classroom units as well as the play structures and relaxation spaces incorporate this strategy.

The other strategy was to give children an experience of the natural environment and reconnect them with nature. The masterplan brings this aspect in numerous ways. There is abundant vegetation in the site and the maintenance of the site vegetation in the design, is one major factor bringing children close to nature. The trees could be a part of their activity by introducing nets or other small interesting elements or the creation of levels. The design allows to play, relax and learn around trees and plants.

The introduction of the ecological pond allows children to observe and learn and experience the various stages during the change in seasons. Vegetable garden patches are included along with the classrooms to give a feeling of personal care and to have better observation. Taking care of the plants and watering it themselves gives understanding on water harvesting as well as farming and production of food and soil. Children are directly involved allowing them to gain knowledge and observe the growth of plants and give them a sense of nurturing and compassion for nature.

Certain parts of the site have variations in the treatment of the flooring and surfaces. This is to distinguish between spaces and avoid monotony. Children experience various textures, grass, sand, stone and some flooring could be colourful and catch attention of children therefore mak-

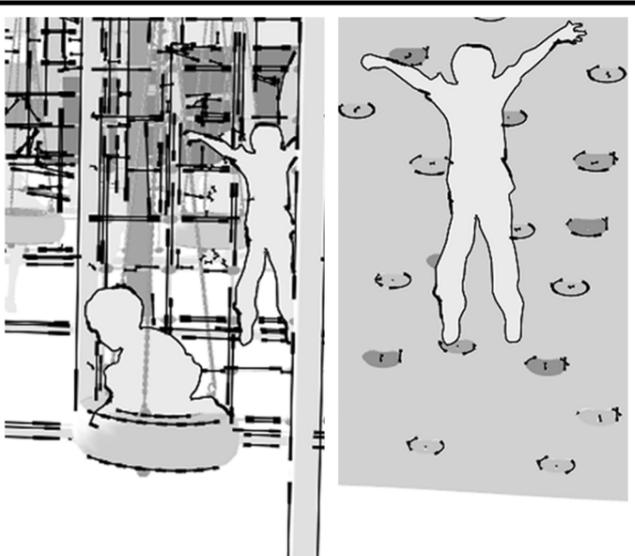
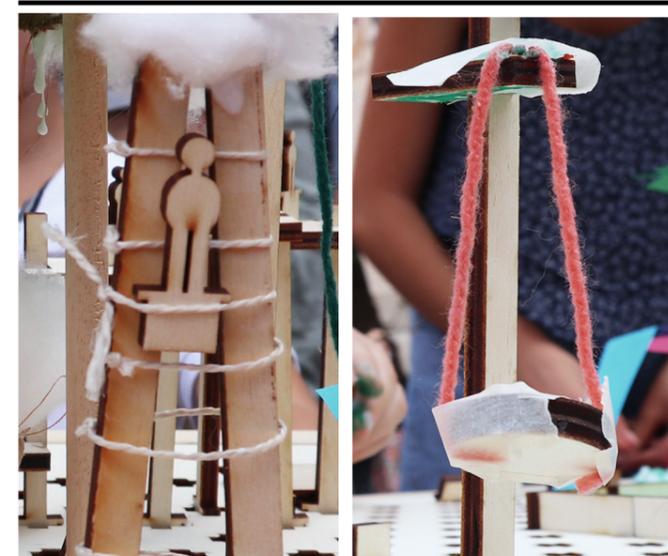
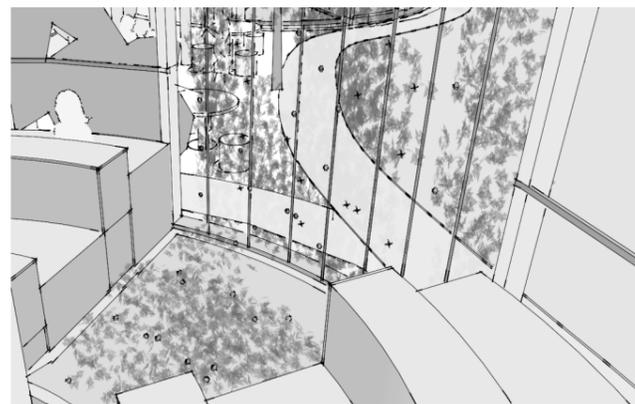
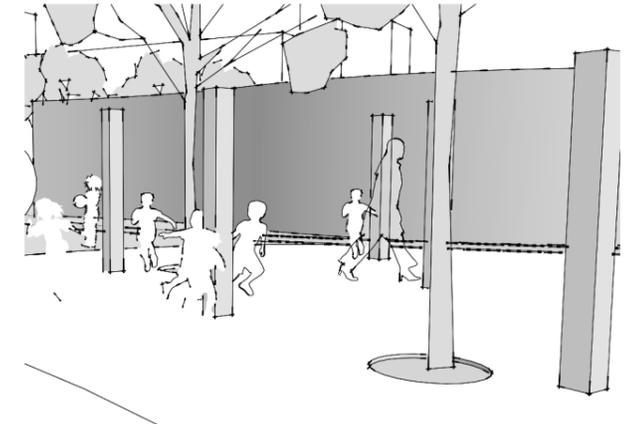
Fig. 20 - Fig. 23 - Elements made on the model during workshop 2

ing the space inviting to them. The addition of abstract elements in the geometrical forms and shapes make the place interesting and it is also a method of observing and learning for children. Observation of shadows and the sun could be done this way.

The structures for playing were suggested by children through drawing during the workshop. Likewise, relaxation spaces were also given equal importance in the form of spaces not only to sit but also lie down. Adventurous activities such as wall climbing were also suggested through drawings.

The drawings clearly showed connected spaces making it easy to move along the site. In the masterplan the connections are easily visible and are visually appealing. Inclusion of services such as restrooms were a necessity.

These strategies that were prepared by the children themselves are made active in reality, making the masterplan interesting and a space that children have in mind as their ideal school at a park.



## Masterplan and Sustainability

Many aspects have been included in the project to make the design sustainable. Some features are the possibility of maintenance of vegetation, urban farming, water harvesting, following a bio-climatic design and maximising the use of natural materials.

### Bio-climatic design

Consideration of the climate conditions and the microclimate of the area gave the possibility to propose a climate sensitive design. The microclimate matrix provided information on the regions with thermal comfort and also helped point out the comfort during different seasons. The best comfort situations were utilised for the school. The less comfortable conditions were tackled using shading devices, the introduction of waterbody and through careful placement of functions.

### Rain water harvesting

Rain water harvesting is included in the project for the purpose of using the water for the vegetable patches in the classrooms and for the gardens. It is provided in the form of an eco-pond for the purpose of observation and learning for children. The eco-pond has living organisms, plants and soil that filter stormwater and make it suitable for irrigation and also help recharge groundwater. Stormwater along the site, roads and roofs is directed to the pond. During the dry months water could be stored in barrels and the pond could be refilled to maintain the ecosystem. Sewage water also could be filtered and used to recharge the pond during dry months.

### Urban farming

The inclusion of vegetable patches in the classrooms encourages urban farming and production of organic food. The introduction of vegetable gardens teaches children at an early age the importance of naturally produced food. This could have a big influence on the future generations to lead a sustainable lifestyle.

### Maintenance of vegetation

The abundant vegetation on the site is maintained without any interruption of the design elements. More trees and shrubs are proposed. The trees are used as natural shading devices instead of artificial canopy. The concept of the design is such that the elements revolve around the trees without interrupting any existing trees.

## Conclusion

The benefits of outdoor learning are well known and encouraged but it is clear that the practice and incorporation of outdoor learning in schools is very limited. This could be due to several inconvenient situations that are faced by teachers and students during such sessions. This project introduces the benefits of the presence of nature and being outdoors in children. The relationship with nature and outdoor environment contributes to the mental, physical and emotional health and wellbeing of children. Nowadays it is certain that children get to spend very less time outdoors. To make best use of the benefits that outdoors could give, it is an apt situation to allow children to spend their time in school, outdoors. Unlike conventional school buildings, there are several possibilities to conduct lessons outdoors for children. The issue is that an outdoor lesson or class is not given much design consideration. However, with proper design consideration and investment to make a better outdoor learning experience, a successful sustainable outdoor learning project could be developed.

The base of this thesis is the workshop that was organised in Novara, interacting with children directly in order to bring out ideas that they have in mind of a school in a park. This helped obtain ideas of how children prefer to have spaces to learn and play in a school. The procedure of the workshop of allowing children to show their ideas in a model gave very clear results that was easily understandable. The results of the workshop was then used to analyse the situation and create a design from an architect's point of view. This gave a good experience of the successful participation of the users and public in the design development stage of the project.

The project site, Parco Boroli at Novara, was analysed and the microclimate conditions were considered for design. The wind direction and sun's position was considered to calculate the shade and wind calm zones. This gave an idea of the effects of wind and sun on each portion of the site and the seasonal variations in the comfort levels. The regions of better thermal comfort were chosen from the microclimate matrix calculation procedure. This allowed the consideration of the climate and comfort in the design.

The functions and requirements of the masterplan were achieved from the first workshop 'A day of school at the park' where children expressed their daily routine and the ways they prefer to have the same routine in a park rather than a school. Altogether the concept for the project was evolved from the free flowing forms found in nature, a design that blends well with the abundant vegetation present in the site. The masterplan was developed based on the workshop, taking into consideration childrens idea of a school at a park. The project strategies were taken from the models made by children during the workshop which were analysed to have architectural concepts and use for the development of the design. The microclimatic analysis was taken into consideration to achieve a sustainable design.

The results of the analysis of workshops and site, led to a masterplan with spaces and structures of multifunctional use. Strategies such as the variation in levels, use of abstract elements, introduction of vegetable gardens, introduction of relaxation elements as well as play areas were used. Different from the conventional school building, the design has less limitations and rules. Children are free to move around, play, sleep, observe, eat, learn without any specific restrictions in areas as most elements are designed for multifunctional purposes. Outdoor learning spaces make children active and engaged. The methodology and the workshops used to arrive at the design, could be further analysed to have design requirements and guidelines for outdoor school projects. Further research and experimentation on this topic with better design considerations and investment in similar outdoor learning projects could result in a better future for children, considering and benefiting their emotional, physical health and wellbeing.

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## Figures

## Chapter 1

**Fig.1-Fig.3** - Guldberg Schoolyard, Copenhagen. Source: [www.nordarchitects.dk/guldberg](http://www.nordarchitects.dk/guldberg)

**Fig.4-Fig.6** - Hazel Wolf school , Seattle. Source: [www.nacarchitecture.com](http://www.nacarchitecture.com)

**Fig.5-Fig.7** - The community classroom, Glasgow. Source: [www.dezeen.com/2020/04/12/community-classroom-odonnellbrown-outdoor-learning/](http://www.dezeen.com/2020/04/12/community-classroom-odonnellbrown-outdoor-learning/)

**Fig.8-Fig.10** - Hedge school. Carlow, Ireland. Source: [www.inhabitat.com/outdoor-living-classroom-constantly-evolves-to-bring-children-closer-to-nature/](http://www.inhabitat.com/outdoor-living-classroom-constantly-evolves-to-bring-children-closer-to-nature/)

**Fig.11-Fig.13** - Fuji Kindergarten, Tokyo. Source : [www.tezukaarch.com/english/works/education/fujiyochien/](http://www.tezukaarch.com/english/works/education/fujiyochien/)

## Chapter 2

**Fig.1-** 'A day of school at the park' Workshop 1. Source: Picture taken by the author

**Fig.2-** Group of children showing their idea of a school at the park through drawings. Source: Picture taken by the author

**Fig.3-** A child's idea of a school in a park. Source: Picture taken by the author

**Fig.4-Fig.6-** Drawing by a group of children representing their idea of a school in the park. Source: Picture taken by the author

**Fig.7-Fig.8-** Drawing prepared for the making of model base. Source: Drawing prepared by the author

**Fig.9-** Drawing prepared for predefined elements of the model. Source: Drawing prepared by the author

**Fig.10-** Axonometric view of the model. Source: Drawing prepared by the author

**Fig11- Fig.17-** Preparation of the base of model used for workshop 2. Source: Picture taken by the author

**Fig.16-Fig.21-** Model making workshop held during Scarabocchi festival, Novara. Source: Picture taken by the author

**Fig.22-Fig.30-** Children's depiction of their ideal 'School at the park'. Source: Picture taken by the author

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**Fig.1-** Average High and Low Temperature at Novara. Source: <https://weatherspark.com/y/148115/Average-Weather-at-Novara-Cameri-Italy-Year-Round#Figures-ObservedWeather>

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**Fig.3-** Average wind speed at Novara. Source: <https://weatherspark.com/y/148115/Average-Weather-at-Novara-Cameri-Italy-Year-Round#Figures-ObservedWeather>

**Fig.4-** Wind Direction at Novara. Source: <https://weath->

[erspark.com/y/148115/Average-Weather-at-Novara-Cameri-Italy-Year-Round#Figures-ObservedWeather](https://weatherspark.com/y/148115/Average-Weather-at-Novara-Cameri-Italy-Year-Round#Figures-ObservedWeather)

**Fig.5-** Daylight time in Novara. Source: : <http://andrew-marsh.com/apps/staging/sunpath3d.html>

**Fig.6-** Cloud cover in Novara. Source: <https://weatherspark.com/y/148115/Average-Weather-at-Novara-Cameri-Italy-Year-Round#Figures-ObservedWeather>

**Fig.7-Fig.14-** Parco Adolfo Boroli. Source: Photo taken by Prof. Savio Lorenzo, Faculty of Architecture, Politecnico di Torino

**Fig.15-** Wind calm zone variation in depth as a function of width and length of the building when  $H=1$ . Source: Provided by Prof. Mario Grosso, Dr. Mehrnoosh Ahmadi. Faculty of Architecture, Politecnico di Torino

**Fig.16-Fig.28-** Elements made on the model during workshop 2. Sources: Picture taken by the author

## Tables

### Chapter 3

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**Table.2 -** Scoring of matrix according to the combination of wind and sun. Source: Provided by Prof. Mario Grosso, Dr. Mehrnoosh Ahmadi. Faculty of Architecture, Politecnico di Torino

**Table.3 -** Interrelation between Microclimate matrix and Thermal comfort. Source: Provided by Prof. Mario Grosso, Dr. Mehrnoosh Ahmadi. Faculty of Architecture, Politecnico di Torino

**Table.4-** No of students and classes in Primary School P.Thouar. Source: [www.cercalatuascuola.istruzione.it/cercalatuascuola/istituti/NOEE82504D/pthouar/alunni/;-jsessionid=ZrfUY2rQEWpOeV7Qj07vttegR.mvlas068\\_1](http://www.cercalatuascuola.istruzione.it/cercalatuascuola/istituti/NOEE82504D/pthouar/alunni/;-jsessionid=ZrfUY2rQEWpOeV7Qj07vttegR.mvlas068_1)

