

The background image shows Carrcroft Elementary School, a long, single-story building with a dark roof and many windows. In front of the school is a large, green grassy field. The sky is blue with some light clouds. The text is overlaid on a semi-transparent green rectangle.

CARRCROFT ELEMENTARY SCHOOL MINDFULNESS TRAIL

PEIYUAN YANG
UNIVERSITY OF DELAWARE
BSLA SENIOR CAPSTONE

CONTENTS

3	INTRODUCTION AND OBJECTIVES
5	EXISTING PHOTOS
8	MINDFULNESS TRAIL PROJECT ACTIVITY
9	PRECEDENT STUDY
10	SITE ANALYSIS
15	CONCEPT PLAN-MINDFULNESS
17	MASTER PLAN
20	REFERENCES

INTRODUCTION

Today, many school-age children face a lot of challenges that come along with the **anxiety** of a progressively complex modern society. Children may suffer from stress, bullying at school, issues from home, and being overwhelmed by social media. According to Sheen and Dudley (2017), anxiety suffered by children may result in children finding it difficult to go to school. A study supported by the National Health Service (NHS) found that one out of eight children in England between the ages of five and 19 experienced one mental disorder during evaluations in 2017. According to a recent New York Times article, surveys show the number of mental disorders in five to 15-year-olds has increased from 9.7 percent in 1999 to 11.2 percent in 2017. (Magra, 2019).

The need for mindfulness training early in life starts to become increasingly important. **Mindfulness** is defined as an awareness that develops from intentional, nonjudgmental attention toward a current personal experience. I am interested in designing spaces where mindfulness is considered as part of the design process because I believe intentionally design outdoor spaces can benefit individuals who are in need of therapeutic services. Studies show that nature-based therapy, including therapeutic woodlots, enhances the effectiveness of the therapy treatments that patients receive (Hayes, 2004). Experts advise that various purposeful gardens should be designed to allow children to participate in different mindfulness activities, specifically quiet space, active space, and engaging space. Mindfulness education helps a group understand the value of engaging in and reflecting on various activities.

Many school children don't have access to nature in their outdoor spaces. However, the site for my project, **Carrcroft Elementary School** in northern Wilmington, Delaware, is a 10.58-acre parcel of land with plenty of open space. The school, built-in 1963, belongs to the Brandywine School District and serves students from kindergarten through 5th grade. The principle, Mark R Overly, has taken the idea of mindfulness seriously by making it an overall theme for the school. Mindfulness practices at the school include morning breathing activities broadcast in class or the hallway, yoga poses, and mindfulness eating habits encouraged in the cafeteria.

I am interested in expanding the school **theme of mindfulness** to the outdoor campus by creating a more functional mindfulness trail and a mindfulness courtyard outside of the newly built cafeteria. Fortunately, the school campus already has some significant elements to include in a mindfulness setting, including the woodlot with a large canopy, healthy dominant plants, a small stream, and mindfulness signs. There is also ample open spaces to design new features. The school is seeking to redesign the curriculum for the children to have access to nature during the school day. The focus of my project is to ensure that there is space in the middle of the fragmented forest where children are able to interact with nature to enhance mindfulness and to design a mindfulness courtyard.

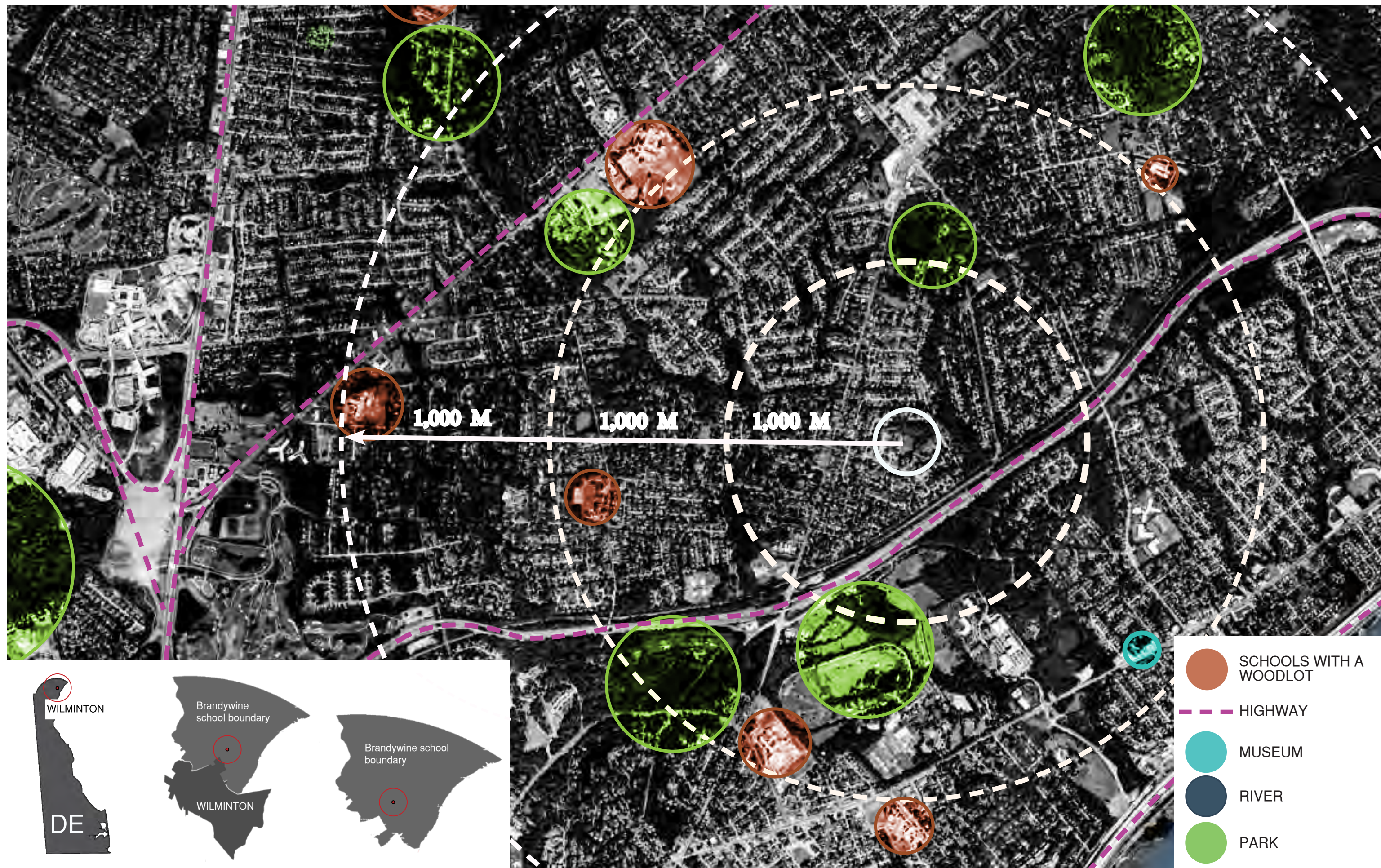
OPPORTUNITY

In considering opportunities at Carrcroft Elementary, I development this guiding questions:

-How might a school provide students with a variety of places to experience different levels of mindfulness activities? **It is highly recommended for any size school with any level of outdoor space, as long as a designer provides different levels of areas as defined below.**

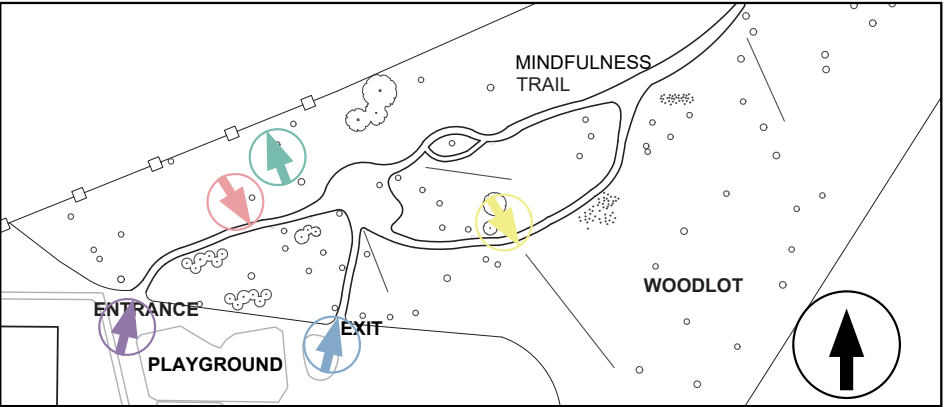
FOUR OBJECTIVES OF THIS PROJECT

1. Design a **quiet space** for elementary school children to interact with nature.
2. Design an **active space** for students to encourage more engagement in the mindfulness and learning process.
3. Design an **engaging space** for students to participate in meaningful hands-on activities.
4. To provide opportunities for students and community members who use the site to learn about mindfulness concepts.



WOODLOT PHOTOS

A forest is an excellent environment for one to achieve mindfulness. It is comprised of trees of different species with many different smells and is home to various bird species whose sounds will enhance the experience.



MINDFULNESS TRAIL ENTRANCE



EDGE OF THE WOODLOT



MINDFULNESS TRAIL EXIT



FALLEN TREE



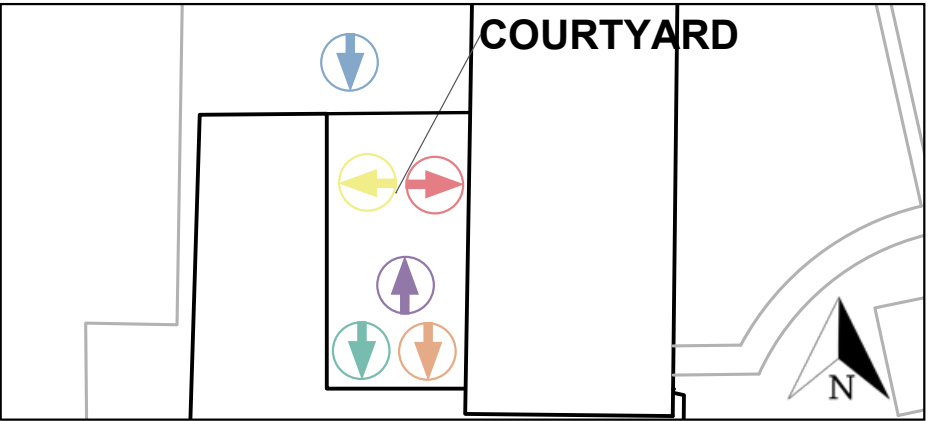
MINDFULNESS SIGN (1 OF 5)



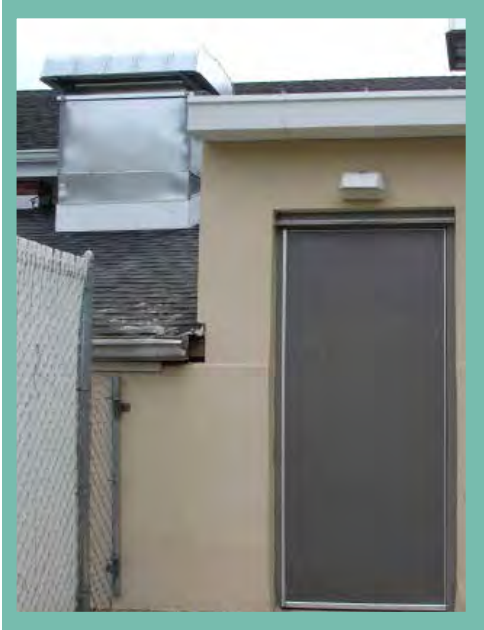
CANOPY

COURTYARD

The courtyard is another proper site for the mindfulness practice considering it has a big open space between the main building and cafeteria of the school. Students and staff could also enjoy the outside view through the big cafeteria windows.



FACING NORTH



EXISTING DOOR



FACING SOUTH



FACING WEST, CAFETERIA

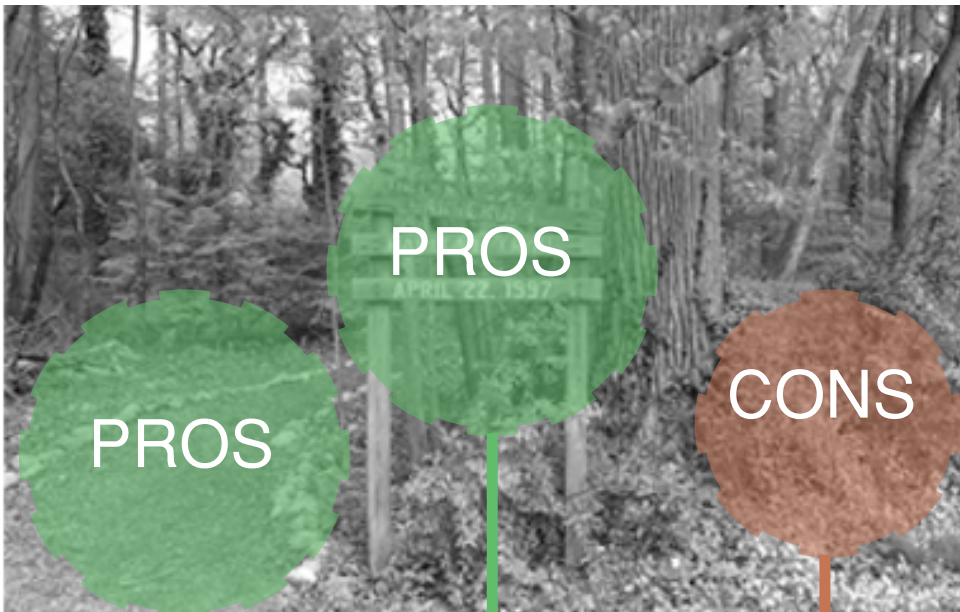


ROOF DRAINAGE



AIR CONDITION

SITE ANALYSIS



PRIMARY
ENTRANCE

MINDFULNESS
TRAIL SIGN

INVASIVE
SHRUBS ON
EDGE



OPEN
SPACE
INSIDE
WOODLOT

BENCH

EXISTING
MINDFULNESS
SIGN (1 OF 5)



INVASIVE
SHRUBS ON
EDGE

PRIMARY EXIT
(CONNECTING TO
PLAYGROUND)



1. ROOF
DRAINAGE
PIPE
2. AIR CONDITIONER

COURTYARD
OPEN SPACE

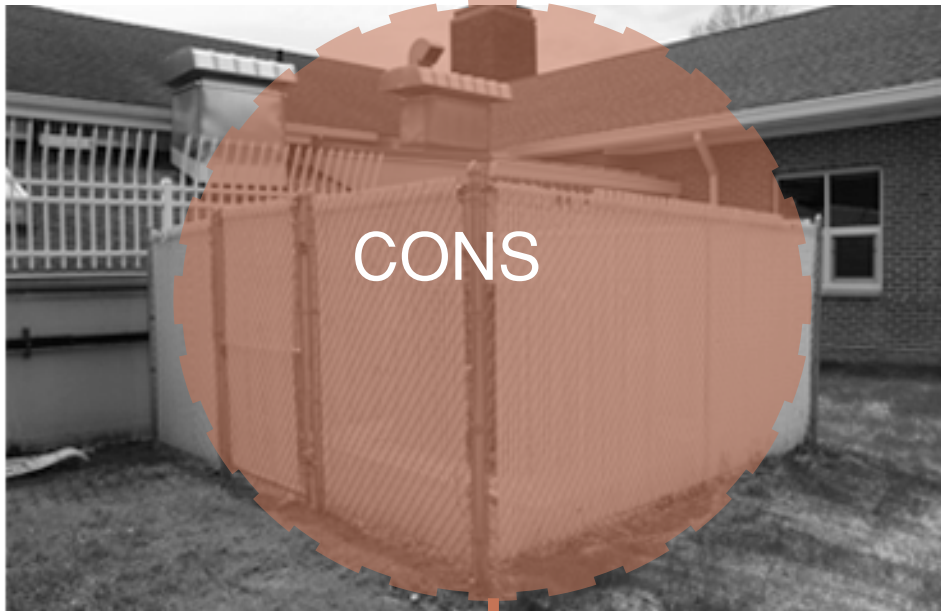
EXIT DOOR
FROM KITCHEN



ROOF
DRAINAGE
PIPE

CAFETERIA
EXIT DOOR

WAREHOUSE
DOOR



AIR CONDITIONER

MINDFULNESS TRAIL PROJECT ACTIVITY

An activity direction :

I provided students with image stickers of different design elements they can include along the mindfulness trail OR anywhere on campus including the courtyard. I also gave a campus map.

After reviewing the description of the images together, they broke into teams of five (5):

As a group they were told to:

1. Decide which of the elements they like BEST.
2. Select THREE stickers to show their favorite ideas.
3. Draw ONE more original idea on the blank sticker I provided.
4. Place all FOUR stickers on the map in the area where they want to locate the element.
5. What additional unique ideas do they have for other elements? Draw on their map and include words that describe the original ideas.

Attendants: 95 students from 5 th grade.

EXAMPLE ACTIVITY PLAN



Mail Box



Insects House



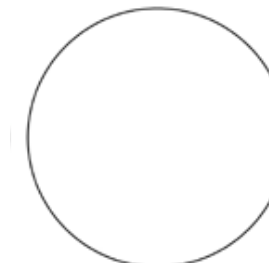
Bird Nest



Bird Feeder



Woodland Sculptures



Other Ideas ?



Rain Harvesting



Plant Labels



Mail Box



Insects House



Vertical Garden

Unique ideas:

1. Treehouse
2. Meditation Yoga station in the treehouse
3. Pond with ducks, fish, frogs, and turtles
4. Log bench
5. Water fountain for people
6. Rose garden and birdhouse for courtyard

PRECEDENT STUDY



A: RANDALL CHILDREN'S HOSPITAL, LEGACY EMANUEL

Innovative Practices:

1. Including several semiprivate niches, like an area with rocks children can climb on.
2. Many details that attract children's attention, like woodland sculpture.
3. Providing places where the therapist can carry out their sessions.



B: A THERAPEUTIC GARDEN FOR THE PUGET SOUND VETERAN'S AFFAIRS HOSPITAL

1. The furniture will be placed in the garden to create a physical and visual appeal within the garden
2. Movable chairs and tables which will enable children to be able to socialize with each other actively.
3. A green wall with aromatic herbs will allow patients to have a place where they can play on by trying to reach up and touch it.



C. A COMMUNITY RESTORATIVE GARDEN Innovative Practices:

1. Addressing entrenched social understandings and increasing access to nature.
2. Plants selected for fragrance and edibility and for children to explore the smells and textures.
3. Adding natural elements, like tree trunks with climbing dowels, wood



D. GREENFIELD PARK - GREENFIELD, CALIFORNIA

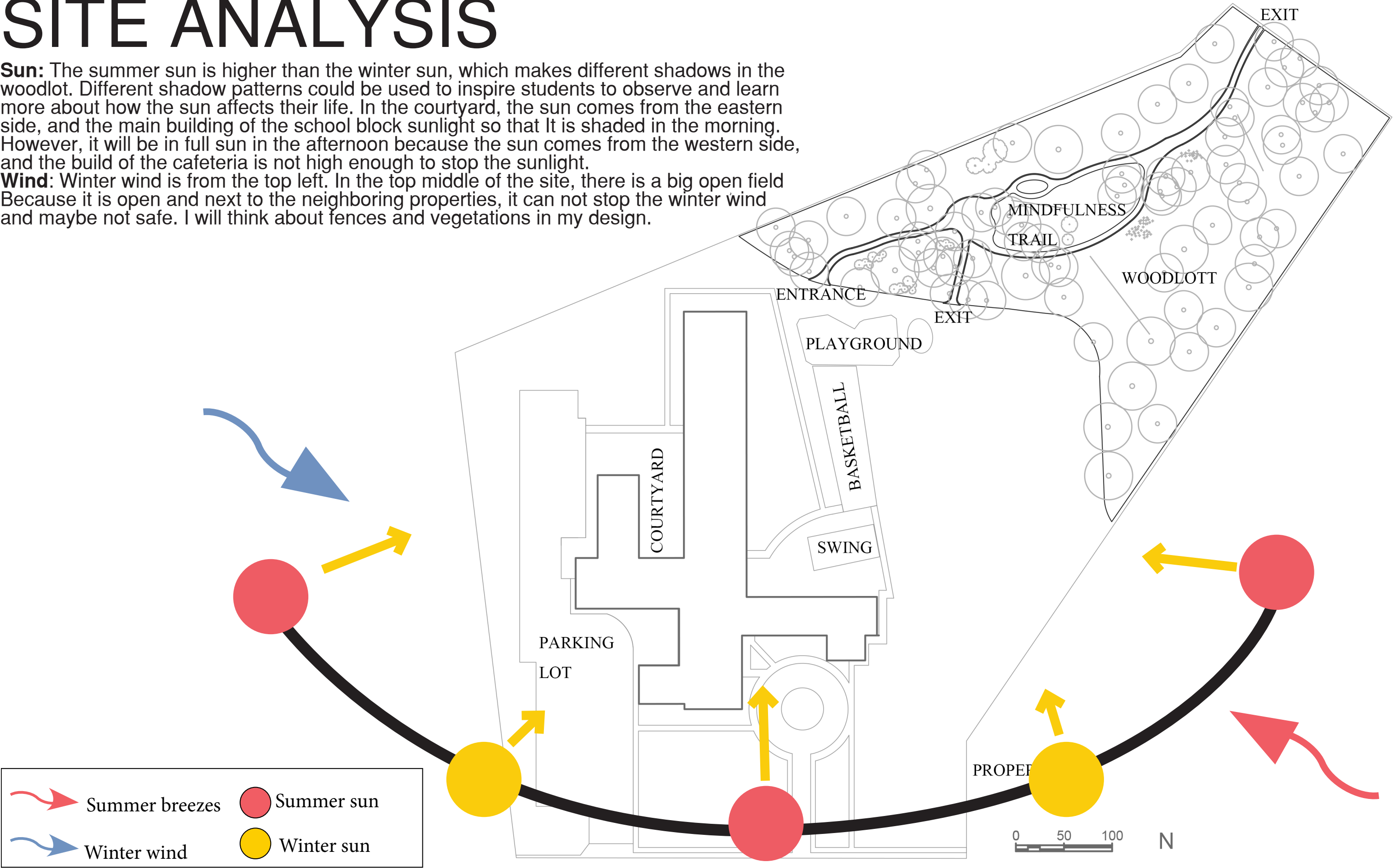
Innovative Practices:

1. The park includes many custom play features that reflect the geology, hydrology.
2. Park features include an amphitheater, water diversion, playgrounds and, a climbing wall.
3. The natural park's vegetation, designed to reflect the chaparral and coastal scrub biomes of the area.

SITE ANALYSIS

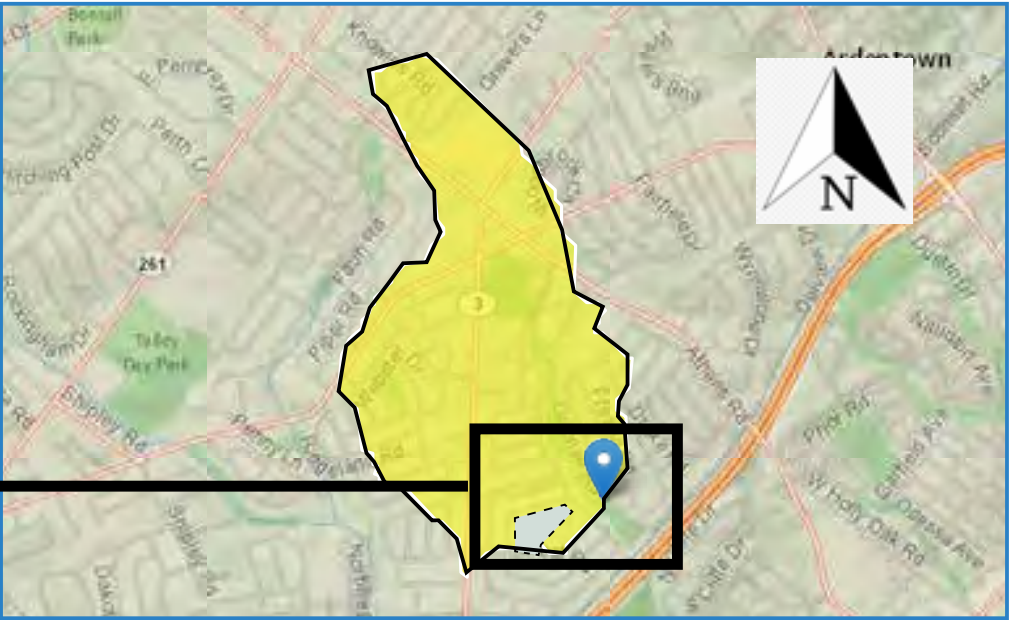
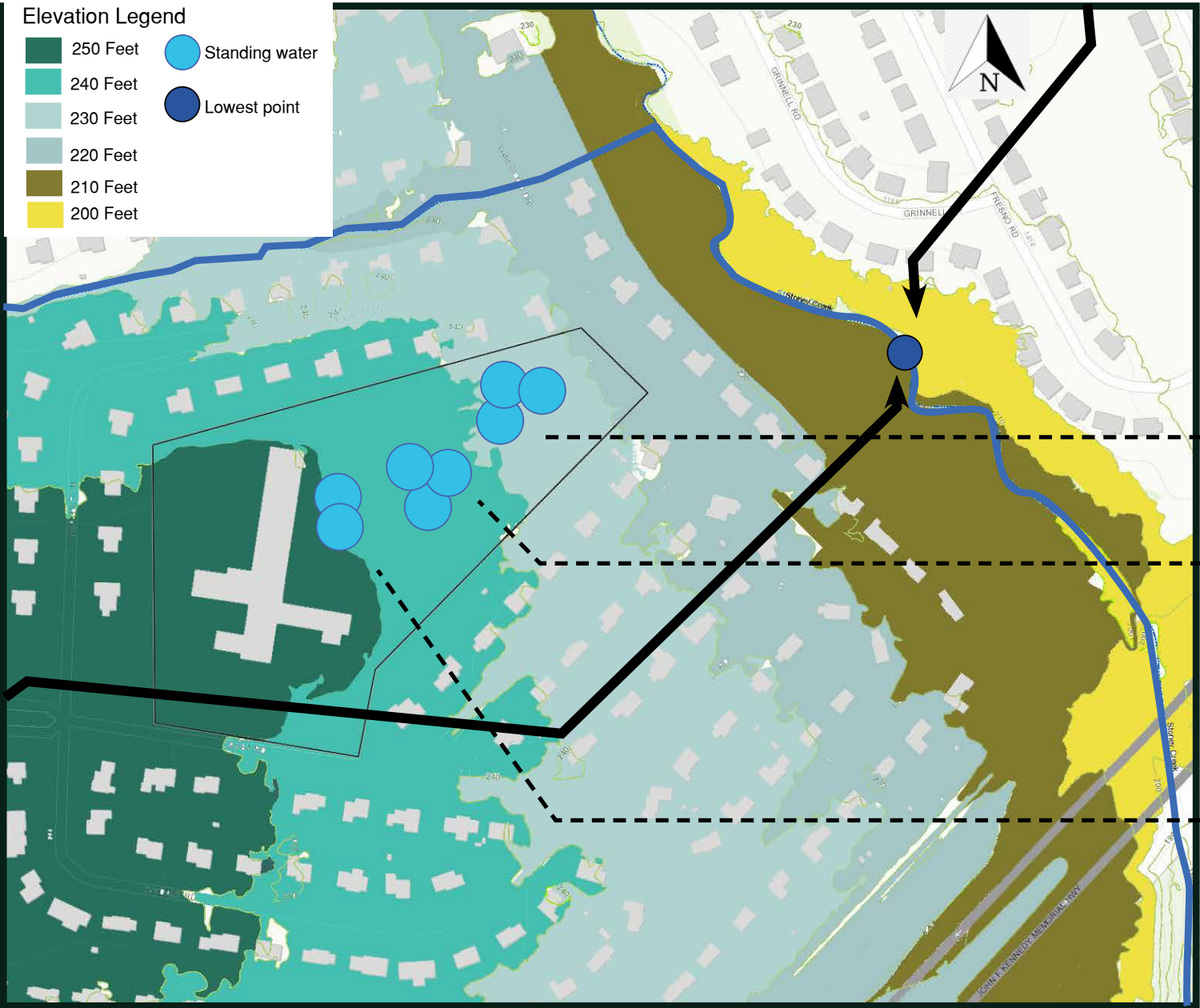
Sun: The summer sun is higher than the winter sun, which makes different shadows in the woodlot. Different shadow patterns could be used to inspire students to observe and learn more about how the sun affects their life. In the courtyard, the sun comes from the eastern side, and the main building of the school block sunlight so that It is shaded in the morning. However, it will be in full sun in the afternoon because the sun comes from the western side, and the build of the cafeteria is not high enough to stop the sunlight.

Wind: Winter wind is from the top left. In the top middle of the site, there is a big open field. Because it is open and next to the neighboring properties, it can not stop the winter wind and maybe not safe. I will think about fences and vegetations in my design.



SITE ANALYSIS: TOPOGRAPHY AND WATER

Elevation changes from 256 to 226 feet, and stormwater runs into the river on the eastern side of the map, which is elevation 212 feet. According to USGS StreamStats, there are 0.75 square miles that drain into the same spot of the river. Since elevation height decrease from left to right, it causes serious standing water problem after or during heavy rain, which is pointed out by blue circles in the graph below. Standing water are located next to the playground, the edge of the woodlot, the edge of the root system, and the northeast side of the trail pathway. It is hard to participate in those areas once it rains, especially the north-east side of the trail pathway in the woodlot. Boardwalks will be considered in the design.



USGSStreamStats



SITE ANALYSIS: PLANT COMMUNITY

Plant Community: Northern Piedmont Mesic Oak-Beech Forest

Occurs: on mesic substrates

Characterized by: not any one dominated species, but a large heterogeneous mixture

Associated soil type: Well drained, silt loam (0-44inches)

Landscape positionl Flat woods that are mesic being half dry and half in the lower elevation on the estern side.

This forest is the most common type in all of the Piedmont watersheds in Delaware. The Mesic Rich Forest is generally dominated by tuliptree and has a richer herbaceous layer. It may include species as below:

Canopy trees: Tuliptree (*Liriodendron tulipifera*) and American beech (*Fagus grandifolia*) are frequent in the canopy and are associated by white oak (*Quercus alba*), northern red oak (*Quercus rubra*), black oak (*Quercus velutina*) and hickory (*Carya* spp.).

Understory tree: American hornbeam (*Carpinus caroliniana*), sweet birch (*Betula lenta*), red maple (*Acer rubrum*).

Herbaceous plants: Christmas fern (*Polystichum acrostichoides*), white wood aster (*Eurybia divaricata*). Solomon s seal (*Polygonatum biflorum*)

Invasive shrub: Multiflora rose

Evergreen shrub: Holly and Rhododendron.

Since it is not safe to have woodpiles and an open field between school and neighborhoods, I will think about adding more holly or Rhododendron in my design.



TULIP TREE



AMERICAN BEECH



WHITEWOOD ASTER



CHRISTMAS FERN

SITE ANALYSIS: ZONING DIAGRAM

Building:

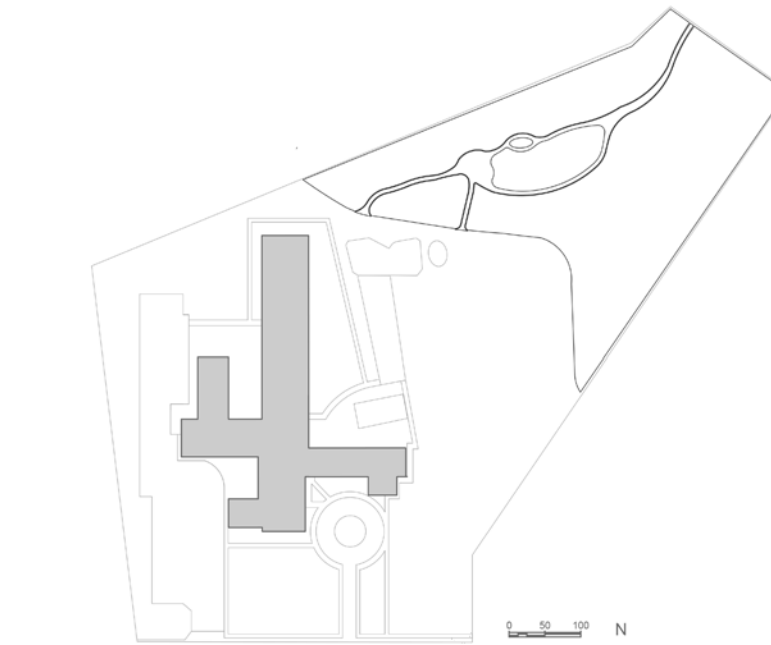
The site is situated in an area with a building running north-south across the first third of the property. The building looks like an overlay of two rectangular boxes. There is a new addition to the building on the left, which is a new cafeteria.

Pavement and Green

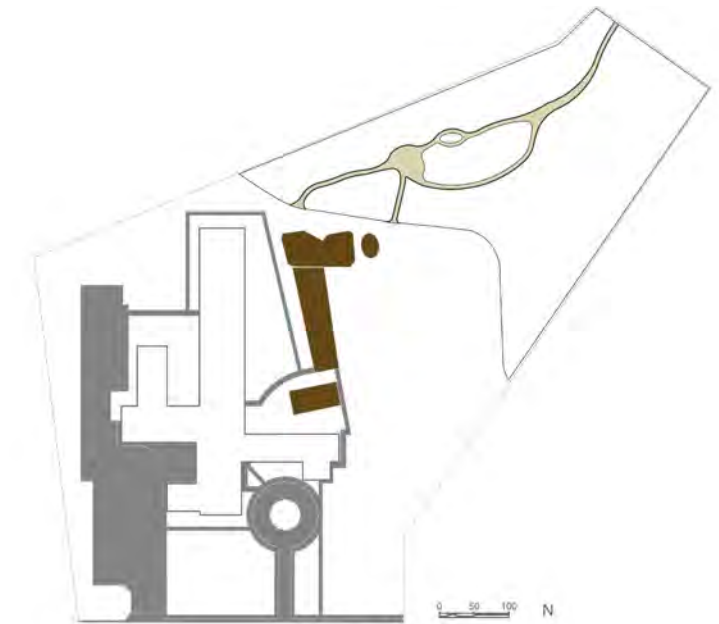
This site leaves the back of the building with approximately two-thirds of the land for outdoor activities. It is separated by pavement area and green area. Pavement area takes 40 percent and green area takes 60 percent.

Tree canopy:

The green area is divided by 50 percent lawns and fragment forest. Lawns give a big open space for schools to hold various activities, like sports. Forest provides a large amount of forest canopy, which is a place to engage in and explore the pleasure of nature.



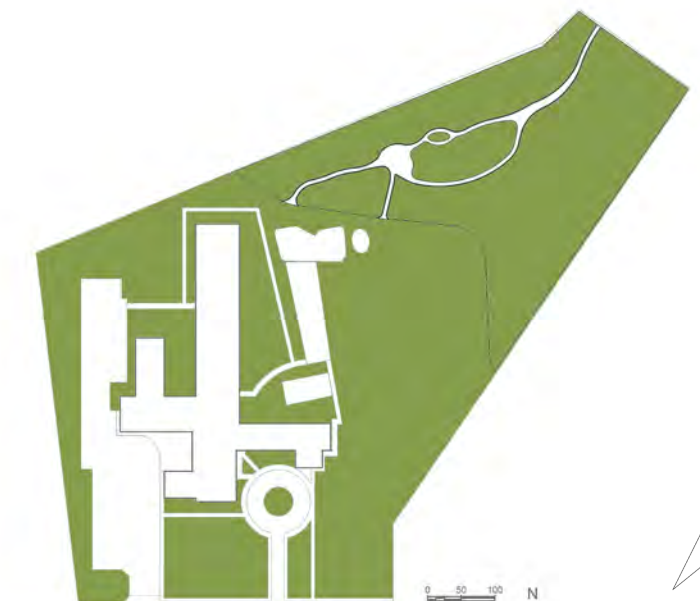
BUILDING



PAVEMENT

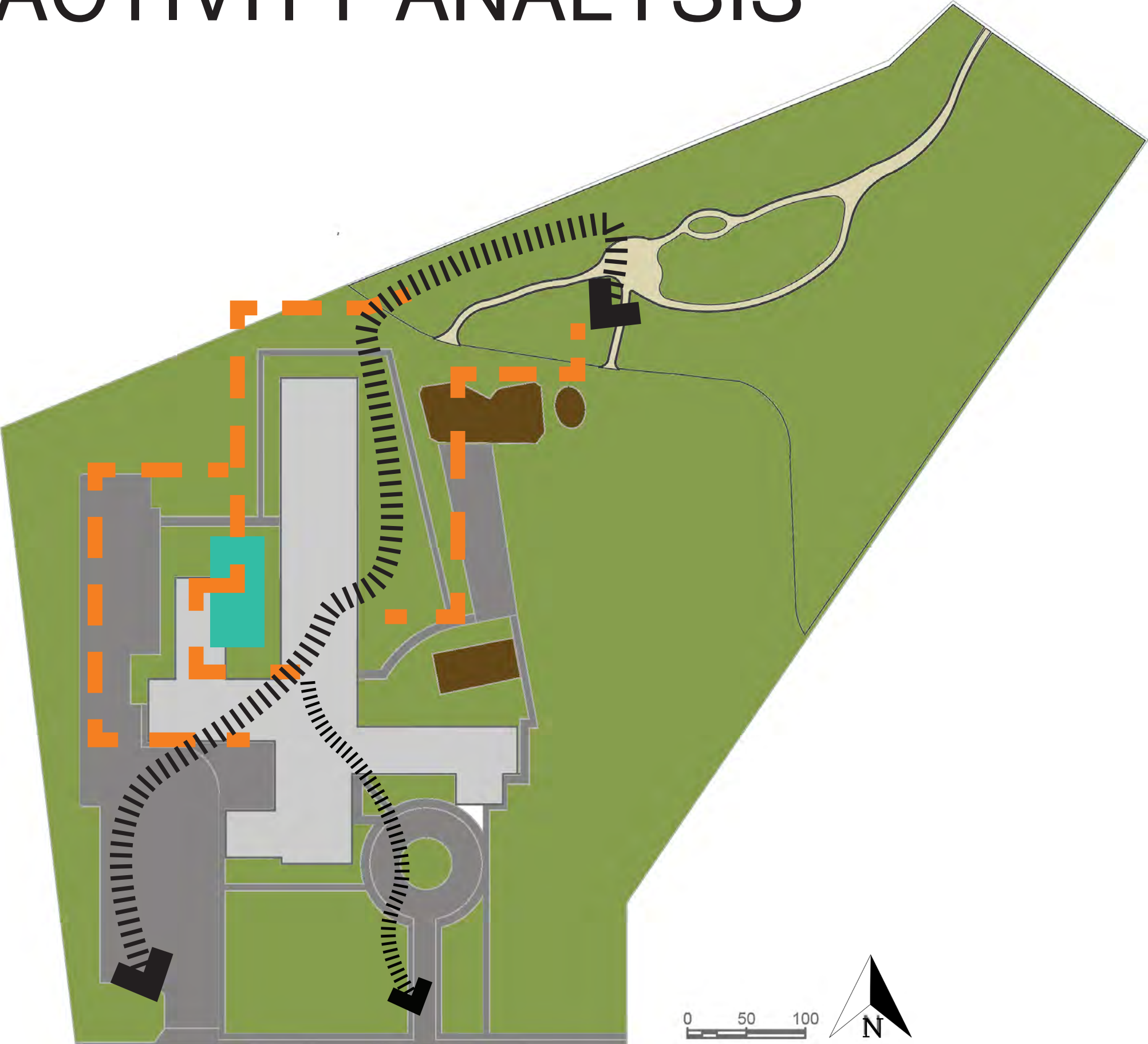


TREE



GREEN

ACTIVITY ANALYSIS




HOW OFTEN IS WOODLOT USED?
Not very often, kindergarten (age 5) use is more than older students (1th-5th grade age 7-11).
5th grade not ok to stay alone in the wood
Need open view

HOW IS IT USED?
Kindergarten: science
Elementary: Cycle from the entrance to exit, which is closer to the school building.


HOW DO PEOPLE WALK THROUGH THE SITE?
Entrance and exit, do not walk through the whole site.

WHICH DOOR DO THEY COME IN AND OUT?
The door next to swing playground


HOW DO THE CARS DROP OFF AND PICK UP STUDENTS?
Long vehicle line always happens because all age students need to be picked up at the same time and same location. School buses drop off at the main entrance of the building.




PRIMARY CIRCULATION



SECONDARY CIRCULATION



COURTYARD



PLAYGROUND

CONCEPT PLAN-MINDFULNESS

According to research described in *Therapeutic Landscapes*, (Marcus & Sachs, 2014) the following three areas are important for creating a mindfulness trail.

SAFTY:

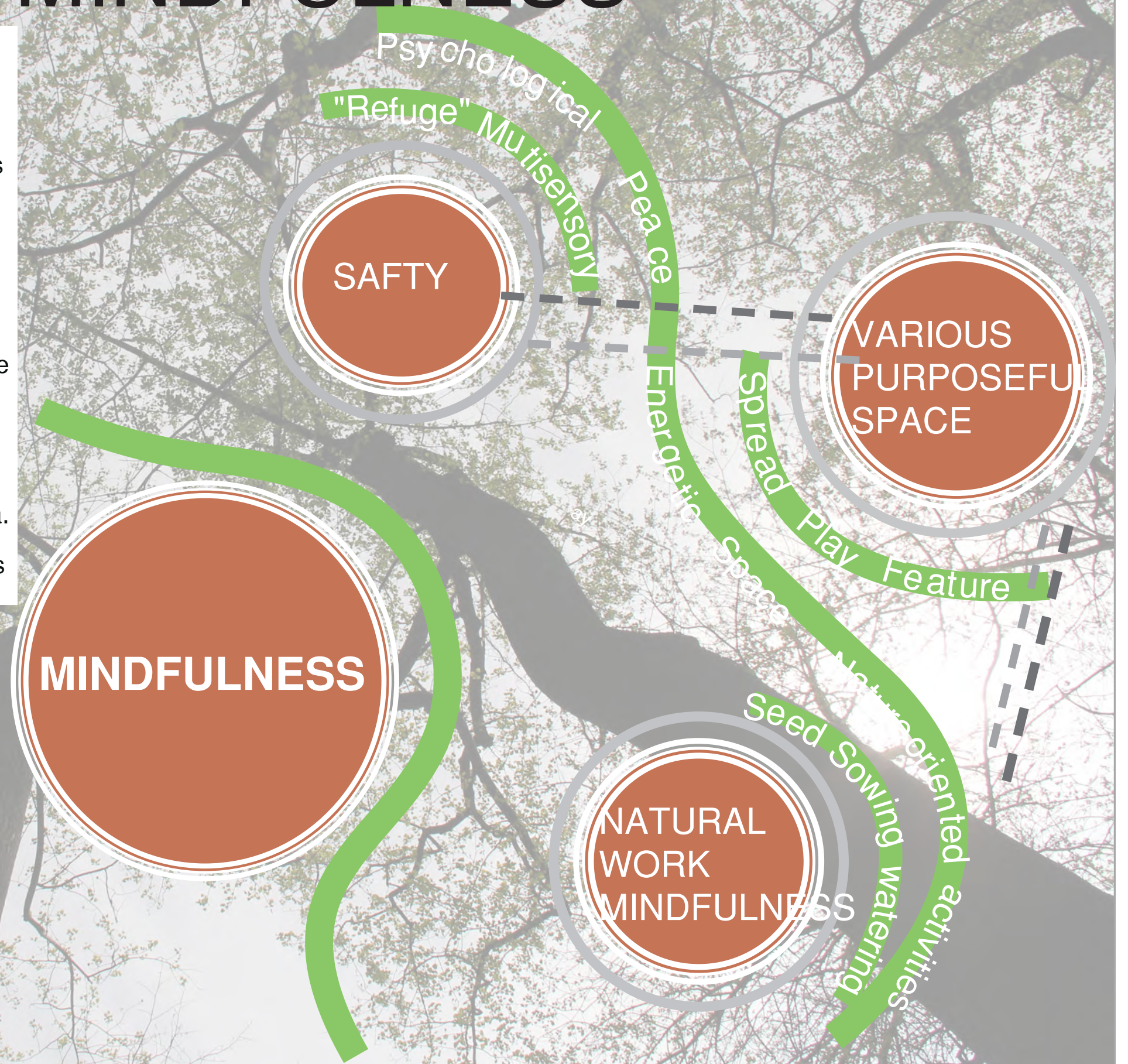
The mindfulness trail will include a safe space within the trees that provide canopy. The open spaces within the area will be made safe to offer refuge for those seeking to realize mindfulness.

VARIOUS PURPOSEFUL SPACE:

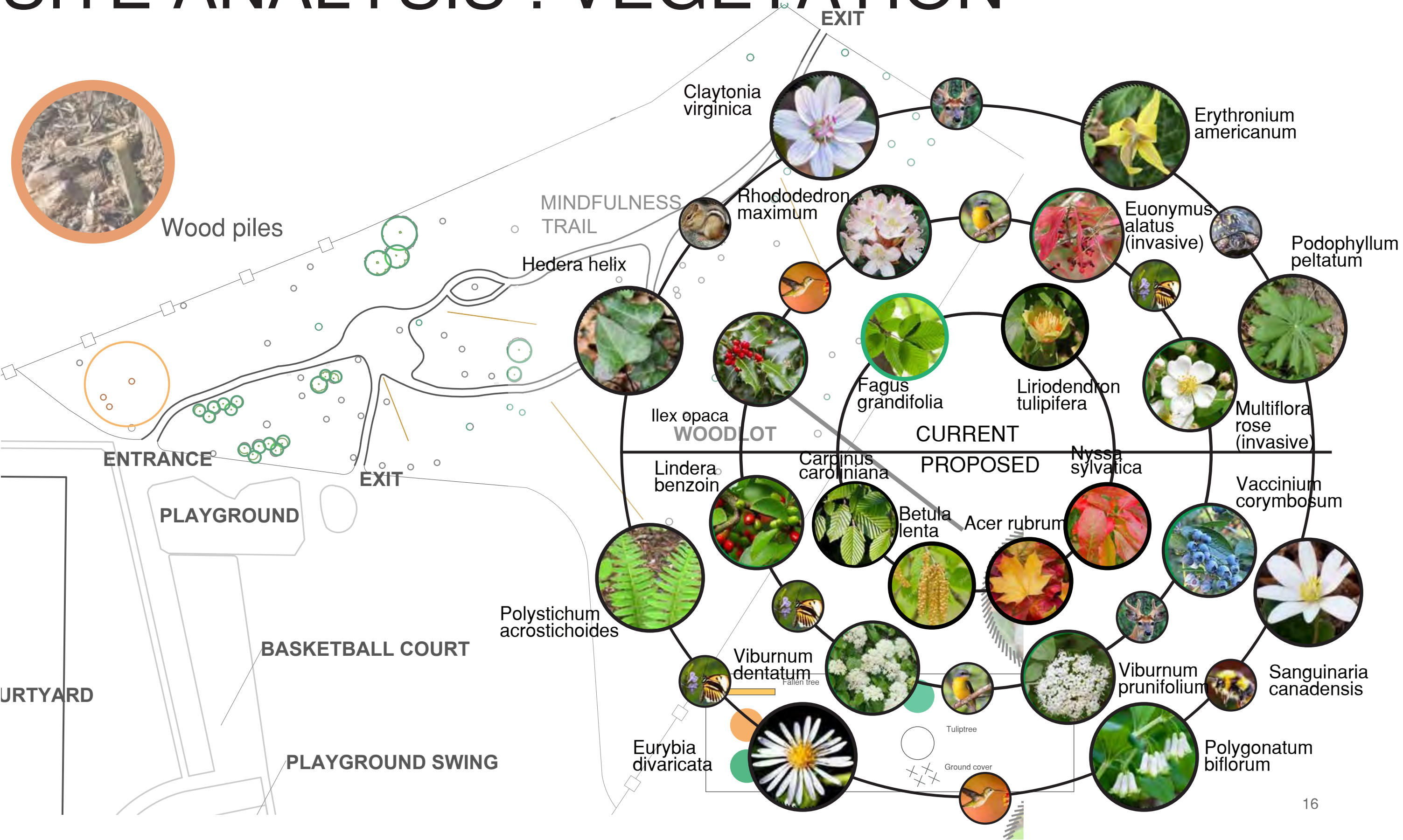
The energetic space will comprise features such as climbing rocks and sand that will encourage those visiting it to play. Space will enable children to wander around and explore the area.

NATURAL WORK MINDFULNESS:

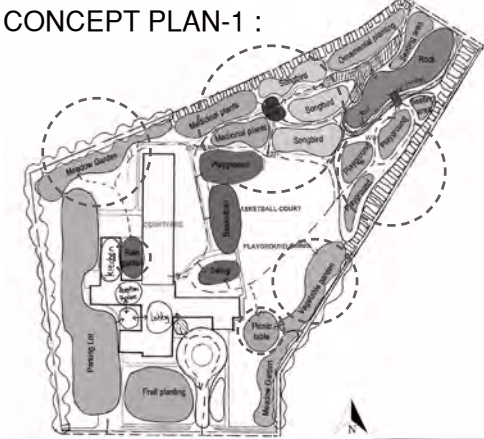
The natural mindfulness space will include an area where seeds are sown and watered. Additionally, there will be a birdhouse where one can feed birds while relaxing in the area. The natural mindfulness space will have enough space for people to work with hands, move and also be able to get tools to use while in the area with ease.



SITE ANALYSIS : VEGETATION

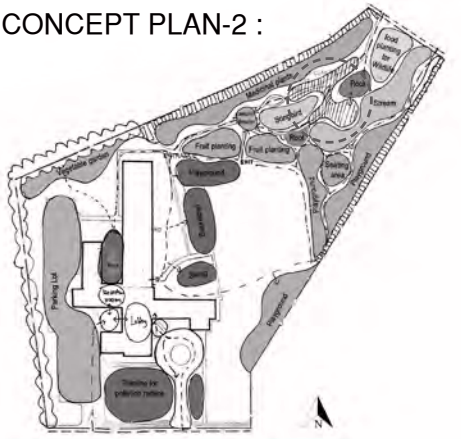


CONCEPT PLAN-1 :



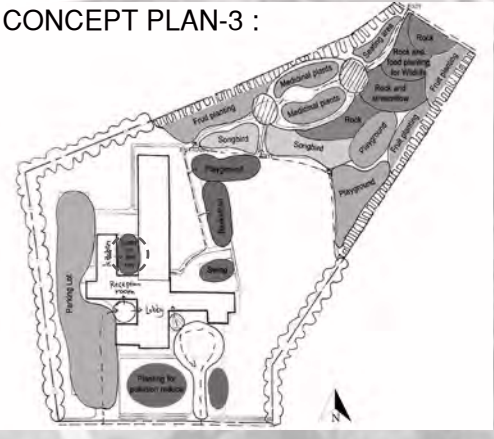
- 1.raingarden solve slop land and stormwater issues
- 2.tree house: a mindfulness space with two low floor, safe space with wall arounded to relax and meditate, or read, learn.
- 3.vegetable garden and picnic table: close to kindgarden building which offers more outside learning spaces.

CONCEPT PLAN-2 :



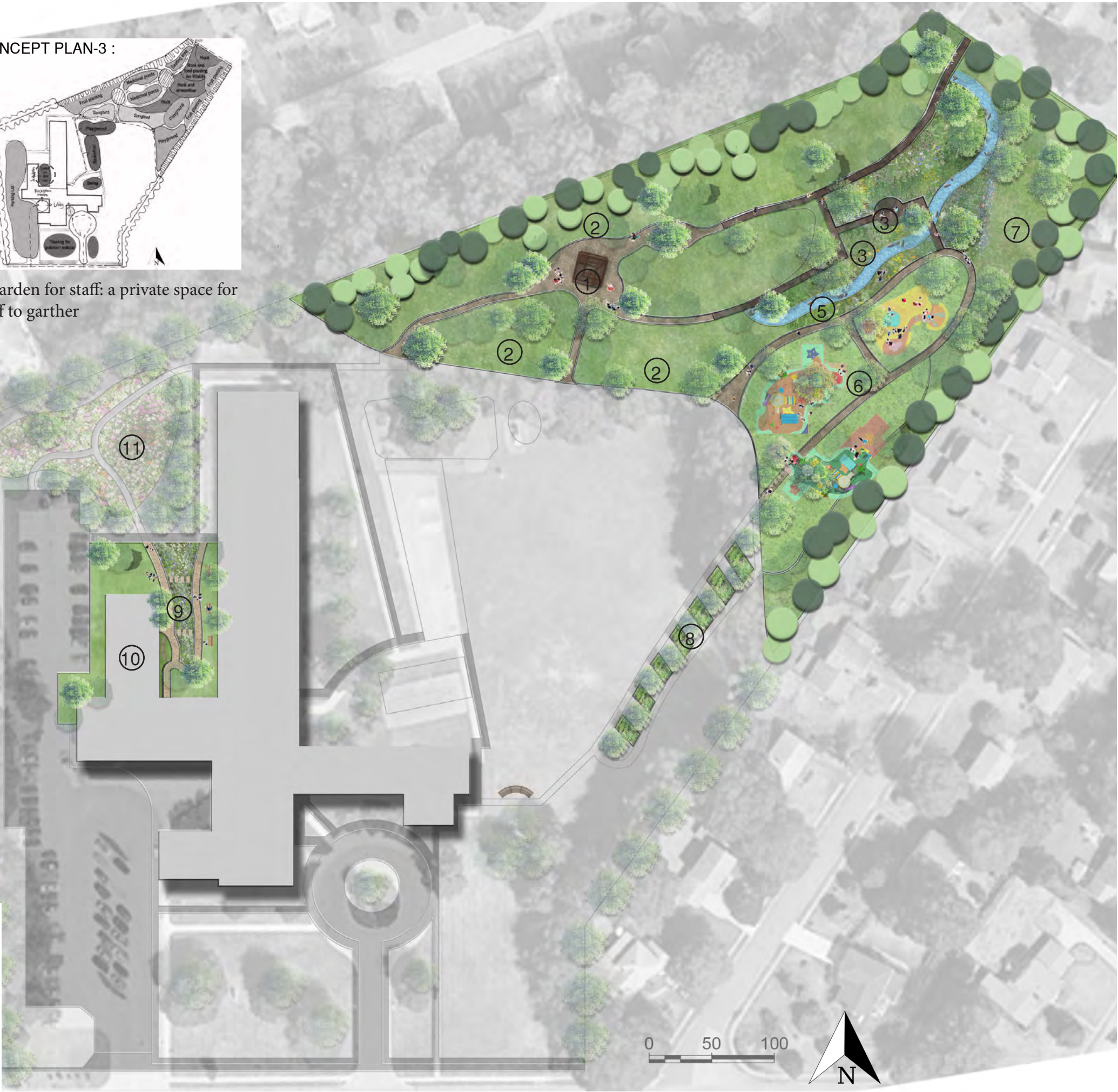
- 1.woodboard with a deck: a space for students to gather together to learn in a enegetic space.
- 2. playground: a enegetic space to help students for a better concentration and patient.

CONCEPT PLAN-3 :

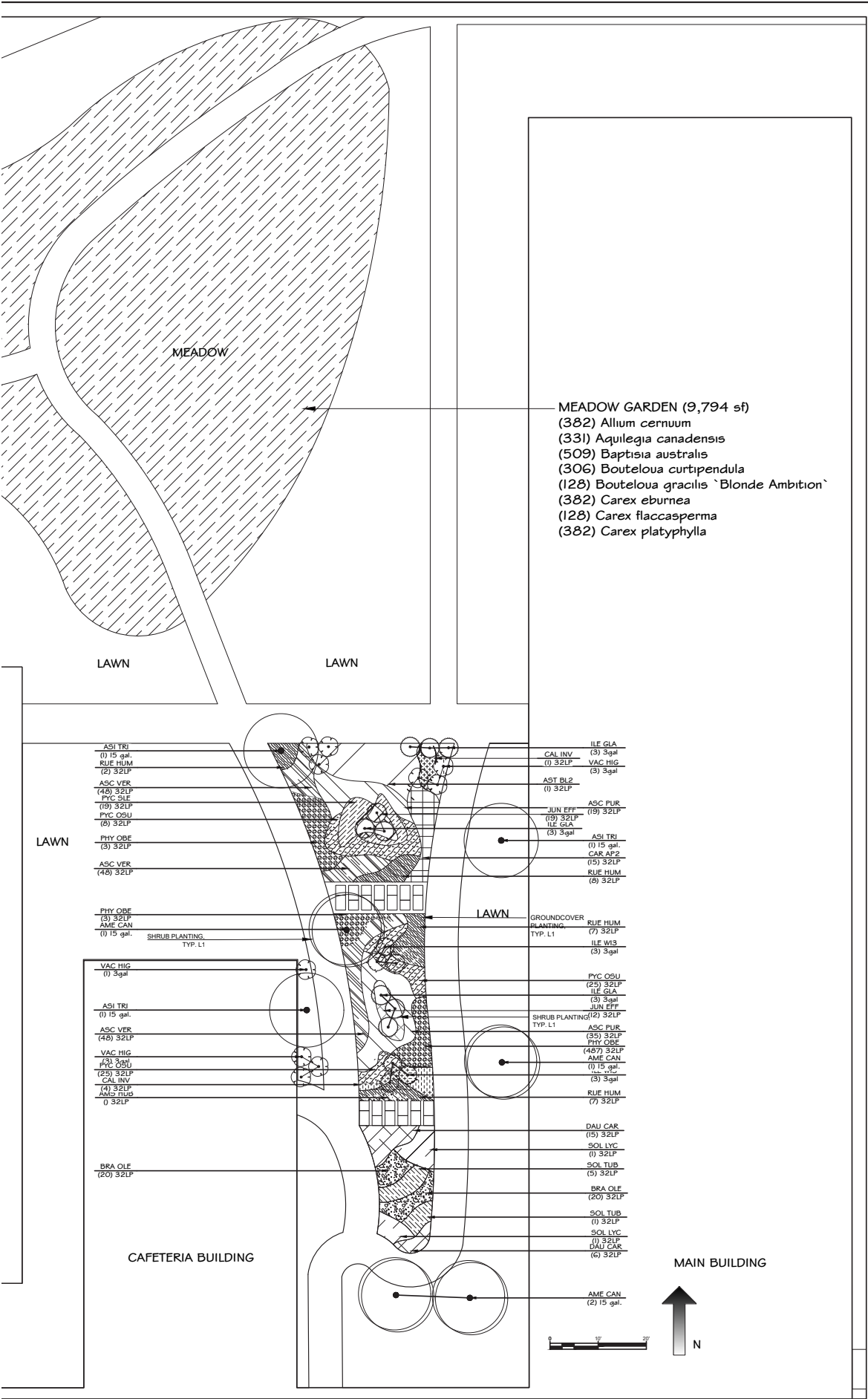


- 1. garden for staff: a private space for staff to garther



















- | | | |
|--|---|---|
|  Tulip tree |  Plants for wildlife |  Courtyard |
|  Tulip tree |  Ephemeral stream |  Cafeteria |
|  Tree house |  Natural base playground |  Meadow garden |
|  Medicinal and songbirds, plants |  Forest farming | |
|  Wood deck |  Vegetable garden | |



COURTYARD PLANTING DESIGN

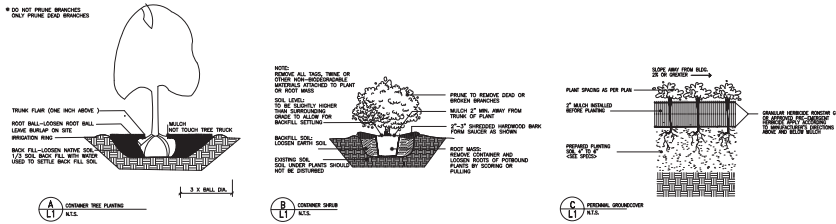


PLANT SCHEDULE

TREES	CODE	BOTANICAL NAME	COMMON NAME	SIZE	QTY	DETAIL	
	AME CAN	Amelanchier canadensis	Shadblow Serviceberry	15 gal.	4		
	ASI TRI	Asimina triloba	Pawpaw	15 gal.	3		
SHRUBS	CODE	BOTANICAL NAME	COMMON NAME	SIZE	QTY	DETAIL	
	ILE GLA	Ilex glabra	Inkberry Holly	3gal	9		
	ILE W3	Ilex verticillata	Winterberry	3gal	6		
	VAC HIG	Vaccinium corymbosum	Highbush Blueberry	3gal	10		
GROUND COVERS	CODE	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QTY	DETAIL
	ASC PUR	Asclepias purpurascens	Purple Milkweed	32LP	24" o.c.	54	
	ASC VER	Asclepias verticillata	Whorled Milkweed	32LP	24" o.c.	48	
	AST BL2	Aster laevis 'Bluebird'	Bluebird Aster	32LP	24" o.c.	1	
	CAL INV	Callirhoe involucrata	Purple Poppymallow	32LP	24" o.c.	5	
	JUN EFF	Juncus effusus	Soft Rush	32LP	24" o.c.	31	
	PHY OBE	Physostegia virginiana 'Vivid'	Vivid Obedient Plant	32LP	24" o.c.	22	
	PYC OSU	Pycnanthemum flexuosum	Mountain Mint	32LP	24" o.c.	33	
	PYC SLE	Pycnanthemum tenuifolium	Slender Mountain Mint	32LP	24" o.c.	19	
	RUE HUM	Ruellia humilis	Wild Petunia	32LP	24" o.c.	17	
LOW GROUND COVERS	CODE	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QTY	DETAIL
	CAR AP2	Carex appalachica	Appalachian Sedge	32LP	24" o.c.	17	
VEGETABLE	CODE	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QTY	DETAIL
	BRA OLE	Brassica oleracea	Wild Cabbage	32LP	24" o.c.	20	
	DAU CAR	Daucus carota	Carrot	32LP	24" o.c.	21	
	SOL LYC	Solanum lycopersicum	Tomato	32LP	24" o.c.	4	
	SOL TUB	Solanum tuberosum	Potato	32LP	24" o.c.	17	

CONCEPT PLANT SCHEDULE

MEADOW GARDEN	9,794 sf
<i>Allium cernuum</i> / Nodding Wild Onion	382
<i>Aquilegia canadensis</i> / Canadian Columbine	331
<i>Baptisia australis</i> / Blue Wild Indigo	509
<i>Bouteloua curtipendula</i> / Side Oats Grama	306
<i>Bouteloua gracilis</i> 'Blonde Ambition' / Blonde Ambition Blue Grama	128
<i>Carex eburnea</i> / Ebony Sedge	382
<i>Carex flaccasperma</i> / Blue Wood Sedge	128
<i>Carex platyphylla</i> / Broadleaf Sedge	382



Notes:

REV | DESCRIPTION | BY | DATE

STATUS:

Address:
503 Crest Rd, Wilmington, DE 19803

CLIENT:
CARRCROFT ELEMENTARY SCHOOL

ARCHITECT:
PEIYUAN YANG

SITE:
CARRCROFT ELEMENTARY SCHOOL

TITLE:
MINDFULNESS TRAIL

SCALE AT A0:
1"=10'

DATE:
12/7/2019

DRAWN:
drawn

CHECKED:
checked

PROJECT NO:
01

DRAWING NO:
01

REVISION:
revision

SECTIONS

Ephemeral stream
(wooden walkway)
before the rain



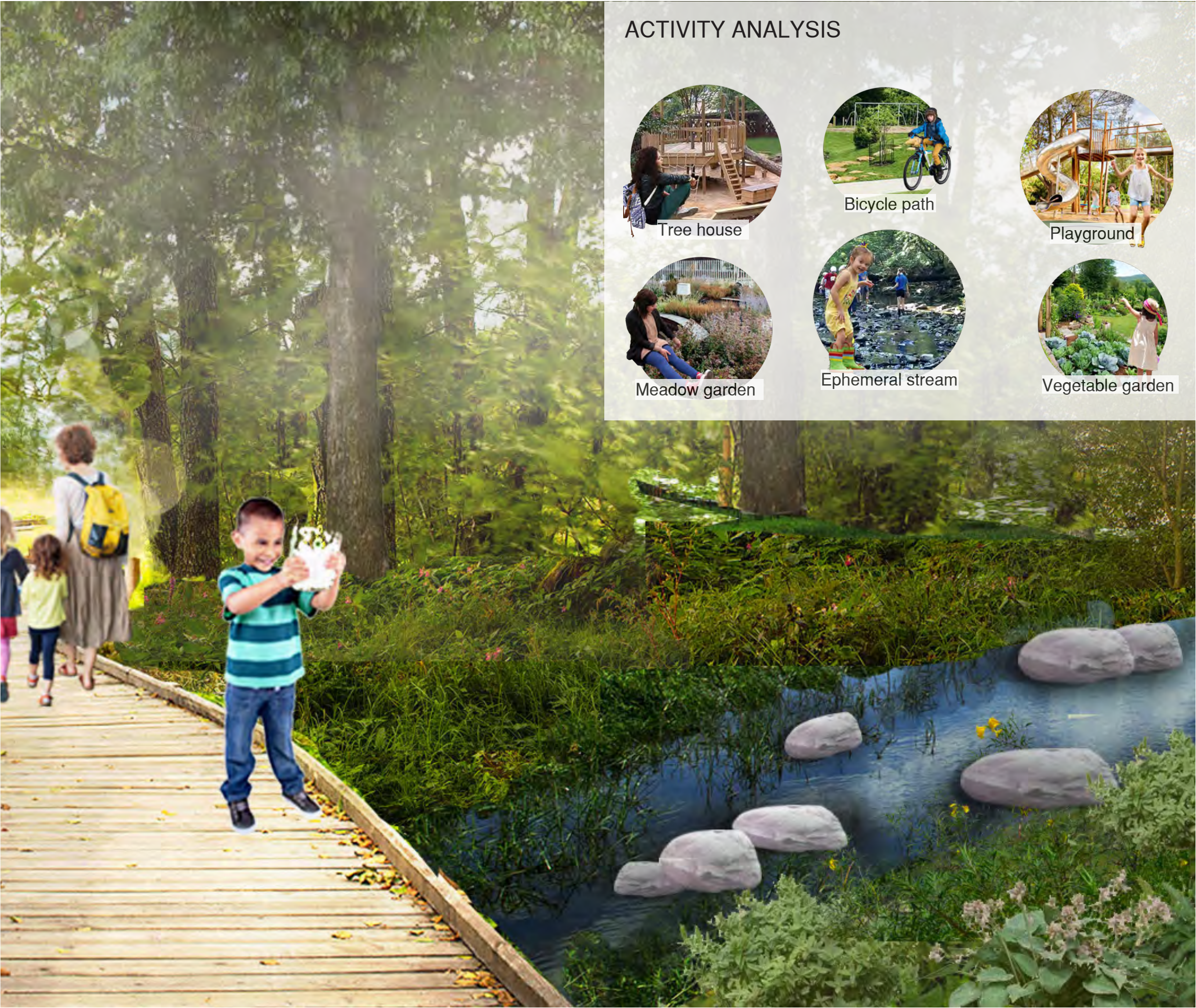
Ephemeral stream
before rain



Ephemeral stream
(wooden walkway)
after rain



Ephemeral stream
after rain



ACTIVITY ANALYSIS



REFERENCES

- Marcus, C., & Sachs, N. (2014). Therapeutic landscapes : An evidence-based approach to designing healing gardens and restorative outdoor spaces. Hoboken, New Jersey: Wiley.
- Wang, X., Shi, Y., Zhang, B., & Chiang, Y. (2019). The Influence of Forest Resting Environments on Stress Using Virtual Reality. International journal of environmental research and public health, 16(18), 3263. doi:10.3390/ijerph16183263
- Tsao, T. M., Tsai, M. J., Hwang, J. S., Cheng, W. F., Wu, C. F., Chou, C. K., & Su, T. C. (2018). Health effects of a forest environment on natural killer cells in humans: an observational pilot study. Oncotarget, 9(23), 16501,16511. doi:10.18632/oncotarget.24741
- Taylor, A. F., & Kuo, F. E. (January 01, 2009). Children with attention deficits concentrate better after walk in the park. Journal of Attention Disorders, 12, 5, 402-9.
- Whitehouse, S., J. W Varni, M. Seid, C. Cooper Marcus, M. J. Ensberg, J. R. Jacobs, and R. S. Mehlenbecket. 2001. Evaluating a Childrens Hospital Garden Environment: Utilization and Consumer Satisfaction. Journal of Environmental Psychology 21: 301,14

THANK YOU

Dr. Jules Bruck
Capstone advisor and professor
Mr. Andrew Hayes
capstone committee
Mr. Mark Overly

The principal of Carrcroft elementary school