Innovative Learning Environment

Campus development for a
Primary & Secondary School in Pune, India

Tampere University
School of Architecture

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Innovative Learning Environment
Campus development for a Primary & Secondary School in Pune, India
Master's Thesis

Editing & Design by Ramkrishna Agrawal.

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Tampere University

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Master's Thesis

Innovative Learning Environment
- Campus development for a Primary & Secondary School in Pune, India

Examiner: Professor Panu Lehtovuori

February, 2019

Abstract:

Tampere University
Degree Program in Architecture

Agrawal, Ramkrishna
Innovative Learning Environment
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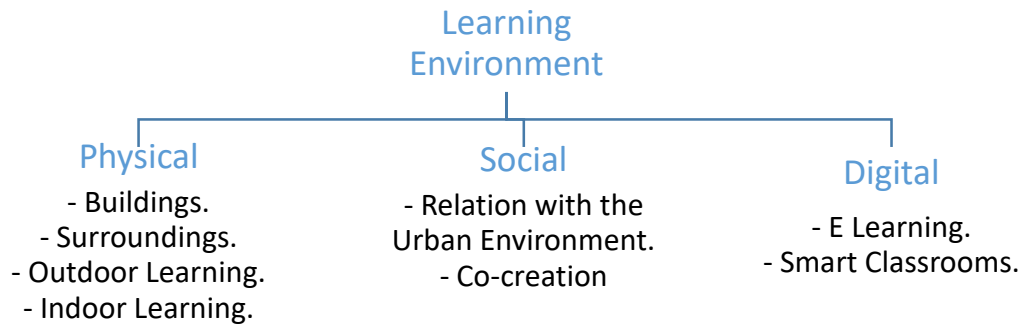
Master of Science Thesis, 63 Pages, February 2019
Examiner: Professor Panu Lehtovuori
Keywords: Learning Environment, Learning Pedagogy, Co-creation.

This thesis explores the solutions for effective learning through Learning Environment Design. This thesis has been done as a part of the Research Project In-Learn – (Innovative Learning Infrastructure and ecosystem) Coordinated by University Properties of Finland (SYK oy) & University of Turku, Finland. The primary aim of the project is to develop a Campus for a Primary & Secondary School in the city of Pune, India. The school would be approximately for 1000 students.



This thesis would be mainly focusing on the Physical and Social aspect of the Learning environment and how do they co-relate to each other. The further plan of the author is to digitalize the same and how technology can be incorporated within it so as to achieve the maximum efficiency. This thesis will also explore the possibilities to create a flexible learning environment which could be adjusted as per the needs of the user supporting the Learning Pedagogy. Co-creation is one of the major aspect which could influence the design of learning environment in various ways. Involving the user in the design process makes the design more efficient

In the First place, the author would be discussing how he got involved in this project and developed interest in the Learning environment. Then he would be discussing the roles of different stakeholders in this project & the visit by Finnish delegation to India. The thesis would also describe the role of the author to act as a mediator between the Finnish & Indian counterpart.

Further, this thesis would elaborate about the city of Pune & a basic urban analysis of the same. It would further describe the site & vicinity. Based on the analysis there will be a proposal for the Site.

In the next chapters, this thesis would elaborate on the spatial concept of the proposed school and the outdoor learning environment. Based on the surrounding environment, it will explore the solutions to

develop the school as a center of community and how the social & physical environment could co-relate with each other.

Further, the study would elaborate the basic component of the school that is a Classroom. The arrangement of the classroom and a brief about pedagogy. The aim is to explore the possibilities to develop a small school environment in a large school thereby providing flexibility in the functioning of the school. The classroom would be the Private zone and then the study would further explore the semi-public building which includes the ancillary activities of the school such as Auditorium, Music room, Arts room, Dining, etc. which could be used by the surrounding community in the evening.

This thesis would also describe the Outdoor Learning Yard including Science Yard, Arts Yard, Play Yard, Flower/Vegetables Yard, etc. which would also be a semi public area catering the school & the community. Finally, this thesis would propose the relevant solution for the campus development of the school in Pune and a brief about how the author would further continue with this project, hoping it becomes reality in the near future.

1.0 Introduction

2.0 Project Timeline

2.1 The Beginning.

2.2 Finnish Delegation visit to India (January 29, 2018 – February 02, 2018).

2.3 Discussions with Professor Panu Lehtovuori.

2.4 White Board discussions from time to time (Sketches).

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2.6 Further Discussions with the Finnish Counterparts.

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3.2 School as a Centre of Community

3.3 Technology Integration in Learning

3.4 Small School Environment at Large Scale school

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Acknowledgements

Bibliography

1.0 Introduction

University Properties of Finland (SYK Oy) and University of Turku had a mutual interest to develop a Innovative K-12 school (Learning environment) model which can be used around the globe. For this task SYK Oy had asked me and a team of Finnish architects to deliver a feasibility study and concept design for a Primary & Secondary school in India. The other target country was Namibia. In the beginning a general school concept design was prepared in the space. Later, it was finalized that the school to be established in the city of Pune, India.

Initially basic concept was prepared in cooperation with Ar. Heikki Luminen (Finnish Education Group) & Ar. Juha Luoma (LSV Architects) under SYK oy. As I started working with them I gradually developed interest in the Learning environment and decided to work further on Learning Environment. Later, the project (In Learn – Innovative Learning Ecosystem & Infrastructure) got funding from Business Finland and I started working directly under SYK oy to prepare a conceptual school proposal for Pune. The other target country as a part of this project was Namibia. I started working for India but later I got involved in the Namibia. I also established my own company, Ajna EduArch Consultants Private Limited through this project.

SYK Oy is an independent corporate body and enjoys full legal status, as well as financial and administrative independence in all its affairs. It is owned by Universities of Finland outside the capital region and the profit that SYK Oy creates is invested to projects of its owner Universities.

This document forms the whole process followed in the past one year (January 2018 – February 2019) for the InLearn project and holistic Architectural Concept for the Campus development of Primary & Secondary school in the city of Pune, India.

2.0 Project Timeline

2.1 The Beginning.

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2.5 Finnish Delegation Visit to Namibia (October 09 – October 14, 2018).

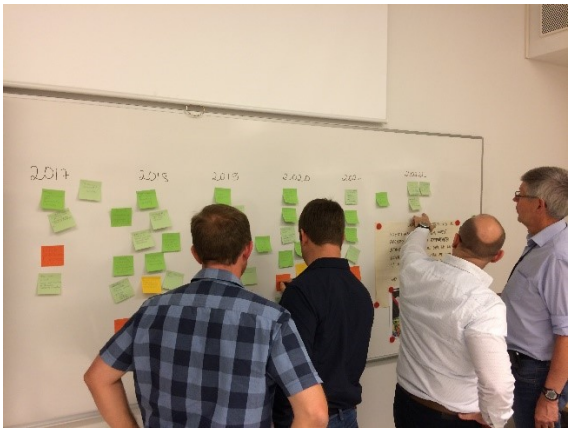
2.6 Further Discussions with the Finnish Counterparts.

2.1 The Beginning

The Project was started having discussion with the CEO Mauno Sievänen & Dr. Olli Niemi (SYK) regarding the proposed school project in India in the month of September, 2017. Previously, I had already worked for about 4-5 months getting an insight into Learning environment and developed my interest in it. I started working for SYK oy and took the campus development of the school as the diploma thesis. As the project proceeded further Delegation visit were organized to India & Namibia.

September 2017, Project Discussion, Day 01.

In October 2017, a delegation from Namibia visited Finland to explore the possibilities of education collaboration. A workshop was organized for them to create a future roadmap for the project.



Workshop: Roadmap for future.

Namibian Teacher delegation visit.

2.2 Finnish Delegation visit to India (January 29, 2018 – February 02, 2018)

Key Partners:

UNIVERSITY OF TURKU
UNIVERSITY PROPERTIES OF FINLAND
FINLAND UNIVERSITY
POLAR PARTNERS

The delegation from Finland visited India to discuss the possibilities for education collaboration. The aim of the delegation was to acquaint themselves with the local conditions of India & to get a basic overview of India. The delegation visited different site locations for the proposed school and University of Pune for academic collaboration. Following guest were the part of the delegation.

Finnish Guest

1. Kalervo Väänänen, Turun yliopisto
2. Riitta Mustonen, Turun yliopisto
3. Vesa Valkila, Turun yliopisto
4. Pasi Kaskinen, Finland University
5. Mauno Sievänen, Suomen yliopistokiinteistöt Oy
6. Olli Niemi, Suomen Yliopistokiinteistöt Oy
7. Ramkrishna Agrawal, Suomen Yliopistokiinteistöt Oy
8. Kimmo Kumpulainen, Polar Partners Oy

Local Hosts

1. Atul Khanna, Tooltech
2. Nilesh Bide, Architec

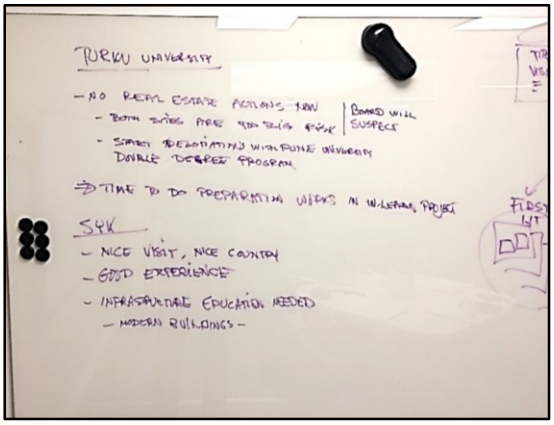
Schedule of the visit was as below:

Day 01, 29.01.2018 - Departure from Finland to India.
Day 02, 30.01.2018 - Mumbai (Chief Minister's Office & IIT Bombay)
Day 03, 31.01.2018 - Pune (Proposed Site: Deccan College Visit & Dinner hosted by Mr. Atul)
Day 04, 01.02.2018 - Pune (Pune University visit & Symbiosis Institute visit)
Day 05, 02.02.2018 - Departure from India to Finland

Visit to a Private University (SIU)

Dinner at Mumbai, Hotel Taj.

Visit to the University of Pune

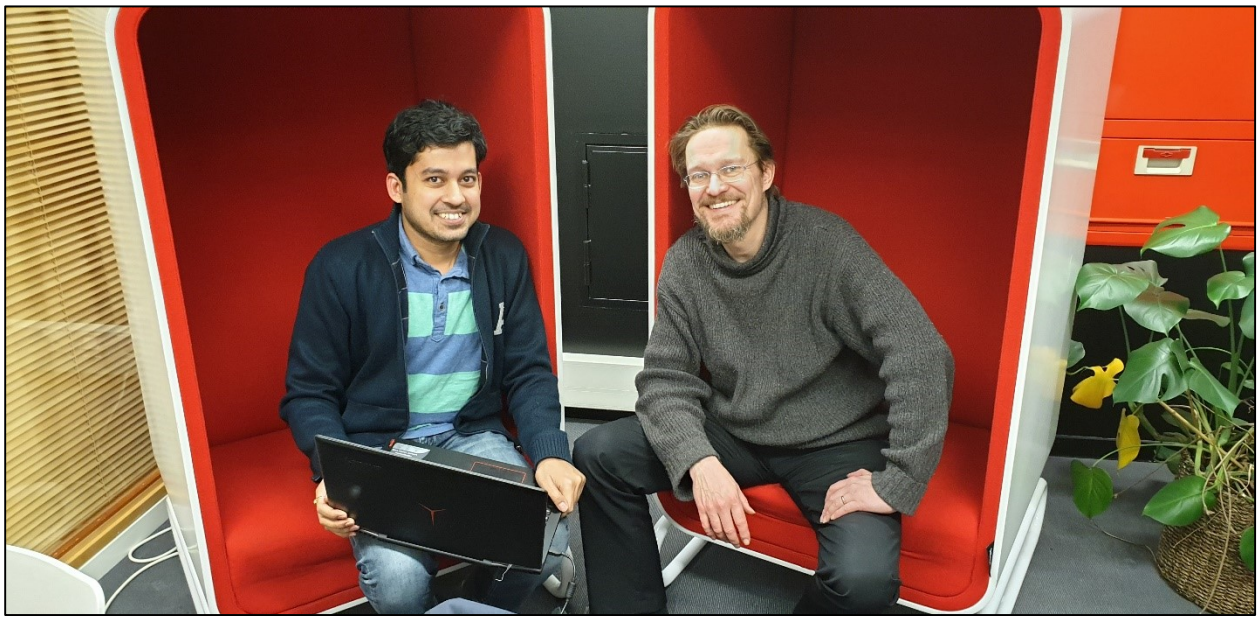


Conclusions.

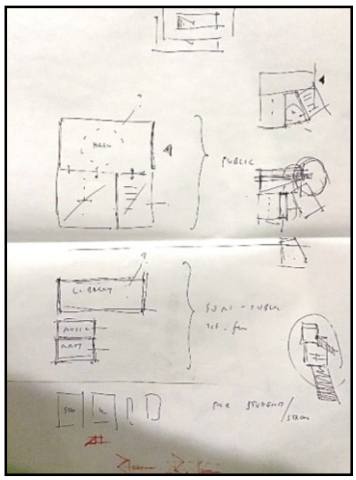
Conclusions from the India visit

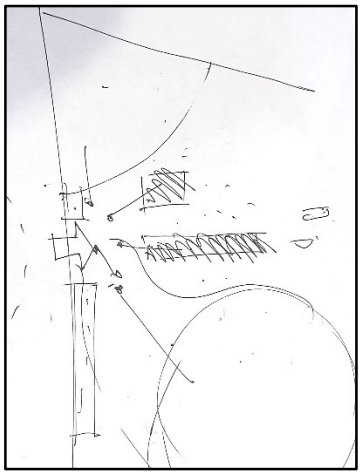
It was concluded that no action is to be taken, at the moment, for the proposed site locations. The project will proceed further step by step. It was decided to start a Double degree program with the University of Pune. My role was to act as a mediator between University of Turku & University of Pune to start the double degree program. Also, at the same time my task was to develop the conceptual proposal for the school at the Deccan College site in Pune.

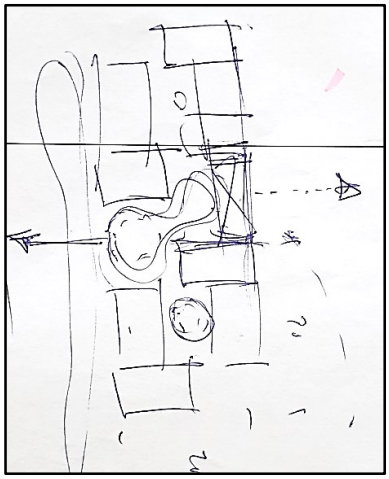
2.3 Discussions with Professor Panu Lehtovuori



Discussions were organised with Professor Panu Lehtovuori from time to time. The encouragement, motivation, knowledge & guidance provided by him during the process led to the holistic development of the project. Also, I was able to establish my own company Ajna Eduarch Consultants Private Limited as a part of this project under his guidance.



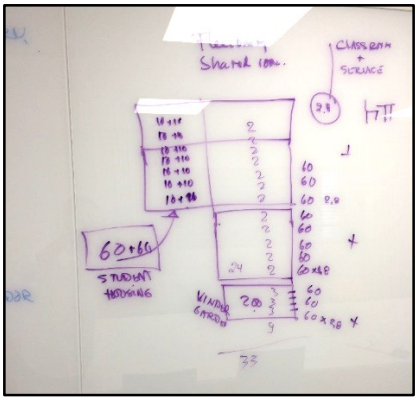




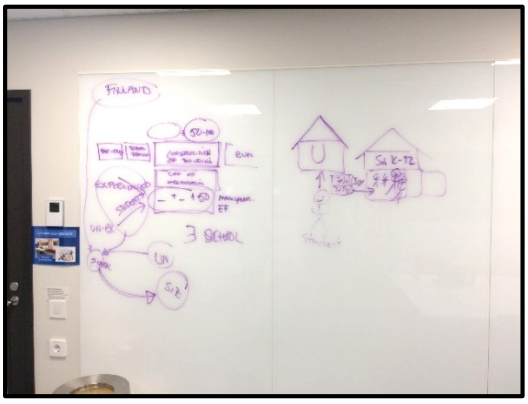
Sketches from the Discussions.

2.4 White Board discussions from time to time (Sketches)

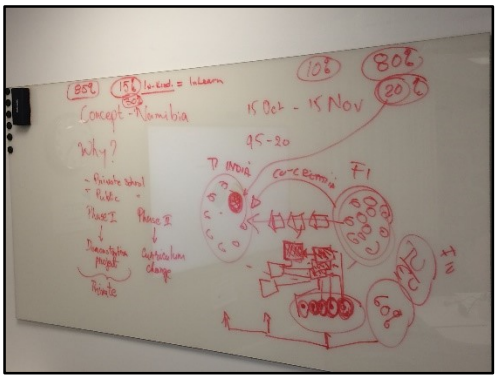
Discussions were organized from time to time in order to develop the concept. Below I have added few images of the discussions.



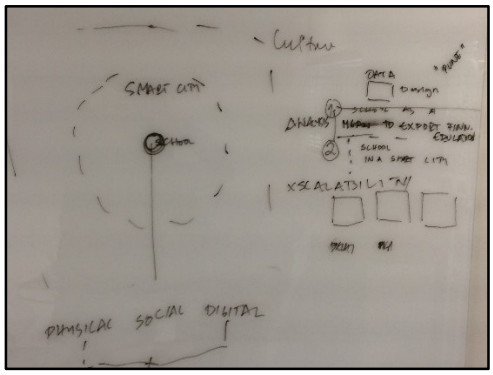
Students per classroom discussion



School Stakeholders Discussion



Business Model Discussion



Concept Discussion

2.5 Finnish Delegation Visit to Namibia. (October 09 – October 14, 2018).

University of Namibia & University of Turku together decided to start a double degree program at UNAM campus. For this purpose UNAM has offered to give a space of about 180 sq. mtrs. to UTU to organize its double degree program at UNAM campus in Namibia. The purpose of the visit was to see the space and develop a design proposal to organise such a program. Also, there were workshops organised with a Private school (Bergop School) and a Government school (Faith Primary school) in namibia to develop their Learning envirоonment.

Workshop with teachers from Faith Primary & Berg op School

University of Namibia visit

Co-Creation Workshop

2.6 Further Discussions with Finnish Delegates

Discussion with Rector Kalervo Väänänen & his team at University of Turku (Pic: October, 2018)

Discussions with Mr. Peter Vesterbacka.

3.0 Literature Study

3.1 The Learning Environment

3.2 School as a Centre of Community

3.3 Technology Integration in Learning

3.4 Small School Environment at Large Scale school

3.5 Principals of the School Cell Design

3.6 Safety & Security in School Design

3.7 Passive Health in School Design

3.8 Outdoor learning environment

3.9 Building furniture

3.10 Architecture history of Finnish Schools

3.1 The Learning Environment

The Learning environment can act as a catalyst for the creativity. It must support the growth and learning of the user. The physical learning environment must be a place which satisfies the user to use it as per his needs. The process of co-creation & co-designing with the user of the space enhances the quality of the space and promotes holistic growth of the user. It should be place where students are willing to engage more and more and spend significant amount of time in that environment.

3.2 School as a Center of Community

The concept of "Schools as Centers of Community" is one that has gained widespread support among citizens. The notion that schools should serve as a hub of activity for the community makes sense in both a practical and financial sense. Schools can provide many services that the community needs, while local citizens can also give back to their schools. For example, while the school is not occupied in the evening, local residents can use the facility as meeting space for extended learning classes. In addition, co-locating a sports center with a school can lead to additional community usage and can lead to a savings in construction and maintenance costs.

Welcoming the community into the school also presents opportunities for learning beyond the classroom through internships, promoting lifelong learning between generations through tutoring and mentoring, and increased support in the community for bond measures supporting local schools. It is critical that the community feel invested in its schools.

The environmental impacts should be included to the quality of the school in terms of local materials, use of solar energy and sustainable maintenance of school (e.g. circulation). The school is a significant hot spot in sustainable urban development in the area and neighborhood.

3.3 Technology Integration in Learning

In the 21st century of digital age it is very important to integrate technology to enhance the use of the space. Technology could play a very important role when combined with the Learning environment. Digital learning tools such as Interactive Boards, E Learning resources, Video Conferencing, Remote Presence, Interactive Cameras, Voice Recorders, etc. when combined with the physical learning environment could boost the Learning efficiency and the space can be utilized more effectively. For example: a simple system of online booking of room saves a lot of time & money of the user. He can open an application in his/her mobile phone and within few seconds check the status of the room. The services related to Integration of technology for example laying of data cables should be discussed before designing of the space and this is where co-creation & co-designing comes into picture. Hence, integration of technology with the Learning environment could have a significant impact on the efficiency of the space.

3.4 Small School Environment at Large Scale school

One of the most powerful predictors of academic success in school environments is the availability of personal attention by teachers and school administrators to students, a situation that is most easily achieved in smaller learning environments. Creating a sense of community and collaboration is a task that

must both be part of the culture of the school and part of the design of the facility itself. Creating appropriate spaces for different types of interaction and gathering can encourage learning and student achievement. School districts are consistently faced with the need to create places for students to learn that will accommodate swiftly growing student populations. Although this is a challenge, the benefits of creating small schools can have extraordinary benefits for students and communities. Even within a larger school building, smaller schools can be carved out to encourage personal interaction. These smaller groupings may function independently during class time, but share facilities such as the cafeteria and library.

3.5 Principals of the School Cell Design

The idea in Cell school concept is problem solving approach to the old fashioned educational buildings as corridor schools, modular schools, open schools and atrium schools. Good design also takes pays attention to the new needs that new productive teaching methods create to educational buildings. Cell schools are more silent, have a better learning atmosphere and create a good surrounding for lifetime learning than any other known educational building concept.

In Cell schools it is easy for teachers to watch over all the student behavior both in classrooms and corridors during school hours. Good design of cell school gives this opportunity without the feeling of heavily controlled environment.

3.6 Safety & Security in School Design

In an age when school security is a major concern for schools and parents, design offers potential solutions to these troubling problems. In some cases, design helps to make security measures less intrusive to students and more effective, while in other cases it may help change the character of a place and make it feel more open and secure.

In addition, designing schools with spaces that promote student-teacher interaction and foster community can create an atmosphere of trust in schools that encourages students to share information with teachers and administrators about potential threats that may exist in the school environment. Students are often aware of potential problems before they happen, so design that encourages relationships can be an important safety feature. There is also a correlation between well-designed facilities and lower absentee rates, as well as a decrease in vandalism and behavior problems. In addition, schools that are designed as “centers of community” experience less vandalism than schools that are isolated from the community.

3.7 Passive Health in School Design

Both research and anecdotal evidence have long indicated the importance and psychological benefits of providing natural daylight, appropriate cooling /heating/ ventilation, and good acoustics in learning environments. These basic considerations should be accounted for when designing a school. The body’s response to light is powerful, and its psychological and physical impact is well documented. Providing similar conditions for students can positively impact their psychological well-being, alertness, and productivity. Similarly, providing adequate temperatures and ventilation throughout the year is critical to student and teacher performance. Acoustics are an important, but neglected aspect of many school facility projects. The premise is very simple—students must be able to hear easily what their teachers are saying

without reverberation or distracting background noise. Equally, teachers should not be forced to shout to be heard in a classroom. This is often one of the first items that is neglected when budget cuts are made to school projects.

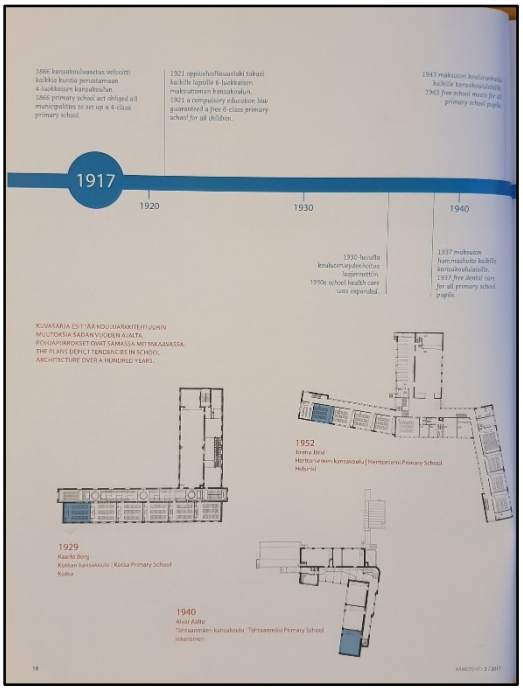
3.8 Outdoor learning environment

The concept of gardening as a part of the school curriculum has been provided along with the campus development. The outdoor education hub can be utilized by the whole neighborhood. This is most important for healthy development. And at the same time, play equipment should be safe for the children. Plants can be used as per the seasons. There could be a seasonal cycle through plants. Pollinator meadows (flowers & wild grasses) to attract butterfly, birds, etc.

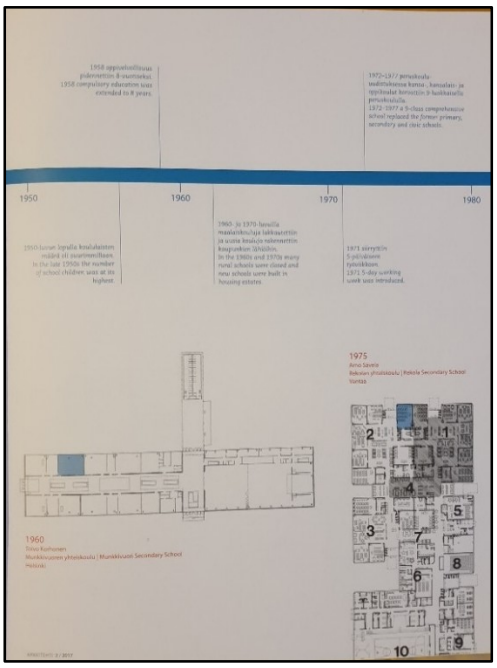
3.9 Building furniture:

The furniture setting in any building is the most flexible thing which user can use to express his/her idea of the space. The Outer shell of the building is permanent and cannot be changed but with the flexibility of the furniture setting the same space can be used to have different functions based on the user preferences.

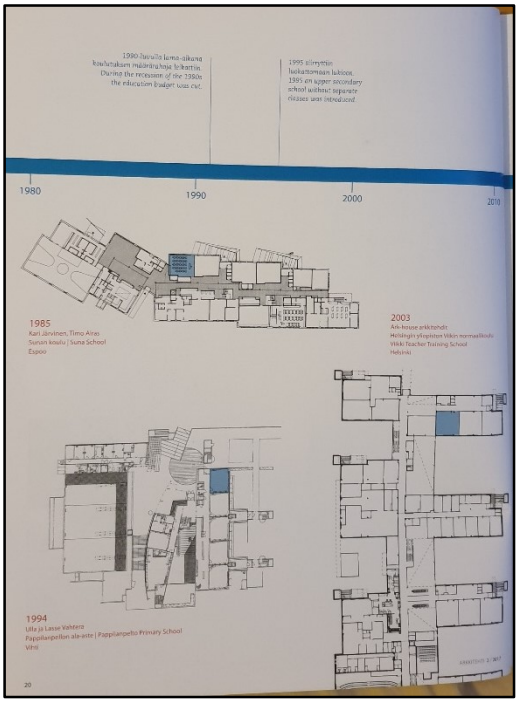
3.10 Architecture history of Finnish Schools



Traditional Corridor Schools



Corridor becoming more functional



Corridor as Learning zone

School as Community having multiple functions

Image Source: Members of Finnish Association of Architects. (2017) Finnish Architectural review (2/2017). Helsinki.

4.0 Urban Analysis

4.1 Analysis of the Pune City

4.2 Analysis of the Proposed Site & Surrounding

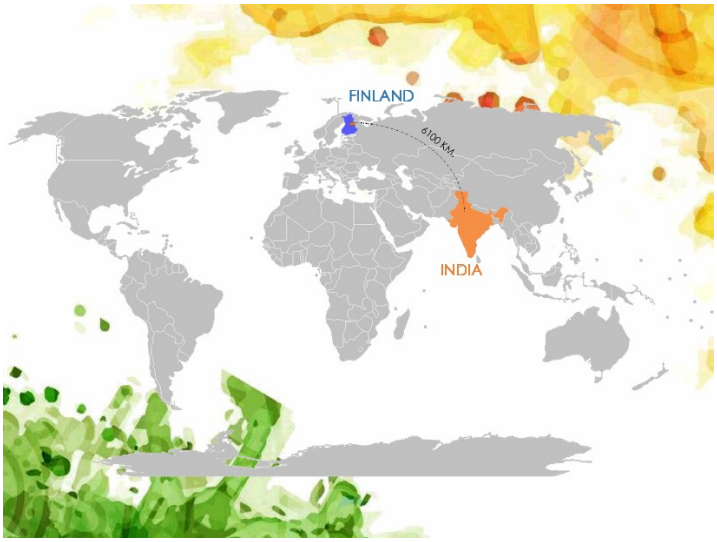
4.3 Proposal for the Site.

4.3.1 Site Development Plan

4.3.2 Street Development Plan

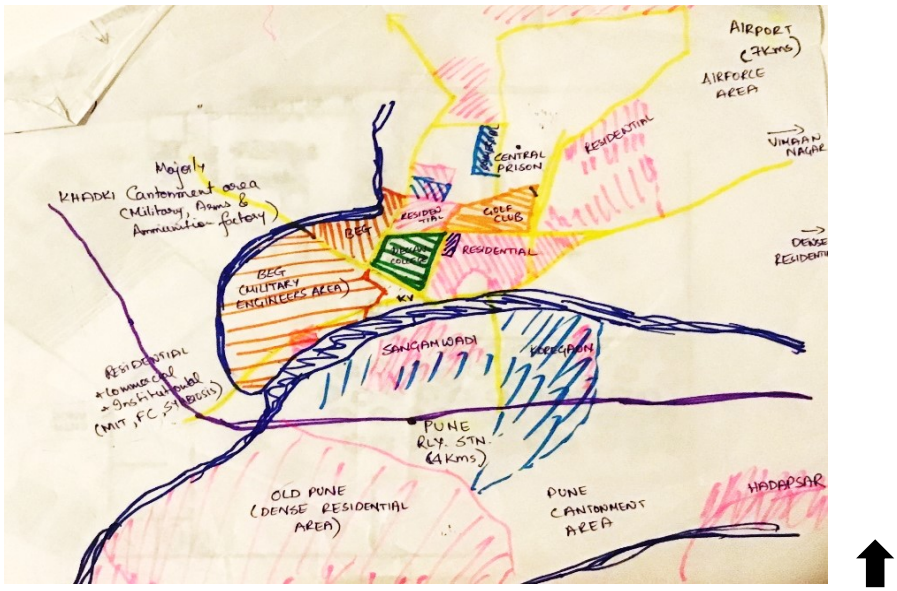
4.1 Analysis of the Pune City

Pune is located on the west side of India in the State/Region of Maharashtra. It is approximately 160 kms. From Mumbai in the south east direction. It is one of the major education hub of India. It hosts around 450 higher education institutes with an average temperature of 25 degrees Celsius. It is the 7th largest city in India. Also, Pune has one of the major defense hub for India (Military Areas are located within the Pune city area). It also has the manufacturing unit for the weapons. In the following pages the reader would get a glimpse about the Pune city and its Urban environment.



World Map

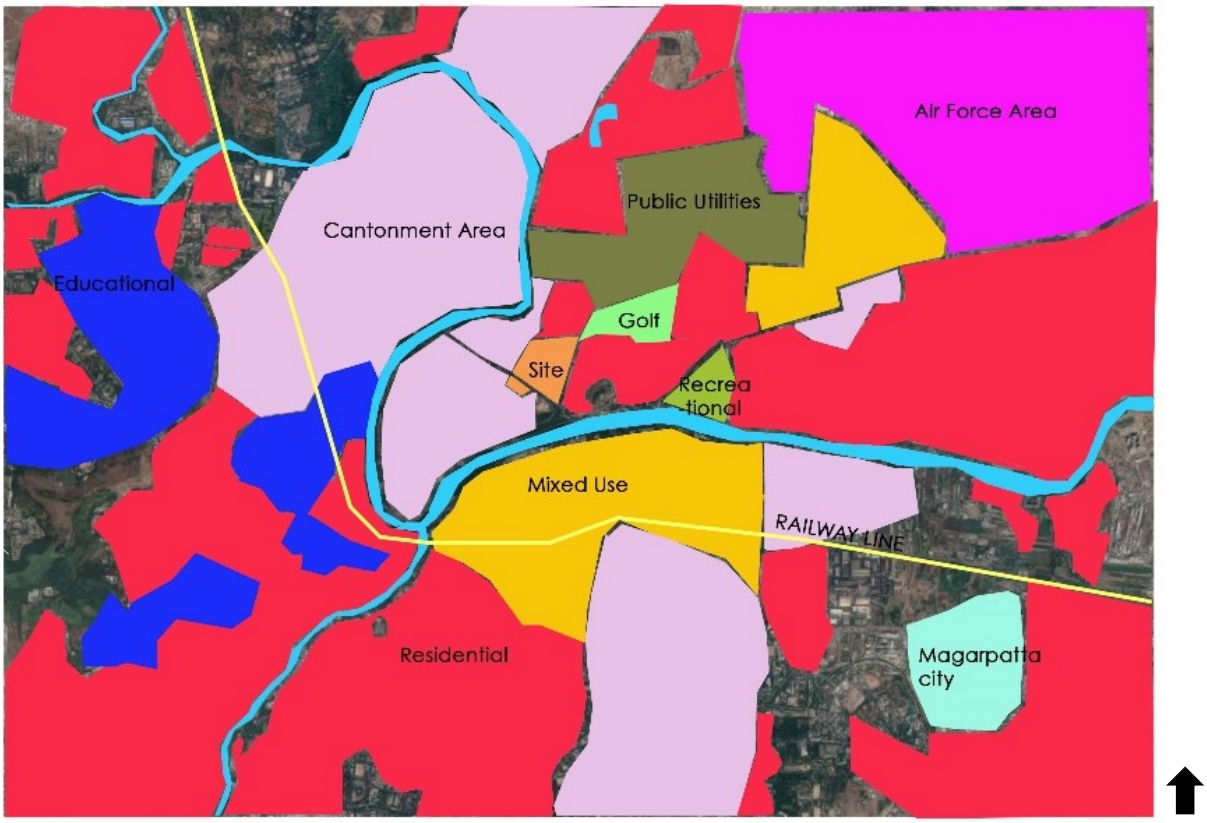
Map of India (Location of Pune)



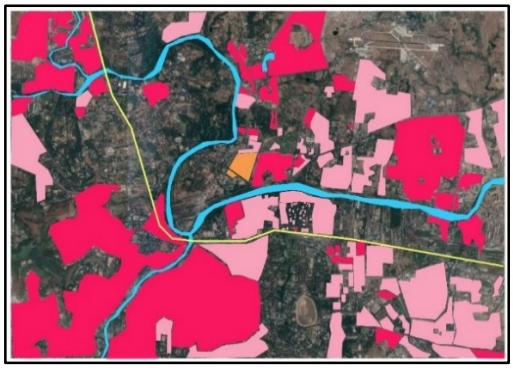
Pune: Urban Analysis sketch (March, 2018)

Functional Use: Pune City

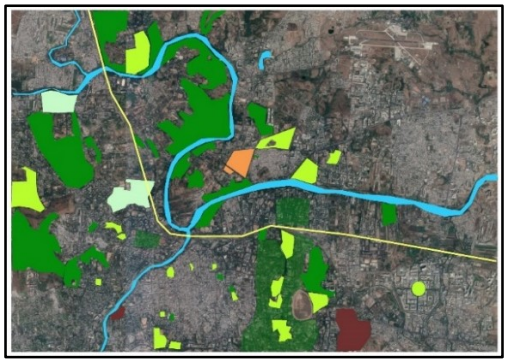
The old city of Pune is near the junction of the river as seen in the plans below. It mainly includes the dense residential area, mixed use area & Cantonment / Military area. The Cantonment area is an isolated area in the middle of the city. At some places in between the Cantonment zone there are road where public vehicles are allowed with restricted entry. The proposed site is located near one of the cantonment area in the center of the city. The site is approximately 4 kms. from the Railway Station & approximately 8kms from the Pune Airport. West side of the city is mainly dedicated to Residential & Educational institutes (Public as well as Private).



Pune: Functional Use. Scale- 1:100000



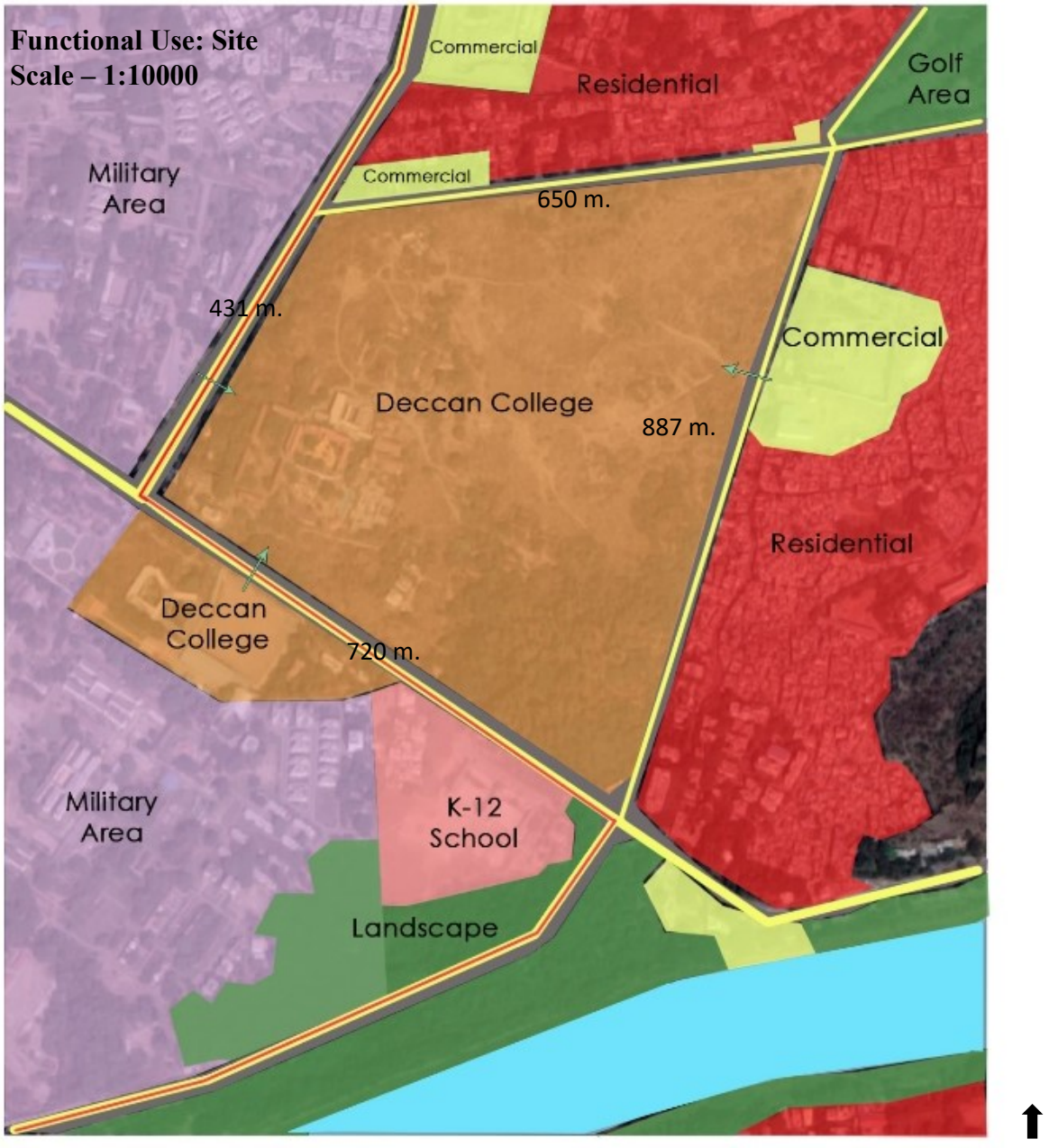
Building Density
Dark Red: More Dense, Light Red: Less Dense



Landscape Plan

4.2 Analysis of the Proposed Site & Surrounding

The prosed site is located at Deccan College in the center of Pune city. The site is surrounded by roads on all four sides. The main road to the site is located on the south west side. The main entrance to the existing college is also located on the main road. The site also has two other entrances as marked on the analysis plan. On the opposite side of the main road there is an existing K-12 school. There are small commercial zones as marked in the plan. On the west side it is surrounded by the cantonment area. The old city of Pune is located within the range of 4 Kms. from the site in South east direction. The river nearby separates the site from the old city area. On the East side there is a dense residential area (slum area) while the residential area on the North side is a legal residential area. There is a Golf Course on the North east area of the site which has a restricted entry with a membership fee. The proposed plan would also have a positive impact to the nearby slum area and would help in regularizing the area.



Site: Building density Scale: 1:20000 Site: Landscape Scale: 1:20000

The pictures below are from Deccan College Site taken in the month of March, 2018. On the south west corner of the site there is existing Deccan College campus as seen in the map below. Rest of the site area is almost empty with no space dedicated to a particular activity, however the local community is utilizing the open land area for recreational purposes (Children playing cricket as seen in the evening during the site visit, Morning /Evening walks, etc.) Below the reader would see a glimpse about the site & surrounding.

Deccan College Site: Photograph

4.3 Proposal for the Site (Deccan College, Pune)

As per the urban analysis following plans are proposed for the development of site & surrounding.

4.3.1 Site Development Plan

Regarding the site development plan the central area would be used as a public park connecting the four corners of the site. As per the current conditions the surrounding community is utilizing the central area for recreational purposes (Play, Morning/Evening Walk, etc.) The park will act as a community area for the four built up areas in the four corners of the site & the surrounding residential area. The proposed school would be situated on the south east corner of the site as it has the main access road, also it complements to the existing school on the opposite side of the road.

Site Development Plan Scale: 1:10000

4.3.2 Street Development Plan

The four streets surrounding the site could be developed as a green shared space, business street & public street respectively to enhance the quality of space.

Street Development Plan Scale - 1:10000

5.0 Design of the School

5.1 Spatial Concept.

5.2 Architectural solution of the School Cell for India.

5.3 Architectural Composition of the School (Campus development Plan).

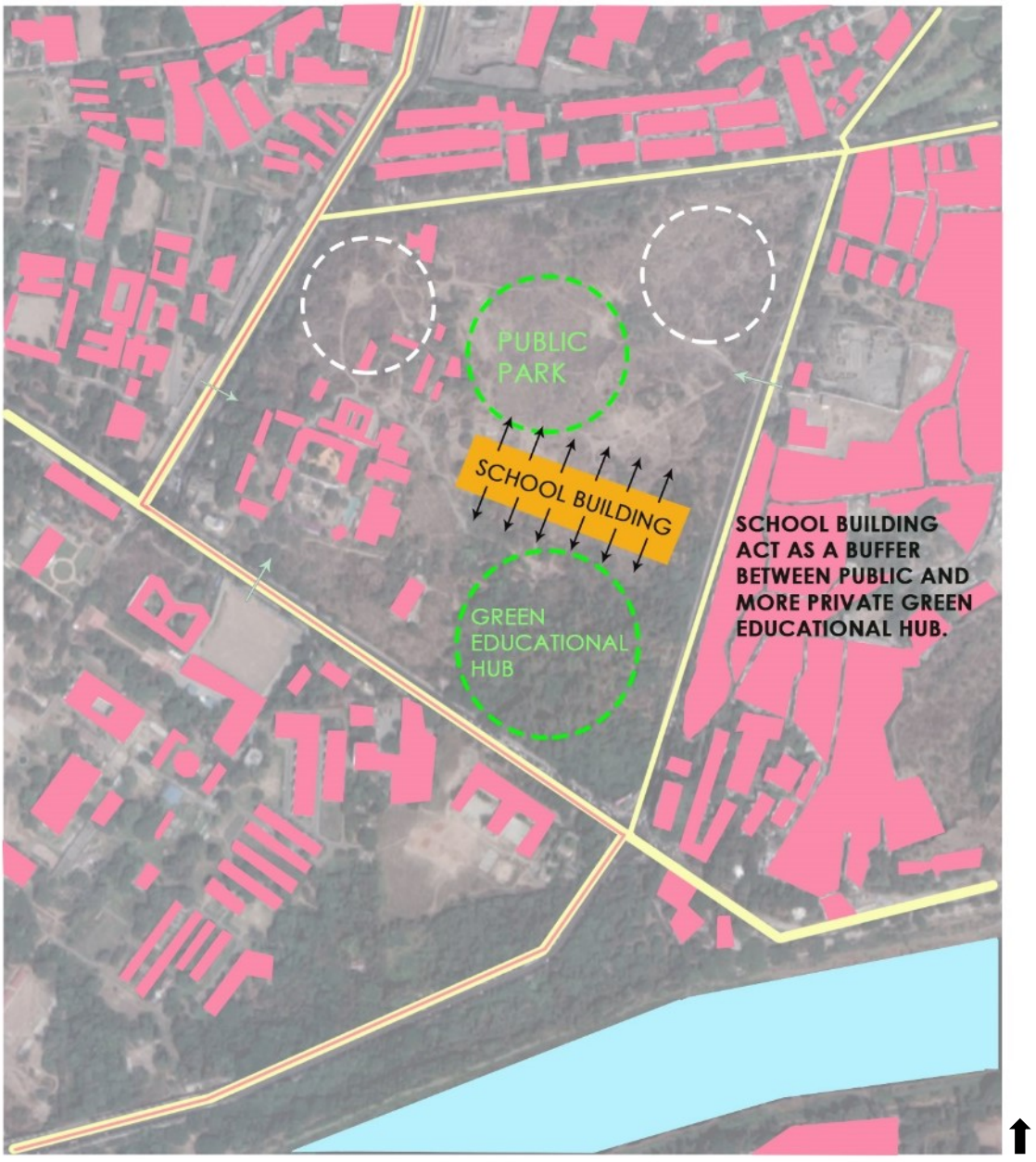
5.4 Material & Colours.

5.5 Light & Shade.

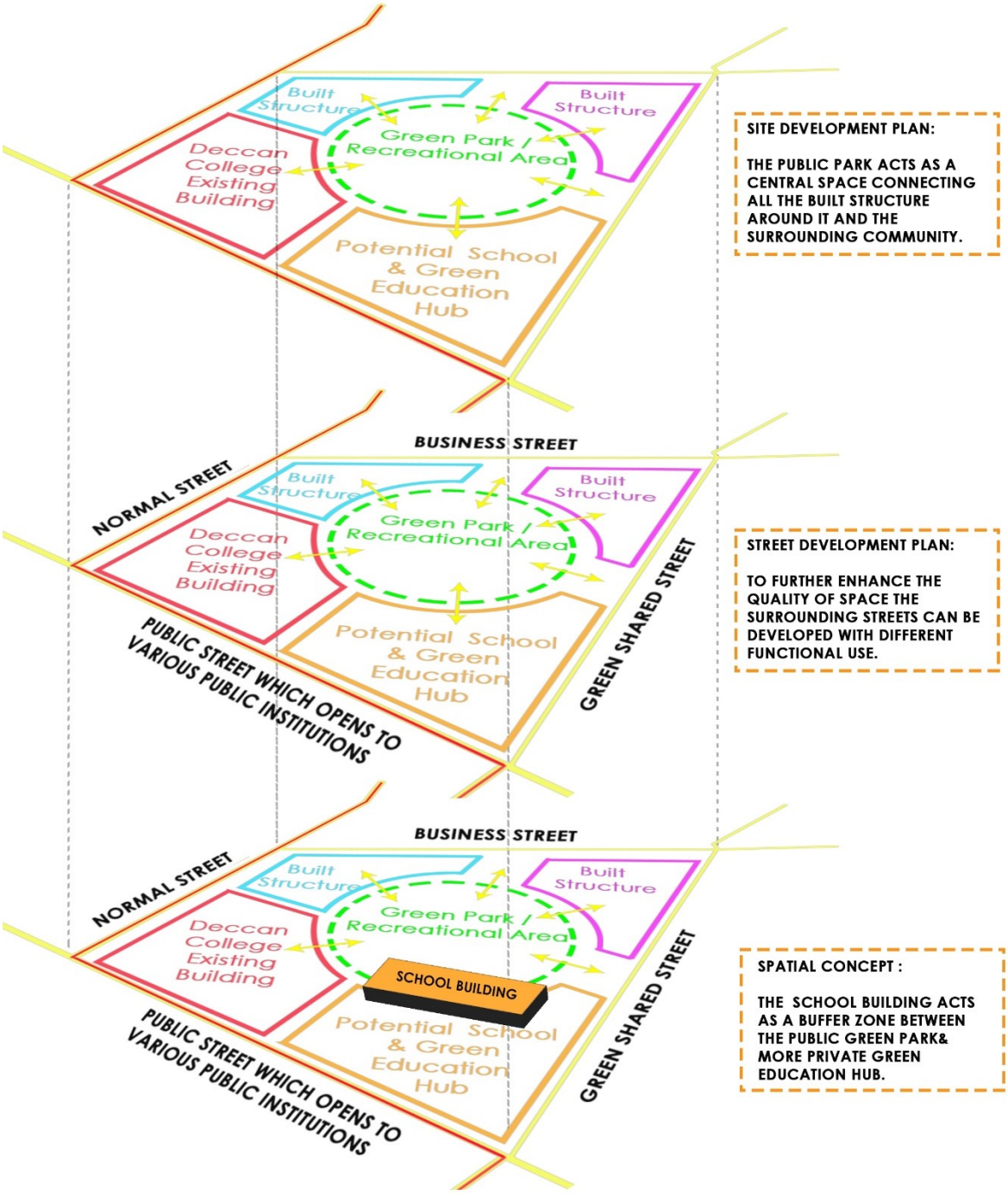
5.6 Passive energy Utilization.

5.1 Spatial Concept

The school building is located between the public Park & the Green education hub so as to act as a buffer between both the space. The green education hub would be a private space operated by the school with a controlled access. A membership fee could be charged to access it. The students have the access to both i.e. Public park & Green education hub. The main entrance to the school is located on the east side (Shared green street). The students in India do not use the public transport to go to school as it is not considered safe. The students mostly use private school bus service to go to school. The green education hub could also be used by the existing school which is located on the opposite side of the main street.



Spatial Concept for the School building. Scale – 1:10000



Conceptual View of the Site:
Site Development Plan, Street Development Plan & Spatial Concept for the school building

5.2 Architectural solution of the School Cell for India

Primary Idea

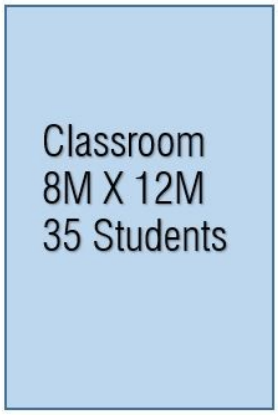
The primary solution of the school is based on the Finnish school design and educational methods combined with Indian curriculum. Basic educational unit is one cell that consists of four classrooms (Primary and Secondary) and their central informal learning space. The cell is the primary area for the students during the school day. Every cell has its own entrance to the schoolyard. One cell can carry maximum of about 140 students in primary and secondary levels. Intake to the school is yearly 70 children and they will be on this school 12 classes (Class 1- 12, 35 students per classroom and each class has 2 classrooms, thereby 12 x 2 = 24 Classrooms). Thereby the total number of the students is 840 (12X70) in the school.

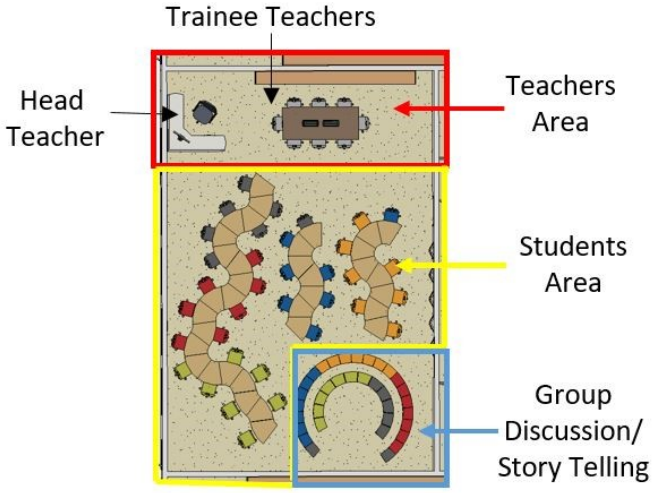
The school has been divided into academic cells of four classrooms each. Each cell can work independently and can also be combined as per the needs of the user. This classroom system is commonly used in Finnish schools, because it has been proven to improve educational results.

The inner core (informal learning environment) of the cells is a spacious central area, which is surrounded by the classrooms and the utility spaces of the cell. The central area is a multifunctional space for many kinds of activities: from a meeting place to a special working area for both the personal and the group work, even special occasions like school parties can be organized there. By rearranging the furniture there are many possibilities to have meetings and happenings. The primary goal of the room like this is to teach the students the sense of community, to get acquainted with the students of the other classes. Distinct shape of the central space makes it easy for teachers to watch over as there is no hazy corners to do hazy things. In addition to the class rooms and the central area there is a Multi-Purpose classroom on the above floor with the Teacher Lounge. Multi-Purpose classroom may vary according to the educational plans. For example, the Arts/Music/Basic Lab equipment, etc. can also be situated in this multipurpose classrooms. Transformable rooms can be united or separated using sliding walls and they allow groups of different size and many kind of action.

The Cells are connected on one side with the educational yard considered as outdoor learning environments (Green Education hub) and on the other side with the Public Park. The students have the access to both. The cells are designed to have age rotation and the youngest are located nearest to the main entrance of the building.

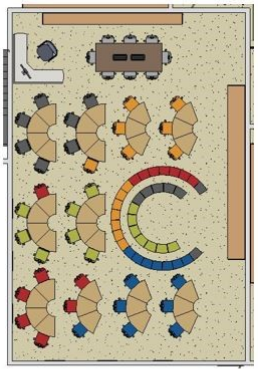
Conceptual classroom for the School.



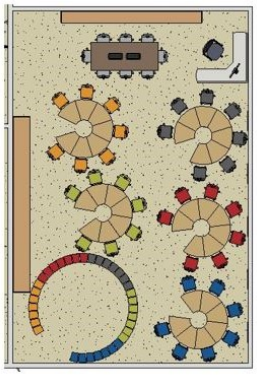


Typical Classroom Plan

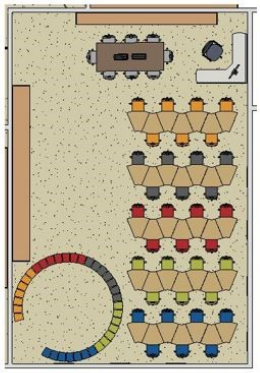
As per the Learning pedagogy used in this classroom design, the teacher gives lecture to the students for 15-20 minutes & then students are distributed in groups and allowed to do their work in groups or solo. The same is being applied in practise in Turku International School. There has been resistance from parents to adapt to this kind of learning pedagogy but gradually people are getting adapted to the same. The results are better with this kind of system as discussed with one of the teacher, Ms. Ulla Riika . The furniture provided in the classroom is very flexible which can be rearranged into different arrangement as per the needs of the user.



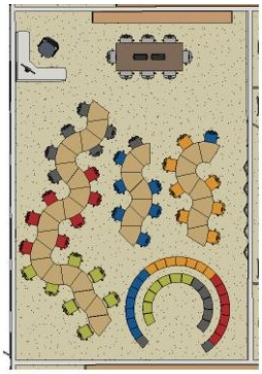
Plan: Type 01 (Traditional Arrangement in Rows)



Plan: Type 02 (Group Arrangement - Circular)



Plan: Type 03 (Group Arrangement - Linear)



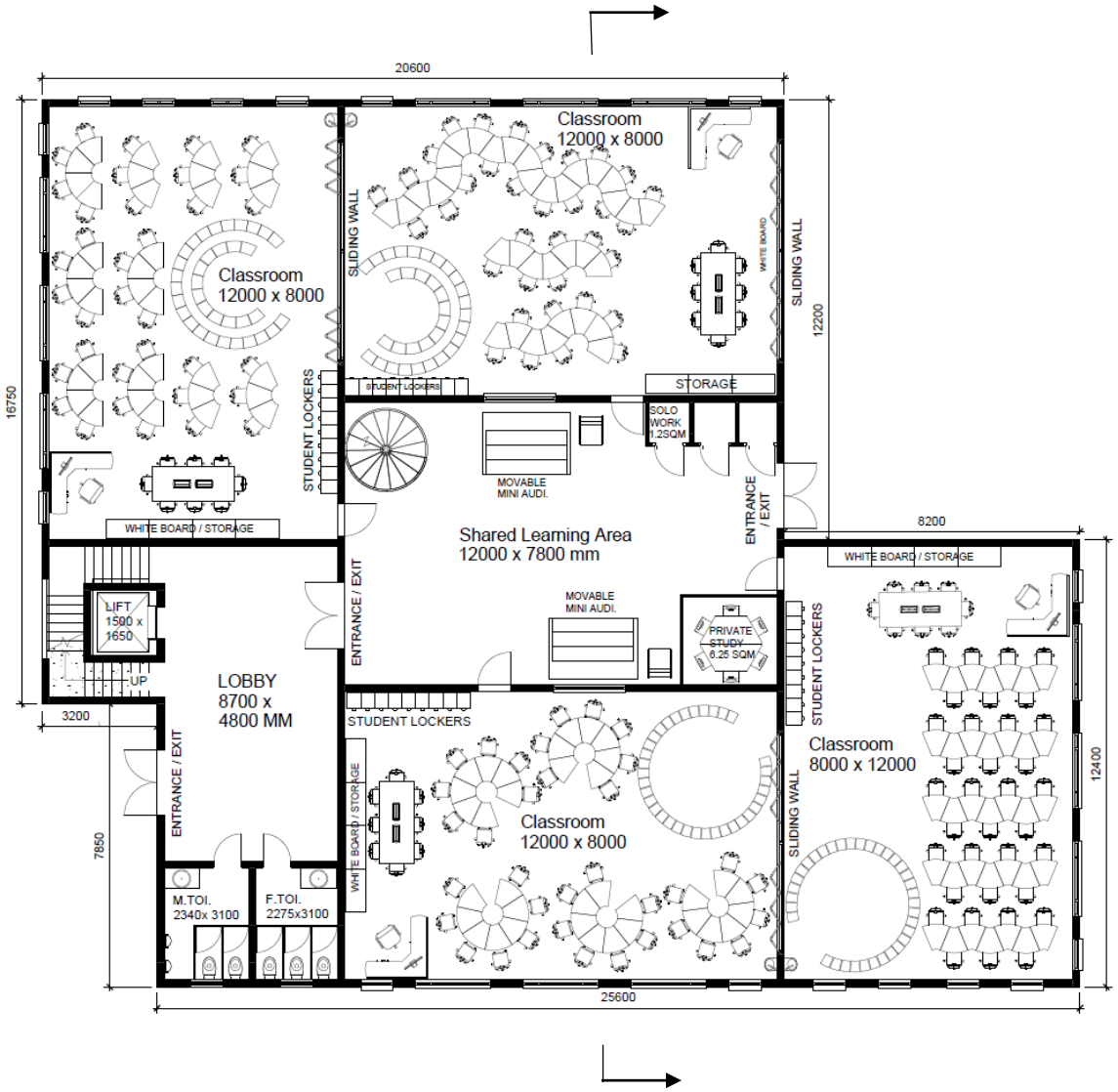
Plan: Type 04 (Flexible Arrangement - Snake Type)

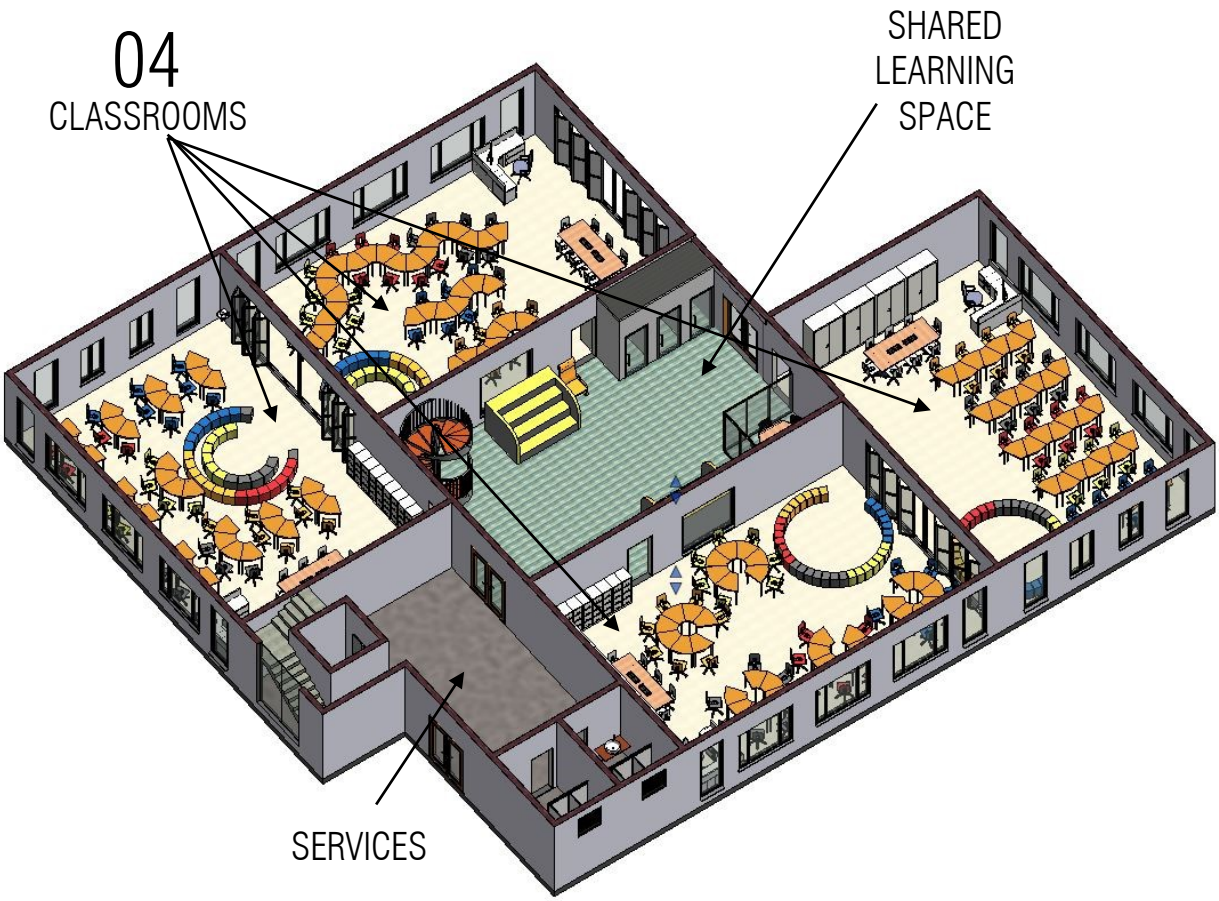
The same furniture can be used in the classroom to have different arrangement.

Proposed Cell design for the School.

First Floor Plan (Scale 1:250)

Classroom area: 96 Sq.m.
Shared Learning Area: 93.6 Sq.m. approx.
Service Area (Fire Staircase, Lift, Toilets, Lobby): 70.8 Sq.m. approx.
Total Cell Area (First floor): 583 Sq.m. approx.





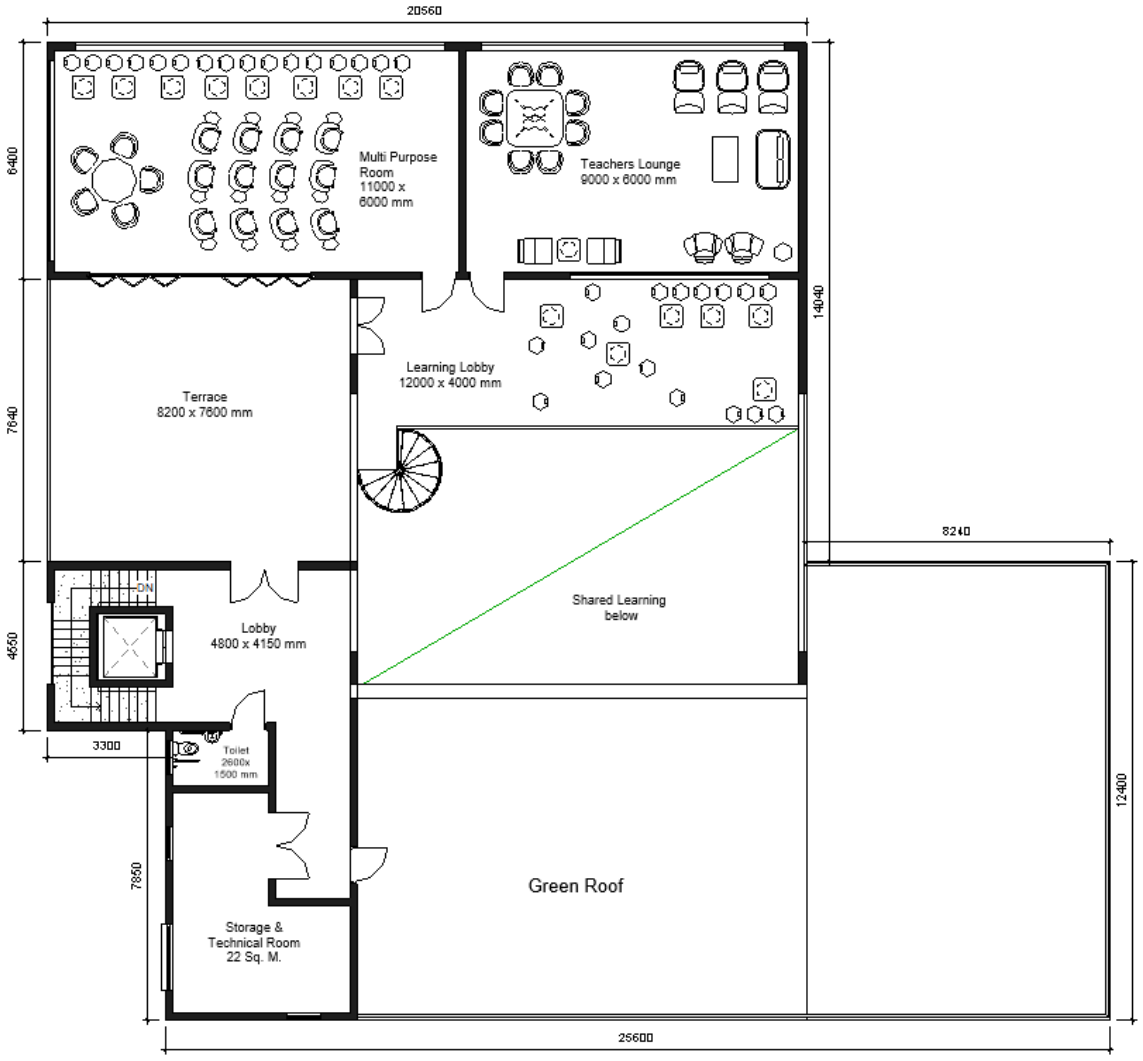
3D View: School Cell – First Floor

Benefits of the School Cell:

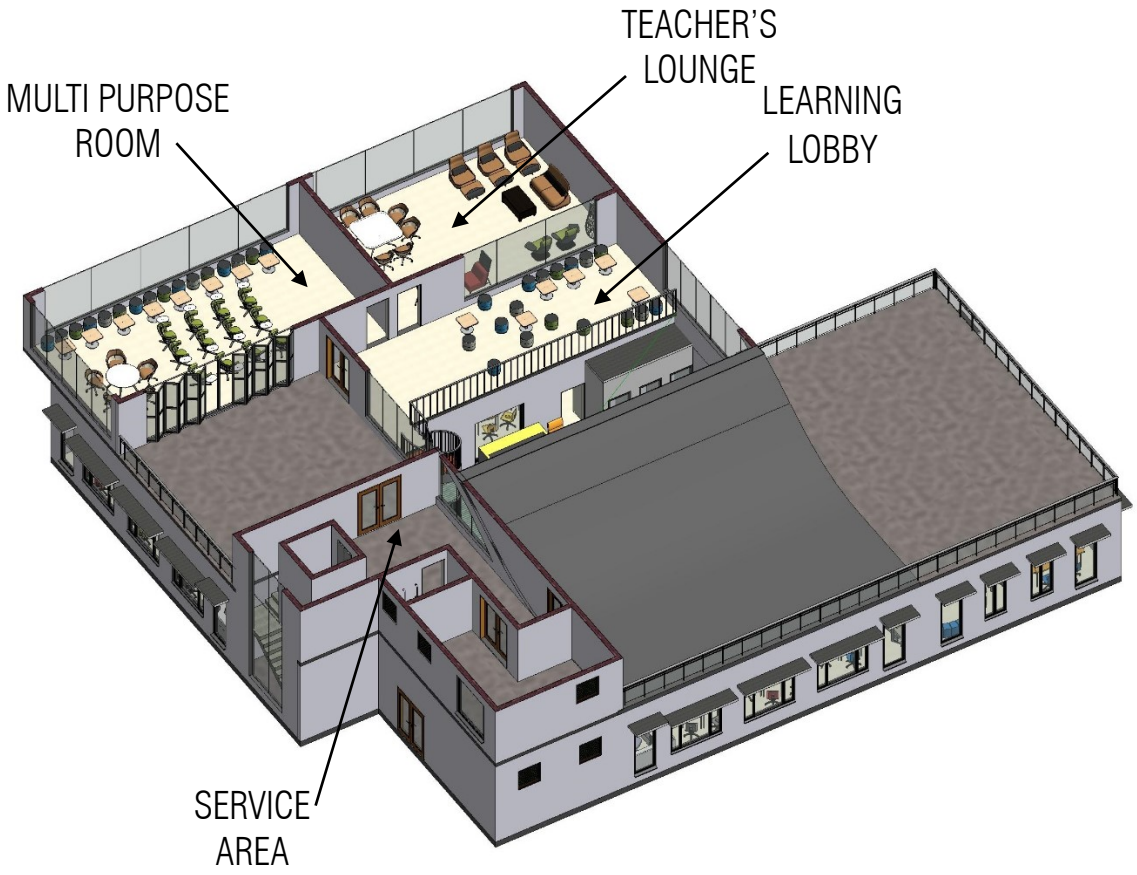
- Flexible arrangement in the classroom with the same furniture.
- A central common zone between 4 classrooms for collaborative learning providing open space, private space for group & solo learning space as well.
- Use of Sliding walls to join the two classroom space, also opening the space further in outdoor providing flexible space area as per the need of the user.
- Use of different color furniture for group work.
- Use of multipurpose furniture for the shared learning space.

Second Floor Plan (Scale – 1:250)

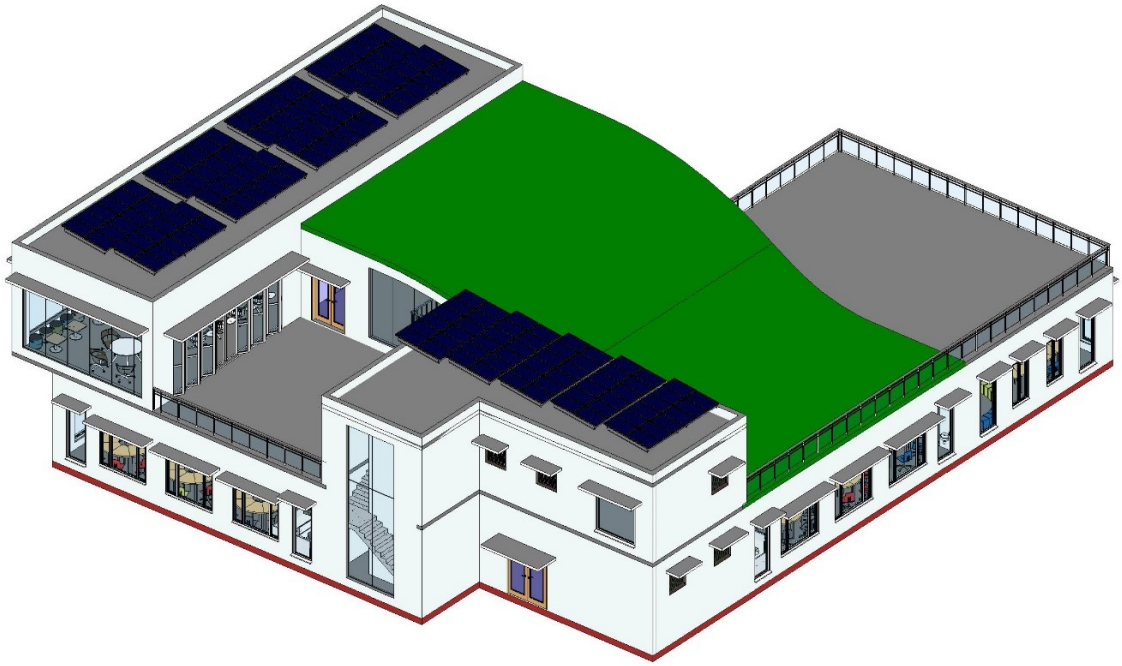
Teacher's Lounge: 54 Sq.m.
Multi Purpose Room Area: 66 Sq.m. approx. (The multi purpose area can be used as a Library, Lab room, digital room, activity room, arts/music room, etc.)
Learning Lobby: 48 Sq.m.
Service Area (Fire Staircase, Lift, Toilet, storage): 70.8 Sq.m. approx.
Total Cell Built up Area (Second floor): 240 Sq.m. approx



Second Floor Plan



3D View : Second Floor – School Cell



Classroom Cell 3D View

Section A-A' (Scale – 1:250)

Interior views of the Classroom cell

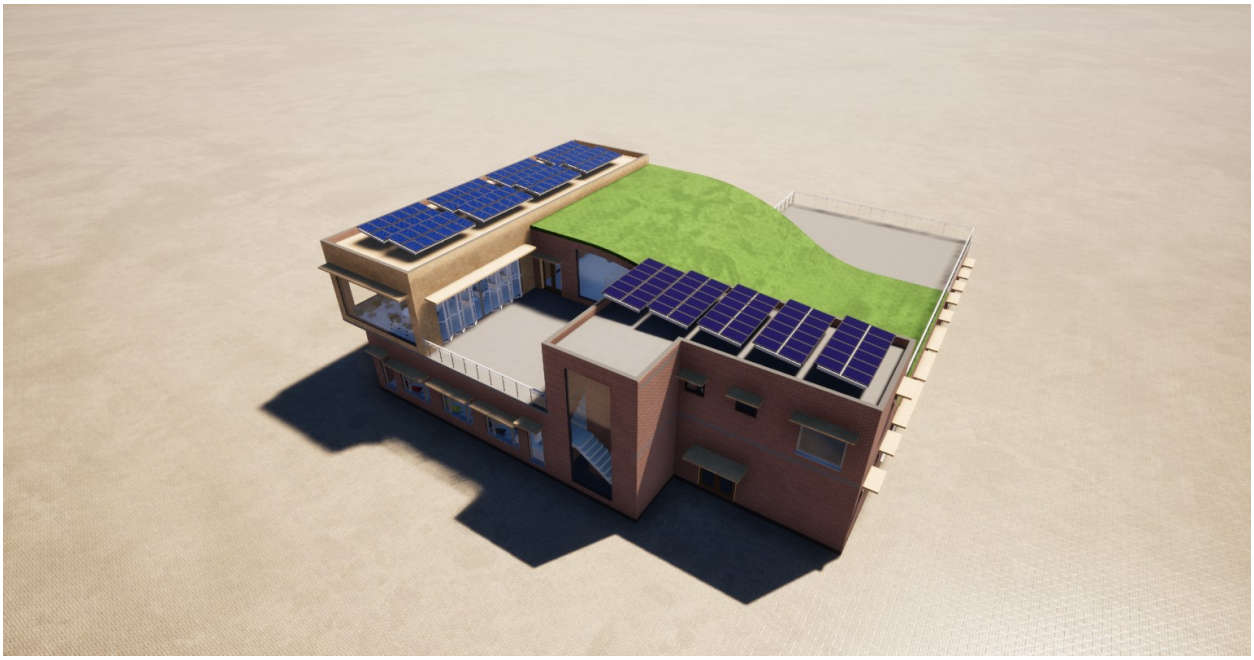
View 01: Circular Arrangement of Classroom where the reader can see trainee teachers discussing with the students, student discussing with other students, etc.

View 02: Informal Snake type arrangement of the classroom. The trainee teacher is giving instructions to the students and head teacher is observing.

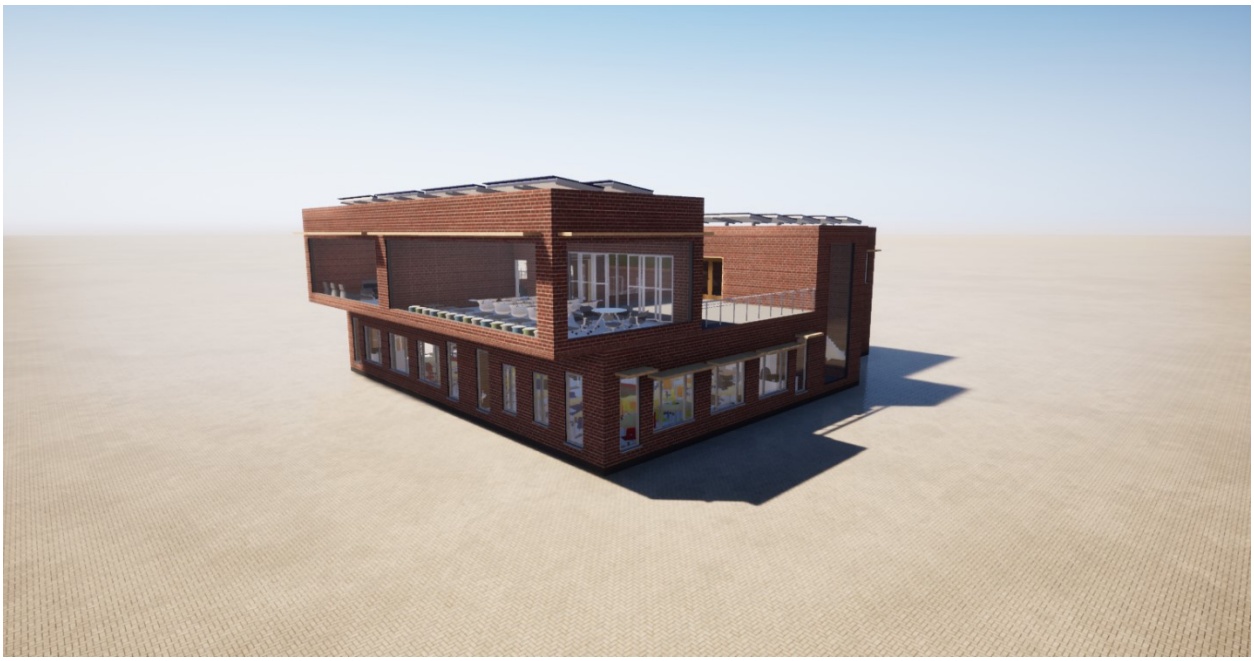
View 03: Traditional arrangement of the classroom in rows.

View 04: Shared Learning space. Flexible movable auditorium has been provided within this space.

View 05: Teacher Lounge.



Outdoor View: School Cell



Outdoor View: School Cell

5.3 Architectural Composition of the School (Campus development Plan)

The school consists of various informal learning places and a number of different spaces for different sizes of groups making it a flexible solution based on the needs of the user. Different spaces are linked with each other & interact with different kind of outdoor shading (Pergolas, Tent shade, etc.) The entrance to each cell has be made more inviting with the use of Pergola at different locations.

The classroom cells are linked to each through open learning spaces and each has a access to the central hall area. The two storey easy access Hall/Gallery area is the core of the whole campus. The Hall area is a gathering space and it operates as restaurant, library, Sports center and auditorium space. There are many possible places for students to meet and work in groups. The hall space is connected to the institutional kitchen, auditorium for 300 people, students' well fair office and rooms for school administration and teachers. The accessibility of all these rooms from parking is easy. On the second floor there are special classrooms for arts, music, biology, geography, chemistry, physics and a Library and informal Learning area suited for the students. The hall area is a multi-purpose area which can be used as a Learning space as well.

The school is also exceptionally open to the surrounding environment. In fact, every classroom cell of the building has a door leading to the exterior, many opening onto courtyards that are designed to serve as outdoor meeting spaces. Classrooms themselves and other spaces are flooded with natural light, contain contemporary furniture, and provide wireless Internet access.

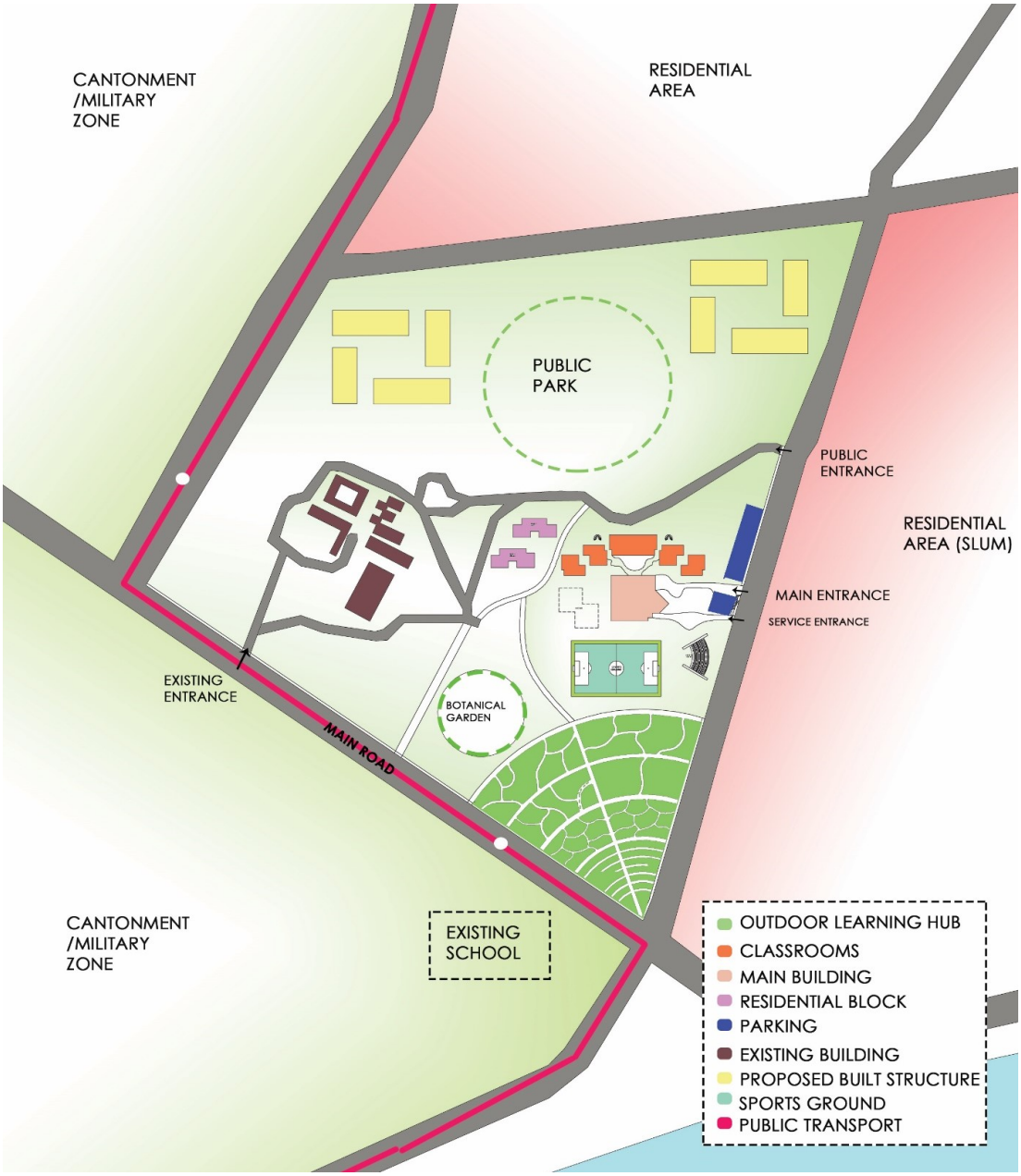
Students can get fresh air in small scale and secure green yard areas between the cells of the school or at the large and fully equipped communal yard area. The soil which has to be moved away from the construction yard is reshaped to make an interesting and inspiring school yard for the kids to play and learn. In addition to play yard areas there is tale telling yard, arts yard, science yard, sports yard, Vegetable & Flowers Yard, Trees Yard, Agriculture yard & Activity yard.

Passages in the yard area have been arranged so that students are as far away as possible from roads and the traffic. Students have their own gate to school yard and bicycle parking space is provided at the entrance of the school.

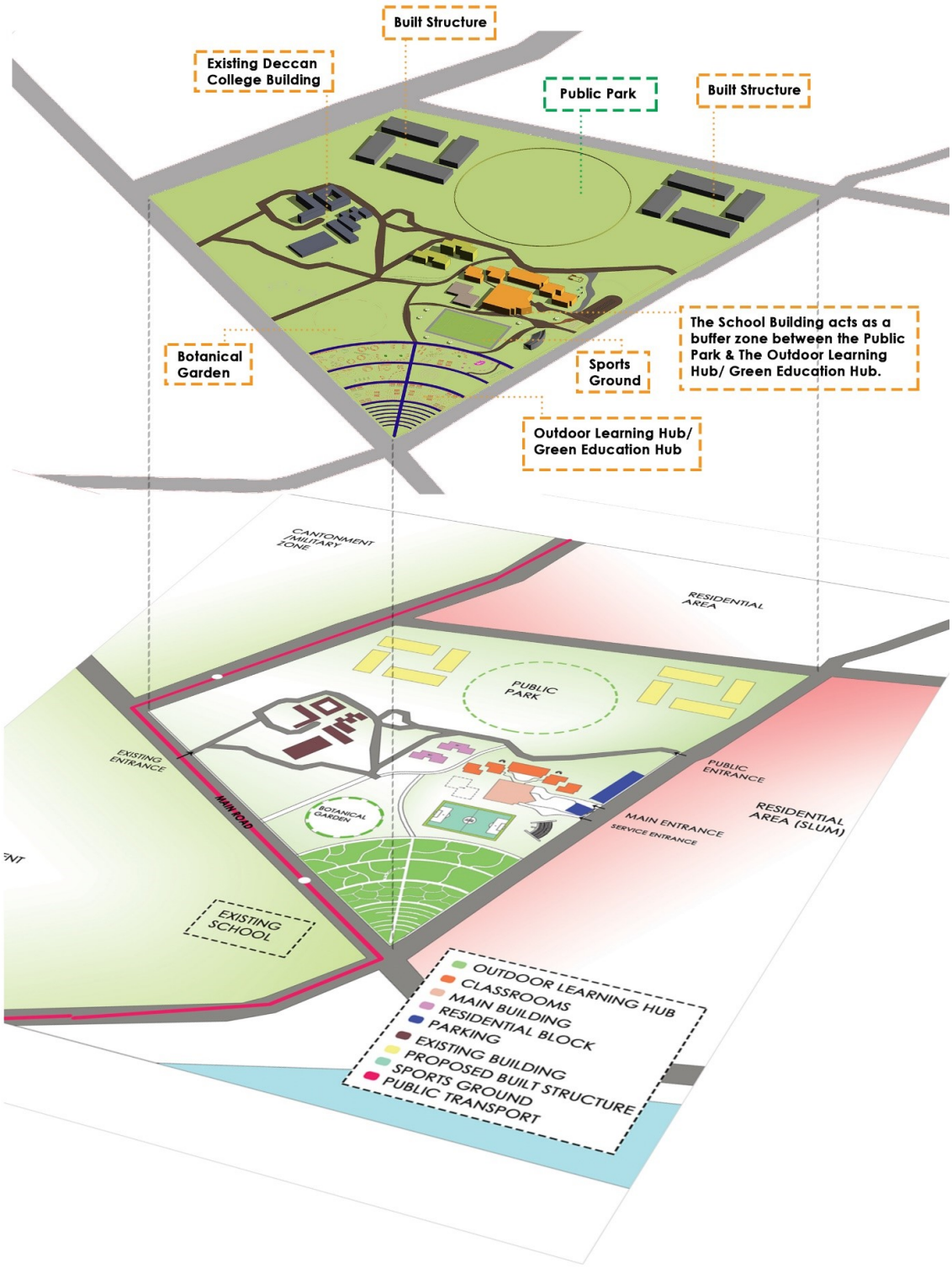
To the front of the main entrance there is stoppage for accompanied transport and bus stop. Service entrance is provided to the other side of the building than the school cells. Walking students and cars do not go across. There is a separate parking area and secure passage to entrance.

Sports hall is located in the central Main building of the campus. Sports hall is fitted to full size basketball field. Sports hall serves also as a theater of festivals. Locker room are designed for both genders with needed privacy requirements and separately for handicapped. Evening time use of Sports hall is made possible with own entrance.

The student & Faculty housing is located behind the Main hall. Also, Kindergarten block is proposed between the hall & Faculty Housing. The kindergarten would have a separate entrance from the back and its location is secure away from the vehicular access.



Campus Site Zoning Scale – 1:10000



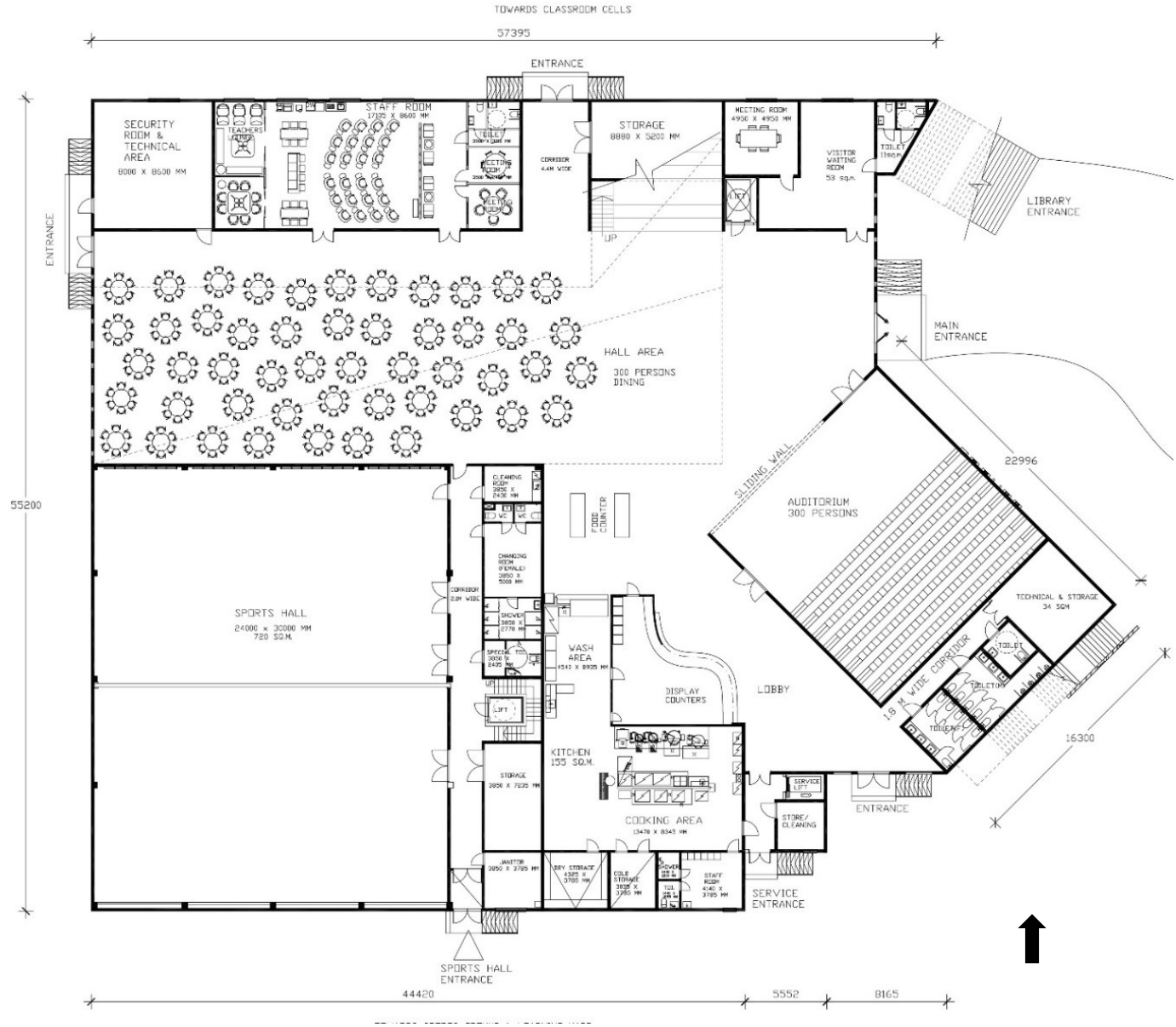
Conceptual View: Site Zoning

School: First Floor Plan
Scale – 1:1250

Main Building

First Floor Plan (Scale – 1:500)

Floor area: 3322 Sq.m.



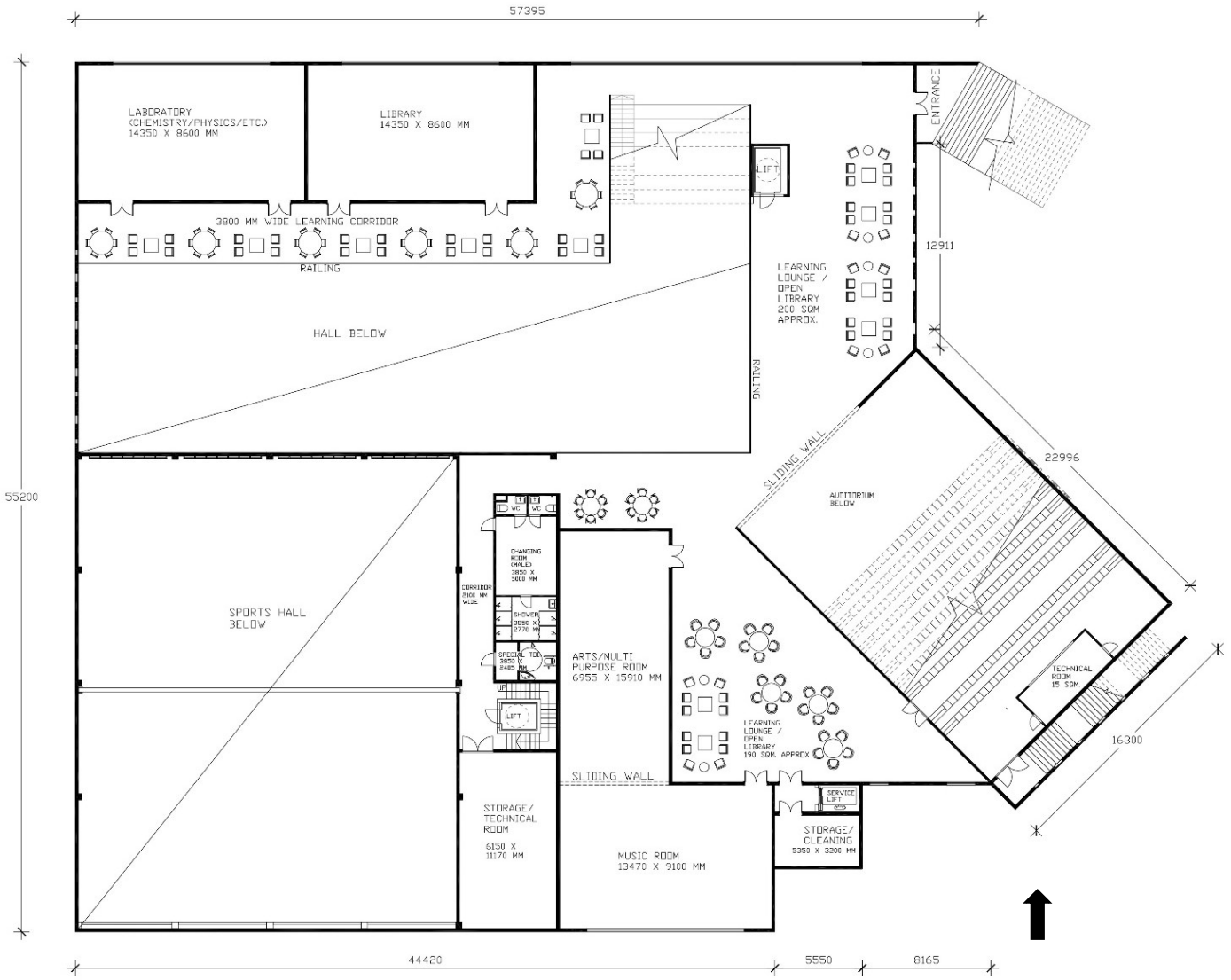
The main building acts as a central core of the school. It comprises of Hall which can be used for Dining & can be used in multiple ways for different functions. It includes the Auditorium with a capacity of 300 persons. The auditorium has been provided with sliding wall which opens in the central hall area and can enlarge the space for bigger gatherings. The Sports Hall is easily accessible from the Hall area and also has a separate entrance on the rear side of the building. The Kitchen has its own service entrance. The Staff Room, Visitor Lounge & optimum technical & storage spaces has been provided in the building.

The whole buiding can be utilized by the surrounding community when it is not been used by the school for eg: in the evening, thereby making it economically more feasible solution. A separate entrance at the front has been provided for the second floor (Library, Music, Arts, etc.) to enhance the architectural character of the building and providing flexibility to the building.

The second floor include the Library & Laboratory. Also, Arts & Music zone are provided on the south end of the building. Optimum space for informal learning & open library has been provided on the second floor.

Second Floor Plan (Scale – 1:500)

Floor area: 1445 Sq.m.



3D View: School Main Building Entrance

3D View: School Entrance

3D View: Intermediate space between Main Hall building & Classroom Cells

3D View: Bird Eye View

3D View

5.4 Material & Colours

The main construction material of the school is concrete core element with the grid of columns & beams. The walls are made of red bricks. The brick can be made on site with the soil available and can be dried in the sun. It is one of the most sustainable material to be used for the construction.

Walls inside the school are mainly painted or graphical concrete. Both clear and colorful glasses of the facade are selective sun protection windows. All the banisters in the school are made of clear tempered glass; railings are made of oak wood. Horizontal and vertical shading grills are steel made. Columns inside the building are made of concrete & reinforcement bars are made of steel.

The ceilings are plastered plain, painted or plated depending where they are.

Playgrounds are covered with secure sand. Yard areas and walkways near the building are covered with concrete made stones. Driveways and parking areas are covered with asphalt.

Chosen materials are more common in commercial and residential construction contributes to the school's unique appearance and help reduce construction and maintenance costs.

Red bricks colour is chosen as a main colour of the building. Scope of themes in color is chosen so that the effect color in the main entrance area of the hall/School is green. Green Wall at the main entrance provides warmth & helps in reducing the heat in the surrounding. Also, the soil in the green wall can be used to purify the rain water and further use it for ancillary purpose. Sun dried Red bricks, the complimentary color to green, the color of liveliness and warmth is the effect color of the facade.

The school cells have green roof which helps in controlling the indoor temperature and also can be used for purification and collection of rainwater.

5.5 Light & Shade

Interiors of the building are designed in a way that one can get long views through the building. When entering the building one can easily orientate and see the light coming from glass wall in the end of the building. Because the corpus of the building is fairly wide there are created several paths to the building. Hall has roof windows which give indirect light core areas. Where the light can enter the building directly there are used insulating windows that prevent heating rays to come in.

Unreasonable dazzle and heat of the sun and rainwater is prevented with horizontal shading lattices above windows. These structures give characteristics to the architecture and they are also one important part of the facade.

5.6 Passive energy Utilization

Low maintenance costs can be provided by passive energy utilization, solutions that prevent need of energy and with high quality surfaces. School building need to have good indoor air conditions. Oxygen percentage has to be high, carbon dioxide percentage low and the temperature between 20 to 22 degrees Celsius. If this cannot be reached the attention of students to teaching will suffer. Ventilation system has to give enough fresh air to classrooms and at the same time cooling system should be effective

Powerful ventilation in the hot areas as Pune in India as in the cold areas as Finland consumes a lot of energy if passive systems, effective energy solutions and effective insulation of heat/cold are not in use.

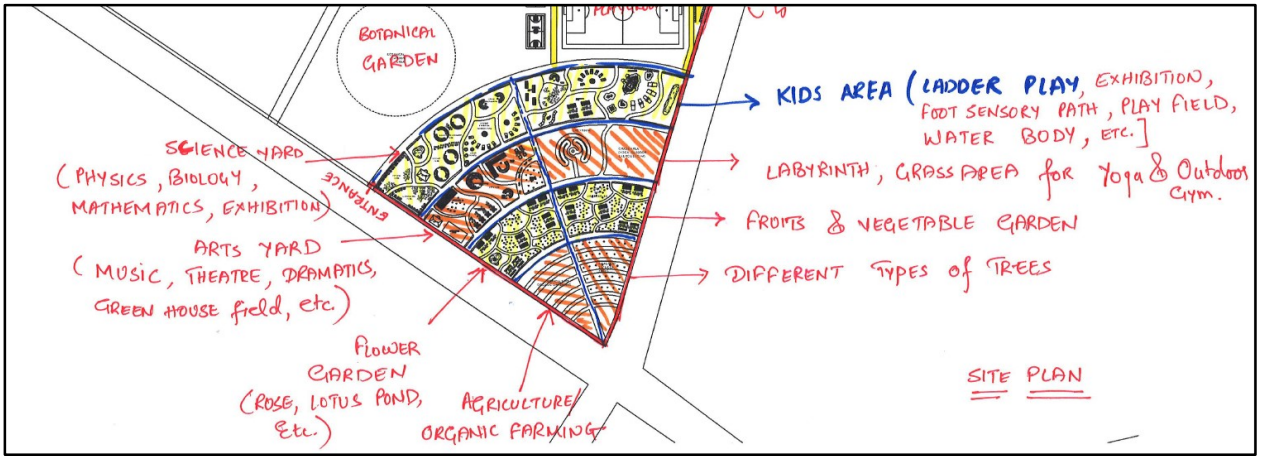
There are many ways to prevent heat to come inside. Sunlight has to come whether indirectly or through sun ray insulating glass. Sun ray insulation glass is clear glass but prevent heating sun rays to come in. Also shading of widows is good way of to prevent heat. Openness in Cell school design principals makes it impossible to use only indirect light as the only solution. Cavity wall system could be used to keep the indoor temperature cool.

Electricity system can be self-sufficient as well. School has a lot of roof and when one can use the roof as installation platform of solar power panels one can possibly produce all the electricity school may need at the school.

6.0 Design of Outdoor Learning Hub

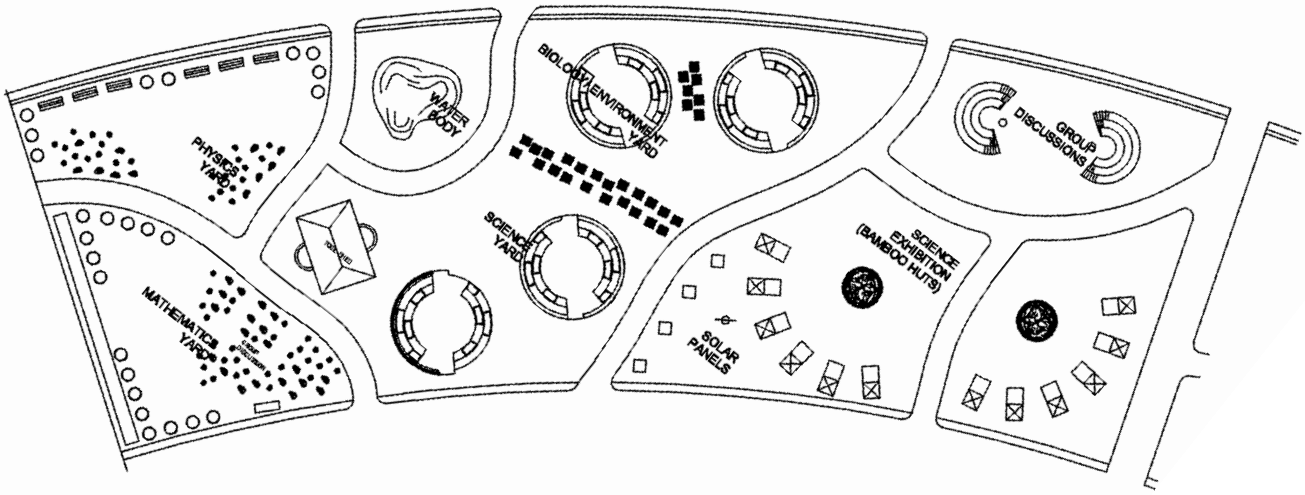
The climate of India is quite different from that of Finland. Indian climate supports having the learning environment in open outdoor space which could be used throughout the year. Outdoor learning provides the opportunity to get connected more to the nature, it leads to the holistic development of the child. It also provides the flexibility to be used not only by children but also adults. It also raises the awareness about the climate change & sustainable issues.

The Learning yard is divided into various zones i.e. Science Yard (Mathematics, Physics, Biology), Arts Yard, Flower Garden, Vegetable Garden and Agriculture / Organic Garden.



Sketch: Outdoor Learning Hub

Plan: **Science Yard (Biology, Physics, Mathematics Yard, Group Discussion, Exhibition)**



3D View: Group discussion/ Story telling zone

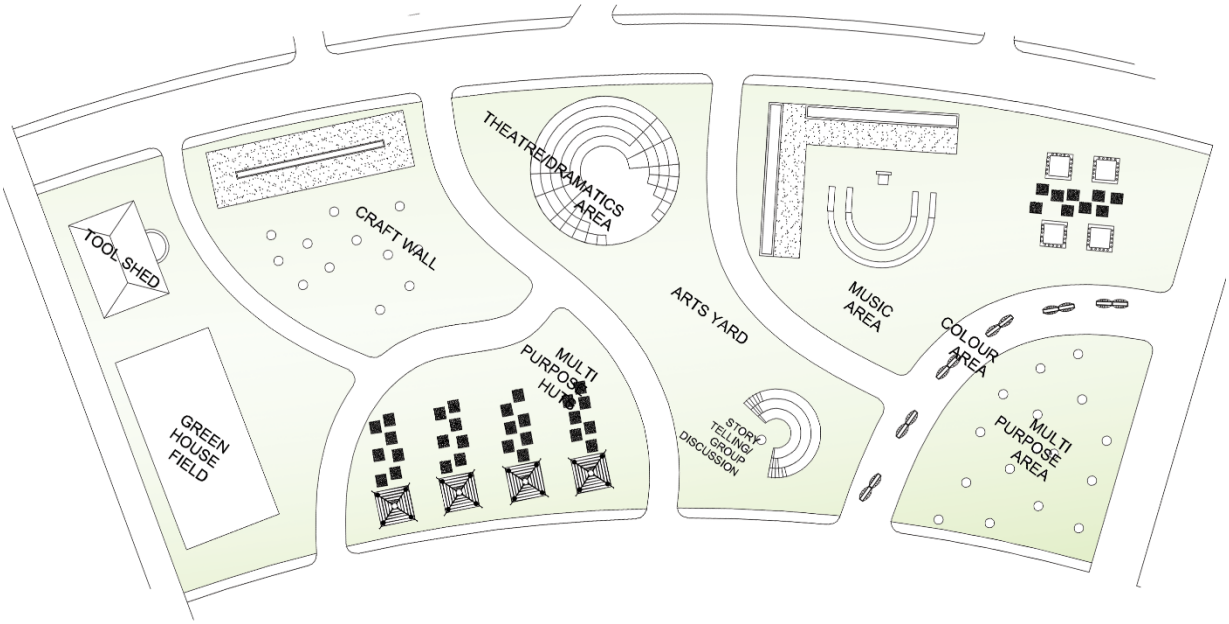
3D View: Exhibition Huts for students

3D View: Science Yard (Biology Yard)

3D View: Biology Yard

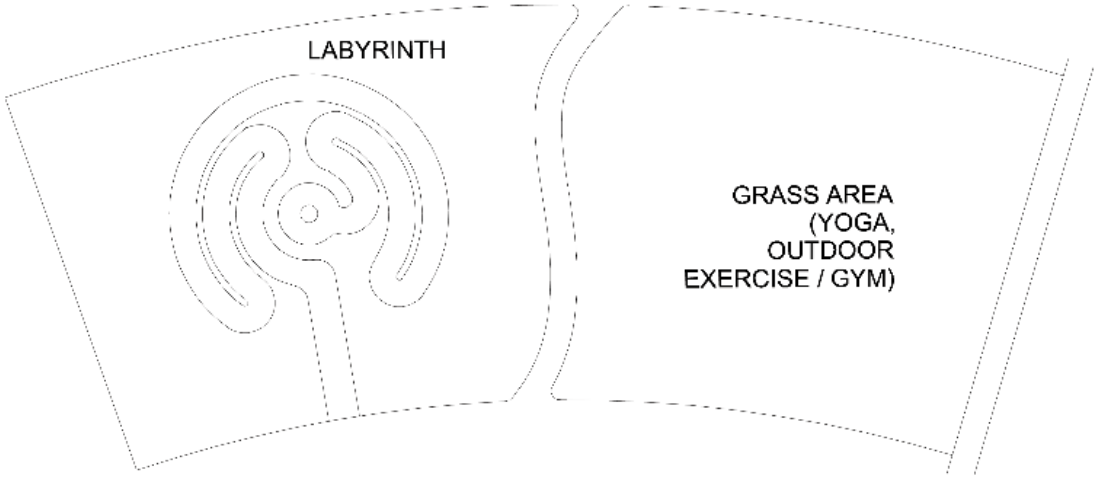
3D View: Mathematics/ Physics Yard

Plan: Arts Yard (Music, Theatre, Dramatics, Group Discussion, etc.)



3D View: Music/Theatre/Drama Yard

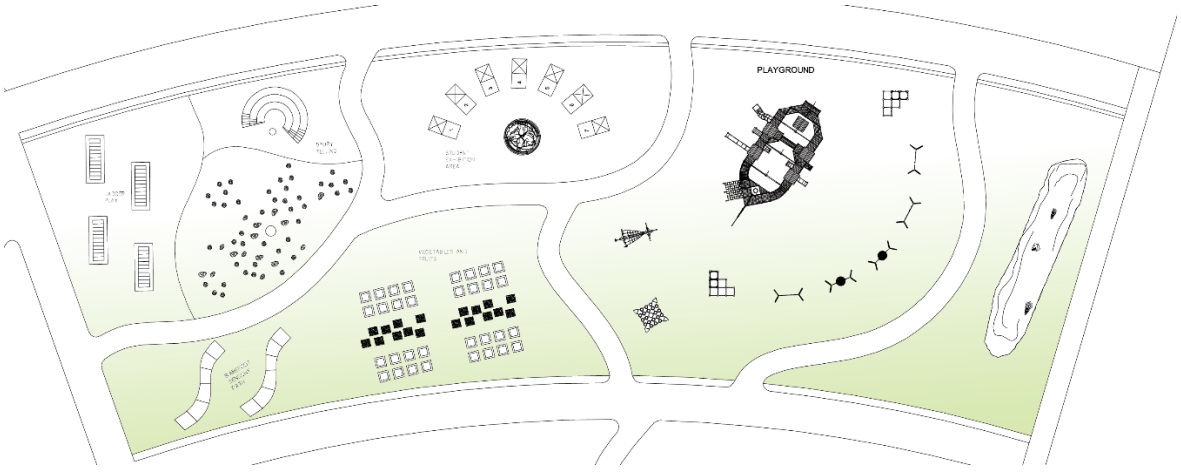
Plan: Fitness Yard



3D View: Labyrinth/ Outdoor Gathering

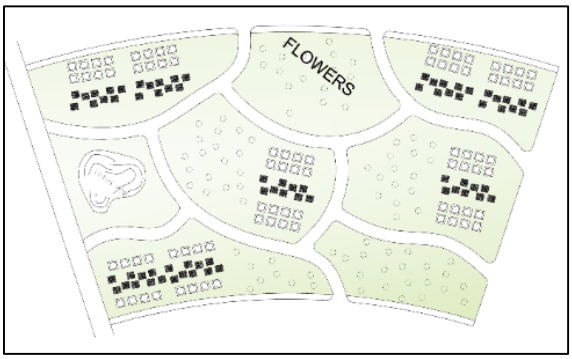
3D View: Outdoor Gym

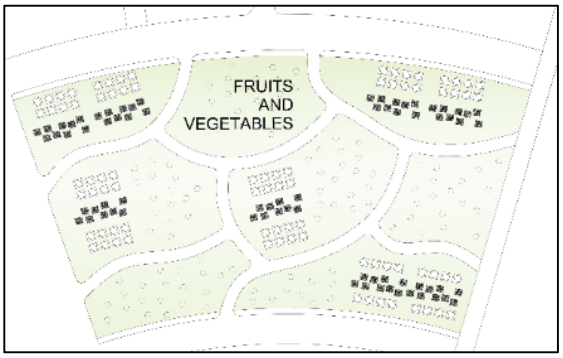
Plan: Play Yard

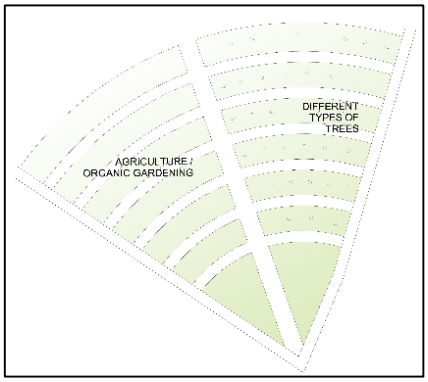


3D View: Play Yard

Other Yards: Flowers, Fruits & Vegetables, Trees & Agriculture







7.0 Conclusion

The design solution is a pedagogically flexible design. Pedagogically flexible furniture settings in class rooms, informal common learning areas and connectable rooms give vast variety of pedagogical possibilities for space usage. Same space in different settings may serve single person work, pair work, small group work and double class working. Pedagogically flexible learning environment serves well not only existing pedagogical options but also future ones.

The school building solution is partly modular. If in late future part of the school or the whole school becomes needless the supporting system on the building allows vast alternations made inside of the building.

The Outdoor Learning Yard (Green Education Hub) provides a unique opportunity to blend with the nature. It is a unique place where community can get involved and can act as a community learning place as well. The proximity to the school on its either side places it in a very unique location.

Integration of technology with the proposed design solution would make it more user friendly and more efficient. Further, my plan is to digitalize the Learning environment. Digitalization of it would further open unique opportunity and could make the design more flexible and more effective.

I think Learning environment plays a significant role in creativity. When our surrounding supports us and we feel comfortable in a particular setting, it contributes towards creativity. Education plays a very important role in developing any individual and the learning environment has the power to boost the efficiency of the individual. It further leads to the development of a creative & positive society. I would like to further continue my work for the learning environment and try to contribute towards the society in a positive way.

Acknowledgements

I would like to express my great appreciation to

Tampere University, Finland
For showing a big hand in welcoming foreign students.

Professor Panu Lehtovuori
For trusting me with the topic and nurturing & guiding me from time to time

CEO Mauno Sievänen, University Properties of Finland Ltd. (Suomen Yliopistokiinteistöt – SYK Oy) For providing me the opportunity to work on a real project.

Dr. Olli Niemi, Dr. Suvi Nenonen, Architect Heikki Luminen
For guiding me regularly regarding the learning environment.

My Family & Friends
For their endless support

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