#### THESIS REPORT ON

#### "RESIDENTIAL SCHOOL, GUDUVANCHERY, TAMIL NADU."

#### A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF:

# BACHELOR OF ARCHITECTURE BY SAURABH SHARMA

#### 1150101070

#### THESIS GUIDE

#### **AR. DEEPTI SAGAR**

SESSION

2019-2020

#### TO THE

# SCHOOL OF ARCHITECTURE AND PLANNING BABU BANARASI DAS UNIVERSITY LUCKNOW.

#### SCHOOL OF ARCHITECTURE AND PLANNING BABU BANARASI DAS UNIVERSITY, LUCKNOW (U.P.).

#### CERTIFICATE

I hereby recommend that the thesis entitled "**RESIDENTIAL SCHOOL, GUDUVANCHERY, TAMIL NADU**." under the supervision of Ar. DEEPTI SAGAR, is the bonafide work of the student and can be accepted as partial fulfillment of the requirement for the degree of Bachelor's degree in architecture, school of Architecture and Planning, BBDU, Lucknow.

PROF. MOHIT KUMAR AGARWAL DEAN OF DEPARTMET PROF. SANGEETA SHARMA HEAD OF DEPARTMENT

EXTERNAL EXAMINER

EXTERNAL EXAMINER

# ACKNOWLEDGEMENT

I wish to express my hearty appreciation towards all the teachers and my colleagues who have given me a helping hand in the completion of this project .

I would like to express my special thanks to my guide AR. DEEPTI SAGAR for providing me all the possible help .

I am thankful to the head of department Prof. SANGEETA SHARMA and Dean of department Prof. MOHIT KUMAR AGARWAL, for their support and encouragement.

I would like to express my special thanks to my mother and sisters who played an important role of a silent motivator behind the completion of this project and inspiring me , and I would also like to thank my teachers MR. AMIT, MR. ANIL and MR. ASHUTOSH who gave me their love and respect during this beautiful journey of 5 years of my graduation , and the most importantly the almighty whose blessings have made this possible.

SAURABH SHARMA

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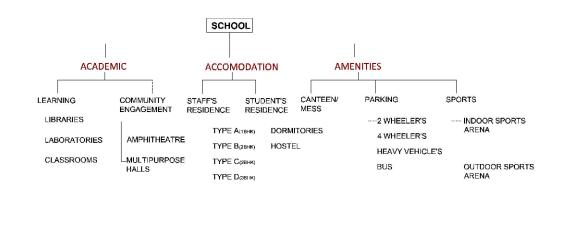
#### RESIDENTIAL SCHOOL AT GUDUVANCHERY, TAMIL NADU

The project taken for thesis design is a RESIDENTIAL SCHOOL, which is a LIVE PROJECT proposed by

#### SEETHAKATHI TRUST.

- The project envisages the establishment of an **International Residential School** with a first enrollment of **800 students** in **13.36 acres** campus at Guduvancheri.
- The project proposes to offer **IGCSE** (Cambridge university), and **CBSE** (Central Board of Secondary Education).
- It has been proposed to be open for both boarders as well as day scholars from standard **1st to standard 12th** with English language as a medium of instruction.
- School provides an access to the latest technology and thoughts.
- School is child's first institution which is responsible for shaping his character & building his future. It gives society a civilized person, a more sensitive & competent citizen.

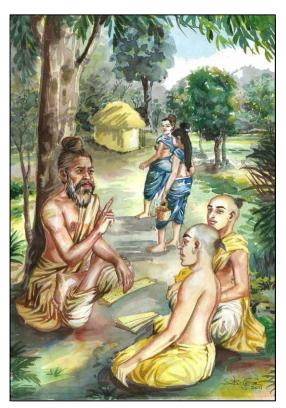
- School is a place where a child starts his/her real development. It provides an environment where the future of mankind is shaped.
- A Residential school is one where students stay in the hostels and purses their studies. They live with fellow students.
- Some schools offer residence as an option for outstation students while in some other, availing the residence facilities of the school is compulsory.
- Residential schools essentially provide food and lodging for a specific fee, Varied number of students share rooms or dormitories and remain under the guidance if house master or house mistress or matron.
- It is essential that the built building environment of the school should be conducive for learning. Design should enhance the environment which support the creative skills of a child.



#### HISTORY-

- The concept of grouping students in a centralized location for learning has existed since classical antiquity. Formal schools have existed at least since ancient Greece, ancient India (**gurukul**) and ancient china. They were taught respect, equality, honesty, etc.
- Many of the earlier public schools in the united states were one-room schools where a single teacher teaches seven grades of boys and girls together in a classroom.

#### **GURUKULA SYSTEM**



- Education in ancient indiawas more identified with the Gurukula system.
- These ancient Hindu schools in India were residential in nature with the sishyas or students living in the same house with the Guru or the teacher .
- The students lived together irrespective of their social standing

#### **PROJECT BRIF:**

TOPIC - RESIDENTIAL SCHOOL, GUDUVANCHERY, TAMIL NADU. TYPOLOGY - INSTITUTIONAL.

#### AIM-

• To realize the importance of environment and building accordingly, and in turn to develop habitable conditions to those living.promote the application of energy efficient/green buildings.to show how building industry is related to every sector and how it could change the economy of the country by using sustainable building practices.

#### **OBJECTIVE-**

- To design a school which will provide a good built environment merging the built form with open spaces and landscape for a soothing environment, based on the site and climatic conditions of the area proposed.
- Design based on psychology of the children plays a vital role in designing the space for them.

- Analyze the site and design **a site responsive building forms** also taking part into considerations of the natural environment since the site area and the surrounding is rich in vegetation.
- To incorporate **cost effective construction** techniques and appropriate building materials.
- Analyze and to design a **comfortable accommodation** spaces and make children feel at home.
- Analyze how to create a **healthy environment** for children to interact with nature and environment and know the importance of nature.
- Build **a self-sustaining** structure.

# **JUSTIFICATION**

• In The total global emission of the world in which the building sector contributes about 47%, Industrial sector 24%, Transportation about 28%. Through which we come to know that the building sector is the leading global emitter. I considered designing an energy efficient residential school would be the best way to start with. School is the place where a child gets most of the knowledge. If A child live in this type of a sustainable environment, He/she will remember whatever he learns, throughout his life. So that in future whatever he/she does will have a sustainable thought.

#### SITE STUDY

# LOCATION:

- Nellikuppam high road, Pandur, Guduvancherry, Kanchipuram district, Tamil nadu.
- It is the land owned by SEETHAKATHI TRUST.
- A 200 acres farm , in which the school is proposed.



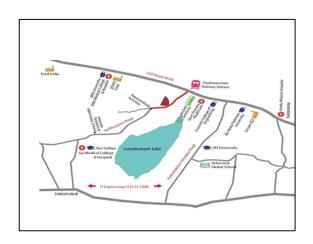
#### Site approach:

- GST road- NH45 take first left after the guduvancherry railway station.
- Nellikuppam, high road.
- Guduvancherry railway station - 750m
- Chennai international airport -20.7kms
- Guduvancherry bus stand -900m
  - Vehicular traffic: moderate

#### **SITE STUDY**

• Annual rainfall: varies from 1105mm -1214mm

- Soil type: loamy soil
- Topography: Slight slope
- Nearby water body: NANDIVARAM LAKE





**SECTION OF THE SITE** 

- **Annual rainfall:** varies from 1105mm
- -1214mm
- Soil type: loamy soil

• **Topography:** Slight slope

• Nearby water body: NANDIVARAM LAKE

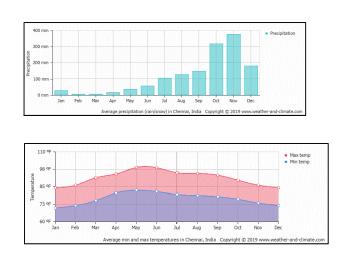




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# Site Temperature:

- Lowest 20'
- Highest 40'



### Average rainfall:

Annual rainfall varies

from 1105mm-1214mm

Source of water on site :

- Madhurakantam water tank-609 M
- Uttirmerur tank-958 M

#### SITE STUDY

• Tenneri tank-

1106 M

• Ground water is the main source of water on site.

# **INFERENCES**

# Strength

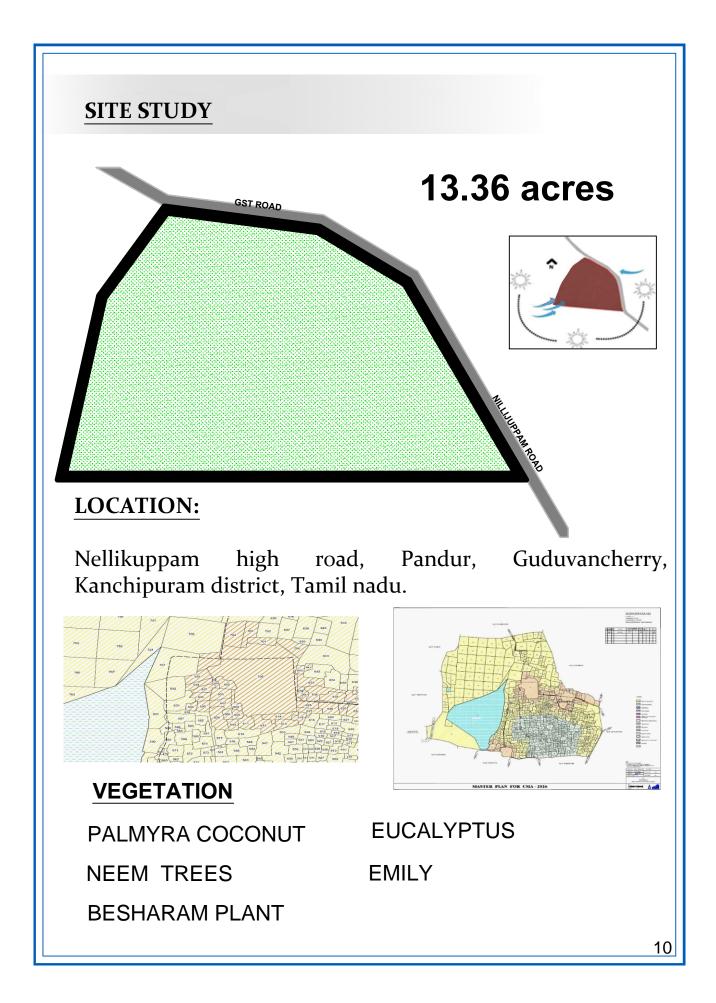
- Site is a central area with densely populated residential surrounding.
- Close to railway station and bus stop, easy access.
- South of the site is a vacant land.
- Cool breeze, as we have nandivaram lake nearby.

#### Weakness

- Site access only through one main road.
- As it is a central area, it has a chances of crime to happen.
- South of the site is a vacant land.

# **Opportunities**

- Site is oriented towards the nellikuppam high road.
- The shape of the site is centrifugal hence planning can be radial centric planning.



#### SITE STUDY



# OPPOSITE TO THE SITE



#### TOWARDS HIGHWAY



TOWARDS NELIKUPPAM ROAD

# SELAQUI INDIA INTERNATIONAL SCHOOL DEHRADOON

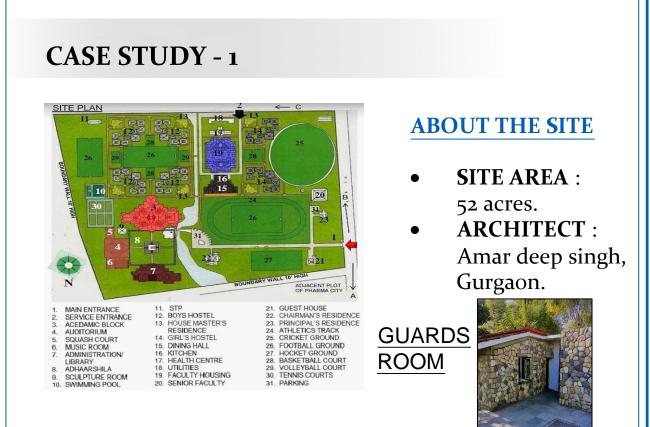
The **selaqui school** is located at the doon valley (dehradun), heavily forested on the foot hills of middle himalayas. the school campus is located on the dehradun-chakrata road about **20 km** from **dehradun**.

- It is a **co-educational** and fully residential school. an international level school which will develop the students and promote gender equality.
- To train future leaders in a multicultural and secular environment.



Location and approch to the site:

- It is located in doon valley (dehradun), heavily forested on the foothills of middle himalayas.
- The school campus is located on dehradun-chakrata road about 20 km from dehradun
- The main entrance of the site is west facing through an 18' wide road.
- The service entrance is through 15' wide road south facing.



#### **Climate:**

- Summers are hot and temperature ranges between 27' c to 41' c.
- Winters are more pleasant and may get cold as the temperature ranges from 5' to 27'.

### Planning analysis:

• The layout of the building and the intensive and luxurious landscaping merges beautifully with the surrounding, thus adds to a quiet and learning environment in the school.

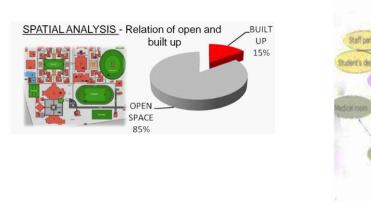
#### zoning:

- Academic offices, classrooms, labs, teacher's rooms, toilets.
- Hostel block separate hostel for boys and girls.

- Staff housing.
- Dining block common dining for students and staff. kitchen
- Sports facilities swimming pool, tennis court, basketball, volleyball, football, squash, cricket grounds and horse riding.
- Other facilities auditorium, sculpture workshops, infirmary.

#### Site analysis

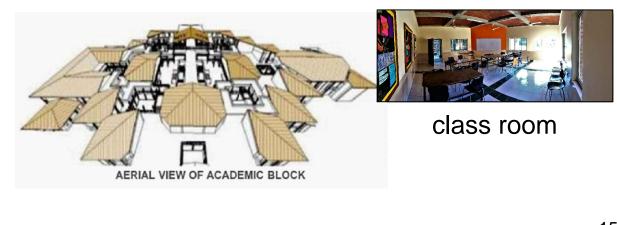
- school building 3 acres(5.8%)
- supportive facilities 1.3 acres (2.5%)
- residential area 3.5 acres (6.7%) open area includes:
- parking and play fields 44.2 acres (86%)





#### Design concept:-

- The philosophy of the school emphasis on tradition, and this is translated into an architecture, which works in harmony with tradition of the local architecture.
- Campus type planning has been involved with the integration of cluster and courtyard forms.
- Interconnection of various activity zones is done in order to make every zone easily accessible to the user.
- The approach is achieved by traditional indian concept of building elements like courtyard, verandahs, terrace, jalis, deep overhangs, local material used, tradition and craftsmanship.
- Proper zoning of academic block, staff-quarters, students' hostels, play fields etc., is done to avoid any interference type of activities.



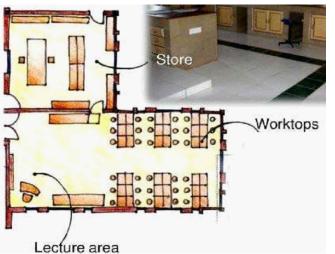
#### Architectural characteristics:

- The architecture of the campus incorporates variation of scale that in turn is an expression of the buildings function and intent, as dining and academic block has more imposing scale.
- •Conforming to the climate of the region as well as to the traditional architectural expression sloping roofs been incorporated for the entire complex.
- These sheltering roofs have large overhangs to protect the buildings from the regions from heavy rainfall.
- Corridors are about 1.8m wide .it is as per standards.
- Informal seating spaces available all over the site, so that the students can use them.
- The academic block is organized around four courts thus around four such split level staircases
- This allows the division of the block into four sub blocks namely the social science block, the business blocks, the physical science block, and the arts block.

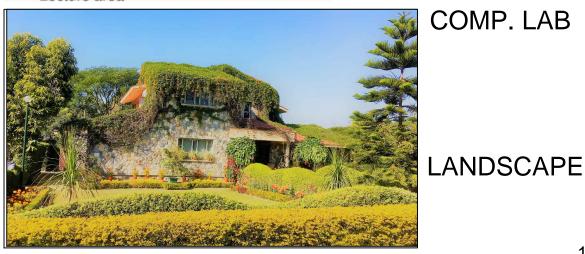


#### Laboratory:-

- there are labs for computer, physics, chemistry, and biology in the school.
- besides working area, technician space, preparatory space and store is provided.
- laboratory size 7.5 x 12.7m (95sqm) for 30 students
- as per standards 86sqm for 30 students.







# **Residential block**:

- Hostels blocks are placed separately for boys and girls,
- Play fields are provided in between both hostels.
- 4 blocks for boys
- 2 blocks for girls
- Dining placed in between boys' and girls' hostel.

#### One cluster consists of:

- 12 seven bedded dorms
- 12 four bedded dorms
- 1 common room.
- 2 care takers residence.
- 2 house master residence
- Block dormitories:

### **STAIR CASE: -**

- RISER : 6.5"
- TREAD : 12"



#### Library:

- Library has an area of 107 sqm with a storage space of about 10.5sqm
- Sitting arrangement for 40-45 students with 14 racks for books.
- Library is in separate block along with administration. placed in such a way that it is easily accessible for students and for teachers.



one cluster consists of:

- 12 seven bedded dorms
- 12 four bedded dorms
- 1 common room.
- 2 care takers residence.
- 2 house master residence

Play fields are provided in between both hostels.

- 4 blocks for boys
- 2 blocks for girls
- dining block placed in between boys' and girls' hostel.



# Health facilities:

• The school has well equipped ten bedded infirmary to address the medical problems of the students for boys and girls including an isolated air-conditioned ward.



#### Services:

#### Dining block -

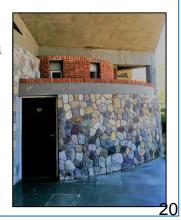
• Storage spaces kept at rear end near the service entry.



• The folded plate roof gives it more imposing scale. has a capacity of 500 students.

### Service block -

- The service block is placed at the southern side so that it is directly accessible from the service road
- It has laundry, carpentry, store for furniture, electricity rooms.



#### **Dormitories:**

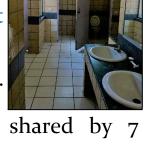
Ground floor -

- No. of dormitories 6
- Dormitory size 7.4 x 7.1m. area 52.5 sqm.
- Each dormitories on ground floor is shared by 7 students.
- As per standards 42sqm for 7 students

#### FIRST FLOOR -

- No. of dormitories 6
- Dormitory size 5.4 x 5.3, area 28.6 sqm
- Each dormitories on first floor is shared by 4 students.

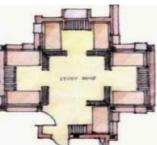












toilet

#### **SPORTS FACILITIES:**

- various sports facilities are provided in the campus
- cricket
- football
- hockey
- tennis
- horse riding
- swimming pool
- basketball
- volleyball.



tennis court



#### swimming pool



### cricket ground

# Landscaping:

- There is a perfect integration of the architecture and landscape.
- A blend of hard and soft landscape
- All the paths are lined with shrubs and trees thus helping to soften the look.



### Materials:

- Locally available stone
- Exposed brickwork
- Funicular shell roofing is used in academic block
- Cost effective materials.



#### **Inference:**

- All the blocks are well integrated with the site and merges into the overall landscape and well connected to each other through walkways.
- The academic block has been excellently designed around a central terrace and courtyards. open spaces all around enhance outdoor learning activities and relates well with the built form.
- Use of local materials and simple techniques gives it an ethic look and forms a part of local environment within the campus.

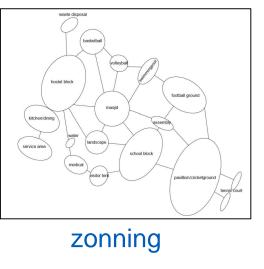
# **CRESCENT SCHOOL, VANDALUR, TAMIL NADU.**

#### **Location:**

- It is in the outskirts of chennai, near the vandalur zoo (a hotspot of chennai).
- to the total design of total d
- Along the two main roads gst road - chennai outer ring road, it is about 37 kms from the chennai.

Site area:17.2 acres.Site Access :GST road - outer ring roadTemperature:lowest 23' - highest 31'Orientation:site is oriented towards east.Traffic:heavy traffic in the outer ring road as itis a highway.GST road has traffic during<br/>peak hours.



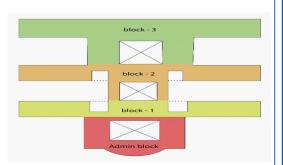


# **Spatial Planing:**

- Sports fields have been incorporated in the master plan with some sports fields becoming a part of hostels.
- **Staff quarters** have been planned along with the crescent college staffs at the **end of the crescent college campus.**
- Around the **masjid** is where the major blocks are planned. it forms the **backbone of the campus**.
- The hostels are placed at the rear side of the site adjacent to the dining and kitchen.
- The entry road directly leads to the admin block.
- **Parking** for the visitors is on the main road, and they have a separate parking for staff.

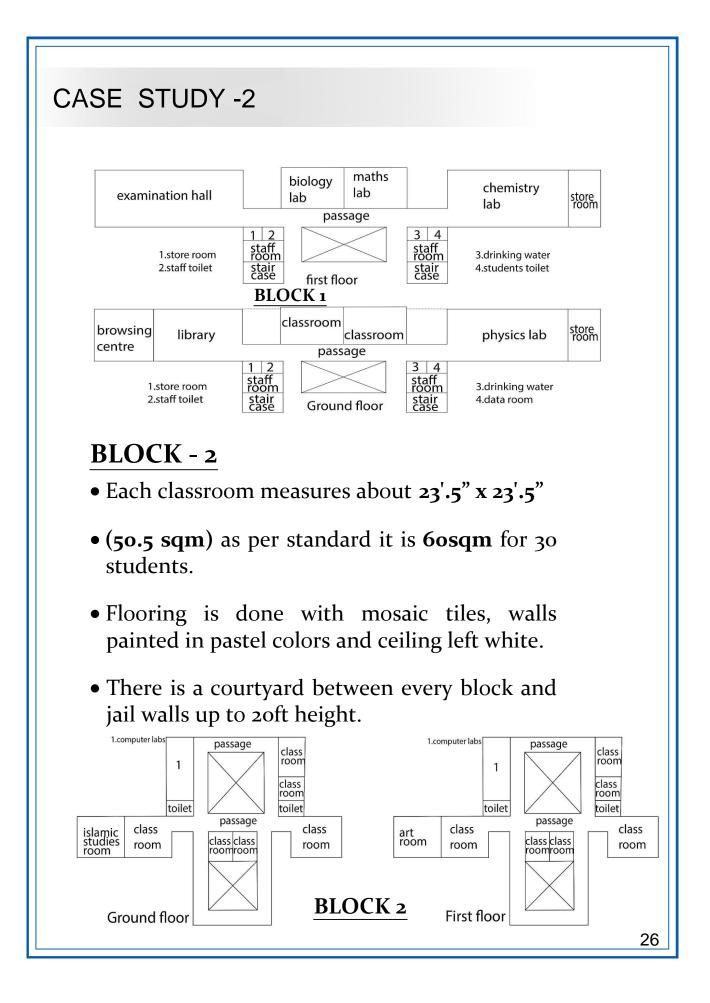
# Academic block:

- Admin
- Block 1
- Block 2
- Block 3



#### BLOCK - 1

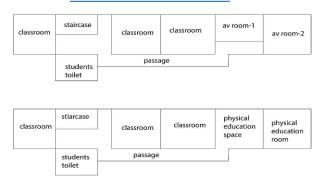
- Math's lab
- Chemistry lab
- Physics lab
- Biology lab
- Library
- Examination hall
- Staffrooms
- Browsing Centre



#### BLOCK - 3

- Classrooms have windows on one side and louvers on the other side.
- Classrooms are well lit and spacious, with storage facility at one side of the classroom.
- Av rooms are airconditioned with a seating capacity of 30 each.
- Physical education area is where the students are been checked for their uniforms, shoes etc.

**PLAN BLOCK-3** 



• The corridors are placed all along the courtyards hence to get a feel of being with the environment.



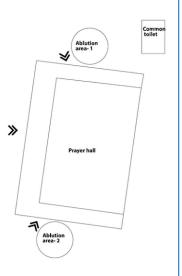
classroom and corridor

• All blocks are G+1

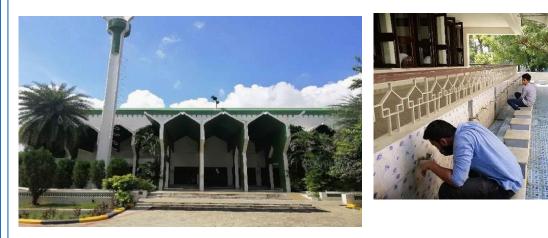


#### MASJID

- Masjid lies at the Centre of the campus connected with all the other blocks and spaces.
- It is an elevated structure ,built with an Arabian style of architecture, and a good landscape surrounded.
- Masjid has a three-way entry with common toilet and ablution facility at two sides.



- The prayer hall can accommodate about 1000 people at a time. Students from crescent college and outsiders join during Fridays.
- The schools time table is totally based on the prayer timings.



#### **HOSTEL BLOCK**

Hostel block is connected to dinning and the kitchen block with a connecting passage.

#### Staffs in charge:

- 1 hostel head
- 2 deputy wardens
- 9 resident teachers
- 1 supervisor.
- Well secured and maintained hostel, A G+2 building with 24x7 water supply.

Admin & junior block

KITCHEN AND DINING BLOCK

Senior & super senior blo

- The hostel block splits into two:
- 1. ADMIN & JUNIOR BLOCK
- 2. SENIOR AND SUPER SENIOR BLOCK.

Wester	Dormitory-7	toilet
Dormitory-6 Warden	badminton court	
toilet case	Dormitory-5	toilet
common room Warden Indoor games room room	≪	
badminton court		
Warden room toilet Dormitory-3	Dormitory-4 toilet	
badminton court	stair case badminton court	the second of th
Warden room	Dormitory-2 toilet	
toilet Dormitory-1	stair case	
:	*	

- Separate entry for both blocks, Hostel is surrounded with badminton grounds and has an indoor games facility inside the hostel premises. The hostel block is surrounded by a well-maintained landscape. Gives a pleasant view.
- Planning of the hostel block is a typical floor planning; all three level students are given separate type of arrangements. Based on standards.
- Each dormitory has a 20-30 beds, with each 5 toilets,
   5 bathrooms and 12 tap wash basins. There are about 21 dormitories to accommodate 600 students.

#### MEDICAL

- School has a well-equipped medical Centre.
- A general ward with 15 beds.
- Doctors are present to address the boys regularly 24x7.
- Ambulance is present to take the boys to hospitals in case of emergency.
- Students are been checked for infections regularly at a
- 3-month interval.





#### **KITCHEN & DINING**

- Dining spaces split into four as 1. 6th to 9th 2. 10th & 11th 3. 12th 4. Staff dining.
- Storage has a separate cold & dry storage facilities.
- About 700 students and 50 staff easily.
- Dining space is easily accessible as it is near the hostel.

#### **PLAY FIELD**

The school has its play fields spread all around the campus and at the reach of the students.

- 2 Basketball courts
- 4 Volleyball courts
- 3 football fields
- 4 badminton courts
- 2 tennis courts
- 1 swimming pool
- And an indoor games facility.



#### **SECURITY**

- There is a 24x7 CCTV security system with around **15 security guards** to secure the campus.
- The school is covered with a 10ft high compound wall for security reasons.



## AVASARA ACADEMY, PUNE, INDIA

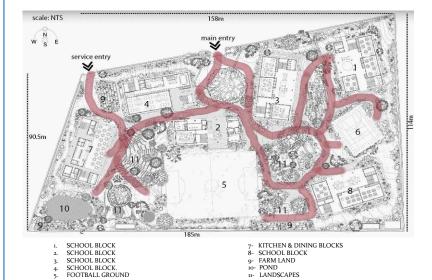
THE **AVSARA ACADEMY** IS SETTLED INTO THE VALLEY SLOPE ABOVE THE VILLAGE OF **LAVALE**, THE **4.3-ACRE CAMPUS** IS LOCATED **10 KM WEST OF PUNE** AND ROUGHLY 145 KM SOUTHEAST OF MUMBAI.

- THE ARCHITECTURAL DESIGN WAS CONCEIVED BY MUMBAI-BASED FIRM CASE DESIGN, MEANWHILE TRANS SOLAR KLIMA
   ENGINEERING CALCULATED THE SOLUTIONS TO ALLOW THE BUILDING TO ACHIEVE ITS NET-ZERO ENERGY STATUS.
- A COLLECTION OF SIMPLE STRUCTURES ARRANGED AROUND AN INFORMAL SERIES OF WALKWAYS, COURTYARDS, GARDENS AND TERRACES.
- THE LARGE BUILDINGS HOST THE CLASSROOMS AND FACILITIES THAT DRIVE THE LEARNING EXPERIENCE FOR THE STUDENTS.





HOCKEY GROUND





### **FEATURES OF THE BUILDING:**

- THE ROOMS HAVE BEEN BASED AROUND THE PERIMETER OF THE BUILDING, ALLOWING THE CENTRAL CORE TO BE COMPLETELY OPEN AND SERVE SOLELY FOR CIRCULATION PURPOSES.
- THESE CENTRALLY LOCATED 'EXHAUST CAVITIES' ARE INTEGRATED IN THE STRUCTURAL CORE OF THE BUILDING AND EVENTUALLY EXTENDS OUT AS SOLAR CHIMNEYS ABOVE ROOF LEVEL TO PASSIVELY DRIVE AIR FLOW, AND PROVIDE COOLING, THROUGHOUT.
- PASTEL COLORS PAINTED ON THE CEILINGS OF EACH FLOOR GIVE THE DETAILED CONCRETE CONSTRUCTION AND STONE BUILDING VIBRANCY, WHILE THE MOSTLY OPEN-FAÇADE IS COVERED IN PANELS OF BAMBOO SHADING.

- THE SCHOOL IS UNIQUELY POSITIONED TO TAKE ADVANTAGE OF LOCALLY SHARED RESOURCES WHILE ESTABLISHING ITS OWN IDENTITY AS A LEADER IN THE EDUCATION.
- WITH A HIGH AMBITION AND A **MODEST BUDGET**, THE BUILDING ACHIEVES A COMFORTABLE INTERNAL CONDITION WITHOUT THE USE OF ANY MECHANICAL SYSTEM DESPITE THE WARM AND HUMID WESTERN CLIMATE OF INDIA.
- GROUND & FIRST FLOORS HAVE CLASSROOMS AND EDUCATION FACILITIES.
- SECOND & THIRD FLOORS HAVE RESIDENTIAL ACCOMMODATION.
- THE STUDY OF AIR FLOW AND THE USE OF LOCALLY SOURCED BAMBOO SHADES IS **CLIMATE RESPONSIVE MASSING**.
- THE **CEILINGS** OF EACH FLOOR HAVE BEEN PAINTED IN A **DIFFERENT COLOR**.
- OUTSIDE AIR IS DRAWN THROUGH A SERIES OF EARTH DUCTS, WHERE IT IS PASSIVELY PRE-COOLED, BEFORE BEING SUPPLIED INTO THE CLASSROOMS AND LIVING SPACES.

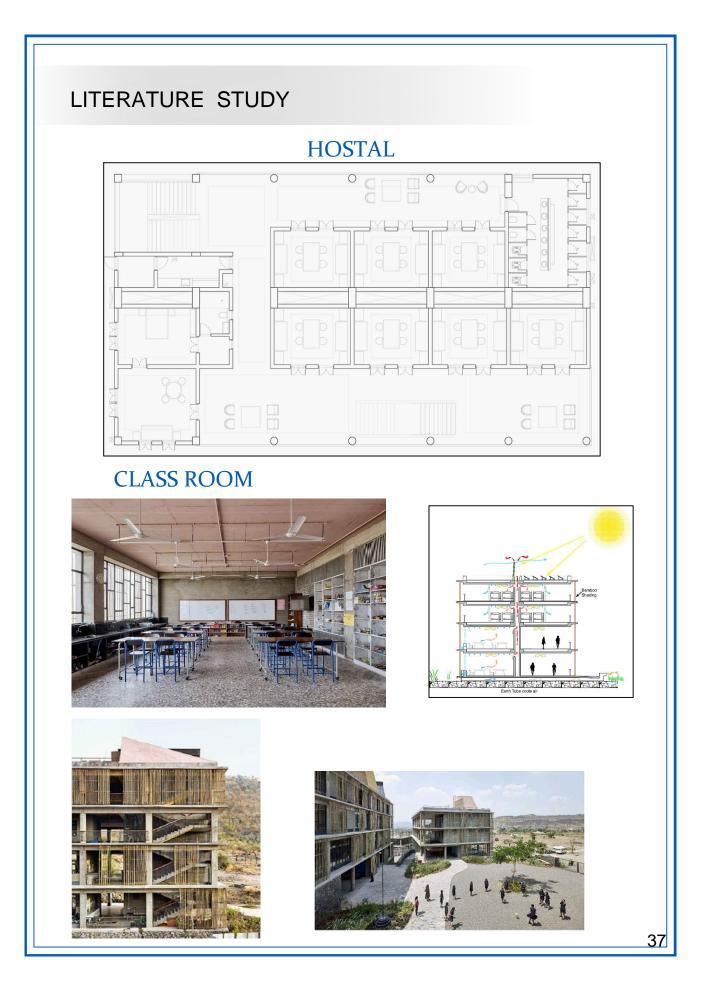
- **BAMBOO** PROVIDES SHADING AND ADDS **PRIVACY** TO THE MOSTLY EXPOSED BUILDING.
- IT CONSTANTLY ENGAGES WITH THE NATURAL ENVIRONMENT THROUGH THE **CENTRAL STAIRWELL** THAT IS ALSO AN OPEN SPACE FOR STUDENTS.











COMPARATIVE ANALYSIS							
S.NO	<u>SPACE</u>	<u>CASE STUDY-1</u> <u>(Selaqui</u> <u>international</u> <u>school,</u> <u>Dehradun)</u>	<u>CASE STUDY-2</u> ( Crescent school, <u>Chennai )</u>	LITERATURE STUDY (Avasara academy, Pune)	<u>STANDARD</u>	PROPOSED	
1.	AREA OF SITE	52 ACRES	17.2 ACRES	4.3 ACRES		13.36 ARCES	
2.	PLANNING	Courtyard planning	Courtyard planning	open block planning		Courtyard planning	
3.	ZONING	<ul> <li>School block</li> <li>Hostel block</li> <li>Dining</li> <li>Play ground</li> </ul>	<ul> <li>School block</li> <li>Hostel block</li> <li>Dining bock</li> <li>Play ground</li> <li>Mosque</li> </ul>	<ul> <li>School block</li> <li>Hostel block</li> <li>Dining bock</li> <li>Play ground</li> </ul>		<ul> <li>School block</li> <li>Hostel block</li> <li>Dining bock</li> <li>Play ground</li> </ul>	
4.	LOCATION	The school campus is located on the Dehradun,chakrata road about <b>20</b> <b>km</b> from <b>Dehradun</b> .	It is in the outskirts of Chennai, near the vandalur zoo.	<b>10 km west of</b> <b>Pune</b> and roughly 145 km southeast of Mumbai.		It is in the outskirts of Chennai, in Guduvanchery Tamil Nadu.	
						3	

COMPARATIVE ANALYSIS								
S.NO	<u>SPACE</u>	<u>CASE STUDY-1</u> <u>(Selaqui</u> <u>international</u> <u>school,</u> <u>Dehradun)</u>	<u>CASE STUDY-2</u> (Crescent school, <u>Chennai</u> )	LITERATURE STUDY (Avasara academy, Pune)	STANDARD	PROPOSED		
5.	TYPE OF SCHOOL	Fully residential school.	Both day scholar and residential school.	Fully residential school.		Fully residential school.		
6.	USERS	Both girls and boys.	Only for boys.	Only for girls.	Both girls and boys.	Only for boys.		
	INTAKE AND STRENGTH OF STUDENTS	25/300	25/600	25/300	max 40	25/1200		
						39		

## **COMPARATIVE ANALYSIS**

S.NO	<u>SPACE</u>	<u>CASE STUDY-1</u> ( <u>Selaqui</u> international <u>school,</u> <u>Dehradun)</u>	<u>CASE STUDY-2</u> ( Crescent school, <u>Chennai )</u>	LITERATURE STUDY (Avasara academy, Pune)	<u>STANDARD</u>	PROPOSED
8.	NO.OF CLASS ROOM	12	24	12		30
9.	ACCESS	1 main entry 1 service entry	1 main entry for site 1 entry for school 1 service entry	1 main entry 1 service entry		1 main entry 1 service entry
10.	LABORA -TORY	130sqm	90sqm		90sqm	110sqm
11.	HOSTEL TYPE	DORMITORY	DORMITORY	DORMITORY		DORMITORY AND SINGLE ROOMS
12.	CORRIDOR	2.2	2		1.8	2.5
13.	SITE		Mem scale: MTS	Val. 193		40

## **STANDARDS**

## **SPACE REQUREMENT**

A classroom should not be a mere enclosure of space to cater for the large variety of activities. It must supply a flexible space to meet the need of the changing education pattern, furniture & equipment. So, the planning of classroom should be the outcome of a careful analysis of space requirements for different activities and arrangements. To arrive the suitable shape & size of a classroom, the following factors are critical:

• Basic dimensions of children's & their space requirements.

• Dimensions and arrangement of furniture & equipment's.

• Number of students to be accommodated, types of activities to be carried out.

• Different seating arrangements essential for these activities.

• According to standards:

• 40 students per class is the commonly accepted standard.

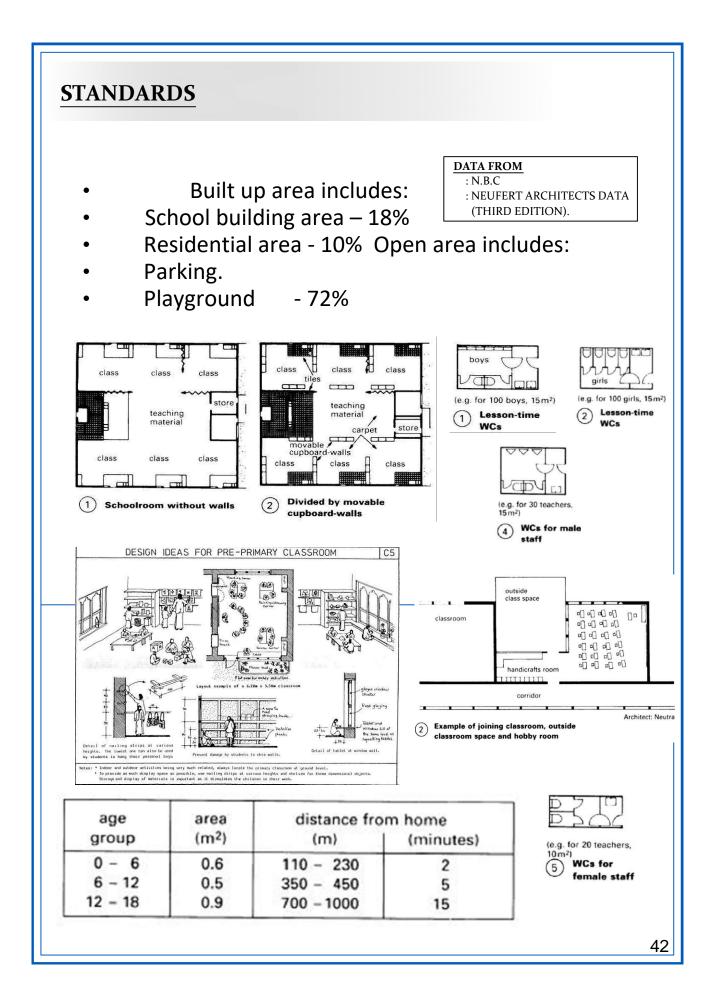
• An area of **1.2 sqm per child** is needed for the effect performance.

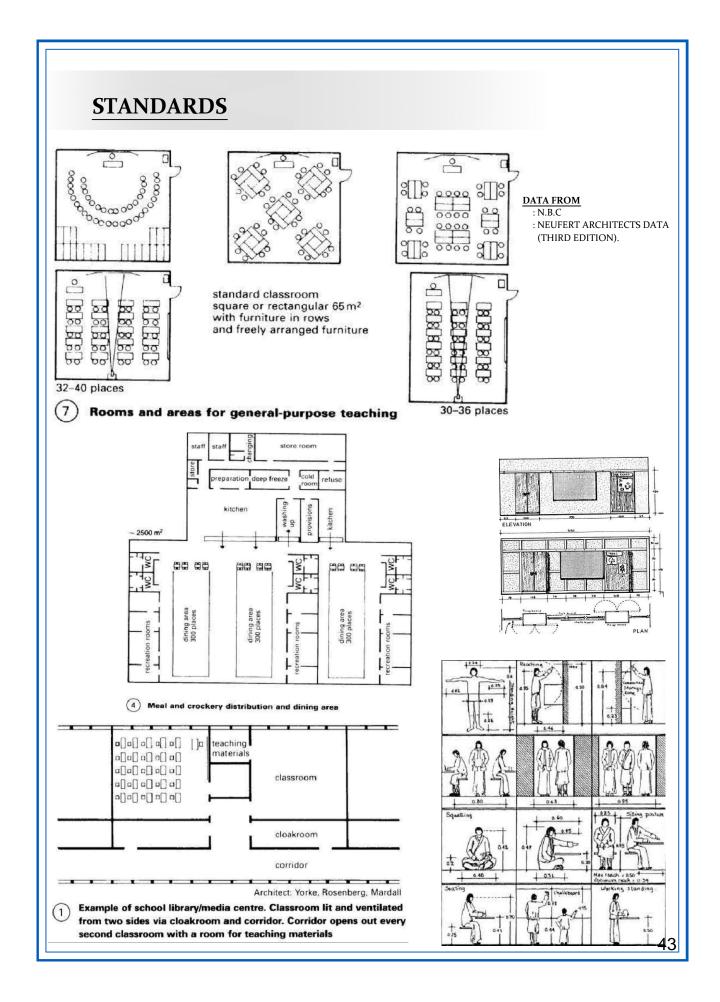
• A classroom of **7.30 x 6.90m** is required for a **class of 40 students.** 

• Land Area Requirement As per **N.B.C**: - (for a residential school)

• Built up area - 28%

• Open space - 72%





#### C.B.S.E. NORMS INFRASTRUCTURE:

THE INFRASTRUCTURE FACILITIES SHOULD BE AS FOLLOWS:

- CLASSROOMS MINIMUM SIZE SHOULD BE 8MX6M (APPROXIMATELY 500SQFT).
- SCIENCE LABS (COMPOSITE LABS OR SEPARATE PHYSICS, CHEMISTRY, AND BIOLOGY FOR SENIOR SECONDARY) -MINIMUM SIZE SHOULD BE 9MX6M EACH (APPROX. 600SQFT) AND FULLY EQUIPPED.
- **LIBRARY** MINIMUM SIZE SHOULD BE **14MX8M** FULLY EQUIPPED AND WITH A READING ROOM FACILITY.
- COMPUTER LAB AND MATH'S LAB NO MINIMUM SIZE IS PRESCRIBED; HOWEVER, THE SCHOOL SHOULD HAVE SEPARATE PROVISION FOR EACH.ROOMS FOR EXTRACURRICULAR ACTIVITIES - EITHER SEPARATE ROOMS FOR MUSIC, DANCE, ARTS, SPORTS, OR ONE MULTI-PURPOSE HALL FOR ALL THESE ACTIVITIES SHOULD BE AVAILABLE.

#### **PHYSICAL FACILITIES:**

- CLASSROOMS SHOULD BE ADEQUATE IN SIZE. THE **MINIMUM FLOOR SPACE** FOR **EACH STUDENT** SHOULD BE AT LEAST **1.SQM**.
- THE SCHOOL SHOULD HAVE SUITABLE FURNITURE IN THE CLASSROOMS, STAFFROOMS, OFFICE ETC. ACCORDING TO THE STRENGTH OF THE STUDENTS AND STAFF.
- THE SCHOOL SHOULD HAVE ADEQUATE FACILITIES FOR PROVIDING RECREATION ACTIVITIES AND PHYSICAL EDUCATION AS WELL AS FOR CONDUCT OF VARIOUS ACTIVITIES AND PROGRAMS FOR DEVELOPMENT EDUCATION, SOCIAL, CULTURE AND MORAL DEVELOPMENT OF THE STUDENTS.
- THE SCHOOL SHOULD HAVE BASIC HEALTH PROGRAMS FOR SAFEGUARDING THEIR HEALTH. 44

#### **ORGANIZATION OF SPACE**

THE BUILT FORM OF A SCHOOL CAN BE BROADLY CLASSIFIED INTO FIVE TYPES NAMELY **SINGLE** AND **DOUBLE CORRIDOR**, **COURTYARD**, **CLUSTER & CAMPUS**.

#### **SINGLE CORRIDOR TYPE:**

THIS IS THE MOST STRAIGHTFORWARD & SIMPLE ARRANGEMENT OF SCHOOL BUILDING, ALLOWS A LINEAR ASSEMBLY OF CLASSROOM ALONG A CORRIDOR HAVING SEVERAL ADVANTAGES:

- CLARITY OF ORGANIZATION.
- EASE OF NATURAL LIGHTING & CONTROL OF ACCESS TO FACILITIES.
- MAY SEPARATE THE DIFFERENT ASPECTS OF THE BUILDING.
- L & S SHAPE CORRIDOR CAN PROVIDE INTERESTING VISUAL SPACES WITH CLASSROOMS ARRANGED ALONG ITS SHAPE.
- SSICAL ARRANGEMENTS INCLUDING THE ORGANIZATION IF IRREGULAR GEOMETRY OR A SERIES OF COURTYARDS, EACH HAVING SEPARATE IDENTITY.

#### **DOUBLE CORRIDOR TYPE:**

DOUBLE CORRIDOR PROVIDES A COMPACT FORM, ECONOMY AND FLEXIBILITY AS COMPARE TO SINGLE CORRIDOR TYPE BUILDING. THE VARIOUS FACTORS OF THIS TYPE OF DESIGN ARE:

- MAKE A CONTINUOUS CLOSE AREA.
- BUILT QUICKLY & ACCOMMODATIVE A HIGHER RATIO OF FUNCTIONAL AREA.
- IT REDUCES THE EXPOSED PERIMETER, WHICH IS SUITABLE FOR HOT CLIMATE.
- THE MAJOR ODD FACTOR WITH TYPE OF DESIGN IS LIGHT & VENTILATION SHOULD BE CAREFULLY INCLUDING SKYLIGHT, DOUBLE HEIGHT, CORRIDOR, DORMER WINDOW ETC.

#### COURTYARD TYPE:

THIS TYPE OF PLANNING IS QUITE COMMON IN INDIA & HOLD ILLUSTRIOUS PLACES IN THE TRADITIONAL ACADEMIC BUILDINGS. THE VARIOUS FACTORS OF THIS TYPE OF DESIGN ARE:

- PROVIDES CENTRAL SHADED AREA, A CONTROLLED PLAY AREA AND A VARIETY OF ADJACENT VERANDAH, CORRIDOR AND ROOMS.
- PROVIDES BETTER INTERACTION BETWEEN STUDENT & FACULTY AND FULFILL THE SHORTCOMINGS OF COVERED SPACES (IN HOT CLIMATES).
- SEPARATE COURT CAN BE USED FOR DIFFERENT FUNCTIONS & LEVEL OF EDUCATIONS, WITH SEVERAL INDEPENDENT AROUND THEIR OWN CENTRAL COURTYARD.

#### **CLUSTER TYPE:**

THE CLUSTER APPROACH ATTEMPTS TO TRANSLATE THE NEED FOR SEGREGATING EDUCATION, ACADEMIC, SERVICE & OTHER FUNCTIONS TO WELL DEFINE ZONES. THE VARIOUS FACTORS OF THIS TYPE OF DESIGN ARE:

- THE CLASSROOMS ARE ARRANGED IN GROUPS OR CLUSTERS AROUND A COMMON AREA.
- THE CREATION OF A COMMON SPACE ALONG WITH CLASSROOM CLUSTER GIVES THE SCHOOL A MORE INTIMATE SPATIAL QUALITY & A GREATER SENSE OF IDENTITY.
- A MODULE OF CLASSROOMS CAN BE EXTENDED IN STAGES, AS NEED INCREASE.
- THE CIRCULATION IS A DIFFICULT PROBLEM, WHICH CAN BE RESOLVED BY CAREFUL PLANNING.

#### **CAMPUS TYPE:**

LARGE SCHOOL & EDUCATIONAL CENTERS DEMAND A COMBINATION OF BUILT FORMS. THE PLANNING OF A LARGE SCHOOL INVOLVES THE INTEGRATION OF CORRIDOR, NUCLEATED, CLUSTER & COURTYARD FORMS. THE VARIOUS FACTORS OF THIS TYPE OF DESIGN ARE:

- IT FOCUSES ON THE CREATION OF A VARIETY OF EXTERIOR & INTERIOR SPACES.
- ITS EMPHASIS IS ON THE RELATIONSHIP OF BUILT AND OPEN SPACES.
- THE CAMPUS PLAN IS A LARGE COURTYARD TYPE CONSISTING OF SEVERAL BUILDINGS AROUND A SERIES OF COURTYARD.
- CAMPUS DESIGN USE BOTH CLASSICAL MODELS OF ORGANIZATION WITH A CENTRAL GREEN AND FORMAL PATHWAYS & ALSO NON-CLASSICAL ARRANGEMENTS INCLUDING THE ORGANIZATION IF IRREGULAR GEOMETRY OR A SERIES OF COURTYARDS, EACH HAVING SEPARATE IDENTITY.

#### I.G.C.S.E NORMS

#### FACILITIES TO SUPPORT THE CURRICULUM

IN ADDITION TO EFFECTIVE TEACHERS, SCHOOLS NEED TO PROVIDE SUITABLE LEARNING ENVIRONMENTS, SUPPORTIVE OF THE CURRICULUM. SCHOOLS WILL HAVE VERY DIFFERENT RESOURCING BUDGETS BUT, AT A MINIMUM, LEARNING SPACE SHOULD SUPPORT TEACHERS IN DELIVERING INTERACTIVE AND STIMULATING LESSONS. EACH LEARNING SPACE SHOULD BE SUITABLE FOR THE NUMBER OF STUDENTS AND THE TYPE OF ACTIVITIES THAT WILL TAKE PLACE IN THEM. THINGS TO THINK ABOUT HERE INCLUDE:

• ACTIVITIES THAT WILL TAKE PLACE FOR COURSEWORK COMPONENTS.

- SUBJECTS THAT REQUIRE EQUIPMENT, RESOURCES AND DIFFERENTIATE LEARNING SPACES, SUCH AS ART, PHYSICAL EDUCATION, MUSIC AND DANCE.
- SCIENCE LABORATORIES AND THE NECESSARY SAFETY REQUIREMENTS.
- ANY CULTURAL ISSUES THAT MAY IMPACT THE WAY YOU SET UP YOUR LEARNING ENVIRONMENTS.

LIBRARIES, OFTEN CALLED MEDIA OR LEARNING RESOURCE CENTER, PROVIDE AREAS FOR LEARNING TO WORK WITH THEIR TEACHERS ON RESEARCH PROJECTS OR INDIVIDUALS' ASSIGNMENTS DURING SCHEDULED CLASSES. LEARNERS CAN ALSO USE THESE FACILITIES DURING SCHEDULED STUDY PERIODS, IF THEY HAVE THEM, DURING BREAK TIMES TIME AND BEFORE AND AFTER SCHOOL. SOME SCHOOLS LINK WITH LOCAL COMMUNITY FACILITIES TO PROVIDE THIS RESOURCE. USUALLY THESE AREAS ARE ALSO EOUIPPED WITH COMPUTERS AND OTHER ELECTRONIC RESOURCES CONNECTED TO THE SCHOOL'S INTERNAL NETWORK OR INTERNET. IDEALLY SCHOOL LIBRARIES WILL HAVE DEDICATED RESOURCES CONNECTED TO SUPPORT THE PROFESSIONAL DEVELOPMENT OF TEACHING STAFF, FOR **EXAMPLE:** 

- PROFESSIONAL DEVELOPMENT BOOKS AND MAGAZINES
- ELECTRONIC JOURNALS
- ACCESS TO PROFESSIONAL SITES AND MAGAZINES
- ACCESS TO SUBJECT WEBSITES
- WRITTEN REFERENCE MATERIALS.

#### **COLORS FOR CHILDREN OF DIFFERENT AGES:**

- YOUNGER CHILDREN SEEM TO GRAVITATE TOWARDS BRIGHT PRIMARY COLORS RED, BLUE AND YELLOW, BUT THESE CAN BE TOO ENERGETIC AT TIMES.
- A GOOD COMPROMISE IS TO PAINT THE WALLS A SOFT WHITE, THEN CREATE AN ARTISTIC BORDER APPROXIMATELY ONE THIRD OF THE WAY UP FROM THE FLOOR (AND NO MORE THAN 24 INCHES HIGH) WITH DESIGN INCORPORATE BRIGHT RED, YELLOW, BLUE.
- IT IS IMPORTANT NOT TO USE BRIGHT WHITE, HOWEVER AS IT HAS A STIMULATING EFFECT LIKE BRIGHT COLORS.
- OLDER CHILDREN PREFER POPULAR COLORS OR MUTED SHADES. TEAM COLORS ARE GOOD CHOICES IF NOT TOO BRIGHT ( OR USE PALE GRAY OR SOFT WHITE).

#### **SCHOOL HALLWAYS:**

- THESE ROOMS ARE FOR SHORT-TIME USAGE BETWEEN CLASSES.
- STRATEGIC USE OF APPROPRIATE COLORS CAN HELP VISUALLY SHORTEN LONG HALLWAYS AND ENLARGE SMALL, DARK ONES.
- TO PREVENT LOITERING **USE BRIGHT COLORS FOR BORDERS**, KEEP BACKGROUND NEUTRAL TO REDUCE DESTRUCTIVE BEHAVIOR.
- CORRIDOR AND STAIRWELLS ARE IDEAL SPACES FOR BRIGHT, HAPPY COLORS TO REFLECT SCHOOL SPIRIT.
- LOCKERS CAN BE PAINTED WITH BRIGHT COLORS.
- MASCOTS AND OTHER **COLORFUL WALL GRAPHICS** ADD INTEREST.
- CHOOSE A FEW COMPLEMENTARY **SHADES OF GREEN** TO GAIN THE COLOR PSYCHOLOGY BENEFITS IT OFFERS WHILE STILL PROVIDING THE VARIETY THAT PRESCHOOLERS CRAVE.

#### **CLASSROOM COLORS:**

- SELECTING THE RIGHT COLOR FOR CLASSROOM CAN MAKE A CRUCIAL DIFFERENCE IN CHILDREN'S BEHAVIOR AND ABILITY TO LEARN.
- PRE-SCHOOL CHILDREN, WHO TEND TO BE VERY SENSITIVE TO ENVIRONMENT FACTORS AND WHO HAVE NOT YET ACQUIRED SKILLS IN CONCENTRATION AND FOCUS, CAN BENEFIT FROM A COLOR SCHEME THAT PROMOTES APPROPRIATE FORMS OF CLASSROOM BEHAVIOR.
- EXPERTS IN COLOR PSYCHOLOGY EMPHASIZE THE IMPORTANCE OF BRIGHTER COLORS FOR YOUNG CHILDREN. COLORS LIKE RED, ORANGE ETC.
- IF THE CLASSROOM ALREADY RECEIVES A GREAT DEAL OF LIGHT FROM SOUTH OR WEST FACING WINDOWS, YOU MAY WANT TO CHOOSE QUIETER COLORS AS THE AMOUNT OF SUNLIGHT CAN MAKE BRIGHT COLORS TOO LOUD.
- YOU CAN CHOOSE A RELAXING PASTEL COLORS, OR ADD A BRIGHTER ELEMENT SUCH AS MURALS ETC.
- GREEN IS KNOWN TO PROMOTE RELAXATION, BUT TOO MUCH OF ONE SHADE OF GREEN CAN BECOME MONOTONOUS.
- CHOOSE A FEW COMPLEMENTARY SHADES OF GREEN TO GAIN THE COLOR PSYCHOLOGY BENEFITS IT OFFERS WHILE PROVIDING THE VARIETY THAT STUDENTS CRAVE.
- WE CAN DIVIDE THE SPACES WITHIN THE CLASSROOM WITH BRIGHT SHADES OF BACKGROUND PLAYTIME OR SOFTER SHADES FOR THE AREAS WHERE YOU WANT CHILDREN TO ENGAGE IN QUITE LEARNING.

## REQUIREMENTS

### **ACADEMIC BLOCK:**

Admin block	Nos:	area
- Principal room	1	30
- Vice principal room	1	25
- Admission room	1	25
- Waiting area	1	20
- Visitors toilet	2	10
- Reception	1	20
- Board room	1	50
- Directors room	1	30
- Office /accounts	1	100
- Lobby	1	40
TOTAL AREA		360 sqm
IOTAL AREA		300 sqm
School block - 1 :	Nos:	Area
	Nos: 2	
School block - 1 :		Area
School block - 1 : - Library	2	<b>Area</b> 200
<b>School block - 1 :</b> - Library - Physics lab	2	<b>Area</b> 200 110
<b>School block - 1 :</b> - Library - Physics lab - Chemistry lab	2 1 1	<b>Area</b> 200 110 110
<b>School block - 1 :</b> - Library - Physics lab - Chemistry lab - Biology lab	2 1 1 1	Area 200 110 110 110
<b>School block - 1 :</b> - Library - Physics lab - Chemistry lab - Biology lab - Math's lab	2 1 1 1 1	Area 200 110 110 110 100
School block - 1 : - Library - Physics lab - Chemistry lab - Biology lab - Math's lab - Computer lab	2 1 1 1 1 2	Area 200 110 110 110 200
School block - 1 : - Library - Physics lab - Chemistry lab - Biology lab - Math's lab - Computer lab - Staffrooms(5staff)	2 1 1 1 1 2 2	Area 200 110 110 100 200 75
School block - 1 : - Library - Physics lab - Chemistry lab - Biology lab - Math's lab - Computer lab - Staffrooms(5staff) - Staff toilets	2 1 1 1 1 2 2 2	Area 200 110 110 100 200 75 24

### **AUDITORIUM:**

CAPACITY	Nos.	Area	
- 1500	1	3000	

School block - 2 :	Nos:	area(sqm)	Total
- Classrooms(1st-8th)	24	65	1560
- Staffrooms(5 staffs)	5	38	190
- Students Toilets	5	44	220
- Av lab	2	9	180
		2150	SQM
School block - 3 :	Nos:	are(sqm)	Total
- Classrooms(9th-12th)	16	65	1040
- Staffrooms(5staff)	6	38	225
- Students Toilets	5	4	220
- Language lab	5	65	175
- Extracurricular classrooms	3	64	192
- Physical education room	1	100	100
			1952sqn

### **MULTIPURPOSE STADIUM:**

Name	Nos:	Area
- Gymnastics	1	
- Badminton	1	
- Table tennis	1	
- Carrom	1	
- Band room	1	
- Billiards	1	
- Storage	1	
		27500 sqm

### **SERVICES:**

1749 sqm

Area:	Nos:	Area
- Transformer/generator/electrical	1	100
- Dry waste disposal	1	30

## REQUIREMENTS

<b>DINING BLOCK:</b>						
Dining area:	Nos:	Area	total			
- Student dining	1 for 600					
- Staff dining	1 for 50		2000sqm			
- Visitors dining	1 for 250					
- Handwash	3					
Kitchen:	Nos:	Area	total			
- Receiving dock	1	20	20			
- Cooking area	1	50	50			
- Dry storage	1	40	40			
- Cold storage	1	20	20			
- Dish washing	1	20	20			
- Trash room	1	10	10			
- Manager	1	15	15			
- Employee room	1	25	25			
- Employee toilet	2	30	60			
- changing room	2	2	40			

Dining space for 900 people approximately 2500sqm

#### **MEDICAL HALL:**

- 10 bedded general ward
- Reception
- Consultation room
- Waiting area
- First aid room

### **HOSTEL BLOCK:**

Admin area:		Nos:		Area/room(sq		ı(sqm)
- Office/reception		1		100		
- Waiting area		1		20	12050	QM
Primary hostel:		Nos:		Area	room/	(sqm)
- 40 in Dormitory		5		240		1200
- 20 in 1 room		10		120		1200
- 10 in 1 room		10		30		боо
- A.H.U room		1		25		25
						3025SQM
Secondary:	Nos:		Area	/roon	n(sqm)	
- 40 in Dormitory		5		240		1200
- 20 in 1 room		10		120		1200
- 10 in 1 room		10		30		600
- A.H.U room		1		25		25
						3025SQM
H.Secondary	Nos:		Area	/roon	n(sqm)	<u>l</u>
- 4 in 1 rooms	30		30			900sqm
- 2 in 1 rooms	30		15			450sqm
- Single rooms	20		10			200sqm
- Toilets	35		50			1750sqm
- A.H.U room	1		25			25sqm
- 1warden room						
for 10 rooms	20		10(+5	sqm to	ilet)	300sqm

### -TOTAL BUILT UP AREA

-24875 SQM

3625sqm

500 sqm

# CONCEPT

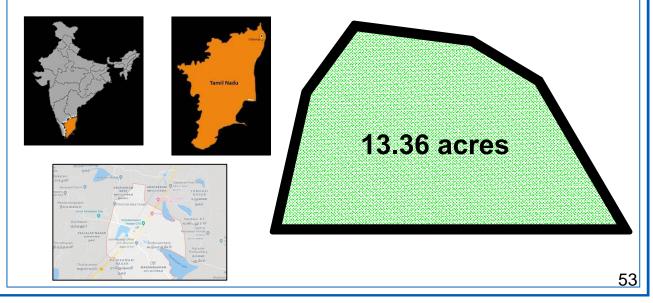
School is such a place where a child starts his early development. It provides an environment where the future mankind is shaped. school is child's first institution which is responsible for shaping his character and belonging his future. It gives society a civilized person. A more sensitive and competent citizen.

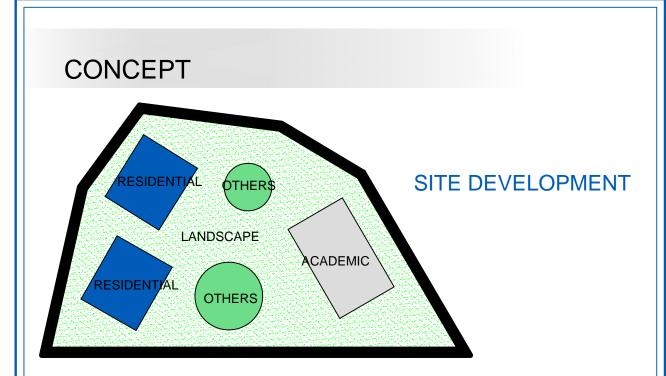
A residential school is one where students lives in hostels and pressure their studies. They live in fellow students.

Some school offers residence as an option for outstation students while in some others, availing the residence facilities is compulsory.

## THE SITE-

Nellikuppam high road, Pandur, Guduvancherry, Kanchipuram district, Tamil nadu.





# COURTYARD PLANNING

A court or courtyard is an enclosed area, often a sapce enclosed by a building that is open to sky

The origin of traditional Indian courtyards can be traced back to the Indus Valley civilisation. ... Courtyard architecture originated as far back as 3000 BC in Egypt, Iran and China. The first courtyard houses, according to historical evidence, appeared to have originated in India probably around 6500-6000 BC



