INTEGRATING SPECIAL NEEDS EDUCATION

Exploring the levels of Autism Inclusion in a Mainstream School

THESIS

Submitted in partial fulfillment

Of the requirement for the award of the degree

Of

BACHELOR OF ARCHITECTURE

By

AARUSHI

CHANDIGARH COLLEGE OF ARCHITECTURE

PANJAB UNIVERSITY

CHANDIGARH (INDIA)

June 2019

CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled "INTEGRATING SPECIAL NEEDS EDUCATION ; Exploring levels of autism inclusion into a mainstream school." in partial fulfillment of the requirement for the award of the Degree of Bachelors of Architecture, is an authentic record of my own work carried out during the period from January 2019 to June 2019 under the supervision of Professor Sohan Lal Saharan.

The matter embodied in this thesis has not been submitted by me for the award of any other degree.

(AARUSHI)

This is to certify that the above statement made by the candidate is correct to the best of our knowledge.

Sohan Lal Saharan	Parmeet Singh Bhatt	Dr. Sangeeta Bagga Mehta
(Thesis Guide)	(Thesis Co-ordinator)	(Principal)

Dated: May 30, 2019

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Integrating Special Needs Education;

Exploring the levels of Autism inclusion in a mainstream School



Chandigarh College of Architecture

THESIS 2019

Proposed by : Aarushi

Thesis guide : Prof. Sohan Lal Saharan

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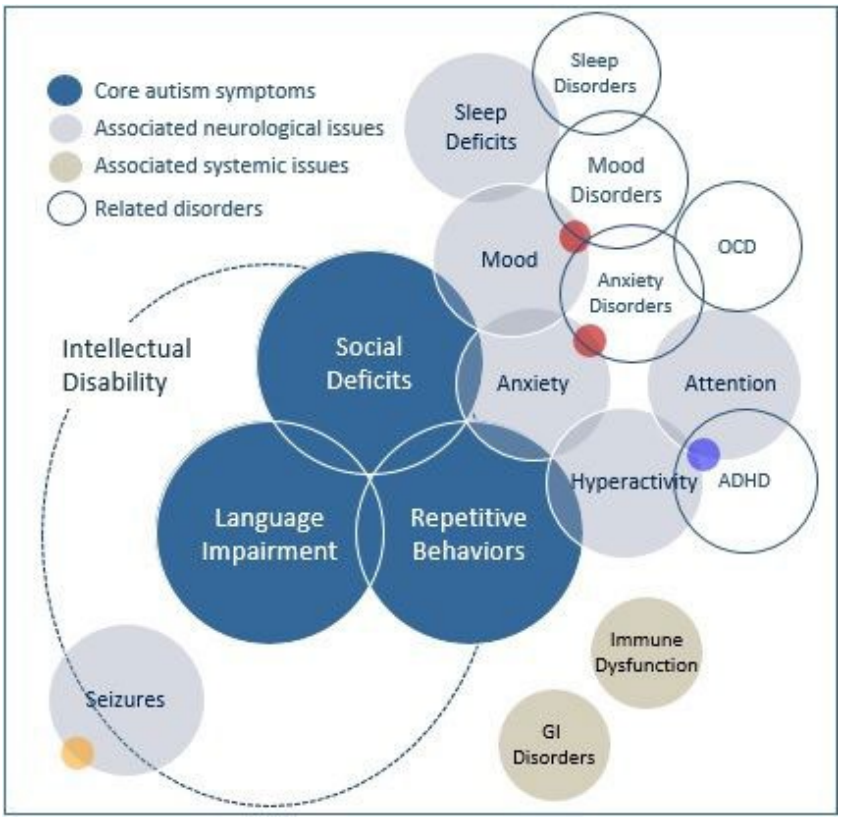
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01 **What is Autism?**

“Autists are the ultimate square pegs, and the problem with pounding a square peg into a round hole is not that the hammering is hard work. It’s that you’re destroying the peg.”
— Paul Collins



Autism is a complex neurobehavioral condition that includes impairments in social interaction and developmental language and communication skills combined with rigid, repetitive behaviors. Because of the range of symptoms, this condition is now called autism spectrum disorder (ASD). ASD ranges in severity from a handicap that somewhat limits an otherwise normal life to a devastating disability that may require institutional care. Autism’s hallmark signs usually appear by age 2 to 3. Often, it can be diagnosed as early as 18 months. Some associated development delays can appear even earlier.

In 2013, the American Psychiatric Association merged four distinct autism diagnoses into one umbrella diagnosis of autism spectrum disorder (ASD). They included autistic disorder, childhood disintegrative disorder, pervasive developmental disorder-not otherwise specified (PDD-NOS) and Asperger syndrome.

There is not one type of autism but many subtypes, and each person with autism can have unique strengths and challenges.



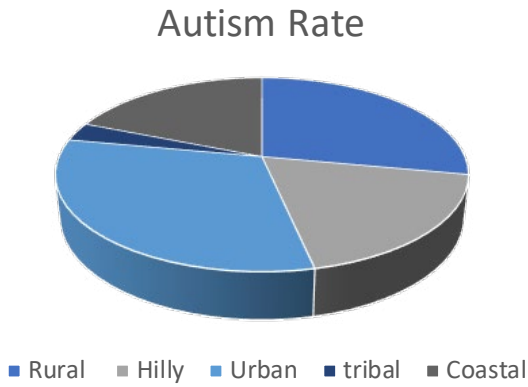
02 Defining Stakeholders

- Autistic Students
  - Level 1
  - Level 2
  - Level 3
- Neuro Typical Students
- Staff

03 **Validity**

Recent estimated prevalence of ASD in India ranges from 0.15% to 1.01% in various studies, depending on the screening method used, and the areas surveyed. In the INCLEN study, the prevalence of ASD (then termed as PDD) was 1 in 125 in children 3-6 years and 1 in 85 in children 6-9 years of age. The prevalence in rural areas was 0.90%, 0.6% in hilly regions, 1.01% in urban areas, 0.1% in tribal areas and 0.61% in the coastal regions

- Rise in the incidence rate of autism spectrum disorder.
- Rise in the actual rate of autism spectrum disorder.
- Social relevance of the topic in today's society.
- Limited literature and instances of architecture in the country ; which does not match the needs projected by the statistics; defines an urgent need for such a facility the tricity.
- Exploring a new way of living in the society that has been theoretically proven!




THE HINDU

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CHENNAI

'Autism on the rise in India'

STAFF REPORTER

CHENNAI:, SEPTEMBER 18, 2016 00:00 IST
UPDATED: NOVEMBER 01, 2016 19:14 IST

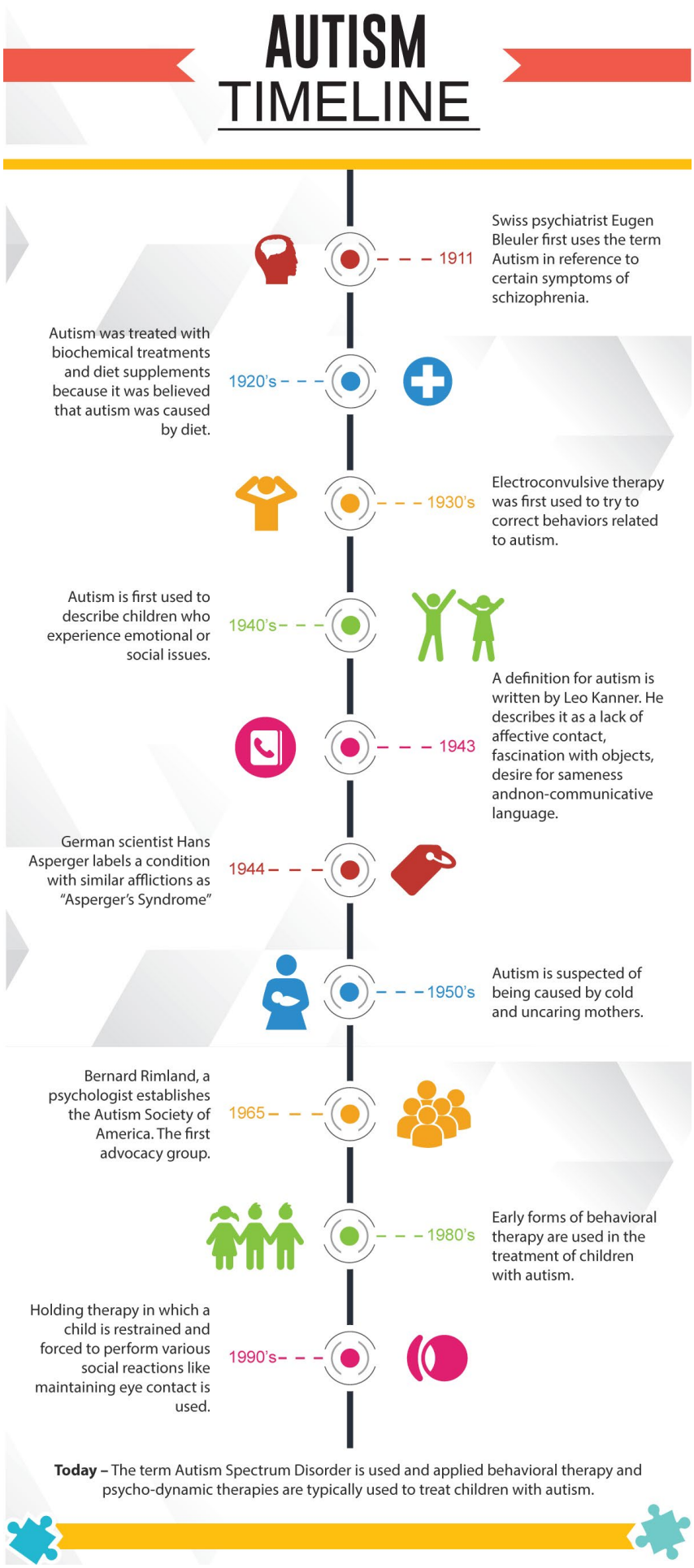
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Aim

To design a school campus which best integrates children with Autism Spectrum disorder into the mainstream education facility.



AUTISM TIMELINE

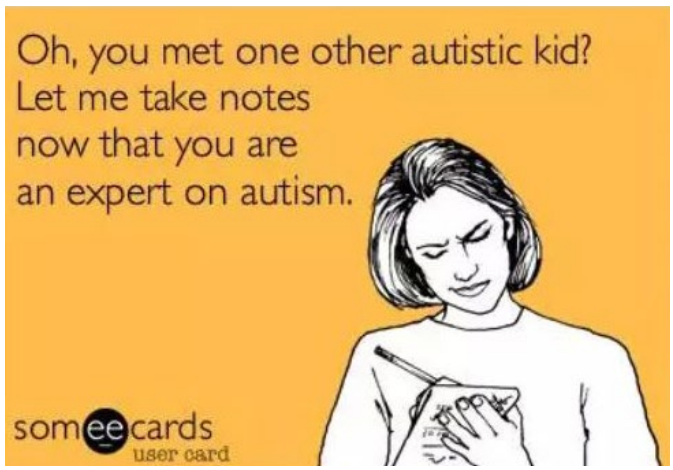


Today – The term Autism Spectrum Disorder is used and applied behavioral therapy and psycho-dynamic therapies are typically used to treat children with autism.

@ Autism-Products.com









Popular views among autistic parents

05 **Challenges**



Lack of Autism awareness throughout the world



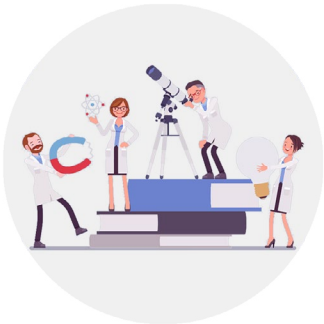
Lack of reliable statistics and ignorance in India



High incidence rate of autism noted throughout



Lack of an adequate education facility in India



No research in the field of architecture and autism

06 **Cognitive Theories in Autism**

cognition
/kɒgˈnɪʃ(ə)n/
noun
the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.

Theory of Mind (ToM):

This is defined as the ability to perceive the mental states of others (Baron-Cohen et ol. 1985), and is said to develop by the age of four. Autistic children find it difficult (if not impossible) to understand the emotions, intentions and behaviours of other people,so they are said to lack 'theory of mind'. However, are non-autistic individuals 'mind-sighted' when they deal with autistic people? Can they easily recognise the feelings and intentions of individuals with autism? Considering that autistic and non-autistic people do not share perceptual experiences due to differences in perceptual and cognitive function ing, don't non-autistic people find it difficult to take the perspectives of autistic individuals? If autistic individuals lack theory of mind. non-autistic individuals are sure to have deficits in their ability to understand the Theory of Autistic Mind. If we could remove one-sidedness from our interpretation of "mind-blindness', we would see how limited we all are in our ability to 'mind-read'.

Weak Central Coherence theory:

Originated by Uta Frith, this focuses on the cognitive differences (both deficits and strengths) in autism. According to Frith , in the normal cognitive system there is 'a built-in propensity to form coherence over as wide a range of stimuli as possible, and to generalize over as wide a range of contexts as possible': in contrast, people with autism lack this 'capacity for coherence'. Quite a few studies (e.g. Garner and Hamilton 200I; Mitchell and Ropar 2004; Ropar and Mitchell 1999, 200 I; Ropar, Mitchell and Ackroyd 2003) have questioned the proposition of universal weak central coherence in autistic people, and alternative explanations have been suggested.

Executive dysfunction theory:

The executive functions include planning, organising. monitoring progress towards a goal and taking a flexible approach to problem-solving. This theory (Ozonoff 1995; Ozonoff, Roger and Pennington 1991) can easily account for the lack of flexibility and rigidity exhibited by autistic people, their difficulties in planning and their problems with starting and finishing actions, but these deficiencies are not exclusive to autism and so cannot be considered as autism-specific problems.3

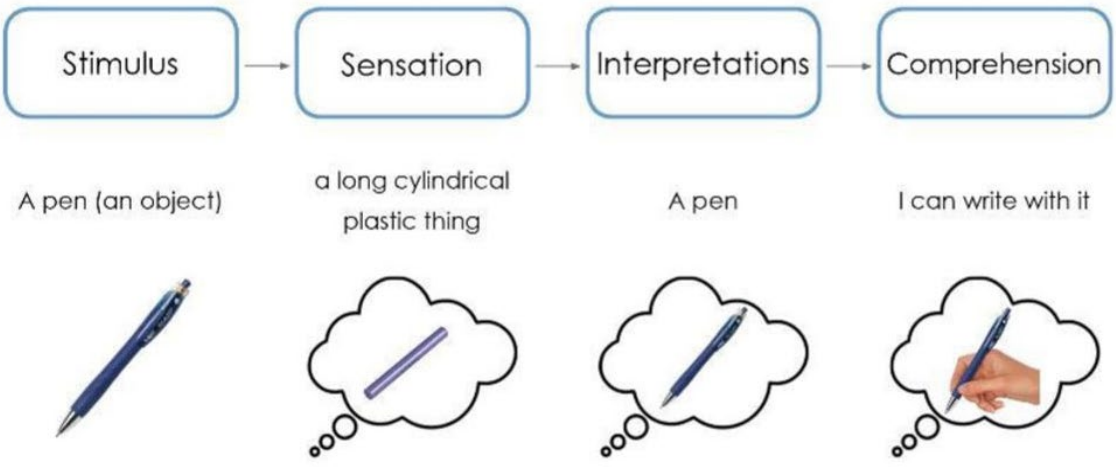
07 The Process of Perception

Learning how each autistic person's senses function is one crucial key to understanding that person. (O'Neill)

sense
/sɛns/
noun
a faculty by which the body perceives an external stimulus; one of the faculties of sight, smell, hearing, taste, and touch.

Each living organism responds in a certain way to sensory input. For any human being the following are the various input methods of this stimuli:





The process of perception (image by author)

08 The Autistic Perception

As soon as we arrive in the world, **our senses shape our experiences**, helping us make sense of and understand the world we live in and everything around us (including other people). So there are two issues – autistic people have sensory differences that affect both: The 'here and now' of any given situation. The way each person has developed their understanding of the world and environment.
Some of the most common differences are:

- Sensitivity (over or under sensitive)
- Sensory overload
- Gestalt perception.
- Fragmented perception
- Delayed perception
- Distorted perception
- Sensory shutdowns
- Compensation



A neurotypical view compared to hypersensitive (image by author)



A neurotypical view compared to hyposensitive (image by author)

Bogdashina, Sensory Perceptual Issues in Autism and Asperger Syndrome : Different Sensory Experiences, Different Perceptual Worlds.
Jon Daly, Sensory Issues in Autism

8.1 **Intensity**

Some of the most common problems autistic individuals experience are their hyper- or hypo-sensitivities to sensory stimuli. Their senses seem to be too acute (hypersensitivity) or not working at all (hyposensitivity).

Hypersensitivity

Vision



Acute vision.

- Notice the tiniest pieces of fluff on the carpet, complain about 'moths (air particles) flying',
- Dislike bright lights,
- Look down most of the time and
- May be frightened by sharp flashes of light.
- Under fluorescent lights such children can see a 60-cycle flickering: the whole room pulsates on and off.

Olafactory



Hypersmell.

- Cannot tolerate how people or objects smell, though their carers can be unaware of any smell at all.
- They run from smells, move away from people and insist on wearing the same clothes all the time.
- For some, the smell or taste of any food is too strong, and they reject it no matter how hungry they are. They are usually poor eaters, gag/vomit easily and eat only certain foods.

Vestibular



Children with vestibular hypersensitivity experience difficulty changing directions and walking or crawling on uneven or unstable surfaces. They are poor at sports. They feel disoriented after spinning, jumping or running and often express fear and anxiety of having their feet leave the ground.

Hearing



Hyperhearing.

- Light sleepers
- Frightened by unpredictable sounds
- Dislike thunderstorm, crowds and are terrified by haircut.
- They often cover their ears when the noise is painful for them, though others in the same room may be unaware of any disturbing sounds at all.
- Sometimes hyperauditory children make repetitive noises to block out other disturbing sounds.

Touch



Hypertactile.

- They fear being touched.
- Slightest touch can send them into a panic attack eg, pull away from hugs.
- Washing hair, cutting nails turns into an ordeal demanding several people to complete it.
- Many refuse to wear certain clothes, cannot tolerate the texture on their skin.
- Some overreact to heat/cold, avoid wearing shoes, getting 'messy' and dislike food of certain texture.

Proprioceptive

Individuals with proprioceptive hypersensitivity hold their bodies in odd positions, and might have difficulty manipulating small objects.

Vision



Hypovision.

- Trouble figuring out where objects are, as they see just outlines, then they may walk around objects running their hand around the edges so they can recognise what it is.
- Attracted to lights, they may stare at the sun or a bright light bulb.
- They are fascinated with reflections and bright coloured objects.
- Having entered an unfamiliar room they have to walk around it touching everything before they settle down.
- Often they sit for hours moving fingers or objects in front of the eyes.

Hearing



Hypohearing.

- 'seek sounds' (leaning their ear against electric equipment or enjoying crowds, sirens and so on).
- They like kitchens and bathrooms – the 'noisiest' places in the house. They often create sounds themselves to stimulate their hearing – banging doors, tapping things, tearing or crumpling paper in the hand, making loud rhythmic sounds.

Olafactoty



Hyposmell/Hypotaste

- Individuals with hypotaste/hyposmell chew and smell everything they can get (e.g. grass, play dough).
- They mouth and licks objects, play with faeces, eat mixed food (for instance, sweet and sour) and regurgitate.

Touch



Hypotactile.

- Seem not to feel pain or temperature.
- May not notice a wound caused by a sharp object or they seem unaware of a broken bone.
- Prone to self-injuries and may bite their hand or bang their head against the wall, just to feel they are alive.
- Like pressure, tight clothes, often crawl under heavy objects. They hug tightly and enjoy rough and tumble play.

Vestibular



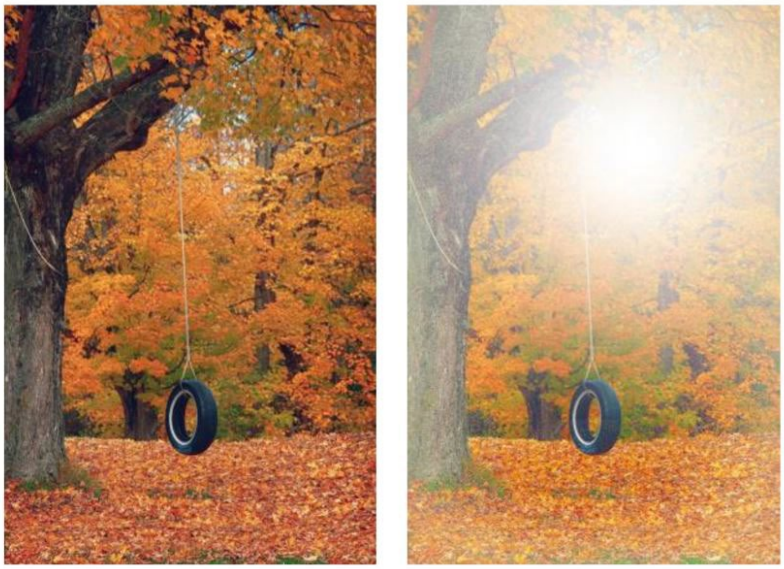
Children with vestibular hyposensitivity enjoy and seek all sorts of movement and can spin or swing for a long time without being dizzy or nauseated. People with vestibular hyposensitivity often rock forth and back or move in circles while rocking their body.

Proprioceptive

Have difficulty knowing where their bodies are in space and are often unaware of their own body sensations, for example, they do not feel hunger. Children with hypoproprioceptive system appear floppy, often lean against people, furniture and walls. They bump into objects and people, stumble frequently and have tendency to fall. They have a weak grasp and drop things.

Hyposensitivity

8.2 **Sensory Overload**

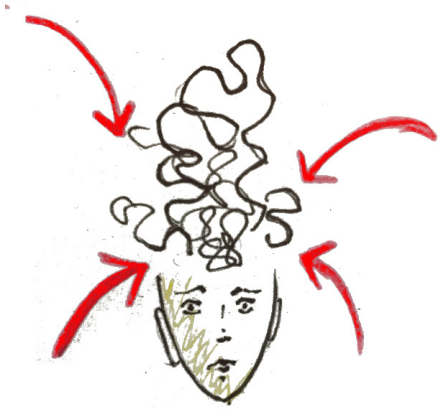


A neurotypical view compared to sensory overload (image by author)

Those with proprioceptive hyposensitivity have difficulty knowing where their bodies are in space and are often unaware of their own body sensations, for example, they do not feel hunger. Children with hypoproprioceptive system appear floppy, often lean against people, furniture and walls. They bump into objects and people, stumble frequently and have tendency to fall. They have a weak grasp and drop things.

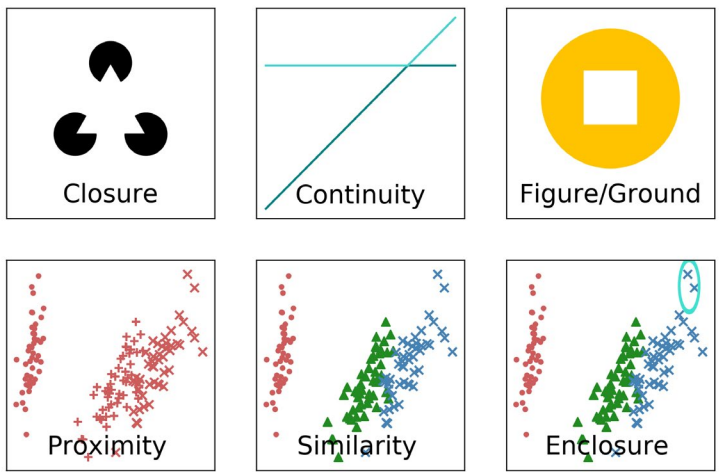
Sensory overload is characterised by:

- Sudden outbursts of self injury or distress
- Tires very easily, when in noisy/bright places, or when standing
- Gets nauseated or vomits from excessive movement
- Withdrawal



8.3 **Gestalt Perception**

Gestalt is a German word that stands for form or shape. The Gestalt principles are a series of theories developed in the 1920s by German researches, which discuss how we perceive visual elements. These principles are well known to graphic designers. More and more scientists are recognizing their importance in data visualization.



@ Bogdashina, Sensory Perceptual Issues in Autism and Asperger Syndrome : Different Sensory Experiences, Different Perceptual Worlds.
@Jon Daly, Sensory Issues in Autism

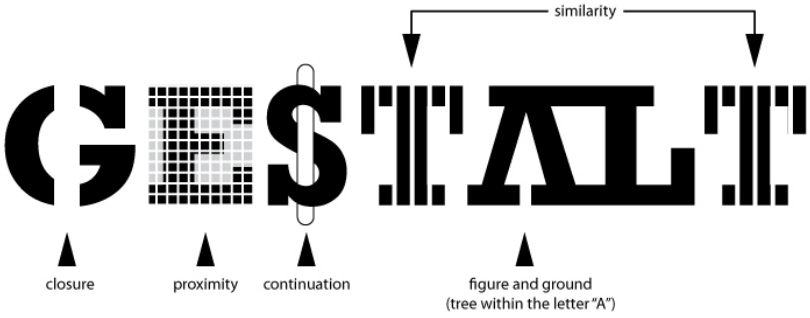


A neurotypical view compared to gestalt perception (image by author)

This is the inability to filter foreground and background information, so everything is perceived as a 'whole' rather than a combination of different items. This can happen in any of the senses – someone who experiences visual gestalt has difficulty focusing on a single detail of a scene and finds it almost impossible to separate it from the whole picture

These are things the child might have trouble with:
• Ability to filter out visual stimuli
• Ability to screen out background noise
• Ability to distinguish between tactile stimuli of a different intensity
• Ability to distinguish between strong and weak smells or tastes
• Ability to co-ordinate body position and movement of body parts
• Ability to distinguish between inner and outer movements or sensations.

Gestalt perception is characterised by:
• Notices every tiny change in the environment ; often disturbed by these changes
• Easily frustrated if trying to do something in a noisy, crowded room
• Clumsy, moves stiffly
• Does not seem to understand instructions if more than one person is talking



@ Bogdashina, Sensory Perceptual Issues in Autism and Asperger Syndrome : Different Sensory Experiences, Different Perceptual Worlds.
@Jon Daly, Sensory Issues in Autism

8.4 **Fragmented Perception**

When too much information needs to be processed at the same time, people with autism may not be able to break down the whole picture into meaningful units. They might process some parts of a whole, for example parts of a scene or a sentence.



A neurotypical view compared to fragmented perception (image by author)

Fragmented perception is characterised by:
- Resists any change
- Gets lost easily
- Does not recognise people in unfamiliar clothes
- Hears a few words instead of the whole sentence
- Selects for attention minor aspects of objects in the environment instead of the whole scene
- Complains about some parts of clothes, smells of some pieces of food etc.
- Complains about limbs or other parts of the body

@ Matthew Bourel's

@ Bogdashina, Sensory Perceptual Issues in Autism and Asperger Syndrome : Different Sensory Experiences, Different Perceptual Worlds.
@Jon Daly, Sensory Issues in Autism

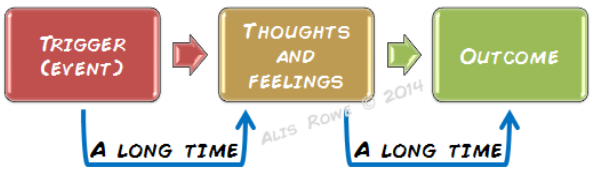
8.5 Delayed processing



A neurotypical view compared to delayed processing (image by author)

Sometimes it may take a long time for an autistic individual to process information that's coming in. This makes it hard for them to understand and learn new things. If they can concentrate properly, are feeling well and there is not very much distraction around they can cope better. It might not take much to distract them (people moving around, background noise, scratchy clothing…)

Delayed processing is characterised by:
- Delayed responses to stimuli
- Poor at sports
- Oblivious to risks
- Any experiences are perceived as new and unfamiliar



8.6 Compensation

Because of sensory sensitivities/fragmented or distorted perception or delayed processing, a person may compensate through other more reliable senses to build a better understanding of their environment.

Sensory shutdowns is characterised by :
- Smell, lick, touch or tap objects
- Look for the source of a sound
- Inspect food before eating it
- Watch own feet whilst walking
- Watch own hands whilst doing something
- Avoid walking on uneven ground

@ Bogdashina, Sensory Perceptual Issues in Autism and Asperger Syndrome : Different Sensory Experiences, Different Perceptual Worlds.
@Jon Daly, Sensory Issues in Autism

8.7 **Distorted Perception**

Sometimes, senses get distorted, which means autistic individuals may change or misrepresent what they can really see, hear, touch, taste or smell. Reported to become worse in the state of information overload.When senses are distorted, a perosn may understand things differently – here are some things they might have difficulty with:

- Space expands or decreases
- Changes in shapes and sizes
- Can't associate location, form,texture
- Fears of heights, stairs and escalators
- Double vision
- Seeing everything in 2D only
- Poor awareness of my own body
- Undistinguisable sounds.
- Fears heights and stairs
- Has difficulty catching balls
- Startled when being approached
- Repetitive body movements
- Hits eyes, ears, nose



A neurotypical view compared to distorted perception (image by author)

8.4 **Sensory Shutdown**

Shutdowns happen when someone can't deal with all the information coming in – for example if they are experiencing a sensory overload. All or some of the senses are being overloaded and the person is unable to cope. Often one manages by shutting down one or some of our sensory systems – to block out the stimuli coming in and enable our other senses to function better.

Sensory shutdowns is characterised by :
- Sometimes does not react to any stimuli
- Seems not to know how to move own body
- Disoriented in noisy/bright places
- Rocks unconsciously during other activities



A neurotypical view compared to sensory shutdown (image by author)

@ Bogdashina, Sensory Perceptual Issues in Autism and Asperger Syndrome : Different Sensory Experiences, Different Perceptual Worlds.
@Jon Daly, Sensory Issues in Autism

09 **Autism Functioning Levels**

The functioning level of a person with an autism spectrum disorder (ASD) diagnosis depends on the severity of his/her symptoms, dysfunctions and impairments in communication, and behavioral and social skills. Learning how psychologists and other medical specialists evaluate an individual to diagnose autism and assign a level of function can help you understand and manage this complex disorder.

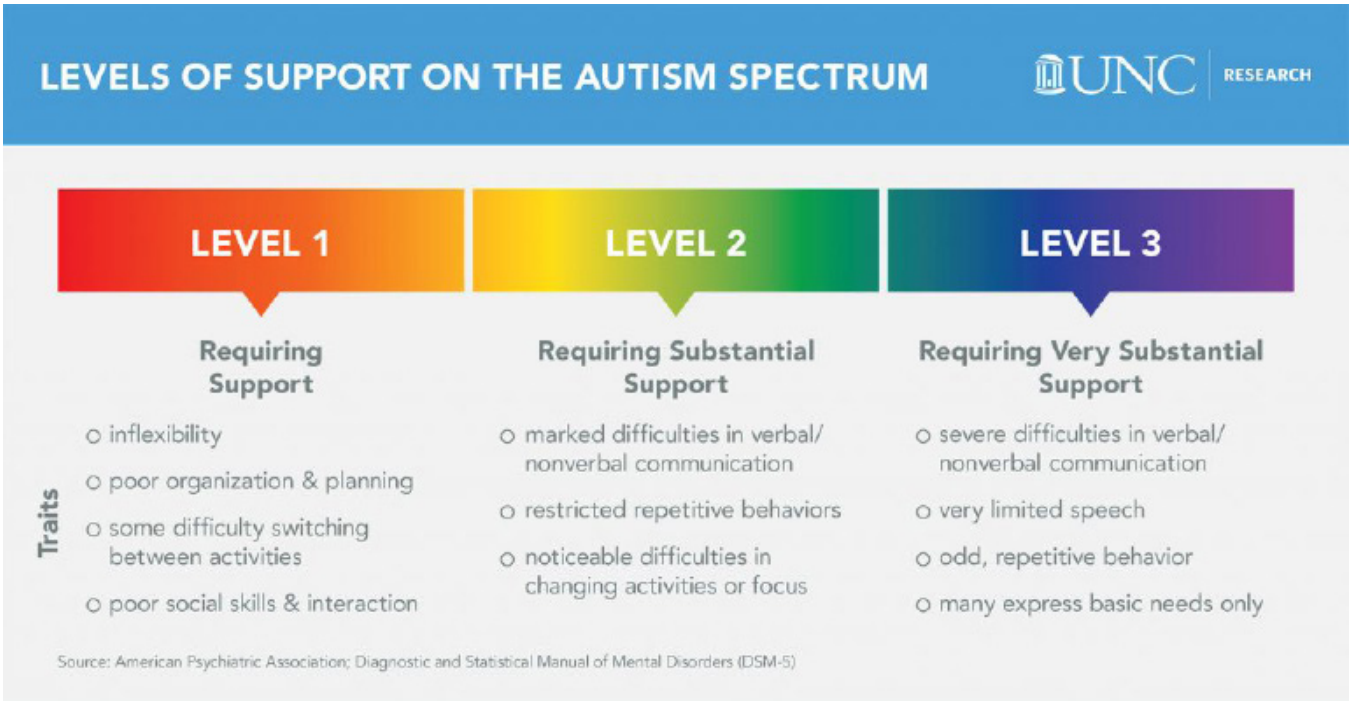




Illustration by Cindy Chung, Verywell

This literature study revolves around not just understanding the psychology of the autistic individual but also understanding which degree of autism spectrum disorder can be integrated within the mainstream education.

10 **Experts Say**

GUIDANCE & COUNSELLING CENTRE

"Autism is a complex and varied disorder that effects everyone differently. However, Level 1 and 2 can be easily integrated into the mainstream system with some form of prior training."



Dr. Shashi Sethi
Neuro Psychologist
M.A. Psy., M.A.Lit, Ph.D.

SOREM
Society for the Rehabilitation of the Mentally Challenged

" The statistics of the prevalence of autism have changed from 4 in 10,000 to 1 in 150 in just a few decades. This rising number is of a startling importance. I fear for the numbers to come and the inadequacy in the system to deal with it. "



-Mrs. Promila Chandra Mohan
Founder & Hon.Secretary

SOREM
Society for the Rehabilitation of the Mentally Challenged



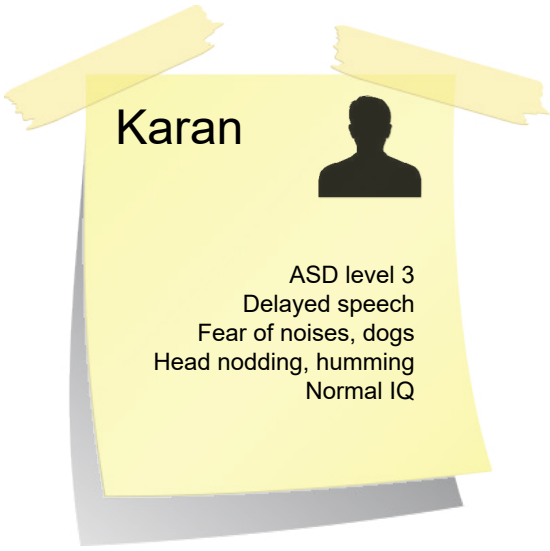
"People don't care enough. There is a strong need to understand and accept children with autism. As a parent, it troubles me to think that my child will not have any support after me."

Mrs. Sangeeta Jain
(Trained Autism and Vocational)
Vice Principal

11 Case Study

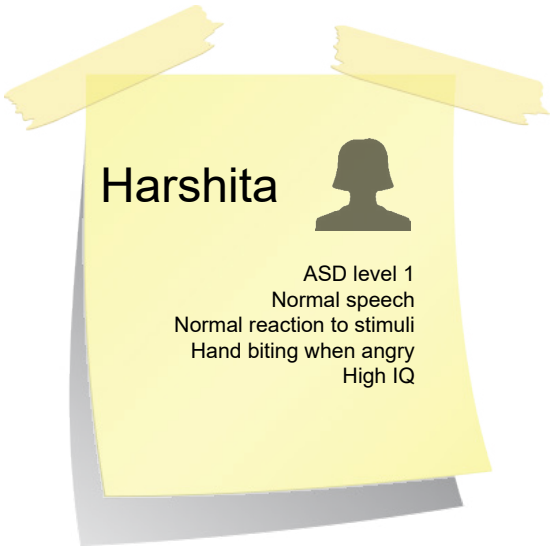
Parents : MBS, BDS
Sitting : 6 months
Walking : 1 year
1st words : 1.5 years
2 word phrases : 5 years
Complete sentences : ---
Traits : Head nodding, hummnig, repeating songs, phrases, avoids eye contact, delayed response, hypersecsitive, good IQ

My analysis : Requires a special wing and shadow teacher.



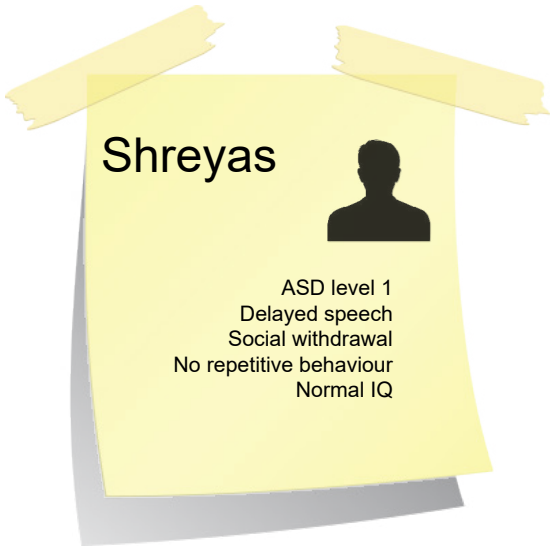
Parents : B.com, P.G.
Sitting : 6-10 months
Walking : 13 months
1st words : 7-12 months
2 word phrases : 2 years
Complete sentences : not so frequent
Traits : Hand biting when angry, responsive, normal reactions to stimuli, few sensory overload instances, high IQ

My analysis : Very easily integrable in a mainstream education facility.



Parents : Defence, House maker
Sittng : 6 months
Walking : 1 year
1st words : 1 years
2 word phrases : 1.5 years
Complete sentences : ---
Traits : Speech delays and social awkwardness, studied in normal school till grade 4, responds well to stimuli, friendly after a while, normal IQ

My analysis : Requires special training before easy integration.



Courtesy- Sorem school, Sector 35, Chandigarh, India

12 Autism Treatments



https://effectivehealthcare.ahrq.gov/topics/autism-update/consumer

Education therapy techniques

- Treatment and Education of Autistic and Related Communication-handicapped Children (TEACCH). This treatment uses visual cues such as picture cards to help your child learn everyday skills like getting dressed. Information is broken down into small steps so he can learn it more easily.
- The Picture Exchange Communication System (PECS). This is another visual-based treatment, but it uses symbols instead of picture cards. Your child learns to ask questions and communicate through special symbols.

Behavioral Treatments and Interventions

- Applied Behavior Analysis (ABA)
- Early Start Denver Model (ESDM)
- Floortime
- Occupational Therapy (OT)
- Pivotal Response Treatment (PRT)
- Relationship Development Intervention (RDI)
- Speech Therapy
- TEACCH
- Verbal Behavior

Other treatments and therapies

- Speech Language therapy (SLT)
- Occupation therapy (OT)
- Sensory Integration (SI)
- Physical therapy (PT)
- Aromatherapy
- Hydrotherapy
- Music therapy

13 How Space effects Autism?



The careful examination of the dynamic between the built environment- with its attributes of acoustics, visual character, spatial quality, color, texture, geometry etc- and human behavior can lead to the development of more specific and sensitive design guidelines. The architect, through design of this physical sensory environment, has control over the nature of this critical sensory input. By understanding the mechanisms of this disorder and consequent needs of the autistic user, this environment may be designed favorably to alter the sensory input, and perhaps modify the autistic behavior, or at least create an environment conducive of skill development and learning.

			SENSORY ISSUE													
			Auditory			Visual			Tactile			Olfactory			Proprioceptive		
			Hyper	Hypo	Interference	Hyper	Hypo	Interference	Hyper	Hypo	Interference	Hyper	Hypo	Interference	Hyper	Hypo	Interference
ARCHITECTURAL ATTRIBUTE	Structure	Closure	1	2		1	2	1	2	1		1	2		2	1	1
		Proportion	3	4	3	3	4								4	3	
		Scale	5	6	5	5	6	5	6	5					6	5	5
		Orientation					7									7	7
		Focus	8			8										8	8
	Balance	Symmetry	9	10		9	10	9							9	10	9
		Rhythm					11									11	11
		Harmony				12	13	13	12							13	13
		Balance				14	15	14							14		14
	Quality	Colour				17	16			18							
		Lighting	19			19	20										
		Acoustics	21	21	21												
		Texture		22					22	23							
		Ventilation										24	25	24			
	Dynamic	Sequence				26	26	26		26						26	26
		Proximity				27		27								27	27
		Routine	28			28		28								28	28

14 Architectural Design Guidelines generated by the Sensory Design Matrix

#	Design Guideline	Suggested Objective and Users
1	High enclosure and containment	1) to reduce external visual and acoustical distraction for the hyper-auditory and hyper-visual 2) to provide tactile stimulation via tight spaces and containment for the hypo-tactile 3) to create visual focus in cases of visual interference 4) to reduce olfactory intrusion via ventilation for the hyper-olfactory
2	Low enclosure and openness	1) to increase opportunities for acoustical stimulation for the hypo-auditory 2) to provide visual stimulation for the hypo-visual 3) to reduce sense of containment for the hyper-tactile
3	Low ceilings and moderate proportions	1) to reduce echoes for the hyper-auditory 2) to reduce visual distortion and illusions of space for the hyper-visual 3) to promote balance for the hypo and interference-proprioceptive 4) to create a more acoustically controllable environment for the interference
4	High ceilings and exaggerated proportions	1) to increase echoes and auditory stimulation for the hypo-auditory 2) to create visual illusionary stimulation for the hypo-visual 3) to stimulate the proprioceptive sense of space for the hyper-proprioceptive auditory
5	Use of intimate scale	1) to reduce echoes for the hyper-auditory 2) to create a controllable auditory environment for the interference auditory 3) to create a controllable and manageable space for the hyper and interference visual 4) to increase tactile stimulation from boundary proximity for the hypo-tactile 5) to increase proprioceptive stimulation from boundary proximity for the hypo-proprioceptive 6) to create a controllable environment for the interference auditory and proprioceptive
6	Use of open scale	1) to create auditory stimulation through echoes for the hypo-auditory 2) to create visual stimulation through spatial expanse for the hypo-visual 3) to relieve over stimulation from spatial boundaries for the hyper-tactile and hyper-proprioceptive
7	Orientation towards external views and elements of interest	1) to create focus and attraction for the hypo-visual 2) to instill balance and direction for the hypo-proprioceptive

#	Design Guideline	Suggested Objective and Users
8	Use of activity focus to organize space	1) to increase attention span and reduce distractibility for the hyper-auditory and visual 2) to create a behavioral and geometric point of reference for the hypo and interference proprioceptive
9	Symmetrical organization	1) creates predictability for the hyper-visual 2) creates acoustical balance for the hyper-auditory 3) increases sense of center and balance for the hypo and interference proprioceptive 4) creates a controllable environment for the interference visual
10	Asymmetrical organization	1) creates auditory and visual stimulation for the hypo-auditory and visual 2) creates proprioceptive stimulation for the hypo-Proprioceptive Tables
11	Use of visual or spatial rhythm	1) to create visual stimulation and tracking opportunities for the hypo-visual 2) to create predictability and coherence to the spatial environment for the hypo and interference
12	Visually harmonious space with no contrast or discord	1) to create a visually neutral space for the hyper-visual 2) to create a neutral tactile space for the hyper-tactile
13	Visually unharmonious space using accents and contrasts	1) to create visual stimulation for the hypo and interference visual 2) to create proprioceptive stimulation for the interference and hypo-proprioceptive
14	Use of dynamic and statically balanced spaces	1) to create orientation and stability for the hyper-proprioceptive and visual as well as the interference proprioceptive and visual
15	Use of unbalanced spaces	1) to create visual stimulation for the hypo-visual
16	Use of bright colours	1) to create visual stimulation for the hypo-visual
17	Use of neutral colours	1) to create serenity for the hyper-visua
18	Use of warm colours	1) to create psychological warmth for the hypo-tactile
19	Indirect day lighting	1) minimize glare and distracting views for the hyper-visual 2) less distracting than buzzing artificial light for the hyper-auditory
20	Direct natural lighting and views	1) creates visual stimulation for the hypo-visual
21	Noise and echo-proofing	1) creates a conducive environment for the hyper-auditory 2) removes the distracting opportunity of self-stimulation through echoes for the hypo-auditory 3) creates a neutral auditory background for the interference auditory

#	Design Guideline	Suggested Objective and Users
22	Use of smooth textures	1) calms the hypo-tactile 2) creates echo and reverberation stimulation for the hypo-auditory
23	Use of rough textures	1) stimulates the hypo-tactile
24	Cross-ventilation	1) reduces smells and odours for the hyper-olfactory
25	Enclosed ventilation	1) may help contain scents during aromatherapy for the hypo-olfactory
26	Organized compartmentalization using visual cues	1) helps orient and adjust the hyper-visual 2) helps stimulate to action the hypo-visual 3) helps organize the interference visual 4) creates necessary boundaries for the hypo-tactile 5) helps orient the hypo and interference proprioceptive
27	Spatial organization according to sensory characteristics	1) helps orient and adjust the hyper-visual 2) helps organize the interference visual 3) helps orient the hypo and interference proprioceptive
28	Use of one-way circulation patterns to capitalize on routine	1) helps orient and adjust the hyper-visual 2) helps organize the interference visual 3) helps orient the hypo and interference proprioceptive 4) helps create predictability in general across the spectrum, particularly the hyper-auditory

15 Common grounds for HYPER & HYPO

Autism is a spectrum disorder. Even though a clear categorisation of HYPER anc HYPO symptoms can be studied, in reality it cannot be so definitatively applied to a child.
A person with ASD can show a variety of perceptional differences and often even the combination of the two. eg. Hypersensitive sight yet hyposensitive hearing.

“It doesn’t make sense to create a division for a sensitivity that is consistently inconsistent”
- Bogdashina O. 2008)

Hence, to design two separate areas with different sensory stimulations cannot be the solution. It becomes imperative to provide a more integrated solution which can benefitial for all.

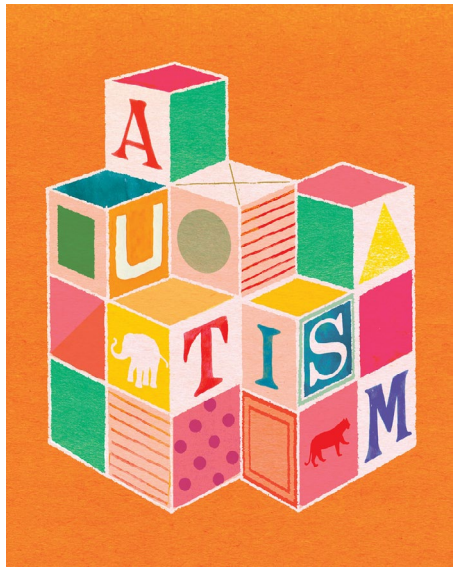
Hypersensitive children need control, similarity, predictability and a safety.

Hyposensitive children seek discovery, texture, sound, and sensory experience.

HYPER and HYPO inclusive approach :

(Non customizable)

- Controlled views and daylighting
- Coexisting inclusive and exclusive spaces
- One way circulation
- Symmetric organisation
- Visual and spatial rhythm
- Transition spaces
- Breakout/escape spaces
- Retireing spaces



(User customizable)

- Organised compartmentalisation
- Customizable interiors
- Uncluttered storage spaces

https://www.archdaily.com/314629/north-brother-island-school-for-autistic-children-competition-entry-ian-m-ellis-frances-peterson?ad_medium=widget&ad_name=recommendation

16 Theory of Design

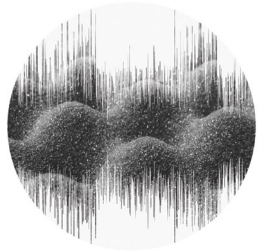
16.1 Madga Mostafa

The Autism ASPECTSS™Design Index

The Autism ASPECTSS™ Design Index is the first set of evidence based design guidelines worldwide to address built environments for individuals with Autism Spectrum Disorder. It was developed over a decade of research and is comprised of seven criteria proposed to be facilitiative for ASD design. It is used as both an assessment and design development tool.

ACOUSTICS

This criterion proposes that the acoustical environment be controlled to minimize background noise, echo and reverberation. The level of such acoustical control should vary according to the level of user-focus required within the space, as well as the skill level and severity of the autism of its users. For example, activities of higher focus should be allowed a higher level of acoustical control and be part of low-stimulus zones. Provisions should also be made for different levels of acoustical control, so students can graduate from one level of acoustical control to the next, slowly moving towards a typical environment in order to avoid the “greenhouse effect”.





SPATIAL SEQUENCING

This criterion is based on the concept of capitalizing on the affinity of individuals with autism to routine and predictability. Coupled with the criterion of Sensory Zoning, Spatial Sequencing requires that areas be organized in a logical order, based on the typical scheduled use of such spaces. Spaces should flow as seamlessly as possible from one activity to the next through one-way circulation whenever possible, with minimal disruption and distraction, using Transition Zones.

ESCAPE SPACE

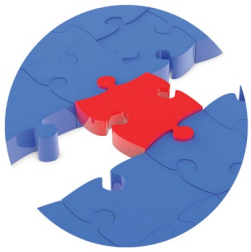
The objective of such spaces is to provide respite for the autistic user from the over-stimulation found in their environment. Empirical research has shown the positive effect of such spaces, particularly in learning environments (Mostafa, 2008, 204). Such spaces may include a small partitioned area or crawl space in a quiet section of a room, or throughout a building. These spaces should provide a neutral sensory environment with minimal stimulation that can be customized by the user to provide the necessary sensory input.



COMPARTMENTALISATION

The philosophy behind this criterion is to define and limit the sensory environment of each activity, organizing a classroom or even an entire building into compartments. Each compartment should include a single and clearly defined function and consequent sensory quality. The separation between these compartments need not be harsh, but can be through furniture arrangement, difference in floor covering, difference in level or even through variances in lighting. The sensory qualities of each space should be used to define its function and separate it from its neighbouring compartment. When coupled with this consistency in activity, this will help provide sensory cues as to what is expected of the user in each space, with minimal ambiguity.





TRANSITIONS

This criterion proposes that when designing for autism, spaces should be organized in accordance with their sensory quality, rather than typical functional zoning. This requires grouping spaces according to their allowable stimulus level, into “high-stimulus” and “low-stimulus” with transition zones aiding the shift from one zone to the next.

SENSORY ZONING

This criterion proposes that when designing for autism, spaces should be organized in accordance to their sensory quality, rather than the typical architectural approach of functional zoning. Grouping spaces according to their allowable stimulus level, spaces are organized into zones of “high-stimulus” and “low stimulus”. The former could include areas requiring high alertness and physical activity such as physical therapy and gross motor skill building spaces. The latter could include spaces for speech therapy, computer skills and libraries. Transition zones are used to shift from one zone to the next.





SAFETY

A point never to be overlooked when designing environments for children, safety is even more of a concern for children with autism who may have an altered sense of their environment for example using hot water safety fittings and avoiding sharp edges and corners.

16.2 Christopher N. Henry

Since 2005 Dr. Christopher Henry, the founder of Autism Design Consultants, has been researching and writing about architecture for autism. His experience is as varied as it is extensive. The following is a short compilation of the various theories explored by him and a final statement of my understanding from it.

Designing for Autism ; Lighting

Direct lighting and views

- Daylighting aids cognitive abilities and improves overall health
- Sunlight and certain types of exterior views improve overall health, increase productivity, and reduce sick days and attrition rates
- Can this be applied to autism?



No day lighting, restricted views

- The amount and type of visual stimulation should be tightly controlled.
- Windows with exterior views may provide autistic students with undesirable distractions
- Many autistic people confirm that bright lights and sunshine disturb them and often cause distortions.

Solution
To maximize daylighting but avoid high contrast (sun/shadow) and distracting views
What is viewed is more important than how much is viewed.

@ Designing for Autism: Lighting 15:30 - 19 October, 2011 by Christopher N. Henry

Designing for Autism ; The ‘Neuro-Typical’ Approach

Sensory Sensitive

- Sensory sensitive approach - Autism need an environment that helps them acquire a skill before they can generalize it
- Environments should be more accommodating for individuals with autism
- Neuro-typical environments do not improve generalization skills, merely mask poor ones

vs

Neuro-typical

- There is widely noted poor generalization skills in autism
- Neuro typical approach believes - simulating the real world in school should make the transition to the real world that much less intimidating
- Does not hinder generalization skill development

Solution
If the ‘ambulant-typical’ environment consists of mainly stairs should architects force individuals with limited mobility to learn to navigate the environment without ramps, lifts, or curb cuts?
We demand it to be for individuals with limited mobility, why not autism?
Perhaps, the more appropriate approach will be more of a mixture of the two than a triumph of one over the other.

Designing for Autism ; Spatial Considersations

Inclusive

- Those in favor of smaller spatial volumes cite the anxiety individuals with autism experience overwhelming feelings in large, unfamiliar, and complex spaces

vs

Exclusive

- Those who advocate for larger spatial volumes claim that people on the autism spectrum can become more guarded and feel threatened in small spaces with other people in them.

Solution
Architects try to resolve these conflicting spatial desires with flexibility, a variety of spaces, or a mixture of the two.
But how much flexibility and diversty? As autism individuals are resistant to change.
Creating threshold spaces or ‘lay-bys’ between each classroom and the potentially busy and large circulation space.

@ Designing for Autism: The ‘Neuro-Typical’ Approach 15:34 - 3 November, 2011 by Christopher N. Henry
@ Designing for Autism: Spatial Considerations 15:30 - 26 October, 2011 by Christopher N. Henry

17 Handbook on Autism Design

There isn't any handbook in India dealing with autism design specifically. However, a key document in relation to published statutory guidance is Building Bulletin (BB) 77. Designing for People with Special Education Needs and Disabilities in School, (updated 2005), published by the Department for Education and Employment, Scotland.

It contains the following points in relation to designing educational spaces for children with autism:

1 **The building should have a simple layout** which reflects order, calm, clarity and has good signage and way-finding.

2 Pupils may show different sensitivities to spaces: some will be frightened by large, open spaces and wish to withdraw to smaller spaces, whilst others will not like enclosed spaces. **Providing a mix of larger spaces with smaller ones to withdraw to when anxious can help.**

3 **Designing low sensory-stimulus environments reduces sensory overload, stress and anxiety.**

4 The provision of pleasant, **well-proportioned space, with plain, bare walls decorated in muted soft colours** will allow teachers to introduce stimulus, (such as wall displays of work or information), gradually to suit pupils needs.

5 **Classrooms can be arranged so that teachers may employ different teaching methods**, with spaces for individual work or screened personal workspaces.

6 **Use of Indirect lighting and the avoidance of noise or other distractions**, (blind cords, exposed pipes or dominant views out), need to be considered.

7 **Containment in the class base for reasons of supervision**, safety or security by the use of two door handles, at high and low-level, must neither compromise escape procedures, nor violate human rights, (in that children must not be locked up unless they are secured or detained legally in secure provision).

8 **Robust materials should be used** where there are pupils with severe disabilities and safety precautions for doors, windows, glass, plaster and piped or wired services will be required.
`

9 **There is a need to balance security and independence** and to find the right mix between tough materials and special equipment on the one hand and ordinary, everyday items on the other, in order to avoid an institutional appearance, whilst at the same time eliminating risks.

10 **Simple or reduced detailing** and changes of plane vmay reduce the opportunity for obsessiveness.

@ BB 77

18 Effects of Natural Envirronment on Autistic Individual ;

Sensory Gardens



Access to gardens can enhance focus and attention, as well as reducing anxiety and boosting selfconfidence. Additionally, the garden can be considered a dynamic environment offering diverse opportunities for learning.
It becomes a crucial question when designing for people with autism. Consideration should be given to social interaction, communication, special interests and sensory preferences in an environment that is by nature dynamic and subject to unpredictable elements: weather, wildlife and seasonal change. The design of such spaces needs to actively encourage the pursuit of interests while offering the reassurance of comfort, security and a sense of control.



@ Green Spaces/Outdoor Environments for Adults with Autism/Katie Gaudion and Chris McGinley

Design consideration for the Hyper and Hypo sensitive

Studies have shown that over 90 per cent of people with autism experience unusual sensory processing. In this case a person may have extreme reactions to sensory input; some seeking it (hypo-sensitivity) others avoiding it (hyper-sensitivity). It is therefore essential to design outdoor spaces flexibly enough to offer a range of experiences that can be enjoyed both by those seeking sensory stimulation and those who wish to minimise it

Visual



Hyper-sensitivity

• Create **visual consistency** and **predictable patterns**, massing plants with similar tones and colours, using contrasting coloured plants to provide visual emphasis or **markers at strategic points**
• Someone sensitive to the glare of sunlight needs **easily accessible shade**, for example patios, porches, arbours, tree canopies, trellises and gazebos.
• **Avoid** plants and trees that secrete **pollen** such as pine trees and dandelions.

Hypo-sensitivity

• Create **different vantage points** – mounds or slopes to offer an improved view of the garden. Create an elevated space with a telescope to a view. Someone attracted to bright lights will benefit from strategic lighting around the garden.
• Hang white sheets in direct sunlight to show shadows of plants and trees. Those fascinated by **reflections** and shadows will enjoy the changing shapes. Latticed partitions and sculptures also cast interesting **shadows**.



Hyper-sensitivity

• Choose **scented plants** and flowers that will only release their scent when rubbed. This gives the hyper-sensitive person control over what they would like to smell and what they would like to avoid.
• Shield scented plants and composters from the direction of the prevailing wind and direct sunlight. This **inhibits the widespread pervasion of scents** across the garden.
• **Group fragrant plants** into types (fresh, floral, spicy and sweet) and place them into pots so that they are movable. This makes them easy to take away or introduce in response to individual sensitivities.

Hypo-sensitivity

• Position **seating close to scented plants** so that olfactory memory aids navigation. For example the smell of rose next to a bench helps a person to locate that bench next time.
• Consider planting non-slip creepers or herbs near the path edges so that when you walk on the plant, it will release an aroma – for example pennyroyal, mint or thyme. Many herbs are very aromatic but only release their scent when the leaves are rubbed or grazed.
• In the summer many flowers release their scent at night, making it desirable for someone who is hypo-sensitive to take an evening stroll.



Hyper-sensitivity

• Ensure that pathways are clear and consider **'soft' dividers**, such as bushes, trees, and slopes
• For those with a short attention span, provide plants or vegetables that grow quickly and require little attention, for example courgettes and marigolds
• If garden activities are timetabled and arranged to take place at the same time each day, the **predictability** will reduce anxiety.

Hypo-sensitivity

• Designing a garden with **large open spaces** will encourage those who want to stretch, jump and move around, which activates their proprioceptive systems
• For those who find it difficult to sit still, a basket of **sensory props** from the garden (twigs, leaves, feathers) may provide a focused sensory activity
• Climbing hills, stumps and boulders offer opportunities to exercise and use body muscles.



Hyper-sensitivity

• Group plants into types of textures (i.e. coarse, fine, medium) or forms (i.e. spiky, round, oval) and introduce them gradually.
• **Avoid lining pathways** with long grasses or fast growing plants to prevent them brushing against anyone passing by who would find the light touch uncomfortable.
• Choose materials for furniture, flooring and partitions that are **consistent in texture** and non-heat absorbent as unfamiliar textures and temperatures may trigger anxiety.

Hypo-sensitivity

• Create a wild garden with a mix of coarse, fine and medium textures, and include **touch-reactive plants** such as mimosas.
• For someone who may enjoy pressure and crawling under things, provide heavy picnic blankets or **create nature tunnels.**
• Include **different types of tactile surfaces** along the walkways – for example sand, crushed gravel or stone slabs.



Hyper-sensitivity

• Create an **enclosed quiet space** that is calm, restful and undisturbed. Position it **away from the social areas** of the garden.
• Be mindful of the materials you use for ground cover in communal spaces, avoiding noisy substances such as gravel, and consider using **sound-absorbent alternatives** (for example cork, bark or sand)
• Mask unwanted noise with **soothing sounds** such as water or swishing grasses.

Hypo-sensitivity

• A person who seeks sensory input may not be able to tolerate silence and will create their own sounds by tapping and banging. Consider the materials used for garden features and furniture from this point of view. Provide **opportunities to produce sounds**.
• Introduce **sculptures** and **focal points** made of materials that amplify the sound of the rain
• Include nectar-producing plants and feeders to attract birds.

Design guidelines for Outdoor design for Autism ; Sensory gardens



1. Design for safety, security, and supervision
a. 5’ minimum height for a perimeter fence
b. Avoid toxic materials and plants
c. Clear sight lines to garden

2. Universal Design
a. Clear edge along paths (for vision impaired)- such as texture differention
b. Plenty of visual aids and signage (orientation maps)
c. Smooth, wide surfaces (avoid overcrowding)



3. Provide opportunities to overcome sensory issues
a.Provide elements of consistency – in the form of materials or plants
b. Provide transition between spaces
c.Sequence activities
d. Provide fixed and non-fixed activities
e. Flexible design that accommodates a variety of uses and individuals
f. Provide opportunities for increased socialization-social seating spaces, moveable seating
g. Build in challenges
h.Provide observation points
i. Provide storage (for play equipment used in therapies)



4. Quiet location-mask or screen unwanted noise

5. Provide places for retreat from sensory overload
a. Cocooning places-willow tunnels, hammocks

6. Provide opportunities for exercise



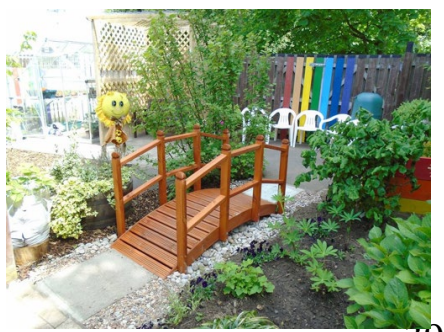
a. Increase motor skills, coordination, and balance

7. Design for maximum nature interaction

8. Provide shade

9. Design for emotional and human comfort

10. Design for the needs of the users



19 Chandigarh Master Plan – 2031

- **Other Educational/Academic sites:**

(a) Volumetric Controls:- The following volumetric controls shall be applicable on all the educational/ academic sites in the Sectoral Grid of Chandigarh:-

Sr.No.	Parameters	Norms	Condition
1.	Maximum Ground coverage	15% to 25%	
2.	Maximum FSI	0.25 to 0.5 (subject to the prescribed payment)	
3.	Maximum Height	48'-9"	
4.	Maximum No. of floors	4	
5.	Height of boundary wall	Upto 5'-11 ½" (solid) + 3'-0" (railing)	
6.	Parking Requirement	20% of the total plot area.	
7.	Gates and wicket gates	Two main gates and two wicket gates in school building shall be allowed.	Their location will be determined by the Department of Urban Planning, Chandigarh Administration on Zoning consideration.
8.	Multipurpose sports hall in school sites	Multipurpose sports hall of International Standard (minimum size of 44 m x 22 m) shall be allowed over and above the permissible ground coverage and FAR.	which have out-door facilities to cater to the size of the football ground, area as per norms, for parking and fire tender movement and still have sufficient open space
9.	Security Cabin/check post	Maximum size of security cabin/check post shall be 14 sqm. On every entry and exit Area of the security cabin/check post shall be free of FAR.	

(b) Basement:-

Sr. No.	Norms	Condition
1.	i)Optional and it shall not be included in F.S.I. ii)Allowed only below the zoned area of the plot.	It flushes with the ground and is properly landscaped
2.	Uses	Storage, parking, air conditioning plant, lift well etc. in addition, limited use of basement for office space with proper arrangement of light and ventilation, fire safety norms, circulation etc. Fulfilment of other terms and conditions, which may be required for a basement to be used to habitable purpose. If sufficient parking space, as per norms, is available within the site.
3.	Toilets, pantry, labs etc. which require water, are not allowed in basement	The area of basement with habitable use shall be counted towards maximum permissible FAR of 0.5.

Chandigarh administration does not have specific guidelines for designing for Autism. The only applicaple guidelines and by laws are the ones that govern the education and academic sites.

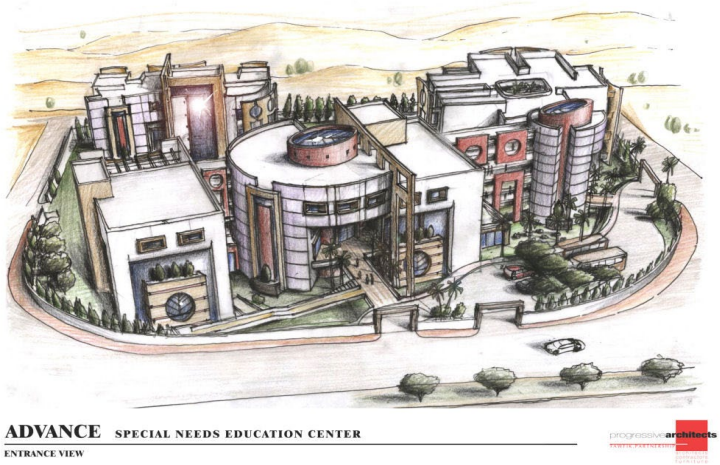
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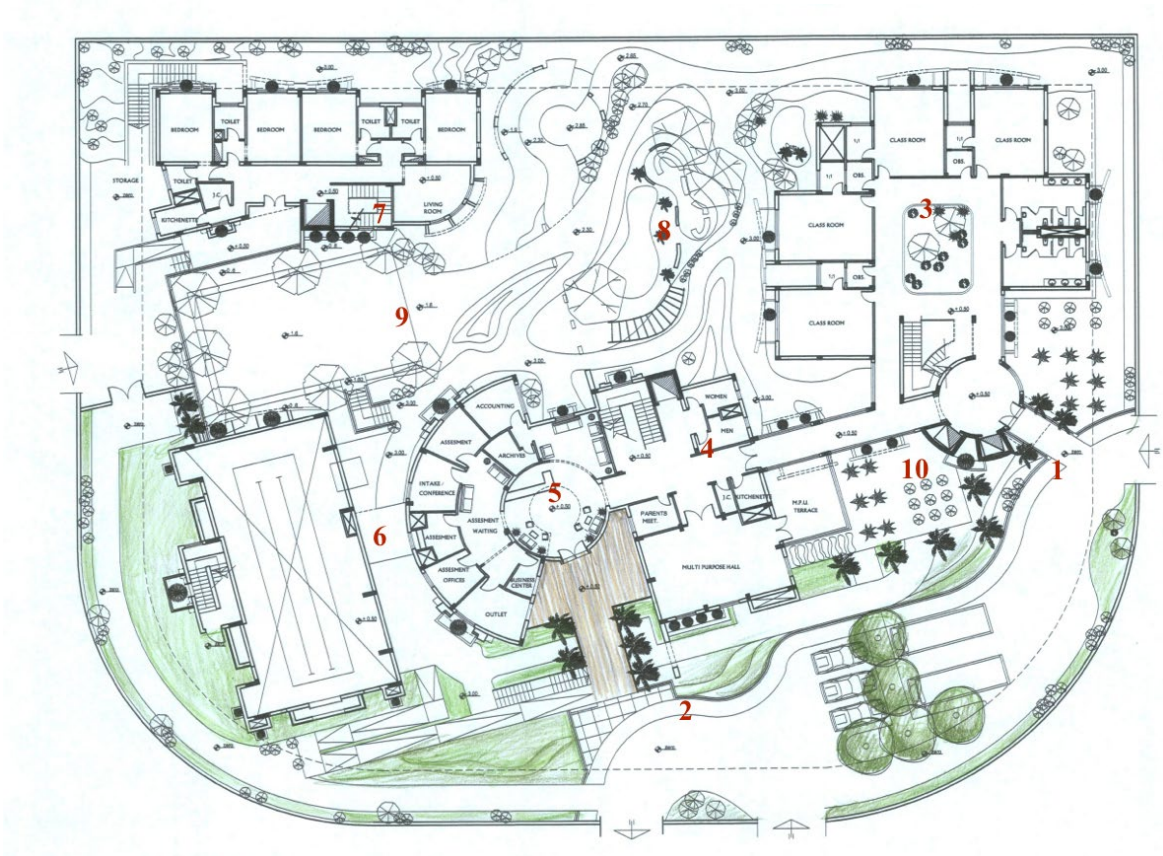
20 Prototype Studies

20.1 The Advance Center, Cairo, Egypt

ADVANCE School for developing skills of special needs children
The Advance Centre for Special needs is the full-time educational service provided by the Egyptian Society for the Developing Skills of Special Needs Children in Egypt.

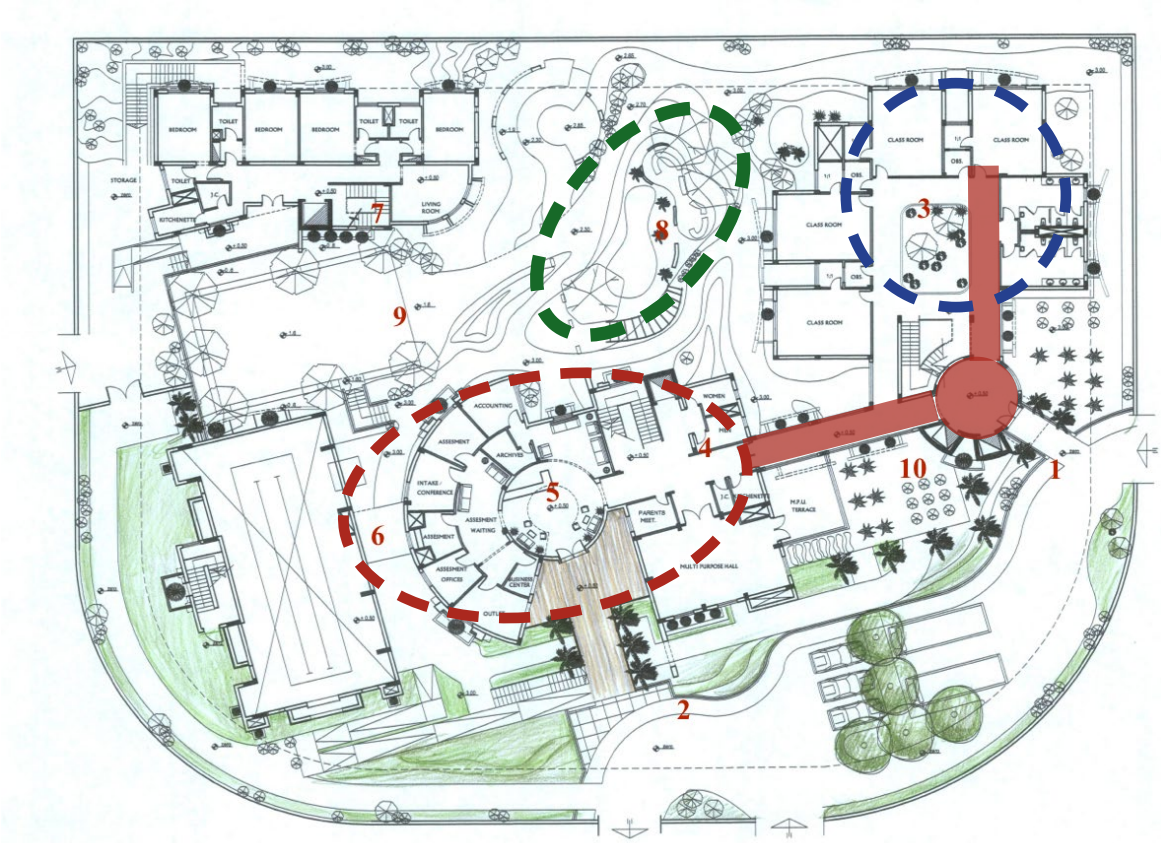
Architect: Magda Mostafa
Location: Qattameya, Cairo
Setting: Rural
Context: Stand-alone school
Year Built: Under construction
Number of Students: 100
Ages: 2-21
Site area: 1.03 acres



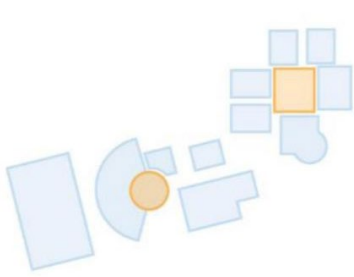


1. Student entrance
2. Admin Entrance
3. Classrooms
4. Therapy Rooms
5. Admin and diagnostics
6. Hydrotherapy
7. Assisted Living
8. Sensory Garden
9. Playfield
10. Gardening Center

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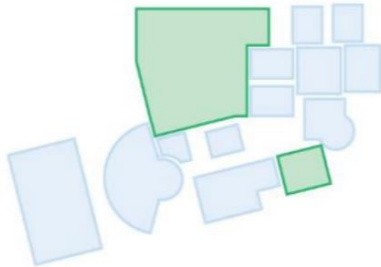
Circulation | High stimulus | Transition | Low stimilus



Central organisation of space



Levels of stimulus



Connection to green spaces

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Design Parameters

Context and Community

- Addresses issue of inclusion and respect in society

Zoning

- Grouping of ‘High stimulus’ and ‘High foucs’ areas separately
- Buffer areas may act as transitional areas between the low-stimulus “focus” zones and the high-stimulus “alertness” zones.

Way-finding, Navigation, Circulation and Spatial Sequencing

- One-way circulation system.
- The use of a circular node or junction between the two main circulation axes, should create such a transition zone between the two sensory zones.
- Visual aids such as color and pattern assist in way finding.
- Avoid visual over-stimulation

Fire safety and evacuation

- This refuge should be secure and located away from the evacuation flow.

Specialized Therapy Spaces

- stimulus functions and should be grouped
- is natural and indirect lighting
- soundproofed rooms

General Classroom Design

- Clustered organization
- Compartmentalized fashion
- Physically and visually separated ‘stations’
- Natural lighting is introduced with above eye-level sills
- North facing to avoid glare
- Open areas for floor play
- “Escape space” is located in the lowest stimulus area of the classroom.
- Joint observation rooms

Outdoor Learning Spaces

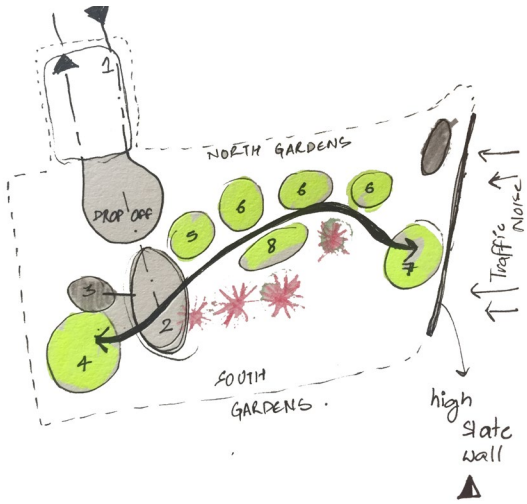
- Outdoor learning space as a transitional zone.

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20.2 The Hazelwood School Glasgow



Architect: Alan Dunlop
Location: Glasgow, Scottland
Setting: Urban
Context: Stand-alone school
Year Built: Under construction
Number of Students: 60
Ages: 2 to 19
Site area: 3.28 acres
Built up: 0.65 acre (2665 msq)
Max height: 6m

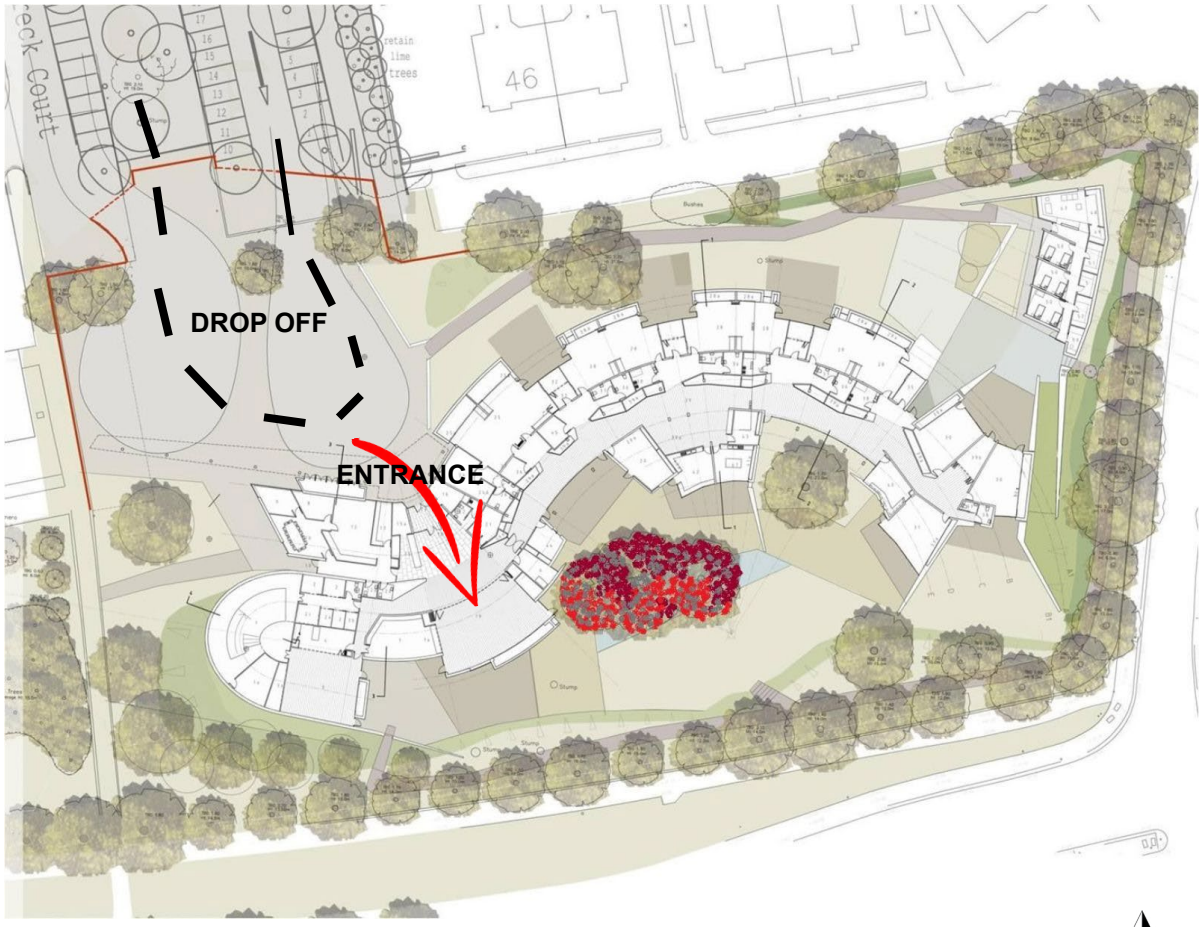


Client: The local government : City Council `(GCC)

Architect: Six architects were invited to submit their initial design ideas, Alan Dunlop won the competition.

User: Children with multi-sensory impairments. Each has a combination of two or more of the following complex impairments: acute visual impairment, hearing impairment, mobility or cognitive impairment. All of the pupils are autistic.

Photo Courtesy of Alan Dunlop Architect



Site Plan

The school steps and curves around the existing beech trees to create a sequence of safe, landscaped teaching gardens. The north wall contains the sensory features, while the south side is glazed and faces the busy main road, designed to be more like a building the children would encounter in everyday life outside the school.

INNOVATION

- Storage boxes, two and a half metres tall, create a solid wall below the clerestory glazing; this reduces external visual distraction, highlighted by teaching staff as a significant cause of loss of concentration levels in some visually impaired students.



Photo Courtesy of Alan Dunlop Architect

CIRCULATION

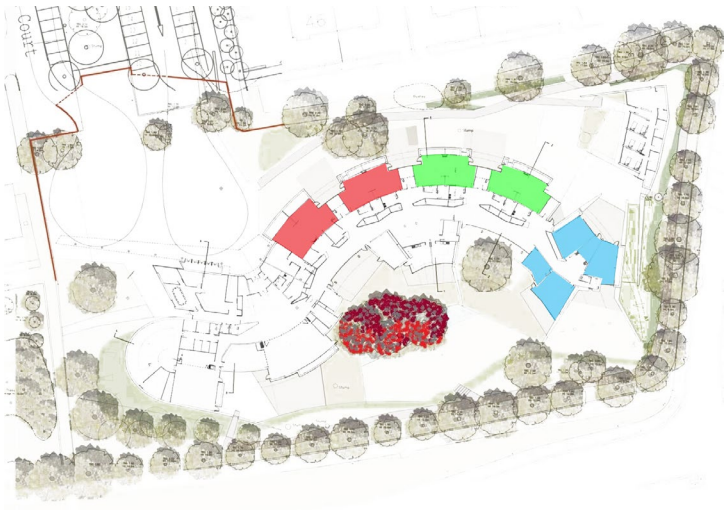
- One way circulation
- Designed out long dark corridors
- Maximised levels of natural light
- Visual, sound and tactile clues
- Ease of navigation
- Internally trail rail, doubled as a storage wall.
- The wall is clad in cork ; warmth and tactile qualities and provides signifiers or messages along the route to confirm the children's location within the school.











CLASS ROOMS

- Classrooms lie along the northern quiet, edge of the site, overlooking verdant play spaces.
- High level clerestory glazing forms a substantial part of the façade of the north-facing classrooms, allowing for maximum daylight to penetrate deep into the spaces and ensuring even distribution of light.



@ Photo Courtesy of Alan Dunlop Architect
https://aasarchitecture.com/2016/09/hazelwood-school-glasgow-alan-dunlop-architect.html



ADMIN AND STAFF

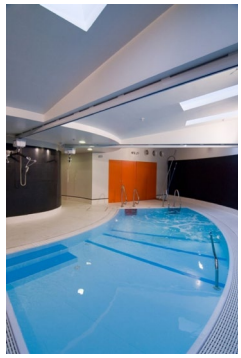






POOL AND GYM





@ Photo Courtesy of Alan Dunlop Architect
https://aasarchitecture.com/2016/09/hazelwood-school-glasgow-alan-dunlop-architect.html

20.3 Nothern School for Autism

Architect: Hede Architects Pvt Ltd
Location: Reservoir, Melbourne Australia
Setting: Urban
Context: Stand-alone school
Year Built: Under construction
Number of Students: 1144
Ages: N/A
Site area: 5.047 acres



The brief required students to be in separate sub schools, accessed separately for safety between junior and senior and positioned to give small learning environments with outside access for calming and separated play. The students understand its zoning and external form. This school re-used a former school site to build a new purpose built school for students with Autism Spectrum Disorder.



Site plan



Location



@ https://exhibition.a4le.org/2013/pdf/NorthernSchoolAutism.pdf

5

OUTDOOR PLAY AREA

The outdoor spaces were deliberately free from trees and landscaping to allow bike riding. climbing and sand play are highly enjoyed by students. The play directly connects to each learning area as well as central toilets and passage.

4

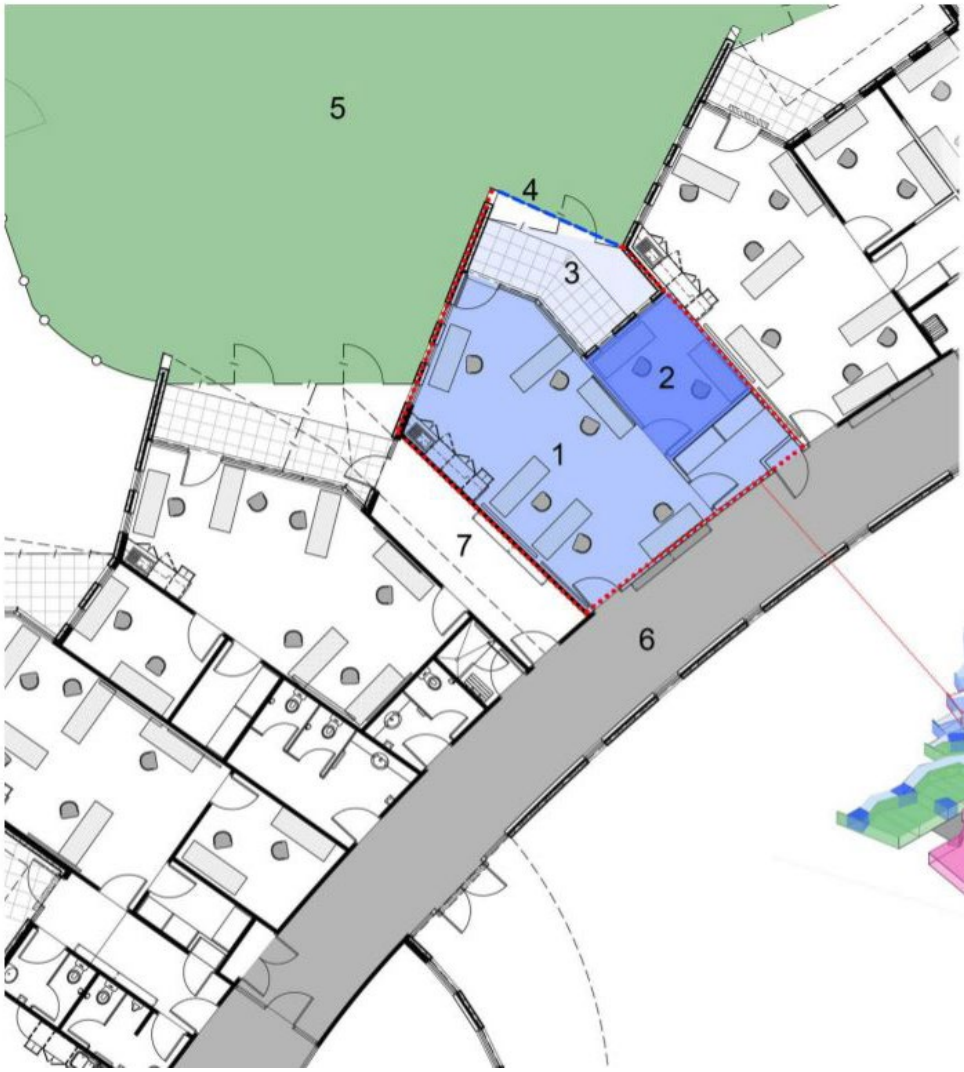
UNDERCOVER AREA (ROOFLINE)

Under cover but with north sun access and access to the subschool space.

3

OUTDOOR WITHDRAWAL ZONE

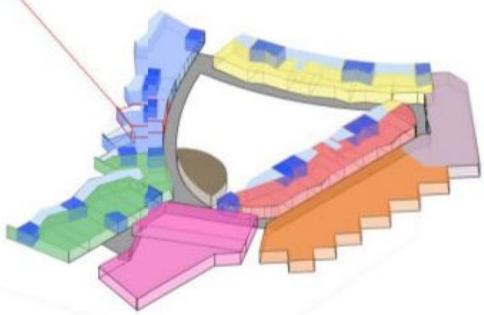
The learning area has access direct to an outside space for self calming.



2

WITHDRAWAL ROOM (QUIET LEARNING)

A withdrawal room which could be for quieter learning by 1 or 2 students or alternatively a calming room for an agitated or anxious student.



Learning areas

6

CIRCULATION

Little distraction from the access passage. However the design of all learning areas had alternative means of escape for staff and students from all rooms.

7

INDEPENDENT ACCESS AND PLAN

Access to toilets for students and staff from building independent of learning areas.

1

MAIN LEARNING AREA (INTERMEDIATE)

A learning space with a stole to enable the amount of furniture and equipment to be controlled by teachers. (Students can use objects aggressively)

@ https://exhibition.a4le.org/2013/pdf/NorthernSchoolAutism.pdf


Northern School for Autism



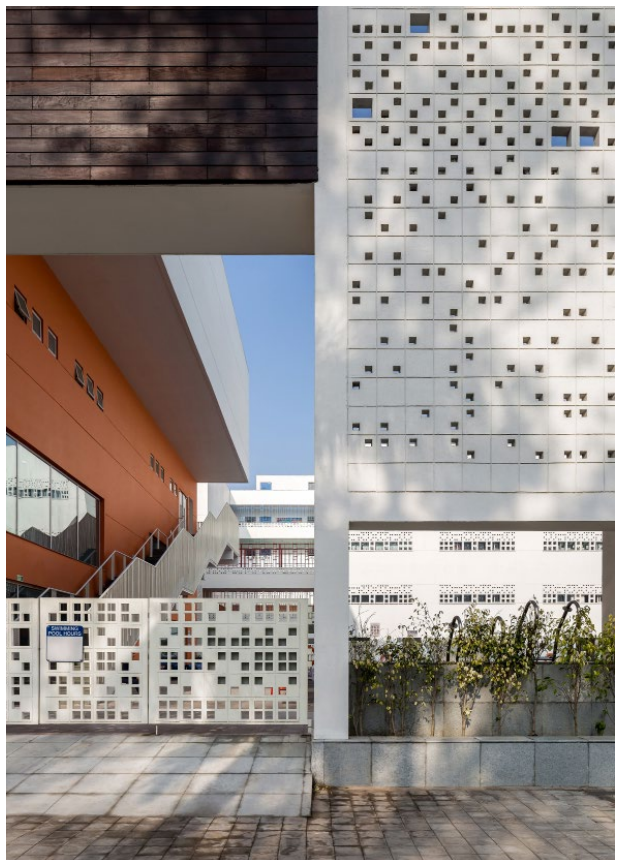






21 Sourced case study

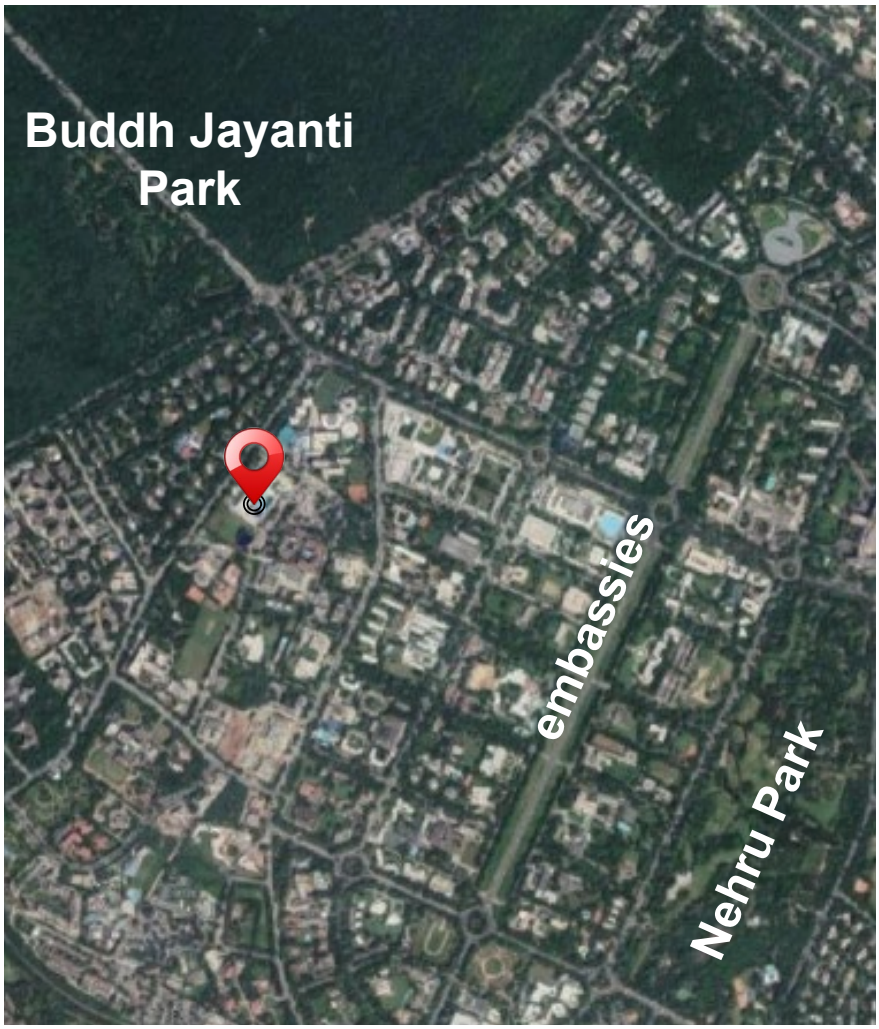
21.1 The British School



Name: The british school
Location: Dr Jose P Rizal Marg, Chanakyapuri, New Delhi, Delhi
Stakeholders: Neuro typical students
Setting: Urban
Architect: Morphogenesis
Context: Stand-alone school
Year Built: 2004
Number of Students: 1300
Ages: 3-18
Site area: 6.8 acres



@ https://www.archdaily.com/891016/the-british-school-morphogenesis/5ab0753df197cc8b4c000495-the-british-school-morphogenesis-fifth-floor-plan





Accessibility : Lies in the Lutyen's Delhi area close to all the embassies.

Landmarks: UAE embassy
Approach: 6 M wide road and 2 entries to the site .No segregation of pedestrian and vehicular movement inside the site.

The site lies in a zone with an educational land use. Easily accesible in one of Delhi's best regions. The large plot sizes buffer create an effective noise barrier.

@ https://www.archdaily.com/891016/the-british-school-morphogenesis/5ab0753df197cc8b4c000495-the-british-school-morphogenesis-fifth-floor-plan

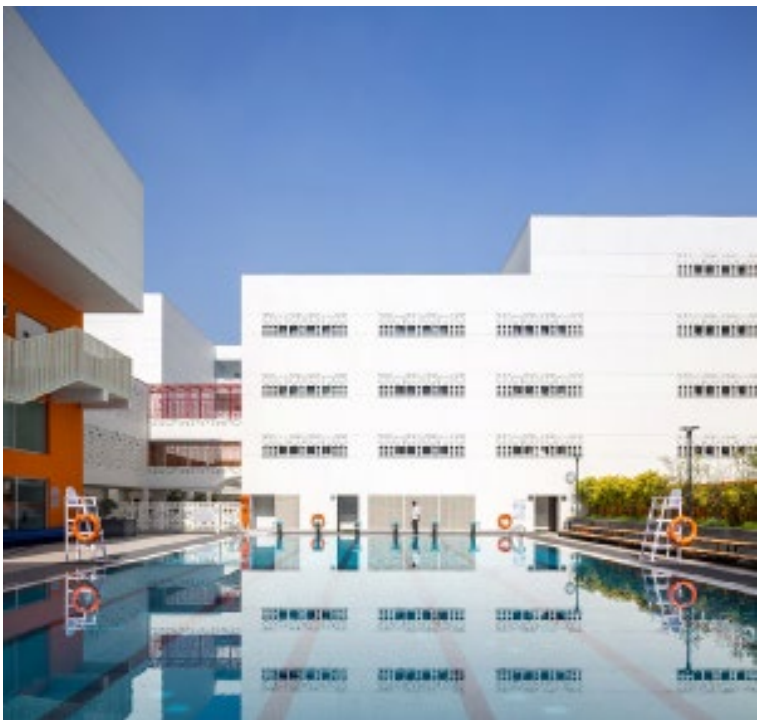






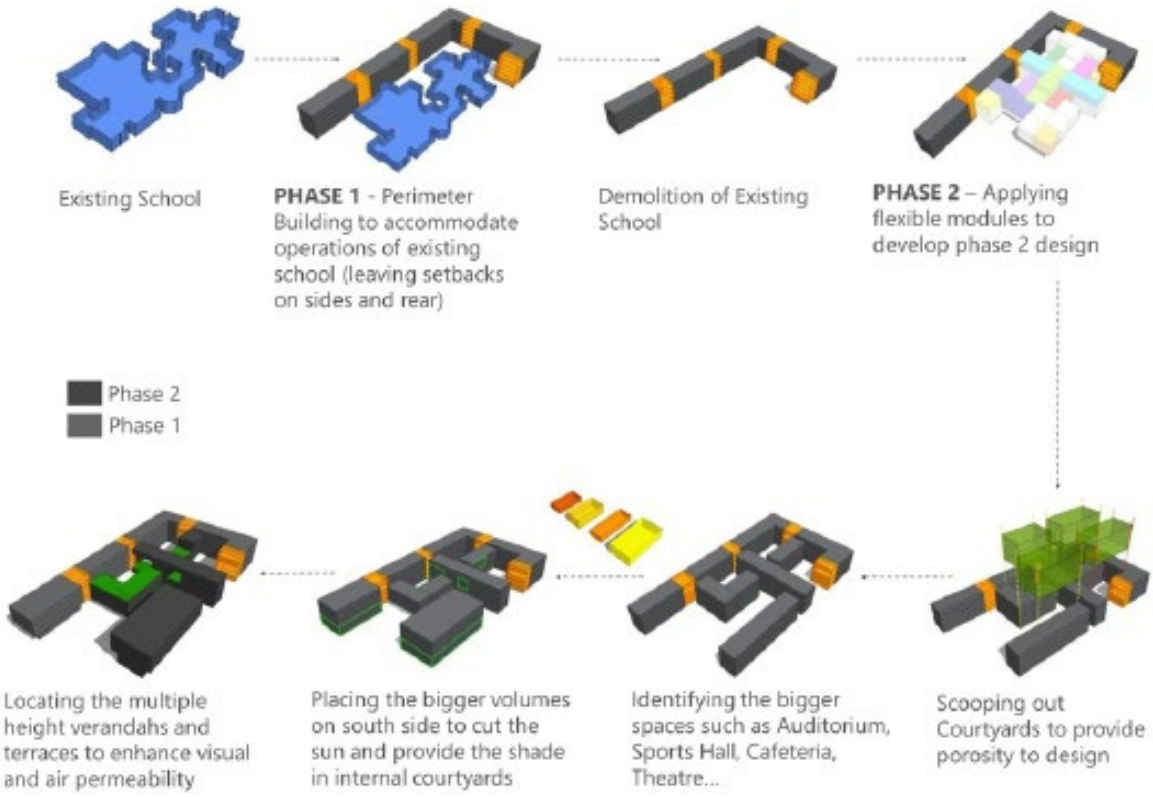
@ https://www.archdaily.com/891016/the-british-school-morphogenesis/5ab0753df197cc8b4c000495-the-british-school-morphogenesis-fifth-floor-plan







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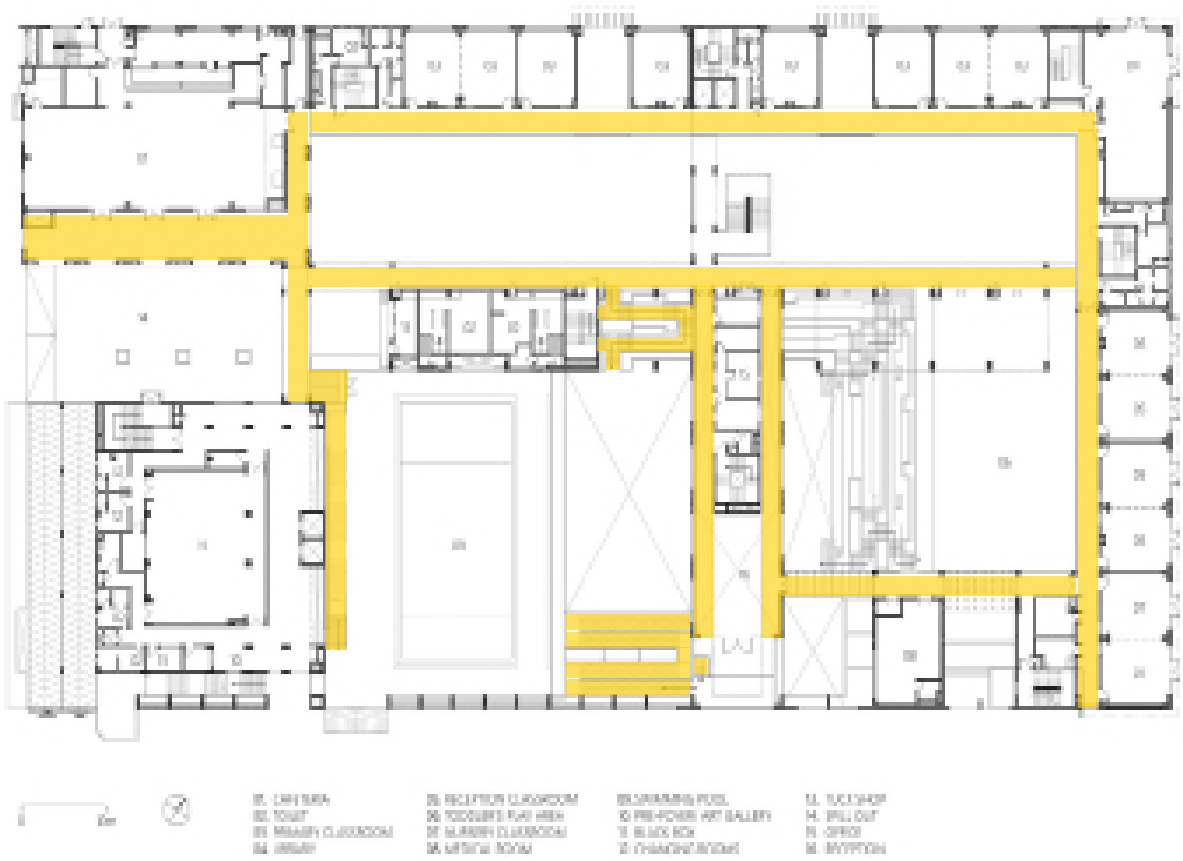


The entire campus is punctured with semi-enclosed breakout spaces that are liberally scattered around the school and are constantly being transformed in the way they are occupied. These breakout spaces have been consciously placed along transition areas, such that the activities they facilitate become an integral part of the student experience.

Passive design stratergies :

- One was to minimize reliance on mechanical systems. Morphogenesis advocated that 50% of the school be non-air-conditioned with traditional passive methods used to temper the environment and optimize energy consumption, creating an environmentally experiential learning environment.
- The second strategy was that of planning the school as a system of courtyards scaled such that majority of them are in shade throughout the year, thus making them effective not only as transition spaces but as extended learning environments. Internal courtyards, chajjas (deep overhangs) and verandahs provide opportunities for students to engage with the environment and nature.

@ https://www.archdaily.com/891016/the-british-school-morphogenesis/5ab0753df197cc8b4c000495-the-british-school-morphogenesis-fifth-floor-plan

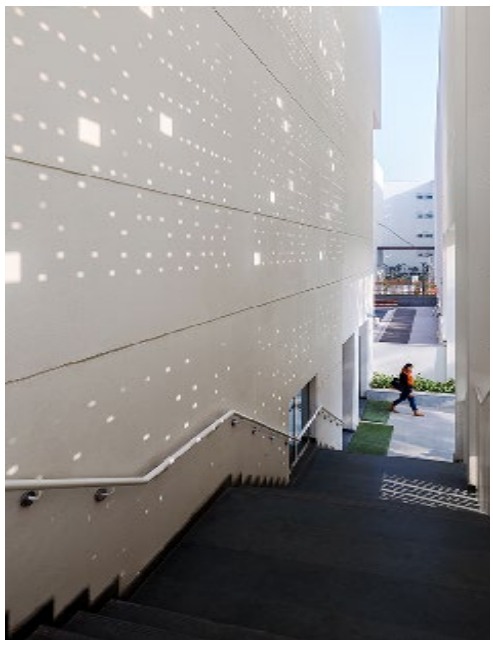


Circuation

Ground Floor Plan

All the coridoors are singly loaded with a close relation to one of the many breakout spaces. Hence, the interiour are wel lit and flexible. The circulation is not clearly visible as but each coridoor has a unique sense of place du to the varying transition spaces that run along it.







@ https://www.archdaily.com/891016/the-british-school-morphogenesis/5ab0753df197cc8b4c000495-the-british-school-morphogenesis-fifth-floor-plan

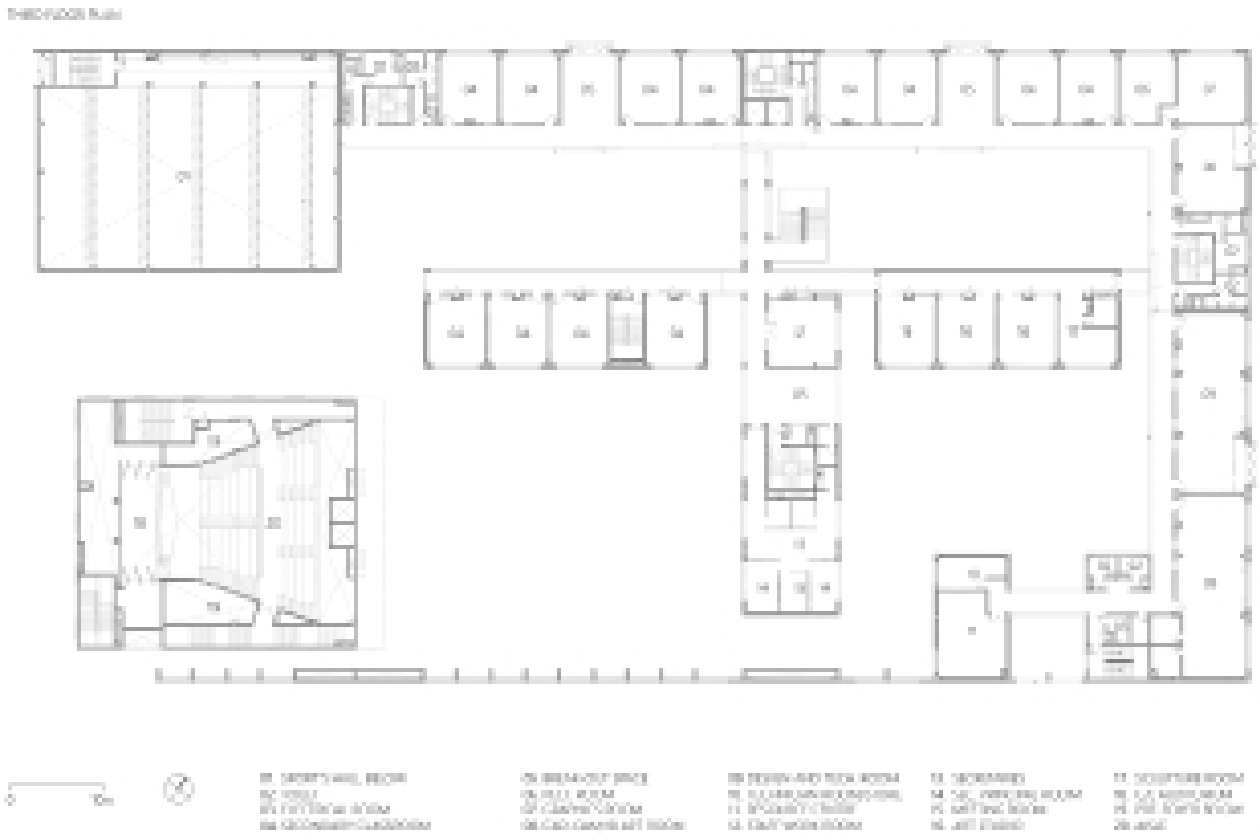


First Floor Plan

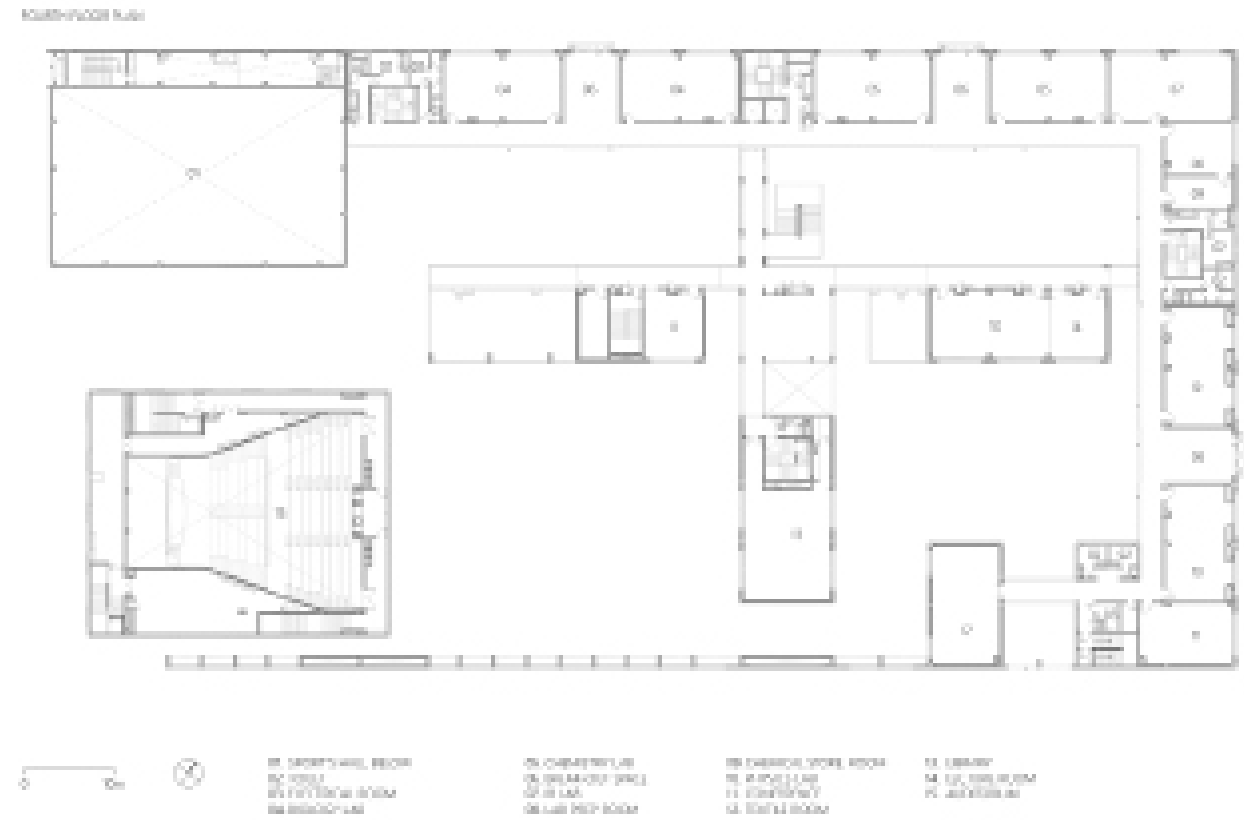


Second Floor Plan

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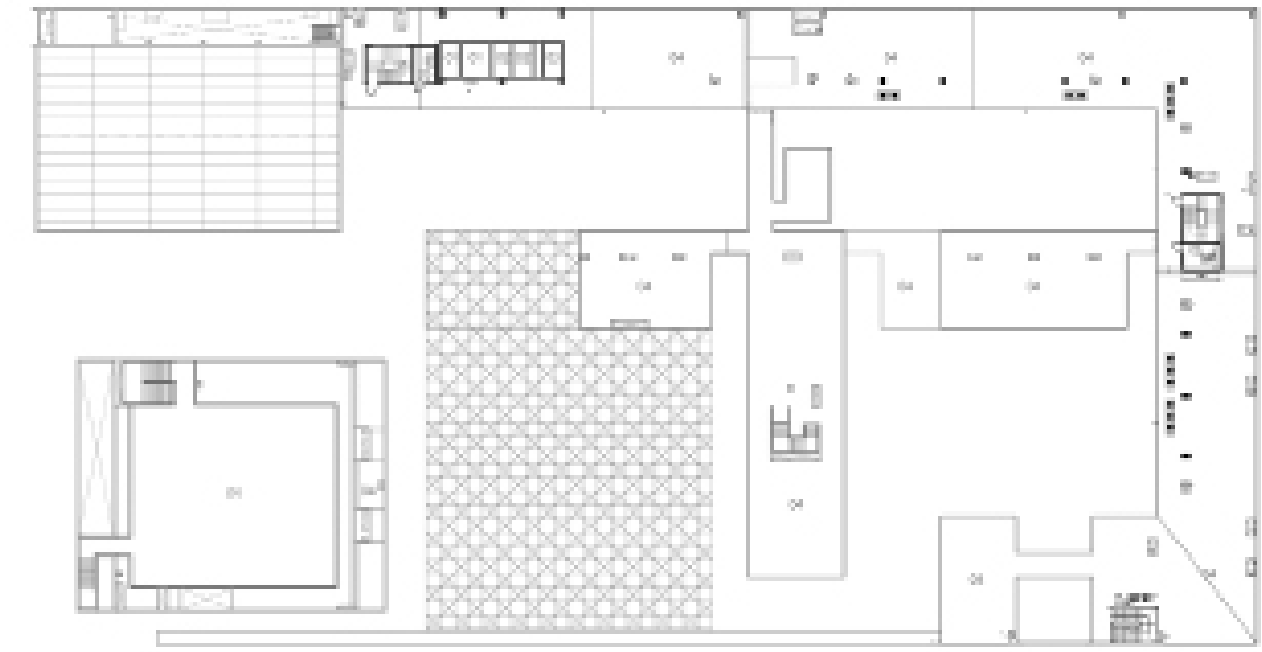


Third Floor Plan

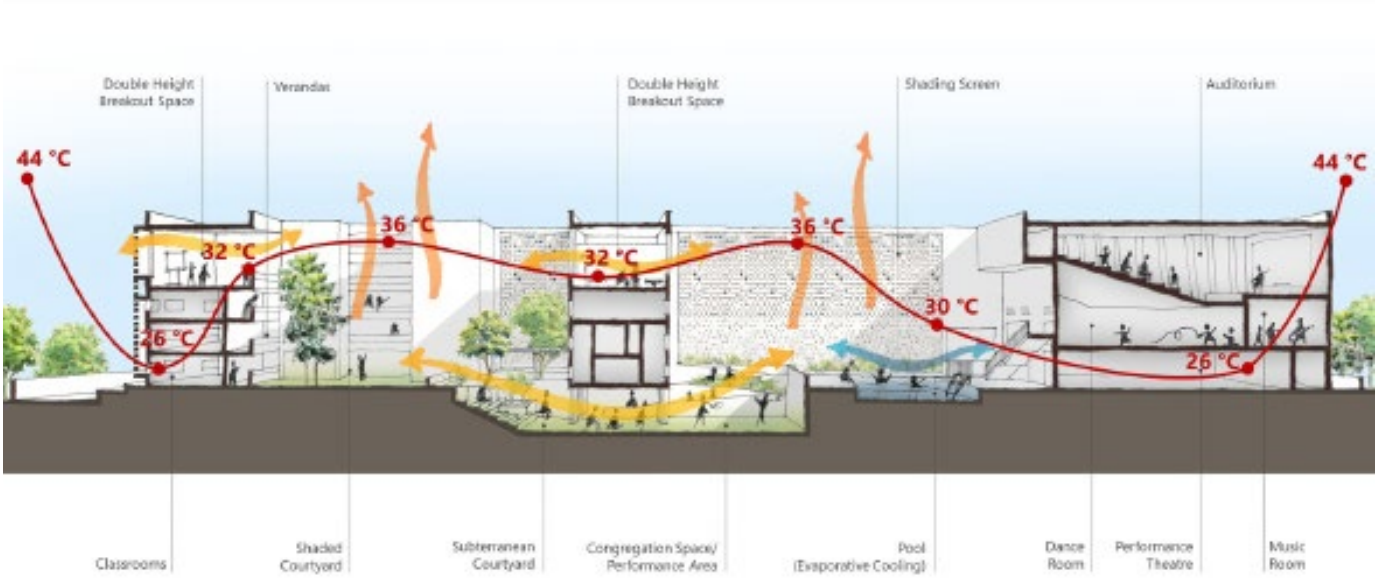


Fourth Floor Plan

@ https://www.archdaily.com/891016/the-british-school-morphogenesis/5ab0753df197cc8b4c000495-the-british-school-morphogenesis-fifth-floor-plan



Fifth Floor Plan



@ https://www.archdaily.com/891016/the-british-school-morphogenesis/5ab0753df197cc8b4c000495-the-british-school-morphogenesis-fifth-floor-plan

22 Live case study

22.1 SOREM

Society for Rehabilitation of the Mentally challenged
Sector 36, Chandigarh



SOREM
Society for the Rehabilitation of the Mentally Challenged

Name: SOREM
Location: Sector 36-C, Chandigarh
Stakeholders: Atypical students, Staff
Setting: Urban
Architect: Planner's group, Chandigarh
Context: Stand-alone school
Year Built:
Number of Students: 100
Ages: 2-21
Site area: 1.12 acres



Site Context

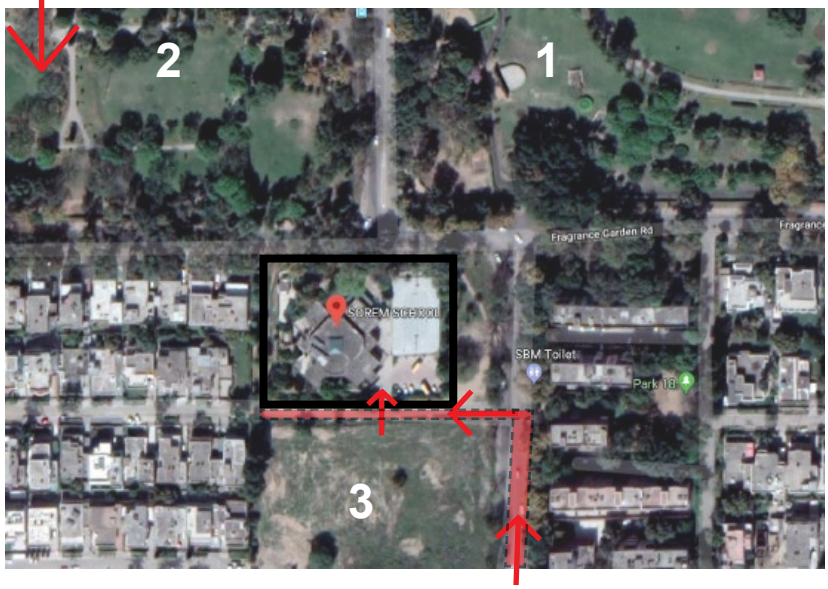




1. Fragrance Garden



2. Dhalia Garden



Site Access





3. Empty green

The site lies in the phase II of chandigarh and is easily accessible via a service lane entry. It is close to the green belt that serves as an effective and much needed noise barrier.

Objective to study SOREM:

- In chandigarh therefore same context as site
- Example of a two way circulation
- Studied as a negative case study
- To unserstand natural lighting

Design Concept:

The single storeyed building has been designed as a symmetriic cross with a skylight at the center.

Facade

The facade integrates well with the context and is not overpowering. The colours used, maroon and green are soothing. With facade with fenestations.

Provisions in SOREM

- General Classrooms
- Outdoor activity spaces
- Vocational Education:
- Rehab Therapies
- Physio Therapy
- Computer Training
- Vocal & Instrumental Music
- Yoga therapy
- Sensory Integration
- Speech Therapy
- Occupational Therapy



Material used

Material Walls: Concrete ,Brick, Plastered walls
Floor: Kota stone, Marble,



8



7



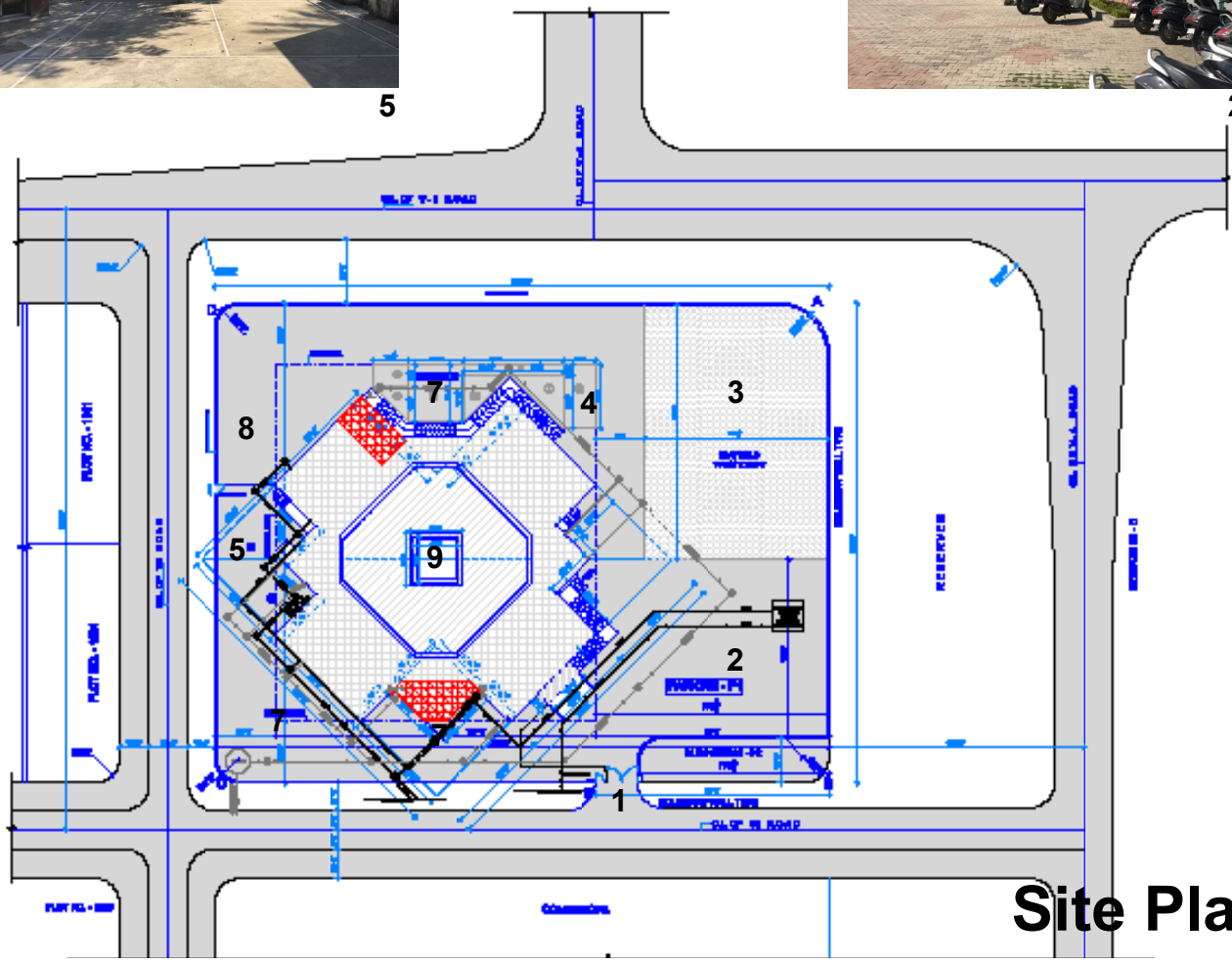
4



5



2,3



Site Plan



7



6

1. Entry
2. Parking
3. Basketball court
4. Labriynth
5. Kitchen
6. Entrance to building
7. Inclusive green spaces
8. Paved play area
9. Skylight

Inclusive play spaces





These inclusive patches act as activity areas where a child can feel safe and stimulated.





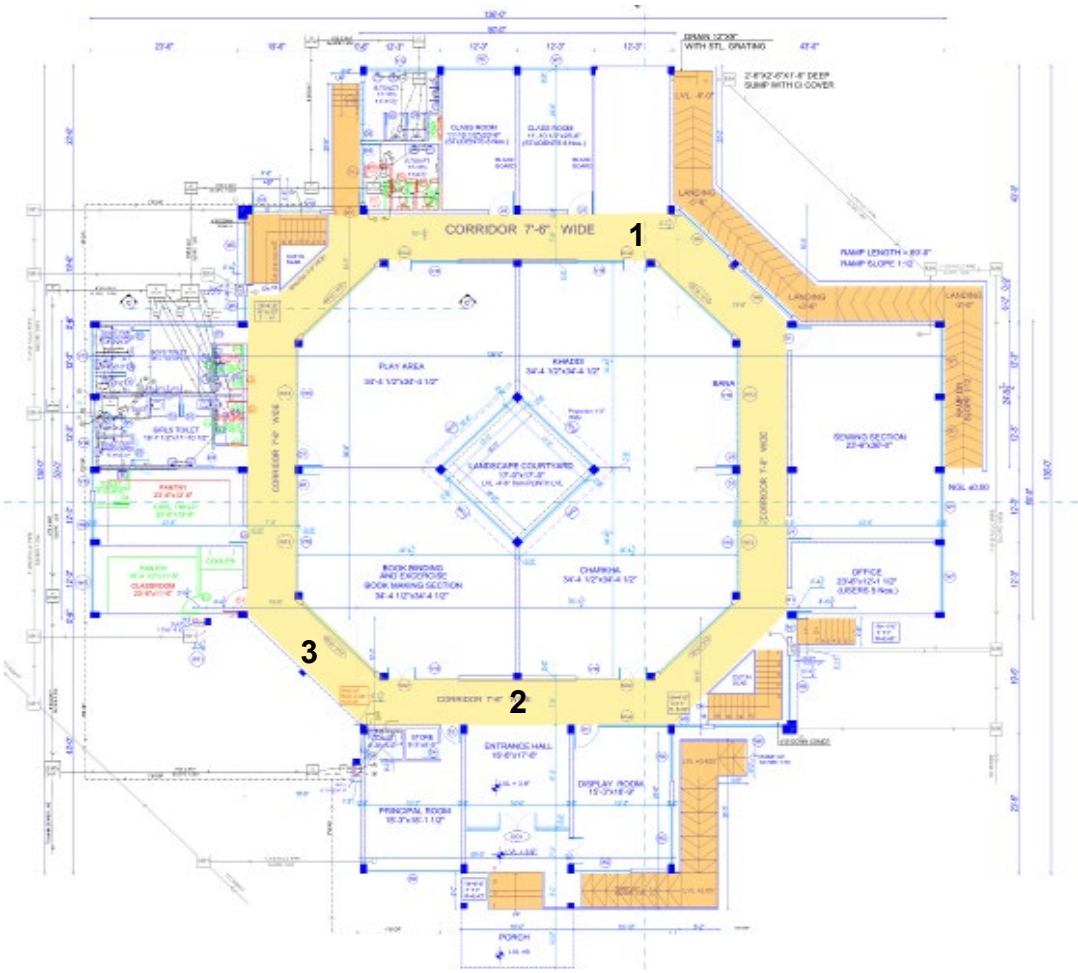
Labyrinth

Meditative walk on the labyrinth to improve concentration based on research by Harvard School of Medicine, USA
Labyrinth installed at SOREM includes a path embedded with sand, concrete and various sizes of white pebbles which helps the nerves of the sole of the feet, in the form of massage and acupressure. Walking on different textures triggers and stimulates the nerve-ends and promotes mental focus and motor coordination. This therapy for rehabilitation of mentally challenged , particularly those with Autism.





Circulation



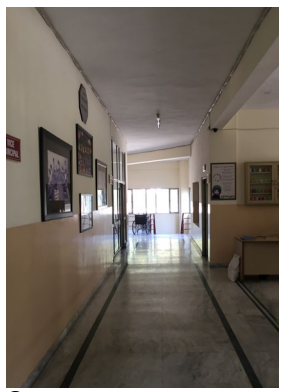
Horizontal circulation

Vertical circulation

The circulation loop is an octagonal ring which is doubly loaded in most places. The blinding turns and lack of breakout spaces make it confusing and unfit as a ‘sensory design’. Vertical circulation is provided at level difference i.e. plinth and basement. All areas are accessible via a ramp. The circulation coridoor is naturally lit via windows at various places that also provide green outside views. However, these views have not been designed in accordance to the needs of a sensory sensitive design.



1

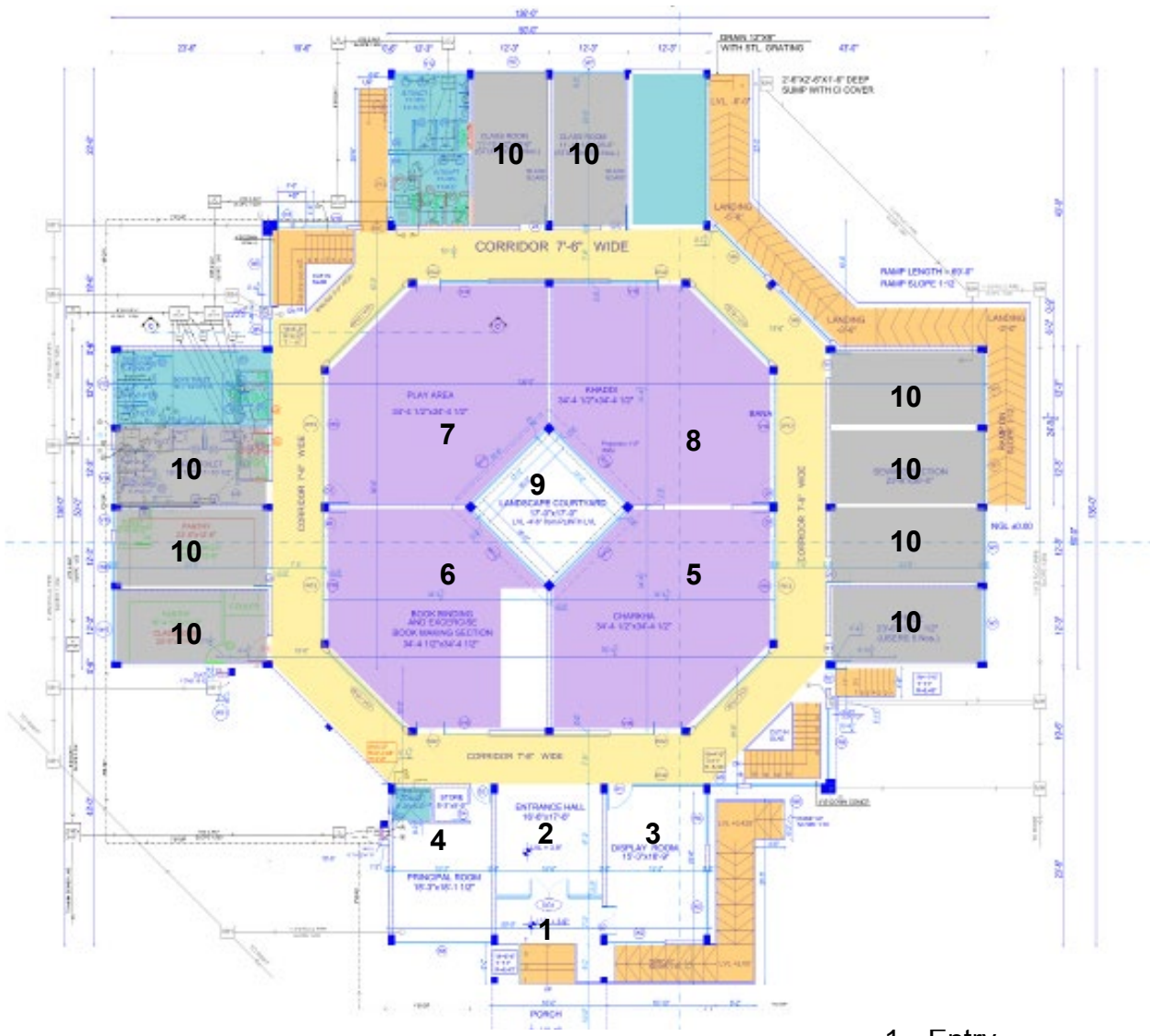


2



3

Zoning



Classrooms

Therapy rooms

Toilets

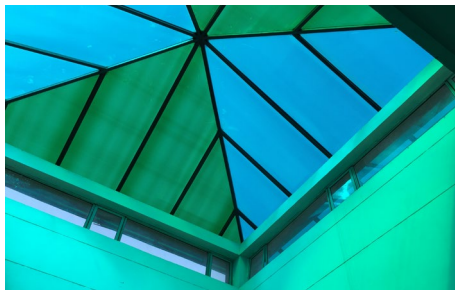
1. Entry
2. Reception
3. Admin office
4. Principal's office
5. Music room
6. Sensory room
7. Play room
8. Vocational room
9. Skylight
10. Classrooms

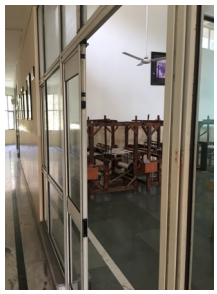
A clear segregation of "high stimulus" and "high focus" areas can be seen by a coridoor between the functions but cannot be experienced due to being doubly loaded and lack of transition spaces. Hence, sensory zoning is missing.

‘High stimulus’ rooms





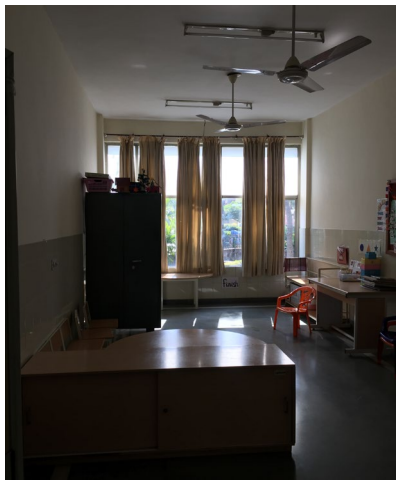


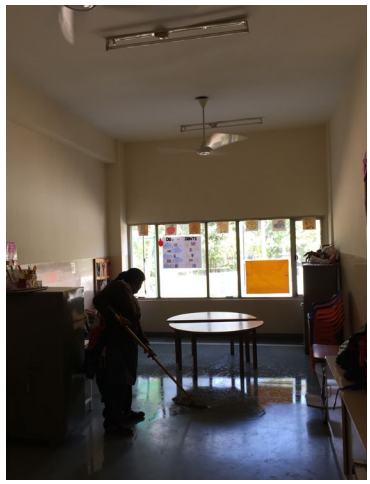


A sensory room, Charkha room, Music room and play area make up the high stimulus zone. Upto date according to the medical treatments but no compartmentalisation, escape or transition spaces.

Classroom

The classroom design is very basic and inadequate. The design is old and not sensory sensitive. It does not even comply to the new neuro typical standards. The volume of the space is inclusive.









Conveniences

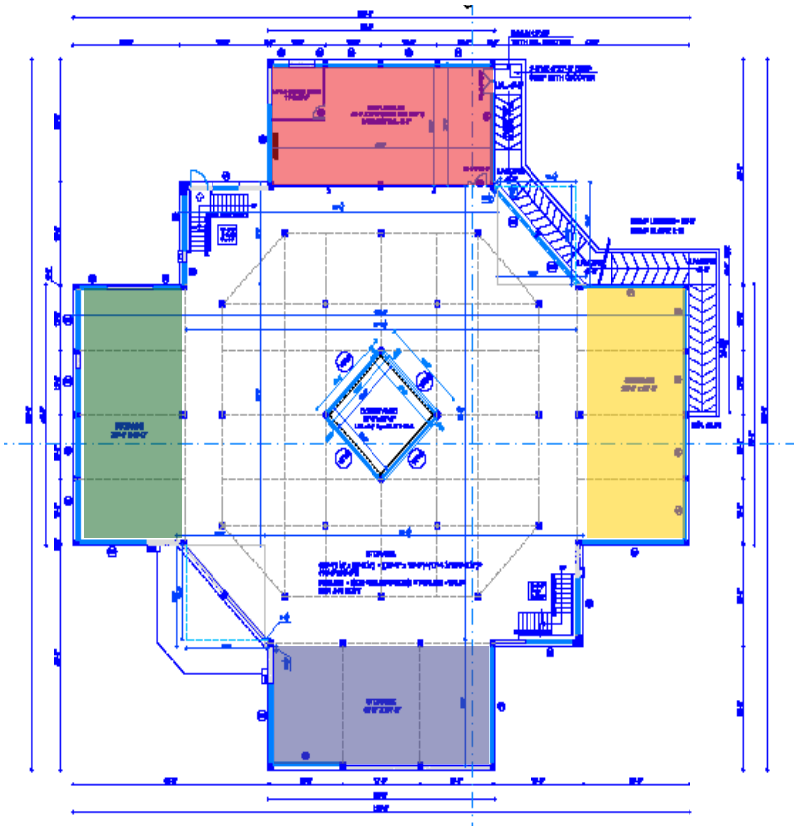
Clear sinage and strategic placement of conveniences. The toilets are handicap friendly. The main student toilets are placed on the exterior and hence have adequate ventilation and lighting.

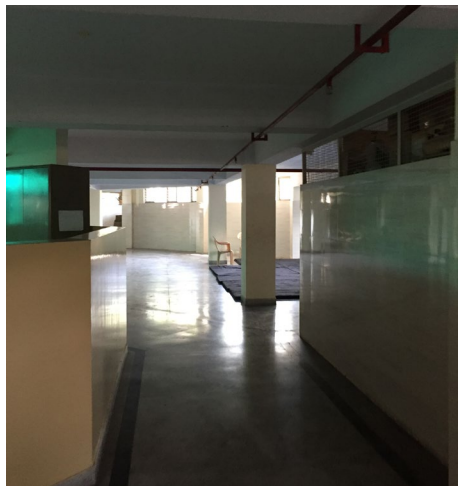


Staircase to the basement



Computer Lab





Circulation

Computer lab

Storage

Gym

Storage

Basement



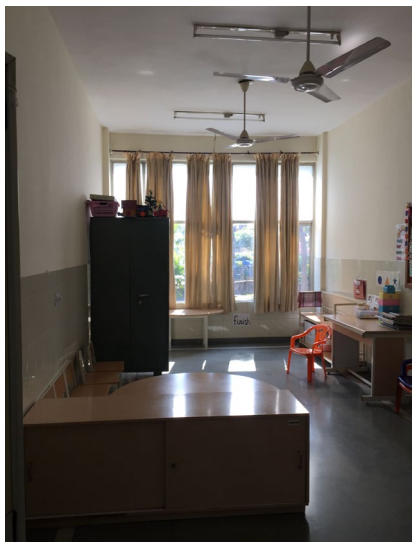
Activity area



Centeral courtayrd

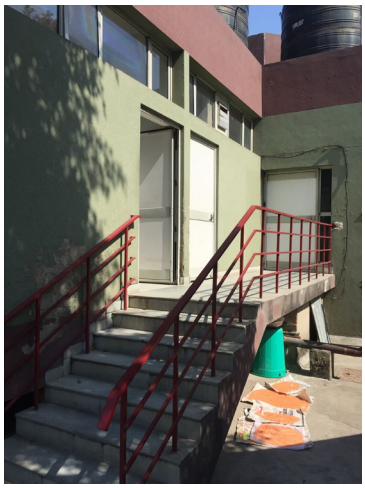
Lighting & Ventilation







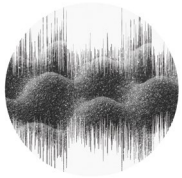
Natural light is available in abundance, let in by large spanning windows, central courtyard and clerestoey windows. The high plinth allows for ventilating windows in the basement that let in enough sunlight. However the views and lighting have not been controlled according to sensory sensitive parameters. In various places passive methods like curtains have been used to reduce direct light and glare.





Ventilators have been provided everywhere and the student restrooms have been placed on the exterior of the built mass. The building is well ventilated.

Comparison to ASPECTSS guidelines



Acoustics

The site is close to the noise free green belt zone. No acoustic consideration can be seen and inadequate segregation between high noise areas make the complex noisy.



Spatial sequencing

Clear yet inaffective segregation of spaces. The doubly loaded coridoors do not allow a sense of this segregation.



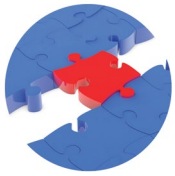
Escape spaces

There are no escape spaces or rooms in the entire school. Exterior connections are provided but no special design considerations.



Compartmentalization

No compartmentalisation in clasroom design. Temporary divisons have been made in the sensory room as per need.



Transition Spaces

The building works as a seemless and flowing space with no breakages except for the outside connections via staircases.



Sensory zoning

Same as the spatial sequencing, there is inaffective sensory zoning due to the doubly loaded coridoor serving as the only segregation.



Safety

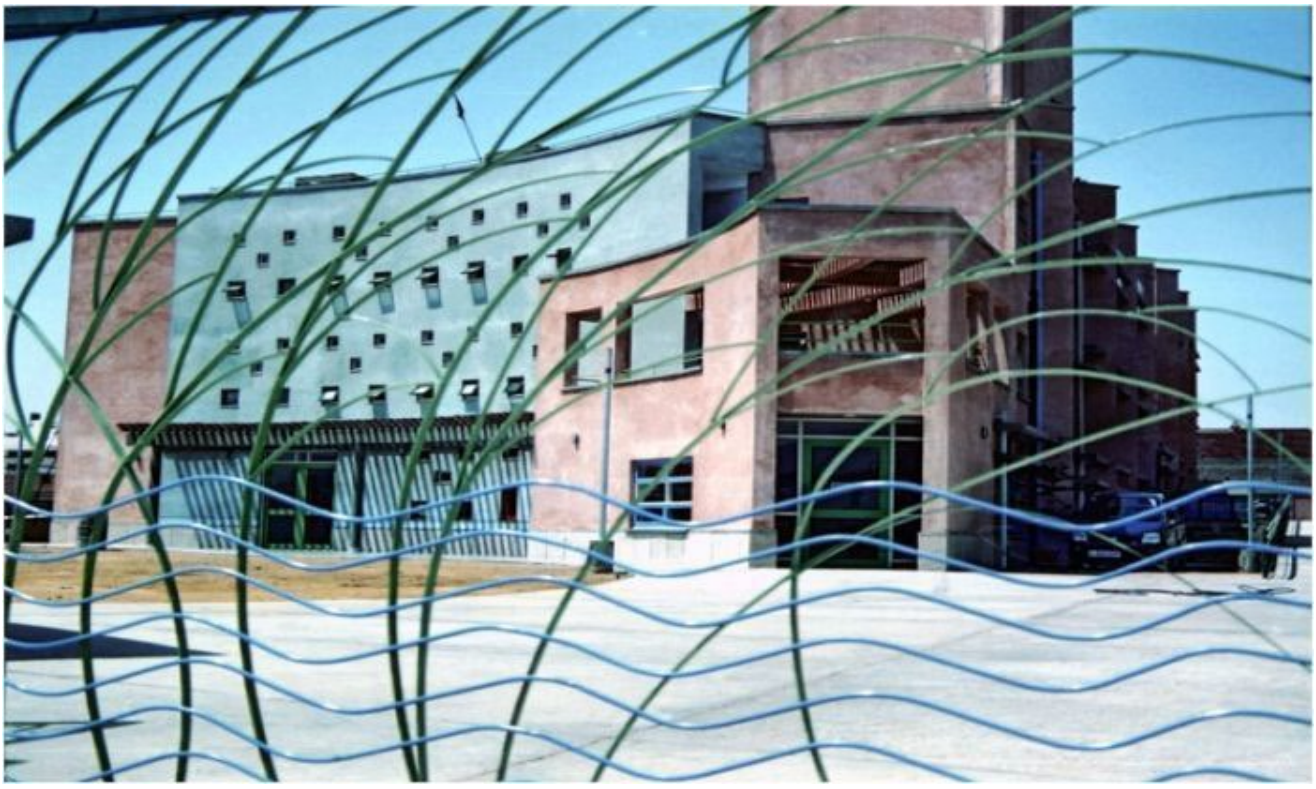
Single site entry away from movingtraffic, high site boundary walls, various fire escape routes, non toxic building material make it safe.

22.2 DISHA

A Resource Centre for Multiple Disabilities
Jaipur



Name: SOREM
Location: Disha Path, Near JDA Park,
Nirman Nagar-C, Jaipur
Stakeholders: Multi disability, Staff
Setting: Urban
Architect: ASHOK B LALL Architects
Context: Stand-alone school
Year Built: 2004
Number of Students: 170
Ages: 2-21
Site area: 0.24 acres





Site Context

The site lies about 30 miutes away from the old city center of Jaipur in a new highly dense urban setting.



Accessibility : 1km from Ganga-Jamuna Petrol Pump(Local Bus Stop). 1km from Mansarover Metro Station.

Landmarks: JDA Park, Mansarover Metro Station.

Approach: 8' wide road and 1entry to the site .No segregation of pedestrian and vehicular movement inside the site.



Residential
Commercial
Access



Entry to DISHA



Parking on the exterior

Objective to study DISHA:

- To understand vertical universal design.
- To understand a climate responsive design.
- How to integrate the exterior and interior.

Design Concept:

1.Energy at Low Cost
2.The Barrier Free-easily Accessible
3.Height Variation
4.Sensory Envronment

The design for the school was guided primarily by the needs of the special child, his access, safety and comfort. As an institution of learning and training, the building design provides a lively environment for two important needs; a sense of community under the shelter of a roof, and a sense of independence and flexibility for the use of individual activity spaces.

Facade

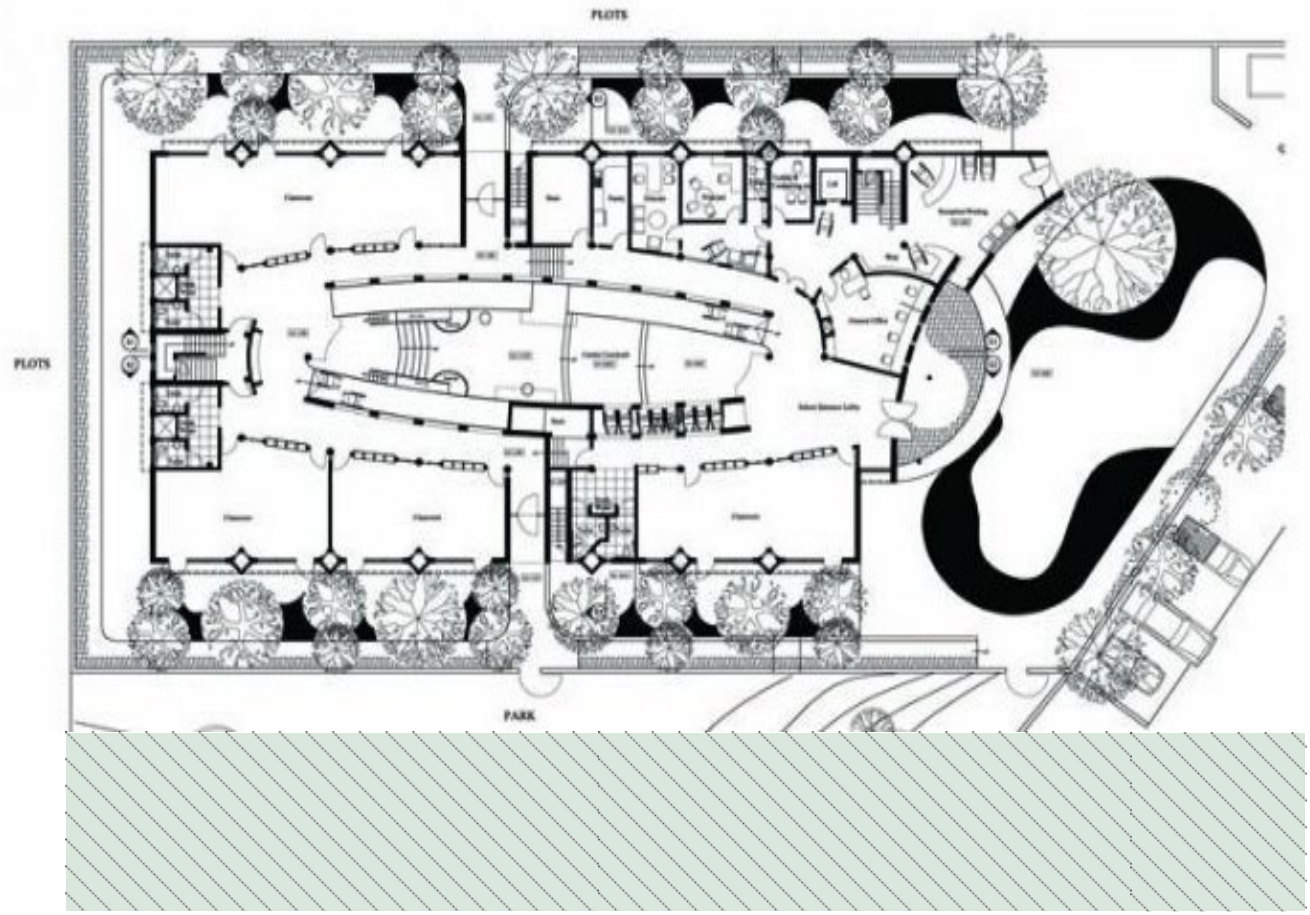
The entrance forecourt has been designed as a play garden and an outdoor gathering space, with the curved facade of the building acting as a backdrop to the stage.





Material used

Material Walls: Concrete ,Brick,Concrete textured walls
Floor: Kota stone, Marble ,Terrazo flooring



Topography

- Flat terrain, trapaezoidal in shape.

Site Plan

- A constraint of resources resulted in a tight urban sight and hence a multi storeyed building.
- Garden adjacent to the site for children proves to be an effective sound barrier.
- Parking Analysis : School Bus/Car parked inside the boundary, along one edge of the site. Staff Parking is outside the entrance gate almost for 15 cars.
- As parking is restricted to the entrance, it allows hassle free movement of challenged people throughout the campus.
- The entrance forecourt has been designed as a play garden and an outdoor gathering space.
- The site boundary consists of a clear circulation alley and small green play areas adjacent to the built mass.
- A strong presence is given to trees, creepers, flowering plants; to reflect the cycle of seasons and to invite butterflies, birds and squirrels to make their homes at Disha.

Observation :
Parking as per the requirement is not sufficient. Outside paking is temporary. No segregation of vehicular and pedestrian entry .

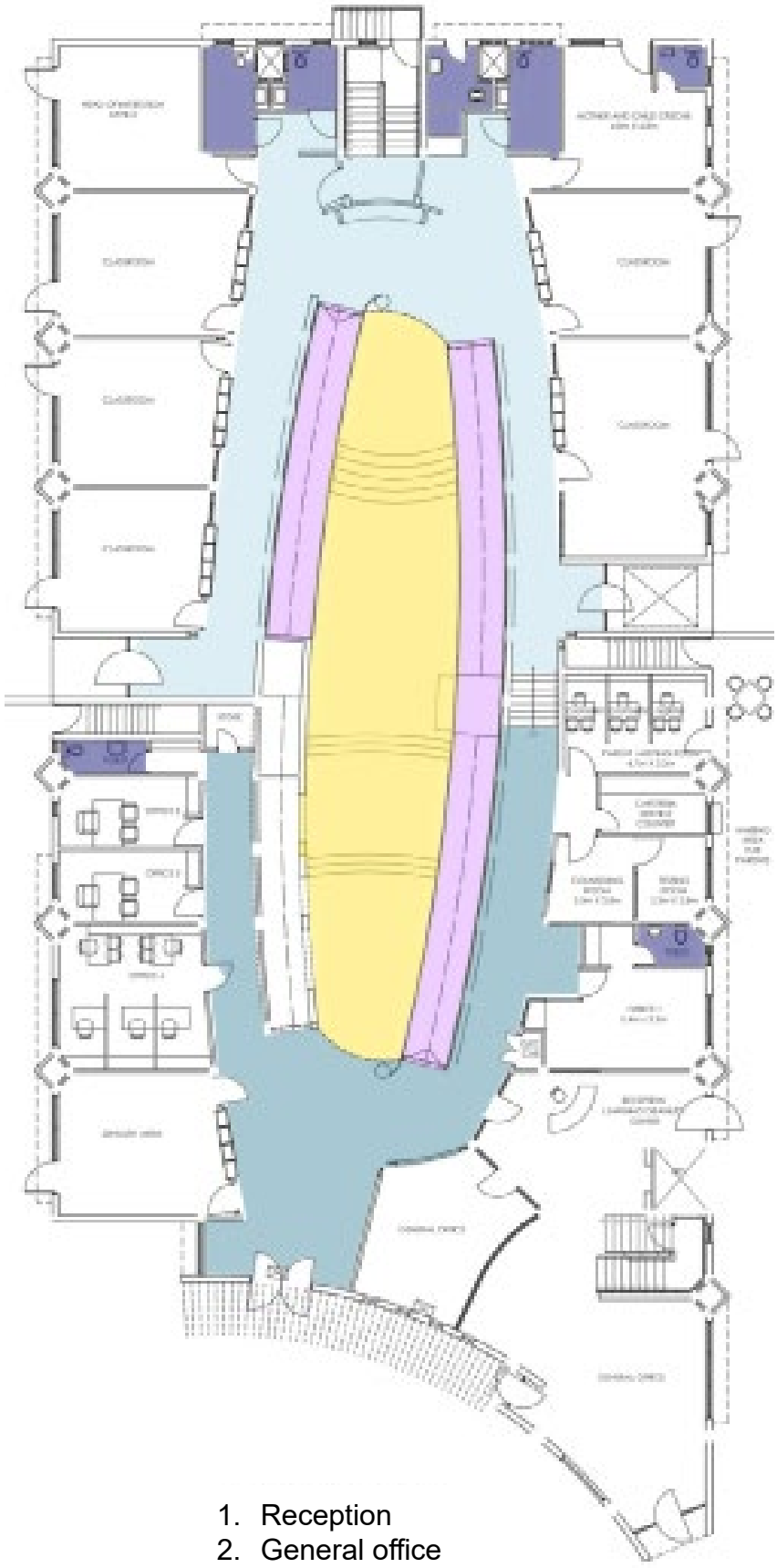
GROUND FLOOR

On entering the building, children arrive into an all-weather Centre Court, which is used for playing and exercising. This court creates a sense of familiarity and enclosure. Clearly visible circulation makes the buidling easily naviagble.
It serves as the center of gravity for a child's attention.



All ground floor rooms have outdoor extensions under the shade of trees. This acts as an escape space and creates a better classroom environment.





CIRCULATION

- Central court
- Horizontal circulation Lvl1
- Horizontal circulation Lvl 2
- Vertical circulation
- Toilets

1. Reception
2. General office
3. Office
4. Sensory room
5. Councelling room
6. Parent meeting room
7. Cafe
8. Classroom
9. Cretch

FIRST FLOOR

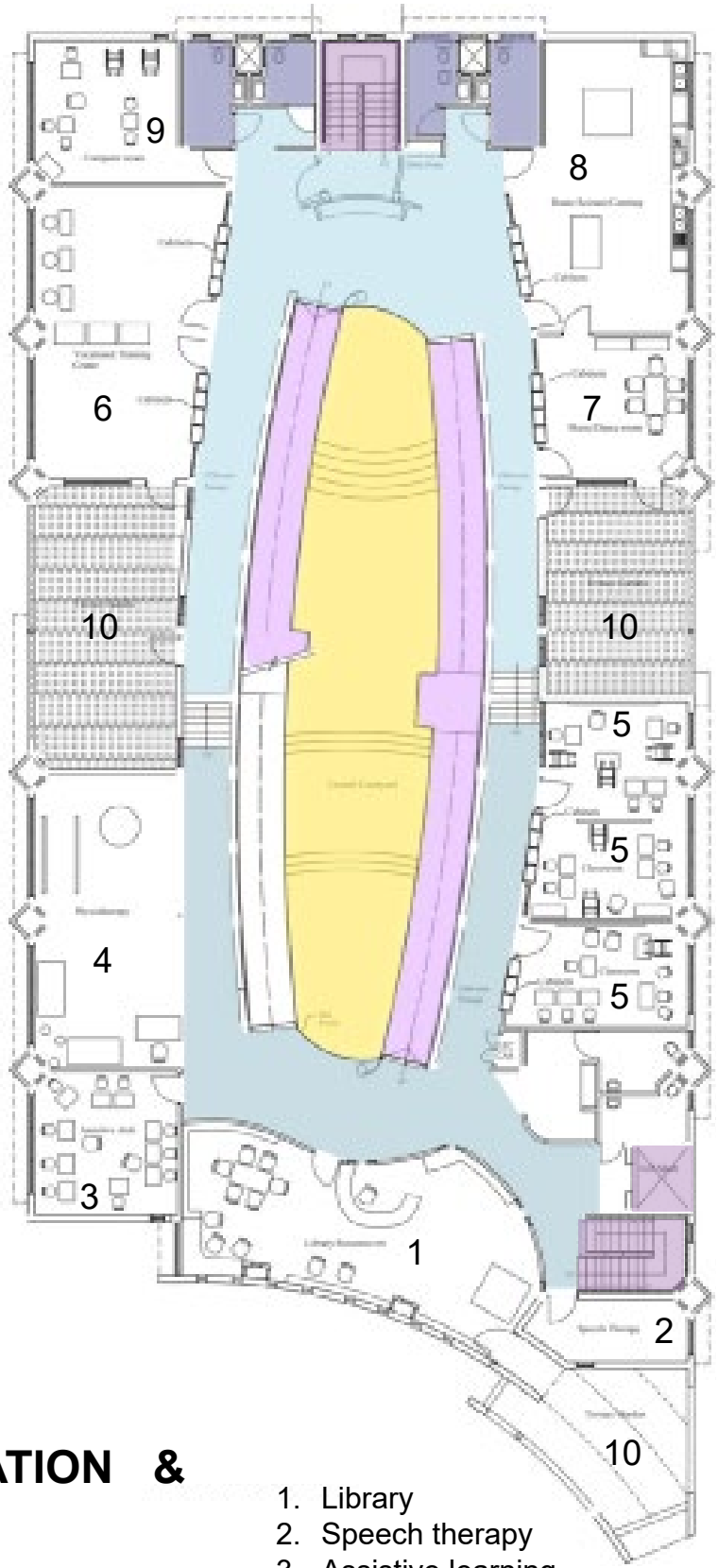
Gently-sloped ramps circum-ambulate around the central court, and the buiding rises in comfortable stages with places for pause and rest along the way. The activity spaces on each floor are separated from these ramps by corridors, which act as buffer space.





The rooms on the upper floors and the library have access to terraces, shaded with pergola. It acts as fire safety, an escape space and transition between functions.





CIRCULATION & ZONING

- Central court
- Horizontal circulation Lvl1
- Horizontal circulation Lvl 2
- Vertical circulation
- Toilets

1. Library
2. Speech therapy
3. Assistive learning
4. Physiotherapy
5. Classroom
6. Vocational training
7. Dance room
8. Home science
9. Computer room
10. Terrace garden

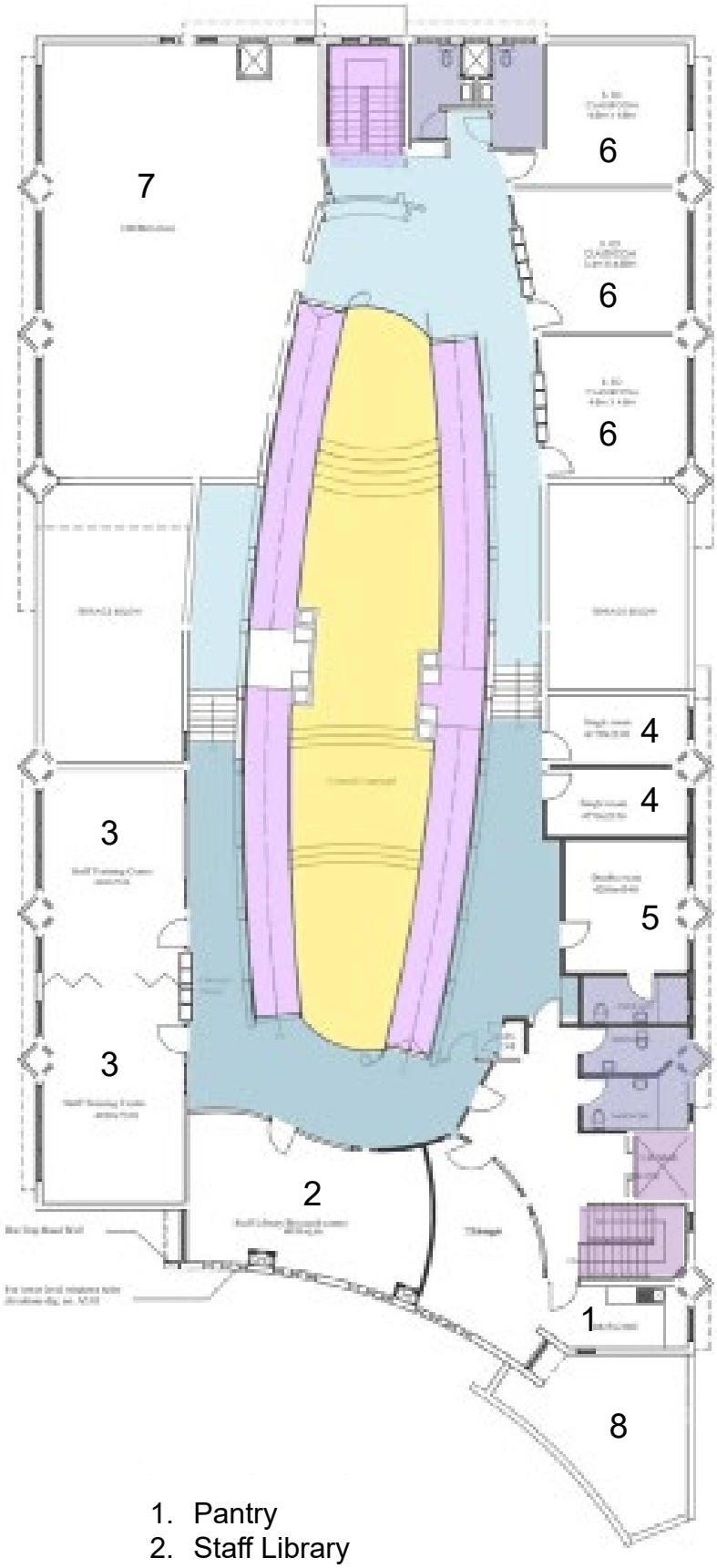
SECOND FLOOR

The corridors have display boards on the outer walls of class rooms, which are formed on the back of cabinets of the class room, thus cutting off the noise from the central space, completely.



All workrooms have glare-free natural light from a window system designed for even distribution of day-light. These customisable windows create a student friendly environment.



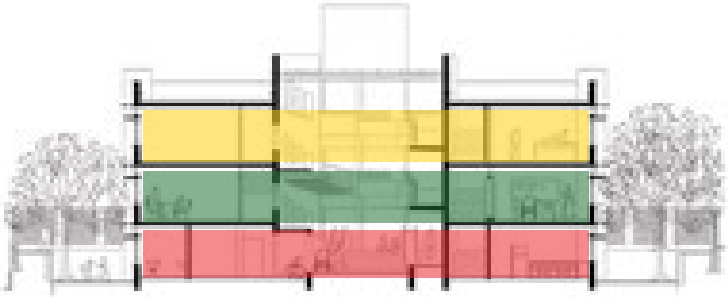


CIRCULATION & ZONING

- Central court
- Horizontal circulation Lvl1
- Horizontal circulation Lvl 2
- Vertical circulation
- Toilets

1. Pantry
2. Staff Library
3. Staff training center
4. Single room
5. Double room
6. B.ED classroom
7. Multipurpose hall
8. Terrace

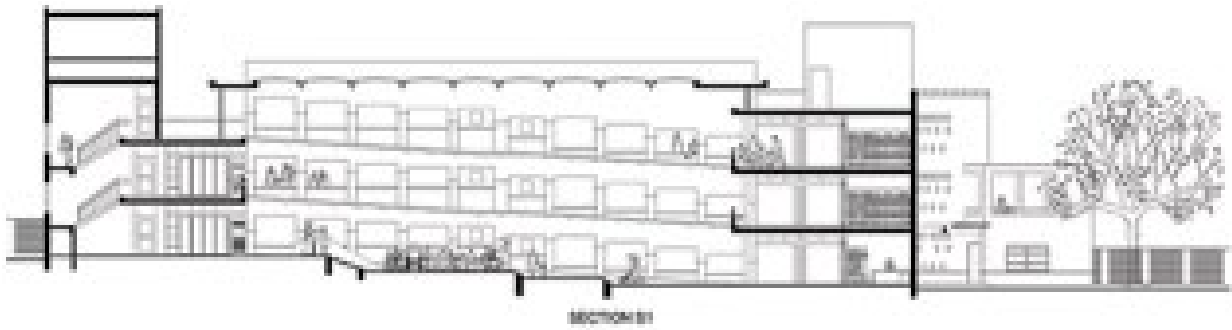
Sections



Guestrooms, HRD, classrooms

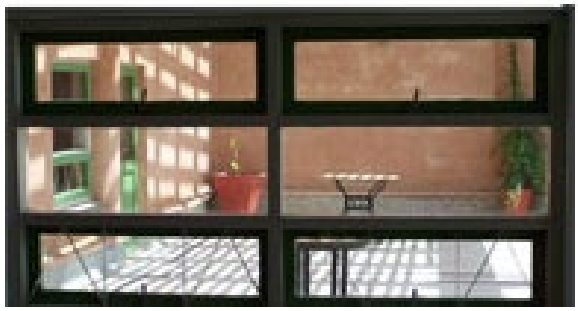
Library, Workshop, Kitchen, Therapy, Vocational classes

Administration, classrooms, conference room, board rooms



Lighting



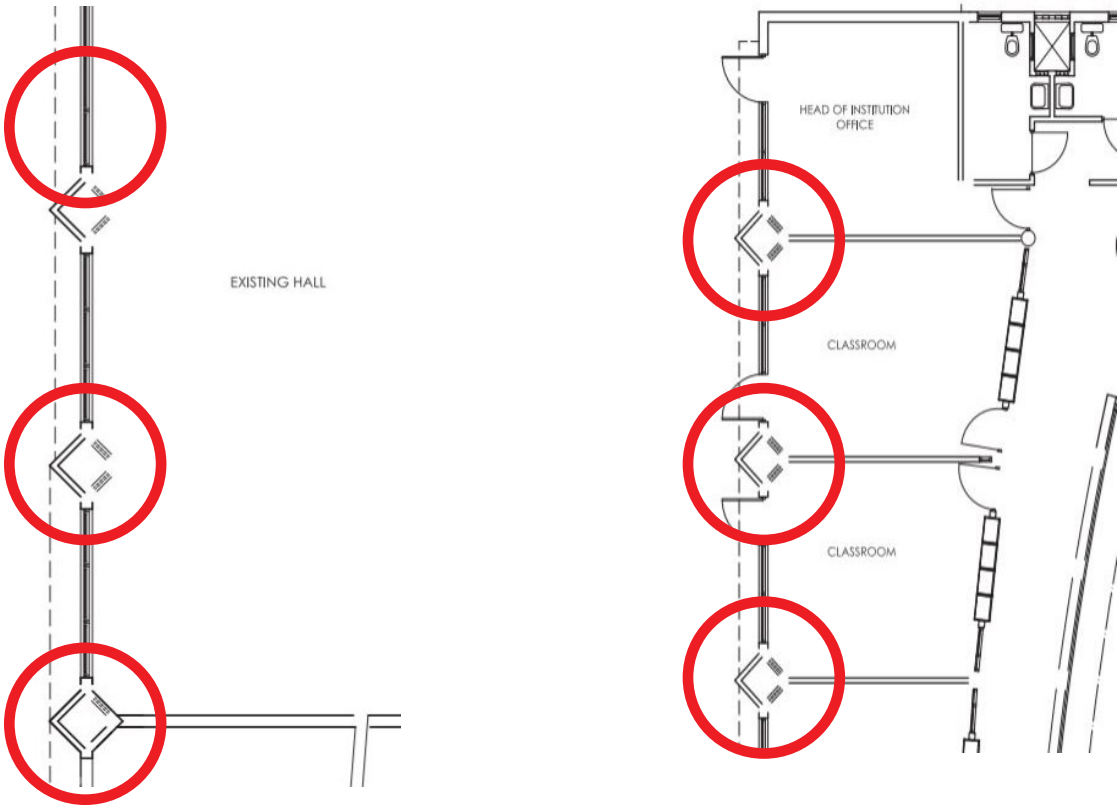


An interesting composition of windows can be seen throughout the building. Building is north east facing , sun shading devices have been designed. But on the southwest side users face the scorching heat during summers so alternatives should be provided



The skyllight above in the central courtyard is the diffused natural lighting source for the circulation area and hence makes the interiors of the building glare free, habitable and welcoming.

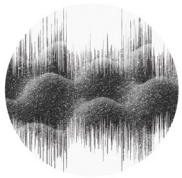
Ventilation



The air-cooling system is interlaced with structural system. The workspaces are air-cooled through vertical ducts coming down from rooftop coolers. The building envelope is designed to keep the interiors cool in summers, warm in winters and well-ventilated during the monsoon season.



Comparison to ASPECTSS guidelines



Acoustics

Acoustic considerations have been incorporated in an interesting manner, by using storage and display boards as partitioning.





Spatial sequencing

The administration and the classroom areas have been segregated well. However, there is a continuity in the flow of spaces otherwise.





Escape spaces

Every classroom on the ground has an access to a small outdoor garden while the upper floor have a common terrace.

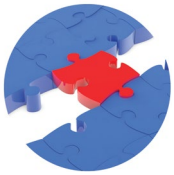




Compartmentalization

No structural compartmentalization can be seen in the classroom design. Only the changing floor levels provides some segregation.





Transition Spaces

There are no structural transitions spaces due to constraints like the site size. The terraces on the upper floor can serve as one.





Sensory zoning

Some zoning can be seen due to the changing floor levels. However, the small site doesn't allow functions to be segregated in groups.





Safety

Single site entry, various fire escape routes , terraces as fire refuge areas, visible circulation, non toxic building material make it safe.



22.3 AADI

Action for Ability Development and Inclusion



Name: aadi
Location: 2, Balbir Saxena Marg
Hauz Khas, New Delhi
Stakeholders: Multi disability, Staff
Setting: Urban
Architect: Romi Khosla
Context: Stand-alone school
Year Built: 1978
Number of Students: -
Ages: all ages
Site area: 1.25 acres



Upon it's genesis, aadi worked as an inclusive school. Since 2008, in response to the change in law & policies, specifically the ratification of the UNCRPD & RTE (2008), the Education programme at AADI has been focusing on supporting the admissions of children with disability into mainstream schools and ensuring retention of children in these schools.



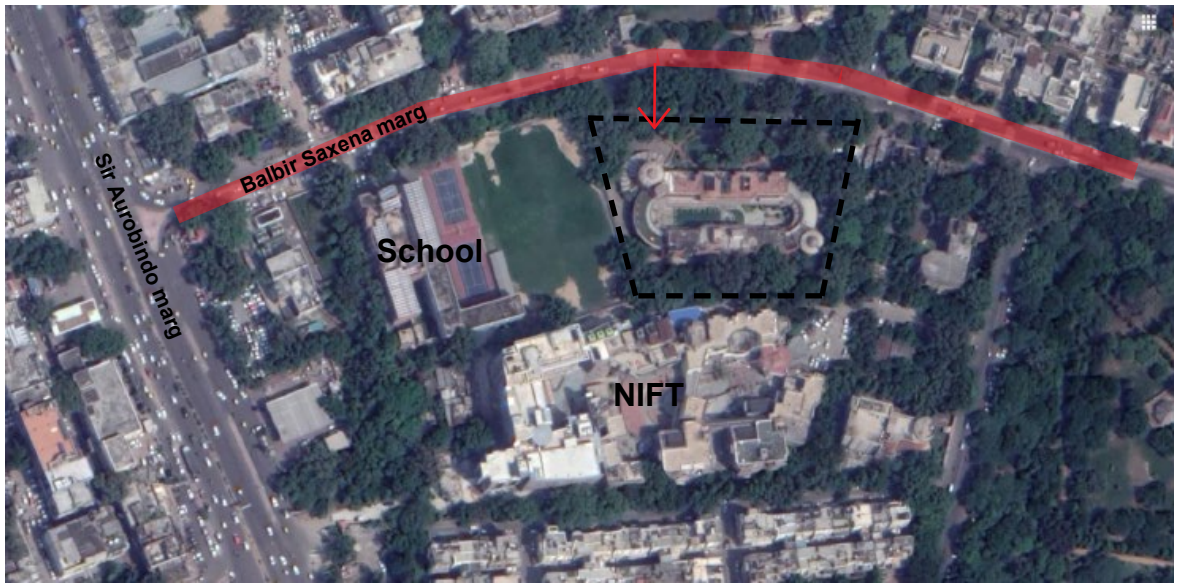
Accessibility : 2.5 km from Hauz Khas village

Landmarks: NIFT, Delhi

Approach: 6 M wide road and 2 entries to the site .No segregation of pedestrian and vehicular movement inside the site.

The site lies in a zone with an educational land use. Easily accesible with and clear sinages make it easy to find. The large plot sizes buffer create an effective noise barrier.

Site Context





Balbir Saxena Marg ; access road



Entry to the complex

Objective to study aadi:

- Design as an “Inclusive” education school
- Designed by a renowned architect
- Example of a unique classroom

Design Concept

Architect wanted to design a secure environment for the children. Hence, the structure is almost fort like, a building which has often been compared to a mother’s womb. visualised a ship with many decks; the numerous balconies in the building came out of this idea.

Facade

The facade has an interesting composition of elements and is a classic example of post modern architecture. The massing via use of different volumes and shapes make along with exposed brick and concrete give a warm look.

Provisions in aadi

- Education Services
- Walk in services
- Sambhav- Making Inclusion Possible
- Programs for young adults
- School of Rehabilitation Sciences (SRS)
- Rural Community Based Rehabilitation Programme
- Jagriti



Cylindrical tower housing the ramp to the basement and rooms on the upper floor.



Balconies as break out spaces

Material used

Material Walls: Concrete ,Brick, Plastered walls
Floor: Kota stone, Marble,



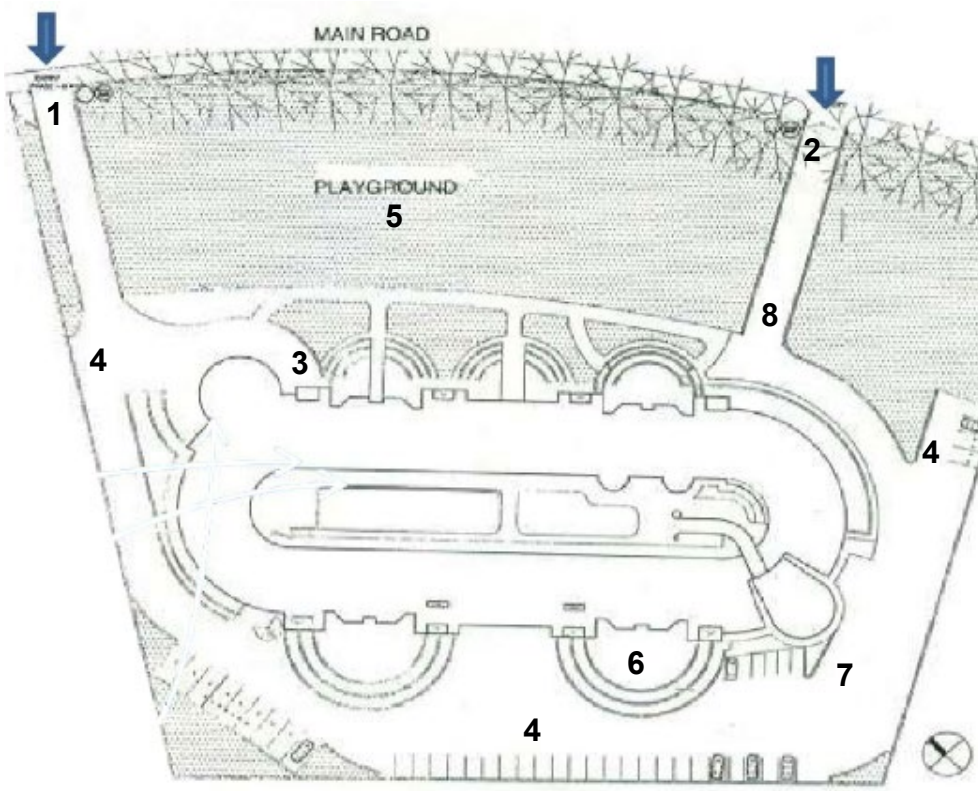
1



5



2



Site Plan

1. Entry to school
2. Entry to WRI office
3. Drop off
4. Parking
5. Playground





4



7

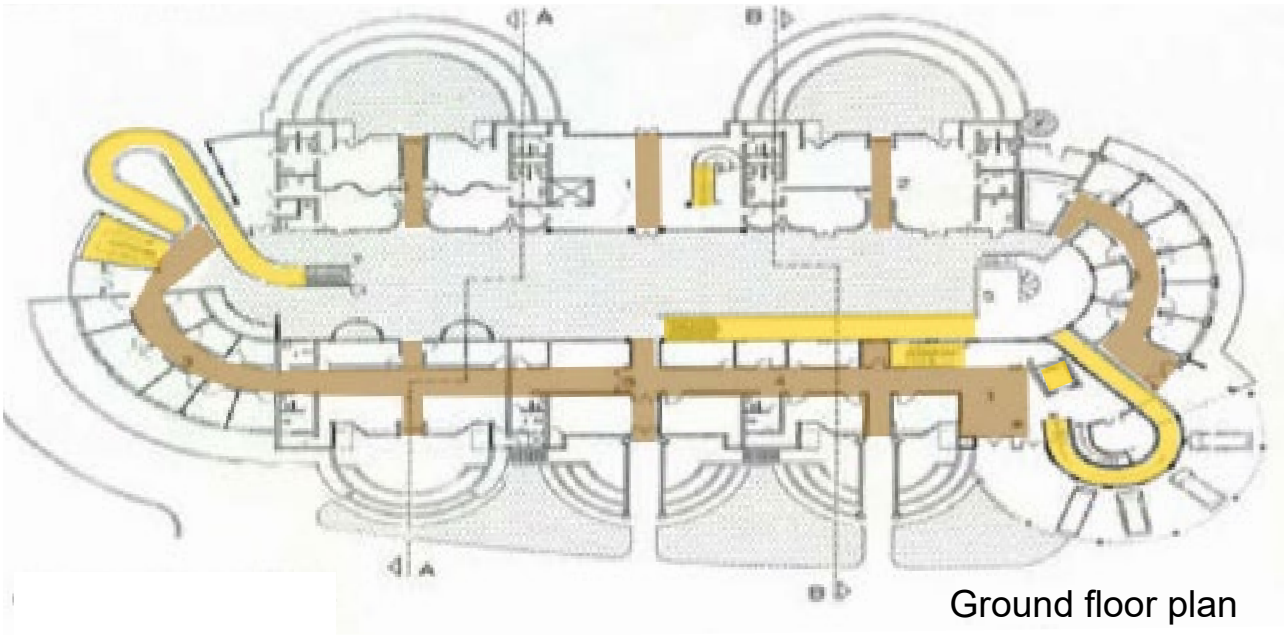


6



8

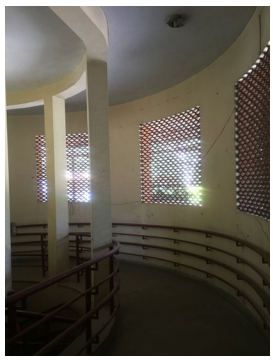
Circulation



Ground floor plan

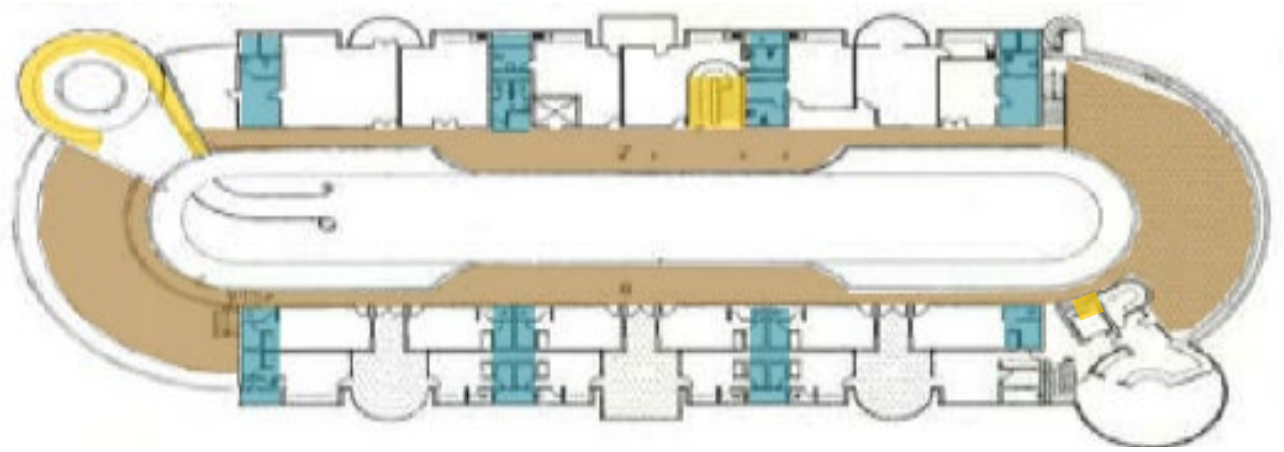
Circulation primary vertical circulation has 2 ramps, 2 staircases and 1 lift. One ramp and staircase stop at the first floor. The ramp is a vital component of the design and is well lit by a skylight and a brick jaali. The area under the ramp is used as storage.







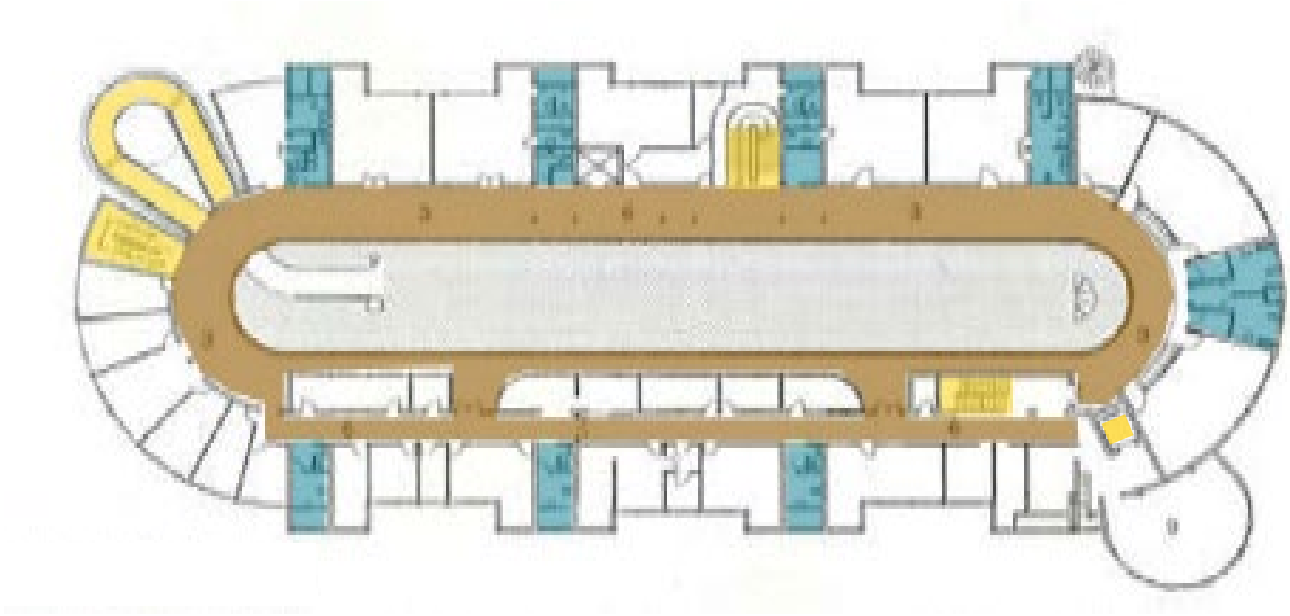




Horizontal circulation

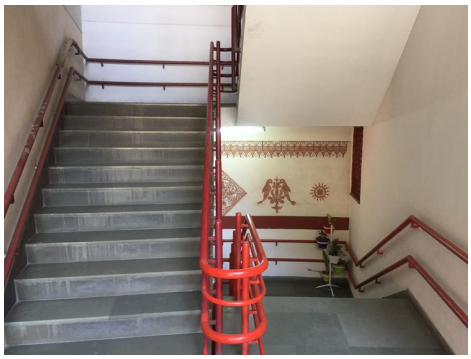
Vertical circulation

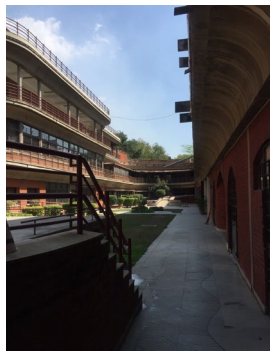
First floor plan



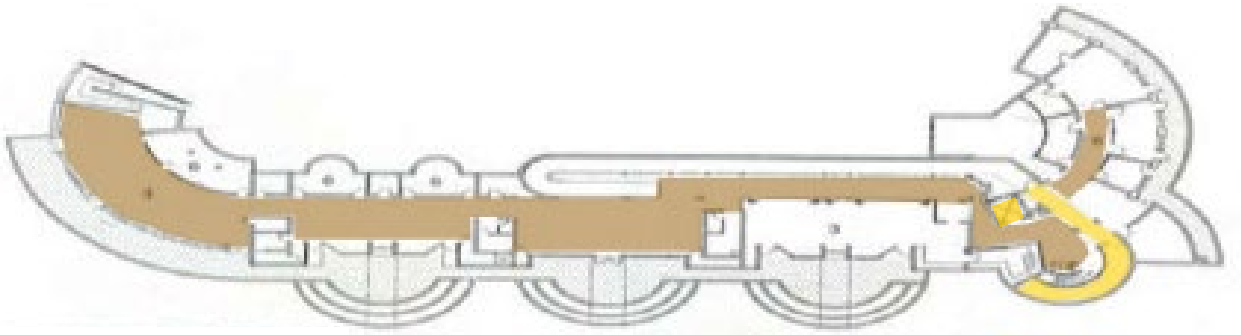
Second floor plan

Horizontal circulation is free flowing and clearly visible from every point. Clear paths inside the building, in the courtyard and galleries onn the upper floor make it easy to navigate and help in way finding. Blinding corners create unfamiliarity and can confuse a person on the spectrum.







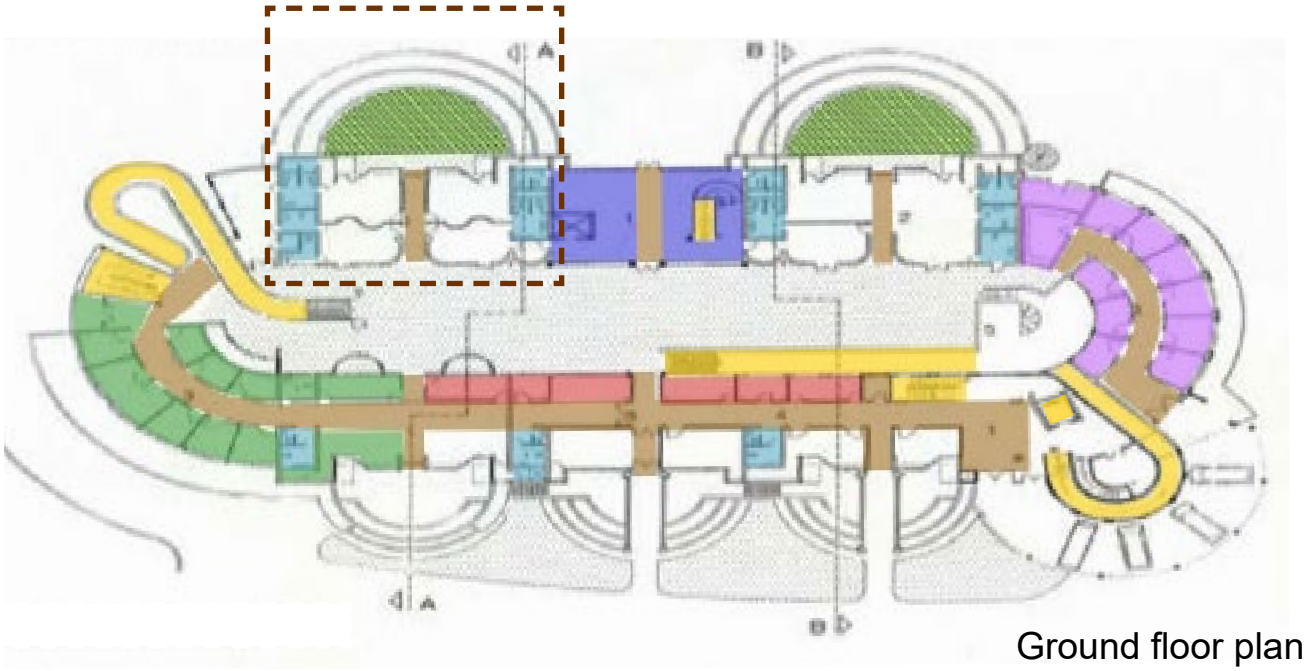


Basement floor plan

Horizontal circulation

Vertical circulation

Zoning



Ground floor plan

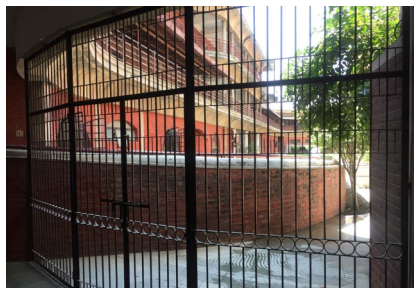




- Vertical circulation
- Horizontal circulation
- WRI India
- Sambhav
- Admin rooms
- Art gallery
- Toilets

Sambhav

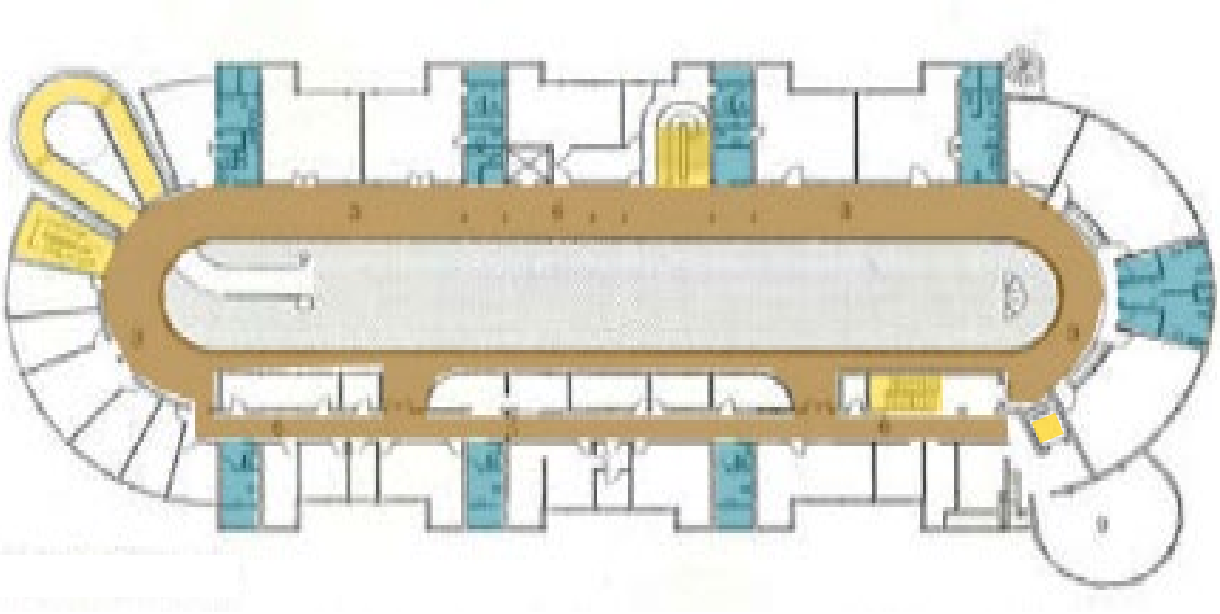
Parts of the building have been rented out after the 2008 inclusion act. One portion, to the right has been given to ‘Sambhav’, an NGO working with aadi for life skill and inclusion training.



WRI India

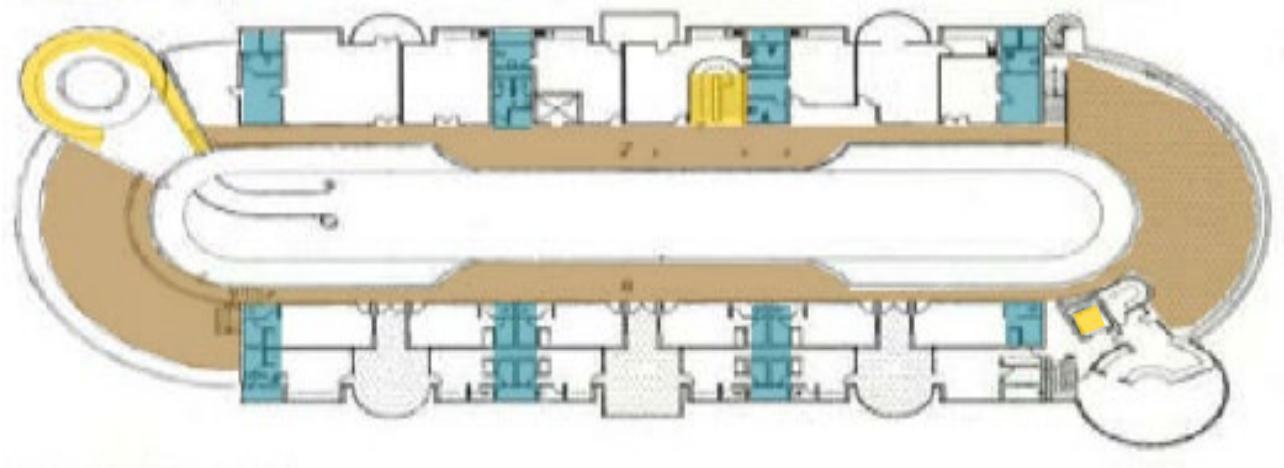
Another portion to the left has been segregated and given to WRI India. The seconf entry is now used for this office.

The entire building is set around a central courtyard; elliptical in shape. The coridoors are a combination of singly and doubly loaded. The functions housed in the buildings have changed over time but by analysing the plan, a clear sensory zoning is possible.



First floor plan

Initially designed to as vocational and prevocational rooms on one side and twin classrooms on the other . Restrooms are provided in close proximity to each room. All rooms are linked via a common circulation loop ; a balcony overlooking the central courtyard. The coridoor is doubly loaded in the vocational section of the floor.



Second floor plan

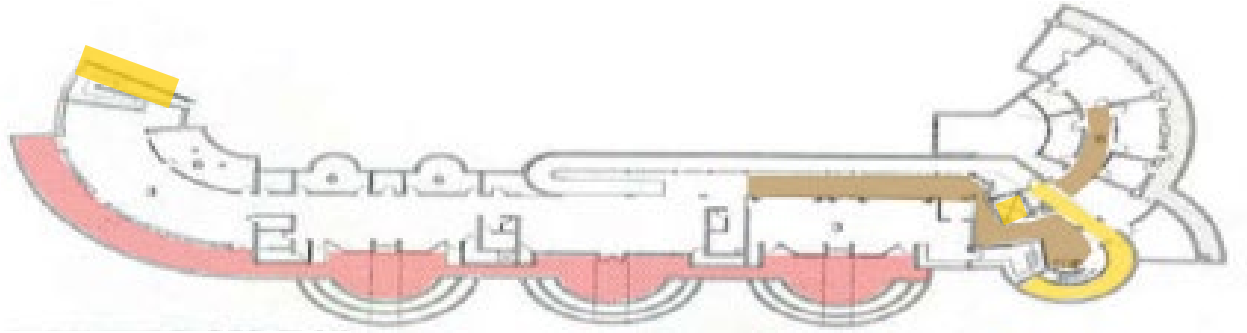
This floor plan is similar to the first floor plan. It has open terraces as break out spaces. The rooms seem to have been used as twin classrooms with small balconies as breakout spaces. These also serve as interesting elemts in the facade. Restrooms are again present in close proximity to the classrooms.

The basement is also divided between aadi and WRI India. The aadi side is currently used as storage. The WRI side is used as office and outdoor breakout space for the employes. The basement is accessible via a ramp and a staircase on the opposite sides of the building. Hence, the WRI office is only accessed through a staircase.









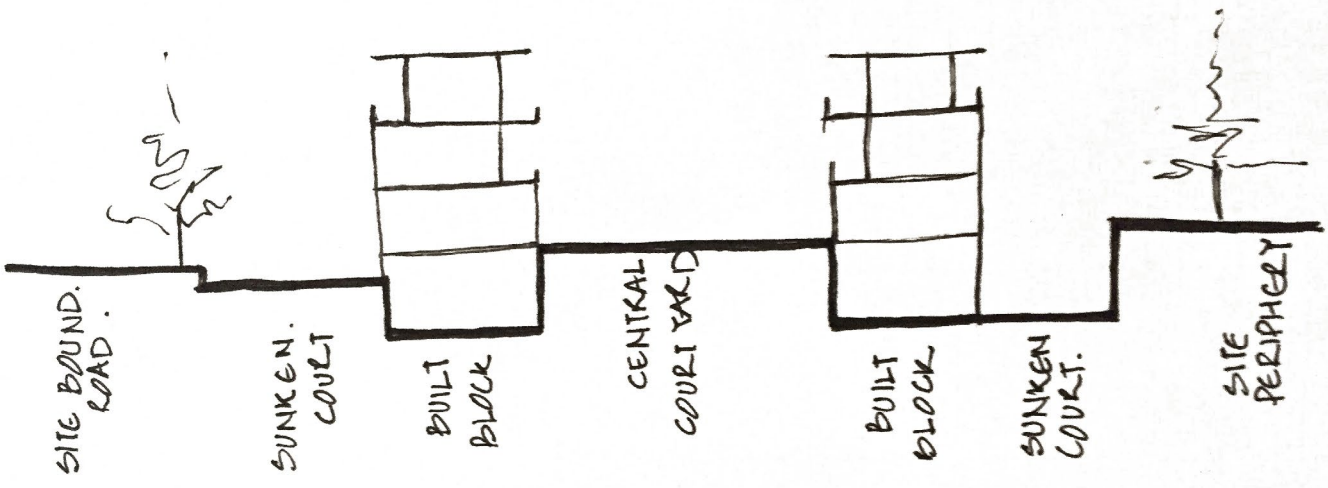
Basement floor plan

Vertical circulation

Horizontal circulation

Outdoor breakout area

The basement is well lit and ventilated via the open to sky breakout spaces attached to the floor plan.



Section across the building






Courtyard

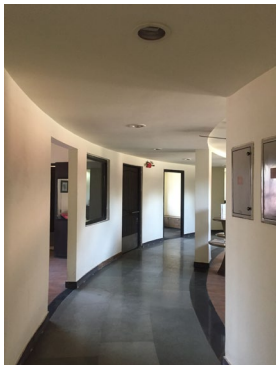
The central courtyard, the main feature, serves as an inclusive congregational space which also provides sunlight and facilitates ventilation. It has a stage and interesting structural design elements.

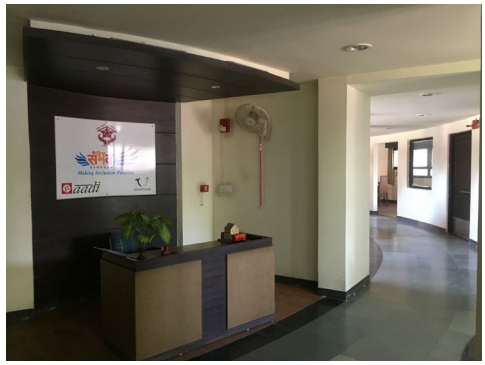





Sambhav

“Making Inclusion possible”

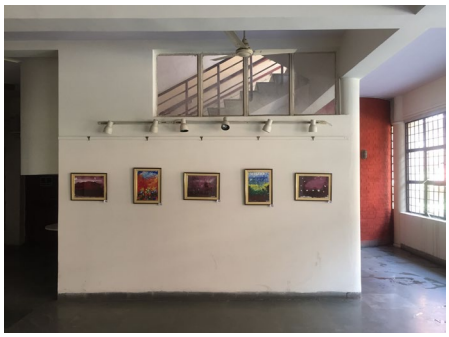







Sambhav showcases various ways in which the principles of universal design can be applied in different areas of life like communication; learning; movement; and just doing things (for well being, safety, eating, drinking self care, home chores, work and managing money) being a few specified ones. The space has been adapted to create a home like setting to facilitate this training programme. A seperate entry to the sambhav center is provided from the side of the building.

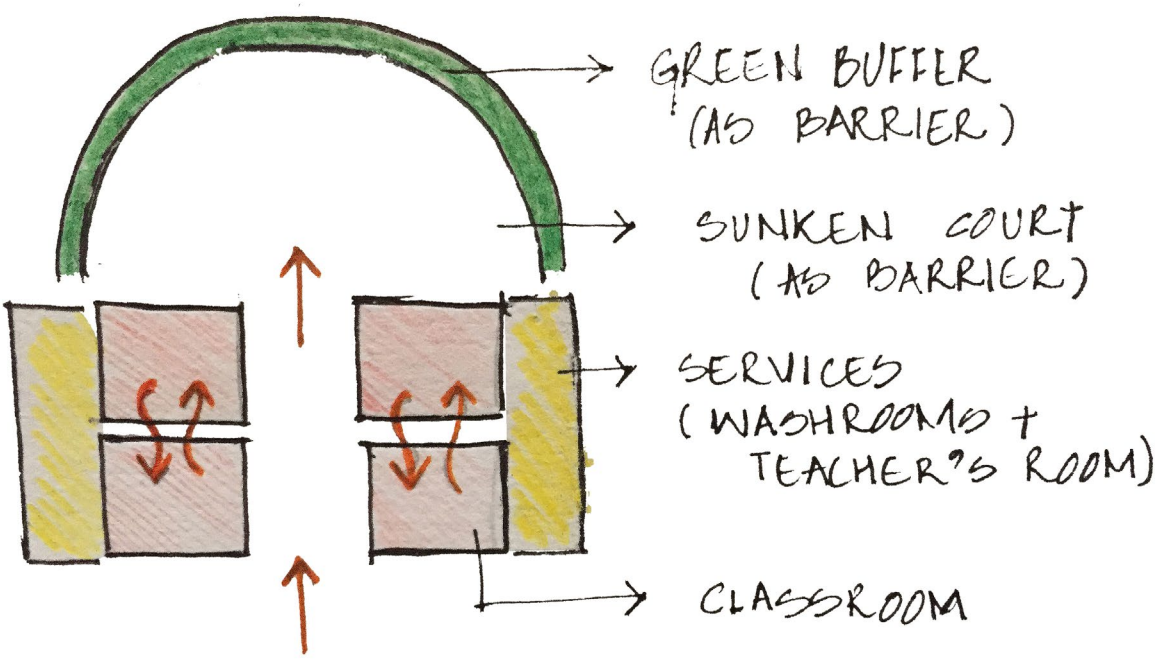
Art and GD rooms





Open ,free flowing and multifunctional spaces. The room has direct connections to the outside i.e one into the courtyard and one to the rear side of the building.

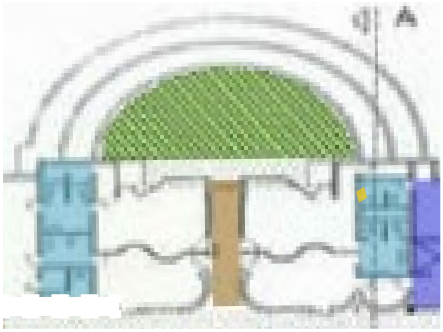
Classroom design

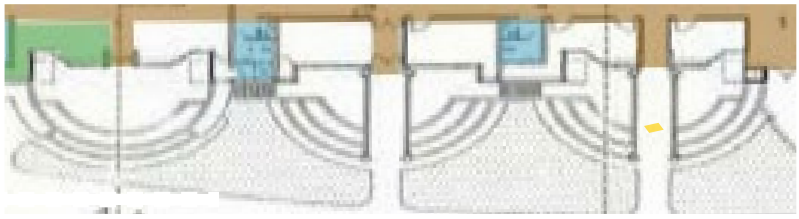


Twin classroom design has been followed in this school, that is there are two classrooms with a common teacher's room in the center. There is free circulation between the classroom.

The classrooms open out into small outdoor play areas which have control over their movement and safety. Provisions of seating, sand pits and swings has been given.

Each classroom has attached toilet. Each toilet has a western W.C, Indian W.C and urinal along with wasg basin, mirror, handrails etc.





Lighting and ventilation

The building is well lit and ventilated due to the central courtyard. However, due to the doubly loaded coridoors in some places, even though the rooms get enough natural light, the circulation coridoor becomes very dingy and unwelcoming.

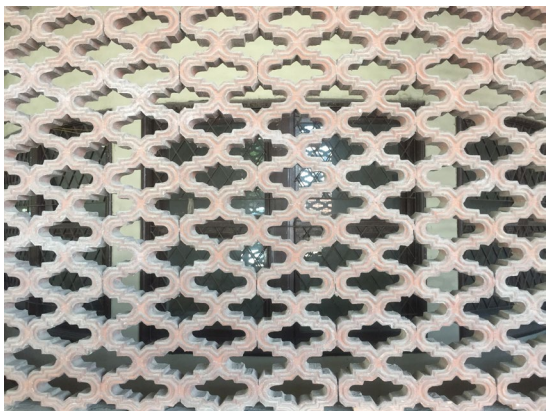
The circulation ramps also get enough natural light via a jaali or skylight.

The windows not only allow for natural light, it also makes for an interesting composition in the facade. The breakout spaces also do the same.

Open floor plans ; open to the outdoors in both directions facilitate proper cross ventilation.





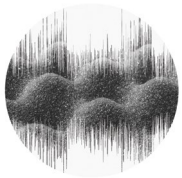








Comparison to ASPECTSS guidelines



Acoustics

No special acoustic consideration can be seen however the long focus of the elliptical shapes provides for segregation.





Spatial sequencing

The shape provides for a difference in the spaces, however the doubly loaded coridoors do not allow a sense of this segregation.





Escape spaces

Ample amount of escape spaces such as the central courtyard, the open extention to the classrooms and the balconies and terraces.

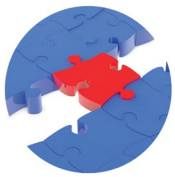




Compartmentalization

Compartmentalisation can be seen in the classroom design, however not as effective as a sensory design requires.





Transition Spaces

A clear lack of transition spaces can be noticed. The functions are lined one after another along traditional coridoors.





Sensory zoning

Even though the original functions are undefined, sensory zoning seems possible due to the long span of the building.





Safety

High site boundary walls, various fire escape routes, non toxic building material make it safe.



22.4 AFA
Action for Autism

National Centre for Autism India

Name: AFA
Location: Allama Shibli Nomani Road, Pocket 7 & 8, Jasola Vihar, New Delhi
Stakeholders: ASD individuals
Setting: Urban
Architect:
Context: Stand-alone school
Year Built: 2004
Number of Students: -
Ages: 1-18
Site area: 0.4 acres









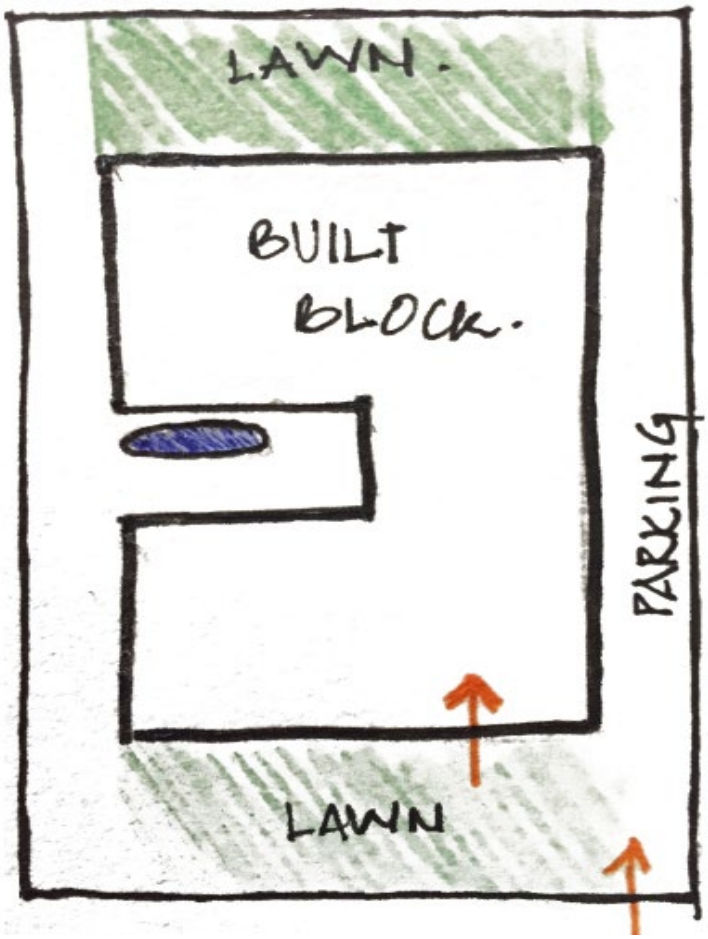




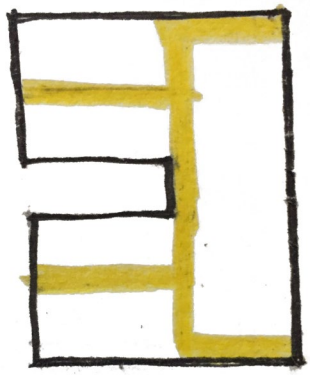


Objective to study AFA:

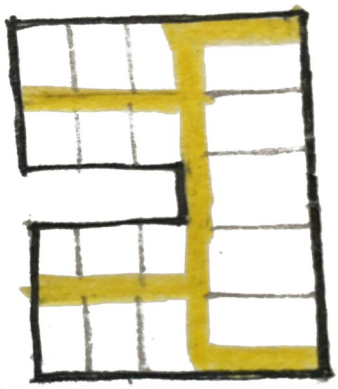
- A well renowned organisation working specifically for Autism since 1991, yet has inadequate infrastucture. This shows the lack of awareness of architectural possibilities in shaping human psycholoy.
- Hence this study validates my thesis topic and proves the need for immediate attention to this problem.



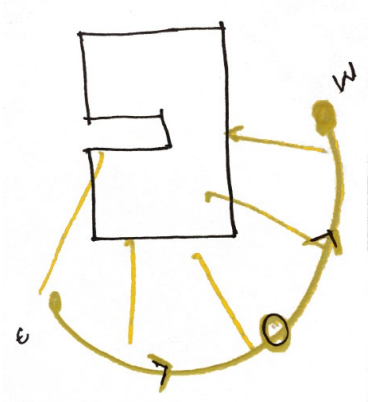
Site plan



Circulation



Compartmentalisation



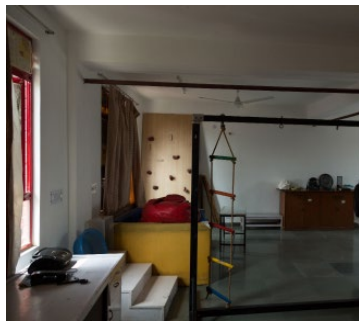
The building faces north east and a major part of it is subjected to the harsh south and west sun. No design detail has been incorporated to cut out this glare and makes the classroom interiors uncomfortable for the sensory sensitive students.
The tiny courtyard receives little daylight.






- The windows in the classroom allow direct light and glare which can be troubling for a person on the spectrum. No design considerations were made. The staff uses storage units and paper to block the light from coming in.
- The administration office space seems poorly lit while it should be the opposite.
- The circulation is well lit.
- Inadequate provisions eg. the library is on the roof (as an extention) and inacessible to the students. It can only be used by the B.ed students.
- There are multiple entries to the basement which is dingy and poorly lit and yet houses important functions like the vocational training cell.
- Sensory rooms are also below average.





23 Comparitive analysis

Project	Type	Site area	Site planning
SOREM Chandigarh	Multi disability school	1.12 acres	Basic site plan, inclusive greens as outdoor activity spaces. No field.
DISHA Jaipur	Multi disability school	0.24 acres	Small site, no fields Green front with facade backdrop Outdoor access to each classroom
aadi Delhi	Multi disability school	1.25 acres	Well designed,respecting the existing nature Central courtyard, sunken opoen courts, green field Adequate parking
Advance Center Cairo	Multi disability school	1.3 acres	Clustered site plan Sensory zoning on site Green spaces as transition zones
Hazelwood Glasgow	Multi disability school	3.2 acres	Responsive to existing nature S-shaped Direct access to outdoor
Nothern Melbourne	Individuals with ASD	5.3 acres	Clustered site plan Clear segregation with central green court Segregated green on site

Project	Built form	Circulation
SOREM Chandigarh	Primitive design Blocked massing Warm and soothing colours	Closed circulation loop Doubly loaded Blinding, Unpredictable
DISHA Jaipur	Primitive blocking Interest via windows, ducts, shading devices Creative interiors	Closed yet visible circulation loop Ramps as focal feature Singly loaded coridoors
aadi Delhi	Elliptical plan with central court Post modern design with interesting elements	Singly and doubly loaded Closed yet visible loop Ramps as focal features
Advance Center Cairo	Combination of various volumes and shapes Differend form for different functions	One way circulation Circular tower at the junctions of main axis Use of visual aids
Hazelwood Glasgow	S-shaped curving form Different functions on each curve Glazing design enhances the design	One way circulation easy to navigate No long dark corridors as unique glazing design Internally trail rail, doubled as a storage wall.
Nothern Melbourne	Non rigid, space goverened shape Independent built forms for different functions	Singly loaded with a central courtyard. Clear, visible and easily navigable Controlled outdoor views

Project	Zoning	Lighting and ventilation
SOREM Chandigarh	Inaffective segregation No noise barriers	Well designed natural lighting, skylight, clerestory Well ventilated
DISHA Jaipur	Zoning via change in levels Affective noise barrier solution Transition space on upper floors	Well lit via central skylight over courtyard Well ventilated via integration of structural ducts
aadi Delhi	Possibility of sensory zoning Segregated functions Courts and terraces as transition spaces	Very well lit and ventilaed Open to outdoors Lack of natural lighting in doubly loaded coridoors
Advance Center Cairo	Example of sensory zoning as per ASPECTSS Zones connected by transition spaces Spatial sequencing	Well lighted and ventilated North facing Either singly loaded or doubly loaded with courtyards
Hazelwood Glasgow	Segregated functions as per natural light and functional needs in the S shape Transition spaces open to outdoors	Creative glazing design Clerestory and perforated to avoid glare Well ventilated as not heavily loaded
Nothern Melbourne	Transition zone as a central court segregating major functions Different built mass housing different functions	Creative glazing solutions Attention to views Clerestory windoes for lighting the coridoors Well ventilated in the singly loaded parts

Project	Classroom design	Sensory sensitivity
SOREM Chandigarh	Below average classroom treatment No compartmentalisation	Not design as per a sensory sensitive approach
DISHA Jaipur	Innovative design, Boards as noise barrier, direct access to outdoor green Innovative window solution	Works well as a sensory environment as compared to contemporaries
aadi Delhi	Unique twin classroom deisgn Access to outdoor escape space Proximity to toilets	Pleasing and inclusive spaces that benefit the sensory sensitive needs
Advance Center Cairo	Clustered organization Compartmentalize Separated ‘stations’ Open areas for floor play “Escape space” in the lowest stimulus area Joint observation rooms	Snsory Sensitive environment as per ASPECTSS
Hazelwood Glasgow	Unique twin classroom deisgn Access to outdoor escape space Proximity to toilets	Pleasing and inclusive spaces that benefit the sensory sensitive needs
Nothern Melbourne	Thoughtful classrooms Indoor and outdoor withdrawal areas Outdoor play areas Flexible main study areas	Designed as per the sensory sensitive needs

S.no.	Activity Space with design strength	Disha (sq.m)	SOREM (sq.m)	Standard school norms	Carpet Area (sq.m)	Number of spaces	Total carpet area (sq.m)
1	LKG, UKG	6.5 X 4.7 = 31	3.5 X 7 = 24	Standard : 2 sqm / student + retiring space	15X2 + 10 = 40	6	240
2	Grade 1-5	6.5 X 4.7 = 31	3.5 X 7 = 24	Standard : 1.1 sqm / student + retiring space	15X1.5 + 10 = 32	15	480
3	Grade 6-10	6 x 3 = 18	3.5 X 7 = 24	Standard : 1.26 sqm / student + retiring space	15X1.5 + 10 = 32	15	480
4	Staff rooms	5 X 3.5 = 17.5	5 X 5 = 25	1.8 sqm per teacher. (One room for 4 teachers per 2 classrooms)	7.2	12	90
5	Common transition spaces	-	-	Breakout spaces after every two classrooms @ 10sqm per space	10	18	180
"High Stimulus" therapy areas							
6	Music room	5 X 5 = 25 (0.1/student)	9 X 10 = 90 (0.6/student)	Standard : Min 65 sqm + retiring space (0.2/student)	120	1	120
7	Speech room	5 X 2 = 10 (0.05/student)	-	0.05 / student	30	1	30
8	Art room	-	-	Standard : Min 65 sqm + retiring space (0.2/student)	120	1	120
9	Dance room	5 X 5 = 25	-	Standard : Min 65 sqm + retiring space (0.3/student)	120	1	120
10	Activity room	5 X 7 = 35	9 X 10 = 90	Standard :1.8 sqm per user / min 65 sqm	80	1	80
11	Yoga and meditation room			Standard : Min 65 sqm + retiring space (0.2/student)	120	1	120
Common areas							
12	Multipurpose auditorium	15 X 8 = 120 (0.7/student)	-	Standard : 0.65 per student for 50% of the strength (excluding stages) (Min: 14 m x 28 m x 5.5 m)	250	1	250
13	Labs (Maths, Science)	-	-	Min 96 sqm / lab + retiring space	120	4	480
14	Library	10 X 5 = 50	-	0.1 per student (Min 50 m2) + multiple inclusive retiring spaces	60+(5X10)	1	110
15	Computer room	5 X 5 = 25 (0.14/student)	10 X 5 = 50(0.3/student)	0.2/student	80	1	80
16	Cafeteria	3.5 X 2 = 7	-	0.1 per student (Min 25 m2) + retiring	80	1	80
17	Counseling room	5 x 3 = 15	-	0.05 / student	25	1	25

18	Medical room	-	-	20 to 30 sqm	25	1	25
19	Kitchen (as therapy)	10 X 4.5 = 45 (.2/student)	5 X 3 = 15 (0.12/student)	-	40	1	40
Administrative areas							
20	Reception	6 x 2.5 = 15	5 X 5 = 25	-	30	1	30
21	Principal's office	5 X 5 = 25	5 X 5 = 25	Min 19sqm for upto 960 students	25	1	25
22	VP office	-	-	Min 29sqm for upto 960 students	30	1	30
23	Conference room	-	-	Capacity 20	160	1	160
24	Faculty retiring lounge	-	-	For seating, pantry and general discussion table, 1.8 sqm per teacher.	40	1	40
25	Administration offices	10 X 7 = 70	9 X 5 = 45	Min 29sqm for upto 960 students	100	1	100
Utilities							
26	Toilet provision	2 X 3 = 6 (6 / floor)	8/floor	(WC 7+11 , Urinals 14 , WB 5+7 Bath 5+5)	36	4	144
27	Staff toilet	-	2/floor	-	20	2	40
28	Drinking water points	1 / Floor	1 / Floor	Two drinking water points per 50 children @ 1 sq.m per point	1	8	8
29	Stores	-	5 X 5 = 25	Different types of stores - for stationary supplies, general distribution material, files, junk, etc.	25	4	100
Autism Wing				**Calculations based on strength (100 students)**			
30	Reception	-	-	-	20	1	20
31	Offices	-	-	-	20	3	60
32	Faculty retiring lounge	-	-	For seating, pantry and general discussion table, 1.8 sqm per teacher.	25	1	25
33	Conference room	-	-	Capacity 10	80	1	80
34	Counseling room	5 x 3 = 15	-	-	15	2	30
35	Parent-child therapy room	5 X 5 = 25	-	-	25	2	50
36	Classrooms	-	-	upto 8 students / class + retiring	8 x 2 + 10 = 26	12	300
37	Staff rooms	-	-	1.8 sqm per teacher (along with classrooms)	7	6	42
38	Inclusion training room	5 X 5 = 25	-	-	25	2	50

39	Vocational training room	10 X 5 = 50	-	-	60	5	300
40	Toilet provision	2 X 3 = 6 (6 / floor)	8/floor	1 Toilet attached to 2 classrooms	10	12	120
41	Staff toilet	-	2/floor	-	10	2	20
Therapy Center							
42	Multipurpose therapy room	-	9 X 10 = 90	-	90	1	90
43	Music therapy room	5 X 5 = 25	9 X 10 = 90	-	50	1	50
44	Physiotherapy room	10 X 5 = 50	5 X 5 = 25	-	50	1	50
45	Speech + language therapy	5 X 2 = 10	-	-	20	2	40
46	Snoozelene room	4.5 X 5.5 = 25	9 X 5 = 45	-	50	1	50
47	Yoga and meditation room	-	-	-	60	1	60
48	Hydrotherapy area	-	-	Standard : 2.5m x 2.25m / patient	100 + changing areas	1	150
Utilities							
49	Toilet	-	-	-	20	2	40
50	Drinking water points	1 / Floor	1 / Floor	Two drinking water points per 50 children @ 1 sq.m per point	1	2	2
51	Store	-	5 X 5 = 25	Different types of stores - for stationary supplies, general distribution material, files, junk, etc.	25	1	25
Teacher's training cell							
52	Lecture room	-	-	-	60	2	120
53	Research Lab	-	-	-	100	1	100
54	Therapy training room	15 X 5 = 70	-	-	70	2	140
55	Office	-	-	-	40	1	40
56	Toilets	-	-		25	1	25
Total							5906
General circulation space		35 % of total area	25 % of total area	Calculated @ 30% of carpet area			1760
Total							7666
57	Parking	-	-	20% total site area = ground + 2 ECS per 100 sq m of built up	5075+ Parking for 152 cars	-	4864
Total Built up area							12530
Outdoor Learning Spaces							
58	Sensory Garden	-	-	-	200	1	200
59	Labryinth	-	5 X 5 = 25	-	30	1	30
60	Gardening area	-	-	-	100	1	100
61	Inclusive activity areas	-	5 X 3 =15 X 4 = 60	-	30	4	120
62	Playing fields	-	Basktball court	Standards for seconday/Higher secondary schools	15000	1	15000

25 SITE

Location



Location of Chandigarh in India
Coordinates: 30°45'N 76°47'E

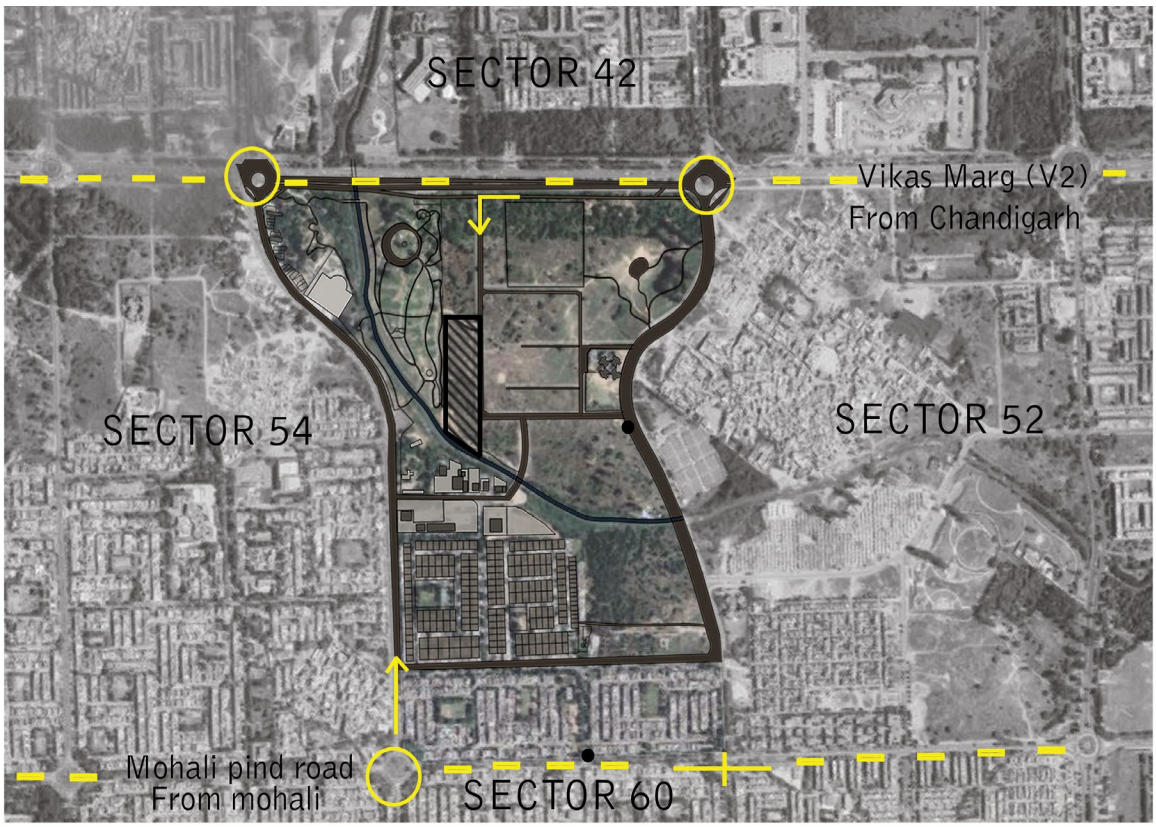


Location of sector 53 in Chandigarh

Location : Sector 53 Chandigarh
Site area : 6.27 acres
Proposed Land use : educational (high school)
Topography : A flat site with a slight natural gradient towards the choe

The location is close to the junction of Chandigarh and SAS nagar Mohali. Hence, a suitable location for easy access from both sides. Most of the site context is currently unbuilt.

Access



Site Context



Gurdware Baba Ke

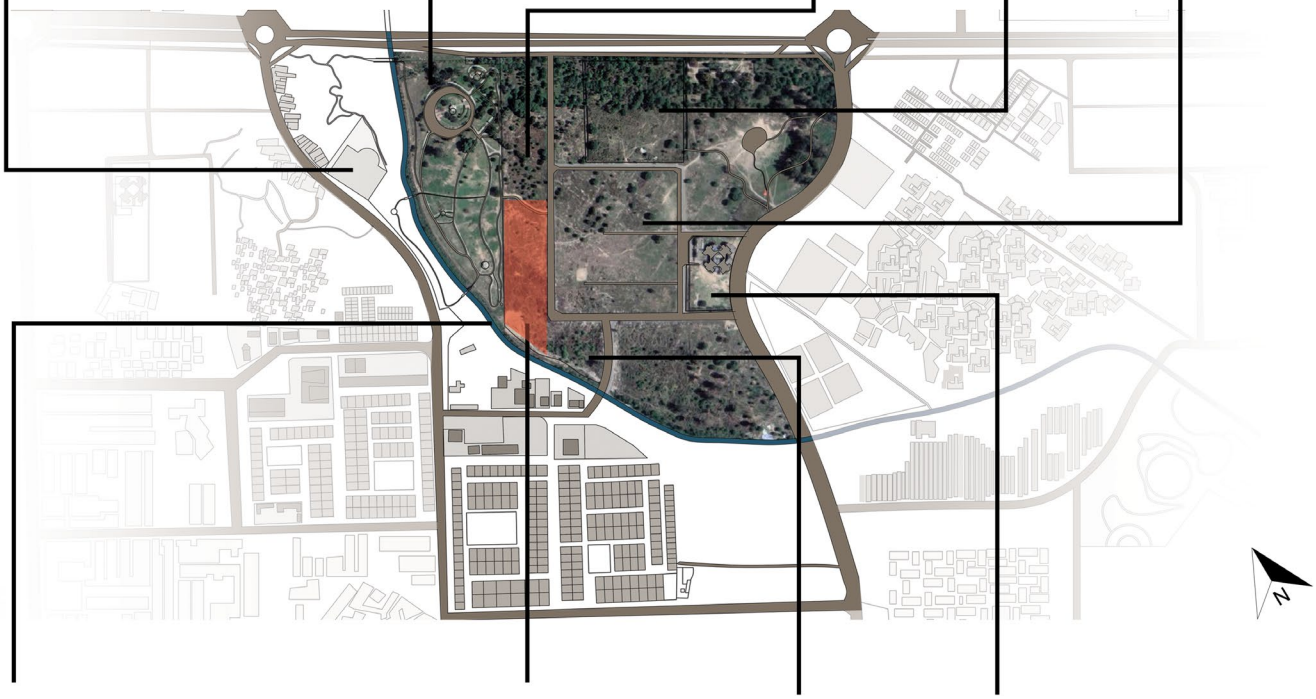


Garden of springs

Proposed site for residential block for staff of regional trauma center

Proposed site for regional trauma center

Proposed residential land use





Attawa Choe



Proposed site

Proposed site for Fire Station



Government high school





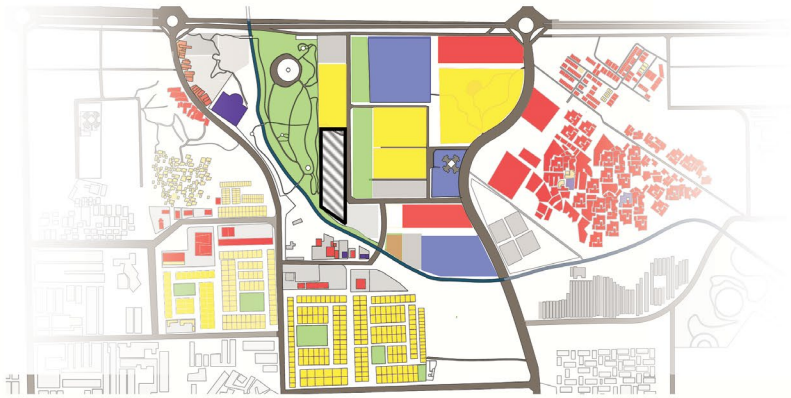
Wall between site and garden

Proposed site





View from proposed site

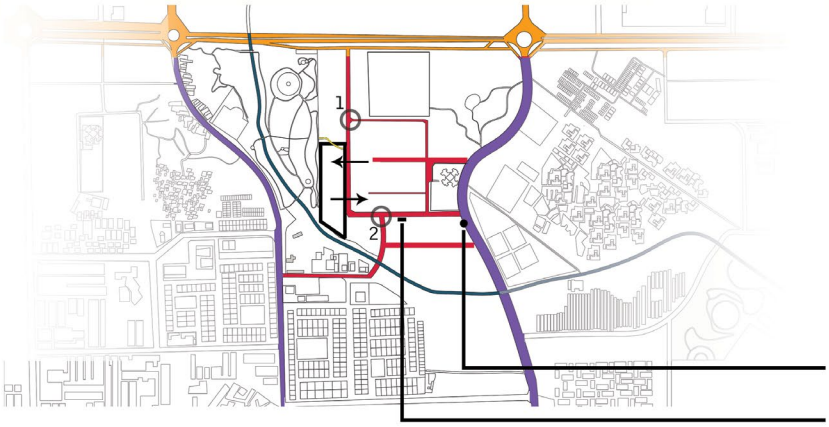


Land use map

The site is surrounded by a garden and public green on two sides and a residential plot on the other. This creates a "NOISE" free zone which is required for the proposed project.

Due to the open site context (even post complete development) sunlight and wind is available in abundance.

- Residential
- Commercial
- Institutional
- Religious
- Utility/Infrastructural
- Public greens



Road hierarchy and access

Via Chandigarh, the site can be easily accessed via a interior sector road (V5) by taking a slip road from the 'Vikas marg' (V2).
Via Mohali, the site can be accessed by the same V5 by taking the V3 from the Mohali pind road

This V5 is the only access road to the site and hence will contain entry and exit to the site.

- Bus stop
- Taxi stand
- V2
- V3
- V5
- Site entry



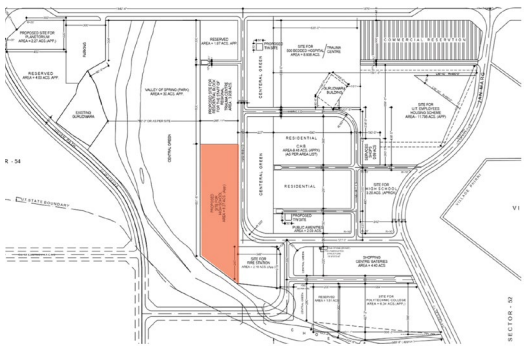
Edge and Landmark

The garden of Springs will serves as a landmark for the site. (even post complete development). It's views can be harnessed and the boundary integrated in the final design.

The Attawa choe creates an EDGE ; a visual and physical barrier. This will also provide security to the site bounds.

- Edge
- Landmark
- Views

Site Context



Zoning map of sector 53



V5 Access road



Junction 1



junction 2

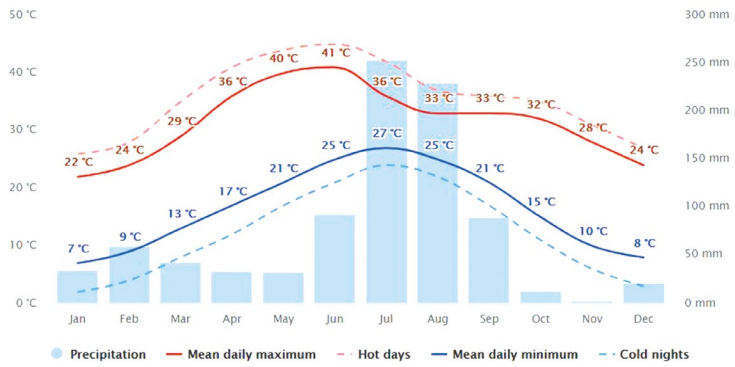


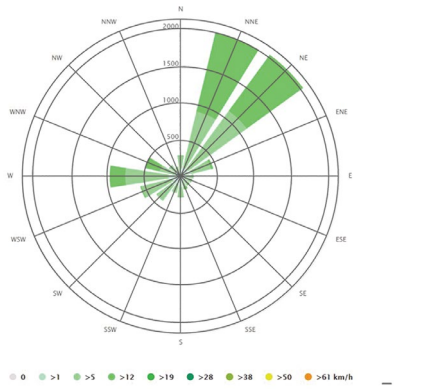
Pedestrian path on site



V5 Access road

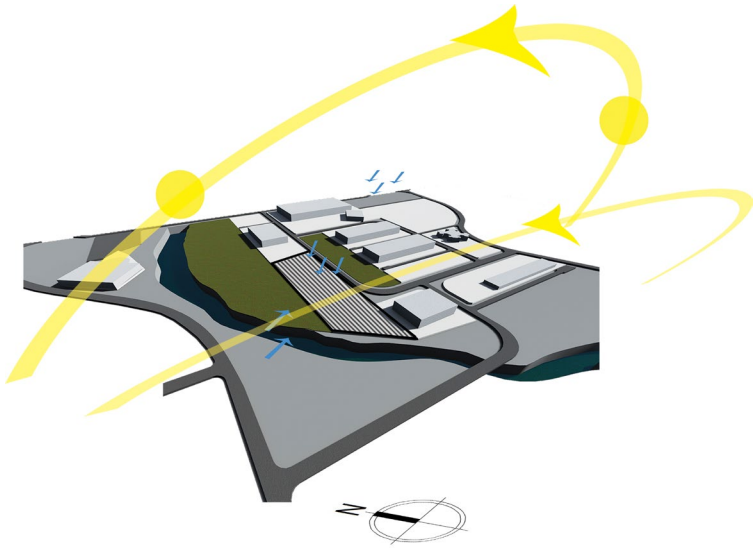
Climatic Analysis



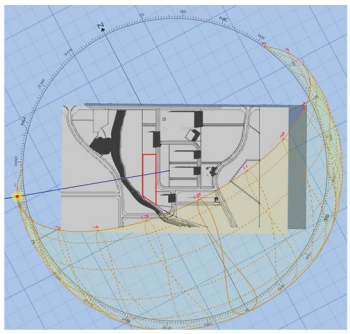


Predominant wind direction from NE,NNE

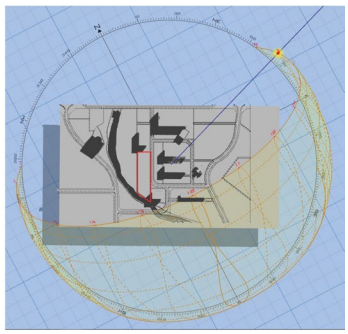
Chandigarh falls under Koeppen's CWG category i.e. it has cold dry winter, hot summer and sub tropical monsoon. Evaporation usually exceeds precipitation and the weather is generally dry. The fluctuating temperatures make it necessary to design for both the summer and winter weathers.



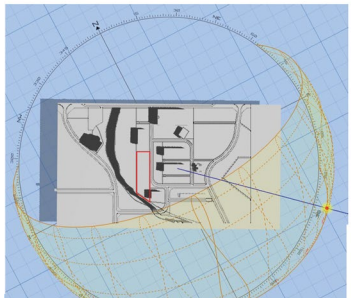
Shadow Analysis



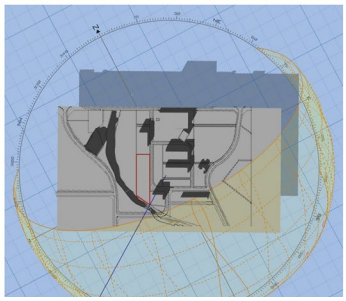
Summer solstice
21 June, 5:30 pm



Summer solstice
21 June, 6:30 am



Winter solstice
22 December, 9:00 am



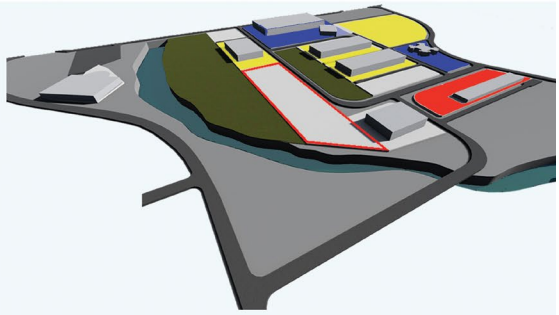
Winter solstice
22 December, 4:00 pm

Majority of the site context is currently unbuilt. Hence, I have simulated the built blocks by assuming the maximum ground coverage and height as per the Chandigarh by laws atnd carried out a shadow analysis. 4 peak situations show that the site remains largely unshaded by the surrounding build blocks. Hence the design challenge would be to create mutually shaded spaces by the blocks on site itself.

1. The site will always remain 'shadow free' even upon complete development of the surroundings.

2. The Attawa choe acts as a natural physical barrier, isolating the site from noise & unwanted infiltration and is the natural drainage.

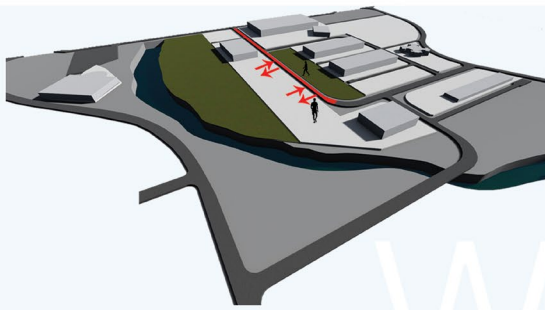
3. The site is located in a 'noise free' zone with public greens and residential as the contextual land use.



Residential
Commercial
Institutional

STRENGTH

1. The site has only one access road available for the site entry and exit.



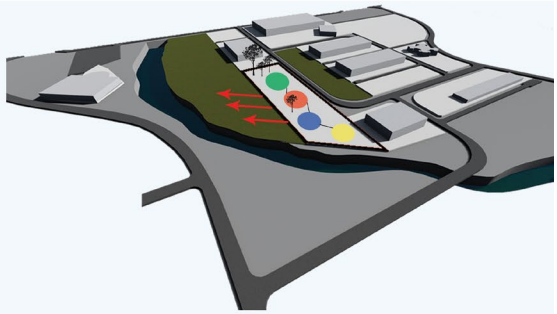
V5 access road
Entry & exit points

WEAKNESS

1. The site has only a few existing trees that need to be protected thus providing design liberty.

2. The adjacent garden of springs provides views and an option of semipermeable integration in the design.

3. The site is liner in shape and hence can allow for a transitional zoning as per the ASPECTSS index.

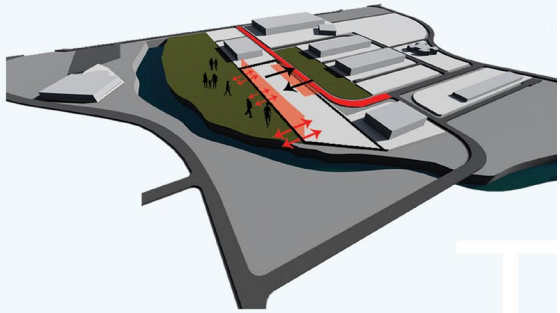


Existing trees
Views
Sensory zones

OPPORTUNITY

1. The site opens onto a main vehicular road with potential traffic flow that is undesirable.

2. Sharing a boundary wall with a public garden can cause security threats.

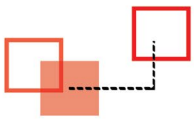
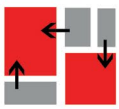
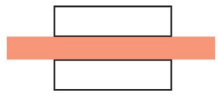
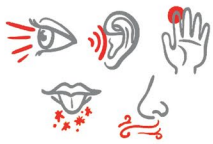
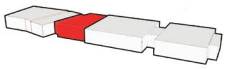
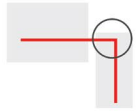
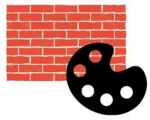


V5 access road
Opening onto vehicular road
Permeable barriers

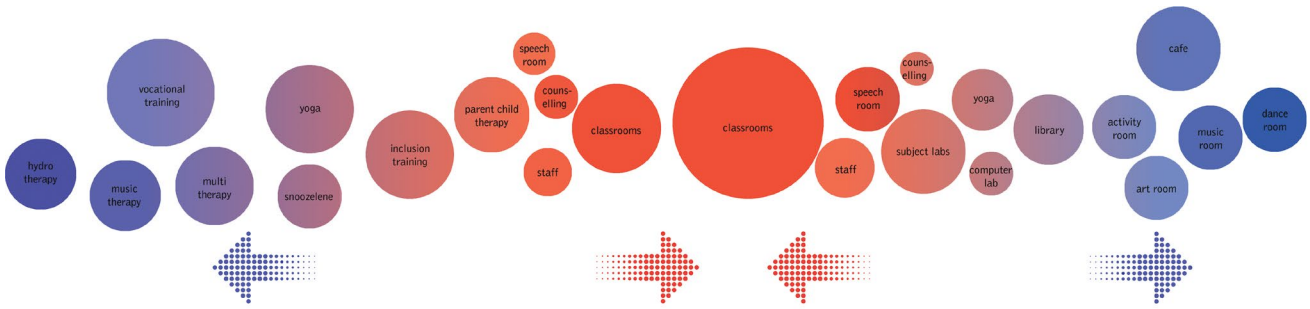
THREAT

SWOT Analysis

26 CONCEPT

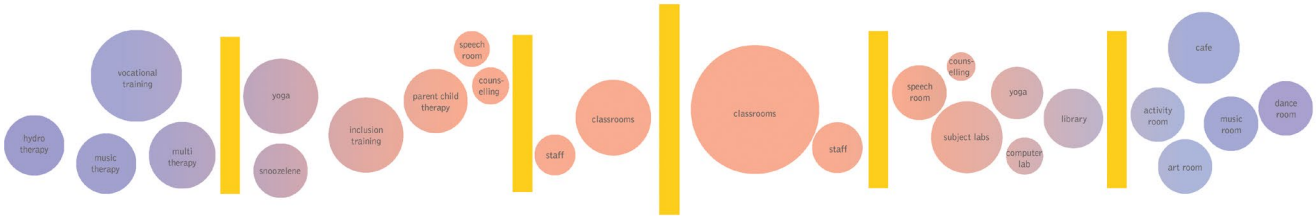
DO	CONDISER	AVOID
 Sensory Zoning	 Wayfinding ; One way circulation	 Confusing routes
 Links to Outside	 Size of Space ; (inclusive + exclusive)	 Tight circulation
 Natural Lighting	 Indirect Natural Lighting	 Direct Glare
 Acoustic Segregation	 Spatial Sequencing	 Overcluttering
 Controlled views	 Sensory requirements	 Distractions
 Visual and Spatial Rythm	 Transition Spaces	 Blinding Corners
 Regulate Sensory Input	 Material and Colour	 Bright Colours

Spatial Sequencing



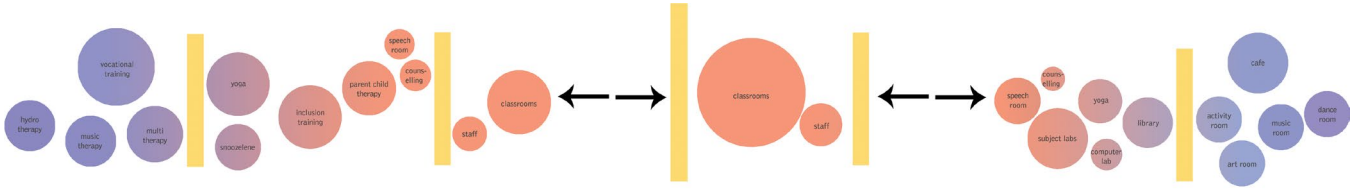
HOT TO COLD

Considering the sensory need of different functions, I have assigned the colour RED to zones which require a HIGH FOCUS and the colour BLUE to the zones which are HIGH STIMULATING. The spatial sequencing shows a gradual gradation from HOT to COLD thus creating an acoustic and logical sequence in the zoning.



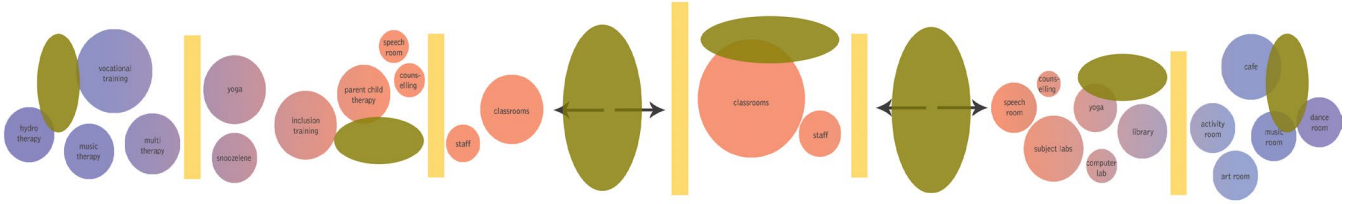
TRANSITION SPACES

Adding transition spaces where the functions change their character even slightly i.e from HOT to COLD. These transition spaces would help ease the flow of sensory change and also provide breakout spaces.



SENSORY ZONING

Distancing the functions on site will enhance the sense of segregation and create logical separation in the minds of the students. Separate buildings housing different needs will create a sense of belonging and identification.



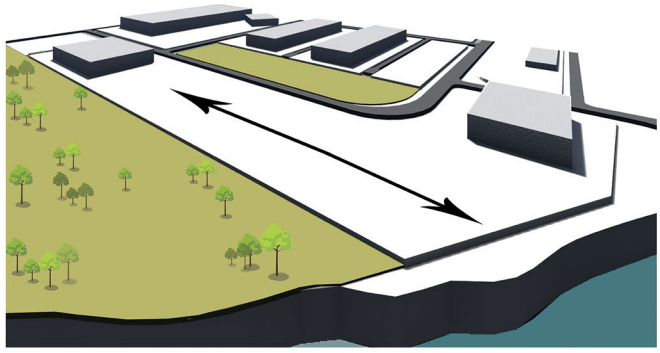
GREEN ZONES

Adding green zones in strategic locations will enhance the user experience by providing break out spaces and calming views. Proximity to nature increases productivity and reduces stress for both autistic and neuro typical.

Sensory Zoning

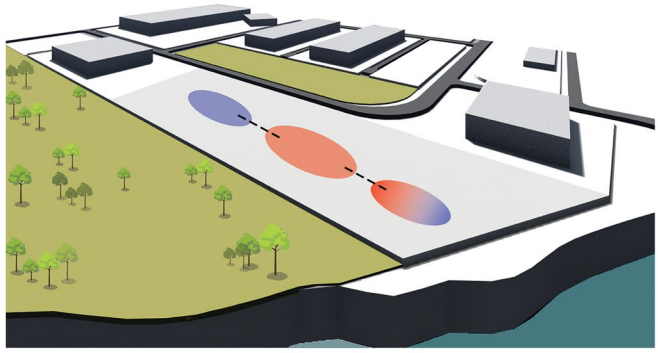
LINEAR SITE

The site is a linear stretch with a length to width ratio of approximate 4:1. This will allow a sensory zoning as per the ASPECTSS index.



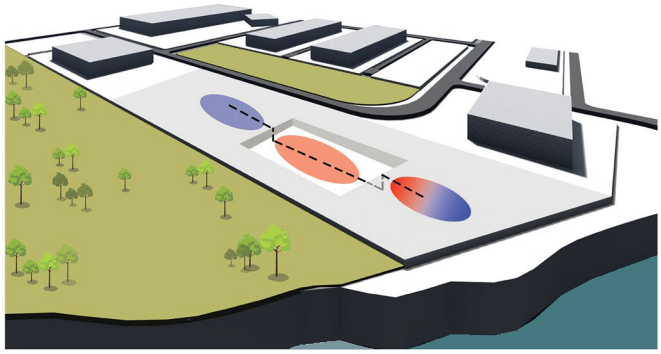
SENSORY ZONING ON SITE

Placing the sensory zoning, as decided earlier, on site. The central red represents the high focus classrooms, the blue zone on the left is the high stimulus area of the mainstream school. The red-blue on the right represents a special autism wing that caters to the needs of people on higher grade of the spectrum.



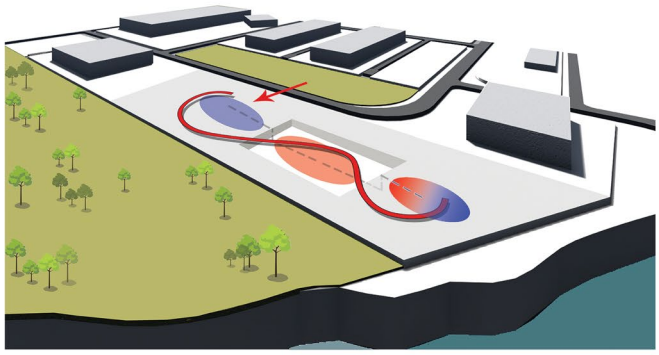
LEVEL TO SEGREGATE

To further enhance the sense of segregation and to block the views of the public garden, the high focus zone has been dropped to a lower level. This allows for controlled views thus improving performance and reducing unwanted distractions.



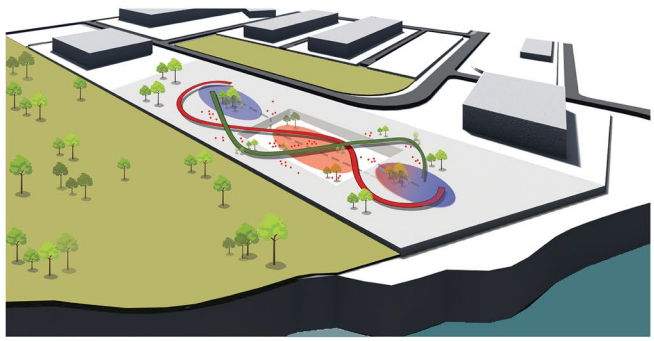
RHYTHMIC CIRCULATION

To connect these three functions, a free flowing, one way and visible circulation is essential. This circulation loop is doesn't not provide hard or blinding corners.

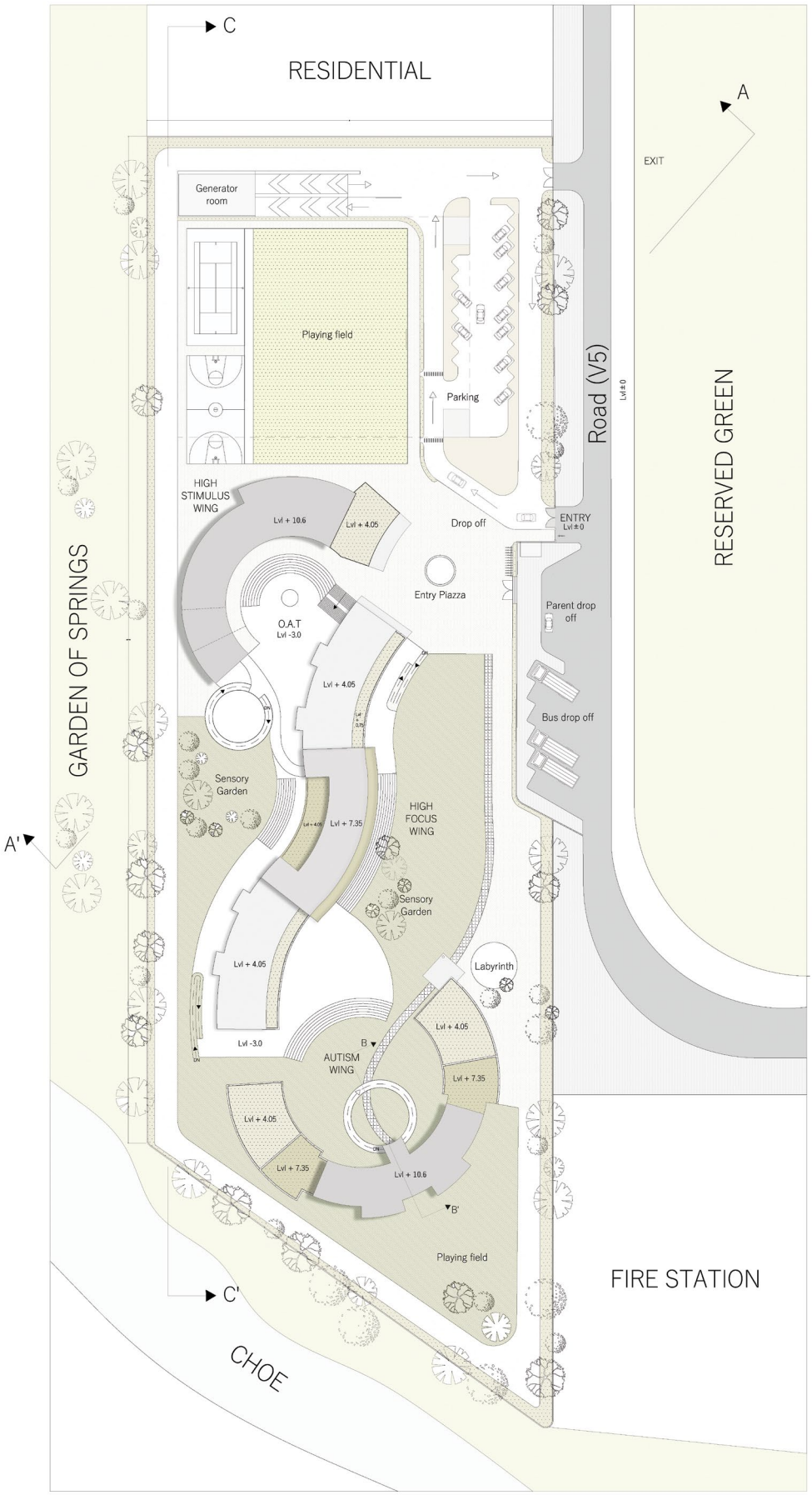


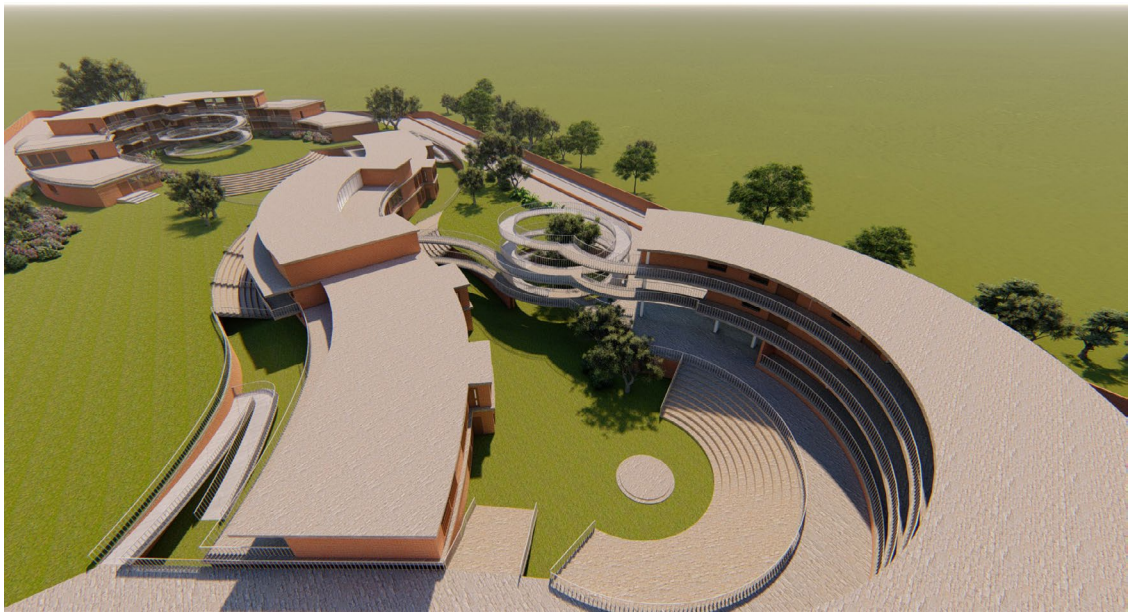
GREEN LOOP

The site circulation is intersected by a free flowing green loop that would be homogeneous i.e without breaks and connect the site as one. An outdoor access id necessary to every built block and hence this intersecting loop is beneficial.

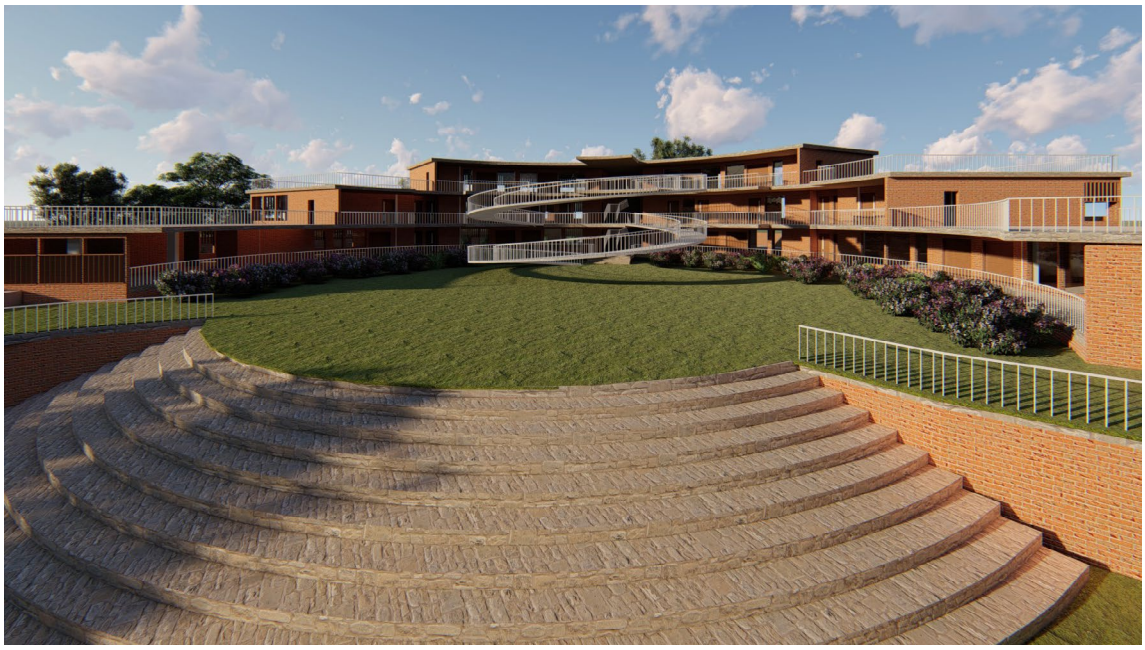


Final site plan









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Designing for Autism: Spatial Considerations 15:30 - 26 October, 2011 by Christopher N. Henry

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https://www.youtube.com/watch?v=-olAoobip5A
http://iiahp.com/autism-treatment/

Special mention :
-SOREM school sector 36, Chandigarh
-Ishh foundation, sector 7, Panchkula